

**Note: This report is subject to modification by LAAS as a result of the completion of the SEPA analysis (Environmental Impact Statement) being undertaken as part of the governmental permitting process.**

**DRAFT**

**PROPOSED THORNDYKE CENTRAL CONVEYOR AND PIER PROJECT  
ARCHAEOLOGICAL RESOURCES AND  
TRADITIONAL CULTURAL PLACES ASSESSMENT  
JEFFERSON COUNTY, WASHINGTON**

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## ABSTRACT

Reid Middleton retained Larson Anthropological Archaeological Services Limited (LAAS) on behalf of Fred Hill Materials to conduct an archaeological resources and traditional cultural places assessment for the proposed Thorndyke Central Conveyor and Pier Project, Jefferson County, Washington. Fred Hill Materials proposes construction of a four mile long conveyor to transport sand and gravel materials from an existing surface mine to Hood Canal. LAAS' archaeological resources and traditional cultural places assessment consisted of archival and literature review; consultation with the Port Gamble S'Klallam, Skokomish, and Suquamish Tribes; consultation with the Washington State Office of Archaeology and Historic Preservation; field reconnaissance of the project area; and production of this technical report. LAAS identified no hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological resources probably eligible for listing in the National Register of Historic Places, in our assessment, and no traditional cultural places were identified in the project area through consultation with the Port Gamble S'Klallam, Skokomish, and Suquamish Tribes.

LAAS developed probabilities for hunter-fisher-gatherer, ethnographic period, historic Indian, and historic period archaeological resources, including shipwrecks, based on archival research and literature review, and conducted field reconnaissance to test those probabilities. LAAS archaeologists determined, prior to field reconnaissance, that areas near water features in the proposed Thorndyke Central Conveyor and Pier Project had moderate probabilities for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological deposits, and that the entire project area contained a low probability for significant historic period archaeological resources.

LAAS conducted field reconnaissance and concluded that the entire Thorndyke Central Conveyor and Pier project area had a low probability for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological resources. We modified our probability model based on the results of fieldwork. LAAS identified no archaeological deposits during field reconnaissance of the proposed Thorndyke Central Conveyor and Pier Project, and noted extensive disturbances to the project area due to logging activities. The proposed Thorndyke Central Conveyor and Pier Project also maintains a low probability for significant historic period archaeological resources. LAAS extends no recommendations for further archaeological assessment of the proposed Thorndyke Central Conveyor and Pier Project.

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We would also like to applaud the extraordinary efforts of LAAS archaeologists Kurt Roedel and Laura Murphy in word processing and technical editing. Kurt and Laura, as usual, worked extremely hard to ensure report production was carried out efficiently and effectively.

## 1.0 INTRODUCTION

Reid Middleton retained Larson Anthropological Archaeological Services Limited (LAAS) on behalf of Fred Hill Materials to conduct an archaeological resources and traditional cultural places assessment for the proposed Thorndyke Central Conveyor and Pier Project (Thorndyke Conveyor Project), Jefferson County, Washington. The Thorndyke Conveyor project area is in Sections 6, 7, 8, 18, 19, and 20, Township 27 North, Range 1 East, Willamette Meridian (Figure 1). LAAS identified no hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological resources probably eligible for listing in the National Register of Historic Places (NRHP) during assessment of the Thorndyke Conveyor project area. LAAS consulted with the Port Gamble S'Klallam Tribe, the Skokomish Tribe, and the Suquamish Tribe regarding possible traditional cultural places in the Thorndyke Conveyor project area, and none were identified. Archaeological investigation was undertaken as a precursor to a State Environmental Policy Act Environmental Impact Statement for the proposed Thorndyke Conveyor Project, and to meet Section 106 of the National Historic Preservation Act, and the National Environmental Policy Act to ensure compliance with federal laws when federal permits are obtained for the proposed project.

LAAS' archaeological resources and traditional cultural places assessment consisted of archival and literature review; consultation with the Port Gamble S'Klallam Tribe, Skokomish Tribe, Suquamish Tribe, and the Washington State Office of Archaeology and Historic Preservation (OAHP); field reconnaissance of the project area; and production of this technical report. LAAS archaeologists developed a research plan that assigned probabilities for significant hunter-fisher-gatherer and historic archaeological resources within the Thorndyke Conveyor project area based on the results of archival review and consultation. LAAS then tested those probability models during field reconnaissance of the Thorndyke Conveyor project area.

LAAS archaeologists reviewed environmental, ethnographic, historic, and archaeological data for the proposed Thorndyke Conveyor Project and vicinity, and determined that a moderate probability for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological resources existed in the proposed Thorndyke Conveyor Project on the shoreline of Hood Canal at the southern end of the project area, near two marshes in the central portion of the proposed project, and near Pheasant Lake in the northern portion of the proposed project. LAAS determined that the remainder of the proposed Thorndyke Conveyor Project had a low probability for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological deposits, and that the entire project area had a low probability for significant historic period archaeological resources. We based our probability model for the Thorndyke Conveyor project area on the availability of the landform for hunter-fisher-gatherer use, the proximity of freshwater and marine resources, ethnographic and historic documentation of land use in the project vicinity, and the results of previous archaeological resources studies conducted on similar landforms in the area.

LAAS identified no probably significant hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological deposits during field reconnaissance of the Thorndyke

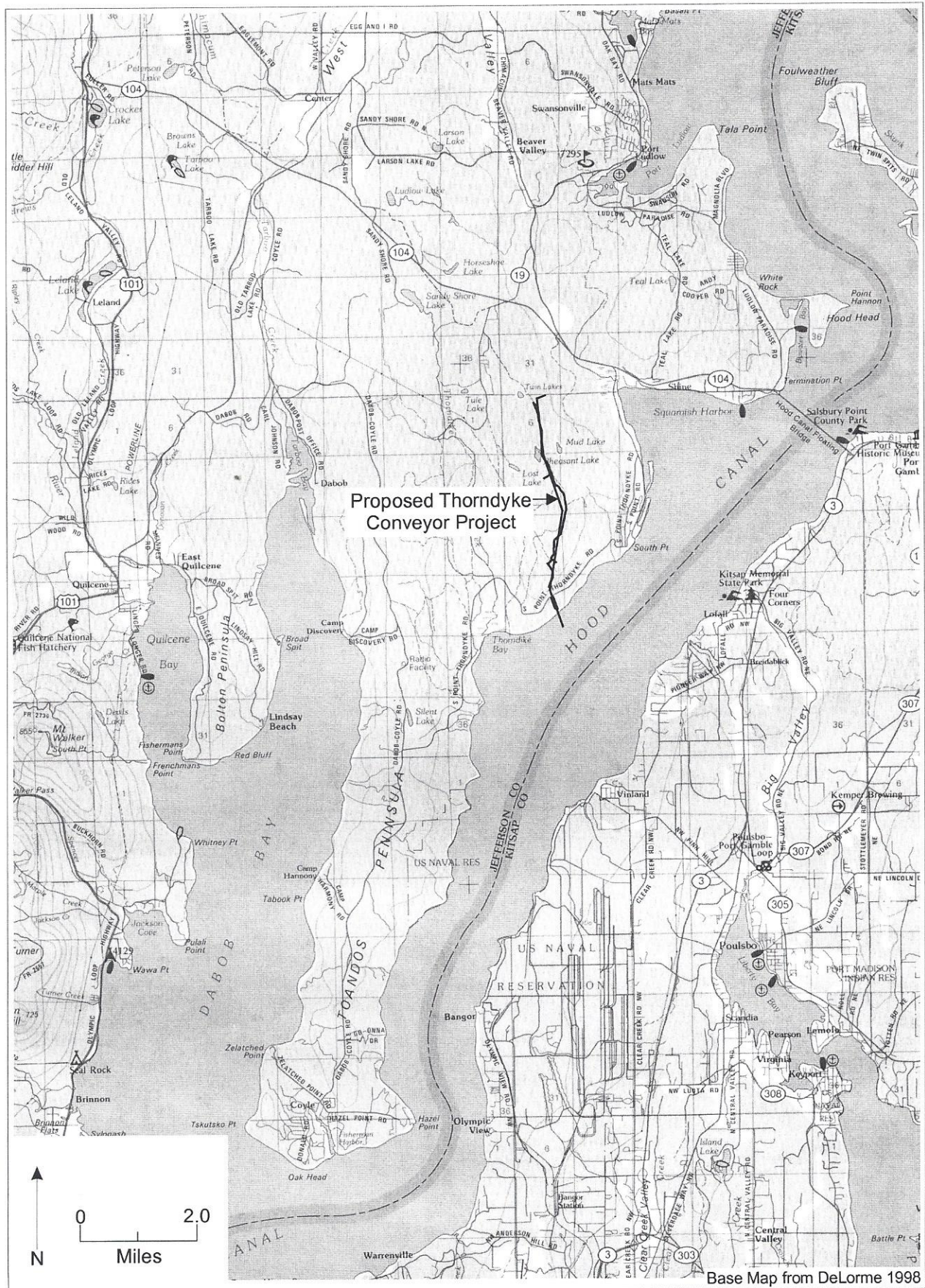


Figure 1. Proposed Thorndyke Conveyor Project vicinity.

Conveyor project area. LAAS concluded that areas near water features originally designated as moderate probability areas for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological resources in the proposed Thorndyke Conveyor Project, actually had low probabilities for such resources because field observations indicated that the entire project area was heavily disturbed from previous logging activity. In order for an archaeological resource to be considered significant, i.e. eligible for listing in the NRHP, the resource must first possess integrity of location and condition, and then meet at least one of four criteria outlined in the Department of Interior Regulations 36CFR60.4. The shoreline of Hood Canal in the southern end of the project area consisted of recent beach deposits and colluvial deposits from a bluff immediately north of the beach. In LAAS' opinion, it is unlikely that intact archaeological deposits exist within the Thorndyke Conveyor project area. The proposed Thorndyke Conveyor Project also maintains a low probability for significant historic archaeological resources. LAAS extends no further recommendations for archaeological assessment or evaluation in the proposed Thorndyke Conveyor Project.

## **1.1 PROJECT DESCRIPTION**

A detailed T-ROC Central Conveyor and Pier project description and fact sheet are provided in Appendix 3.

## **1.2 METHODOLOGY**

LAAS conducted an archival review of environmental reports, ethnographic notes, histories, and historic maps of the Thorndyke Conveyor project vicinity on file at LAAS, the Jefferson County Historical Society, and the University of Washington Libraries. LAAS archaeologists also examined site records, survey reports, and documentation concerning shipwrecks on file at LAAS and the OAH (Appendix 1) for previously recorded shipwrecks within or near the Thorndyke Conveyor project area. LAAS consulted with the Port Gamble S'Klallam Tribe, the Skokomish Tribe, the Suquamish Tribe, and the OAH regarding the proposed Thorndyke Conveyor Project. LAAS developed probabilities for hunter-fisher-gatherer, ethnographic period, historic Indian, and historic period archaeological resources in the project area based on environmental, ethnographic, and historic data, and the results of previous archaeological studies in the project vicinity. LAAS archaeologists tested these probability models during field reconnaissance, and modified probabilities based on fieldwork observations.

We use the term hunter-fisher-gatherer to describe the Indian people who lived in Puget Sound prior to the arrival of Euroamerican settlers, regardless of their tribal associations. We have consulted with local Indian Tribes for many years to determine an appropriate term to describe their ancestors. Indian people do not want their ancestors to be called prehistoric people, which is an ethnocentric term. We routinely use the term hunter-gatherer to refer to Indian people who inhabited environments in the interior of the United States. Tribes in Puget Sound suggested the addition of "fisher" to the descriptor "hunter-gatherer" to reflect the importance of fishing among the Puget Sound Tribes. Puget Sound Indian people view themselves as fishermen as well as hunters and food gatherers.



### **1.3 TRIBAL CONSULTATION**

LAAS initiated tribal consultation for the proposed Thorndyke Conveyor Project by sending letters to the chairpersons and cultural representatives of the Port Gamble S’Klallam Tribe, the Skokomish Tribe, and the Suquamish Tribe (Appendix 2). Marie Hebert (personal communication 2002), Tribal Council Member, Port Gamble S’Klallam Tribe, asked that LAAS contact Ted Labee, Habitat Biologist, Port Gamble S’Klallam Tribe, for comments. Mr. Labee stated that he had no knowledge of any cultural places or archaeological sites in the upland areas or on the shoreline within the project area. Mr. Labee noted that there was a small elk herd in the project vicinity and that Port Gamble S’Klallam people hunted in the area. Celeste Vigil (personal communication 2002), Cultural Technician, Skokomish Tribe stated that the Skokomish Tribe had no comments and added that they usually defer to the Port Gamble S’Klallam Tribe to consult on projects near the Hood Canal Bridge. Charles Sigo (personal communication 2002), Tribal Curator, Suquamish Tribe, stated that the Suquamish had no specific comments other than that Suquamish people hunted in the project area vicinity.

### **1.4 AGENCY CONSULTATION**

Lyn Keenan, Senior Planner, Reid Middleton, stated that Fred Hill Materials would wait until they apply for federal permits to establish an Area of Potential Effects (APE) for the proposed Thorndyke Conveyor Project in conjunction with the lead federal agency, with the understanding that the APE could possibly expand the existing project area boundaries. The United States Army Corps of Engineers will probably be the lead federal agency for the proposed Thorndyke Conveyor Project (Lyn Keenan, personal communication 2002).

LAAS archaeologists conducted a records search at OAHP to identify archaeological resources studies conducted in the Thorndyke Conveyor project vicinity, and for any hunter-fisher-gatherer or historic period archaeological sites, or shipwrecks recorded in the project vicinity (Appendix 1).

## **2.0 ENVIRONMENT**

The proposed Thorndyke Conveyor Project is on the west side of Hood Canal, on the northeastern portion of Toandos Peninsula. The southern end of the project area terminates approximately 1,000 feet southeast of the shoreline of Hood Canal. The Thorndyke Conveyor project area is on glacial deposits formed during the last glacial advance and retreat through Western Washington. The Puget Lobe of the Cordilleran Ice Sheet advanced through the Puget Sound region, reaching its maximum extent south of Olympia, Washington, approximately 17,000 years ago (Porter and Swanson 1998; Thorson 1980, 1981). As the Puget Lobe retreated northward, a sublobe of the glacier probably formed on the northeast Olympic Peninsula (Thorson 1981:23). Channeled meltwater flowing south to Hood Canal from the retreating sublobe formed the glacial terrace that encompasses the Thorndyke Conveyor project area (Thorson 1981:Figure 9). Gravelly and very gravelly sandy loam, including Alderwood, Everett,

Dabob, and Sinclair Series soils, formed in the upland portions of the project area on material that was deposited from the meltwater of the retreating glacier (McCreary 1975; Soil Survey Division, Natural Resources Conservation Service, United States Department of Agriculture 2002). The Thorndyke Conveyor project area would have been available for hunter-fisher-gatherer land use after deglaciation of the area, approximately 14,000 years ago.

Subsequent to the glacial retreat, vegetation in Western Washington was conditioned by a cooler and drier climate than that of today, and consisted of an open grassland with a sparse woodland containing lodgepole pine (*Pinus contorta*), sedges (*Cyperaceae* sp.), sage (*Artemisia* sp.), and herbs (Barnosky et al. 1987:234; Brubaker 1991; Whitlock 1992). Elk (*Cervus canadensis*) herds and deer (*Odocoileus* sp.) would have browsed on shrubs and herbs in the open grassland-forest. By around 12,000 years ago, the regional climate of the Pacific Northwest became warmer and drier than today (Barnosky et al. 1987; Brubaker 1991; Whitlock 1992), and the appearance of a Douglas fir (*Pseudotsuga menziesii*) and Western hemlock (*Tsuga heterophylla*) grassland-forest accompanied the shift in climate (Whitlock 1992:14). The climate of Western Washington shifted to the cool, moist climate seen in the region today by around 6,000 years ago. The canopy of the Douglas fir-Western hemlock forest became more dense in response to the change to a cool, moist climate (Brubaker 1991:23; Whitlock 1992). Hunter-fisher-gatherer lifeways also changed as a result of the shift in climate and vegetation. The increased forest vegetation limited the grazing land available to elk and deer, and decreased the amount of plant foods, such as camas, previously available in open grassland areas. However, berries and medicinal plants, timber for houses and canoes, and cedar bark for clothing and baskets became abundant in the closed canopy forest.

Changes in relative sea level over time would have also affected the way hunter-fisher-gatherers used the Thorndyke Conveyor project area. Changes in vegetation and microorganisms observed in cores taken from the Shine Marsh, approximately one mile east of the north end of the Thorndyke Conveyor project area, suggest sea level in the project vicinity rose gradually over the past 10,000 years (Eronen et al. 1987). Relative sea level in the Thorndyke Conveyor project vicinity was over 10 meters (32.8 feet) lower 10,000 years ago than it is today (Eronen et al. 1987:Figure 6). Hood Canal was probably within six meters (19.7 feet) of its current elevation by 6,000 years ago, and has probably not risen more than one meter (3.3 feet) over the last 1,000 years (Eronen et al. 1987:Figure 6; Sherrod et al. 2000:385). Data from the Shine Marsh suggest that the rise in sea level in the Thorndyke Conveyor project vicinity was gradual, rather than an abrupt change brought about by seismic activity (Bucknam et al. 1992; Sherrod et al. 2000:Figure 1). The effects of a large earthquake on the Seattle Fault approximately 1,100 years ago were probably not felt as far west as Hood Canal (Johnson et al. 1999:1048). The current offshore topography of the proposed Thorndyke Conveyor Project slopes steeply from eight feet (2.4 meters) to 50 feet (15.2 meters) below sea level (Reid Middleton 2002b). The portion of the project area available to hunter-fisher-gatherers between 10,000 and 5,000 years ago, now submerged by Hood Canal, would have been a relatively steep bluff face well above the marine shoreline, with the base of the bluff south of the Thorndyke Conveyor project area.

A description of the vegetation and topography in the Thorndyke Conveyor project vicinity during the historic period is given in early General Land Office Survey notes (United States

Surveyor General 1859). The General Land Office surveyor observed fir, hemlock, cedar, and some pine (*Pinus* sp.) timber, with an understory of salal (*Gaultheria shallon*), willow (*Salix* sp.), rhododendron (*Rhododendron macrophyllum*), and oceanspray (*Holodiscus discolor*) on the northeastern portion of the Toandos Peninsula (United States Surveyor General 1859). The land was described as rolling, with second rate soil, and with partially burned timber in the central portion of the Thorndyke Conveyor project area (United States Surveyor General 1859). Current vegetation typical of glacial soils in the project area includes Douglas fir, Western red cedar (*Thuja plicata*), Western hemlock, and madrone (*Arbutus menziesii*), with an undergrowth of bracken fern (*Pteridium aquilinum*), swordfern (*Polystichum munitum*), vine maple, willow, rhododendron, evergreen huckleberry (*Vaccinium ovatum*), red huckleberry (*Vaccinium parvifolium*), trailing blackberry (*Rubus ursinus*), salal, and Oregon grape (*Mahonia nervosa*) (McCreary 1975; Soil Survey Division, Natural Resources Conservation Service, United States Department of Agriculture 2002). A sheer bluff face drops to the beach in the southern end of the project area (Reid Middleton 2002b; United States Geological Survey 1973). The bluff experienced slope failure some time in the 1990s, depositing large amounts of material on the backshore (Reid Middleton 2002a:6).

Water features adjacent to the proposed Thorndyke Conveyor Project include a small lake, marshes, and intermittent streams. Pheasant Lake is approximately 200 feet west of the proposed Thorndyke Conveyor Project in the northern end of the project area (Figure 2). The lake was mapped in the early historic period in the same position as today (United States Surveyor General 1860). Krazan and Associates delineated the wetland boundary for the lake, encompassing approximately 642,940 square feet, in 2001 (Team 4 Engineering 2002). Two marsh areas, Wetland C and Wetlands K and M, are approximately 100 feet east of the southern half of the Thorndyke Conveyor project area (Figure 2). The marsh areas were also delineated by Krazan and Associates in 2001 (Team 4 Engineering 2002), and do not appear on early Government Land Office Survey maps. Wetland C was mapped in its current location on a modern United States Geological Survey (1973) map. Small intermittent drainages associated with Wetland C cross the proposed Thorndyke Conveyor Project in the central portion of the project area (Reid Middleton 2002a:15). Wetlands K and M were delineated as two separate wetlands, but are separated by less than 100 feet and may have been contiguous at one time in the past. Wetland C encompasses approximately 857,990 square feet, and Wetlands K and M combined measure approximately 93,830 square feet. Additional wetlands are delineated in the vicinity of the Thorndyke Conveyor project area, however, they are either relatively small (less than 10,000 square feet), and/or are more than 200 feet distant from the project area (Team 4 Engineering 2002). Two small intermittent streams drain into Hood Canal on either side of the Thorndyke Conveyor project area. Both streams are within steep drainages and are more than 100 feet distant from the project area (Reid Middleton 2002b; United States Geological Survey 1973). A wetland area is also delineated at the base of the bluff in the south end of the project area, north of the Hood Canal shoreline (Reid Middleton 2002b). Two larger streams, including Thorndyke Creek 1.25 miles southwest of the Thorndyke Conveyor project area, and an unnamed intermittent stream 1.15 miles northeast of the project area, drain into Hood Canal. Both streams have lower gradients and would have been more attractive to hunter-fisher-gatherers than the small streams on either side of the project area. A sandspit 1.7 miles east of the Thorndyke

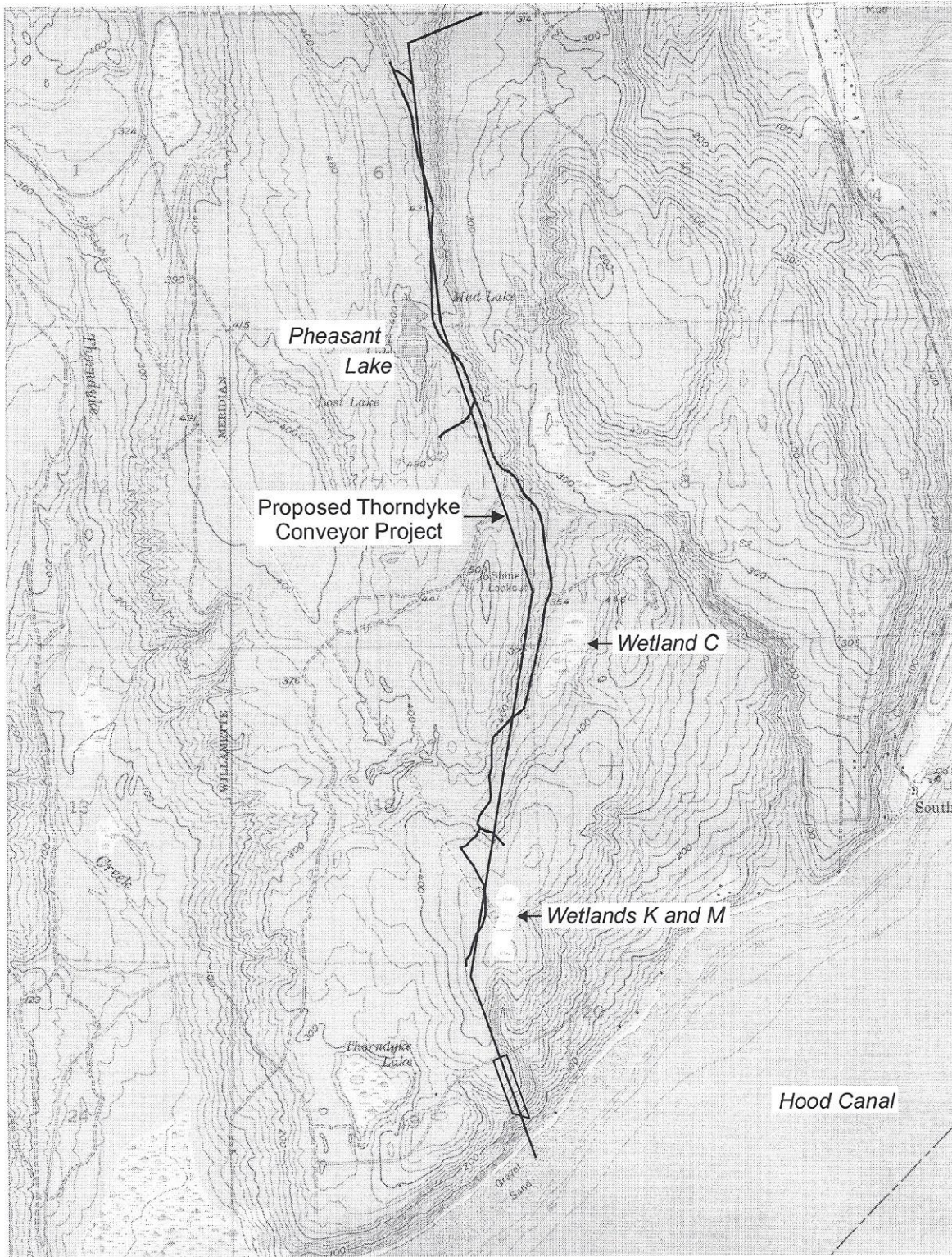


Figure 2. Proposed Thorndyke Conveyor Project location showing water features adjacent to the project area.

Conveyor project area at South Point is also a landform more likely to have been frequented by hunter-fisher-gatherers than landforms in the project area.

### 3.0 CULTURAL BACKGROUND

#### 3.1 PREVIOUS CULTURAL RESOURCES STUDIES

##### 3.1.1 ARCHAEOLOGICAL STUDIES

No archaeological resources studies have been conducted in the proposed Thorndyke Conveyor Project, and no archaeological sites are recorded within the project area. Six archaeological resources studies have been conducted in the vicinity of the Thorndyke Conveyor project area (Table 1). Two of the studies (Madson et al. 1999; Robinson 1983) were carried out for upland landforms similar to the landform with most of the Thorndyke Conveyor project area. Neither study identified significant hunter-fisher-gatherer or historic period archaeological resources, and Madson et al. (1999:5) concluded that upland landforms in the Thorndyke Conveyor project vicinity away from fresh water resources had low probabilities for significant hunter-fisher-gatherer archaeological deposits.

Table 1. Previous Archaeological Resources Studies in the Proposed Thorndyke Conveyor Project Vicinity.

Author(s)	Date	Title	Cultural Resources Identified	NRHP Status
Robinson	1983	<i>SR 104: Beaver Valley Road Car Pool Lot, Jefferson County, Washington</i>	None	NA
Stilson	1987	Cultural Resource Assessment of the Proposed Hyper-Fix Navigational Beacon Antenna, U.S. Naval Reservation, Toandos Peninsula, Jefferson County, Washington	FMR, Possible Lithic Waste Flake	Not Eligible
Hess et al.	1990	<i>Archaeological Resource Assessment of Naval Undersea Warfare Engineering Station Properties in Jefferson and Kitsap Counties, Washington</i>	45JE-A, 45JE-B, 45JE-C, 45JE-D	Eligible (A) Not Eligible (B, C, D)
Lewarch et al.	1993	<i>Cultural Resources Overview and Probabilistic Model for Subase Bangor and Camp Wesley Harris, Kitsap County, Washington</i>	45KP106 45KP107 45KP108	Not Evaluated
Madson et al.	1999	<i>SR 104 Westbound Passing/Truck Lane and Junction SR 19 Improvements Projects Cultural Resource Overview, Jefferson County, Washington</i>	None	NA
Emerson	2001	<i>A Cultural Resources Survey of the Washington State Department of Transportation's Proposed Ferry Terminal Sites, South Point and Port Gamble, Jefferson and Kitsap Counties, Washington</i>	Port Gamble National Historic District	Listed in NRHP

NRHP - National Register of Historic Places

NA - Not Applicable

Eligible - Author Opinion

FMR - Fire Modified Rock

LAAS identified three shell midden sites on the eastern side of Hood Canal, the Floral Point Shell Midden (45KP106), the Amberjack Shell Midden (45KP107), and the Carlson Spit Shell Midden (45KP108), during an archaeological survey of the Subase Bangor (Lewarch et al. 1993). Two of the shell midden sites, 45KP106 and 45KP107, were recorded directly south of and on

the opposite side of Hood Canal from the Thorndyke Conveyor project area. LAAS concluded that archaeological testing of the sites was necessary to determine if the sites were significant (Lewarch et al. 1993:84). Lewarch et al. (1993:8) made the observation that the beaches on the eastern side of Hood Canal appeared to have suffered more historic ground disturbance than had those on the western side. Two shell midden sites, the Tower Point Site (45JE-A) and the Brown Point Site (45JE-B), are reported on the Toandos Peninsula, approximately four miles southwest of the beach in the Thorndyke Conveyor project area (Hess et al. 1990). Hess et al. (1990:43, 44) concluded that the Tower Point Site (45JE-A) was probably eligible for listing in the NRHP, and that the Brown Point Site (45JE-B) was probably not significant. All of these shell midden sites were reported on sandspits on Hood Canal. The Thorndyke Conveyor project area does not contain similar landforms, and it is unlikely that shell midden deposits exist within the Thorndyke area.

Other shell midden sites are more likely to be on the western shores of Hood Canal on landforms such as the sandspit at South Point, 1.7 miles north of the Thorndyke Conveyor project area. Emerson (2001) conducted a “visual survey” for a proposed ferry terminal immediately south of the South Point sandspit. Emerson (2001) identified no archaeological deposits at South Point, probably because the project area was covered with asphalt pavement and was on the south, seaward side of the sandspit. Stilson (1987:8) observed fire modified rock and one “dubious” lithic waste flake on the beach on the eastern side of Hood Canal, immediately north of the Tower Point Site (45JE-A) prior to Hess et al.’s (1990) identification of the site. The cultural resources were not considered eligible for listing in the NRHP because they lacked integrity (Stilson 1987:8).

Hess et al. (1990) reported two historic period archaeological sites, a historic period “ruins” (45JE-C) and the Long Farmstead (45JE-D), on the Toandos Peninsula. Neither site is probably eligible for listing in the NRHP (Hess et al. 1990:45-47), and it is unlikely that similar historic period occupations took place within the Thorndyke Conveyor project area. Although Emerson (2001) describes the Port Gamble National Historic District, which is listed in the NRHP, the district is more than five miles north of the Thorndyke Conveyor project area, and does not contribute to our probability model for significant historic period archaeological resources in the proposed Thorndyke Conveyor Project.

### **3.1.2 SHIPWRECK STUDIES**

A review of documentation at OAHF revealed no shipwreck studies and no recorded shipwreck sites in the Thorndyke Conveyor project vicinity. Three shipwrecks have occurred within three miles of the project area. The steamer *Union* burned in 1910 in Thorndyke Bay, approximately 1.4 miles southwest of the project area (Gibbs 1955), however, the Evergreen Scuba Divers Guide (1979) plotted the shipwreck north of Bangor, approximately 6.0 miles southwest of the project area. The gas scow *Curlew* burned in 1931, approximately 1.5 miles south of the project area (Gibbs 1955). The tug *Elk*, formerly *Katherine*, burned off the coast of Vinland on January 11, 1911, approximately 3.0 miles south of the project area (Gibbs 1955; Newell 1960:207). The *Nokomis* shipwreck was near Lofall, 3.0 miles east of the project area (Puget Sound Vessels Lost 1858-1949 ca. 1949). The exact location of many shipwrecks cannot be known because their

locations were not originally recorded precisely and because factors such as tides, currents, and storms may cause shipwrecks to move over time.

### **3.1.3 TRADITIONAL CULTURAL PLACES STUDIES**

No traditional cultural places studies have been conducted in the vicinity of the Thorndyke Conveyor project area.

## **3.2 ETHNOGRAPHY**

The Thorndyke Conveyor project area is in the aboriginal territory of a Twana group known as the Dabop (Suttles and Lane 1990:486). The aboriginal Twana were identified both by their language, which was a Salishan language unintelligible to neighboring groups, and their territory, which surrounded Hood Canal (Elmendorf 1992:255). The project area is near the northern boundary of Twana territory that borders land formerly occupied by the Chemakum (Elmendorf 1990:439). The Klallam occupied Chemakum territory in the historic period as the Chemakum population declined due to warfare and disease, in addition to lost cultural identity through intermarriage with the Klallam and Twana (Eells 1985:16-17; Elmendorf 1990:438, 1992:284, 296). The aboriginal Twana mostly lived in villages at the mouths of rivers and streams draining into Puget Sound from the Olympic Mountains. The Thorndyke Conveyor project area is near the mouth of Hood Canal, which was an important fishing and clam digging area for the neighboring Klallam (Gunther 1927:195), Chemakum (Elmendorf 1990:439), and Suquamish (Riley 1974:56) groups.

The aboriginal Twana resided in villages on the Skokomish River, Vance Creek, Lake Cushman, the Duckabush River, the Dosewallips River, Quilcene Bay, Dabob Bay, at Hoodspout, the Tahuya River, and the Union River (Elmendorf 1992:265). Winter houses consisted of a cluster of two to four gable-roof houses with associated smaller, shed-roof houses usually sited at the mouth of a stream or river. The Twana used cedar planks for the exterior wall and roof of their winter houses. The Twana and their neighbors also built summer houses at camp sites at hunting, fishing, berrying, and clam digging areas throughout the Hood Canal area. There were three types of summer houses: the plank shed made from cedar planks temporarily taken from the winter house, the mat house consisting of a pole frame covered with woven cattail mats, and a simple, open-air, lean-to made from cedar planks atop a pole frame (Elmendorf 1992:169-170). During their stays at the summer camps, the Twana and their neighbors harvested salmon, bottomfish, clams and oysters, hunted sea mammals, land game, waterfowl, and picked berries for immediate consumption, winter use, trade, or for travel provisions. Small fires were built to dry the food resources. The Twana and their neighbors dug clams using a pointed wooden stick and open weave baskets. The fresh clams were steamed over heated rocks and eaten fresh or dried for storage or trade. The Twana mostly traveled by water, using cedar dugout canoes. Cedar was also a source of material for textile products; inner cedar bark, limbs, and roots were used to make rope, baskets, clothing, and fishing nets.

The Twana and neighboring groups visited the local forests for hunting, berry picking, gathering cedar bark, limbs and roots, felling cedar trees for planks and canoe logs, and for spirit questing.

Deer were the primary land mammals hunted by the Twana and neighboring groups, who used bow and arrow, pitfalls, nets, loop snares, and group drives (Elmendorf 1992:92-93). Hunters also hunted deer from canoes along the shoreline by using a torch to create shadows, which scared the prey towards the beach and the hunters. Twana women picked berries in burned over areas (Elmendorf 1992:128). Cedar bark was stripped from the cedar tree from the bottom up in the spring time when the bark was easily separated from the tree. Cedar trees were felled for canoes by burning the base of the tree (Elmendorf 1992:180). Adolescent boys were encouraged to seek spirit power by traveling to isolated areas where the seeker built a fire and fasted until a vision appeared (Elmendorf 1992:493). Sometimes the vision seeker was sent to a specific place, such as a fresh water lake, to dive for spirit power.

The Dabop, a Twana subgroup, lived at ta'bv<sup>w</sup> on Long Spit near the head of Dabob Bay, the winter village closest to the project area (Figure 3) (Elmendorf 1992:45). The village at ta'bv<sup>w</sup>, a native term that has since been anglicized into "Tarboo" and applied to the small bay enclosed by Long Spit, is 4.2 miles west of the project area. The people at ta'bv<sup>w</sup>, known to the Twana as the čtta'bv<sup>w</sup>, were not living in the village in the 1870s (Elmendorf 1992:45), suggesting the village may have been permanently abandoned during the historic period. A Klallam village, which was probably first occupied by the Chemakum, known as nux<sup>w</sup>sna'anaʔ, was at Port Ludlow 4.2 miles northeast of the project area (Figure 3). The Dapob, Klallam, Chemakum, and neighboring Twana villages (Elmendorf 1992:45, 294-295; Lane 1975:43) engaged in seasonal clam digging in two areas north and south of the shoreline segment of the project area: 1) a clam digging area and camping place on Thorndyke Bay to the south and 2) a popular clam digging beach and camping area on Squamish Harbor known as dux<sup>w</sup>ho'bəd to the north (Figure 3) (Elmendorf 1992:45). The dux<sup>w</sup>ho'bəd beach was "a stretch of territory on the west side of Hood Canal" used by the Twana clam diggers from throughout Hood Canal in the late summer and fall (Elmendorf 1992:45). The Klallam called Squamish Harbor, nixa i, which was not translated by Waterman (ca. 1920). Members of the 1841 Wilkes Expedition observed a group of Klallam and Squamish people engaged in a gambling contest on Squamish Harbor. The Klallam also described Manhattan Beach, or x<sup>w</sup>lla'ap, part of the larger dux<sup>w</sup>ho'bəd clam digging area, as "a great place for littleneck and for butterclams...the clams there had a good taste" (James 1993:105). The beach within the Thorndyke Conveyor project area was probably part of the larger Manhattan Beach clam digging area used by the Twana and Klallam (Figure 3). The Klallam called South Point, which may also be part of the larger Manhattan Beach clam digging area, x<sup>w</sup>ola b (Figure 3), also was not translated by Waterman (ca. 1920).

After initial contacts with explorers, the Twana, Klallam, Chemakum, and Suquamish were exposed to disease and acculturation efforts that reduced their population. The Point Elliott and Point No Point Treaties, signed in 1855, established the Skokomish Indian Reservation for the Twana, Klallam, and Chemakum, and the Port Madison Reservation for the Suquamish. Most of the Twana and some Chemakum (Elmendorf 1990:439) settled on the Skokomish Reservation and are now known as the Skokomish Tribe (Lane 1973:21). The Klallam bands, who absorbed most of the severely reduced Chemakum band, settled into three primary areas in the historic period (James 1993:14). The Port Gamble S'Klallam settled at Port Gamble across from the Pope and Talbot Sawmill, while the Jamestown S'Klallam settled near present Sequim, and the Lower Elwha Klallam settled near present Port Angeles. The Klallam bands refused to move to





the Skokomish reservation and eventually received reservations at these historically occupied communities, which were also within their aboriginal use areas. The Klallam and Chemakum people on the Port Gamble Indian Reservation are now members of the Port Gamble S'Klallam Tribe.

### 3.3 HISTORY

Jefferson County was formed within the Oregon Territory in 1852, with Port Townsend as the county seat, and became part of the Washington Territory when the territory was formed in 1853 (Daly 1966:4-6). Most early Euroamerican settlers in the area were loggers or worked in support of the logging industry, with a small number of farmers, ranchers, and fishermen settling on lands cleared of timber (Clayson 1998; Hermanson 2002; Jefferson County Historical Society 1966; McCurdy 1937; Russell and Bean 1978). The Toandos Peninsula was first settled by non-native Americans around 1860, with logging as its major industry (Hermanson 2002:43-44). The Thorndyke Conveyor project area has been logged several times, and the primary landowners in the project area have been timber companies.

The first sawmill in Jefferson County was built at Port Ludlow in 1852, four miles north of the Thorndyke Conveyor project area, by William Sayward and John Thorndyke (Hermanson 2002:40; McCurdy 1937:75; Swanson 1966:180; Thompson 1987:11). The Puget Mill Company, owned by Andrew Pope and William Talbot, bought the Ludlow mill in 1878 (Hermanson 2002:40; Jefferson County Historical Society 1966:185; Swanson 1966:180; Thompson 1987:11). The Puget Mill Company began buying timber land in Jefferson County through grants from the University of Washington in 1861, and owned over 13,000 acres by the time they bought the Ludlow mill, including land in the Thorndyke Conveyor project area (Hermanson 2002:41; O.P. Anderson and Company ca. 1900; Swanson 1966:181; Thompson 1987:12). The McCormick Lumber Company bought the Puget Mill Company from the sons of Andrew Pope and William Talbot in 1925, but was foreclosed in the 1930s because of economic hardships caused by the Great Depression. The Pope and Talbot Lumber Company, later Pope and Talbot, Incorporated, regained their timber holdings in Jefferson County in 1938 (Hermanson 2002:42; Jefferson County Historical Society 1966:186; Swanson 1966:184; Thompson 1987:13). However, because much of their timber resources were “well-nigh exhausted” by this time, Pope and Talbot closed the mill at Ludlow and concentrated operations at their mill in Port Gamble (Jefferson County Historical Society 1966:186).

In addition to the large timber corporations, smaller logging outfits on the Toandos Peninsula also supplied the local mills with timber (Clayson 1998:1-2). While most of the early industry in the area concentrated on logging operations, the timber economy also brought others to the area. Some early ranches operated on the peninsula, and many men worked as both ranchers and loggers. Between 1865 and at least 1885, Owen Price owned a ranch near Thorndyke Bay (Clayson 1998:2). A post office and general store were at Fisherman's Harbor on the southern point of the Toandos Peninsula by 1908 (Hermanson 2002:43). A school was built in the community of Shine on Squamish Bay, approximately two miles east of the Thorndyke Conveyor project area, some time prior to 1912 (Calkins 1991:132). Shine was apparently named after the horse of Bob Slyter, who delivered mail to the community from Port Ludlow in a horse drawn

buggy (Calkins 1991:132; Thompson 1987:28). Ships also carried mail to outlying communities along Hood Canal, as well as transporting lumber, freight, and passengers (Ames 1966; Hermanson 2002). Ferries transported passengers and automobiles across Hood Canal until the opening of the Hood Canal Bridge in 1961 (Thompson 1987:29).

The Puget Mill Company bought much of the property containing the Thorndyke Conveyor project area from the University of Washington (O.P. Anderson and Company ca. 1900). By 1925, the Puget Mill Company owned the northern half of the Thorndyke Conveyor project area. A logging road intersected the southern end of the project area at what is now Thorndyke Road. The Thorndyke Bay Logging Company and the Spring Hill Ranch Company owned the property north of the logging road, and private landowners controlled the property south of the road to the beach (Metsker 1925). The McCormick Lumber Company owned the northern half of the Thorndyke Conveyor project area in 1936, and by 1943, the property had reverted back to Pope and Talbot, Incorporated. The former logging road is mapped as a trail between 1936 and 1943, with Jefferson County and private landowners holding the property in the south half of the project area (Metsker 1936, 1943). Between the 1920s and the 1940s, the property east and west of the southern end of the Thorndyke Conveyor project area was subdivided as the Cedar Holme Villa Tracts and the Goodfellow's Manhattan Beach Tracts, respectively (Metsker 1925, 1936, 1943). John McDougall owned property west of the Thorndyke Conveyor project area and immediately north of the Cedar Holme Villa Tracts in the 1920s and 1930s (Metsker 1925, 1936). McDougall worked in a shingle mill on the western side of the Toandos Peninsula before moving to Aberdeen (Proctor 1993:17). It is likely that many of the private land owners living in the southern end of the Thorndyke Conveyor project area between the 1920s and 1940s were employed in the logging industry in one way or another. Various operators, including Lakeside Industries, mined at or near the proposed Thorndyke Conveyor Project since 1959 (Loving 2002). Fred Hill Materials began a sand and gravel mining operation in the area in the late 1970s (Loving 2002).

#### **4.0 IMPLICATIONS FOR LAND USE AND PROBABILITY FOR HUNTER-FISHER-GATHERER AND HISTORIC PERIOD ARCHAEOLOGICAL RESOURCES**

##### **4.1 ARCHAEOLOGICAL RESOURCES**

LAAS developed probabilities for archaeological resources in the proposed Thorndyke Conveyor Project based on environmental, ethnographic, historic, and archaeological data. Most of the Thorndyke Conveyor project area has a low probability for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological resources. Areas within the proposed Thorndyke Conveyor Project near water features have a moderate probability for such archaeological deposits. The shoreline of Hood Canal in the south end of the Thorndyke Conveyor project area, Wetlands K and M, and Wetland C east of the central portion of the project area, and Pheasant Lake west of the northern end of the proposed project have moderate probabilities for significant hunter-fisher-gatherer, ethnographic period, and historic Indian

archaeological resources. The entire Thorndyke Conveyor project area has a low probability for significant historic period archaeological resources.

The Thorndyke Conveyor project area would have been available to the first hunter-fisher-gatherers in Western Washington, who were probably in the region by around 14,000 years ago. Prior to 5,000 years ago, the shoreline of Hood Canal would have been farther east than it is today, and the portion of the project area on the shoreline at that time would have been a steep bluff. It is therefore unlikely that hunter-fisher-gatherers utilized the shoreline portion of the project area prior to 5,000 years ago. Early hunter-fisher-gatherers may have hunted land animals in open grassland and later forest-parkland on upland landforms in the Thorndyke Conveyor project area. Water features in the project area vicinity, such as swamps and lakes, may have been utilized to establish temporary hunting camps. Significant hunter-fisher-gatherer archaeological deposits associated with this type of activity would include hearth features, fire modified rock (FMR), lithic tools, and waste debris from the manufacture of lithic tools.

Subsequent to 5,000 years ago, hunter-fisher-gatherers, ethnographic populations, and historic Indians probably accessed the shoreline portion of the Thorndyke Conveyor project area while harvesting marine resources. The beach in the proposed project is part of an ethnographically recorded clamming area, and is between known camping areas at Squamish Harbor and Thorndyke Bay. However, low gradient streams north and south of the project area, as well as the ethnographically recorded campsites, would have been more attractive to hunter-fisher-gatherers, ethnographic populations, and historic Indians for extended stays during marine resource processing. The beach in the Thorndyke Conveyor project area was probably mainly used in a transitory manner for digging clams and procuring other shellfish. Temporary resource processing stations may have been established on the beach or at the base of the bluff in the south end of the project area. Evidence of such stations observable in the archaeological record could include basketry and net fragments, FMR, stone tools, and flakes from the manufacture of stone tools. It is unlikely that shell midden sites exist within the beach portion of the Thorndyke Conveyor project area due to tidal and wave action at the base of the steep bluff. Ethnographic populations and historic Indians may have also frequented fresh water features in the upland portion of the Thorndyke Conveyor project area to procure plant resources, while on hunting forays, and during vision quests. Again, archaeological evidence from these activities would be very low density, and would probably consist of lithic tools and waste flakes, FMR, hearth features, and/or culturally modified trees.

The entire Thorndyke Conveyor project area has a low probability for significant historic period archaeological resources. Euroamerican logging operations in the project vicinity began in the 1850s, and have characterized the major historic period land use in the project area. LAAS identified no structures or historic period activity, including logging camps, that may have left significant archaeological deposits in the southern portion of the project area during archival research.

## **4.2 SHIPWRECKS**

LAAS reviewed shipwreck maps and determined that no recorded shipwrecks are in the Thorndyke Conveyor project area. The distances of the recorded shipwreck locations from the Thorndyke Conveyor project area limits the probability that the wrecks would have drifted into the project area. The probability for unrecorded shipwrecks in the project area is low because it is unlikely that sunken ships would rest on the steep submarine shelf within the project area.

## **4.3 TRADITIONAL CULTURAL PLACES**

LAAS identified no traditional cultural places in the Thorndyke Conveyor project area through consultation with the Port Gamble S'Klallam, Skokomish, and Suquamish Tribes.

# **5.0 FIELD RECONNAISSANCE**

## **5.1 FIELD METHODS**

LAAS archaeologist David Iversen conducted field reconnaissance of the Thorndyke Conveyor project area on April 10, 11, and 12, 2002. John Vanhulle and Ted Hutt, Pit Managers, Fred Hill Materials, accompanied Mr. Iversen on a tour of the project area on April 10, 2002. Fieldwork consisted of pedestrian transects and the excavation of subsurface shovel probes. The LAAS archaeologist traversed the entire Thorndyke Conveyor project area, excluding a near vertical bluff in the southern end of the project area, and excavated shovel probes at 15 to 20 meter intervals on level surfaces near water features adjacent to the proposed area. Shovel probes were approximately 35 centimeters wide and excavated to between 30 and 120 centimeters below ground surfaces. Mr. Iversen took photographs and recorded notes concerning subsurface stratigraphy, disturbances, topography, and vegetation, on LAAS Shovel Probe Forms, Daily Tracking Forms, and Photo Logs. Field notes and photographs are on file at LAAS.

## **5.2 FIELD RESULTS**

LAAS identified no hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological resources during field reconnaissance of the Thorndyke Conveyor project area. The proposed Thorndyke Conveyor Project was heavily disturbed from multiple logging episodes, and it is unlikely that such resources are extant within the project area. The project area was generally located on upland landforms that sloped gradually to the south. A sheer bluff dropped to the beach in the southern end of the Thorndyke Conveyor project area, and the southernmost portion of the project terminated in Hood Canal (Figure 4). A steeply incised, intermittent stream drained into Hood Canal approximately 150 feet west of the southern end of the Thorndyke Conveyor project area (Figure 4), and a similar stream was approximately 600 feet east of the project area. The project area adjacent to Wetland C was on a steep east-west trending slope, and therefore, the LAAS archaeologist excavated no shovel probes near the water feature. Mr. Iversen excavated shovel probes along pedestrian transects at the base of the bluff

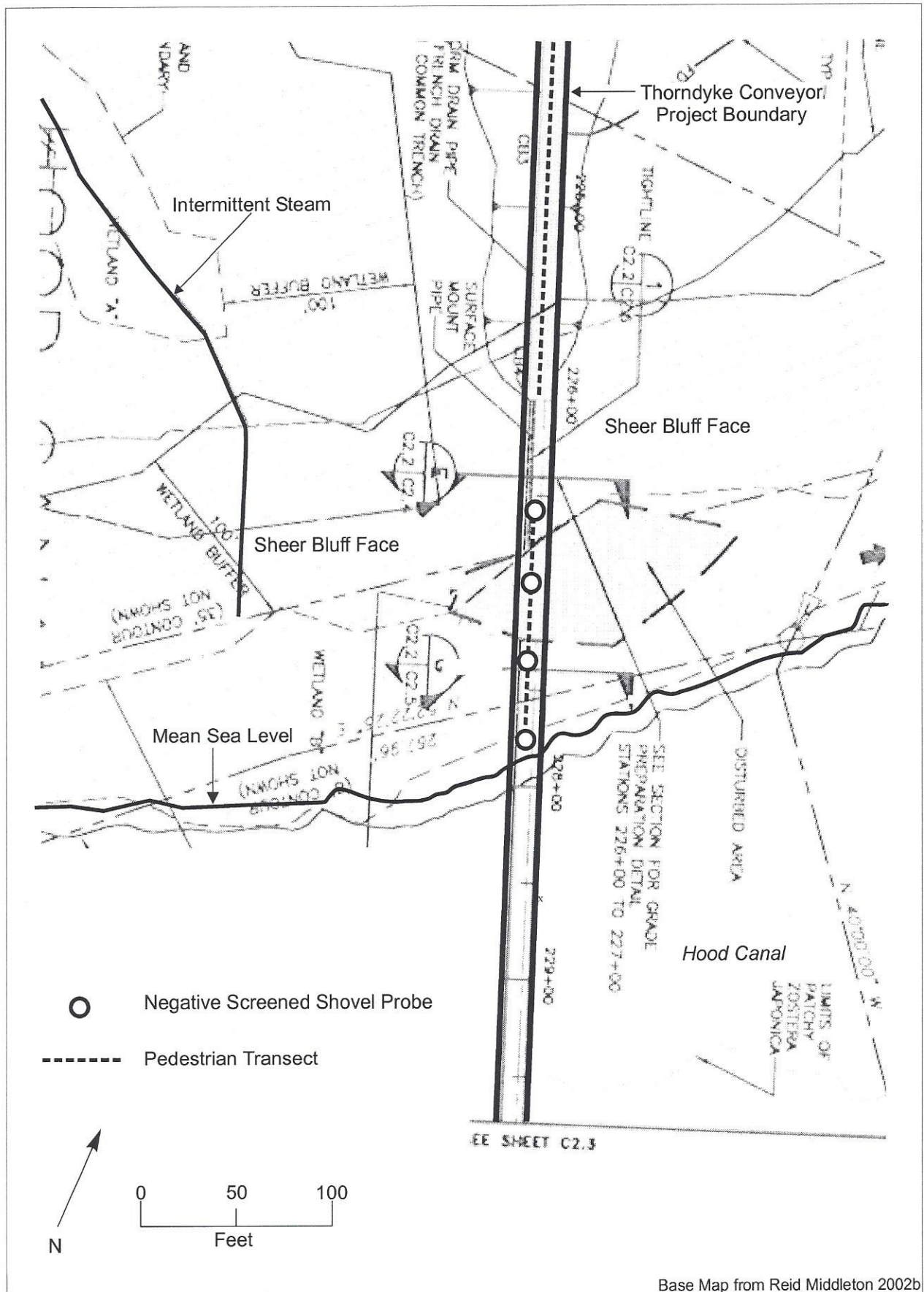


Figure 4. Pedestrian transects and shovel probes in the southern end of the Thorndyke Conveyor project area.

and on the beach in the southern end of the project area (Figure 4), west of Wetlands K and M (Figure 5), and east of Pheasant Lake (Figure 6).

Vegetation in the Thorndyke Conveyor project area consisted of second growth Douglas fir, Western red cedar, madrone, and red alder (*Alnus rubra*), with a dense understory, including salal, Oregon grape, evergreen huckleberry, red huckleberry, brackenfern, swordfern, lady fern (*Athyrium filix-femina*) deer fern (*Blechnum spicant*), stinging nettles (*Urtica dioica*), and rhododendron. Immature pines were dispersed sparsely across the Thorndyke Conveyor project area, and Scot's broom (*Cytisus scoparius*) was present in some cleared areas in the southern end of the project area. The northern portion of the proposed Thorndyke Conveyor Project was recently logged, and contained downed timber, stumps, and snags. Oceanspray (*Holodiscus discolor*), red alder, swordfern, horsetail (*Equisetum* sp.), and cattail (*Typha latifolia*), were immediately above the beach at the base of the bluff in the south end of the project area. The LAAS archaeologist observed one blacktail deer crossing the Thorndyke Conveyor project area west of Wetland C.

Sediments from shovel probes at the base of the bluff in the south end of the project area were wet, brown sand, with silty clay intrusions, apparently colluvium from the face of the adjacent bluff. Shovel probes south of the bluff face had recent beach deposits. Matrices from shovel probes excavated adjacent to Pheasant Lake and Wetlands K and M were typically a five to 10 centimeter thick forest duff over a 10 to 25 centimeter thick dark brown silt loam. The silt loam overlaid an orange-brown silty sand with 20 to 40 percent poorly sorted gravels. Matrices from some shovel probes east of Pheasant Lake contained a loose, brown-gray sand with no gravels to over one meter below the ground surface, while others consisted of a compact brown silt with orange and gray mottles.

The Thorndyke Conveyor project area was extensively disturbed by previous logging activities, and portions of the project area have been recently logged. The Shine Pit, a sand and gravel pit operated by Fred Hill Materials, is immediately north of the northern end of the project area. Abandoned logging roads and maintained gravel roads were observed throughout the project area. Thorndyke Road, a paved county road, crossed the southern end of the project area.

## 6.0 CONCLUSIONS

LAAS contracted with Reid Middleton to conduct an archaeological resources and traditional cultural places assessment of the proposed Thorndyke Conveyor Project, Jefferson County, Washington. Fred Hill Materials proposes to build a conveyor to transport sand and gravel from an existing mine to a pier on Hood Canal. LAAS's assessment was undertaken in conjunction with a State Environmental Policy Act Environmental Impact Statement for the proposed Thorndyke Conveyor Project, and to comply with Section 106 of the National Historic Preservation Act, and the National Environmental Policy Act when federal permits for the project are obtained. LAAS identified no hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological resources that may meet criteria for listing in the

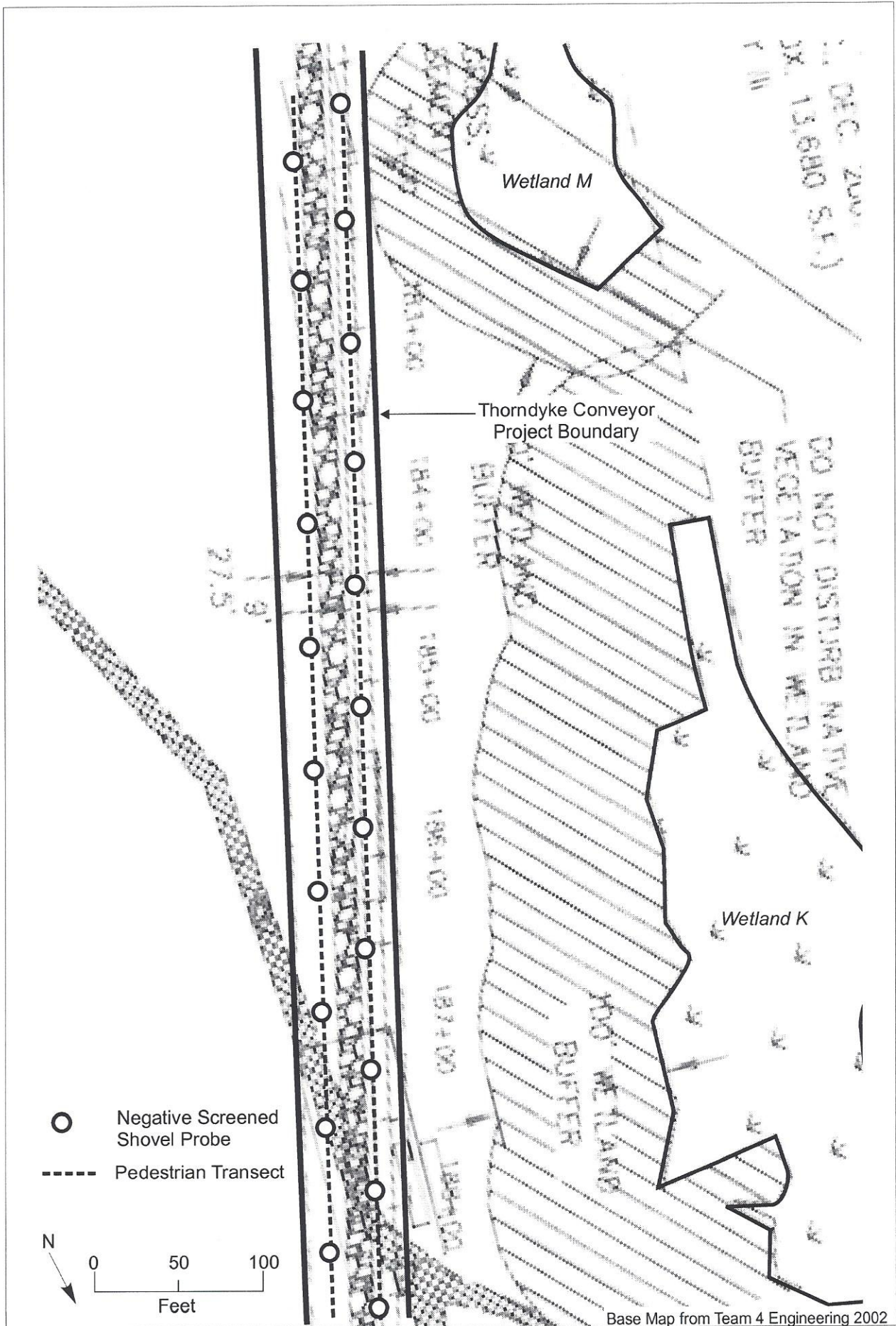


Figure 5. Pedestrian transects and shovel probes west of Wetlands K and M in the Thorndyke Conveyor project area.



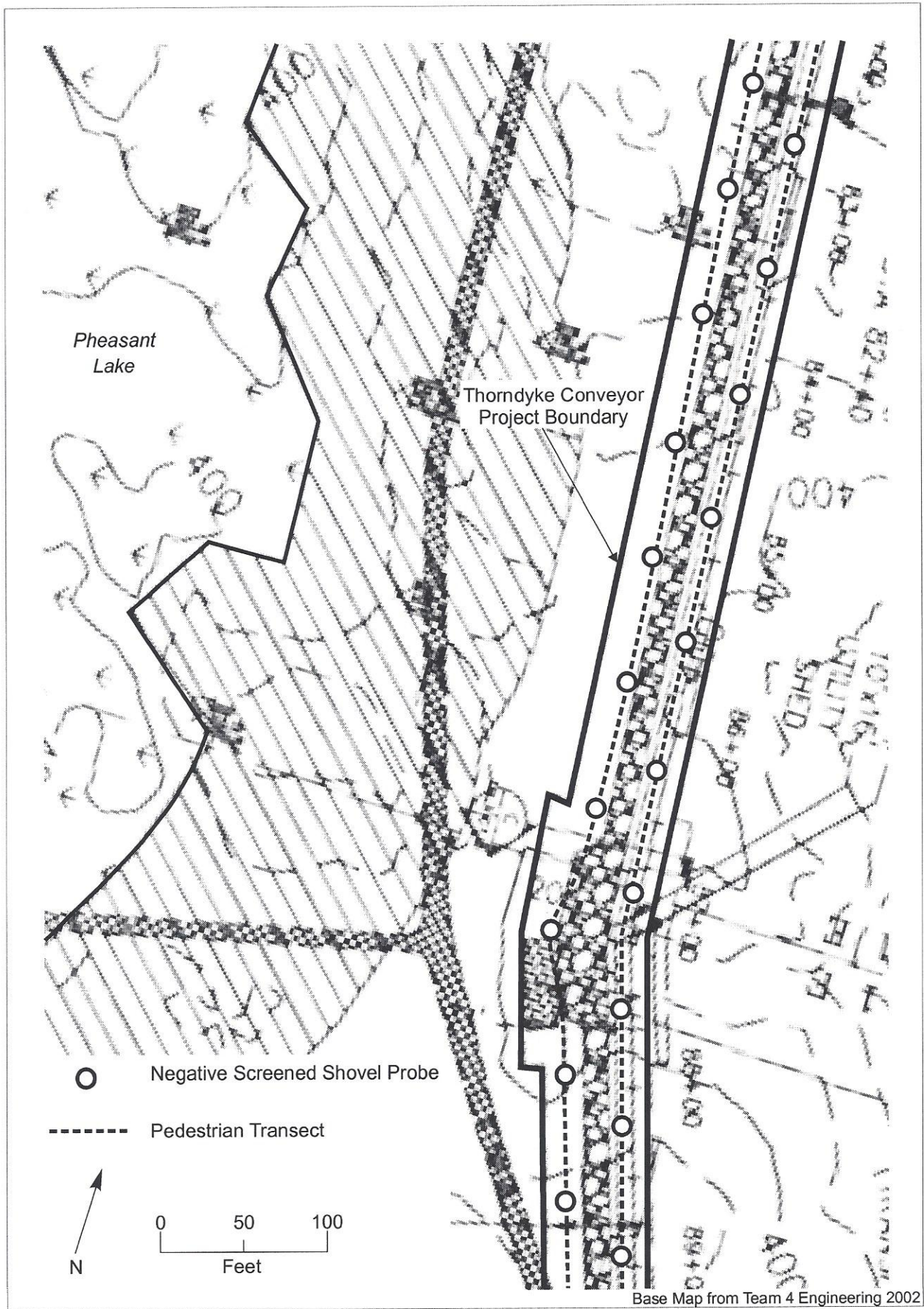


Figure 6. Pedestrian transects and shovel probes east of Pheasant Lake in the Thorndyke Conveyor project area.

National Register of Historic Places (NRHP) during assessment of the Thorndyke Conveyor project area, and no traditional cultural places were identified through consultation with the Port Gamble S'Klallam Tribe, the Skokomish Tribe, and the Suquamish Tribe.

LAAS's archaeological resources and traditional cultural places assessment consisted of archival and literature review; consultation with the Port Gamble S'Klallam Tribe, Skokomish Tribe, Suquamish Tribe, and the OAHP; field reconnaissance of the project area; and production of this technical report. LAAS archaeologists examined archaeological, environmental, ethnographic, and historic data from the OAHP, the University of Washington Libraries, and the LAAS library. We developed probabilities for hunter-fisher-gatherer, ethnographic period, historic Indian, and historic period archaeological resources in the project area based on the results of archival review, and conducted field reconnaissance to test those probabilities.

LAAS determined that there was a moderate probability for significant hunter-fisher-gatherer, ethnographic period, and historic Indian archaeological resources in the proposed Thorndyke Conveyor Project on the shoreline of Hood Canal, west of two marshes, and east of Pheasant Lake. Hunter-fisher-gatherers, ethnographic populations, and historic Indians may have accessed the Thorndyke Conveyor project area infrequently while collecting shellfish, hunting land game, procuring plant resources, and during vision quests. However, landforms north and south of the Thorndyke Conveyor project area with natural harbors, sandspits, and low gradient streams draining into Hood Canal would have been used more frequently and would be expected to have higher probabilities for containing significant archaeological resources. LAAS also concluded that the Thorndyke Conveyor project area had a low probability for significant historic period archaeological sites and shipwrecks, based on historic research.

LAAS identified no probably significant hunter-fisher-gatherer, ethnographic period, historic Indian, or historic period archaeological deposits during field reconnaissance of the Thorndyke Conveyor project area. We modified our probability estimates based on the results of fieldwork, and concluded that the entire Thorndyke Conveyor project area has a low probability for significant hunter-fisher-gatherer, ethnographic period, historic Indian, and historic period archaeological deposits. The shoreline portion of the project area was comprised of recent beach deposits and colluvial deposits from the bluff face on the northern end of the shoreline. Construction excavation at the base of the bluff is unlikely to extend below recent colluvial deposits. The portion of the project area near Wetland C sloped steeply to the east, and the entire upland portion of the project area was heavily disturbed by multiple logging episodes. Logging activity may have destroyed any significant archaeological deposits in the upland portion of the project area, if archaeological resources were ever extant.

## **7.0 RECOMMENDATIONS**

- LAAS extends no recommendations for further archaeological assessment or monitoring for the proposed Thorndyke Conveyor Project.

- If hunter-fisher-gatherer or historic period archaeological deposits and/or human remains are inadvertently discovered during construction excavation in any portion of the proposed Thorndyke Conveyor Project, ground disturbing activities should be halted immediately in an area large enough to maintain integrity of the deposits, and the Port Gamble S’Klallam, Skokomish, and Suquamish Tribes, the OAHP, and a professional archaeologist should be immediately notified. Treatment of the archaeological deposits or human remains would be coordinated through consultation between these parties.

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**APPENDIX 1**

**INDIVIDUALS AND AGENCIES CONTACTED**

## INDIVIDUALS AND AGENCIES CONTACTED

Adams-Lee, Keri, Planner, Reid Middleton, e-mail, April 8, 2002.

Armstrong, Bennie, Chairman, Suquamish Tribe, letter, March 27, 2002.

Brooks, Rich, Environmental Program Supervisor, Suquamish Tribe, letter, March 27, 2002.

Charles, Ron, Chairperson, Port Gamble S'Klallam Tribe, letter, March 27, 2002.

Hebert, Marie, Tribal Council Member, Port Gamble S'Klallam Tribe, letter, March 27, 2002; telephone, April 23, 2002.

Hill, Zee, Administrative Assistant, Washington State Office of Archaeology and Historic Preservation, meeting, April 5, 2002.

Hurtado, Denny, Chairperson, Skokomish Tribe, letter, March 27, 2002.

Hutt, Ted, Pit Manager, Fred Hill Materials, meeting, April 10, 2002.

Keenan, Lyn, Senior Planner, Reid Middleton, telephone, March 25, April 3 and 26, and September 11, 2002.

Labee, Ted, Habitat Biologist, Port Gamble S'Klallam Tribe, telephone, April 30, 2002.

Sigo, Charles, Tribal Curator, Suquamish Tribe, letter, March 27, 2002; meeting, April 18, 2002.

Vanhulle, John, Pit Manager, Fred Hill Materials, telephone, April 9, 2002; meeting, April 10, 2002.

Vigil, Celeste, Cultural Technician, Skokomish Tribe, letter, March 27, 2002; telephone, April 12, 2002.

**APPENDIX 2**

**TRIBAL CORRESPONDENCE**



LARSON  
ANTHROPOLOGICAL  
ARCHAEOLOGICAL  
SERVICES  
LIMITED

March 27, 2002

Bennie Armstrong  
Chairman  
Suquamish Tribe  
P.O. Box 498  
Suquamish, Washington 98392

Subject: Thorndyke Conveyor Project Archaeological Resources and Traditional Cultural Places Assessment

Dear Mr. Armstrong:

Reid Middleton retained Larson Anthropological Archaeological Services Limited (LAAS) to conduct an archaeological resources and traditional cultural places assessment for the proposed Thorndyke Conveyor Project (Thorndyke), Jefferson County, Washington. The Thorndyke project area is in Sections 6, 7, 8, 18, and 19, Township 27 North, Range 1 East, Willamette Meridian. The proposed project is on the western side of Hood Canal, south of Highway 104, approximately three miles south of the Hood Canal Bridge (Figure 1).

Fred Hill Materials, the project proponent, proposes construction of a 3.9 mile long conveyance system, within a 60-foot easement, to transport sand and gravel material from an existing surface mine to Hood Canal. The conveyance system would load the material directly onto marine vessels at a marine loadout facility on Hood Canal. The proposed project would also include construction of gravel access roads. Construction excavation for the proposed Thorndyke Project would be as deep as 20 feet.

LAAS' archaeological assessment for the project currently consists of archival and literature review, field reconnaissance, and production of a technical report. We are gathering existing archaeological, historic, ethnographic, and historic Indian data from the Washington State Office of Archaeology and Historic Preservation, the Jefferson County Historical Society, and the University of Washington Libraries. However, we are aware that the Suquamish Tribe may have information gathered from elders regarding the project area and/or the Tribe may currently use areas for traditional cultural activities near the proposed project.

We encourage the Suquamish Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but

7700 PIONEER WAY  
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GIG HARBOR  
WASHINGTON  
98335-1184  
TEL: [253] 858-1411  
SEATTLE TEL: [206] 782-0980

Mr. Bennie Armstrong  
March 27, 2002  
Page 2

would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact us at 1-888-631-6131 or at lforsman.laas@attglobal.net at your earliest convenience if you would like to discuss the matter further. Otherwise, Leonard Forsman from LAAS will contact the Tribe's cultural representative within the next week.

Sincerely,



Lynn L. Larson  
Principal Investigator

cc: Charles Sigo, Tribal Curator, Suquamish Tribe  
Rich Brooks, Environmental Program Supervisor, Suquamish Tribal Fisheries Department

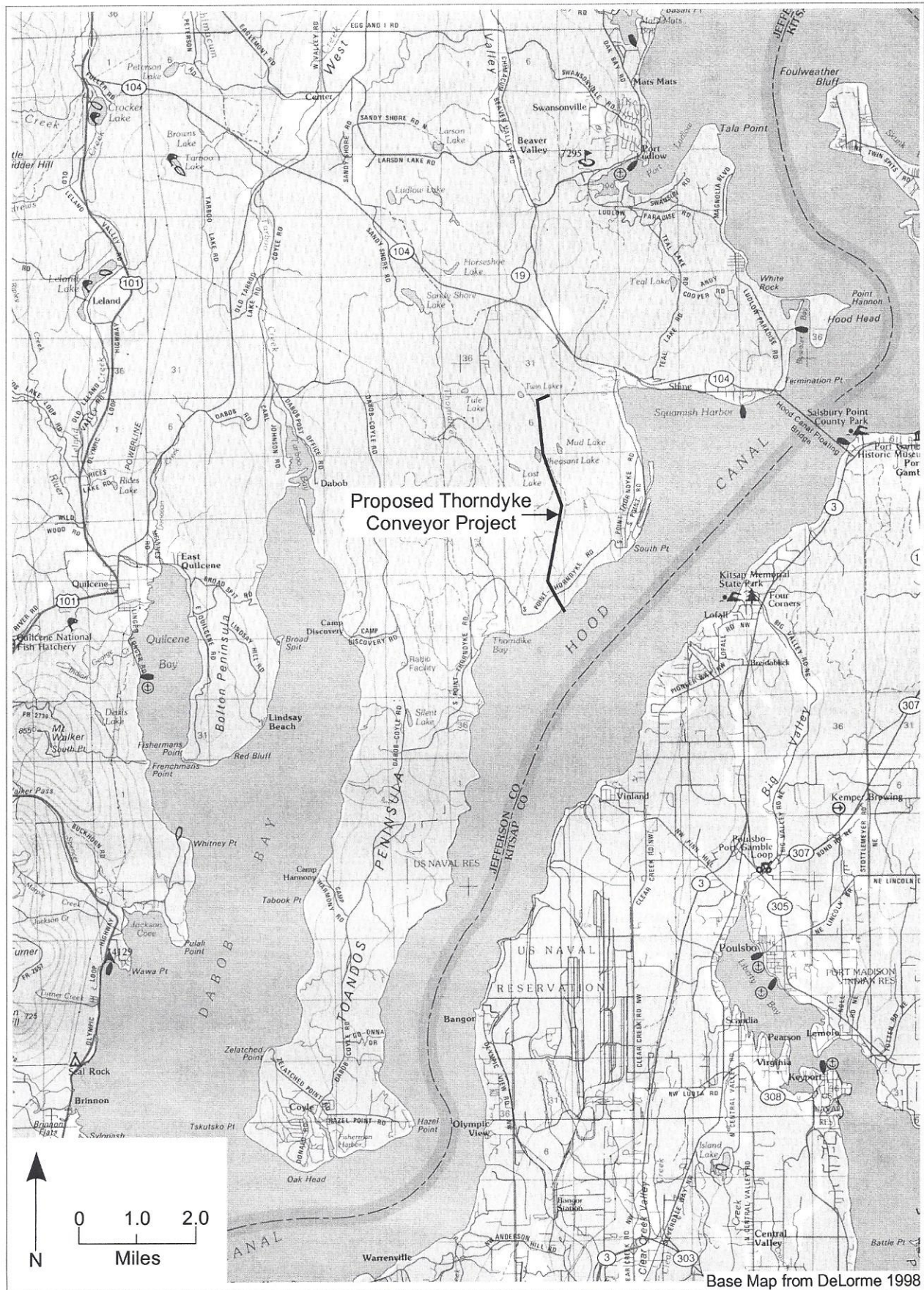


Figure 1. Proposed Thorndyke Conveyor Project vicinity.

L A A S



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March 27, 2002

Ron Charles  
Chairperson  
Port Gamble S'Klallam Tribe  
31912 Little Boston Road  
Kingston, Washington 98346

Subject: Thorndyke Conveyor Project Archaeological Resources and Traditional Cultural Places Assessment

Dear Mr. Charles:

Reid Middleton retained Larson Anthropological Archaeological Services Limited (LAAS) to conduct an archaeological resources and traditional cultural resources assessment for the proposed Thorndyke Conveyor Project (Thorndyke), Jefferson County, Washington. The Thorndyke project area is in Sections 6, 7, 8, 18, and 19, Township 27 North, Range 1 East, Willamette Meridian. The proposed project is on the western side of Hood Canal, south of Highway 104, approximately three miles south of the Hood Canal Bridge (Figure 1).

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We encourage the Port Gamble S'Klallam Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are

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Mr. Ron Charles  
March 27, 2002  
Page 2

private, but would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact us at 1-888-631-6131 or at lforsman.laas@attglobal.net at your earliest convenience if you would like to discuss the matter further. Otherwise, Leonard Forsman from LAAS will contact the Tribe's cultural representative within the next week.

Sincerely,



Lynn L. Larson  
Principal Investigator

cc: Marie Herbert, Cultural Representative, Port Gamble S'Klallam Tribe

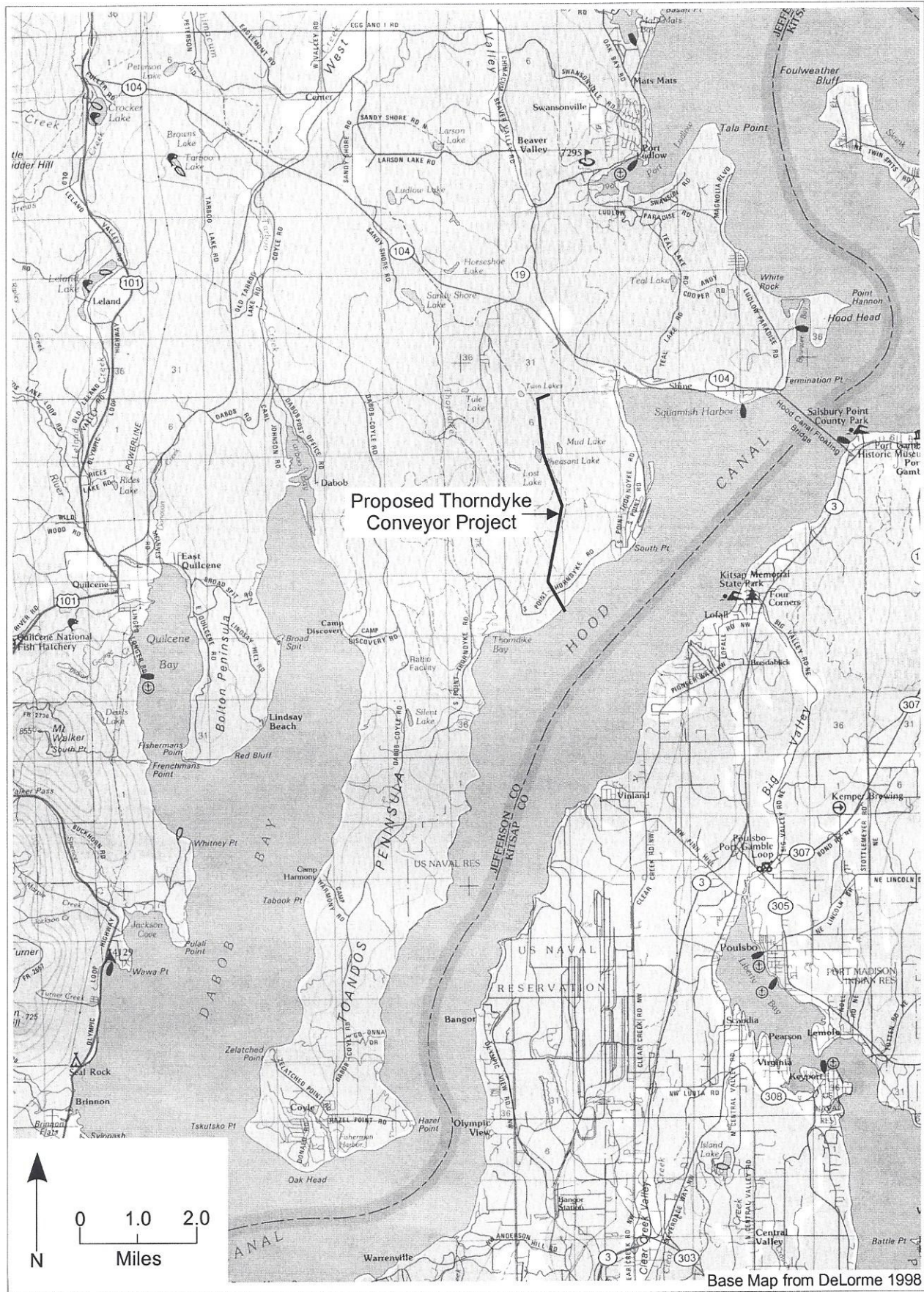


Figure 1. Proposed Thorndyke Conveyor Project vicinity.

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ARCHAEOLOGICAL  
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LIMITED

March 27, 2002

Denny Hurtado  
Chairperson  
Skokomish Tribe  
North 80 Tribal Center Road  
Shelton, Washington 98584

Subject: Thorndyke Conveyor Project Archaeological Resources and Traditional Cultural Places Assessment

Dear Mr. Hurtado:

Reid Middleton retained Larson Anthropological Archaeological Services Limited (LAAS) to conduct an archaeological resources and traditional cultural places assessment for the proposed Thorndyke Conveyor Project (Thorndyke), Jefferson County, Washington. The Thorndyke project area is in Sections 6, 7, 8, 18, and 19, Township 27 North, Range 1 East, Willamette Meridian. The proposed project is on the western side of Hood Canal, south of Highway 104, approximately three miles south of the Hood Canal Bridge (Figure 1).

Fred Hill Materials, the project proponent, proposes construction of a 3.9 mile long conveyance system, within a 60-foot easement, to transport sand and gravel material from an existing surface mine to Hood Canal. The conveyance system would load the material directly onto marine vessels at a marine loadout facility on Hood Canal. The proposed project would also include construction of gravel access roads. Construction excavation for the proposed Thorndyke Project would be as deep as 20 feet.

LAAS' archaeological assessment for the project currently consists of archival and literature review, field reconnaissance, and production of a technical report. We are gathering existing archaeological, historic, ethnographic, and historic Indian data from the Washington State Office of Archaeology and Historic Preservation, the Jefferson County Historical Society, and the University of Washington Libraries. However, we are aware that the Skokomish Tribe may have information gathered from elders regarding the project area and/or the Tribe may currently use areas for traditional cultural activities near the proposed project.


We encourage the Skokomish Tribe's cultural representative to contact us if the Tribe has information that might be useful in the assessment, or if the Tribe has comments or concerns regarding the project area. We also understand that traditional cultural use areas are private, but

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Mr. Denny Hurtado  
March 27, 2002  
Page 2

would welcome the opportunity to work with the Tribe regarding incorporation of this type of information in a secure and respectful manner. Please contact us at 1-888-631-6131 or at lforsman.laas@attglobal.net at your earliest convenience if you would like to discuss the matter further. Otherwise, Leonard Forsman from LAAS will contact the Tribe's cultural representative within the next week.

Sincerely,



Lynn L. Larson  
Principal Investigator

cc: Celeste Vigil, Cultural Technician, Skokomish Tribe

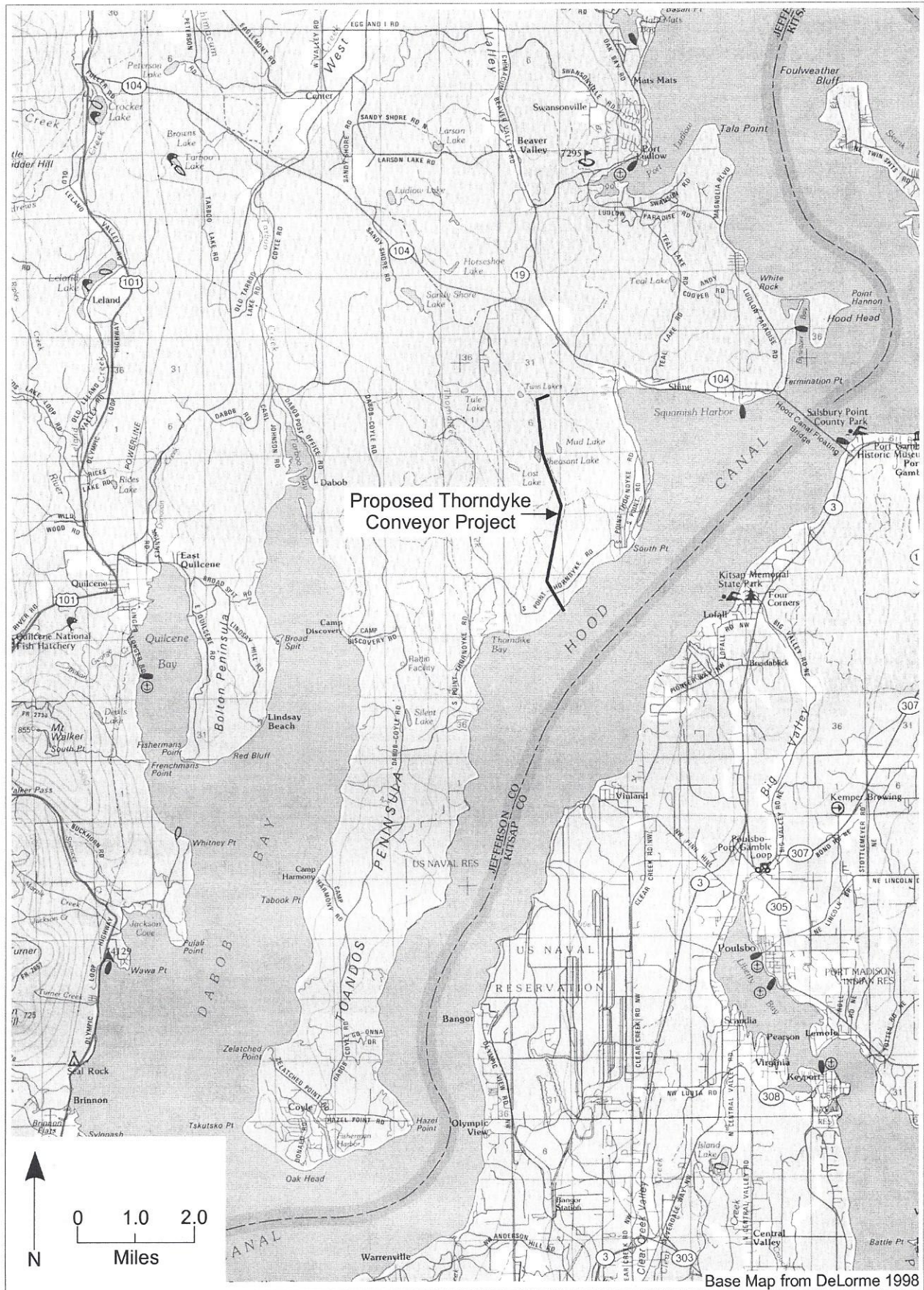


Figure 1. Proposed Thorndyke Conveyor Project vicinity.

**APPENDIX 3**

**T-ROC CENTRAL CONVEYOR AND PIER PROJECT DESCRIPTION AND FACT SHEET**

# Project Description

Jan. 31, 2003

## Purpose

This application is for a permit to build a Central Conveyor and Pier to move sand and gravel from the T-ROC Operations Hub to Hood Canal for marine transport by barges and ships.

## Introduction

Fred Hill Materials, Inc. (FHM) conducts its primary sand and gravel mining and processing operations in Jefferson County at the existing Shine Pit, which is the Operations Hub for the Thorndyke Resource Operations Complex (T-ROC). T-ROC encompasses both existing and proposed expanded operations in and around the Shine Pit.

FHM has undertaken a planning and development process to identify and then pursue its business objectives into the mid-21<sup>st</sup> century. As a result of this planning process, including analysis of the geologic resources and critical environmental areas within the Thorndyke Management Area (Thorndyke Block), FHM has established a series of proposals, which, if approved, would result in:

- Continued growth of existing activities (Shine Pit), including opening of new extraction areas approximately one mile west and south of the Shine Pit (Wahl and Meridian)
- Development of a marine transportation system for the delivery of sand and gravel (Central Conveyor and Pier)

## General Location

T-ROC is located within the approximately 21,000-acre Thorndyke Block, which is a portion of the Pope Resources 72,000-acre Hood Canal Tree Farm. The Thorndyke Block is located in Jefferson County on the Toandos Peninsula, which is south and west of the Hood Canal Bridge. The area is locally known as the Upper Coyle Peninsula.

## General Description of Central Conveyor and Pier

The proposed four-mile Central Conveyor originates at the southwest corner of the Shine Pit, travels south through the Thorndyke Block (within an approximately 34-acre easement), bridges over Thorndyke Road (just south of mile post 3), crosses a 14.7-acre parcel of waterfront property (owned by Hood Canal Sand and Gravel, LLC) and terminates at the end of the proposed 1,000-foot Pier on Hood Canal.

Hood Canal Sand and Gravel's waterfront property, from which the Pier will originate, is approximately five miles southwest of the Hood Canal Bridge, one mile northeast of Thorndyke Bay, and 1.25 miles southwest of South Point.

The Central Conveyor's route was specifically selected to avoid and/or minimize impacts to environmentally sensitive areas (steep slopes, wetlands, streams, and their associated buffers). An Environmental Impact Statement (EIS) is being prepared and when completed will accompany and be incorporated into this Central Conveyor and Pier Application and applications for other proposals identified herein.

The Pier is designed for ships and barges of various sizes and displacements to transport sand and gravel. Only ships will require opening of the Hood Canal Bridge. Only U.S. flagged ships will call at the Pier. At this time, the particular ships required for transport of sand and gravel at the proposed Pier are not available on the West Coast. It is anticipated that these ships will become available in approximately eight to 12 years after the Pier's construction and will be used subject to market demand.

## Proposed Pier Operations

Initially, only barges will call at the Pier. Typical barge capacity is 5,000 dead-weight U.S. short tons (dwt).

In Year 1 of Pier operations, it is anticipated that the volume of sand and gravel transported by barge will be 2 million U.S. short tons (tons).

By Year 10, the volume of sand and gravel transported by barge is expected to reach 4 million tons annually.

In the first year that U.S. flagged ships become available (Year 8 to 12 of Pier operations), it is anticipated that 600,000 tons of sand and gravel will be transported by ship.

By Year 25, the volume of sand and gravel transported by ship is expected to reach 2.75 million tons annually.

By Year 25, it is anticipated that the combined volume of sand and gravel transported by ship and barge will reach 6.75 million tons annually (i.e. 4 million tons via barge and 2.75 million tons via ship), subject to market demand.

(For further details, see *Central Conveyor and Pier Fact Sheet*.)

## History

The Thorndyke Block was logged in the early 1900s, with most of the logging having taken place in the 1930s. After a significant forest fire in 1939, much of the forest re-seeded naturally.

Currently, the area is managed as commercial forestland with periodic logging of small acreage units and predominant replanting of Douglas fir. Much of the commercial forestland crossed by the proposed Central Conveyor was logged within the past 10 years. Old tree stumps, small Douglas firs, forest brush, and shrubs dominate the landscape. In areas that were recently logged, second growth Douglas fir and stands of alder dominate.

Mining of sand and gravel in the general area of the Shine Pit began in 1959 to supply materials for the building of the Hood Canal Bridge revetment on the Jefferson County side. Since that time, various operators have mined sand and gravel in the same vicinity and provided truck delivery of materials.

In December 1979, FHM took over operation of the Shine Pit and obtained a Surface Mine Reclamation Permit (No. 70-011936) issued by the Washington State Department of Natural Resources (WSDNR). Since then, FHM has continuously operated the pit.

In addition to the WSDNR surface mining reclamation permit, FHM operates under a Washington State Department of Ecology (WSDOE) Sand and Gravel General Permit (No. WAG 50-1120), which regulates the treatment and control of stormwater. All stormwater that falls on the existing 144-acre Shine Pit is prevented from leaving the site through application of infiltration techniques.

In June 1999, Ace Paving obtained a Jefferson County Conditional Use Permit (No. ZON98-0041) to operate a portable asphalt batch plant located on five acres within the 144-acre Operations Hub/Shine Pit. Ace Paving operates under its own Washington State Department of Ecology (WSDOE) Sand and Gravel General Permit (No. WAG 50-1237). The stormwater that runs off the asphalt batch plant site goes directly into FHM's central stormwater treatment and control system.

In March 2001, to prepare for the impending depletion of sand and gravel supplies at the existing Shine Pit, FHM submitted to WSDNR a preliminary application for the 156-acre Wahl Extraction Area as an expansion of the existing Shine Pit

In April 2002, FHM submitted a Mineral Resource Lands Overlay (MRL) application to Jefferson County. The submission complied with the new requirements (effective January 2001) of the Jefferson County Unified



Development Code (UDC).

In September 2002, WSDNR determined that the March 2001 FHM application for the Wahl Extraction Area would need to be resubmitted as a new permit, independent of the existing permit. In addition, Jefferson County UDC requirements will be applicable.

In December 2002, Jefferson County approved a modified application for MLA-02-235, a Mineral Resource Land Overlay (MRL) designation for 690 acres, located approximately a mile west and south of FHM's existing T-ROC Operations Hub. This MRL designation formally recognizes the existence of commercially viable deposits of sand and gravel; provides for appropriate notification of adjacent landowners regarding likely future mineral resource activities in this designated area; and allows FHM to apply for specific excavation permits greater than 10 acres in size under the requirements of the Jefferson County UDC. The MRL designation alone does not authorize specific mining activities within the MRL.

### **Existing T-ROC Operations**

T-ROC *currently* consists of five major activity components at the existing 144-acre Shine Pit:

1. Sand and gravel extraction area
2. Operations Hub, including
  - portable crushing, washing, and sorting equipment for sand and gravel
  - portable equipment for recycling of concrete waste
  - stockpile areas
  - trucks and loaders
  - scale house, maintenance building, caretaker home, well, and outbuildings
  - an access road to Hwy. 104
3. Portable conveyors used to move sand and gravel from the extraction area to the Hub
4. Asphalt batch plant (operated by Ace Paving)
5. Mined acreage in various stages of reclamation

In 2003, it is anticipated that the volume of sand and gravel transported by truck will be 500,000 tons, including sand and gravel used in asphalt mix. In approximately 10-15 years, the annual volumes of sand and gravel transported by truck are projected to reach 750,000 tons and remain constant due to the saturation of the local market.

Current and future volumes of sand and gravel transported by truck will be supported by the existing configuration of the T-ROC Operations Hub.

### **Continued Growth of Existing Activities**

Current truck-based operations are expected to deplete the sand and gravel extraction area at the existing Shine Pit by 2004, requiring the opening of a new extraction area.

The analysis of geological resources within the Thorndyke Block, combined with the public concern with the visual impacts of existing mining operations, led FHM to propose a new extraction area approximately a mile west and south of the existing Shine Pit. This new extraction area (Wahl) is outside the public's general viewshed.

The proposed 156-acre Wahl Extraction Area is located west of Wahl Lake and is anticipated to have sufficient volumes of sand and gravel to supply truck-based operations for 20 years. After the Wahl Area is depleted, new permits would be sought to mine in the Meridian Extraction Area (a portion of MLA-02-0235).

Sand and gravel will be transported from the proposed Wahl and prospective Meridian Extraction Areas to the T-ROC Operations Hub via a 1.25-mile conveyor (located in an easement of approximately nine acres) referred to as

the Wahl Conveyor. This conveyor will be built adjacent to an approved forestry service road. Much of the commercial forestland crossed by the proposed Wahl Conveyor has been logged within the past 10 years.

Since the extraction area located in the existing Shine Pit is nearing exhaustion, FHM reiterates that the proposed Wahl Extraction Area and Conveyor (a portion of MLA-02-235) are necessary to provide a continued supply for *existing* FHM truck-based operations.

Application for the Wahl Extraction Area and Wahl Conveyor has been initiated and will be considered in parallel to this application for the Central Conveyor and Pier.

In addition, FHM will initiate application for permission for processing concrete waste from outside sources.

### Development of Marine Transportation System

Should FHM receive necessary approvals for the proposed Central Conveyor and Pier, the extraction rates from the Wahl Extraction Area will accelerate due to the added marine delivery. This acceleration would advance the time frame for application for excavation permits in some or all of the remaining MRL area (Meridian Extraction Area).

The prospective 525-acre Meridian Extraction Area is located generally south of Wahl Lake, and contains the remainder of MLA-02-235. FHM expects that as excavation is completed in the Wahl Extraction Area, permits for expansion of mining into some or all of the Meridian Extraction Area will be submitted. The exact timing of a prospective application for the Meridian Extraction Area will be a function of numerous variables, including but not limited to future market demand and successful development of marine transport capabilities (i.e. the Central Conveyor and Pier).

Upon construction of the Central Conveyor and Pier, reconfiguration of the T-ROC Operations Hub will be needed to accommodate the processing of increased volumes of sand and gravel. The reconfigured Operations Hub will be located on an 100-acre area within the existing 144-acre Shine Pit.

### Summary

Under currently planned proposals, if approved, T-ROC would include:

- a 100-acre **Operations Hub** located within the existing Shine Pit, where up to 7.5 million tons of sand, gravel and recycled concrete will be processed annually and transported by trucks (750,000 tons), barges (4 million tons), and ships (2.75 million tons)
- a proposed 156-acre extraction area (**Wahl Extraction Area**), where sand and gravel would be mined to supply truck-based operations and initial years of marine operations
- a prospective 525-acre extraction area (**Meridian Extraction Area**), where up to 40 years of sand and gravel would be mined
- a proposed 1.25-mile conveyor (**Wahl Conveyor**) connecting the Wahl Extraction Area and subsequent Meridian Extraction Area to the Operations Hub
- a proposed 4-mile conveyor (**Central Conveyor**) connecting the Operations Hub to a 1,000-foot Pier located on Hood Canal, where ships and barges would be loaded up to 300 days a year, up to 24 hours a day

# CENTRAL CONVEYOR AND PIER FACT SHEET

Feb. 11, 2003

## CENTRAL CONVEYOR

*The proposed Central Conveyor will move sand and gravel from the T-ROC Operations Hub (at the existing Shine Pit) to a Pier on Hood Canal for marine transport by barges and ships. The Central Conveyor will be approximately four miles long and is made up of the Twin Conveyors and the Single Conveyor.*

### **Twin Conveyors**

*Located at the northern portion of the Central Conveyor, originating at Shine Pit.*

Location:	Station 25+23.69 to 200+00
Length:	3.3 miles long
Width (each conveyor)	5 feet wide
Gap between conveyors:	4 feet
Segments between transfer points:	4 of varying lengths
Stormwater:	Full dispersion

### **Single Conveyor**

*Located at the southern portion of Central Conveyor, originating at end of the Twin Conveyors and terminating at end of Pier.*

Location:	Station 200+00 to 237+90
Length:	0.7 miles long
Width:	6 feet
Segments between transfer points:	2 of varying lengths
Color:	Natural color(s) to blend into existing environment
Stormwater:	Full dispersion

### **Belts**

*Central Conveyor belts travel on rollers forming a U-shaped trough that carries sand and gravel. Failsafe sensors on head pulley motor automatically shut down operation along the entire conveyor system in case of belt failure.*

Power:	Electric motor at head pulley (tail pulley unpowered)
Rollers:	Self-lubricating
Materials:	Composite
Belt speed (approx.):	6 miles per hour

### **Conveyor Assembly**

Frame:	Steel channel, open box
Height (approx.):	5 feet
Vertical support:	20-foot spacing

Color(s): Natural to blend into existing environment

### **Cover**

*Installed over the Central Conveyor's belts to keep out rain and wind and to prevent fugitive dust, sand, or gravel from escaping.*

Location: Station 25+23.69 to 228+00 (beginning of Pier)  
Material: Metal  
Height above belt: 2 feet 6 inches  
Height above ground: 7 to 8 feet

### **Pan**

*Installed under the Central Conveyor's return belt over all stream crossings and from top of the shoreline bluff to beginning of the Pier.*

Locations: Station 144+00 to 165+00 (stream crossings)  
Station 226+00 to 228+00 (bluff to Pier)  
Clearance from ground: Less than 2 feet

### **Enclosures**

*Enclosures can include a roof, siding, pan under return belt, and a grated walkway or solid floor.*

Thorndyke  
Road Location: Station 211+50 to 214+00  
Components: Roof, siding, solid floor

Shoreline Location: Station 228+00 to 234+35  
Components: Roof, siding, pan under return belt, and grated walkway

Pier Loadout Locations: Station 234+35 to 237+90  
Components: Roof, siding, solid floor

### **Wildlife Crossings**

Typical clearance: 2 feet below return belt  
Large mammal crossings: 4-6 foot clearance below return belt  
Spacing (approx.): Every 300 feet  
Electrical Power: Underground  
Control Lines: Underground

## ROADS AND PARKING

*A gravel forestry service road will provide access for forest firefighting, logging, and Central Conveyor maintenance. It will parallel the Central Conveyor and connect to the network of existing roads in the Thorndyke Block. Abandoned roads will be re-graded and reforested. A turn-out/parking area for a maintenance vehicle will be provided at each transfer point. A parking area will be provided for employees working at the Pier. Stormwater generated by roads and parking surfaces will be managed via full dispersion.*

### **Roads**

Location:	Station 25+69 to 211+50, 214+00 to 217+50
Width:	14 feet
Surface:	Gravel
New surface area:	7.3 acres (includes road surfaces at transfer points, 10 employee parking stalls at Pier and concrete access road)
Abandoned roads:	6.3 acres
Net increase:	1.0 acres

### **Employee Parking for Pier**

Location:	Station 214+50 to 215+50
Number of stalls:	10
Surface:	Gravel
Lighting:	Shielded

### **Turn-out/Parking at Transfer Points**

Location:	Transfer Points 2, 3, 4, 5, & 6
Number of stalls:	One
Surface:	Gravel
Lighting:	None

### **Concrete Access Road**

Location:	217+50 to 222+00
Width:	24 feet

## TRANSFER POINTS

*Each of the six segments of the Central Conveyor terminates at a transfer point, where sand and gravel on the incoming conveyor segment will drop into a hopper and funnel on to the next conveyor segment. A utility shed at each transfer point will enclose the conveyor and hopper to protect electrical equipment, contain fugitive dust, and minimize noise. The Central Conveyor shifts direction slightly at Transfer Points 2, 3, 4, and 5.*

<b>Locations:</b>	Transfer Point 1 Station 25+23.69
	Transfer Point 2 Station 39+27.09

Transfer Point 3 Station 87+16.4  
Transfer Point 4 Station 134+44.87  
Transfer Point 5 Station 200+00  
Transfer Point 6 Station 221+55

### **Utility Shed**

*At each transfer point, a small building will house a head pulley and electric motor, unpowered tail pulley, hopper, and return belt cleaning equipment.*

Location:	Transfer Points 1, 2, 3, 4, 5, and 6
Size:	12 feet by 16 feet
Material:	Wood and metal
Lighting:	Interior only
Stormwater:	Downspout infiltration system or dispersion

### **PIER**

*The proposed Pier consists of a stationary and retractable load-out conveyor supported on pilings spaced at 100-foot intervals, support towers, and eight dolphins (six breasting and two mooring dolphins), with an elevated catwalk. The Pier is the only structure to be placed above the water's surface and will be as low profile as possible. The Pier will be painted to blend into the existing environment and constructed in a manner that will minimize visual intrusion and glare. To minimize shading effects, the Pier will be constructed largely of open steel girders.*

Pier Location:	5 miles southwest of Hood Canal Bridge
Total Length (measured from the Ordinary High Water mark [OHW]):	990 feet
Stationary Conveyor:	Station 228+00 to 236+75
Length:	875 feet

### **Station 228+00 to 233+00**

*Station 228+00 is the location of the first pilings, marking the beginning of the Pier, and is located at approximately the Ordinary High Water mark.*

Length:	500 feet
Truss Height:	10 feet
Truss Width:	13 feet
Top Elevation:	32 feet above MLLW (26 feet MSL)
Invert Elevation:	22 feet above MLLW (16 feet MSL);
Clearance for Boats:	11 feet MHHW
Clearance from Beach (MSL):	19 or more feet above mudline/existing grade

**Station 233+00 to 234+35**

*Station 233+00 begins the incline toward the first support structure.*

Length:	135 feet
Truss Height:	12 feet
Truss Width:	13 feet
Top Elevation:	Slopes from 32 feet MLLW to 91 feet MLLW (26 feet MSL to 85 feet MSL)
Bottom of Conveyor:	Slopes from 22 feet MLLW to 76 feet MLLW (16 feet MSL to 70 feet MSL)

**Station 234+35 to 236+75**

*Station 234+35 is supported by the first steel support structure. Station 236+75 is supported by the second steel support structure.*

Length:	240 feet
Truss Height:	15 feet
Truss Width:	18 feet
Top Elevation:	91 feet above MLLW (85 feet MSL)
Bottom of Conveyor:	76 feet above MLLW (70 feet MSL)

**Station 236+75 to 237+90**

*This modular enclosed distribution (load-out) conveyor pivots and retracts to conform to various vessel loading configurations.*

Length:	165 feet long
Overlap (Retractable Conveyor):	50 feet
Truss Height:	15 feet
Truss Width:	15 feet
Top Elevation:	76 feet above MLLW (70 feet MSL)
Bottom of Conveyor:	61 feet above MLLW (55 feet MSL)
Channel Elevation at end of pier:	-79 feet MLLW (-73 feet MSL)

**Support structures**

*Two open steel structures will support the conveyor near the end of the pier. The first structure supports the conveyor. The second structure supports both the conveyor and the load-out conveyor. The Central Conveyor's second support structure will have an overall height of approximately 76 feet above MLLW (70 feet MSL). This is the minimum height necessary to be able to load sand and gravel on ships.*

**Support #1: Station 234+35 to 234+65**

Dimensions:	30 feet by 30 feet
Top Elevation:	76 feet above MLLW (70 feet MSL)
Channel Elevation (measured at center of support):	13 feet MLLW (7 feet MSL)

**Support #2: Station 236+55 to 236+95**

Dimensions: 40 feet by 40 feet  
Top Elevation: 61 feet MLLW (55 feet MSL)  
Channel Elevation (measured  
at center of support): -52 feet MLLW (-46 feet MSL)

**Pilings**

*Pilings will be installed to support the Pier (truss supports), support structures, and breasting and mooring dolphins.*

Material: Steel  
Diameter: 18-inch (Truss supports)  
18-inch (Catwalk supports)  
30-inch (Support structures)  
30-inch (Dolphins)  
Spacing: 100-foot (Truss supports)  
50-foot (Catwalk supports)  
Number: 4 each (Truss supports)  
16 each (Support structures)  
12 each (Dolphins)  
3 each (12 Catwalk Supports)

**Control room**

*An enclosed control room with access stairways, storage area, restroom, and holding tank is located within the second support structure. These facilities will not increase the area of over-water coverage.*

Dimensions: 20' x 40' x 20'  
Material: Same siding as enclosures  
Lighting: Shielded

**Maintenance walkway**

*The pile-supported breasting and mooring dolphins will be connected by a grated maintenance catwalk.*

Material: Galvanized or Aluminum steel  
Width: 5 feet  
Length: 710 feet  
Railings: 36 – 42" high  
Elevation: 22' MLLW or 16' MSL



### **Breasting and Mooring Dolphins**

*The end of the Pier will consist of six pile-supported breasting dolphins and two pile-supported mooring dolphins.*

Water depth range: -49 feet to -64 feet MLLW  
(-43 feet to -58 feet MSL)  
Shallowest dolphin depth: -37 feet MLLW (-31 feet MSL)  
Pilecap Dimensions: 20-foot by 20-foot, 7-foot thick  
Pilecap material: Concrete  
Pilecap invert elevation: 15 feet MLLW (9 feet MSL)

### **Maintenance and Storage Buildings**

*Two maintenance/storage buildings will be located on dolphins.*

Dimensions: 10 feet by 10 feet  
Material: Same siding as enclosures

### **Lighting**

*Lighting of the intertidal and subtidal portions of the Central Conveyor and Pier will be kept to the minimum required for safe operation. Lighting of the water surface will be minimized with the use of shielding and directional fixtures. During non-operation hours, lights will be turned off except as needed for maritime safety requirements.*

### **VESSEL DESCRIPTION**

*The Pier is designed for ships and barges of varying sizes and displacements to transport sand and gravel. Only ships will require opening of the Hood Canal Bridge. It is anticipated that the first ships will call at the Pier eight to 12 years after the Pier's construction.*

	Ship		Barge		Typical Barge
<b>Maximum Length (LOA):</b>	745'		400'		240'
<b>Maximum Width (berth):</b>	110'		100'		60'
<b>Maximum Draft:</b>	45'		25		16'
<b>Volume Range (dead weight tons [dwt]):</b>	20,000 to 65,000		2,500 to 20,000		5,000 to 7,000
<b>Estimated Loading Time (hrs):</b>	10-24		1-8		2-3

**APPENDIX 4**

**WASHINGTON STATE OFFICE OF ARCHAEOLOGY AND HISTORIC  
PRESERVATION CULTURAL RESOURCES SURVEY  
COVER SHEET**

## Cultural Resources Survey Cover Sheet

Author: David R. Iversen, Leonard A. Forsman, Kurt W. Roedel, Dennis E. Lewarch, and Lynn L. Larson

Title: Draft Thorndyke Conveyor Project Archaeological Resources and Traditional Cultural Places Assessment, Jefferson County, Washington.

Date: March 4, 2003

County: Jefferson Section: 6, 7, 8, 18, 19 Township: 27N Range: 1E Quad: Lofall, Washington

Total Pages: 64 Acres: 27

Site No. :

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(For Author's review)

This report:

- Describes the objectives & methods.
- Summarize the results of the survey.
- Reports where the survey records and data are stored.
- Has a Research Design that:
  - Details survey objectives
  - Details specific methods
  - Details expected results
  - Details area surveyed
  - Details how results will be feedback in the planning process

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\_\_\_\_\_  
OAHF Use Only

NADB Document No: \_\_\_\_\_ OAHF Log No: \_\_\_\_\_

My review results in the opinion this survey report \_\_\_ does \_\_\_ does not conform with the Secretary of the Interior's Standards for Identification.

Signed:

\_\_\_\_\_ Date: \_\_\_\_\_