ENVIRONMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT
CITY SHORELINE EMERGENCY BANK STABILIZATION, DILLINGHAM, ALASKA

November 2008

FINDING OF NO SIGNIFICANT IMPACT

In accordance with the National Environmental Policy Act of 1969, as amended, the U.S. Army Corps of Engineers, Alaska District, has assessed the environmental impacts of the following action:

City Shoreline Emergency Bank Stabilization
Dillingham, Alaska

The U.S. Army Corps of Engineers, Alaska District will construct revetments on the West Side and City Dock Side of the Dillingham Small Boat Harbor entrance channel to protect riverbanks from accelerated erosion and to construct a breakwater perpendicular to the Nushagak River and 50 degrees (acute) to the west revetment to prevent waves from eroding riverbanks within the harbor. Erosion protection structures on the West Side and City Dock Side of the harbor will include approximately 1,950 linear feet of rock revetment and 371 linear feet of rock breakwater. Construction will cover approximately 4.2 acres of intertidal mudflats above 0 MLLW, 2.3 acres of a former upland dredged material disposal site, and 0.2 acre of sedge-beach rye covered wetland.

The Nushagak River estuary is highly turbid, and sediments deposited on the mudflats are dynamic. Marine invertebrates on the project site are meiofaunal and low in diversity. Macrofaunal invertebrates are low in abundance or non-existent. Small numbers of microscopic invertebrate fauna will be destroyed, but no long-term effects to the invertebrate population are expected.

Adult and juvenile Pacific salmon are seasonally present, but no long-term adverse effects that will jeopardize the salmon populations are expected. The project is not expected to have long-term effects on essential fish habitat.

The upper portion of the rock revetment will be vegetated with willow and native grass to mitigate loss of second-growth willow that will be destroyed during construction. Approximately 0.2 acre of sedge-beach rye covered wetland will be used for this project. Wildlife use of this wetland area is low, and there will be no mitigation to compensate for its loss.

The project will have no effect on threatened or endangered species or their critical habitat. The project will not affect any known cultural or archeological resources eligible for inclusion in the National Register of Historic Places.

This action was coordinated with the U.S. Fish and Wildlife Service, U.S. National Marine Fisheries Service, Alaska Division of Natural Resources Office of Project Management and Permitting, State Historic Preservation Officer, Alaska Department of Environmental Conservation, and the Regulatory Branch of the U.S. Army Corps of Engineers, Alaska District.

The U.S. Fish and Wildlife Service drafted a Coordination Act Report (CAR) for this action. Mitigation recommended by the U.S. Fish and Wildlife Service Coordination Act Report has been incorporated to the maximum extent practicable..

This work is consistent with the Bristol Bay CRSA Coastal Management District coastal management standards to the maximum extent practicable. The accompanying environmental assessment supports the conclusion that this project will not constitute a major Federal action significantly affecting the quality of the human environment. Therefore, an environmental impact statement is not necessary for construction of the proposed riverbank protection structures at Dillingham, Alaska

_____ _____

Kevin J. Wilson Date
Colonel, Corps of Engineers
District Commander

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Environmental Assessment
for
City Shoreline Emergency Bank Stabilization,
Dillingham, Alaska

1.0 PURPOSE AND NEED

1.1 Background

Dillingham is in southwestern Alaska, approximately 327 miles southwest of Anchorage (figure 1). Dillingham serves as the economic, transportation, and public service center for western Bristol Bay. Commercial fishing, fish processing, cold storage, and fishing industry support services form the base of the local and regional economy. The Dillingham Small Boat Harbor accommodates about 350 fishing vessels and is vital for commercial salmon fishing interests. The Dillingham harbor was first constructed in 1960 by enlarging the channel of Scandinavia Creek where it enters the Nushagak River estuary (COE 2006), and has been labeled a "half-tide harbor" (Everts 1976) because it goes essentially dry at low tides.

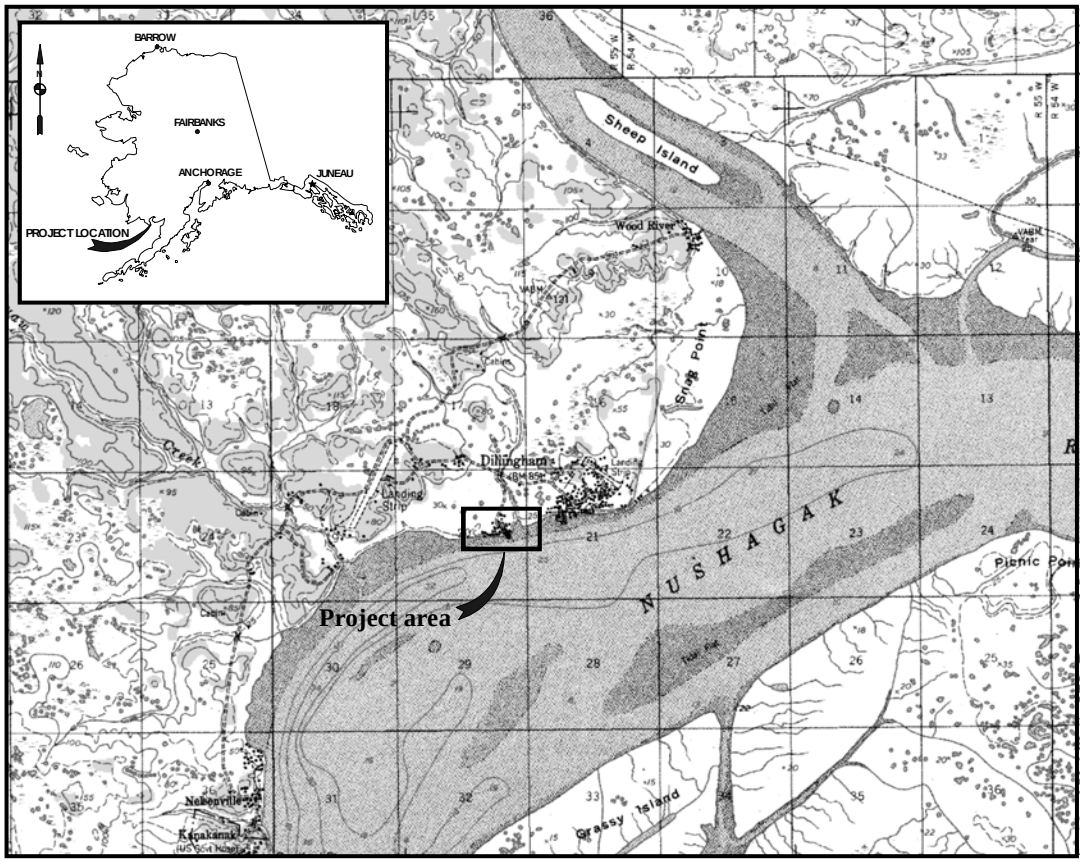

Figure 1. Location of the project area.

1.2 Problem

The Nushagak Estuary shoreline near Dillingham harbor is lined with low riverbanks composed mostly of clay, peat, and silt, and some higher bluffs partly composed of unconsolidated glacial outwash sand, gravel, cobble, and boulders. Sparse riparian vegetation, whose roots help stabilize the riverbanks, grows in places on these riverbanks, but shoreline storm waves are eroding the banks in many areas including those adjacent to the small boat harbor. Erosion of riverbanks near the entrance of the small boat harbor has been relatively rapid. Average erosion per year on the west side of the harbor entrance was 10.8 linear feet for the period of analysis from 1972 through 2001, with an estimated 5.7 acres lost since 1972. On the City Dock Side of the harbor the erosion rate has been from 2.4 to 7.6 feet per year over the period from 1972 to 2001, with up to 8 feet of erosion during a single storm in August 1980. An estimated 6.2 acres on the City Dock Side has been lost to erosion during this period.

The principal cause of the erosion is storm waves that attack the riverbanks during the higher high tides. The U.S. Army Corps of Engineers, Alaska District proposes to construct rock revetments on the West Side and City Dock Side of the harbor (east of the harbor) to protect the riverbanks from erosion and to construct a breakwater to inhibit waves from entering the harbor and eroding the banks inside the harbor. The entrance channel to the small boat harbor and the 600-foot-long sheet-pile structure mentioned in Section 1.3 separate the recommended City Dock Side and West Side project sites. Protecting the river banks and inner harbor from storm-wave erosion would extend the useful life of the harbor for the expected useful life of the project (50 years). Without the proposed project the useful life of the harbor would be shorted to approximately 10 years at the current rate of erosion due to erosion of the unprotected west bank and flanking of the existing sheetpile seawall. Details of construction for the proposed project are presented in the Letter Report, of which this EA is part, and are summarized in the alternatives section that follows.

1.3 Previous Protection Efforts

Previous efforts to control riverbank erosion in Dillingham include 1,600 feet of sheet-pile bulkhead at Snag Point built by the Corps of Engineers between 1995 and 1998 (USACE 1995, 1997), and about 600 feet of sheet-pile bulkhead built by the Corps immediately east of the harbor entrance and about 400 feet of riprap revetment on the east bank of the entrance channel in 1999 (USACE 1998). The timber plank and pile bulkheads built in 1983 by the city, cited in PL 106-377, were replaced by the city in 2004-2005 with an open cell sheet-pile bulkhead and will not be addressed further in this report. In addition, Bristol Alliance Fuels (BAF) has installed a sheet-pile wall to protect their facilities west of the harbor entrance channel.

Other private efforts to control erosion have been attempted along the west bank of the harbor entrance channel. These efforts consisted of sheet-pile and wood bulkheads that have failed to withstand the energy of storm waves, and the remains of the wood bulkheads offer little or no stabilization to the shoreline in this area today.

1.4 Previous Environmental Assessments

The Corps wrote environmental assessments (EA's) in 2001 and 2002 for actions similar to this action (COE 2001, 2002). The actions described in 2001 and 2002 were not constructed. This EA combines and modifies the actions described in the 2001 and 2002 EA's, and introduces new designs that are expected to provide superior protection to the riverbanks on both sides of the harbor. The alternatives considered are described in the following sections.

2.0 ALTERNATIVES

2.1 West Side Alternatives

Six alternatives were considered for the West Side revetment and breakwater. West Side designs include rock revetment or a combination of rock revetment and sheet-pile construction. Alternatives for the West Side and City Dock Side bank protection projects are summarized below. Additional construction detail is presented in the Hydraulic Design Appendix (Appendix A) of the Alaska District Letter Report (COE 2007).

Alternative W1. Alternative W1 consists of a rock revetment on both the west and east sides of the inner harbor (figure 2). The revetments would be constructed as a three-layer system of core, secondary, and armor stone. The rock would extend up to an elevation of +32 feet MLLW with 1V:3H side slopes. From elevation +29 MLLW to elevation +32 MLLW, the slope would be graded to transition to the existing top of bank. This upper section of revetment would be planted with live willow stakes and sprigging of grasses of species common to the Dillingham area. This planting would replace vegetation lost either to erosion or during the construction of the project.

Alternative W1A. Alternative W1A consists of a combination of sheet-pile wall and rock revetment on the west side of the harbor and a rock revetment on the east side of the harbor (figure 3). This alternative was prepared in response to a request by the owner of BAF. The owner of BAF wants to be able to utilize portions of the west bank for loading and unloading barges. Although the harbor is not currently configured to allow for this activity, the owner of BAF believes that if a riprap revetment were installed the west bank could not be used for this purpose.

Alternative W2. Alternative W2 consists of a rubblemound breakwater and a rock revetment on the west side of the harbor with no bank stabilization on the east bank (figure 4). This alternative utilizes both a breakwater and revetment to prevent future erosion. The breakwater would prevent large waves from entering the harbor. The revetment along the west bank outside the breakwater alignment would prevent erosion in the areas of the west bank still exposed to waves. The west bank revetment in the interior of the harbor would prevent erosion from residual waves or rare storms that would result in waves from the east. Because the waves that would impact the interior west bank would be much smaller than those that are currently impacting the interior west bank, the revetment cross section for this interior section would not require material as large as that required in Alternatives W1 and W1A.

The revetments would be constructed as a three-layer system of core, secondary, and armor stone. The rock would extend up to an elevation of +32 feet MLLW with 1V:3H side slopes. From elevation +29 MLLW to elevation +32 MLLW, the slope would be graded to transition to the existing top of bank. This upper section of revetment would be planted with live willow stakes and sprigging of grasses of species common to the Dillingham area. This planting would replace vegetation lost either to erosion or during the construction of the project.

The breakwater would be constructed using a three-layer system of core, secondary, and armor stone. The breakwater would have a crest elevation of +32 feet MLLW and have 1V:1.5H side slopes.

Alternative W3. Alternative W3 is essentially the same as Alternative W2, except for including the east revetment and a different alignment for the breakwater (figure 5). This alternative accomplishes the same as alternative W2, but includes additional protection to the east bank from small residual waves inside the harbor.

The revetments would be constructed as a three-layer system of core, secondary, and armor stone. Rock would extend up to an elevation of +32 feet MLLW with 1V:3H side slopes. From elevation +32 MLLW to elevation +32 MLLW, the slope would be graded to transition to the existing top of bank. This upper section of revetment would be planted with live willow stakes and sprigging of grasses of species common to the Dillingham area. This planting would replace vegetation lost either to erosion or during the construction of the project.

Alternative W4. Alternative W4 is essentially the same as alternative W2 and W3, except for including the east revetment and a different alignment for the breakwater (figure 6).

Revetments for Alternative 4 would be constructed as a three-layer system of core, secondary, and armor stone. Rock would extend up to an elevation of +32 feet MLLW with 1V:3H side slopes. From elevation +32 MLLW to elevation +32 MLLW, the slope would be graded to transition to the existing top of bank. This upper section of revetment would be planted with live willow stakes and sprigging of grasses of species common to the Dillingham area. This planting would replace vegetation lost either to erosion or during the construction of the project.

Alternative W5. Alternative W5 has the same breakwater and rock revetments on the west side of the harbor as Alternative W2 and the revetment on the east bank (figure 7).

Revetments for Alternative W5 would be constructed as a three-layer system of core, secondary, and armor stone. The rock would extend up to an elevation of +32 feet MLLW with 1V:3H side slopes. From elevation +29 MLLW to elevation +32 MLLW, the slope would be graded to transition to the existing top of bank. This upper section of revetment would be planted with live willow stakes and sprigging of grasses of species

common to the Dillingham area. This planting would replace vegetation lost either to erosion or during the construction of the project.

Alternative W6. Alternative W6 is the No-Action Alternative for the West Side project site and it only meets the objectives of minimizing impacts to fishing habitat and maintenance dredging of the harbor. There is no figure for this alternative.

Figure 2. Alternative W1

Figure 3. Alternative W1A

Figure 4. Alternative W2

Figure 5. Alternative W3

Figure 6. Alternative W4

Figure 7. Alternative W5

2.2 City Dock Side Alternatives

Four concept alternatives for stabilizing the shoreline from future erosion on the City Dock side of the harbor were developed and evaluated. The four alternatives consist of either a rock revetment or a sheet-pile bulkhead along two alternative alignments. Each alternative includes a beach access ramp near the east end of the existing sheet-pile bulkhead in front of the harbor. This access ramp would serve as a foundation for a temporary pipeline during annual harbor dredging and potentially as public (pedestrian) access to the beach for local subsistence and recreational activities.

This section highlights the key design parameters describing the four concept design alternatives. Both alignments extend eastward from the terminus of the existing sheet-pile bulkhead. A more detailed discussion of the alignments and the associated advantages and disadvantages can be found in the Hydraulic Design Appendix of the Letter Report (COE 2007).

Alignment 1. Alignment 1 incorporates the minimum bank stabilization necessary and parallels the containment berm of the former Peter Pan Seafoods (PPS) disposal site and leaves the wetland between the former PPS disposal site berm and the PPS dock mostly undisturbed.

Alignment 1 begins at the terminus of the existing sheet-pile bulkhead and extends east along the shoreline, wraps around the existing dredged material containment berm and keys into the east side of the berm about 100 feet inland. Alternatives C1 and C2 (figures 8 and 9) follow Alignment 1.

Alignment 2. Alignment 2 also begins at the east end of the existing harbor sheet-pile bulkhead and follows the shoreline and former PPS containment berm east. The primary difference between the alignments is that alignment 2 crosses the wetland and ties into the westernmost PPS dock. Alternatives C3 and C4 (figures 10 and 11) follow Alignment 2.

Alternative C1: Alignment 1 Rock Revetment. Alternative C1 consists of a rock revetment with the alignment 1 configuration (figure 8). The Alternative C1 revetment would have a 1V:1.5H slope using a three-layer system of construction similar to the West Side alternatives. The top elevation of the revetment would be +32 feet MLLW. The revetment would have a top width of 20 feet as needed for construction and maintenance equipment. The eastern terminus of the revetment wraps around the southeast corner of the existing PPS containment berm and extends an additional 100 feet landward. The rock revetment is keyed into the east side of the existing containment berm on the east end.

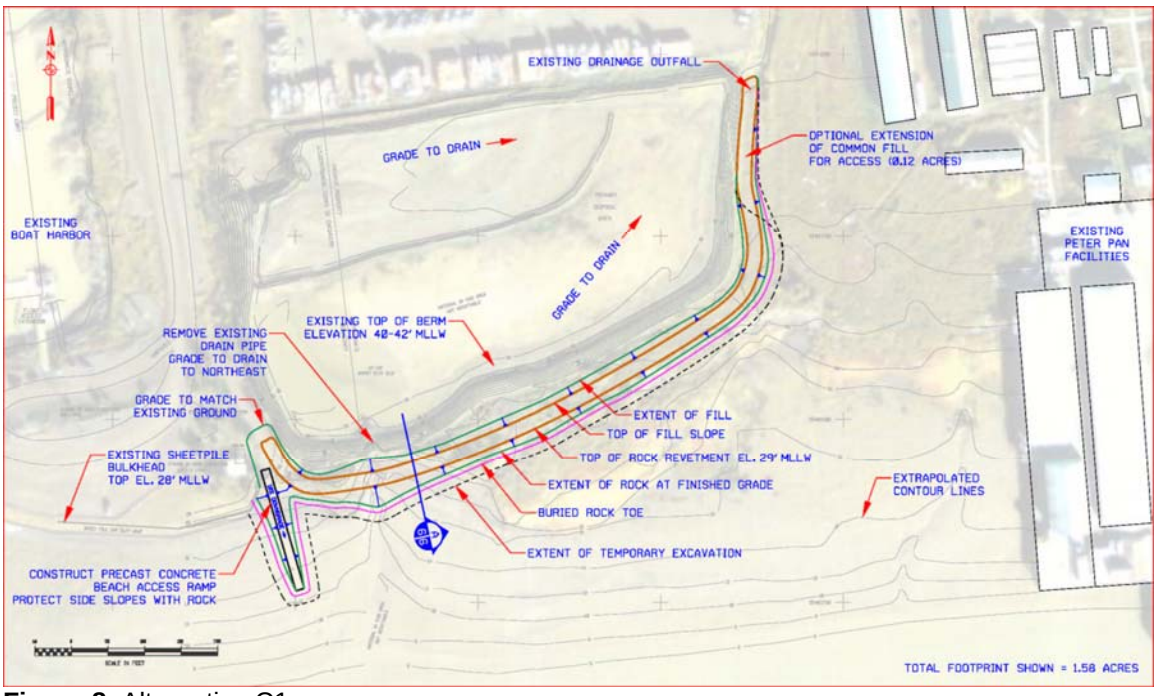

Figure 8. Alternative C1

Alternative C2: Alignment 1 Sheet-pile. Alternative C2 includes a sheet-pile bulkhead that extends along the same alignment as the revetment in Alternative C1 (figure 9). The preliminary bulkhead design has a capped top at elevation 32 feet MLLW. The eastern terminus of the bulkhead wraps around the southeast corner of the existing containment berm and extends an additional 100 feet landward. Along this eastern reach, the bulkhead transitions to rock revetment, which is keyed into the east side of the existing containment berm.

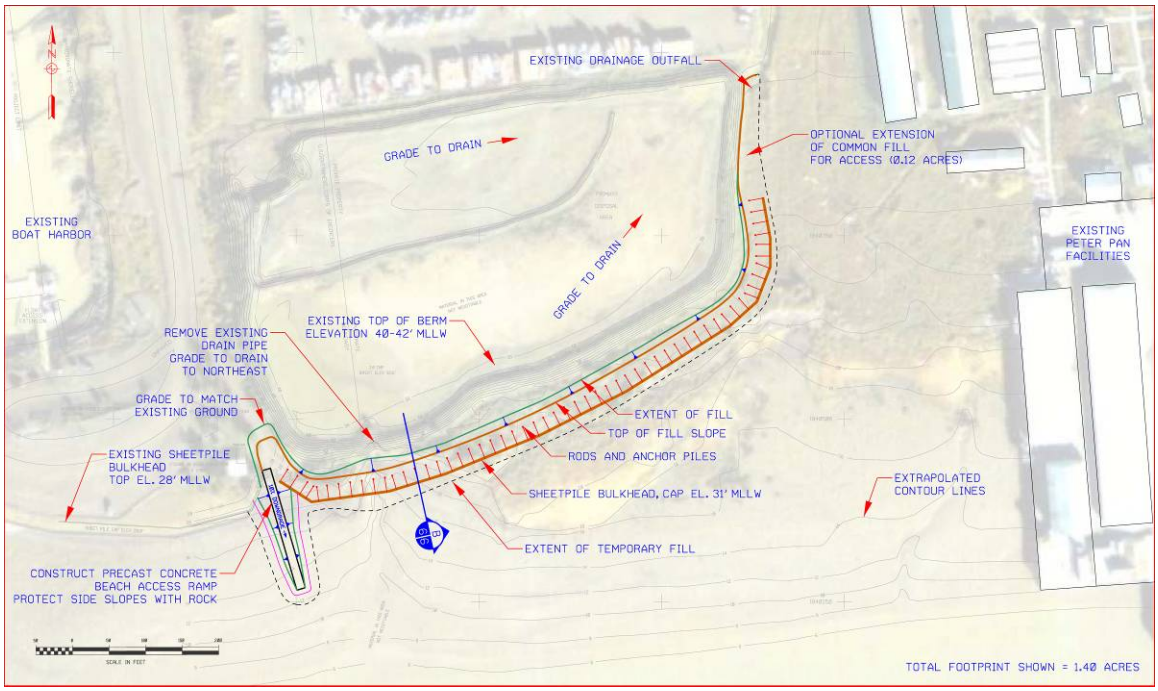

Figure 9. Alternative C2

A drainage system is included with free-draining material placed against the bulkhead and 6-inch-diameter weepholes at maximum 12-foot spacing. Safety ladders are included at regular intervals as required by City of Dillingham regulations. Attachments are included at 100-foot intervals to accommodate the placement of subsistence fishing nets. Corrosion protection (coal tar epoxy coating and galvanic anodes) is recommended for sheet-piles, HP-piles, and anchor rods.

Alternative C3: Alignment 2 Rock Revetment. Alternative C3 is a revetment similar to that of Alternative C1; the difference is the alignment (figure 10). Alternative C-3 follows Alignment 2. The Alternative C3 revetment would have a 1V:1.5H slope using a three-layer system of construction similar to the West Side alternatives. The top elevation of the revetment will be +32 feet MLLW. The revetment would have a top width of 20 feet as needed for construction and maintenance equipment. This alignment crosses the existing wetland drainage between the PPS dock and the former PPS dredged material disposal area. A drainage culvert would be required through the Alternative C3 revetment in this location.

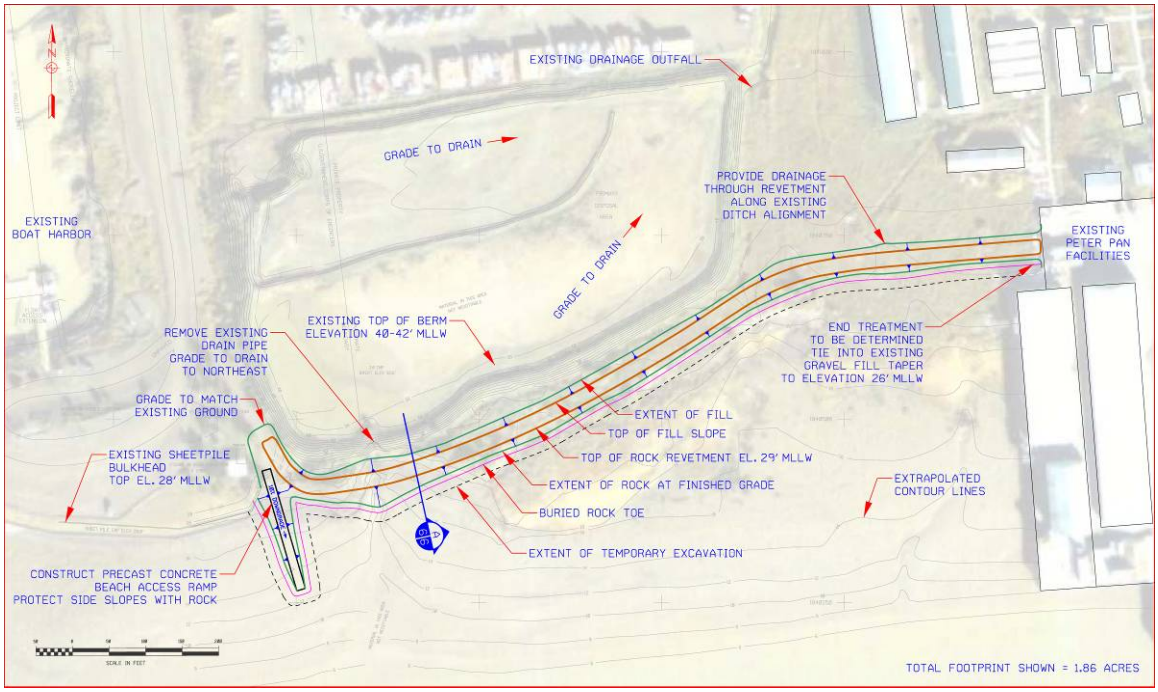

Figure 10. Alternative C3

Alternative C4: Alignment 2 Sheet-pile. This alternative follows alignment 2 and consists of sheet-pile instead of rock revetment (figure 11). This alignment crosses an existing drainage channel between the PPS dock and the former PPS dredged material disposal area. A drainage culvert would be required through the proposed bulkhead in this location.

A drainage system is included with free-draining material placed against the bulkhead and 6-inch-diameter weepholes at maximum 12-foot spacing. Safety ladders are included at regular intervals as required by City of Dillingham regulations. Attachments are included at 100-foot intervals to accommodate the placement of subsistence fishing nets. Corrosion protection (coal tar epoxy coating and galvanic anodes) is recommended for sheet-piles, HP-piles, and anchor rods.

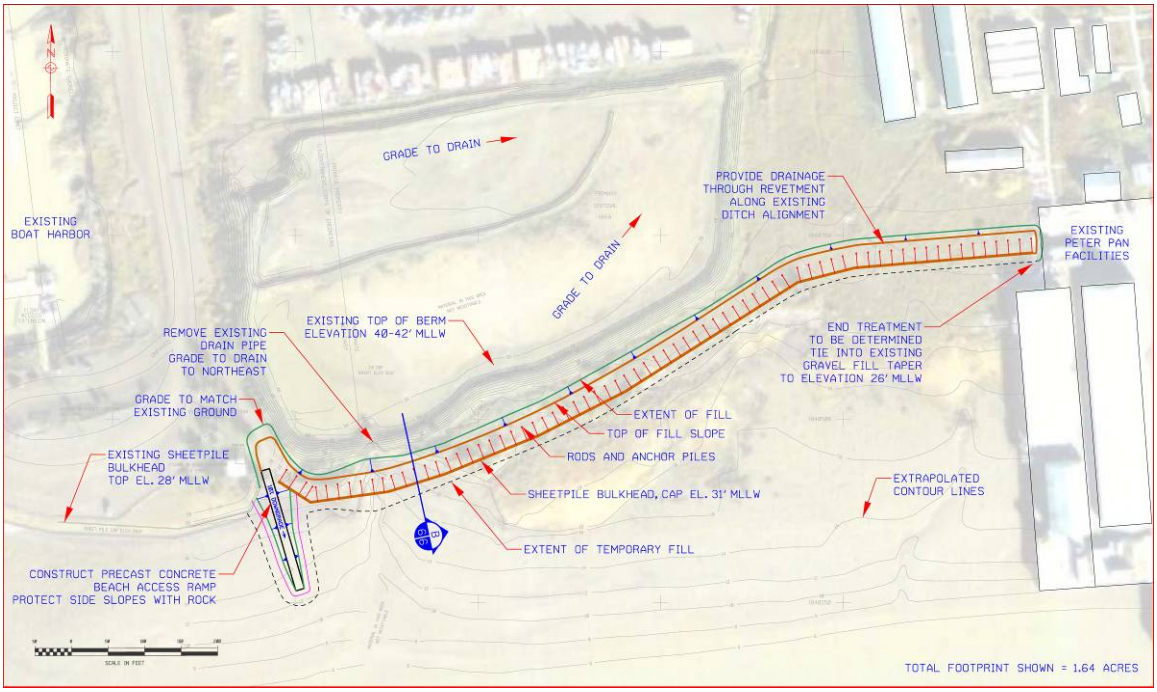

Figure 11. Alternative C4

Alternative C5: No Action. The no-action alternative for the City Dock Side assumes that the erosion would continue at its current rate. Physical and financial impacts to existing facilities under this alternative are described in the Economics Appendix of the Letter Report (COE 2007). There is no figure for this alternative.

2.3 Recommended West Side Alternative

Alterative W2 is the recommended West Side alternative. Alternative W2 consists of a rubblemound breakwater and a rock revetment. The rock revetment would begin at the east end of the BAF sheet-pile dock and extend north up the west side of the harbor for approximately 1,100 feet (figure 4). The breakwater would be approximately 371 feet long and extend east into the Nushagak River estuary from the west side of the harbor.

The approximate dimensions and footprint areas of Alternative W2 are:

Structure	Length (ft)	Base Width (ft)	Area (ft^2)	Acres	Type of Habitat
Breakwater	371	84	31,164	0.7	Intertidal
Revetment	1,100	84	92,400	2.1	Intertidal/upland
Access Road	1,700	60	102,000	2.3	Upland

The West Side revetment and breakwater would occupy mostly intertidal mud, while the access road would occupy the former Old Western dredged material disposal area.

An estimated 25,600 cubic yards of material would be needed to construct the revetment and an estimated 13,050 cubic yards of material would be needed to construct the breakwater. The total estimated fill would be 38,650 cubic yards.

2.4 Recommended City Dock Side Alternative

Of the four alternatives considered in detail for the City Dock Side revetment, Alternative C1 was selected as the recommended alternative. Alternative C1 consists of a rock revetment approximately 850 feet long (figure 8). The revetment would extend approximately 750 feet from the eastern end of the sheetpile that currently protects the harbor and follow the former PPS disposal area berm for 100 feet where it would key into the berm. The estimated footprint for Alternative C1 is 1.6 acres, the majority of which would be on intertidal mud recently created by erosion of the river bank and the base of the former PPS disposal area containment berm. A maintenance road would be constructed on top of the former PPS disposal site berm and a ramp for access to the beach would be included on the west end of the revetment adjacent to the east end of the existing harbor sheetpile.

2.5 Environmentally Recommended Alternative

Alternative W2 was selected as the environmentally recommended alternative because it is 1,471 feet in length compared to 1,900 to 2,271 feet in length for the alternatives not recommended while providing a breakwater alignment best suited to protect the harbor.

Of the four alternatives considered for construction on the City Dock Side, the environmentally recommended alternative is the recommended alternative (C1) because: (1) rock revetment results in less energy refraction than sheetpile, (2) the selected alignment (Alignment 1) covers the least area of wetland, and (3) potential damage to historic structures is mitigated.

3.0 SOURCE OF QUARRIED ROCK

The Corps of Engineers does not designate rock revetment material sources. The contractor would be responsible for selecting a quarry site and providing rock to meet design specifications. Pre-project planning, including National Environmental Policy Act investigations and documentation, assumes the contractor would use only an existing quarry as a rock source.

Borrow materials (gravel, sand, and classified material) would continue to come from sites designated by the government from a permitted borrow source. A rock quarry is considered existing if there has ever been mining at the site, and it has not been restored. An existing quarry may be “operating” or “non-operating” (abandoned, idle, not currently used). Local quarries can likely provide the necessary construction materials.

A review of the selected quarry site would determine if there are environmental issues and if a more thorough evaluation would take place. Upon selection of a quarry site, the contractor would submit a quarry development plan for that site to the Corps of Engineers. A coordinated agency review of the plan would be conducted to allow state and federal agencies to propose stipulations on the use of the site. The development plan would include limits of construction, disposal of quarry waste, necessary roads and traffic routes, quarry stockpile area(s), and other stockpile areas for quarry restoration material. Other requirements include a blasting plan, outline of excavation methods, and a restoration plan, if applicable.

4.0 MITIGATION

The U.S. Fish and Wildlife Service drafted a Coordination Act Report (CAR) in 2002 for an earlier project design on the West Side and applied mitigation recommendations from that CAR (Appendix B) to the existing West and City Dock Side designs because of their similarities to the earlier design. The recommendations that were made to mitigate potential effects to wildlife and habitat were incorporated in the current project designs as practicable.

The U.S. Fish and Wildlife Service recommended the following seven measures be incorporated to avoid and minimize what the Fish and Wildlife Service believes could be adverse impacts from construction of the project.

1. The COE defines the purpose and need of this project in the Environmental Assessment for this project.

This recommendation was complied within Section 1.0 of this environmental assessment.

2. The COE develop an assessment of the cumulative impacts of their erosion control projects in the Dillingham area and develop a long-term plan to address bank stabilization and boat harbor maintenance needs.

A brief discussion of cumulative impacts is found in Section 6.3.3 of this environmental assessment.

2. Selection of the rock revetment alternative instead of the hybrid rock revetment and sheet-pile alternative. The Service believes that rock revetment has a greater potential to hold and maintain vegetation, has greater hydrologic roughness, and may provide some degree of fish habitat greater than steel sheet-pile.

Alternatives incorporating both sheetpile and rock construction were considered and evaluated. This project uses rock for revetment and breakwater construction because compared with sheet-pile it has less tendency to deflect wave energy and a greater potential to provide surface area for the colonization of diatoms and algae in the intertidal zone.

4. That all work below ordinary high water shall occur when the tide level is below the work area to avoid impacts to fish and water quality.

Mitigation for this project includes minimizing inwater work as much as possible to protect juvenile salmon. Much of the revetment construction below the mean high water line would be done during lower tides when the tide flat is dewatered, but some construction on the breakwater might be necessary when the tide flats are flooded. The toe of the breakwater would be 11 feet above MLLW and the breakwater would be dewatered most of the time. Juvenile pink and chum salmon that migrate alongshore during May and early June are expected to avoid disturbance resulting from placement of rock and would not suffer adverse harm as a result.

The Nushagak River is very turbid (Section 5.11) and rock from local quarries does not contain known contaminants. Consequently, minor amounts of turbidity that might result from placement of rock on the mud flats would not add significant turbidity to the already very turbid water.

> 5. Vegetation within the project area shall only be cleared between August 15 and May 15 to avoid impacts to nesting birds.

Both the West and City Dock Side revetments would be built at the base of former disposal site berms. The riverbanks behind the West Side revetment would be sloped to grade before construction. Some low growing, second growth willow is present on the former disposal area immediately behind where the west revetment would be placed. This area is adjacent to the BAF tank farm and subject to a considerable amount of human traffic. Consequently, it is unlikely that wild migrating birds would nest in the immediate vicinity. To mitigate the possibility that a bird might nest in the construction area, the area would be inspected for nesting activity prior to the start of construction. Nests found would be avoided.

> 6. Revegetating of the filled areas behind the rock revetment with native cultivars and shrub species in order to partially recreate passerine bird habitat values. In addition, we recommend that the COE install soil wraps and willow brush layers along the top of the rock revetment, similar to the COE revetment/restoration design at the Peter Pan spoil site weir outfall, in order to partially recreate fish and riparian habitat.

The west revetment would be planted with live willow stakes on the upper slopes of the revetments. The Alaska Department of Fish and Game published revised guidelines for live-staking willows in 2005 (ADFG 2005). Live willow stakes of appropriate species used in this project would be collected, stored, and staked according to these guidelines. Topsoil of local origin would be included as necessary to facilitate survival of the live stakes.

> 7. Environmental impacts and subsequent reclamation needs associated with the selection or expansion of a new quarry site should be addressed in a separate environmental document after the site has been proposed. The U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Alaska Department of Fish and Game shall be contacted to determine whether endangered or threatened species, essential fish habitat, marine mammals, or anadromous fish are present at a potential quarry site.

Quarry considerations are discussed in Section 3.0 of this environmental assessment.

Endangered Species Act coordination indicated no effect to any listed species indicated. Mitigation measures in addition to those recommended by the U.S. Fish and Wildlife Service were considered for this project. These measures are discussed below.

Access to the west revetment and breakwater would be from Scandinavian Creek Road and across former wetlands that had been used for disposal of dredged sediments (figure 12). Accessing the project site across the former disposal site would avoid impacts to virgin wetland. Access to the City Dock Side revetment would be across the former Peter Pan disposal site from existing roads that include the harbor access road. These mitigation measures would avoid impacts to undeveloped lands as much as is practicable.

Fueling of mobile equipment would take place only in a designated area removed from the water and would have sufficient spill response equipment including absorbent materials on hand. Equipment that cannot be moved to the designated fueling areas would be fueled on site with spill response equipment including absorbent materials on hand.

Erosion control materials including silt fences would be used as necessary during construction to contain runoff sediments.

5.0 EXISTING CONDITIONS

5.1 General

Dillingham is located at the extreme northern end of Nushagak Bay in northern Bristol Bay at the confluence of the Wood and Nushagak Rivers (figure 1). Dillingham is at approximately 59.039720° North Latitude and -158.4575° West Longitude in Section 21, Township 013S, Range 055W, Seward Meridian. The area encompasses 33.6 square miles of land and 2.1 square miles of water and is a major regional fishing community in the Bristol Bay area. Roads extend from Dillingham about 6 miles west to the Kanakanak hospital, and about 18 miles north the community of Aleknagik. The east boundary of Togiak National Wildlife Refuge is a few miles west of Dillingham along the road to Aleknagik, and the Wood-Tikchik State Park boundary is about 23 miles north of Dillingham.

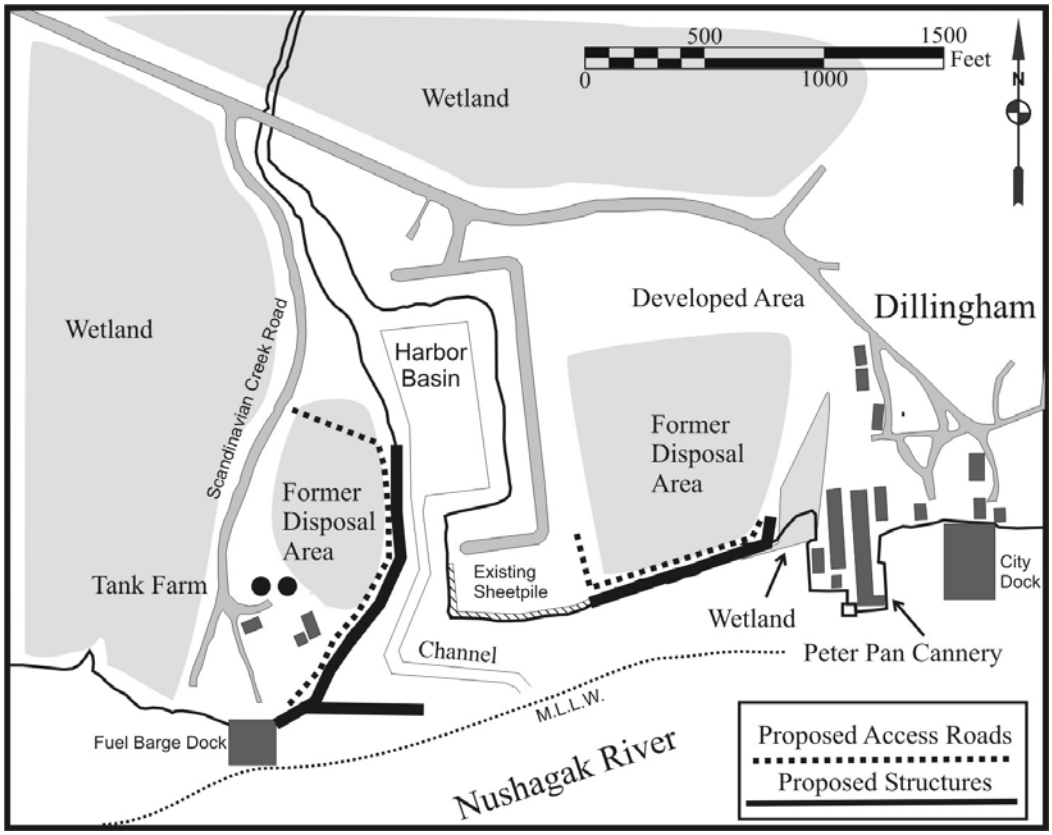

Figure 12. Dillingham harbor area with main project features shown.

5.2 Demographics

Dillingham has a diverse population, with 53 percent all or part Alaska Native and 47 percent other races. Fifty one percent of the population is male and 49 percent is female. The median age of the population is 31.2 years.

5.3 Socioeconomics

The 2000 U.S. Census reported 1,000 housing units in Dillingham, and 884 of those units were occupied. About half of the units were owner occupied and 116 were rented. Thirty-nine units were for seasonal, recreational, or occasional use. The community has a wide variety of structures and construction styles, including wood framed, manufactured, and fabricated buildings. The City of Dillingham owns most of the land around the community, but there is also privately and corporation owned parcels. Many residents hunt and gather plants along the coast or travel up the Wood River to fish or hunt. There is also several subsistence set net sites along the shore of the Nushagak and Wood rivers in front of town.

The people of Dillingham work in a variety of occupations, and 1,242 (73 percent) are in the labor force. About 37 percent work in management or professional jobs, approximately 24 percent work in office or sales positions, 15 percent are in the service industry, just under 11.5 percent have construction, extraction, or maintenance related occupations, a little more than 8 percent work in production, transportation, and material

moving, and about 5 percent have farming, fishing, or forestry occupations (2000 U.S. Census).

Commercial salmon fishing, fish processing, cold storage, and support for the fishing industry are primary areas of employment. The area's population nearly doubles during the fishing season. The city also serves as a regional center for government and social services.

5.4 Environmental Justice

On February 11, 1994, President Clinton issued Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations. The order directs federal agencies to identify and address disproportionately high and adverse human health and environmental effects on minority and low-income populations.

The median household income in Dillingham was $51,458 and the per capita income was $21, 537 (2000 U.S. Census). Ten percent of families in the community and about 12 percent of Dillingham's residents lived below the weighted average poverty level in 2000. Household convenience statistics from the 2000 census show that most homes in Dillingham have modern conveniences. Only 7.1 percent lacked modern toilet facilities and only 5.1 percent lacked complete kitchen facilities.

Dillingham has a diverse population that is composed of over 53 percent minority races (Section 5.2). People of minority race reside throughout the Dillingham area and some would reside in general proximity of the project site.

5.5 Protection of Children

On April 21, 1997, Executive Order 13034, Protection of Children from Environmental Health Risks and Safety Risks was signed so environmental health and safety risks that may disproportionately affect children would be identified pursuant to federal actions. Dillingham has two schools attended by 536 students. The boat harbor is in an industrial area and there are no schools, public playgrounds, parks, or childcare centers near the harbor. A picnic table and shelter at the harbor was destroyed in the September 2005 storm and not replaced.

5.6 Subsistence and Personal Harvest

A significant portion of Dillingham's population depends to some extent on locally available fish, game, and plants for food. Species commonly harvested include salmon, grayling, pike, Dolly Varden, rainbow trout, moose, bear, caribou, waterfowl, and ptarmigan. Subsistence set-net fishing for salmon occurs at sand and gravel beaches north and south of the project area, and occasionally on the mud flats fronting the City Dock Side project site. Commercial and personal use salmon are caught in Nushagak and Bristol Bays using drift or gill nets.

5.7 Land Ownership

The City is the Non-Federal sponsor and will be required to provide all Lands, Easements, and Rights-of-Way (LER) necessary for access, construction, and operation

and maintenance of this project (Appendix D, Letter Report, (COE 2007)). Bristol Alliance Fuels, Inc., the City, and PPS own the uplands and tidelands required for construction of this project.

5.8 Soils and Landforms

Dillingham is in the southwestern region of the Nushagak Bristol Bay Lowlands, which are formed by the Ahlakum Mountains to the west, the Aleutian Range to the east, and the Nushagak Big River Hills to the north. The land in the Dillingham area is a gently rolling plain with local relief of 50 to 200 feet and wide expanses of muskeg, lakes, and rivers. Nushagak Bay is an estuary and migratory route for Pacific salmon and associated fisheries. Soils in the region are generally peat composed of decomposing sphagnum moss and sedges. Glacial till, outwash deposits or silty alluvium occur under the peat layers. The Nushagak Estuary shoreline near Dillingham harbor is lined with low riverbanks composed mostly of clay, peat, and silt, and some higher bluffs partly composed of unconsolidated glacial outwash sand, gravel, cobble and boulders.

Soils backing the West Side project site are former wetland soils covered by several feet of silt, sand, and gravel deposited from previous dredgings of the small boat harbor. The proposed access road to the project site would cross these soils. Soils fronting the West Side project site are eroded peat and clay over compressed glacial till that is intermittently covered by tidally deposited silt. The silt that covers the intertidal substrate is active and changes in area and depth with each storm.

Soils backing the City Dock Side project site are recent deposits from dredged material disposal while soils under the footprint are the same eroded clay and peat soils found at the West Side project site. A sedge wetland of about 5 acres lies between the east end of the City Dock Side revetment and the Peter Pan Seafood cannery.

5.9 Climate

The climate in Dillingham is transitional between continental and maritime climates. Mean annual air temperature is 34°F with average summer temperatures around 55°F and average winter temperatures about 15 °F. Annual precipitation is approximately 25 inches, with about 65 inches in snow. Heavy fog is common in July and August. Winds of up to 60 to 70 mph may occur between December and March. Freeze-up usually occurs in early November and breakup from early May to June.

5.10 Hydrology

The Nushagak River estuary at Dillingham is 2½ miles wide with depths to about –30 feet MLLW. Strong tidal and riverine currents contribute to bedload movement in Nushagak Bay. Tides at Dillingham are semi diurnal with two highs and two lows each 24-hour period. The mean tide range is 15.9 feet, with extreme ranges from 24.5 feet to -4.2 feet MLLW. The mean high tide is 19.8 feet and the mean tide is 10.0 feet. Tidal currents are swifter on the flood tide than on the ebb tide (Teeter 2003, PND 1988). Currents on the flood tide are about 6.0 feet/second (3.5 knots), but currents as high as 12.7 feet/second (7.5 knots) have been measured in the project area (COE 2003a).

Currents at the project site are expected to be significantly less than those experienced in the river channel.

A large wetland lies a few hundred yards west of the West Side project site (figure 12). This wetland is separated from the project site by a former dredged material disposal site and the Scandinavian Creek Road that leads from the main east-west Dillingham highway to the BAF office, tank farm, and dock. This wetland is a bog-type wetland of approximately 80 acres and 40 feet deep, and appears to be the remnants of a former river channel or lake. The flow of water through this wetland is unknown, but is most likely toward the Nushagak River and estuary.

The former Old Western disposal site over which the proposed access road for the West Side project site would cross is a former wetland covered by several feet of dredged silt, sand, and gravel. The site is now dry and covered with low brush and grass typically found on relatively well-drained soils in the Dillingham area.

A smaller sedge wetland lies between the City Dock Side revetment and the PPS cannery. This wetland has a natural drainage that was once used to drain excess water from dredged sediments when they were disposed in the now full and unused PPS disposal site. There is no standing water in this wetland.

5.11 Sediment and Water Quality

Sediments and water quality of the Nushagak River near the Dillingham boat harbor were studied in October 1987 (PND 1988). The following summarizes some of the findings from that study. The Nushagak River off Dillingham is an estuary and experiences high turbidity and wide fluctuations in suspended fine sediment concentrations, bed load movement, and salinity. Salinity was reported to be near zero at low tide then increased to about 3 parts per thousand at high tide. Suspended fine sediment concentrations in water near the harbor ranged from 184 parts per million (mg/L) near the surface to 3,230 mg/L in about 30 feet of water. Bedload sediments are predominantly silts within 50 feet of the harbor and sandy gravels to about 250 feet offshore. Tidal and river currents contribute to bedload movement of sediments in Nushagak Bay. The quality of Nushagak River water fronting the West Side and City Dock Side project sites would be similar to that described above.

5.12 Air Quality and Noise

The combination of limited development, and low population density generally results in good to excellent air quality throughout southwestern Alaska. Air quality generally improves with distance from point sources of pollution, and the point sources of air pollution in Dillingham generally do not significantly degrade air quality in the wider area.

The Environmental Protection Agency (EPA) defines Air Quality Control Regions (AQCR's) for all areas of the United States and designates them as attainment or nonattainment areas based on comparison to National Ambient Air Quality Standards (NAAQS). Alaska is divided into these four AQCR's.

- Cook Inlet Intrastate Air Quality Control Region,
- Northern Alaska Intrastate Air Quality Control Region,
- South Central Alaska Intrastate Air Quality Control Region, and the
- Southeast Alaska Intrastate Air Quality Control Region.

Dillingham is within the South Central Alaska Intrastate Air Quality Control Region. The area surrounding Dillingham has been classified as attainment or unclassifiable for all regulated pollutants. The closest nonattainment area is the Anchorage/Eagle River PM_{10} nonattainment area, which is approximately 327 miles northeast of Dillingham.

Point sources of air pollution are mostly diesel generators that supply power to the city. Nushagak Electric owns and operates a diesel plant in Dillingham. Many businesses and emergency facilities also have standby diesel generators. Vehicles, boats, aircraft, and home heating and cooking fuels also add to air pollution in the area. Fugitive dust and smoke does not generally degrade air quality in Dillingham other than perhaps in an immediate location.

Ambient noise in Dillingham is generally low and temporary. Aircraft, vehicles, and boats are temporary sources of noise and diesel generators are sources of more constant noise.

5.13 Vegetation and Algae

Dwarf scrub, sphagnum moss, and herbaceous wetland plant communities dominate the vegetation in large areas around Dillingham (Gallant et al. 1995). Sedges, sphagnum moss, and dwarf shrub species characterize undisturbed wetlands to the west and north of the project area. The Old Western Disposal site backs the west project site. Vegetation on this former wetland is mature, second-growth willow, alder, grass, and fireweed because the site has been elevated and disturbed by disposal of dredged sediments and construction activity. The former PPS disposal site backs the City Dock Side project site. The berms of this recently filled disposal site are covered with native grasses and a few small willow bushes *Salix sp*. A small wetland lies between the City Dock Side site and the PPS cannery. This wetland grows native sedges *Carex sp*., beach rye *Elymus sp*., and the occasional dwarf willow *Salix sp*.

A tidal flat of the Nushagak River estuary fronts the project site. Attached green algae *Vaucheria sp* sometimes grows on the surface of the mud near the high tide line during summer, but marine phytoplankton in the estuary is not especially abundant because there is little light penetration through the silt. A thin layer of diatoms would typically be present on the surface of the mud during summer. Small quantities of freshwater phytoplankton likely enter the estuary from the Nushagak and Wood rivers. There are no attached macroalgae along the shoreline near the small boat harbor and project site.

5.14 Fish and Wildlife

Unless noted, most of the information for this section was obtained from the Fish and Wildlife Service draft Coordination Act Report (FWS 2002) and during site visits by Corps of Engineers biologists.

Populations of macrofaunal benthic invertebrates such as amphipods, isopods, shrimp and clams in the Nushagak estuary are believed to be low because of ice scouring, extreme tides, and heavy bedload from Nushagak Bay. Tidal flats adjacent to and under the project site are mostly composed of mud, silt, and clay and peat over a compressed glacial till (Section 3.8 *ibid.*). The surface deposits on these flats are very active. No marine invertebrates or indications of marine invertebrates were seen during inspections at extreme low tides or when the Corps dug shallow excavations to bury accretion plates during a 2004 sediment deposition study (COE 2004), and it is unlikely that macroscopic infaunal invertebrates are present. Marine invertebrates on these mud flats are likely composed of short-lived epibenthic copepods and especially harpacticoid copepods that feed on attached diatoms.

Rainbow trout *Oncorhynchus mykiss*, Arctic char *Salvelinus alpinus*, Arctic grayling *Thymallus arcticus*, round whitefish *Prosopium cylindraceum*, and northern pike *Esox lucius* inhabit the freshwater reaches of the Nushagak and Wood rivers upstream of the project area. Five species of North American salmon *Oncorhynchus sp.* return to the Nushagak and Wood rivers to spawn. Sockeye (*O. nerka*-red salmon) and Chinook (O. *tshawytscha* - king salmon) are the most important of these five species. Sockeye is the most important commercial and subsistence species, but Chinook is also very important to the subsistence fishery because it is much larger than sockeye and are the first salmon to return in spring. Several species of anadromous whitefish *Coregonus sp*., including cisco, also return to the Nushagak and Wood rivers. All these species pass Dillingham and the harbor, but the estuary is about 2½ miles wide fronting the project area. The creek that flows through the harbor, Scandinavian Creek, is not an anadromous stream.

See the Essential Fish Habitat section for fish important in commercial fisheries and the Endangered Species section for listed wildlife.

According to local reports (Sands personal communication) beluga whales *Delphinapterus leucas* enter the Nushagak River on rare occasions and have even been seen inside the harbor basin. Harbor seals *Phoca vitulina* may enter the Nushagak River as far up as Dillingham, but are not likely to use the beach areas at the project site. Pacific walrus *Odobenus rosmarus divergens* may occasionally be seen in outer Nushagak Bay.

Common birds that may use the grass and shrub habitat on the former Old Western disposal site are golden-crowned sparrow *Zonotrichia atricapilla*, savannah sparrows *Passerculus sandwichensis*, fox sparrow *Passerella iliaca*, common redpoll *Carduelis flammea*, and yellow warbler *Dendroica petechia*. Common shorebirds that may use the mudflats and beaches are western sandpiper *Calidris mauri*, least sandpiper *C. minutilla*, dunlin *C. alpina*, and turnstones *Arenaria sp*. Bald eagles *Haliaeetus leucocephalus* may

also use larger trees in the surrounding area for nesting, but there are no suitable nesting trees near the project site.

Small terrestrial mammals that might be found in brush and grass growing on the former Old Western disposal site and adjacent 80-acre wetland across Scandinavian Creek Road from the project site are lemmings *Lemmus sp.*, meadow and tundra voles *Microtus sp.*, masked and dusky shrews *Sorex sp.* , short-tailed weasels *Mustela erminea*, and least weasels *M. nivalis*.

5.15 Endangered and Threatened Species

The Alaska District recently coordinated with U. S. Fish and Wildlife Service and National Marine Fisheries Service for disposal of dredge materials from the Dillingham harbor to determine if any threatened, endangered, or candidate species inhabit the area. The disposal of dredge materials would take place immediately adjacent to the proposed project and the recent consultation for disposal of dredged materials would be the same as for this project. Other consultations for this project and projects in the immediate vicinity of this project were done in 2000, 2001, 2003, and 2005 (Appendix A). The project is within the range of Steller sea lion *Eumetopias jubatus* (Lentfer 1988), Steller's eider *Polysticta stelleri* (FWS 1997), and spectacled eider *Somateria fischeri* (FWS 1993). Seven species of whale (blue, fin, sperm, humpback, right, bowhead, and sei, Wynne 1997) are found in Bristol Bay, but would not be found in the vicinity of these projects.

Spectacled eider is a threatened species that has experienced severe declines in population during recent decades. It is a marine duck that during summer feeds on invertebrates in shallow coastal waters. Nests are built near water, along shorelines and islands, mostly within 10 miles of the coast. They once nested along the Alaska coast from the Nushagak Peninsula north to Barrow and on St. Lawrence Island. Today, the highest nesting densities are in the Yukon-Kuskokwim Delta, about 100 miles northwest of the project area. Consequently, the presence of a spectacled eider in the project area during summer would be a rare occurrence.

The only known wintering habitat of the spectacled eider is in the central and northwestern Bering Sea where they gather in polynyas and dive hundreds of feet to feed on benthic clams and small invertebrates. Consequently, the presence of a spectacled eider in the project area during winter would be a rare occurrence.

Steller's eiders are a small sea duck for which the Alaska breeding population is listed as threatened. Steller's eiders feed on mollusks, worms, and crustaceans in shallow, near-shore marine waters generally less than 30 feet deep. They nest on tundra adjacent to shallow ponds in the arctic coast of northern Alaska and eastern Russia. Steller's eiders do not currently breed in the Bristol Bay area, but historical breeding areas included the Kuskokwim-Delta area north of Bristol Bay. Most Steller's eiders winter along the Alaska Peninsula outside the Bristol Bay area and from the eastern Aleutian Islands to southern Cook Inlet. They may feed and rest in outer Nushagak Bay during fall and spring migrations, but the probability of seeing one on or near the project site would be very low.

Northern Steller sea lions may occur in the Nushagak River and estuary and Steller sea lions that would be in the project area are endangered. Steller sea lions occur around the North Pacific rim from the Channel Islands off Southern California to northern Hokkaido, Japan. Their center of distribution is the Gulf of Alaska and the Aleutian Islands. The world population is divided between two stocks at 144 degrees W (Cape Suckling, East Prince William Sound). The western stock, which includes those in the Bristol Bay area and is listed as endangered, has declined by 70 percent since the 1980's (Trites and Larkin 1996). There are no sea lion rookeries or haulouts near Dillingham, but an occasional sea lion might enter the Nushagak River estuary as far upstream as Dillingham.

Seven species of large whales are listed as endangered. Whales are infrequent visitors to near-shore waters. Most are found in deeper waters off the Gulf of Alaska, North Pacific, and Bering Sea. No baleen whales, endangered or otherwise, or sperm whales are expected on or near the project site.

5.16 Essential Fish Habitat

The National Marine Fisheries Service (NMFS) essential fish habitat (EFH) interactive web page was consulted for a determination of EFH in the project area. Dillingham and the project area have not been designated as EFH for crab, groundfish or scallops by the NMFS. The project site and area are designated EFH for Pacific salmon.

Pacific salmon are important in regional commercial fisheries and in the Dillingham area (ACED 2005). The Bristol Bay area, including the Nushagak and Wood River systems is highly productive salmon areas. Sockeye, Chinook, coho, chum, and pink salmon are present in Nushagak Bay and rivers at various times of the year (FWS 1995). The Nushagak River at Dillingham serves primarily as a migration route for salmon between rearing areas in Nushagak and Bristol bays and spawning, egg incubation, and early rearing in freshwater habitats farther upstream. Juvenile salmon migrating downstream to saltwater are found in the project area beginning in late May through early July. The juveniles of chum and pink salmon are the species most likely to be found adjacent to the project site. Both species are minor species in the Nushagak River and their fry migrate through the area from about late April through early June.

Adult salmon occur in the Nushagak River off Dillingham from late May through late August (FWS 1995).

5.17 Historical Resources

Captain James Cook was the first European to explore the Nushagak River and Bristol Bay in 1778 (COE 2001a). The area around Dillingham was inhabited by both Eskimos and Athabascans and became a trade center when Russians erected the Alexandrovski Redoubt (Post) in 1818. Local Native groups and Natives from the Kuskokwim Region, the Alaska Peninsula, and Cook Inlet mixed together as they came to visit or live at the post. The community was known as Nushagak by 1837, when a Russian Orthodox mission was established. In 1881 the U.S. Signal Corps established a meteorological

station at Nushagak. In 1884 the first salmon cannery in the Bristol Bay region was constructed by Arctic Packing Co., east of the site of modern-day Dillingham. Ten more were established within the next 17 years. The post office at Snag Point and in town was named after U.S. Senator Paul Dillingham in 1904, who toured Alaska during 1903. The 1918-19 influenza epidemic struck the region, and left no more than 500 survivors. After the epidemic, a hospital and orphanage were established in Kanakanak, 6 miles from the present-day city center. The Dillingham townsite was first surveyed in 1947. The city was incorporated in 1963.

Yupik villages and fishing camps tended to be along rivers and shorelines where there was access to salmon runs (COE 1985). The Native Village of Choggiong underlies the Dillingham townsite and was completely obliterated by the modern town (COE 1997). Significant historic sites of the old Native villages of Kanakanak and Wood River are within about 10 miles of the proposed project site (COE 1985).

The Alaska District archeologist surveyed the area surrounding the West Side revetment in 2001 (Grover 2001). The area surrounding the City Dock Side revetment borders the historical PPS cannery and has not been surveyed. The PPS cannery is eligible for registry as a historical site. Aerial photos dating from the 1950's and 1960's show that approximately 20 small dwelling-like structures occupied the sedge wetland between the recommended City Dock Side project site and the nearby PPS cannery (figure 13). How long the structures occupied the wetland prior to and after the photographs is unknown. The photos also show that the wetland was also used to beach fishing boats, skiffs, and scows.

Figure 13. 1955 aerial photo of project area with location of former dwellings shown (Anc. Mus. History and Art, MCC 19152).

6.0 ENVIRONMENTAL CONSEQUENCES

6.1 No-Action Alternatives

Unprotected riverbanks near and within the harbor would continue to erode during storm conditions combined with high tides. The wetted area encompassing the entrance channel would continue to widen. Storm waves would continue to enter the harbor basin and attack the low riverbanks inside the harbor. Berms confining the former PPS disposal site on the City Dock side of the harbor would likely collapse, allowing the confined sediments to enter the Nushagak River estuary. Without additional protection on its east end the existing sheetpile structure in front of the harbor would continue to be flanked by storm waves and erosion.

6.2 Comparison of Action Alternatives

6.2.1 West Side Alternatives

West Side alternatives eliminated from consideration are longer from 1,900 to 2, 271 feet in length (figures 2, 3, 5, 6 and 7) compared to the recommended alternative (1,471 feet) or incorporate sheetpile structural components. Alternatives using sheetpile refract wave energy to a higher degree than rock structures.

The recommended West Side alternative (W2) is not expected to have other than minimal short or long term effects on the environment. There would be minor loss of upland and intertidal habitat used for resting by birds other than gull species, but use of the habitat in question is minimal by birds other than gulls because of human activity in the area. Relatively large numbers of gulls are noted to rest on the mud flats near the harbor and these birds would be expected to capitalize on the addition of a rock revetment as they do in other areas where rock revetments are added to the environment.

Loss of habitat used by juveniles of pink and chum salmon is expected to have minimal environmental impact because the habitat used by the footprint would only be accessible to them during the very short periods of higher tides. Although pink and chum salmon are very abundant in many parts of Alaska, they are in low natural abundance and have minimal economic and subsistence value in the Nushagak drainage. Addition of a breakwater is not expected to result in the entrapment of fry or juvenile salmonids of any species inside the harbor because of its alignment and maximum base elevation of 11 feet MLLW. There are few if any infaunal invertebrates within the footprint of the recommended structures to affect. Algae and diatoms would flourish on the portion of the structure that would be wetted at higher tides because of the increased surface area.

6.2.2 City Dock Side Alternatives

City Dock Side Alternative C2 would be constructed using sheetpile and alternatives C3 and C4 would have an alignment that would increase footprint area across intertidal mud and sedge wetland, require incorporation of drainage culverts, and could result in damage to the historic PPS cannery dock from transfer of wave energy along the face of the rock or sheetpile structure. .

Alternative C2 is a sheetpile structure, which although follows the preferred alignment might result in accelerated erosion of a sedge wetland between the end of the structure and the historic PPS Cannery dock. The revetment might allow transfer of energy along its alignment. Excess energy could cause some disruption of the topography at the terminus unless dissipated. The end treatment would require further investigation if this alternative were to be considered further.

Alternative C1, the recommended alternative, would have minimal impact on the environment. Pink and chum salmon fry would have access to the structure only during higher tides. Gull that rest on the mud flats adjacent to the PPS cannery would capitalize on the rock revetment and use it for roosting. There are no infaunal invertebrates living in the mud under the recommended project footprint. Algae and diatoms would flourish on the portion of the structure that would be wetted at higher tides because of the increased surface area.

6.3. Consequences Common to All Alternatives

6.3.1 Social Consequences.

This project would have negligible impacts on the tourist industry and socioeconomics of the Dillingham area. It would have no effect on demographics of the Dillingham area and might help maintain or improve the socioeconomic climate in Dillingham through protection and preservation of riverbanks adjacent to the small boat harbor used for local cash economy and subsistence efforts. Erosion of the shoreline that is adjacent to, but not protected by the City Dockside portion of the project is expected to continue. Continued erosion of the shoreline in this area is not expected to negatively affect any particular underprivileged class of persons or racial group (Executive Order 12898), and would not negatively affect children (Executive Order 13034).

The project would visually change the environment near the small boat harbor from one of natural, albeit rapidly eroding, riverbanks to riverbanks hardened with a rock structure. Pedestrian access to the beach would not be restricted for subsistence fishing or other purposes except when necessary to maintain a safety perimeter around heavy equipment in the construction area.

This project would not adversely impact historical/cultural resources in the Dillingham area.

6.3.2 Physical Consequences.

Minor silt deposits might collect in the bight of the proposed breakwater, but it would have no affect on navigation into and out of the harbor. The project could add small amounts of turbidity to the already turbid waters of the Nushagak estuary during construction, but it would not likely be measurable. The proposed construction would not be associated with any contaminant materials and is not expected to contribute to degradation of water quality in the bay.

The project would temporarily add diesel exhaust fumes to the atmosphere during construction. These exhaust fumes would temporarily degrade air quality in the

immediate vicinity of the operating equipment, but would have negligible effects on the overall air quality of Dillingham. The project would result in a temporary increase in noise levels from construction activities.

6.3.3 Cumulative Consequences

Any long-term consequences from this project would be added to consequences from existing structures that include a recently built sheetpile City dock a few hundred yards upstream from the project, and a recently built barge dock adjacent to the recommended west revetment. Other projects in the area include the bank protection structures at Snag Point and the sheet-pile structure fronting the small boat harbor, as mentioned in Section 1.3.

Reasonable foreseeable projects in the area that could have cumulative environmental effects might be future construction of riverbank protection structures near the Kanakanak Hospital, 6 river-miles south of this project. It is unlikely the effects of these projects would be cumulative because of the 6-mile distance between the two.

The effects of existing and future bank protection structures would be physical and include the slowing or prevention of natural erosion process. Bank protection structures in Dillingham are mostly placed at high tide levels where they have minimal effects on wildlife. With exception of the perpendicular breakwater (figure 4) bank protection structures recommended for this project are parallel to the shoreline and are expected to have negligible effects on sediment transport along the immediate shoreline.

7.0 COASTAL ZONE MANAGEMENT

The evaluation of Alaska Coastal Management Program (ACMP) processes follows guidelines established in Chapter 2 of the Partnership Agreement (COE\DGC 1997) between the Alaska District Corp of Engineers and the State of Alaska Department of Natural Resources Office of Project Management and Permitting (formerly Division of Governmental Coordination - DGC). The Alaska Coastal Management Program (ACMP) guidelines require evaluation of a project relative to the following coastal habitat categories (6 AAC 80.130).

1. Offshore areas
2. Estuaries
3. Wetlands and tide flats
4. Rocky islands and seacliffs
5. Barrier islands and lagoons
6. Exposed high energy coasts
7. Rivers, streams, and lakes
8. Important upland habitat

A guide for preparing an Alaska Coastal Management Program (ACMP) consistency determination for Federal activities was prepared for this project. This guide helps evaluate Federal actions for compliance with local administrative and enforceable ACMP policies and determines compliance of the project with the ACMP. This evaluation

would be submitted to the Alaska Department of Natural Resources Office of Project Management and Permitting along with this EA.

The proposed action is within the Bristol Bay Coastal Resource Service Area (BBCRSA) and was found to be consistent with the enforceable administrative policies of the BBCRSA and ACMP to the maximum extent practicable. An evaluation of the applicable BBCRSA enforceable policies would be submitted to the Alaska Department of Natural Resources Office of Project Management and Permitting along with this EA.

8.0 PERMITS AND COORDINATION

This project would require the following permits or evaluations through coordination with the named agencies.

- Coastal Consistency Determination - Alaska Department of Natural Resources, Office of Project Management and Permitting\Alaska Coastal Management Program (OPMP\ACMP).
- Alaska Anadromous Fish Habitat Permit - Alaska Department of Natural Resources, Office of Habitat Management and Permitting (OHMP).
- Clean Water Act Section 401 Certificate of Assurance – Alaska Department of Environmental Conservation, Division of Water.

The U.S. Fish and Wildlife Service and the National Marine Fisheries Service were consulted for a listing of threatened and endangered species found in the project area (Appendix A).

This project was coordinated with the U.S. Fish and Wildlife Service who drafted a Coordination Act Report (CAR) that independently described environmental impacts and made recommendations for mitigation (Appendix B).

Construction would also require a Section 404(b) Clean Water Act evaluation to evaluate the impacts of discharge into waters of the United States. This evaluation would be coordinated with the Regulatory Branch of the U.S. Army Corps of Engineers, Alaska District and included as Appendix C.

This project is consistent with the Corps Environmental Operating principles and ER 200-1-5.

9.0 PREPARERS

This Environmental Assessment was written by Larry Bartlett and Margan Grover, and edited by Diane Walters, Environmental Resources Section, Civil Works Branch, Alaska District U.S. Army Corps of Engineers. This EA underwent Internal Technical Review (ITR) and reviewer's comments were incorporated as appropriate.

10.0 CONCLUSION

Alternative W2 was selected as the recommended and the environmental alternative for the West Side portion of the project. Alternative C1 was selected as the recommended and the environmental alternative for the City Dock Side portion of the project. Details

of construction authority, funding and engineering are presented in the Letter Report for this project (COE 2007).

Construction of shoreline protection and a breakwater near the West Side and City Dock Side of the Dillingham Small Boat Harbor entrance channel is not expected to result in adverse impacts to the environment. The project is consistent with State coastal zone management programs to the maximum extent practicable. This assessment supports the conclusion that the proposed project does not constitute a major Federal action significantly affecting the quality of the human environment and that an Environmental Impact Statement is not necessary; therefore, a Finding of No Significant Impact (FONSI) will be prepared.

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Appendix A

EA-Correspondence

2006-007

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Anchorage Fish and Wildlife Field Office
605 West 4th Avenue, Room G-61
Anchorage, Alaska 99501-2249

October 13, 2005

Mr. Guy McConnell
US Army Corps of Engineers
PO Box 898
Anchorage, Alaska 99506-0898

Re: Dillingham Riverbank Protection Structures Project (*consultation number 2006-007*)

Dear Mr. McConnell,

Thank you for your letter, received in this office on September 16, 2005, requesting a list of threatened and endangered species as well as informal consultation about whether or not any endangered, threatened or candidate species or their habitats will be affected within the area of the proposed riverbank protection structures project in Dillingham, Alaska. The U.S. Fish and Wildlife Service (Service) has reviewed the information on this project and is providing the comments below in accordance with section 7 (a) (2) of the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended, 16 U.S.C. 1531 *et seq.*).

According to your letter, you are proposing to construct two riverbank protection structures: one on the west side of the entrance channel and small boat harbor, and one on the east side of the small boat harbor. Structures are meant to prevent additional damage to the harbor and nearby riverbanks from storm-caused waves. We have anecdotal evidence that Steller's eiders (*Polysticta stelleri*), listed as threatened under the Endangered Species Act in 1997, occur in small numbers in the marine waters near Dillingham, primarily in winter.

However, because construction would occur during the spring and summer, when eiders would not be present, we believe that the proposed project is not likely to adversely affect them. Preparation of a biological assessment or further consultation under section 7 of the Endangered Species Act regarding this project is therefore not necessary at this time. If project plans change, additional information on listed or proposed species becomes available, or new species are listed that may be affected by the project, consultation should be reinitiated.

This letter relates only to federally listed or proposed species and/or designated or proposed critical habitats under our jurisdiction. It does not address species under the

jurisdiction of National Marine Fisheries Service, or other legislation or responsibilities under the Fish and Wildlife Coordination Act, Clean Water Act, National Environmental Policy Act, or Bald and Golden Eagle Protection Act.

This concludes section 7 consultation on the proposed riverbank protection structures project in Dillingham, Alaska. Thank you for your cooperation in meeting our joint responsibilities under section 7 of the Endangered Species Act. If you have any questions, please contact me at (907) 271-2807. In future correspondences regarding this project please refer to consultation number 2006-007.

Sincerely,

Gregory S. Risdahl

Gregory Risdahl
Fish and Wildlife Biologist

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

January 28, 2003

Guy McConnell
U.S. Army Corps of Engineers
Alaska District
EN-CW-ER (Bartlett)
P.O. Box 898
Anchorage, Alaska 99506

Re: Dredged Material Management Plan for Dillingham Small Boat Harbor

Attn: Larry Bartlett

Dear Mr. McConnell:

Thank you for requesting information and compliance with the applicable environmental laws which National Marine Fisheries Service (NMFS), Alaska Region (AKR), administers in regard to your project. NMFS has reviewed your preliminary information and offers the following comment specific to section 7 of the Endangered Species Act (ESA), the Marine Mammal Protection Act (MMPA), and Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act.

Endangered Species Act

Section 7(a)(2) of the ESA directs interagency cooperation "to insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species" or result in the destruction or adverse modification of critical habitat.

NMFS AKR is responsible for the administration of the ESA as it applies to certain cetaceans, pinnipeds, and marine fish. These include several species of whales, Pacific salmon[1], and Steller sea lions.

[1] Several Northwest Pacific salmon stocks grow to maturity in offshore areas of Alaska. Several of these stocks are listed as an endangered species. Please see the Summary of Salmon & Steelhead Listings at http://www.nwr.noaa.gov/ for further information. Any consultation requirements will need to be coordinated with the NMFS Northwest Region, Habitat Division, Portland, Oregon at (503) 231-6880.

We do not expect any endangered marine mammals to occur in the vicinity of the project site, and no critical habitat for the above listed species has been identified within this project area.

Marine Mammal Species

Marine mammals protected under the MMPA of 1972, as amended, 16 U.S.C. 1361 *et seq.* (not endangered or threatened under the ESA of 1973, as amended, 16 U.S.C. 1531 *et seq.*), range throughout Alaskan waters.

Marine mammal species which associate with marine waters near Dillingham include minke, killer, and beluga whales, Dalls' and harbor porpoises, and bearded, harbor, spotted and ringed seals. However, we feel beluga whales, harbor porpoises and harbor seals are more frequently observed in the Nushagak River and near the boat harbor area.

Essential Fish Habitat (EFH)

The upland dredge disposal area is not considered EFH. However, the in-water disposal area would be considered EFH. EFH has been designated in waters for anadromous fish, specifically salmon, and certain life stages of marine fish under NMFS's jurisdiction. For specific EFH information regarding your project area, please visit our web site at:

http://www.fakr.noaa.gov/habitat/

Dredging activities and the placement of dredge spoils in the open water site may have some impact to EFH. *Preliminarily, NMFS recommends the project utilize upland areas for disposal before in-water disposal.* Any action that may adversely affect EFH should include an EFH assessment in either a separate document or be clearly referenced in a support document, such as an environmental assessment for the project. An EFH assessment is outlined in 50 CFR Part 600.920. A clearly referenced EFH assessment will satisfy the requirements of the provisions regarding EFH within the administration of the Magnuson-Stevens Act.

We hope this information is useful to you in fulfilling any requirements under section 7 of the ESA, the MMPA, and EFH requirements under the Magnuson-Stevens Act. Please direct any questions to Matthew P. Eagleton at (907) 271-5006.

Sincerely,

For James W. Balsiger
Administrator, Alaska Region

Attachment

cc: EPA, ADGC, ADEC, USFWS, ADFG - Anchorage

FROM: BRAD SMITH [BRAD.SMITH@NOAA.GOV]
SENT: WEDNESDAY, OCTOBER 12, 2005 3:12 PM
TO: BARTLETT, LARRY D POA
SUBJECT: DILLINGHAM RIVERBANK PROJECT

HI LARRY; RE: YOUR LETTER REQUESTING ESA SPECIES UPDATES FOR DILLINGHAM,
THERE HAVE BEEN NO REVISIONS OR UPDATES OF THE LIST APPLICABLE TO THIS AREA.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Anchorage Fish & Wildlife Field Office
605 West 4th Avenue, Room G-61
Anchorage, Alaska 99501-2249

IN REPLY REFER TO:

AFWFO

NOV 21 2005

Colonel Timothy J. Gallagher
District Engineer, Alaska District
U. S. Army Corps of Engineers
Post Office Box 6898
Anchorage, Alaska 99506-6898

Re: Dillingham Boat Harbor- West
Revetment and Breakwater

Dear Colonel Gallagher:

The U.S. Fish and Wildlife Service (Service) has reviewed the Corps of Engineers' modified proposal to construct a revetment and breakwater to protect eroding riverbanks along the west side of the Dillingham Small Boat Harbor entrance channel. A breakwater has now been added to the revetment project. The Service prepared a Fish and Wildlife Coordination Act Report (CAR) (WAES-CAR-0102) for the West Bank Stabilization Project dated April 15, 2002. That report covers existing conditions in the vicinity of the project site and will adequately serve as the final CAR for the modified project. The Service has no additional recommendations at this time.

If you have any questions regarding this report, please contact project biologist Phil Brna at 271-2440, or by email at phil_brna@fws.gov.

Sincerely,

Kimberly A. Trust (acting)

Ann G. Rappoport
Field Supervisor

cc: G. McConnell, COE
S. Seaberg, ADNR
J. Hanson, NMFS

TAKE PRIDE IN AMERICA

Original Message-----
From: Dana_Seagars@fws.gov [mailto:Dana_Seagars@fws.gov]
Sent: Thursday, February 23, 2006 2:09 PM
To: Schreifels, Chelan J POA
Cc: Ann_Rappoport@fws.gov; Bartlett, Larry D POA; Mary_Nation@fws.gov
Subject: RE: CAR scoping for Dillingham City Dock Side bank stabilization project

Dear Chelan:

The U. S. Fish and Wildlife Service (Service) has reviewed the subject project description. Based on the similarity in project design and potential impacts to trust resources between this project and the West Bank project (for which we previously completed a Coordination Act Report or CAR) we have determined an additional CAR would not provide substantially new or different information and conclusions. In addition, the administrative costs for completing a Scope of Work to produce a new CAR would likely exceed the cost of conducting the review. Therefore, we are declining to act on your request to scope out CAR related work for this project. We recommend you use the information previously provided to complete your review.

Thank you for including the Service in your review process. If you have any further questions, please contact Mr. Dana J. Seagars of our Project Planning Branch at (907) 271-2871.

(for)
Ann G. Rappoport
Supervisor
Anchorage Fish and Wildlife Field Office
U. S. Fish & Wildlife Service
605 West Fourth Avenue
Anchorage, AK 99501

STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF PARKS AND OUTDOOR RECREATION
OFFICE OF HISTORY AND ARCHAEOLOGY

550 W. 7TH AVENUE, SUITE 1310
ANCHORAGE, ALASKA 99501-3565
PHONE: (907) 269-8721
FAX: (907) 269-8908

March 20, 2006

File No.: 3130-1R COE/Environmental

SUBJECT: Bank stabilization measures, Dillingham, Alaska

Guy R. McConnell
U. S. Army Engineer District Alaska
CEPOA-EN-CW-ER (C)
P. O. Box 6898
Elmendorf, AFB, AK 99506-0898

Dear Mr. McConnell,

The Alaska State Historic Preservation Office received your letter regarding the referenced project on February 17, 2006. We have reviewed your undertaking to construct a revetment east of the existing bulkhead for conflicts with cultural resources under Section 106 of the National Historic Preservation Act. We agree that the wetlands immediately east of the proposed revetment may be prone to an increased rate of erosion as a result and that this area should be archaeologically surveyed. The Alaska Portland Packers Association/Peter Pan Cannery (DIL-101) appears to be far enough away to not be at significantly increased risk of erosion. We concur therefore, that DIL-101 will not be adversely affected by this project.

Please contact Stefanie Ludwig at 269-8720 if you have any questions or if we can be of further assistance.

Sincerely,

Judith E. Bittner
State Historic Preservation Officer

JEB:sll

Printed on Recycled Paper

Appendix B

U.S. Fish and Wildlife Service Coordination Act Report

Note: Per email correspondence dated 10-26-2007k, the USFWS Ecological Services Anchorage Field Office management chose to apply the 2002 CAR to the existing project because of its similarity to a previous design for which the 2002 CAR was written. The cost to update the 2002 CAR was unwarranted. The USFWS will be included in the distribution of the public review of the report/EA to ensure they have no other concerns

U.S. Fish and Wildlife Service
Ecological Services
Anchorage Field Office

Coordination Act Report
WAES-CAR-O 102

Dillingham Boat Harbor Entrance West Bank Stabilization Project Dillingham, Alaska

By:
Neil Stichert

April 15, 2002

Dillingham Boat Harbor Entrance, West Bank Stabilization
Dillingham, Alaska

Final Fish and Wildlife Coordination Act Report

Submitted By: Neil Stichert

U.S. Fish and Wildlife Service Anchorage Field Office 605 W 4th Avenue, Room G-61
Anchorage, AK 99501

April 15, 2002

INTRODUCTION

The Alaska District of the Corps of Engineers (COE), under their emergency bank stabilization authorities, is planning to construct a bank stabilization project in the Nushagak River in Dillingham, Alaska. The west side of the boat harbor entrance channel has been subjected to natural erosion processes and the COE has proposed to stabilize 923 feet of the riverbank though the construction of a rock revetment or a hybrid sheet pile bulkhead with rock revetment.

This report constitutes the U.S. Fish and Wildlife Service (Service) final Fish and Wildlife Coordination Act Report on the bank stabilization work in Dillingham. The purpose of this report is to: provide the COE with planning information, discuss the presence of significant fish and wildlife resources likely to be affected by the bank stabilization work, define the potentially significant impacts that could result from cumulative and secondary impacts caused directly or indirectly from the proposed action, and make recommendations on how to avoid, minimize, and/or compensate for those impacts.

This report is prepared in accordance with the fiscal year 2002 Scope of Work and the Fish and Wildlife Coordination Act (48 Stat. 401, as amended: 16 V.S.C. 661). This document constitutes the final report of the Secretary of the Interior as required by Section 2b of the Fish and Wildlife Coordination Act (FWCA). This report is intended to provide equal consideration of fish and wildlife conservation in conjunction with the project purpose. If the proposed project plans change, we anticipate making further recommendations than those presented here.

The following report is based on the information provided from John Sargent at the COE, Alaska District. Service involvement in the project includes an evaluation of the potential impacts on fish and wildlife resources and their habitats, and recommendations ~f methods for mitigating adverse impacts on these resources, if practicable. Biological information presented here is based upon a literature review, a field visit, and phone interviews with agency biologists.

PROJECT AREA

Dillingham is located approximately 327 miles southwest of Anchorage in the southwestern region of the state. Dillingham lies at the extreme northern end of Nushagak Bay in northern Bristol Bay, at the confluence of the Wood and Nushagak Rivers just outside the boundaries of the Togiak National Wildlife Refuge. The City is located at approximately 590 North latitude and 158027' West longitude in Section 21 of Township 13 South, Range 55 west, Seward Meridian. Dillingham is located in a climatic transition zone with maritime and arctic climates.

Average summer temperatures range from 37 to 66 F and winter temperatures average 40 to 30 F. Annual precipitation ranges from 20 to 26 inches, with 65 inches of snow. Heavy fog is common in July and August. Winds of up to 60-70 mph may occur between December and March. The Nushagak River is ice-free from June through November (Alaska Department of Community and Economic Development).

The proposed project area is located on the western shore of the entrance channel to the Dillingham boat harbor. The existing shoreline extends from the mouth of Scandinavian Creek, south and west to the dock at the Bristol Fuels facility. Inland from the shoreline, this area holds the Old Western boat harbor dredge spoil site and a mix of wetlands and vegetation.

PROJECT DESCRIPTION

Purpose and Need

The COE has incorporated by reference a similar purpose and need for this project as was stated in the 1998 Environmental Assessment and Finding of No Significant Impact for 613 feet of rock revetment on the City Dock Side bank of the Dillingham boat harbor entrance. For the 2002 project, the COE, using their emergency bank stabilization authorities, proposes to stabilize the west bank of the boat harbor entrance to protect an undeveloped wetland and dredged materials storage site from further erosion and to reduce wave heights entering the harbor.

Design Alternatives

The COE has considered three alternatives for stabilizing the bank and reducing wave heights in the Dillingham harbor. These alternatives include plans for a rock revetment, a combination of rock revetment and sheetpile, and no action. A preferred alternative has not been selected or presented at this time.

1) No Action

Erosion of the riverbank would continue at approximately the same rate. Vessels and the existing docks may continue to sustain damage during storms. A COE diffraction analysis of the current conditions at Dillingham has shown that waves of up to 4 feet can be expected at the outer floats.

2) Rock Revetment

This plan consists of 923 feet of rock revetment starting east of the Bristol Fuels dock and continuing along an alignment following the existing natural shoreline to a point across from the boat launch, as shown in Figure 1. The rock revetment will have a top elevation of +29 feet MLLW. The top elevation of the revetment was determined from 5 feet of wave run-up the rubble slope with a design high water level of24 feet, which is the extreme high water level plus one foot of storm surge.

Approximately 5,050 cy of armor rock will be used, ranging in size from 1,300 to 2,200 pounds. Secondary rock size will range from 130 to 1300 pounds and the COE estimates that 2,975 cy will be required. Approximately 1,750 cy of core rock will be placed behind the secondary layer and will range in size from 10 to 130 pounds. Approximately 520 cy of filter rock and approximately 45,200 cy of classified fill will be needed behind the revetment for backfill. About 15,650 square yards of geotexti1e fabric will be placed under the filter rock and under the backfill material to prevent the placed material from settling and also to provide a stable area for

construction activities. A cross-section of the revetment design is shown in Figure 2. The total project footprint is 4.12 acres for this alternative.

3) Rock Revetment and Sheetpile Bulkhead

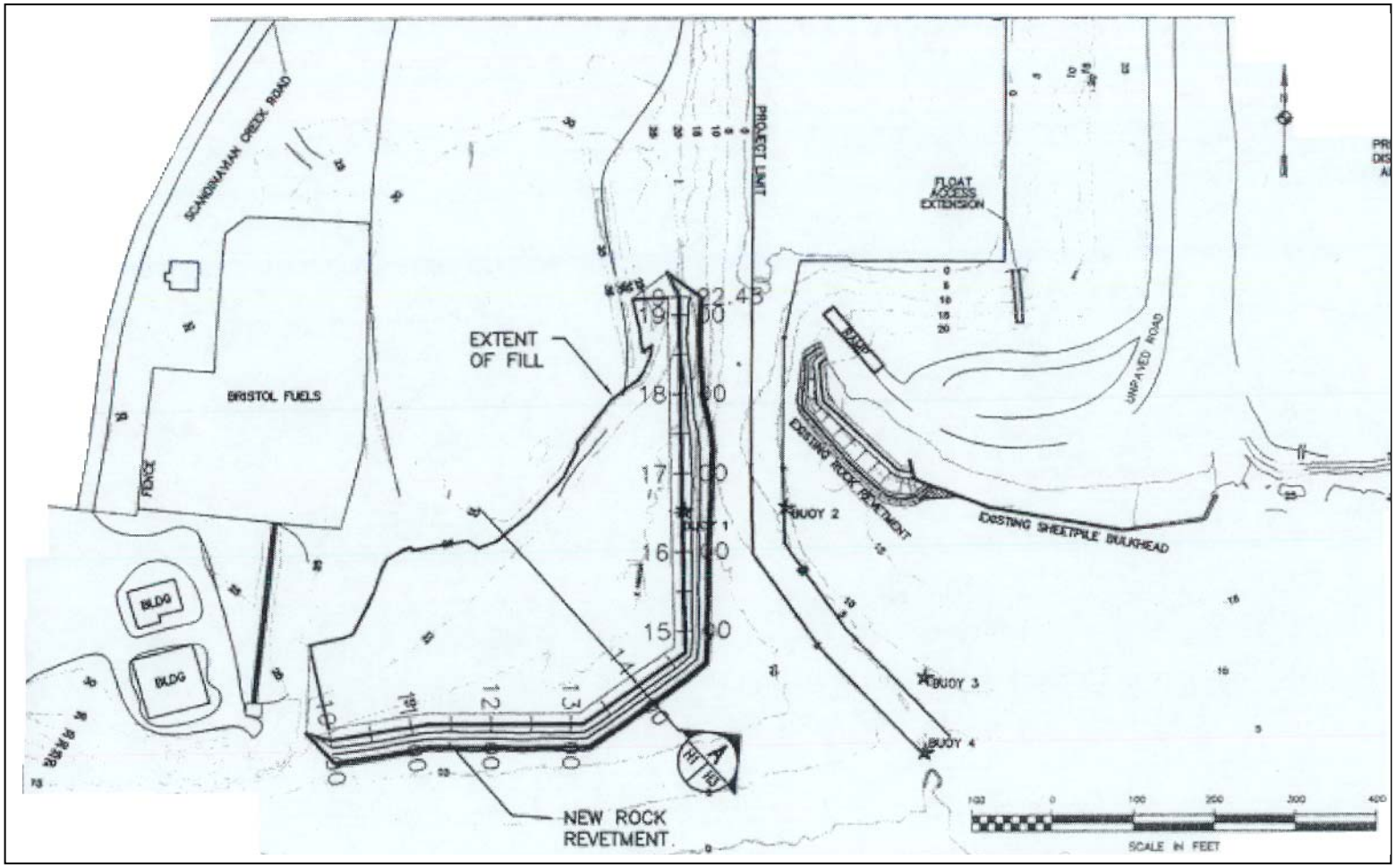
This plan consists of 482 feet of rock revetment and 450 feet of sheetpile, as shown in Figure 3 Rock is being used instead of sheetpile on the east side of the revetment to prevent waves from reflecting off the sheetpile and into the harbor.

The rock revetment will have a top elevation of +29 feet MLLW. The top elevation of the revetment was determined from 5 feet of wave run-up the rubble slope with a design high water level of 24 feet, which is the extreme high water level plus one foot of storm surge. The rock size is the same as for the rock revetment option. Approximately 2,430 cy of armor rock will be used, ranging in size from 1,300 to 2,200 pounds. Secondary rock size will range from 130 to 1300 pounds and 1,450 cy will be required. Approximately 860 cy of core rock will be placed behind the secondary layer, ranging in size from 10 to 130 pounds. Approximately 260 cy of filter rock will be required and approximately 38,310 cy of classified fill and 740 cy of porous fill will be needed behind the revetment and sheetpile. About 13,945 square yards of geotextile fabric will be placed under the filter rock and under the backfill material to prevent the placed material from settling and also to provide a stable area for construction activities. A cross-section of the revetment design is shown in Figure 4. The total project footprint is 3.2 acres for this alternative.

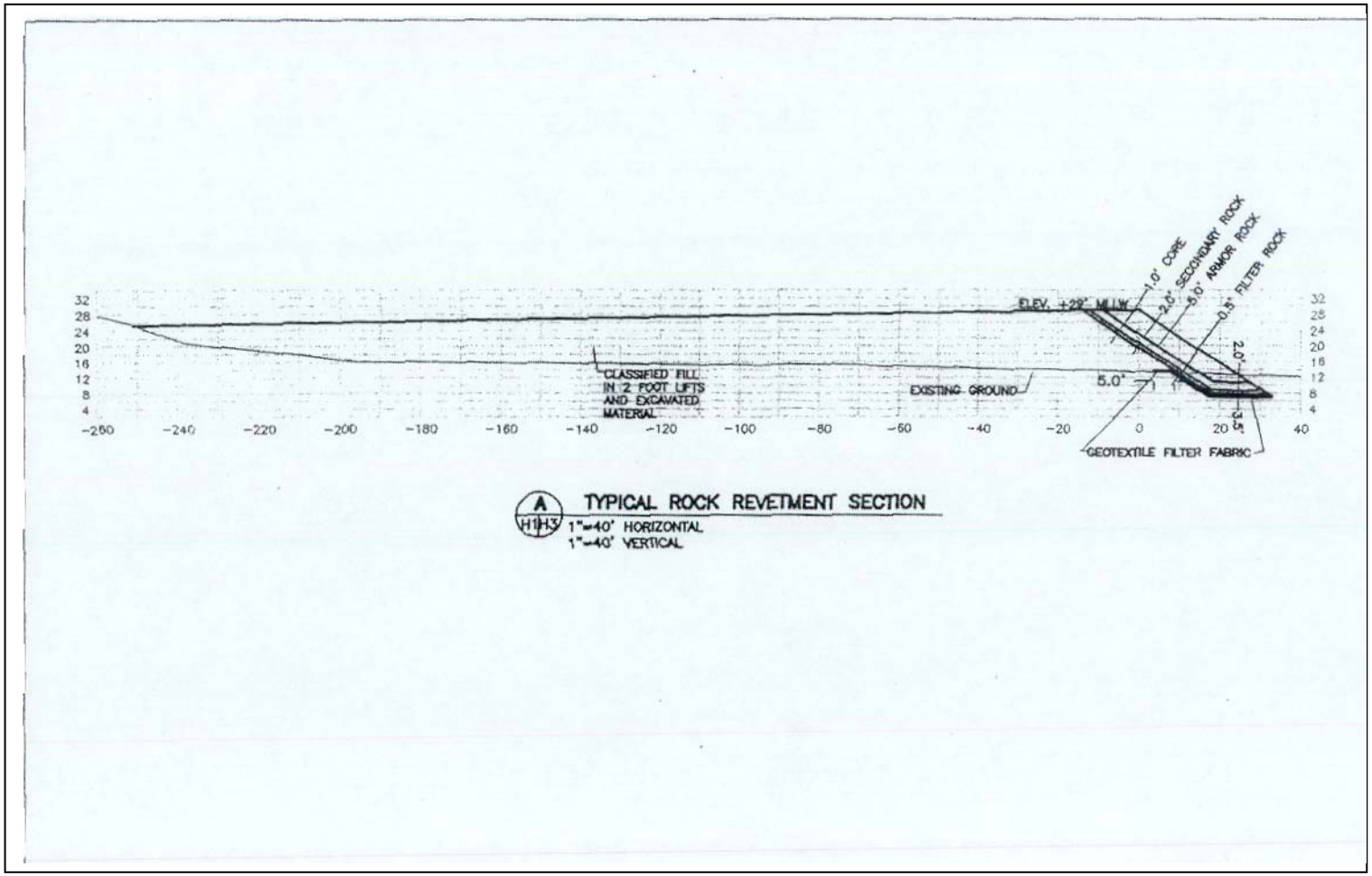
The steel sheetpile bulkhead would consist of coal tar epoxy coated Z or U piles with anchor rods extending back to anchor piles at 16- foot spacing. A galvanized wale assembly would be constructed along the face of the sheetpile. Drainpipes would be placed on a 12-foot spacing to drain water from behind the wall and minimize overburden pressures. The top elevation of the sheetpile would be +29' MLLW and the sheets would extend to a minimum elevation +4'MLLW for a total length of 25 feet. Figure 4 shows the sheetpile configuration in cross-section.

Quarry Site

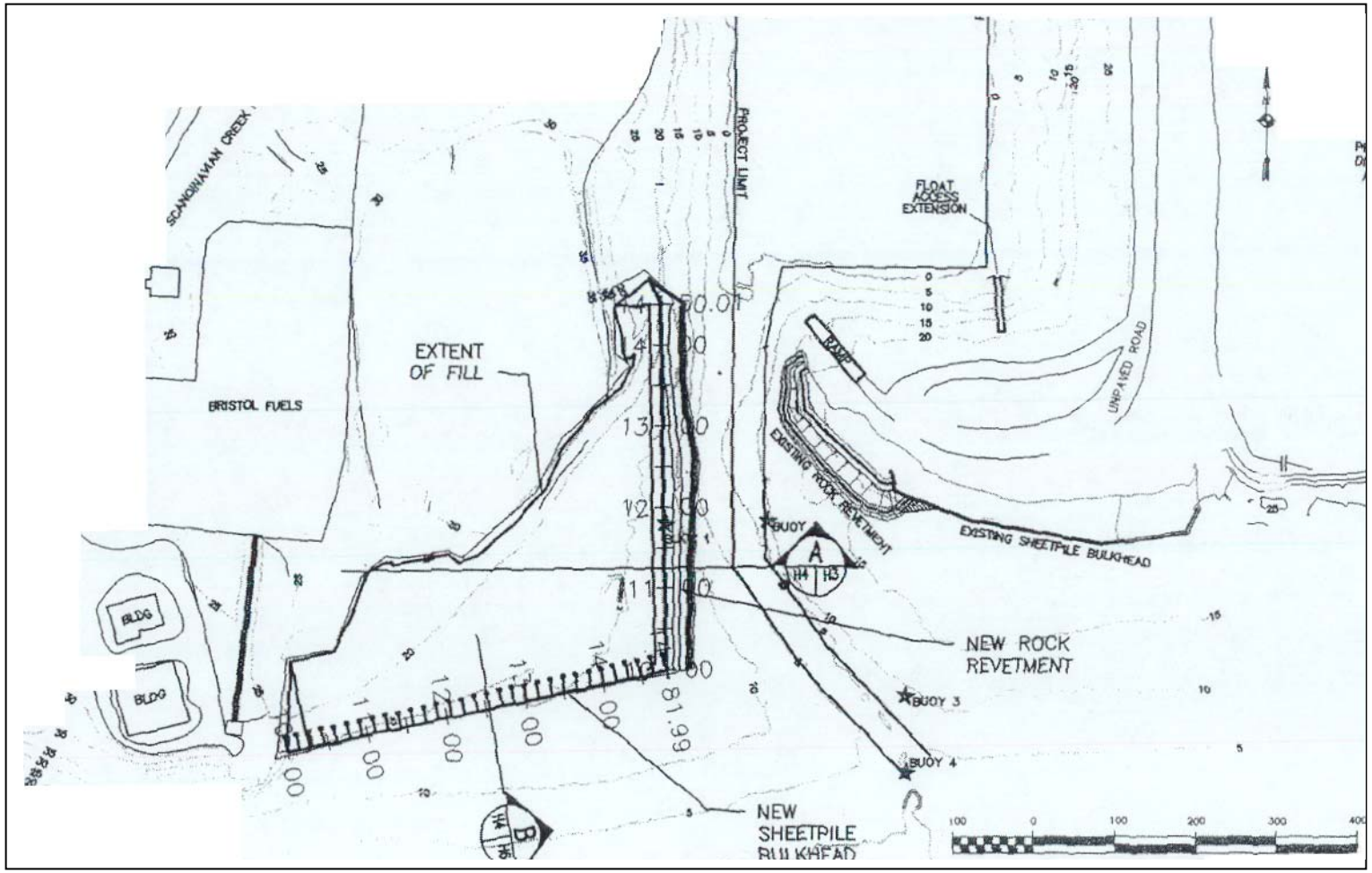
Quarry material for the rock revetment and backfill material will come from an unknown site. After site selection, the contractor will submit a quarry plan to the Alaska District for approval. If the contractor selects an existing quarry, representatives from the Alaska District will meet with resource agencies to determine if any additional stipulations or permitting requirements for quarry operations are warranted. If a new quarry site is selected, a site development and reclamation plan should be developed and reviewed by resource agencies.



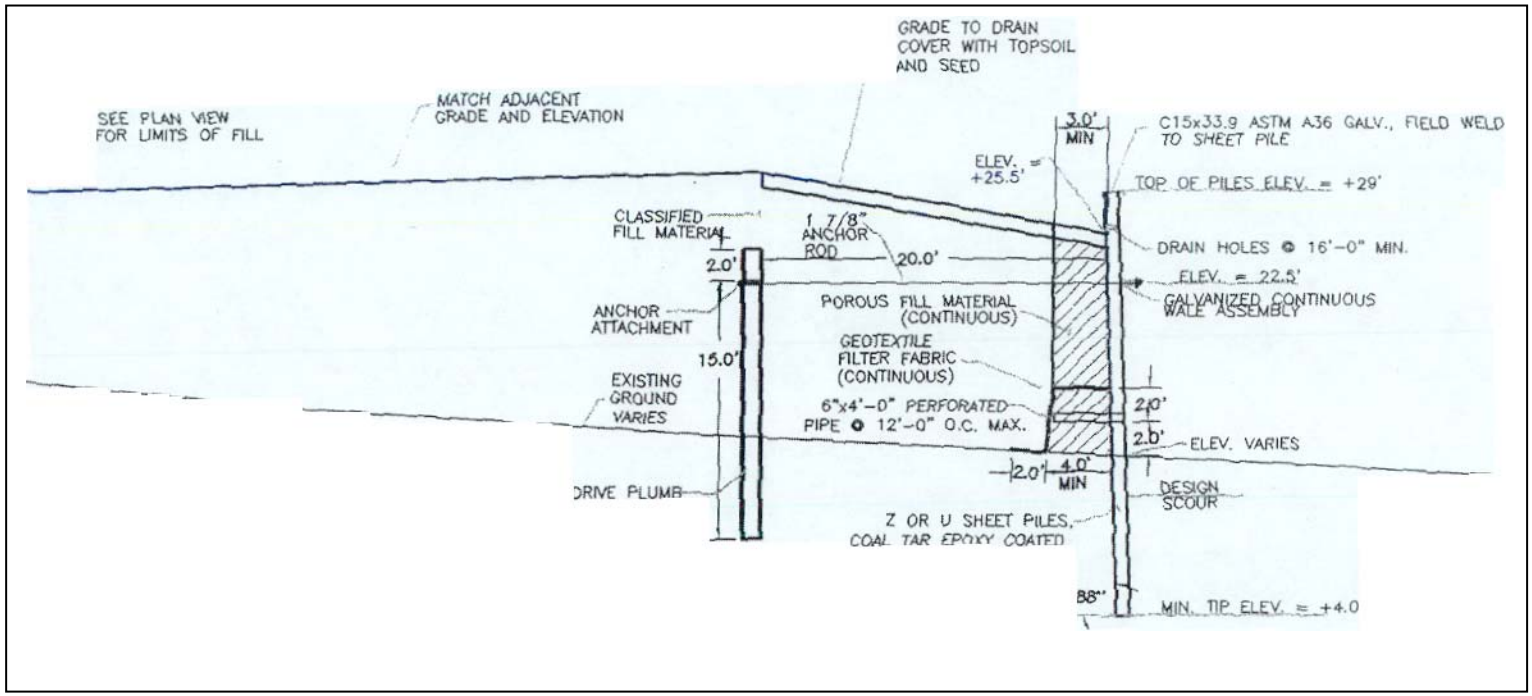
ALASKA DISTRICT CORPS Of ENGINEERS CIVIL WORKS BRANCH
Rock Revetment Plan View H-1
Dillingham Ban Stabilization



ALASKA DISTRICT CORPS OF ENGINEERS CIVIL WORKS BRANCH
Rock Revetment Cross Section H-3
Dillingham Bank Stabilization



ALASKA DISTRICT CORPS Of ENGINEERS CIVIL WORKS BRANCH
Sheetpile Plan View H-4
Dillingham Bank Stabilization



ALASKA DISTRICT CORPS Of ENGINEERS CIVIL WORKS BRANCH
Sheetpile Bulkhead Cross Section
Dillingham Bank Stabilization

BIOLOGICAL RESOURCES

Wetlands
The undisturbed area to the immediate west of the Dillingham small boat harbor is classified in the National Wetlands Inventory as palustrine scrub-shrub (PSS) and palustrine emergent (PEM) wetlands. These wetlands contain sedges, cottongrass, sphagnum moss, cranberry, bog blueberry, bog cranberry, lowbush cranberry, silverweed, leatherleaf, willow, bluejoint, and dwarf arctic birch (COE 1979).

Functionally, these wetlands provide vegetated buffer zones between the Old Western disposal site and the road to Bristol Fuels, nesting habitat for passerines and shorebirds, and seasonally-available cover to juvenile anadromous and resident fish.

Birds
The Dillingham area supports a large diversity of breeding birds. Sixty -seven species of breeding birds were recorded in surveys within the Dillingham Army National Guard training area, 4 miles north of the small boat harbor between 1995 and 1998 (USFWS 1999). Migratory waterfowl that are possible breeders within the project area include mallard, northern pintail, green-winged teal, greater scaup and, during short periods in May and September, large numbers of migrating ducks and geese use the tidal areas and lagoons throughout the Nushagak Bay area. Breeding shorebirds include black-bellied plover; American golden- and Pacific golden plover; greater yellowlegs; Hudsonian godwit; whimbrel; solitary and least sandpipers; dunlin; short- billed dowitcher; common snipe; and red-necked phalarope. Sandhill cranes also likely utilize the wetlands in and around Dillingham. Other migratory land birds that likely utilize the project area include alder flycatcher; tree, cliff, and bank swallows; ruby-crowned kinglet; gray-cheeked, Swainson's, hermit, and varied thrushes; American robin; yellow wagtail; American pipit; arctic, orange-crowned, yellow, yellow-romped, blackpoll and Wilson's warblers; northern water thrush; American tree, savannah, fox, Lincoln's, white-crowned and golden-crowned sparrows; dark-eyed junco; Lapland longspur; and rusty blackbird (USFWS 1999).

Mammals
Mammals that occur in the Dillingham area include moose, caribou, wolf, wolverine, brown and black bears, beaver, river otter, mink, weasels, red fox, lynx, arctic hare, porcupine, hoary marmot, arctic ground squirrel and muskrat (State of Alaska 1985,1974; USFWS 1986). No mammals were observed in the wetlands in the project area; however, they most likely support numerous small mammals.

Fish
The many lakes, streams, and rivers of the Nushagak Bay drainage basin support numerous freshwater fish species that include Dolly Varden, rainbow trout, grayling, whitefish, and pike. Smelt, herring, sculpin, stickleback, lamprey, flatfish (flounder, soles, and halibut) and shellfish (sand shrimp) are also present in the waters of Nushagak Bay. (COE 1979).

The Nushagak River system provides spawning and rearing habitat for chinook, chum, coho, pink, and sockeye salmon (State of Alaska 1993; USFWS 1990). Returning adult salmon occur in Nushagak Bay following this general timing pattern:

Species	Start of Run	End of Run
Chinook	**Late May**	**Mid-July**
Coho	Mid-June	Late August
Sockeye	Mid-June	Late July
Pink	Mid-July	Early August
Chum	Late June	Late June

In May and early June, juvenile salmon smolts outmigrate to open water. The estuaries and near coastal waters of the Nushagak Bay serve as an important transition zone for juvenile fish as the move from freshwater to saltwater. Juvenile anadromous and resident fish from nearby tributary streams Squaw Creek and Scandinavian Creek are likely to seasonally inhabit the nearshore habitat near rand within the Dillingham harbor. The presence of shellfish and other benthic organisms in the project area is unknown.

Water Quality

The lower Nushagak River and upper Nushagak Bay areas are classified as estuarine, subtidal, unconsolidated bottom wetlands (EIUBL) in the National Wetlands Inventory. The Nushagak River carries turbidity and suspended solid levels at naturally high levels. These levels vary throughout the year depending on winds, tides, and freshwater interception and runoff.

Threatened and Endangered Species

At this time, no threatened or endangered species under the Endangered Species Act of 1973, as amended (ESA), are known to occur in the project area. Formal consultation per Section 7 of the ESA, will become necessary if new information becomes available that would indicate listed or proposed species may be affected by the action.

DISCUSSION

The Service has a responsibility to identify and make recommendations that ensure fish and wildlife and their habitats receive equal consideration during project planning. Our recommendations are an attempt to ensure that project-related losses to fish and wildlife resources are mitigated through the following sequence: avoidance, minimization, and compensation for unavoidable impacts.

Based on information on the fish and wildlife resources of the project area, the Service has determined that the placement of armor rock revetment and/or steel sheetpile on 3.20 or
4.12 acres (depending on selected alternative) of the bed of the Nushagak River will have an unknown impact to fishery resources. No fish spawning is known to occur at the project site, and the river at Dillingham serves primarily as a transitional and migratory corridor. Juvenile salmon outmigrating downstream in May and June and adult salmon migrating upstream in June, July, and August could be disturbed or killed by the sudden deposition of rock into the water column. Any fish cover habitat created from the placement of rock would likely be temporary as interstitial spaces become filled with silt and sediment.

Resuspension of fine materials will also occur during the placement of the riprap, primarily due to silt disturbance upon impact with the river bottom. Secondary impacts from this project may include altered flow velocities and hydraulic vectors along the 923 feet of armor rock as well as altered erosion and deposition patterns downstream. Project-derived impacts to water quality will be difficult to predict. It is also possible that project-derived impacts may be masked by natural hydrologic events such as high flood flows and natural erosion and deposition.

It is important for the COE to acknowledge and assess the cumulative and secondary impacts their projects may be creating in the aquatic environment in the Dillingham harbor area. The Dillingham Shoreline Erosion Control Project authorized in 1995 and 1997 placed approximately 1600 feet of sheetpile in the Nushagak River. In 1998, the COE authorized the Additional Riprap Revetment and Sheetpile Bulkhead Protection Shoreline Erosion Control Project for 613 feet of additional protection immediately downstream of the original project. In 2001, 260 feet of additional riprap was authorized to stabilize Nushagak riverbanks affected by a poorly designed outlet weir at the Peter Pan dredge spoil site. The current project proposes to alter 923 additional feet of riverbank. In total, at least 3,396 feet of the Nushagak River nearshore environment may have been affected from COE sponsored projects in the Dillingham area. In addition, maintenance-dredging activities at the Dillingham harbor deposit approximately 90,000 cy of spoils on nearby wetlands annually. While the effects to nearshore ecology, hydrology, and fish habitat may have not become obviously apparent at higher trophic levels in the Nushagak River/Bay system, a degree of impact is undoubtedly occurring.

Portions of the wetlands in the project area have been altered and filled through the deposition of the dredged materials from the Dillingham boat harbor. The remaining palustrine emergent scrub-shrub wetlands provide habitat for migratory and passerine birds. Operation of heavy equipment and the placement of fill in the project area will permanently destroy these wetlands and avian habitat will be lost.

Quarry development and operations typically have severe environmental impacts from the destruction of vegetation, scraping and stockpiling of overburden, noise from rock blasting~ and heavy equipment operation. In order to minimize these impacts, appropriate erosion control and reclamation measures should be utilized. Installation and maintenance of silt screens on any drainage ways between the quarry and nearby water bodies should be enforced.

RECOMMENDATIONS

We recommend that the following measures be incorporated in to the project to avoid and minimize potential adverse impacts from the project construction.

We recommend:

1. The COE thoroughly define the purpose and need of this project in the Environmental Assessment for this project.

2. The COE develop an assessment of the cumulative impacts of their erosion control projects in the Dillingham area and develop a long-term plan to address bank stabilization and boat harbor maintenance needs.

3. Selection of the rock revetment alternative instead of the hybrid rock revetment and sheetpile alternative. The Service believes that rock revetment has a greater potential to hold and maintain vegetation, has greater hydrologic roughness, and may provide some degree of fish habitat greater than steel sheetpile.

4. That all work below ordinary high water shall occur when the tide level is below the work area to avoid impacts to fish and water quality.

5. Vegetation within the project area shall only be cleared between August 15 and May 15 to avoid impacts to nesting birds.

6. Revegetation of the filled areas behind the rock revetment with native cultivars and shrub species in order to partially recreate passerine bird habitat values. In addition, we recommend that the COE install soil wraps and willow brush layers along the top of the rock revetment, similar to the COE revetment/restoration design at the Peter Pan spoil site weir outfall, in order to partially recreate fish and riparian habitat.

7. Environmental impacts and subsequent reclamation needs associated with the selection or expansion of a new quarry site should be addressed in a separate environmental document after the site has been proposed. The U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Alaska Department of Fish and Game shall be contacted to determine whether endangered or threatened species, essential fish habitat, marine mammals, or anadromous fish are present at a potential quarry site.

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Appendix C

Evaluation of the Discharge of Fill Material Related to Emergency Riverbank Stabilization, Dillingham, Alaska in Accordance with Section 404(b) Guidelines

Evaluation Under Section 404(b)(1)
of the Clean Walter Act for
Bank Stabilization, Small Boat Harbor
Dillingham, Alaska

I. Project Description

The U.S. Army Corps of Engineers, Alaska District is planning to construct riverbank stabilization structures and a breakwater at Dillingham, Alaska. The proposed action would result in the placement of 950 feet of rock revetment and a 391-foot-long rock breakwater perpendicular to the revetment on the west riverbank near the Dillingham, Alaska Small Boat Harbor and an 850-foot long-rock revetment that would extend an existing sheet-pile structure on the City Dock Side of the harbor. The purpose of the project would be to protect the riverbanks along the east and west sides of the entrance channel from accelerating erosion, and to prevent storm waves from entering the harbor where they erode the riverbanks.

The West Side project footprint would cover 1.4 acres of intertidal mud flat and use about 2.8 acres of the former dredged material disposal site for the revetment and a service road. Mean low tide on the project site is +10 feet MLLW and the toe of the breakwater would extend to +11 feet MLLW. The breakwater would be exposed during most low tides. The City Dock Side project would cover 1.4 acres of intertidal mud flat and 0.2 acre of sedge wetland above the intertidal mud, for a total of 1.6 acres. Construction details of the preferred construction alternatives are summarized in a U.S. Army Corps of Engineers, Alaska District letter report and environmental assessment, titled, “Emergency Bank Stabilization, Dillingham, Alaska.”

II. Physical and Biological

A. Substrate

Intertidal substrate on the project site is mud and clay composed of eroded glacial silt and riparian organics. Riverbanks are silty loam subject to rapid erosion during storm events. The range of erosion is estimated at 2.4 to 7.6 feet per year.

The wetland substrate is composed of peat and clay covered by a thick layer of river silt that had escaped from the former Peter Pan dredged material disposal site when it was active.

B. Water Circulation, Fluctuations, and Salinity

The lower Nushagak River and estuary is a high-energy system caused by extreme tidal fluctuations and high current velocities. Tides in the area range from 12 to 23 feet above mean lower low water, with an extreme range of 30 feet. Tide current velocities of almost 12 feet per second have been recorded.

Water fluctuations, circulation or salinity in the area would not be impaired by the proposed action.

C. Suspended Particulate/Turbidity

Suspended sediment concentration in the Nushagak River ranges from about 136 mg/l to 843 mg/l (PND 1988). Bedload sediments are as high as 3,230 mg/l. The placement of structures and fill material behind structures could cause some temporary increases in local turbidity during construction. The amount of suspended sediment increases from the project would likely be small compared with the amount now in the system.

Longshore drift of sediments might be temporarily disrupted and collect in the bight where the breakwater joins the revetment. Sediments that collect in the adjacent entrance channel and mooring basin are dredged annually.

D. Contaminants

Only clean rock from local quarries would be used for construction. Rock from local quarries is not contaminated. The proposed project would not contribute to degradation of water quality in the bay.

E. Aquatic Ecosystems

There have been no quantitative studies of benthic invertebrates or plankton in Nushagak Bay. The U.S. Army Corps of Engineers, Alaska District conducted a study in 2004 where 44, 5 by 8-inch aluminum accretion plates were buried on Dillingham tide flats including the tide flat on the project site. No macro invertebrates such as clams or worms were seen on these tide flats. It is assumed that meiofauna, including harpacticoid copepods, are in high seasonal abundance, but in low species diversity on the tide flats. A thin layer of diatoms and green algae would typically form on the surface of the mud during summer, but the proposed action would not degrade the overall marine ecosystem and its food base for marine mammals, fishes, and seabirds.

The project is in an aquatic system that supports large numbers of migrating salmon, and is within essential fish habitat for Pacific salmon. Construction activities would alter 2.8 acres of intertidal mud that is included in essential fish habitat, but would not permanently remove it from biological production. The project would not have an adverse impact on local populations of returning adult salmon or outmigrating juvenile salmon because the area of impact is relatively small and of marginal value to migrating salmon. Some juvenile pink and chum salmon might be temporarily detained near the breakwater until the tide recedes to its lowest mean level.

The wetland adjacent to the City Dock Side project site is a natural drainage that does not have standing water. It is relatively well drained and grows sedge *Carex sp*., beach rye *Elymus sp*. and a few dwarf willow *Salix sp*. Much of this wetland is occasionally and

temporarily flooded by storm surge. The project would cover about 0.2 acre of this wetland with rock.

F. Wildlife

Impacts to terrestrial wildlife and avian fauna were considered. There are no large terrestrial mammals in the area. A small number of voles and shrews might inhabit the wetland area that would be impacted. These species are ubiquitous to Alaska including the Dillingham area, and this project would have only local and minor impacts to distribution and abundance of these species.

Some shorebirds would likely be displaced from potential feeding on the intertidal mud flats, but food resources on these particular flats are so limited that loss of this small area of habitat would not have a significant effect on the population of migrating shorebirds.

G. Other Determinations

The proposed action would have no appreciable detrimental effects on any of the following:

- Municipal and private water supplies
- Recreational, subsistence, or commercial fisheries
- Water-related recreation
- Cultural or historical resources

If archeological artifacts were discovered, work at that particular site would be stopped until the required consultation with the State Historical Preservation Officer could be conducted. Work would not begin until a determination of eligibility was made and appropriate mitigation measures were agreed to. The State Historic Preservation Officer concurs with our determination that the proposed action would have no adverse effect on properties that may be eligible for listing in the National Register of Historic Places.

No parks, national seashores, wilderness areas, or research sites are in the project area.

Aesthetics of the local view would be permanently altered from the view of a natural riverbank to one of a rock revetment and breakwater. The top of the west revetment would be vegetated with willow and grass to soften the view and mitigate the potential for erosion.

G. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem

No significant cumulative or secondary effects on the aquatic ecosystem are expected from the proposed action.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

A. Adaptation of the Section 404 (b)(1) Guidelines to this Evaluation

The proposed project complies with the requirements set forth in the Environmental Protection Agency's Guidelines for Specification of Disposal Sites for Dredged or Fill Material.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site That Would Have Less Adverse Impact on the Aquatic Ecosystem

An environmental assessment was prepared in conjunction with planning for this project. The selected alternative is the most practicable alternative for riverbank stabilization and protection from storm surge waves.

C. State Water Quality Standards

The proposed project would not be expected to have an appreciable adverse effect on water supplies and recreation. The project would not be expected to introduce petroleum hydrocarbons, radioactive materials, residues, or other pollutants into wetlands and other waters of the United States. A temporary and inconsequential increase in turbidity may result from the proposed action during construction. The project would comply with State water quality standards.

D. Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act

The proposed action complies with the toxic effluent standards of Section 307 of the Clean Water Act.

E. Endangered Species Act of 1973

The proposed project would not have an adverse effect on Steller’s eiders, spectacled eiders, Northern Steller sea lions, listed whale species or their critical habitat. This determination has been coordinated with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service, agencies responsible for management of protected species.

F. Essential Fish Habitat

The action would not adversely impact essential fish habitat (EFH) including salmon populations or their habitats. This determination has been coordinated with the National Marine Fisheries Service, which is responsible for managing EFH under the Magnuson-Stevens Fishery Conservation and Management Act.

G. Evaluation of Extent of Degradation of the Waters of the United States

There are no municipal water supplies in the area that could be negatively affected by the proposed project. Recreation and commercial interests would not be negatively affected by the dredging and disposal project. There would be no significant adverse impacts to plankton, fish, shellfish, wildlife, or special aquatic sites.

H. Appropriate and Practicable Steps Taken To Minimize Potential Adverse Impacts of the Discharge on the Aquatic Ecosystem

All appropriate and practicable steps would be taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem. The proposed bank stabilization project in Dillingham, Alaska, would comply with the requirements of the guidelines.