Environmental Resources Section

Public Notice

Alaska District
U.S. Army Corps of Engineers

Date: 6 November 2013 Identification No. ER-14-02
Please refer to the identification number when replying.

The U. S. Army Corps of Engineers (Corps) has prepared an environmental assessment (EA) and finding of no significant impact (FONSI) for the following action:

Navigation Improvements
Little Diomede, Alaska

The Corps is proposing to construct breakwaters at Little Diomede that would provide protection from predominantly northerly waves to make launching and retrieval of subsistence vessels safer and to help improve the overall quality of life at Diomede. The recommended plan would require 78,400 cubic yards of associated rock with a small near-shore area dredged to -10 feet, requiring removal of 3,000 cubic yards of material at a total cost of $32,718,000, which includes repair and maintenance to be performed once every 10 years for the 50-year project life. The constructed project would support safe subsistence opportunities and provide much needed protection for navigation access.

The proposed action, alternatives considered, and potential environmental impacts are described in the enclosed EA. The EA is available for public review and comment for 30 days from the date of this notice. The EA and unsigned FONSI may be viewed on the Alaska District's website at: http://www.poa.usace.army.mil. Click on the Reports and Studies button and look under Documents Available for Review, Civil Works.

The comment period will close 30 days from the date of this notice. Written comments received on or before this date will become part of the official record. The FONSI will be signed upon review of comments received and resolution of significant concerns, if any. Please submit comments regarding the proposed action to the following address:

U.S. Army Corps of Engineers, Alaska District
ATTN: CEPOA-EN-G-ER (Floyd)
P.O. Box 6898
Joint Base Elmendorf-Richardson, Alaska 99506-0898

No public meeting is scheduled for this project. If you believe a meeting should be held, please send a written request to the above address during the 30-day review period explaining why you believe a meeting is necessary.

Notice is hereby given that the Corps will be applying for State Water Quality certification from the Alaska Department of Environmental Conservation (ADEC). ADEC may certify there is a reasonable assurance this proposed action and any discharge that might result will comply with the Clean Water Act, Alaska Water Quality Standards, and other applicable State laws. ADEC's certification may authorize a mixing zone and/or a short-term variance under 18 AAC 70. ADEC may also deny or waive certification.

Any person desiring to comment on this proposed action with respect to water quality certification may submit written comments to ADEC at the address below within 30 days from the date on this public notice.

Alaska Department of Environmental Conservation
WQM/401 Certification
555 Cordova Street
Anchorage, AK 99501-2617
Telephone: (907) 269-7564
FAX (907) 269-7508

Please contact Mr. Christopher Floyd of the Environmental Resources Section at (907) 753-2700 if you have any questions about the proposed action. Comments or requests for additional information may also be submitted electronically to the email address: Christopher.B.Floyd@usace.army.mil.\

Michael R. Salyer

Michael R. Salyer
Chief, Environmental Resources Section

US Army Corps
of Engineers
Alaska District

Draft Feasibility Report
Environmental Assessment and
Finding of No Significant Impact

Navigation Improvements
Diomede, Alaska

November 2013

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
P.O. BOX 6898
JBER, ALASKA 99506-0898

NAVIGATION IMPROVEMENTS
LITTLE DIOMEDE, ALASKA

DRAFT FEASIBILITY REPORT

November 2013

EXECUTIVE SUMMARY

Little Diomede Island is at the center of the Bering Strait, an extremely remote community of 115 people that rely almost entirely upon a subsistence way of life. The community is perhaps the least accessible in the United States, based on its location, the time, cost, and difficulty/uncertainty associated with travel to and from the island, and the island's severe physical attributes. The problem of concern at Diomede is restricted navigation related to harsh physical and environmental conditions, which result in a reduced quality of life, life/safety issues, and lack of access to subsistence activities.

This report documents a detailed study of these problems and alternative solutions utilizing criteria of Remote and Subsistence Harbors as defined in the Water Resources Development Act of 2007, Section 2006. This report recommends construction of breakwaters that would provide protection from predominantly northerly waves to make launching and retrieval of subsistence vessels safer and help improve the overall quality of life. The recommended plan would require 78,400 cubic yards of associated rock with a small near-shore area dredged to -10 feet, requiring removal of 3,000 cubic yards of material at a total cost of $32,718,000, which includes repair and maintenance to be performed once every 10 years for the 50-year project life. The constructed project would support safe subsistence opportunities and provide much needed protection for navigation access. Although the range of total benefits is between $6.1million and $7.4 million, a cost effectiveness/incremental cost analysis was performed that substantiates the best investment in accordance with Section 2006 criteria. Non-Federal sponsor support for implementation of the project includes the City of Diomede and the Native Village of Diomede, with financial assistance from Kawerak, Inc.

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1.0 INTRODUCTION

1.1 Study Authority

The authority for this General Investigation study is provided by the "Rivers and Harbors in Alaska" study resolution adopted by the U.S. House of Representatives Committee on Public Works on December 2, 1970, which reads in part:

> *"Resolved by the committee on public works of the House of Representatives, United States, that the Board of Engineers for Rivers and Harbors is hereby requested to review the reports of the Chief of Engineers on rivers and harbors in Alaska, published as House document numbered 414, 83rd Congress, 2nd session… and other pertinent reports, with a view to determine whether any modifications of the recommendations contained therein are advisable at the present time."*

and the Water Resources Development Act (WRDA) of 2007, Section 2006. Remote and Subsistence Harbors

(a) In General- In conducting a study of harbor and navigation improvements, the Secretary may recommend a project without the need to demonstrate that the project is justified solely by national economic development benefits if the Secretary determines that—

(1)(A) the community to be served by the project is at least 70 miles from the nearest surface accessible commercial port and has no direct rail or highway link to another community served by a surface accessible port or harbor; or

(B) the project would be located in the State of Hawaii, the Commonwealth of Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the United States Virgin Islands, or American Samoa;

(2) the harbor is economically critical such that over 80 percent of the goods transported through the harbor would be consumed within the community served by the harbor and navigation improvement; and

(3) the long-term viability of the community would be threatened without the harbor and navigation improvement.

(b) Justification- In considering whether to recommend a project under subsection (a), the Secretary shall consider the benefits of the project to—

(1) public health and safety of the local community, including access to facilities designed to protect public health and safety;

(2) access to natural resources for subsistence purposes;

(3) local and regional economic opportunities;

(4) welfare of the local population; and

(5) social and cultural value to the community.

1.2 Scope of Study

This report documents the study to investigate the feasibility of navigation improvements at Little Diomede, Alaska. The study was conducted and the report prepared in accordance with goals and procedures for water resources planning as contained in Engineer Regulation (ER) 1105-2-100 and the project authorization. Alternatives were examined for their feasibility, considering engineering, economic, environmental, and other criteria. A determination of Federal interest, in accordance with present laws and policies, is also included. An environmental assessment was be prepared for this project as an attached document.

1.3 Study Location/Congressional District

Little Diomede Island is at the center of the Bering Strait that separates the Bering Sea from the Chukchi Sea (Figure 1). The island is about 685 miles northwest of Anchorage, 135 miles northwest of Nome, and only 2.5 miles east of Big Diomede Island in Russia. The International Date Line passes between Big and Little Diomede Islands.

The study area is in the Alaska Congressional District. The Congressional delegation is composed of:

Senator Lisa Murkowski (R)

Senator Mark Begich (D)

Representative Don Young (R)

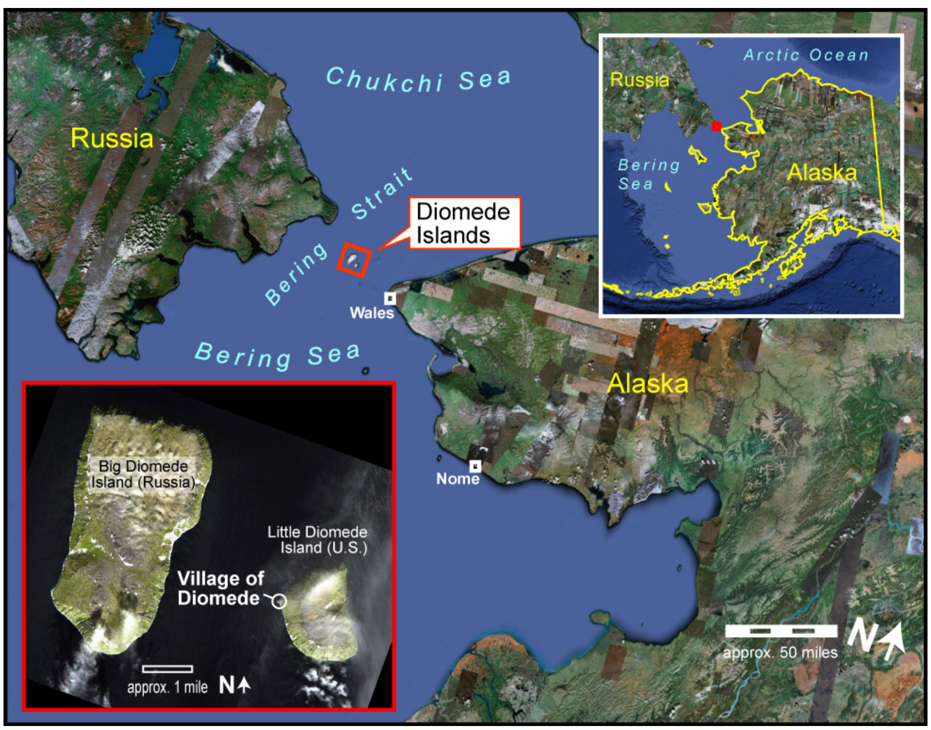


Figure 1. Location and vicinity map

1.4 Related Reports and Studies

There have been several studies and reports as follows:

Diomede Day School Protection. The Alaska District, U.S. Army Corps of Engineers prepared this report in December 1978 at the request of the Bureau of Indian Affairs (BIA). The request was for a study of wave conditions at the BIA Day School and provision of a design and specifications for a structure to protect the school from storm waves.

Navigational Improvements Reconnaissance Report. The Alaska District, U.S. Army Corps of Engineers prepared this report in May 1982 at the request of the City of Diomede. The report concluded that navigation improvements could be economically justified and recommended feasibility level studies.

Navigational Improvements Reconnaissance Report. The Alaska District, U.S. Army Corps of Engineers prepared this report in June 1990 at the request of the Alaska Department of Transportation and Public Facilities. The report concluded that a solution to the navigation needs of Little Diomede was possible and that the Federal government had an interest in working toward that solution.

Seabird Use at Proposed Quarry Sites Little Diomede Island, Alaska. The U.S. Fish and Wildlife Service Migratory Bird Management Project completed this report in 1991. Three potential quarry sites (talus, beach boulder, and cliff) were investigated. It was determined that if rock were to be removed from any of the potential quarries, that doing so from the cliff quarry would pose the smallest threat to birds.

Little Diomede Navigation Improvement Project Final Coordination Act Report. The U.S. Fish and Wildlife Service prepared this report in 1992. The report contains recommendations for further study and mitigation options for construction.

Navigational Improvement Technical Report. The Alaska District, U.S. Army Corps of Engineers prepared this report in February 1994 at the request of the Alaska Department of Transportation and Public Facilities. The report concluded that navigation improvements could not be economically justified at that time. This finding was based in part on a change in the operations and equipment of the barge company servicing the island, reducing the cost of annual freight delivery to the island and thereby reducing the benefits that could be claimed for harbor construction. (Subsequently, the annual barge delivery was suspended and currently no commercial company will provide this service except as a special charter. The cost of the special charter is very expensive and is undertaken infrequently.)

Little Diomede Inland Seawater Intake Feasibility Report. Peratrovich, Nottingham & Drage, Inc. prepared this report for VECO Polar Resources in September 2002. The report investigated the feasibility of installing a seawater intake structure in Diomede. Of particular interest to this navigation improvements study, a total of seven geotechnical test holes were drilled in the area to the north of the local helipad.

Section 905(b) (WRDA 86) Analysis Navigation Improvements, Little Diomede, Alaska. The Alaska District, U.S. Army Corps of Engineers prepared this report in April 2003 in response to Congressional direction included in Conference Report 106-988 for Fiscal Year 2001 Appropriations, Public Law 106-377. This report concluded that navigation improvements could be economically justified and recommended feasibility level studies.

1.5 Non-Federal Sponsor

The non-Federal Sponsors for implementation of the project are expected to be the City of Diomede and the Native Village of Diomede, with financial assistance from Kawerak, Inc, the Norton Sound Economic Development Corporation, and the State of Alaska.

2.0 DESCRIPTION OF STUDY AREA

2.1 Project Area

The community of Inalik, commonly known as Diomede or Little Diomede, is a traditional Eskimo village of approximately 120 people located on the western shore of Little Diomede (locally known as Ignaluk) Island, Alaska. Residents of Little Diomede rely almost entirely upon a subsistence way of life, harvesting fish and crab, hunting whales, walrus, seals, and polar bears. Little Diomede and its companion island, Big Diomede, lie at the center of the Bering Strait, separating the Bering Sea from the Chukchi Sea and Russia from the United States (Figure 1). The community is 2.5 miles from Big Diomede, which belongs to Russia; 0.6 mile from Russian waters and airspace; 27 miles from the Alaskan mainland; and about 685 air miles northwest of Anchorage.

Diomede is an extremely remote community, perhaps the least accessible in the United States, based on its location, the time, cost, and difficulty/uncertainty associated with travel to and from the island, and the severe physical attributes of Little Diomede Island.

Little Diomede Island rises abruptly from the sea at a 40-degree angle to a height of nearly 1,300 feet and is characterized by steep slopes littered with substantial amounts of rock and boulders. The community's location is the only area that does not have near-vertical cliffs to the water. The island is 2-1/8 miles long and 1-7/8 miles wide, encompassing only 2.8 square miles. Little or no soil covers the side slopes of the island, and many areas are barren of vegetation. The vegetation that does exist is alpine tundra composed of salmonberry, moss, greens, and some roots. The shoreline consists of large rock and boulders with no semblance of a beach.

2.2 Access

The small size and steep topography of Little Diomede Island makes constructing a year-round runway prohibitive. Diomede currently has limited accessibility. Conditions permitting, a temporary airstrip is established annually on a stable section of sea ice between the two islands. Hence, year-round access to Diomede is currently limited to helicopter. Diomede possesses a helipad and, conditions permitting, receives mail once a week via helicopter when not accessible by plane. Seasonal conditions permitting access to Diomede by boat during open water and plane during periods of stable sea ice are also possible.

Emergency medical service can be provided by the Alaska National Guard stationed in Nome, or other commercial sources, weather permitting. However, delays or failures to respond to medical emergencies occur every year and, in some cases, have resulted in fatalities. Travel to and from Diomede for business and/or pleasure is restricted by the concern over irregular transportation availability. Visitors to Diomede have been stranded in the community for long periods of time, sometimes 2 or more weeks. Likewise, Diomede residents have been unable to return home and are forced to reside with relatives or friends since bush communities typically do not have commercial lodging or dining facilities.

2.2.1 Navigation

Few navigation improvements have been built at Diomede. There are no improved landing ramps, areas of protected moorage, or protected storage areas along the beach. Boats must be launched and retrieved directly from the shoreline, which consists of large rocks and boulders with little to no suitable landing areas. Some boulders have been placed in the near shore to the south of the helipad to form two small jetty-like structures extending a short distance perpendicular from the beach (Photo 1). The area between these two can serve as a crude launching area but only safely under the calmest of conditions due to the confined space between them. Winds are typically 20 to 30 mph, with sustained winds of 60 to 80 mph common. In addition to wind generated waves, Diomede is also susceptible to long period swells. Due to the rocky beach and wave climate, landing any sort of vessel at Diomede is a risky venture. Barges delivering fuel and goods must either lighter goods to shore using small skiffs or construct a crude landing from material available locally. The size of the boats utilized by Diomede residents is limited to those sizes that can be manually hauled out of the water and stored high enough above the beach to avoid damage from waves. A crude ramp was constructed of material available from the beach and near shore in the summer of 2011 to support a school reconstruction project. This ramp required constant upkeep during the duration of the construction project to remain operational.

Located in the middle of the Bering Strait (see Figure 1), the island is nearly a full day's travel by boat to Wales, the nearest community with regular air transportation service. The Bering Strait is frequently rough and windy, making travel to and from the island in 18- to 20-foot open aluminum skiffs a hazardous undertaking, and several lives have been lost in these crossings. Because of the hazardous landing conditions at Diomede, local shipping companies have discontinued regular freight delivery service. Small freight shipments are received through the weekly helicopter service or, for a limited time during the freeze-up, by plane; however, larger items must wait for a sufficiently large accumulation to justify the expense of barge delivery. Typically this delivery interval is 2 or more years. Fuel oil is delivered once a year.

Photo 1. Aerial photo of Diomede showing helipad and crude launch area

2.2.2 Aviation

A state-owned heliport (Photo 1) allows for weekly mail delivery. The mail helicopter carries four passengers or 1,300 pounds of small freight; however, mail has priority because the U.S. Postal Service (USPS) subsidizes this service. Bad weather and/or mechanical problems frequently disrupt service and several weeks often can pass between flights.

Conditions permitting, most commonly and recently occurring from February through April, a runway is constructed on the frozen ocean, and fixed wing aircraft are capable of transporting residents and visitors, mail, and small dry goods and supplies during this time. A shallow reef between Little and Big Diomede Islands has historically facilitated the formation of solid ice between the two islands. More recently, though, the formation of solid ice has not been as reliable. Historically, the Bering Strait was frozen from mid-December to mid-June, but more recently, freeze-up has occurred as late as February and March. The 1982 reconnaissance report stated that fixed wing aircraft could land on the ice runway during the 5 months in which the ice between Little and Big Diomede was frozen. Today, this runway is typically available for only 3 to 4 weeks. During the winter months of 2008 and 2009, the ice was too thin to allow construction of the ice runway. Continuing climate change may result in this form of access being lost altogether.

2.3 Economics

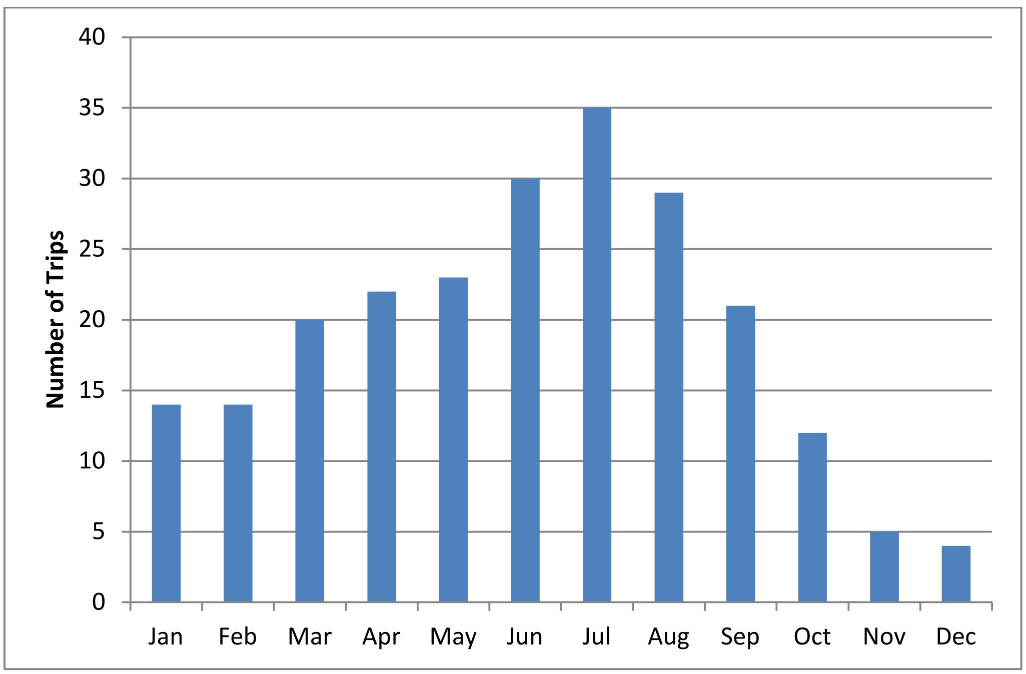
Residents of Diomede estimate that access to the ocean, given the current conditions, can only occur when waves are no greater than 2 feet. When waves are 2 feet or greater, the rocks, surges, and currents at the beach make conditions too dangerous to launch.

Because of its remote location and difficult conditions, Diomede has had no scheduled freight deliveries for more than a decade. Occasional chartered freight deliveries come into the community for special situations, such as delivering materials for the community boardwalk. Diomede residents acquire through subsistence a very large proportion of their food, both by necessity as well as cultural preference (

Figure 1.

Figure 2). Diomede residents' high level of dependence on subsistence foods for their very survival makes the community unique, even compared with other villages in the region.

Residents of the community have suggested that subsistence acquisition of foods could be increased by as much as 50 percent over current harvest levels if a project was completed that would allow the local boat fleet better access during periods of higher wave conditions[1].



Source: data from Tetra Tech, Inc. et. al. Economic Value of Subsistence Activity, Little Diomede, Alaska, December 2011.

[1] Francis Ozenna, Diomede IRA Council, personal communication, December 2011.

Figure 2. Number of activities in which one or more of a subsistence resource species were targeted by Diomede hungers by month.

The U.S. Army Corps of Engineers completed an official survey of Diomede residents in 2007 to gather information on the needs of the community. The following quotes are from the responses of Diomede residents to a question asking about the impact "a protected harbor" in Diomede would have on extending their subsistence harvests or extending the family's subsistence activities[2]. The phrase "protected harbor" is slightly different from the current proposed alternatives (which provide wave protection). However, we believe the effect is the same since the skiff fleet would not have remained on the water in either situation. The comments received included the following:

"Subsistence harder by year due to warming. Walrus moving in March. Used to be May."
"20 percent more subsistence overall. Helpful in October and November when surf is harsh."
"Yes, a protected small harbor facility would increase our subsistence harvest by lots."
"Would extend the range of hunting."
"Yes, a protected small harbor facility would increase our subsistence harvest by 50 percent."
"Would make 5 more trips (per year)."
"Yes, would be able to purchase skiff – 10 to 12 trips per year."
"Yes, a few more times a year. Protection from large swells when launching."
"The harbor would help – boats wouldn't have to be stored on land, lager boats."
"Yes, 24 more hunting trips, currently 8 trips. 25 to 50 percent improvement"

The following points taken from the technical report performed by Jim Richardson of ResourcEcon titled "Summary of Without Project Conditions and Impacts to Diomede" provide some perspectives on greater marine access resulting in increased food production and resolving the shortage of food for the residents of Diomede. The report is included in Appendix A.

- Diomede residents prefer to harvest walrus that migrate past Diomede. In the spring (May and June), females and sub-adults migrate northward through the Bering Strait. Depending on the weather and ice conditions, the period of successful hunting may be relatively short. In the fall (October and November), the reverse population migration occurs as the walrus head south to join up with the males working their way north from Bristol Bay. Again, the weather conditions dictate the potential for launching boats and safely returning in difficult wave environment at the Diomede beach. Restricted ability for the Diomede hunters to launch and return mean either lost opportunities and/or longer hunting trips that increase costs and risks. Table 1shows the walrus harvests by Diomede hunters for the period from 1989 to 2011. There is a very clear decline in the numbers harvested, particularly in recent years. We do not know the reasons for this sharp decline, but since walrus is a preferred species for food production, this trend represents restricted food opportunities for residents of Diomede. It is likely that changing weather patterns have resulted in changed ice conditions during the periods that the walrus migrate past Diomede Island. If that is the case, then expanding the 'operating window' for hunters to be able to get out, could mean a substantial increased opportunity for walrus harvests, particularly in the

[2] U.S. Corps of Engineers, Alaska Region. Household Interviews: Diomede, conducted during the week of March 19 through March 23, 2007.

early spring and late fall – the time periods when migrating walrus are likely to be travelling through the area.

It is suggested that the known decline in harvests of walrus by Diomede residents is symptomatic of the ocean access problems that could be partially addressed by one of the wave protection alternatives. Data for harvests of seals and other important subsistence species have not been collected in recent years, so trends in harvests of other species are not available.

Table 1. Walrus harvests at Diomede: 1989 to 2011

Year	Total walrus reported as harvested
1989	1
1990	236
1991	532
1992	99
1993	91
1994	378
1995	197
1996	90
1997	152
1998	163
1999	131
2000	159
2001	57
2002	99
2003	64
2004	60
2005	15
2006	21
2007	51
2008	30
2009	46
2010	31
2011	8
Data source: U.S. Fish and Wildlife, Marine Mammals Management, Marking, Tagging, and Reporting, Program at http://alaska.fws.gov/fisheries/mmm/mtrp/mtrpmain.htm	

- We know that long-term food storage is difficult on Diomede. Households use "ice pits" dug under their homes to preserve foods for long-term use since freezer use is not practical. The freshness and quality of subsistence foods consumed would be increased if addressing the ocean access for Diomede hunters were enhanced throughout the season, but particularly during the early spring and late fall when walrus are migrating through the area.

- Aside from subsistence foods harvested directly for consumption by Diomede residents, it is likely that increased ocean access would enable acquisition of food that could be traded to residents of nearby communities for food or other items not available at Diomede.

2.4 Physical Environment

2.4.1 Climate

The climate at Little Diomede is subarctic and dominated by the movements of weather systems and sea ice through the Bering Strait. The island receives about 10 inches of precipitation a year, with 30 inches of snow; fog is common. Temperatures average from -10 to 6 degrees F in the winter to 40 to 50 degrees F in summer.

2.4.2 Winds

Situated in the middle of the Bering Strait, Little Diomede is subject to frequent wind, consistently blowing from the north. Winds are typically 20 to 30 mph, with sustained winds of 60 to 80 mph common.

2.4.3 Ice Conditions

The Bering Strait is generally frozen between mid-December and mid-June. Typically, the Bering Strait will freeze over entirely between Big and Little Diomede Islands, while the waters elsewhere around the islands become covered with floe ice.

2.4.4 Tides and Storm Surge

Little Diomede is in an area of semi-diurnal tides, with two high waters and two low waters each lunar day. Tidal parameters at Little Diomede are similar to those at Tin City, which is 31 miles to the southeast on the Alaska mainland. The tidal parameters in Table 2 were determined using National Oceanic and Atmospheric Administration published data for Tin City. The Tin City tide data is based on observations made during September 2007. There was no reported highest observed water level and no lowest observed water level.

Little Diomede is susceptible to low pressure events that could contribute to storm surge, but the water is too deep to allow the water to stack up and cause a significant surge. A rise in the water elevation due to surge has not been a problem reported at Little Diomede.

Table 2. Tidal Parameters – Tin City

Parameter	Elevation (ft)
Mean Higher High Water (MHHW)	1.02
Mean Sea Level (MSL)	0.47
Mean Lower Low Water (MLLW)	0.00

2.4.5 Wave Climate

Because of its location, the rocky beach in Diomede is unprotected from wind and waves and is vulnerable to waves from the north, south, and west. During open water months, waves less than 2 feet in height occur only 2 to 3 days per month, the maximum wave height that allows residents to launch vessels.

The Coastal and Hydraulics Laboratory (CHL) of the Engineer Research and Development Center (ERDC) developed an Alaskan deep-water wave hindcast for the years 1985-2009 using hindcast generated wind data. This data was supplemented with selected storms from the early 1950's through 1984 for evaluation of the extreme wave condition to determine the 50-year return interval deep-water wave height of 27.5 feet. Waves from hindcast in the deep water off the coast of Little Diomede were then transformed into the area of interest on Little Diomede using the wave transformation model STWAVE, resulting in a design wave of 16.4 feet.

2.4.6 Currents

The dominant flow through the Bering Strait is to the north. The current velocity has been reported to vary between 1and 3 knots. Flow at the surface is greatly influenced by winds. Flow to the north increases strongly with southerly winds and diminishes or completely reverses under the influence of northerly winds.

2.4.7 Bathymetry

Water depths have been determined within the project area, and surveys are included in the Engineering Appendix.

2.4.8 Rivers and Creeks

There are no notable surface water sources on Little Diomede Island. Water for residents' personal use is drawn from a mountain spring and stored in a 434,000 steel tank, and families haul water from this source. The tank is filled for winter use, but the water supply typically runs out around March.

2.4.9 Geology

Little Diomede Island is believed to be a Tuya type mountain (distinctive, flat-topped, steep-sided volcano formed when lava erupts through a thick glacier or ice sheet) and remains from the Bering land bridge. The slopes around the island of Little Diomede are composed of loose boulders. These boulders can be unstable and result in slides. The boulders are also home to many species of birds.

2.4.10 Biological Resources

Terrestrial Habitat. The terrestrial habitat on Little Diomede Island consists largely of boulder fields, cliffs, and rocky spires. Vegetation is limited to a very low mat of mosses, grasses, and forbs growing amongst the exposed boulders and rock outcroppings. Most boulders are heavily encrusted with lichens.

Birds. Nesting seabirds are the dominant animal life using the Little Diomede terrestrial habitat. A total of 31 species of birds have been observed on or in the vicinity of Little Diomede Island. The steep boulder-studded slopes, rocky cliffs, rich surrounding waters, and relatively low predator pressure at Little Diomede Island create important breeding habitat for millions of seabirds, including auklets, kittiwakes, puffins, murres, and cormorants. A number of additional species, such as the black guillemot, sandhill crane, and snowy owl may nest or be present on the island during various times of the year.

Mammals. Arctic fox is the only mammal known to regularly use the island's interior, and they are presumably present mostly in spring and summer, drawn by the abundance of eggs and ground-nesting birds.

Marine Habitat. Large boulders and cobbles characterize the shoreline, intertidal, and near-shore habitat. The formation and movement of sea-ice strongly affects this habitat and limits the colonization of rock faces as deep as 10 feet below the surface. Shoreline boulders and cobbles are subjected to ice-scouring and severe temperatures much of the year, which discourages multi-year growth. The intertidal zone at Little Diomede Island is very narrow and sparsely inhabited. Offshore, marine algae are able to grow amongst the boulders where they are sheltered against the worst of the local currents. At depths where the boulders are not subject to ice-scouring, they support dense growths of anemones and other epilithic organisms. As the distance from the shoreline increases, flat patches of sand or pulverized shell appear amongst the boulders, and broad areas of sand are present several hundred feet offshore. The concentration of nutrients and shallow depths within the Bering Strait provide unusually abundant, diverse, and accessible populations of marine invertebrates and fish for marine mammals to feed upon.

Marine Mammals. The Bering Strait provides the only passage for several marine mammal species that migrate between the Bering Sea and the Chukchi and Beaufort Seas. Some of these species are considered endangered or threatened, and are discussed further in the attached environmental assessment. Marine mammals occurring in the vicinity of Little Diomede include minke and beluga whales, Pacific walrus, and several seals, including the ringed, spotted, and bearded. Gray whales commonly occur in the vicinity throughout the spring, summer, and fall months. Little Diomede Island is a known haul-out area for concentrations of Pacific walrus.

Fish. Approximately 300 species of fish are found in the Bering Sea and may be expected around the Diomede Islands. These species include Pacific herring; Pacific, Arctic and saffron cod; and Pacific sand lance.

Threatened and Endangered Species and Critical Habitat. The polar bear was listed as threatened under the Endangered Species Act (ESA) on May 14, 2008. Polar bears occur in the vicinity of and have denned on Little Diomede Island. Critical habitat was designated for polar bears on November 24, 2010. At Diomede, critical habitat includes the island itself, a 1-mile "no disturbance zone" surrounding the island, as well as all sea ice, regardless of seasonal presence, out to the international border.

Several endangered species of whales under the jurisdiction of the National Marine Fisheries Service (NMFS) may occur in the waters around the island during certain seasons of the year. These include the bowhead, humpback, fin, and blue whales.

Bearded seals and ringed seals in the Arctic Ocean and adjacent Pacific Ocean waters (i.e., the Bering Sea) were listed by the NMFS as threatened under the ESA in December 2012.

These “ice seal” species are regarded to be at heightened risk from climate change and changes in sea ice formation and distribution patterns. Critical habitat designations by the NMFS for these species are pending (NMFS 2013b).

The endangered Steller sea lion might occasionally be found in the area, but haul-outs and rookeries are not documented on Little Diomede Island, and no critical habitat areas are designated north of St. Lawrence Island, more than 100 miles to the south.

The USFWS listed the Pacific walrus as a candidate species under the ESA in February 2011. The status of candidate species under the ESA are reviewed annually, and the USFWS has until October 2017 to propose the Pacific walrus as either threatened or endangered, or to remove it from candidate status.

2.4.11 Archaeological and Historical Resources

Human use of Little Diomede Island goes back several thousand years, and its location in the center of the Beringia region between Asia and North America suggests that it may have been occupied continuously by several successive cultures as a hunting and trading center. Cultural deposits, including middens, caches, and former dwelling sites, have been excavated within the village and are believed to be scattered through the general village area, reflecting its many centuries of occupation.

3.0 PLANNING CRITERIA

This section lays the foundation of what the study is investigating and what objectives are being used to measure study outcomes. Section 3.1 provides the problems and opportunities that exist for a project at Little Diomede. A summary of issues and concerns raised during the feasibility and NEPA scoping process are shown in Section 3.2. The planning objectives and constraints for this study are defined in Section 3.3.

3.1 Problem Statement

The problem of concern at Diomede is restricted navigation related to harsh physical and environmental conditions, which result in a reduced quality of life, life/safety issues, and lack of access to subsistence activities. Compounding this problem is the lack of aviation access.

3.1.1 National Objectives

The objectives of Federal water and land resources planning are to contribute to National Economic Development (NED) in a way that protects the nation's environment and increases the net value of goods and services provided to the economy of the United States as a whole, to contribute to National Ecosystem Restoration (NER) in a way that increases the net quantity and/or quality of ecosystem resources, and balance the net beneficial effects after considering all plan effects, beneficial and adverse, in the four Principle and Guidelines evaluation accounts: National Economic Development, Environmental Quality, Regional Economic Development, and Other Social Effects.

Navigation improvements at Diomede would have a combination of commercial and subsistence NED benefits. Diomede also meets the criteria of Section 2006 of the Water Resources Development Act (WRDA) of 2007 as detailed in Section 1.1 and may be approved without justification solely based upon NED benefits. Planning for the Little Diomede project is consistent with the NED objective and considers economic, social, environmental, and engineering factors.

3.1.2 Study Objectives

The desired alternative for Diomede would be one that meets the objective of providing reliable and safe marine access to the community to promote increased subsistence activities. It is anticipated that the project could be constructed in 2017 and this analysis considers a 50-year period of analysis.

3.1.3 Study Constraints

Constraints are statements about things you want to avoid doing, or things you cannot change, while meeting your objectives. Due the remoteness and physical characteristics of Little Diomede Island, physical construction of any project will pose challenges. Study constraints primarily involve the engineering, economic, and environmental criteria items that are discussed in the report sections that follow.

3.2 National Evaluation Criteria

Alternative plans should be formulated to address study objectives and adhere to study criteria. Each alternative plan shall be formulated in consideration of four criteria: completeness, efficiency, effectiveness, and acceptability.

- Completeness is the extent to which alternative plans provide and account for all necessary investments or other actions to ensure the realization of the planning objectives, including actions by other Federal and non-Federal entities.
- Effectiveness is the extent to which alternative plans contribute to achieve the planning objectives.
- Efficiency is the extent to which an alternative plan is the most cost-effective means of achieving the objectives.
- Acceptability is the extent to which alternative plans are acceptable in terms of applicable laws, regulations, and public policies. Mitigation of adverse effects shall be an integral component of each alternative plan.

3.3 Study Specific Evaluation Criteria

3.3.1 Base Year and Period of Analysis

The base year for this evaluation is 2017. This will allow sufficient time for more detailed engineering, obtaining financing, and finalizing any cooperative agreements necessary to implement this project. The project period of analysis is 50 years, so it runs through 2067. When constructed, the project could remain functional for longer than the 50-years, but the costs and benefits for this evaluation are limited to the 50-year timeframe.

3.3.2 Engineering Criteria

Alternative plans should be adequately sized to accommodate user needs and protection against wind-generated waves. Adequate depths and entry should provide for safe navigation. The plans must also be feasible from an engineering standpoint and capable of being economically constructed. Specific considerations for this study include:

- The Diomede helipad has clearance requirements that alternatives will need to comply with. Proposing navigation improvements within the constraints will require coordination with the State of Alaska Department of Transportation & Public Facilities and the Federal Aviation Administration
- Any alternatives must be designed to withstand forces from the seasonal sea ice that forms in the project area
- A shallow shoal that causes turbulent water extends out perpendicular from the helipad. Approaches to any structures should not require transit in the vicinity of this shoal.
- Any proposed breakwaters must not extend too far from shore since the local bathymetry drops off quickly to deep water. Breakwater features that extend very far out from shore would do so into deep water and would be more expensive and difficult to construct.
- Potential locations for navigation improvements are limited to the current village location. There is no access to transport goods and supplies from any other portion of the island.

- There is limited space to house a construction crew in Diomede. During recent construction to improve the school, the construction crew was housed in the school, including during periods of classes.
- Due to safety and environmental concerns, no construction material is available locally. Geology investigations confirm the unavailability.
- Seasonal sea ice constrains the shipping season for the importation of construction materials and equipment, and there are no offloading facilities other than the unimproved shore.
- Seasonal sea ice along with species specific environmental windows and subsistence activities would place restrictions upon permissible construction periods.
- There is very limited space available in Diomede to serve as a staging area to store equipment or materials.

3.3.3 Economic Criteria

Principles and guidelines for Federal water resources planning require a plan to be identified that produces the greatest contribution to the NED plan. The NED plan is defined as the plan providing the greatest net benefits as determined by subtracting annual costs from annual benefits. Corps of Engineers' policy requires recommendation of the NED plan unless there is adequate justification to do otherwise. Selection of a locally preferred plan is allowed if the local sponsor either identifies a physical constraint that necessitates the selection of a plan smaller than the NED plan, or is willing to fully pay for the increment larger than the NED plan.

Alternatives considered should be presented in quantitative terms where possible. Benefits attributed to a plan must be expressed in terms of a time value of money and must exceed equivalent economic costs for the project. To be economically feasible each separate portion or purpose of the plan must provide benefits at least equal to the cost of that unit. The scope of development must be such that benefits exceed project costs to the maximum extent possible.

If a plan includes NER benefits, the analysis should include a cost effectiveness and incremental cost analysis. The cost effectiveness analysis determines if the plan is a "best buy" or provides the "best benefit for the buck." The incremental cost analysis determines if each additional increment of NER benefit is worth the additional increment of cost.

As mentioned in the specific study authority and elsewhere within this document, Section 2006 of the WRDA 2007 allows for the decision to recommend a project without the need to demonstrate that the project is justified solely by NED benefits. This determination is based on the elements stated in the authorization and frames the analysis that is presented.

3.3.4 Environmental Criteria

National policy requires ecosystem restoration, particularly that which results in the conservation of fish and wildlife resources, be given equal consideration with other study purposes in the formulation and evaluation of alternative plans. Current planning guidance specifies the Federal objective of water and land resources planning is to contribute to national economic development consistent with protecting the nation’s environment, pursuant to national environmental statutes and applicable executive orders. Protecting the nation’s environment is achieved when damage to the environment is eliminated or avoided.

4.0 WITHOUT-PROJECT CONDITIONS

The without-project condition provides a benchmark for comparison of the various navigations improvements considered.

4.1 Potential Future Scenarios

The Corps of Engineers requires that planning studies and engineering designs over the project life cycle, for both existing and proposed projects, consider alternatives that are formulated and evaluated for the entire range of possible future rates of sea-level change represented by three scenarios of “low,” “intermediate,” and “high” sea-level change. As detailed in the Hydraulic Appendix, the sea level rise predictions as listed in Table 3were calculated at Little Diomede.

Table 3. Sea Level Rise Prediction for a 50-Year Project Life.

Risk	Low	Intermediate	High
Sea Level Rise (ft)	0.54	1.2	2.5

Sea level rise is unlikely to impact the future operation of the breakwater because it is designed to be an overtopping breakwater. The number of launch days would not change due to sea level rise; they would change if there was an increase or decrease in storminess, a change in sea ice conditions, or if animal migration patterns changed.

4.1.1 Future Demand for Moorage

The future without-project condition for Diomede does not include an increase in demand for moorage of vessels. Existing vessels are hauled out of the water across the rocky beach by hand after each use. There is very limited storage area for boats; usable flat land is a premium on the island.

4.1.2 Future of Commercial Fleet

The existing small boat fleet in Diomede is composed of aluminum outboard skiffs of various makes. Specific boat characteristics are listed as:

- 20-foot Star Trek Aluminum boat with an Evinrude 150 horsepower outboard
- 20-foot fiberglass boat with a 90 horsepower outboard
- 18-foot Ocean Pro aluminum boat with a Yamaha 70 horsepower outboard
- 16-foot Crestline aluminum boat with a Tohatsu 40 horsepower outboard
- 20-foot Bering Sea aluminum boat with a Tohatsu 40 horsepower motor
- Several smaller aluminum boats
- Two traditional skin boats

There are no projections of future increase in the commercial fleet of vessels for the residents of Diomede. The existing fleet is primarily used for subsistence activities. The existing fleet is projected as representative of the future fleet.

4.1.3 Summary of Without-Project Condition

This section summarizes the major without-project conditions that have created, and continue to cause, negative impacts to the community and residents of Diomede. Access to the offshore marine environment is probably the most critical requirement for continued existence of the community. Diomede is in an extremely difficult location to provide wave protection. Because of its remote location and difficult conditions, Diomede has had no scheduled freight deliveries for more than a decade. Diomede residents produce a very large proportion of their food both by necessity as well as cultural preference. Diomede residents' high level of dependence on subsistence produced foods for their very survival makes the community unique, even compared with other villages in the region. Table 4 contains information on key aspects of the current project conditions at Diomede and the outlook for the future. The information concerning subsistence days available to launch vessels is a key factor in comparing alternative plans. Further information can be found in a technical report titled "A Summary of Without Project Conditions and Impacts to Diomede" compiled by Jim Richardson of ResourcEcon for the U.S. Army Corps of Engineers, Alaska District, dated May 2012, included in the Appendix.

Table 4. Without Project Conditions, Key Factors

Item	Trend	Discussion/information
Resident Population	Decline	178 in 1990 to 107 in 2011; steady decline over 20 yrs.
Subsistence – Walrus Harvest # Reported	Decline	Average is 118 annually over 23 yrs. Average over most recent 10 yrs is 42. Average most recent 5 yrs is 33.
Boat Damages	Steady	Fleet continues to sustain damages from being landed and hauled across rocks
Subsistence – Launch Days Available	Steady	50 available days to launch vessels safely on an annual basis.

5.0 ALTERNATIVE FORMULATION

5.1 Project Site Selection

Potential locations for navigation improvements are limited to the current village site. There are two options for the location of a rubble mound breakwater: north of the helipad or south of the helipad. Residents indicated that they preferred the breakwater to be located south of the helipad, where their current crude launch is. It was also observed during a site visit that a shoal exists off of the helipad. This shoal was observed to have a distinct current over it that would make an entrance channel dangerous if it was in the area of the fast current.

5.2 Initial Measures Screening

There are three basic methods of transporting people and goods: land based travel provided by roads and rail, air based travel provided by airplanes and helicopters, and water based travel provided by boats, barges, and other marine vessels. Since Little Diomede Island is 27 miles from mainland Alaska across open ocean, travel by land based means is not an economically viable option.

Currently, Diomede is served by a small helicopter and a small helipad at sea level. The Alaska Department of Transportation and Public Facilities has studied improved air travel by means of airplanes and a larger helicopter. Runways would have to be built offshore in deep water or on top of the island. Either location is cost prohibitive and is not a cost effective transportation method at this time. A larger helipad and larger helicopter would be costly, would not increase reliability, and would not help with the transportation of bulk goods and fuel.

Community relocation as an alternative was also deemed too costly based on extensive studies and estimates performed for village relocation for Shishmaref, Alaska, a community similar to Diomede and within the general region. Two specific reports on Shishmaref relocation, one covering the physical costs involving infrastructure and services and another covering cultural and social impact, were researched. Based on these sources and others, detailed studies for relocation were not performed specifically for Diomede; however, the estimated cost range was determined to be over $1.5 million per person, equating to over $200 million for the total village relocation.

This leaves improvements to water based transportation as the only potentially economically viable alternatives for study. Therefore, water-based transportation alternatives at Diomede will be evaluated.

Options considered for navigation improvements include off shore mooring systems, floating breakwaters, and rubble mound breakwaters. Analysis, as detailed in Appendix A, showed that only rubble mound breakwaters are suitable for consideration at Diomede. The use of a rubble mound breakwater to provide wave protection in an arctic environment that is susceptible to ice and severe wave action is a proven concept. Rubble mound breakwaters have been successfully used at Nome and Saint Paul, Alaska. Rubble mound revetments have been successfully used at

Kivalina and Shishmaref, Alaska, and a rubble mound revetment currently protects the Diomede helipad.

5.3 Description of Alternatives

The characteristics of the fleet proposed to utilize the various navigation improvement alternatives are shown in Table 5. Proposed plans were laid out to accommodate vessels that need to access the shore at Little Diomede.

Table 5. Fleet Characteristics

Vessel	Vessel Length [ft]	Design Beam [ft]	Design Draft [ft]
Subsistence boat	20	7.5	3
Rescue/Emergency boat	54	17	5.25

The design vessel utilized is established as the subsistence boat because the rescue vessel would only require occasional usage. Several project features are common to all the alternatives and include the following:

- All would provide a protected launch area, not a harbor providing moorage.
- Target protection would be for waves between 1.7 and 3.3 feet.
- Breakwaters would be periodically overtopped by large waves.

5.3.1 No Action Alternative

This alternative would leave the community without a safe place to launch or take out their boats or for rescue vessels to land. Vessels would continue to sustain damages as they try to launch and opportunities to subsistence hunt or fish would be lost.

5.3.2 Alternative N1 – North of Helipad

Alternatives on the north side of the helipad were not the locally preferred location because there was little room available to take out and store boats. Only one alternative was looked at north of the helipad, and it was designed to provide adequate take out area and boat storage.

This plan consists of two rubble mound breakwaters that would provide shelter from storms from the south and prevent shore side boulders from being transported into the landing area (Figure 3). The north breakwater was designed wider to provide a flat staging area for the community. A large area would be dredged and filled to provide an adequate take out area. The two breakwaters would require approximately 20,600 cubic yards of core rock, 24,400 cubic yards of B rock, and 28,600 cubic yards of armor stone.

This alternative would require a small near-shore area to be dredged to -10 feet Mean Lower Low Water (MLLW) to provide boats a rock free approach to shore and room to turn around once launched. It is assumed that the dredging would include boulders and could possibly require blasting. Approximately 2,000 cubic yards would need to be removed for this alternative.

The breakwater was not designed to provide protection from storm waves; rather it was designed to make launching and retrieval safer in the average wave climate, not during storm events. Using the dominant southerly direction (168.75^{o} – 191.25^{o}), this breakwater configuration would reduce waves that are 8 seconds or less to 2.5/10 of the wave height at the boat launch area**.**

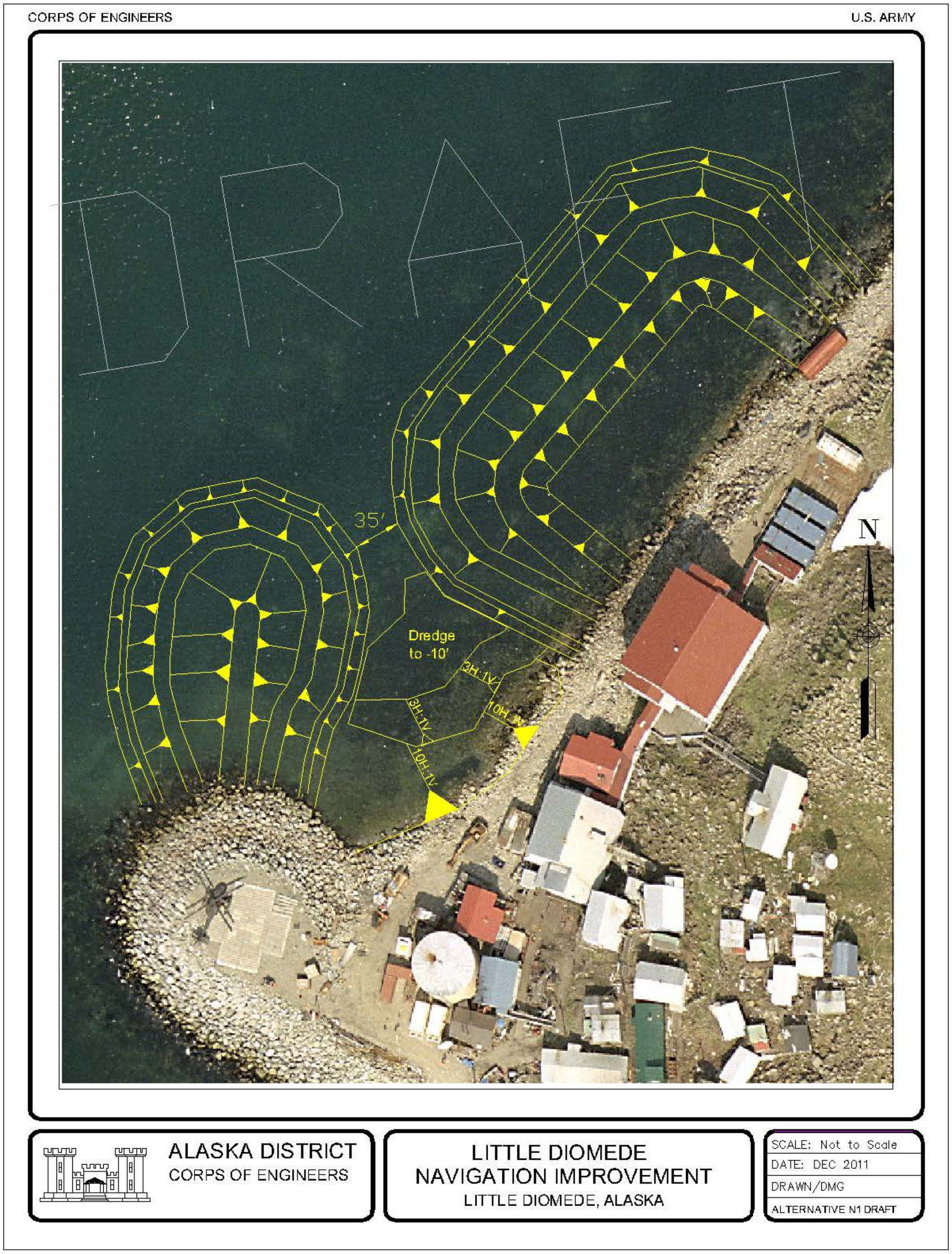


Figure 3. Alternative N1

5.3.3 Alternative S1 – South of Helipad

This plan consists of two rubble mound breakwaters that would provide shelter from storms from the north and prevent shore side boulders from being transported into the landing area (Figure 4). The south breakwater was widened at its base to try to provide an area for boat storage once the boats were removed from the water. The size of the armor stone took up the majority of space that could be used as a storage area. The two breakwaters would require approximately 12,600 cubic yards of core rock, 24,800 cubic yards of B rock, and 25,500 cubic yards of armor stone.

This alternative would require a small near-shore area to be dredged to -10 feet MLLW to provide boats a rock free approach to shore and room to turn around once launched. It is assumed that dredging would include boulders and could possibly need blasting. Approximately 3,000 cubic yards would need to be removed for this alternative.

The breakwater was not designed to provide protection from storm waves; rather it was designed to make launching and retrieval safer in the average wave climate, not during storm events. Using the dominant northerly wave direction (348.75^{o} – 11.25^{o}), this breakwater configuration would reduce waves of 8 seconds or less to 2.5/10 of the wave height at the boat launch area.

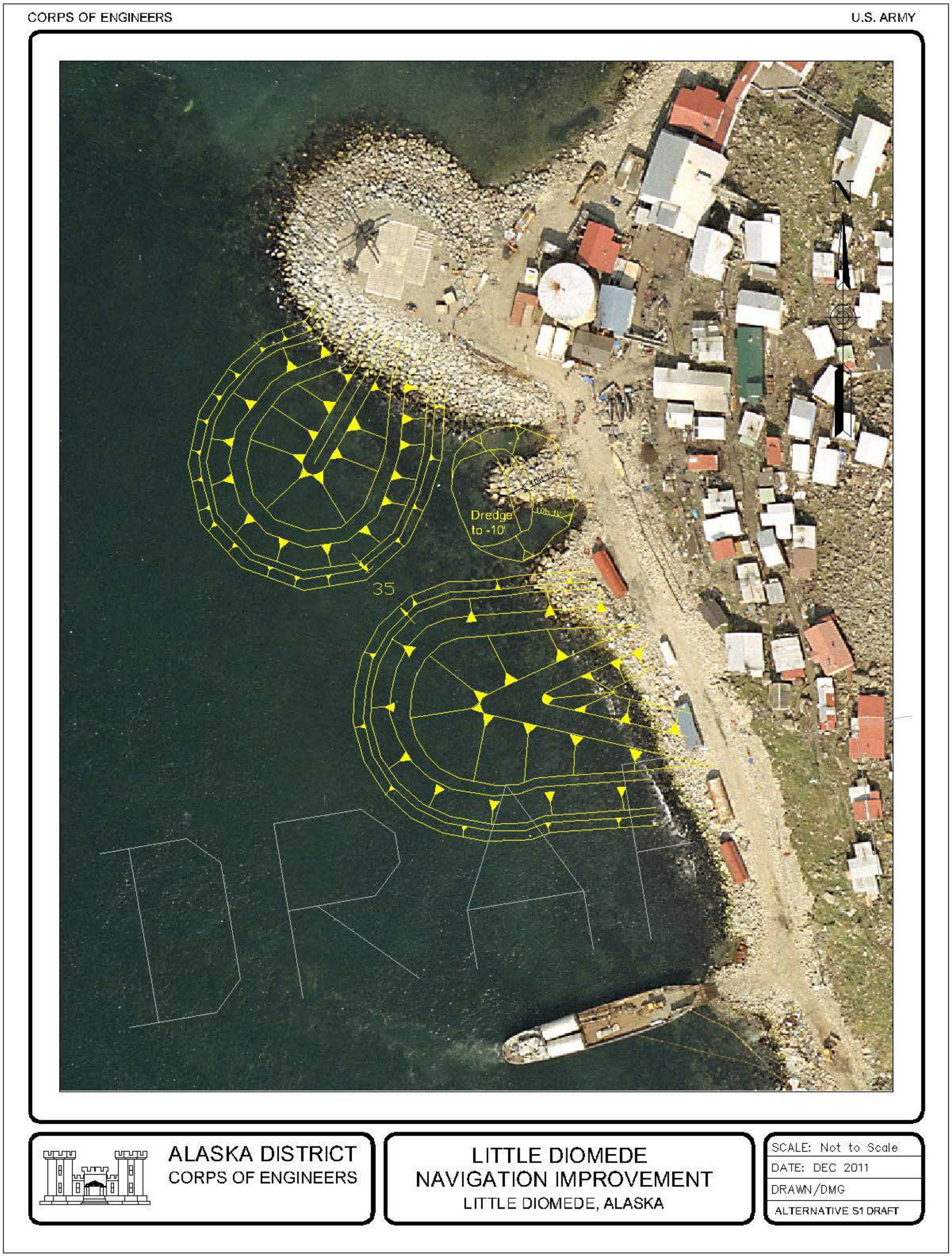


Figure 4. Alternative S1

5.3.4 Alternative S2 – South of Helipad with Hooked Breakwater

This plan consists of two rubble mound breakwaters. One breakwater is perpendicular to the shore and the other is hooked off the helipad (Figure 5). This alternative would provide shelter for waves from the north and give a little more protection from waves from the west than Alternative S3. This alternative would also prevent shore side boulders from being transported into the landing area. The two breakwaters would require approximately 23,400 cubic yards of core rock, 24,200 cubic yards of B rock, and 32,900 cubic yards of armor stone. This alternative provides no area to store boats taken from the water.

This alternative would require a small near-shore area to be dredged to -10 feet MLLW to provide boats a rock free approach to shore and room to turn around once launched. It is assumed that dredging would include boulders and could possibly need blasting. Approximately 3,000 cubic yards would need to be removed for this alternative.

The breakwater was not designed to provide protection from storm waves; rather it was designed to make launching and retrieval safer in the average wave climate, not during storm events. Using the dominant northerly wave direction (348.75^o – 11.25^o), this breakwater configuration would reduce waves of 8 seconds or less to 2/10 of the wave height at the boat launch area.

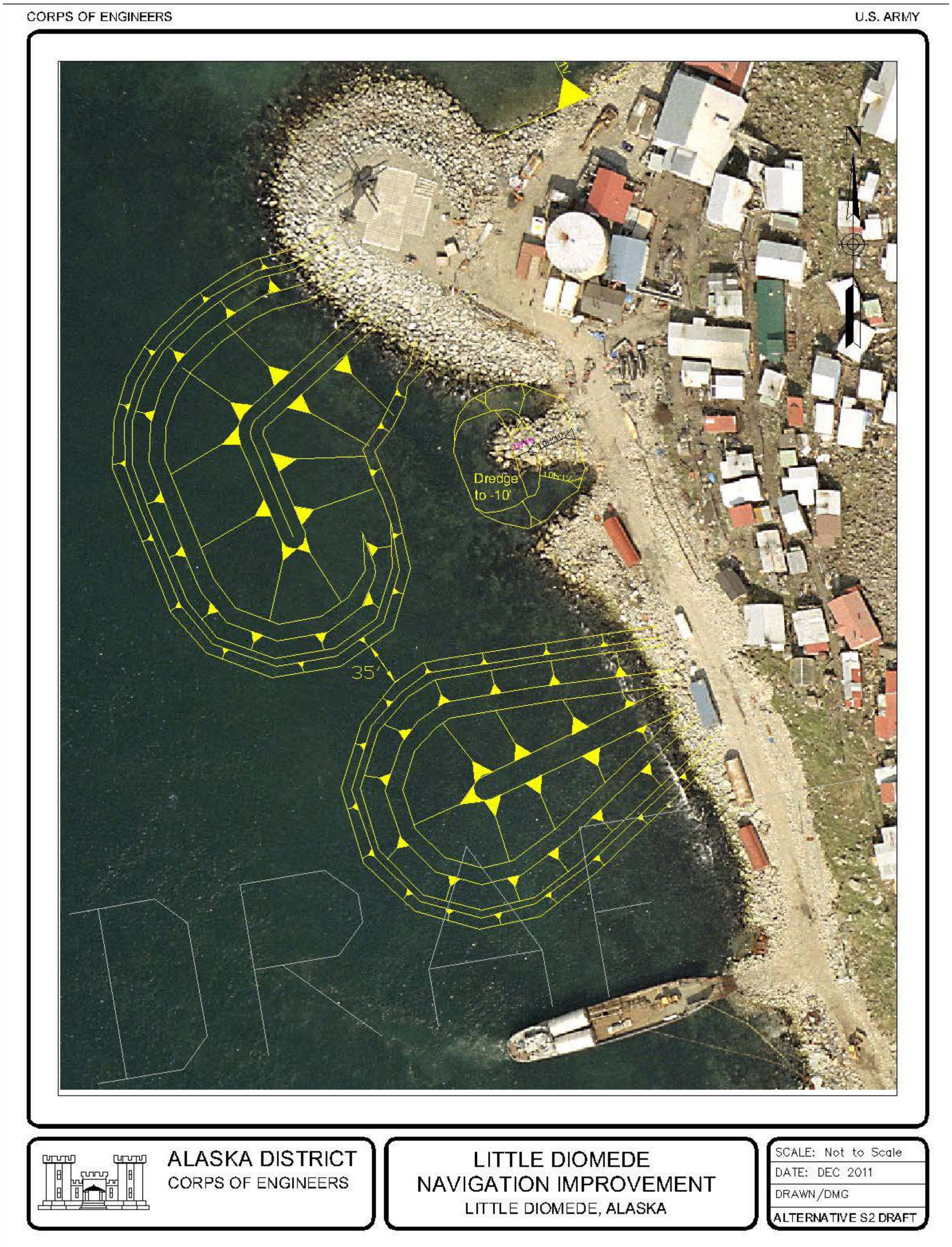


Figure 5. Alternative S2

5.3.5 Alternative S3 – South of Helipad with Boat Storage Area

This plan consists of two rubble mound breakwaters that would provide shelter from northerly storms and prevent shore side boulders from being transported into the landing area (Figure 6). The south breakwater was designed wider compared with those in Alternatives S1 and S2 to provide a flat staging area for the community. The two breakwaters would require approximately 19,000 cubic yards of core rock, 23,100 cubic yards of B rock, and 36,400 cubic yards of armor stone.

This alternative would require a small near-shore area to be dredged to -10 feet MLLW to provide boats a rock free approach to shore and room to turn around once launched. It is assumed that dredging would include boulders and could possibly need blasting.

Approximately 2,500 cubic yards would need to be removed for this alternative.
The breakwater was not designed to provide protection from storm waves; rather it was designed to make launching and retrieval safer in the average wave climate, not during storm events. Using the dominant northerly wave direction (348.75^o – 11.25^o), this breakwater configuration would reduce waves of 8 seconds or less to 2.5/10 of the wave height at the boat launch area.

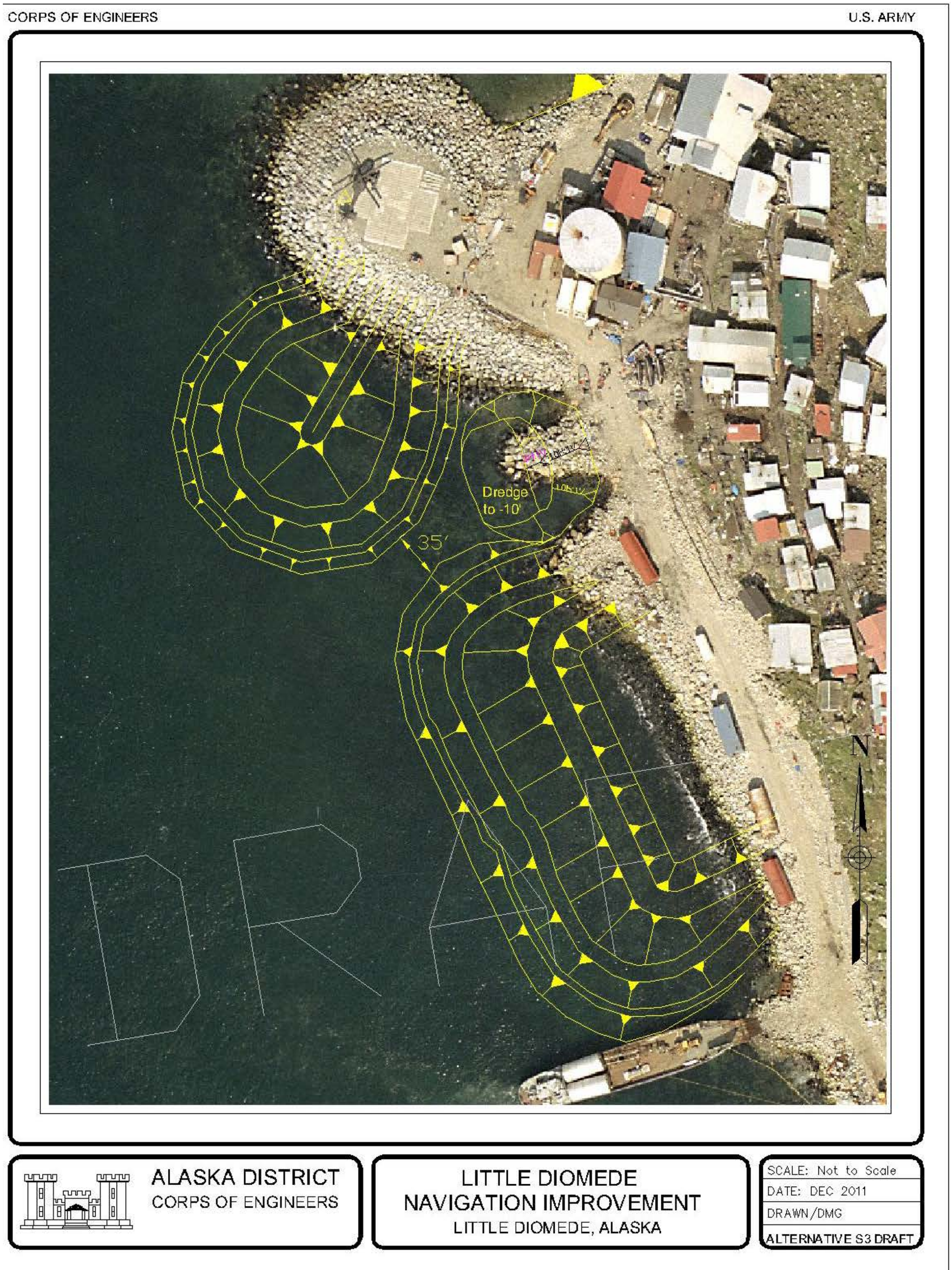


Figure 6. Alternative S3

5.3.6 Environmental Considerations of Alternatives

The Corps has been working with the USFWS on proposed navigation improvement projects at Diomede for a number of years. Many of the concerns stated in their 1992 Fish and Wildlife Coordination Act Report, 2008 Planning Aid Letter, and recent correspondence (Boldenow 2012) are discussed in the attached environmental assessment; their specific recommendations include:

- Prohibiting construction or other activities that may potentially result in the taking of migratory birds between 1 May and 30 September
- Ensuring that any outdoor lighting used during construction minimizes the potential for disorienting birds and luring them into collisions with ships or equipment
- Requiring contractors to observe appropriate measures to avoid transporting rats and other invasive species to the island on project vessels, as promoted by State and Federal agencies
- Managing food waste and other possible attractants so as to not draw increased numbers of gulls, foxes or other seabird predators to the island

Mitigation during construction would include the observance of site-specific recommendations from the U.S. Fish and Wildlife Service (USFWS) and other resource agencies, to include selecting a construction timing window that poses the least risk of impact to sensitive resources such as bird nesting colonies.

Strict observance of the 1 May to 30 September no-construction period recommended by the USFWS may not be entirely feasible given the very limited working season at Little Diomede. However, the Corps will continue to work with USFWS and other agencies to develop construction timing windows that protect wildlife but also allow the project to move forward. For both practical and environmental reasons, the Corps is studying the possibility of performing some construction work, such as dredging, during the winter. Some project tasks, such the delivery of rock for the breakwaters, can only be done during the open-water season, which overlaps with the USFWS-recommended no-construction period.

5.3.7 Dredge Material Disposal Alternatives

Dredged material quantities are relatively small for the alternatives, ranging from 2,000 to 3,000 cubic yards and comprising boulders. For each alternative, boulder and rock debris would be incorporated into the breakwater structures as fill material to the extent practicable. An evaluation of the effects of its proposed discharge under Section 404(b)(1) of the Clean Water Act, will be made available. Compliance with Section 401 for water quality certification from the State of Alaska Department of Environmental Conservation is also anticipated. Because of the small size of proposed discharge, and the similarity of the discharged material (i.e., large rock placed for the construction of the breakwaters) to the existing sediments, the determination has been made that compensatory mitigation under Section 404 is not warranted.

6.0 EVALUATION OF ALTERNATIVES

6.1 Cost of Alternatives

Each alternative has a cost estimate prepared utilizing MCASES and CDEPS found in the Cost Appendix. For evaluation purposes the following costs are used for each alternative as presented in Table 6.

Table 6. Cost of Alternatives

Alternative	Description	Cost
N1	North of helipad - two rubble mound breakwaters with lay-down/boat storage area	$30,435,000
S1	South of helipad - two rubble mound breakwaters	$26,483,000
S2	South of helipad - two rubble mound breakwaters with hooked breakwater and dredging	$31,534,000
S3	South of helipad - two rubble mound breakwaters with lay-down/boat storage area	$32,718,000

Note: Cost includes periodic repair and maintenance of 5% of the armor stone every 10 years for the 50-year period of analysis and interest during the 2-year construction period. Costs include initial dredging, but periodic maintenance dredging is not anticipated. Periodic repair and maintenance have been discounted using the Federal FY14 discount rate of 3.5 percent.

6.2 Benefits of Alternatives

Each alternative offers the same quantifiable benefits – increased acquisition of preferred foods. Other potential benefits could include decreased fuel consumption if long journeys to harvest walrus can be avoided, increased certainty for medical evacuations, the potential for decreased freight costs, efficiencies in harvest preparation if lay-down area is included in the alternative, erosion protection/peace of mind during storms, and opportunity to house Search and Rescue equipment near the proposed offshore Arctic drilling. Not enough is known about the harvest practices to determine if shorter trips to harvest food would decrease fuel consumption or just be offset by the additional time spent harvesting so no benefits are claimed for this category. Freight operators for the region have indicated they will not change their current delivery practices. They would not use the protected harbor but would instead time deliveries to Little Diomede during relatively calm weather. Winter freight arrives by airplane and would not be affected by the proposed harbor improvements. No attempt was made to quantify increased certainty for medical evacuations or peace of mind for the erosion protection afforded by the proposed alternatives.

The harvesting season for Diomede residents runs from June to October. An analysis of storms suggests that with protection, Diomede residents could gain between 17 and 21 days annually in safe launch and retrieval of vessels. This would allow residents to harvest subsistence foods when the food source is close to the community rather than traveling great distances or avoiding the harvest altogether.

Table 7details the average wave height conditions by month and direction for Little Diomede. Residents are currently able to launch when wave heights are 1.7 feet or less. The alternatives proposed would provide protection in the 3.3- foot wave height or less climate. The percent of wave constraint column in this table indicates the average percent of the month when Little Diomede residents are unable to launch and retrieve vessels. June is the least constrained at 40.9 percent, and October is the most constrained at 92.6 percent.

Table 7. Wave Heights by Month and Direction at Diomede, AK

	Waves from:	No waves	Up to 1.7 feet	1.7 to 3.3 feet	3.3-6.6 feet	Over 6.6 feet	Percent of wave constraint
June	north	7.1	14.4	11.5	7.5	6.5	40.9
	south		37.6	12	3.4		
July	north	1.1	12.6	10.8	7.6	9.7	52.3
	south		34	17.3	6.9		
August	north	0.8	9.5	14.3	14.8	19.6	74.1
	south		15.6	14	11.4		
September	north	0.1	8.2	17	25.3	31.6	87.1
	south		4.6	8.4	4.8		
October	north	0	4.5	15.5	26.6	39.3	92.6
	south		2.9	5.4	5.8		

Note: Numbers in cells represent the proportion of time (percent) waves come from the specified direction. Also note that southerly alternatives will provide protection from northerly waves and the north alternative will provide protection from the southerly waves.

Table 8 shows the number of days of increased ability to launch and retrieve for Little Diomede residents with a project. The days without a project column depict the days the wave height is up to 1.7 feet. The proposed project would provide launch and retrieve protection for the 3.3-foot wave height. The percentage increase for the north alternative (protects from southerly waves) is 35.4 percent (north and south total days plus south additional days divided by north and south total days without a project). The percentage increase for the south alternatives (protects from northerly waves) is 42.7 percent (north and south total days plus north additional days divided by north and south total days without a project). These percentages are used for the NED calculation of possible benefits to more clearly compare the NED evaluation with the CE/ICA evaluation, which follows:

Table 8. Wave Heights by Month and Direction at Diomede, Alaska

	Waves from:	Days without project	Additional days with project
June	north	6.45	3.45
	south	13.41	3.60
July	north	4.25	3.35
	south	10.88	5.36
August	north	3.19	4.43
	south	5.08	4.34
September	north	2.49	5.10
	south	1.41	2.52
October	north	1.40	4.81
	south	0.90	1.67
Total annual days	north	17.78	21.14
	south	31.68	17.50
Percent increase	north		42.73%
	south		35.38%

Estimates for the amount of increased food acquisition in Diomede, if a wave protection project was developed, show that subsistence could increase from 35.4 percent to 42.7 percent over current levels. The 2010 subsistence valuation estimate for Diomede was $651,000. Using the Producer Price Index for Finished Consumer Foods from the U.S. Bureau of Labor Statistics, the 2013 value subsistence effort at Little Diomede is $742,000.

- An increase of 35.4 percent represents an annual with-project benefit of $262,000.
- An increase of 42.7 percent represents an annual with-project benefit of $317,000.

These amounts are based on point estimates of the economic value of Diomede's subsistence production in 2013 dollars and use the percentage increase in days as a proxy for the increased production. The range of total benefits given a 50-year project life and using the Fiscal Year 2013 discount rate of 3.5 percent is between $6.1 million and $7.4 million. All of the alternatives have estimated costs in excess of these potential benefits; therefore, none of the alternatives serve as the most likely recommended NED plan.

As mentioned previously, Section 2006 of WRDA 2007 allows for further analyses of viable alternatives based on subsistence variables. Further plan comparisons in accordance with the Section 2006 authority follow.

7.0 COMPARISON AND SELECTION OF PLANS

7.1 Comparison of Plans

7.1.1 Comparison of Costs

Of the four design alternatives, S1 is the least costly at $26,265,000 but does not include a lay-down area. Alternative S3, with an estimated cost of $32,479,000, is the least cost plan that has been identified that includes the maximum protection and provides a lay-down area.

7.1.2 Comparison of Benefits

All the alternatives offer the same quantifiable benefits – increased acquisition of preferred subsistence foods. Other benefits that have not been quantified include decreased fuel consumption if long journeys to harvest walrus can be avoided, increased certainty for medical evacuations, the potential for decreased freight costs, efficiencies in harvest preparation for lay-down areas, erosion protection during storms, and opportunity to house Search and Rescue equipment.

7.2 Selection of Plan

Navigation improvements at Diomede would meet the criteria of Remote and Subsistence Harbors as defined in the Water Resources Development Act of 2007 (WRDA 2007), Section 2006 as indicated below.

> *(1)(A) the community to be served by the project is at least 70 miles from the nearest surface accessible commercial port and has no direct rail or highway link to another community served by a surface accessible port or harbor; or*
>
> *(B) the project would be located in the State of Hawaii, the Commonwealth of Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the United States Virgin Islands, or American Samoa;*

The nearest surface accessible port to Diomede is in Anchorage approximately 685 air miles from Diomede. Diomede is an isolated island village lacking any direct rail or highway access to any other communities.

> *(2) the harbor is economically critical such that over 80 percent of the goods transported through the harbor would be consumed within the community served by the harbor and navigation improvement; and*

Lacking any sort of access to any other communities, 100 percent of goods transported to Diomede would be consumed within the community.

> *(3) the long-term viability of the community would be threatened without the harbor and navigation improvement.*

WRDA 2007, Section 2006 formally recognizes the importance of harbors and navigation improvement projects serving isolated communities. These harbors and projects are the lifelines of the communities, without which, the very existence of the communities would be threatened.

(b) Justification- In considering whether to recommend a project under subsection (a), the Secretary shall consider the benefits of the project to—

(1) public health and safety of the local community, including access to facilities designed to protect public health and safety;

Potential safety boat could serve as back up to the helicopter during poor visibility or mechanical breakdowns.

(2) access to natural resources for subsistence purposes;

Increased subsistence effort/harvest

(3) local and regional economic opportunities;

Alternate mode of access between the island and mainland could increase opportunity for locals to seek seasonal employment and/or to travel to sell their art

(4) welfare of the local population; and

Reduce time away from island, people more likely to travel to island to provide services, people more likely to travel from island to seek routine medical treatment

(5) social and cultural value to the community.

Maintaining a viable community at Diomede will preserve their unique culture.

Improved access will allow more social and cultural interaction between residents and their relatives in other communities, contributing to preservation of a broader regional cultural identity.

7.2.1 Identification of Tentatively Recommended Plan

The Implementation Guidance for Section 2006 of the Water Resources Development Act of 2007 (WRDA 2007, dated 22 Jul 2008) – Remote and Subsistence Harbors states that the following policy and procedures will be used to implement Section 2006:

a. Decision documents addressing harbor and/or related navigation improvements may address the criteria and considerations listed above in the formulation, evaluation and selection of alternatives. The analysis will be incorporated into the existing four accounts (see EC 1105-2-409) and ER 1105-2-100.

b. Decision documents will continue to present the NED analysis for all viable alternatives and identify the NED Plan when alternatives exist with net positive NED benefits.

c. A decision document may recommend a plan other than the NED Plan based on a full description of the benefits of the project to public health and safety of the local community; access to natural resources for subsistence purposes; local and regional economic opportunities; welfare of the local population, and social and cultural value to the community.

d. If there is no NED Plan and/or the selection of a plan other than the NED Plan is based in part or whole on the non-monetary units (Environmental Quality (EQ) and Other Social Effects (OSE) accounts), then the selection will be supported by a cost effectiveness/incremental cost analysis consistent with ecosystem restoration evaluation procedures (see Appendix E, Section V, ER 1105-2-100). The decision document will present the tradeoffs of impacts in the four accounts for the plan in the final array and describe the compelling justification for any plan that is not the NED Plan.

None of the alternatives for Little Diomede have net positive NED benefits. Public health and safety, access to natural resources for subsistence purposes, economic opportunities, welfare of the local residents, and social and cultural value to the community have been described previously in this document. The following section uses the cost effectiveness/incremental cost analysis (CE/ICA) methodology to determine a recommended plan.

CE/ICA. Cost effectiveness/incremental cost analysis is typically used for environmental studies where the cost of the solution is compared with changes in habitat. Little Diomede, however, is not an environmental study. The problem concerns navigability to and from the community. Improved navigability will allow the residents of Little Diomede to engage in subsistence activity more frequently, thereby increasing the overall harvest and allowing residents to harvest their preferred foods. So the comparisons to costs for the CE/ICA evaluation were established as increased days of navigability and increased flat land for processing of harvest and boat storage.

The criteria used in the analysis are as follows:

a. **Total Project Costs –** including materials, labor, mobilization and demobilization, engineering, and contingencies. Repair and maintenance are calculated as 5 percent replacement of the armor rock every 10 years. Interest During Construction is calculated for a 2-year construction period at the FY13 discount rate of 3.75 percent.

b. **Additional Subsistence Days Available –** the north alternative provides protection from southerly wind and waves, while the south alternatives provide protection from northerly wind and waves. Based on engineering calculations and historic storm data, the north alternative would provide an additional 17 days annually that Little Diomede residents could safely launch and retrieve vessels. The south alternatives provide an additional 21 days of protection. Additional days for the south alternatives occur primarily August through October as this is when northerly waves are predominant. The presence of ice during June and July is a major reason the wave climate is dominated by 0.3 to 3.2-foot waves; the ice acts essentially as breakwater protection and facilitating subsistence activities. Table 9 provides the additional launch days that would be available for each alternative. The values were compiled by utilizing existing wave information calculated from the data found in the engineering appendix.

Table 9. Additional Launch Days Available (waves less than 3.3 feet)

***N1 data uses only south waves**

Month	N1*	S1	S2	S3
June	3.6*	3.5	3.5	3.5
July	5.4*	3.3	3.3	3.3
August	4.3*	4.4	4.4	4.4
September	2.5*	5.1	5.1	5.1
October	1.7*	4.8	4.8	4.8
Totals	**17.5***	**21.1**	**21.1**	**21.1**

c. **Lay-down/Boat Storage Area –** two of the alternatives (one north and one south, N1 and S3, respectively) were designed to provide new flat land for Little Diomede residents to store/repair boats or conduct subsistence activity (i.e. skinning mammals, preparing for hunts). The sheer cliff environment at Little Diomede makes flat land very valuable and a desirable navigation feature. The existing areas for these activities are within the village along the steep slopes and amongst loose boulders, and comprise a calculated area of 0.325 acre. The additional subsistence area provided for in alternative N1 is 0.38 acre; alternative S3 is 0.14 acre. Only the area provided in alternative S3 is a gain since the N1 area was determined necessary for the movement and storage of the existing subsistence vessel fleet. For alternative S3, it was determined that an increase of 2 vessels (0.07 acre each) would be appropriate for calculation of the subsistence vessel day (see Table 10**)**.

d. **Improved Safety –** all alternatives would improve the ability of boat owners to launch and retrieve vessels and would also allow a larger vessel to access the community for emergency evacuations. Using a dominant north wave (348.75^o – 11.25^o), the south alternatives have slight differences in reducing wave heights near the launch area. Alternatives S1 and S3 provide the same level of reduction, with S2 providing slightly more due to the bent breakwater configuration. Despite these slight differences, there would be no discernible difference among the south alternatives for additional days; all provide the same 21 days. The north alternative N1 would not provide any protection from the dominant north waves, which occur during the months of August through October; neither would it serve beneficially the current barge/cargo movement activities and existing storage facilities.

e. **Existing Road –**Little Diomede has few roads. However, there is a frontage road on the island that would benefit the south helipad alternatives as vehicles and heavy equipment can maneuver in this area while the north alternative does not have this same access.

These criteria were taken into account with respect to available vessel days so that a measurement could be given and incremental justification could be accomplished. Additional Subsistence Days Available, Lay-down/Boat Storage Area, and Improved Safety (items b, c and d) were given a value and combined for each alternative and a "subsistence vessel day" (SVD) amount calculated. Each alternative adds days that vessels can be launched, increasing the subsistence opportunities. The additional lay-down area increases the number of vessels that can be utilized, and the flat areas were equated with the daily subsistence values found in a technical report titled "A Summary of Without Project Conditions and Impacts to Diomede" compiled by Jim Richardson of ResourcEcon for the U.S. Army Corps of Engineers, Alaska District, dated May 2012, included as Appendix A.

The criteria categories are displayed in the following table for each alternative.

Table 10. Criteria for Little Diomede CE/ICA

Alt	Total Project Cost [1]	Additional Days [2]	Lay-down/Boat Storage Area (Acres)	Safety from North Waves	Existing Road [3]	Additional Subsistence Vessel Days (Calc.) [4]
N1	$30,435,000	17*	0.38	No	No	87
S1	$26,483,000	21	0	Yes	Yes	106
S2	$31,534,000	21	0	Yes	Yes	106
S3	$32,718,000	21	0.14	Yes	Yes	247

1. Cost: TPCS estimate dated 4/8/2013 (see also Table 6)

2. Additional Days: North alternative protects from southerly wind and wave conditions; south alternatives protect from northerly wind and wave conditions. These are additional days that boaters can launch and retrieve with protections from waves up to 3.3 feet.

3. Existing Road: The northern alternative does not include construction of a road to access the lay-down area. Southern alternatives have a road adjacent to the lay-down area.

4. Subsistence Vessel Days: Additional days multiplied by number of subsistence vessels with consideration of additional subsistence area for S3. Currently, there are about five active subsistence vessels in the community and the lay-down area (additional acreage) is given a value of 2 for the S3 alternative. So for Alt S2, there are an additional 21 days to launch and retrieve for 5 vessels for a total Subsistence Vessel Day value of 106 (21 * 5) = 106). For S3, the additional lay-down area has a value of 2 and would apply to all the available launch and retrieval days, not just the additional days. So the calculation for SVD on Alternative 3 is the additional lay-down area times the total launch and retrieve days (70.6 days *2) plus the additional launch and retrieve days times the number of vessels (21 days * 5 vessels) for a total change in SVD of 247 (70.6 * 2 + 21 * 5 = 247).

In processing the criteria for incremental analysis, the north alternative (N1) was eliminated from further consideration since it fell short on important characteristics that would provide the study objective. It was clear that N1 lacks viable access and does not provide protection from northerly waves that are dominant in August, September, and October. In contrast, each of the south alternatives provides protection for the dominant wave condition. The N1 alternative is also impractical because of a reef area between Big and Little Diomede that hinders safe navigation and is unworkable considering the existing storage and movement of cargo in the southern area of the village. Lack of road access was another relevant factor. The three southern alternatives, S1, S2, and S3 remained viable.

The goal for the Little Diomede project is to improve navigation for the community so they will have safe and reliable access to emergency and routine medical care, and assist in the long-term viability of the community with regards to subsistence activities per Section 2006. So the added criteria of additional days to launch and retrieve vessels and the lay-down/boat storage area will help achieve this goal.

The project cost for S3 is found to be the best investment on a subsistence vessel day basis. The construction cost is $32,718,000 and it provides 247 subsistence vessel days at an average annual cost $5,651. The least costly alternative is S1 at $26,483,000; however, it only provides 106 additional subsistence vessel days and has a greater average annual cost of $10,683. Alternative S2 provides the same output for higher cost so it was eliminated from further evaluation.

Table 11shows the three alternatives along with total project cost, average annual cost, the output in subsistence vessel days (SVD), and the average cost per subsistence vessel day..

Table 11. Output and Cost of Alternatives

Alternative	Total Project Cost	Average Annual Cost	Output (SVD)	Average Cost per SVD
S1	$26,483,000	$1,129,000	106	$10,683
S2	$31,534,000	$1,344,000	106	$12,718
S3	$32,718,000	$1,395,000	247	$5,651

The cost, output, and average costs are used along with the incremental cost and output in Table 12. This provides the incremental cost per subsistence vessel day that helps answer whether or not the increased project cost is worth the investment. The incremental analysis shows that S1 provides 106 additional subsistence vessel days, each costing $10,683. Having S3 in place provides 141 more subsistence vessel days than S1, at a smaller incremental cost of $1,884 per unit.

Table 12. Alternative Plans with Incremental Cost per SVD

ALT.	Cost	Output (SVD)	Average Annual Cost	Incremental Cost (Average Annual)	Incremental Output	Inc. Cost per SVD
No-Action	$0	247	n/a	n/a	n/a	n/a
S1	$26,483,000	353	$1,129,000	$1,129,000	106	$10,683
S3	$32,718,000	494	$1,395,000	$266,000	141	$ 1,884

Note: Additional lay-down area provides benefit to the total days for launch and retrieval of vessels, not just the additional days.

As a visual aid the following graphic (

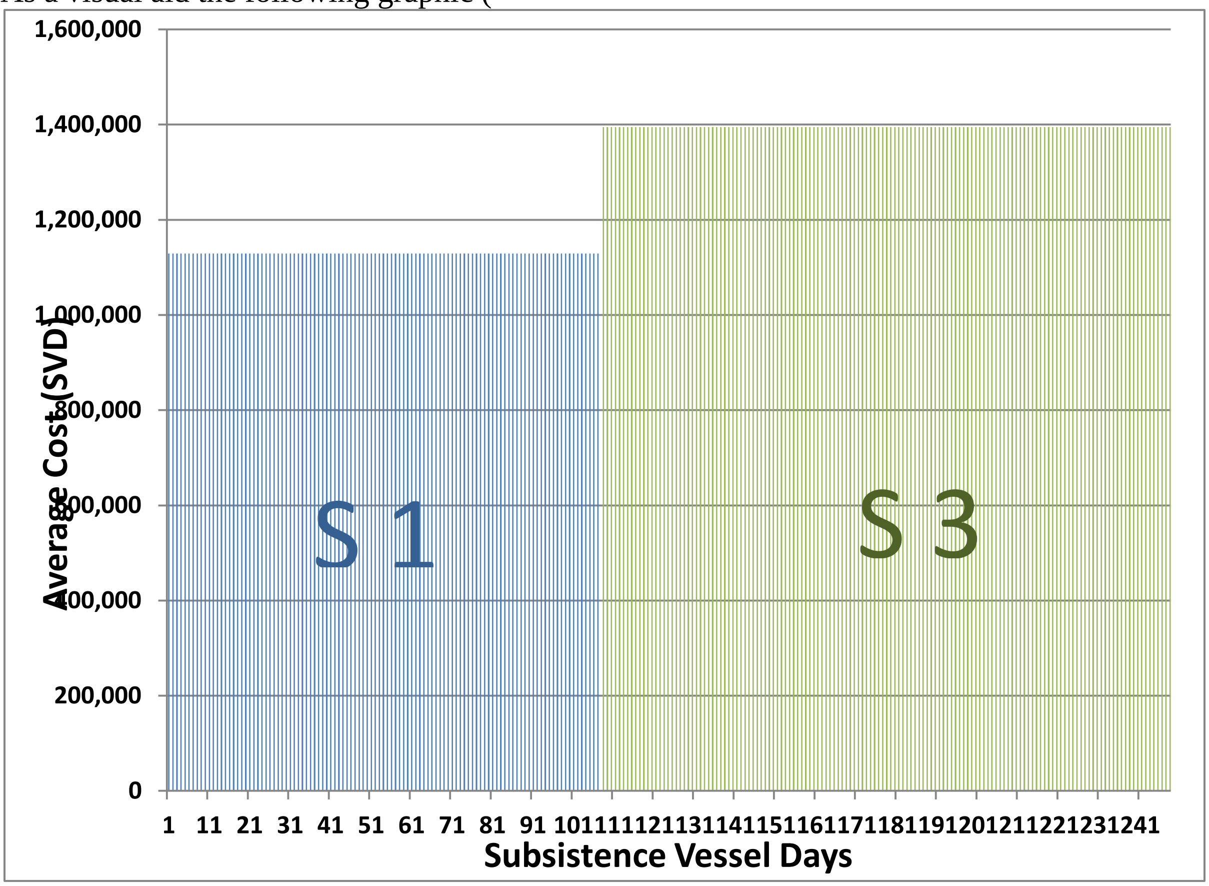


Figure 7) depicts the incremental cost and output clearly showing that alternative S3 is a worthwhile investment over S1 because it provides more output at less cost.

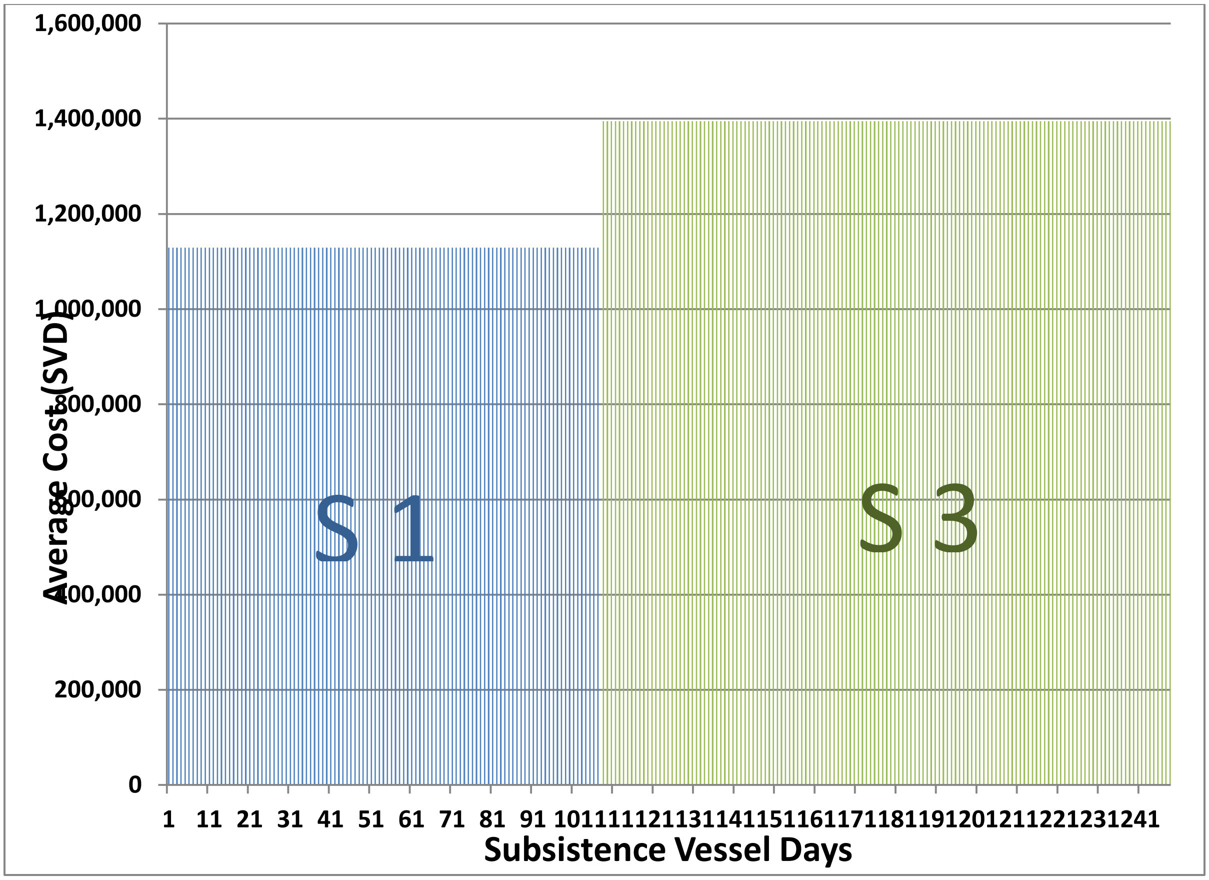


Figure 7. Incremental Analysis Cost Graphic

8.0 TENTATIVELY RECOMMENDED PLAN

8.1 Plan Components

The alternative that offers the most benefit to the community for the cost is S3, a southern breakwater along with a rubble mound lay-down/boat storage area.

8.1.1 Basin

A small near-shore area would be dredged to -10 feet MLLW, requiring removal of approximately 3,000 cubic yards of material.

8.1.2 Breakwaters

The breakwaters would require approximately 78,400 cubic yards of assorted rock. The breakwater configuration would reduce waves from the north with periods of 8 seconds or less to about a third of the wave height at the current boat launch area. Plan S3 is shown in Figure 8.

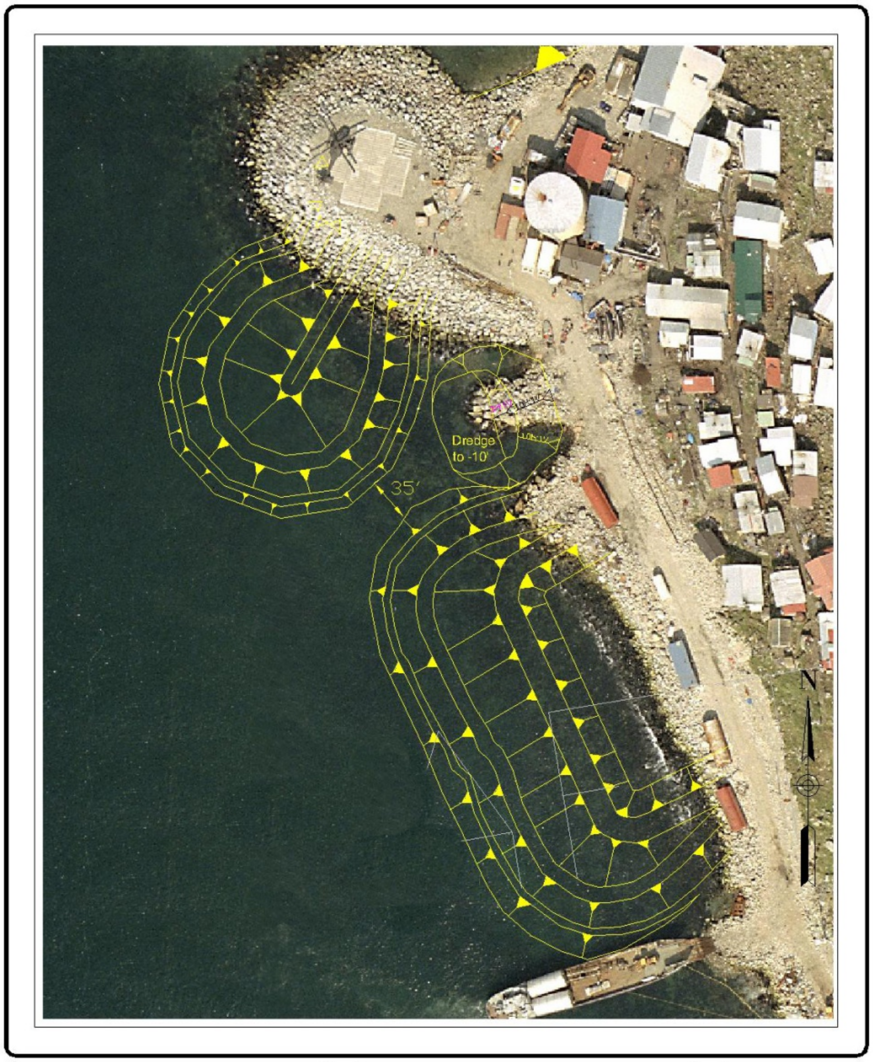


Figure 8. Alternative S3

8.1.3 Dredged Material Disposal and Dredged Material Maintenance Plan

To the extent practicable, the Corps would incorporate the rocky material dredged from between the breakwaters as fill in the expanded breakwater and lay-down areas. The enforcement agency for Section 404 is the U.S. Army Corps of Engineers; the Corps does not issue permits to itself, but will prepare an evaluation of the effects of its proposed discharge under Section 404(b)(1), available in Appendix 1. The Corps will comply with Section 401 by applying for water quality certification from the State of Alaska Department of Environmental Conservation. Because of the small size of proposed discharge, and the similarity of the discharged material (i.e., large rock placed for the construction of the breakwaters) to the existing sediments, the Corps determines that compensatory mitigation under Section 404 is not warranted.

8.2 Plan Benefits and Accomplishment

The proposed construction of breakwaters and a boat launching area at Diomede, Alaska, as discussed in this document, would have some minor, largely controllable short-term impacts, but in the long term would help improve the overall quality of the human environment. The recommended plan also meets study authorization criteria of Remote and Subsistence Harbors as defined in the Water Resources Development Act of 2007 (WRDA 2007), Section 2006 as indicated below. A project specific response to each element is given.

> *(1)(A) the community to be served by the project is at least 70 miles from the nearest surface accessible commercial port and has no direct rail or highway link to another community served by a surface accessible port or harbor; or*
>
> *(B) the project would be located in the State of Hawaii, the Commonwealth of Puerto Rico, Guam, the Commonwealth of the Northern Mariana Islands, the United States Virgin Islands, or American Samoa;*

The nearest surface accessible port to Diomede is in Anchorage approximately 685 air miles from Diomede. Diomede is an isolated island village lacking any direct rail or highway access to any other communities.

> *(2) the harbor is economically critical such that over 80 percent of the goods transported through the harbor would be consumed within the community served by the harbor and navigation improvement; and*

Lacking any sort of access to any other communities, 100 percent of goods transported to Diomede would be consumed within the community.

> *(3) the long-term viability of the community would be threatened without the harbor and navigation improvement.*

Lack of safe and reliable access has resulted in a life threatening shortage of emergency and routine medical care, significant restrictions on travel both to and from the community, shortages of basic commodities, and lack of materials to repair deteriorating infrastructure. Long-term continued viability of the community is in jeopardy. WRDA 2007, Section 2006 formally recognizes the importance of harbors and navigation improvement projects serving isolated communities. These harbors and projects are the lifelines of the communities, without which, the very existence of the communities would be threatened.

(b) Justification- In considering whether to recommend a project under subsection (a), the Secretary shall consider the benefits of the project to—

(1) public health and safety of the local community, including access to facilities designed to protect public health and safety;

Potential safety boat could serve as back up to the helicopter during poor visibility or mechanical breakdowns.

(2) access to natural resources for subsistence purposes;

Increased subsistence effort/harvest by increasing the opportunities to launch/land vessels is accomplished – a main objective for Diomede.

(3) local and regional economic opportunities;

Alternate mode of access between the island and mainland could increase opportunity for locals to seek seasonal employment and/or to travel to sell their art.

(4) welfare of the local population; and

Reduce time away from island, people more likely to travel to island to provide services, people more likely to travel from island to seek routine medical treatment.

(5) social and cultural value to the community.

Maintaining a viable community at Diomede will preserve their unique culture.

Improved access will allow more social and cultural interaction between residents and their relatives in other communities, contributing to preservation of a broader regional cultural identity.

Thirdly, cultural funders invest in assets that have significance beyond their economic value. The assets – whether a painting, a performance or a historic building – are often unique and almost always incapable of being replicated, replaced or exchanged. Furthermore, cultural assets and activities have a worth beyond cost or realizable value and that worth is difficult to articulate, let alone calculate. Competing investment claims do not rest on straightforward comparisons; funders are rarely comparing like with like.

The project would significantly improve the quality of life for the residents of Little Diomede as well as provide life/safety benefits, which include the following:

- Improve resident's quality of life through better access to:
    - health care and emergency services
    - education and employment opportunities
    - subsistence resources
    - manufactured goods
- Improvements to standards of living and sustainability of the community from reductions in the delays and costs of delivery of passengers, freight, and supplies

- Improved quality of life and health by improving waste disposal practices
- Accommodation of larger, more sea-worthy local vessels providing for increased subsistence harvests and safer travel to nearby communities.
- Providing a level area suitable for the staging of goods and subsistence harvest support activities (net mending, butchering, skin stretching, etc.)
- Accommodation of a search and rescue vessel
- Regularly scheduled boat service to nearby communities providing reliable access to Diomede
- Reduced damages to locally owned boats
- Increased economic opportunity through more frequent visitation by cruise vessels passengers (via zodiac boat)

Realizing any of these identified items will improve the sustainability of the community and help maintain its unique social and cultural values and traditions.

8.3 Plan Costs

The estimated construction cost of the tentatively recommended plan is $28,863,000. Construction cost share is 90 percent Federal and 10 percent non-Federal. There is also a requirement for an additional 10 percent of the navigation features to be paid over a period not to exceed 30 years of which any applicable LERRs may be credited. The non-Federal Sponsors for implementation of the project are expected to be the City of Diomede and the Native Village of Diomede, with financial assistance from Kawerak, Inc, the Norton Sound Economic Development Corporation, and the State of Alaska. The estimated study costs are projected as $3.1million and are being cost shared with Kawerak, Inc (Table 13).

Table 13. Cost Apportionment

Cost Sharing ($) – FY2013 Program/Budget Year Cost - Escalated						
TSP – S3	Total Cost	Federal 90%	Sponsor 10%	10% GNF (Post-Construction)	LSF & LERRs	U.S. Coast Guard (ATON)
PED (Design for GNF)	3,323,000	2,990,700	332,300	332,300		
Total Construction (GNF)	23,570,000	21,213,000	2,357,000	2,357,000		
Construction Management	1,880,000	1,692,000	188,000	188,000		
Real Estate (LERR)	60,000			-60,000	60,000	
Aids to Navigation	30,000					30,000
TOTAL	28,863,000	25,976,700	2,877,300	2,817,300	60,000	30,000
OMRR&R	3,616,000					

*PED values are based on a set percentage of construction cost; actual amounts will vary

*OMRR&R consists of 5% replacement of armor rock, once every 10 years – 100% Federal

9.0 PUBLIC AND AGENCY INVOLVEMENT

9.1 Public Involvement

A public scoping meeting with the residents of Diomede was held in Diomede on 28 February 2007. Alternatives and potential environmental impacts of those alternatives were discussed.

Additional site visits were made later in 2007 and in subsequent years to gather data and gain additional input from the local residents.

9.2 Agency Coordination

As of September 2013, coordination activities with major resource agencies stood as follows:

Alaska Department of Fish and Game: A letter describing the project and inviting ADFG to participate in project coordination was sent to ADFG (attn: William Morris) on 10 January 2012. The Corps received an email response from ADFG (Todd Nichols) dated 23 January 2012, stating that the ADFG had found no issues of concern and had no preference of one alternative over the other.

Alaska Department of Natural Resources, Office of History and Archaeology: The Corps used online resources offered by this office to study potential impacts of the project and develop a determination of effect, but has not yet sent a letter of determination to the State Historic Preservation Officer as required under Section 106 of the NHPA.

National Marine Fisheries Service: A letter requesting a list of endangered and threatened species under the ESA and the initiation of informal ESA consultation was mailed to the NMFS Protected Resources Division (attn: Brad Smith) on 10 January 2012. No response was forthcoming; the Corps re-sent an electronic copy of the letter in an email to Mr. Smith on 21 June 2013, and followed up with a telephone call on 27 June 2013. The Corps was assured during the telephone conversation that NMFS would provide the requested ESA information, but to date the Corps has received no further response.

The Corps sent a separate letter to the NMFS Habitat Conservation Division (attn: Jeanne Hanson) on 10 January 2012, describing the proposed project and inviting coordination on EFH issues. No response was received; however, Division member Matt Eagleton had explained in an earlier email (3 January 2012) that his office preferred to comment on EFH assessments as part of the NEPA process, so a response to the 10 January letter was not expected.

U.S Fish and Wildlife Service: The Corps mailed a letter on 10 January 2012 to the USFWS Fairbanks Field Office (attn: Sarah Conn), requesting a re-initiation of informal consultation under the ESA, and also inviting resumption of coordination under the FWCA. The Corps received an ESA consultation letter from USFWS on 28 June 2013, in which it determined that the project is not likely to adversely affect ESA-listed species under USFWS jurisdiction (polar bears, Steller’s eiders, and spectacled eiders), and that further Section 7 consultation or preparation of biological assessments is not necessary. The Corps has continued working closely with the Fairbanks Field Office Conservation Planning Assistance Branch on an informal basis, but that office has not yet indicated how it wishes to document its findings under the FWCA (e.g., via a revised PAL or a new FWCA report).

9.3 Status of Environmental Compliance

Table 14. Status of Environmental Compliance.

ACTS and EO's	Status	Notes
Archeological & Historical Preservation Act of 1974	In progress	
Clean Air Act	In Compliance	
Clean Water Act	In progress	
Coastal Zone Management Act of 1972	NA	
Endangered Species Act of 1973*	In progress	
Fish and Wildlife Coordination Act	In progress	
National Environmental Policy Act	In progress	
Marine Protection, Research & Sanctuaries Act of 1972	In Compliance	
National Historic Preservation Act	In progress	
River and Harbors Act of 1899	In progress	
Magnuson-Stevens Fishery Conservation & Mgt. Act	In progress	
Marine Mammal Protection Act	In progress	
Executive Order 11593, Protection of Cultural Environment	In progress	
Executive Order 12898, Environmental Justice	In Compliance	
Executive Order 13045, Protection of Children	In Compliance	
STATE AND LOCAL		
State Water Quality Certification	In progress	
Alaska Coastal Mgmt. Program	NA	

9.4 Views of the Sponsor

The non-Federal sponsors for implementation of the project are expected to be the City of Diomede and the Native Village of Diomede, with financial assistance from Kawerak, Inc, the Norton Sound Economic Development Corporation, and the State of Alaska. Letters of intent are being developed with each potential entity; those received have been included in the Correspondence Appendix. The Native Village of Diomede was sent a letter dated September 23, 2009 that offered continued coordination and consultation through the government-to-government consultation process. Formal government-to-government consultation was not requested.

10.0 CONCLUSIONS AND RECOMMENDATIONS

10.1 Conclusions

The studies documented in this report indicate that Federal construction of navigation improvements as described in the recommended plan is technically possible, environmentally and socially acceptable, and in accordance with Section 2006 of the Water Resources Development Act of 2007. Thus, it is concluded that the navigation improvements described herein should be pursued by the Federal government in cooperation with the non-Federal sponsor.

10.2 Effectively Implement a Comprehensive Systems Approach

This item of change describes how the Corps will comprehensively design, construct, maintain and update engineered systems to be more robust, with full stakeholder participation.

10.2.1 Item of Change 1 - Employ Integrated, Comprehensive and Systems-based Approach

In planning for this project, the study examined the system of vessel usage in the Bering Strait region. We considered how the system of Little Diomede subsistence was utilized for various purposes, where the system inefficiencies were, and what measures could be implemented to improve those inefficiencies.

10.2. 2 Item of Change 2 - Employ Risk-based Concepts in Planning, Design, Construction, Operations, and Major Maintenance

The analysis of this study investigated what would happen if the costs or benefits of the project would increase or decrease and how that may affect project justification. We also examined the impact of hydraulic conditions on the breakwater features to determine the most appropriate dimension and gradations of this structure. We also examined how the tidal cycle would affect the performance of the project to determine what the appropriate depth of dredging would be in order to achieve the desired project benefits. However, when taken into the greater context of projects that provide physical protection from damages, this is a very low risk project in terms of likelihood of physical damages and the magnitude of potential damages.

10.2.3 Item of Change 3 - Continuously Reassess and Update Policy for Program Development, Planning Guidance, Design and Construction Standards

This Item of Change is not directly applicable to the navigation improvements project for Little Diomede, Alaska.

10.2.4 Item of Change 4 - Employ Dynamic Independent Review

This project underwent detailed Agency Technical Review. At several times throughout project formulation, the PDT called upon national experts in the formulation of small boat harbors and subsistence concerns to identify key policy issues and how best to ensure the project was in compliance with current policy and practice.

10.2.5 Item of Change 5 - Employ Adaptive Planning and Engineering Systems

The District employed many collaborative meetings as part of the planning process to identify the needs and concerns of the community, project stakeholders, and environmental resource agencies to develop a plan that met the many needs of the community, the environment, and project stakeholders.

10.2.6 Item of Change 6 - Focus on Sustainability

As part of the project, an agreement is proposed with the USFWS to dispose of dredged materials in an area that will be utilized for additional habitat creation. In addition, the new project examined the ability of the navigation improvements to naturally provide the appropriate circulation and flushing needed for maintaining water quality.

10.2.7 Item of Change 7 - Review and Inspect Completed Works

As part of the planning and design of this project, the PDT used a variety of lessons learned from historical projects and ones that have recently gone through formulation and approval processes. We also examined existing navigation works and associated breakwater projects to ensure that anything we would incorporate into our designs would not propagate inefficiencies or shortcomings of previous projects.

10.2.8 Item of Change 8 - Assess and Modify Organizational Behavior

This Item of Change is not directly applicable to the navigation improvements project for Little Diomede, Alaska.

10.2.9 Communication

This item of change discusses the effective and transparent communication with the public, and within the Corps, about risk and reliability.

10.2.10 Item of Change 8 - Effectively Communicate Risk

The PDT met with stakeholders, the local sponsor, and resource agencies to discuss the planning process, plan selection methodology, and the recommended plan and its expected performance. As mentioned previously, this is a low risk project.

10.2.11 Item of Change 9 - Establish Public Involvement Risk Reduction Strategies

The public will be able to review the project and public meetings may be held to discuss the findings and recommendations of this report. As mentioned previously, this is a low risk project.

10.2.12 Reliable Public Service Professionalism

Improve the state-of-the-art and the Corps' dedication to a competent, capable workforce on a continuing basis. Make the commitment to being a "learning organization" a reality.

10.3 Consistency with the Environmental Operating Principles

The Corps civil works mission has traditionally focused on its principal areas of responsibility: navigation, flood control, storm damage protection, and most recently environmental restoration. Water resources projects look to address society's need to encourage economic growth consistent with a healthy environment and national security. Key to integrating these goals, which in the past were often viewed as conflicting, is developing projects and systems that are sustainable in the long term from each perspective. Integrated water resources management requires an examination of proposed projects in a manner that comprehensively examines outputs and potential to integrate other purposes to achieve overall sustainability. The Corps has reaffirmed its commitment to the environment in a set of "Environmental Operating Principles". These principles foster unity of purpose on environmental issues and reflect a positive tone and direction for dialogue on environmental matters. By implementing these principles within the framework of Corps regulations, the Corps continues its efforts to evaluate the effects of its projects on the environment and to seek better ways of achieving environmentally sustainable solutions in partnership with stakeholders. The seven "Environmental Operating Principles" are as follows:

1. Foster sustainability as a way of life throughout the organization. The improvements provide sustainable subsistence way of life for the community.
2. Proactively consider environmental consequences of all Corps activities and act accordingly. Throughout the development of alternatives the foundational concepts consider avoidance and minimization of environmental impacts.
3. Create mutually supporting economic and environmentally sustainable solutions. The potential opportunities identified in the study represent a balance between development and the environment.
4. Continue to meet our corporate responsibility and accountability under the law for activities undertaken by the Corps, which may impact human and natural environments. The project will comply with all Federal and State laws and regulations, notably in the areas of environmental impacts, review, and comment.
5. Consider the environment in employing a risk management and systems approach throughout the life cycles of projects and programs. All study elements consider risk management and have incorporated factors such as varying contingency amounts.
6. Leverage scientific, economic, and social knowledge to understand the environmental context and effects of Corps actions in a collaborative manner.
7. Employ an open, transparent process that respects views of individuals and groups interested in Corps activities. This study was fully coordinated in a collaborative manner.

For large-scale navigation improvements, the EOP requires a view that does not end with merely minimizing and mitigating the impacts of dredging and dredged material disposal, but looks further to examine how a project might incorporate features, methods, and procedures that synergistically incorporate these mission goals. Towards that end, management measures are developed to address such opportunities, and where appropriate, these are incorporated into project plans. Other procedures are evaluated and incorporated into project design at later stages when project recommendations are more defined.

The recommended plan maximizes the balance of human need and impacts to the environment. The community and users were involved in the planning process and endorse the recommended plan. Avoidance of impacts to the environment was incorporated in the placement plan for dredged material to a location in need of such material. The breakwater layout maximizes circulation within the harbor to provide sustainable water quality.

10.4 Corps of Engineers Campaign Plan

The USACE Campaign Plan guides Corps policy decisions on how we organize, train, and equip our personnel; how we plan, prioritize, and allocate resources; and how we respond to emerging requirements and challenges. Implementation of the goals and objectives from this Campaign Plan will lead to actual change in the Corps organization moving the Corps from "good to great." The Corps strategic plan effort towards improvement began in August 2006 with the "12 Actions for Change" and has evolved to four goals and associated objectives. Although the effort originally developed with a focus on missions that seek to manage risk associated with flooding and storm damage, the Campaign Plan Goals and Objectives are applied to all aspects of the Corps including the navigation mission.

USACE Campaign Plan Goals and Objectives are derived, in part, from the Commander's Intent, the Army Campaign Plan, and Office of Management and Budget guidance. The four goals with associated objectives applicable to this civil works navigation improvement are:

- Goal 1: Deliver USACE support to combat, stability, and disaster operations through forward deployed and reach back capabilities.
- Goal 2: Deliver enduring and essential water resource solutions through collaboration with partners and stakeholders.
  - Objective 2a: Deliver integrated, sustainable, water resources solutions.
  - Objective 2b: Implement collaborative approaches to effectively solve water resource problems.
- Goal 3: Deliver innovative, resilient, sustainable solutions to the Armed Forces and the Nation.
- Goal 4: Build and cultivate a competent, disciplined, and resilient team equipped to deliver high quality solutions.
  - Objective 4b: Communicate strategically and transparently.

The study provides opportunities for agency technical review and involvement of the Corps established Centers of Expertise, and technical and policy expertise available through the vertical chain of command at the Alaska District, Pacific Ocean Division, and Corps Headquarters, Office of Water Policy Review, Washington D.C.

10.5 Recommendations

I recommend that the navigational improvements at Little Diomede, Alaska, be constructed generally in accordance with the plan herein, and with such modifications thereof as in the discretion of the Chief of Engineers may be advisable at an estimated total Federal cost of $26,775,400 provided that prior to construction the local sponsor agrees to the following:

a. Provide, during the period of design, 10 percent of design costs allocated by the Government to commercial navigation in accordance with the terms of a design agreement entered into prior to commencement of design work for the project; and provide, during the first year of construction, any additional funds necessary to pay the full non-Federal share of design costs allocated by the Government to commercial navigation in accordance with the cost sharing as set out in paragraph b. below;

b. Provide, during construction, 10 percent of the total cost of construction of the general navigation features attributable to dredging to a depth not in excess of 20 feet; plus 25 percent of the total cost of construction of the general navigation features attributable to dredging to a depth in excess of 20 feet but not in excess of 45 feet; plus 50 percent of the total cost of construction of the general navigation features attributable to dredging to a depth in excess of 45 feet;

c. Pay with interest, over a period not to exceed 30 years following completion of the period of construction of the project, up to an additional 10 percent of the total cost of construction of the general navigation features. The value of lands, easements, rights-of-way, and relocations provided by the non-Federal sponsor for the general navigation features, described below, may be credited toward this required payment. If the amount of credit exceeds 10 percent of the total cost of construction of the general navigation features, the non-Federal sponsor shall not be required to make any contribution under this paragraph, nor shall it be entitled to any refund for the value of lands, easements, rights-of-way, and relocations in excess of 10 percent of the total cost of construction of the general navigation features;

d. Provide all lands, easements, and rights-of-way, and perform or ensure the performance of all relocations determined by the Federal Government to be necessary for the construction or operation and maintenance of the general navigation features (including all lands easements, and rights-of-way, and relocations necessary for dredged material disposal facilities);

e. Accomplish all removals determined necessary by the Federal Government other than those removals specifically assigned to the Federal Government;

f. Provide, operate, maintain, repair, replace, and rehabilitate, at its own expense, the local service facilities consisting of the existing float system and additional floats added to accommodate the fleet designed for the recommended project in a manner compatible with the project’s authorized purposes and in accordance with applicable Federal and State laws and regulations and any specific directions prescribed by the Federal Government;

g. Shall not use funds from other Federal programs, including any non-Federal contribution required as a matching share thereof, to meet any of the non-Federal obligations for the project unless the Federal agency providing the Federal portion of such funds verifies in writing that expenditure of such funds for such purpose is authorized;

h. Shall prepare and implement a harbor management plan that incorporates best management practices to control water pollution at the project site and to coordinate such plan with local interests;

i. Comply with all applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, as amended (42 U.S.C. 4601-4655), and the Uniform Regulations contained in 49 CFR Part 24, in acquiring lands, easements, and rights-of-way required for construction or operation and maintenance of the general navigation features and the local service facilities, including those necessary for relocations, the borrowing of materials, or the disposal of dredged or excavated material and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act;

j. Give the Federal Government a right to enter, at reasonable times and in a reasonable manner, upon property that the non-Federal sponsor owns or controls for access to the project for the purpose of operating and maintaining the general navigation features;

k. Hold and save the United States free from all damages arising from the construction or operation and maintenance of the project, any betterments, and the local service facilities, except for damages due to the fault or negligence of the United States or its contractors;

l. Keep and maintain books, records, documents, or other evidence pertaining to costs and expenses incurred pursuant to the project, for a minimum of 3 years after completion of the accounting for which such books, records, documents, or other evidence are required, to the extent and in such detail as will properly reflect total costs of construction of the general navigation features, and in accordance with the standards for financial management systems set forth in the Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments at 32 Code of Federal Regulations (CFR) Section 33.20;

m. Comply with all applicable Federal and State laws and regulations, including, but not limited to: Section 601 of the Civil Rights Act of 1964, Public Law 88-352 (42 U.S.C. 2000d) and Department of Defense Directive 5500.11 issued pursuant thereto; Army Regulation 600-7, entitled “Nondiscrimination on the Basis of Handicap in Programs and Activities Assisted or Conducted by the Department of the Army”; and all applicable Federal labor standards requirements including, but not limited to, 40 U.S.C. 3141- 3148 and 40 U.S.C. 3701 – 3708 (revising, codifying and enacting without substantial change the provisions of the Davis-Bacon Act (formerly 40 U.S.C. 276a *et seq.*), the Contract Work Hours and Safety Standards Act (formerly 40 U.S.C. 327 *et seq.*) and the Copeland Anti-Kickback Act (formerly 40 U.S.C. 276c *et seq.*);

n. Perform, or ensure performance of, any investigations for hazardous substances that are determined necessary to identify the existence and extent of any hazardous substances regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Public Law 96-510, as amended (42 U.S.C. 9601-9675), that may exist in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction or operation and maintenance of the general navigation features. However, for lands that the Federal Government determines to be subject to the navigation servitude, only the Federal Government shall perform such investigations unless the Federal Government provides the non-Federal sponsor with prior specific written direction, in which case the non-Federal sponsor shall perform such investigations in accordance with such written direction;

o. Provide the non-Federal share of that portion of the costs of mitigation and data recovery activities associated with historic preservation that are in excess of 1 percent of the total amount authorized to be appropriated for the project; and

p. Assume, as between the Federal Government and the non-Federal sponsor, complete financial responsibility for all necessary cleanup and response costs of any hazardous substances regulated under CERCLA that are located in, on, or under lands, easements, or rights-of-way that the Federal Government determines to be required for construction or operation and maintenance of the general navigation features;

q. To the maximum extent practicable, perform its obligations in a manner that will not cause liability to arise under CERCLA; and

r. Comply with Section 221 of Public Law 91-611, Flood Control Act of 1970, as amended (42 U.S.C. 1962d-5b), and Section 101(e) of the Water Resources Development Act of 1986, Public Law 99-662, as amended (33 U.S.C. 2211), which provides that the Secretary of the Army shall not commence the construction of any water resources project, or separable element thereof, until each non-Federal sponsor has entered into a written agreement to furnish its required cooperation for the project or separable element.

The recommendations for implementation of navigation improvements at Little Diomede, Alaska reflect the policies governing formulation of individual projects and the information available at this time. They do not necessarily reflect the program and budgeting priorities inherent in the local and State programs or the formulation of a national civil works water resources program. Consequently, the recommendations may be changed at higher review levels of the executive branch outside Alaska before they are used to support funding.

________________________ ____________________

Christopher D. Lestochi, P.E. Date
Colonel, Corps of Engineers
District Commander

ENVIROMENTAL ASSESSMENT
AND
FINDING OF NO SIGNIFICANT IMPACT

NAVIGATION IMPROVEMENTS
DIOMEDE, ALASKA

November 2013

Prepared by
The Alaska District
U.S. Army Corps of Engineers

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 (Corps), has assessed the environmental effects of the following action:

Navigation Improvements
Diomede, Alaska

The residents of Diomede rely on small open boats for transportation and subsistence hunting, but lack a sheltered boat launching area. The village has no harbor, and boats must be launched from a rocky, unprotected shoreline at the risk of injury and property damage during even moderate wave action. The project will create a protected boat launching area at the village by constructing two small rubble mound breakwaters and dredging a limited area at the shoreline to a depth of -10 feet below Mean Lower Low Water. Unlike previous proposed projects at Diomede that obtained rock for construction by blasting and quarrying at Little Diomede Island, the recommended project will bring in rock from an established quarry on the mainland. Other mitigation steps will include scheduling construction tasks to times of year that minimize risk to nesting seabirds and other sensitive resources.

The Corps evaluated four alternatives, similar in size, layout, and location, for their impact on environmental resources and compliance with applicable laws and regulations. The Corps will continue to coordinate this project with the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, and the Alaska Department of Fish and Game to minimize the project's impact on marine and terrestrial species. The Corps determined that the navigation improvements project will have no adverse effect on species protected under the Endangered Species Act or the Marine Mammals Protection Act, or on essential fish habitat. The Corps also determined that the action will have no adverse effect on cultural or historical resources, and will seek concurrence from the State Historic Preservation Officer under the National Historic Preservation Act.

The environmental assessment supports the conclusion that the navigation improvements at Diomede do not constitute a major Federal action significantly affecting human health and the environment. An environmental impact statement (EIS) is therefore not necessary for this project.

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Christopher D. Lestochi Date
Colonel, Corps of Engineers
District Commander

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for
Navigation Improvements
Diomede, Alaska

1.0 PURPOSE AND NEED OF THE PROPOSED ACTION

1.1 Introduction

Diomede, also known as *Inalik*, is a village on the western shore of Little Diomede Island in the middle of the Bering Strait (figure 1-1). The community has a population of about 150 people and includes members of the federally recognized tribe N ative Village of Diomede. The village is perched on an exposed rocky shoreline with no harbor, breakwater, or adequate barge landing area (figures 1-2, 1-3). Travel to and from Diomede and the importation of goods is difficult as Diomede has no year-round airstrip.

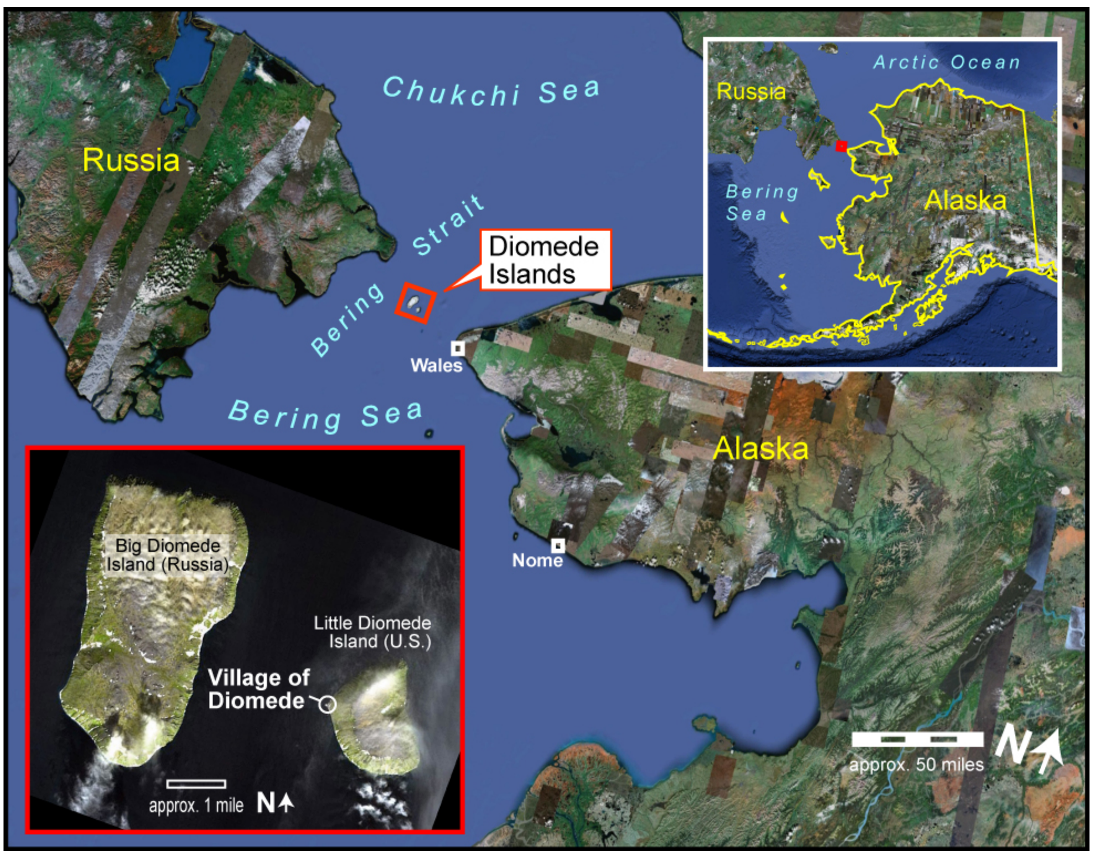

Figure 1-1. Location and vicinity of Little Diomede Island.

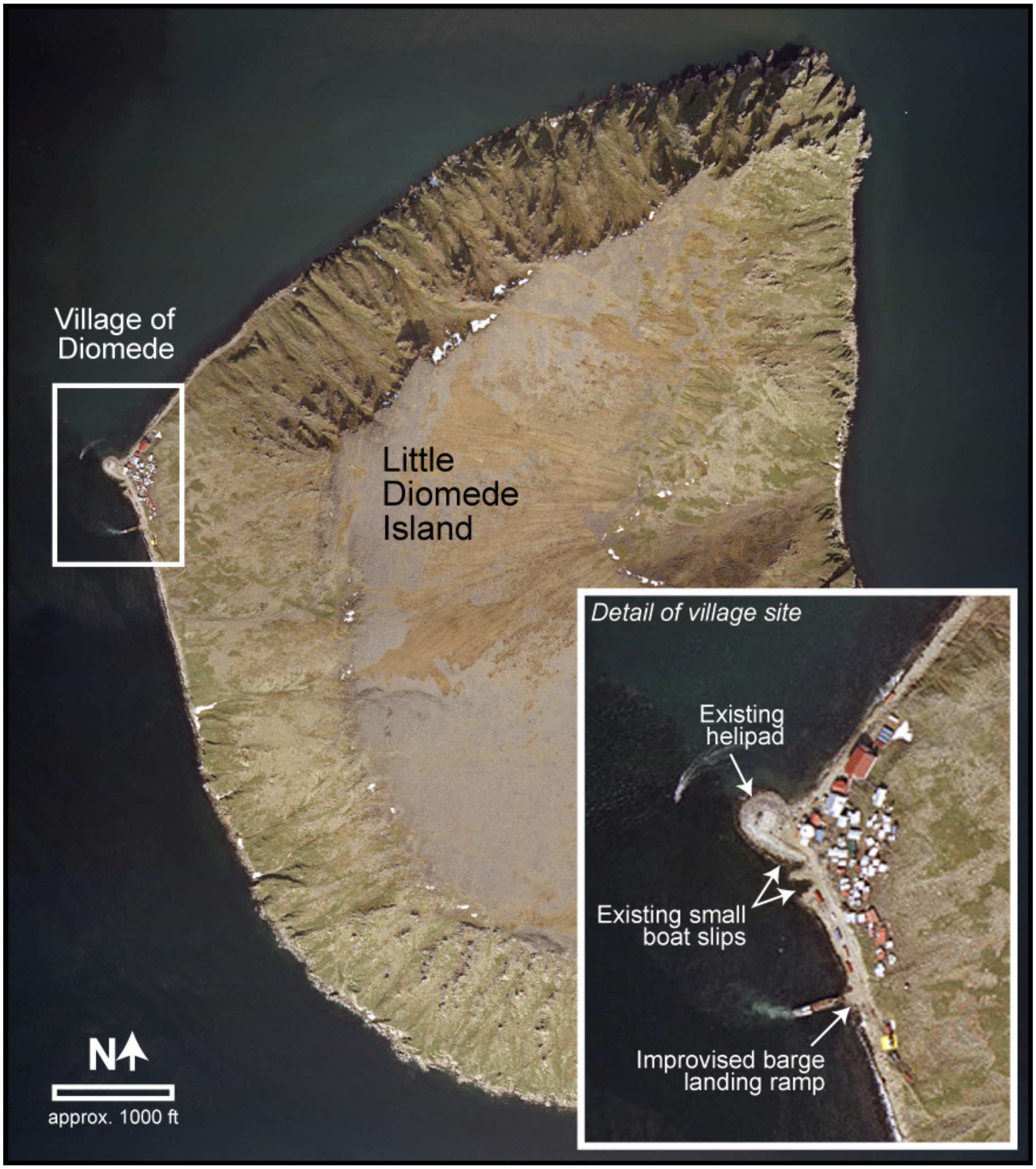

Figure 1-2. Location and vicinity of the Village of Diomede.

Air travel is limited to an expensive seat on the weekly mail helicopter or other chartered helicopter, or to those months when a temporary airfield can be carved out of the sea ice offshore of the village. A fuel barge delivers diesel fuel once per year, and a supply barge arrives once per year, but barge operations at the village are difficult and risky (figure 1-2). A barge company that no longer provides service to Diomede lost three barges in 15 years because of navigation problems at Diomede, and companies now charge the village a cost premium for dangerous conditions, increased insurance costs, and for the possibility of having to wait for weather and sea conditions to permit delivery. Because of the lack of moorage at the village, the boats used by residents for transportation must be limited to craft small enough to be manually hauled out of the ocean and stored on shore. Rough slips have been carved out of the shoreline boulders (figures 1-2 and 1-3), but no other protection from waves or storm surge exists. Launching these small open aluminum or skin boats from the exposed rocky shore can cause damage to the boats and be a hazard to the operators. Villagers use these small craft to travel the 26 miles to the mainland when the strait is sufficiently free of ice and when no other transportation options are available.

1.2 Authority

The authority for this General Investigation study is provided by the "Rivers and Harbors in Alaska" study resolution adopted by the U.S. House of Representatives Committee on Public Works on December 2, 1970, and the Water Resources Development Act (WRDA) of 2007, Section 2006 - Remote and Subsistence Harbors. The non-Federal Sponsors for implementation of the proposed project are expected to be the City of Diomede and the Native Village of Diomede, with financial assistance from Kawerak, Inc., the Norton Sound Economic Development Corporation, and the State of Alaska. Cost share for construction of the proposed project will be 90 percent Federal and 10 percent local.

1.3 Proposed Action

The intent of this project is to provide a basic protected launching and landing area at the community to accommodate the small craft used locally for subsistence and transport, as well as for larger rescue vessels. Previously studied concepts for navigation improvements at Diomede included larger breakwater structures and even an off-shore airfield. Those projects required the development of a source of rock at Little Diomede Island; however, studies on the creation of a rock quarry on the island revealed significant environmental and technical problems. The currently proposed alternatives assume that the rock would come from an established source on the mainland.

Figure 1-3. View of the village, with the existing small boat slips shown at the center of the photos, and the helipad at the extreme left.

2.0 DESCRIPTION OF ALTERNATIVES

2.1 No Action Alternative

The no-action alternative would leave in place the current hazards and difficulties in launching and landing small boats or rescue vessels.

2.2 Project Design Criteria and Navigation Improvement Options

The intent of the project is to provide an area of reduced wave action along the shore adjacent to the village and to limit damages to vessels trying to launch from or land on the shore. The physical limitations of the site do not allow for an entrance channel to provide protection from waves coming from all directions or for a sheltered moorage area. The launch area would need to be smoothed and widened, and the approach lane cleared of submerged boulders that might create a strike hazard in the trough of a wave.

The project alternatives were designed to accommodate two types of vessels:

- Small craft used for subsistence hunting and fishing, or for commercial fishing (approximately 20 feet long with a 7.5-foot beam and up to a 3-foot draft)

- An emergency rescue vessel capable of transporting residents to the mainland for medical care (approximately 30 feet long with a 10-foot beam and 5-foot draft)

Options considered for vessel protection included structures for off-shore mooring, a floating breakwater, and a rubble mound breakwater. An off-shore mooring system such as a dolphin would provide larger vessels a structure to tie off to, but would not provide protection to the local fleet of small craft. A dolphin would have to be strong enough to withstand winter ice movement and would likely require regular maintenance. Difficulties were also anticipated in driving the steel pilings for a dolphin in areas of boulders and cobbles. For these reasons, the option of an off-shore mooring structure was dropped from further consideration.

A floating breakwater can provide wave protection in seas of up to 4 feet and must be anchored to the sea floor with chains or pilings. A floating breakwater would be vulnerable to damage from sea ice and would have to be removed from the water and stored on shore during much of the year. However, there is no existing place on shore to store such a large structure. Because of these practical considerations, and the fact that waves at Diomede are frequently greater than the limits of protection provided by a floating breakwater, this option was not pursued further.

While expensive and time-consuming to build, rubble mound breakwaters have a proven performance record in arctic conditions of heavy sea ice and severe wave action. Rubble mound breakwaters have been built at Nome and St. Paul Island, and rubble mount revetment has protected the helipad at Diomede for over a decade. For these reasons, the alternatives retained for further consideration all feature rubble mound breakwaters in different configurations to provide near-shore protection.

2.3 Alternatives Considered in Detail

A description of the wave environment at Diomede and detailed descriptions of the four alternative designs are provided in the Corps' hydraulic design document (Ginter 2012). The two general locations for a boat landing area at Diomede are north and south of the helipad. Residents have indicated a strong preference for the boat landing area to be located south of the helipad as that is the side from which small craft are currently launched. The racks for skin boats are also south of the helipad, as is much of the available flat, unoccupied land suitable for the lay-down, storage, and transfer of gear and cargo. A boat landing area built on the north side of the heliport may require boat operators to more frequently cross the often-turbulent waters overlying the reef that extends west of the helipad. All alternatives feature a 35-foot-wide entrance channel to maximize wave protection at the shore landing area and the dredging of a small near-shore area to clear boulders and rocky debris, but no moorage space. These alternatives were not designed as protection from storm waves, but to make launching and retrieving boats in an average wave climate safer (Ginter 2012).

Alternative N1 (figure 2-1): This alternative is the only one located north of the helipad. It would consist of two rubble mound breakwaters; the northern breakwater would be expanded to provide a boat storage area on its top surface. A small near-shore area would be dredged to 10 feet below Mean Lower Low Water (MLLW), requiring removal of approximately 2,000 cubic yards of material. The breakwaters would require approximately 73,600 cubic yards of assorted rock. This breakwater configuration would reduce waves from the south with periods of 8 seconds or less to about a third of the wave height at the current boat launch area (Ginter 2012). The expanded northern breakwater would incorporate all rocky dredged material as fill within the boat storage area (Ginter 2013).

Alternative S1 (figure 2-2): This alternative on the south side of the helipad would consist of two rubble mound breakwaters; the base of the southern breakwater would be widened to allow for a limited boat storage area on its top surface. A small near-shore area would be dredged to -10 feet MLLW and would require the removal of approximately 3,000 cubic yards of material. The breakwaters would require approximately 62,900 cubic yards of assorted rock. This breakwater configuration would reduce waves from the north with periods of 8 seconds or less to about a third of the wave height at the current boat launch area (Ginter 2012). This alternative could incorporate little of the rocky dredged material as fill, and much of the dredged material may require disposal elsewhere (Ginter 2013).

Alternative S2 (figure 2-3): This alternative provides a little more protection than the other alternatives, but allows no boat storage surface. A small near-shore area would be dredged to -10 feet MLLW and would require removal of approximately 3,000 cubic yards of material. The breakwaters would require approximately 80,900 cubic yards of assorted rock. This breakwater configuration would reduce waves from the north with periods of 8 seconds or less to about a third of the wave height at the current boat launch area and would provide some small additional protection from waves from the west (Ginter 2012). The unmodified breakwaters in this alternative may not be able to incorporate all the rocky dredged material as fill, and much of the dredged material would require disposal elsewhere (Ginter 2013).

Alternative S3 (figure 2-4): This alternative is similar to S1, but expands the southern breakwater to allow for a large storage area on the upper surface. A small near-shore area would be dredged to -10 feet MLLW, requiring removal of approximately 3,000 cubic yards of material. The breakwaters would require approximately 78,400 cubic yards of assorted rock. This breakwater configuration would reduce waves from the north with periods of 8 seconds or less to about a third of the wave height at the current boat launch area (Ginter 2012). The expanded southern breakwater would incorporate all rocky dredged material as fill within the boat storage area (Ginter 2013).

2.4 Recommended Alternative

The Corps has identified Alternative S3 as the design that offers the most benefit to the community for the cost.

2.5 Construction Considerations

The Corps anticipates that construction would occur over 2 years. Sea ice and severe weather would limit construction activities to an estimated 100 days each year. All equipment, supplies, and fuel would have to be brought in, primarily by barge, and logistics would need to be planned well in advance. Flat land suitable for equipment and material lay-down, and facilities for providing worker room and board, are extremely limited on the island.

The stone for the breakwaters would most likely come from a quarry near Nome; no local material source on Little Diomede Island would be developed.

The Corps expects the material dredged from between the breakwaters to consist primarily of large boulders and cobbles, perhaps with small amounts of silty sand. Boring logs from the area around the Diomede School provide the best available information on local shoreline soils. Dredging may be accomplished with land-based excavators. If the contractors encounter boulders too large to be moved or bedrock outcroppings during dredging, explosives or other means may be necessary to break up the rock. Any such use of explosives would be done on a contingency basis to address a specific problem with a boulder or outcropping, so it is difficult to speculate at this time on the size of charge, depth of placement, or other factors that would affect the environmental impact of the blast. The Corps and its contractors may explore the possibility of dredging during winter months. This would extend the effective work season and lessen some environmental concerns regarding blasting.

Expanding the breakwaters to provide storage under Alternatives N1 and S3 offers an opportunity to incorporate the rocky dredged material into the breakwater structures, thereby eliminating or greatly reducing the quantity of dredged material requiring disposal. The dredged rock, while not currently well-characterized, should be adequate to serve as general fill under the boat storage areas of the expanded breakwaters. Upland placement is not feasible for the bulk of the dredged material as accessible, flat, unoccupied land is very scarce on the island. The Corps does not expect the dredged material to be chemically contaminated. Rocky substrate is porous and subject to tidal flushing. As a result, contaminants rarely persist is these environments, especially with Bering Sea tide ranges and the scarcity of anthropogenic sources. If significant quantities of gravel or sand are collected during dredging, it may be placed upland for local use if space for such stockpiling is available, or perhaps it could be used as surfacing on the breakwater storage areas. Small quantities of excess rocky material could conceivably be placed with similar material along the shoreline. Open water disposal of the dredged material would be avoided. The baseline of the territorial sea is at MLLW at Diomede, so any non-beneficial, in-water disposal would fall under the Marine Protection, Research, and Sanctuaries Act (MPRSA), and potentially would require development of a U.S. Environmental Protection Agency (USEPA) approved disposal site.

2.6 Avoidance and Minimization of Environmental Impacts

Impacts to the environment during construction would be avoided and minimized by observing site-specific recommendations from the U.S. Fish and Wildlife Service (USFWS) and other resource agencies (Section 4.8.1). These recommendations include selecting a construction timing window that poses the least risk of impact to sensitive resources such as bird nesting colonies (Section 4.8.2). Obtaining the rock for the breakwaters from a mainland source, rather than quarrying the rock on Little Diomede Island (as proposed in earlier navigation improvement studies), also represents a minimization of project impacts in response to input from agencies.

To the extent practicable, the Corps would incorporate the rocky material dredged from between the breakwaters as fill in an expanded breakwater (as described under Alternatives N1 and S3). This would eliminate or greatly reduce the need for disposal of the dredged material.

The Corps will propose that an archaeological monitor be present on site at key points during construction to examine dredged material for evidence of cultural resources and to help identify existing cultural resources for avoidance during construction activities.

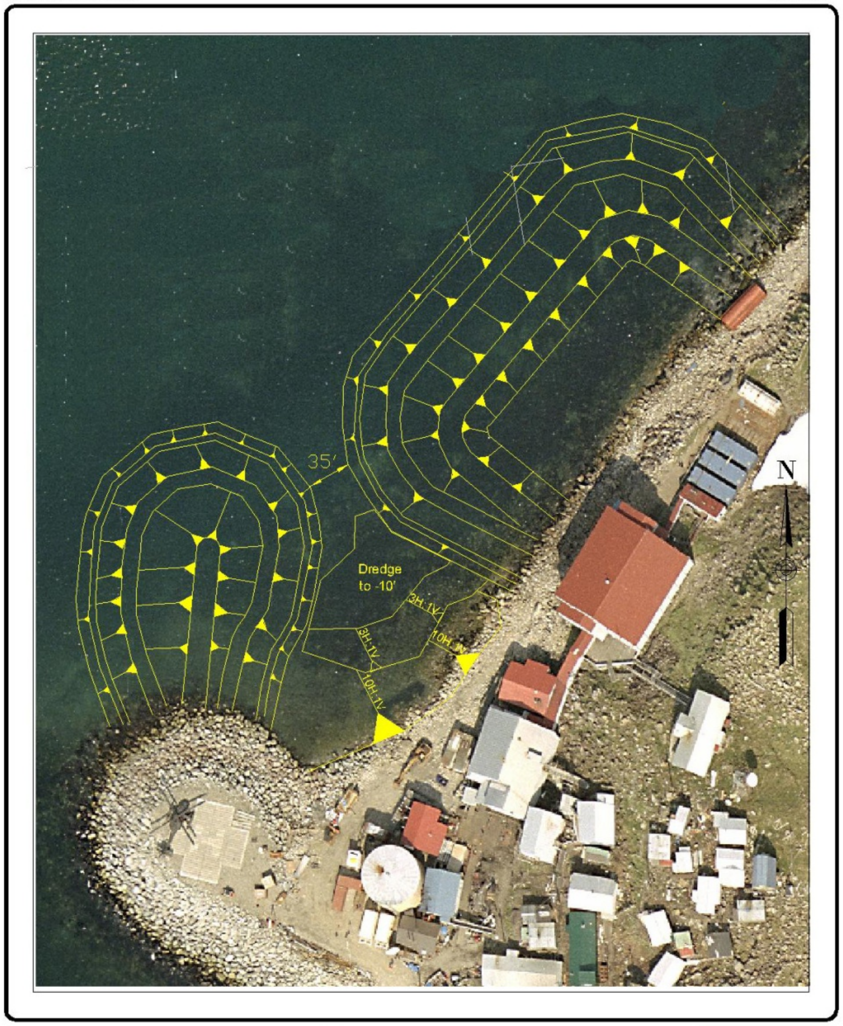

Figure 2-1. Alternative N1.

Figure 2-2. Alternative S1.

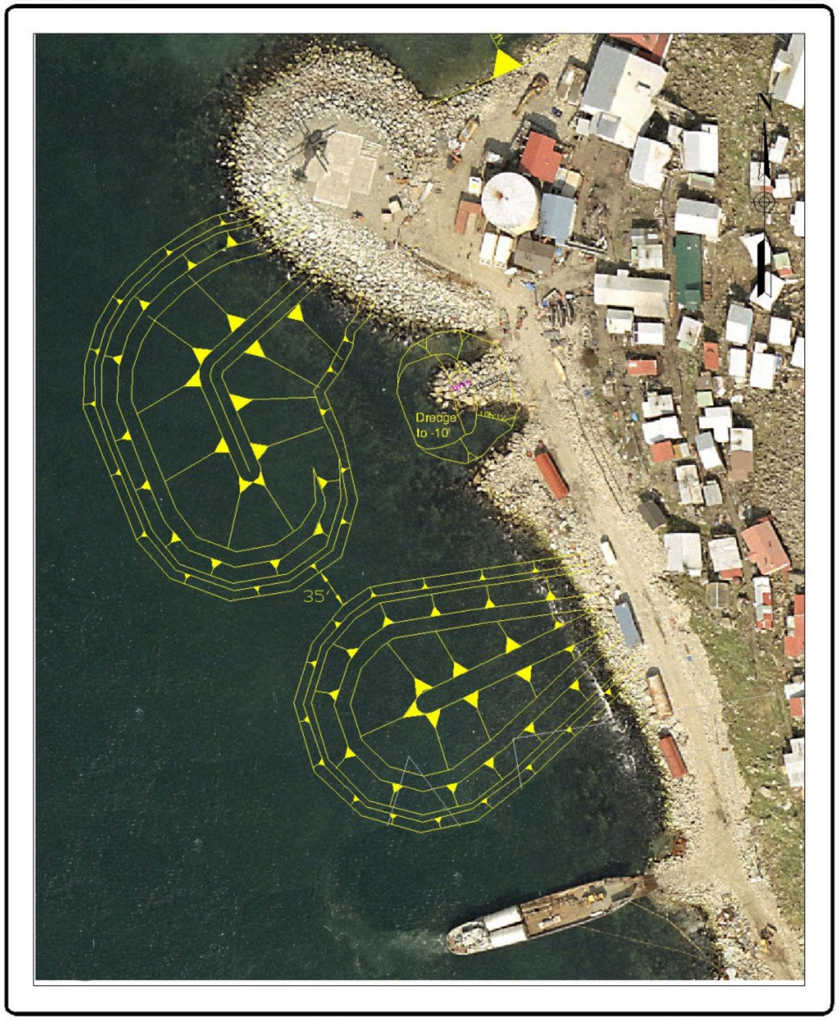

Figure 2-3. Alternative S2.

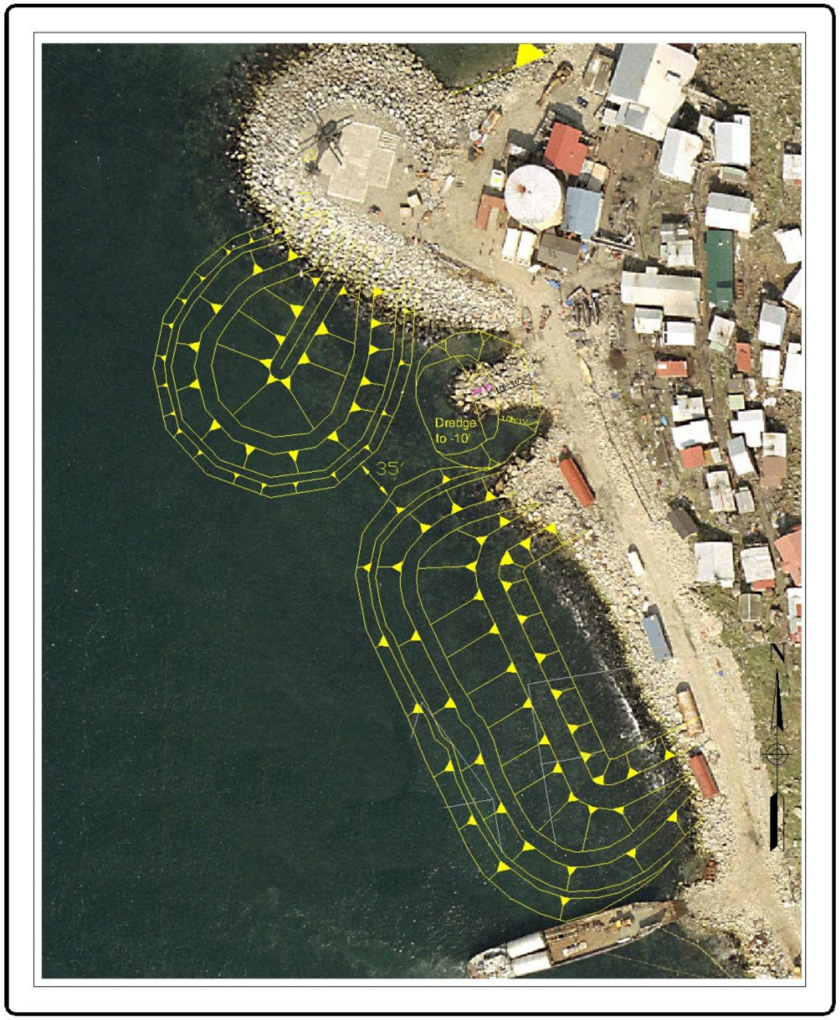

Figure 2-4. Alternative S3.

3.0 EXISTING ENVIRONMENT

3.1 Community and People

3.1.1 History

The community of Diomede is a traditional Ingalikmiut Eskimo Native village with a long history of continuous habitation. The village was well-established when a Russian expedition visited the Diomede Islands (also known as Inalik and Imaqliq) in 1728 and named them for Saint Diomede. The community was incorporated as the City of Diomede in 1970, but remains outside an organized borough (ADCRA 2010).

3.1.2 Demographics

As of the 2010 census, 115 people lived on Little Diomede, with 94 percent identifying themselves as all or part Alaska Native. The population was 178 in 1990, and estimated at 110 in 2006. The community has a long history and a relatively stable population, with 146 inhabitants counted as early as 1779, but the downward trend in population noted over the last decade has been attributed to the lack of economic opportunity on the island. There has been some sentiment within the community towards relocating the village to a site on the mainland (ADCRA 2010; Ellana 1983).

3.1.3 Economics and Infrastructure

The villagers of Diomede rely heavily on subsistence for their livelihood (described further in section 3.4). There are a limited number of employed positions in the community, and some of those are temporary or on an as-needed basis. Some villagers take temporary jobs on the mainland or in the fishing industry. Others carve ivory or make other traditional crafts for sale.

Travel between Little Diomede and the mainland is difficult; Diomede has no airfield and no boat harbor. The options for travel depend on the condition of the sea ice in the Bering Strait. When the sea ice becomes stable and sufficiently thick (generally, January to May), an airstrip is plowed on the surface of the ice, allowing fixed-wing aircraft to serve the community. Barges are rarely brought to Little Diomede’s exposed shoreline, so the importation of large items such as snowmachines and construction materials must sometimes await ice airstrip conditions allowing large cargo aircraft to land. Snowmachines are also used in winter to traverse the 26 miles from the village to the mainland.

A chartered helicopter travels between Diomede and Wales once a week, carrying mail and limited freight. Light open boats with outboard motors are also used to cross the Bering Strait to the mainland. With no moorage or even a boat ramp, any watercraft used at Diomede must be light enough to be hauled manually out of the water and up onto land for storage.

A fuel barge delivers diesel fuel once per year, and a supply barge arrives once per year to deliver dry-goods and some equipment. The village water supply consists of seasonal spring water stored in a 434,000-gallon tank, which supplies the washeteria, clinic, and school. Individual households must haul water to their homes from outlets to this tank. The tank is filled during the spring and summer for winter use, but this water supply typically runs out around March. The washeteria is then closed, and residents are forced to melt ice and snow for several months. The washeteria, clinic, and school are served by septic systems, but all households dispose of human waste via honeybuckets. The community has no landfill or incinerator; refuse is disposed of in the ocean or in burn barrels.

3.1.4 Land Use

The severe landscape and lack of ground suitable for construction tends to limit land use on Little Diomede Island to the same use that it has seen for centuries, as a base for subsistence hunting and gathering. A few scientific organizations have explored using Little Diomede Island as a platform for meteorological and oceanographic studies.

3.2 Physical Environment

3.2.1 Climate

The climate at Little Diomede is subarctic and dominated by the movements of weather systems and sea ice through the Bering Straits. Prevailing winds are from the north and average 15 knots with gusts of 70 knots. The island receives about 10 inches of precipitation a year; fog and 30 inches of snow are common. Temperatures average from -10 to 6 degrees F in the winter to 40 to 50 degrees F in summer. The Bering Strait is generally ice-free from July through September, with maximum sea ice coverage occurring in late winter to early spring. Snow banks may persist on the island's northern slopes into July (ADCRA 2010, Gualtieri 2001).

3.2.2 Air Quality

Little Diomede presumably enjoys good air quality because of the community's isolation, the small number of pollutant emission sources, and persistent winds. The primary source of air pollutants would be the community's diesel electric generator, along with individual fuel oil stoves, and a handful of small-engine vehicles such as outboard motors and snowmachines. There is no established ambient air quality monitoring program at Little Diomede, however, and little existing data to compare with the National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act (CAA). These air quality standards include concentration limits on the "criteria pollutants" carbon monoxide, ozone, sulfur dioxide, nitrogen oxides, lead, and particulate matter. The city is not in a CAA "non-attainment" area, and the "conformity determination" requirements of the CAA would not apply to the proposed project at this time (ADCRA 2011, ADEC 2010).

3.2.3 Geology and Soils

The flat-topped shape of Little Diomede Island is attributed to either the result of lava extruding through an ice sheet (a *tuya*) or the remains of an uplifted marine terrace that has been eroded and weathered by frost cycles in the subarctic climate. The island is roughly 2.7 square miles, much of which is a relatively flat plateau, 1,150 to 1,190 feet above sea level (figure 3-1). The island's margins range from sheer rocky cliffs to steep slopes studded with boulders and granite outcroppings. The island consists primarily of a medium to coarse-grained Cretaceous granite called the Diomede Pluton, which is believed to be of the same age and type as found at Big Diomede Island, King Island, and western portions of the Seward Peninsula (Gualtieri 2001). A seismic survey conducted in 2007 revealed an overburden layer estimated to vary from 1 to 18 feet thick overlying weathered granite bedrock. The overburden consisted of boulders with gravel, sand, and silt filling the voids in between (R&M 2007). What little surface soil is present is augmented with guano from the island's large seabird colonies and decomposing vegetation. Surface boulders are heavily encrusted with lichens, which are presumably weathering the stone and contributing to soil formation.

The village occupies a small bench of relatively flat land along the island's western shore. The shoreline is made up of boulders and large cobbles, with no sand or silt beach apparent anywhere. The boulders and cobbles continue offshore and compose much of the near-shore sediments. The submerged boulders have a smooth rounded or subangular appearance, suggesting that they may be frequently tumbled about by ice movement and strong currents. A rocky reef extends hundreds of feet westward from the point occupied by the village. It is unclear whether the reef is made up entirely of boulders or is underlain by a bedrock dike. Broad, flat areas of sand exist to the north and south of the reef, but it is not known how far these extend (Floyd and Hoffman 2007).

Figure 3-1. Little Diomede Island viewed from the south.

3.2.4 Hydrology

Little Diomede Island does not possess a true aquifer or persistent bodies of fresh water. However, melting snow and ice percolate through the talus and boulder fields to emerge as springs and transient streams. Treated water from one such spring is collected over the summer and stored in a 434,000-gallon holding tank at the village. This water supply typically lasts the community until March (DCRA 2010).

3.2.5 Oceanography

The Diomede Islands are in the Bering Strait, which is the sole conduit between the Bering Sea/Pacific Ocean and the Arctic Ocean. The relatively shallow (with maximum depths of about 165 feet below mean sea level) strait is about 50 miles across at its narrowest point. An enormous volume of water, calculated to be 380 to 595 cubic miles, flows annually through the strait, primarily northward from the Pacific Ocean into the Arctic Ocean. This migration of nutrient-rich oceanic water into the Arctic drives much of the productivity of the Chukchi Sea and Arctic Ocean (Cooper 2006). The northward current varies from 1 to 3 knots; the current at the surface can be increased by winds from the south and slowed or even reversed by strong northerly winds. The tides at Diomede are not substantial, with only about 12 inches difference between Mean Higher High Water and Mean Lower Low Water.

Little Diomede and Big Diomede Islands are themselves separated by a strait roughly 2.5 miles wide. The islands are created by separate uplift plateaus, and the seafloor drops away rapidly from their coastlines to a depth of roughly 100 to 150 feet below mean sea level in the inter-island strait (figure 3-2; Cooper 2006; TerraSond 2007). A rocky reef extends several hundred yards into the strait from the western point of Little Diomede Island occupied by the village. The general northerly flow in the Bering Strait creates a strong current running between the islands. Where this current interacts with the reef, a broad area of turbulence with visible upwelling is often evident in the waters offshore of the village.

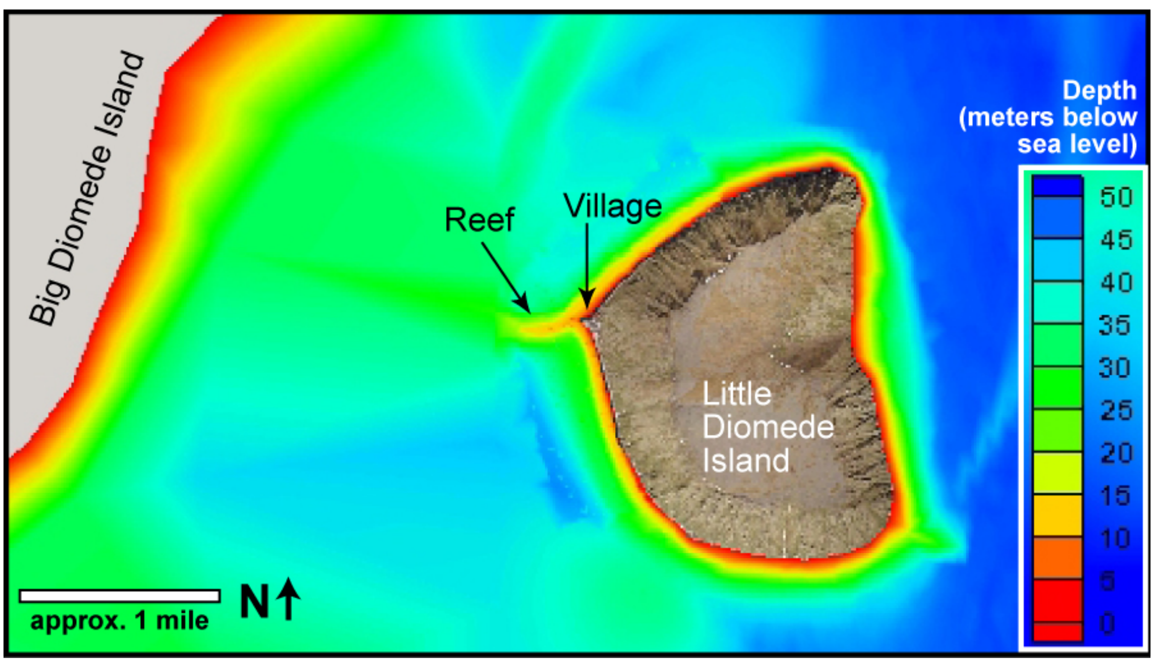

Figure 3-2. Bathymetry in the vicinity of Little Diomede Island (TerraSond 2007).

The Bering Strait is generally covered with ice between mid-December and mid-June. Whereas most of the winter ice in Bering Strait is mobile floe ice, the waters between Little and Big Diomede Islands will typically freeze solid, forming a fixed, stable body of ice 6 to 10 feet thick (Cooper 2006).

During the months of open water, stormy conditions affecting wave height are common. Waves less than 2 feet in height occur only 2 to 3 days per month. The significant wave height for a 50-year storm is estimated to be 11.5 feet, with major storms coming from either the north or the south. The lack of shallows or protective shoals around the island leaves its shoreline vulnerable to the brunt of Bering Sea storms.

The Corps' hydraulic design (Ginter 2012) studied the wave environment at Little Diomede. The average wave climate in the area of the Diomede Islands is dominated by waves from the north and from the south. Wave heights between 0.3 to 3.2 feet dominate the wave climate in June and July. By August the climate is fairly evenly split between the north and south for all wave heights evaluated, and by September and October the wave dominance has switched to the north along with an increase in the percentage of occurrence of the larger waves (3.3 to 6.6 feet).

3.2.6 Water Quality

Little direct information exists on general water quality at Little Diomede Island. There is a prevailing northerly flow of ocean water through the Bering Straits, which is readily apparent as a strong current in the pass between Little Diomede and Big Diomede islands. This rapid movement of water, and the lack of protected bays or coves along the Little Diomede coastline, suggests that the water quality in the Little Diomede near-shore waters probably reflects that of the Bering Sea in general, with little opportunity for localized degradation of coastal water through oxygen depletion or sedimentation. This is supported by physical measurements, such as salinity, collected at Little Diomede as part of regional studies of Bering Sea conditions (Cooper 2006). Current practices of disposing of solid waste in near-shore waters might lead to localized degradation under certain circumstances. The coastal waters are not known to have been evaluated against State of Alaska water quality standards (ADEC 2009).

3.3 Significant Resources

3.3.1 Terrestrial Habitat

The terrestrial habitat on Little Diomede Island consists largely of boulder fields, cliffs, and rocky spires. Vegetation is limited to a very low mat of mosses, grasses, and forbs growing amongst the exposed boulders and rock outcroppings (figure 3-3). Locally significant species include salmonberry (*Rubus spectibilis*), Eskimo potato (probably *Claytonia tuberosa*), and edible forbs (referred to generally as "greens") identified as brook saxifrage (*Saxifraga punctata*), mountain sorrel (*Oxyria digna*), and sourdock (*Rumex arcticus*; Jarvenpa and Brumback 2006). Most boulders are heavily encrusted with lichens.

Figure 3-3. Typical boulder-field vegetation.

As discussed in subsequent sections, nesting seabirds are the dominant animal life using the Little Diomede terrestrial habitat. Arctic fox are the only mammal known to regularly use the island's interior, and they are presumably present mostly in spring and summer, drawn by the abundance of eggs and ground-nesting birds.

3.3.2 Marine Habitat

Large boulders and cobbles characterize the shoreline, intertidal, and near-shore habitat. The formation and movement of sea-ice strongly affects this habitat, and limits the colonization of rock faces as deep as 10 feet below the surface. No vegetation is present along the boulder-covered shoreline. Offshore, marine algae are able to grow amongst the boulders where they are sheltered against the worst of the local currents. An underwater video survey in 2007 showed short tufts of a dark filamentous algae growing on the sides of submerged boulders and bladed kelp (*Laminaria* sp.) emerging from gaps between the boulders (figure 3-4). At depths where the boulders are not subject to ice-scouring, they support dense growths of anemones and other epilithic organisms. As the distance from the shoreline increases, flat patches of sand or pulverized shell appear amongst the boulders, and broad areas of sand are present several hundred feet offshore.

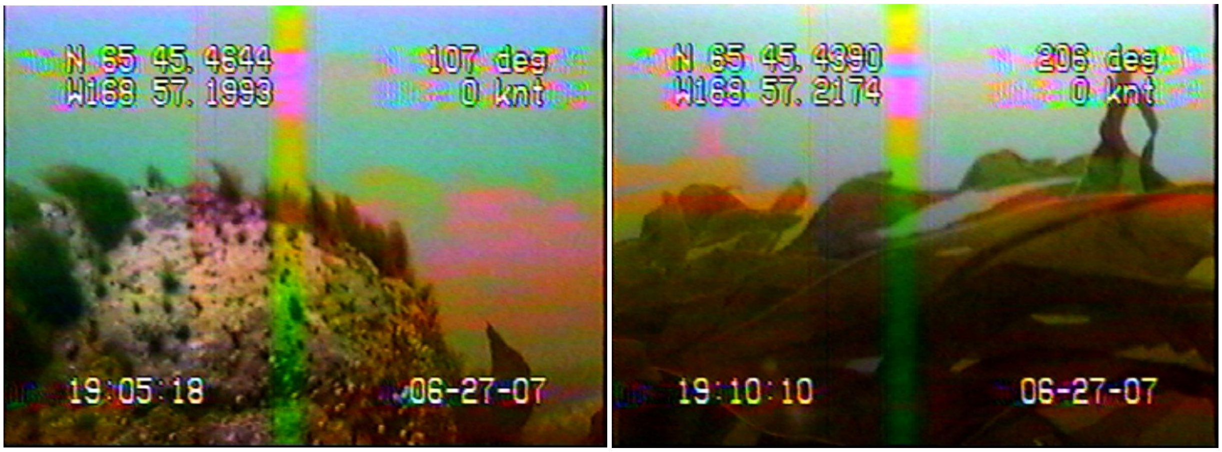

Figure 3-4. Screen-shots from the June 2007 underwater videos, showing typical near-shore marine algae.

3.3.3 Intertidal and Subtidal Biota

The intertidal zone at Little Diomede Island is narrow and sparsely inhabited. Shoreline boulders and cobbles are subjected to ice-scouring and severe temperatures much of the year, which discourages multi-year growth. A Corps survey in 2007 noted only a few *Littorina* marine snails and very small barnacles occupying the shoreline boulders in the intertidal zone.

The marine environment just offshore of Diomede was assessed by Alaska Department of Transportation and Public Facilities (DOTPF) geologist Hal Livingston during dives made in 1990 and 1991 (McIntosh 1992). Livingston described the bottom as consisting of several layers of coarse cobbles and boulders, up to 15 feet in diameter, nested on one another with small materials absent between the boulders. One exception was a 20-foot-diameter area composed of pulverized barnacle shells. Kelp and barnacles were common on all boulders to a depth of 40 feet, the maximum depth of his dive. Kelp holdfasts were rooted in the barnacles and occasionally in mussels that covered the boulders. All boulders in waters shallower than 30 feet had been scraped clear of epilithic organisms on their topmost surfaces by ice keels of the pressure ridges in sea ice. Marine organisms observed during Livingston's 1990 and 1991 dives are listed in Table 3-1

Corps of Engineers biologists conducted a survey with a surface-operated underwater video camera in June 2007. Swift currents and equipment limitations prevented observations as detailed as the 1990 and 1991 surveys, but the 2007 videos covered a broader area and essentially corroborated observations on environment and biota from the 1990-1991 dive surveys. One of the more complete underwater video transects began in 8 feet of water about 40 feet offshore of the village boat slip. The bottom initially consisted of large boulders encrusted with tufts of a green filamentous algae, small barnacles, and blades of kelp-like algae growing in the crevices. At a depth of approximately 15 feet, a thicker growth of kelp (*Laminara* sp.) appeared with blades long enough to conceal most of the boulders.

Table 3-1. Summary of Marine Fauna Observed near Diomede, 1990-1991

Major Taxa Observed	Scientific Name(s)	General Description
Cnidarians:		
- Hydrozoa	Family *Sertularidae*	Multibranched hydroid attached to boulders.
- Scyphozoa	*Cyanea capillata*	Jellyfish.
- Anthoza	*Meretridium senile*	Sea anemone (tall stalked).
- Anthoza	*Cribrinopsis fernaldi*	Sea anemone (squat, multi-colored to 10 in).
Platyhelminthes:		
- Turbellaria	Order *Polycladia*	Marine flatworm.
Mollusks		
- Polyplacophora	*Tunicella insignis*	Chiton.
- Gastropoda	*Lunatia lewisii*	Marine snail, 1 in.
- Gatropoda	*Succiunum* spp.	Marine snail.
- Bivalvia	*Modiolus modiolus*	Horse mussel, 3-5 in.
Annelids:		
- Polychaeta	*Pectinaria granulata*	Conical sand-tube constructing marine worms, 1 in.
Crustaceans:		
- Malacostraca	Superfamily *Paguroidea*	Hermit crabs, small.
- Malacostraca	*Temessus chiragonus*	Crab.
- Cirripedia	Unidentified	Barnacles, small, found near-shore.
- Cirripedia	Unidentified	Barnacles, large, deep-water.
Echinoderms:		
- Echinoidea	*Strongylocentrotus franciscanus*	Green sea urchin, 2 in.
- Asteroidea	*Henricia sanginolenta* (?)	Seastar, five-armed, 6-8 in.
Osteichthyes:		
- Unidentified	Unidentified	Unidentified silvery fish, 1-2 in., in large schools.
- Cottidae	*Hemilepidotus hemilepidotus*	Red Irish lord, 12 in.

Adapted from McIntosh 1992.

The first anemones (*Meretridium senile*) appeared as the kelp began to thin out at a depth of approximately 22 feet. By 31 feet in depth, large numbers of squat, pale anemones (*Urticina* sp.; figure 3-5) could be seen on the boulders, along with a few *Evasterias* sea stars, *Meretridium* anemones, dense barnacles, and sparse patches of kelp. The sea floor began transitioning to a pale, flat sandy or silty bottom with scattered boulders at a depth of around 57 feet. A large crab, perhaps a lithodid, was seen at a depth of 63 feet; this was the only crab observed on any of the transects. The widely spaced boulders were still colonized by *Meretridium* and other anemones, and a large gastropod (resembling *Calliostoma* sp.; figure 3-5) was visible on a cobble. At a depth of 82 feet, the bottom was flat and shelly, with no boulders visible. The transect ended at a distance of 1,420 feet from shore at a depth of 82 feet (Floyd and Hoffman 2007).

As part of the 2007 survey, the Corps attempted to collect sediment samples from a broad sandy area about 700 feet southeast of the helipad. The small hand-operated dredge performed poorly in the strong current, but one sample contained numerous small bivalve shells, probably from *Hiatella arctica*, and pectinariid polychaetes. The pectinariids had constructed their characteristic conical tubes with grains of reddish sand. Another sample contained a few small live bivalves (*Macoma* sp.), a number of different small motile polychaetes, a possible sedentary polychaete in a long, thin leathery tube (too badly damaged to identify), and bluish weathered shell fragments from a species of large barnacle (Floyd and Hoffman 2007).

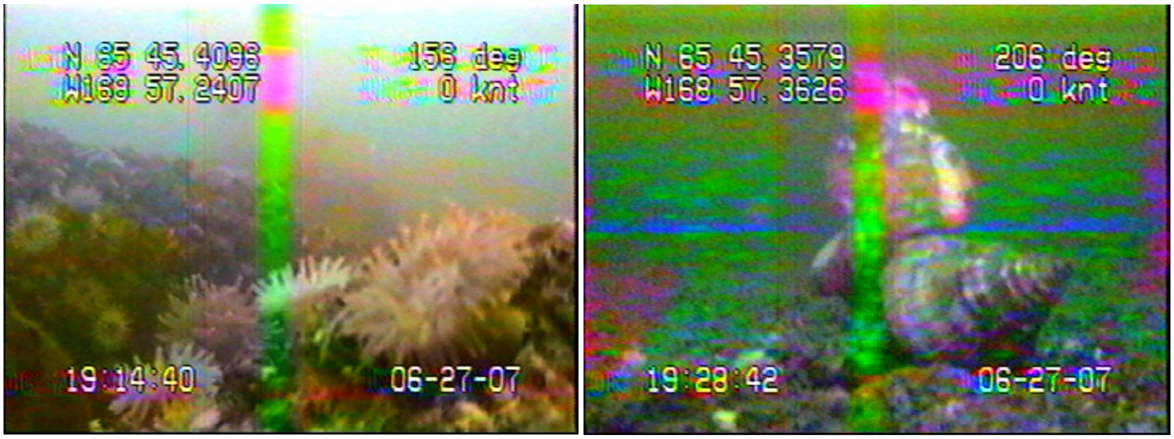

Figure 3-5. Screen-shots from the June 2007 underwater videos, showing anemone-encrusted boulders (left), and a large gastropod on a sandy seafloor (right).

Other marine organisms known or believed likely to be present in Little Diomede near-shore waters include blue king crab *(Paralithodes platypus)*, tanner crab *(Chionoecetes opilio)*, mysid shrimp *(Mysis* spp.), capelin *(Mallotus villosus)*, Pacific herring *(Clupea harengus pallasi)*, Pacific cod *(Gadus macrocephalus)*, Arctic cod *(Boreogadus saida)*, saffron cod *(Eleginus gracilis)*, and Pacific sand lance *(Ammodytes hexaptera.* Approximately 300 species of fish are found in the Bering Sea and may be expected around the Diomede Islands. Bering Sea fishes have two distinct groups, those indigenous to cold arctic water temperatures and found in the northern Bering Sea, and the subarctic Pacific group, which is dominant throughout most of the Bering Sea (McIntosh 1992).

3.3.4 Birds

A survey of birds at Little Diomede Island between May 29 and August 28, 1991 found a total of 31 species (summarized in table 3-2). A number of additional species, such as the black guillemot (*Cepphus grylle*), sandhill crane (*Grus canadensis*), and snowy owl (*Nyctea scandiaca*) have been reported in the local subsistence take and may nest or be present on the island during various times of the year.

The steep boulder-studded slopes, rocky cliffs, rich surrounding waters, and relatively low predator pressure at Little Diomede Island create important breeding habitat for millions of seabirds, including auklets, kittiwakes, puffins, murres, and cormorants. The U.S. Fish and Wildlife Service (USFWS) publication "Catalog of Alaskan Seabird Colonies" (Sowls 1978) lists 13 species of seabirds as nesting at Little Diomede. The island is the site of the largest

Table 3- 2. Birds observed near the project site on Little Diomede, 1991

Taxa of Species Observed	Common Name	Spring	Summer	Fall	Frequency	Observed

						Nesting?
Procellariidae: - *Fulmarus glacialis*	northern fulmar	●			?	No
Phalacrocoracidae: - *Phalacrocorax pelagicus*	pelagic cormorant	●	●	●	C	Yes
Anatidae: - *Somateria mollissima*	common eider	●			?	No
- *S. spectabilis*	king eider	●			?	No
- *Histrionicus histrionicus*	harlequin duck	●			?	No
- *Clangula hyemalis*	long-tailed duck	●			?	No
- *Mergus serrator*	red-breasted merganser	●			?	No
Falconidae: - *Falco peregrinus*	peregrine falcon	●	●	●	U	Yes
Scolopacidae: - *Calidris mauri*	western sandpiper			●	?	No
- *C. melanotos*	pectoral sandpiper			●	?	No
- *C. alpine*	dunlin	●			?	No
Laridae: - *Larus hyperboreus*	glaucous gull	●	●	●	C	Yes
- *Rissa tridactyla*	black-legged kittiwake	●	●	●	C	Yes
Alcidae: - *Alle alle*	dovekie	●	●	●	U	Probable but unconfirmed in 1991 and 2007
- *Uria aalge*	common murre	●	●	●	C	Yes
-*U. lomvia*	thick-billed murre	●	●	●	C	Yes
- *Cepphus columba*	pigeon guillemot	●	●	●	C	Yes
-*Cyclorrhynchus psittacula*	parakeet auklet	●	●	●	C	Yes
- *Aethia pusilla*	least auklet	●	●	●	C	Yes
- *A. cristatella*	crested auklet	●	●	●	C	Yes
- *Fratercula cirrhata*	tufted puffin	●	●	●	C	Yes
- *F. corniculata*	horned puffin	●	●	●	C	Yes
Corvidae: - *Corvus corax*	raven	●	●	●	C	Yes
Muscicapidae: - *Phylloscopus borealis*	arctic warbler	●	●	●	U	Yes
- *Oenanthe oenanthe*	northern wheatear	●	●	●	U	Yes
Motacillidae: - *Motacilla flava*	yellow wagtail	●	●	●	?	No
- *M. alba*	white wagtail	●	●	●	?	No
- *Anthus cervinus*	red-throated pipit	●	●	●	C	Yes
Ernberizidae: - *Calcarius lapponicus*	Lapland longspur	●	●	●	C	Yes
- *Plectrophenax nivalis*	snow bunting	●	●	●	C	Yes
Fringillidae: - *Carduelis* spp.	redpoll	●	●	●	U	Yes

Adapted from McIntosh 1992
Frequency of occurrence: C = Common; U = Uncommon; ? - Unknown.

colony of black-legged kittywakes *(Rissa tridactyla)* in the northern Bering Sea and hosts the largest population of auklets in Alaska. It may also be the only nesting area of the dovkie (*Alle alle*) within the United States (McIntosh 1992).

Least auklets *(Aethia pusilla;*figure 3-6*)* and crested auklets *(A. cristatella)* nest under boulders on the talus-covered slopes, while parakeet auklets *(Cyclorrhynchus psittacula)* and puffins *(Fratercula* spp.) dig burrows in the vegetated slopes or nest in rock crevices. The steep cliffs provide excellent nesting conditions for cliff-nesting birds such as murres *(Uria* spp.), black-legged kittiwakes, and pelagic cormorants *(Phalacrocorax pelagicus).*

Figure 3-6. A swarm of auklets (right), and least auklets perched on a boulder (June 2007).

Seabird use of Little Diomede Island is seasonal. Migration to the island begins with the breakup of sea ice in April and continues until mid-June. Common (*Uria aalge*) and thick-billed (*Uria lomvia*) murres, black-legged kittywakes, and pigeon guillemots (*Cepphus columba*) have been reported offshore by the end of May, but the birds may not begin congregating on the island slopes until June. Auklet species may appear by mid-May and start exploring the island slopes by the end of May.

The timing of egg-laying on Little Diomede Island depends upon the pace of ice breakup and the availability of food, and by the availability of nest sites, which may vary from year to year due to snow cover. A 1991 field study of seabirds at Little Diomede Island (Fowler 1991) estimated a median egg-laying date of July 9 for crested auklets and July 4 for least auklets. The first black-legged kittiwake and murre eggs may be seen on cliffs by the end of June. The first black-legged kittiwake chicks were observed on Little Diomede Island cliffs on July 24; the first murre chicks were seen on July 31. The median hatch date was estimated to be August 11 for crested auklets and August 4 for least auklets. Murre chicks appeared to fledge around August 20, and adult murres were observed escorting young off the cliffs on the evening of August 27.

Based upon median nestling periods of 29 and 33 days for crested and least auklets, respectively, Fowler (1991) estimated the median fledging dates of crested auklets and least auklets to occur on September 13 and September 4, respectively. Black-legged kittiwakes were also thought to fledge by early September (Fowler 1991, McIntosh 1992).

The USFWS and the Corps conducted an additional bird survey in June 2007, with the specific goal of observing bird behavior during geotechnical seismic testing at two proposed quarry sites. The 2007 survey was a qualitative assessment of bird distribution and habitat based on foot surveys conducted at two elevations through each potential quarry area and during seismic monitoring efforts. As expected, in both the north and south quarry areas, auklet density was greatest on rocky substrates and lowest in vegetated areas, with very few birds observed in grassy areas. Smaller patches of boulders surrounded by vegetation appeared to be used more by least auklets, where rocks were small, and by parakeet auklets, where rocks were larger. In general, the amount of rocky substrate and, therefore, the number of auklets, was higher at the southern quarry site. The small (one-third pound) seismic charges created dramatic flushes of birds from the island slopes. In one observation, 10,000 or more auklets, probably all or most birds within 500 meters of the blast, left the slope in response to the detonation. Some returned to the slope almost immediately after the blast, although most appeared to have returned within 3 to 4 minutes, and after 10 minutes, activity levels appeared similar to pre-blast conditions. At another location, an observer noted that gulls and puffins were also flushed from lower slopes and rocky shoreline areas by the blasts. The puffins began returning to the slope within 1 to 3 minutes after the blast, but the kittiwakes and gulls flew 300 to 500 meters offshore and landed on the water, where they remained until after the second blast. They did not return to the island for at least a half-hour after the second blast (Zelenak 2007).

Boat surveys also indicated that more birds used the lower slope and shoreline of the south quarry site than the north (150 to 200 pigeon guillemots and 120 to 140 black-legged kittiwakes at the south site versus 5 guillemots and 5 to 15 kittiwakes at the north site). Kittiwakes were associated with the southern end of the south quarry area, in proximity to the cliffs just to the south of the quarry area. Smaller numbers of horned and tufted puffins and pelagic cormorants also were observed near the south end of the southern quarry site, and several common murres were observed on or over the water adjacent to the north quarry site.

3.3.5 Mammals

The Bering Strait provides the only passage for several marine mammal species that migrate between the Bering Sea and the Chukchi and Beaufort Seas. The concentration of nutrients and shallow depths within the Bering Strait provide unusually abundant, diverse, and accessible populations of marine invertebrates and fish for marine mammals to feed upon. Table 3-3 lists marine mammals known to appear around Little Diomede Island. Many of these species are considered endangered or threatened, and are discussed further in a subsequent section. Other species include the gray *(Eschrichtius robustus),* sei *(Balaenoptera borealis),* minke *(B.acutorostrata),* and beluga whales *(Delphinapterus leucas);* the Pacific walrus *(Odobenus rosmarus);* and several seals, including the ringed *(Phoca hispida),* spotted *(P. largha),* and bearded *(Erignathus barbatus),* also occur near Little Diomede. Gray whales commonly occur in the vicinity throughout the spring, summer, and fall months. Little Diomede Island is a known haul-out area for concentrations of Pacific walrus (McIntosh 1992).

Table 3-3. Marine mammals in the vicinity of Little Diomede Island

Scientific Name	Common Name	Spring	Summer	Fall	Winter	Frequency$_b$
Order: Cetacea						
Family: Balaenidae - *Balaena mysticetus*	bowhead	●		●		C
Family: Balaenopteridae - *Balaenoptera musculus*	blue whale		●			R
-*B.* physalus	fin whale		●			U
-*B. borealis*	sei whale		●			U
-*B. acutorostrata*	minke whale		●			U
-*Megaptera novaeangliae*	humpback whale		●			U
Family: Eschrichtiidae - *Eschrichtius robustus*	gray whale	●	●	●		C
Family: Monodontidae - *Delphinapterus leucas*	beluga	●		●		C
Family: Delphinidae - *Orcinus* orca	killer whale		●	●		C
Family: Phocoenidae - *Phocoena phocoena*	harbor porpoise		●			U
Order: Pinnipedia						
Family: Phocidae -*Phoca hispida*	ringed seal	●	●	●	●	C
- *P. fasciata*	ribbon seal		●	●		U
- *P. largha*	spotted seal		●	●		C
-*Erignathus barbatus*	bearded seal	●	●	●	●	C
Family: Otariidae -*Eumetopias jubatus*	Steller sea lion	●	●			U
Family: Odobenidae *Odobenus rosmarus*	Pacific walrus	●	●	●		C
Order: Carnivora						
Family: Ursidae *Ursus maritimus*	polar bear	●			●	C

Adapted from McIntosh 1992.
Frequency: C = Common; U = Uncommon; R = Rare

The only terrestrial mammal known to occur on Little Diomede is the arctic fox *(Alopex lagopus),* which is known to roam the sea ice many miles from shore. This small fox is an efficient predator on the eggs and young of seabirds (ADFG 2010).

3.3.6 Threatened and Endangered Species and Critical Habitat

On May 14, 2008, the polar bear *(Ursus maritimus)* was listed as threatened under the Endangered Species Act (ESA). Polar bears occur in the vicinity of and have denned on Little Diomede Island (McIntosh 1992). Critical habitat was designated for polar bears on November 24, 2010. At Diomede, critical habitat includes the island itself, a 1-mile "no disturbance zone" surrounding the island, as well as all sea ice, regardless of seasonal presence, out to the international border.

Little Diomede Island is within the migratory ranges of spectacled eiders (*Somateria fischeri*) and Steller's eiders (*Polysticta stelleri*), both of which are listed as threatened under the ESA. Neither species breeds, molts, or overwinters at Little Diomede, nor are they known to stop-over in the vicinity of the island during migration. Critical habitat is not designated near Diomede for either spectacled or Steller's eiders (McIntosh 1992).

Several endangered species of whales under the jurisdiction of the National Marine Fisheries Service (NMFS) may occur in the waters around the island during certain seasons of the year. These include the bowhead *(Balaena mysticetus),* humpback *(Megaptera novaeangiae),* fin *(Balaenoptera physalus),* and blue whales *(B. musculus).* Bowhead whales can be found in the area during migration from late March to May and from September to December. Humpback, fin, and blue whales may occur in the area from June through September (NMFS 2013a)

Bearded seals (*Erignathus barbatus*) and ringed seals (*Pusa hispida*) in the Arctic Ocean and adjacent Pacific Ocean waters (i.e., the Bering Sea) were listed by the NMFS as threatened under the ESA in December 2012. These "ice seal" species are regarded to be at heightened risk from climate change and changes in sea ice formation and distribution patterns. Critical habitat designations by the NMFS for these species are pending (NMFS 2013b).

The endangered Steller sea lion *(Eumetopias jubatus)* might occasionally be found in the area, but haul-outs and rookeries are not documented on Little Diomede Island, and no critical habitat areas are designated north of St. Lawrence Island, more than 100 miles to the south (NMFS 2013c).

The USFWS listed the Pacific walrus (*Odobenus rosmarus*) as a candidate species under the ESA in February 2011. The status of candidate species under the ESA are reviewed annually, and the USFWS has until October 2017 to propose the Pacific walrus as either threatened or endangered, or to remove it from candidate status The current size of the Pacific Walrus population and its population trends are not known with any certainty: A 2006 aerial survey conducted by the USFWS estimated the population at 129,000, but, due to the difficulties in counting walruses, the confidence of that estimate is low and the possible range in population size is between 55,000 and 507,000. The population is believed to have increased between 1960 and 1980, and may have reached their environment's carrying capacity. By the 1990s, the population was believed to be stable or declining, and current trends are unclear but appear to be downward (ADFG 2013). Walrus need to haul out of the ocean onto ice or shore more frequently than seals, and the USFWS believes that this makes walrus more vulnerable to the loss of sea ice through climate change (USFWS 2011a, 2011b). Walrus in the Bering Straits region are co-managed by the USFWS and the Eskimo Walrus Commission (EWC; Kawerak 2013). The EWC was established in 1978 to represent coastal walrus hunting communities in Alaska, and has a cooperative management agreement with the USFWS for the conservation and management of walrus. The Alaska Department of Fish and Game (ADFG) and the U.S. Geological Survey (USGS) also participate in walrus research and management efforts (ADFG 2013).

3.3.7 Essential Fish Habitat

The National Marine Fisheries Service designated the waters surrounding Little Diomede Island as essential fish habitat (EFH) for "snow crab" (*Chionoecetes* spp.) and saffron cod (*Eleginus gracilis*; NOAA 2013d).

There are no Habitat Areas of Particular Concern (HAPC) near Little Diomede. The nearest HAPC is at Bower's Ridge in the Bering Sea, more than 700 nautical miles southwest of Little Diomede. The island falls within the areas of both the Arctic Fisheries Management Plan and Crab Management Plan (NOAA 2013d).

3.3.8 Special Aquatic Sites

The U.S. Environmental Protection Agency (EPA) identifies six categories of special aquatic sites in their Clean Water Act Section 404 (b)(i) guidelines: Sanctuaries and refuges, wetlands, mudflats, vegetated shallows, coral reefs, and riffle and pool complexes. None of these categories appear to exist at the Little Diomede Island project site.

3.3.9 Wetlands

Little Diomede Island is not known to have been formally evaluated for wetlands; however, the steep slopes, very coarse substrate, and lack of vegetation along the island shoreline strongly suggest conditions that are unsuitable for the development of typical wetland soils or plant communities in the project area.

3.3.10 Archaeological and Historical Resources

Human use of Little Diomede Island goes back several thousand years, and its location in the center of the Beringia region between Asia and North America suggests that it may have been occupied continuously by several successive cultures as a hunting and trading center. Contact with European explorers began as early as 1648. As recently as the mid-1800s, the village at Little Diomede Island was reportedly located on a long sand or gravel spit extending westward toward Big Diomede Island; the rocky reef just off the village is presumably a remnant of this feature. Burials at that time were performed on Little Diomede Island about where the current village is situated. As the spit eroded away or was otherwise submerged, the village moved to the rocky rim of the island (Potter 2002).

The Corps' 2007 underwater video survey at Little Diomede included an examination of the near-shore reef area, looking for any evidence of past habitation. No such evidence was found. The reef area surveyed consisted of large tumbled boulders indistinguishable from the rest of the Little Diomede near-shore environment. The video survey of the reef did spot a large timber projecting up from between the boulders. However, the timber appeared to be a weathered remnant of dimensional lumber and was located in waters shallow enough that sea ice should have sheared it off; therefore, the timber was reasoned to have been somehow wedged in the boulders since the previous winter and not associated with the old village site (Floyd and Hoffman 2007).

The Alaska Heritage Resources Survey (AHRS) identifies the broader prehistoric and historic village site at Little Diomede as TEL-00014 (or 3330-6 Ignaluk). This site covers all prehistoric and historic cultural features and artifacts in the vicinity of the present-day village and extends to any offshore features that may remain on the submerged reef (Potter 2003; figure 3-8). Cultural deposits, including middens, caches, and former dwelling sites, have been excavated in the village and are believed to be scattered through the general village area, reflecting its many centuries of occupation. Artifacts and human remains are occasionally found on the surface, having eroded out of the soil or been exposed by construction work or other activities (Potter 2002). The State Historic Preservation Officer (SHPO) determined this site to be eligible for inclusion in the National Register of Historic Places (NRHP) in 2003.

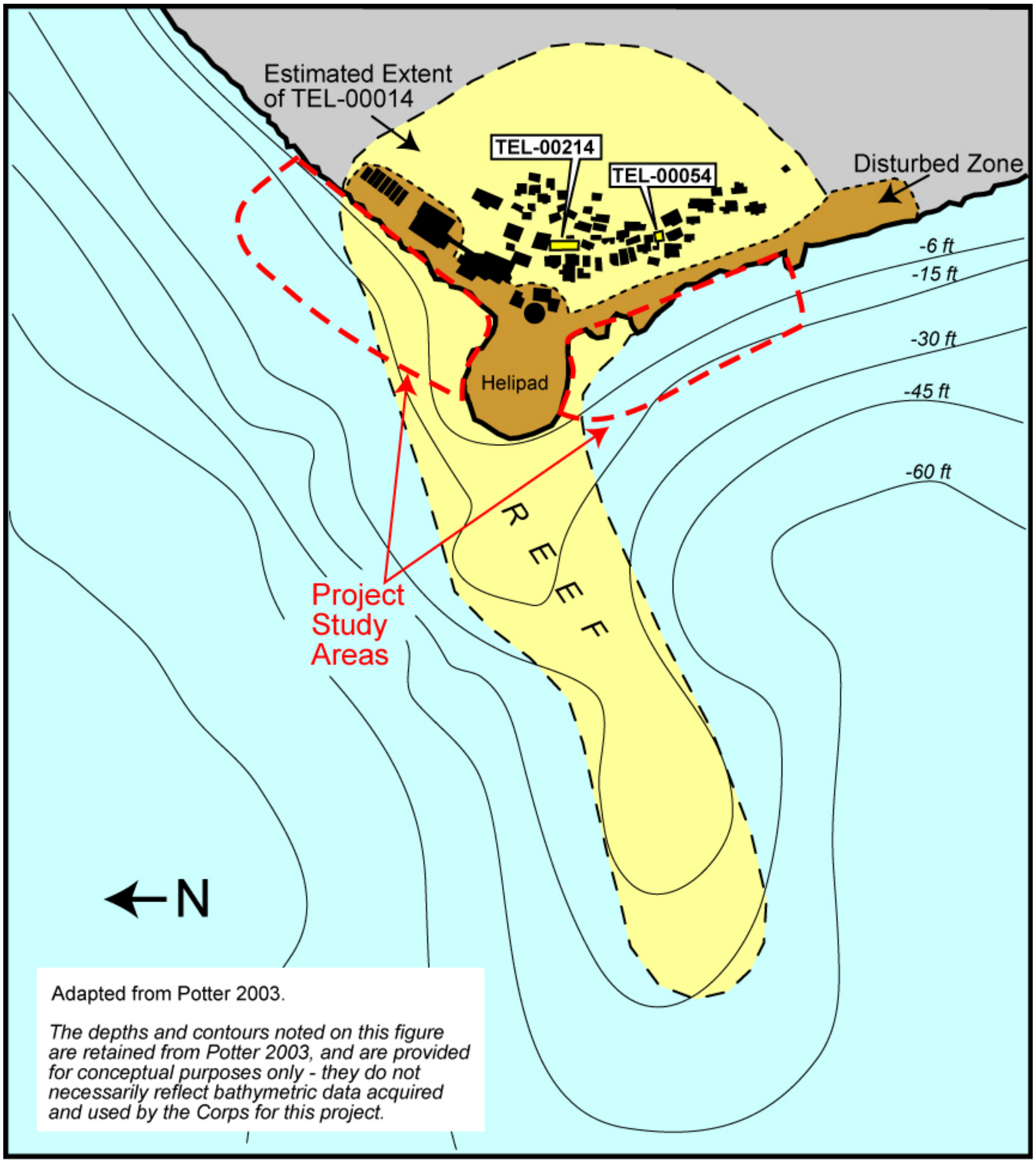

Figure 3-7. Prehistoric and historic village site at Little Diomede

Much of the coarse shoreline material within TEL-00014 has been disturbed by construction of the school, helipad, and other infrastructure. Portions of the shoreline south of the helipad are occasionally reworked with heavy machinery to repair storm erosion and provide relatively level areas for storage and barge off-loading. Potter (2003) delineated an area of TEL-00014 (figure 3-7) in which the ground has been sufficiently disturbed or covered by extraneous materials that future surface disturbances are unlikely to adversely affect undiscovered cultural resources.

Most other AHRS-cataloged features are historic structures within the TEL-00014 area. These include the remains of a traditional semi-subterranean house called a *kugeri* (TEL-00054) located in the village. The upper part of this structure was demolished in 1996, but subsurface portions are believed to remain, and the site is eligible for inclusion in the NRHP. Another eligible building in the village is the Federal Scout Readiness Center (TEL-00214), built in 1960 as a military observation post and still in use. Several other structures in the village have been cataloged in the AHRS, but were determined to be not eligible for inclusion in the NRHP.

3.3.11 Subsistence Activities

The residents of Diomede continue a heavy reliance on subsistence. Major subsistence resources include walrus, seals, whales, and seabirds. Walrus are a principle target species that provide large quantities of meat, as well as skins for the traditional open boats (*umiaks*), and ivory for handicrafts. Migrating walrus are hunted from boats along the sea ice edge in spring and fall. In May and June, females and sub-adults migrate north with the receding sea ice past the Diomede Islands. In October and November, the migration reverses as walrus follow the ice edge south. Depending on weather, sea, and ice conditions, the opportunities for a successful hunt during a given migration period may be limited. Heavy surf at the Little Diomede landing site may keep hunters from launching their boats or make it difficult and dangerous to come ashore. The number of walrus harvested each year has been variable over the last several decades, ranging from 532 in 1991 to 8 in 2011. In general, the annual harvest at Diomede appears to be trending downward. It is unknown if this is due to lower numbers of walrus available, less frequent hunting opportunities, or other variables (Richardson 2012).

Ice seals such as bearded, spotted, and ringed are also hunted along the ice edge, as well as from the shore of Little Diomede Island (figure 3-8). A small number of beluga whales are taken, probably from boats during the whales' migration through the Bering Strait (Magdanz 1981; Campbell 2008).

The villagers harvest both meat and eggs from the extensive seabird colonies on Little Diomede. Eggs are collected from nests on the talus slopes and accessible cliffs for a relatively brief period lasting about 7 to 10 days; eggs are not collected once the embryo starts to form. The larger murre eggs are preferred, but eggs from auklets, puffins, cormorants, kittiwakes, and guillemots are also collected. Adult birds, particularly auklets, are caught in long handled nets by hunters concealed in stonework "bird blinds" built along trails traversing the steep slopes (Campbell 2008).

Most fishing and crabbing takes place in the winter and spring through leads in the sea ice offshore of the village (figure 3-8). Most crabs are caught in waters 60 to 100 feet deep, roughly 250 to 300 feet offshore. The villagers once gathered seaweed and caught fish from the shoreline immediately south of the village, but that area is no longer used for subsistence due to concerns about contamination from septic systems and household waste (Campbell 2008).

Villagers gather plant materials during the short growing season, including berries, Eskimo potatoes, Eskimo cabbage, and greens (Campbell 2008).

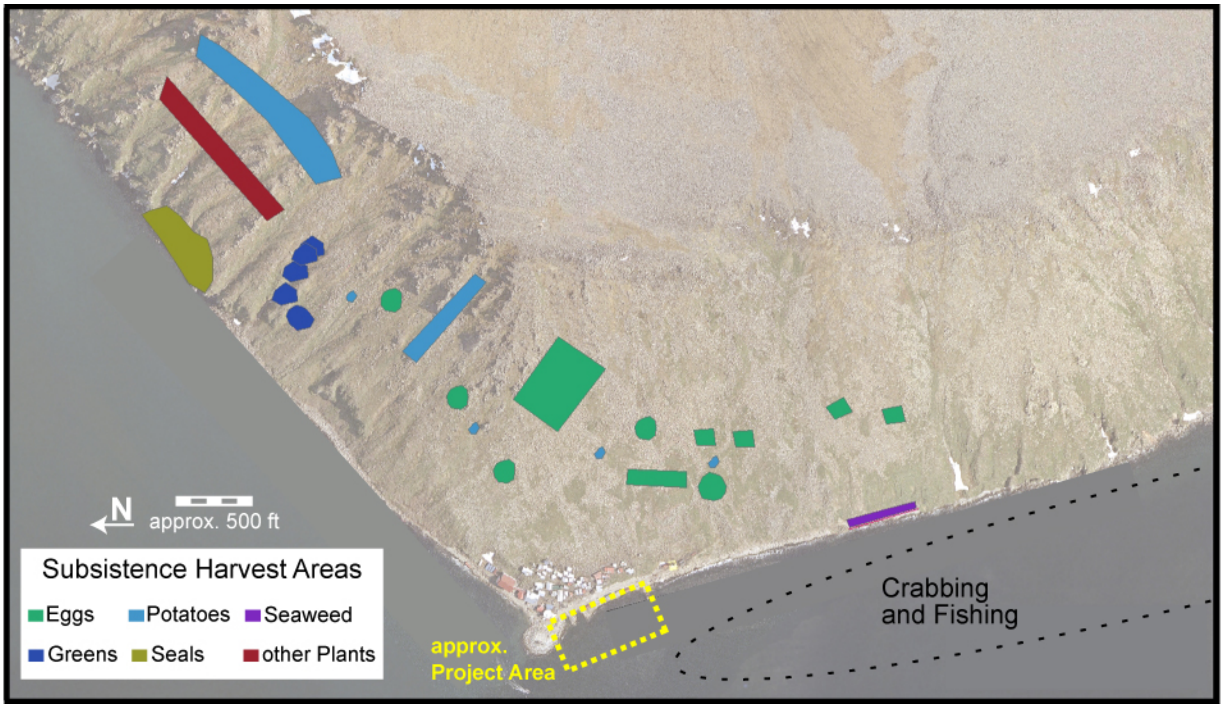

Figure 3-8. Map of subsistence use areas near Diomede village (adapted from Campbell 2008).

4.0 Environmental Consequences

4.1 No-Action Alternative

The no-action alternative would avoid the direct and indirect environmental impacts described below, but would leave in place the current hazards and difficulties in launching and landing small boats or rescue vessels. In addition, the no-action alternative would forgo any potential environmental benefits from a safer vessel landing area, such the reduced risk of fuel spills.

4.2 Design Alternatives

Of the four design alternatives discussed in section 2, the three located south of the helipad (S1, S2, and S3) differ slightly in layout and the size of the filled areas, but all occupy the same general location, would require the same construction practices, and would provide approximately the same degree of improved boat access; therefore, the discussions of consequences below will generally not distinguish between the three southern alternatives. The one alternative located north of the helipad (N1) would have larger breakwaters and require a broader area to be dredged than the south alternatives.

4.3 Effects on Community and Economy

The proposed boat landing area would not significantly change the types of watercraft operated by village residents or the activities for which they are used. The primary consequence would be to increase the number of days local watercraft could be safely launched and retrieved. The alternatives on the south side of the heliport (S1, S2, and S3) would protect against waves from the north, which predominate during the fall hunting season. This may increase subsistence hunting success as a result of providing a safer launch. A 2007 survey of Diomede residents showed a consensus amongst the villagers that a protected launch and landing area would improve subsistence opportunities (Richardson 2012). The use of the boat landing area to bring in a rescue vessel would improve public safety and may allow some medically-vulnerable residents (such as the elderly or pregnant women) to stay in the village longer.

The N1 location appears not to be as convenient to the existing village layout as the southern options and would probably force some changes to patterns of movement and land use in the village. New pathways would have to be established around the school and clinic buildings to access the boat launch and the north breakwater storage site. The villagers would need to assess the suitability of the north breakwater as a storage and lay-down area for their boats and equipment.

4.4 Effects on Air Quality and Noise

Air quality may be affected during the construction period due to the use of heavy equipment, near-shore vessel operation, and electrical generators. The Corps believes any poor air quality conditions caused by the project would be transient and highly localized, and would dissipate entirely at the end of the project. The Corps and its contractors would comply with all applicable air quality regulations and policies of the landowner, local authorities, and the State and Federal governments. The project would not provide moorage space for larger vessels nor alter the type of watercraft routinely operated at Diomede.

The construction project would inevitably cause a temporary increase in noise at the village, as the project site is within a few yards of many village homes. Sources of noise would include the operation of heavy machinery on shore, unloading of rock and other materials, work site communications, and possibly blasting of underwater boulders. The Corps and contractors would need to coordinate closely with the village residents to find a balance between the need for an aggressive work schedule (to complete the project within the short construction season) and an acceptable level of disturbance within the community. Construction at the north alternative site would affect the school and other public buildings most immediately, and may create slightly less disturbance for individual homes. On the other hand, construction activities north of the helipad may require more frequent movement of equipment and personnel through or around the village.

4.5 Effects on Geology and Hydrology

None of the proposed small off-shore structures would have any significant effect on local geology, landforms, or surface water flow.

4.6 Effects on Oceanography and Water Quality

The breakwaters would have a small, localized effect on near-shore currents. The existing heliport riprap structure, constructed in 1993, projects directly out into the prevailing northerly current but has caused no evident disruptions to the near-shore environment such as sediment scouring. The proposed breakwaters would not project any farther out into the current than the existing heliport and would presumably not add to the obstruction of the prevailing current.

Dredging, blasting, and placement of rock during construction would cause a temporary increase in levels of suspended sediment in the water column. The local strong ocean currents would disperse the suspended sediments very quickly, but also render ineffective conventional sediment control measures, such as silt curtains.

4.7 Effects on Significant Resources

4.7.1 Effects on Terrestrial Habitat

Direct project impacts on terrestrial biological resources would be very limited. The currently proposed project would not involve upland blasting, quarrying, or removal of rock from the island, and the construction footprint would be almost entirely off-shore. Staging of materials and heavy equipment on shore would be limited by available space to shoreline areas already heavily used by the village for similar activities. Increased noise and activity during construction may conceivably have an impact on nesting seabirds, especially if underwater blasting is required to move submerged boulders. The most disruptive activities may need to be scheduled to avoid the most sensitive periods of the birds' nesting and rearing season.

4.7.2 Effects on Marine Habitat and Near-shore Biota

Construction of the breakwaters and dredging of a boat approach lane would directly impact between 2.4 acres (alternative S2) and 3.6 acres (alternative N1) of existing shoreline and near-shore environment. Creation of the breakwaters would permanently alter the marine environment where the breakwaters were laid down. However, since that environment currently consists essentially of an expanse of large rocks, the addition of the breakwater structures would not represent a major change in habitat type. The Corps has observed that new rock breakwaters in other Bering Sea locations, such as St. Paul, Unalaska, and False Pass, have recolonized rapidly with marine algae and epilithic invertebrates, following a succession very similar to what would be expected on a naturally-occurring rock surface. The existing submerged boulders show signs of having been tumbled and weathered by wave action and ice, which presumably limits the amount of multi-year growth that the boulders can sustain. The greater stability of the breakwaters and the localized areas of reduced current velocity and wave action may encourage localized areas of greater diversity and productivity in the near-shore ecology.

Material would be dredged from a relatively small area, 0.2 to 0.7 acre, of shoreline and near-shore habitat to create a safe approach path for small vessels. This modified area may consist of finer material (smaller cobbles or gravel) than the surrounding boulders, especially if explosives were used to break apart subsurface boulders or bedrock outcroppings. Modification of this limited area would not represent a significant loss of habitat, as little marine life is able to thrive along the ice-scoured shoreline.

4.7.3 Effects on Birds

The Corps has consulted with the USFWS on previously proposed navigation projects at Diomede under the Fish and Wildlife Coordination Act (FWCA). The USFWS produced a FWCA report in 1992 and a Planning Aid Letter (PAL) in 2008. Both documents were primarily concerned with the potential effects of upland blasting and quarrying (an activity that is no longer under consideration) on nesting seabirds. However, the USFWS has recently identified the following potential impacts to birds that apply to the currently proposed project (Boldenow 2012):

Invasive Species. The most serious potential indirect effect would be the introduction of invasive species, particularly rats, to Little Diomede Island, brought in either on vessels directly involved in project construction or on vessels able to visit the island with greater frequency in the future due to improved landing conditions. Introduced rats have had devastating effects on seabird populations at other Alaska islands, especially on smaller burrow-nesting species such as auklets. Studies of rat-seabird interactions on Kiska Island in the Aleutians have found food caches created by rats containing the remains of up to 148 auklets, and rat predation is thought to contribute to the greatly depressed auklet breeding success rates observed at Kiska Island (Frits 2007). The large auklet population on Little Diomede Island would be especially vulnerable to the introduction of rats, given the lack of predators that might limit the rat population, and the absence of a port facility at which to implement rat interdiction measures.

While it is debatable whether rats could survive the severe winters at Little Diomede Island, their chances of survival could increase if the winters become milder due to climate change. Rats have formed a breeding population at nearby Nome (Frits 2007), which is the primary transshipping point for goods headed to Diomede. At Nome, rats presumably cohabitate with humans and find enough to eat year round in human garbage and food supplies. Similarly, rats at Little Diomede Island could conceivably find refuge in homes and other structures in the village, and thus be able to overwinter on the island.

Little Diomede Island has been thus far protected from rat infestation in part because large vessels land there so infrequently. During the construction project, the Corps would require its contractors to observe appropriate measures to avoid transporting rats to the island on project vessels, as promoted by State and Federal agencies (Frits 2007, AMNWR 2008, AMNWR, *et al* 2011). Such measures may include setting traps and bait boxes onboard vessels en route to Little Diomede Island as well as in any storage containers brought on shore, and educating the ship's crew and passengers. Once construction was complete, it would fall to local and regional authorities to assess the "rat-fall" risk posed by any increase in vessel traffic to the island and to implement suitable policies.

The risk of introducing other invasive species, such as noxious weeds, could be minimized by ensuring that the contractor's construction equipment is as clean as possible before landing it on the island. The risk of introducing aquatic invasive species via ballast water to the waters surrounding Little Diomede Island during construction is low if the barges, tugs, or landing craft used are ones typically plying the Bering Sea. Construction vessels brought in from outside the Bering Sea could be required to change out ballast water away from shore. The proposed project would not accommodate deep draft vessels, so the risk from future ballast water discharge as a result of the finished project is low.

Helicopter Disturbance. Helicopter pilots flying the weekly mail delivery to Diomede are acutely aware of the presence of dense flocks of seabirds in the area during the spring and summer months and, when possible, choose a flight path that avoids a close pass by the island's cliffs and minimizes the risk of bird-strikes. Some bird strikes are inevitable; Evergreen Aviation estimates that two bird strikes occurred in 2011 (Varnadoe 2012).

It is difficult to project how much extra helicopter traffic could be expected during construction. The expense of specially-chartered flights, plus the likelihood of weather-delays, suggests that the contractor would not choose to rely on them to move personnel and supplies around with any frequency, but would try to make use of boat transportation or of available space on scheduled helicopter flights as much as possible.

The finished project would not affect the location or usability of the existing helipad, and there is no reason to believe that it would increase the frequency of helicopter flights, post-construction. Improved access for an emergency boat or other medium-sized vessels might reduce the number of medically-related flights or chartered visits.

Solid Waste and Predator Attraction. Seabird predators such as foxes and gulls could potentially be attracted to the project area in greater numbers by improperly stored food or mishandled food waste. The community at Diomede already has a significant challenge in managing its solid waste. The construction project would not be allowed to add to this problem. The contractor would be required to properly dispose of all solid waste, especially food waste, generated by the contractor in the course of the project.

Light Attraction. Seabirds can become attracted to artificial lighting and risk colliding with light-masts, antennae, or other structures. Auklets are particularly susceptible to light attraction (Boldenow 2012). The proposed project does not include any permanent illumination structures. Low-profile navigation beacons may be necessary at the seaward end of the breakwaters, but these are unlikely to create bird attraction or collision issues. If the contractor needs to employ work lights during part of the construction season, the lights would be shielded or otherwise used in a way that minimizes their affect on bird behavior.

Boat Traffic and Fuel Spills. The construction project would temporarily increase vessel activity and bring an increased risk of fuel spills, both at sea and along the shoreline. The contractor would be required to implement safe fuel handling procedures and to have adequate spill kits on hand to manage both marine and on-land releases of fuel and other chemicals.

The finished project would allow the residents of Diomede to launch their small boats more frequently but would not cause a qualitative change in the types of vessels working in the waters off Diomede. Safer launching and landing of boats would lessen the risk of spilled fuel from a damaged or capsized boat.

Loss of Habitat from Filling and Dredging. Corps personnel's observations of seabird behavior in June 2007 suggested that the dense flocks of auklets, murres, and puffins were largely heading out to or returning from feeding areas some distance offshore. The visible oceanic upwelling between Little and Big Diomede Islands, several hundred yards west of the village, seemed a particularly attractive destination. Murres and puffins were occasionally seen rafting near the cliffs north of the village, on the lee side of the reef. In contrast, the waters immediately offshore of the village did not appear to be heavily used by alcids, although gulls were often seen floating near shore. The underwater video surveys in the shallow, turbulent, boulder-strewn waters offshore of the village did not record obvious concentrations of small fish, squid, crustaceans, or other potential prey species. The proposed project would occupy at most about 3.6 acres, and extend a few hundred feet from shore into waters no more than about 30 feet deep. The Corps does not believe the finished product would impinge upon seabird feeding habitat in a significant way.

Use of Underwater Explosive Charges. Given the effects of the small seismic charges observed in 2007 on nesting seabirds (section 3.3.4), as well as the hazards and disruption that explosives use would pose to the community, the potential use of explosives during project construction to break up submerged boulders or rock outcroppings would require careful consideration and coordination. The use of explosives would be limited to the smallest effective charge necessary to yield the desired effect and may be restricted to as late in the construction season as possible, when impacts on nesting seabirds and their offspring would be minimized. The Corps and its contractors would also explore the possibility of dredging (along with any use of explosives) during the winter months.

4.7.4 Effects on Mammals

While marine mammals migrate through the Bering Strait and the waters surrounding Little Diomede Island, none are known to routinely use the near-shore waters immediately off Diomede. Construction of the project should have little direct effect on marine mammal habitat. The low-level noise and activity generated during construction may cause some mammals to avoid the area and use similar adjacent habitat. The potential effects of underwater explosives (if used) on marine mammals are difficult to assess, as the location, depth, and size of charge would be determined by conditions encountered during construction. Dredging would typically take place after the breakwaters were constructed, so the effects of any underwater detonation would be somewhat confined by the stone breakwaters.

The finished project would not alter the type of watercraft used by the villagers for hunting but should allow an increase in the number of safe boat launches in a given season. In principle, this should translate into proportionately greater hunting success and potentially greater hunting pressure on seals, walrus, and other prey. However, because of the high number of variables involved in a successful hunt, it is not possible to meaningfully quantify the potential increase in the number of animals taken. The number of walrus taken by Little Diomede hunters, for example, appears to have been on a downward trend (Section 3.3.11), but it is unclear whether this is due to decreased hunting participation or opportunity, reduced walrus population, changes in ice movement patterns making fewer walruses available, more frequent poor weather, or other factors or combination of factors.

The construction project would temporarily increase vessel activity and bring an increased risk of fuel spills both at sea and along the shoreline. The contractor would be required to implement safe fuel handling procedures and to have adequate spill kits on hand to manage both marine and on-land releases of fuel and other chemicals. The finished project would allow safer launching and landing of boats, which should lessen the risk of spilled fuel from a damaged or capsized boat.

4.7.5 Effects on Threatened and Endangered Species

The effects of the project on other protected species would be the same as those described for mammals in general in section 4.7.4. The proposed project would occupy a small area immediately adjacent to the existing community that is not believed to contain valuable habitat for any protected species and would not have a direct adverse effect on the widely dispersed marine mammals in question.

The project site is within the range of polar bears, and within both Unit 1 (sea ice) and Unit 3 (barrier island) of critical habitat designated in 2010 (USFWS 2010). Polar bears have been reported to den at Little Diomede Island. Pregnant female polar bears select denning sites on land or on sea-ice in October or November, give birth in December or January, and then escort their cubs out to the edge of the sea ice, where prey species like seals are abundant (USFWS 1994). If some construction activities are carried out in winter to reduce impacts to migratory birds, that construction may overlap the polar bear denning period.

The residents of Diomede are avid subsistence hunters of polar bear and would be likely to take any bear that ventures close enough to the village to be directly affected by construction or the presence of the finished proposed project; however, the USFWS may require the preparation of a Polar Bear Interaction Plan for the project, especially if winter dredging operations are contemplated. The finished project would allow more frequent launching of the small craft used to hunt polar bear along the ice edge, which might in turn lead to marginally greater hunting pressure upon that species.

The Corps received an ESA consultation letter from USFWS on 28 June 2013, in which the USFWS determined that the project is not likely to adversely affect ESA-listed species under USFWS jurisdiction (polar bears, Steller's eiders, and spectacled eiders). The USFWS reasoned that the proposed action could temporarily disturb listed eiders or polar bears, but due to the low densities of these species and the proposed minimization measures, the effects of disturbance would be insignificant.

The USFWS states that current subsistence harvest is not a threat to walrus populations; however, subsistence impacts may need to be re-evaluated if the population is found to be declining, while harvest levels remain steady or increase (USFWS 2012b). When queried specifically about the effects on the proposed Little Diomede project on walrus, USFWS biologist and walrus program supervisor James MacCracken stated that he did not believe that the proposed project would affect the success of walrus hunters, and agreed that other variables beyond increased frequency of boat launches would have a greater influence on walrus take (McCracken 2013).

4.7.6 Effects on Essential Fish Habitat

The National Marine Fisheries Service defines EFH as "those waters and substrate necessary for spawning, breeding, feeding or growth to maturity" for certain aquatic species. The two species with EFH identified in Little Diomede Island waters are saffron cod and snow crab. The NMFS states that insufficient information exists to describe EFH for saffron cod eggs, larvae, and early juveniles. EFH for late juvenile and adult saffron cod is described as "pelagic and epipelagic waters along the coastline, within near-shore bays, and under ice along the inner (0 to 50-meter) shelf throughout Arctic waters and wherever there are substrates consisting of sand and gravel" (NMFS 2005).

Similarly, insufficient information exists to describe EFH for larvae and early juvenile snow crab. EFH for late juveniles and adults is described as "bottom habitats along the inner (0 to 50-meter) and middle (50 to 100-meter) shelf in Arctic waters south of Cape Lisburne, wherever there are substrates consisting mainly of mud." The NMFS presumes the EFH for snow crab eggs is the same as that of adult females (NMFS 2005).

The rocky, ice-scoured near-shore environment that would be occupied by the proposed project does not appear to resemble the essential habitat described by the NMFS for these species. The finished project would not alter the manner in which Diomede residents gather fish or increase harvest of these species. The Corps concludes that the project would not have an adverse impact on EFH.

4.7.7 Effects on Cultural and Historical Resources

The proposed project would have no adverse impact on any known cultural or historic sites at Diomede. While the footprints of the proposed alternatives overlap the boundary of the TEL-0014 site (section 3.3.10 and figure 3-7) to varying degrees, nearly all of that overlap is along shoreline recognized in the TEL-0014 site description as having been heavily modified by past erosion-control and construction activity. No sign of a submerged village site was observed in the proposed project areas during the underwater video survey. The Corps believes a more comprehensive archaeological investigation of the submerged project area, with its boulder-paved surface and powerful currents, is not feasible. The finished project is unlikely to encourage greater visitation to Little Diomede Island and is thus unlikely to contribute to the risk of greater impact to cultural sites. The Corps will seek concurrence on a determination of no adverse effect with the SHPO and will propose that an archaeological monitor be present on site at key points during construction to examine dredged material for evidence of cultural resources and to help identify existing cultural resources for avoidance during construction activities.

4.7.8 Effects on Coastal Zone Resource Management

Alaska's Coastal Zone Management Program expired on 30 June 2011. Project proponents are no longer required to evaluate projects for consistency with enforceable standards of coastal management plans. Those plans do, however, offer useful criteria for evaluating projects in the coastal zone. Diomede is within the Bering Straits Coastal Resource Service Area (CRSA) and covered by the CRSA coastal management plan (Bering Straits CRSA Board 2011). The proposed project is consistent with the approved enforceable policies of that plan:

- Historical and Archaeological Sites: The Corps would coordinate this project with the State Historic Preservation Officer and would consult with local authorities on the identification and protection of historical and archaeological sites. If previously undiscovered artifacts or areas of historic, prehistoric or archaeological importance were encountered during development, the Corps would notify SHPO and local authorities, and protect the site from further disturbance until completion of a resource survey of the project site.
- Coastal Development: For economic as well as environmental reasons, the Corps would seek to minimize the extent of discharge to coastal waters to that necessary for the project.
- Sand and Gravel Extraction and Mining: The project would not involve sand or gravel extraction or mining.
- Energy Facilities: The project would not involve an energy generation facility.

The project is consistent with the coastal management plan's general goals of protecting and prioritizing subsistence and recreation uses, and limiting impacts on coastal resources and processes. If the Alaska Coastal Zone Management Program is reconstituted before construction of this project, the project would be submitted to the State of Alaska for coastal consistency review.

4.7.9 Effects on Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," requires Federal agencies to identify and address any disproportionately high and adverse human health effects of its programs and activities on minority and low-income populations.

Diomede's population is about 96 percent minority (Alaska Native or combination), and 52 percent below the poverty line based on income (ADCRA 2011). However, the proposed protected boat launching area should be an asset to the community that improves coastal resource access for all. The Corps does not foresee that construction of the project would create disproportionate adverse effects on the more vulnerable elements of the community.

4.7.10 Cumulative Effects

Federal law (40 CFR 651.16) requires that NEPA documents assess cumulative effects, which are the impact on the environment resulting from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

No other similar water access projects are known to be in development at Diomede. The proposed project is intended to improve safety for the types of small craft currently in use and allow for landings by a rescue boat, but is not designed to improve access by large craft, such as barges.

4.8 Coordination and Compliance with Environmental Requirements

4.8.1 Relationship to Environmental Laws and Compliance

National Environmental Policy Act (NEPA) of 1969 (42 USC 4341 et seq). This Act requires that environmental consequences and project alternatives be considered before a decision is made to implement a Federal project. NEPA established the requirements for preparation of an Environmental Impact Statement (EIS) for projects potentially having significant environmental impacts and an Environmental Assessment (EA) for projects with no significant environmental impacts. This EA has been prepared to address impacts and propose avoidance and minimization steps for the proposed project, as discussed in the CEQ regulations on implementing NEPA (40 CFR 1500-1508). This document presents sufficient information regarding the generic impacts of the proposed construction activities at the proposed Little Diomede project to guide future studies and is intended to satisfy all NEPA requirements.

In accordance with NEPA and Corps policies, the EA and Finding of No Significant Impact (FONSI) will be circulated for public and agency review, and the EA will be made available on the USACE website to the interested public prior to the implementation of this proposed action.

Clean Water Act Of 1972 (33 USC 1251 et seq). The objective of the Clean Water Act (CWA) is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. Specific sections of the CWA control the discharge of pollutants and wastes into aquatic and marine environments.

The specific sections of the CWA that apply to the proposed project are Section 404, addressing discharges to waters of the United States, and Section 401, which requires certification that the permitted project complies with the State Water Quality Standards for actions within State waters. The enforcement agency for Section 404 is the U.S. Army Corps of Engineers; the Corps does not issue permits to itself, but will prepare an evaluation of the effects of its proposed discharge under Section 404(b)(1), available in Appendix 1. The Corps will comply with Section 401 by applying for water quality certification from the State of Alaska Department of Environmental Conservation. Because of the small size of proposed discharge, and the similarity of the discharged material (i.e., large rock placed for the construction of the breakwaters) to the existing sediments, the Corps determines that compensatory mitigation under Section 404 is not warranted.

Rivers and Harbors Act of 1899 (33 USC 403 et seq). Section 10 of this Act prohibits the obstruction or alteration of navigable waters of the U.S. without a permit from the U.S. Army Corps of Engineers. The Corps does not issue permits to itself, so no specific permit is required under this act.

Endangered Species Act of 1973 (16 USC 1531 et seq). The Endangered Species Act (ESA) protects threatened and endangered species by prohibiting Federal actions that would jeopardize continued existence of such species or result in destruction or adverse modification of any critical habitat of such species.

The Corps has requested from both the USFWS and the NMFS a list of threatened, endangered, and candidate species in the project area. Based on available knowledge of Little Diomede Island and Bering Sea wildlife and ecology, the Corps provisionally concludes that the proposed project will not adversely affect any federally listed endangered or threatened species or their critical habitat, and formal consultation under Section 7 of the ESA would not be required. Early discussions with the USFWS (Walther 2012) indicate that the project would most likely be addressed through informal consultation, although coordination would be ongoing as the project develops.

Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act (FWCA) requires the Corps to consult with the USFWS whenever the waters of any stream or other body of water are proposed to be impounded, diverted, or otherwise modified.

Specific comments are being solicited from the USFWS, NMFS, and Alaska Department of Fish and Game concerning the proposed project. Comments and concerns from the USFWS on previously proposed Diomede projects have already been incorporated into this EA, and coordination efforts will continue in order to fulfill the requirements of the FWCA.

Magnuson-Stevens Fishery Conservation and Management Act Fishery Conservation Amendments of 1996, (16 USC 1801 et seq). The Magnuson-Stevens Fishery Conservation and Management Act provides for the conservation and management of all fishery resources between 3 and 200 nautical miles offshore. The 1996 amendments to this act require regional fisheries management councils, with assistance from the NMFS, to delineate Essential Fish Habitat (EFH) in Fishery Management Plans (FMPs) for all managed species. EFH is defined as an area that consists of “waters and substrate necessary for spawning, breeding, feeding or growth to maturity” for certain fish species. Federal action agencies that carry out activities that may adversely impact EFH are required to consult with the NMFS regarding potential adverse effects of their actions on EFH.

The Corps has conducted an assessment of EFH for the proposed project using information provided on-line by the NMFS, and has sought further information from the NMFS. As discussed previously in this EA, the proposed project would be in waters declared EFH for snow crab and saffron cod, and in areas covered by two FMPs. Because of the small scope of this project, the dissimilarity between the project environment and the EFH descriptions for those species, and the fact that it is unlikely to alter fishing practices in the Little Diomede Island area, the Corps concludes that the project would have no adverse effect on EFH, and will seek concurrence from the NMFS.

Marine Mammal Protection Act, (16 USC 1361 et seq). The Marine Mammal Protection Act (MMPA) provides protection to marine mammals in both the State waters (within 3 miles from the coastline) and the ocean waters beyond. As specified in the MMPA, the USFWS is responsible for the management of polar bears, walrus, and sea otters; the NMFS is responsible for all other marine mammals.

Based on available information, the Corps concludes that the proposed project would not have a significant adverse impact on marine mammals, but will continue to coordinate with the USFWS and the NMFS.

Migratory Bird Treaty Act, (16 USC 703 et seq). The essential provision of the Migratory Bird Treaty makes it unlawful, except as permitted by regulations, "to pursue, hunt, take, capture, kill…any migratory bird, any part, nest or egg," or any product of any bird species protected by the convention.

The seabirds that nest at Little Diomede Island are protected by this Act, and the Corps will work closely with the USFWS to minimize any risk posed to migratory birds by the project.

National Historic Preservation Act of 1966, as amended (16 USC 470 et seq). The purpose of the National Historic Preservation Act (NHPA) is to preserve and protect historic and prehistoric resources that may be damaged, destroyed, or made less available by a project. Under this Act, Federal agencies are required to identify cultural or historic resources that may be affected by a project and to consult with the State Historic Preservation Officer (SHPO) when a Federal action may affect cultural resources.

Based on available information, the Corps provisionally concludes that the proposed project would have no effect on known cultural resources. The Corps will seek concurrence with this determination from the SHPO, and all project consultation with respect to Section 106 of the NHPA (36 CFR 800) would be completed prior to construction. If previously unknown cultural resources are identified during project implementation, all activity will cease until requirements of 36 CFR 800.11, *Discovery of Properties During Implementation of an Undertaking*, are met.

Table 4- 1. Summary of Relevant Federal Statutory Authorities

Archaeological and Historic Act of 1974	PC
Clean Air Act, as amended	FC
Clean Water Act of 1977, as amended	PC
Coastal Zone Management Act of 1982	NA
Endangered Species Act of 1973, as amended*	PC
Fish and Wildlife Coordination Act, as amended	PC
Marine Mammal Protection Act	FC
Marine Protection, Research, and Sanctuaries Act of 1972	FC
Migratory Bird Treaty Act of 1918*	PC
Magnuson-Stevens Fishery Conservation and Management Act*	PC
National Environmental Policy Act of 1969, as amended*	PC
National Historic Preservation Act of 1966, as amended*	PC
Protection of Wetlands (Executive Order 11990)	FC
Rivers and Harbors Act of 1899	FC

PC = Partial Compliance, FC = Full Compliance
**Full compliance will be attained upon completion of the public review process and/or further coordination with responsible agencies.*
Note: This list is not exhaustive.

4.8.2 Status of Project Coordination

As of September 2013, coordination activities with major resource agencies were as follows:

Alaska Department of Fish and Game: A letter describing the project and inviting ADFG to participate in project coordination was sent to ADFG (attn: William Morris) on 10 January 2012. The Corps received an email response from ADFG (Todd Nichols) dated 23 January 2012, stating that the ADFG had found no issues of concern and had no preference of one alternative over the other.

Alaska Department of Natural Resources, Office of History and Archaeology: The Corps has made use of online resources offered by this office to study potential impacts of the project and develop a determination of effect, but has not yet sent a letter of determination to the State Historic Preservation Officer as required under Section 106 of the NHPA.

The Corps sent a letter, dated September 23, 2009, to the N ative Village of Diomede offering Government to Government consultation. The Native Village of Diomede did not respond to this letter. However, the Corps continues to work directly with the Native Village of Diomede.

National Marine Fisheries Service: A letter requesting a list of endangered and threatened species under the ESA and the initiation of informal ESA consultation was mailed to the NMFS Protected Resources Division (attn: Brad Smith) on 10 January 2012. No response was forthcoming; the Corps re-sent an electronic copy of the letter in an email to Mr. Smith on 21 June 2013, and followed up with a telephone call on 27 June 2013. The Corps was assured during the telephone conversation that NMFS would provide the requested ESA information, but to date the Corps has received no further response.

The Corps sent a separate letter to the NMFS Habitat Conservation Division (attn: Jeanne Hanson) on 10 January 2012, describing the proposed project and inviting coordination on EFH issues. No response was received; however, Division member Matt Eagleton had explained in an earlier email (3 January 2012) that his office preferred to comment on EFH assessments as part of the NEPA process, so a response to the 10 January letter was not expected.

U.S Fish and Wildlife Service: The Corps mailed a letter on 10 January 2012 to the USFWS Fairbanks Field Office (attn: Sarah Conn), requesting a re-initiation of informal consultation under the ESA, and also inviting resumption of coordination under the FWCA. The Corps received an ESA consultation letter from USFWS on 28 June 2013, in which it determined that the project is not likely to adversely affect ESA-listed species under USFWS jurisdiction (polar bears, Steller's eiders, and spectacled eiders), and that further Section 7 consultation or preparation of Biological Assessments is not necessary.

The Corps has continued working closely with the Fairbanks Field Office Conservation Planning Assistance Branch on an informal basis, but that office has not yet indicated how it wishes to document its findings under the FWCA (e.g., via a revised PAL or a new FWCA report).

4.8.3 U.S. Fish and Wildlife Service Recommendations

The Corps has been working with the USFWS on proposed navigation improvement projects at Diomede for a number of years, and the USFWS has provided the majority of input on environmental issues. Many of the concerns stated in their 1992 Fish and Wildlife Coordination Act Report, 2008 Planning Aid Letter, and recent correspondence (Boldenow 2012) are discussed in Section 4.7.3 above; their specific recommendations include:

- Prohibiting construction or other activities that may potentially result in the taking of migratory birds between 1 May and 30 September
- Ensuring that any outdoor lighting used during construction minimizes the potential for disorienting birds and luring them into collisions with ships or equipment
- Requiring contractors to observe appropriate measures to avoid transporting rats and other invasive species to the island on project vessels, as promoted by State and Federal agencies
- Managing food waste and other possible attractants so as to not draw increased numbers of gulls, foxes or other seabird predators to the island

Strict observance of a prohibition on potentially-disruptive activities during the 1 May to 30 September period recommended by the USFWS may not be feasible given the very limited working season at Little Diomede. However, the Corps will continue to work with USFWS and other agencies to develop construction timing windows that protect wildlife but also allow the project to move forward. For both practical and environmental reasons, the Corps is studying the possibility of performing some construction work, such as dredging, during the winter. Some project tasks, such the delivery of rock for the breakwaters, can only be done during the open-water season, which overlaps with the USFWS-recommended no-construction period.

5.0 Conclusion

The proposed construction of breakwaters and a boat launching area at Diomede, Alaska, as discussed in this document, would have some minor, largely controllable short-term impacts, but in the long term would help improve the overall quality of the human environment. This assessment supports the conclusion that the proposed project does not constitute a major Federal action significantly affecting the quality of the human environment; therefore, a finding of no significant impact will be prepared.

6.0 Document Preparers

This environmental assessment was prepared by Chris Floyd, Chris Hoffman, Diane Walters, and Michael Salyer of the Environmental Resources Section, Alaska District, U.S Army Corps of Engineers. The Corps of Engineers Project Manager is David Williams.

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APPENDIX 1

EVALUATION UNDER SECTION 404(b)(1) of the CLEAN WATER ACT

Navigation Improvements
Diomede, Alaska

Prepared by:

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September 2013

EVALUATION UNDER SECTION 404(b)(1)
of the CLEAN WATER ACT

Navigation Improvements
Diomede, Alaska

This is the factual documentation of an evaluation conducted under Section 404 of the Clean Water Act of 1977. This evaluation covers the placement of rock for the construction of breakwaters at the Village of Diomede, Little Diomede Island, Alaska, and the placement of rocky material removed from the construction site. The authority for this General Investigation study is provided by the "Rivers and Harbors in Alaska" study resolution adopted by the U.S. House of Representatives Committee on Public Works on December 2, 1970, and the Water Resources Development Act (WRDA) of 2007, Section 2006 - Remote and Subsistence Harbors.

I. PROJECT DESCRIPTION

A. Location: The project area is at the shoreline adjacent to the Village of Diomede, on the western shore of Little Diomede Island.

B. General Description: The environmental assessment (EA) to which this evaluation is appended contains a full discussion of the navigation problems and alternative solutions to address those problems. The intent of this project is to provide a basic, protected launching and landing area at the village to accommodate the small craft used locally for subsistence and transport, as well as larger rescue vessels. The four alternatives discussed in the EA are similar in scope and location, differing mainly in the configurations of two rubblemound breakwaters. The recommended alternative (S3) would be located south of the existing rubblemound helicopter pad and consist of two breakwaters requiring approximately 78,400 cubic yards of assorted rock imported from an off-island quarry. A small near-shore area would be dredged to -10 feet MLLW, requiring removal of approximately 2,000 to 3,000 cubic yards of existing shoreline material.

C. Authority: The authority for the project is discussed above and in the EA.

D. General Description of Dredged or Fill Material: Construction of the breakwaters would require the placement of approximately 19,000 cubic yards of core rock, 23,100 cubic yards of b-rock, and 36,400 cubic yards of armor stone. The breakwaters would occupy roughly 2 to 3 acres of submerged land. The material removed from in between the breakwaters is expected to consist primarily of granite boulders and bedrock, along with some lesser amount of sand or silty sand. The dredged material is not expected to be chemically contaminated. The expanded breakwater storage areas proposed under Alternatives S3 (the preferred alternative) and N1 would be able to incorporate all or most of the dredged material as general fill under the storage areas.

E. Description of the Proposed Discharge Site: At the construction site, the shoreline is made up of boulders and large cobbles, with no sand or silt beach apparent. The boulders and cobbles continue offshore and compose much of the near-shore sediments. The submerged boulders have a smooth rounded or subangular appearance, suggesting they may be frequently tumbled about by ice movement and strong currents. A rocky reef extends hundreds of feet westward from the point occupied by the village; it is unclear whether the reef is made up entirely of boulders or is underlain by a bedrock dike. Broad flat areas of sand exist to the north and south of the reef, but it is not known how far these extend.

F. Description of Disposal Method: The rock used for construction would be delivered to the site by barg and placed with an excavator; the small dimensions of the project may allow most rock to be placed with shore-based equipment.

II. FACTUAL DETERMINATIONS

A. Physical Substrate Determinations: The near-shore seabed along the west shore of Little Diomede Island consists of boulders and large cobbles, with occasional pockets of sand in between large boulders. There are no rivers or other significant sources of fine sediment on the island, and the strong, turbulent ocean currents would tend to loft and carry away any fine material.

B. Water Circulation, Fluctuation, and Salinity Determinations: The breakwaters would have an intentional localized effect on near-shore currents. The existing heliport riprap structure, constructed in 1993, projects directly out into the prevailing northerly current but has caused no evident disruptions to the near-shore environment such as sediment scouring. The proposed breakwaters would not project any farther out into the current than the existing heliport and would presumably not add to the obstruction of the prevailing current.

C. Suspended Particulate/Turbidity Determinations: The rock rubble to be placed at the disposal site would contain very little in the way of fines to be suspended in the water column, and little turbidity should be generated during disposal. The local strong ocean currents would both disperse the suspended sediments very quickly, but also render ineffective conventional sediment control measures, such as silt curtains.

D. Contaminant Determinations: The material to be placed for construction would be quarried rock from an established commercial source and would not be expected to introduce any chemical contamination. The existing material to be relocated from the construction site is expected to consist primarily of boulders and rocky debris dredged from the slipway. There is no history of significant chemical (e.g., fuel) releases in this area, and the very coarse material involved would not retain much in the way of any contaminants.

E. Aquatic Ecosystem and Organism Determinations: The intertidal zone at Little Diomede Island is very narrow and sparsely inhabited. The shoreline boulders and cobbles are subjected to ice-scouring and severe temperatures much of the year, which discourages multi-year growth. A Corps survey in 2007 noted only a few *Littorina* marine snails and very small barnacles occupying the shoreline boulders within the intertidal zone.

In the subtidal area where the seabed is deep enough to avoid ice-scouring, the boulders host a fairly rich assemblage of marine invertebrates, including anemones, barnacles, sea stars, and gastropods. Kelp is able to grow where anchored in the spaces in between boulders. Blue king crab is found farther off shore in numbers that make them an important food resource for the villagers.

Construction of the breakwaters and dredging of a boat approach lane would directly impact between 2.4 and 3.6 acres of existing shoreline and near-shore environment. Creation of the breakwaters would permanently alter the marine environment where the breakwaters are laid down. However, since that environment currently consists essentially of an expanse of large rocks, the addition of the breakwater structures would not represent a major change in habitat type. The Corps has observed that new rock breakwaters in other Bering Sea locations, such as St. Paul, Unalaska, and False Pass, have recolonized rapidly with marine algae and epilithic invertebrates, following a succession very similar to what would be expected on a naturally-occurring rock surface. The existing submerged boulders show signs of having been tumbled and weathered by wave action and ice, which presumably limits the amount of multi-year growth that the boulders can sustain. The greater stability of the breakwaters and the localized areas of reduced current velocity and wave action may encourage localized areas of greater diversity and productivity in the near-shore ecology.

Material would be dredged from a relatively small area, 0.2 to 0.7 acre, of shoreline and near-shore habitat to create a safe approach path for small vessels. This modified area may consist of finer material (smaller cobbles or gravel) than the surrounding boulders, especially if explosives are used to break apart subsurface boulders or bedrock outcroppings. Modification of this limited area does not represent a significant loss of habitat, as little marine life is able to thrive along the ice-scoured shoreline.

F. Proposed Disposal Site Determinations: The large rock material to be placed at the construction and relocation areas would descend immediately to its placement site with no dispersion and little or no suspension of fine sediments.

G. Determination of Cumulative/Secondary Effects: No cumulative or secondary effects are foreseen for this small project. No other similar water access projects are known to be in development at Diomede. The proposed project is intended to improve safety for the types of small craft currently in use and allow for landings by a rescue boat, but is not designed to improve access by large craft, such as barges.

III. FINDINGS OF COMPLIANCE

A. Adaptation of the Section (404)(b)(1) Guidelines to this Evaluation: No adaptations of the guidelines were made relative to this evaluation.

B. Evaluation of Availability of Practical Alternatives: Non-fill alternatives, such as floating breakwaters, were studied for this project, but only a rubblemound breakwater would be sufficiently robust to survive the severe ice and wave environment at Diomede. Dredged material removed from the construction site cannot be disposed of upland, as no area on the island large enough to receive the material is available.

C. Compliance with Applicable State Water Quality Standards: The disposal of the dredged material would not violate any applicable State water quality standards. The fill operation would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. Compliance with Endangered Species Act of 1973: The proposed action would not harm any endangered species or their critical habitat. The Corps would work with the U.S. Fish and Wildlife Service to minimize impacts on denning polar bears if construction work is pursued in winter.

E. Compliance with Specified Protection Measures for Marine Sanctuaries Designed by the Marine Protection Research and Sanctuaries Act of 1972: No action is associated with the proposed project that would violate the above Act.

F. Evaluation of Extent of Degradation of the Waters of the United States: There would be no significant adverse impacts to municipal and private water supplies, recreation and commercial fisheries, plankton, fish, shellfish, wildlife and/or aquatic sites caused by the proposed action. There would be no significant adverse effects on regional aquatic ecosystem diversity, productivity, and/or stability caused by the placement of the fill material nor would there be significant adverse effects on recreation, aesthetic, and/or economic values caused by this project.

G. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on Aquatic Ecosystems: All appropriate and practicable steps would be taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.

On the basis of the Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR part 230), the proposed project has been specified as complying with the requirements of the guidelines for Section 404 of the Clean Water Act.

APPENDIX 2

ESSENTIAL FISH HABITAT ASSESSMENT

NAVIGATION IMPROVEMENTS
DIOMEDE, ALASKA

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September 2013

ESSENTIAL FISH HABITAT ASSESSMENT

Navigation Improvements
Diomede, Alaska

Preface

The 1996 amendments to the Magnuson-Stevens Fishery Conservation and Management Act set forth the essential fish habitat (EFH) provision to identify and protect important habitats of federally managed marine and anadromous fish species. Federal agencies that fund, permit, or undertake activities that may adversely affect EFH are required to consult with the National Marine Fisheries Service (NMFS) regarding the potential effects of their actions on EFH and respond in writing to NMFS' recommendations.

EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, and may include aquatic areas historically used by fish where appropriate. "Substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

Upon completing the Corps's EFH-coordination with the NMFS, the Corps will incorporate its EFH evaluation and findings and NMFS' conservation recommendations (if any) into the project's environmental assessment.

Project Purpose

The intent of this project is to provide a basic protected launching and landing area at the village of Diomede to accommodate the small craft used locally for subsistence and transport, as well as for larger rescue vessels.

Project Authority

The authority for this General Investigation study is provided by the "Rivers and Harbors in Alaska" study resolution adopted by the U.S. House of Representatives Committee on Public Works on December 2, 1970, and the Water Resources Development Act (WRDA) of 2007, Section 2006 - Remote and Subsistence Harbors.

Project Description

Diomede, also known as *Inalik*, is a village on the western shore of Little Diomede Island in the middle of the Bering Strait (figure 1). The community of about 150 people is perched on an exposed rocky shoreline with no harbor, breakwater, or adequate barge landing area (figure 2). Travel to and from Diomede and the importation of goods is difficult as Diomede has no year-round airstrip. Because of the lack of moorage at the village, the boats used by residents for transportation must be limited to craft small enough to be manually hauled out of the ocean and stored on shore. Rough slips have been carved out of the shoreline boulders (figure 2), but no other protection from waves or storm surge exists.

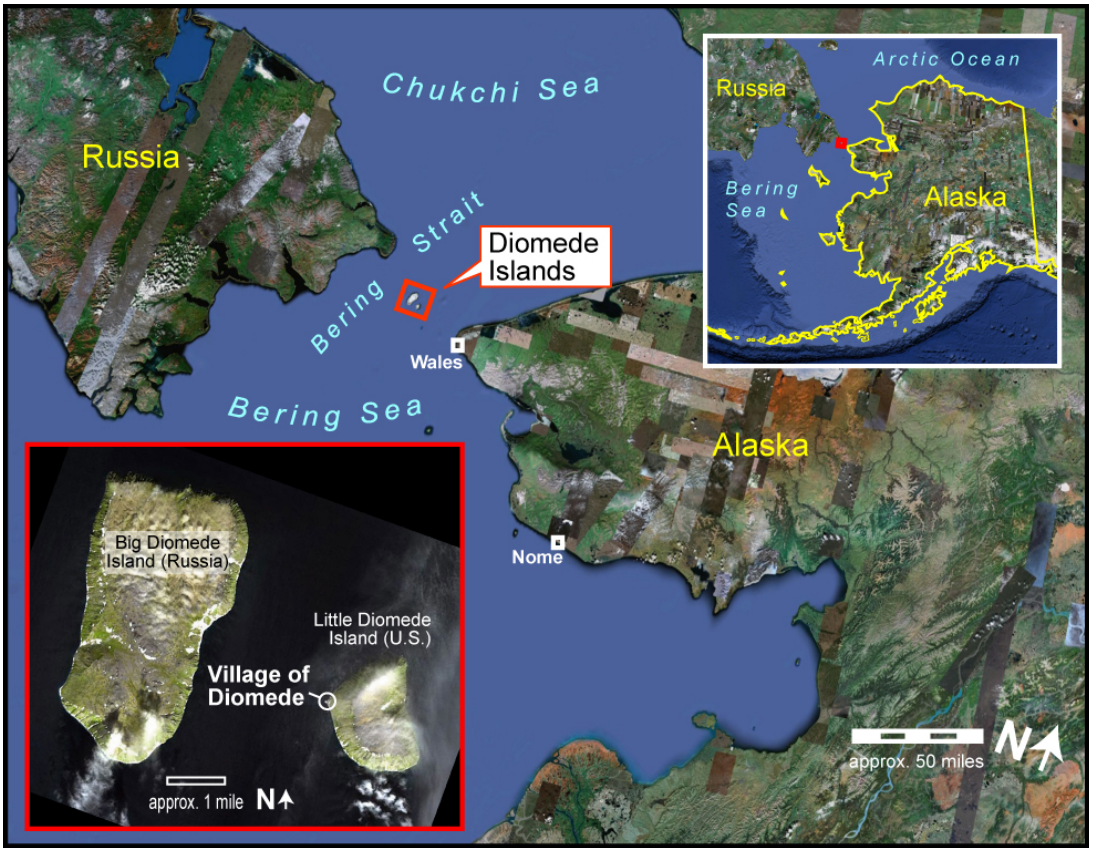


Figure 1. Location and vicinity of Little Diomede Island.

Figure 2. View of the village, with the existing small boat slips shown at the center of the photos, and the helipad at the extreme left.

The alternatives under study (figures 3 through 6) are for a protected boat launching area immediately adjacent to the village, consisting of a small (0.2 to 0.3 acre) area cleared of near-shore boulders to a depth of -10 feet below mean lower low water (MLLW) sheltered by two rubblemound breakwaters.

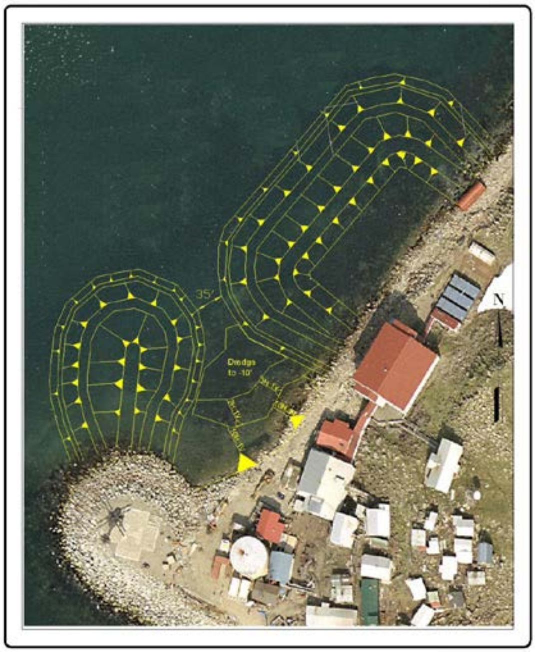


Figure 3. Alternative N1.

Figure 4. Alternative S1.

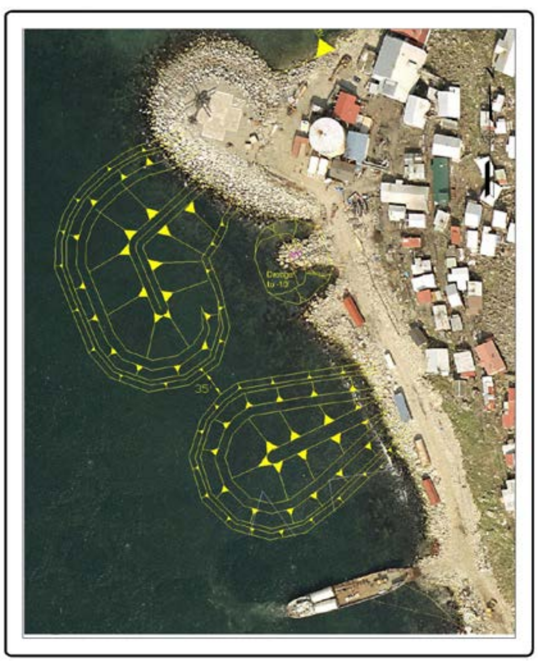


Figure 5. Alternative S2.

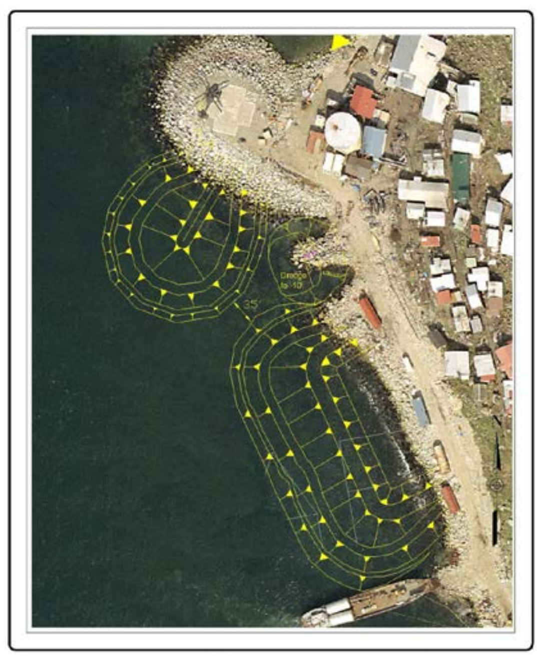


Figure 6. Alternative S3.

Essential Fish Habitat

The NMFS' authority to manage EFH is directly related to those species covered under Fishery Management Plans (FMPs) in the United States. The Little Diomede Island project site is very near the boundary of the Arctic Management Area and the Bering Sea/Aleutian Island (BSAI) Management Area. Two species, snow crab and saffron cod, have designated EFH off the west coast of Little Diomede Island (NOAA 2013). Snow crab has EFH described both under the Arctic Fishery Management Plan and the BSAI Crab Fishery Management Plan (NPFMC 2009; NOAA 2005). Saffron cod EFH is described only in the Arctic Fishery Management Plan (NPFMC 2009).

No EFH "habitat areas of particular concern" are in the Corps' project area. The waters off Nome are included in the Northern Bering Sea Research Area Bering Sea Subarea 514.

Table 1. Species with designated essential fish habitat in the project area.

Species	Lifestages expected at project location	FMP
Snow Crab	Late Juvenile	Arctic, BSAI Crab
Saffron Cod	Late Juvenile, Mature	Arctic

Assessment of Project Effects on Essential Fish Habitat

Short-term impacts include water quality impacts in the form of increased levels of turbidity, noise from dredging operations, pollution in the form of fuel or oils spilled from the dredging equipment, noise from the dredging equipment, and disturbance from the movement of equipment through the area.

Short-term Impacts

Water Quality. The material removed by dredging is expected to consist of boulders and rocky debris with little fines. Dredging, blasting, and placement of rock during construction would cause a temporary increase in levels of suspended sediment in the water column. The local strong ocean currents would both disperse the suspended sediments very quickly, but also render ineffective conventional sediment control measures, such as silt curtains.

Pollution. Neither the material to be dredged nor the rock placed for the breakwaters would be contaminated. The primary risk of introducing pollutants into the environment would be accidental releases of fuels or lubricants. The contractor would be required to prepare a spill prevention and response plan and have appropriate spill response materials at the work site.

Waterborne Noise. Sources of underwater noise would include the operation of heavy machinery on shore and in the water, dredging, unloading of rock and other materials, and possible blasting of underwater boulders or rock outcroppings. The low-level noise and activity generated during construction may cause some fish to avoid the area and use similar adjacent habitat. The potential effects of underwater explosives (if used) on EFH species are difficult to assess, as the location, depth, and size of charge would be determined by conditions encountered during construction. Dredging would typically take place after the breakwaters were constructed, so the effects of any underwater detonation would be significantly confined by the stone breakwaters.

Construction-Related Vessel Traffic. The construction project would temporarily increase vessel activity and bring an increased risk of fuel spills, both at sea and along the shoreline. The contractor would be required to implement safe fuel handling procedures and to have adequate spill kits on hand to manage both marine and on-land releases of fuel or other chemicals.

Long-Term Impacts

Loss and Conversion of Marine Habitat. The existing habitat at the project site is dominated by large boulders and cobbles. Severe cold and annual scouring by sea ice limits the growth of marine algae and invertebrates in the intertidal zone and on rock surfaces submerged as deep as 10 feet below MLLW. Farther offshore, marine algae are able to grow amongst the boulders where they are sheltered against the worst of the local currents. At depths where the boulders are not subject to ice-scouring, they support dense growths of anemones and other epilithic organisms. As the distance from the shoreline increases, flat patches of sand or pulverized shell appear amongst the boulders, and broad areas of sand are present several hundred feet offshore.

Creation of the breakwaters would permanently alter the marine environment where the breakwaters were laid down. However, since that environment currently consists essentially of an expanse of large rocks, the addition of the breakwater structures would not represent a major change in habitat type. The Corps has observed that new rock breakwaters in other Bering Sea locations, such as St. Paul, Unalaska, and False Pass, have recolonized rapidly with marine algae and epilithic invertebrates, following a succession very similar to what would be expected on a naturally-occurring rock surface. The existing submerged boulders show signs of having been tumbled and weathered by wave action and ice, which presumably limits the amount of multi-year growth that the boulders can sustain. The greater stability of the breakwaters and the localized areas of reduced current velocity and wave action may encourage localized areas of greater diversity and productivity in the near-shore ecology.

Material would be dredged from a relatively small area, 0.2 to 0.7 acre, of shoreline and near-shore habitat to create a safe approach path for small vessels. This modified area may consist of finer material (smaller cobbles or gravel) than the surrounding boulders, especially if explosives were used to break apart subsurface boulders or bedrock outcroppings. Modification of this limited area would not represent a significant loss of habitat, as little marine life is able to thrive along the ice-scoured rocky shoreline.

Water Quality. The proposed dredging project would have no long-term impact on coastal water quality. The breakwaters would have a small, localized effect on near-shore currents. The existing heliport riprap structure, constructed in 1993, projects directly out into the prevailing northerly current but has caused no evident disruptions to the near-shore environment such as sediment scouring. The proposed breakwaters would not project any farther out into the current than the existing heliport and would presumably not add to the obstruction of the prevailing current.

Avoidance and Minimization Measures. Planned measures to limit the project's impact on fish habitat include:

- Any use of explosives would be limited to the smallest effective charge necessary to yield the desired effect and may be restricted to as late in the construction season as possible. If practicable, dredging (including the use of explosives) would be conducted after the breakwaters are in place, which would limit the propagation of noise.

- To minimize the danger to marine mammals from project-related vessels, speed limits (e.g. less than 8 knots) shall be imposed on vessels moving in and around the project area.

- Project-related vessels and barges shall not be permitted to ground themselves on the bottom during low tide periods, unless there is a human safety issue requiring it.

- A construction oil spill prevention plan shall be prepared.

- The Corps will conduct post-dredging bathymetry surveys to ensure that only the material identified to be dredged was removed to the authorized depth and that the design depth was achieved by the dredge action.

Conclusions and Determination of Effect.
The proposed project would have little or no short-term or long-term effects on EFH. The project would directly impact a small area (less than 4 acres) of marine habitat not believed to be valuable habitat for fish. The habitat eliminated, an expanse of large boulders, would be replaced by rock structures that would function similarly to the existing boulders in providing shelter for anchored kelp species and substrate for epilithic organisms. The dredging of up to 0.7 acre of near-shore habitat would not represent a significant loss of habitat, as little marine life is able to thrive along the ice-scoured shoreline.

Where descriptions of life-stage essential habitat are available for the two EFH species, snow crab and saffron cod, those essential habitats are quite different from what exists in the project area. Late juvenile and adult snow crab EFH is described as requiring primarily mud substrates, while that of late juvenile and adult saffron cod is described as requiring primarily sand and gravel substrates. Therefore, the boulder and large cobble substrate existing in the project area does not constitute EFH for either of these species at the late juvenile or adult life-stages, and the project would not cause a loss of EFH.

The finished project would allow the residents of Diomede to launch their small boats more frequently but would not cause a qualitative change in the types of vessels working in the waters off Diomede or alter fishing habits. Safer launching and landing of boats would lessen the risk of spilled fuel from a damaged or capsized boat.

References

National Marine Fisheries Service (NMFS). 2013. Alaska Region Essential Fish Habitat (EFH) website, http://www.fakr.noaa.gov/habitat/efh.htm

NMFS. 2005. Environmental Impact Statement for Essential Fish Habitat Identification and Conservation in Alaska. April 2005.

North Pacific Fishery Management Council (NPFMC). 2009. Fishery Management Plan for Fish Resources of the Arctic Management Area. August 2009.

DESCRIPTIONS OF ESSENTIAL HABITAT

Snow Crab

Eggs
Essential fish habitat of snow crab eggs is inferred from the general distribution of egg-bearing female crab (see Adults).

Larvae and Early Juveniles
Insufficient information is available to determine EFH for Larvae and Early Juveniles.

Late Juveniles
EFH for late juvenile snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m) and middle (50 to 100 m) shelf in Arctic waters south of Cape Lisburne, wherever there are substrates consisting mainly of mud.

Adults
EFH for adult snow crab is the general distribution area for this life stage, located in bottom habitats along the inner (0 to 50 m) and middle (50 to 100 m) shelf in Arctic waters south of Cape Lisburne, wherever there are substrates consisting mainly of mud.

Saffron Cod

Eggs, Larvae, and Early Juveniles
Insufficient information is available to determine EFH for Eggs, Larvae, and Early Juveniles.

Late Juveniles
EFH for late juvenile Saffron cod is the general distribution area for this life stage, located in pelagic and epipelagic waters along the coastline, within near-shore bays, and under ice along the inner (0 to 50 m) shelf throughout Arctic waters and wherever there are substrates consisting of sand and gravel.

Adults
EFH for adult Saffron cod is the general distribution area for this life stage, located in pelagic and epipelagic waters along the coastline, within near-shore bays, and under ice along the inner (0 to 50 m) shelf throughout Arctic waters and wherever there are substrates consisting of sand and gravel.

APPENDIX 3

CORRESPONDENCE

NAVIGATION IMPROVEMENTS
DIOMEDE, ALASKA

United States Department of the Interior
U.S. FISH AND WILDLIFE SERVICE
Fairbanks Fish and Wildlife Field Office
101 12th Avenue, Box 19, Room 110
Fairbanks, Alaska 99701
June 28, 2013

Mr. Christopher Floyd
U.S. Army Engineer District, Alaska
P.O. BOX 6898
Elmendorf AFB, Alaska 99506-0898

Re: Little Diomede Navigation Improvements

Dear Mr. Floyd:

This responds to your request for information concerning endangered and threatened species and critical habitats pursuant to section 7 of the Endangered Species Act of 1973, as amended (Act).

THE PROPOSED ACTION

We understand that the U.S. Army Corps of Engineers (USACE) is proposing to permit a navigation improvement project at the village of Diomede, on Little Diomede Island. Currently, four alternatives are being evaluated.

All alternatives would involve barging material to construct small rubble-mound breakwaters on the west side of the island (Figures 1 and 2). Rock placement for the breakwaters would take place when shorefast ice is not present and prior to the onset of heavy autumn storms and arrival of new sea ice, from about 1 July through 1 October. Dredging and possible blasting in an area less than an acre would most likely take place on stable sea-ice from about March through mid-May. If blasting is required, the charge would be small such that is removes a particular rock and did not pose a hazard to the nearby village. During construction, vessel traffic would temporarily increase to include a barge periodically delivering rock, a small survey boat, and possibly a support ship to accommodate work crew lodging. Other equipment would likely include a large excavator working from shore, and possibly a second excavator on the barge to help manipulate the rock.

Polar Bear Minimization Measures
Field crews will incorporate relevant portions of the attached *Polar Bear Interaction Guidelines* into their operational plan. Additionally, a designated person(s) will scan the blast area prior to detonation to confirm no polar bears are in the vicinity. If one or more polar bears are in or adjacent to the blast area, the field crew will wait until no bears are present leave before blasting.

ACTION AREA

The action area includes the western portion of the island and marine environment where direct and indirect effects on listed species may occur. Boating activities consisting of skiffs and umiaqs currently take place in the Action Area. Thus, the Action Area currently experiences disturbance that may influence local distributions of listed species.

EFFECTS OF THE ACTION

Listed Eider Species
The Service listed the Alaska-breeding population of the Steller's eider as threatened on June 11, 1997 (62 FR 31748) and the spectacled eider on May 10, 1993 (58 FR 27474). The proposed project sites are within the migration corridors of these species. Threatened eiders typically migrate north through the Diomede area en route to their breeding grounds in late April and early May and back south through the area to their wintering grounds anytime from late August to early November.

A few listed eiders may use the waters in the Action Area during migration and could experience disturbance from boating activities. However, we expect eiders to avoid this relatively small area due to ongoing and proposed activities. If eiders are present and are disturbed, they would most likely fly a short distance away and resume previous activities. Thus, we expect the proposed action would have, at most, minor, temporary, and insignificant effects on listed eiders.

Polar Bears
The Service listed the polar bear (*Ursus maritimus*) as a threatened species under the Act on May 15, 2008 (73 FR 28212). Polar bears may occasionally pass/swim through the area, although their density is low and encounters are expected to be infrequent. Transient bears that enter the Action Area could be disturbed by the presence of humans or equipment/vessel noise. We expect disturbances would be minor and temporary because transient bears would be able to respond to human presence or disturbance by departing the area. Furthermore, personnel would follow their polar bear interaction plan should human-polar bear interactions occur.

Because (1) the density of polar bears in the Action Area is low; (2) encounters with polar bears are expected to be infrequent; (3) behavioral effects to transient bears would be minor and temporary; and (4) mitigation measures are included in the interaction plan to minimize potential impacts in the event that transient polar bears are encountered; we expect effects of the proposed action on polar bears would be insignificant.

Pacific Walruses
The Pacific walrus (*Odobenus rosmarus divergens*) can occur in the Action Area and is protected under the Marine Mammal Protection Act. To minimize impacts to this species, please coordinate with Craig Perham (craig_perham@fws.gov, 907-786-3810) and Jim MacCracken (james_maccracken@fws.gov, 907-786-3816) in the Service's Marine Mammal Management office.

CONCLUSION

The proposed action could temporarily disturb listed eiders and polar bears in the project area; however, due to low densities of these species and minimization measures in place, we expect the effects of disturbance to be insignificant. Therefore, the Service determines that the proposed action is not likely to adversely affect listed eiders or polar bears. Preparation of a Biological Assessment or further consultation under Section 7 of the ESA is not necessary at this time. Thank you for the opportunity to comment on this project. If you need further assistance, please contact Shannon Torrence at (907) 455-1871.

Sincerely,

Ted Swem,
Branch Chief, Endangered Species

Cc: Craig Perham, MMM

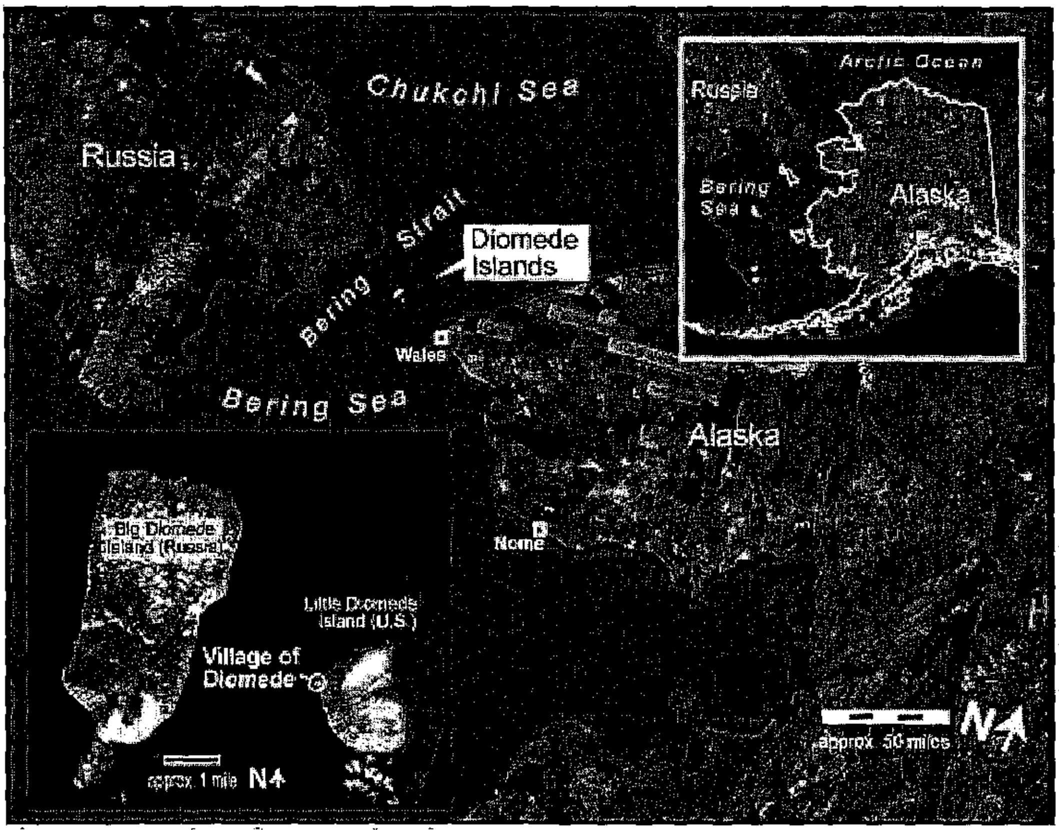
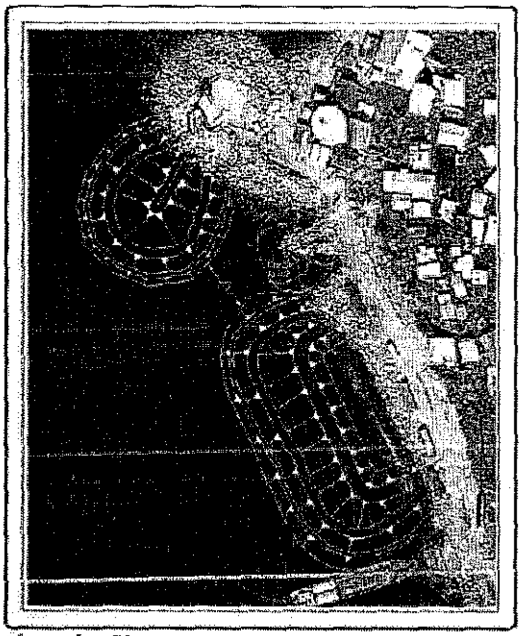


Figure 1. Location of proposed project.

Alternative N1.

Alternative S1.

Alternative S2.



Alternative S3.

Figure 2. Four alternatives for the proposed project.

POLAR BEAR INTERACTION GUIDELINES

These Polar Bear Interaction Guidelines (Guidelines) were developed to ensure that activities are conducted in a manner that avoids conflicts between humans and polar bears. Polar bears are protected under the Marine Mammal Protection Act (MMPA), and were listed as a threatened species under the Endangered Species Act (ESA) in 2008. The MMPA and ESA both prohibit the "take" of polar bears without authorization. Take includes disturbance/harassment, as well as physical injury and killing of individuals.

In addition to sea ice, polar bears use marine waters and lands in northern Alaska for resting, feeding, denning, and seasonal movements. They are most likely to be encountered within 25 miles of the coastline, especially along barrier islands during July-October. Polar bears may also be encountered farther inland, especially females during the denning period (October-April). Polar bears may react differently to noise and human presence. The general methods for minimizing human-bear conflicts are to: 1) avoid detection and close encounters; 2) minimize attractants; and 3) recognize and respond appropriately to polar bear behaviors. These Guidelines provide information for avoiding conflicts with polar bears during air, land, or water-based activities.

Unusual sightings or questions/concerns can be referred to: Susanne Miller or Craig Perham, Marine Mammals Management Office (MMM Office), 1-800-362-5148; or to Sarah Conn (907) 456-0499 of the Fairbanks Fish & Wildlife Field Office (FFWFO).

<u>When operating aircraft:</u>

- If a polar bear(s) is encountered, divert flight path to a minimum of 2,000 feet above ground level or ½ mile horizontal distance away from observed bear(s) whenever possible.

<u>When traveling on land, ice, or water:</u>

- Avoid surprising a bear. Be vigilant—especially on barrier islands, in river drainages, along bluff habitat, near whale or other marine mammal carcasses, or in the vicinity of fresh tracks.

- Between October and April special care is needed to avoid disturbance of denning bears. If activities are to take place in that time period the MMM Office should be contacted to determine if any additional mitigation is required. In general, activities are not permitted within one mile of known den sites.

- Avoid carrying bear attractants (such as strongly scented snacks, fish, meat, or dog food) while away from camp; if you must carry attractants away from camp, store foods in air-tight containers or bags to minimize odor transmission until you return them to "bear-resistant" containers.*

- If a polar bear(s) is encountered, remain calm and avoid making sudden movements. Stay downwind if possible to avoid allowing the bear to smell you.

Do not approach polar bears. Allow bears to continue what they were doing before you encountered them. Slowly leave the vicinity if you see signs that you've been detected. Be aware that safe viewing distances will vary with each bear and individual situation. Remember that the closer you are to the animal, the more likely you are to disturb it.

- If a bear detects you, observe its behavior and react appropriately. Polar bears that stop what they are doing to turn their head or sniff the air in your direction have likely become aware of your presence. These animals may exhibit various behaviors:

  - *Curious* polar bears typically move slowly, stopping frequently to sniff the air, moving their heads around to catch a scent, or holding their heads high with ears forward. They may also stand up.

  - *A threatened or agitated* polar bear may huff, snap its jaws together, stare at you (or the object of threat) and lower its head to below shoulder level, pressing its ears back and swaying from side to side. These are signals for you to begin immediate withdrawal by backing away from the bear. If this behavior is ignored, the polar bear may charge. Threatened animals may also retreat.

  - In rare instances you may encounter a *predatory* bear. It may sneak or crawl up on an object it considers prey. It may also approach in a straight line at constant speed without exhibiting curious or threatened behavior. This behavior suggests the bear is about to attack. Standing your ground, grouping together, shouting, and waving your hands may halt the bear's approach.

- If a polar bear approaches and you are in the bear's path—or between a mother and her cubs—get out of the way (without running). If the animal continues to approach, stand your ground. Gather people together in a group and/or hold a jacket over your head to look bigger. Shout or make noise to discourage the approach.

- If a single polar bear attacks, defend yourself by using any deterrents available. If the attack is by a surprised female defending her cubs, remove yourself as a threat to the cubs.

From:	Megan_Boldenow@fws.gov
To:	Floyd, Christopher B POA
Subject:	Re: FW: Little Diomede correspondence [navigation improvements]
Date:	Wednesday, January 04, 2012 12:44:39 PM

Hi, Chris. Great timing! Jewel and I had Little Diomede on our list of things to discuss this week.

You are correct in identifying oil spills and the potential for introduction of rats to the island as our two primary concerns at Little Diomede. I've identified some additional concerns that should be discussed in the EA you are drafting. I think these have come out as second tier concerns, once blasting and quarrying were eliminated from the project. (And just to confirm- there won't be any blasting, including for dredging or for leveling an area for placement of infrastructure?)

1. Repeated helicopter disturbance. Seabirds are sensitive to disturbance at their nesting colonies. Helicopters in particular may cause massive fly-off and may impact productivity at nesting colonies, as well as the numbers of birds found on islands in years following repeated helicopter disturbance.

We would like to see the EA discuss the short-term impacts of helicopter traffic related to construction. In order to determine whether the project will introduce increased long-term impacts related to helicopter traffic, the EA should also address current helicopter frequency as well as anticipated, routine helicopter frequency post-heliport construction. A discussion of the present location of the helicopter landing pad/tarmac, relative to the location of breeding birds, versus the location relative to breeding birds after construction would also be useful.

2. Attraction of predators, including arctic fox and gulls, as a result of human activities.

Seabirds generally need predator-free nesting areas, so the EA should consider the potential to increase seabird predators on Little Diomede. For example, gull numbers increase with access to human waste. This could impact Parakeet Auklets, which are particularly vulnerable to predation by gulls because they do not exhibit mass flight, anti-predator response.

3. Potential for collisions caused by light attraction. Light attraction is particularly a problem for auklets.

Since radiant lights at facilities could be an attractant to birds, especially during periods of inclement weather and/or increasing darkness, shielded lighting will be required at project facilities, to lessen the potential for episodic collision events. Low radiant lighting should be used, and lighting should be directed inward wherever possible so as to prevent "star" effects when viewed offsite. Only lighting necessary for navigational safety should be directed offsite. Anticipated construction and permanent lighting, whether to meet FAA or public safety requirements, should be specified in the EA.

4. Impacts resulting from dredging and placement of fill.

Aside from the potential for direct habitat loss resulting from disturbance to seabird nesting/roosting sites, the project has the potential to impact foraging sites. Insufficient food availability is a threat to seabird populations, and seabirds particularly need access to abundant food supplies near the nesting sites. There has been documentation that seabirds use the breakwater area at Little Diomede for feeding because of its shallow depths. I believe the planned harbor is located next to the breakwater, and this area would be dredged for barge access. Dredging and the placement of fill should minimize impacts to this potentially important feeding area to the extent practicable. The EA should discuss the potential for impacts to the breakwater area.

We want to note the recommended construction timing window, as identified in our 2008 comment letter: construction and other activities that may potentially result in the take of migratory birds should be prohibited between May 1 and September 30.

We would appreciate an opportunity to review your draft EA, so as to identify any potential issues that we have missed here; and we would be more than happy to meet with you about the project, at the point you think a meeting would be most useful, to discuss the issues identified above or any other questions you might have. Jewel and I may convene a brainstorming session with folks that more regularly deal with seabird issues to make sure that we identify and, to the extent possible, address potential problems. We will additionally be contacting our Migratory Bird office, once we have the opportunity to review the draft, so that we can identify early whether your project will require a permit. You would be more than welcome to be involved in these discussions.

Because previous field work at Little Diomede focused on proposed quarry sites, we would love to be kept in the loop about any planned site visits. It may be helpful for us to document distance of proposed infrastructure from active colonies.

Thanks for the early opportunity to review the proposed heliport at Little Diomede. We look forward to continued coordination with you.

Megan

****

Megan Boldenow
Biological Technician
Conservation Planning Assistance
Fairbanks Fish and Wildlife Field Office
101 12th Ave, Room 114
Fairbanks, AK 99701
907.456.0227

"Floyd, Christopher B POA" <Christopher.B.Floyd@usace.army.mil>

01/03/2012 01:07 PM To
<megan_boldenow@fws.gov>
cc
Subject
FW: Little Diomede correspondence [navigation improvements]

Hi Megan -

I was trying to remember where you, Jewel Bennett, and I left the FWCA issues on this project...

I'm working on the EA for the latest proposed design. I have the old 1991 FWCA Report and the 2008 Planning Aid Letter for the previous, more ambitious project designs. Those previous correspondences focused mainly on the effects of blasting and quarrying on Little Diomede Island.
Since the current plan does not involve blasting or quarrying, I've identified USFWS concerns about (a) rats, and (b) fuel spills as the prime remaining issues brought up in previous correspondence with USFWS, and am addressing those in the EA.
Please let me know if USFWS has identified additional issues it would like to address under the FWCA.

Thanks much,

Chris Floyd
Environmental Resources
US Army Corps of Engineers
907-753-2700

-----Original Message-----
From: Jewel_Bennett@fws.gov [mailto:Jewel_Bennett@fws.gov]
Sent: Tuesday, November 08, 2011 11:10 AM
To: Floyd, Christopher B POA
Subject: Re: Little Diomede correspondence

Chris: Thank you for the reports. I've forwarded them to Megan, who is already digging into the project information. Her email is: megan_boldenow@fws.gov; phone is: 907-456-0227.

Jewel

Jewel Bennett, Chief
Conservation Planning Assistance Branch
Fairbanks Fish and Wildlife Field Office U.S. Fish and Wildlife Service
101 12th Ave., Room 110
Fairbanks, AK 99701
907-456-0324
907-456-0208 fax
Jewel_Bennett@fws.gov

"Floyd, Christopher B POA" <Christopher.B.Floyd@usace.army.mil>

11/08/2011 10:44 AM To
<Jewel_Bennett@fws.gov>
cc
Subject
Little Diomede correspondence

Hi Jewel -
Attached is the 1991 FWGCAR we discussed.

I've also attached what appears to be an informal field report by Jim Zelenak, probably something he provided to my coworker Chris Hoffman to work into our Feasibility Study Report.

cfloyd
[attachment "1991 FWGCAR.pdf" deleted by Jewel Bennett/R7/FWS/DOI]
[attachment "Little Diomede Seismic Monitoring June 2007.doc" deleted by Jewel Bennett/R7/FWS/DOI]

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, ALASKA
P.O. BOX 6898
ELMENDORF AFB, ALASKA 99506-0898

REPLY TO
ATTENTION OF:

SEP 23 2009

District Engineer

Mr. Patrick F. Omiak, Sr.,
President
Native Village of Diomede (Inalik)
P.O. Box 7079
Diomede, Alaska 99762

Dear President Omiak:

The Alaska District, U.S. Army Corps of Engineers (Corps) is currently studying the feasibility of providing coastal storm damage protection and harbor development at Little Diomede. We have developed several alternatives to improve small boat and barge navigation. Since we were not able to meet with you as planned on August 20, 2009 due to transportation issues, drawings of the alternatives were provided to Kawerak, Inc. for delivery to the Native Village of Diomede. The Corps will plan a future meeting to discuss the alternatives and other issues as the study progresses. We want to hear about the tribe's interests and concerns throughout the development of the study. Also, if the study shows that a project is feasible, then there may be future opportunities for the tribe to be involved in planning the storm damage protection and/or harbor development.

Please consider this letter our notification of proposed Department of Defense activity under the Department of Defense American Indian and Alaska Native Policy (please see policies enclosed). If you believe this activity may significantly affect tribal rights and/or protected resources, and you wish to enter into government-to-government consultation on those tribal rights and/or protected resources, please advise me in writing on what tribal rights and/or protected resources you wish to consult about.

If you have any questions, please feel free to contact me or my project manager, Dave Williams at (907) 753-5621 or e-mail: David.P.Williams@usace.army.mil. You may also contact my tribal liaison, Amanda Shearer, at (907) 753-5674 or e-mail: Amanda.M.Shearer@usace.army.mil.

Sincerely,

Reinhard W. Koenig
Colonel, Corps of Engineers
District Commander

CF: Ms. Frances Ozenna, Tribal Administrator