



# **DOCK AND MARINE INFRASTRUCTURE IMPROVEMENTS TECHNICAL REPORT**



**PORT GRAHAM, ALASKA**

**NOVEMBER 2009**



## EXECUTIVE SUMMARY

---

**Report Purpose:** This report presents an evaluation of the marine infrastructure problems and opportunities at Port Graham and presents preliminary design concepts and costs. These concepts range from providing a hardened barge landing and boat haulout to a new public dock.

**Study Partners and Scope:** The findings of this report are based on a collaborative study effort between the Denali Commission, Port Graham, marine transportation providers, and the Army Corps of Engineers.

**Community Profile:** Port Graham is located at the southern end of the Kenai Peninsula on the shore of Port Graham and lies 28 air miles from Homer. Residents of Port Graham are predominantly of Alutiiq origin. The 2008 population was 136. According to the 2000 Census, the population consists of 88.3 percent Alaska Native or part with a median age of 37.8 years.

Port Graham became the site of a cannery and wharf, according to the U.S. Geological Survey in 1909. In 1911, the Fidalgo Island Packing Co. established a cannery, and Aleuts from Nanwalek moved to the community. The cannery burned in 1960. It was rebuilt in 1968 by Whitney/Fidalgo, and was sold to the village corporation in 1983. A pink salmon hatchery began operations in 1991. In January 1998, the hatchery and salmon processing plant were destroyed by fire. The hatchery and processing plant were rebuilt and re-opened in June 1999. The rebuilt cannery operated from 2000 through 2002, but has not operated since because the community could not find a company willing to lease and operate the plant. Port Graham remains a traditional Alutiiq village with a fishing and subsistence lifestyle.

**Problem description:** The Port Graham marine infrastructure is inadequate or aged. Although there is a floating transient dock, boats can only be moored during calm weather due to the limited protection from waves. Skiffs are dragged up the beach or anchored offshore when not in use. Larger commercial fishing vessels are moved to nearby shallow lagoons to seek shelter during storm events and the crews travel by skiff to shore. The existing public dock facility provides water access to the cannery. The salmon cannery is not in use and disintegrating dock facility provides little incentive for potential operators to consider reinstating the cannery. Fuel is delivered at the dock and barge operators are cautious of continuing this practice and may cease fuel deliveries at the dock. The weakened condition of the dock presents a hindrance to the economic sustainability and growth of the community and a significant hazard to users and to the environment.

**Potential Project Implementation:** Before a project can be implemented using Federal funds additional studies may be required to meet National Environmental Policy Act (NEPA) requirements. Formal study scoping has not been conducted and it is uncertain at this time if a project at Port Graham would require an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). However, based on available information, an EA would likely meet the requirements. Estimated cost to complete an EA is \$100,000. It is suggested that geotechnical investigations and surveying and mapping be conducted to reduce construction risks and cost overruns. Cost for these efforts range from \$300,000 to \$500,000.

**Report Findings and Alternatives Considered:** This report finds that there are several viable alternatives to address many of the problems faced by the community. The alternatives are at sites presently used for similar marine activities and it is anticipated that environmental impacts would not be significant.

Based on a Corps of Engineers site visit in March 2009, it was determined that given the extent of degradation of the dock, repair is not feasible. Therefore, the focus of the alternatives was replacement of the dock and repair was excluded from the alternatives.

- Alternative 1 is a concrete-plank boat launch ramp located on the east side of a gravel point, which creates a natural protected area in Port Graham. The basis of this concept is the use of 6 inch thick precast concrete planks to provide a 16-foot wide drivable surface to retrieve skiffs from the water on trailers. An 8-foot wide transient mooring float would be constructed adjacent to this ramp to facilitate launch and recovery operations. The current estimated construction cost is \$1,540,000.

- Alternative 2 replaces the existing cannery dock with a 100- x 90-foot concrete dock supported on 12 inch steel piles with a minimum depth of -12 feet MLLW at the dock face. This dock includes a 30- x 60-foot float accessible from the dock by an 80-foot aluminum gangway and a 3,000-square foot metal frame building to house the cannery equipment. A fuel pump will be installed on the float for vessel refueling. The existing dock would be demolished and the cannery and icing equipment and fuel headers would be salvaged for use in the new facility. The current estimated construction cost is \$9,370,000.

- Alternative 3 is a multi-use dock capable of handling cargo and fuel transfers and mooring for the state ferry M/V Tustumena. The dock is a 50- x 150-foot concrete platform at 30 feet MLLW supported on 24-inch steel piles. Two mooring dolphins would be installed to allow access for larger vessels. The dolphins will be accessible from the dock by means of steel walkways. Access to the dock will be created with a 400-foot gravel road and a 100-foot bridge connecting the road to the dock. The landside bridge abutment would be driven pile with a sheet pile retaining wall. The existing cannery dock would be demolished and the fuel headers would be relocated. The current estimated construction cost is \$13,460,000.

- Alternative 4 is a concrete plank barge landing located to the east of the log transfer dock to the northwest of the community. Site improvements will be made to improve the driving surface on the upper beach to connect the plank ramp to the existing road. Two mooring points will be installed to allow the operator to tie off during loading and unloading. The current estimated construction cost is \$1,960,000.

- Alternative 5 is a steel trestle adjacent to the existing cannery dock to provide a new fuel transfer facilities and moorage for the fuel barge, but does not provide space for cannery or bulk cargo transfer operations and represents the minimum moorage facility required to continue fuel transfer operations. The current estimated construction cost is \$3,740,000.

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska

**CONTENTS**

---

<b>1.0 Study Scope</b> .....	<b>1</b>
<b>2.0 Study Partners and Authority</b> .....	<b>1</b>
<b>3.0 Community Profile</b> .....	<b>1</b>
<b>4.0 Problem description</b> .....	<b>2</b>
<b>5.0 Plan Formulation</b> .....	<b>4</b>
<b>6.0 Economics Summary</b> .....	<b>11</b>
<b>7.0 Other Needed Studies</b> .....	<b>11</b>
<b>8.0 Conclusions</b> .....	<b>11</b>

**FIGURES**

---

<b>Figure 1. Location Map</b> .....	<b>1</b>
<b>Figure 2. Port Graham Waterfront Infrastructure</b> .....	<b>2</b>
<b>Figure 3. Cannery Dock</b> .....	<b>3</b>
<b>Figure 4. Rotting Timbers of Cannery Dock</b> .....	<b>3</b>
<b>Figure 5. Alternative 1 – Boat Launch Ramp (initial cost \$1,540,000)</b> .....	<b>8</b>
<b>Figure 6. Alternative 2 – Cannery Dock Replacement (initial cost \$9,370,000)</b> .....	<b>9</b>
<b>Figure 7. Alternative 3 – Multi-use Dock (initial cost \$13,460,000)</b> .....	<b>9</b>
<b>Figure 8. Alternative 4 – Barge Landing (initial cost \$1,960,000)</b> .....	<b>10</b>
<b>Figure 9. Alternative 5 – Fuel Trestle (initial cost \$3,740,000)</b> .....	<b>10</b>

**APPENDIXES**

---

<b>Appendix A - Economics</b>
<b>Appendix B - Hydraulics</b>
<b>Appendix C – Real Estate</b>
<b>Appendix D – Site Visit Trip Report</b>



## 1.0 Study Scope

This study examines the need for barge landing and boat haulout and dock improvements or replacement and other related marine infrastructure at Port Graham, Alaska.

## 2.0 Study Partners and Authority

The findings of this report are based on a collaborative study effort between the Denali Commission, Port Graham, marine transportation providers, and the Army Corps of Engineers.

## 3.0 Community Profile

Port Graham is located at the southern end of the Kenai Peninsula on the shore of Port Graham and lies 28 air miles from Homer. Residents of Port Graham are predominantly of Alutiiq origin. Residents of Port Graham are predominantly of Alutiiq origin. The 2008 population was 136. According to the 2000 Census, the population consists of 88.3 percent Alaska Native or part with a median age of 37.8 years. In 1911, the Fidalgo Island Packing Co. established a cannery, and Aleuts from Nanwalek moved to the community. The cannery burned in 1960. It was rebuilt in 1968 by Whitney/Fidalgo, and was sold to the village corporation in 1983. A pink salmon hatchery began operations in 1991. In January 1998, the hatchery and salmon processing plant were destroyed by fire. The hatchery and processing plant were rebuilt and re-opened in June 1999. The rebuilt cannery operated from 2000 through 2002, but has not operated since because the community could not find a company willing to lease and operate the plant. Port Graham remains a traditional Alutiiq village with a fishing and subsistence lifestyle. The community waterfront is shown on figure 2.

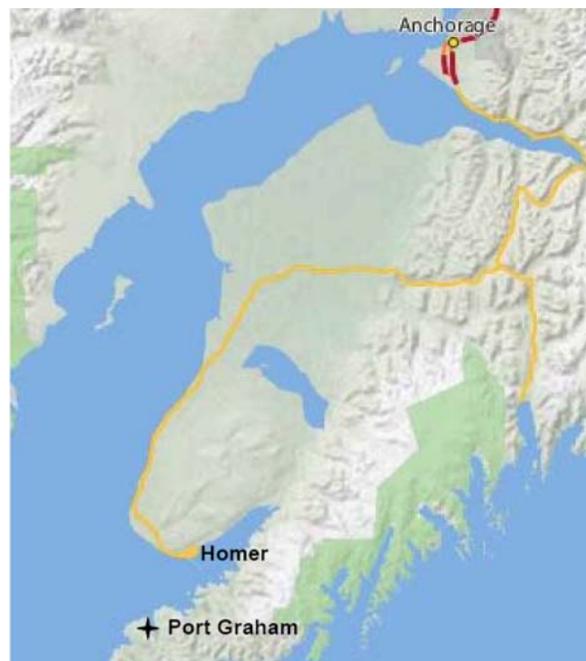


Figure 1. Location Map

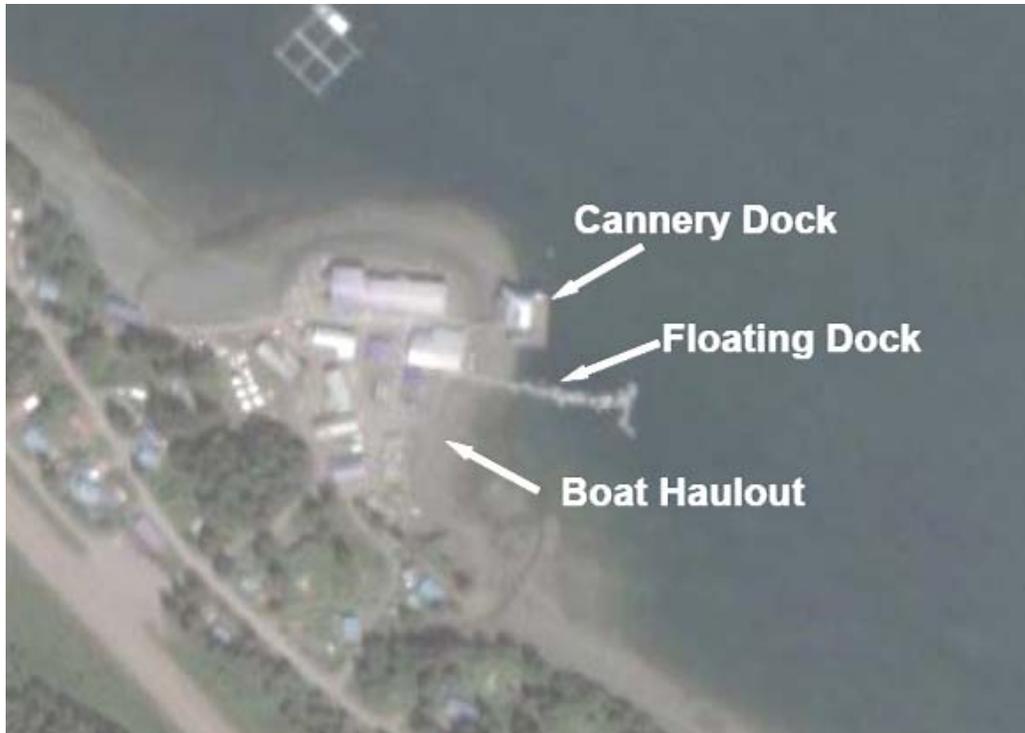


Figure 2. Port Graham Waterfront Infrastructure

#### 4.0 Problem description

The Port Graham marine infrastructure is inadequate or aged. Although there is a floating transient dock, boats can only be moored during calm weather due to the limited protection from waves. Skiffs are dragged up the beach or anchored offshore when not in use. Larger commercial fishing vessels are moved to nearby shallow lagoons to seek shelter during storm events and the crew travels by skiff to shore. The existing public dock facility, which provides water access to the cannery, is well beyond its design life and its structural integrity is minimal at best. Due to its poor condition, repair of the dock was excluded from the scope of alternatives. The salmon cannery is not in use and the disintegrating dock facility provides little incentive for potential operators to consider reinstating the cannery. Fuel is delivered at the dock and barge operators are cautious of continuing this practice and may cease fuel deliveries at the dock. The weakened condition of the dock presents a hindrance to the economic sustainability and growth of the community and a significant hazard to users and to the environment. Based on a Corps of Engineers site visit in March 2009 (see Appendix D), it was determined that given the extent of degradation of the dock, repair was not feasible. The dock is shown in figure 3 and 4.

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska



Figure 3. Cannery Dock

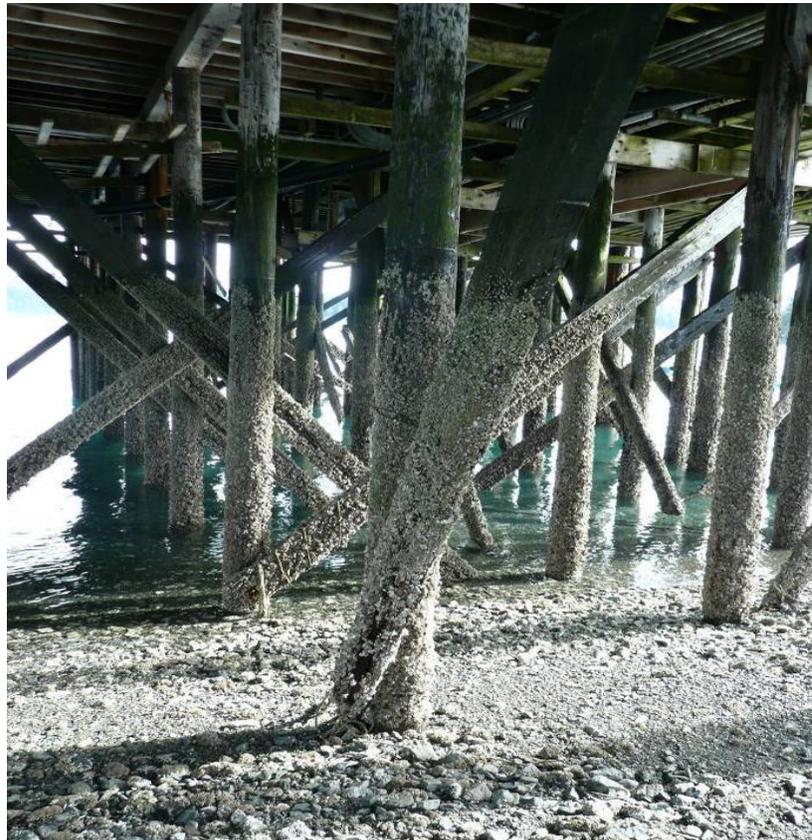


Figure 4. Rotting Timbers of Cannery Dock

## 5.0 Plan Formulation

This study examines the potential benefits of improved boat and barge landings and improvement (replacement) of the existing public dock at Port Graham. Residents expressed interest in becoming a port for either the state ferry or the private Seldovia fast ferry. Improved dock facilities may increase the opportunity for these ferries to call upon Port Graham. Improved dock facilities would encourage potential future use including tourism, timber harvesting, and fuel service. Additionally, residents stated a desire to purchase larger vessels and expand their participation in commercial fisheries if they have a place to store their boats and a market for their catch.

The existing dock is considered beyond repair due to the large amount of rotting timbers and we recommend that it is demolished. Therefore, repair of the dock was excluded from the alternatives.

Below is a summary of the marine related activities at Port Graham and opportunities for improvement:

- **Cannery Operations** - The cannery operated from 2000 through 2002, and has not operated since because the community could not find a company willing to lease and operate the plant. The facility was historically a major portion of Port Graham's economic base. Improved docking facilities may increase the likelihood of a company leasing and restarting the cannery.
- **Barge Cargo Operations** – Cargo is delivered to Port Graham approximately twelve times per year. Deliveries are comprised of goods too large to be delivered via air taxi. Alaskan Coastal Freight also delivers propane fuel to power the school. Propane trucks are driven off the vessel into the community. The Helenka B is a beach landing craft that lands adjacent to the existing log transfer facility. The vessel cannot land closer to the community, near the existing cannery dock, because the water depth is too shallow. Usually, vehicles and fuel trucks delivered via barge have to be towed up the beach due to lack of traction, with the exception of propane trucks under favorable conditions. A barge landing ramp located near the sheet pile dock would increase the efficiency of barge deliveries by providing mooring points and a staging area, thereby making deliveries safer and easier to offload.
- **Air Freight** - Port Graham residents and merchants rely on air transport of cargo from Homer for many of their everyday goods. With improved docking facilities, and subsequent improvements in efficiency of cargo barge operations, some of this air cargo could be delivered by barge for less cost.
- **Fuel Barge Operations** - Port Graham receives fuel three times per year via fuel barge from Petro Marine Services in Homer. Deliveries are made through the fuel headers which are located on the cannery dock. However, the cannery dock is in poor condition with rotting decking and there is a high likelihood for collapse. Given existing conditions, the operations director of Petro Marine reports that were it his decision, the company would not make fuel deliveries to Port Graham now. Without dock improvements, Port Graham will be forced to fly in fuel at extraordinary expense or build a road to Nanwalek so deliveries could be made from that community. Improved dock facilities would ensure that Port Graham is able to receive fuel at a cost-effective price.

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska

- Seldovia Ferry - There are plans to create a year-round private ferry service based out of Seldovia, serving some of the communities in Kachemak Bay including Homer, Halibut Cove, Port Graham, and Jackolof Bay. Improved docking facilities at Port Graham may increase the likelihood of becoming a stop for this ferry.
- Alaska Marine Highway System – Residents expressed interest in becoming a port of call for the Tustumena. The AMHS does not stop at Port Graham and does not have a significant interest in docking at Port Graham at this time. Improved docking facilities would not increase the likelihood of an AMHS stop because the Tustumena is more suited for large loads and would not be cost effective for a community like Port Graham.
- Timber Products - Chugachmiut, a non-profit Alaska Native group, reports that Port Graham has the potential for a sustainable timber industry. Transportation of product to Homer or Kenai is a key component for this industry. One form of transportation would be a small cargo ship, which would dock at deep water and have wood products loaded via conveyor belt. The ideal option is to have the wood product loaded into a van and a semi truck and then driven onto a ferry and delivered to Homer, which is the nearest connection to the Alaska state highway system. This option relies on AMHS ferry stoppage in Port Graham. Current designs for the Seldovia fast ferry do not have the cargo capability to transport large amounts of timber products or the vehicles into which the products would be loaded. Export of timber products relies on inexpensive transportation. Both transport scenarios would benefit from improved docking facilities, so the overall likelihood of creating a sustainable timber industry improves with replacement of docking facilities.
- Tourism and Recreation - The community of Port Graham hopes that improved docking facilities will increase the tourism potential of the community and provide incentive for new businesses. Tourism potential is abundant in Kachemak Bay due to its wilderness setting and natural beauty, and hunting and fishing opportunities. Increased tourism would provide income for Port Graham and employment for residents to operate these tourist-related businesses. Improved docking facilities at Port Graham would allow these types of businesses to develop.
- Fuel Sales - Port Graham residents state that many recreational boaters leave Homer and must turn around before getting to Port Graham so that they can conserve fuel for the return trip. If Port Graham had reliable fuel service available to recreational boaters in Kachemak Bay, the community could capitalize on fuel sales and allow recreational boaters the opportunity to travel further into Kachemak Bay and Cook Inlet. This would enhance the recreational boating experience and provide much-needed income to Port Graham residents. Likewise for commercial fishing vessels, the opportunity to refuel at Port Graham, close to the fishing grounds, rather than return to Homer or Seldovia would benefit both the commercial fishing fleet and the community of Port Graham.
- Local Commercial Fishing - Commercial fishermen from Port Graham deliver their catch to Homer and must moor their boats in either Homer or Seldovia due to lack of protected moorage in Port Graham. Restored operations of the Port Graham processing facility and improved docking conditions would eliminate the need for local commercial fishermen to travel to Homer to deliver their catch. However, permanent protected moorage is beyond the scope of this study and vessels would still have to return to Homer for moorage.

- **Local Skiff Fleet** - There are an estimated 30 skiffs regularly used by Port Graham residents. Currently, local skiffs are tied to the float adjacent to the cannery dock for storage during the summer season. Residents report that damages to these skiffs occur when vessels are tied to the dock during wind and storm conditions or from being dragged onto the beach to avoid storm conditions. While vessels are moored at the dock, heavy wind and wave conditions cause vessels to rub against the dock surface and/or damage vessel sides, cleats, and ropes. With improvements to the existing float and the addition of a boat launch ramp, skiff damages could be reduced from being dragged up the beach during storm conditions.

### **Alternatives Considered**

Alternatives were developed to address the existing problems. These alternatives consist of: 1. boat launch ramp, 2. barge landing, 3. cannery dock replacement, 4. cannery dock replacement with a multi-use dock, and 5. fuel trestle. These alternatives are presented and discussed in more detail in Appendices A and B. A summary of the real estate ownership is presented in Appendix C.

Before a project can be implemented using Federal funds additional studies may be required to meet National Environmental Policy Act (NEPA) requirements. Formal study scoping has not been conducted and it is uncertain at this time if a project at Port Graham would require an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). However, based on available information, an EA would likely meet the requirements. Estimated cost to complete an EA is \$100,000. It is suggested that geotechnical investigations and surveying and mapping be conducted to reduce construction risks and cost overruns. Cost for these efforts range from \$300,000 to \$500,000. Detailed design work and construction supervision and administration would also be required to implement a project and would add an additional 18 to 22 percent to the cost of construction.

**Alternative 1.** This alternative is a concrete-plank boat launch ramp located on the east side of a gravel point, which creates a natural protected area in Port Graham. The basis of this concept is the use of 6 inch thick precast concrete planks to provide a 16-foot wide drivable surface to retrieve skiffs from the water on trailers. An 8-foot wide transient mooring float would be constructed adjacent to this ramp to facilitate launch and recovery operations. Estimated construction cost is \$1,540,000.

The local skiff fleet would benefit from this alternative due to reduced vessel damages from dragging vessels up the beach. The Seldovia private ferry would be able to utilize this alternative since it can land at the existing float. However, this alternative does not address additional travel for commercial vessels since there would be only limited moorage for small skiffs. The alternative also does not address cargo barge deliveries or fuel barge deliveries since these vessels could not land at this site due to draft restrictions.

**Alternative 2.** This alternative replaces the existing cannery dock with a 100- x 90-foot concrete dock supported on 12 inch steel piles with a minimum depth of -12 feet MLLW at the dock face. This dock includes a 30- x 60-foot float accessible from the dock by an 80-foot aluminum gangway and a 3,000-square foot metal frame building to house the cannery equipment. A fuel pump will be installed on the float for vessel refueling. The existing dock would be demolished and the cannery and icing equipment and fuel headers would be salvaged for use in the new facility. Estimated construction cost is \$9,370,000.

Commercial vessels could benefit from this alternative if the cannery were to reopen in the future due to reduced travel expenses for cannery facilities; however the float would not provide protected moorage. Fuel barge deliveries would benefit from this facility because the barge could utilize this dock. The private Seldovia Fast Ferry could also utilize this alternative since the existing float will remain in place. This alternative does not address cargo barge deliveries, since the cargo barge cannot land in this area, nor does it address skiff damages since no small vessel launch/landing facilities are provided. This alternative would help facilitate the community's desire to reinstate cannery operations by providing a new cannery building and useful infrastructure for vessels delivering their catch.

**Alternative 3.** Alternative 3 is a multi use dock capable of handling cargo and fuel transfers and mooring for the state ferry M/V Tustumena. The dock is a 50- x 150-foot concrete platform at 30 feet MLLW supported on 24-inch steel piles. Two mooring dolphins would be installed to allow access for larger vessels. The dolphins will be accessible from the dock by means of steel walkways. Access to the dock will be created with a 400-foot gravel road and a 100-foot bridge connecting the road to the dock. The landside bridge abutment would be driven pile with a sheet pile retaining wall. The existing cannery dock would be demolished and the fuel headers would be relocated. Estimated construction cost is \$13,460,000.

For this alternative commercial fishing vessels would not benefit from this dock due to the harsh wave climate and lack of moorage. The dock would accommodate a cargo barge or other large vessel attempting to land in Port Graham. Fuel deliveries would improve, although the schedule could be interrupted based on the wave climate. Also, the Seldovia private ferry could utilize the existing float in its new location for potential future service to Port Graham, but could not land at the new dock. Skiff damages would not be avoided with this dock because smaller vessels cannot utilize the facility. This dock has the potential to meet the community's desire of supporting future cannery operations by providing a dock capable of sustaining cargo transportation. This alternative meets the community's desire to have the capability for state ferry landings, though AMHS is not planning on making Port Graham a port of call in the future. The dock could also meet the community's need for infrastructure to facilitate transport of timber products to support the future industry.

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska

**Alternative 4.** This alternative is a concrete plank barge landing located to the east of the log transfer dock to the northwest of the community. Site improvements will be made to improve the driving surface on the upper beach to connect the plank ramp to the existing road. Two mooring points will be installed to allow the operator to tie off during loading and unloading. Estimated construction cost is \$1,960,000.

This alternative would allow for safer and more efficient cargo deliveries by providing a solid landing and mooring location so vehicles would no longer have to be towed up the beach. No other users would benefit from this alternative. But since the existing float would remain in its current location, it could still support future service from the private Seldovia Fast Ferry. This area cannot be used as a boat launch ramp for local skiffs because this is an unprotected area and weather conditions bad enough to warrant pulling skiffs out of the water will likely be too severe to put a boat on a trailer in this location.

**Alternative 5.** This alternative is a steel trestle adjacent to the existing cannery dock. This alternative provides a new fuel transfer facility and moorage for the fuel barge but does not provide space for cannery or bulk cargo transfer operations and represents the minimum moorage facility required to continue fuel transfer operations at Port Graham. Estimated cost is \$3,740,000.

The only operation supported by this structure is fuel transfer. No other operations can be performed at this facility.



Figure 5. Alternative 1 – Boat Launch Ramp (initial cost \$1,540,000)

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska

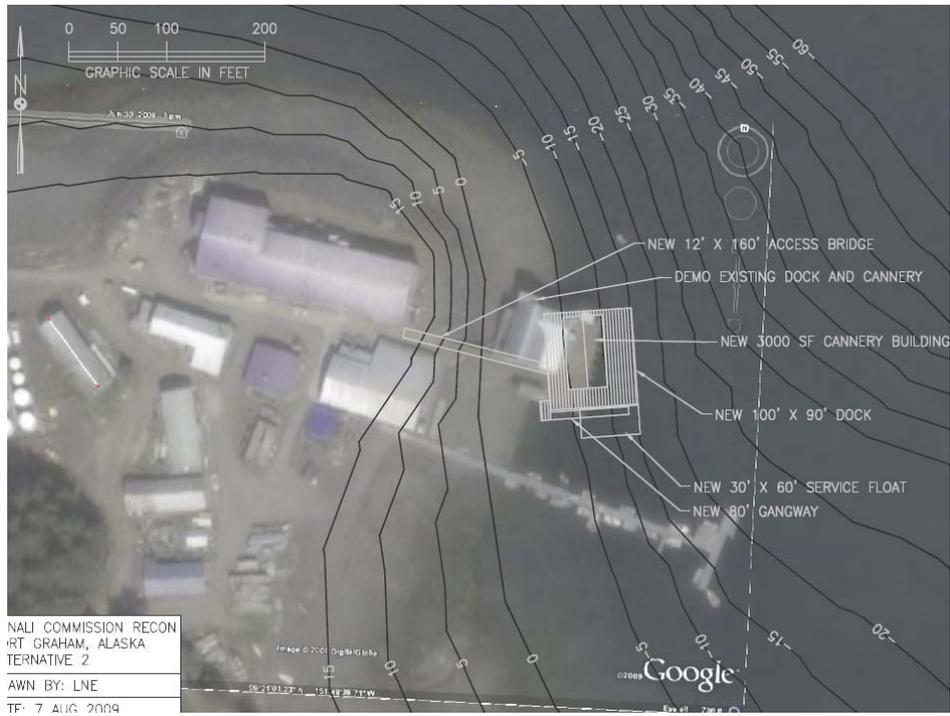


Figure 6. Alternative 2 – Cannery Dock Replacement (initial cost \$9,370,000)

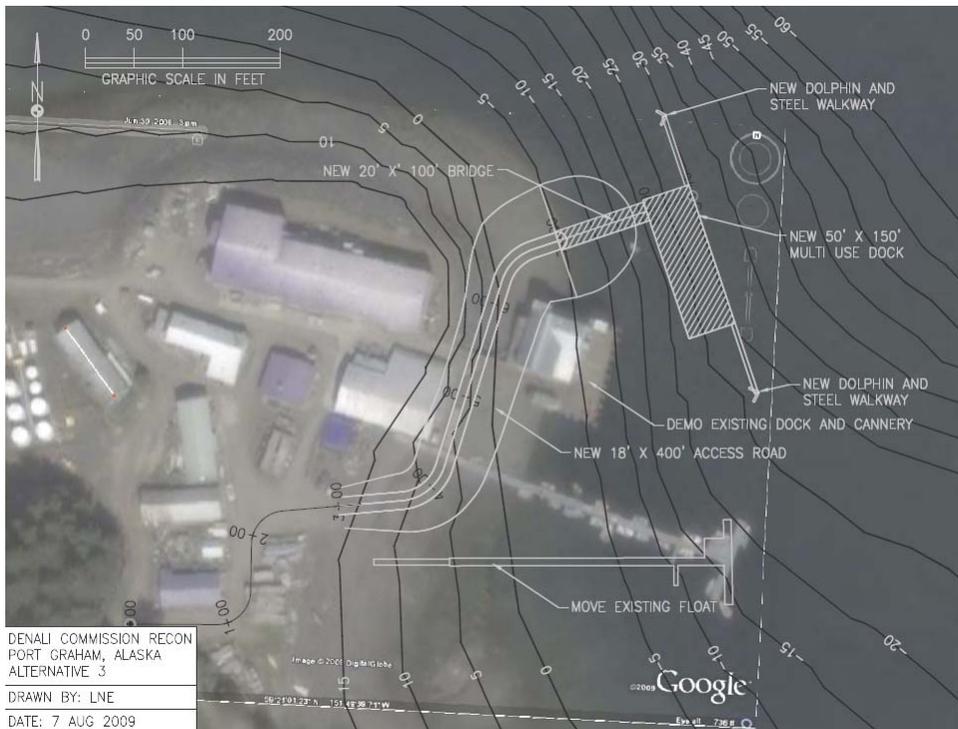


Figure 7. Alternative 3 – Multi-use Dock (initial cost \$13,460,000)

Dock and Marine Infrastructure Improvements  
Technical Report – Port Graham, Alaska



Figure 8. Alternative 4 – Barge Landing (initial cost \$1,960,000)



Figure 9. Alternative 5 – Fuel Trestle (initial cost \$3,740,000)

## 6.0 Economics Summary

The local marine infrastructure in Port Graham is important to the community's welfare. Residents rely on the existing public dock for fuel delivery and hope that the dock could facilitate economic activity and sustainability in the future through reopening of cannery facilities and other various dock uses. The public dock is in poor condition and will become unable to accommodate users within the 50-year period of analysis. Improvements to other marine infrastructure in Port Graham (such as the existing boat launch ramp) could enhance operations in the community for local boaters, cargo deliveries, and a future private ferry service. Loss of the existing dock and continued use of existing marine facilities without improvements will result in the community spending an additional \$6,000 to \$2 million annually for increased costs of fuel service, cargo deliveries, local vessel travel, and passenger transportation. More detailed information is presented in Appendix A.

## 7.0 Other Needed Studies

**Environmental.** The quality and productivity of coastal and terrestrial habitats near Port Graham is very high. The Kenai Peninsula Borough Coastal Management Program has identified the Port Graham/Nanwalek area as an Area which Merits Special Attention (AMSA) due to its importance for subsistence hunting, fishing, and food gathering by area residents and its unique cultural value and historical significance. Clams, mussels, chitons (bidarkies), crab, and other species of shellfish are harvested for subsistence along the shores and in the coastal waters. Halibut, rockfish, and cod are harvested for subsistence in deeper waters. Marine mammals, such as seals, sea otters, and sea lions are harvested for subsistence along the outer coastline. Land animals, such as moose, mountain goat, porcupine, black bear, ptarmigan, spruce hen, and waterfowl, such as ducks and geese are harvested for subsistence throughout the area.

Potential conflicts between subsistence activities, resource enhancement, maintenance of fish and wildlife habitats and development activities receive special attention in the State's review and permitting process. The proposed replacement of facilities does not appear to present significant conflicts with existing subsistence and land use activities.

Some environmental studies have been performed within the project area. Additional studies may be required. Formal study scoping has not been conducted and it is uncertain at this time if the project would require the development of an Environmental Assessment (EA) or an Environmental Impact Statement (EIS). However, based on available information, an EA would likely meet National Environmental Policy Act (NEPA) requirements.

**Surveying and Mapping.** A detailed survey and mapping of the project area would be conducted before developing detailed design of an alternative(s).

**Engineering.** Geotechnical investigations and review of the existing dock designs and construction records would be required to complete detailed designs and cost estimates.

## 8.0 Conclusions

This report finds that there are several viable alternatives to address many of the problems faced by the community. The alternatives are at sites presently used for similar marine activities and it is anticipated that environmental impacts would not be significant.



---

**Dock and Marine Infrastructure Improvements  
Port Graham, Alaska**

**Appendix A - Economics**



**DOCK AND MARINE INFRASTRUCTURE IMPROVEMENTS  
ECONOMICS APPENDIX  
PORT GRAHAM, ALASKA**

---

**CONTENTS**

I.	Community Profile.....	1
A.	Population .....	2
B.	Employment and Income .....	4
C.	Infrastructure and Facilities.....	5
D.	Government.....	7
E.	Project Purpose .....	7
II.	Potential Uses for Improved Facilities.....	8
A.	Cannery Operations.....	8
B.	Cargo Operations .....	11
1.	Barge .....	11
2.	Air Freight.....	12
C.	Fuel Barge Operations .....	13
D.	Ferry Service .....	15
1.	Alaska Marine Highway System.....	15
2.	Seldovia Private Fast Ferry (Kachemak Bay Ferry) .....	16
E.	Other Potential Users .....	16
1.	Timber Products .....	16
2.	Tourism and Recreation .....	17
3.	Fuel Sales to Boaters.....	17
4.	Local Commercial Fishermen .....	18
5.	Local Skiff Fleet.....	18
F.	Potential for Expansion .....	18
III.	Evaluation of Alternatives.....	20
A.	Alternative 1 – Boat Launch for Skiff Fleet .....	20
B.	Alternative 2 – Cannery Dock .....	21
C.	Alternative 3 – Multi-Use Dock.....	22
D.	Alternative 4 – Barge Landing.....	23
E.	Alternative 5 – Fuel Trestle .....	24

---

**FIGURES**

Figure 1. Location of Port Graham .....1  
Figure 2. Port Graham Cannery and Dock.....2  
Figure 3. Port Graham Population (2000-2008) .....3  
Figure 4. Port Graham School Enrollment (K-12).....6  
Figure 5. Port Graham and Cook Inlet Hatchery Returns 2001-2009 (in millions of fish) .....9  
Figure 6. Site of Cargo Barge Deliveries.....12  
Figure 7. Existing Cannery Dock.....14  
Figure 8. Pilings at existing Cannery Dock. ....15  
Figure 9. Proposed Boat Launch Site, Alternative 1 .....20  
Figure 10. Proposed Cannery Dock Replacement Site, Alternative 2.....21  
Figure 11. Proposed Multi-Use Dock Site, Alternative 3 and Fuel Trestle, Alternative 5 .....22  
Figure 12. Proposed Barge Landing Site, Alternative 4 .....23

---

**TABLES**

Table 1. Port Graham Employment by Category and Industry .....4

---

## I. COMMUNITY PROFILE

---

Port Graham is located at the southern end of the Kenai Peninsula on the shore of Port Graham. It is five miles to Nanwalek, 7.5 miles southwest of Seldovia and 28 air miles from Homer. It lies at 59.35 degrees North Latitude and -151.83 degrees West Longitude (Sec. 32, T009S, R015W, Seward Meridian). Port Graham is located in the Seldovia Recording District. The area encompasses 5.9 square miles of land and no square miles of water. Winter temperatures range from 14 degrees to 27 degrees Fahrenheit, summer temperatures range from 45 degrees to 65 degrees Fahrenheit, and average annual precipitation is 24 inches.<sup>1</sup>

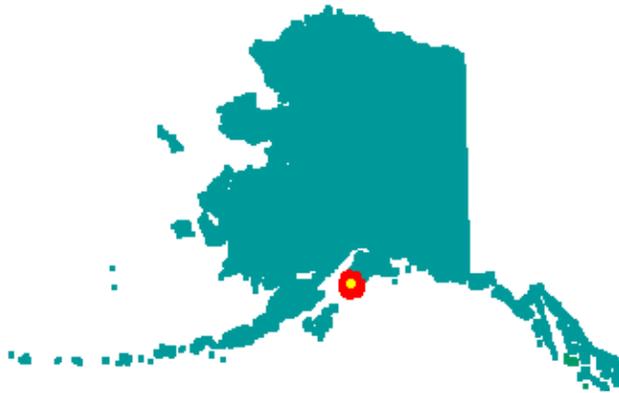


Figure 1. Location of Port Graham

Residents of Port Graham are predominantly of Alutiiq origin. Alutiiqs are an Eskimo that settled along the northern coast of the Gulf of Alaska over a thousand years ago. They are distinguished from other Eskimo groups by their language (Sugcestun) and some of their customs.<sup>2</sup> The earliest known settlers in Port Graham were Russians from the nearby trading post at Nanwalek. In 1850, the Russian-American Co. established a coal mine at Port Graham, but it was not economical and lasted only a few years. Port Graham became the site of a cannery and wharf, according to the U.S. Geological Survey in 1909. In 1911, the Fidalgo Island Packing Co. established a cannery, and Aleuts from Nanwalek moved to the community. A post office was operated between 1938 and 1961. The cannery burned in 1960. It was rebuilt in 1968 by Whitney/Fidalgo, and was sold to the village corporation in 1983. A pink salmon hatchery began operations in 1991. In January 1998, the hatchery and salmon processing plant were destroyed by fire. The hatchery and processing plant were rebuilt and re-opened in June 1999. The rebuilt cannery operated from 2000 through 2002, but has not operated since because the community could not find a company willing to lease and operate the plant. The hatchery has

---

<sup>1</sup> [http://www.commerce.state.ak.us/dca/commdb/CF\\_BLOCK.cfm](http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm)

<sup>2</sup> Development Plan for producing Value-added Pink Salmon Products at the Port Graham Processing Plant, prepared by the Chugach Regional Resources Commission

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

not been consistently operational in the past few years, and is reported to now be closed. Port Graham remains a traditional Alutiiq village with a fishing and subsistence lifestyle.<sup>3</sup> Figure 2 shows the Port Graham cannery and existing dock.



Figure 2. Port Graham Cannery and Dock

### A. Population

According to the 2008 State Demographer estimate, Port Graham is home to 136 people.<sup>4</sup> In recent years, Port Graham has suffered from a declining population as the 2000 Census showed the population to be 171 persons: nearly 21 percent higher than the current population estimate. Anecdotal evidence from residents of Port Graham suggests that the population has been declining since the closure of the cannery in 2002. Census data and anecdotal evidence from the community suggests that under existing conditions, Port Graham may see a continued decrease in population or growth at a relatively slow rate.

---

<sup>3</sup> [http://www.commerce.state.ak.us/dca/commdb/CF\\_BLOCK.cfm](http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm)

<sup>4</sup> State of Alaska Department of Labor and Workforce Development, Research and Analysis Section, 2008 population estimate.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

Figure 3 below shows the population of Port Graham from 2000 through 2008. During this period, population peaked in 2001, which was the last full year that the Port Graham cannery was operational, and has since experienced a decline.

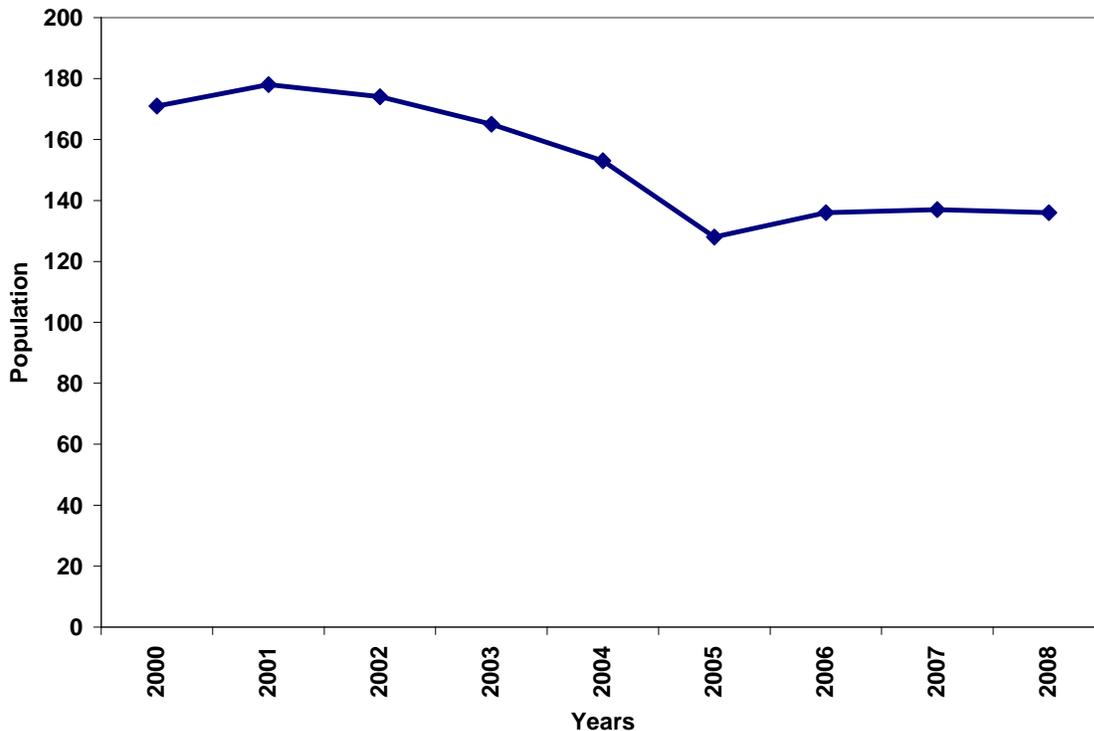


Figure 3. Port Graham Population (2000-2008)

*Source:* Alaska Department of Labor, Research and Analysis Section, Demographics Unit

According to the 2000 Census, the population of Port Graham consists of 88.3 percent Alaska Native or part Native compared to 10.2 percent in the Kenai Peninsula Borough and 19.0 percent in the State of Alaska. Of the remaining population in Port Graham, the next largest racial group was reported as white or part white at 14.6 percent (keeping in mind that individuals may report more than one race). The gender breakdown of Port Graham's population was approximately 53.2 percent male and 46.8 percent female compared to 52 percent male and 48 percent female in both the Kenai Peninsula Borough and the State of Alaska. The median age of a Port Graham resident is 37.8 years, compared to 36.3 years in the Kenai Peninsula Borough and 32.4 years in the State of Alaska.<sup>5</sup>

---

<sup>5</sup> <http://labor.alaska.gov/research/cgin/sf3profiles/ken.pdf>. US Census Bureau, Census 2000. Demographic Profile of Kenai Peninsula Borough, Alaska.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

#### B. Employment and Income

Employment in Port Graham is dominated by the agriculture, forestry, fishing, hunting, and mining, and the educational, health and social services sectors. Combined, these sectors account for 64.4 percent of total employment in the community. According to the 2000 Census, about 59.3 percent of Port Graham's workers were in the private sector, 33.9 percent worked for government entities, and 6.8 percent were self-employed. The 2000 Census also reports that Port Graham had a total potential workforce (population over 16 years of age) of 129 at that time. Of these, 76 were considered to be part of the labor force with 59 employed and 17 unemployed. This was a civilian unemployment rate of 13.2 percent compared to the state average of 9.0 percent.<sup>6</sup> These unemployment figures are from the 2000 US Census: a time when the Port Graham cannery was still in operation. This means that today's level of unemployment is likely much higher since the community's major source of employment has not been operational since 2002.

Table 1. Port Graham Employment by Category and Industry

<b>Employment Category</b>	<b>Number</b>	<b>Percent</b>
Private wage and salary workers	25	59.3
Government workers	20	33.9
Self-employed	4	6.8
<b>Industry</b>		
Agriculture, forestry, fishing and hunting	8	13.6
Construction	1	1.7
Retail trade	3	5.1
Professions, scientific management, administrative, and waste management services	5	8.5
Educational, health and social services	30	50.8
Other services (except public administration)	6	10.2
Public administration	6	10.2

Source: U.S. Bureau of the Census, Census 2000

The unemployment rate does not account for all of the non-working adults in Port Graham. There were also 53 residents, 41.1 percent of the potential workforce, who were considered not in the labor force according to the 2000 Census.<sup>6</sup> This means that they were not working and not looking for work. Many factors can play into the decision to search for jobs, including: scarce availability, informal searching (through communal connections), and seasonal shifts in job opportunities and subsistence activities. Were these individuals included, the unemployment rate for the community would be 54.3 percent rather than the 13.2 percent reported by the Census. It

---

<sup>6</sup> <http://labor.alaska.gov/research/cgin/sf3profiles/ken.pdf>. US Census Bureau, Census 2000. Demographic Profile of Kenai Peninsula Borough, Alaska.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

is important to recognize the definitional differences of the potential workforce and the actual labor force for an accurate understanding of local economic conditions.

The 2000 Census reports that Port Graham has a total of 65 households with a median income of \$40,250 per year. This is compared to a statewide median of \$51,571 and \$46,397 in the Kenai Peninsula Borough. The income per capita for Port Graham was reported as \$13,666, compared to \$20,949 in the Kenai Peninsula Borough and \$22,660 statewide. In Port Graham, 7.6 percent of families live below the poverty level whereas the statewide level is 6.7 percent. In addition to regular income, the community had 18.3 percent of its residents collecting Social Security Income, 10.2 percent with public assistance income, and 15.5 percent with retirement income. Port Graham does not levy taxes.<sup>6</sup>

In addition to wage earning jobs, many Port Graham residents practice a subsistence lifestyle. These subsistence activities include the harvest of salmon, big game animals and many plant species.

Commercial fishing also plays an important role in the local economy. According to the Alaska Department of Fish and Game, residents held nine commercial fishing permits in 2006 with one additional resident holding a crew member license. Due to confidentiality restrictions, commercial harvest and earnings data is not available for Port Graham for all reported years. For 2000, the last year when data was published, the Commercial Fisheries Entry Commission (CFEC) reports that there were 12 permit holders in Port Graham. Only five permits were fished. The total harvest for the year for all fisheries including halibut, herring, other groundfish, sablefish, and salmon was 139,348 pounds, for estimated gross earnings of \$67,925 or \$13,585 per permit fished.<sup>7</sup>

#### **C. Infrastructure and Facilities**

Water in Port Graham is derived from a surface source, treated and stored in a 50,000 gallon redwood tank. Port Graham has a piped water system, sewage disposal system in a community septic tank, and a sludge lagoon. Almost 90 percent of households are fully plumbed and 66 homes and facilities are served by the system. Port Graham Corporation operates the washeteria. The community has requested funds for a new 150,000 gallon water storage tank to provide better treatment and pressure.<sup>8</sup>

The Homer Electric Association provides electricity to the community. The Port Graham Corporation also owns and operates the community fuel tank which holds over 90,000 gallons. Fuel is delivered via a Petro Marine Services fuel barge from Homer, usually three times per year.<sup>8</sup>

---

<sup>7</sup> <http://www.cfec.state.ak.us/gpbycen/2000/122234.htm>. State of Alaska Department of Fish and Game, Commercial Fisheries Entry Commission, Permit & Fishing Activity by Year and City.

<sup>8</sup> [http://www.commerce.state.ak.us/dca/commdb/CF\\_BLOCK.cfm](http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm)

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

Port Graham is not accessible by road. There is a state-owned 1,975 foot by 45 foot dirt and gravel airstrip. Residents rely on air travel and private vessels to travel outside of Port Graham. Two air taxi operators based in Homer provide regularly scheduled and charter flights between Homer and Port Graham, with stops at Nanwalek and Seldovia. Within the community, residents travel by vehicle or all-terrain vehicles (ATVs). There is a four-mile unimproved trail which connects Port Graham and nearby Nanwalek, usually traveled by ATV.<sup>8</sup>

The Port Graham Clinic is available for medical concerns. Medical facilities are also available in nearby Homer. Public safety concerns in Port Graham are addressed by the Alaska State Troopers in Homer or by the local Port Graham EMS/Ambulance service.<sup>8</sup>

Port Graham School, part of the Kenai Peninsula Schools, is the only educational center in the community, serving grades K through 12. Total enrollment was 20 in fiscal year 2009 (FY '09).<sup>9</sup> In rural Alaskan communities, schools are closed if enrollment falls below ten students. As of FY '09, six of the 20 students at the Port Graham School were in 12<sup>th</sup> grade, meaning that school enrollment may experience a significant decrease in the near future and could be in danger of closing.

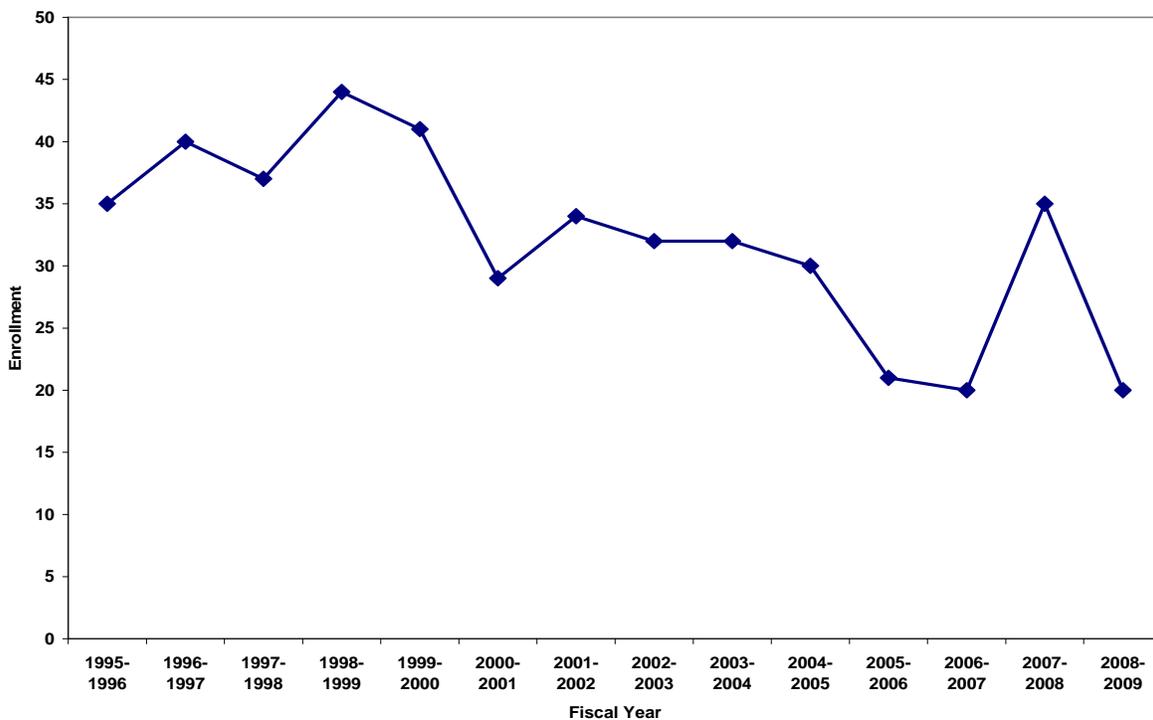


Figure 4. Port Graham School Enrollment (K-12)

<sup>9</sup> Alaska Department of Education and Early Development - <http://www.eed.state.ak.us/stats/SchoolEnrollment/2009SchoolEnrollment.pdf>

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

According to the 2000 Census, there are 79 housing units in Port Graham. Most of these, 88.6 percent, are single-unit detached structures.<sup>10</sup>

**D. Government**

Port Graham is an unincorporated community within the Kenai Peninsula Borough (a borough is similar to a county). The Port Graham Village Council is a federally recognized tribe that serves as the local government entity. The council is an elected government led by a chief. As Port Graham is not incorporated, it is not empowered to enact or collect taxes. Funds for capital projects and their maintenance are provided through government grants or government-sponsored construction.<sup>11</sup>

The Kenai Peninsula Borough was incorporated in 1964 as a second-class borough under the authority of the State of Alaska Borough Act of 1961. The Borough's governmental responsibilities include tax assessment and collection, education, solid waste disposal, planning and zoning, 911 communications, senior citizen funding, and college funding.<sup>11</sup> The borough has an elected mayor and a separately elected assembly and school board.

Port Graham's federally recognized tribe is the Native Village of Port Graham, its local village corporation is Port Graham Corporation, and its ANCSA Native Village Corporation is Chugach Alaska Corporation. Chugachmiut also represents Port Graham as a non-profit corporation to advance the overall economic, social, and cultural development of the people of Chugach region.

**E. Project Purpose**

Existing public dock facilities in Port Graham are insufficient to support the community's desired purposes. The salmon cannery is not in use and disintegrating dock facilities provide little incentive for potential operators to consider reinstating the cannery. Community residents expressed interest in becoming a port for either the state ferry or the private Seldovia fast ferry. It is unlikely that either of these ferry operations would be willing to regularly stop at Port Graham with poor docking facilities. The dock also facilitates fuel barge deliveries because the fuel barge lands at the dock and pumps fuel into the fuel headers, located on the dock. These deliveries are in jeopardy based on the condition of the dock (because the dock is on the verge of collapse) and alternate fuel delivery methods would be very costly for Port Graham. The community reports that improvements to docking facilities would encourage potential future use including tourism, timber harvesting, and fuel service. This study examines the potential benefits of replacing the existing public dock at Port Graham.

---

<sup>10</sup> <http://labor.alaska.gov/research/cgin/sf3profiles/ken.pdf>. US Census Bureau, Census 2000. Demographic Profile of Kenai Peninsula Borough, Alaska.

<sup>11</sup> <http://www.borough.kenai.ak.us/gov01.htm> The Kenai Peninsula Borough

## II. POTENTIAL USES FOR IMPROVED FACILITIES

---

### A. Cannery Operations

The Port Graham salmon cannery was first built in 1909. In 1983, the Port Graham Corporation bought the cannery from the Whitney Fidalgo Company and began leasing the cannery to Chugach Alaska Fisheries (CAF). The facility was historically a major portion of Port Graham's economic base, at one time employing nearly 160 people from Port Graham and nearby Nanwalek. The old cannery building was destroyed by fire in 1998 and a new cannery was built in 1999. The new cannery operated from 2000 through 2002, and has not operated since because the community could not find a company willing to lease and operate the plant.<sup>12</sup>

The existing cannery limits fish processing to canned salmon. The village has been working with Indian Valley Meats in South Anchorage to develop value-added salmon products.<sup>12</sup> According to residents at Port Graham, several workers are already trained to use the value-added equipment, should the cannery become operational.

To improve commercial salmon fishing opportunities in Port Graham, the community obtained a hatchery permit for pink salmon at the cannery. Pink salmon smolts are released at the cannery, which means that the adult fish return to the cannery. Recently, hatchery operations have been inconsistent, creating a significant impact on the commercial pink salmon fishery in the Lower Cook Inlet. Harvests of pink salmon in 2007 were less than one-fifth of the most recent 10-year average and the lowest catch since 1987. Nearly half of pink salmon harvests are taken from the Southern District of the Lower Cook Inlet, the majority of which is a direct result of Port Graham Hatchery production. However in 2007, approximately 92 percent of the Southern District total harvest was utilized for hatchery cost recovery. Similarly, pink salmon harvests in the Southern District in 2008 were very low due to very few returning adults to the Port Graham Hatchery and commercial catches were forced to rely entirely upon natural salmon runs.<sup>13</sup>

Figure 5 below shows the estimated adult returns of all species to the Port Graham Hatchery and compares to all hatcheries in Cook Inlet, including common property harvests, as reported by the hatchery operators. The Port Graham Hatchery did not release any pink salmon in 2008, but did release approximately 250,000 sockeye salmon, which were reared by the Cook Inlet Aquaculture Association (CIAA) for release at the Port Graham facility. In 2007, Port Graham Hatchery released over 13 million pink salmon. According to Alaska Department of Fish and Game 2009 projections, no pink salmon will return to Cook Inlet, and the only returns to the Port Graham Hatchery will be a small number of sockeye. Returns of all species of salmon to Cook Inlet have decreased by almost 90 percent since 2004.

---

<sup>12</sup> Development Plan for producing Value-Added Pink Salmon Products at the Port Graham Processing Plant, Chugach Regional Resources Commission

<sup>13</sup> <http://www.sf.adfg.state.ak.us/FedAidPDFs/sp07-16.pdf> Review of the 2007 Lower Cook Inlet Area Commercial Salmon Fishery, Personal Use Coho Salmon Gillnet Fishery, and Salmon Enhancement Programs, and an Overview of the Lower Cook Inlet Area Herring Fishery/Stock Status

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

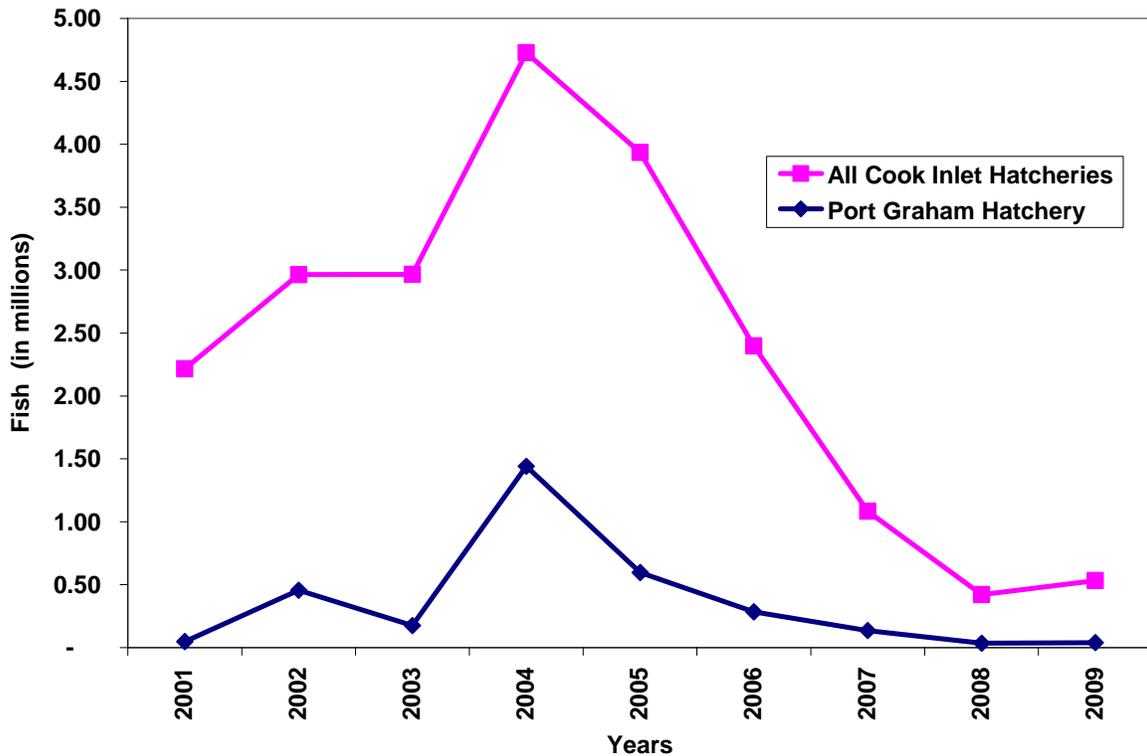


Figure 5. Port Graham and Cook Inlet Hatchery Returns 2001-2009 (in millions of fish)

Source: Alaska Department of Fish and Game, Division of Commercial Fisheries, Mariculture and Aquatic Farming, Alaska Salmon Enhancement Program Annual Reports

Note: 2009 returns are projected.

Port Graham residents report that the hatchery is not operational due to financial problems and that they contacted the CIAA about running the facility. According to Gary Fandrei, the executive director of CIAA, the Port Graham hatchery is a significant asset to the community, and CIAA has discussed taking over the facility with both Port Graham and the Alaska Department of Fish and Game. CIAA would like to help educate members of the community on efficient management strategies so the community could maintain operations of the facility. However, without additional financial support, CIAA cannot commit to operating the facility at this time.<sup>14</sup>

The most recent operator of the Port Graham cannery was SunLand Development LLC based in Homer, Alaska. SunLand constructed the new cannery and hatchery buildings and then operated the facility for a short time. SunLand is a construction and contracting firm and did not have an interest in operating the facility in the long term. Port Graham Corporation believes that

<sup>14</sup> Email communication with Gary Fandrei, Executive Director of CIAA, 6 April 2009.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

SunLand operated the cannery to help the community. SunLand reported that the buildings and canning equipment were installed in the early 2000s and had only operated a short time, suggesting that equipment is in good condition.

The cannery is owned by the Port Graham Corporation who is responsible for finding a company to lease and operate the facility. Port Graham Corporation identified several companies who had at one time expressed interest in operating the cannery. E&E Foods based in Seattle, Washington is one such company. E&E Foods purchased hatchery salmon from Port Graham in 2004, and currently has little to no interest in operating the cannery. The company believes that the facility is too expensive to operate in such a remote location with a relatively limited resource base.<sup>15</sup> Improvements to the docking facilities do not change E&E's interest in operating the Port Graham cannery.

The Port Graham Corporation also identified Icicle Seafoods as at one time having an interest in the Port Graham cannery. According to Icicle, the company does not have an interest in operating the facility at this time for reasons that do not include transportation. Icicle Seafoods reports a lack of fishing resource in the Port Graham area, and that operating a facility in such a remote location with limited resources is not cost effective. Icicle also stated that upon their last inspection, existing cannery equipment is not in good condition and would require a significant effort and cost to repair. Returning the cannery to working order would not be worthwhile for Icicle unless available fishing resources in Cook Inlet increased dramatically above what has been seen in the last 15 to 20 years.<sup>16</sup>

Auction Block Company in Homer, Alaska is another company with an interest in the Port Graham cannery. Auction Block does not have a strong interest in leasing the facility at this time, but would like to lease the facility sometime in the future. The company is currently engaged in other projects and does not have the money to concurrently lease the Port Graham cannery, and believes that the salmon run is not strong enough at this time to lease the facility. However, they believe that conditions will improve which will make Port Graham more profitable. Auction Block expressed concern that transportation is a problem throughout Kachemak Bay and a reliable mode of transportation for cannery items from Port Graham would increase their interest in the cannery. Thus, improved docking facilities which would allow for more reliable cargo transportation would further entice Auction Block to lease the Port Graham cannery. Auction Block has inspected the fish processing equipment at the Port Graham cannery and reports it to be in adequate condition with some maintenance necessary to return the facility to operation. Auction Block estimated that 20 to 40 residents of Port Graham could secure seasonal jobs at the cannery.<sup>17</sup>

According to Auction Block, Port Graham cannery has one of the only institutional can lines in the state. This type of processing produces large cans which can be used by school districts, the U.S. military, or other institutions. Currently, institutional products are not in high demand in

---

<sup>15</sup> Personal communication with Randy Patrick, General Manager of E&E Foods, 5 May 2009.

<sup>16</sup> Email communication with John Woodruff, Icicle Seafoods Inc., 10 May 2009.

<sup>17</sup> Personal communication with Kevin Hogan, Auction Block Company, 5 May 2009.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

the state. But one way to increase the viability of the facility would be if the Port Graham cannery was able to secure a contract to produce institutional food for a government entity.<sup>17</sup>

According to past and potential future operators of the Port Graham cannery, interest in resuming cannery operations is low at this time. Respondents cited a lack of interest in re-establishing operations at the cannery due to lack of transportation in Kachemak Bay, concerns over the condition of canning equipment, and the reduced fishing resources in Cook Inlet. However, Port Graham residents expressed interest in continuing to update their cannery for value-added production, including new equipment and training for employees. If the salmon run in Cook Inlet were to improve considerably, cannery operators could become more interested in operating value-added production at the Port Graham facility.

#### **B. Cargo Operations**

##### **1. Barge**

The *Helenka B*, a supply ship operated by Alaskan Coastal Freight, delivers cargo to Port Graham. Deliveries are made approximately twelve times per year. Deliveries are comprised of goods that are too large to be delivered via air taxi such as vehicles, stoves, mattresses, and supplies for the local school. Alaskan Coastal Freight also delivers propane fuel to power the school. Propane trucks are driven off the vessel into the community. The cost to charter the vessel for a full day is \$11,000, although this cost is sometimes split between Port Graham, Nanwalek, and Seldovia as deliveries can be made to more than one community per day.<sup>18</sup>

The *Helenka B* is a beach landing craft that lands adjacent to the existing log transfer facility. The vessel cannot land closer to the community, near the existing cannery dock, because the water depth is too shallow. Figure 6 below shows the site of cargo barge landings. Improvement to harbor facilities near the Port Graham cannery would have no immediate impact on cargo delivery methods. Since Alaskan Coastal Freight currently delivers to multiple communities in Kachemak Bay on a single day, it is unlikely that Port Graham alone has the freight capacity to warrant a larger barge vessel. It is unknown how large the population would need to expand to necessitate a larger vessel, but such expansion is not expected in Port Graham in the foreseeable future.

However, an improvement which involves a barge landing ramp located near the sheet pile dock would improve the way cargo is delivered. Usually, vehicles and fuel trucks delivered via barge have to be towed up the beach due to lack of traction, with the exception of propane trucks under favorable conditions. A barge landing ramp located near the sheet pile dock would address this problem and increase the efficiency of barge deliveries to Port Graham by providing mooring points and a staging area, thereby making deliveries safer and easier to offload.

Also, if the cannery and hatchery were returned to full operations and salmon runs in Cook Inlet were to improve, there could be increased economic activity and population numbers would

---

<sup>18</sup> Personal communication with Bruce Flanigan, captain of the *Helenka B*, Alaskan Coastal Freight., 21 April 2009.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

return to more historical levels in Port Graham. This would also result in an increased need for cargo capability to support cannery products and other activities. The transportation needs of the community could evolve to be better suited by a more efficient barge vessel which could use improved docking facilities.

Improvement to docking facilities near the existing Port Graham Public Dock would provide no immediate benefit to existing cargo delivery methods. An alternative which provides landing ramp near the existing sheet pile dock would improve cargo deliveries. Deliveries could be accomplished more quickly and safely since the vessel could land on a ramp rather than the beach and vehicles could be driven off, rather than towed up the beach.



Figure 6. Site of Cargo Barge Deliveries

## 2. Air Freight

Port Graham residents and merchants rely on air transport of cargo from Homer for many of their everyday goods. Homer Air charges 33 cents per pound to deliver cargo and estimates that there was approximately 300,000 pounds of cargo delivered to Port Graham during the last 12 months.<sup>19</sup> This represents an annual cost to Port Graham of \$99,000. With improved docking facilities, and subsequent improvements in efficiency of cargo barge operations, some of this air cargo could be delivered by barge for less cost. If cannery operations were to return to full capacity, Port Graham may be able to solicit cargo barge operations which would utilize docking facilities and replace some air cargo transport with less expensive barge operations.

---

<sup>19</sup> Personal communication with Homer Air, 5 May 2009.

### C. Fuel Barge Operations

Port Graham receives fuel deliveries three times per year via fuel barge from Petro Marine Services. The fuel barge from Homer is 280 feet in length with a 2 million gallon fuel capacity and is usually loaded in Nikiski and delivers to communities throughout Southeast and Southcentral Alaska. Only 100,000 gallons of fuel are delivered to Port Graham at a time due to the size of the community's fuel tank. The cost per fuel barge delivery is \$12,600 plus the cost of fuel, which is purchased by the Port Graham Corporation. Deliveries can only be made during daylight hours and during high tide due to navigational constraints and safety concerns of the fuel barge and tug boats. These conditions mean that there are relatively few times during the year when deliveries are feasible so the fuel barge may have to wait for days in Homer for conditions suitable for delivery. Additional delays of fuel delivery occur because the barge cannot be fully-loaded when delivering to Port Graham due to the delivery channel. It is not financially viable for a fuel barge to be loaded less than full, so the barge must first deliver to another community before Port Graham. After being filled at a refinery in Nikiski, the fuel barge makes deliveries to communities such as Cordova or Kodiak and then backtracks to Port Graham in order to deliver a less than half-loaded vessel. This results in extra travel for Petro Marine and delays waiting for deliverable conditions to Port Graham.<sup>20</sup>

According to the operations manager for Petro Marine, delivery conditions at Port Graham are extremely hazardous. Deliveries must be made to the cannery dock because that is where the fuel transfer pipes are located. But the cannery dock is in poor condition with rotting decking and a high likelihood for collapse. There is concern that the entire dock structure could collapse during fuel delivery should the barge make contact with the structure. Barge operators must be precise in their deliveries and a sudden change in weather condition could become dangerous. Any other vessel such as a small commercial fishing boat colliding with the dock pilings would likely cause the dock to become unusable. Staff at Petro Marine estimate that a natural occurrence such as an earthquake or extreme storm could also destroy the dock, and that left on its own under natural conditions and assuming no collisions, the dock will likely be unusable in the next five to ten years.<sup>20</sup> This means that under existing conditions, fuel barge delivery will be infeasible in the near future. Figure 7 shows the existing dock where fuel barge landings are made, and Figure 8 shows the condition of some of the pilings located underneath the dock.

Given existing conditions, the operations director of Petro Marine reports that were it his decision, the company would not make fuel deliveries to Port Graham now. Similarly, he doubts that Port Graham would be able to find another barge delivery service willing to dock at their facilities. Should fuel barge operations cease at Port Graham, there are few other options to provide fuel to the community. One option is to have residents bring fuel over from Homer on their private vessels, but given that the village uses up to 300,000 gallons per year and the relatively small number of vessels in the community, this option is unreasonable. Another option is to hire a landing craft out of Homer to deliver fuel. The cost to charter a landing craft to Port Graham would be at least \$8,000 per delivery, and a vessel of this type could only carry three to

---

<sup>20</sup> Personal communication with Jim Beckham, Vice President of Operations for Petro Marine Services, 23 April 2009.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

five thousand gallons of fuel per trip. An easier option, though much more expensive for fuel delivery is to have fuel delivered by airplane, which would cost ten to twelve dollars per gallon of fuel delivered.

Currently, fuel is delivered to Port Graham three times per year at a cost of \$12,600 per delivery. Petro Marine estimates that with better conditions, deliveries could be reduced by one trip per year. Without dock improvements, Port Graham will be forced to fly in fuel at extraordinary expense or build a five-mile road to Nanwalek so deliveries could be made from that community. Petro Marine stated that in order to make fuel delivery safe, Port Graham would need facilities to accommodate a barge at least 300 feet in length and a tug, which would include a three dolphin structure, which can support such a vessel.<sup>21</sup> Also, an alternative which includes additional fuel tank space could reduce the number of fuel deliveries required per year.



Figure 7. Existing Cannery Dock

---

<sup>21</sup> Personal communication with Jim Beckham, Vice President of Operations for Petro Marine Services, 23 April 2009.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

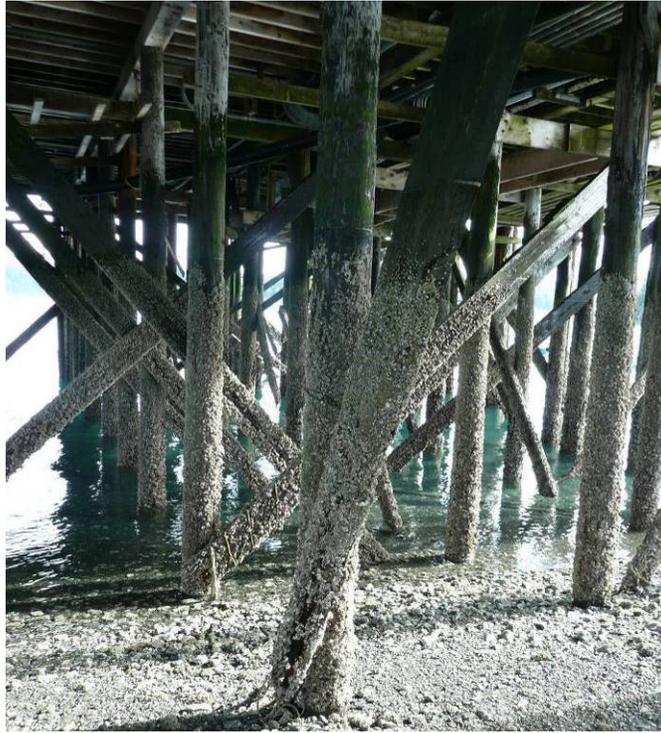


Figure 8. Pilings at existing Cannery Dock.

## D. Ferry Service

### 1. Alaska Marine Highway System

There is currently no ferry service to Port Graham. One Port Graham resident believed that the M/V Tustumena had stopped in Port Graham over the course of one summer. Contact with a representative from the Alaska Marine Highway System (AMHS) could not confirm that the Tustumena had ever stopped in Port Graham. Further inquiry into potential services for the State of Alaska ferry indicated that the AMHS does not have a significant interest in docking at Port Graham at this time.<sup>22</sup> Improved docking facilities would not increase the likelihood of an AMHS stop because the Tustumena is more suited for large loads and would not be cost effective for a community like Port Graham. Service of the Tustumena to Port Graham was compared to having a 747 stop in Homer: not necessary given the size of the community. Another explanation for the lack of interest in Port Graham as a ferry stop is due to the proximity of an AMHS ferry stop in Seldovia. Seldovia is located 7.5 miles from Port Graham. Even though there are no roads between Seldovia and Port Graham, residents could travel by boat to the community in order to pick up the ferry. The M/V Tustumena currently runs between Homer and Seldovia two to three times per week during the summer at a rate of \$33 per person. The

---

<sup>22</sup> Personal communication with Dana Jensen, Port Captain for AMHS 17 April 2009.

M/V Kennicott and the Tustumena operate between Homer and Seldovia one to two times per week during the winter months (October through April) for the same fare.<sup>23</sup>

## **2. Seldovia Private Fast Ferry (Kachemak Bay Ferry)**

There are plans to create a year-round private ferry service based out of Seldovia, serving some of the communities in Kachemak Bay including Homer, Halibut Cove, Port Graham, and Jackolof Bay. However, the project has recently been changed to a summer-only, passenger-only (no vehicles) ferry, running between Seldovia and Homer. The service is intended to complement the existing AMHS ferry schedule and private water taxis, not to compete with these services. The project is led by the Seldovia Native Association (SNA), who states that the ferry will be operational on the Seldovia to Homer route beginning in May 2010.<sup>24</sup>

Port Graham has a strong interest in becoming a port of call for this ferry for both passenger and limited freight transport. SNA expressed an interest in servicing other communities in Kachemak Bay. The ferry would like to add Port Graham to its service schedule, but first needs to strongly establish the Seldovia to Homer route in order to ensure viability of the operation. The private ferry will likely run only the Seldovia to Homer route for the first three to five years of operation before considering expansion to other ports. Improved docking facilities at Port Graham would increase the likelihood of becoming a stop for the Seldovia private ferry.<sup>24</sup> However, the configuration of the existing float is suitable for landings of a ferry vessel of this type. The existing float is in good condition and is expected to last into the foreseeable future.

## **E. Other Potential Users**

### **1. Timber Products**

Chugachmiut, a non-profit Alaska Native group which represents the people in the Chugach region, reports that Port Graham has the potential for a sustainable timber industry. This would include the production of wood chips, briquettes or pellets either for shipment or sale, or use at a future biomass power facility in Port Graham. Port Graham would produce wood chips which would need to be transported to Homer or Kenai to be made into briquettes or pellets. Port Graham could produce the briquettes or pellets locally, but it could be more cost effective to have wood chips shipped to an outside plant for value-added production. Transportation is a key component for the Port Graham timber industry. One form of transportation would be a small cargo ship, which would dock at deep water and have wood products loaded via conveyor belt. The ideal option is to have the wood products loaded into a van and a semi truck and then driven onto a ferry and delivered to Homer, which is the nearest connection to the Alaska state highway system. This option relies on AMHS ferry stoppage in Port Graham. Current designs for the

---

<sup>23</sup> <http://www.dot.state.ak.us/amhs/index.shtml> Alaska Marine Highway System.

<sup>24</sup> Personal communication with Bob Walsh, Director of Rural Affairs for Senator Lisa Murkowski, 24 April 2009.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

Seldovia fast ferry do not have the cargo capability to transport large amounts of timber products or the vehicles into which the products would be loaded.<sup>25</sup>

Export of timber products from Port Graham relies on inexpensive transportation. Both transport scenarios would benefit from improved docking facilities, so the overall likelihood of creating a sustainable timber industry improves with replacement of docking facilities.

### **2. Tourism and Recreation**

There is currently one business licensed in Port Graham which directly caters to tourists.<sup>26</sup> J&L Scenic Wilderness Adventures is a Bed and Breakfast which offers local village tours and local “ecotours”, for \$116 per person, per night. J&L partners with Seaman’s Adventure Charters based out of Homer, which is a fishing and hunting charter and wildlife-viewing company, and offers a stop in Port Graham as part of their services. The natural history tour offered by Seaman’s which stops in Port Graham costs \$225 per person.<sup>27</sup>

The community of Port Graham hopes that improved docking facilities will increase the tourism potential of the community and provide incentive for new businesses. Tourism potential is abundant in Kachemak Bay due to its wilderness setting and natural beauty, and hunting and fishing opportunities. Seldovia, which is only 7.5 miles from Port Graham, offers adventure guiding, fishing and hunting charters, bed and breakfasts, house rentals, restaurants and cafes, and markets for locally created Alaska Native art and food.<sup>26</sup> These are the types of visitor industries which are popular in the area and can be utilized by Port Graham to expand local tourism and recreation in the community. Increased tourism would provide income for Port Graham and employment for residents to operate these tourist-related businesses. Improved docking facilities at Port Graham would allow these types of businesses to develop.

### **3. Fuel Sales to Boaters**

Port Graham residents believe that many recreational boaters leave Homer and must turn around before getting to Port Graham so that they can conserve fuel for the return trip. If Port Graham had reliable fuel service available to recreational boaters in Kachemak Bay, the community could capitalize on fuel sales and allow recreational boaters the opportunity to travel further into Kachemak Bay and Cook Inlet. This would enhance the recreational boating experience and provide much-needed income to Port Graham residents. It is unknown at this time just how many boaters would take advantage of this opportunity.

Likewise for commercial fishing vessels, the opportunity to refuel at Port Graham, close to the fishing grounds, rather than return to Homer or Seldovia would benefit both the commercial fishing fleet and the community of Port Graham.

---

<sup>25</sup> Personal communication with Charlie Sink, Chugachmiut Inc., 6 May 2009.

<sup>26</sup> [http://www.commerce.state.ak.us/dca/commdb/CF\\_BLOCK.cfm](http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm). State of Alaska, Department of Community, Commerce and Economic Development, Business Licenses by community.

<sup>27</sup> <http://www.seamansadventures.com/home> Seaman’s Adventures.

#### **4. Local Commercial Fishermen**

Currently, commercial fishermen from Port Graham must deliver their catch to Homer and must moor their boats in either Homer or Seldovia due to lack of protected moorage in Port Graham. Restored operations of the Port Graham processing facility and improved docking conditions would eliminate the need for local commercial fishermen to travel to Homer to deliver their catch, but the planned alternatives do not include protected moorage, so the vessels would still have to return to Homer to store their vessels.

#### **5. Local Skiff Fleet**

There are an estimated 30 skiffs regularly used by Port Graham residents. Currently, local skiffs are tied to the float adjacent to the cannery dock for storage during the summer season. Residents report that damages to these skiffs occur when vessels are tied to the dock during wind and storm conditions or from being dragged onto the beach to avoid storm conditions. While vessels are moored at the dock, heavy wind and wave conditions cause vessels to rub against the dock surface and/or damage vessel sides, cleats, and ropes. Vessel damages occur as a result of storm avoidance activities. These damages could be avoided in every storm, reported by residents to be 3 or 4 per year. With improvements to the existing float and the addition of a boat launch ramp, skiff damages could be reduced from being dragged up the beach during storm conditions.

Vessel damage occurs when vessels are tied to the existing float adjacent to the cannery dock during wind and storm conditions or from being dragged onto the beach to avoid inclement weather. Port Graham residents estimate that the life of a skiff is reduced by as much as 75 percent due to storm avoidance activities. Residents report needing hull repairs every one to two years at a cost of \$175 per repair including labor and materials. This means approximately \$5,250 of annual damages to Port Graham skiffs could be avoided. Repairs to aluminum skiffs are even more expensive, as one resident described that the local welder charges \$65 per hour to repair the aluminum vessels.

#### **F. Potential for Expansion**

The community of Port Graham envisions many ways in which improved docking facilities will benefit their community beyond more efficient transportation. The village council and corporation expressed interest in adding a fuel float to a new public dock for fueling of vessels. A fuel float in Port Graham would enable both recreation and commercial fishing vessels to travel farther from Kachemak Bay.

Currently, when fuel is delivered to Port Graham, it is owned and operated by the Port Graham Corporation for use by residents. The addition of a fuel float to docking facilities in Port Graham could be a source of income for the community in the form of fuel revenues. Benefits from the addition of a fuel facility at Port Graham are twofold. First, operating expenses for local boaters would be reduced due to a reduced number of trips to Homer or Seldovia. Second, the revenue for the community from dispensing fuel must be considered.

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

However, the Port Graham Corporation stated that the major benefit from a fuel float in Port Graham would not be its revenue-generating potential. Expected use and revenue are very difficult to estimate based on changing fuel prices and shipping costs. It is likely that the cannery operator would operate the fuel float (rather than the Port Graham Corporation or village council), and it is common for canneries to sell fuel at cost to entice fishermen to deliver their catch to the processing facility. The primary purpose of a fuel float in Port Graham would be to encourage boaters and fishermen to stop in the community and utilize other services, not to generate fuel revenue for the community. Port Graham Corporation would rather sell the fuel at a lower price to encourage more people to stop than to make money from the fuel.<sup>28</sup>

Also, the community is taking steps to enroll in the National Marine Fisheries Service Community Quota Entity (CQE) program that allows villages to purchase Individual Fishing Quotas (IFQs) which are then leased to fishers from the village. The lease income goes back into the village to pay for program administration and IFQ purchases, and the fishing income (minus the lease portion) is retained by the fishers. Should this program be enacted, fishing participation and harvest for Port Graham residents is expected to increase.

The Corps of Engineers is concurrently studying the potential for public dock improvements at the neighboring community of Nanwalek, also at the request of the Denali Commission. Due to the proximity of Nanwalek and Port Graham, there is the possibility for improved facilities at one location, but not the other, or one shared safe harbor site. However, Nanwalek and Port Graham desire harbor facilities for different reasons, so it is likely that a shared facility would have to meet the needs of both communities. Port Graham would like to improve or replace its existing public dock in order to encourage renewed operations at the local salmon canning facility. Nanwalek would like a safe harbor in order to aid in the transportation of source material from the proposed rock quarry near Flat Island. Also, the functionality of a shared facility for the communities is contingent upon a road connecting them. There currently exists an unimproved trail between the communities which is usually traveled by 4-wheeler, but can be inaccessible in the winter. This trail is not sufficient to meet the transport needs of either community to frequently travel to the other to utilize docking facilities. The State of Alaska Department of Transportation and Public Facilities (DOT&PF) has a preliminary plan in place to build an airstrip somewhere between Port Graham and Nanwalek which would serve both communities. Part of this plan includes a road from both communities to the airstrip, which could serve as a link from Nanwalek to Port Graham. The airport plan is still in the preliminary phases.

---

<sup>28</sup> Personal communication with Lloyd Styasni, Port Graham Corporation, 6 May 2009.

### III. EVALUATION OF ALTERNATIVES

---

The purpose of this evaluation is to provide viable replacement options for the Port Graham Public Dock to meet the marine transfer needs of the community. The following proposed alternatives provide infrastructure to meet the varying needs and potential future uses of Port Graham docking facilities. See the Hydraulics Appendix for more detail on alternative designs and costs.

#### A. Alternative 1 – Boat Launch for Skiff Fleet

Alternative 1 (location shown in Figure 9) is a concrete-plank boat launch ramp located on the east side of a gravel point which creates a natural protected area in Port Graham. The basis of this concept is the use of concrete planks to provide a drivable surface to retrieve skiffs from the water on trailers. An 8-foot wide transient float is to be constructed adjacent to this ramp to facilitate launch and recovery operations. For this alternative, the existing float would remain in its present location. The local skiff fleet would benefit from this alternative due to reduced vessel damages from dragging vessels up the beach. Also, the Seldovia private ferry would be able to utilize this alternative since it can land at the existing float. However, this alternative does not address additional travel for commercial vessels since there would be only limited moorage for small skiffs. The alternative also does not address cargo barge deliveries or fuel barge deliveries since these vessels could not land at this site due to draft restrictions.



Figure 9. Proposed Boat Launch Site, Alternative 1

## Dock and Marine Infrastructure Improvements

### Port Graham, Alaska

#### **B. Alternative 2 – Cannery Dock Replacement**

Alternative 2 (location shown in Figure 10) is a replacement for the existing cannery dock. This dock includes a float accessible from the dock by an aluminum gangway and a building to house the cannery equipment. The existing finger float in Port Graham would remain in its existing location for this alternative. The cannery line equipment and icing equipment are assumed to be salvageable and re-used in the new facility. A fuel pump will be installed on the float for vessel refueling which addresses the community's interest in utilizing fueling facilities to attract more vessels to Port Graham. The existing community fuel headers are located on the dock and will need to be re-installed on the new dock. Commercial vessels could benefit from this alternative if the cannery were to reopen in the future due to reduced travel expenses for cannery facilities; however the float would not provide protected moorage. Fuel barge deliveries would benefit from this facility because the barge could utilize this dock. The private Seldovia Fast Ferry could also utilize this alternative since the existing float will remain in place. This alternative does not address cargo barge deliveries, since the cargo barge cannot land in this area, nor does it address skiff damages since no small vessel launch/landing facilities are provided. This alternative would help facilitate the community's desire to reinstate cannery operations by providing a new cannery building and useful infrastructure for vessels delivering their catch.



Figure 10. Proposed Cannery Dock Replacement Site, Alternative 2

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

**C. Alternative 3 – Multi-Use Dock**

Alternative 3 (location shown in Figure 11) is a multi-use dock capable of handling cargo and fuel transfers and has enough depth and mooring space for the state ferry M/V Tustumena. It should be noted that AMHS currently has no interest in routing the Tustumena to Port Graham and use of this facility by smaller vessels would be hampered by the more severe wave climate than is experienced at the cannery dock. This increased vessel motion at the dock face may restrict fuel delivery schedules. This alternative requires demolition of the existing cannery dock and relocating the fuel headers which are currently located there. This alternative also requires that the existing float be relocated to not interfere with the new dock.

Commercial fishing vessels would not benefit from this dock due to the harsh wave climate created and lack of moorage. This alternative would accommodate a cargo barge or other large vessel attempting to land in Port Graham. Fuel deliveries would improve with this alternative, although the schedule could be interrupted based on the wave climate. Also, the Seldovia private ferry could utilize the existing float in its new location for potential future service to Port Graham, but could not land at the new dock. Skiff damages would not be avoided with this dock because smaller vessels cannot utilize the facility. This dock has the potential to meet the community's desire of supporting future cannery operations by providing a dock capable of sustaining cargo transportation. This alternative meets the community's desire to have the capability for state ferry landings, though AMHS is not planning on making Port Graham a port of call in the future. The dock could also meet the community's need for infrastructure to facilitate transport of timber products to support the future industry.



Figure 11. Proposed Multi-Use Dock Site, Alternative 3 and Fuel Trestle, Alternative 5

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

**D. Alternative 4 – Barge Landing**

Alternative 4 (location shown in Figure 12) is a concrete-plank barge landing located to the east of the log transfer dock to the northwest of the community. The basis of this concept is to provide a drivable surface for cargo transfer from the barge Helenka B. Site improvements will be made to improve the driving surface on the upper beach to connect the plank ramp to the existing road. Two mooring points will be installed to allow the operator to secure the vessel for offloading and a staging area will be created near the community landfill. This alternative would allow for safer and more efficient cargo deliveries by providing a solid landing and mooring location so vehicles would no longer have to be towed up the beach. No other users would benefit from this alternative. But since the existing float would remain in its current location, it could still support future service from the private Seldovia Fast Ferry. This area cannot be used as a boat launch ramp for local skiffs because this is an unprotected area and weather conditions bad enough to warrant pulling skiffs out of the water will likely be too severe to put a boat on a trailer in this location.



Figure 12. Proposed Barge Landing Site, Alternative 4

**E. Alternative 5 – Fuel Trestle**

Alternative 5 (location shown in Figure 11) is a steel trestle structure adjacent to the existing cannery dock. The trestle is 200 feet long to provide adequate moorage for a 300-foot fuel barge which services Port Graham. The fuel headers and dolphins are accessible via steel walkways. Construction of this alternative includes re-routing the fuel lines and relocating the fuel headers. Since the existing float will remain in its current location under this alternative, future service from the Seldovia private Fast Ferry is supported. The only other operation supported by this structure is fuel transfer; no other operations can be performed at this facility.

---

**Dock and Marine Infrastructure Improvements  
Port Graham, Alaska**

**Appendix B - Hydraulics**



## DOCK AND MARINE INFRASTRUCTURE IMPROVEMENTS

### PORT GRAHAM, ALASKA

---

#### TABLE OF CONTENTS

Location of project .....	1
A. Environmental/Climatological Data.....	1
B. Wind and Wave Data .....	1
C. Tides.....	2
D. Cannery Dock Face Depth .....	4
E. Multi-Use Dock Face Depth .....	4
F. Ferry Service .....	4
General Information and Alternatives.....	5
A. General .....	5
B. Proposed Harbor Sites.....	5
C. Alternative 1.....	9
D. Alternative 2.....	11
E. Alternative 3.....	13
F. Alternative 4.....	15
G. Alternative 5.....	17

---

**LIST OF FIGURES**

Figure 1. Wind Frequency Curve for Homer Area, Alaska (Homer Spit, 210-360°).....2

Figure 2. Fetch Determination .....3

Figure 3. Port Graham Vicinity .....6

Figure 4. Proposed Boat Launch site, Alternative 1 .....7

Figure 5. Proposed Cannery Dock Replacement site, Alternative 2.....7

Figure 6. Proposed Multi-Use Dock site, Alternative 3 and Fuel Trestle, Alternative 5.....8

Figure 7. Proposed Barge Landing site, Alternative 4.....8

Figure 8. Alternative 1 – Boat Launch.....10

Figure 9. Alternative 2 – Cannery Dock Replacement .....12

Figure 10. Alternative 3 – Multi-Use Dock .....14

Figure 11. Alternative 4 – Barge Landing .....16

Figure 12. Alternative 5 – Fuel Trestle .....18

---

---

**LIST OF TABLES**

Table 1. Tide Elevations at Port Graham.....2

Table 2. Cannery Dock Face Depth.....4

Table 3. Multi-Use Dock Face Depth .....4

Table 4. Alternative 1 (Boat Launch) Cost Estimate .....9

Table 5. Alternative 2 (Cannery Dock) Cost Estimate .....11

Table 6. Alternative 3 (Multi-Use Dock) Cost Estimate .....13

Table 7. Alternative 4 (Barge Landing) Cost Estimate.....15

Table 8. Alternative 5 (Fuel Trestle) Cost Estimate .....17

---

## **Location of project**

---

Port Graham is located at the southern end of the Kenai Peninsula on the shore of Port Graham. It is adjacent to Nanwalek, 7.5 miles southwest of Seldovia and 28 air miles from Homer. The community lies at 59.351390° North Latitude and 151.829720° West Longitude. Winter temperatures range from 14 to 27; summer temperatures vary from 45 to 65. Average annual precipitation is 24 inches.

### **A. Environmental/Climatological Data**

The following wind, Tide and Wave information has been taken from a U.S. Army Corps of Engineers report “Port Graham, Alaska Small Boat Harbor Preliminary Reconnaissance Report” dated May 1990.

### **B. Wind and Wave Data**

Wind from Homer Spit was used to predict the wave environment at Port Graham from the northwest fetch. This information was augmented by local accounts of winds from the east fetch. The 50-year design wind was 70 miles per hour, based on a 1-hour sustained duration.

Port Graham is subject to seas from the northwest and east. Site-specific wind data are unavailable. Wind data from Homer Spit, 24 miles northeast of Port Graham, was used to develop the wave climate in the northwest fetch. The frequency curve for the Homer area is shown in Figure 1. Information from local residents was used to arrive at wind speeds used to develop the wave climate in the east fetch, as Homer wind data would not apply due to terrain effects. From this information, a 70-mile-per-hour, 1-hour-duration winds peed was derived for the east fetch. This is considered reasonable due to the funneling effects of the mountains at the head of the east fetch (Figure 2).

Both the northwest and east fetch lengths were computed by constructing nine radials from Port Graham at 3-degree intervals (Figure 2). The average value of the nine radials in each fetch was then used as the fetch length. The northwest fetch is 2 statute miles long, and the east fetch is 1.4 statute miles long.

The wave climate was developed by the methods in the Shore Protection Manual (SPM), 1984, and by the use of ACES (Automated Coastal Engineering System). The following wave characteristics were determined:

Northwest fetch:  $H_s$  - 4.0 feet,  $T$  - 3.2 seconds,  $L_o$  - 52 feet

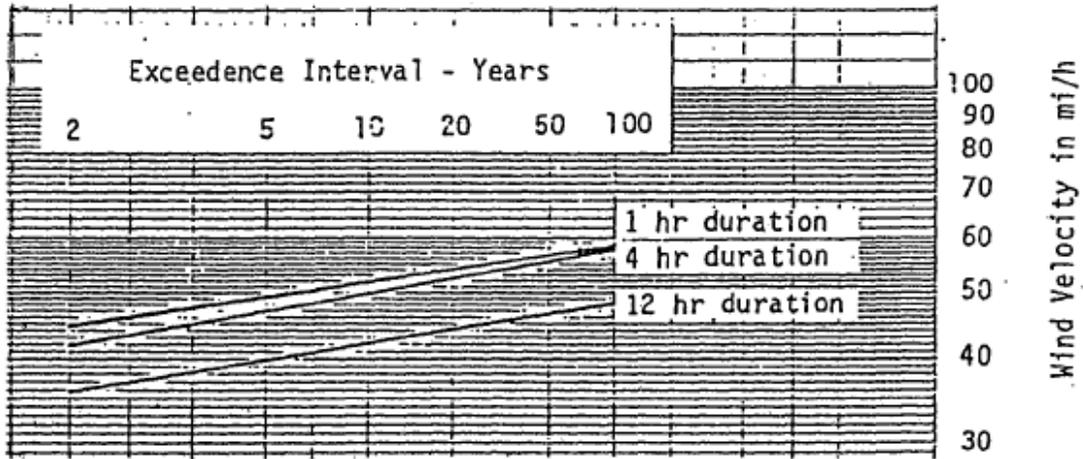
Fetch limited

East fetch:  $H_s$  - 4.0 feet,  $T$  - 3.2 seconds,  $L_o$  - 52 feet

Fetch limited

$H_s$  is the significant wave height,  $T$  is the wave period, and  $L_o$  is the deep-water wave length. Refraction was ignored for this study, as water depths leading up to the structure are generally greater than one-half the wave length.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



NOTES: (1) Frequency curves are based on 5 years of wind data collected between 1965 and 1973.  
(2) Data were fitted to a Log-Pearson Type III distribution with zero skew.

Figure 1. Wind Frequency Curve for Homer Area, Alaska (Homer Spit, 210-360°)

**C. Tides**

Tide levels referenced to mean lower low water (MLLW) are shown in Table 1. Extreme high tide levels result from a combination of astronomic tides and rises in local water levels due to atmospheric pressure.

Table 1. Tide Elevations at Port Graham

Level Type	Level Referred to MLLW (ft)
Highest Tide (Estimated)	22.3
Mean Higher High Water (MHHW)	16.5
Mean High Water (MHW)	15.8
Mean Half Tide Level	8.6
Mean Low Water (MLW)	1.6
Mean Lower Low Water (MLLW)	0.0
Lowest Tide (Estimated)	-7.0

Sources: NOAA Chart 16646 and Tides & Currents Pro 2.5

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

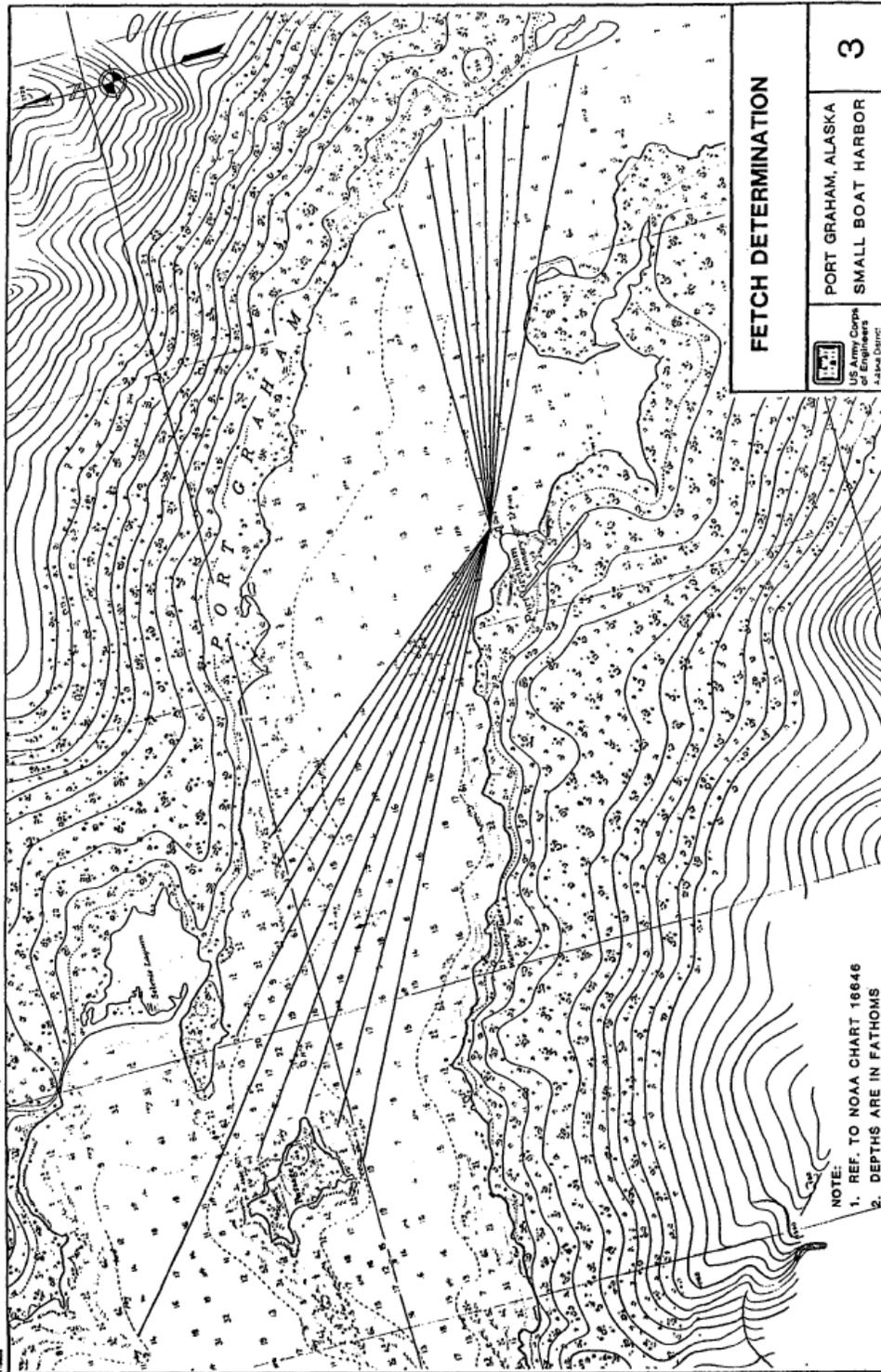


Figure 2. Fetch Determination

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

**D. Cannery Dock Face Depth**

The minimum required mooring depth for the fishing fleet was based on the following criteria:

Table 2. Cannery Dock Face Depth

Design Parameter	Value
Vessel Draft	-6.5 ft
Pitch, roll, and heave	-2.0 ft
Squat	-0.5 ft
Tide Allowance*	-5.0 ft MLLW
Safety Clearance (based on sand & gravel bottom)	-2.0 ft
Ferry Dock Face Depth	-16 ft MLLW

\*Tide allowance assumes some periods of inoperability during extreme low tides.

**E. Multi-Use Dock Face Depth**

The minimum required mooring depth for the ferry dock was based on the following criteria:

Table 3. Multi-Use Dock Face Depth

Design Parameter	Value
Vessel Draft (MV Tustumena)	-14.5 ft
Pitch, roll, and heave	-3.0 ft
Squat	-1.5 ft
Tide Allowance	-7.0 ft MLLW
Safety Clearance (based on sand & gravel bottom)	-2.0 ft
Dock Face Depth	-28 ft MLLW

**F. Ferry Service**

Currently, there is no regularly scheduled ferry service to Port Graham. The Alaska Marine Highway System (AMHS) operates a ferry route in the area that serves Homer and Seldovia. There is no current interest in altering the route to make a stop at Port Graham. The AMHS vessel serving this route is the MV Tustumena which is a 150-foot vessel with a draft of 14.25 feet. For the Tustumena to operate, a ferry dock capable of handling vehicle traffic is required.

The Seldovia Native Association recently commissioned the Kachemak Voyager, a passenger ferry scheduled to run from Homer to Seldovia to Homer on a regular basis. This vessel is designed for some freight capacity and can be loaded and unloaded from a floating dock. With some modifications, the float proposed in Alternative 2 could be used as a passenger loading and offloading facility. As with the AMHS, there are currently no plans for this ferry to serve Port Graham.

## **General Information and Alternatives**

---

### **A. General**

This reconnaissance-level report is based on a site visit and information gathered from reports and studies. All costs presented herein are parametric costs only using scalable values taken from bid proposals from various other jobs using a large amount of engineering judgment to adjust these costs to this site. Costs developed for the Harbor Improvements Evaluation at Perryville, Alaska were used as a check to this evaluation. It must be emphasized that this is a decision making level report, not a design level report. While the information presented is believed to be representative, it is based on very preliminary information that will have to be checked and verified at the design stage before anything is built.

### **B. Proposed Harbor Sites**

Four different alternatives have been evaluated, and a parametric cost estimate prepared for each. Alternatives 1, 2, 3, and 5 are located in the lee of the gravel point where the cannery facilities are located while alternative 4 is located near the log transfer dock which is a more exposed location.

Alternative 1 is a new concrete plank boat launch with a transient mooring float located within the protected area of Port Graham.

Alternative 2 replaces the existing timber dock and moves it into deeper water for improved mooring. This alternative also adds a float which can be used for fueling vessels.

Alternative 3 is a multi-use dock located off the point of the gravel bar. The dock was sized to service the MV Tustumena and includes a 400-foot access road and 100-foot bridge to move traffic from the ferry to the community. This is the location where the design wave was calculated for Port Graham.

Alternative 4 is a concrete plank barge landing located to the northwest of the community near the existing log transfer dock. This alternative includes road improvements and a staging area to facilitate cargo offloading operations.

Alternative 5 is a steel trestle located adjacent to the existing cannery dock. This alternative provides new fuel transfer facilities and moorage for the fuel barge but does not provide space for cannery or bulk cargo transfer operations and represents the minimum moorage facility required to continue fuel transfer operations at Port Graham.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



Figure 3. Port Graham Vicinity

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



Figure 4. Proposed Boat Launch site, Alternative 1



Figure 5. Proposed Cannery Dock Replacement site, Alternative 2

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



Figure 6. Proposed Multi-Use Dock site, Alternative 3 and Fuel Trestle, Alternative 5



Figure 7. Proposed Barge Landing site, Alternative 4

Dock and Marine Infrastructure Improvements

Port Graham, Alaska

**C. Alternative 1**

Alternative 1 is a concrete-plank boat launch ramp located on the east side of a gravel point, which creates a natural protected area in Port Graham. The basis of this concept is the use of 6-inch thick precast concrete planks to provide a 16-foot wide drivable surface to retrieve skiffs from the water on trailers. The planks run down to elevation -2 feet MLLW, enabling trailers to drive to the water under most tide conditions. An 8-foot wide transient mooring float is to be constructed adjacent to this ramp to facilitate in launch and recovery operations. The existing float is in good condition and will continue to be used for moorage at its present location. The cost estimate and site plan are shown in Table 4 and Figure 8.

Table 4. Alternative 1 (Boat Launch) Cost Estimate

<b>Item</b>	<b>Quantity</b>	<b>Unit of Measure</b>	<b>Unit Price</b>	<b>Cost</b>
Mob./Demob. & Bonds	1	LS	750,000	750,000
16' x 250' Boat Launch	4,000	SF	15	60,000
8' x 250' Transient Float	2,000	SF	200	400,000
12" Piles	5	EA	5,000	25,000
Upgrade Access Road (120' x 40' x 18")	4,800	SF	10	48,000
				<u>\$ 1,283,000</u>
Contingency (20%)				257,000
			Construction Cost (2009)	\$ 1,540,000
			<b>Construction Cost (at year 2011)</b>	<b>\$ 1,800,000</b>

Note: Design costs range between 8.5% and 12.5 % of the construction cost.  
Construction supervision and administration would be about 10% of the construction cost.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

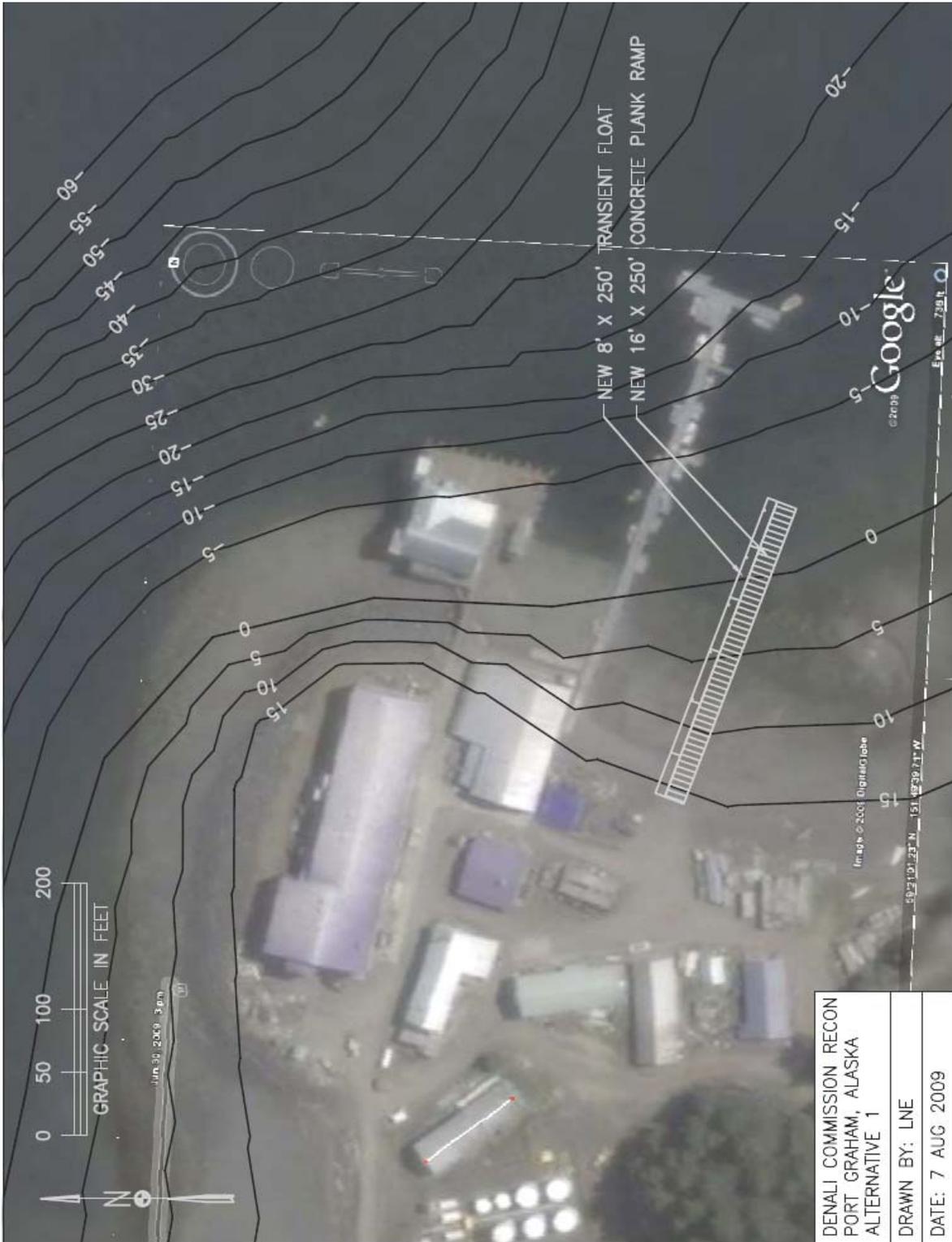


Figure 8. Alternative 1 – Boat Launch

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

**D. Alternative 2**

Alternative 2 replaces the existing cannery dock with a 100- x 90-foot concrete dock supported on 12-inch steel piles with a minimum depth of -16 feet MLLW at the dock face. Two dolphins are required to accommodate mooring of the fuel barge. The new deck would be 10-inch thick reinforced concrete laid on steel pile cap beams. This dock includes a 30- x 60-foot float, accessible from the by an 80-foot aluminum gangway, and a 3,000-square foot metal frame building to house the cannery equipment. A fuel pump would be installed on the float for vessel refueling. Costs include demolition of the existing timber dock and ice and canning facilities. The cannery and icing equipment is assumed to be salvageable and would be re-used in the new facility. The fuel headers located on the dock will need to be re-installed. The elevation of the dock is 30 feet MLLW with pile average lengths of 55 feet. This alternative appears to best meet the needs of the community in terms of protected moorage and cannery operation. An alternative design is to use a sheetpile bulkhead and backfill to create the uplands required for the cannery and other dock operations for a comparable cost. A drawback to this design is wave reflection along the face of the bulkhead. This process increases the wave height at the dock face and can be problematic for mooring and cargo handling activities. The cost estimate and site plan are shown in Table 5 and Figure 9.

Table 5. Alternative 2 (Cannery Dock Replacement) Cost Estimate

Item	Quantity	Unit of Measure	Unit Price	Cost
Mob./Demob. & Bonds	1	LS	850,000	850,000
<b><u>Dock</u></b>				
Demo Existing Dock & Building	1	LS	450,000	450,000
Dock	10,700	SF	275	2,942,500
Mooring Dolpin	2	EA	400,000	800,000
12" Piling (Includes Batter Piles)	6,400	LF	85	544,000
Light Duty Fender System	450	LF	1,000	450,000
Heavy Duty Fender System	330	LF	2,000	660,000
Jib Crane	2	EA	140,000	280,000
Electric Generator Set	1	EA	45,000	45,000
Relocate Fuel Headers, Install Fuel Pumps	1	LS	90,000	90,000
Steel Building	1	LS	130,000	130,000
80' Aluminum Gangway	1	EA	30,000	30,000
30' x 60' Float	1,800	SF	300	<u>540,000</u>
				\$ 7,811,000
Contingency (20%)				1,562,000
			Construction Cost (2009)	\$ 9,370,000
<b>Construction Cost (at year 2011)</b>				<b>\$ 11,000,000</b>

Note: Design costs range between 8.5% and 12.5 % of the construction cost.  
Construction supervision and administration would be about 10% of the construction cost.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

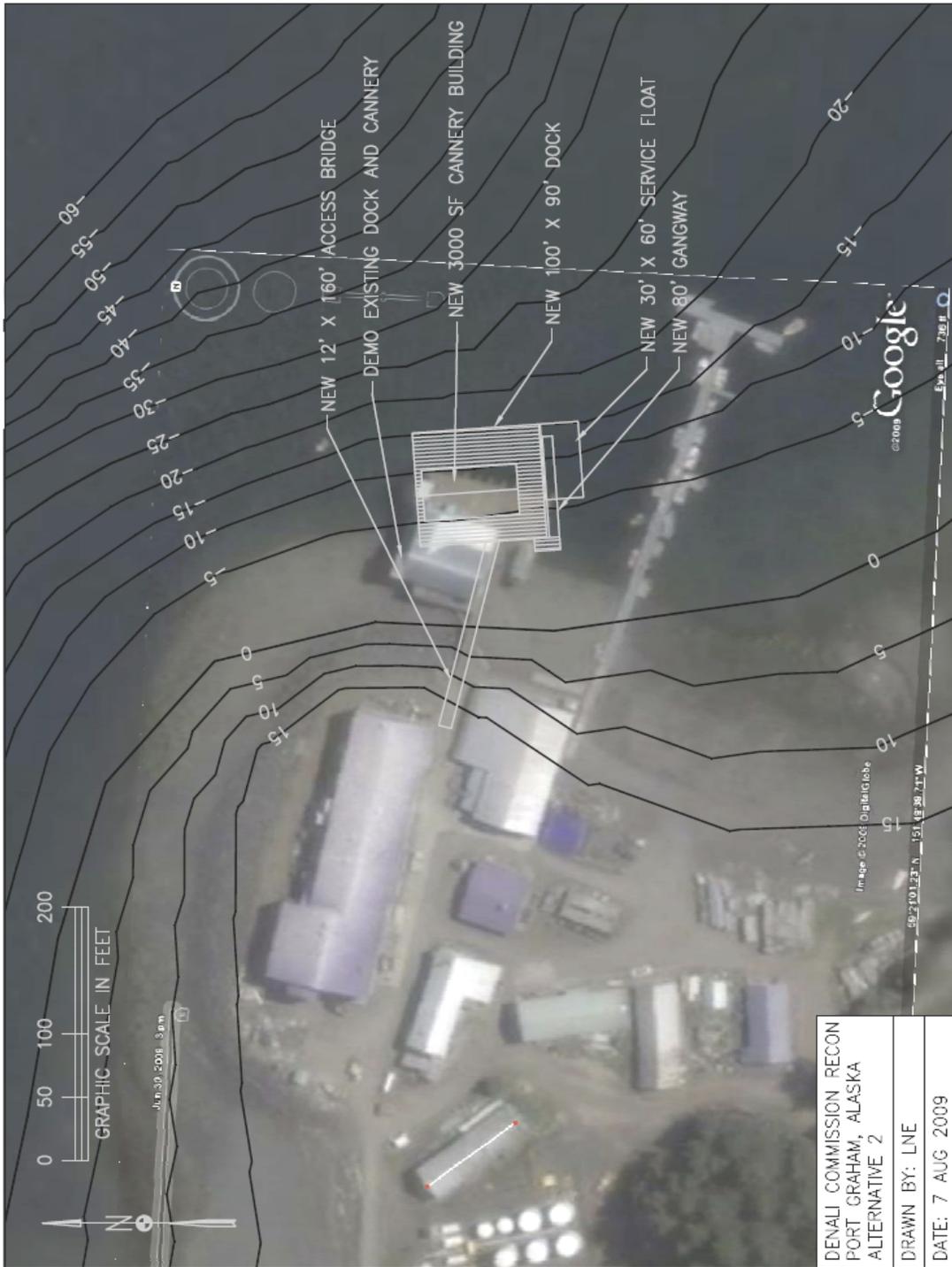


Figure 9. Alternative 2 – Cannery Dock Replacement

Dock and Marine Infrastructure Improvements

Port Graham, Alaska

**E. Alternative 3.**

Alternative 3 is a multi-use dock for handling cargo and fuel transfers and mooring the MV Tustumena. The dock is a 50- x 150-foot concrete platform at 30 feet MLLW supported on 24-inch steel piles. The concrete platform is 12 inches thick. Two mooring dolphins would be installed to allow access for larger vessels. The dolphins would be accessed from the dock by means of steel walkways. Access to the dock would be via a 400-foot gravel road to be built in the tidal zone and a 100-foot bridge connecting the road to the dock. The road will be gravel surfaced with an 18-foot driving surface and the bridge will be 20 feet wide and made of pre-cast concrete panels resting on steel beams. The landside bridge abutment would be driven pile with a sheet pile retaining wall. The road would require armor. The existing cannery dock would be demolished and fuel headers relocated to the new facility. This alternative also requires relocation of the existing mooring float to the east since the road embankment will inhibit access to the float at its current location. The AMHS currently has no interest in routing the Tustumena to Port Graham and any use of this facility by smaller vessels would be hampered by the more severe wave climate than is experienced at the cannery dock. This increased vessel motion at the dock face may restrict fuel delivery schedules. As with the cannery dock, this structure could also be constructed with a sheetpile bulkhead for comparable cost. Vessel motion would be more pronounced at this location due to its increased exposure to waves from Kachemak Bay. The cost estimate and site plan are shown in Table 6 and Figure 10.

Table 6. Alternative 3 (Multi-Use Dock) Cost Estimate

Item	Quantity	Unit of Measure	Unit Price	Cost
Mob./Demob. & Bonds	1	LS	2,000,000	2,000,000
<u>Dock</u>				
Demo Existing Dock & Building	1	LS	450,000	450,000
Dock and Road Bridge	9,500	SF	300	2,850,000
24" Piling (Includes Batter Piles)	13,500	LF	90	1,215,000
Heavy Duty Fender System	800	LF	2,000	1,600,000
Mooring Dolphins	2	EA	400,000	800,000
Electric Generator Set	1	EA	45,000	45,000
Relocate Fuel Headers	1	LS	70,000	70,000
<u>Road</u>				
New Access Road (400' x 20')	19,000	CY	40	760,000
Armor Stone	4,000	CY	250	1,000,000
Filter Layer	2,000	CY	175	350,000
Relocate existing float	1	LS	75,000	<u>75,000</u>
				\$11,215,000
Contingency (20%)				2,243,000
			Construction Cost (2009)	\$ 13,460,000
			<b>Construction Cost (at year 2011)</b>	<b>\$ 15,700,000</b>

Note: Design costs range between 8.5% and 12.5 % of the construction cost.  
Construction supervision and administration would be about 10% of the construction cost.



Dock and Marine Infrastructure Improvements

Port Graham, Alaska

**F. Alternative 4**

Alternative 4 is a concrete-plank barge landing located to the east of the log transfer dock to the northwest of the community. The basis of this concept is the use of 12-inch thick precast concrete planks to provide a drivable surface for cargo transfer from the barge Helenka B. The planks run down to elevation -2 feet MLLW. Site improvements would be made to improve the driving surface on the upper beach to connect the plank ramp to the existing road. Two mooring points would be installed to allow the operator to tie off during loading and unloading. A staging area will be created near the community landfill. Note that this alternative does not improve fuel delivery to Port Graham, only bulk cargo delivered by barge. The cost estimate and site plan are shown in Table 7 and Figure 11.

Table 7. Alternative 4 (Barge Landing) Cost Estimate

<b>Item</b>	<b>Quantity</b>	<b>Unit of Measure</b>	<b>Unit Price</b>	<b>Cost</b>
Mob./Demob. & Bonds	1	LS	1,100,000	1,100,000
24' x 180' barge landing	4320	SF	20	86,400
Upgrade Access Road	4,000	SF	5	20,000
Staging Area	15,000	SF	15	225,000
Mooring Points	2	Each	100,000	<u>200,000</u>
				\$ 1,631,000
Contingency (20%)				326,000
			Construction Cost (2009)	\$ 1,960,000
			<b>Construction Cost (at year 2011)</b>	<b>\$ 2,300,000</b>

Note: Design costs range between 8.5% and 12.5 % of the construction cost.  
Construction supervision and administration would be about 10% of the construction cost.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



Figure 11. Alternative 4 – Barge Landing

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska

**G. Alternative 5**

Alternative 5 is a steel trestle structure adjacent to the existing cannery dock. The trestle is 200 feet long to provide adequate moorage for a 300-foot fuel barge which services Port Graham. The fuel headers and dolphins would be accessed via steel walkways. The only operation supported by this structure is fuel transfer. No other operations can be performed at this facility. Construction of this alternative includes re-routing the fuel lines and installing the fuel existing headers on the structure.

Table 8. Alternative 5 (Fuel Trestle) Cost Estimate

<b>Item</b>	<b>Quantity</b>	<b>Unit of Measure</b>	<b>Unit Price</b>	<b>Cost</b>
Mob./Demob. & Bonds	1	LS	850,000	850,000
Demo Existing Dolphin	4320	SF	20	100,000
Steel Walkway				360,000
24" Piling (includes batter piles)	15,000	SF	15	135,000
Mooring Dolphins	2	Each	100,000	800,000
Heavy Duty Fender System				700,000
Electric Generator Set				45,000
Relocate Fuel Headers				75,000
Steel Building				50,000
				<u>\$ 3,115,000</u>
Contingency (20%)				623,000
			Construction Cost (2009)	\$ 3,740,000
			<b><u>Construction Cost (at year 2011)</u></b>	<b>\$ 4,400,000</b>

Note: Design costs range between 8.5% and 12.5 % of the construction cost.  
Construction supervision and administration would be about 10% of the construction cost.

Dock and Marine Infrastructure Improvements  
Port Graham, Alaska



Figure 12. Alternative 5 – Fuel Trestle

---

**Dock and Marine Infrastructure Improvements  
Port Graham, Alaska**

**Appendix C – Real Estate**



## I. REAL ESTATE SUMMARY

---

**Project Summary:** The purpose of this summary is to determine real estate requirements for the project planning document for potential navigation improvements at Port Graham, Alaska. The document includes an outline of reasonable alternatives, including replacement of the dock. Real estate at this point has been tasked to:

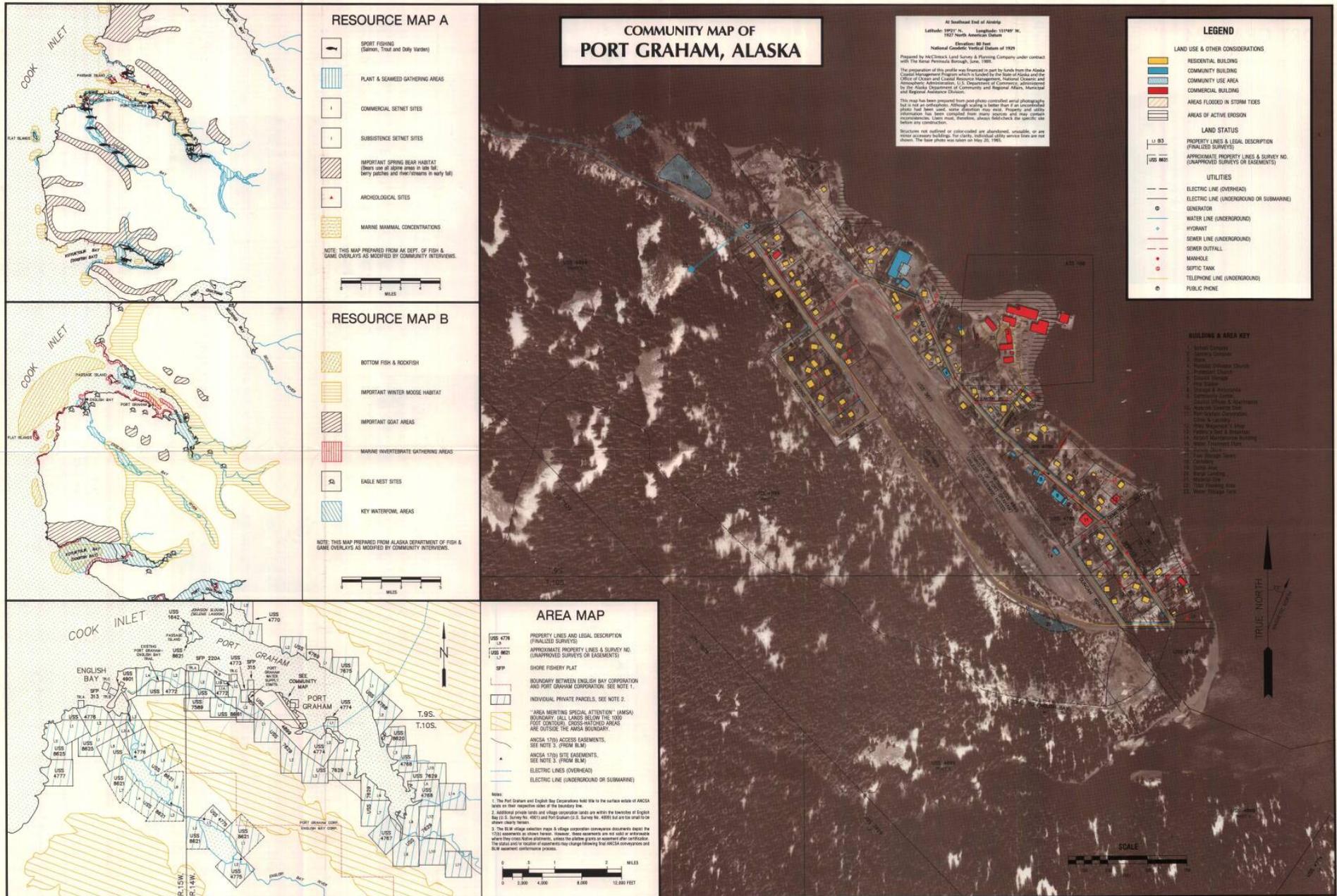
- Determine ownership of land and tidelands of the existing dock and two alternate locations.
- Identify rights of way required to replace the existing dock.
- Prepare a map that illustrates ownership for the dock and proposed alternative locations.

**Current Ownership:** Alternative Site 1, where the existing City Dock is located, the uplands and tidelands are owned by the Port Graham Village Council as shown on U.S. Survey 510. Alaska Statue 38.05.825 provides for conveyance to municipalities of tidelands that are occupied or suitable for occupation and development. The Division of Mining, Land and Water conveyed to the present dock to The Port Graham Village Council in 1999. The Port Graham Village Council owns the 6.18 acres of uplands and 9.32 acres of the tide and submerged lands identified on U.S. Survey 510. Alternative sites 2, 3, and 5 are all located within USS 510, identified on the attached community map. Alternative site 4 is located within U.S. Survey 4899, Tract “E”. The Port Graham Village Council is the land owner for the uplands and tidelands in the area Tract “E”, as shown on the official plat.

**Real Property Interests required for the project:** Initial information indicates all lands required for construction, operation, and maintenance of each alternative are owned by the Port Graham Corporation. Port Graham would likely be responsible for operating and maintaining which ever alternative is construction. Real estate requirements for all alternatives are the same.

**Required Rights of Way:** An access Agreement for Construction from the Port Graham Council would have to be obtained before construction.

# Dock and Marine Infrastructure Improvements Technical Report – Port Graham, Alaska



---

**Dock and Marine Infrastructure Improvements  
Port Graham, Alaska**

**Appendix D – Site Visit Trip Report March 2009**



## MEMORANDUM FOR RECORD

SUBJECT: Port Graham Site Visit - Trip Report

NAME OF TRAVELER – Lorraine Cordova, Emily Toenes, Nathan Epps, Tina McMaster-Goering, Patrick Fitzgerald

DATE OF TRAVEL – 17 March 2009

PURPOSE OF TRIP – Meeting with community members and leaders to discuss marine-related problems and opportunities at Port Graham.

EXECUTIVE SUMMARY – The study team spoke with several community members and provided a study briefing to the Village Council. Patrick Norman, Chief, Port Graham Village Council led a tour of the potential harbor and dock area and discuss the problems and opportunities of the Village. Findings from the trip are presented below:

Small Boat Harbor:

- 20 to 30 skiffs owned by residents
- 9 to 10 residents have obtained a six-pack license. Only one resident owns a boat for chartering
- Harbor could allow the skiff owners to purchase large boats. 42-foot boat probably the biggest boat that would be purchased
- Tanner crab personal use fishery is expanding due to return of crab to Kachemak Bay area
- Boat owners and helpers haul boats up the beach during periods of high wind and waves and icing.
- Boat damages occur from being dragged up the beach and impacts with the floating dock during wave conditions
- Potential harbor sites – the small cove in front of the community and adjacent to the existing dock offers partial natural protection from wind and waves and access to deep water. Predominant waves smaller, shorter period waves from the east and north.

Dock and Facilities:

- Landing crafts land adjacent to log transfer facility
- Cannery Dock – built in late 1960's/early 70's time frame. Dock is in poor condition and its use is limited due to decreased integrity.
- Hatchery – expecting return of red salmon this year. Cook Inlet Aquaculture Association asked to come and take over Port Graham hatchery.
- Port Graham and Nanwalek have trained labor for cannery and hatchery
- A new dock may be more important than a harbor. Dock could open the door for processing (frozen and canned) and fresh fish market. Choke point is getting product out of the village/region.

- Fuel barges generally deliver product twice per year
- Fuel currently owned and operated by Village Council
- Some boats out of Homer can only go as far as Port Graham area of Cook Inlet due to limited fuel carrying capacity. Fuel dock at Port Graham could allow these boats to travel farther and provide income to Village.

#### Wood Biomass Power Plant

- Study completed. Applied for year 2010 funding.
- Could provide power to cannery and eventually to Nanwalek

#### Action Items

- Develop several harbor concepts and evaluate benefits (recon level) from a harbor and a dock
- Develop draft Corps recon report for small boat harbor
- Develop scope and budget for Denali Commission dock study

CF: Borash/EN-CW, Hemphill/EN-CW-PF, McConnell/EN-CW-ER, Eisses/EN-CW-HH,  
Harrop/RD