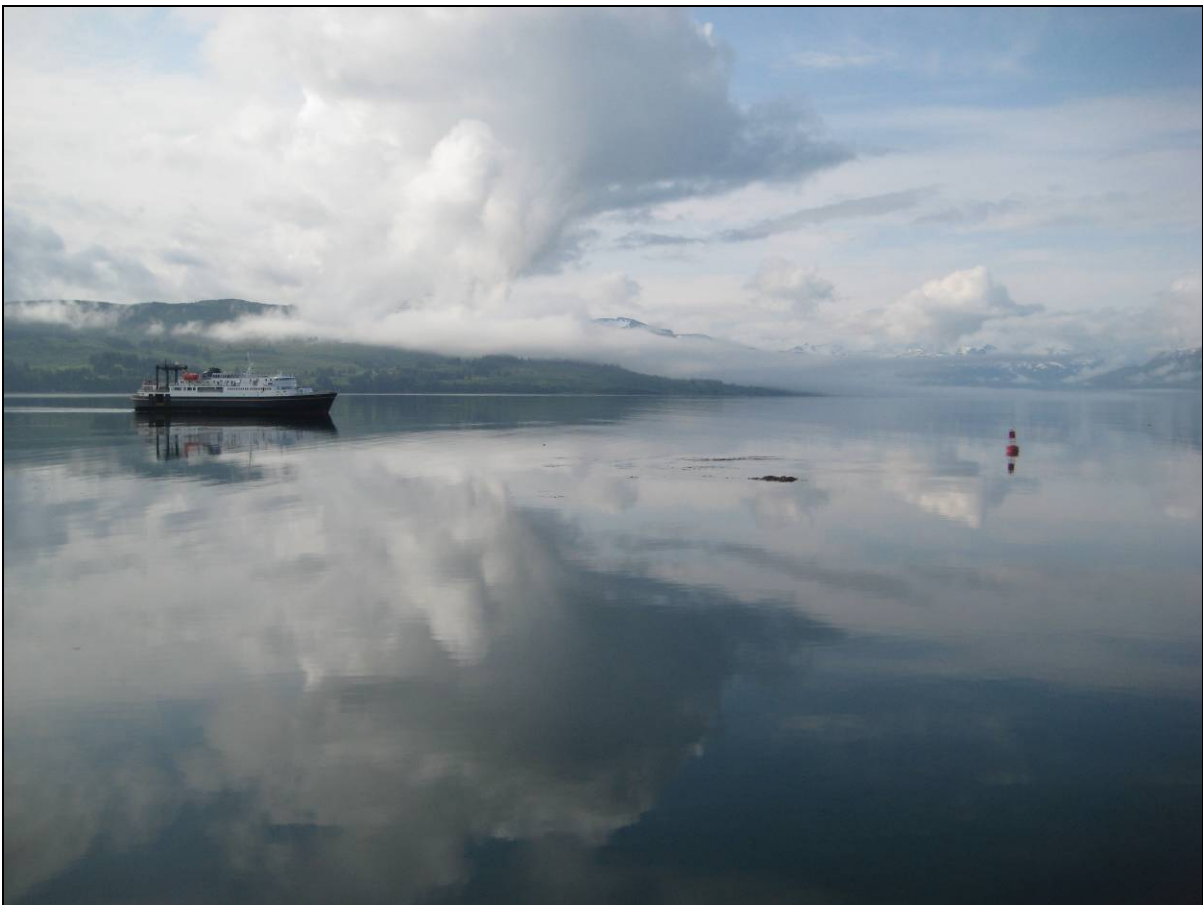




**CITY DOCK AND FERRY TERMINAL REPAIRS
TECHNICAL REPORT**



PORT LIONS, ALASKA

OCTOBER 2009

EXECUTIVE SUMMARY

Report Purpose: This report presents an evaluation of the marine infrastructure issues relating to the City Dock and Ferry Terminal at Port Lions, Alaska, and an assessment of community need for marine transfer and preliminary design concepts. The design concepts include multipurpose docks, a hardened barge/launch ramp, and a ferry and fuel trestle. This report describes the opinion of the U.S. Army Corps of Engineers that repairing the existing dock is not a viable option and the focus should instead be on dock replacement.

Study Partners and Scope: The findings of this report are based on a collaborative study effort between the Denali Commission, the City of Port Lions, marine transportation providers, and the Corps of Engineers. The Corps of Engineers entered into a Memorandum of Agreement with the Denali Commission to complete a planning level study for improvements to the City Dock and Ferry Terminal in Port Lions. The Denali Commission's Transportation Advisory Committee, through its selection and approval process has allocated funds to the Corps of Engineers for the study phase for the barge landing system design. According to the Denali Commission, there is need to investigate the city dock and ferry terminal repairs, capacity and configuration to provide a cost-effective, practical marine transfer point at Port Lions. In the case of Port Lions, the original scope of dock repairs was modified to dock replacement because the existing dock is beyond the stage of repair. As this report outlines, a new marine transfer facility is needed to meet the transportation needs of the community and increase safety.

Community Profile: Port Lions is located on the northern coast of Kodiak Island, approximately 260 air miles southwest of Anchorage. The community is now home to 190 people, mostly of Alutiiq origin. Most residents practice a subsistence lifestyle. Commercial fishing and tourism are important to the community. Port Lions is not accessible by road. The state ferry operates bi-weekly from Kodiak and all other transportation and freight is dependent on small planes and beach landing craft from Kodiak.

Problem Description: The dock was designed by the Corps of Engineers and built in the early 1960s. There have been no significant repairs over the years other than replacement of damaged pilings, beams along the trestle, and the dock surface. As a result, the dock is in poor condition with inadequate lateral stabilization and a significantly reduced weight capacity.

The City of Port Lions relies on the City Dock for many services including cargo transportation, the state ferry, fuel deliveries, and local boaters. The Alaska Marine Highway System (AMHS) ferry M/V Tustumena docks at Port Lions two to three times per week year round and provides an important cargo and passenger link to Kodiak and mainland Alaska. However, the effectiveness of the ferry in Port Lions is limited by the reduced weight capacity on the dock. Service will continue to degrade without dock improvements. In the event that the Tustumena could no longer serve Port Lions due to overhaul or retirement, the other ship that serves southwest Alaska, the M/V Kennicott, cannot land at the existing Port Lions dock because the vessel is larger than the Tustumena and the water depth at the dock and dock configuration are not sufficient for the Kennicott.

Fuel is delivered by tug-assisted barge to the dock. This method is the most cost-effective for the community because the fuel lines are located on the dock. The poor condition of the dock will

make it unusable for a fuel barge within the next five to fifteen years and alternate means of fuel transportation would add significant cost to fuel deliveries.

Barge service to Port Lions from Seattle was discontinued in 2005, due to changes within the shipping company. Residents now rely on the state ferry, beach landing craft, and flights for cargo delivery which are less cost effective than larger barge services. Large or heavy loads must be delivered to the small boat harbor or existing barge landing ramp via beach landing craft due to weight restrictions on the city dock, which induces additional costs.

Tourism and commercial fishing are important industries which are put in jeopardy due to degrading fuel and transport facilities. Commercial fishermen from Kodiak used to unload their crab pots at the Port Lions City Dock and store the pots in Port Lions because the community is closer to the fishing grounds than Kodiak. Now most of these fishermen bypass Port Lions and unload and store their pots in Kodiak due to the city dock's weight restrictions. Most boaters in the community receive fuel at the dock and would have to incur additional costs to purchase fuel elsewhere. Tourists arrive in Port Lions aboard the state ferry and on private vessels which fuel at the dock.

Based on an assessment of the community's needs through discussions with dock users, the most pressing needs for the community are the state ferry for passenger and cargo transportation, additional cargo service, and fuel delivery. Both the AMHS and Petro Marine Services plan to continue service to the community for the foreseeable future, but their operations are in jeopardy based on the condition of the dock.

Potential Project Implementation: Before a project could be implemented, additional technical studies need to be conducted to determine more detailed designs and more accurate costs. These studies include geotechnical investigations, bathymetry, wind and wave analysis, surveying and mapping, environmental field studies, and more detailed plans and specifications. Additionally, alternate locations for a replacement dock should be examined as the scope of this study included only the existing location. The estimated cost for this effort is \$1.2 million.

Report Findings and Alternatives for Consideration: Port Lions relies on the city dock for cost effective delivery of cargo and fuel and for lower-cost passenger transport. Alternate means of marine transport would increase costs of passenger, cargo and fuel transportation and may negatively impact local business and industry. This report finds that there are opportunities to replace existing docking facilities to improve the community's infrastructure thereby increasing the safety and efficiency of marine transport and residents' quality of life.

Based on a Corps of Engineers site visit in June 2009, it was determined that given the extent of degradation of the dock, repair of the facility was not feasible and the focus should instead be on dock replacement. An assessment of the community's needs was developed to determine which attributes the community would utilize most in a new facility and four conceptual alternatives were developed. For all alternatives, it was assumed that the dock would remain in its existing location; it is possible that alternate locations for a new dock could be found, however this work is outside the scope of this report. 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 verified at the design stage before anything is built. The alternatives are presented below, along with their conceptual construction costs. The designs do not include adapting or relocating the existing water and fuel lines, which would induce additional cost. Any future project designs or

implementations should include close coordination with the AMHS to ensure continuity of service for the community and additional environmental study.

- Alternative 1 is a steel pipe pile and concrete multipurpose dock with mooring and breasting dolphins, and an access trestle. The new dock places the mooring face in the same location of the existing dock and provides 9,400 square feet of dock space and a 100-foot mooring face. Mooring and breasting dolphins would be designed for the M/V Tustumena with three breasting dolphins spaced at about 80 feet. This alternative provides for continued ferry service, continued cargo loading/offloading requirements, fuel barge service (assuming relocation of fuel lines), and could incorporate fuel and water headers. Preliminary construction cost estimates are \$8.8 million with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs.

- Alternative 2 is a concrete launch ramp sited at the existing launch ramp that would accommodate barges and other vessels wishing to launch from shore. This ramp would provide for offloading of heavy equipment directly to shore, however it does not make any provision for continued ferry service to the community and fuel service would have to utilize beach landing craft. The existing staging area is considered to be adequate for staging of cargo resulting from barge loading and offloading. The preliminary construction cost estimate for this alternative is \$540,000 with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs. This alternative attempted to create a lower-cost solution for the marine transfer needs of Port Lions. However, this alternative does not provide a viable solution because it neglects two of the community's most pressing dock usages: ferry service and fuel barge deliveries.

- Alternative 3 is a new modified diaphragm sheet pile dock with fenders for the M/V Tustumena and an armored gravel access causeway. This alternative would provide for continued ferry and fuel barge service as well as providing a robust structure capable of handling all present and foreseeable future loadings and could incorporate fuel and water lines. In addition, this alternative essentially provides a breakwater along the length of the causeway. The design of this alternative would have to evaluate the need for a breach in the causeway, and thus a bridge which would be determined by future environmental evaluation of the site. Preliminary construction cost estimates are \$10 million for this alternative with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs.

- Alternative 4 is a steel pipe pile and concrete deck trestle with mooring and breasting dolphins. This alternative places the mooring face in the same location as the existing dock and provides space for a 12-foot by 6-foot fuel header building. Mooring and breasting dolphins would be designed for the M/V Tustumena with three breasting dolphins spaced at about 80 feet. This alternative provides for continued ferry and fuel barge service and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new trestle have not been included in the cost estimate. The trestle would be designed for typical highway vehicle loading. The preliminary construction cost estimate is \$6.4 million for this alternative with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs.

CONTENTS

1.0 Study Scope 1

2.0 Study Partners and Authority..... 1

3.0 Community Profile..... 1

4.0 Problem Description 3

5.0 Plan Formulation 4

6.0 Economics Summary 11

7.0 Data Necessary for further Project Implementation 12

8.0 Conclusions 13

FIGURES

Figure 1. Location of Port Lions 2

Figure 2. Port Lions City Dock and Ferry Terminal aerial view 2

Figure 3. Steel Pipe Pile and Concrete Multipurpose Dock (Alternative 1) 7

Figure 4. Concrete Barge/Launch Ramp (Alternative 2)..... 8

Figure 5. Modified Diaphragm Sheet Pile Multipurpose Dock (Alternative 3)..... 9

Figure 6. Steel Pipe Pile and Concrete Deck Trestle (Alternative 4) 10

TABLES

Table 1. Dock Uses and Potential Infrastructure..... 14

APPENDICES

- Appendix A Economics**
- Appendix B Hydraulics**
- Appendix C Real Estate**
- Appendix D Trip Report**

1.0 Study Scope

This study examines the need for improvements to the City Dock and Ferry Terminal at Port Lions, Alaska. The initial focus of the study was to provide viable design alternatives for repair to the existing dock based on the current marine transfer usage of the facility. During the early phases of the project, it was determined that the dock had degraded beyond the point of repair and dock replacement was the best option. The scope of the study was then adapted to include an assessment of the community's needs for a marine transfer facility and conceptual designs for dock replacement.

2.0 Study Partners and Authority

The U.S. Army Corps of Engineers (Corps of Engineers) entered into a Memorandum of Agreement with the Denali Commission to complete a planning level study for improvements to the City Dock and Ferry Terminal in Port Lions. The Denali Commission's Transportation Advisory Committee, through its selection and approval process allocated funds to the Corps of Engineers for the study phase for the barge landing system design. According to the Denali Commission, there is need to investigate the city dock and ferry terminal repairs, capacity and configuration to provide a cost-effective, practical marine transfer point at Port Lions. The necessity of dock repair has received attention throughout governmental channels in the State of Alaska as seen through letters of support from State Senator Gary Stevens, State Representative Alan Austerman, the Deputy Commissioner of Marine Operations for the Department of Transportation and Public Facilities, the Mayor of the Kodiak Island Borough, the Captain of the M/V Tustumena, and the staff of the Port Lions School.

The scope of the Port Lions study includes development of a project planning document for city dock and ferry terminal replacement at Port Lions including an outline of reasonable alternatives for marine transfer needs. The findings of this report are based on a collaborative study effort between the Denali Commission, the City of Port Lions, marine transportation providers, and the Corps of Engineers.

3.0 Community Profile

Port Lions was founded in 1964 by the displaced inhabitants of Afognak, which was destroyed by tsunami after the Good Friday Earthquake. The community is located on the northern coast of Kodiak Island, approximately 260 air miles southwest of Anchorage. The City of Port Lions was incorporated in 1966 as a second class city within the Kodiak Island Borough. Port Lions is now home to 190 people, mostly of Alutiiq origin. Most residents practice a subsistence lifestyle. Commercial fishing and tourism are important to the community. According to the Alaska Department of Fish and Game, residents held 38 commercial fishing permits in 2007 and another 20 residents held active crew member licenses. Port Lions is not accessible by road. The state ferry operates bi-weekly from Kodiak and all other transportation and freight is dependent on small planes and beach landing craft from Kodiak, and fuel is delivered by tug-assisted barge.



Figure 1. Location of Port Lions



Figure 2. Port Lions City Dock and Ferry Terminal aerial view

Source: Google Earth

4.0 Problem Description

The dock, a triangular shaped, creosote treated timber wharf with an approximately 254-foot berthing face and timber fender piles with no mooring or breasting dolphins along the face, was designed by the Corps of Engineers and built in the early 1960s. There have been no significant repairs over the years other than replacement of damaged pilings, replacement of beams along the 300-foot long timber trestle which is used to access the dock, and replacement of the dock surface. As a result, the dock is in poor condition with inadequate lateral stabilization and a significantly reduced weight capacity. Conditions at the dock include missing or deteriorating bracing on the causeway and dock, missing horizontal cross beams, crooked pilings, a longitudinal sag in the causeway, lack of adequate drainage on the decking, vegetation growth on the decking and in pilings, and missing bracing for dock ladders.

The City of Port Lions relies on the City Dock and Ferry Terminal for many services for the community including cargo transportation, the state ferry, fuel deliveries, and local boaters.

The Alaska Marine Highway System (AMHS) state ferry M/V Tustumena docks in Port Lions two to three times per week, year-round. Since the community is accessible only by small plane or boat, the ferry serves as a connection from Port Lions to Kodiak and mainland Alaska and the state highway system. The cargo capability of the ferry has become even more important to the community since barge service from Seattle was discontinued in 2005. Residents rely on the ferry as a cost-effective means of passenger and cargo transportation as air travel and alternate cargo transport modes are more expensive. However, the effectiveness of the ferry in Port Lions is limited by the reduced weight capacity on the dock, and service will continue to degrade without dock improvements.

Fuel is delivered by tug-assisted barge to the Port Lions City Dock. This method of fuel delivery is the most cost-effective for the community because the fuel lines are located on the dock. Alternate means of fuel transportation would add significant costs as fuel would have to be delivered in smaller loads and transported by another means to the local fuel farm—likely via truck driven off beach-landing craft from Kodiak.

Port Lions lost cargo barge service from Seattle in 2005 due to a transition in the company and no other company has continued barge service. Due to decreased barge service, residents rely on the state ferry, beach landing crafts, and flights for cargo delivery. Large or heavy loads must be delivered to the small boat harbor via beach landing craft from Kodiak due to weight restrictions on the city dock which induces additional costs. Port Lions residents report that barge service from Seattle was the most cost-effective means of cargo transportation and the community will attempt to reinstate barge service.

The Port Lions City Dock also supports local industry in the community. Commercial fishermen use the city dock to unload their crab pots at the dock, but are concerned about the continuation of this activity due to the dock's weight restrictions. Commercial fishermen in the community and from Kodiak also fill up their freshwater tanks at the city dock. Many commercial fishermen and all of the community's charter boats fuel at the dock. Tourism is an important industry to the community which is supported by the dock through tourist transportation, delivery of supplies for lodges and charters, and dispensing fuel for charter and recreational boaters.

Based on an assessment of the community's needs through discussions with dock users, the most pressing needs for the community are the state ferry for passenger and cargo transportation, additional cargo service, and fuel delivery. Both AMHS and Petro Marine Services plan to

continue service to the community for the foreseeable future, but their operations are in jeopardy based on the condition of the dock.

5.0 Plan Formulation

Based on a Corps of Engineers site visit in June 2009, it was determined that given the extent of degradation of the dock, repair of the facility is not feasible and the focus should instead be on dock replacement. An assessment of the community's needs was developed to determine which attributes the community would utilize most in a new facility. This assessment is presented in Appendix A. Four conceptual alternatives were developed and discussed in Appendix B. For all alternatives, it was assumed that the dock would remain in its existing location; it is possible that alternate locations for a new dock could be found, however this work is outside the scope of this report. 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 verified at the design stage before anything is built. The alternatives are presented below, along with their conceptual costs.

The below alternatives represent only a few of the possible solutions for a marine transfer facility in Port Lions. As these alternatives were conceptually designed, additional ideas for replacement facilities came to mind but were not investigated further due to limited project scope. These additional alternatives include a fuel barge ramp, a fueling float, and dredging the entrance basin, and should be investigated further in future study. The alternatives address the marine transportation issues in Port Lions caused by the degrading city dock and ferry terminal. Residents rely on the city dock for the following uses:

- Light Cargo: This includes community supplies such as groceries, personal supplies, and personal vehicles delivered by barge.
- Heavy Cargo: This includes construction equipment and other large or heavy vehicles or supplies which require machinery to be offloaded from a barge. The delivery of these materials is currently limited based on the City Dock's weight restrictions.
- AMHS Ferry: The M/V Tustumena lands at the City Dock and serves as an important means of passenger and cargo transportation.
- Fuel Barge Deliveries: Petro Marine Services uses a tug-assisted fuel barge which lands at the City Dock to utilize fuel headers. This is the most cost effective means of fuel delivery.
- Local Fleet and other vessels: Local vessels including charter boats, lodge operators, recreational boaters, and sport fishermen use the dock for loading and transporting supplies. The City Dock also supports local tourism through transportation of passengers and supplies for tourist activities.
- Crab Pot Offloading: Local commercial crab fishermen use the City Dock to unload their crab pots, but may be unable to continue this operation based on the condition of the dock. Crab fishermen from Kodiak used to use the Port Lions dock to unload their pots, but now bypass Port Lions due to the dock's weight restrictions.
- Fueling and Watering of Vessels: Most vessels in Port Lions use the City Dock to fuel, including fishermen and charter boats. Commercial fishermen from Port Lions and Kodiak use the City Dock to fill their boats' holding tanks with fresh water because Port Lions is closer to the fishing grounds than Kodiak.

- Coast Guard Vessels: The City of Port Lions reports that Coast Guard vessels occasionally stop in Port Lions and land at the City Dock. Coast Guard use of the dock would increase with improved facilities.

- Oil Spill Response: The Spill Prevention and Response (SPAR) Division of the Alaska Department of Environmental Conservation has identified Port Lions as a staging area in the event of an oil spill. Safe and reliable docking capabilities are crucial in accommodating this effort.

- Safe Harbor: When the dock was in better condition, large vessels would come to Port Lions during inclement weather and tie up at the City Dock to wait out the storm. This used to happen several times per year, especially during the crab fishing season, when the City Dock would see several 50-foot seiners from Kodiak seek refuge. Boats no longer use the dock as a harbor of refuge due to poor docking conditions.

The existing city dock will become unable to accommodate these users within the 50-year period of analysis. In most cases there are available substitutes for these uses, but they would induce additional expense to Port Lions residents. Each of the below alternatives addresses at least one community use for the city dock and attempts to create a cost-effective solution to prevent future loss of service.

- Alternative 1 is a steel pipe pile and concrete deck multipurpose dock with mooring and breasting dolphins, and a similarly constructed access trestle. The new dock places the mooring face in the same location of the existing dock and provides 9,400 square feet of dock space and a 100-foot mooring face. Mooring and breasting dolphins would be designed for the M/V Tustumena with three breasting dolphins spaced at about 80 feet. It is possible that a wave barrier could be included along the south face of the dock and trestle; however this has not been included in the pricing of this alternative. This alternative provides for: continued ferry service; a dock capable of construction equipment loading/offloading as well as providing for typical cargo loading/offloading requirements; continuation of fuel barge service (assuming relocation of fuel lines with the new dock); and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new dock have not been included in the cost estimate. Preliminary construction cost estimates are \$8.8 million with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs. See Figure 3.

This alternative provides infrastructure to accommodate the state ferry, cargo deliveries, and fuel deliveries- assuming relocation of the fuel lines to the new dock. The alternative would allow all major dock users to continue operations into the future in a more safe and effective manner, thereby meeting the community's needs and preventing a future loss of service.

- Alternative 2 is a concrete barge and launch ramp sited at the existing launch ramp that would accommodate barges and other vessels wishing to launch from shore. This ramp would provide for the offloading of heavy equipment directly to shore, however it does not make any provision for continued ferry service to the community or fuel barge deliveries. It is assumed under this alternative that fuel would arrive via trucks aboard beach landing craft from Kodiak and would be driven to the tank farm as the current fuel barge deliveries are not supported by this alternative. The existing staging area is considered to be adequate for staging of cargo resulting from barge loading and offloading. The existing launch ramp is in poor condition and demolition costs are included in the cost estimate. The preliminary construction cost estimate is

\$540,000 for this alternative with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs. See Figure 4.

This alternative attempted to create a lower-cost solution for the marine transfer needs of Port Lions. However, the alternative does not provide a viable solution because it neglects two of the community's most pressing dock usages: ferry service and fuel barge deliveries. This alternative provides an upgraded landing area for the beach landing craft from Kodiak, which may not be a vital community need since the vessel already lands at the small boat harbor.

- Alternative 3 is a new modified diaphragm sheet pile dock with fenders for the M/V Tustumena and an armored gravel access causeway. The mooring face remains in the same location as the existing dock thus requiring that it be demolished. This alternative would provide for continued ferry service; a structure capable of handling all present and foreseeable future loadings; continuation of fuel barge service (assuming relocation of fuel lines); and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new dock have not been included in the cost estimate. In addition, this alternative essentially provides a breakwater along the length of the causeway. The design of this alternative would have to evaluate the need for a breach in the causeway, and thus a bridge. The need for the breach and bridge is driven by the environmental regulatory agencies and has not been evaluated in the scope of this report; as such no additional costs have been included for these features. Preliminary construction cost estimates are \$10.0 million for this alternative with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs. See Figure 5.

This alternative provides infrastructure to accommodate the state ferry, cargo deliveries, and fuel deliveries- assuming relocation of the fuel lines to the new dock. The alternative would allow all major dock users to continue operations into the future in a more safe and effective manner, thereby meeting the community's needs and preventing a future loss of service.

- Alternative 4 is a steel pipe pile and concrete deck trestle with mooring and breasting dolphins. The new trestle occupies the footprint of the existing dock and trestle thus requiring demolition of the existing features. This alternative places the mooring face in the same location as the existing dock and provides space for a 12-foot by 6-foot fuel header building. Mooring and breasting dolphins shown would be designed for the M/V Tustumena with three breasting dolphins spaced at about 80 feet. It is possible that a wave barrier could be included along the south face of the trestle; however this has not been included in the pricing of this alternative. This alternative provides for continued ferry and fuel barge service and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new trestle have not been included in the cost estimate. The trestle would be designed for typical highway vehicle loading, meaning that virtually all cargo deliveries could be accommodated. The preliminary construction cost estimate is \$6.4 million for this alternative with design and supervision and administration cost estimates adding approximately 18.5 to 22.5 percent to the construction costs. See Figure 6.



Figure 3. Steel Pipe Pile and Concrete Multipurpose Dock (Alternative 1)
(Initial Cost \$8,822,000)



Figure 4. Concrete Barge/Launch Ramp (Alternative 2)
(Initial Cost \$540,000)

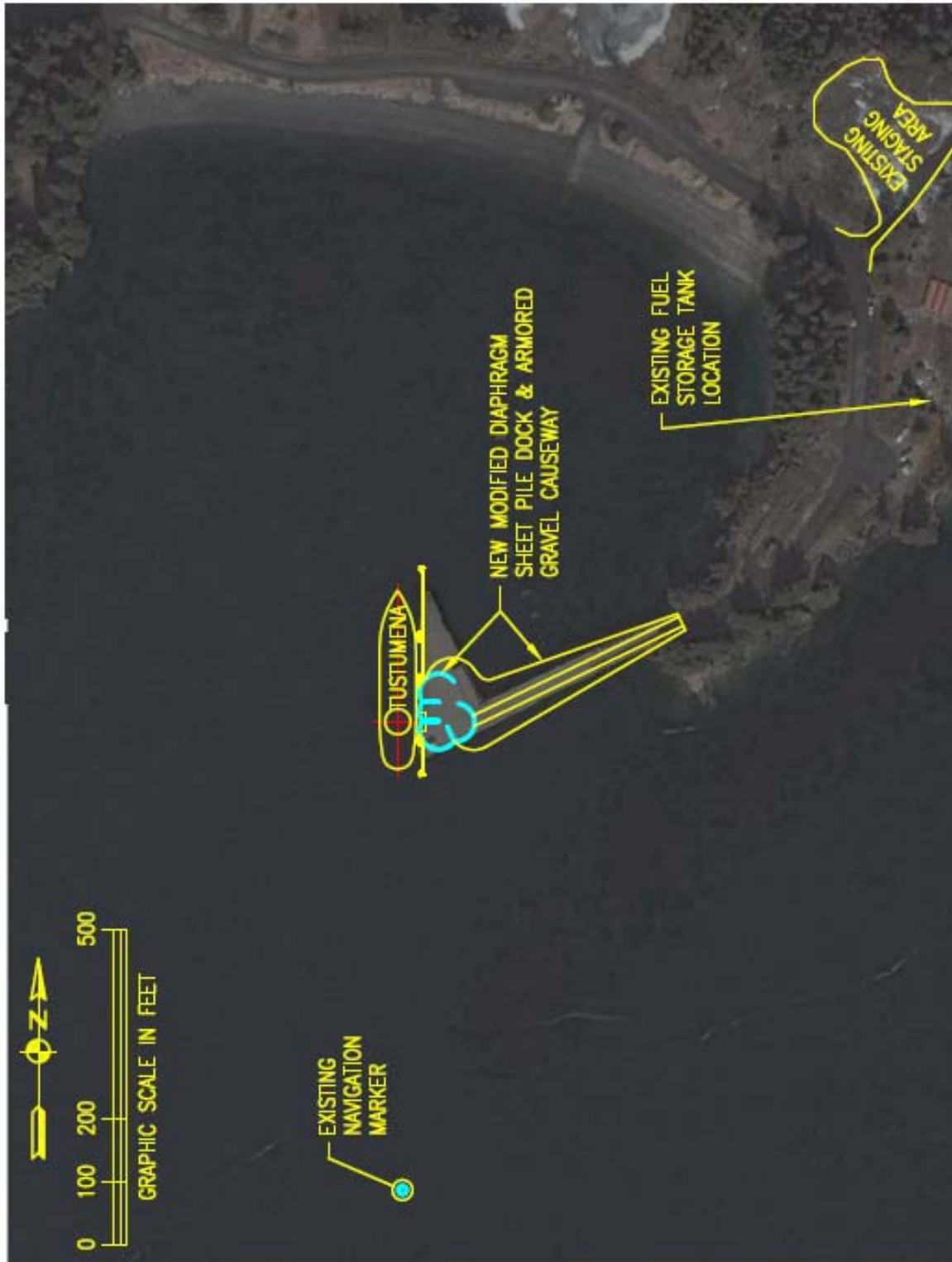


Figure 5. Modified Diaphragm Sheet Pile Multipurpose Dock (Alternative 3)
(Initial Cost \$9,986,000)



Figure 6. Steel Pipe Pile and Concrete Deck Trestle (Alternative 4)
(Initial Cost \$6,441,000)

6.0 Economics Summary

The economics scope of work for this project evolved from a summary of the importance of the dock to the community to an investigation of the need of the community for marine transfer which included interviews with the community and other dock users. As such, the economics effort does not include a quantitative evaluation of benefits, but is instead a qualitative assessment of community dock usage. A summary of findings is presented below. More detailed information is presented in Appendix A.

•**Ferry Service.** Port Lions is served by the AMHS ferry M/V Tustumena two to three times per week year-round, excluding approximately one month in the winter when the Tustumena is not in service. The ferry serves as an important transportation link for the isolated community and an important means of cargo transportation as shown through a large increase in passenger and vehicle traffic on the ferry since 2005 when barge service was discontinued. Cargo use of the ferry is already limited based on the weight restrictions of the dock and AMHS reports that the city dock is the worst ferry landing in the state. The community reports that ferry service is the most important usage of the dock and provides cost-effective transport. AMHS would like to continue service to Port Lions in the future, but this is in jeopardy based on dock conditions and the potential retirement of the Tustumena within the next twenty years. The other vessel which could serve Port Lions in place of the Tustumena, the M/V Kennicott, cannot dock at the current facility due to the size of the vessel, water depth, and current dock configuration. AMHS stated that it is unlikely that the Kennicott will ever dock in Port Lions. Without ferry transportation, Port Lions residents would have to rely on more expensive air or private vessel travel for transportation, and freight service would rely entirely on beach landing craft from Kodiak or air freight—both of which are more costly options for the community.

•**Fuel Delivery.** Port Lions identified the next most important usage of the city dock as fuel deliveries. The Port Lions City Dock supports the local fuel service because deliveries are received at the dock and fuel is dispensed from the dock to local users. The fuel lines to the tank farm are located on top of the original decking. Petro Marine Services delivers fuel to Port Lions six times per year aboard a tug-assisted fuel barge and reports that the dock is currently in usable condition. The dock will become unusable for fuel deliveries in five to fifteen years. Without fuel deliveries via fuel barge, Port Lions would rely on alternate, more expensive means of fuel delivery. The most likely means of fuel transportation if fuel barge service was unavailable would be to have fuel arrive via trucks aboard beach landing craft from Kodiak and be driven into the community. Additional expenses would be induced because either the fuel lines would have to be relocated from the city dock, or fuel would have to be transported on a truck to the tank farm. Port Lions estimates loss of fuel barge service would cause fuel prices to increase significantly.

•**Cargo Delivery.** Port Lions stopped receiving barge deliveries from Seattle in 2005 because the barge service discontinued its shipping operations and no other company has resumed service to Port Lions. As a result, the local grocery store closed and the community has become more reliant on the state ferry and beach landing craft from Kodiak (for items which are too heavy for the dock). If the dock became unusable, the community would rely on more expensive freight deliveries via air and beach landing craft. Residents report that barge service from Seattle was more cost effective than other freight shipment options and if the dock was replaced, the community would lobby to regain barge service.

•**Local Boaters.** The City of Port Lions reports that local boaters, including commercial, charter, and sport fishermen are frequent users of the dock. Despite the decrease in the commercial fishing industry since the 1989 Exxon Valdez oil spill, there are still active salmon, herring, and crab boats which now utilize the dock for fuel and fresh water for their holding tanks. Some crab fishermen from Kodiak used to unload their pots at the city dock, but this activity has decreased due to the dock's weight restriction. Resident fishermen still use the dock to unload their pots, but are concerned about the dock's stability. Most boaters in the community fuel at the dock, including commercial fishermen, charter boat operators, sport fishermen, and fishing lodge operators. Without the dock fuel lines, local boats may have to get their fuel elsewhere. This would induce additional costs in terms of vessel travel expenses and the value of lost time. The dock also supports the important tourism industry in Port Lions through fuel service for charter boats and passenger transportation aboard the ferry.

•**Summary.** Port Lions City Dock and Ferry Terminal is important to the community's welfare. Residents rely on the city dock, but it will become unable to accommodate users within 5 to 15 years. In some cases there are available substitutes for these uses, but they induce additional expense on Port Lions residents. Based on preliminary estimates, loss of the dock will result in the community spending an additional \$935,000 to \$6.6 million annually for increased costs of passenger, cargo, and fuel deliveries.

7.0 Data Necessary for further Project Implementation

This study identified the needs of the community for a marine transfer facility and tried to identify the most useful solution based on those needs. However, during the course of the study, the question was raised as to whether a multi-use facility would be most advantageous for the community or could each use of the facility be addressed individually. Designing for one priority use of the facility at a time may be the most effective use of resources. A single facility which meets the needs for a larger state ferry, fuel barge deliveries, potential barge service from Seattle, and local boaters would be a significant financial undertaking for the community which may not be feasible in the short term and may not be necessary given that some needs could be met with smaller scale improvements. Instead, one need of the community could be addressed at a time (i.e. fuel deliveries or the state ferry) and smaller scale solutions could be implemented over time, such as a fuel trestle now and an improved barge landing ramp in the future.

The next step in project development is to conduct detailed studies and designs as described below. Based on preliminary scoping, these design efforts would cost an estimated \$1.2 million.

•**Project Sighting.** In determining appropriate replacements for the dock, this study considered only the existing dock site. Future study should be conducted to determine if a city dock would be more useful and cost-effective if it were located elsewhere in the community.

•**Environmental.** Repair, replacement, or demolition of the dock at Port Lions, or construction of additional navigation or port facilities would require consideration of environmental impacts and would require coordination and permit acquisition. Additional environmental field 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 or an Environmental Impact Statement.

•**Surveying and Mapping.** A detailed land and bathymetric survey and mapping of the project area will be needed to conduct detailed design of alternatives.

•**Engineering.** Additional information regarding wind and wave conditions and bathymetry will need to be collected to complete more detailed analysis of alternatives. Geotechnical and soil contamination investigations of the project area will be required to complete detailed designs and cost estimates.

•**Economics.** In order to estimate the cost effectiveness of the proposed alternatives, a more thorough analysis of economic benefits and costs should be performed as well as an analysis of operations and maintenance at the proposed facilities.

•**Real Estate.** Initial information indicates that all lands required for construction, operation, and maintenance of the project are owned by the City of Port Lions. The Denali Commission is funding this project and has indicated that the City has a vested interest in the repair of the dock and will be responsible for operating and maintaining the project. Real estate requirements for all four (4) alternatives are the same. In the case of additional locations for a replacement dock, further study of real estate will be needed.

•**Plans and Specifications.** In order to complete the design process, detailed plans and specifications will be required.

8.0 Conclusions

Port Lions relies on the city dock for cost effective delivery of cargo and fuel and for lower-cost passenger transport. Alternate means of marine transport would increase costs of passenger, cargo and fuel transportation and may negatively impact local business and industry. This report finds that there are opportunities to replace existing docking facilities to improve the community's infrastructure thereby increasing the safety and efficiency of marine transport and residents' quality of life.

Based on the stated community uses for docking facilities (described in section 5.0 Plan Formulation), Table 1 illustrates how each design alternative and other potential docking infrastructure meet the marine transfer needs of Port Lions.

Table 1. Dock Uses and Potential Infrastructure

Infrastructure	Uses										Cost
	Light Cargo	Heavy Cargo	AMHS Ferry	Fuel Barge Deliveries	USCG	Oil Spill Response	Local Fleet & Other Uses	Crab Pot Offloading	Fueling & Watering of Vessels	Safe Harbor	
Multipurpose Dock (piles) Alternative 1	x	x	x	x	x	x	x	x	x	x*	\$8.8 million
Barge Ramp Alternative 2	x	x									\$540,000
Multipurpose Dock/Causeway (sheetpile) Alternative 3	x	x	x	x	x	x	x	x	x	x*	\$10 million
Ferry trestle, Mooring points, Fuel lines Alternative 4	x		x	x	x	x	x	x	x		\$6.4 million
Fuel Barge Ramp	x	x		x*							Not Costed
Fueling Float									x		Not Costed
Fuel Trestle				x					x		Not Costed
Multipurpose Dock & Dredge Entrance Basin	x	x	x	x	x	x	x	x	x	x*	Not Costed
Without Project	x*	x*									

*Restricted Use

City Dock and Ferry Terminal Improvements

Appendix A - Economics

Port Lions, Alaska



Prepared for:

Denali Commission

October 2009

Prepared by:



**U.S. Army Corps
of Engineers**

Alaska District

**CITY DOCK AND FERRY TERMINAL IMPROVEMENTS
ECONOMICS APPENDIX A
PORT LIONS, ALASKA**

CONTENTS

I.	Community Profile.....	1
A.	Population	2
B.	Employment and Income	3
C.	Infrastructure and Facilities.....	4
D.	Government.....	6
II.	Importance of City Dock – Assessment of Need.....	8
A.	Ferry Service	9
1.	Alaska Marine Highway ferry service	9
2.	Kodiak Island private ferry	14
B.	General Cargo/Barge Delivery.....	15
C.	Fuel Delivery and Service.....	16
D.	Local Boaters	18
III.	Summary	22

FIGURES

Figure 1. Location of Port Lions.....1
Figure 2. Port Lions Population (2000-2008).....2
Figure 3. Port Lions School Enrollment (K-12), 1995-20096
Figure 4. Port Lions City Dock and Ferry Terminal.....8
Figure 5. AMHS Passenger Embarkations and Disembarkations at Port Lions, 1999-2008 ...10
Figure 6. AMHS Vehicle Embarkations and Disembarkations at Port Lions, 1999-200811
Figure 7. M/V Tustumena at the Port Lions Dock.....14
Figure 8. Port Lions City Dock.....18
Figure 9. Underside of Dock.....18
Figure 10. Port Lions Commercial Fishing Permit Activity, 1987-200720

TABLES

Table 1. Port Lions Employment and Income4

I. COMMUNITY PROFILE

Port Lions is located in Settler Cove, on the north coast of Kodiak Island, 260 air miles southwest of Anchorage. It lies at approximately 57.87 degrees North Latitude and -152.88 degrees West Longitude (Sec. 05, T027S, R022W, Seward Meridian) in the Kodiak Recording District. The area encompasses 6.3 square miles of land and 3.7 square miles of water. The climate of the Kodiak Islands is dominated by a strong marine influence. There is little or no freezing weather, moderate precipitation, and frequent cloud cover and fog. Severe storms are common from December through February. Annual precipitation is 54 inches, with 75 inches of snowfall. Temperatures remain within a narrow range, from 20 to 60 degrees Fahrenheit.¹

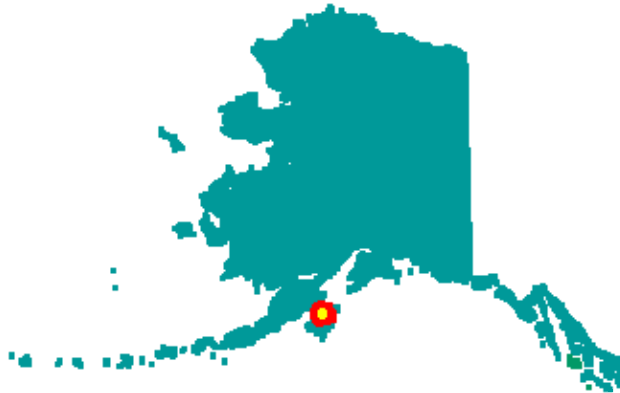


Figure 1. Location of Port Lions

Source: Alaska Department of Commerce, Community, and Economic Development

Residents of Port Lions 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 and some of their customs. Port Lions was founded in 1964 by the displaced inhabitants of Afognak, which was destroyed by tsunami after the Good Friday Earthquake. The community was named in honor of the Lions Club, for their support in rebuilding and relocating the village. The City was incorporated in 1966. For many years, Port Lions was the site of the large Wakefield Cannery, on Peregrebni Point. The cannery burned down in March 1975. Soon thereafter, the village corporation purchased a 149-foot floating processor, the Smokwa. Although sold in 1978, the Smokwa processed crab in the area intermittently between 1975 and 1980. A small sawmill, located

¹ State of Alaska Division of Community and Regional Affairs, Community Database Online – Port Lions.
http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

south of town, operated until 1976. Today, most residents of Port Lions lead a fishing and subsistence lifestyle.²

A. Population

According to the 2008 State Demographer estimate, Port Lions is now home to 190 people. In recent years, Port Lions has suffered from a declining population as the 2000 Census showed the population to be 256 persons.³ Figure 2 shows the population of Port Lions from 2000 through 2008.

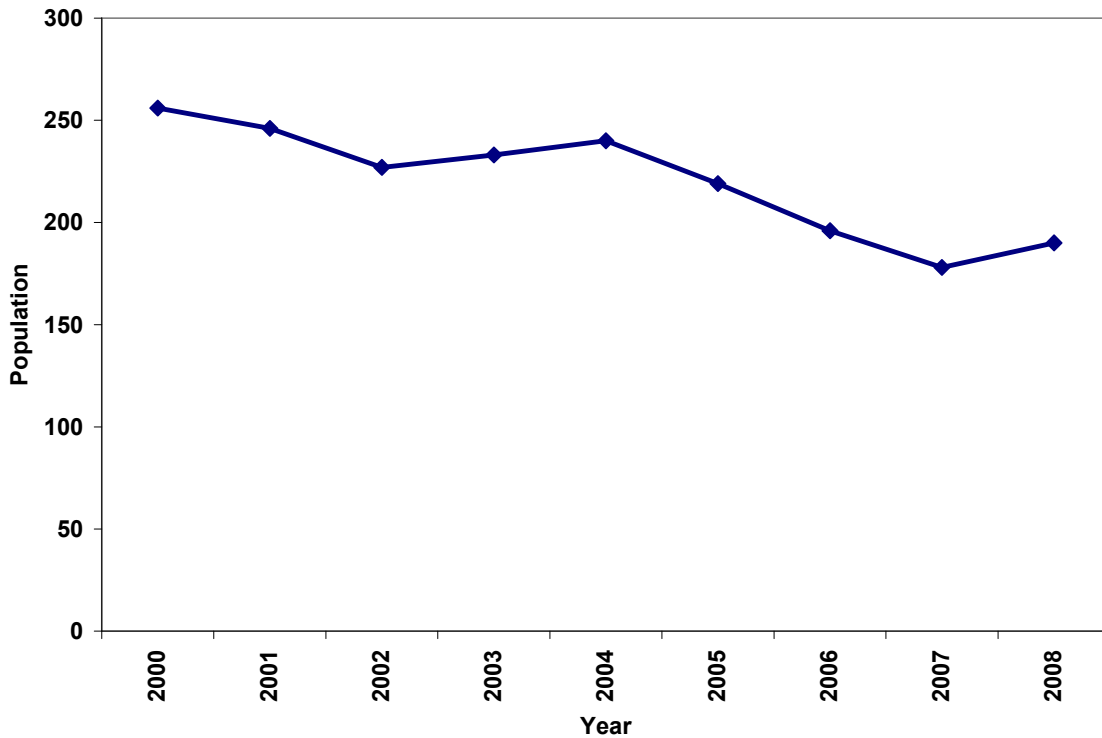


Figure 2. Port Lions Population (2000-2008)

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

According to the 2000 Census, the population of Port Lions consists of 63.7 percent Alaska Native or part Native compared to 17.6 percent in the Kodiak Island Borough and 19.0 percent in the State of Alaska. Of the remaining population in Port Lions, the next largest racial group was reported as white or part white at 36.7 percent (keeping in mind that

² State of Alaska Division of Community and Regional Affairs, Community Database Online – Port Lions. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

³ State of Alaska Department of Labor, Research and Analysis Section, Demographics Unit.

individuals may report more than one race). The gender breakdown of Port Lions' population was approximately 53.1 percent male and 46.9 percent female compared to 52 percent male and 48 percent female in the State of Alaska. The median age of a Port Lions resident is 35.6 years compared to 31.6 years in the Kodiak Island Borough and 32.4 years in the State of Alaska.⁴

B. Employment and Income

Employment in Port Lions is dominated by the educational, health and social services, and public administration sectors. Combined, these sectors account for 47.3 percent of total employment in the community. According to the 2000 Census, about 24.2 percent of Port Lions workers were in the private sector, 62.6 percent were government workers, and 13.2 percent of workers were self-employed. The 2000 Census also reports that Port Lions had a total potential workforce (population over 16 years of age) of 191 at that time. Of these, 95 were considered in the labor force with 91 employed and four unemployed. This was a civilian unemployment rate of 4.2 percent compared to the state average of 9.0 percent.⁴

The unemployment rate does not account for all of the non-working adults in Port Lions. There were also 96 residents, 50.3 percent of the potential workforce who were considered not in the labor force according to the 2000 Census.⁴ 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 52.4 percent rather than the 4.2 percent reported by the Census. It 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 Lions has a total of 91 households with a median income of \$39,107 per year. This is compared to a statewide median of \$51,571 and \$54,636 in the Kodiak Island Borough. In Port Lions, 12.7 percent of families live below the poverty level compared to the statewide level of 6.7 percent. In addition to regular income, the community had 19.8 percent of its residents collecting Social Security Income, 11 percent with public assistance income, and 15.4 percent collecting retirement income.⁴

⁴ U.S. Census Bureau, Census 2000. Demographic Profile of Kodiak Island Borough, Alaska.
<http://labor.alaska.gov/research/cgin/sf3profiles/kod.pdf>

Table 1. Port Lions Employment and Income

Employment Category	Number	Percent
Private wage and salary workers	22	24.2
Government workers	57	62.6
Self-employed	12	13.2
Employment Status		
Potential workforce	191	100
Not in labor force	96	50.3
In the labor force	95	49.7
Employed	91	47.6
Unemployed	4	2.1
Income		
Median household income	\$ 39,107	
Per capita income	\$ 17,492	

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

In addition to wage earning jobs, many Port Lions residents practice a subsistence lifestyle. These subsistence activities include the harvest of salmon, halibut, herring, 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 38 commercial fishing permits in 2007 and 20 additional residents held crew member licenses. For 2007, the most recent year for which complete harvest data is available, the Commercial Fisheries Entry Commission (CFEC) reports that of the 38 permits issued, 22 permits were actually fished. The total harvest for the year for all fisheries (including crab, halibut, herring, other groundfish, sablefish, and salmon) was 2.7 million pounds, for estimated gross earnings of \$1.3 million or about \$59,000 per permit fished.⁵

C. Infrastructure and Facilities

The community water system was built by the Bureau of Indian Affairs (BIA) and Indian Health Services in 1965. Over 100 residences are connected to the City’s piped water and sewer systems and 95 percent of these have complete plumbing. The Branchwater Creek Reservoir provides water, which is treated and stored in a 125,000 gallon tank.⁶

The Kodiak Electric Association provides electricity to the community. Kodiak Electric Association also owns a 1,100 gallon bulk fuel tank in the community. An additional 90,600 gallon bulk fuel tank is owned and operated by the Port Lions Village Council and Kizhuyak Oil Sales.⁶

⁵ State of Alaska, Department of Fish and Game, Commercial Fisheries Entry Commission, Permit & Fishing Activity by Year and City, 2007, Port Lions. <http://www.cfec.state.ak.us/gpbycen/2007/150279.htm>

⁶ State of Alaska Division of Community and Regional Affairs, Community Database Online – Port Lions. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

Port Lions is not accessible by road. There is a state-owned 2,200 foot long by 75 foot wide gravel airstrip and the small boat harbor may be used by seaplanes. Regularly scheduled and charter flights are available from Kodiak. The small boat harbor with breakwater and dock provide 82 boat slips.⁷ The Alaska Marine Highway System (AMHS) ferry operates bi-weekly from Kodiak. Barge service from Seattle was available, but was discontinued in 2005.⁸

The Port Lions Health Clinic is available for medical concerns. Medical facilities are also available in the City of Kodiak. Public safety concerns in Port Lions are addressed by the State Village Public Safety Officer (VPSO), or the Alaska State Troopers in Kodiak, and supplemented by the Port Lions Public Safety/Emergency Management System (EMS).⁷

Port Lions School, part of the Kodiak Island Borough Schools, is the only educational center in the community, serving grades K through 12. Total enrollment at Port Lions School was 32 students in fiscal year 2009 (FY '09).⁹ Figure 3 shows the school enrollment at Port Lions School from FY '96 through FY '09. In rural Alaskan communities, schools are closed if enrollment falls below ten students. As of FY '09, 14 of the 32 students at the Port Lions School were in upper level grades (grades 7 through 12), meaning that school enrollment may experience a significant decrease in the near future and could be in danger of closing.

⁷ State of Alaska Division of Community and Regional Affairs, Community Database Online – Port Lions. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

⁸ Personal communication with Katy Adkins, Grant Writer for the City of Port Lions. 26 August 2009.

⁹ State of Alaska Department of Education and Early Development, Enrollment by School and Grade as of Oct. 1, 2008, FY2009. <http://www.eed.state.ak.us/stats/SchoolEnrollment/2009SchoolEnrollment.pdf>

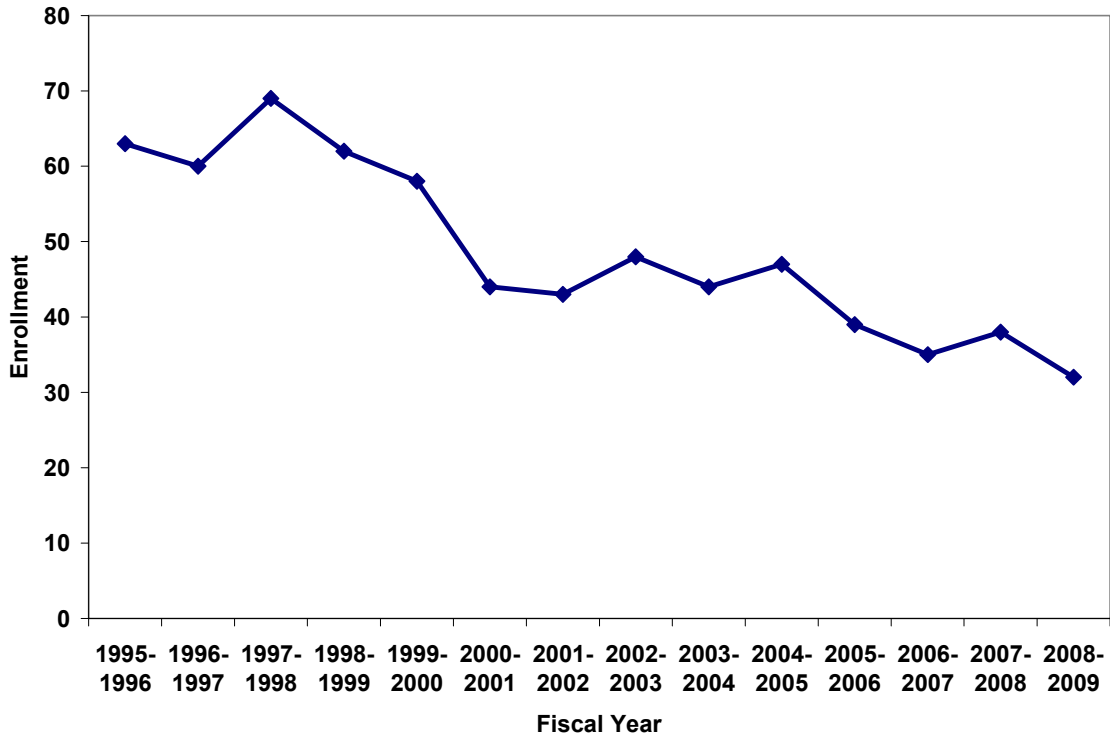


Figure 3. Port Lions School Enrollment (K-12), 1995-2009

Source: State of Alaska Department of Education and Early Development

D. Government

The City of Port Lions was incorporated in 1966 as a second class city within the Kodiak Island Borough in the State of Alaska. The local government entity is an elected mayor and seven-member city council. According to the Department of Commerce, Community, and Economic Development 2008 Alaska Taxable publication, a second class city may, by referendum, levy property taxes as provided for first class cities. The City of Port Lions does not levy property taxes, but is subject to the property taxation imposed by the Kodiak Island Borough. The only tax levied in the City of Port Lions is a 5 percent bed tax, with total revenue in 2008 of \$6,049, or \$32 per capita. Port Lions residents are also subject to the taxation of the Kodiak Island Borough which includes property tax, 1.05 percent severance tax, 5 percent bed tax, and a \$0.75 per line 911 tax. Total tax revenues in the Kodiak Island Borough were \$12.5 million in 2008.¹⁰

The Kodiak Island Borough is a second-class borough incorporated September 24, 1963. The Borough currently operates under a Manager form of government. The Manager is hired by

¹⁰ State of Alaska Department of Commerce, Community and Economic Development, Alaska Taxable 2008. <http://www.commerce.state.ak.us/dca/osa/pub/08Taxable.pdf>

the Assembly and oversees the day-to-day affairs of the Borough. The Assembly is comprised of seven members elected by the public to govern the Borough. The Borough Mayor, also elected by the people presides over the Assembly meetings, votes only in the case of a tie, and serves as a ceremonial figure for certain borough affairs. Services provided by the City include street and sidewalk maintenance, water and sewer, health services, library, public dock facilities, solid waste management, and public safety.¹¹

Port Lions' federally recognized tribe is the Native Village of Port Lions, its local village corporation is the Afognak Native Corporation, and its ANCSA Native Village Corporation is Koniag, Incorporated.¹²

¹¹ Kodiak Island Borough. <http://www.kodiakak.us/>

¹² State of Alaska Division of Community and Regional Affairs, Community Database Online – Port Lions. http://www.commerce.state.ak.us/dca/commdb/CF_BLOCK.cfm

II. IMPORTANCE OF CITY DOCK – ASSESSMENT OF NEED

The Port Lions City Dock serves several purposes for the community. The major uses include state ferry service, fuel service, and cargo delivery. In a 2006 community development plan, Port Lions identified improvements to the city dock and small boat harbor as the highest capital improvement priority project. The City of Port Lions reports that the two most important usages of the city dock are the AMHS ferry and fuel deliveries. Other users of the dock include commercial fishermen, sport fishermen, recreational boats, freight service and the Coast Guard. The largest vessel that uses the dock is the state ferry M/V Tustumena (296 feet), and the smallest are several 25-foot skiffs that fuel at the dock.



Figure 4. Port Lions City Dock and Ferry Terminal

In the past, Port Lions had freight delivery service from Seattle. This barge service was discontinued in 2005 because the company discontinued its shipping operations. Now, personal cargo is carried via private vehicles on the state ferry, and some community supplies are delivered by a smaller barge from Kodiak. The dock's weight restrictions limit the amount of cargo that can be unloaded on the dock, so some items arrive via beach landing craft and are offloaded at the small boat harbor. Residents report that freight shipments from

Seattle were more cost effective than freight shipments from Kodiak. If the city dock was repaired, the community would lobby to have freight service from Seattle reinstated.¹³

An additional use for the dock in the past was as a safe harbor for large vessels traveling in the area. This prior use explains the old floats and wave barriers located on the City Dock. When the dock was in better condition, large vessels would come to Port Lions during storms and inclement weather and tie up at the city dock or anchor near the dock for safety to wait out the storm. This used to happen several times per year, especially during the crab fishing season, when the Port Lions City Dock would see several 50-foot seiners from Kodiak seek refuge at the dock. Boats no longer use the dock as a harbor of refuge due to poor docking conditions.¹³

Also, the Spill Prevention and Response (SPAR) Division of the Alaska Department of Environmental Conservation has identified Port Lions as a staging area in the event of an oil spill. Safe and reliable docking capabilities are crucial in accommodating this effort.¹⁴

Residents rely on the city dock for essential needs including transportation and delivery of cargo and fuel supplies. The Kodiak Island Borough's 2007 Comprehensive Plan describes the Port Lions City Dock as critical to keeping Port Lions' economy alive given its economic endeavors of tourism, sport fishing, and hunting. Charter boats and fishing vessels which transport tourists to Port Lions utilize the fuel facilities at the dock. Without these facilities, tourism and local business in the community would suffer. Residents are concerned that if docking conditions continue to disintegrate, the community will be in jeopardy of losing all fuel and ferry service. The major roles of the city dock and ferry terminal are described in more detail in the following sections.

A. Ferry Service

1. Alaska Marine Highway ferry service

Port Lions is served by the AMHS ferry M/V Tustumena. The Tustumena docks in Port Lions two to three times per week, year-round (excluding approximately one month in the winter when the ferry is not in service). The other vessel which serves southwest Alaska and the Aleutian chain and can generally serve as a substitute for the Tustumena during repairs or overhaul is the M/V Kennicott. However, the Kennicott cannot land in Port Lions so the community relies on service solely from the Tustumena. The Kennicott is nearly one hundred feet longer than the Tustumena and is also wider and draws more water. Existing docking is not adequate for the Kennicott both in terms of strength of the dock and adequate maneuverable space. Also, the Kennicott must load aft (toward the rear of the ship) and would have to slide farther forward at the dock to deliver which would put the bow of the vessel in bad water conditions. The dock would have to be made larger in order for the Kennicott to dock at Port Lions. Given the condition of the existing dock, it likely cannot be

¹³ Personal communication with Katy Adkins, Grant Writer for the City of Port Lions. 26 August 2009.

¹⁴ Letter from State Representative Alan Austerman to the Denali Commission. 26 August 2009.

modified adequately to provide a facility suitable for the Kennicott; a new, larger facility would have to be constructed.¹⁵

There is no road access to Port Lions, so the ferry and local flights provide the only access to Kodiak or mainland Alaska and the state highway system. The Port Lions City Dock supports resident access to Kodiak and Homer on the ferry. Figure 5 shows ferry passenger traffic arriving and leaving Port Lions from 1999 through 2008.

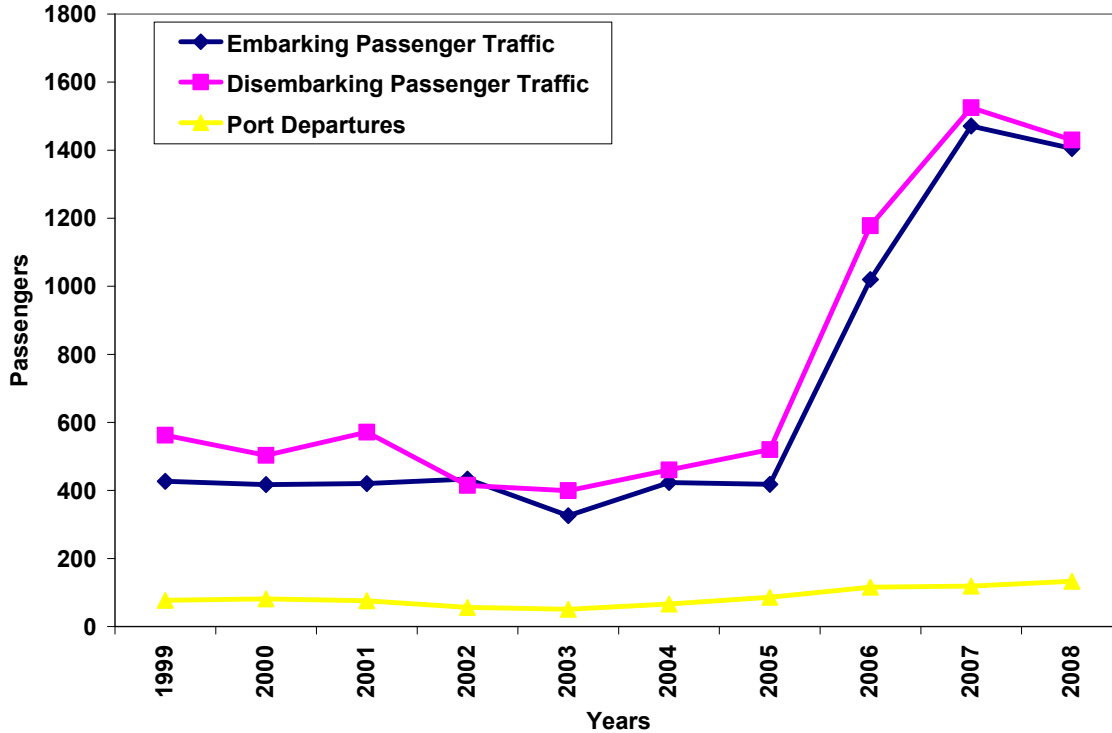


Figure 5. AMHS Passenger Embarkations and Disembarkations at Port Lions, 1999-2008

Source: Alaska Marine Highway System 2008 Traffic Volume Report

Since Port Lions lost freight service from Seattle in 2005, the cargo capability of the ferry has become more important to the community. Reduced barge service means that freight arrives via ferry. The airstrip in Port Lions can accommodate only small planes with small freight loads, and the ferry provides a more stable means of transportation for freight in addition to passenger service. The ferry is the easiest and most cost-effective way for large or heavy shipments to be transported in and out of Port Lions.¹⁶ Figure 6 shows the total vehicular traffic arriving to and departing from Port Lions on the ferry from 1999 through 2008. Both passenger and vehicular traffic showed significant increases after 2005, when barge service from Seattle was discontinued, while the number of port departures from Port Lions remained

¹⁵ Personal communication with Dana Jensen, Port Captain for the Alaska Marine Highway System. 25 August 2009.

¹⁶ FY2008 Denali Commission Project Nomination Form, Port Lions City Dock and Ferry Terminal

relatively stable. These increases are likely due to residents' increased reliance on the ferry for cargo transportation.

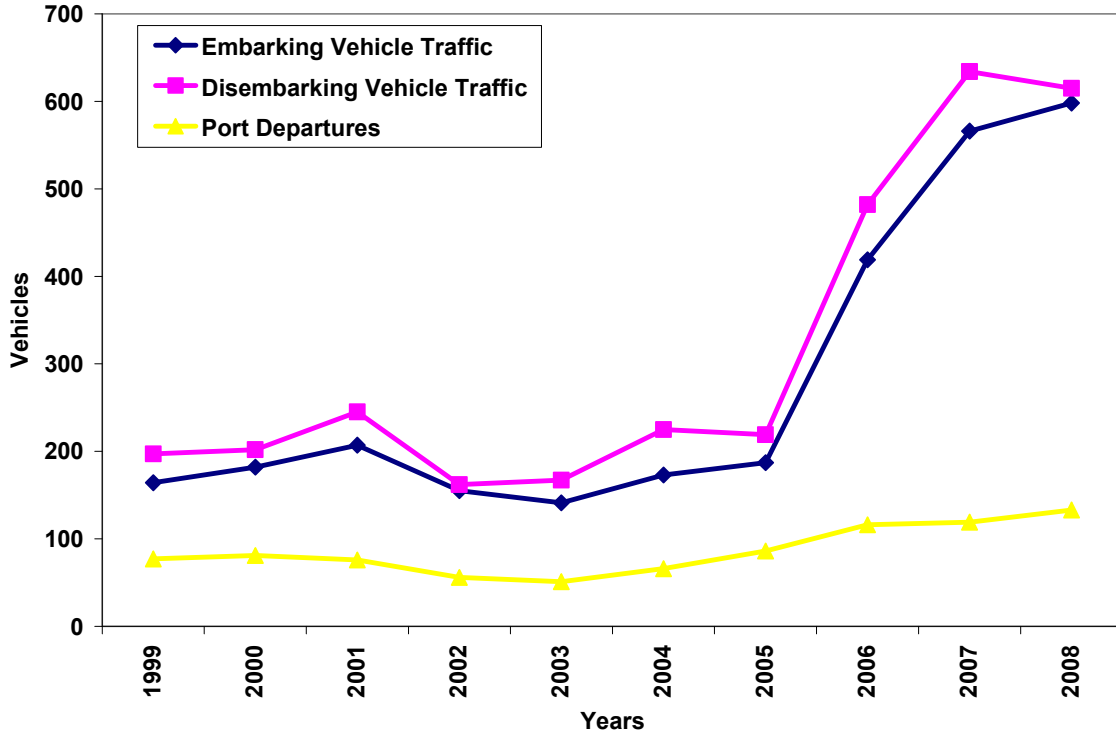


Figure 6. AMHS Vehicle Embarkations and Disembarkations at Port Lions, 1999-2008

Source: Alaska Marine Highway System 2008 Traffic Volume Report

Port Lions reports that the most important usage of the dock is the state ferry service. Loss of the ferry would be equivalent to another community losing its only road or connection to the mainland. The ferry has become important for resident and cargo transportation and also serves as a means for tourists to visit Port Lions. Many residents of Port Lions obtain their cargo by driving personal vehicles and trailers onto the AMHS ferry and loading them with goods from Kodiak and Homer.¹⁷ If ferry service were discontinued to Port Lions due to poor docking conditions, residents would have to find alternate means of transportation and cargo delivery. Residents would be forced to rely on more expensive air travel and private vessels. However, if barge service from Seattle was reinstated, Port Lions would have less of a need for the cargo transportation aspect of the ferry, based on the spike in ferry activity when cargo service stopped.

AMHS reports that the Port Lions dock is in the worst condition of all the docks used by state ferries. The current dock is still useful, but its condition is reported to be questionable and its usefulness in the long term may be in jeopardy. The future life of the dock cannot accurately

¹⁷ Personal communication with Katy Atkins, Grant Writer for the City of Port Lions. 26 August 2009.

be estimated, but there is concern about the stability of the structure and it will become unusable during the 50-year period of analysis.¹⁸ Ferry landings and cargo deliveries put large lateral loads on the dock and fendering system. The degraded condition of the fendering and lateral load bracing make landing conditions at Port Lions hazardous for the ferry. The original weight capacity of the dock was 50,000 pounds, but that capacity has been downgraded to 23,000 pounds in recent years. These weight limitations prohibit roll-on-roll-off containerized cargo and certain recreational vehicles. The ferry reports that on some occasions of bad weather, the Tustumena has had to bypass Port Lions or spend a significant amount of time waiting for the weather to moderate in order to allow for safe landing.¹⁹

The elimination of ferry service to Port Lions would cause an increase in cost for travel and cargo transport. On the ferry, the price per vehicle ranges from \$40 to \$88 (not including passenger fare) depending on vehicle length. AMHS reports that in 2008, there were 615 vehicles which disembarked at Port Lions, and 598 vehicles embarked. All these vehicle trips, whether they were privately owned passenger vehicles or vans delivering loads, would have to seek alternate transportation methods to reach Port Lions. Without the ferry, freight would have to be delivered by air or a smaller landing craft from Kodiak. Servant Air, which serves the Kodiak Island area charges \$0.40 per pound for freight with a minimum freight charge of \$20 and an additional charge of \$0.30 per pound for oversized items over 80 pounds. Large loads or materials which cannot be shipped by air are delivered by beach landing craft from Kodiak or private vessel. Currently, as an alternative to ferry transportation, some residents drive their boats to Anton Larsen Bay and then drive private vehicles to Kodiak. This can only be completed during the summer months as the bay freezes during the winter.

Without passenger service from the ferry, Port Lions residents would have to rely upon air and private vessel travel. According to AMHS, there were 1,405 passengers who embarked from Port Lions and 1,430 passengers who disembarked at Port Lions via the state ferry in 2008. The cost per passenger to travel from Port Lions to Kodiak is \$33. This represents an annual cost of nearly \$94,000. Comparatively, a flight from Port Lions to Kodiak costs \$50 per passenger. If ferry service was discontinued, passengers would instead rely on more costly air travel which would cost almost \$142,000 annually- an increase of more than \$48,000 compared to ferry travel.

Loss of ferry service to Port Lions would increase the costs of cargo delivery and passenger transport. Port Lions would also lose a major connection to other communities and the state road system. Future AMHS ferry service to Port Lions is somewhat questionable. Should the Port Lions dock become unusable, ferry service would have to be halted until suitable repair or replacement could be completed. Another concern is the age of the vessel Tustumena and future length of service, since AMHS stated that the other vessel which serves southwest Alaska, the Kennicott, cannot land in Port Lions. The Tustumena is 45 years old. Currently, AMHS has no date set for her retirement and no vessels in mind to replace her. However,

¹⁸ Personal communication with Dana Jensen, Port Captain, Alaska Marine Highway System. 25 August 2009

¹⁹ Letter from AMHS Captain Robert Crowley to the Denali Commission (not dated).

based on the age of the vessel, the Tustumena will have to be retired and replaced within the next 20 years. A replacement vessel for the Tustumena would likely be of similar size or slightly larger than the existing vessel. If the Kennicott took over the service route of the Tustumena, modifications would have to be made to the current dock structure to accommodate the vessel; however this report focuses on the community's use of the Tustumena and AMHS estimates that it is unlikely that the Kennicott will serve Port Lions. The Tustumena and the Kennicott are unique to almost any other vessels in the world in that they have turntable elevator systems which makes them able to deliver to remote Alaska communities. These lift systems are costly and increase the liability of the vessels in terms of additional repair costs. In order to maintain service to Port Lions, a replacement vessel would have to be equipped with a similar lift system or some other kind of ramp which would enable the vessel to land at the Port Lions dock.²⁰

AMHS reports that due to the existing delivery schedule with Port Lions, it is unlikely that ferry service to the community will stop, even after the Tustumena is retired and another vessel takes her place. The choice to deliver to communities is a political decision and AMHS cannot simply decide to discontinue ferry operations to a particular community. Terminating ferry service to Port Lions is unlikely without political intervention except in specific cases such as a replacement ferry vessel being able to inexpensively serve all communities except Port Lions in Southwest Alaska and the Aleutian Chain. At this time, AMHS has no intentions of relinquishing service to Port Lions. However, if there was another viable transportation method such as a sustainable commercial ferry or private shuttle service, AMHS would not fight to keep service in Port Lions.²⁰

²⁰ Personal communication with Dana Jensen, Port Captain, Alaska Marine Highway System. 25 August 2009



Figure 7. M/V Tustumena at the Port Lions Dock

2. Kodiak Island private ferry

As of late August 2009, the Kodiak Island Borough had an open Request for Proposals (RFP) to complete the Kodiak Island-Wide Transportation Feasibility Study. The Kodiak Island Borough is interested in determining the feasibility of developing a local small vessel ferry service. This is an effort to enhance commercial and other services around Kodiak Island, to improve transport safety and convenience for Borough residents and visitors, and in recognition that it is unlikely that AMHS will add more Kodiak Island stops to its Southwest Alaska run. The service would run between Kodiak and other Borough communities on a regular basis. The project is funded by a State of Alaska Department of Transportation and Public Facilities appropriation, a grant from the Denali Commission, and Kodiak Island Borough funds. The study will examine the existing transportation delivery systems between the Kodiak Island community and supplier locations and will propose small ferry vessels that can provide service between the Port of Kodiak and the remote communities on the island.²¹

This plan for a private Kodiak Island ferry service is in the very early stages, so details regarding potential service to Port Lions are limited. The Kodiak Island Borough reports that at this time, Port Lions will be among the communities considered for ferry service, but decisions regarding community selection will be dependent on the results of the feasibility study. Similarly, there are currently no plans regarding size of the ferry, cargo and passenger

²¹ Kodiak Island Borough Request for Proposals, Island-Wide Transportation Feasibility Study, Kodiak Island, Alaska.. <http://www.kodiakak.us/DocumentView.aspx?DID=887>

capacity, or facilities necessary for docking. The RFP closes in early September 2009, a company will be awarded the study in October 2009, and the Borough hopes that a feasibility study will be completed in approximately one year. At that time, more detail will be available regarding a potential private ferry service on Kodiak Island.²²

B. General Cargo/Barge Delivery

For many years, Port Lions had freight delivery service from Western Pioneer, Inc., a Seattle-based company, which delivered building materials, groceries, and personal vehicles. This service was discontinued in June 2005 because Western Pioneer suspended its shipping operations. The company did not sell or transfer its business to another company, it simply stopped shipping. Western Pioneer no longer has records regarding their past freight service and all employees knowledgeable of freight no longer work for the company. Western Pioneer had three vessels in its shipping operations with lengths ranging from 165 feet to 192 feet, with drafts of 13 to 19 feet. The cubic capacity of the vessels ranged from 62,000 cubic feet to 74,000 cubic feet.

Residents of Port Lions report that the only store in the community closed as a result of barge stoppage. This store closure has induced additional costs on the residents of Port Lions as all of their personal cargo must now be shipped from elsewhere or delivered via plane or ferry. The community also receives freight shipments from Kodiak from Lazy Bay LLC. Lazy Bay's vessel is 100-feet long and is a beach landing craft. The vessel lands at the city dock for about 80 percent of their deliveries and otherwise lands and offloads at the concrete dock at the small boat harbor or the existing landing ramp. Lazy Bay cannot deliver large or heavy loads to the city dock because of the dock's weight restriction. The forklift used for offloading weighs about 20,000 pounds, which is close to the city dock's 23,000-pound weight limit.

Lazy Bay charges approximately 12.5 cents per pound plus an additional 25 percent fuel surcharge for cargo deliveries to Port Lions and delivers any kinds of goods residents request including building materials, groceries, fuel barrels, and vehicles which are too large to fit on the ferry. The vessel can also be chartered for \$3,600 per load including the fuel surcharge. Lazy Bay delivers to the community once every one to two weeks depending on the amount of cargo they have to deliver. Lazy Bay reports that at this time, the dock is usable but is in need of repair. The company estimates that under existing conditions, the dock will become unusable within two years.²³

If the dock were to become unusable, freight deliveries from Lazy Bay would not be affected because they would land at the small boat harbor. In fact, Lazy Bay reports that they actually benefit from the poor condition of the dock because it encourages business. Loads which are too heavy to be offloaded at the city dock on the state ferry must be shipped through Lazy Bay. However, if the dock were to become unusable for cargo traffic aboard the ferry and all

²² Personal communication with Mary Barber, Secretary, Kodiak Island Borough Engineering and Facilities Office, 26 August 2009.

²³ Personal communication with Tony Lara, M/V Lazy Bay LLC. 31 August 2009.

freight was delivered by Lazy Bay, freight deliveries would become more expensive for community residents. Residents would no longer be able to fill personal vehicles with supplies and drive onto the ferry and would instead have to pay for more frequent barge service or use more expensive air travel to offset cargo deliveries which used to arrive on the ferry. If Port Lions was unable to utilize Petro Marine for fuel delivery service, Lazy Bay is willing to take over fuel service and would probably charge the same rate as it does for other cargo: currently 12.5 cents per pound. This would induce additional costs to the community as the Lazy Bay beach landing craft would have to deliver more often than the fuel barge. Lazy Bay reports that the size of the existing dock is sufficient for their freight operations, but that if the dock were to be rebuilt, the ideal size for all dock users would be approximately 80 feet larger than the existing city dock and ferry terminal.²³

Residents report that freight shipments from Seattle were much more cost effective than freight shipments from Kodiak or utilizing the ferry for cargo transportation. One lodge owner stated that barge service from Seattle supported the tourism industry in Port Lions because lodges and charter operators could stock up on supplies for the entire tourist season rather than relying on more frequent and expensive deliveries from Kodiak.²⁴ The community hopes that repair or replacement of the city dock would allow them to negotiate freighter services out of Seattle to return to Port Lions.

C. Fuel Delivery and Service

The Port Lions City Dock supports the local fuel service because deliveries are received at the dock and dispensed from the dock to local users by Kizhuyak Oil Sales. The fuel lines to the tank farm are located on top of the original decking at the edge of the dock. Fuel is supplied by Petro Marine Services and delivered via tug and fuel barge. The Petro Marine barge has a 2-million gallon capacity and is usually loaded in Nikiski and delivers to communities throughout Southeast and Southcentral Alaska. Fuel deliveries are made approximately six times throughout the year to Port Lions, with about 90,000 gallons of fuel per delivery depending on how much the community requests. Petro Marine uses a 280-foot barge towed behind a 100-foot tug to deliver fuel. In the future, Petro Marine may upgrade to a 300-foot barge and a 100- to 120-foot tug as an articulated unit. This means that fuel deliveries would require the ability to moor a 300-foot piece of equipment safely and securely with access to the fuel headers. In terms of a future facility, a dock is not required for fuel deliveries, but at a minimum, breasting dolphins and a trestle for headers are needed. Petro Marine suggests that the community would best be served by a dock that can support containerized freight loads.

According to the community, fuel deliveries are an important usage of the city dock. Most boaters in Port Lions fuel at the dock, including commercial and sport fishermen. All charter vessels in the community fuel at the dock. If fuel barges were no longer able to deliver to the city dock, the price of fuel deliveries would increase dramatically. The City reports that if

²⁴ Personal communication with Katy Adkins, Grant Writer for the City of Port Lions. 26 August 2009.

fuel barges were to stop deliveries, the next most cost effective means of fuel transport would likely be beach landing craft delivery from Kodiak. The beach landing craft is a smaller vessel than the fuel barge and would have to make more deliveries at additional cost to the community. Since the fuel lines are located on the city dock, fuel trucks would have to be driven off the beach landing craft to the tank farm rather than just pumped directly into the pipes on the dock, unless the fuel headers are relocated. This would increase expenses as fuel deliveries would take longer and would include the cost of trucks and operators. Port Lions estimates that without barge service, fuel would likely be “so expensive that some residents would not be able to afford it.”²⁵

Alternate delivery methods can add a significant cost to the delivery of fuel. According to one industry representative, fuel delivery via beach landing craft and trucks adds \$1.50 to \$2.00 per gallon, while charter flight delivery could add as much as \$10 to \$12 per gallon of fuel delivered. Since Port Lions currently receives about 540,000 gallons of fuel per year, the loss of the city dock could incur additional costs of \$810,000 to \$1.08 million for beach landing deliveries or \$5.4 million to \$6.5 million per year for flight delivery, in addition to the price of fuel. Regardless of the fuel delivery replacement method, the loss of the city dock would have adverse impacts on the price of fuel and efficiency of fuel delivery, and would induce additional costs on vessel owners. Also, relocation of fuel lines would be a costly endeavor for the community—but is likely less costly than a new dock.

Petro Marine Services reports the Port Lions City Dock to be in fair condition for their needs. There are currently no delivery restrictions in place by the company. Petro Marine does not anticipate interruption of fuel delivery in the near future as a result of conditions at the dock.²⁶ However, the period of analysis for this project is 50 years. Based on reports from Corps site visits, other users of the dock, and Port Lions residents, the dock will become unusable within the 50-year period of analysis, likely within the next 5 to 15 years, necessitating alternate fuel delivery methods. Figure 8 and Figure 9 show the current conditions of the Port Lions City Dock.

²⁵ Personal communication with Katy Adkins, Grant Writer for the City of Port Lions. 26 August 2009.

²⁶ Personal communication with Jim Beckham, Vice President of Operations, Petro Marine Services. 17 August 2009.



Figure 8. Port Lions City Dock



Figure 9. Underside of Dock

D. Local Boaters

The City of Port Lions reports that local boaters, including commercial, charter, and sport fishermen are frequent users of the dock. In the past, many crab fishermen from Port Lions

and Kodiak used the dock to offload their crab pots, but current weight restrictions have caused some fishermen to store their pots in Kodiak instead. Some resident crab fishermen still use the dock for loading and offloading their pots during tanner crab season in January, but there is concern about the weight load on the bridge that connects the dock and road as well as the dock itself. The City of Port Lions reports that if the dock were to be replaced, more fishermen would utilize the city dock to load and unload their pots, and would store their pots in the community because Port Lions is closer to the fishing grounds than other nearby ports.²⁷ Due to the proximity to the fishing grounds, Port Lions is a convenient location for commercial fishermen to fill their holding tanks with fresh water and to fuel their vessels. The only place to get fuel and water is at the City Dock and more fishermen would stop at the community to use facilities if the dock was improved.

The development plan for the Kodiak Island Borough reports that the commercial fishing industry has decreased in Port Lions since the 1989 Exxon Valdez Oil Spill. According to the state CFEC, permits for commercial fishing have decreased sharply since 1989. In 1988, there were 109 permits issued to 40 permit holders; 74 of those permits were fished. In 2007, there were 38 permits issued to 17 permit holders, 22 of which were actually fished. This represents a 65 percent decrease in the number of permits issued in Port Lions.

²⁷ Email communication with Katy Adkins, Grant Writer for the City of Port Lions. 8 September 2009.

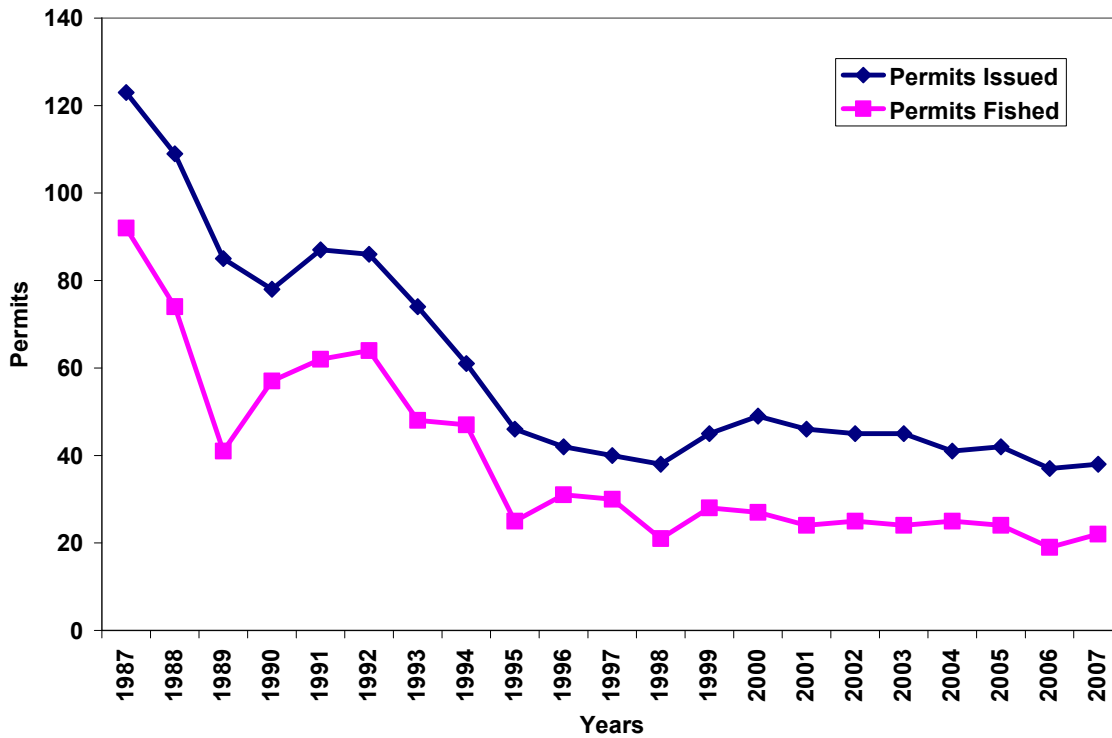


Figure 10. Port Lions Commercial Fishing Permit Activity, 1987-2007

Source: State of Alaska Commercial Fisheries Entry Commission

Despite the decrease in the commercial fishing industry, there are still active salmon, herring, and crab boats. The CFEC reports that there were 24 commercial vessels and 38 permits issued in Port Lions in 2007.

In addition to commercial fishermen, other local boaters utilize the city dock including charter boat operators, sport fishermen, recreational boaters, and fishing lodge operators. Most of these users accommodate the tourism industry in Port Lions. According to the Kodiak Island Borough’s 2007 Comprehensive Plan, the Port Lions City Dock is critical to the Port Lions economy given its major economic endeavors of tourism, sport fishing, and hunting. According to the State of Alaska Department of Commerce, Community, and Economic Development, there are 20 businesses in Port Lions which cater to tourists out of 30 total businesses listed for the community. These businesses are all charter services or lodges. All of these tourist businesses are reliant upon the city dock as passengers arrive either via ferry which lands at the dock or by private vessel which fuels at the dock. The City of Port Lions reports that if dock conditions were to improve, more users would utilize the dock including fishing boats, U.S. Coast Guard ships, Alaska State Trooper boats, and other local boaters.

The City reports that the majority of commercial fishermen in the community fuel at the dock and all charter boat operators fuel at the dock. If the dock were to become unusable, a major industry would suffer through the loss of convenient fuel service which supports tourism, and local passenger transportation.

Without the dock and fuel lines, local boats may have to get their fuel elsewhere. The closest fueling location is the town of Kodiak, 48 nautical miles away. Traveling to Kodiak to buy fuel for boats would represent a significant expense to vessel owners in Port Lions. Vessels incur costs while in operation, including vessel repair and replacement, insurance, maintenance, food and miscellaneous, the cost of fuel and lubricating oil, and potential moorage fees to dock at other harbors. A recent study for the City of Valdez found that operating costs for charter vessels were \$98 to \$131 per hour depending on size of the vessel.

An additional cost to be considered is the value of time lost traveling between Port Lions and Kodiak. Opportunity Cost of Time (OCT) is the monetary value of work or leisure activities forgone because of travel to alternate ports. Cornell University analyzed OCT for commercial fishermen in Alaska in 2006 and found that the fishing wage per hour for salmon fishers is \$71.17 for captains and \$57.13 for crew members, and wage rates per hour for halibut fishers is \$188.60 for captains and \$84.50 for crew members. The value of forgone leisure activities is equal to one-third of wage rates. The increased costs to fuel in Kodiak will likely have a negative effect on area tourism and fishing since prices could increase, and may entice commercial fishermen and charter boat operators to move their operations out of Port Lions due to the relatively higher fuel costs and other expenses.

III. SUMMARY

Port Lions City Dock and Ferry Terminal is important to the community's welfare. Residents rely on the city dock for passenger and freight transportation aboard the state ferry, additional cargo deliveries, fuel barge deliveries, and additional uses for local boaters such as fuel and water. The existing city dock will become unable to accommodate these users within the 50-year period of analysis. In some cases there are available substitutes for these uses, but they would induce additional expense to Port Lions residents. Loss of the dock will result in the community spending an additional \$935,000 to \$6.6 million annually for increased costs of passenger, cargo, and fuel deliveries.

City Dock and Ferry Terminal Improvements

Appendix B - Hydraulics

Port Lions, Alaska



Prepared for:

Denali Commission

October 2009

Prepared by:



**U.S. Army Corps
of Engineers**

Alaska District

**CITY DOCK AND FERRY TERMINAL IMPROVEMENTS
HYDRAULIC APPENDIX
PORT LIONS, ALASKA**

TABLE OF CONTENTS

Location of project and climatology	1
A. Environmental/Climatological Data.....	1
B. Wind Data	2
C. Tides.....	4
D. City/Ferry Dock Face Depth	4
E. Wave Climate.....	5
General Information and Alternatives.....	6
A. General	6
B. MV Kennicott	6
C. Alternative 1	6
D. Alternative 2.....	9
E. Alternative 3.....	12
F. Alternative 4.....	15

LIST OF FIGURES

Figure 1. - Location of Port Lions1
Figure 2. – Alternative 1 Site Plan.....7
Figure 3. – Alternative 1 Cost Estimate.....8
Figure 4. – Alternative 2 Site Plan.....10
Figure 5. – Alternative 2 Cost Estimate.....11
Figure 6. – Alternative 3 Site Plan.....13
Figure 7. – Alternative 3 Cost Estimate.....14
Figure 8. – Alternative 4 Site Plan.....16
Figure 9. – Alternative 4 Cost Estimate.....17

LIST OF TABLES

Table 1. Extreme Wind Analysis Results for Kodiak, Alaska.....3
Table 2. Tide Elevations, Port Lions, Alaska4
Table 3. City/Ferry Dock Face Depth.....5

Location of project and climatology

Port Lions is located on Kodiak Island, approximately 30 air-miles northwest of the city of Kodiak and 260 air-miles southwest of Anchorage. Port Lions City Dock and the contiguous marine waters of Port Wakefield are at latitude 57°52' N and longitude 152°52' W (Sec. 05, T027S, R022W, Seward Meridian) in the Kodiak Recording District. Port Wakefield opens to Kizhuyak Bay and Marmot Bay toward the northeast. The area has a maritime climate primarily influenced by strong low-pressure centers generated in the Gulf of Alaska and North Pacific Ocean. Cool summers, mild winters, and year-round rainfall characterize the climate. Snow falls primarily between November and April and the average annual snowfall is 75 inches. Rains may occur any time of the year, and annual average precipitation per year is 54 inches. The wettest months occur in the fall with October and November having the highest monthly and record rainfall. Fog is generally common and occurs under certain conditions during the summer months. Normal winter temperature ranges from 10 °F to 40 °F, while summer temperatures range from 55 °F to 70 °F. Temperatures can reach record lows of -5 °F and record highs of +80 °F.

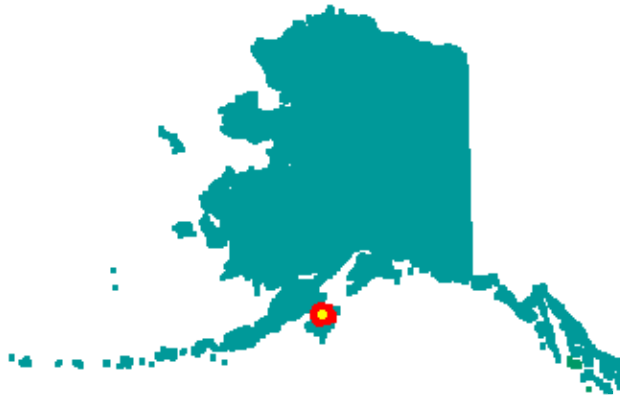


Figure 1. - Location of Port Lions

Source: Alaska Department of Commerce Community and Economic Development.

A. Environmental/Climatological Data

The following tide information is taken from U.S. Army Corps of Engineers (Corps of Engineers) report “Navigation Improvements Draft Feasibility Report and Environmental Assessment, Port Lions, Alaska” dated July 2005. The following wind and wave information is taken from the July 2005 report as well as from the Corps of Engineers detailed project report “Navigation Improvement for Small Boat Harbor, Port Lions, Alaska” dated 20 June 1978.

B. Wind Data

Predominant winds at Port Lions are generally caused by low-pressure systems that track in an easterly direction across the North Pacific Ocean and Gulf of Alaska. Strong winds occur throughout the year; however, wind patterns have a seasonal component. Summer winds are generally from the east and are lighter. Winter winds are predominantly from the northwest and are generally stronger. The Port Lions area as with most of Kodiak Island is known for intense storms that occur from various directions. According to local residents, the severe and damage-causing storms usually occur in the fall and winter and come from the northeast direction. These storms are relatively infrequent; however, they can occur two to three times a year according to local residents. High winds and waves have caused severe damage to the float system in the existing harbor in Settler Cove under such conditions. Local residents have estimated wind speeds to be a sustained 65 to 80 miles per hour (mph) during major storms. Gusts of up to 100 mph have been observed.

A wind data summary was presented by the Corps of Engineers in the June 1978 Detailed Project Report for Port Lions. Wind data from an onsite onshore anemometer for a period of record of 1970 to 1975 was analyzed. The resulting estimate for the 50-year wind speed of 40 miles per hour (mph) was determined.

An additional wind data analysis was prepared by the Corps of Engineers for the June 1982 Letter Report for Port Lions following the failure of the armor stone layer on the newly constructed breakwater. Analyses of several types of data were used to revise the original estimate of the 50-year design wind to be used in the design wave determination for breakwater repair. These data included National Weather Service (NWS) data for the airport at the city of Kodiak, recorded wind velocities from an anemometer and wave-rider buoy at Kodiak, an analysis of local winds published by H.C.S. Thom, an evaluation of observed wind velocities at Port Lions during the November 1981 storm, and a wind hindcast study conducted by Waterways Experiment Station (WES) in May of 1982. The resulting 50-year design wind determined is summarized in the following table.

	Alaska District Frequency			
	Analysis		WES Hindcast Analysis	
	JONSWAP	SMB	JONSWAP	SMB
Design wind speed (mph)	66	55	89	56
Duration (hours)	4.6	1.7	3.8	1.7

The terms JONSWAP and SMB are used to distinguish winds estimated with differing adjustments. The JONSWAP winds indicated in the above table included adjustments for height of the anemometer, the drag coefficient, and air-sea temperature difference. The SMB winds included adjustments for height of the anemometer only. The storm that produced damage causing wave conditions shortly after initial breakwater construction at Port Lions occurred November 9 thru 12, 1981. This storm system was part of a major low-pressure center that moved through the North Pacific Ocean during that week. Local television stations in Anchorage indicated that it would have been classified as a hurricane had it been

on the east coast. The NWS at the Kodiak Airport recorded the following wind gusts for the period of November 9 thru 12, 1981:

Date	Direction	Gust Speed (mph)
November 9, 1981	NE	63
November 10, 1981	SE	43
November 11, 1981	NE	48
November 12, 1981	NE	48

The winds on November 9 were described as gusty. The winds on November 11 and 12 were sustained near the peak levels for most of both days. Local residents indicated that wind velocities in Port Lions were between 35 and 45 mph on a sustained basis. The estimated wind velocity at the harbor was approximately 60 mph during this storm event. Long time residents of the Port Lions area characterize winds of this magnitude as not unusual. Local accounts of larger storms include northeasterly winds of 80 mph in January of 1976 and 80 to 100 mph in November of 1980, both storms occurring prior to construction of the original breakwater.

Wind data recorded by a NWS anemometer at the Kodiak Airport was obtained. The Air Force Combat Climatology Center (AFCCC) provided the data for a period from 1949 to 1996 for peak gust winds and 1973 to 2001 for 2-minute average sustained winds. AFCCC provided an extreme value analysis that gave wind speeds for various return periods and directions. Results of this analysis are shown in table 1.

Table 1. Extreme Wind Analysis Results for Kodiak, Alaska

2-minute average winds (mph)

Wind Direction	Return Period (years)							
	1.1	1.25	2	5	10	20	50	100
Northeast 30° - 60°	34.3	36.1	39.4	42.5	44.1	45.4	46.9	47.8
Southeast 120° - 150°	32.0	34.1	38.0	41.9	43.9	45.5	47.3	48.5
East 75° - 105°	36.0	37.6	40.9	44.4	46.4	48.1	50.0	51.3
North 345° - 015°	27.2	29.2	33.3	37.6	40.1	42.1	44.5	46.1

Source: Air Force Combat Climatology Center, period of record 1973-2001

Wind speeds at the city of Kodiak airport and at Port Lions may not necessarily relate as being the same. They are likely similar in that higher speed winds would be by the same storm systems moving through the area. However, topographical effects could cause wind speeds at Port Lions to be higher than at the city of Kodiak, particularly during northeasterly storms. Northeasterlies would tend to come straight in off the open ocean at the city of Kodiak while at Port Lions, they would be channeled somewhat by mountains rising above the shoreline of Marmot Bay and propagate toward the harbor and the town. Such constriction of winds would tend to increase the wind speed. Local residents of Port Lions report that winds are generally more intense there compared with the city of Kodiak.

Wind condition summary statements from the July 2005 report state: Design winds selected for use in derivation of the design waves are taken from the hindcast done by WES in 1982 previously discussed. Such wind speeds are taken to be representative of the 50-year design wind for the northeast direction (30° to 60°). The design wind speed of 89 mph with duration of 3.8 hours was used. Using methods described in the 1984 Shove Protection Manual (SPM), this design wind equates to a one-hour wind speed of 81.4 mph. For the southwest direction (215° to 245°) a one-hour wind speed of 50.0 mph was determined.

In summary, for winds from the northeast the design wind is a one-hour, 81.4 mph event. For winds from the south to southeast, this report recommends use of a design wind of 50 mph for a one-hour duration with a recommendation that additional future design work be done to determine the one-hour design wind from this direction.

C. Tides

The tides at Port Lions are generally diurnal with two highs and two lows occurring daily. Tide levels, referenced to mean lower low water (MLLW), are shown in table 2. Extreme high water levels result from the combination of astronomic tides and rise in local water levels due to atmospheric and wave conditions.

Table 2. Tide Elevations, Port Lions, Alaska

Level Type	Levels Referred to MLLW (ft)
Est. Highest Tide (observed)	+14.0
Highest Tide (predicted)	+12.3
Mean Higher High Water (MHHW)	+9.6
Mean High Water (MHW)	+8.7
Mean Low Water (MLW)	+1.1
Mean Lower Low Water (MLLW)	0.0
Lowest Tide (predicted)	-4.0

Source: NOAA National Ocean Service

D. City/Ferry Dock Face Depth

The existing facilities have provided ferry service via the MV Tustumena. During the site visit on 24 June 2009 the Tustumena was observed docking during calm conditions and a low tide (predicted @ -2.2'). The captain of the vessel noted that his thrusters were stirring up the bottom and putting a small plume in the water. The State of Alaska Department of Transportation and Public Facilities (DOT/PF) Facility Condition Report from July 2004 indicates that the maximum depth at the dock face was 31'. The existing conditions, including minimum water depth have not been confirmed. For comparison purposes the minimum required mooring depth for the City/Ferry Dock was established based on the following criteria:

Table 3. City/Ferry 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	-5.0 ft MLLW
Safety Clearance (based on sand & gravel bottom)	-2.0 ft
Entrance Channel and Basin Depth	-26 ft MLLW

E. Wave Climate

The wave climate at the current Port Wakefield City/Ferry Dock location is taken from the 20 June 1977 Corps of Engineers detailed project report referenced above.

The waves near Port Wakefield are generally limited to two directions: locally generated waves from the south to southeast direction coming directly up Kizhuyak Bay with a fetch of around 8 miles; and locally generated waves from the northeast out of Marmot Bay coming past Peregrebni Point with a fetch of around 27 miles.

Wave heights predicted from fetch distances and wind speeds yielded a 6.2 foot wave from the south to southeast with a period of about 5.2 seconds and an 8.0 foot wave from the northeast with a period of 8.5 seconds. The south to southeast wave condition is based on fully-arisen conditions with a 50 mph, 1.25 hour duration event. It is noted that this does not exactly match with the 50 mph, 1 hour duration event mentioned under the wind data paragraph above, but is considered to be appropriate given the questions regarding actual wind conditions from this direction. The wave heights indicated match well with anecdotal evidence gathered from the local inhabitants, and represents the significant wave height, H_s , which is the average of the highest 1/3 of all waves.

General Information and Alternatives

A. General

This is a reconnaissance level report based on a site-visit and information gathered from previous reports and studies. Previous Corps of Engineers feasibility and draft feasibility reports were relied on for much of the site specific information contained in this report. There is no bathymetry for the site for this report. 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. MV Kennicott

Consideration has been given to whether the MV Kennicott should be considered as the future design vessel for ferry service to Port Lions. Communication with ADOT/PF personnel indicated that service via the Kennicott is extremely unlikely. The additional length of the Kennicott and its stern loading/offloading configuration make maneuvering the Kennicott within the existing mooring configuration problematic as it would push the bow into too shallow water.

C. Alternative 1

Alternative 1 is a steel pipe pile and concrete deck multipurpose dock with mooring and breasting dolphins, and a similarly constructed access trestle. The new dock and trestle occupy the footprint of the existing dock and trestle thus requiring demolition of these existing features. It is possible that an alternate location for the new dock could be found, thus avoiding the demolition costs, however this work is outside the scope of this report. The new dock places the mooring face in the same location as the existing dock and provides 9,400 square feet of dock space and a 100' mooring face. Mooring and breasting dolphins shown would be designed for the MV Tustumena with three breasting dolphins spaced at about 80'. It is possible that a wave barrier could be included along the south face of the dock and trestle; however this has not been included in the pricing of this alternative. This alternative provides for: continued ferry service; a dock capable of construction equipment loading/offloading as well as providing for typical cargo loading/offloading requirements; and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new dock have not been included in the cost estimate. Figures 2 and 3 are a site plan and parametric cost estimate for this alternative, respectively.

Figure 2. – Alternative 1 Site Plan



City Dock and Ferry Terminal Improvements

Port Lions, Alaska

Figure 3. – Alternative 1 Cost Estimate

Port Lions - Alternative 1 - Pipe Pile Dock w/ Concrete Deck

Comments: Approx. 100' dock face with fuel header & water service

Item	Unit	Unit Price	Quantity	Amount
Mob./Demob. & Bonds	Each	\$ 800,000.00	1	\$ 800,000
Demolition of Existing Dock & Trestle	Each	\$ 700,000	1	\$ 700,000
Pipe Pile Dock	SF	\$ 300	9,400	\$ 2,820,000
Pipe Pile Trestle	SF	\$ 300	5,440	\$ 1,632,000
Mooring Dolphins	Each	\$ 400,000	2	\$ 800,000
Breasting Dolphins	Each	\$ 200,000	3	\$ 600,000
Contingency (20%)				\$ 1,470,400
Total Construction Cost (08)				\$ 8,822,000
Estimated Construction Cost (2011 @ 8% per Year)				\$ 10,290,000

Note: Design costs are estimated to be between 8.5 & 12.5% of construction cost with construction supervision and administration cost estimated at about 10% of construction cost.

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ALT 1 New Pipe Pile Dock Cost Estimates - Final, Port Lions.xls

D. Alternative 2

Alternative 2 is a 24' wide by 145' long concrete barge/launch ramp sited at the existing launch ramp in Port Wakefield. This ramp would provide for the offloading of heavy equipment directly to shore, however it does not make any provision for continued ferry service to the community. The existing staging area indicated is considered to be adequate for staging of cargo resulting from barge loading and offloading. The existing launch ramp is in poor condition and demolition costs are included. Figures 4 and 5 are a site plan and parametric cost estimate for this alternative, respectively.

Figure 4. – Alternative 2 Site Plan



*City Dock and Ferry Terminal Improvements
Port Lions, Alaska*

Figure 5. – Alternative 2 Cost Estimate

Port Lions Alternative 2 - Barge/Launch Ramp

Item	Unit	Unit Price	Quantity	Amount
Mob./Demob. & Bonds	Each	\$ 200,000	1	\$ 200,000
Demo. Existing Ramp	Each	\$ 100,000	1	\$ 100,000
24' x 145' Barge Ramp	SF	\$ 20	3480	\$ 69,600
24" Dia. Pipe Pile Mooring Bollards	Each	\$ 40,000	2	\$ 80,000
Contingency (20%)				\$ 89,900
Total Construction Cost (08)				\$ 540,000
Estimated Construction Cost (2010 @ 8% per Year)				\$ 630,000

Note: Design costs are estimated to be between 8.5 & 12.5% of construction cost with construction supervision and administration cost estimated at about 10% of construction cost.

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E. Alternative 3

Alternative 3 is a modified diaphragm sheet pile multipurpose dock with fenders for the MV Tustumena and an armored gravel access causeway. The mooring face remains in the same location as the existing dock thus requiring that it be demolished. It is possible that an alternate location for the new dock could be found, thus avoiding the demolition costs, however this work is outside the scope of this report. This alternative would provide: for continued ferry service; a robust structure capable of handling all foreseeable present and future loadings; and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new dock have not been included in the cost estimate. In addition, this alternative essentially provides a breakwater along the length of the causeway. The design of this alternative would have to evaluate the need for a breach in the causeway, and thus a bridge. The need for the breach and bridge is driven by the environmental regulatory agencies and has not been evaluated in the scope of this report; as such no additional costs have been included for these features. Figures 6 and 7 are a site plan and parametric cost estimate for this alternative, respectively.

Figure 6. – Alternative 3 Site Plan



Figure 7. – Alternative 3 Cost Estimate

Port Lions Alternative 3 - Modified Diaphragm Sheet Pile Dock

Comments: Approx. 80' dock face with fuel header & water service

Item	Unit	Unit Price	Quantity	Amount
Mob./Demob. & Bonds	Each	\$ 500,000	1	\$ 500,000
Demolition of Existing Dock & Trestle	Each	\$ 700,000	1	\$ 700,000
Steel Sheet Piles	SF	\$ 280	5200	\$ 1,456,000
Mooring Dolphins	Each	\$ 400,000	2	\$ 800,000
Breasting Dolphins	Each	\$ 200,000	3	\$ 600,000
Dock Fill	CY	\$ 40	14000	\$ 560,000
Causeway				
Core/Fill	CY	\$ 60	30,000	\$ 1,800,000
B-Rock	CY	\$ 215	3,300	\$ 709,500
A-Rock	CY	\$ 280	4,600	\$ 1,196,000
Contingency (20%)				\$ 1,664,300
Total Construction Cost (08)				\$ 9,986,000
Estimated Construction Cost (2010 @ 8% per Year)				\$ 11,648,000

Note: Design costs are estimated to be between 8.5 & 12.5% of construction cost with construction supervision and administration cost estimated at about 10% of construction cost.

F. Alternative 4

Alternative 4 is a steel pipe pile and concrete deck trestle with mooring and breasting dolphins. The new trestle occupies the footprint of the existing dock and trestle thus requiring demolition of these existing features. It is possible that an alternate location for the new dock could be found, thus avoiding the demolition costs, however this work is outside the scope of this report. This alternative places the mooring face in the same location as the existing dock and provides space for a 12' x 16' fuel header building. Mooring and breasting dolphins shown would be designed for the MV Tustumena with three breasting dolphins spaced at about 80'. It is possible that a wave barrier could be included along the south face of the trestle; however this has not been included in the pricing of this alternative. This alternative provides for: continued ferry service; and could incorporate fuel and water headers. Costs to replace the existing fuel and water lines on the new trestle have not been included in the cost estimate. The trestle would be designed for typical highway vehicle loading. Figures 8 and 9 are a site plan and parametric cost estimate for this alternative, respectively.

Figure 8. – Alternative 4 Site Plan



*City Dock and Ferry Terminal Improvements
Port Lions, Alaska*

Figure 9. – Alternative 4 Cost Estimate

Port Lions - Alternative 4 - Pipe Pile Trestle with Concrete Deck

Comments: Accomodates Fuel Header & Water Service

Item	Unit	Unit Price	Quantity	Amount
Mob./Demob. & Bonds	Each	\$ 800,000.00	1	\$ 800,000
Demolition of Existing Dock & Trestle	Each	\$ 700,000	1	\$ 700,000
Pipe Pile Trestle	SF	\$ 300	8,225	\$ 2,467,500
Mooring Dolphins	Each	\$ 400,000	2	\$ 800,000
Breasting Dolphins	Each	\$ 200,000	3	\$ 600,000
Contigency (20%)				\$ 1,073,500
Total Construction Cost (08)				\$ 6,441,000
Estimated Construction Cost (2011 @ 8% per Year)				\$ 7,513,000

Note: Design costs are estimated to be between 8.5 & 12.5% of construction cost with construction supervision and administration cost estimated at about 10% of construction cost.

9/23/2009
CEPOA-EN-CW-HH
R. Tedrick

O:\EN\Public\CW\EN-CW-HH\Projects\Port Lions\
ALT 4 New Pipe Pile Trestle Cost Estimates - Final, Port Lions.xls

City Dock and Ferry Terminal Improvements

Appendix C – Real Estate

Port Lions, Alaska



Prepared for:

Denali Commission

October 2009

Prepared by:



**U.S. Army Corps
of Engineers**

Alaska District

**CITY DOCK AND FERRY TERMINAL IMPROVEMENTS
REAL ESTATE APPENDIX C
PORT LIONS, ALASKA**

CONTENTS

I. Real Estate Summary	1
A. Project Summary	1
B. Current Ownership.....	1
C. Real Property Interests required for the project.....	1

I. REAL ESTATE SUMMARY

A. Project Summary

The purpose of this summary is to determine real estate requirements for the project planning document for potential repairs to the existing city dock at Port Lions, Alaska. The document includes an outline of reasonable alternatives, including replacement if warranted, for marine transfer needs. Real estate at this point has been tasked to:

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

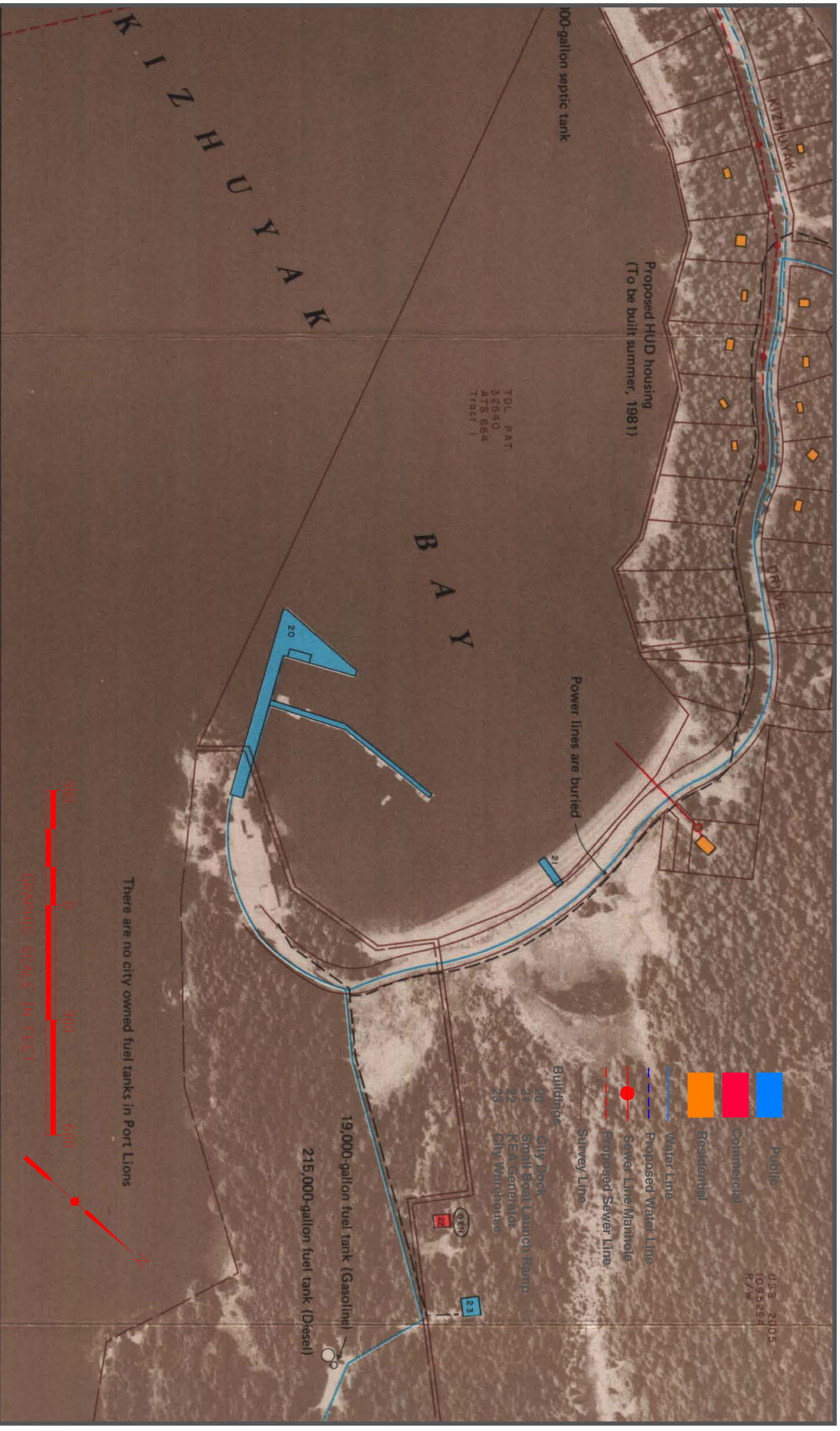
B. Current Ownership

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 City of Port Lions, 220 acres, more or less, tide submerged land situated in Settler Cove on Kizhuyak Bay. The existing City Dock extends out into the tidelands. The City of Port Lions owns 43.31 +/- acres of land identified on USS 2005, Tract 'C', identified in figures 1, 3, and 4 as Alternative Sites 1, 3, and 4, where the existing City Dock is presently located, and 54.85 +/- acres, Tract 'F', identified in figure 2 as Alternative 2.

C. Real Property Interests required for the project

Initial information indicates all lands required for construction, operation, and maintenance of the project are owned by the City of Port Lions. The Denali Commission is funding this project and has indicated that the City has a vested interest in the repair of the dock and will be responsible for operating and maintaining the project. Real estate requirements for all four (4) alternatives are the same.

Recommendation: That the City of Port Lions hold permanent interest in the structure and land.



DEPARTMENT OF THE ARMY
OFFICE OF THE ALASKA DISTRICT ENGINEER
PACIFIC OCEAN DIVISION

REAL ESTATE

City Dock and Ferry Terminal Improvements
Port Lions, Alaska
September 2009

City Dock and Ferry Terminal Improvements

Appendix D – Trip Report

Port Lions, Alaska



Prepared for:

Denali Commission

October 2009

Prepared by:



**U.S. Army Corps
of Engineers**

Alaska District

**CITY DOCK AND FERRY TERMINAL IMPROVEMENTS
TRIP REPORT APPENDIX D
PORT LIONS, ALASKA**

CONTENTS

I. Trip Report..... 1
II. Public Meeting Summary..... 11

FIGURES

Figure D-1. Vegetation growing atop pile ends..... 5
Figure D-2. Gap between pile and dock..... 5
Figure D-3. Unbraced piles on bedrock..... 6
Figure D-4. Unbraced piles on bedrock with bolts indicating missing bracing..... 6
Figure D-5. View underneath causeway..... 7
Figure D-6. Dangling ladder missing supports due to decay of bracing..... 7
Figure D-7. View showing misaligned pile under causeway..... 8
Figure D-8. Tustumena at the dock..... 8
Figure D-9. Unbraced concrete barrel supports atop bedrock under causeway..... 9
Figure D-10. Fuel lines on edge of dock..... 9
Figure D-11. Typical dock surface with vegetative growth..... 10
Figure D-12. Decaying live crab pots, fuel lines, and vegetative growth including trees 10

I. TRIP REPORT

Site Visit Summary Port Lions City Dock June 23 – 24, 2009

Participants

Robert Tedrick – EN-CW-HH

George Kalli – EN-CW-PF

Summary

June 23, 2009

Robert and George arrived in Port Lions on the evening on June 23rd at approximately 17:00 on Island Air. After a quick reconnaissance of the city dock and dinner a community meeting was conducted. A summary of the community meeting can be found at O:_Projects by Location\Port Lions\AKV283 (322824) Port Lions City Dock and Ferry Terminal Repairs Denali Commission\06 Site Visits-Meeting Minutes.

Photos taken during the site visit are located at O:_Projects by Location\Port Lions\AKV283 (322824) Port Lions City Dock and Ferry Terminal Repairs Denali Commission\05 Photos-Maps-Drawings\Site Visit Jun23-24 2009

June 24, 2009

07:30

Robert and George returned to the city dock at 08:30 to take advantage of the lowest tide of the summer that was occurring that morning (Kodiak low tide -2.7 at 10:01).

Rich, the bulk fuel operator informed us that the new bulk fuel facility was constructed in 2007.

The causeway portion of dock is partially supported by concrete filled drums, some of which have eroded away from the concrete within. We observed no bracing at the top or bottom of these drums.

Cross beams located lower than high water were observed to be severely decayed with many detached from their pile attachment points and many missing large portions of the beams themselves.

Diagonal cross beams located above the water line appeared to be generally good shape, at least in comparison to those that are periodically submerged.

Some newer horizontal cross beams were observed.

Many horizontal cross beams near the base of the dock piles were missing completely. This was particularly visible during the low tide.

Numerous piles appear to have lost cross-sectional area towards the base of the pile.

A missing pile under the causeway portion of the dock was noted. (In photos, a dangling cross beam touches the ground near the shoreline in the vicinity of the missing pile.)

Crooked, non-vertical piles are obvious, especially in the outer piles. While many are batter piles, intended to be non-vertical to add horizontal stability by providing a wider base, others were not intended to be non-vertical (narrower base).

Multiple piles and drums were noted that are not touching the bottom of the deck.

A longitudinal and slightly crosswise sag in the causeway is evident.

New surface decking was constructed directly atop old decking material. This prevents adequate drainage through the decking. There is much vegetation, mostly grass, sprouting out of the cracks of the decking. Small trees were also observed, especially along the perimeter on the deck and along the bulk fuel lines.

The tops ends of most of the piles along the outside of the dock are recessed and have vegetation growing in them.

09:00

The harbormaster Russell Gundersen joined us on the dock. He stated that he had washed the deck 2 – 3 weeks ago and that the grass was already growing back atop the deck.

The original decking surface that was covered over was visible around the storage building located atop the dock. The top of this decking was covered in some sort of lichen-like vegetative growth and appeared to be ‘punky’.

The 2nd bollard from the seaward side of the dock is quite loose and can easily be made to sway by a human shoving on it.

Throughout the dock there is antiquated equipment including, pipes, pumps, and decaying wooden live crab traps, mostly related to its origin as a cannery dock. Removal of this equipment may be a consideration as part of any dock repair efforts.

The building located on the dock has a freezer on one side and storage on the other. The freezer did not appear to be in use or operational. The storage area contains an inoperable salt water pump.

09:20

Jon Scott Pestrikoff joined us on the dock.

- He stressed the community’s need to maintain the size of the dock to support future economic endeavors in the community.

- Jon stated that the dock swayed up to 18 inches during a storm with 80 – 90 mph winds.

09:25

The Alaska Marine Highway ferry Tustumena began approaching the dock to land under calm conditions.

After docking, Captain John Merrill spoke with us.

- He confirmed that the Port Lions dock is the worst dock that they call upon.
- He referred to the dock as dilapidated.
- Due to concerns with the dock, they often have to avoid it in the winter during rough conditions.
- He stated that a dock face alignment east of north of the current alignment would be advantageous to the ferry.
- There has been talk of the Kennicott coming to Port Lions in the future but Captain Merrill was not sure if that was plausible without dredging. The Kennicott is a larger boat than the Tustumena.
- Captain Merrill indicated that he would prefer a new dock, but that any improvements would be great.
- An independent fender system would be beneficial but the reduced weight limitation of the dock (23,000 lbs) would still limit what the ferry could bring to Port Lions.

Petro Marine Services is the fuel supplier for Port Lions. The K-Sea is the tug that services Port Lions. The last tug captain to service Port Lions was named Amos. He might be a good contact as a user of the dock.

10:30

Marvin Bartleson Sr. took us out on his boat for a water based inspection of the dock.

According to Marvin, the new decking was laid atop the old decking approximately 15 years ago.

Marvin stated that the dock was constructed in 1964 or 1965 (Port Lions was established after the 1964 Good Friday earthquake).

Bracing for the dock ladders are missing. The ladders are only supported by their attachment point to the dock at the top of the ladder. This is a safety concern.

Noting the extent of cross bracing that is missing and/or decayed in place it became evident that it would be prudent to replace all the cross bracing for the dock.

12:10

Robert and George returned to the dock on foot to explore underneath it as the tide was still quite low.

Bolts with nothing attached to them indicate a missing lowest level of cross bracing.

All bracing below a certain elevation are missing or obviously decayed.

A pile tapered at the bottom was noted resting upon bedrock.

Numerous crooked, non-batter piles were observed.

It appears that the sag in the causeway corresponds to where the piles are in soil as opposed to bedrock.

In summary, based upon our impressions during this site visit, the potential scope of repairing the Port Lions City Dock appears to contain the following efforts;

- Conduct follow-up dive inspection (recommended every 5 years)

- Replace all bracing

- Replace some batter piles

- Replace some piles (timber and concrete)

- Replace ladders

- Remove live crab tanks

- Replace decking

- Remove old equipment

- Cut and cap outer piles to prevent vegetative growth

- Install independent fender system

We question whether it would be cheaper and safer to demolish the existing dock and construct a new dock at Port Lions.

PHOTOS



Figure D-1. Vegetation growing atop pile ends



Figure D-2. Gap between pile and dock



Figure D-3. Unbraced piles on bedrock



Figure D-4. Unbraced piles on bedrock with bolts indicating missing bracing



Figure D-5. View underneath causeway



Figure D-6. Dangling ladder missing supports due to decay of bracing



Figure D-7. View showing misaligned pile under causeway



Figure D-8. Tustumena at the dock



Figure D-9. Unbraced concrete barrel supports atop bedrock under causeway



Figure D-10. Fuel lines on edge of dock



Figure D-11. Typical dock surface with vegetative growth



Figure D-12. Decaying live crab pots, fuel lines, and vegetative growth including trees

II. PUBLIC MEETING SUMMARY

Public Meeting Summary
Port Lions City Dock Repairs
June 23, 2009

Participants

City of Port Lions

Lorna Maughan
Judith Clayton
Jon Scott Pestrikoff
Rich Pestrikoff
Steve Anderson
Susan Boslofsky
Annie Kewan
Wendy Bartleson
Wayne L?
Marvin Bartleson Sr.
Katy Adkins
Sheila Biehl
Liz Pennington
Dorinda Kewan
Arnold Kewan
Rodney K?
Marilyn Wagner
Chris Bartleson
Russell Gunderson
Harold Christensen Jr.
Bruce Nelson
Kathie Kyono
Steve Kyono
Jay Kaiser
Julie Kaiser

Corps of Engineers

Robert Tedrick
George Kalli

Purpose

This meeting served as a scoping meeting for Denali Commission funded repairs to the Port Lions city dock. Considering Port Lions has a population below 200 and that it was summer charter season, attendance at the meeting was superb. The attendance reflects the importance of this project to community members.

Topics Discussed

- The community is concerned about the condition of the dock. Due to its poor condition barge service from Seattle was discontinued in 2006. This caused the only store in town to close down. This has caused a financial and logistical burden upon the residents of Port Lions. Loss of barge service has made the community even more reliant upon the Alaska Marine Highway ferry stops in the community. Concerns are that if the dock continues to degrade that they may lose that service, and their fuel deliveries, as well. Due to the condition of the dock, current fuel deliveries are only conducted during daylight hours. The community is hopeful that barge service will return and ferry stops and fuel deliveries will continue with an improved or replacement dock
- It was confirmed that the current deck surface was placed directly atop the previous deck.
- It was the general impression that the piles of the dock were sound but the many cross braces were either missing or unsound.
- People expressed interest in the possibility of a dock replacement as opposed to repair. Corps employees informed community members that the current scope of work was for repair of the existing dock. The Corps would notify the Denali Commission if it appeared that replacement of the dock would be more economically feasible.
- The schedule to produce a final report was questioned. Mike McKinnon from the Denali Commission had indicated to some community members that a final report would not be available until December 2009. In order to apply for grants with application deadlines of November 1st, community members asked if we could have a final report available to them by mid-October. George offered to get back to Judith Clayton about this question.
- The Tustumena is the ferry currently servicing Port Lions. There is some talk of the larger Kennicott calling on Port Lions in the future, however, such a scenario is not part of the Borough of Kodiak regional transportation plan.
- Restoring the weight capacity of the dock to 50,000 lbs will reduce the costs to ship equipment and materials to the community (reduce mobilization and demobilization costs). Currently, items too heavy for the dock must be brought to the community via a barge beach landing at additional cost. The State of Alaska dictated the current weight limit of 23,000 lbs.
- Nobody was aware of any available original design drawings of the dock. The original design of the dock was intended to be dual purpose in that it was designed to serve the ferry and crab boats at the same time.
- A Koniag owned gravel source is available near the Port Lions airstrip. Koniag is in the process of developing a rock source nearby.
- One resident described that he can see the dock sway back and forth in heavy seas.
- Interest was expressed in reconstruction of the finger dock. The previous finger dock is the source of the string of pilings extending inland from the dock causeway.

- The fuel lines to the tank farm are atop the original decking at the edge of the dock.
- The status of the buildings on the dock was questioned.
- The dock ladders are on their “last legs” and are a safety concern.
- Judith asked if we were familiar with a project regarding a dock in Gustavus. Not being familiar with the project, she offered to follow up with a point of contact.
- Community members stressed that at some point repair may be more expensive than replacement.
- There was relative agreement among those present that if replaced, the current size of the dock would be adequate.
- It was suggested that the reef extending out from the end of the dock towards the red buoy could be built up as a breakwater which would provide additional protection for the ferry.