# APPENDIX M

Williamsport Pile Bay Road

THIS PAGE INTENTIONALLY LEFT BLANK.

# SOUTHWEST ALASKA
# TRANSPORTATION PLAN UPDATE
# IRIS PROJECT NUMBER Z804080000

## APPENDIX M:

WILLIAMSPORT PILE BAY CORRIDOR

CONSOLIDATION OF DOCUMENTED INFORMATION

**Prepared for:**

Alaska Department of Transportation and Public Facilities,

Southcoast Region
6860 Glacier Highway
Juneau, Alaska 99801

Central Region
4111 Aviation Avenue
Anchorage, Alaska 99519

**Prepared by:**

DOWL
4041 B Street
Anchorage, Alaska 99503

January 2016

# TABLE OF CONTENTS

Page

# TABLE OF CONTENTS (cont)

## FIGURES



## TABLES

# LIST OF ACRONYMS

ABLS.....Alaska Barge Landing System
DOT&PF..... Alaska Department of Transportation and Public Facilities
IRTCA..... Iliamna Regional Transportation Corridor Analysis
ITS.....Intelligent Transportation Systems
MLLW ..... mean lower low water
PCM .....DOT&PF Highway Preconstruction Manual
SWATP .....Southwest Alaska Transportation Plan
USACE ..... United States Army Corps of Engineers
USGS.....United States Geological Survey
WPB .....Williamsport Pile Bay

# 1.0 INTRODUCTION

This appendix to the Southwest Alaska Transportation Plan (SWATP) documents plans and records that pertain to current improvement plans for the multi-modal Williamsport Pile Bay Road (WPB) Corridor. Proposed improvements focus on upgrading the single-lane, 14-mile long gravel road to a two-lane, all-season road between Pile Bay, on the east shore of Lake Iliamna, to Williamsport, on the west coast of the Cook Inlet (Figure 1).

## 1.1 Project Location


*Figure 1: Project Map and Location*

*Corridor Option A follows the route of the existing WPB from Pile Bay to Williamsport. Segment 6 would be new construction, accessing a proposed barge landing site at Port Site 3. Segment 5 is also new construction and provides access to an eventual deep water port at Port Site 1.*

*Pile Bay improvements:* Pile Bay would be developed as a hub dock facility for distribution of provisions to Lake Iliamna communities.

*Road improvements:* The proposed alignment would generally follow that of the existing road except for a section in the Summit Lakes area. The road currently bisects private property at the Williamsport end, and new routing to avoid the private property would be considered. At Williamsport, new road can be extended in two directions:

- A three-mile extension south to Diamond Point (light blue line in Figure 1) would provide better barge access in a deeper part of Iliamna Bay.
- An eventual extension to the southeast (dark blue line in Figure 1) would provide access to an area appropriate for deep water port development.

*Williamsport improvements:* The project includes analysis and construction of a landing craft landing and boat pull-out at Williamsport in Iliamna Bay. Eventual development could include port facilities at the ends of the two proposed road extensions described above:

- Initial studies favor a barge dock at Diamond Point. This would improve barge access for provisions currently arriving via Williamsport. It would also improve beachhead landing support for construction personnel and equipment that would be used in the eventual development of a deep water port at Port Site 1.
- Development of a deep water port at Port Site 1 could be developed when economically feasible.

This project is part of a two-project plan to improve a multi-modal surface transportation corridor between Cook Inlet and Bristol Bay (Figure 2). While WPB provides access from Cook Inlet to Lake Iliamna (green line in Figure 2), the Kaskanak Road Project would establish access from Lake Iliamna to Bristol Bay via the Kvichak River (lavender line in Figure 2). The length of the eventual corridor will be approximately 176 miles: The WPB Corridor is 14

miles, a journey across Lake Iliamna is approximately 75 miles, and the Kaskanak Road project from Igiugig to Bristol Bay is approximately 78 miles.

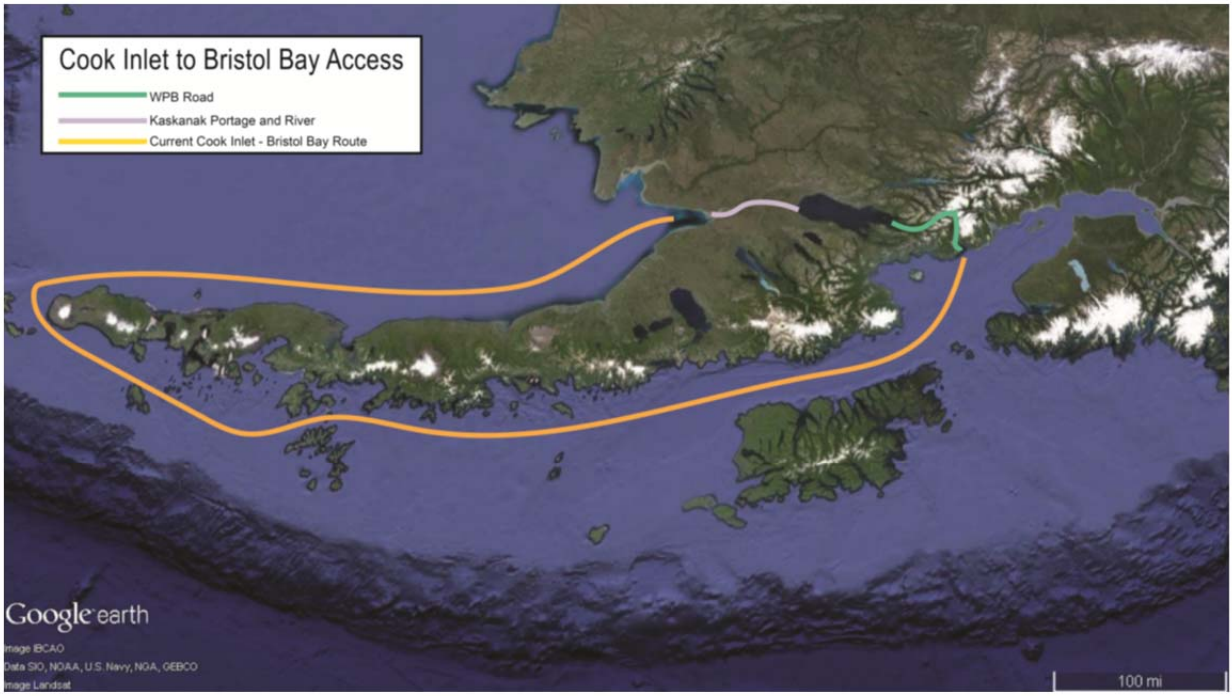


*Figure 2: Cook Inlet to Bristol Bay Corridor*

*The proposed multi-modal improvements between Cook Inlet and Bristol Bay would shorten the approximately 1,000-mile trip around the Alaska Peninsula to 170 miles.*

Currently, the only access that Iliamna fishermen have to Bristol Bay is an approximately 1,000 mile journey via WPB, Cook Inlet, around the Alaska Peninsula, through False Pass, and finally to Bristol Bay (orange line in Figure 2). Improving WPB access is becoming more important as the braided shallows of the Kvichak River continue to become shallower, limiting access to vessels with drafts less than 2 feet.

## 1.2 Purpose and Need

This project improves connectivity and efficiency along a well-established corridor. It

- reduces the tide-dependency of freight delivery to Williamsport,
- improves intermodal connection between sea and land,
- improves safety and efficiency of vehicle traffic by improving road condition and geometry, and
- provides basic infrastructure required for future upgrades.

The route immediately benefits the residents of the Iliamna Lake and Lake and Peninsula Borough, a population of about 1,631. As an element of a Bristol Bay corridor, the project will serve 16,177 year-round residents.

Improvement of the route is estimated to net $3 million a year in freight savings; creating a more robust private barging industry while reducing costs for residents.

> *"Planning studies for Southwest Alaska have identified up to $3 million in annual freight savings from upgrading this road to better serve general freight and fuel delivery. This project will also provide Iliamna Lake communities with access and connectivity to Homer; allow gillnetters to transport vessels; provide an alternative to low water problems on the Kvichak River..."*
>
> *Draft MOA with the Denali Commission*

## 1.3 Project History

There is evidence that early Alaska Natives used this route for trading between the west side of Cook Inlet to Iliamna Lake. Athabascan, Yupik, and Aleut used the trail for hundreds of years, followed later by Russian traders and American gold miners (Klouda, 2010). The road currently in use was constructed between 1917 and 1937 (Alaska Department of Transportation and Public Facilities [DOT&PF], 2007, p. 2-1). Williamsport is named after Carl Williams, who purchased the trading post in 1936 and established a freight business (Klouda, 2010).

The possible use of WPB in Pebble Mine development is a significant element in the recent history of the road. While Pebble Mine investigations have been suspended, interest in the road continues.

During Phase I of the SWATP Update, Lake and Peninsula Borough Community Development Coordinator Jordan Keeler listed Williamsport as the first priority for his borough. He said they needed upgraded roads and landings and better drainage on roads. Pebble exploration had increased the need for heavy cargo and fuel; and bridges along the route are at the end of their useful life.

> *"We completely support the upgrade of the Williamsport Pile Bay road and the concept that this very important corridor is critical to getting cheaper goods and services to the region."*
>
> *Jeff Currier, Lake and Peninsula Borough Manager, in comments for the 2004 Southwest Alaska Transportation Plan*

Mary Jane Sutliff, the retired DOT&PF Area Planner for Southwest Alaska, also cited the WPB as a priority. It connects areas not otherwise connected. While there are concerns that the road would open the door for Pebble Mine development, Sutliff stated that DOT&PF has nothing to do with the mine as it is not included in their plans in the Statewide Transportation Improvement Program, a big signal that Pebble Mine access was not a DOT&PF concern.

Representative Alan Austerman represented District 36 in the Alaska State Legislature House of Representatives through 2014. This district includes significant areas of Bristol Bay, and has traditionally supported upgrades and road maintenance for WPB.

WPB has had opposition, some due to concerns about use of the road to support Pebble Mine. A fuel spill in 2009 was said to prove that Pebble development could not happen without environmental consequence. This is despite the fact that the fuel spill was due to

equipment failure (the tanker was punctured by its own support structures) and the fuel was destined for the Iliamna Development Corporation (Klouda, 2010).

### 1.3.1 Current conditions

The current facilities can be broken into three elements: Pile Bay, the WPB, and Williamsport.

Pile Bay: Regional heavy freight is delivered to Pile Bay via the WPB then barged to communities on the lake. Communities served include Iliamna, Newhalen, Igiugug, Kokhanok, Pedro Bay, and Pile Bay Village. The Alaska Barge Landing System (ABLS) Assessment and Design for Various Locations, Statewide, Alaska, Phase 2 (United States Army Corps of Engineers [USACE], 2010, p. 104) cites Pile Bay as a possible location to develop a hub dock facility. Vessels carrying bulk fuel up the Kvichak from Bristol Bay are forced to lighter across the shallow areas and then to communities along the lake. These efforts are estimated to take 3 boat crews more than a week (USACE, 2010, p. 105).

The Pile Bay port is not formally developed and is essentially a road that ends in the lake (Figure 3).

*Figure 3: Pile Bay*

*The Williamsport Pile Bay Road ends in Lake Iliamna, with no formal watercraft landing facilities developed. Photo courtesy of Rebecca Rauf, Planner, DOT&PF.*

Williamsport Pile Bay Road: WPB (CDS # 074000) is a single lane, 14.19 mile gravel road functionally classified as a Major Collector (DOT&PF, 2015a).

Williamsport: The Polar Bear is a large landing craft currently providing freight service to Williamsport eight times a month and only when the tide is above 15 feet (Cape International, Inc., 2012, p. 41). The Polar Bear has a draft of five feet and must wait for a tide on the way in and on the way out. The combined time of waiting and the cost of trucking the fuel to Pile Bay makes flying fuel a more cost effective option (USACE, 2010, p. 105).

### 1.3.2 Planning

Many recent studies of WPB investigated the possibility of using the route to provide a deep water port for ore mined from the Pebble deposit, west of Iliamna.

The Iliamna Regional Transportation Corridor Analysis (IRTCA) (DOT&PF, 2007) is the most recent examination of the connection between Williamsport and Pile Bay. The purpose of the study was to, *"…identify a feasible transportation corridor that that can accommodate a road route that terminates at a deep-water port, services the needs of the communities, and can aid in the development and the economic expansion of the region."* (DOT&PF, 2007, p. 8-1) The Executive Summary adds that the report will, *"…identify transportation corridors to connect local communities and mineralized areas to a deep water dock."* (DOT&PF, 2007, p. 1-1) The preferred alternative included the existing WPB beginning approximately three miles outside of Pedro Bay and extending to Williamsport, an improved barge landing at Diamond Point, and a deep water port to the southeast, just inside Iniskin Bay (DOT&PF, 2007, p. 1-12 and 1-9). While this was predominantly a desktop study, it provides the most complete design analysis of the WPB corridor available at this time.

The Pebble Partnership also included the WPB corridor in a transportation analysis for their Environmental Baseline Document (Kevin Waring & Associates, Inc., 2010). Pebble was working on the development of a large mine west of Iliamna until the project was shelved

due to opposition and permitting challenges. The study provided documentation of transportation options in the area but did not provide a preferred alternative.

The ABLS was developed for the U.S. Army Engineer District in November of 2010 and considers barge landings statewide. While the study does not specifically propose improvements to Pile Bay or Williamsport, it does recognize the possibility of developing a hub dock facility at Pile Bay (USACE, 2010, p. 104).

A few other plans provide general contextual information.

- The Cook Inlet Vessel Traffic Study (Cape International, Inc., 2012) summarizes Williamsport constraints and current uses.
- The USACE provided an Alaska Baseline Erosion Assessment (ABEA) for the road between Pile Bay and Williamsport (USACE, 2007).
- Information about natural disasters is in the Kenai Peninsula is found in the Borough All Hazards Mitigation Plan (Kenai Peninsula Borough, 2014).

### 1.3.3 Recent upgrades

DOT&PF has programmed $373,841 to begin the environmental process to replace the modular steel bridge spanning the Iliamna River with a permanent structure (DOT&PF, 2015c). This upgrade appears to be the result of a memorandum of agreement (MOA) with the Denali Commission to address immediate needs on the Williamsport to Pile Bay Road. It is currently unclear if the agreement was executed (DOT&PF, 2003).

> *The purpose of this Agreement is to establish the guidelines for completing a project to address the immediate needs on the Williamsport to Pile Bay Road.*
>
> *The Commission shall provide $750,000 to DOT&PF for addressing the immediate needs on the Williamsport to Pile Bay Road, including: (i) the replacement of a deficient bridge on the Iliamna River with a Bailey-type expedient bridge; and (ii) spot widening of rock cuts and curve realignments to improve safety for freight vehicles.*
>
> *DOT&PF shall contribute $83,333 funds to this effort, for design and construction management of the construction activities.*
>
> *Upon completion of the project, DOT&PF shall assume responsibility for sustaining the ongoing operation and maintenance of this segment.*
>
> *The total Commission funding for this Agreement is $750,000 and is intended for use for the scope of work identified in the Agreement document only. In the event there is a balance of funding after the full scope of work is completed, then the Commission (in consultation with DOT&PF) will determine how the excess funds will be allocated. The final decision on how excess funds are used is a Commission decision, and may include withdrawing excess funds for reallocation to other Commission projects. DOT&PF will return any unexpended project funds (based upon pro rata project contributions) to the Commission at the end of the project Period of Agreement.*
>
> *Memorandum of Agreement Between the Alaska Department of Transportation and Public Facilities and the Denali Commission for a Project to Address Immediate Needs on the Williamsport Pile Bay Road, Denali Commission Project No. A02003.01, March 2003*

## 2.0 DESIGN STANDARDS

IRTCA design criteria considered transportation of concentrate, supplies, and fuel for mineral development. At the time of the report, the design vehicle had not been decided on, but a 360,000 truck trailer combination (AS20-44) was chosen for the interim. This resulted in road criteria of

- 8 percent maximum grade,
- 1,000 foot minimum curve radius, and
- 30 feet top of road width from shoulder to shoulder.

The design vessels for port options for Iliamna and Iniskin Bay are listed in Table 1.

Table 1, Design Vessels: Design vessels used in analysis of port options for Iliamna and Iniskin Bay

| Vessel | Tonnage | Length (ft) | Beam (ft) | Draft (typical/max) |
|---|---|---|---|---|
| Panamax | 77,000 DWST | 800-950 | 106 | 42/45 |
| Handymax | 44,000 DWST | 630 | 100 | 36/38 |
| Barge | | 400 | 100 | 15-20 |

Source: DOT&PF, 2007, p. 8-1

## 3.0 DESIGN ALTERNATIVES

The most recent treatment of alternatives for the WPB is the IRTCA. While this analysis looked at a road from the mineralized area approximately 17 miles west of Nondalton to port facilities in Williamsport, a significant section of the route follows the existing WPB. The proposed IRTCA route picks up WPB about three miles outside of Pile Bay.

The purpose of that document was to connect local communities and mineralized areas to a deep water dock, which was identified as a key factor in minimizing shipping costs for local freight and ore concentrate (DOT&PF, 2007, p. 1-1).

Design alternatives can be considered for three general areas: Pile Bay, the WPB, and Williamsport (Figure 4).

Pile Bay: As noted, the road proposed in the IRTCA bypassed Pile Bay. While the ABLS noted Pile Bay as a location for a dock hub, it did not analyze or describe facilities needed.

WBP Road: Two alternatives for transportation between the area of Pile Bay and Cook Inlet were considered. The options and segments outlined below use the numbering system from the IRTCA for consistency when reviewing documents.

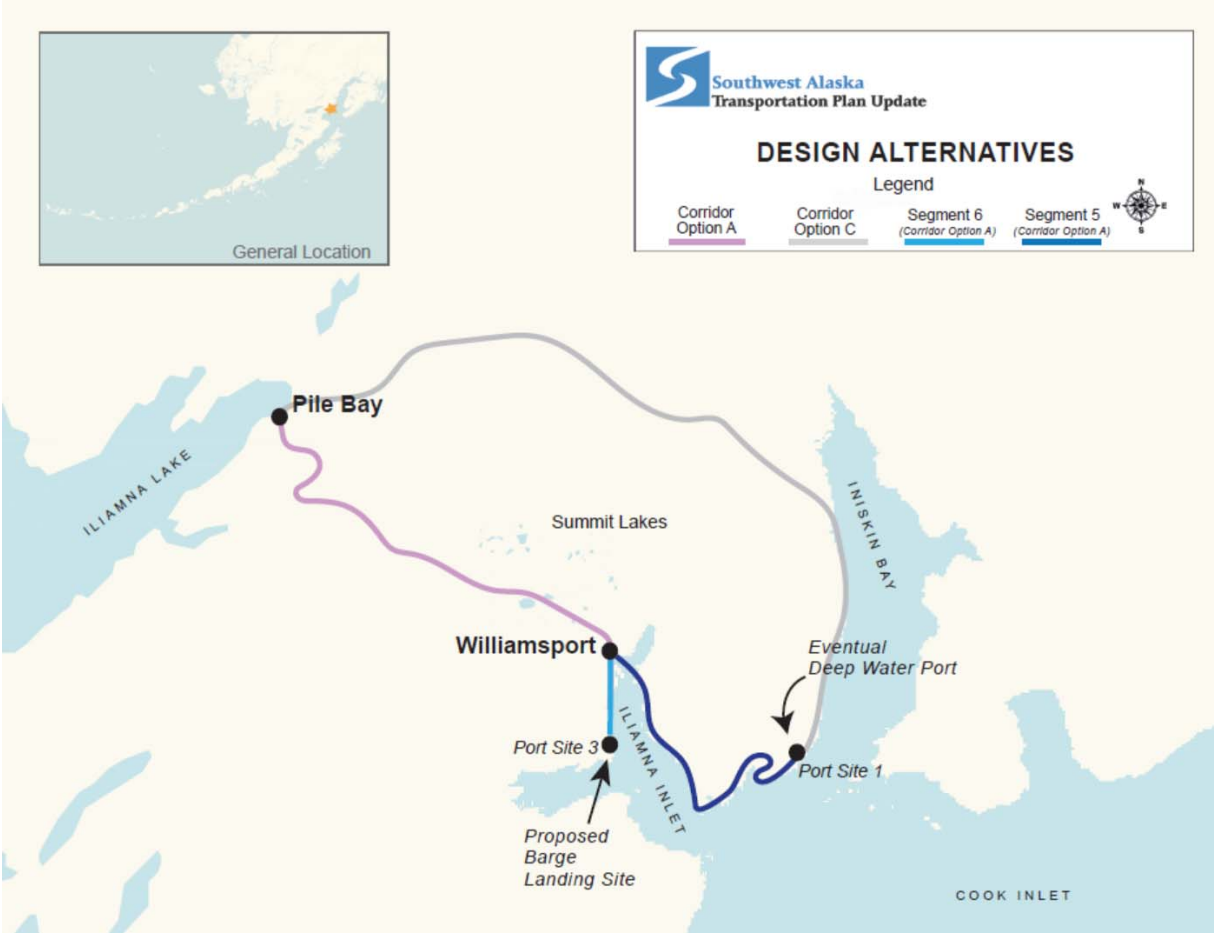


*Figure 4: Design Alternatives*

*Corridor Option C was considered as an alternative but would require new construction across previously undisturbed areas.*

Corridor Option A picks up WPB where it crosses the Iliamna River, about 2.75 road miles from Pile Bay. From there it generally follows the routing of the WPB except for a section between Chinkelyes Creek and Williams Creek (DOT&PF, 2007, p. 1-2), where the proposed route diverges south from the road. Option A includes two extensions to the existing road. One is a three mile extension to the south to a better barge landing site (Segment 6) and one

an extension approximately 11 miles to the southeast to a deep water port site at Iniskin Bay (Segments 5A and B).

Corridor Option C circumvents the existing WPB to the north, following a route along the Iliamna River, in the valley north of Sugarloaf Mountain, and terminating at Iniskin Bay (DOT&PF, 2007, p. 1-3). This alternative appears to have the best road grades and lowest construction costs but crosses previously undisturbed areas (DOT&PF, 2007, p. 1-10). Note that this route would require development of a road between Pile Bay and where the road alternative begins, in the saddle between the Iliamna and Pile Rivers.

Williamsport/Cook Inlet: The IRTCA considered four different port sites (Figure 5, below).

- Port Site 1 has developable uplands for facilities and requires a short access to relatively deep water (-60+ mean lower low water [MLLW]). However, it has some exposure to weather from the southeast (DOT&PF, 2007, p. 11-2).
- Port Site 2 was considered to address the weather concerns with Port Site 1, but had submerged hazards, limited turning area, and required longer access roads. These concerns eliminated it from further consideration.
- Port Site 3 is well protected from weather and has uplands for development but is relatively shallow (-3+/- MLLW).
- Port Site 4 is deeper (-12+/- MLLW) but has steep uplands, requiring support facilities to be built on pilings.

Port Sites 3 & 4 would require dredging if used by a HandyMax vessel (37 foot draft). All sites would require dredging for a Panamax (46 foot draft) vessel (DOT&PF, 2007, p. 11-2).


*Figure 5: Port Locations:*

*The IRTCA considered four locations for a deep water port.*

## 4.0 PREFERRED ALTERNATIVE

For the IRTCA, the preferred alternative was Corridor Option A with Port Sites 1 and 3. Option A with provisions for HandyMax ships and barges is estimated to cost $336 million. Option C would cost $270 million. The study notes that the construction cost differences

between Option A and Option C are narrow enough that further consideration of each may be warranted.

At this point in the study, the preferred Option A was chosen because (DOT&PF, 2007, p. 1-12 and 8-32):

- using the existing WPB corridor has fewer environmental impacts than constructing a new road.
- developing Port Site 3 would improve barge landing capability in the short term, with multiple road construction headings and direct transfer of barge freight. These improvements are not dependent on development of a deep-water port at Site 1.
- delaying development of Port Site 1 until use of the larger vessels is assured would reduce initial development costs. When Port Site 1 is constructed, provisioning of men and supplies would be through the barge landing at Port Site 3.
- the route:
  - minimizes stream crossings,
  - maximizes the use of low impact construction methods,
  - takes advantage of local material sites,
  - avoids community and private property impacts,
  - uses existing infrastructure,
  - minimizes the need for avalanche hazard reduction, and
  - maintains a grade of less than 8 percent.

## 5.0 TYPICAL SECTIONS

Eight typical sections were developed for the route (DOT&PF, 2007, p. 8-24).

| Typical Section | Prescribed use |
|---|---|
| Overlay | Where stable soils allow gravel overlays without geotextile, and where the soils dug up would not be an appropriate source of borrow. |
| Overlay (permafrost) | This section is similar to that above, but uses geotextile. |
| Cross Slope | For areas where terrain is too steep for an overlay, but the ground can be used as the road base, with minor filling on the downslope side and minor cutting on the upslope side. |
| Low Rock Cut | Where roads must be slightly benched into bedrock. |
| Rock Cut High | Where high rock cuts are required, and the road is fully benched into the bedrock. |
| Borrow Pit | Where the material dug up from the road is suitable for use as a material source. |
| Low Coastal Fill | Where wave action would require riprap protection, but road base construction does not require as much fill. |
| High Coastal Fill | Areas where more fill is needed to build the road base, and riprap is required to protect against wave action. |

A typical section was also developed for a possible tunnel along the existing WPB near Summit Lakes, bypassing 10 percent grades and avoiding avalanche chutes in the area (DOT&PF, 2007, p. 8-34).

## 6.0 GEOMETRIC ALIGNMENT

IRTCA authors used aerial photography and United States Geological Survey (USGS) mapping to design the preliminary road layout in the IRTCA with grades of 8 percent or less. Cuts and fills were not balanced.

## 7.0 EROSION AND SEDIMENT CONTROL

Erosion and sediment control will be studied in more detail as part of developing plans for the project.

## 8.0 DRAINAGE

In the IRTCA, PND Engineers note that a more significant hydraulic analysis is required to determine the best alternatives for drainage crossings, but they outline four general structures to anticipate (DOT&PF, 2007, p. 6-1 through 6-3).

- Cross-drainage pipe culverts: 24-inch pipe culverts that would be placed at approximately 700' intervals.
- Drainage pipe culverts: These would vary from 36 to 96 inches and used at identified drainages. If the stream hosts anadromous fish, the culvert would include floor baffles to retain bed load and be subject to additional design standards to assure fish passage.
- Single-span bridges: 40- to 100-foot bridges will be considered for drainage crossings that are not adequately addressed by use of drainage pipe culverts. Two such bridges are the Four Mile Creek Bridge (#1253) and the Timberline Creek Bridge (#1321). These proposed bridges are both steel stringer bridges with timber running planks and are 40- and 30-feet long respectively (State of Alaska, 2014; DOT&PF, 2013).
- Multi-span bridges: These structures are anticipated at major river crossings including Iliamna River, Chinkelyes Creek, and for the causeway across Iliamna Bay (Segment 5 in Figure 4) (DOT&PF, 2007, p. 6-1 through 6-3).

## 9.0 GEOLOGIC CONDITIONS

The WPB traverses u-shaped glacial valleys in the Chigmit Mountains, with much of the route running through rolling terrain. However, there are sections that require road construction on steep cross slopes with shallow bedrock, which may be subject to land and rock slides.

The section of road that would lead to Port Site 3 runs along a steep coastline. To avoid the most challenging areas, the route would have to cross mud flats in some areas (DOT&PF, 2007, p. 4-4).

## 10.0 ACCESS CONTROL FEATURES

The DOT&PF Highway Preconstruction Manual (PCM) addresses access control in section 1120.2.4 (DOT&PF, 2014a). While rural highways provide desirable access to rural lands, eventual development of the corridor may require restrictions to access. To the degree possible, future restrictions should be considered in design decisions.

## 11.0 TRAFFIC ANALYSIS

No ADT data was provided by DOT&PF at the time of this report.

## 12.0 SAFETY IMPROVEMENTS

The Williamsport Pile Bay Road has three documented safety concerns: flooding, avalanches, and landslides. Flooding problems could be addressed with this project, except in floodplain areas. Avalanches will remain a concern, and the road may have to endure seasonal closures or avalanche control procedures. Road design may address concerns with landslides.

### 12.1 Flooding

The Teddy Swamp floodplain is on the Pile Bay side of the Iliamna River. In 2003, heavy rainfall caused nearly half a million dollars in damage to the road (Kenai Peninsula Borough, 2014, p. 179). At one point, the Iliamna Bridge was under four feet of water. Photographic analysis done by the USACE estimated erosion at Chinkelyes Creek, Williams Creek, 3 mile bridge, 4 mile bridge and 6 mile culvert (USACE, 2007). The photos below are from the Alaska Baseline Erosion Report (Figure 6).

Photo 1: Williamsport Road washed out from 2003 Flooding.

Photo 2: Iliamna Bridge 4 feet underwater, 2003 flooding.


Photo 3: Williamsport Road washed out from 2003 Flooding.


Photo 4: Williamsport Road washed out from 2003 Flooding.

## 12.2 Avalanches

Steep terrain along the existing road creates known avalanche hazards. Figure 7 was taken flying from Williamsport west and shows avalanches crossing the existing road (DOT&PF, 2007, p. Appendix D). The road currently has seasonal closures.

Photo 3: Starting to Approach Pass – Better view of avalanche chutes.

*Figure 7: WPB Avalanches*

*This screen print is directly from the IRTCA, Appendix D. On the right side of the photo avalanches chutes cross WPB.*

The areas of green below show where avalanches are predicted due to steep terrain, illustrating the higher concern at the Williamsport end of the road (Figure 8) (DOT&PF, 2007, Appendix D).

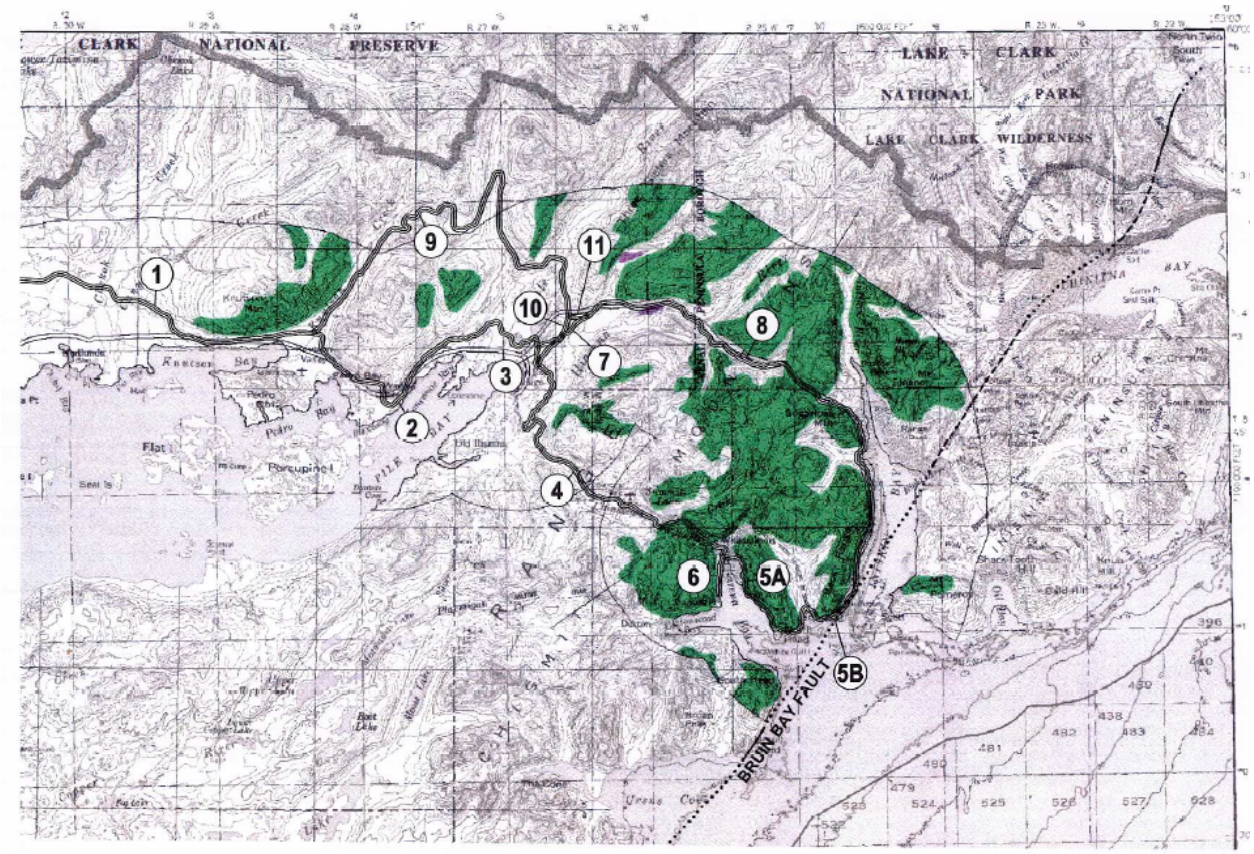


*Figure 8: Avalanche-prone Areas*

*This screen print is directly from the IRTCA, Appendix D. Segments 4, 5 and, 6 correspond to the preferred route outlined in this appendix.*

One proposed solution was a 0.4-mile tunnel near Summit Lakes, though it was dropped from consideration due to construction costs, maintenance costs, and tunnel-associated safety concerns (DOT&PF, 2007, p. 8-35 and 8-28).

## 12.3 Landslides

The section of roadway that traverses steeper areas has experienced landslides (DOT&PF, 2007, p. 4-9).

The existing road is very narrow, and the pull-outs often have boats, equipment, or vehicles parked in them, further exacerbating safety issues.

The IRTCA includes a road section designed for steep areas where high rock cuts are required. Deeper rock cuts would be required in some areas, such as the Pedro Bay area, Chigmit Mountains, and some of the coastal areas (DOT&PF, 2007, p. 8-24).

# 13.0 RIGHT OF WAY REQUIREMENTS

The majority of the studied section of proposed roadway falls on Alaska Native Claims Settlement Act land, from outside of Pedro Bay through Corridor Options 5 and 6. 2.7 miles cross privately owned property (DOT&PF, 2007, p. 9-1), bisecting land owned by Bill Williams at the Williamsport end (Klouda, 2010). Note that the IRTCA analysis does not include the three mile section between Pedro Bay and the crossing at Iliamna River.

# 14.0 PEDESTRIAN ACCOMMODATION

Because of very low traffic volumes, pedestrian accommodation is not receiving explicit consideration at this time.

# 15.0 UTILITY RELOCATION AND ACCOMMODATION

Utility reconnaissance and analysis has not been an element of previous studies or documents. Because of the relatively undeveloped nature of the road, utilities would appear to be most likely at the Pile Bay or Williamsport ends; though, in general, road support will not require utilities. Exceptions would be required lighting, air exchange, and emergency functions if a tunnel was considered. Note that at this time, development costs preclude

tunnel development (DOT&PF, 2007, p. 8-28). Another exception might be for support of Integrated Transportation Systems (ITS) applications, such as road cameras or sensors.

## 16.0 PRELIMINARY WORK ZONE TRAFFIC CONTROL

Construction will need to accommodate cargo transportation between Williamsport and Pile Bay, and portaging of boats between Cook Inlet and Lake Iliamna. There are no alternative routes available, so it may be necessary to have the road in passable condition for these events. This could cause significant disruption and cost increases for construction.

For road construction phases where passage is not possible during construction, mitigating actions may include:

- scheduling construction to avoid the shoulder seasons of fishing season, when boat transportation between ports may be most intense.
- scheduling construction to avoid fishing season all together, though this this would eliminate a significant amount of the summer construction season for consideration.
- scheduling construction around barge landings at Williamsport (delivery at Williamsport is highly variable due to dependence on tides).
- creating a permitting system for passage during construction, necessitating a significant public involvement and notification campaign.

This project may be considered significant. Depending on impacts, this project may require, "greater than normal attention to traffic control to eliminate sustained work zone impacts greater than what would be considered acceptable" (DOT&PF, 2014a, p. 1400-1).

## 17.0 PAVEMENT DESIGN

This project will not include a paved surface.

## 18.0 COST ESTIMATE AND CONSTRUCTION CONSIDERATIONS

This estimate is based on the IRTCA (DOT&PF, 2007), which focused on preparing the road for industrial use. There are two key pieces of information missing from the IRTCA report because they were not in the scope of that study:

- proposed barge landing and support facilities at Pile Bay, and
- road costs for the road from Pile Bay to the Iliamna River.

Table 2 assumes that Corridor Option A (Segment 4) road costs are the same for the section from Pile Bay to Iliamna River, though a more accurate cost estimate needs to be developed. Table 2 below does not include Pile Bay improvements, interim improvements to Williamsport, or costs of interim uplands development at either location.

It is unlikely that DOT&PF would be able to build this entire project at once, necessitating a phased approach. The section of the project that is most likely to be put off is Segment 5 and development of the deep water port. That leaves DOT&PF to determine what elements would be included in an initial phase, which could include:

- road improvements between Williamsport and Pile Bay,
- road construction down to the eventual Port Site 3,
- improvements to Pile Bay facilities (yet to be studied), and
- construction of a barge facility at Port Site 3.

In addition to construction phasing, other possible cost savings include:

- upgrading the road, but leaving it a one-lane road,
- providing more pull-outs, and
- extending road to an area where a landing craft can land at most tides and not developing a formal dock.

The $72 million cost estimate in the main planning document assumes approximately $62 million for construction of Corridor Option A and Segment 6, with $10 million for improvements at Williamsport and Pile Bay. As illustrated here, that figure is a starting point and further scoping may modify that figure significantly (Table 2).

Table 2, Estimated Costs: Estimated costs for elements of the preferred option.

| Segment 4 (Option A) | length or number | Unit | Per Unit Price | Cost |
|---|---|---|---|---|
| *Road costs* | 16 | miles | $ 903,856 | $ 14,461,700 |
| *48" Culvert* | 52 | feet | $ 24,000 | $ 1,248,000 |
| *60" Culvert* | 56 | feet | $ 31,000 | $ 1,736,000 |
| *84" Culvert* | 64 | feet | $ 56,000 | $ 3,584,000 |
| *Iliamna Bridge* | 1 | 300' bridge | $ 7,500,000 | $ 7,500,000 |
| *Chinkleyes Creek Bridge* | 1 | 800' bridge | $ 18,540,000 | $ 18,540,000 |
| *Bridge, unnamed drainage* | 3 | 40' bridge | $ 1,500,000 | $ 4,500,000 |
| **TOTAL:** | | | | $ 51,569,700 |
| **2015 TOTAL:** | | | | **$ 59,273,000** |
| | | | | |
| **Road from Pile Bay to Iliamna River (2015)** | 2.8 | miles | $ 1,038,879 | **$ 2,908,861.20** |
| | | | | |
| | | | | |
| Segment 5 | | | | |
| *Road costs* | 9.3 | miles | $ 1,139,774 | $ 10,599,900 |
| *84" Culvert* | 64 | feet | $ 56,000 | $ 3,584,000 |
| **TOTAL:** | | | | $ 14,183,900 |
| **2015 TOTAL:** | | | | **$ 16,303,000** |
| | | | | |
| Segment 6 | | | | |
| *Road costs* | 1.9 miles | miles | | $ 2,078,600 |
| **2015 TOTAL:** | | | | **$ 2,389,570** |
| | | | | |
| Port Site 1: Deep Water Dock | | | | $107,730,000 |
| **2015 TOTAL:** | | | | **$ 123,823,000** |
| | | | | |
| | | | | |
| Port Site 3: Barge Dock | | | | $ 27,790,000 |
| **2015 TOTAL:** | | | | **$ 31,941,000** |
| | | | | |
| | | | | |

All cost data from IRTCA (2007), Appendix C. Road length and cost from Table C-6. Culvert and bridge costs from Table C-4. Port costs are from Table C-8.

*Segment 4 per mile road costs with inflation factor applied, see note below.

Total cost converted to 2015 dollars with U.S. Bureau of Labor Statistics calculator: http://data.bls.gov/cgi-bin/cpicalc.pl?cost1=67832&year1=2007&year2=2015

## 19.0 ENVIRONMENTAL COMMITMENTS AND MITIGATION

Anticipated environmental concerns include:

- wetlands and drainage concerns,
- anadromous fish passage, and
- preservation and/or documentation of possible historic and cultural resources.

## 20.0 PRELIMINARY BRIDGE LAYOUT

There are six existing bridges recorded in the DOT&PF Roadway Information Portal (RIP) along WPB (Table 3, DOT&PF 2015).

Table 3, Current Bridges on WPB

| Name | Number | MP | Length (ft) | Construction |
|---|---|---|---|---|
| Chinkeleyes Creek | 0484 | 3.5 | 140 | Modular steel pony truss (Bailey bridge) |
| Four Mile Creek | 1235 | 4.1 | 40 | Steel stringer with timber running plank |
| Unnamed Creek | 7143 | 6.0 | 10 | |
| Timberline Creek | 1321 | 7.6 | 30 | Steel stringer with timber running plank |
| Unnamed Creek | 7142 | 8.1 | 10 | |
| Iliamna River | 2137 | 11.0 | 190 | Modular steel pony truss (Bailey bridge) |

*DOT&PF 2015.*

Bridges numbered 7143 and 7142 are not included in the 2013 Bridge Inventory Report.

Bridge costs outlined in the IRTCA assume steel piles with vertical steel sheet piles for armor, but field data was not available to confirm that assumption. Other options for abutments would include rock, steel bin walls, rock-anchored piles, or fabric-reinforced fill.

Cost estimates for single span bridges (#1235 and 1321) assumed steel box beams supporting a concrete deck. Steel I beams with precast concrete deck or bulb-t beams would have comparable costs.

Cost estimates for longer bridges (#0484 and 2137) assume 100 foot-length supported spans, with in-stream piers as needed.

The IRTCA recognizes that further analysis of each drainage and the appropriate crossing method should be a part of future design efforts (DOT&PF, 2007, p. 6-3).

## 21.0 IDENTIFICATION AND JUSTIFICATION OF DESIGN EXEMPTIONS AND WAIVERS

WPB is a rural major collector and could be considered a rural highway by standards outlined in the PCM (DOT&PF, 2014a, p. 1100-6). Final design standards have not been established, and proposed layouts are very preliminary. The IRTCA's initial treatment of alignment focuses mainly on minimizing excessive cross slopes and road grades (DOT&PF, 2007, p. 8-25 through 8-36). Due to terrain, there may be areas were design varies from standards, and those will need to be documented. The PCM (DOT&PF, 2014a, section 1100.3.2 ,1100.3.3) provide more information on design exemptions and waivers.

## 22.0 MAINTENANCE CONSIDERATIONS

Maintenance costs cannot be separated from how the road will be operated, especially with the goal of year-round access.

A traditional single-lane road provides the most challenges, requiring some operational considerations.

- Do larger commodity shipments require a lead and/or sweep car to clear the road of opposite-direction traffic?
- Would the road be one-way in one direction for a span of time (for instance, to accommodate deliveries from Williamsport to Pile Bay) and one-way in the opposite direction for a span of time?
- Would road users be required to broadcast their position via radio on a common communications frequency?
- Would there be a check-in/check-out station at each end that briefed users on traffic and road condition?

A single-lane road with pull-outs has similar concerns. While pull-outs are available, their use depends on operating speed and being able to see on-coming traffic with enough time to choose a pull-out.

Any restrictions to regular traffic also impact maintenance crews, increasing complexity and man hours required for maintenance activities. This applies not only to road work but to permitting and communications as well.

A two-lane road or quasi-single-lane road (15 to 16 feet wide with a low posted speed, such as 35 miles per hour) provide the most flexibility for users and maintenance crews and save money on maintenance costs.

A wider, more usable road will result in more traffic, and it is a logical assumption that many who use the road may not be familiar with the special operations along the road. Boat haulers may need to get a "wide load" permit and conduct special operations to accommodate other traffic.

## 23.0 INTELLIGENT TRANSPORTATION SYSTEMS FEATURES

Intelligent Transportation Systems (ITS) leverage technology to reduce man hours required for safe and efficient transportation. Current applicable projects include (DOT&PF, 2015b):

- 511 Traveler Information: This service could be used to notify users of restrictions during construction or special operations after construction. It can also notify users of hazards due to poor weather. One possible application is in notifying users of avalanche danger, avalanche control, or of travel delays due to road blockage or avalanche clean-up.
- Alaska Land Mobile Radio: This technology could improve communications regarding travel emergencies along the route. Deployment is under way, not all existing DOT&PF vehicles have access to the technology.

- Bridge scour detection system: This system alerts maintenance staff of adverse scour conditions. This reduces man hours inspecting bridges, especially helpful in remote areas with long lengths of road. These systems are installed and maintained by the USGS.

## 24.0 CONCLUSION

This appendix has consolidated WPB Corridor route information from 18 sources, none developed with the current corridor in mind.

Recommended future studies items include:

- A well-defined purpose and need for the project.
- Long-term needs for Pile Bay to function as a port hub, and phasing recommendations for various elements.
- WPB:
  - Two lane road? Single lane with pull-outs?
  - Would the road alignment or pull-outs require coordination with local land owners?
  - What access control should be established at this stage?
  - When should extensions to port locations be constructed? (See discussion below)
  - Possible further analysis comparing the preferred option in this appendix to the "Option C" outlined in the IRTCA, which found construction costs for both to be comparable.
- Port facilities at the Cook Inlet end:
  - What would trigger development of Port Site 3? Is immediate development warranted, or should Williamsport be upgraded for interim operation?

  - What would trigger development of Port Site 1?

- Project funding options.
- Hydrological analysis and further development of drainage crossing options.

This project provides important freight and industry access for the residents of Lake and Peninsula Borough. With the Kaskanak Road project, it establishes reliable transportation infrastructure between Anchorage (Alaska's largest community) and the rich fishing resources of Bristol Bay, and keeps Alaska moving through service and infrastructure.

## 25.0 CITATIONS

Alaska Marine Transport and Salvage. 2014. Accessed 29 July, 2014. http://www.alaskamarinetransport.com/

Cape International, Inc. 2012. Cook Inlet Vessel Traffic Study. Cook Inlet Risk Assessment Advisory Panel. January, 2012. Web access: http://www.cookinletriskassessment.com/files/120206CIVTSvFINAL.pdf

DOT&PF. 2003. Memorandum of Agreement Between the Alaska Department of Transportation & Public Facilities and the Denali Commission for a Project to Address Immediate Needs on the Williamsport to Pile Bay Road, Denali Commission Project No. A-2003-1. March, 2003 (unsigned, word document)

DOT&PF. 2007. Iliamna Regional Transportation Corridor Analysis. N.p., N.p., December, 2007. Web access: http://www.dowlhkm.com/projects/SWAKTP/new_website/docs/iliamna_reg_transp_corr_final_rpt_12-31-07.pdf

DOT&PF. 2013. Bridge Design. 2013 Bridge Inventory Report. Summary of structural, dimensional, and location data for bridges and culverts in Alaska. Juneau(AK): DOT&PF. 207 pages.

DOT&PF. 2014a. State of Alaska Department of Transportation and Public Facilities, Statewide Design & Engineering Services. November, 2005-2014. Alaska Highway Preconstruction Manual. Guidance document for developing and designing highways. Juneau (AK), DOT&PF. 364 pages. Accessed at: http://www.dot.state.ak.us/stwddes/dcsprecon/preconmanual.shtml

DOT&PF. 2014. State of Alaska. Department of Transportation and Public Facilities. 2012-2015 Statewide Transportation Improvement Program (Am 10). N.p., N.p., 27 June, 2014. Web access: http://dot.alaska.gov/stwdplng/cip/stip/index.shtml

DOT&PF. 2015. Roadway Information Portal. October 12, 2015. Juneau (AK), requested through DOT&PF Transportation Information Group, Transportation Data Programs Planner Andrew Heist.

DOT&PF. 2015a. Functional Classification [Internet]. August 31, 2015. Juneau (AK): DOT&PF. [cited 10/12/2015] . Available from: http://akdot.maps.arcgis.com/home/webmap/viewer.html?webmap=8d34059bbfed4fada20a4fdc2a138aca

DOT&PF. 2015b. Alaska IWAYS Program [Internet]. 2011. Juneau (AK): DOT&PF. [cited 10/12/2015] . Available from: http://www.dot.state.ak.us/iways/projects.shtml

DOT&PF. 2015c. Status of Active Statewide Projects [Internet]. 2011-2015. Juneau (AK): DOT&PF. [cited 10/12/2015] . Available from: http://dot.alaska.gov/projects-status/wrapper.cfm?project_id=63692

Kenai Peninsula Borough. 2014. All-Hazard Mitigation Plan Update. May, 2014. Web access: http://www.borough.kenai.ak.us/images/KPB/PLN/PlansReports/MitigationPlan/Indexplan.pdf

Kevin Waring & Associates, Inc. 2010. Pebble Project Environmental Baseline Document, 2004 through 2008 (With Updates in 2010). Chapter 47. Transportation – Cook Inlet Drainages. The Pebble Partnership. 21 December, 2010. Web access: http://pebbleresearch.files.wordpress.com/2014/03/ch_47_transportation_ci.pdf

Klouda, Naomi. 2010. "Long Journey, Short Road." Homer Tribune. 25 August, 2010. Web access: http://homertribune.com/2010/08/long-journey-short-road/

State of Alaska, Office of Management and Budget. May 28, 2014. State of Alaska Capital Project Summary. Williamsport to Pile Bay Road. Juneau (AK): State of Alaska. #41678, 1 page.

United States Army Corps of Engineers (USACE). 2007. United States Army Corps of Engineers. Alaska Baseline Erosion Assessment Erosion Information Paper – Pile bay-Williamsport Road, Alaska. Alaska District. 10 October, 2007. Web access: http://www.poa.usace.army.mil/Portals/34/docs/civilworks/BEA/Pile%20Bay-Williamsport_Final%20Report.pdf

USACE. 2010. Alaska Barge Landing System Assessment and Design, Various Locations, Statewide, Alaska, Phase 2. U.S. Army Engineer District, Alaska. N.p., N.p., November 2010.