Final Report

Juneau Access Improvements Project

Independent Estimate for Zones 1, 2, and 3

Project Approach and Risks for Zones 4 and 5

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Prepared for:

Western Federal Lands Highway Division

and

Alaska Department of Transportation and Public Facilities

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1 INTRODUCTION AND PROJECT APPROACH

1.1 BACKGROUND

The Western Federal Lands Highway Division (WFLHD) has been requested by Alaska Department of Transportation & Public Facilities (AKDOT & PF) to perform an independent construction cost estimate for the highway portion of the Juneau Access Improvements Project, also known as the East Lynn Canal Highway. The project has been broken into five zones and is described in the *Financial Plan 2007 Annual Update* prepared by AKDOT & PF as follows:

The April 2006 FHWA ROD for the Juneau Access Improvements Project selected Alternative 2B, East Lynn Cannel Highway to Katzehin with shuttle to Haines and Skagway as the proposed action. This alternative will construct a 50.8-mile highway from the end of the existing Glacier Highway at Echo Cove around Berners Bay to Katzehin, construct a ferry terminal at the end of the new highway and run shuttle ferries.

Zones 1, 2, and 3 of the Juneau Access Improvements Project, from Echo Cove to Sweeny Creek, are an approximately 24-mile-long section of highway that was advertised for construction bids in May of 2006. However, the project was not to be awarded until all agency permits were in hand. Due to a delay in the permitting process and a desire to begin construction, the project was reduced in scope to the construction of a pioneer road and associated work bridges. The pioneer road and work bridges work could be funded solely by the State of Alaska and did not require a U.S. Army Corps of Engineers (USACE) permit before award. Because the State of Alaska possessed sufficient funding in its general fund, the project moved forward: Two bids (with Base Bid and Alternate A) were received and opened on November 22, 2006, but the results were well above the AKDOT & PF $30,000,000 budget, which was the available funding at that time, and the bids were rejected. The project was again scaled back by reducing a portion of the pioneer road and including fewer work bridges. Subsequently, two bids were received and opened on November 24, 2006. AKDOT & PF awarded the pioneer road Base Bid portion of the November 24, 2006, bid results to Southeast Road Builders of Haines, Alaska. Shortly thereafter, the AKDOT & PF's administration elected to terminate the contract.

In an effort to better analyze the potential highway cost, the AKDOT & PF has decided that it would be advantageous to obtain an independent construction cost estimate. The costs related to the risks on the project will be addressed separately as a contingency for the project, by others, and will not be reflected in the unit prices.

While the design for Zones 1 through 3 is fairly complete, the design for the Zones 4 and 5 is in the preliminary stages and is not at an appropriate point of development for the preparation of a construction contractor's detailed estimate. A review of the project from the construction contractor's perspective would generate a project approach, based on assumptions as indicated, and identify the risks associated with this grouping of zones. A preliminary plan and profile indicating bridge, tunnel, and wall locations, with only limited design beyond that level of detail has been completed. Therefore, a detailed contractor estimate was prepared for Zones 1, 2, and 3, but not for Zones 4 and 5.

David Evans and Associates, Inc. (DEA), in association with Aadland Evans Constructors LLC (AECI) and Elting NW (collectively referred to as the Consultant) has been retained by the Federal Highway Administration – Western Federal Lands Highway Division, to review and prepare a report on the Juneau Access Improvement project. The report will focus on the following items in the two zone groupings:

Zones 1, 2, and 3 review will include the following:

1. Review existing AKDOT & PF provided documents
2. Travel to the proposed project location and review of the proposed alignment
3. Develop a project approach
4. Prepare a contractor's type estimate for the project
5. Provide a list of project risks
6. Develop a list of contingency considerations

Zone 4 and 5 review will include the following:

1. Review existing AKDOT & PF provided documents
2. Travel to the proposed project location and review of the proposed alignment
3. Develop a project approach
4. Provide a list of project risks
5. Develop a list of contingency considerations

1.2 PROJECT DESCRIPTION

The proposed Juneau Access Improvements Project would add a 50.8-mile section of new highway extending from the north end of the existing Glacier Highway at Echo Cove, which is approximately 40 miles north and west of Juneau, Alaska, to the proposed ferry terminal north of the Katzehin River across the Lynn Canal from Haines, Alaska. There are currently 33 bridges contemplated for the project, three of which are major bridge structures each approximately a half-mile long.

Project plans and specification have been prepared for Zones 1, 2, and 3, which is the first zone grouping for the project. This zone grouping, from Echo Cove to Sweeny Creek, is a nearly 24-mile-long section of highway with two long bridges over the Antler River and Lace River, which would be approximately 2,763 feet and 2,677 feet in length, respectively. There are seven shorter bridges scattered throughout Zones 1, 2, and 3 that vary in length from 120 feet to 290 feet in length. Rock and other excavation quantities for this zone grouping total approximately 2.6-million cubic yards.

At this time, the preliminary design for Zones 4 and 5, the second zone grouping for the project, is in the conceptual phase and "on hold" awaiting the outcome of pending litigation before continuing site investigation and design work. This section of the proposed highway is over 27 miles long, with one major bridge over the Katzehin River that is approximately 2,590 feet long and 23 shorter bridges varying in length from 90 feet to 400 feet long. The 400-foot-long bridge at station 1732+00 (also referred to as the "1740 Cliffs") is arguably the

most challenging bridge among the group, because it is to be built over the water and around an existing cliff feature. Rock and other excavation quantities total more than 3.4-million cubic yards combined with nearly 840,000 square feet of MSE wall.

The mountainous terrain in Zone 4 offers many more construction challenges. These challenges include:

- Difficulty of moving of materials, equipment, and workers along the roadway when multiple activities have to be concurrently ongoing,
- Access to material, material processing (crushing and screening of shot rock), and equipment staging logistics conditions,
- Potentially long haul distances, up to 14 miles, from material sources to placement locations,
- Road construction on 45+-degree rock slopes that extend up to 300 feet high, most of which may require work from rappelling ropes to access the work area,
- Sideslopes are typically very steep over long distances,
- Two extremely difficult bridges at the "1740 Cliffs" and Clay Creek, in addition to the 20 other bridges required along this section of road,
- Pattern rockbolting on controlled blasted faces of rock slow the production of rock excavation,
- Two tunnels totaling 1,250 lineal feet,
- Environmental constraints related to sea lions and a much higher concentration of eagle nests,
- Approximately 840,000 square feet of MSE wall construction,
- The average MSE wall heights are nearly twice that of those in Zones 1, 2, and 3 and the cost per square foot increases based on the height of the wall, and
- Average worker travel time to the workface, as work progresses, reduces labor productivity up 10 percent to 15 percent.

The costs associated with negotiating these challenges would likely result in a higher cost of this zone grouping as compared to the cost of Zones 1, 2, and 3, based on the current preliminary design.

1.3 SUMMARY OF FINDINGS

The independent estimate amount is shown below for Zones 1, 2, and 3. Since the design is only in the conceptual stage for Zones 4 and 5, as explained earlier, it is not appropriate to prepare a detailed contractor based estimate at this time.

Description	Amount[1]
Zones 1, 2, and 3	$ 146,000,000

[1] *The amount column does not include contingency*

1.4 GENERAL APPROACH FOR INDEPENDENT ESTIMATE

1.4.1 Independent Estimate for Zones 1, 2, and 3

The independent estimate for Zones 1, 2, and 3 was built from the ground up as a contractor would do in preparing a bid for a construction project. This estimate, generated from a contractor's perspective, takes into consideration the actual logistics of building the project, how to negotiate the actual field conditions anticipated, and where the excavation and embankment quantities exist with respect to processing for the final use and placement on the project.

Upon preliminary review of the bid documents, a general project approach was developed to determine how the project would be constructed in the most economical manner. This approach was modified slightly as less expensive means and methods were identified that would reduce the cost of the project. Relying on the quantities indicated on the bid document drawings and the Bid Schedule for Zones 1, 2, and 3, the estimates were built by determining crew sizes, labor classification and rates, equipment types and rates, and production rates for the work to be performed. Once the direct cost estimating proceeded to a point where project duration could be estimated, the field overhead and construction camp costs were developed.

1.4.2 Material Quotes

Material and equipment quotes were obtained from local and national suppliers. It was recognized that many of the suppliers likely were not providing their best price for the purposes of an independent estimate as opposed to an actual contractor's bid. Therefore, all material and subcontractor pricing was reduced by 10%, with the exception of fuel, to address this concern and to provide a more representative independent estimate. Fuel was not included as it is expected that fuel costs will continue to rise with time.

1.4.3 Effect of Current Economic Conditions

The current economic conditions, arguably the worst recession seen in the United States since the Great Depression, may have an impact on contractor pricing for the project. To assess that effect, one must consider the project's size and duration, geographic size, complexity, and remote location. The projects for Zone 1, 2, and 3 and for Zones 4 and 5 are estimated to have project durations of 3 1/2 and 7 1/2 years, respectively. If the past is any indication of the future, recessions are generally shorter in duration than either of these projects. Therefore, there may be minimal favorable price impact to this project if the recession turns in 2009 or before a project is put out to bid. The cost estimate for Zones 1-3 in this report does not reflect possible temporary 2009 lower prices

However, if the U.S. economy does remain depressed and the Zones 1, 2, and 3 projects were awarded with a Notice to Proceed (NTP) issued sometime during the current recession, then there could be some reduction in bid prices as a result. Based on the dollar amount and geographic expanse of the project, the labor and equipment rates will likely stay relatively constant, the overall material costs may drop, and the contractor mark-ups may drop, resulting in an estimated overall 7-percent to 9-percent minimum reduction from bid pricing than might have been seen under more normal economic conditions. There would likely be no effect on the Zones 4 and 5 project, because it is

projected to begin at some point after the completion of Zones 1-3 and the recession will likely have subsided by the start of that project.

1.5 PROJECT GENERAL ASSUMPTIONS

In order to prepare the independent construction cost estimate, the following general assumptions were made:

1.5.1 Information and Data Provided

1. Consultant shall place reliance on the information, quantities, and design work provided by AKDOT & PF in preparing the independent construction estimate.
2. Consultant shall rely on updated design information (plan and profile drawings, cross sections, AutoCAD design files and Land Development Desktop project information) on Zones 4 and 5 provided by AKDOT & PF.
3. Consultant shall rely on updated design information (plan, profile, and cross sections) for the change to Zone 2 required by the USACE permit as provided by AKDOT & PF.
4. The Consultant shall use the Juneau Access Permit Drawings, dated February 2006, as required, to translate the location of bridge, culvert size and lengths, excess fill locations and other design features not currently shown on the Zone 1, 2, and 3 plans. The Consultant shall use the Zones 4 and 5 roadway plans and profiles for bridge , tunnel, and MSE Wall locations, and in conjunction with and translated from the USACE permit drawings, for culvert size, lengths, and locations in these zones.
5. AKDOT & PF will provide the bid item quantities for the grouping of Zones 1, 2, and 3 on a Bid Schedule prepared by AKDOT & PF.
6. The AKDOT & PF quantity breakouts for Zones 4 and 5 includes:
    a. Length, area, and general location for earth retaining structures. The height of the earth retaining structures was obtained from the cross-sections.
    b. Bridge locations, lengths, and quantities, as available.
7. Zones 1, 2, and 3 typical section and pavement section shall be used on Zones 4 and 5, with assumptions as noted in paragraph 1.5.3.3 below.
8. Zones 4 and 5 shall use similar retaining walls, with exception of welded wire facing for those walls above Elevation 50, and bridge structures as shown on the Zones 1, 2, and 3 plan set, where applicable.
9. In general, the details for work shown on the Drawings for Zones 1, 2, and 3 will be the same or similar for Zones 4 and 5.

1.5.2 General Estimating Guidelines

1. When soliciting pricing from contractors, suppliers, and service providers for this project, the Consultant shall not provide any project information other than that shown publicly on the Juneau-Access website for Zones 1, 2, and 3. No information other than selected Zone 5 geotechnical information is available on the website for Zones 4 and 5.

2. The Zones 1, 2, and 3 project will be completed before beginning work on the Zones 4 and 5 project.
3. The remote location dictated the necessity for some of the construction operations to be supported by on-site self-sufficient camp facilities for a portion of the staff and construction workforce, providing all necessary facilities and services for the project.
4. The construction season will be eight months long, from April through November. Only limited activities will occur from December through March. The crews will generally work six 10-hour days a week during the construction season.
5. Schedule logistics are based on on-site mobilization and construction beginning on or about April 1, 2009.
6. Costs will be based on current year (2009) and project escalation costs are excluded.

1.5.3 Roadway and Bridge Work

1. An on-site concrete batch plant will produce concrete for the project from on-site concrete aggregate sources.
2. The in-situ rock encountered in excavation sections will be suitable, both structurally and chemically (so as not to damage MSE wall anchor systems) and in sufficient quantities to use as asphalt paving rock, concrete aggregate, aggregate base, and MSE wall backfill.
3. Based on the bid quantities, it was assumed that the roadway section will consist of 2 inches of asphalt concrete /2 inches of asphalt treated base/4 inches of aggregate base.
4. The Special Provisions for Zones 1, 2 and 3 indicated that the MSE walls could be concrete-faced or welded wire-faced and gave the contractor six approved MSE wall manufacturers as options. Five of those six options presented were concrete-faced walls, with the sixth one being an optional concrete or wire-faced system. Details on sheet J2 would indicate that a concrete-faced wall was intended. Investigating the cost difference of changing that to a wire-faced wall shows that the deletion of Cast-in-Place (CIP) coping and precast concrete facing will save approximately $13 per square foot in direct costs. Based on sheet J2 Zone 1-3, MSE wall costs were estimated as concrete faced.
5. Equipment rates were developed to approximate those that a large contractor would use as internal rates for company-owned equipment. The rates were calculated by taking 80 percent of the local monthly rental rates offered by NC Rentals and Construction Machinery, Inc. (CMI), both local rental companies operating in southeast Alaska. The discounted monthly rate was then divided by the number of equipment hours allowed per month at that rate (200 hours) and added fuel costs based on $2.00 per gallon.
6. The pricing for furnishing the 48-inch diameter piles would be the same as that obtained by AKDOT & PF in their procurement of 48-inch diameter piles in late 2006, as current prices are anticipated to be very close to this pricing.
7. The shot rock shall only require minimal processing in order to be used for road embankment and may be coarser than standard specifications.

1.5.4 Other

1. No delays from avalanches will occur in November and April of each year.
2. Cost and schedule issues will be addressed in a timely manner (resolve issues as the project proceeds rather than wait until end of project to resolve these issues) so as to alleviate cash flow issues for the contractor.
3. There will be no interference from third parties besides those who are part of a contractual agreement for the duration of the construction project.
4. Consultant shall not address any right-of-way (ROW) issue on this project.
5. Government-furnished materials are not included in the construction cost estimate pricing.
6. A construction schedule will not be prepared as a deliverable for this Juneau Access Improvements Project cost estimate.
7. Consultant will not be using "Unit Price Analysis or Bid Tab Analysis" for preparing the independent estimate, except where necessary as a last resort.
8. Consultant shall not be required to estimate ROW costs, Indirect Cost Allocation Plan (ICAP) percentage, mitigation costs, or other costs not directly associated with a construction cost estimate per the Bid Schedule.
9. Consultant shall not be required to estimate permits and fees, except as required for construction camps and drawing water from existing waters.

1.6 RISKS COMMON TO BOTH PROJECTS

Several risks are common to both the Zones 1, 2, and 3 project and the Zones 4 and 5 project:

1.6.1 Geotechnical

1. Swell factor assumed by AKDOT & PF for excavated rock that will be placed as embankment or backfill should be reviewed for adequacy, as underestimating this factor could lead to more material left over than anticipated.
2. If the in-situ rock proves to be chemically incompatible with MSE wall anchor systems, backfill material would need to be found elsewhere on the project, adding cost and time for disposal of unsuitable excavated material and the import of suitable material.

1.6.2 Survey

1. Potential LIDAR (Light Detection and Ranging) survey inaccuracy could lead to significant quantity increases of excavation bid item and increases in length and height dimensions for retaining walls.
2. Tie-in between above water survey work and water subsurface survey work has not been completed and could impact the project.

1.6.3 Design

1. The quantity of rock bolting may be low if it is determined that pattern rock bolting is required and the quantity of spot rock bolting is significant. Spot rock bolting may increase significantly if used to stabilize rock formations other than those described under controlled blasting surfaces, for example, construction worker safety purposes.

1.6.4 Contractor

1. Pushing the project forward when, or if, litigation against the project is pending would create uncertainty in the project for potential bidders that would likely be reflected in increased bid prices.
2. The current difficult bond market, ability of contractors and subcontractors to maintain the dollar amount of bonding capacity, may reduce competition for bidding this project.
3. For projects of this size, the ability of contractors to bond such a project will be limited and therefore, competition may be limited to three or four contractors or less, as some may choose to joint venture on such a large project.

1.7 OVERALL PROJECT SUGGESTIONS

There is a general project need for considerably more geotechnical investigation work in order to fully understand the geotechnical character of the soil and rock and the subsurface conditions within the general scope of work of the project. The confidence in the accuracy of survey work should be confirmed to reduce project risk for significant increases in excavation quantities that result from the vertical and horizontal tolerance levels. The potential geotechnical and survey uncertainties affect both zone groupings, but are likely more uncertain for Zones 4 and 5.

From the construction contractor's perspective, if the risks and the responsibility for risks associated with a given project are clear and well understood, the contingency factor will tend to be lower. When the risks are not well understood and the responsibilities for assuming specific risk are not known, the contingency factor will be higher. Examples of areas where clarification could be provided include:

1. Describe whether contractor or owner is responsible for costs associated with changing from vibratory hammer pile driving, if vibratory hammer does not work or is not effective.
2. Delineate who is responsible for repairing avalanche, debris flow, spring run-off, and other geotechnical hazard related damage to existing work during construction.
3. Define the responsibility for safety measures (rock bolting, rock doweling, rock netting, etc…) required to protect the construction workers from rock falls, avalanches, debris flows, and other geotechnical hazards.

1.7.1 Other suggestions include:

1. Provide for at least a 4-month bid period for projects that are large and logistically challenging like these.
2. Award contract and issue NTP in the spring, before subsequent construction season (i.e., award in April or May 2009 for a May/June 2010 construction start) to allow for proper planning, coordination, and mobilization of materials and equipment for barge shipment from Seattle to Juneau. Crowley Marine indicated that it would not be able to support this project for this coming summer (2009) due to 16 barge shipments heading to Prudhoe Bay.
3. Revise the Standard Specification Section 640, Mobilization and Demobilization, to allow for more upfront payment for first season work.
4. Confined right-of way access limits a contractor's ability to stockpile materials effectively throughout the project. Increase the contractor's access to the full 300-foot Right-of-Way width to allow for adequate space for temporary turnouts, temporary storage of materials and processing of excavated materials for embankment.
5. Test chemical properties of soil and rock to be sure that they do not adversely affect the building materials (MSE wall straps/anchors) to be used on the project.
6. Break the project into smaller pieces that would allow more contractors to bid, generate more competitive pricing with more competition, and address a growing inability, aggravated by the current financial crisis, of contractors to bond projects.
7. Fuel/oil, steel, and cement escalation costs clause could be added to specifications to reduce risk to Contractor for pricing work. In bidding a 3 1/2-year Zones 1, 2, and 3 project, it is likely that a Contractor would include an escalation factor of about 1.5 to 1.7 times the current price of fuel into a project with a duration of approximately four years and then add a risk factor to that number. A longer project, such as the 7 1/2-year Zones 4 and 5 project, would likely increase the escalation factor accordingly.
8. Provide for a special bid item for daily field overhead that would provide a contract administration tool to more easily negotiate/settle time issues related to changes that increase contract performance period.
9. Add a separate bid item for "Construction Camp" to the Bid Schedule, if the project is to be bid with the zone grouping of Zones 1, 2, and 3 or any project breakout where a construction camp is needed.
10. Requirements for stabilization rockbolting are not clear in Zones 1, 2, and 3 plans and specifications. Providing rockbolt size, length, double corrosion protection requirements, and test loads would be extremely useful information to bidders. The Specifications should also specify that AKDOT does not permit the use of an epoxy grout if it is not acceptable for encapsulating rockbolts. In general, it would be helpful to bidders to clarify the spot bolting versus the pattern bolting schemes desired. Rock dowels may be a good alternative to rockbolting in some scenarios and would save costs.

11. Implement a pile driving load test program, performed by the contractor, so that the piles driven to the required tip elevation with a vibratory hammer (required to try this method by permit) can be verified, by impact hammer, that they will hold the design loads required. It could potentially verify that the vibratory hammer system could be used for the entire driven depth, possibly eliminating the need to use the impact hammer on each pile, thereby reducing set-up time from vibratory hammer to impact hammer for each pile. The test pile program would be in effect until subsurface conditions change significantly warranting additional proof testing. Suggested language could be, "Pile are to be set with a vibratory hammer to within 10 feet of the proposed tip elevation with final set to be driven with an impact hammer. Engineer, at his discretion, may allow the contractor to set the pile to tip elevation with the vibratory hammer and proofed with an impact hammer. The Engineer, at his discretion, may waive proofing the pile with the impact hammer, if the pile driven solely with the vibratory hammer meets the design loading requirements."
12. Consider having Contractor order extra materials (i.e. culverts, MSE walls, and piling) to minimize delays when the owner wants to make changes that increase quantities. Provide clear means for payments for materials not incorporated into the work.

2 ZONES 1, 2, AND 3

2.1 CONSTRUCTION PROJECT APPROACH

2.1.1 General Schedule

For purposes of this estimate it was assumed that the Zones 1, 2, and 3 project would start in the spring of 2009. On-site mobilization would begin on or about April 1, 2009, and would take approximately three months. The projected on-site construction start date would be on or about July 1, 2009, with a completion date of November 30, 2012, making the project duration roughly 3 1/2 years.

A majority of the construction equipment and permanent materials for the project will be delivered by barge from Seattle. The on-site construction activities that begin in 2009 generally do not need permanent materials that would be shipped from Seattle, but require substantial number of workers in all zones to pioneer roads, rock excavation, modify existing roads, create staging areas, and mob bridge erection equipment. The construction equipment needed, to begin work in 2009, would be rented from Juneau. During the period from June 1, 2009 to April 1, 2010, a portion of the staff would be consumed with project preplanning and permanent materials approval, fabrication, and delivery to Seattle for barge shipment to the project location. For a project this size, the barge services request a minimum notice of approximately eight months to ensure that a contractor would get delivery by the dates needed to support the on-site materials mobilization date of April 2010.

2.1.2 Work Sequence

Beginning the summer of 2009, work would start on three different fronts nearly concurrently, after mobilization and construction camp and office setup. Site cleanup and demobilization would be completed by the end of November 2012. A four-month winter shutdown period from December through March each construction season is figured into the work schedule.

The work fronts pursued initially would include:

2.1.2.1 Zone 1 roadwork starting from the south end of Zone 1 and working north.

1. The first season of work would construct roadway to subgrade from approximately STA 58+00 (at end of existing Glacier Highway) to STA 400+00 (at Boulder Creek).
2. The second season of work would include finishing the embankment section from approximately STA 400+00 (Boulder Creek) to STA 665+00 (at south edge of Antler River), and then move on to Zone 2 embankment over the Antler River on grade roads and two work bridges to STA 727+00 (south end of Lace River Bridge).
3. The third season of work would construct roadway to near finish grade along the entire Zone 3 section in preparation for AC paving the following summer.
4. AC paving, guardrail, signage, and striping would occur the summer of 2012.

2.1.2.2 Zone 3 roadwork starting from the north side of the Lace River Bridge heading north.

1. During the first season, the first priority would be to realign and improve the existing Jualin Road from the Slate Cove dock to where the new alignment deviates towards the north end of the Lace River Bridge in order to transport bridge materials and equipment. Then a road would be constructed along the new alignment from Jualin Road to the north end of the Lace River. A staging area for bridge materials and equipment would be constructed near the north abutment.
2. Once the bridge support work is completed, the first year of work would construct roadway to subgrade from approximately STA 753+00 (north end of Lace River Bridge) to approximately STA 932+00 (north and west of Slate Creek Cove). Some probing and excavation work behind the pioneer road would be performed in the glacial till areas to determine the working conditions of that material.
3. The second season of work would construct roadway to subgrade from approximately STA 932+00 (north and west of Slate Creek Cove) to approximately STA 1150+00.
4. The third season of work would finish constructing roadway to subgrade from approximately STA 1150+00 (north and west of Slate Creek Cove) to approximately STA 1290+00 (south of Sweeny Creek). Then roadway would be constructed to near finish grade along the entire Zone 3 section in preparation for AC paving the following summer.
5. AC paving, guardrail, signage, and striping would occur the summer of 2012.

2.1.2.3 Zone 2 bridge work starting at the north abutment of the Lace River Bridge heading south.

1. The first season work would include mobilization of bridge equipment and temporary bridgework materials to the north abutment area. The concrete aggregate could be identified and a concrete batch plant, minus cement, would be set up.
2. The second season work would include mobilization of permanent bridge materials and construction of the bridge from the north abutment. Temporary traveling piles would be used in front of the work elements of the permanent structure, because the bridge is effectively built on itself. No separate work bridge would be constructed for this bridge.
3. Once the Lace River Bridge is completed, a temporary road and work bridges over the two active channels in Antler River would be constructed. The temporary road and work bridges would serve as support for building the Antler River Bridge, as well as provide a route to haul embankment material for constructing the Zone 2 roadway.
4. The Antler River Bridge would be constructed during the third season of work. The crews for the Lace and Antler river bridges would comprise the “Long Bridge” Crew constructing the two major bridges of the project.

5. With at least a construction season lag, a "Short Bridge" Crew would likely begin at Sawmill Creek Bridge in Zone 1 and work north, building all the seven short bridges that would end at Slate Creek Bridge in Zone 3.

2.1.3 Construction Camps and Offices

The number of staff and construction workers projected for the project varies from approximately 125 persons the first season, peaking at 175 during the second season, and tapering off to the end of the project. It is estimated that approximately 50 to 70 staff and construction workers would be required for Zone 1 roadway and bridge work. The number of Zone 2 and 3 staff and construction workers is estimated to be approximately 75 to 105 persons.

The Zone 1 roadway workers (and later the Zone 1 bridge workers) would be supported from Juneau. A trailer park would be constructed on the south end of Echo Cove (assuming that permission is granted by Goldbelt Inc.) so that workers could live in either the trailer camp or town and commute to the jobsite each day. These workers would be paid a daily per diem. The estimated maximum capacity of the trailer park would be approximately 80 construction-related personnel.

The Zone 2 and Zone 3 work would be supported primarily by a floating construction camp and offices located at Slate Creek Cove. The Coeur Mine facilities and the facilities near Comet, to be purchased by AKDOT & PF, at the southern end of Zone 4 were considered as possible locations, but for the purposes of this estimate, we thought it would be the most cost-effective to assume that these facilities would be located at Slate Creek Cove. Command and control of the project and the transportation time to and from Zone 2 and 3 work areas for the Slate Creek Cove location were thought to be optimal compared to the other options. Those workers and staff who live at the camp would not receive a per diem, because room and board would be provided by the camp. This camp would be supported by air and water transportation. We do envision that some workers may live in town and commute by passenger vehicle to a point where they could be transported by boat to the camp and office location. We have estimated a per diem cost for these workers. The estimated maximum capacity of the construction camp would be approximately 105 persons and would include capacity for AKDOT and project visitors. A floating camp with a capacity for approximately 90 persons would be staged at or near Slate Creek Cove and any overruns would be addressed by land facilities.

Based on price and the ease with which they can be brought on line for a project, we assumed that floating camp facilities would be the most cost-effective means of providing camp services with the least impact on the land. However, land-based office facilities seemed more appropriate for the project, as adequate available floating camp office space is severely limited.

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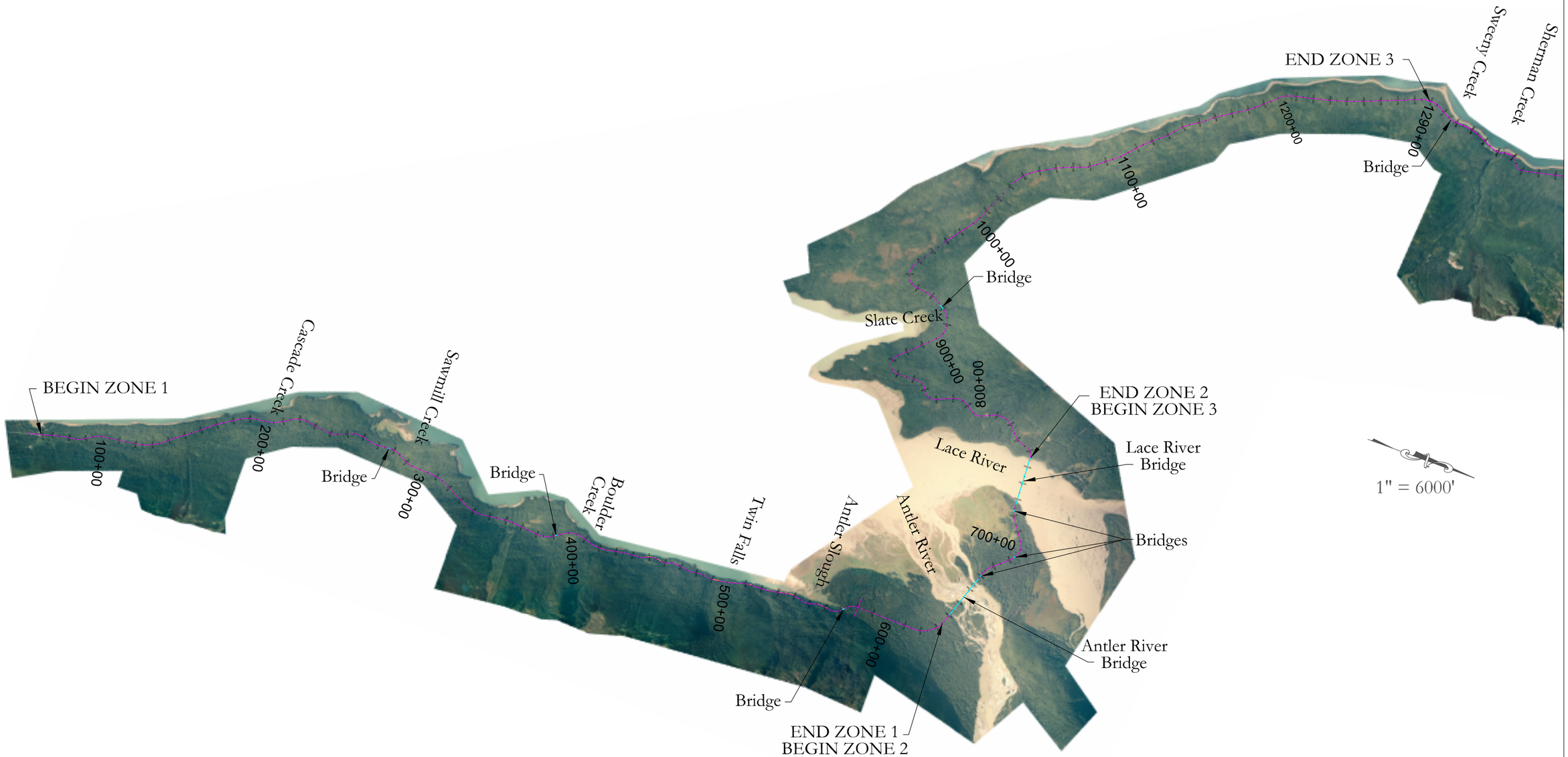
JNU-LYNN CANAL HIGHWAY

ECHO COVE to SWEENY CREEK



1" = 6000'

JUNEAU ACCESS HIGHWAY
INDEPENDENT COST ESTIMATE
EXHIBIT 1

SCALE	DATE	SHEET
1" = 6000'	04/27/2009	1

2.1.4 Avalanche Mitigation

At this time we do not anticipate that avalanches will impede the construction efforts in Zones 1, 2, and 3, both because of the minimal avalanche exposure in these zones and because a winter shutdown period will be implemented each construction season. It is the intent to shut down most construction activities for four months, from December through March, each season, as snow and colder weather would slow production, thereby increasing costs and risks for the project.

2.1.5 General Fuel Distribution

The fueling operation would consist of the following elements:

1. Zone 1 roadway and bridgework from Juneau: by truck tanker with some possible smaller fuel tank storage at construction locations.
2. Zones 2 and 3 roadway and bridgework: either by fuel tanks on a barge or a land-based tank farm. Fuel trucks would shuttle fuel from the larger fuel tanks near the shore to the construction equipment and possibly smaller fuel storage tanks at construction locations, maintenance shops, and field office facilities.

2.2 ZONES 1, 2, AND 3 ASSUMPTIONS

The following section outlines the assumptions that were made for the Zones 1, 2, and 3 project as a whole, as well as for the Zones 1, 2, and 3 roadway work and bridge work.

2.2.1 Project Assumptions

1. Goldbelt Inc. will allow the construction of a 120-person trailer park on its property on the south end of Echo Cove that will be capable of handling 80 construction staff and workers, along with an estimated 40 of their dependents or others.
2. The Contractor will be permitted by Coeur Alaska, Inc. to construct and operate a temporary construction camp at Slate Creek Cove for the duration of the project.
3. The Contractor will be permitted by Goldbelt Inc. to use private land along the south end of Zone 1 to stage equipment and materials for the duration of the project at no cost to the project.
4. The Contractor will be permitted to use and develop existing quarries on Coeur Alaska, Inc. and Goldbelt Inc. private land for the duration of the project.
5. It will be acceptable to construct a temporary road over the Antler River delta in lieu of a work bridge, with exception of two river channel crossings, for the construction of the Antler River Bridge.
6. Consultant shall estimate the finished project items listed as “future work” (i.e., 2 “AC, Guardrail, etc.) on the Project drawings, based on quantities provided by AKDOT & PF.

2.2.2 Roadway Assumptions

1. The northern portion of Zones 1 and 3 excavated rock will be suitable after processing for use as asphalt paving aggregate, structural backfill, aggregate base, and MSE wall backfill.

2. Any phyllite material encountered will be suitable for embankment if the embankment is constructed during dry conditions and encapsulated with either rock or common material. It is our understanding that this material becomes unsuitable only when exposed to water.
3. AKDOT & PF will work with the contractor to make minor grade and alignment adjustments where such adjustments would benefit the construction of the roadway.
4. A suitable disposal site for glacial till will be available within a one-mile haul from where it is encountered.

2.2.3 Bridge Assumptions

1. For driving the piles for the Antler River and Lace River bridge foundations, the vibratory hammer will be tried initially in order to meet the requirements of the permit, but the cost of driving the majority of the pile with an impact hammer is included.
2. Approximately the top 40 feet of each foundation pipe pile will be galvanized on the exterior wall of the pipe.
3. The access to bridge sites varies; some sites require road construction, including fills, even to access the site. Others are within the influence of the tidal zone and require work bridge construction either for the total length or for some smaller portion. With the exception of the Lace and Antler river bridges, we have included the work bridge cost as part of the pile driving, based on the belief that the work bridge is necessary for that work activity.
4. Short temporary work bridges over the two anadromous fish water channels will be constructed to facilitate building the Antler River Bridge. The balance of the Antler River Bridge construction work will be serviced by a temporary road constructed of 18 inches of crushed rock over soil filter fabric. Culverts will be strategically placed in an effort to maintain the road during the high runoff periods. Reconstruction costs for seasonal damage to the road during and after the high runoff periods are included.
5. The length and weight of the precast bridge beams require the use of special handling equipment (steering dolly in the back) and roads and work bridges that are capable of supporting the heavy loads. The existing Jualin Road, from Slate Cove to the junction with the highway (approximately 1,000 feet) will be modified to accommodate the transportation of bridge materials and equipment, and costs for that modification are included.
6. Existing rock sources are suitable to produce concrete aggregates for the project.

2.3 ZONES 1, 2, AND 3 CONSTRUCTION BID SCHEDULE

AKDOT BID SCHEDULE
Soft Costs Distributed Throughout All Bid Items
JAI - Zones 1, 2, and 3
Echo Cove to Sweeny Creek

Item Number	Item Description	Pay Unit	Quantity	Unit Bid Price	Amount Bid
201 (1A)	Clearing	Acre	150	$3,822.63	$573,394.26
201 (1B)	Clearing - Zones 1, 2, & 3	Acre	144	$4,300.43	$619,262.63
201 (6)	Selective Tree Removal	Each	350	$93.04	$32,562.32
202 (4)	Removal of Culvert Pipe	Linear Foot	530	$13.90	$7,369.36
203 (2)	Rock Excavation	Cubic Yard	1,804,700	$12.03	$21,718,244.02
203 (3)	Unclassified Excavation	Cubic Yard	786,900	$4.12	$3,241,901.78
203 (5)	Borrow	Cubic Yard	242,500	$3.39	$821,596.30
203 (10)	Controlled Blasting	Square Yard	148,000	$16.06	$2,376,767.99
203 (12)	Drain Holes	Linear Foot	11,000	$71.83	$790,087.66
203 (13)	Stabilization - Rock Bolt	Each	3,330	$1,158.70	$3,858,487.28
203 (19)	Barrier Rocks	Linear Foot	4,000	$16.51	$66,025.85
205 (3)	Foundation Fill	Cubic Yard	7,951	$53.31	$423,899.43
301 (1)	Aggregate Base Course, Grading ___	Ton	97,120	$15.65	$1,520,188.29
306 (1)	Asphalt Treated Base	Ton	47,525	$31.44	$1,494,227.88
401 (1)	Asphalt Concrete, Type II; Class B	Ton	51,360	$34.15	$1,754,010.87
401 (2)	Asphalt Cement, Grade 58-28	Ton	5,232	$691.56	$3,618,262.14
402 (1)	STE-1 Asphalt for Tack Coat	Ton	125	$691.56	$86,445.48
	Temporary Work Bridges & Road- Antler River	***Lump Sum***	***All Required***	***$1,080,643.73***	***$1,080,643.73***
	Traveling Work Bridge - Lace River	***Lump Sum***	***All Required***	***$5,045,509.80***	***$5,045,509.80***
501 (1)	Class A Concrete	Lump Sum	All Required	$7,664,989.84	$7,664,989.84
501 (2)	Class A-A Concrete	Lump Sum	All Required	$1,253,977.36	$1,253,977.36
501 (7A)	Precast Concrete Member (128' Decked Bulb Tee)	Each	18	$92,926.94	$1,672,684.91
501 (7B)	Precast Concrete Member (143' Decked Bulb Tee)	Each	228	$96,516.91	$22,005,854.42
501 (7C)	Precast Concrete Member (118' Decked Bulb Tee)	Each	12	$85,101.49	$1,021,217.93
501 (8)	Concrete Price Adjustment	Contingent Sur	All Required	$0.00	$0.00
501 (9)	Bridge Expansion Joint	Linear Foot	660	$871.75	$575,356.74
501 (11)	Precast Concrete Headwall	Each	14	$0.00	$0.00
503 (1)	Reinforcing Steel	Lump Sum	All Required	$2,511,192.10	$2,511,192.10
503 (2)	Epoxy-Coated Reinforcing Steel	Lump Sum	All Required	$906,925.02	$906,925.02
504 (2)	Structural Steel	Pound	1,150,000	$2.90	$3,335,172.78
505 (5A)	Furnish Structural Steel Piles - HP14X117	Linear Foot	787.5	$114.04	$89,807.25
505 (5B)	Furnish Structural Steel Pipe Piles - 24 in	Linear Foot	6,668	$169.73	$1,131,736.63
505 (5C)	Furnish Structural Steel Pipe Piles - 48 in dia	Linear Foot	15,161.40	$526.49	$7,982,260.09
505 (6A)	Drive Structural Steel Piles - HP14X117	Each	6	$4,964.70	$29,788.23
505 (6B)	Drive Structural Steel Pipe Piles - 24 in dia	Each	78	$6,110.41	$476,612.24
505 (6C)	Drive Structural Steel Pipe Piles - 48 in dia	Each	111	$14,576.40	$1,617,980.30

AKDOT BID SCHEDULE
Soft Costs Distributed Throughout All Bid Items
JAI - Zones 1, 2, and 3
Echo Cove to Sweeny Creek

Item Number	Item Description	Pay Unit	Quantity	Unit Bid Price	Amount Bid
505 (9)	Structural Steel Sheet Piles	Square Foot	3,200	$57.84	$185,089.21
507 (1)	Steel Bridge Railing	Linear Foot	14,135	$181.76	$2,569,189.17
507 (6)	Safety Railing	Linear Foot	1,553	$8.54	$13,259.24
511 (1)	Mechanically Stabilized Earth Wall	Square Foot	22,306	$85.15	$1,899,308.37
602 (3A)	Structural Plate Arch 20' Span, 8'3 1/2" Rise, 7 Gage	Linear Foot	50	$2,207.72	$110,385.95
602 (3B)	Structural Plate Arch 35' 4" Span, 11' 5' Rise, 7 Gage	Linear Foot	52	$3,880.56	$201,789.31
603 (17-24)	24 Inch Pipe	Linear Foot	10,877	$54.61	$594,047.13
603 (17-36)	36 Inch Pipe	Linear Foot	7,312	$74.75	$546,596.90
603 (17-48)	48 Inch Pipe	Linear Foot	1,434	$104.76	$150,222.63
603 (17-60)	60 Inch Pipe	Linear Foot	664	$193.43	$128,436.98
603 (17-72)	72 Inch Pipe	Linear Foot	504	$270.65	$136,407.13
603 (17-144)	144 Inch Pipe	Linear Foot	120	$683.19	$81,982.64
606 (1)	W-beam Guardrail	Linear Foot	4,400	$33.88	$149,073.14
606 (11)	Extruder Terminal (ET-2000)	Each	36	$3,049.22	$109,772.04
606 (12)	Guardrail/bridge Rail Connection	Each	36	$4,065.63	$146,362.72
610 (3)	Ditch Lining	Station	25	$1,036.51	$25,912.64
611 (1A)	Riprap, Class II	Cubic Yard	3,885	$48.38	$187,960.23
611 (3)	Riprap Slope Stabilization	Square Yard	3,222	$2.36	$7,597.69
615 (1)	Standard Sign	Square Foot	1,872	$27.10	$50,739.08
618 (1)	Seeding	Acre	94	$6,342.10	$596,157.41
619 (2)	Matting	Square Yard	59,000	$1.34	$79,157.84
630 (1)	Geotextile, Separation	Square Yard	130,000	$1.11	$144,465.43
631 (2)	Geotextile, Erosion Control, Class 1	Square Yard	3,740	$2.51	$9,376.70
633 (1)	Silt Fence	Linear Foot	57,000	$3.05	$173,805.73
637 (1)	Reinforced Soil Slope	Square Foot	500	$37.20	$18,600.26
640 (1)	Mobilization And Demobilization	Lump Sum	All Required	$10,790,670.33	$10,790,670.33
641 (1)	Erosion And Pollution Control Administration	Lump Sum	All Required	$976,662.36	$976,662.36
641 (2)	Temporary Erosion And Pollution Control	Contingent Sum	All Required	$717,461.94	$717,461.94
641 (5)	Preliminary Seeding	Acre	47	$5,219.00	$245,292.84
641 (6)	Temporary Rock Check Dam	Each	540	$67.76	$36,590.68
641 (7)	Erosion And Pollution Control Price Adjustment	Contingent Sum	All Required	$0.00	$0.00
641 (8)	Settling Pool	Each	8	$767.39	$6,139.10
642 (1)	Construction Surveying	Lump Sum	All Required	$3,944,475.38	$3,944,475.38
642 (3)	Three Person Survey Party	Hour	700	$311.70	$218,188.87
644 (1)	Field Office	Each	3	$231,740.98	$695,222.93
644 (2)	Field Laboratory	Each	3	$66,856.59	$200,569.78

AKDOT BID SCHEDULE
Soft Costs Distributed Throughout All Bid Items
JAI - Zones 1, 2, and 3
Echo Cove to Sweeny Creek

Item Number	Item Description	Pay Unit	Quantity	Unit Bid Price	Amount Bid
644 (3)	Curing Shed	Lump Sum	All Required	$51,498.00	$51,498.00
	Construction Camp and Per Diem	***Lump Sum***	***All Required***	***$14,427,807.03***	***$14,427,807.03***
644 (4)	Meal	Contingent Sum	All Required	$655,176.47	$655,176.47
644 (5)	Lodging	Contingent Sum	All Required	$1,012,545.45	$1,012,545.45
644 (8a)	Vehicle, 4X4 SUV	Each/Month	216	$4,309.57	$930,866.92
644 (8b)	Vehicle, 4X4 ATV	Each/Month	288	$3,306.71	$952,333.45
644 (15)	Nuclear Testing Equipment Storage Shed	Lump Sum	All Required	$39,301.10	$39,301.10
644 (16)	Storage Container	Lump Sum	All Required	$10,299.60	$10,299.60
645 (1)	Training Program, 2 Trainees/Apprentices	Labor Hour	3,000	$67.76	$203,281.56
646 (1)	CPM Scheduling	Lump Sum	All Required	$335,414.57	$335,414.57
670 (1)	Painted Traffic Markings	Lump Sum	All Required	$108,370.21	$108,370.21
				TOTAL ESTIMATED BID AMOUNT	**$146,278,307.05**

DIRECT COST SUBTOTAL		107,937,710.29	
			% of Direct Cost
Field Overhead (FOH) Estimated Cost		22,667,921.00	121.00%
Subtotal		130,605,631.29	
Home Office Overhead & Profit	12%	15,672,675.75	114.52%
TOTAL		146,278,307.05	
Amount to Distribute		38,340,596.75	135.52%

NOTES:

1. The Construction Camp & Per Diem is an extra cost compared to projects close to town.
2. The bold Bid Items are those that were added to the original Bid Schedule provided by AKDOT & PF for clarity.

2.4 RISKS FOR ZONES 1, 2, AND 3

The following risks were determined for the Zones 1, 2, and 3 project:

1. The project could find unsuitable material during excavation in the northern section of Zone 1, where currently no subsurface geotechnical investigation work has been performed. If unsuitable material is found, then there will be additional costs associated with disposing of that unsuitable material somewhere on the project and with processing and hauling in suitable materials.
2. The geotechnical information currently available for the Antler River and Lace River bridge foundation piles does not cover every pile location. Using a vibratory hammer to install piles may prove difficult or impossible at some locations. In our view, the specifications are not clear about whether the contractor is to assume risk for the additional cost of impact driving if the use of a vibratory hammer is not effective.
3. The requirement that the top 20 feet of the 48-inch pipe files be galvanized may prove difficult to manage in the field because the galvanizing would have to be performed in the shop, but the actual driving depths may either increase or decrease based on soil conditions.
4. The assumed Zone 3 glacial till quantities may be light. If so, there will be additional costs associated with disposing of that material somewhere on the project and possibly for replacing with suitable material for embankment, if necessary.
5. It is anticipated that there will be excess suitable embankment material from Zone 3 and that the excess will be stockpiled at the north end of Zone 3 for use in Zone 4 embankment. Otherwise, a place would need to be found to dispose of this excess material, estimated to be approximately 300,000 bank cubic yards (BCY).
6. If the phyllite material that is encountered is unsuitable for embankment, then suitable material will need to be identified for embankment and a location for disposal of the unsuitable phyllite identified.

2.5 CONTINGENCY FACTOR CONSIDERATIONS

When developing the project contingency, many factors should be taken into consideration either individually or in combination with others to fully assess and develop an appropriate project contingency. Below are some of the issues that have been identified for consideration.

The level of design development and the risks to the project with respect to cost and schedule have a significant impact on the contingency factor for a project. Other factors, such as the size of project, the duration of the project, environmental impacts, and public scrutiny and/or opposition, also affect the contingency factor.

This independent contractor based cost estimate for the project does not address the risks associated with Zones 1, 2, and 3. Those risks are:

1. Anticipated cost growth during the construction due to change orders,

2. The level of geotechnical information currently available for non-bridge locations. More geotechnical investigation work along the alignment would be useful to clearly understand the character of the materials to be excavated and subsurface conditions,
3. The accuracy of the LIDAR survey through existing tree canopy, where applicable,
4. The requirements necessary for rockbolting, and
5. The bonding capability of contractors for a job this large.

2.6 SUGGESTIONS FOR ZONES 1, 2, AND 3

The following are suggestions for the Zones 1, 2, and 3 project:

1. The separate work bridge bid items shown on the Bid Schedule included with this report are for clarity only and not recommended as separate bid items in an actual bid situation.
2. Coordinate logistics (potential quarry, dock, and construction camp availability during project) with Coeur Alaska and Goldbelt Inc.
3. Break this project zone grouping into several projects. It would likely generate more competition because more contractors could potentially bid it and local contractors familiar with AKDOT procedures and practices may be able to provide lower bid prices.
4. A suggested zone construction sequence could be as follows:
    - Zone 1 – Start from the south end of Zone 1 and work north so that a construction camp would not be necessary. However, materials necessary for road embankment in Zone 2 would need to be stockpiled for later use, if another source cannot be identified for use from Zone 2 in Zone 2.
    - Zone 3 – Start from the north end of Zone 3 and work south so that a Contractor would need to use the existing Comet facilities, provided by AKDOT & PF for Contractor use, as a construction camp for the workforce, thereby reducing overall camp costs.
    - Zone 2 – Once Zones 1 and 3 are completed; construct Zone 2 road embankment and bridges. Access will be generally good from Juneau and a construction camp may not be necessary.
    - Lay AC pavement under separate contract after all the Zones 1, 2, and 3 roadway and bridgework are completed.

3 ZONES 4 AND 5

3.1 CONSTRUCTION PROJECT APPROACH

3.1.1 Approach for Zones 4 and 5

Because the design for Zones 4 and 5 is only at the conceptual stage, it was assumed that details similar to those shown on the Zones 1, 2, and 3 bid document drawings would be used for Zones 4 and 5. After a preliminary review of the conceptual design documents, a general project approach was developed to determine how the project might be constructed based on the limited design documents provided by AKDOT & PF.

3.1.2 General Schedule

For project approach and identification of project risk purposes it was assumed that the Zones 4 and 5 project would be awarded and a Notice to Proceed issued no later that the end of March 2009. On-site mobilization would begin on or about April 1, 2009, and would take approximately three months. The projected on-site construction start date would be on or about July 1, 2010, with a completion date of November 30, 2016, making a project duration of approximately 7 1/2 years.

A majority of the construction equipment and permanent materials for the project would likely be delivered by barge from Seattle. The on-site construction activities that begin in 2009 generally do not need permanent materials that would be shipped from Seattle, but require a substantial number of workers in all zones to clear and pioneer roads, excavate rock, create staging areas, and mob bridge erection equipment. The construction equipment needed to begin work in 2009 would be rented from Juneau and/or Haines. During the period from June 1, 2009 to April 1, 2010, a portion of the staff would be consumed with project preplanning and permanent materials approval, fabrication, and delivery to Seattle for barge shipment to the project location. For a project this size, the barge services request a minimum notice of approximately eight months to ensure that a contractor would get delivery by the dates needed to support the on-site materials mobilization date of April 2010.

3.1.3 Work Sequence

Beginning the summer of 2009, work would start at one work face the first season of work, after mobilization and construction camp and office setup. Work would begin on three other work faces during the second season. Site cleanup and demobilization would be completed by the end of November 2016. A four-month winter shutdown period from December through March each construction season is figured into the work schedule.

The first season work face would be:

3.1.3.1 Zone 4 roadwork starting from the south end of Zone 4 and working to the north.

1. The first season of work would begin pioneer road operations from approximately STA 1290+00.

2. The second season of work would construct the roadway to near subgrade from approximately STA 1290+00 to STA 1460+00. The cut and fill quantities are closely matched in this section of the roadway.
3. The third through seventh season of work would construct roadway to near subgrade from approximately STA 1460+00 to STA 2200+00. The cut and fill quantities on the mass diagram prepared for the project strongly indicate the need for embankment material for this section and will be constrained by how quickly the material from the tunnel area can be excavated, processed, and transported to the middle and southern sections of Zone 4. This section of roadway would be constructed to a temporary subgrade well below the actual road subgrade to allow construction traffic of materials and equipment to the work face. Once the material at the tunnels can be accessed, it will be transported south, either by barge or truck, to this section for embankment.
4. The next zone of work would construct roadway to near subgrade from approximately STA 1460+00 to STA 1640+00, where there is marginally more embankment than excavation. The subsequent station grouping activities (STA 1640+00 to STA 1800+00, STA 1800+00 to STA 2000+00, and STA 2000 to STA 2200+00) will be temporarily constructed at grades significantly lower than final grade. This is necessary until the material source for embankment, located primarily on the north side of the north tunnel (in the vicinity of STA 2380+00) of this section of the highway, can be accessed to bring back material from the tunnel area. The end of the 2015 and the beginning of the 2016 construction seasons would include bringing the roadway to its final subgrade. AC paving, guardrail, signage, and striping would occur the summer of 2017.
5. The three work faces added during the second season would include:

3.1.3.2 Zone 4 roadwork starting from the north end of Zone 4 working to the south.

1. This second season work would construct the embankment roadway section to subgrade from approximately STA 2609+00 (at south side of Katzehin River) to STA 2520+00 using material from the pioneer road work.
2. The third and fourth season work would construct the road to subgrade from approximately STA 2520+00 to approximately STA 2400+00, the north portal location of the north tunnel.
3. The excess excavated material (the material that is not needed to go south to embank the south end of Zone 4) from the first work section would be transported across the Katzehin River work bridge to begin constructing embankment road in Zone 5 from north side of Katzehin River at STA 2629+00 to STA 2772+00, the location of the proposed Katzehin Ferry Terminal at the end of the proposed highway.
4. The tunnels, the North Tunnel from STA 2381+50 to 2377+00 and the South Tunnel from STA 2370+00 to STA 2362+00, would be excavated and lined during the fourth and fifth seasons of work. During the sixth season, the road would be constructed to subgrade from approximately STA 2362+00 to

approximately STA 2200+00, where it would meet up with the roadway work from the south end of the project.

5. The seventh season work would bring the roadway to final subgrade.
6. The AC paving, guardrail, signage, and striping would occur the summer of 2017.

3.1.3.3 Zone 5 Work Bridge at the Katzehin River.

1. Permanent materials would be mobilized to the north side of the Katzehin River delta at the beginning of the second work season. The Katzehin River Bridge would begin construction from the north abutment heading south.
2. Once the Katzehin River Bridge is completed, it can be used as a haul road for materials to be embanked north of the bridge in Zone 5, towards the end of the third work season.

3.1.3.4 Zone 4 "STA 1740 Cliffs" bridge.

1. Work would begin on possibly the most difficult bridge on the project. In the vicinity of STA 1734+00, a 400-lineal-foot heavy duty bridge over the water and around a vertical rock face will be constructed from an anchored barge. Permanent materials would be mobilized to Comet near the south end of Zone 4 and then reloaded on a smaller barge to be delivered to the work site at the beginning of the second work season.
2. This bridge would be completed during the third work season.
3. This bridge needs to be constructed to gain access to the roadway work between this bridge and the South Tunnel. It needs to be completed before the roadway work heading up from the south reaches this location, because there is no way around the bridge location within the ROW of work.

The small bridge work, 23 individual bridges, would typically lag the roadwork by approximately one season in most instances, but up to two years in mid-Zone 4 due to the number of bridges that need to be constructed in that area. The quantity of MSE wall construction in the middle and north sections of Zone 4 will likely slow normal road construction progress.

3.1.4 Construction Camps and Offices

The range of the number of staff and construction workers projected for the project varies between approximately 100 and 220 persons. It is estimated that approximately 45 to 110 staff and construction workers would be required for roadway and bridge work at the south and middle sections of Zone 4. The number of staff and construction workers for Zone 5 and the north section of Zone 4 is estimated to be approximately 60 to 130 persons.

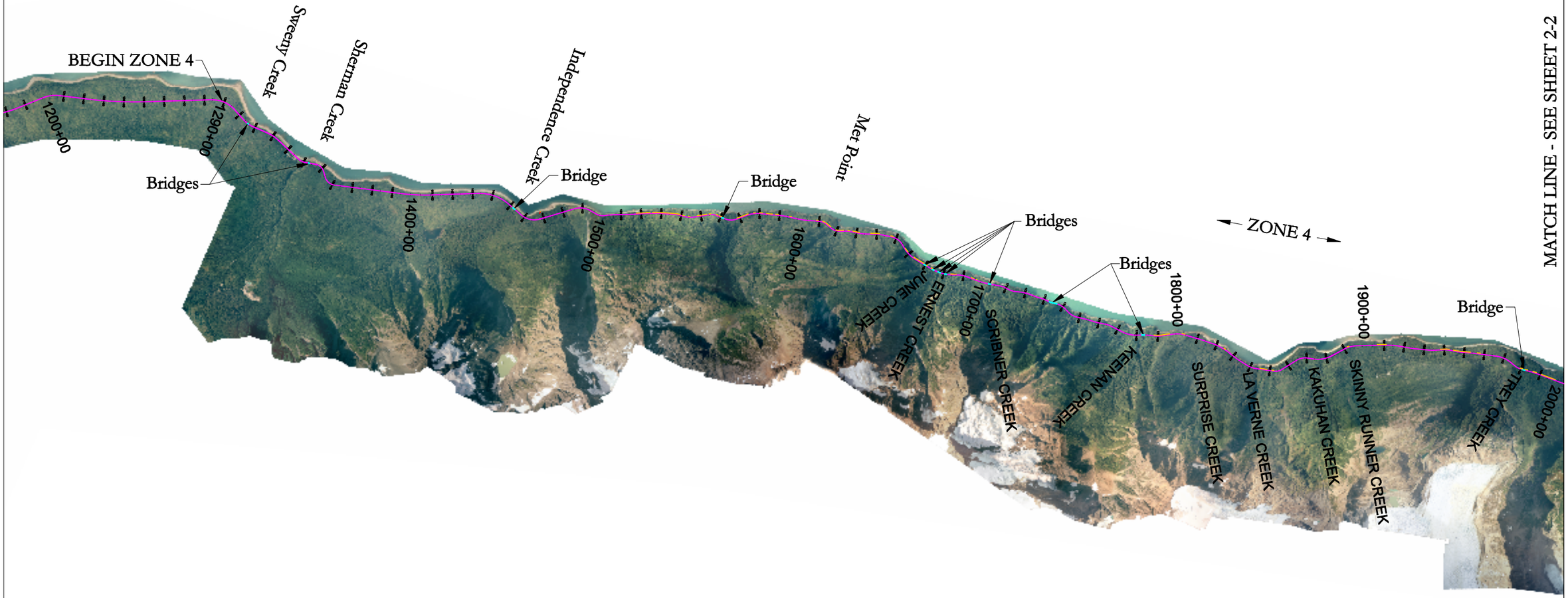
The south Zone 4 work would be supported from the construction camp, supplemented by a floating camp (as required), and offices located in the Comet area (between Sweeny Creek and Sherman Creek). The construction camp could be supported from Juneau, once the road reaches the camp from Sweeny Creek. However, it would be approximately

65 miles one way from Juneau, a distance that could be prohibitive to drive daily if workers are on a six 10s work schedule.

The workforce on the north end of the project would live in Haines, Alaska, and be transported by boat to the north end of the project each day. A construction office would be located in Haines. Minimal field office facilities, emergency housing, and substantial maintenance capabilities, would be located on the north and/or south side of the Katzehin River, as required, to support field construction activities.

JNU-LYNN CANAL HIGHWAY

SWEENY CREEK to KATZEHIN FERRY TERMINAL



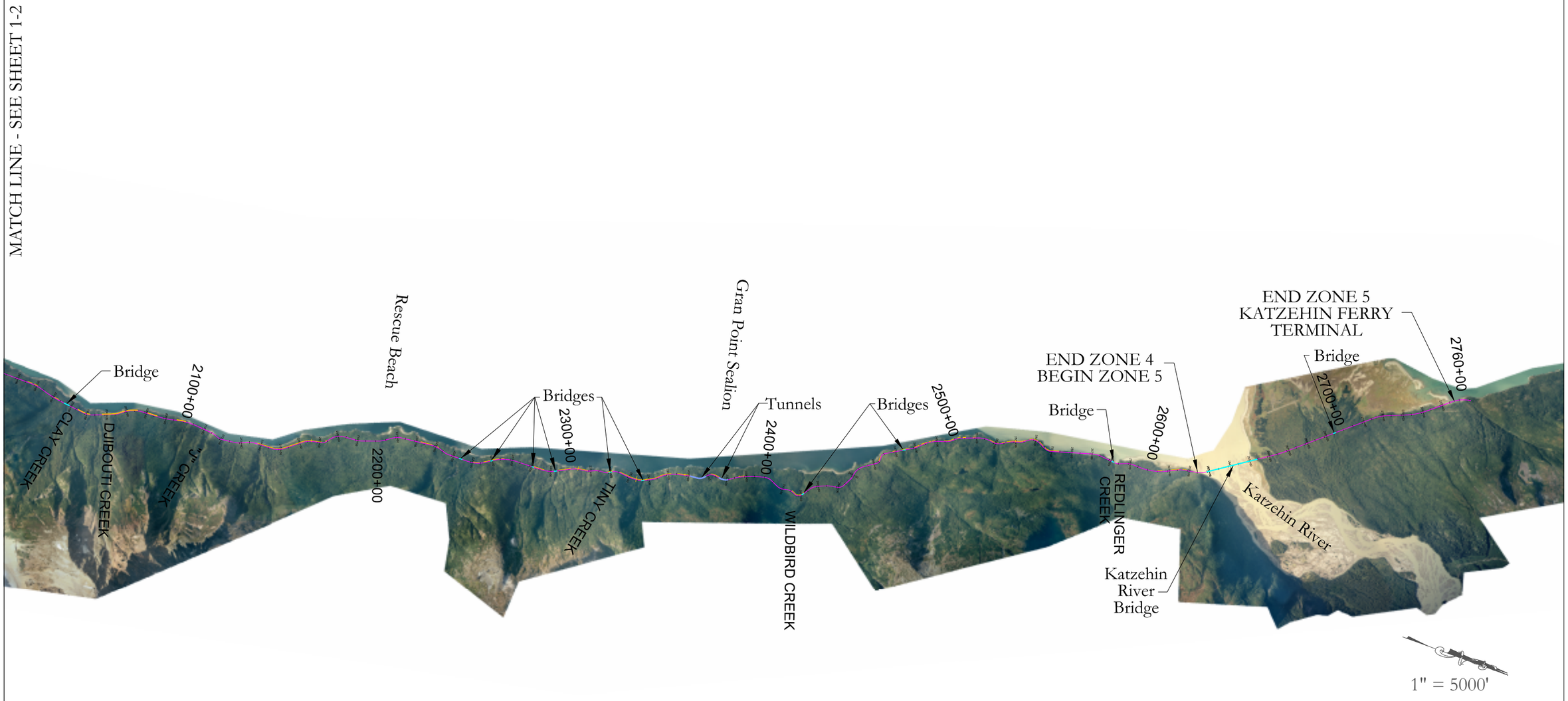
1" = 5000'

JUNEAU ACCESS HIGHWAY
INDEPENDENT COST ESTIMATE
EXHIBIT 2

SCALE	DATE	SHEET
1" = 5000'	04/27/2009	1-2

JNU-LYNN CANAL HIGHWAY

SWEENY CREEK to KATZEHIN FERRY TERMINAL



JUNEAU ACCESS HIGHWAY
INDEPENDENT COST ESTIMATE
EXHIBIT 2

SCALE	DATE	SHEET
1" = 5000'	04/27/2009	2-2

3.1.5 Avalanche Mitigation

Avalanche season, typically from November to April each winter, would encroach on the construction work. All but minimal construction activity would be shut down from December through March, four months each year and maybe longer since the current roadway alignment is located at higher elevation and affected by winter conditions for a longer period of time, due to snow and colder weather that would slow production rates, thereby increasing the costs and risks to the project. Therefore, the periods a month before and a month after the planned shutdown during avalanche season would need to be addressed with avalanche forecasting and mitigation measures, to include snow removal after a minor avalanche event. It is assumed that avalanches will not cause damage to the roadway and bridge work that is completed at the time they occur.

3.1.6 General Fuel Distribution

The fueling operation would consist of the following elements:

1. The most likely scenario for providing fuel to the south Zone 4 area would be to barge the fuel into Comet Camp. A backup option for providing fuel to south Zone 4 roadway and bridgework would be by road from Juneau, by truck tanker, with some possible smaller fuel tank storage at construction locations.
2. For Zone 5 and north Zone 4 roadway and bridge work, fuel would be provided either by fuel tanks on a barge or by a land-based tank farm. Fuel trucks would shuttle fuel from the larger fuel tanks near the shore to the construction equipment and possibly smaller fuel storage tanks at construction locations, maintenance shops, and field office facilities.

3.2 ZONES 4 AND 5 ASSUMPTIONS

The following section outlines the assumptions that were made for the Zones 4 and 5 project roadway work and bridge work.

3.2.1 Roadway Assumptions

1. AKDOT & PF will work with the contractor to make minor grade and alignment adjustments where such adjustments would benefit the construction of the roadway.
2. The structural plate arch culverts will be easily oriented and placed in the locations where they are to be placed.
3. It was determined during the estimating for Zones 1, 2, and 3 that there will likely be a surplus of material from Zone 3 that can be used for embankment construction in Zone 4. The surplus is estimated to be approximately 300,000 cubic yards and it will be stockpiled from the Zones 1, 2, and 3 project for use on the south end of Zone 4.
4. Not all design features needed to address avalanche hazards have been developed for the current alignment of the roadway.
5. Concrete facing panels for the MSE walls, to be used at locations that are at Elevation 50 and below, will be cast on site instead of cast off site and delivered to the jobsite by barge from Seattle.

6. Excavation through talus zones will be similar to those through other rock conditions and that no slope stabilization measures will be required for installation of the roadway and/or MSE walls.
7. The tunnels will be lined with a minimum 8-inch thick concrete liner with temperature steel. No tunnel waterproofing measures will be provided.

3.2.2 Bridge Assumptions

1. The access to bridge sites varies. Some require road construction, including fills, to access the site. Others are over steep channels with limited access at both ends. Many of the bridges cannot be accessed until after major road work has been completed.
2. Guidelines for bridge foundation type were used based on the e-mail information provided by AKDOT & PF, dated April 10, 2009. It identified which bridges would require piles and which would require shallow foundations or possibly both.
3. Because the bridges would be located in steep mountainside channels, debris fields, and avalanche zones, the State will assume responsibility for repair of damage to any bridge or portion of a bridge during the life of the construction project.
4. The protection of work zones must be a major consideration in rock fall areas. Work zone protection such as rockbolting, scaling, and other measures that are needed to protect the crews and the bridges would be compensated for by AKDOT.
5. Some bridge locations will require special consideration for delivery of materials because of several factors, such as how much room is available to turn trucks around.

3.3 RISKS FOR ZONES 4 AND 5

The following risks were determined for the Zones 4 and 5 projects:

1. The uncertainty of the roadwork in Zone 4 talus areas is a very significant project cost risk. Bridge work through talus areas, especially in Zone 4, has the potential for significant cost and schedule impacts. MSE wall work through talus areas, especially in Zone 4, could potentially have significant cost and schedule impacts. The work required to stabilize the talus slope areas adequately to allow excavation for roadway and/or MSE walls varies based on actual conditions, and the engineering solutions are not known at this time.
2. The use of structural plate arch culverts may not be viable options in most of Zone 4 due to the exceedingly steep cross-slope, possibly requiring more expensive drainage structures.
3. Debris flow mitigation structures are not defined and, in many cases, they may need to be placed well above the highway in order to be effective, thereby increasing the cost of installation.
4. The cost and time associated with seasonal debris flow and damage to roads and bridges caused by avalanches during construction is a project risk. It should be clarified as to who is responsible for this risk to the project.
5. The cost and time associated with avalanche control measures to minimize or avoid damage to roads and bridges during the seasonal avalanche season is a project risk.

6. The safety of the work zone will be an issue. The contractor will need to work outside of the 150-foot zone from the road centerline to address geological and avalanche hazards.
7. Mitigation measures for potential rockfall areas next to the road and bridges could occur well outside of the ROW.
8. The potential need for covered roadway structures to protect sections of roadway or bridges could present significant cost and schedule issues for the project and were not considered for the project approach.
9. Strike, dip, and jointing of rock will affect how the rock breaks during controlled blasting and may increase the amount of rock quantity for the project.
10. Loss of rock during initial benching operations may go beyond the ROW limits, and the rock may be cost prohibitive to retrieve. Cost to retain the shot rock is also significant. Further information is needed to address this issue.
11. The sea lion haul-out area at Gran Point may have a substantial impact on tunnel and rock excavation operations in its vicinity. Specifications will need to be written to address specifically this particular area, which coincides with tunnel excavation, steep rock excavations, and tall (up to approximately 70 feet high) MSE wall construction.
12. "STA 1740 Cliffs" bridge construction offers significant risk in foundation design and protection of the permanent bridge from falling rock from adjacent cliffs.

3.4 CONTINGENCY FACTOR CONSIDERATIONS

The level of design development and the risks to the project with respect to cost and schedule have a significant impact on the contingency factor for a project. Other factors such as size of a project, duration of a project, environmental impacts, and public scrutiny and/or opposition, also affect the contingency factor.

The limited design information developed at this point creates the need for a larger project contingency for zone grouping.

The risks associated with Zones 4 and 5 include the following:

1. The areas where the roadway traverses talus slopes,
2. The lack of sufficient geotechnical investigation work along the alignment to address the actual ground conditions,
3. Debris flow, rock falls, and avalanche damage to the roadway and bridges during construction of the projects,
4. Safety during construction activities along rockfall and avalanche areas,
5. The tunnel work,
6. The accuracy of the LIDAR survey through the existing tree canopy, where applicable,
7. The requirements necessary for rockbolting,

8. The ability of a vibratory hammer to drive 24-inch and 48-inch pipe piles for bridge foundations at the Katzehin River, and
9. The bonding capability of contractors for a job this large.

3.5 SUGGESTIONS FOR ZONES 4 AND 5

1. Award contract at least one year ahead of intended construction project start so that planning, coordination, and barge business capacity can accommodate the demand for a project of this scale. Crawley Marine indicated that it would not be able to support this project for this coming summer (2009) due to 16 barge shipments heading to Prudhoe Bay.
2. Design a single longer tunnel (approximately 2,500 lineal feet) that combines both the North and South Tunnels. This approach would eliminate the need for the MSE wall in between. It would still be possible to get sufficient excavated material from south end of the tunnel for embankment locations in middle and south end of Zone 4.
3. Another option would be to decrease the length of the South Tunnel from 800 feet to 450 feet and increase length of the North Tunnel from 450 fee to 800 feet so that borrowed material necessary for the middle and southern portion of Zone 4 will be easier to move to the locations where it is needed. Currently, the bulk of the material is north of the North Tunnel, making it much more costly and logistically difficult to get south across the two tunnels and the draw between the tunnels, which requires that a 65-foot-high MSE wall be built.
4. Modify road alignment in the middle and south end of Zone 4 to better balance the cut and fill in this area within two- to three-mile work zones and to find a way to a way to reduce the area of MSE walls.
5. Be proactive with mitigation of rockfall and avalanche areas well outside the ROW, which ends 150 feet from the road centerline. Being proactive will hopefully reduce the number of road closures during the duration of the construction project.
6. Break this project zone grouping into several projects. It would likely generate more competition because more contractors could potentially bid it and local contractors familiar with AKDOT procedures and practices may be able to provide lower bid prices.
7. A suggested sequence of work might consist of the following:
    a. Due to the similar topography of the section of road between Sweeny Creek and Independence Creek being more like Zone 3 than Zone 4, add this section to Zone 3. This revision would also help balance the overage in excavated material from Zone 3. This work could be supported from Juneau and with the AKDOT & PF Comet Camp.
    b. Construct Zone 5 and either get embankment material for the roadway for Zone 5 from a Zone 5 source or add an appropriate amount of the north end of Zone 4 to the project which would provide the necessary source of material for the Zone 5 embankment. This project could be supported from Haines without a construction camp.

c. Build a section of highway, 5-miles or less, north of Independence Creek in Zone 4 as a pilot project to learn how to adequately design and gain experience with construction techniques before tackling the rest of the Zone 4 highway. The section of roadway in Zone 4 from Independence Creek to the Katzehin River is the most difficult section of roadway on the entire five zones of the project.

d. With experience gained from the previous item, devise a strategy for breaking the rest of Zone 4 into smaller pieces that make sense for the project.

e. Lay AC pavement under separate contract after all the Zones 4 and 5 roadway, tunnel, and bridgework are completed.

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4 APPENDIX - COSTS