Technical Memorandum			
To:	Mike Brodie, P.E. Chugach Electric Association	Project:	Eklutna Fish & Wildlife Project
From:	Sean Ellenson, P.E. McMillen, Inc	cc:	Curtis Neibaur McMillen, Inc
Prepared by:	Grant Wilson McMillen, Inc	Job No.:	22-028
Date:	May 23, 2023		
Subject:	Engineering Feasibility Study – Class 5 Opinion of Probable Construction Costs (OPCC)		

Revision Log

Revision No.	Date	Revision Description
0	Jan 12, 2023	Initial Draft
1	Mar 24, 2023	Revised Draft
2	May 23, 2023	Added Replacement Dam Alternative

1.0 Introduction

1.1 Purpose

This technical memorandum (TM) presents a summary of the Opinion of Probable Construction Costs (OPCC) for the Eklutna Fish & Wildlife Project Engineering Feasibility Study. The OPCC estimates are based on the revised Engineering Feasibility Study Conceptual Design drawing package dated May 12, 2023.

1.2 Background

The Eklutna Hydroelectric Project (Project) is located in Southcentral Alaska approximately 30 miles northeast of downtown Anchorage near the Native Village of Eklutna (NVE). The Project was originally constructed by the Federal government in the 1950s but was later sold to, and is currently owned by, the Municipality of Anchorage (MOA), Chugach Electric Association, Inc. (Chugach), and the Matanuska Electric Association (MEA), collectively the “Project Owners”. As part of the sale of the Project, the current Project Owners entered into the 1991 Fish and Wildlife Agreement (1991 Agreement) with the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (USFWS), and the State of Alaska (the Parties). The 1991 Agreement requires the Project Owners to develop and propose to the Governor of Alaska (Governor) a program to protect, mitigate damages to, and enhance fish and wildlife impacted by the development of the Project.

In development of the program, the Project Owners have met with various stakeholders to identify protection, mitigation, and enhancement measures that may be implemented within the Project study area. These measures were incorporated into a Phase 1 Engineering Feasibility Study which advanced the preliminary design, estimated capital expenditures, and determined operations and maintenance costs for each alternative for the purposes of evaluation.

1.3 Estimation Preparation

McMillen has utilized historical cost data from similarly technical projects which we have designed or constructed as a self-performing general contractor, as the basis of our Class 5 OPCC estimate. Appropriate overhead and profit markups have been included below the subtotal to account for the competitive bidders' markups, they are likely to apply on their bid prices. A 25% contingency has been included at this stage to account for details and minor project features which are not yet included in the project documents at the conceptual level of detail. The contingency value may be reduced in future versions of the OPCC estimate, as the project design is advanced.

General requirement and mobilization costs are estimated at 12% and 8% of construction activity costs based on historical project ranges. Overhead and profit markups have been included at 10% and 5% respectively of direct construction costs. The estimate is in 1st quarter 2023 dollars. No escalation is included in the pricing. This OPCC estimate is consistent with a Class 5 estimate as defined by the AACE classification system, as shown in Figure 1-1 and 1-2 For the purposes of this project, McMillen has utilized the accuracy range of -50% to +100%.

CLASS 5 ESTIMATE	
Description: Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systemic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with little effort expended—sometimes requiring less than an hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation. **Level of Project Definition Required:** 0% to 2% of full project definition. **End Usage:** Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	**Estimating Methods Used:** Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. **Expected Accuracy Range:** Typical accuracy ranges for Class 5 estimates are - 20% to -50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. **Effort to Prepare (for US$20MM project):** As little as 1 hour or less to perhaps more than 200 hours, depending on the project and the estimating methodology used. **ANSI Standard Reference Z94.2-1989 Name:** Order of magnitude estimate (typically -30% to +50%). **Alternate Estimate Names, Terms, Expressions, Synonyms:** Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.

Figure 1-1: Class 5 Estimate Description

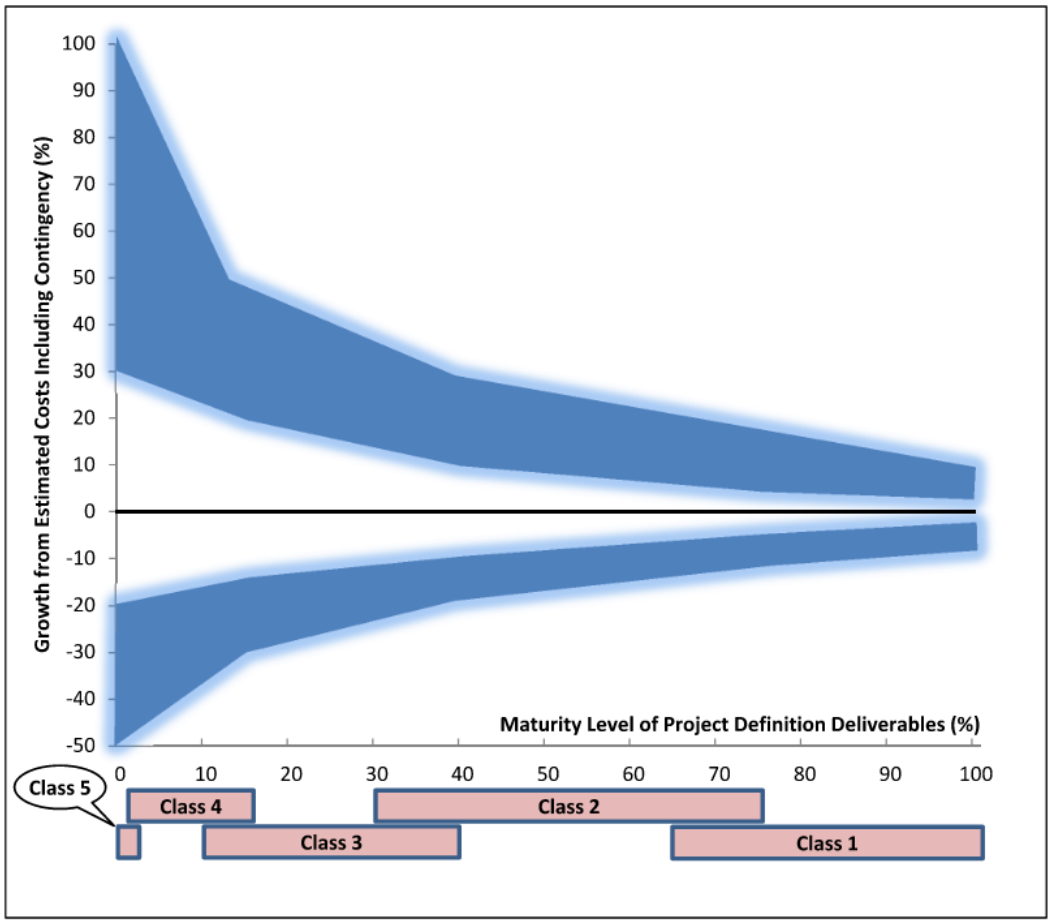

Figure 1-2: Variable in Accuracy Ranges (AACE 69R-12)

2.0 Project Cost Estimate

2.1 Project Description

The Eklutna Feasibility Study consists of a total of 18 alternatives within six site improvement categories as summarized in the cost summary table. Each alternative is accompanied with conceptual level drawings illustrating an overview of each respective design. When necessary, project quantities were estimated by deducing the likely layout of project components. Table 2-1 summarizes each alternative listing the identifying project component.

Table 2-1. Alternative Feature Descriptions.

INSTREAM FLOW MEASURES		WORK FEATURES
A	Dam Release Modifications	Add electric motor operator and controls to existing sluice gate and complete powerhouse upgrades to allow powerhouse to be offline through winter months.
B	Siphon Bypass Pipeline	Add a pipeline that will siphon water out of the Eklutna Lake to Eklutna River and complete powerhouse upgrades to allow powerhouse to be offline through winter months.
C	AWWU Portal Valve Release	Tap into existing 54" bypass pipeline at the AWWU portal valve location to divert flow to Eklutna River.
D	AWWU Pipeline Release	Tap into existing 54" bypass line at specified location along AWWU Pipeline at River Mile 5.5 to divert flow to Eklutna River.
E	Bypass Tunnel Release	Add a tee to the existing 108" APA tunnel and drive a 7,500 foot long 72" diameter tunnel to divert flow to the Eklutna River.
F	Channel Excavation	Excavate a channel from Eklutna Lake past the previous storage dam to make the Eklutna Dam Pond a live storage pool all year.
G	Lach Q'atnu Creek Re-Route	Divert current path of Lach Q'atnu Creek to new channel to allow creek to flow directly to Eklutna River downstream of Eklutna Dam.
PEAK FLOW MEASURES		
H	Spillway Modifications - New Tainter Gate	Add new Tainter gate and hoist to the existing Eklutna Dam spillway crest.
I	Spillway Modifications - New Wheel Gate	Add new fixed wheel gate and hoist in place of the existing Eklutna Dam spillway.
FISH PASSAGE		
J	Gravity Flow Fish Ladder	Add gravity fish ladder passage through dam.
K	Variable Exit Fish Ladder	Add variable exit fish ladder passage through dam.
L	Pumped Supply and Slide Fish Ladder	Add new concrete fishway through dam with pumped water supply.
M	Trap and Haul Facility	Add trap and haul fish transfer facilities at new downstream bypass valve.
N	Floating Surface Collector	Add floating surface fish collector in Eklutna Lake.
O	Fish Exclusion Barrier	Add fish exclusion netting at existing intake structure.
P	Replacement Dam	Excavate deep channel, remove existing dam, and replace with larger embankment dam including fish passage.
INFRASTRUCTURE IMPROVEMENTS		
Q	Lakeside Trail Improvements	Improve the lakeside trail and repair erosional features on the northeast shoreline of Eklutna Lake.
R	AWWU Maintenance Road Crossings	Add 8 new road bridges over Eklutna River on AWWU access road.
HABITAT IMPROVEMENTS		
S	Physical Habitat Manipulation	Implement new physical habitat modifications within the Eklutna River to improve fish and wildlife habitat.

2.2 Class 5 Cost Estimate

This OPCC estimate is consistent with a Class 5 estimate as defined by the Association for the Advancement of Cost Engineering (AACE) standard practice 69R-12. The maturity level of the project definition warrants a wide range of potential growth as the project design progresses. The Eklutna feasibility concept OPCC is based on alternative concept drawing package dated December 23, 2022. The cost summary is included in Table 2-2.

Table 2-2. Class 5 OPCC - Cost Summary.

		TOTAL MEDIAN COST	EXPECTED ESTIMATE COST RANGE - CLASS 5 (-50% TO +100%)		
A	Dam Release Modifications	$6,680,000	$3,340,000	to	$13,360,000
B	Siphon Bypass Pipeline	$22,371,500	$11,186,000	to	$44,743,000
C	AWWU Portal Valve Release	$5,546,500	$2,773,000	to	$11,093,000
D	AWWU Pipeline Release	$2,248,300	$1,124,000	to	$4,497,000
E	Bypass Tunnel Release	$76,747,200	$38,374,000	to	$153,494,000
F	Channel Excavation	$569,000	$285,000	to	$1,138,000
G	Lach Q'atnu Creek Re-Route	$1,523,000	$762,000	to	$3,046,000
H	Spillway Modifications - New Tainter Gate	$5,574,300	$2,787,000	to	$11,149,000
I	Spillway Modfications - New Wheel Gate	$6,573,500	$3,287,000	to	$13,147,000
J	Gravity Flow Fish Ladder	$16,670,300	$8,335,000	to	$33,341,000
K	Variable Exit Fish Ladder	$17,569,600	$8,785,000	to	$35,139,000
L	Pumped Supply and Slide Fish Ladder	$15,240,200	$7,620,000	to	$30,480,000
M	Trap and Haul Facility	$8,336,200	$4,168,000	to	$16,672,000
N	Floating Surface Collector	$57,557,000	$28,779,000	to	$115,114,000
O	Fish Exclusion Barrier	$3,125,600	$1,563,000	to	$6,251,000
P	Replacement Dam	$113,344,500	$56,672,000	to	$226,689,000
Q	Lakeside Trail Improvements	$1,720,700	$860,000	to	$3,441,000
R	AWWU Maintenance Road Crossings	$2,941,500	$1,471,000	to	$5,883,000
S	Physical Habitat Manipulation	$1,469,200	$735,000	to	$2,938,000

2.3 Cost Assumptions and Qualifications

The cost estimate was primarily developed utilizing costs from past projects and estimates. Below is a summary of the cost basis including any assumptions necessary for cost estimating purposes at this stage of design.

Common Cost Basis:

- General requirement and mobilization costs are based on a typical percentage of total direct construction costs: 12% and 8% respectively.
- Overhead & profit are added to direct construction costs at 10% and 5% respectively.
- A 25% contingency is added to the costs which is a typical contingency at the early concept phase of a project.
- Site access and laydown areas were all based on a unit price of $160k per acre for 0.3 acres.
- Tree clearing is all priced at $5,000 an acre.
- All steel buildings priced at $200/sf.
- Powerhouse stoplogs were based on average cost per square foot for the stoplogs and a standard unit rate for concrete for the seals.
- All handrail and grating costs are based on recent supply and install estimates.
- All vaults and shafts require shoring to construct.
- Excavation spoils can be disposed of nearby the location of excavation.
- All electric controls are assumed to include a PLC for semi-automatic control capabilities along with standard instrumentation readouts.
- Electrical overhead and underground transmission costs provided by MEA.
- Transformer costs are provided by MEA.

Alternative B – Siphon Bypass Cost Basis:

- The existing earthen dam can be excavated by normal methods without contaminating any of the zone materials at the excavation extents.
- 36” steel pipe cost is based on a 0.375” wall thickness and pricing was scaled from a recent estimate utilizing 54” diameter steel pipe.

Alternative E – Bypass Tunnel Cost Basis:

- 108” Steel Tee can be lowered into shaft structure.

Alternative G – Lach Q’Atnu Cost Basis:

- No rock excavation is required.

Alternative G & H – Gravity Fish Ladder & Variable Fish Ladder Cost Basis:

- Dam excavation can be completed by normal methods without contaminating the zone materials adjacent to the excavation.
- Dam core material can be reused.

Alternative P – Lakeside Trail Cost Basis:

- Small equipment is required.
- No floating equipment is required to access any section of the trail or embankment improvement location.
- Excavated material is able to be placed on site to prevent further erosion as necessary.

Appendix A. Cost Estimate

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$847,392**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$338,957	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$508,435	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$40,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
03	**SPILLWAY MODIFICATIONS**					**$45,200**
	Steel Access Platform w/ Grating	90	SF	$180.00	$16,200	
	Handrail	95	FT	$200.00	$19,000	
	Stilling Well Installation	1	LS	$10,000.00	$10,000	
04	**GATE CHAMBER MODIFICATIONS**					**$24,500**
	Electric Motor Operator	1	LS	$10,000.00	$10,000	
	Gate Actuator Installation	1	LS	$14,500.00	$14,500	
05	**ELECTRICAL AND TRANSMISSION**					**$334,523**
	Overhead Transmission Line 7.2kV - 1P.	0.66	mi	$150,000.00	$99,432	
	Buried Power/Conrols Conduit	0.11	mi	$300,000.00	$34,091	
	5 kVA - 1P Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Main Panelboard	1	EA	$10,000.00	$10,000	
	Instrumentation & Gate Controls	1	LS	$81,000.00	$81,000	
06	**POWERHOUSE UPGRADES**					**$1,251,317**
	Building Heaters - Electric	15,762	SF	$26.40	$416,117	
	Bulkhead Gate; 12-ft x 4-ft (Qty = 2)	96	SF	$1,350.00	$129,600	
	New Stoplog Structure Tailrace Conduit Exit, 12-ft x 14 ft (Qty = 4)	672	SF	$1,050.00	$705,600	
07	**DAM UPGRADES**					**$2,541,235**
	Riprap Removal	3,074	CY	$50.00	$153,704	
	Rockfill Bedding; Compacted Fill	3,074	CY	$110.00	$338,148	
	Concrete Facing, 8" Thick, Reinforced	1,025	CY	$2,000.00	$2,049,383	
	Project Subtotal (without Division 01)					**$4,236,958**
	Project Subtotal					**$5,084,350**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost			Amount
01	DIVISION 01 INDIRECTS			$847,392
02	SITE CONSTRUCTION AND ACCESS ROADS			$40,184
03	SPILLWAY MODIFICATIONS			$45,200
04	GATE CHAMBER MODIFICATIONS			$24,500
05	ELECTRICAL AND TRANSMISSION			$334,523
06	POWERHOUSE UPGRADES			$1,251,317
07	DAM UPGRADES			$2,541,235
			Total Construction Cost	**$5,084,350**
	Overhead			
	GC Overhead and Profit	15.00%		$193,770
	Construction Bonds	1.25%		$65,976
			Total - Overhead	**$259,746**
	Direct Cost Contingency			
	*Overall Project Contingency:	25.00%		$1,336,024
			Total - Contingency	**$1,336,024**
	Taxes			
	AK Sales Tax	0.00%		$0
			Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect			**$6,680,120**
	Total Construction Price Range (-50% to +100%)			**$3,340,060 to $13,360,240**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative A - Dam Release Modifications

Date: 2/1/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 61,025**
2	**Operation**							
3	Facility Technician	0.06	168			$ 66.64	$ 11,226	
4	Facility Operator	0.25	730			$ 64.91	$ 47,384	
5								
6	**Maintenance**							
7	Electrician	0.01	16			$ 81.42	$ 1,303	
8	Mechanic	0.01	16			$ 69.48	$ 1,112	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 294,380**
16	Gate Operation			1095	kWh	$ 0.68	$ 743	
17	General Site Consumption			1.0	LS	500	$ 500	
18	SS Powerhouse Winter Load			432000	kWh	$ 0.68	$ 293,137	
19								
20								
21								
22	**Materials**							**$ 500**
23	Gate			1.0	LS	500	$ 500	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 356,000**
30								
31	**Contingency**			30%	LS			**$ 106,800**
32								
33								
34	**Project Total**							**$ 462,800**

Assumptions:
(1) Flow released through Gate year-round
(2) Facility operator is required to visit the site twice per week.
(3) The gate will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A 2 day outage was assumed for performing inspection and maintenance of the gate chamber
(6) Electrical and mechanical maintenance support assumes ongoing support for gate and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative B - Siphon Bypass

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$2,985,318**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$1,194,127	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$1,791,191	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$405,368**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
	Tree Clearing	5.0	ACRE	$5,000.00	$25,000	
	Road Construction - Abandoned Access Road	1,000	LF	$75.00	$75,000	
	Road Construction - New	600	LF	$125.00	$75,000	
	Temporary Construction Roads	2,500	LF	$60.00	$150,000	
03	**SIPHON CONSTRUCTION**					**$8,396,817**
	Pipe Excavation/Backfill	46,000	CY	$45.00	$2,070,000	
	Pipe Bedding - Imported Material	6,000	CY	$70.00	$420,000	
	Disposal Area Fill (Excavation Spoils)	10,000	CY	$10.00	$100,000	
	36" Steel Pipe (Qty = 3)	7,011	LF	$600.00	$4,206,744	
	Inlet Structure Shoring	350	SF	$120.00	$42,000	
	Inlet Structure Excavation	536	CY	$40.00	$21,440	
	Siphon Inlet Structure	134	CY	$1,500.00	$201,000	
	Siphon Outlet Structure	134	CY	$1,500.00	$201,000	
	Vent Vault Shoring, Excavation, & Concrete	25	FT	$10,000.00	$250,000	
	Vacuum Priming Pumps	3	EA	$20,000.00	$60,000	
	Instrumentation Vault, Shoring	400	SF	$120.00	$48,000	
	Instrumentation Vault, Excavation	33	CY	$40.00	$1,333	
	Instrumentation Vault, 10' x 10' (6-ft depth)	21	CY	$1,500.00	$31,500	
	Outlet Vault - Shoring, Excavation, & Concrete	15	FT	$10,000.00	$150,000	
	Mechanical Gates, Valves, Flow Regulation	3	SETS	$175,000.00	$525,000	
	Inlet Structure Valve House 10' x 10'	100	SF	$200.00	$20,000	
	Instrumentation House 10' x 10'	100	SF	$200.00	$20,000	
	Power and Communications Building 12' x 12'	144	SF	$200.00	$28,800	
04	**ELECTRICAL AND TRANSMISSION**					**$2,049,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	5 kVA Transformer, Pole Mount	1	LS	$7,500.00	$7,500	
	Main Panelboard	3	EA	$10,000.00	$30,000	
	Instrumentation, Flow Meters	1	LS	$25,000.00	$25,000	
	Valve Controls	1	LS	$70,000.00	$70,000	
	Vacuum Pump Controls	1	LS	$70,000.00	$70,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Building Lighting	660	SF	$15.00	$9,900	
	Building HVAC	660	SF	$60.00	$39,600	
05	**POWERHOUSE UPGRADES**					**$1,533,557**
	Building Heaters - Electric	15,762	SF	$26.40	$416,117	
	Bulkhead Gate; 12-ft x 4-ft (Qty = 2)	96	SF	$1,350.00	$129,600	
	New Stoplog Structure Tailrace Conduit Exit, 12-ft x 14 ft (Qty = 4)	672	SF	$1,470.00	$987,840	
06	**DAM UPGRADES**					**$2,541,235**
	Riprap Removal	3,074	CY	$50.00	$153,704	
	Rockfill Bedding; Compacted Fill	3,074	CY	$110.00	$338,148	
	Concrete Facing, 8" Thick, Reinforced	1,025	CY	$2,000.00	$2,049,383	
	Project Subtotal (without Division 01)					**$14,926,591**
	Project Subtotal					**$17,911,909**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$2,985,318
02	SITE CONSTRUCTION AND ACCESS ROADS		$405,368
03	SIPHON CONSTRUCTION		$8,396,817
04	ELECTRICAL AND TRANSMISSION		$2,049,614
05	POWERHOUSE UPGRADES		$1,533,557
06	DAM UPGRADES		$2,541,235
		Total Construction Cost	**$15,370,674**
	Overhead		
	GC Overhead and Profit	15.00%	$2,305,601
	Construction Bonds	1.25%	$220,953
		Total - Overhead	**$2,526,555**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$4,474,307
		Total - Contingency	**$4,474,307**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$22,371,536**
	Total Construction Price Range (-50% to +100%)		**$11,185,768 to $44,743,072**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative B - Siphon Bypass

Date: 2/1/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 120,714**
2	**Operation**							
3	Facility Technician	0.33	973			$ 66.64	$ 64,856	
4	Facility Operator	0.25	730			$ 64.91	$ 47,384	
5								
6	**Maintenance**							
7	Electrician	0.02	56			$ 81.42	$ 4,572	
8	Mechanic	0.02	56			$ 69.48	$ 3,902	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 303,181**
16	Siphon Controls			9286	kWh	$ 0.68	$ 6,301	
17	Vacuum Pump Operations			1095	kWh	$ 0.68	$ 743	
18	General Site Consumption			1.0	LS	3000	$ 3,000	
19	SS Powerhouse Winter Load			432000	kWh	$ 0.68	$ 293,137	
20								
21								
22	**Materials**							**$ 6,000**
23	Valves			3.0	LS	2000	$ 6,000	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 430,000**
30								
31	**Contingency**			30%	LS			**$ 129,000**
32								
33								
34	**Project Total**							**$ 559,000**

Assumptions:
(1) Flow released through siphon year-round
(2) Facility operator is required to visit the site twice per week.
(3) Power consumption is estimated based on daily valve position changes and general site power consumption.
(4) A one week outage was assumed for performing inspection and maintenance of the siphon.
(5) Electrical and mechanical maintenance support assumes ongoing support for valves and instrumentation system.
(6) Facility operator is a trained local operator with general mechanical skills.
(7) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative C - AWWU Portal Valve Release

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$635,135**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$254,054	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$381,081	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$40,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
03	**CIVIL WORKS - GRADING**					**$521,622**
	Excavation to Existing Buried Pipe	1,620	CY	$50.00	$81,019	
	Vault Shoring	3,740	SF	$100.00	$374,000	
	Excavate Bypass Channel	193	CY	$40.00	$7,704	
	Disposal Area Fill (Excavation Spoils)	1,620	CY	$20.00	$32,400	
	Security Fencing	150	LF	$110.00	$16,500	
	Bypass Portal Pad - Fill to El. 807.3	100	CY	$100.00	$10,000	
04	**BYPASS VALVE SHAFT STRUCTURE**					**$526,185**
	Reinforced Concrete	161	CY	$2,000.00	$321,185	
	Steel Builidng	375	SF	$200.00	$75,000	
	Equipment Hatch	1	LS	$15,000.00	$15,000	
	Stairway and Ladder	1	LS	$25,000.00	$25,000	
	Grating Platform	480	SF	$150.00	$72,000	
	Building Lighting	240	SF	$15.00	$3,600	
	Building HVAC	240	SF	$60.00	$14,400	
05	**PIPING AND VALVES**					**$346,000**
	Install Flanged Tapping Saddle on Existing 54" Pipe (Wrapper)	1	LS	$10,000.00	$10,000	
	Mechanical Hot Tap Existing Pipe	1	LS	$75,000.00	$75,000	
	Supply and Install 30" Cl150 Gate Valve, Electric Motor Operated	1	LS	$175,000.00	$175,000	
	Supply and Install 30" Cl150 Globe Valve, Electric Motor Operated	1	LS	$21,000.00	$21,000	
	Install 30" Steel Piping (5 LF), Dismantling Joint and Wall Sleeve	1	LS	$15,000.00	$15,000	
	Upgrades to Existing AWWU Portal Shaft	1	LS	$50,000.00	$50,000	
06	**ELECTRICAL AND TRANSMISSION**					**$1,741,682**
	Buried Power/Controls Conduit	100	ft	$56.82	$5,682	
	10 kVA Transformer, Pole Mount	1	LS	$15,000.00	$15,000	
	Vault Main Panel Board	1	EA	$10,000.00	$10,000	
	Instrumentation, Pressure Transducers, Valve Controls	1	LS	$81,000.00	$81,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$3,175,673**
	Project Subtotal					**$3,810,808**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$635,135
02	SITE CONSTRUCTION AND ACCESS ROADS		$40,184
03	CIVIL WORKS - GRADING		$521,622
04	BYPASS VALVE SHAFT STRUCTURE		$526,185
05	PIPING AND VALVES		$346,000
06	ELECTRICAL AND TRANSMISSION		$1,741,682
		Total Construction Cost	**$3,810,808**
	Overhead		
	GC Overhead and Profit	15.00%	$571,621
	Construction Bonds	1.25%	$54,780
		Total - Overhead	**$626,402**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$1,109,302
		Total - Contingency	**$1,109,302**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$5,546,512**
Total Construction Price Range (-50% to +100%)	**$2,773,256 to $11,093,024**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative C - AWWU Portal Valve

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 120,714**
2	**Operation**							
3	Facility Technician	0.33	973			$ 66.64	$ 64,856	
4	Facility Operator	0.25	730			$ 64.91	$ 47,384	
5								
6	**Maintenance**							
7	Electrician	0.02	56			$ 81.42	$ 4,572	
8	Mechanic	0.02	56			$ 69.48	$ 3,902	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 2,977**
16	Gate Operation			3650	kWh	$ 0.68	$ 2,477	
17	General Site Consumption			1.0	LS	500	$ 500	
18								
19								
20								
21								
22	**Materials**							**$ 2,000**
23	Valve			1.0	LS	2000	$ 2,000	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 126,000**
30								
31	**Contingency**			30%	LS			**$ 37,800**
32								
33								
34	**Project Total**							**$ 163,800**

Assumptions:
(1) Flow released through valve year-round
(2) Facility operator is required to visit the site twice per week.
(3) The valve will be fitted with an instrumentation system capable of automated valve position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily valve position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the valve shaft.
(6) Electrical and mechanical maintenance support assumes ongoing support for valves and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative D - AWWU Pipeline Release

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$257,457**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$102,983	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$154,474	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$40,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
03	**CIVIL WORKS - GRADING**					**$91,400**
	Excavation to Existing Buried Pipe	970	CY	$50.00	$48,500	
	Excavate Bypass Channel	280	CY	$40.00	$11,200	
	Disposal Area Fill (Excavation Spoils)	970	CY	$10.00	$9,700	
	Security Fencing	200	LF	$110.00	$22,000	
04	**BYPASS VALVE SHAFT STRUCTURE**					**$253,200**
	Reinforced Concrete	72	CY	$2,000.00	$144,000	
	Steel Building Cover	192	SF	$200.00	$38,400	
	Equipment Hatch	1	LS	$15,000.00	$15,000	
	Grating Platform	154	SF	$150.00	$23,100	
	Stairway and Ladder	1	LS	$15,000.00	$15,000	
	Building Lighting	180	SF	$15.00	$2,700	
	Building HVAC	1	LS	$15,000.00	$15,000	
05	**PIPING AND VALVES**					**$315,000**
	Install Flanged Tapping Saddle on Existing 54" Pipe (Wrapper)	1	LS	$10,000.00	$10,000	
	Mechanical Hot Tap Existing Pipe	1	LS	$75,000.00	$75,000	
	Supply and Install 18" Cl150 Gate Valve, Electric Motor Operated	1	LS	$130,000.00	$130,000	
	Supply and Install 18" Cl150 Globe Valve, Electric Motor Operated	1	LS	$90,000.00	$90,000	
	Install 18" Steel Piping -- 5' pipe / dismantling joint / wall sleeve	1	LS	$10,000.00	$10,000	
06	**ELECTRICAL AND TRANSMISSION**					**$587,500**
	Buried Power/Controls Conduit	100	ft	$56.82	$5,682	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Main Panelboard	1	EA	$10,000.00	$10,000	
	Instrumentation, Pressure Transducers, Controls	1	LS	$75,000.00	$75,000	
	3-Phase Upgrade Transmission Line - Overhead	2.2	mi	$150,000.00	$330,000	
	New 3-Phase Transmission Line - Overhead	0.4	mi	$150,000.00	$56,818	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$1,287,284**
	Project Subtotal					**$1,544,741**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$257,457
02	SITE CONSTRUCTION AND ACCESS ROADS		$40,184
03	CIVIL WORKS - GRADING		$91,400
04	BYPASS VALVE SHAFT STRUCTURE		$253,200
05	PIPING AND VALVES		$315,000
06	ELECTRICAL AND TRANSMISSION		$587,500
		Total Construction Cost	**$1,544,741**
	Overhead		
	GC Overhead and Profit	15.00%	$231,711
	Construction Bonds	1.25%	$22,206
		Total - Overhead	**$253,917**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$449,664
		Total - Contingency	**$449,664**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$2,248,322**
Total Construction Price Range (-50% to +100%)	**$1,124,161 to $4,496,644**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% and turbine contingency is set to 20% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative D - AWWU Pipeline

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 120,714**
2	**Operation**							
3	Facility Technician	0.33	973			$ 66.64	$ 64,856	
4	Facility Operator	0.25	730			$ 64.91	$ 47,384	
5								
6	**Maintenance**							
7	Electrician	0.02	56			$ 81.42	$ 4,572	
8	Mechanic	0.02	56			$ 69.48	$ 3,902	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 2,977**
16	Gate Operation			3650	kWh	$ 0.68	$ 2,477	
17	General Site Consumption			1.0	LS	500	$ 500	
18								
19								
20								
21								
22	**Materials**							**$ 2,000**
23	Valve			1.0	LS	2000	$ 2,000	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 126,000**
30								
31	**Contingency**			30%	LS			**$ 37,800**
32								
33								
34	**Project Total**							**$ 163,800**

Assumptions:
(1) Flow released through valve year-round
(2) Facility operator is required to visit the site twice per week.
(3) The valve will be fitted with an instrumentation system capable of automated valve position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily valve position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the valve shaft.
(6) Electrical and mechanical maintenance support assumes ongoing support for valves and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative E - Bypass Tunnel

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$7,714,786**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$3,085,915	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$4,628,872	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$120,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
	Bulkead Installation and APA Tunnel Dewatering	1	LS	$80,000.00	$80,000	
03	**CIVIL WORKS - GRADING**					**$401,404**
	Bypass Portal Excavation	1,620	CY	$50.00	$81,000	
	Bypass Valve Portal - Shoring	2,500	SF	$100.00	$250,000	
	Excavate Bypass Channel	193	CY	$40.00	$7,704	
	Disposal Area Fill (Excavation Spoils)	1,620	CY	$10.00	$16,200	
	Security Fencing	150	LF	$110.00	$16,500	
	Bypass Portal Pad - Fill to El. 820	300	CY	$100.00	$30,000	
04	**BYPASS VALVE SHAFT STRUCTURE**					**$1,028,662**
	Reinforced Concrete	161	CY	$1,750.00	$281,037	
	Steel Building	375	SF	$200.00	$75,000	
	Equipment Hatch	1	LS	$15,000.00	$15,000	
	Stairways and Ladders	1	LS	$25,000.00	$25,000	
	Grating Platform	480	SF	$150.00	$72,000	
	Building Lighting	375	SF	$15.00	$5,625	
	Building HVAC	2	EA	$30,000.00	$60,000	
	Install Flanged Tapping Saddle on Existing 54" Pipe (Wrapper)	1	LS	$10,000.00	$10,000	
	Mechanical Hot Tap Existing Pipe	1	LS	$75,000.00	$75,000	
	Supply and Install 30" Cl150 Gate Valve, Electric Motor Operated	1	LS	$175,000.00	$175,000	
	Supply and Install 30" Cl150 Globe Valve, Electric Motor Operated	1	LS	$220,000.00	$220,000	
	Install 30" Steel Piping (5 LF), Dismantling Joint and Wall Sleeve	1	LS	$15,000.00	$15,000	
05	**TUNNEL CONSTRUCTION**					**$30,228,000**
	8-ft Excavation; Segmentally Concrete Lined; 6-ft Finished ID	7,182	LF	$4,000.00	$28,728,000	
	108" Steel Tee into Existing APA Tunnel; Demo and Installation	1	LS	$1,500,000.00	$1,500,000	
06	**BYPASS INTAKE PORTAL**					**$5,035,000**
	9-ft Diameter Excavated Shaft	100	LF	$10,000.00	$1,000,000	
	Shaft Concrete	300	CY	$1,500.00	$450,000	
	Steel Building	400	SF	$200.00	$80,000	
	Equipment Hatch	1	LS	$15,000.00	$15,000	
	Stair Tower with landings	100	FT	$4,000.00	$400,000	
	72" Gate Valve - Manual Operation	1	LS	$1,330,000.00	$1,330,000	
	72" Butterfly Valve - Hydraulic Operation	1	LS	$1,760,000.00	$1,760,000	
07	**ELECTRICAL AND TRANSMISSION**					**$1,760,682**
	Buried Power/Controls Conduit	100	ft	$56.82	$5,682	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Main Panelboard	1	EA	$10,000.00	$10,000	
	Instrumentation, Pressure Transducers, Controls	1	LS	$105,000.00	$105,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$38,573,932**
	Project Subtotal					**$46,288,718**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$7,714,786
02	SITE CONSTRUCTION AND ACCESS ROADS		$120,184
03	CIVIL WORKS - GRADING		$401,404
04	BYPASS VALVE SHAFT STRUCTURE		$1,028,662
05	TUNNEL CONSTRUCTION		$30,228,000
06	BYPASS INTAKE PORTAL		$5,035,000
07	ELECTRICAL AND TRANSMISSION		$1,760,682
		Total Construction Cost	**$46,288,718**
	Overhead		
	GC Overhead and Profit	15.00%	$2,409,108
	Tunnel Overhead and Profit	40.00%	$12,091,200
	Construction Bonds	1.25%	$608,723
		Total - Overhead	**$15,109,031**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$15,349,437
		Total - Contingency	**$15,349,437**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$76,747,186**
	Total Construction Price Range (-50% to +100%)		**$38,373,593 to $153,494,371**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative E - Bypass Tunnel

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 129,188**
2	**Operation**							
3	Facility Technician	0.33	973			$ 66.64	$ 64,856	
4	Facility Operator	0.25	730			$ 64.91	$ 47,384	
5								
6	**Maintenance**							
7	Electrician	0.04	112			$ 81.42	$ 9,144	
8	Mechanic	0.04	112			$ 69.48	$ 7,803	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 3,477**
16	Gate Operation			3650	kWh	$ 0.68	$ 2,477	
17	General Site Consumption			2.0	LS	500	$ 1,000	
18								
19								
20								
21								
22	**Materials**							**$ 4,000**
23	Intake Valve			1.0	LS	2000	$ 2,000	
24	Outlet Valve			1.0	LS	2000	$ 2,000	
25								
26								
27								
28								
29	**Project Subtotal**							**$ 137,000**
30								
31	**Contingency**			30%	LS			**$ 41,100**
32								
33								
34	**Project Total**							**$ 178,100**

Assumptions:
(1) Flow released through valve year-round
(2) Facility operator is required to visit the site twice per week.
(3) The valve will be fitted with an instrumentation system capable of automated valve position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily valve position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of each valve shaft.
(6) Electrical and mechanical maintenance support assumes ongoing support for valves and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative F - Channel Excavation

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$65,157**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$26,063	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$39,094	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$139,934**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
	Tree Clearing	0.3	ACRE	$15,000.00	$3,750	
	Temporary Construction Roads	1,200	LF	$80.00	$96,000	
03	**EARTHWORKS**					**$185,850**
	Channel Excavation	5,310	CY	$25.00	$132,750	
	Disposal Area Fill (Excavation Spoils)	5,310	CY	$10.00	$53,100	
	Project Subtotal (without Division 01)					**$325,784**
	Project Subtotal					**$390,941**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost			Amount
01	DIVISION 01 INDIRECTS			$65,157
02	SITE CONSTRUCTION AND ACCESS ROADS			$139,934
03	EARTHWORKS			$185,850
		Total Construction Cost		**$390,941**
	Overhead			
	GC Overhead and Profit	15.00%		$58,641
	Construction Bonds	1.25%		$5,620
		Total - Overhead		**$64,261**
	Contingency			
	*Overall Project Contingency:	25.00%		$113,800
		Total - Contingency		**$113,800**
	Taxes			
	AK Sales Tax	0.00%		$0
			0	**$0**
	Median Construction Price - Direct and Indirect			**$569,002**
	Total Construction Price Range (-50% to +100%)			**$284,501 to $1,138,005**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

Eklutna Feasibility Study
Alternative G - Lach Q'Atnu Creek Re-Route

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$174,396**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$69,758	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$104,638	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$487,416**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
	Tree Clearing	3.1	ACRE	$15,000.00	$47,231	
	Temporary Construction Roads	5,000	LF	$80.00	$400,000	
03	**EARTHWORKS**					**$384,564**
	Channel Excavation	7,239	CY	$25.00	$180,975	
	Haul to Dispoal Area	7,239	CY	$15.00	$108,585	
	Rip Rap	165	CY	$200.00	$33,000	
	Re-Seeding; Native Vegetation on Bank Stabilization	64,008	SF	$0.50	$32,004	
	Highway Culvert Installation	1	LS	$30,000.00	$30,000	
	Project Subtotal (without Division 01)					**$871,980**
	Project Subtotal					**$1,046,375**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$174,396
02	SITE CONSTRUCTION AND ACCESS ROADS		$487,416
03	EARTHWORKS		$384,564
	Total Construction Cost		**$1,046,375**
	Overhead		
	GC Overhead and Profit	15.00%	$156,956
	Construction Bonds	1.25%	$15,042
	Total - Overhead		**$171,998**
	Contingency		
	*Overall Project Contingency:	25.00%	$304,593
	Total - Contingency		**$304,593**
	Taxes		
	AK Sales Tax	0.00%	$0
	Total - Taxes		**$0**
	Median Construction Price - Direct and Indirect		**$1,522,967**
	Total Construction Price Range (-50% to +100%)		**$761,483 to $3,045,933**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative G - Lach Q'Atnu Creek

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 14,580**
2	**Operation**							
3	Laborer - Ditch Repair	0.04	112			$ 64.91	$ 7,290	
4	Laborer - Ditch Repair	0.04	112			$ 64.91	$ 7,290	
5								
6	**Maintenance**							
7								
8								
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ -**
16								
17								
18								
19								
20								
21								
22	**Materials**							**$ -**
23								
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 15,000**
30								
31	**Contingency**			30%	LS			**$ 4,500**
32								
33								
34	**Project Total**							**$ 19,500**

Assumptions:
(1) Annual Ditch maintenance event required (1-week), erosion abatement, debris removal as required .
(2) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48
Ditch Digger, Debris Removal	S1201		$ 64.91

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$638,316**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$255,327	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$382,990	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$80,368**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
03	**SPILLWAY MODIFICATIONS**					**$248,600**
	Steel Access Platform w/ Grating	90	SF	$150.00	$13,500	
	Steel Hoist Platform w/ Grating	244	SF	$150.00	$36,600	
	Stilling Well Installation	1	LS	$10,000.00	$10,000	
	Concrete Demo for Sill and Side Seals	15	CY	$4,500.00	$67,500	
	Concrete - 2nd Stage for Sill and Seals	15	CY	$3,000.00	$45,000	
	Trunnion Girders	6	CY	$6,000.00	$36,000	
	Trunnion Anchors	2	EA	$20,000.00	$40,000	
04	**MECHANICAL EQUIPMENT**					**$974,000**
	Trunnion Installation	1	LS	$35,000.00	$35,000	
	Radial Gate Fabrication; 18-ft x 12-ft	15,500	lb	$20.00	$310,000	
	Radial Gate Installation	1	LS	$250,000.00	$250,000	
	Hoist and Gearbox Procurement	1	LS	$279,000.00	$279,000	
	Hoist, Gearbox, and Wire Rope Installation	1	LS	$100,000.00	$100,000	
05	**ELECTRICAL AND TRANSMISSION**					**$1,888,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Instrumentation, Flow Meters, Gate Controls & Grounding	1	LS	$81,000.00	$81,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$3,191,582**
	Project Subtotal					**$3,829,898**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$638,316
02	SITE CONSTRUCTION AND ACCESS ROADS		$80,368
03	SPILLWAY MODIFICATIONS		$248,600
04	MECHANICAL EQUIPMENT		$974,000
05	ELECTRICAL AND TRANSMISSION		$1,888,614
		Total Construction Cost	**$3,829,898**
	Overhead		
	GC Overhead and Profit	15.00%	$574,485
	Construction Bonds	1.25%	$55,055
		Total - Overhead	**$629,540**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$1,114,859
		Total - Contingency	**$1,114,859**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$5,574,297**
Total Construction Price Range (-50% to +100%)	**$2,787,149 to $11,148,594**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative H - Tainter Gate

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 21,605**
2	**Operation**							
3	Facility Technician	0.06	100			$ 66.64	$ 6,664	
4	Facility Operator	0.25	100			$ 64.91	$ 6,491	
5								
6	**Maintenance**							
7	Electrician	0.02	56			$ 81.42	$ 4,560	
8	Mechanic	0.02	56			$ 69.48	$ 3,891	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 1,305**
16	Gate Operation			450	kWh	$ 0.68	$ 305	
17	General Site Consumption			1.0	LS	1000	$ 1,000	
18								
19								
20								
21								
22	**Materials**							**$ 1,500**
23	Gate			1.0	LS	1500	$ 1,500	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 25,000**
30								
31	**Contingency**			30%	LS			**$ 7,500**
32								
33								
34	**Project Total**							**$ 32,500**

Assumptions:
(1) Flow released through Gate during one 72-hour period each year
(2) Facility operator is required to visit the site daily during release.
(3) The gate will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A 1 week outage was assumed for performing inspection and maintenance of the gate
(6) Electrical and mechanical maintenance support assumes ongoing support for gate and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative I - Spillway Modifications; Fixed Wheel Gate Installation

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$752,739**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$301,096	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$451,644	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$80,368**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
03	**SPILLWAY MODIFICATIONS**					**$567,315**
	Concrete Demolition, Spillway Concrete	252	CY	$500.00	$126,000	
	Concrete Demolition, Gate Guides	1	LS	$100,000.00	$100,000	
	Steel Access Platform w/ Grating	90	SF	$150.00	$13,500	
	Hoist Structure and Platfoms	1	LS	$150,000.00	$150,000	
	Stilling Well Installation	1	LS	$10,000.00	$10,000	
	Spillway Apron Suface Concrete	36	CY	$1,500.00	$54,000	
	Spillway Wall Surface Concrete	55	CY	$2,000.00	$110,815	
	Gate Guides & Sill Concrete	1	CY	$3,000.00	$3,000	
04	**MECHANICAL EQUIPMENT**					**$1,227,400**
	Gate Guides and Embeds	1	LS	$62,400.00	$62,400	
	Fixed Wheel Gate Fabrication; 16-ft x 20-ft	25,000	lb	$20.00	$500,000	
	Fixed Wheel Gate Installation	1	LS	$250,000.00	$250,000	
	Hoist and Gearbox Procurement	1	EA	$190,000.00	$190,000	
	Superstructure, Hoist and Gearbox Installation	1	LS	$200,000.00	$200,000	
	Gate Startup & Commissioning	1	LS	$25,000.00	$25,000	
05	**ELECTRICAL AND TRANSMISSION**					**$1,888,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Instrumentation, Flow Meters, & Gate Controls	1	LS	$81,000.00	$81,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$3,763,697**
	Project Subtotal					**$4,516,436**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$752,739
02	SITE CONSTRUCTION AND ACCESS ROADS		$80,368
03	SPILLWAY MODIFICATIONS		$567,315
04	MECHANICAL EQUIPMENT		$1,227,400
05	ELECTRICAL AND TRANSMISSION		$1,888,614
		Total Construction Cost	**$4,516,436**
	Overhead		
	GC Overhead and Profit	15.00%	$677,465
	Construction Bonds	1.25%	$64,924
		Total - Overhead	**$742,389**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$1,314,706
		Total - Contingency	**$1,314,706**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$6,573,531**
Total Construction Price Range (-50% to +100%)	**$3,286,766 to $13,147,063**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative I - Fixed Wheel Gate

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 21,605**
2	**Operation**							
3	Facility Technician	0.06	100			$ 66.64	$ 6,664	
4	Facility Operator	0.25	100			$ 64.91	$ 6,491	
5								
6	**Maintenance**							
7	Electrician	0.02	56			$ 81.42	$ 4,560	
8	Mechanic	0.02	56			$ 69.48	$ 3,891	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 1,305**
16	Gate Operation			450	kWh	$ 0.68	$ 305	
17	General Site Consumption			1.0	LS	1000	$ 1,000	
18								
19								
20								
21								
22	**Materials**							**$ 1,500**
23	Gate			1.0	LS	1500	$ 1,500	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 25,000**
30								
31	**Contingency**			30%	LS			**$ 7,500**
32								
33								
34	**Project Total**							**$ 32,500**

Assumptions:
(1) Flow released through Gate during one 72-hour period each year
(2) Facility operator is required to visit the site daily during release.
(3) The gate will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A 1 week outage was assumed for performing inspection and maintenance of the gate
(6) Electrical and mechanical maintenance support assumes ongoing support for gate and instrumentation system.
(7) Facility operator is a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative J - Gravity Flow FIsh Ladder

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$1,964,172**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$785,669	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$1,178,503	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$462,868**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
	Tree Clearing	2.0	ACRE	$15,000.00	$30,000	
	Road Construction - Abandoned Access Road	1,000	LF	$80.00	$80,000	
	Road Construction - New	600	LF	$100.00	$60,000	
	Temporary Construction Roads	2,500	LF	$85.00	$212,500	
03	**FISH LADDER CONSTRUCTION**					**$3,395,588**
	Dam Excavation	4,132	CY	$30.00	$123,956	
	Fishway Excavation	1,321	CY	$30.00	$39,639	
	Raised Earthfill Pad	5,662	CY	$15.00	$84,933	
	Dam Backfill	3,210	CY	$60.00	$192,579	
	24" HDPE Supply Pipe (Qty = 1)	400	LF	$200.00	$80,000	
	Retaining Wall; Reinforced Concrete	142	CY	$1,500.00	$212,333	
	Fishway Exit Structure; Reinforced Concrete	78	CY	$1,500.00	$116,333	
	Fishway Entrance Structure and Dam Conduit; Reinforced Concrete	1,148	CY	$2,000.00	$2,295,815	
	12-ft x 12-ft Dam isolation Gate	10,000	lb	$15.00	$150,000	
	Gate Seal Embedded Metals	1	SET	$20,000.00	$20,000	
	Isolation Gate Installation	1	LS	$80,000.00	$80,000	
04	**ELECTRICAL AND TRANSMISSION**					**$1,887,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	5 kVA Transformer, Pole Mount	1	LS	$7,500.00	$7,500	
	Main Panelboard	1	EA	$7,500.00	$7,500	
	Instrumentation, Flow Meters, Controls	1	LS	$75,000.00	$75,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
05	**POWERHOUSE UPGRADES**					**$1,533,557**
	Building Heaters - Electric	15,762	SF	$26.40	$416,117	
	Bulkhead Gate; 12-ft x 4-ft (Qty = 2)	96	SF	$1,350.00	$129,600	
	New Stoplog Structure Tailrace Conduit Exit, 12-ft x 14 ft (Qty = 4)	672	SF	$1,470.00	$987,840	
06	**DAM UPGRADES**					**$2,541,235**
	Riprap Removal	3,074	CY	$50.00	$153,704	
	Rockfill Bedding; Compacted Fill	3,074	CY	$110.00	$338,148	
	Concrete Facing, 8" Thick, Reinforced	1,025	CY	$2,000.00	$2,049,383	
	Project Subtotal (without Division 01)					**$9,820,862**
	Project Subtotal					**$11,785,034**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$1,964,172
02	SITE CONSTRUCTION AND ACCESS ROADS		$462,868
03	FISH LADDER CONSTRUCTION		$3,395,588
04	ELECTRICAL AND TRANSMISSION		$1,887,614
05	POWERHOUSE UPGRADES		$1,533,557
06	DAM UPGRADES		$2,541,235
		Total Construction Cost	**$11,785,034**
	Overhead		
	GC Overhead and Profit	15.00%	$1,386,570
	Construction Bonds	1.25%	$164,645
		Total - Overhead	**$1,551,215**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$3,334,062
		Total - Contingency	**$3,334,062**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$16,670,311**
	Total Construction Price Range (-50% to +100%)		**$8,335,156 to $33,340,622**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative J - Gravity Flow Fish Ladder

Date: 2/1/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 92,402**
2	**Operation**							
3	Facility Operator	0.33	973			$ 66.64	$ 64,863	
4								
5								
6	**Maintenance**							
7	Electrician	0.06	183			$ 81.42	$ 14,859	
8	Mechanic	0.06	183			$ 69.48	$ 12,680	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 293,637**
16	General Site Consumption			1.0	LS	500	$ 500	
17	SS Powerhouse Winter Load			432000	kWh	$ 0.68	$ 293,137	
18								
19								
20								
21								
22	**Materials**							**$ -**
23								
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 387,000**
30								
31	**Contingency**			30%	LS			**$ 116,100**
32								
33								
34	**Project Total**							**$ 503,100**

Assumptions:
(1) Fish ladder operates during 4 Months of spawning season
(2) Facility operator is required to visit the ladder daily to ensure the exit gates are operating correctly and remove debris from ladder exit.
(3) The ladder will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the fish ladder facility.
(6) Electrical and mechanical maintenance support assumes ongoing support for gate operators and instrumentation system.
(7) Facility operator is a not a fish biologist but rather a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative K - Variable Exit Fish Ladder

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$2,067,155**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$826,862	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$1,240,293	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$462,868**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
	Tree Clearing	2.0	ACRE	$15,000.00	$30,000	
	Road Construction - Abandoned Access Road	1,000	LF	$80.00	$80,000	
	Road Construction - New	600	LF	$100.00	$60,000	
	Temporary Construction Roads	2,500	LF	$85.00	$212,500	
03	**FISH LADDER CONSTRUCTION**					**$3,808,500**
	Dam Excavation	6,297	CY	$30.00	$188,916	
	Fishway Excavation	2,102	CY	$30.00	$63,053	
	Raised Earthfill Pad	13,720	CY	$40.00	$548,800	
	24" HDPE Supply Pipe (Qty = 1)	400	LF	$200.00	$80,000	
	Retaining Wall; Reinforced Concrete	102	CY	$1,500.00	$153,117	
	Fishway Exit Structure; Reinforced Concrete	54	CY	$2,000.00	$107,556	
	Fishway Entrance Structure and Dam Conduit; Reinforced Concrete	906	CY	$2,000.00	$1,812,259	
	30" Slide Gate; Stainless Steel w/ Electric Actuator Procurement	11	EA	$30,000.00	$330,000	
	Slide Gate Installation	11	LS	$11,000.00	$121,000	
	12-ft x 15-ft Dam isolation Gate	15,000	lb	$15.00	$225,000	
	Gate Hoist Assembly	1	LS	$40,000.00	$40,000	
	Gate Seal Embeds	1	set	$40,000.00	$40,000	
	Isolation Gate Installation	1	LS	$50,000.00	$50,000	
	Instrumentation House 10' x 10'	100	SF	$200.00	$20,000	
	Power and Communications Building 12' x 12'	144	SF	$200.00	$28,800	
04	**ELECTRICAL AND TRANSMISSION**					**$1,989,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Main Panelboard	1	EA	$30,000.00	$30,000	
	Instrumentation, Flow Meters, Controls	1	LS	$152,000.00	$152,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
05	**POWERHOUSE UPGRADES**					**$1,533,557**
	Building Heaters - Electric	15,762	SF	$26.40	$416,117	
	Bulkhead Gate; 12-ft x 4-ft (Qty = 2)	96	SF	$1,350.00	$129,600	
	New Stoplog Structure Tailrace Conduit Exit, 12-ft x 14 ft (Qty = 4)	672	SF	$1,470.00	$987,840	
06	**DAM UPGRADES**					**$2,541,235**
	Riprap Removal	3,074	CY	$50.00	$153,704	
	Rockfill Bedding; Compacted Fill	3,074	CY	$110.00	$338,148	
	Concrete Facing, 8" Thick, Reinforced	1,025	CY	$2,000.00	$2,049,383	
	Project Subtotal (without Division 01)					**$10,335,773**
	Project Subtotal					**$12,402,928**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$2,067,155
02	SITE CONSTRUCTION AND ACCESS ROADS		$462,868
03	FISH LADDER CONSTRUCTION		$3,808,500
04	ELECTRICAL AND TRANSMISSION		$1,989,614
05	POWERHOUSE UPGRADES		$1,533,557
06	DAM UPGRADES		$2,541,235
		Total Construction Cost	**$12,402,928**
	Overhead		
	GC Overhead and Profit	15.00%	$1,479,254
	Construction Bonds	1.25%	$173,527
		Total - Overhead	**$1,652,781**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$3,513,927
		Total - Contingency	**$3,513,927**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$17,569,637**
	Total Construction Price Range (-50% to +100%)		**$8,784,818 to $35,139,274**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative K - Fish Ladder w/ Variable Exits

Date: 2/1/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 130,957**
2	**Operation**							
3	Facility Operator	0.33	973			$ 66.64	$ 64,863	
4								
5								
6	**Maintenance**							
7	Electrician	0.15	438			$ 81.42	$ 35,662	
8	Mechanic	0.15	438			$ 69.48	$ 30,432	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 294,510**
16	2 Hp Gate Operators			1287	kWh	$ 0.68	$ 873	
17	General Site Consumption			1.0	LS	500	$ 500	
18	SS Powerhouse Winter Load			432000	kWh	$ 0.68	$ 293,137	
19								
20								
21								
22	**Materials**							**$ 1,200**
23	Gates				LS		$ 1,200	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 427,000**
30								
31	**Contingency**			30%	LS			**$ 128,100**
32								
33								
34	**Project Total**							**$ 555,100**

Assumptions:
(1) Fish ladder operates during 4 Months of spawning season
(2) Facility operator is required to visit the ladder daily to ensure the exit gates are operating correctly and remove debris from ladder exit.
(3) The ladder will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the fish ladder facility.
(6) Electrical and mechanical maintenance support assumes ongoing support for gate operators and instrumentation system.
(7) Facility operator is a not a fish biologist but rather a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Eklutna Feasibility Study
Alternative L - Pumped Supply and Slide Fish Ladder

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$1,800,409**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$720,164	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$1,080,246	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$462,868**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
	Tree Clearing	2.0	ACRE	$15,000.00	$30,000	
	Road Construction - Abandoned Access Road	1,000	LF	$80.00	$80,000	
	Road Construction - New	600	LF	$100.00	$60,000	
	Temporary Construction Roads	2,500	LF	$85.00	$212,500	
03	**FISH LADDER CONSTRUCTION**					**$2,499,956**
	Dam Excavation	4,132	CY	$30.00	$123,956	
	Fishway Excavation	1,321	CY	$30.00	$39,639	
	24" HDPE Supply Pipe (Qty = 1)	250	LF	$200.00	$50,000	
	20" HDPE Fish Chute (Qty = 1)	150	LF	$130.00	$19,500	
	Fishway Entrance Structure and Dam Conduit; Reinforced Concrete	1,148	CY	$1,500.00	$1,721,861	
	12-ft x 12-ft Dam isolation Gate	10,000	lb	$15.00	$150,000	
	Gate Seal Embeds	1	LS	$40,000.00	$40,000	
	Isolation Gate Installation	1	LS	$50,000.00	$50,000	
	Pump Barge w/ Walkway System	1	LS	$150,000.00	$150,000	
	Barge Anchoring System (allowance)	1	LS	$25,000.00	$25,000	
	Vertical Turbine Pump; 100 kW (135hp))	1	LS	$130,000.00	$130,000	
04	**ELECTRICAL AND TRANSMISSION**					**$1,964,432**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$45,000	
	150 kVA Transformer, Pole Mount	1	LS	$30,000.00	$30,000	
	Main Panelboard	1	EA	$10,000.00	$10,000	
	Instrumentation, Flow Meters, Controls	1	LS	$25,000.00	$25,000	
	Gate and Pump Controls	1	LS	$125,000.00	$125,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
05	**POWERHOUSE UPGRADES**					**$1,533,557**
	Building Heaters - Electric	15,762	SF	$26.40	$416,117	
	Bulkhead Gate; 12-ft x 4-ft (Qty = 2)	96	SF	$1,350.00	$129,600	
	New Stoplog Structure Tailrace Conduit Exit, 12-ft x 14 ft (Qty = 4)	672	SF	$1,470.00	$987,840	
06	**DAM UPGRADES**					**$2,541,235**
	Riprap Removal	3,074	CY	$50.00	$153,704	
	Rockfill Bedding; Compacted Fill	3,074	CY	$110.00	$338,148	
	Concrete Facing, 8" Thick, Reinforced	1,025	CY	$2,000.00	$2,049,383	
	Project Subtotal (without Division 01)					**$9,002,047**
	Project Subtotal					**$10,802,457**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$1,800,409
02	SITE CONSTRUCTION AND ACCESS ROADS		$462,868
03	FISH LADDER CONSTRUCTION		$2,499,956
04	ELECTRICAL AND TRANSMISSION		$1,964,432
05	POWERHOUSE UPGRADES		$1,533,557
06	DAM UPGRADES		$2,541,235
		Total Construction Cost	**$10,802,457**
	Overhead		
	GC Overhead and Profit	15.00%	$1,239,183
	Construction Bonds	1.25%	$150,521
		Total - Overhead	**$1,389,704**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$3,048,040
		Total - Contingency	**$3,048,040**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$15,240,201**
Total Construction Price Range (-50% to +100%)	**$7,620,100 to $30,480,402**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative L - Fish Ladder with Pump Station and Slide

Date: 2/1/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 130,957**
2	**Operation**							
3	Facility Operator	0.33	973			$ 66.64	$ 64,863	
4								
5								
6	**Maintenance**							
7	Electrician	0.15	438			$ 81.42	$ 35,662	
8	Mechanic	0.15	438			$ 69.48	$ 30,432	
9								
10								
11	**Transportation**							**$ -**
12					Miles	$ 0.200	$ -	
13					LS	$ 500	$ -	
14								
15	**Power**							**$ 389,043**
16	Water Supply Pump			140601.2	kWh	$ 0.68	$ 95,406	
17	General Site Consumption			1.0	LS	500	$ 500	
18	SS Powerhouse Winter Load			432000	kWh	$ 0.68	$ 293,137	
19								
20								
21								
22	**Materials**							**$ 1,200**
23	Pumps				LS		$ 1,200	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 522,000**
30								
31	**Contingency**			30%	LS			**$ 156,600**
32								
33								
34	**Project Total**							**$ 678,600**

Assumptions:
(1) Fish ladder operates during 4 Months of spawning season
(2) Facility operator is required to visit the ladder daily to ensure the exit false weir and pump station are operating correctly.
(3) The ladder will be fitted with an instrumentation system capable of maintaining constant flow to the fish ladder exit throughout the lake level fluctuation.
(4) Power consumption is estimated based on the pump station operation and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the fish ladder facility.
(6) Electrical and mechanical maintenance support assumes ongoing support for pump station and instrumentation system.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$972,609**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$389,043	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$583,565	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$40,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
03	**CIVIL WORKS - GRADING**					**$723,093**
	Excavation to Existing Buried Pipe	3,889	CY	$50.00	$194,444	
	Vault Shoring	4,750	SF	$100.00	$475,000	
	Excavate Bypass Channel	193	CY	$40.00	$7,704	
	Disposal Area Fill (Excavation Spoils)	1,944	CY	$10.00	$19,444	
	Security Fencing	150	LF	$110.00	$16,500	
	Bypass Portal Pad - Fill to El. 807.3	100	CY	$100.00	$10,000	
04	**BYPASS VALVE SHAFT AND RACEWAY**					**$826,335**
	Valve Vault Structural Concrete	179	CY	$2,000.00	$358,519	
	Equipment Hatch	1	LS	$15,000.00	$15,000	
	Stairway and Ladders	1	LS	$20,000.00	$20,000	
	Grating Platform	760	SF	$150.00	$114,000	
	Building Lighting	760	SF	$15.00	$11,400	
	Building HVAC	1	LS	$15,000.00	$15,000	
	Raceway Structural Concrete	45	CY	$1,500.00	$67,417	
	Fish Hopper	6000	LBS	$15.00	$90,000	
	Monorail Structure, Hoist, and Lift Beam	1	LS	$100,000.00	$100,000	
	Tank Fill Structure	1	LS	$35,000.00	$35,000	
05	**PIPING AND VALVES**					**$703,750**
	Install Flanged Tapping Saddle on Existing 54" Pipe (Wrapper)	1	LS	$10,000.00	$10,000	
	Mechanical Hot Tap Existing Pipe	1	LS	$75,000.00	$75,000	
	Supply and Install 30" Cl150 Gate Valve, Electric Motor Operated	1	LS	$175,000.00	$175,000	
	Supply and Install 30" Cl150 Globe Valve, Electric Motor Operated	1	LS	$220,000.00	$220,000	
	Supply and Install 24" Cl150 Globe Valve, Electric Motor Operated	1	LS	$140,000.00	$140,000	
	Install 30" Steel Piping	1	LS	$15,000.00	$15,000	
	Install 24" Steel Piping	125	LF	$150.00	$18,750	
	Upgrades to Existing AWWU Portal Shaft	1	LS	$50,000.00	$50,000	
06	**FISH TRANSPORT**					**$829,000**
	100 Ft3 Fish Transport Tanks	4	EA	$52,000.00	$208,000	
	5 Ton Transport Jib Crane	2	EA	$30,000.00	$60,000	
	Transport Hoist Structure	18,000	LB	$7.00	$126,000	
	5 Ton Transport Hoist and Trolley	1.0	EA	$20,000.00	$20,000	
	Tank Guides	25,000	LB	$7.00	$175,000	
	Transport Trucks	3	EA	$80,000.00	$240,000	
07	**ELECTRICAL AND TRANSMISSION**					**$1,740,682**
	Buried Power/Controls Conduit	100	ft	$56.82	$5,682	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Main Paenlboard	1	EA	$10,000.00	$10,000	
	Instrumentation, Pressure Transducers, Controls	1	LS	$85,000.00	$85,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$4,863,044**
	Project Subtotal					**$5,835,652**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost			Amount
01	DIVISION 01 INDIRECTS			$972,609
02	SITE CONSTRUCTION AND ACCESS ROADS			$40,184
03	CIVIL WORKS - GRADING			$723,093
04	BYPASS VALVE SHAFT AND RACEWAY			$826,335
05	PIPING AND VALVES			$703,750
06	FISH TRANSPORT			$829,000
07	ELECTRICAL AND TRANSMISSION			$1,740,682
			Total Construction Cost	**$5,835,652**
	Overhead			
	GC Overhead and Profit	15.00%		$750,998
	Construction Bonds	1.25%		$82,333
			Total - Overhead	**$833,331**
	Direct Cost Contingency			
	*Overall Project Contingency:	25.00%		$1,667,246
			Total - Contingency	**$1,667,246**
	Taxes			
	AK Sales Tax	0.00%		$0
			Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect			**$8,336,229**
	Total Construction Price Range (-50% to +100%)			**$4,168,115 to $16,672,459**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative M - Trap and Haul

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 144,827**
2	**Operation**							
3	(1) Trap Operator/Truck Driver	0.33	964			$ 66.64	$ 64,214	
4	(1) Trap Technician	0.33	964			$ 64.91	$ 62,547	
5								
6	**Maintenance**							
7	Electrician	0.04	120			$ 81.42	$ 9,748	
8	Mechanic	0.04	120			$ 69.48	$ 8,318	
9								
10								
11	**Transportation**							**$ 2,281**
12	Truck Cost per mile			480	Miles	$ 0.585	$ 281	
13	Truck Maintenance			1	LS	$ 2,000	$ 2,000	
14								
15	**Power**							**$ 1,024**
16	1 Hp Fish Crowder			257.4	kWh	$ 0.68	$ 175	
17	2 Hp Hopper Hoist			514.7	kWh	$ 0.68	$ 349	
18	General Site Consumption			1.0	LS	$ 500	$ 500	
19								
20								
21								
22	**Materials**							**$ 4,800**
23	Pre-sort Holding				LS		$ 1,200	
24	Gates and Valves				LS		$ 600	
25	Fish Crowder				LS		$ 600	
26	Intake Screen Cleaning System				LS		$ 1,200	
27	Tank Life Support				LS		$ 1,200	
28								
29	**Project Subtotal**							**$ 153,000**
30								
31	**Contingency**			30%	LS			**$ 45,900**
32								
33								
34	**Project Total**							**$ 198,900**

Assumptions:
(1) Fish are crowded, loaded, and transported an average of three times per week during spawning season (July - October).
(2) Transport truck consists of a pickup fitted with a fiberglass tank with life support equipment.
(3) Release point is at or near Eklutna Lake boat ramp
(4) Purchase cost of transport truck cost is not included in the estimate.
(5) A one week outage was assumed for performing inspection and maintenance of the trapping facility.
(6) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Hourly
Trap Operator/Truck Driver	A2106	$ 66.64
Trap Technician - Biological Technician	S1201	$ 64.91
Electrician	A0707	$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601	$ 69.48

Eklutna Feasibility Study
Alternative N - Floating Surface Collector

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$6,660,586**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$2,664,234	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$3,996,352	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$160,736**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	1.0	ACRE	$160,736.40	$160,736	
03	**DEBRIS BOOM**					**$610,000**
	Shore Anchors	2	EA	$50,000.00	$100,000	
	Lake Anchor	1	EA	$60,000.00	$60,000	
	Continuous HDPE Boom w/ skirt and Angled Freeboard	1,000	FT	$400.00	$400,000	
	Boat Gate	1	EA	$50,000.00	$50,000	
04	**EXCLUSION/GUIDANCE NETS**					**$3,835,712**
	Shore Anchors	2	EA	$50,000.00	$100,000	
	Lake Anchor	2	EA	$60,000.00	$120,000	
	Continuous Bottom Anchor	1000	FT	$55.00	$55,000	
	Guidance Net w/ 1/4" Netting	116,454	SF	$28.00	$3,260,712	
	Floatation Boom	1000	FT	$250.00	$250,000	
	Boat Gate	1	EA	$50,000.00	$50,000	
05	**FLOATING SURFACE COLLECTOR/BARGE**					**$24,586,800**
	Structure	1	LS	$10,000,000.00	$10,000,000	
	Ballasting	1	LS	$1,000,000.00	$1,000,000	
	Stairs	20	EA	$240.00	$4,800	
	Landings	1	EA	$200.00	$200	
	Drilled Shaft Columns Foundations	80	FT	$4,000.00	$320,000	
	Columns	20,000	LB	$9.00	$180,000	
	Stringers	2,200	LB	$8.00	$17,600	
	Handrail	300	FT	$125.00	$37,500	
	Beams and Bracing	36,300	LB	$9.00	$326,700	
	Floating Access Platform	450	FT	$1,200.00	$540,000	
	Anchors	3	EA	$300,000.00	$900,000	
	Chain and Rope	1,300	FT	$100.00	$130,000	
	Screen Supports	3,000	SF	$210.00	$630,000	
	Screen Panels and Baffles	3,000	SF	$2,500.00	$7,500,000	
	Cleaner System	2	EA	$750,000.00	$1,500,000	
	Dewatering Pumps	1	LS	$1,500,000.00	$1,500,000	
06	**FISH TRANSPORT**					**$904,000**
	100 Ft3 Fish Transport Tanks	4	EA	$52,000.00	$208,000	
	5 Ton Transport Jib Crane	2	EA	$30,000.00	$60,000	
	Transport Hoist Structure	18,000	LB	$7.00	$126,000	
	5 Ton Transport Hoist and Trolley	1.0	EA	$20,000.00	$20,000	
	Tank Guides	25,000	LB	$7.00	$175,000	
	Transport Barge	1.0	EA	$75,000.00	$75,000	
	Transport Trucks	3.0	EA	$80,000.00	$240,000	
07	**ELECTRICAL AND TRANSMISSION**					**$3,205,682**
	Buried Power/Controls Conduit	100	ft	$56.82	$5,682	
	Barge Electrical	1	LS	$1,000,000.00	$1,000,000	
	Testing and Startup	1	LS	$500,000.00	$500,000	
	10 kVA Transformer, Pole Mount	1	LS	$10,000.00	$10,000	
	Main Panelboard	1	EA	$10,000.00	$10,000	
	Instrumentation, Pressure Transducers, Controls	1	LS	$50,000.00	$50,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	Project Subtotal (without Division 01)					**$33,302,930**
	Project Subtotal					**$39,963,516**

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Eklutna Feasibility Study
Alternative N - Floating Surface Collector

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$6,660,586
02	SITE CONSTRUCTION AND ACCESS ROADS		$160,736
03	DEBRIS BOOM		$610,000
04	EXCLUSION/GUIDANCE NETS		$3,835,712
05	FLOATING SURFACE COLLECTOR/BARGE		$24,586,800
06	FISH TRANSPORT		$904,000
07	ELECTRICAL AND TRANSMISSION		$3,205,682
		Total Construction Cost	**$39,963,516**
	Overhead		
	GC Overhead and Profit	15.00%	$5,513,675
	Construction Bonds	1.25%	$568,465
		Total - Overhead	**$6,082,140**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$11,511,414
		Total - Contingency	**$11,511,414**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$57,557,070**
	Total Construction Price Range (-50% to +100%)		**$28,778,535 to $115,114,141**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative N - Floating Surface Collector

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 269,922**
2	**Operation**							
3	(1) Trap Operator/Truck Driver	0.33	964			$ 66.64	$ 64,214	
4	(1) Trap Technician	0.33	964			$ 64.91	$ 62,547	
5	(1) Field Biologist	0.33	964			$ 64.91	$ 62,547	
6	(1) Field Biologist	0.33	964			$ 64.91	$ 62,547	
7								
8	**Maintenance**							
9	Electrician	0.04	120			$ 81.42	$ 9,748	
10	Mechanic	0.04	120			$ 69.48	$ 8,318	
11								
12								
13	**Transportation**							**$ 3,790**
14	Truck Cost per mile			3060	Miles	$ 0.585	$ 1,790	
13	Truck Maintenance			1	LS	$ 2,000	$ 2,000	
14								
15	**Power**							**$ 393,412**
16	1 Hp Fish Crowder			257	kWh	0.68	$ 175	
17	2 Hp Hopper Hoist			515	kWh	0.68	$ 349	
18	Pumps			577900	LS	0.68	$ 392,139	
19	General Site Consumption			1	LS	750	$ 750	
20								
21								
22	**Materials**							**$ 94,144**
23	Pre-sort Holding				LS		$ 1,200	
24	Gates and Valves				LS		$ 600	
25	Fish Crowder				LS		$ 600	
26	Intake Screen Cleaning System				LS		$ 1,200	
27	Tank Life Support				LS		$ 1,200	
28	Net Replacement Cost			$ 3,260,712	LS	0.0274	$ 89,344	
29								
30	**Project Subtotal**							**$ 762,000**
31								
32	**Contingency**			30%	LS			**$ 228,600**
33								
34								
35	**Project Total**							**$ 990,600**

Assumptions:
(1) Fish are crowded, loaded, and transported an average of three times per week during outmigration season (April through June).
(2) Transport truck consists of a pickup fitted with a fiberglass tank with life support equipment.
(3) Release point is at or near Eklutna Tailrace
(4) Purchase cost of transport truck cost is not included in the estimate.
(5) A one week outage was assumed for performing inspection and maintenance of the Floating Surface Collector
(6) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022
(7) Fish barrier Netting has a 25-Year design life. Future replacement cost amortized over 25 years. 5% Discount Rate.

	Class	Hourly
Trap Operator/Truck Driver	A2106	$ 66.64
Trap Technician - Biological Technician	S1201	$ 64.91
Electrician	A0707	$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601	$ 69.48

Eklutna Feasibility Study
Alternative O - Fish Exclusion Barrier

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$357,909**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$143,164	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$214,745	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$160,736**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	1.0	ACRE	$160,736.40	$160,736	
03	**EXCLUSION/GUIDANCE NETS**					**$1,628,808**
	Shore Anchors	2	EA	$50,000.00	$100,000	
	Lake Anchor	2	EA	$60,000.00	$120,000	
	Continuous Bottom Anchor	1000	FT	$55.00	$55,000	
	Guidance Net w/ 1/4" Netting	37,636	SF	$28.00	$1,053,808	
	Floatation Boom	1000	FT	$250.00	$250,000	
	Boat Gate	1	EA	$50,000.00	$50,000	
	Project Subtotal (without Division 01)					**$1,789,544**
	Project Subtotal					**$2,147,453**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$357,909
02	SITE CONSTRUCTION AND ACCESS ROADS		$160,736
03	EXCLUSION/GUIDANCE NETS		$1,628,808
		Total Construction Cost	**$2,147,453**
	Overhead		
	GC Overhead and Profit	15.00%	$322,118
	Construction Bonds	1.25%	$30,870
		Total - Overhead	**$352,988**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$625,110
		Total - Contingency	**$625,110**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$3,125,551**
	Total Construction Price Range (-50% to +100%)		**$1,562,776 to $6,251,102**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative O - Fish Exclusion Barrier

Date: 12/19/2022
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ -**
2	**Operation**							
3								
4								
5								
6								
7								
8	**Maintenance**							
9								
10								
11								
12								
13	**Transportation**							**$ -**
14								
13								
14								
15	**Power**							**$ -**
16								
17								
18								
19								
20								
21								
22	**Materials**							**$ 28,874**
23	Net Replacement Cost			$ 1,053,808	LS	0.0274	$ 28,874	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 29,000**
30								
31	**Contingency**			30%	LS			**$ 8,700**
32								
33								
34	**Project Total**							**$ 37,700**

Assumptions:
(1) Fish barrier Netting has a 25-Year design life. Future replacement cost amortized over 25 years. 5% Discount Rate.

	Class	Hourly
Trap Operator/Truck Driver	A2106	$ 66.64
Trap Technician - Biological Technician	S1201	$ 64.91
Electrician	A0707	$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601	$ 69.48

Eklutna Feasibility Study
Alternative P - Replacement Dam

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$15,574,984**
	Mobilization and Establishment of Site Infrastructure	10	%	0.1	$6,229,994	
	Contractor General Requirements (Percentage of Direct Cost)	15	%	0.15	$9,344,990	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$1,013,236**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	1.0	ACRE	$160,736.40	$160,736	
	Tree Clearing	25.0	ACRE	$15,000.00	$375,000	
	Road Construction - Abandoned Access Road	1,000	LF	$80.00	$80,000	
	Road Construction - New	600	LF	$100.00	$60,000	
	Temporary Construction Roads	2,500	LF	$85.00	$212,500	
	Erosion and Sediment Control; Turbidity Contro	1	LS	$125,000.00	$125,000	
03	**CHANNEL EXCAVATION**					**$39,463,585**
	Embankment Coffer Dam Construction; Local Excavated Material	50,000	CY	$30.00	$1,500,000	
	Dewatering; Water Control Pumping	12	MO	$20,000.00	$240,000	
	Dam Removal; Excavation	85,000	CY	$30.00	$2,550,000	
	Dam Removal; Concrete	3,002	CY	$500.00	$1,501,085	
	Channel Excavation, Glacial Till, In Situ Volume	550,000	CY	$20.00	$11,000,000	
	Material Transport, Haul 30 miles, Bulk Volume	632,500	CY	$25.00	$15,812,500	
	Site Disposal, Compaction	632,500	CY	$8.00	$5,060,000	
	Erosion Protection, Bank Stabilization	260,000	SF	$5.00	$1,300,000	
	Site Restoration	1	LS	$500,000.00	$500,000	
04	**DAM CONSTRUCTION WITH FISH LADDER**					**$19,330,500**
	Foundation Treatment	110,000	SF	$3.00	$330,000	
	Earthfill Impervious Core - Borrow Source Excavation	16,100	CY	$25.00	$402,500	
	Earthfill Dam - Fill (Using Channel Excavation Material)	78,200	CY	$50.00	$3,910,000	
	Raised Earthfill Pad	13,720	CY	$25.00	$343,000	
	48" Steel Pipe; Low Level Outlet	400	LF	$600.00	$240,000	
	60" Steel Pipe; Juvenile Bypass Release	400	LF	$800.00	$320,000	
	Fishway Exit Retaining Wall; Reinforced Concrete	500	CY	$2,000.00	$1,000,000	
	Spillway and Approach Slab; Reinforced Concrete	2,000	CY	$1,500.00	$3,000,000	
	Training Walls, Reinforced Concrete	1,500	CY	$1,500.00	$2,250,000	
	Fishway Exit Bays; Reinforced Concrete	800	CY	$2,000.00	$1,600,000	
	Rock Ramp Walls/Slab; Reinforced Concrete	920	CY	$1,750.00	$1,610,000	
	3 to 6-ft Diameter Boulders	120	TON	$250.00	$30,000	
	1- to 2-ft Diameter Stone	325	TON	$200.00	$65,000	
	1- to 6-inch Diameter Cobble	100	TON	$150.00	$15,000	
	Picket Weir	1	LS	$130,000.00	$130,000	
	60" Slide Gate; Stainless Steel w/ Electric Actuator Procurement	1	EA	$75,000.00	$75,000	
	30" Slide Gate; Stainless Steel w/ Electric Actuator Procurement	21	EA	$20,000.00	$420,000	
	Slide Gate Installation	21	LS	$10,000.00	$210,000	
	Fishway Isolation Gate Fabrication; 10-ft x 16-ft	15,000	lb	$15.00	$225,000	
	Fixed Wheel Gate Fabrication; 10-ft x 16-ft; Qty = 2	30,000	lb	$15.00	$450,000	
	Gate Guides and Embeds	3	EA	$20,000.00	$60,000	
	Fixed Wheel Gate Installation	3	EA	$50,000.00	$150,000	
	Hoist and Gearbox Procurement	3	EA	$100,000.00	$300,000	
	Superstructure, Hoist and Gearbox Installation	3	EA	$50,000.00	$150,000	
	Gate Startup & Commissioning	1	LS	$25,000.00	$25,000	
	Dam Outlet Structure 35' x 35'	1,225	SF	$400.00	$490,000	
	Energy Dissipation Valve, 48-inch	1	LS	$850,000.00	$850,000	
	Power and Communications Building 20' x 20'	400	SF	$400.00	$160,000	
	Electrical Allowance	1	LS	$520,000.00	$520,000	
05	**ELECTRICAL AND TRANSMISSION**					**$2,492,614**
	Overhead Transmission Line 7.2kV - 3P.	0.7	mi	$150,000.00	$99,432	
	Buried Power/Controls Conduit	0.2	mi	$300,000.00	$68,182	
	75 kVA Transformer, Pole Mount	1	LS	$80,000.00	$80,000	
	Main Panelboard	1	EA	$65,000.00	$65,000	
	Instrumentation, Flow Meters, Controls	1	LS	$300,000.00	$300,000	
	3-Phase Upgrade Transmission Line - Overhead	8.2	mi	$150,000.00	$1,230,000	
	3-Phase Upgrade Transmission Line - Underground	1.0	mi	$300,000.00	$300,000	
	Voltage Regulator	1	LS	$100,000.00	$100,000	
	SCADA Gate Controls	1	LS	$250,000.00	$250,000	
	Project Subtotal (without Division 01)					**$62,299,935**
	Project Subtotal					**$77,874,919**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$15,574,984
02	SITE CONSTRUCTION AND ACCESS ROADS		$1,013,236
03	CHANNEL EXCAVATION		$39,463,585
04	DAM CONSTRUCTION WITH FISH LADDER		$19,330,500
05	ELECTRICAL AND TRANSMISSION		$2,492,614
		Total Construction Cost	**$77,874,919**
	Overhead		
	GC Overhead and Profit	15.00%	$11,681,238
	Construction Bonds	1.25%	$1,119,452
		Total - Overhead	**$12,800,690**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$22,668,902
		Total - Contingency	**$22,668,902**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect	**$113,344,511**
Total Construction Price Range (-50% to +100%)	**$56,672,255 to $226,689,021**

Notes:
All costs based on 2023 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

McMillen

Eklutna Fish & Wildlife Program
Engineering Feasibility Study
Annual Operation and Maintenance Cost Summary
Alternative P - Replacement Dam

Date: 5/13/2023
By: S. Ellenson
Checked By: J. Boag

Line Item	Item	Full Time Equivalent	Total Hours	Quantity	Unit	Unit Cost (2022)	Cost	Total Cost
1	**Personnel**							**$ 219,083**
2	**Operation**							
3	Facility Operator	0.33	973			$ 66.64	$ 64,863	
4								
5								
6	**Maintenance**							
7	Electrician	0.35	1022			$ 81.42	$ 83,211	
8	Mechanic	0.35	1022			$ 69.48	$ 71,009	
9								
10								
11	**Transportation**							**$ -**
12								
13								
14								
15	**Power**							**$ 6,746**
16	2 Hp Gate Operators			2574	kWh	$ 0.68	$ 1,746	
17	General Site Consumption			1.0	LS	5000	$ 5,000	
18								
19								
20								
21								
22	**Materials**							**$ 3,600**
23	Gates				LS		$ 3,600	
24								
25								
26								
27								
28								
29	**Project Subtotal**							**$ 230,000**
30								
31	**Contingency**			30%	LS			**$ 69,000**
32								
33								
34	**Project Total**							**$ 299,000**

Assumptions:
(1) Fish ladder operates during 4 Months of spawning season
(2) Facility operator is required to visit the ladder daily to ensure the exit gates are operating correctly and remove debris from ladder exit.
(3) The ladder will be fitted with an instrumentation system capable of automated gate position changes to accommodate lake level fluctuations.
(4) Power consumption is estimated based on daily gate position changes and general site power consumption.
(5) A one week outage was assumed for performing inspection and maintenance of the fish ladder facility.
(6) Electrical and mechanical maintenance support assumes ongoing support for gate operators and instrumentation system.
(7) Facility operator is a not a fish biologist but rather a trained local operator with general mechanical skills.
(8) Labor Wages Per State of Alaska Minimum Rates of Pay; April 2022

	Class	Monthly	Hourly
Trap Operator/Truck Driver	A2106		$ 66.64
Trap Technician - Biological Technician	S1201		$ 64.91
Electrician	A0707		$ 81.42
Mechanic - Maint. & Ops. Supervisor	A1601		$ 69.48

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$247,097**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$98,839	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$148,258	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$40,184**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.3	ACRE	$160,736.40	$40,184	
03	**REACH 1 - LAKESIDE TRAIL**					**$67,050**
	E1a - Construct split rail fence	30	LF	$45.00	$1,350	
	E1a - Rebuild Trail	40	LF	$25.00	$1,000	
	E1b - Construct split rail fence	30	LF	$45.00	$1,350	
	E1b - Rebuild Trail	40	LF	$25.00	$1,000	
	E2 - Clean drainage ditch	70	LF	$10.00	$700	
	E2 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E2 - Drive Log Piles	20	EA	$1,500.00	$30,000	
	E3 - Clean drainage ditch	100	LF	$10.00	$1,000	
	E3 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E3 - Place Logs	12	EA	$700.00	$8,400	
	E4 - Clean drainage ditch	600	LF	$10.00	$6,000	
	E4 - Install 18" CPP Cross Drain	72	LF	$75.00	$5,400	
	E5 - Rebuild Trail	170	LF	$25.00	$4,250	
	E5 - Excavate into Hillside	300	CY	$10.00	$3,000	
04	**REACH 2 - LAKESIDE TRAIL**					**$149,200**
	E6 - Drive Log Piles	30	EA	$1,500.00	$45,000	
	E6 - Place Logs	20	EA	$700.00	$14,000	
	E7 - Rebuild Trail	200	LF	$25.00	$5,000	
	E7 - Excavate into Hillside	350	CY	$10.00	$3,500	
	E7a - Rebuild Trail	500	LF	$25.00	$12,500	
	E7a - Excavate into Hillside	1,500	CY	$10.00	$15,000	
	E7b - Rebuild Trail	100	LF	$25.00	$2,500	
	E7b - Excavate into Hillside	150	CY	$10.00	$1,500	
	E8 - Construct split rail fence	50	LF	$45.00	$2,250	
	E8 - Rebuild Trail	50	LF	$25.00	$1,250	
	E8 - Excavate into Hillside	150	CY	$10.00	$1,500	
	E8 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E9 - Construct split rail fence	500	LF	$45.00	$22,500	
	E9 - Rebuild Trail	500	LF	$25.00	$12,500	
	E9 - Excavate into Hillside	750	CY	$10.00	$7,500	
	E9 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
05	**REACH 3 - LAKESIDE TRAIL**					**$458,600**
	E9a - Construct split rail fence	500	LF	$45.00	$22,500	
	E9a - Rebuild Trail	500	LF	$25.00	$12,500	
	E9a - Excavate into Hillside	750	CY	$35.00	$26,250	
	E9a - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E9b - Construct split rail fence	500	LF	$45.00	$22,500	
	E9b - Rebuild Trail	500	LF	$25.00	$12,500	
	E9b - Excavate into Hillside	750	CY	$35.00	$26,250	
	E9b - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E9c - Construct split rail fence	500	LF	$45.00	$22,500	
	E9c - Rebuild Trail	300	LF	$25.00	$7,500	
	E9c - Excavate into Hillside	450	CY	$35.00	$15,750	
	E9c - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E10 - Rebuild Trail	150	LF	$25.00	$3,750	
	E10 - Excavate into Hillside	250	CY	$35.00	$8,750	
	E11- Rebuild Trail	150	LF	$25.00	$3,750	
	E11 - Excavate into Hillside	450	CY	$35.00	$15,750	
	E12- Rebuild Trail	300	LF	$25.00	$7,500	
	E12 - Excavate into Hillside	450	CY	$35.00	$15,750	
	E13- Rebuild Trail	100	LF	$25.00	$2,500	
	E13 - Excavate into Hillside	150	CY	$35.00	$5,250	
	E14 - Rebuild Trail	300	LF	$25.00	$7,500	
	E14 - Excavate into Hillside	450	CY	$35.00	$15,750	
	E14 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E15 - Rebuild Trail	1,000	LF	$25.00	$25,000	
	E15 - Excavate into Hillside	1,500	CY	$35.00	$52,500	
	E15 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E16 - Clean drainage ditch	60	LF	$10.00	$600	
	E16a - Clean drainage ditch	25	LF	$10.00	$250	
	E17a - Clean drainage ditch	1,000	LF	$10.00	$10,000	
	E17a - Install 18" CPP Cross Drain	96	LF	$75.00	$7,200	
	E17b - Drive Log Piles	30	EA	$1,500.00	$45,000	
	E17b - Place Logs	20	EA	$700.00	$14,000	
	E17c - Rebuild Trail	500	LF	$25.00	$12,500	
	E17c - Excavate into Hillside	750	CY	$35.00	$26,250	
	E17c - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
06	**REACH 4 - LAKESIDE TRAIL**					**$194,500**
	E17d - Rebuild Trail	300	LF	$25.00	$7,500	
	E17d - Excavate into Hillside	450	CY	$35.00	$15,750	

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
	E17e - Rebuild Trail	200	LF	$25.00	$5,000	
	E17e - Excavate into Hillside	300	CY	$35.00	$10,500	
	E18 - Rebuild Trail	150	LF	$25.00	$3,750	
	E18 - Excavate into Hillside	450	CY	$35.00	$15,750	
	E18 - Install 18" CPP Cross Drain	36	LF	$75.00	$2,700	
	E19a - Rebuild Trail	400	LF	$25.00	$10,000	
	E19a - Excavate into Hillside	600	CY	$35.00	$21,000	
	E19b - Rebuild Trail	400	LF	$25.00	$10,000	
	E19b - Excavate into Hillside	600	CY	$35.00	$21,000	
	E19c - Rebuild Trail	400	LF	$25.00	$10,000	
	E19c - Excavate into Hillside	600	CY	$35.00	$21,000	
	E20 - Rebuild Trail	400	LF	$25.00	$10,000	
	E20 - Excavate into Hillside	600	CY	$35.00	$21,000	
	E20 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E20a - Rebuild Trail	100	LF	$25.00	$2,500	
	E20a - Excavate into Hillside	150	CY	$35.00	$5,250	
07	**REACH 5 - LAKESIDE TRAIL**					**$217,900**
	E21 - Clean drainage ditch	200	LF	$10.00	$2,000	
	E21 - Add Riprap/Rock Armor	10	CY	$200.00	$2,000	
	E22 - Rebuild Trail	1,300	LF	$25.00	$32,500	
	E22 - Excavate into Hillside	2,000	CY	$35.00	$70,000	
	E22 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E23 - Clean drainage ditch	100	LF	$10.00	$1,000	
	E23 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E24 - Clean drainage ditch	150	LF	$10.00	$1,500	
	E24 - Rebuild Trail	150	LF	$25.00	$3,750	
	E24 - Excavate into Hillside	450	CY	$35.00	$15,750	
	E25a - Clean drainage ditch	300	LF	$10.00	$3,000	
	E25a - Rebuild Trail	300	LF	$25.00	$7,500	
	E25a - Excavate into Hillside	450	CY	$35.00	$15,750	
	E25b - Clean drainage ditch	150	LF	$10.00	$1,500	
	E25b - Rebuild Trail	150	LF	$25.00	$3,750	
	E25b - Excavate into Hillside	450	CY	$35.00	$15,750	
	E26 - Clean drainage ditch	200	LF	$10.00	$2,000	
	E26 - Rebuild Trail	200	LF	$25.00	$5,000	
	E26 - Excavate into Hillside	650	CY	$35.00	$22,750	
	E26 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E26a - Clean drainage ditch	50	LF	$10.00	$500	
	E26a - Rebuild Trail	50	LF	$25.00	$1,250	
	E26a - Excavate into Hillside	150	CY	$35.00	$5,250	
	E26a - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
07	**REACH 6 - LAKESIDE TRAIL**					**$82,450**
	E26b - Clean drainage ditch	100	LF	$10.00	$1,000	
	E26b - Rebuild Trail	100	LF	$25.00	$2,500	
	E26b - Excavate into Hillside	150	CY	$35.00	$5,250	
	E26b - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E26c - Clean drainage ditch	100	LF	$10.00	$1,000	
	E26c - Rebuild Trail	100	LF	$25.00	$2,500	
	E26c - Excavate into Hillside	150	CY	$35.00	$5,250	
	E26c - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E27 - Rebuild Trail	500	LF	$25.00	$12,500	
	E27 - Excavate into Hillside	750	CY	$35.00	$26,250	
	E27 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E28 - Clean drainage ditch	400	LF	$10.00	$4,000	
	E28 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E29 - Clean drainage ditch	400	LF	$10.00	$4,000	
	E29 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E30 - Clean drainage ditch	400	LF	$10.00	$4,000	
	E30 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E31 - Clean drainage ditch	40	LF	$10.00	$400	
	E32 - Clean drainage ditch	100	LF	$10.00	$1,000	
	E32 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E33 - Clean drainage ditch	100	LF	$10.00	$1,000	
	E33 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E34 - Clean drainage ditch	100	LF	$10.00	$1,000	
07	**REACH 7 - LAKESIDE TRAIL**					**$22,600**
	E35 - Clean drainage ditch	400	LF	$10.00	$4,000	
	E35 - Install 18" CPP Cross Drain	24	LF	$75.00	$1,800	
	E36 - Clean drainage ditch	150	LF	$10.00	$1,500	
	E36 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E37 - Clean drainage ditch	300	LF	$10.00	$3,000	
	E37 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	
	E38 - Clean drainage ditch	400	LF	$10.00	$4,000	
	E38 - Install 18" CPP Cross Drain	48	LF	$75.00	$3,600	
	E39 - Clean drainage ditch	200	LF	$10.00	$2,000	
	E39 - Install 18" CPP Cross Drain	12	LF	$75.00	$900	

Eklutna Feasibility Study
Alternative Q - Lakeside Trail Improvements

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
08	**REACH 8 - LAKESIDE TRAIL**					**$3,000**
	E40 - Clean drainage ditch	200	LF	$10.00	$2,000	
	E40a - Clean drainage ditch	100	LF	$10.00	$1,000	
	Project Subtotal (without Division 01)					**$1,235,484**
	Project Subtotal					**$1,482,581**

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Eklutna Feasibility Study
Alternative Q - Lakeside Trail Improvements

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$247,097
02	SITE CONSTRUCTION AND ACCESS ROADS		$40,184
03	REACH 1 - LAKESIDE TRAIL		$67,050
04	REACH 2 - LAKESIDE TRAIL		$149,200
05	REACH 3 - LAKESIDE TRAIL		$458,600
06	REACH 4 - LAKESIDE TRAIL		$194,500
07	REACH 7 - LAKESIDE TRAIL		$22,600
08	REACH 8 - LAKESIDE TRAIL		$3,000
		Total Construction Cost	**$1,182,231**
	Overhead		
	GC Overhead and Profit	15.00%	$177,335
	Construction Bonds	1.25%	$16,995
		Total - Overhead	**$194,329**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$344,140
		Total - Contingency	**$344,140**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect			**$1,720,700**
Total Construction Price Range (-50% to +100%)	**$860,350**	**to**	**$3,441,400**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

Eklutna Feasibility Study
Alternative R - AWWU Maintenance Road Crossings

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$336,836**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$134,734	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$202,102	
02	**SITE CONSTRUCTION AND ACCESS ROADS**	**8**			**$20,092**	**$160,736**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.1	ACRE	$160,736.40	$20,092	
03	**CIVIL WORKS - GRADING**	**8**			**$30,556**	**$244,444**
	Approach Ramp Fill Material	278	CY	$110.00	$30,556	
04	**AWWU BRIDGES**	**8**			**$159,875**	**$1,279,000**
	Steel Sheetpile Abutments, 20-ft Height, 35-ft length (qty = 2)	1400	SF	$50.00	$70,000	
	Steel Girder, 30-ft length, Qty = 3	5250	LB	$3.50	$18,375	
	Transverse Timber Decking	600	SF	$35.00	$21,000	
	Rough Sawn Wear Surface; Timber	600	SF	$35.00	$21,000	
	12" x 12" Timber Decking	600	SF	$35.00	$21,000	
	High Hub Rails (Qty = 2)	100	LF	$85.00	$8,500	
	Project Subtotal (without Division 01)					**$1,684,181**
	Project Subtotal					**$2,021,017**

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Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$336,836
02	SITE CONSTRUCTION AND ACCESS ROADS		$160,736
03	CIVIL WORKS - GRADING		$244,444
04	AWWU BRIDGES		$1,279,000
		Total Construction Cost	**$2,021,017**
	Overhead		
	GC Overhead and Profit	15.00%	$303,153
	Construction Bonds	1.25%	$29,052
		Total - Overhead	**$332,205**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$588,305
		Total - Contingency	**$588,305**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**
	Median Construction Price - Direct and Indirect		**$2,941,527**
	Total Construction Price Range (-50% to +100%)		**$1,470,764 to $5,883,054**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.

Eklutna Feasibility Study
Alternative S - Physical Habitat Manipulation

Line Item	Item	Quantity	Unit	Unit Cost	Total Cost	Total
01	**DIVISION 01 INDIRECTS**					**$168,237**
	Mobilization and Establishment of Site Infrastructure	8	%	0.08	$67,295	
	Contractor General Requirements (Percentage of Direct Cost)	12	%	0.12	$100,942	
02	**SITE CONSTRUCTION AND ACCESS ROADS**					**$280,368**
	Site Access - Construct Laydown Areas, Turnarounds and Crane Pads	0.5	ACRE	$160,736.40	$80,368	
	Dewatering; Coffer Dam; 50 LF (Required in Lower River Reaches)	10	EA	$20,000.00	$200,000	
03	**ENGINEERED LOG JAM**	**3**			**$43,310**	**$129,930**
	Excavation	110	CY	$40.00	$4,400	
	Pile logs - fir/spruce, 10-14" DBH, 20 ft L (buy 42's and cut in half)	6	EA	$1,500.00	$9,000	
	Horizontal logs with root fan fir/spruce, 10-14" DBH, 42' long	3	EA	$1,200.00	$3,600	
	Horizontal logs with root fan fir/spruce, 10-14" DBH, 30' long	8	EA	$1,000.00	$8,000	
	Horizontal logs - fir/spruce, 10-14" DBH, 42' long	3	EA	$1,200.00	$3,600	
	Horizontal logs - fir/spruce, 10-14"" DBH, 30' long	4	EA	$1,000.00	$4,000	
	Fasteners (cable, chain, rebar, threaded rod)	1	LS	$2,500.00	$2,500	
	Logging slash	10	EA	$50.00	$500	
	Re-use Excavated Spoils; Fill	50	CY	$35.00	$1,750	
	Borrow Fill	20	CY	$40.00	$800	
	Riprap	20	CY	$150.00	$3,000	
	Erosion Control; Willow Stakes	40	EA	$10.00	$400	
	Revegetation	0.1	AC	$2,600.00	$260	
	Large Woody Debris; Import	3.0	EA	$500.00	$1,500	
04	**POST ASSISTED LOG STRUCTURE/BEAVER DAM ANALOG**	**20**			**$15,600**	**$312,000**
	Cedar/Spruce/Fir; 4-6" dia, 6-ft long, Qty = 16	15	EA	$240.00	$3,600	
	Willow Weave, Alder/Poplar/Cedar/Fir/Spruce Boughs, 4-8' Wands, Qty = 50	15	EA	$400.00	$6,000	
	PALS/BDA Installation	1	LS	$6,000.00	$6,000	
05	**GRAVEL AUGMENTATION**	**6**			**$5,000**	**$30,000**
	Borrow Gravel; Local Source; Deposit in Streambed	50	CY	$100.00	$5,000	
06	**CHANNEL EXCAVATION**	**2**			**$44,444**	**$88,889**
	Excavation; 500-ft length	1,111	CY	$40.00	$44,444	
	Project Subtotal (without Division 01)					**$841,187**
	Project Subtotal					**$1,009,425**

AACE International CLASS 5 Cost Estimate - Class 5 estimates are generally prepared based on very limited information, and subsequently have wide accuracy ranges. Typically, engineering is 0% to 2% complete. They are typically prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc. Virtually all Class 5 estimates use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques. Expected accuracy ranges are from -20% to -50% on the low side and +30% to 100% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances. As little as 1 hour or less to perhaps more than 200 hours may be spent preparing the estimate depending on the project and estimating methodology (AACE International Recommended Practices and Standards).

Project: Eklutna Engineering Feasibility Study
Location: AK

Direct Construction Cost

Item	Direction Construction Cost		Amount
01	DIVISION 01 INDIRECTS		$168,237
02	SITE CONSTRUCTION AND ACCESS ROADS		$280,368
03	ENGINEERED LOG JAM		$129,930
04	POST ASSISTED LOG STRUCTURE/BEAVER DAM ANALOG		$312,000
05	GRAVEL AUGMENTATION		$30,000
06	CHANNEL EXCAVATION		$88,889
		Total Construction Cost	**$1,009,425**
	Overhead		
	GC Overhead and Profit	15.00%	$151,414
	Construction Bonds	1.25%	$14,510
		Total - Overhead	**$165,924**
	Direct Cost Contingency		
	*Overall Project Contingency:	25.00%	$293,837
		Total - Contingency	**$293,837**
	Taxes		
	AK Sales Tax	0.00%	$0
		Total - Taxes	**$0**

Median Construction Price - Direct and Indirect			**$1,469,186**
Total Construction Price Range (-50% to +100%)	**$734,593**	**to**	**$2,938,372**

Notes:
All costs based on 2022 Construction Dollars
Does not include: interest during construction, legal, financing, or administration costs.
* Overall Project Contingency is set at 25% due to the current level of project definition and it may be reduced at later stages of design.