

# APPENDIX D

## PRELIMINARY OPINION OF COST

Ragged Mountain Dam  
Earthen Embankment Dam  
Preliminary Opinion of Cost  
(Prices in 2010 Dollars)

Dam Construction		Schnabel Engineering 2010			
Item Number	Description	Units	Quantity	Unit Price	Extended
1	Mobilization & Demobilization				
	a. General	LS	1	\$1,342,503	\$1,342,503
	b. Bonds and Insurance	LS	1	\$617,358	\$617,358
2	Care and Diversion of Water				
	a. Erosion and Sediment Control	LS	1	\$800,000	\$800,000
	b. Foundation Dewatering/Water Control	LS	1	\$400,000	\$400,000
3	Clearing and Grubbing				
	a. Dam, Access Road, Inlet and Outlet Excavation, Emergency Spillway	AC	16	\$6,000	\$96,000
	b. Borrow Areas	AC	45	\$4,500	\$202,500
4	Reservoir Clearing	AC	100	\$6,500	\$648,700
5	Demolition and Removal of Structures				
	a. Miscellaneous Structures	LS	1	\$10,000	\$10,000
	b. Modifications to Lower Dam	LS	1	\$100,000	\$100,000
	c. Removal of Upper Dam	LS	1	\$200,000	\$200,000
	d. Removal of Old Piping	LS	1	\$50,000	\$50,000
6	Excavation				
	a. Common Excavation	CY	65,000	\$5.00	\$325,000
	b. Rock Excavation	CY	37,000	\$20.00	\$740,000
	c. Rock Trimming	CY	3,000	\$75.00	\$225,000
	d. Rock Shaping	SY	250	\$50.00	\$12,500
	e. Tunneling - 10' Diameter Drill & Blast	LF	560	\$2,500.00	\$1,400,000
7	Rock Cleaning	SY	5,410	\$40.00	\$216,400
8	Foundation Drilling and Grouting	SF	129,000	\$25	\$3,225,000
9	Fill				
	a. Common Earth Fill (Shell Fill)	CY	475,200	\$4.00	\$1,900,800
	b. Select Earth Fill (Core 1 Fill, Includes Keyway)	CY	79,300	\$6.50	\$515,450
	c. Select Earth Fill (Core 1A Fill)	CY	76,000	\$5.50	\$418,000
	d. Fine Drain Fill	CY	23,100	\$65.00	\$1,501,500
	e. Coarse Drain Fill	CY	4,650	\$50.00	\$232,500
	f. Embankment Test Fill	LS	1	\$25,000	\$25,000
10	Slope Protection				
	a. Class I Rip Rap (Plunge Pool and Wave Action Protection)	CY	6,320	\$80.00	\$505,600
	b. Class IA Rip Rap (Abutment Swales)	CY	1,020	\$75.00	\$76,500
	c. Rip Rap Bedding Material	CY	2,400	\$45.00	\$108,000
	d. Geotextile	SY	2,300	\$3.50	\$8,050
11	Conventional Concrete (Includes Waterstop)				
	a. Structural Concrete (Riser, Bridge Pier, Retaining Walls, Tunnel, Vaults)	CY	2,400	\$750.00	\$1,800,000
	b. Dental Concrete	CY	2,500	\$250.00	\$625,000
12	Steel Reinforcing Bars (170 lb / yd <sup>3</sup> Concrete)	LB	408,000	\$0.80	\$326,400
13	Gates				
	a. 18-Inch Ball Valves	EA	2	\$40,000	\$80,000
	b. 30-Inch Sluice Gate	EA	4	\$60,000	\$240,000
	c. 30-inch Knife Gate (Electrically Operated)	EA	3	\$85,000	\$255,000
14	Operation Building	LS	1	\$20,000	\$20,000
15	Drainage Pipe and Materials				
	a. Solid 8-inch PVC Pipe	LF	100	\$30	\$3,000
	b. Perforated 8-inch PVC Pipe	LF	2,400	\$35	\$84,000
16	Chain-Linked Fence	LF	1,000	\$30	\$30,000
	Gates	EA	3	\$250	\$750
17	Instrumentation	LS	1	\$165,000	\$165,000
18	Riser Bridge (14' Wide, Light Vehicular Loading)	LS	1	\$135,000	\$135,000
19	Storm Drainage System				
	a. Manhole	EA	9	\$2,000	\$18,000
	b. 18-inch HDPE Pipe	LF	1,075	\$75	\$80,625
20	Metal Work	LS	1	\$100,000	\$100,000
21	Landscaping and Site Restoration				
	a. Topsoil	CY	15,900	\$6.00	\$95,400
	b. Permanent Turf Establishment (with Matting) (20% of Area)	AC	15	\$3,000	\$45,000
24	30/36-Inch Flange Pipe & Fittings, Riser and Tunnel				
	a. Furnish and Install	LS	1	\$350,000	\$350,000
25	525-Feet of 36-inch Pipe, Open Cut, 10-foot Depth, Class 53 Ductile Iron Pipe (Access Vault to Valve Vault)				
	a. Furnish and Install Pipe	LF	525	\$280	\$147,000
	b. Rock Removal (20% Rock, 6-Foot Wide Trench)	CY	200	\$200	\$40,000
	c. 36/18-Inch Connections	EA	2	\$6,000	\$12,000
26	100-Feet of 42-Inch Ductile Iron Pipe				
	a. Furnish and Install Pipe	LF	100	\$350	\$35,000
	b. Rock Removal (25% Rock, 6-Foot Wide Trench)	CY	100	\$200	\$20,000
27	Ball Valves, Electrical and Controls				
	a. Electrical	EA	1	\$150,000	\$150,000
	b. Controls	EA	1	\$100,000	\$100,000
	c. Mechanical	EA	1	\$15,000	\$15,000
28	Roadways				
	a. Reservoir Drive Upgrade and Maintenance	LS	1	\$250,000	\$250,000
	b. Traffic Control	LS	1	\$150,000	\$150,000
	c. Roadway Surfacing	SY	7,000	\$12	\$84,000
	d. Access Road Improvements	LS	1	\$200,000	\$200,000
29	Unlisted Items (5%)	LS	1	\$979,934	\$979,934

Construction Costs Subtotal: **\$22,538,470**

Construction Costs Subtotal Minus 10% Factor: **\$20,284,623**

Construction Costs Subtotal Plus 20% Factor: **\$27,046,164**

Engineering Services

30	Engineering Services				
	a. Engineering Design	LS	1	\$890,298	\$890,298
	b. Construction Observation and Testing	LS	1	\$2,800,000	\$2,800,000

Engineering Services Subtotal: **\$3,690,298**

Engineering Services Subtotal Plus 10% Factor: **\$4,059,328**