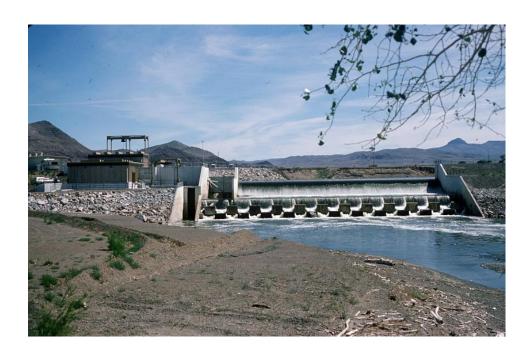
RECLAMATION Managing Water in the West

Hydraulic Laboratory Technical Memorandum PAP-1076

2013 Feasibility Level Fish Bypass Design at Marble Bluff Dam





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Executive Summary

The objective of this study is to provide the Fish and Wildlife Service (FWS) with appraisal-level quantities and cost estimates for reconstruction of the Pyramid Lake fishway at Marble Bluff Dam. Pyramid Lake Fishway and Marble Bluff Dam are Bureau of Reclamation (Reclamation) facilities operated by FWS.

Historically, when the water elevation in Pyramid Lake falls below 3805 feet, fish passage access up the river is blocked by a sediment delta at the river's mouth. During these periods of low lake elevations the fishway serves as the main access for fish moving upriver to spawn. The fishway as constructed in 1976 fails to provide effective fish passage for the endangered and threatened Cui-ui lake sucker and Lahontan cutthroat trout fish species of Pyramid Lake. Without an effective fishway, spawning during years when the lake elevation falls below 3805 is severely restricted.

The existing fishway contains five fish ladders. Starting at the lake, the ladders are referred to as the entrance ladder (also referred to as the terminal ladder in prior documents), intermediate ladders 1, 2 and 3 and the exit ladder. In its current condition (April 2013) the original fishway is operational but limits passage at each of the intermediate ladders.

Two main concepts were developed during this study, both providing passage along the existing fishway alignment from Pyramid Lake to the exit ladder but using two different fish ladder types. Both designs were initially investigated and developed by Relacmation in November 2000 (Reclamation, 2000), this report slightly modifies the 2000 design and updates the cost estimates.

Design A (concrete ladders) includes replacing the existing fish ladders with concrete or steel baffles in a 3.25 percent sloped concrete rectangular channel with 8.0-ft bottom width and 8.0-ft channel depth with approximately 6-ft of flow. Chevron shaped baffles, developed for effective Cui-ui passage, will be constructed of either concrete or steel and will be spaced 8 feet apart.

Design B (rock riffle ladders) includes replacing the existing fish ladders with rock baffles placed in a 6.0-ft bottom width, 5.5-ft deep riprap lined channel with 1.5:1 H:V side slopes. The ladder will provide passage using large boulder weir drops spaced 28 ft apart along a 1.20 percent slope.

Appraisal level drawings, construction quantities, and cost estimates are presented for both options. To replace all 3 ladders Design A (concrete ladders) and B (rock ladder) are estimated to approximately cost \$5.9M and \$2.3M respectively. Maintenance and inspection costs were estimated based on discussion with fishway operators and are approximately \$25,000 annually for either option.

The remainder of this report contains a summary of the findings, assumptions and design criteria for both options.

Background

Marble Bluff Dam is located on the Truckee River approximately 50 miles downstream of Reno, Nevada and approximately 3 miles upstream of Pyramid Lake (Figure 2). The terminal waters (no outlet) of Pyramid Lake are supplied largely by flow from the Truckee River. Both the Truckee River and Pyramid Lake contain unique habitats for the spawning and survival of endangered Cui-ui lake suckers (Chasmistes cujus) and threatened Lahontan cutthroat trout (Oncorhynchus clarki) (LCT).

Historically Pyramid Lake elevations have fluctuated widely creating a unique challenge to keeping Cui-ui and LCT from becoming extinct. Records dating sporadically from about 1844 indicate that the lake elevation remained relatively stable, with cyclical fluctuations of about 20 feet maximum until about 1910, when a general decline began. In the last 100 years, the lake elevation has dropped as much as 80 feet due to upstream diversions coupled with periods of drought (Figure 1). A declining lake elevation lead to severe degradation of the Lower Truckee River. Upstream passage problems for both Cui-ui and LCT developed as a result.

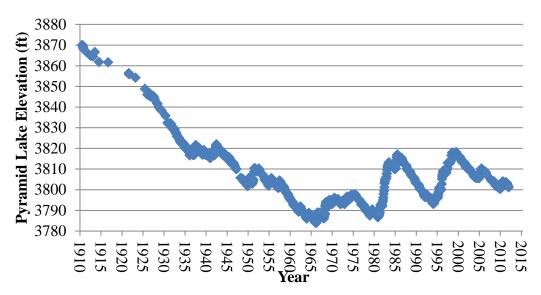


Figure 1 - Pyramid Lake elevation from 1910 to 2013

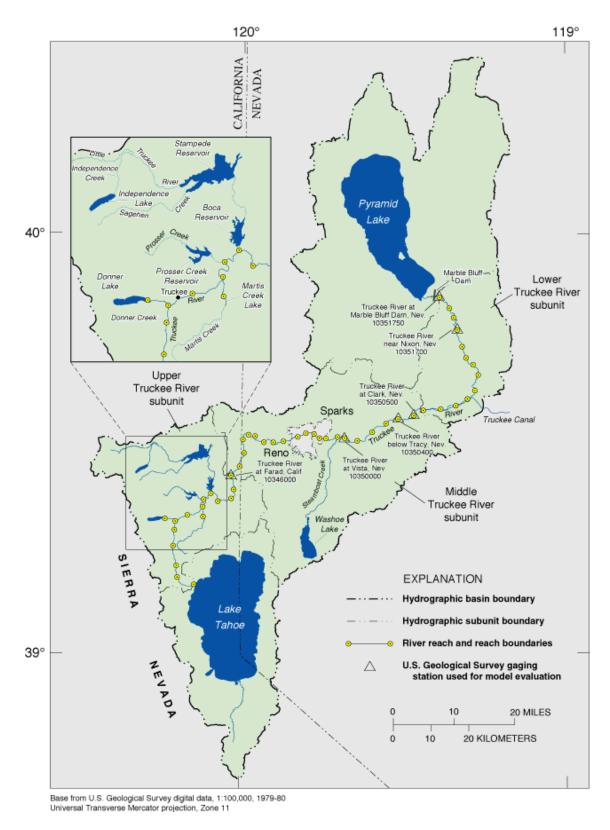


Figure 2 – Area map showing the location of Marble Bluff dam (courtesy of USGS)

In 1992 the U.S. Fish and Wildlife Service (FWS) issued a recovery plan for the endangered Cui-ui lake sucker (Service, 1992) and in 1995 a recovery plan for Lahontan cutthroat trout (LCT) (Service, 1995). These plans identify improving passage at Marble Bluff Dam as a key component to the recovery of these species.

In 1976 the Bureau of Reclamation constructed Marble Bluff Dam and fish passage facilities for the U.S. Fish and Wildlife Service. The facilities were designed to aid fish passage and stabilize the rapidly degrading river channel. For conditions when fish were not able to pass up the natural river, the Pyramid Lake fishway was constructed to provide fish passage directly from the lake to upstream of Marble Bluff Dam. The three-mile-long fishway contains five fishway ladders and was designed to provide fish passage for a maximum elevation gain between the lake and the river upstream of the dam of about 76 ft. The five fish ladders are linked by an earth lined trapezoidal channel. The fishway ladders are commonly referenced by location in the upstream direction of fish movement. Starting at Pyramid Lake the ladders are referred to as the fishway entrance ladder (or terminal ladder as in previous documents), ladder 1, ladder 2, ladder 3 (or intermediate ladders), and the exit ladder (Figure 3).

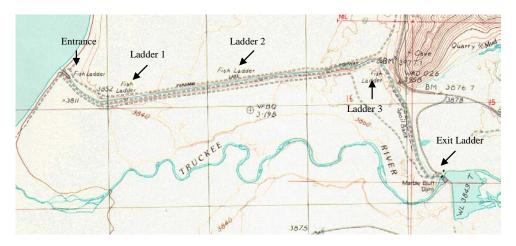


Figure 3 - Location map showing Marble Bluff dam and Pyramid Lake fishway

Each ladder contains a series of baffles (weir and orifice combination) that were originally spaced every 10 ft. Each baffle provided a water surface drop of 1 ft and a passage flow velocity of 8 ft/sec. The ladder design was based on experience with salmonid passage and available studies of the Cui-ui physical and behavioral attributes (Koch, 1972) (Koch, 1976) (Koch, 1973) (Ringo, et al., 1977).

During initial operation of the fishway, the ladder baffle design and head drop were found to be a poor match for Cui-ui behavior and swimming strength. Cui-ui that attempted to move up the ladders crowded near the fishway invert. The 8 ft/sec passage velocity was found to be too high for efficient passage. In addition, the bottom-oriented behavior of the Cui-ui was contrary to passing over a weir that forced them high in the water column. To improve passage, FWS added weirs halfway between the original baffles. This reduced the drop over each baffle to 0.5 ft and reduced the pool length between baffles to 5 ft. Velocity over

the baffles was reduced to about 5 ft/sec. Passage of Cui-ui improved; however fish passage efficiency remains low.

Starting in 1995, FWS and other organizations pursued a project to develop better methods for passing Cui-ui suckers and LCT that move up the river to Marble Bluff Dam. The project resulted in three major structures being built. These are; replacement of the river fish trap and hoist system with a hydraulic fish lock, construction of a gradient control structure in the river downstream of the dam and replacement of the exit fishway ladder with a new fish ladder designed for Cui-ui (Mefford, et al., 1995).

The replacement exit ladder was an 8-ft-wide, 6-ft-deep concrete channel with baffles placed every 8 ft of length. To improve flow conditions, the ladder gradient was set at 0.031-ft-vertical to 1-ft-horzontal (3.13 percent) and new dual slot chevron shaped steel baffles were designed specifically for Cui-ui passage. Flow through the exit ladder varied from 30-46 ft³/sec depending on river stage. When needed, supplemental flow can be added to increase the fishway capacity to 50 ft³/sec (Mefford, et al., 1995).

The new fish lock and gradient control structure have functioned well. However, the existing fishway channel, including the new exit fish ladder, is not considered operational as the fish ladders downstream of the exit have not been replaced to allow effective Cui-ui passage.

In 2011, FWS partnered with the U.S. Army Corp of Engineers and Reclamation to create feasibility level fish passage replacement designs for the entire Marble Bluff Fishway (Heiner, 2011). The proposed design included rehabilitation of the entire fishway to increase the current capacity to 100 ft³/sec. After completing the feasibility designs, the Corp of Engineers withdrew their support and FWS determined it more economical to redesign the fishway based on the current 50 ft³/sec capacity and conveyance channel.

Fishway Design Criteria

Fishway ladder and conveyance channel designs were selected based on achieving flow conditions suitable for efficient Cui-ui and LCT passage. Fishway design criteria set by FWS are as follows:

- Utilize the existing conveyance channel and exit ladder
- Fishway flow capacity of 50 ft³/sec
- Normal conveyance channel flow depth of 4.0 ft
- Maximum conveyance channel flow velocity of 2 ft/sec
- Maximum average fish ladder baffle velocity of 4 ft/sec
- Strong downstream flow to enhance fish orientation

- Provide passage at all levels within the water column
- Provide designs for each ladder to be replaced independently
- Provide designs for both concrete- and rock-lined replacement ladders.

Fishway Design Options

The Fish and Wildlife Service requested that Reclamation develop two separate designs for rehabilitating the fishway at Marble Bluff Dam. Both designs utilize the existing entrance meander, conveyance channel and exit ladder. The two design options are described as follows:

Design A (concrete)

Design A includes replacing the existing fish ladders with concrete chute and baffle fish ladders similar to the new exit ladder. Baffles will be placed in a 3.25 percent sloped concrete rectangular channel with 8.0-ft bottom width and 8.0-ft channel depth. Chevron shaped baffles, developed for effective Cui-ui passage, will be constructed of either concrete or steel and will be spaced 8 feet apart.

Design B (rock)

Design B includes replacing the existing fish ladders with large rock boulder baffles placed in a 6.0-ft bottom width, 5.5-ft deep riprap lined channel with 1.5:1 H:V side slopes. The large boulder baffle drops will be spaced 28 feet apart along a 1.20 percent slope.

Base Stationing

Due to the discontinuity of the stationing between the existing construction drawings from 1973 and the 1996 re-construction drawings of the new exit ladder and fish lock, new stationing was determined starting from station 0+00.00 off the 1996 exit ladder specification drawings (Spec. No. 20-C0451) that was constructed in 1998. The approximate centerline of the existing fishway and channel was used as a baseline for both designs to reduce right of way concerns and minimize excavation costs.

Design A – Concrete Channel with Steel or Concrete Chevron Baffles

Description

Design A includes replacing the three intermediate ladders built in 1976 with ladders that resemble the new exit ladder that was replaced in 2000. The new ladders would be constructed on a 0.0325 slope with a water surface drop across each baffle of approximately 0.26 ft. Detailed plan and profile drawings of the proposed fishway can be found in Appendix B (Drawings 949-D-A1 thru A4).

The slope of the proposed fishway was selected to keep velocities less than 4.0 ft/sec. The proposed ladder channels are 8 ft wide by 8 ft deep.

Baffles in each ladder will have two 1-ft-wide slots and will be spaced every 8 ft down the fishway. Baffles will be similar to those found in the exit ladder except guidance vanes will be added which will allow fish to navigate more efficiently. Both concrete (Drawings 949-D-CB1 & CB2 in Appendix A) and steel baffles (Drawings 949-D-SB1 & SB2 in Appendix A) were priced during this study to determine what would be the most economical for construction. Both designs are the same basic shape and size but the steel baffles will be removable and the concrete baffles will be permanent.

Overflow Bypass

Each fishway ladder is designed with a flow bypass system that can convey flow around the fishway ladder. The flow bypass provides overflow protection should the fishway baffles become partially plugged with debris. The bypass system includes a 12-ft-long weir overflow located 4 ft above the channel bottom just upstream of each fishway ladder, an energy dissipation box at the downstream end of each ladder and a 24-in diameter pipe linking the two structures. The overflow is designed to pass 40 ft³/sec when the channel depth is 1 ft above the weir crest, leaving approximately 0.5 ft of freeboard in the channel.

Flow Characteristics

Flow through each fishway is determined by the flow depth in the conveyance channel upstream and downstream of the ladders as shown in Table 1. Assuming a Manning's n of 0.03 the channel roughness will control the depth in the channel until flows reach about 37 ft³/sec. Above 37 ft³/sec the ladder baffles and overflow bypass will control the depth in the channel. Any flow above that which can pass through the baffles will be passed through the overflow bypass.

Velocities in the conveyance channels will range from 0.67-0.82 ft/sec and the average velocity through each baffle will be between 1.85 and 3.23 ft/sec. Velocities in both the conveyance channel and through the baffles meet the recommended design criteria set by the FWS.

Flow depth in the conveyance channels will meet the recommended design criteria of 4 ft when flows down the fishway are at or above 39 ft³/sec. Each ladder section is offset 2 ft lower than the channel upstream and downstream to increase the depths in the ladder and reduce the average baffle velocity.

Table 1 - Design A - Concr	ete ladder channel and	ladder flow characteristics
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Depth in U/S & D/S Channel (ft)	Total Drop per Ladder (ft)	Water Surface drop per baffle (ft)	Estimated Ladder Flow ⁺ (ft ³ /sec)	Estimated Channel Flow* (ft ³ /sec)	Average Baffle Velocity (ft/sec)	Average Channel Velocity (ft/sec)
2.5	13	0.26	29.1	16.7	1.85	0.68
3.0	13	0.26	32.3	23.7	2.37	0.75
3.5	13	0.26	35.6	32.1	2.92	0.82
4.0	13	0.26	38.8	42.0	3.23	0.81
4.5	13	0.26	42.0	53.5	3.23	0.73
5.0	13	0.26	45.3	66.6	3.23	0.67

⁺values that are crossed out indicate that channel roughness is controlling

Location

Each replacement ladder will utilize the existing conveyance channel and entrance meander. Individual ladders will be located based on Drawings 949-D-A1 thru A4 (Appendix B) and Table 2. Brief descriptions of each ladder are as follows:

<u>Concrete Ladder #3</u> – Contains a series of chevron baffles at a 3.25 percent slope (0.0325 ft/ft). The baffles will be spaced every 8.0 ft apart between stations 40+79.70 and 45+19.56 over 13 feet of elevation change (see Table 2 and Drawing 949-D-A2 in appendix B).

<u>Concrete Ladder #2</u> – Contains a series of chevron baffles at a 3.25 percent slope (0.0325 ft/ft). The baffles will be spaced every 8.0 ft apart between stations 85+29.85 and 89+69.71 over 13 feet of elevation change (see Table 2 and Drawing 949-D-A3 in appendix B).

<u>Concrete Ladder #1</u> – Contains a series of chevron baffles at a 3.25 percent slope (0.0325 ft/ft). The baffles will be spaced every 8.0 ft apart between stations 130+29.85 and 134+69.71 over 13 feet of elevation change (see Table 2 and Drawing 949-D-A4 in appendix B).

^{*}values that are crossed out indicate that ladder baffles are controlling

Table 2 - Design A - Concrete ladder stationing and elevation details

Description	Station	Channel Invert	Grade In	Grade Out
Description	(ft)	Elevation (ft)	(ft/ft)	(ft/ft)
U/S Run #4	2+79.44	3846.00	-	-0.0001
D/S Run #4	40+79.70	3845.61	-0.0001	-0.0325
U/S Concrete Ladder #3	40+79.70	3845.61	-0.0001	-0.0325
D/S Concrete Ladder #3	45+19.56	3832.59	-0.0325	-0.0001
U/S Run #3	45+19.56	3832.59	-0.0325	-0.0001
D/S Run #3	85+29.85	3832.18	-0.0001	-0.0325
U/S Concrete Ladder #2	85+29.85	3832.18	-0.0001	-0.0325
D/S Concrete Ladder #2	89+69.71	3819.16	-0.0325	-0.0001
U/S Run #2	89+69.71	3819.16	-0.0325	-0.0001
D/S Run #2	130+29.85	3818.75	-0.0001	-0.0325
U/S Concrete Ladder #1	130+29.85	3818.75	-0.0001	-0.0325
D/S Concrete Ladder #1	134+69.71	3805.73	-0.0325	-0.0001
U/S Run #1	134+69.71	3805.73	-0.0325	-0.0001

Design B – Riprap Channel with Boulder Baffles

Description

Design B includes replacing the three intermediate ladders built in 1976 with rock riffle ladders that resemble the fishway that was installed at Derby Dam in 2000 (Heiner, 2011). The new rock riffle ladders would be constructed on a 0.012 slope with a water surface drop across each baffle of approximately 0.33 ft. The slope of the proposed rock riffle ladders was selected to keep average drop velocities less than 4.0 ft/sec. The proposed rock riffle ladders will be placed in a trapezoidal channel with similar dimensions as the conveyance runs (6 ft bottom width, 5.5 ft depth and 1.5:1 side slopes) except they will be lined with 2-10 inch well-graded riprap. Detailed plan and profile drawings of the proposed rock riffle ladders can be found in Appendix B (Drawings 949-D-B1 thru B4).

Baffles in each rock riffle ladder will consist of three boulders. Two 3.5 ft diameter (outside) and one 4-4.5 ft diameter (center) boulders spaced in a chevron shape with approximately 1 ft clearance between the boulders. Boulder baffles will be spaced every 28 ft down the rock riffle ladders.

The rock riffle ladders will be constructed by over excavating the channel 1.5 ft, laying down a low porosity geotextile fabric, laying the riprap lining then placing the boulder baffles. The three boulders used for each baffle drop will provide four passage routes (also referred to as chutes). Boulders will be positioned on a 60 degree angle to the channel centerline with roughly 1 ft of clear space between them (Drawing 949-D-B1 in Appendix B). The large center boulders will be

placed on the riprap bedding and the side boulders will be set a minimum of 6 inches below the riprap grade.

Overflow Bypass

Each rock riffle ladder is designed such that a separate flow bypass is not necessary. Any flow over that which is designed to pass through the rock baffle chutes will be transferred downstream by overtopping the boulder weirs.

Flow Characteristics

Flow through each fishway is determined by the flow depth in the conveyance channel upstream and downstream of the ladders. The boulder arrays are designed to pool water to a depth of about 3.5 to 4 ft with an average drop in water surface of about 0.33 ft across each array. The boulder weir drops are designed to convey the full 50 ft³/sec fishway design flow with an average passage velocity of about 4 ft/sec. As rock boulders are different shapes, flow conditions will vary through each drop structure. Some tuning of the individual boulder arrays after initial operation is expected. As is typical with rock boulder ladders hydraulic conditions are more sensitive to changes in flow, headwater and tailwater conditions.

Location

Each replacement ladder will utilize the existing conveyance channel and entrance meander. Individual ladders will be located based on the based on Drawings 949-D-B1 thru B4 (Appendix B) and Table 3. Brief descriptions of each ladder are as follows:

<u>Rock Riffle Ladder #3</u> – Contains a series of boulder arrays at a 1.2 percent slope (0.0120 ft/ft). The boulder arrays will be spaced every 28.0 ft apart between stations 38+00.00 and 48+91.12 over 13 feet of elevation change (see Table 3 and Drawing 949-D-B2 in appendix B).

<u>Rock Riffle Ladder #2</u> – Contains a series of boulder arrays at a 1.2 percent slope (0.0120 ft/ft). The boulder arrays will be spaced every 28.0 ft apart between stations 83+00.00 and 93+91.12 over 13 feet of elevation change (see Table 3 and Drawing 949-D-B3 in appendix B).

<u>Rock Riffle Ladder #1</u> – Contains a series of boulder arrays at a 1.2 percent slope (0.0120 ft/ft). The boulder arrays will be spaced every 28.0 ft apart between stations 127+00.00 and 137+91.12 over 13 feet of elevation change (see Table 3 and Drawing 949-D-B4 in appendix B)

Table 3 - Design B – Rock riffle ladder stationing and elevation details

Description	Station	Channel Invert	Grade In	Grade Out
	(ft)	Elevation (ft)	(ft/ft)	(ft/ft)
U/S Run #4	2+79.44	3846.00	-	-0.0001
D/S Run #4	38+00.00	3845.64	-0.0001	-0.0120
U/S Rock Ladder #3	38+00.00	3845.64	-0.0001	-0.0120
D/S Rock Ladder #3	48+91.12	3832.55	-0.0120	-0.0001
U/S Run #3	48+91.12	3832.55	-0.0120	-0.0001
D/S Run #3	83+00.00	3832.21	-0.0001	-0.0120
U/S Rock Ladder #2	83+00.00	3832.21	-0.0001	-0.0120
D/S Rock Ladder #2	93+91.12	3819.11	-0.0120	-0.0001
U/S Run #2	93+91.12	3819.11	-0.0120	-0.0001
D/S Run #2	127+00.00	3818.79	-0.0001	-0.0120
U/S Rock Ladder #1	127+00.00	3818.79	-0.0001	-0.0120
D/S Rock Ladder #1	137+91.12	3805.69	-0.0120	-0.0001
U/S Run #1	137+91.12	3805.69	-0.0120	-0.0001

Sediment Flushing

Reclamation's 2000 and 2011 reports provide detailed analysis on the viability of flushing windblown sediment deposits down the fishway. The studies looked at a variety of options for addressing sediment including channel slope, flow velocity, flow depth and channel width. Both studies utilized the Corps of Engineers SAM Model for hydraulic design of channels (now available in the Corps HEC-RAS model).

Both studies determined that transportation of all sediment would be unlikely given the current design flows and slope of the existing channel. As such, it is assumed that yearly inspection and cleaning of any sand deposits will be needed.

To aid in the removal of sand deposits in Design A, the downstream end of each concrete ladder will have a zero- or flat-slope 8-ft wide concrete section where the water velocity will approach 1 ft/sec and allow suspended sediments to settle on the channel bottom. Deposited sediment can be removed during the off season by means of a shovel or bucket loader.

Due to the complex flow patterns in Design B, it is anticipated that little deposition will occur in the rock riffle ladders. Experience from similar rock fishways operating with high sediment loads shows deposition only occurs in low velocity zones but does not significantly alter flow conditions or passage efficiency. To prevent excess deposition of sediment, the fishway can be operated

for a short period of time at flows less than the design discharge. Reducing fishway flow alters the flow pattern in the rock riffle ladder from a step-pool regime to a shallow boundary flow capable of transporting sediment deposits into the conveyance channels where removal can be performed as needed.

Construction Dewatering Plan

Dewatering estimates were made based on groundwater data that was collected in 1972 and is available on the 1973 construction drawings. Any location where the ground water was expected to be within 2.5 ft of the cut invert was assumed to need dewatering. As contractors prefer different methods for construction dewatering no detailed dewatering plan is presented in this report. Both the 2000 and 2011 Reclamation reports present possible dewatering options. Table 4 and Table 5 provide the estimated dewatering including location and estimated maximum drawdown for both Design A and Design B.

Table 4 - Estimated groundwater control required for Design A

Location	Stati	Length	Max Drawdown	
	Start (Upstream) End (Downstream)		(ft)	(ft)
Concrete Ladder 3	NA NA		0	NONE
Concrete Ladder 2	88+00	89+75	175	3.9 ft
Concrete Ladder 1	NA	NA	0	NONE

Table 5 - Estimated groundwater control required for Design B

Location	Stati	Length	Max Drawdown	
	Start (Upstream) End (Downstream)		(ft)	(ft)
Rock Ladder 3	48+93 49+05		12	2.0
Rock Ladder 2	93+60	94+08	48	3.7
Rock Ladder 1	137+93	138+05	12	1.8

Project Construction Costs

Estimated construction costs were prepared using the Bureau of Reclamation's Technical Service Center standard cost estimate worksheets. Worksheets were developed for both Design A (concrete ladder) and Design B (rock riffle ladder). For Design A costs were estimated for two different chevron baffle designs, steel or concrete. Each steel baffle was estimated to cost \$23,000 and each concrete

baffle was estimated to cost \$8,000. Individual cost estimate worksheets can be found in Appendix A. Table 6 provides the overall estimated costs for each design option. It should be noted that the price of Design B is very sensitive to the price and availability of rock which is approximately 35% of the cost shown. Rock prices fluctuate frequently bases on supply and demand and should be verified prior to selecting a design option.

	Design A (C	Design B (Rock Ladder)	
Ladder	adder Steel Chevron Concrete Chevro Baffles Baffles		
#1	\$3,100,000.00	\$1,950,000.00	\$730,000.00
#2	\$3,200,000.00	\$2,000,000.00	\$760,000.00
#3	\$3,100,000.00	\$1,950,000.00	\$790,000.00
ALL	\$9,400,000.00	\$5,900,000.00	\$2,280,000.00

Operation

Both Design A and Design B will not modify existing fishway operations. Currently the fishway is operated by fully opening the slide gate at the head of the fishway and allowing water to pass down the exit ladder. Auxiliary water can be added downstream of the exit ladder by opening Gate #5. Flow should be added if the flow depth in the fishway channel is less than 4.0 feet. The swing bar gate at the downstream end of the exit ladder should be positioned to guide fish up the exit ladder. Fish may need to be controlled into the fishway at the lake interface with the entrance meander by the means of a bar gate structure. The bar gate could be moved each year as needed to follow changes in the lake elevation.

Maintenance

The fishway will require cleaning prior to each operation. Cleaning will consist of removing blown in weeds and large sediment deposits. Within the fishway weeds should be removed to prevent possible debris plugging of the baffles or boulder riffles. The ladders should not require mechanical removal of sediment. If large windblown sand deposits form within the riffles the fishway should be operated at low flows prior to the fish run to flush material out of the ladders where it can be removed by a small bobcat type loader. In the channel between riffles, blown in weeds should be removed by hand. Large sediment deposits should be removed by a small loader driven along the channel invert. The cleaning crew should be versed in proper cleaning techniques that protect the

integrity of the channel lining. Based on FWS experience, in most years the cleaning is estimated to require two people four days plus any additional inspection time and costs around \$25,000. If the fishway is not used or cleaned for several years, the cleaning requirements may increase.

Bibliography

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- **Koch D.L.** Life History Information on the Cui-ui Lakesucker (Chasmites cujus Cope 1883) in Pyramid Lake, Nevada [Report]. [s.l.]: Biol. Soc of Nev. Occasional Papers 40:1-12, 1976.
- **Koch D.L.** Reproductive Characteristics of the Cui-ui Lakesucker (Chasmites cujus Cope) and its Spawning Behavior in Pyramid Lake [Journal]. [s.l.]: Trans. Am. Fish. Soc., 1973. 1: Vol. 102.
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- **U.S. Fish and Wildlife Service** Cui-ui (Chasmistes cujus) Recovery Plan. Second revision [Report]. Portland OR: [s.n.], 1992.
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APPENDIX A QUANTITY ESTIMATE WORKSHEET

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PLANT	Existine Replace	n - Fishway Modifications g Fishway Modifications ement of Ladder #1 - Concrete	WOID:	Washoe Pro	-		
PLANT	Replace		WOID:	ΩΔ227	FOTUL		
PLANT		ement of Lauder #1 - Concrete	WOID.			ATE LEVEL:	Appraisal
			REGION:	MP		RICE LEVEL:	Oct-12
	_		FILE: C:\UZ- Files\2012 JWZ Projects\Marble Bluff - Feasil - 12-2012.xlsx]Example - FC Summary Sheet (3)		Marble Bluff - Feasib Est\[Total E		
	РАҮ ІТЕМ	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	Δ.	11071117171011					
		MOBILIZATION					
		REMOVAL OF EXISTING STRUCTURES	68140				
		Assume removal, haul off and disposal of					
		Include cost of transportation and disposal					
		structures are 1'-0" thick and reinforced					
		Concrete Fish Ladder #1					
	a-01	Concrete (walls, floor, baffles & transition	าร)	260	CY	\$125.00	\$32,500.
	a-02	Handrails		320	LF	\$12.00	\$3,840.
	a-03	24" Concrete Pipe		120	LF	\$62.00	\$7,440.
	a-04	EXCAVATION		3,200	CY	\$13.50	\$43,200.
		Common, removal and disposal (max 3 i	miles)				
	a-05	COMPACTED BACKFILL Structural, hauled in from borrow (max 3	miles)	3,000	CY	\$20.00	\$60,000.
	a-06	CAST-IN-PLACE CONCRETE		460	CY	\$1,050.00	\$483,000.
		Includes 8' high wall 9' wide slab					· · ·
	a-07	CONCRETE REINFORCEMENT rebar calculated assuming 150 lb/cy of c	oncrete	69,000	LB	\$1.55	\$106,950.

	a-08	CEMENTIOUS MATERIAL cement calculated assuming 0.282 ton/c	v of concrete	130	TON	\$200.00	\$26,000.
	a-09	TRANSITION RIPRAP 4-10" diam. well graded riprap (≈1.5 ton/		8	CY	\$150.00	\$1,200.0
		•					
;	a-10	GRAVEL SURFACING 12' X 4" access road along the entire fish	nway	75	CY	\$63.00	\$4,725.
		12 A + access road along the entire list	iway				
		SUBTOTAL THIS SHEE	Т				\$768,855.
		QUANTITIES	DV.		Р	PRICES	
BY		CHECKED	BY	_		CHECKED	
Bryan Heine		Jason Wagner	Jerry Zandei	Г		1	
DATE PREI 11/06/12		D PEER REVIEW / DATE	DATE PREP	ADED		PEER REVIEW / DATE	

FEATU		RECLAMATION	LOTIMA	PROJECT:						
	Bluff Dan	n - Fishway Modification g Fishway Modifications		•	Washoe Pro	oject				
		g Fishway Modifications ement of Ladder #1 - Co		WOID:	OA227	FSTIMA	TE LEVEL:	Appraisal		
	поршо	ment of Ludder #1 oc	norcie	REGION:	MP			Oct-12		
				FILE:	C:\JZ- Files\2012 \	MP UNIT PRICE LEVEL: Oct-12 IZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff File-2012.xlsx]Example - FC Summary Sheet (3)				
PLANT ACCOUNT	РАУ ІТЕМ	DESCI	RIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
	a-11	METALWORK								
	a-11	Handrails			880	LF	\$65.00	\$57,200.0		
		Along viewing a	rea and bridge		860		\$63.00	φ37,200.0		
	a-12	HDPE PIPE								
		24" diameter			450	LF	\$104.00	\$46,800.		
	a-13	DEWATERING minimal dewatering based on 1972 grou			1	LS	\$10,500.00	\$10,500.		
	a-14	CONTROL OF SURFAC	E WATER		1	LS	\$10,000.00	\$10,000.		
		3' high sandbag coff	erdam at upstream end c	of						
вү		QUANTITIES	SUBTOTAL THIS SHEET	BY		P	RICES	\$124,500.0		
Bryan H	einer	Jason W		Jerry Zande	r					
-	REPARE		EVIEW / DATE	DATE PREF			PEER REVIEW / DAT	E		
11/06/12			fford/ 10/16/12	04/25/13						

FEATU		RECLAMATION		PROJECT				E1 _3_ OF _4_
	Bluff Dan	n - Fishway Moo g Fishway Mod			Washoe Pro	ject		
		-	r #1 - Concrete	WOID:	OA227	ESTIM/	ATE LEVEL:	Appraisal
	-	te Baffles		REGION:	MP		RICE LEVEL:	Oct-12
				FILE:	C:\JZ- Files\2012	WZ Projects	Marble Bluff - Feasib Est\[Total E	Est - Marble Bluff Fishw
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	b-15	CAST-IN-DI AC	CE CONCRETE		115	CY	\$1,250.00	\$143,750.0
	D-13	-	les with 2.3 CY/baffle		113	O1	ψ1,230.00	ψ143,730.0
		OO Buill	00 Will 2.0 0 1/ballio					
	b-16	CONCRETE R	EINFORCEMENT		17,250	LB	\$1.55	\$26,737.5
		1	alculated assuming 150 lb/cy of co	oncrete	<u> </u>			
	b-17	CEMENTIOUS	MATERIAL		33	TON	\$200.00	\$6,600.0
		cemen	calculated assuming 0.282 ton/cy	of concrete				
	b-18	METALWORK						
	<u> </u>		e contains custom metal work:		24,000	LB	\$9.20	\$220,800.0
			ner supports 1/4"X7.5"X7.5'					
			lbs each)	7.51				
	1		ustable panels 1/4"X23"(unbent)X7	7.5'				
		(14	7 lbs each)					
			SUBTOTAL THIS SHEET	Г				\$397,887.
		QUAN	TITIES			P	RICES	
ЗҮ			CHECKED	BY			CHECKED	
Bryan H			Jason Wagner	Jerry Zande				_
DATE PREPARED PEER REVIEW / DATE			DATE PREP	ARED		PEER REVIEW / DATE		
11/06/12	2		Brent Mefford/ 10/16/12	04/25/13				

FEATU	FEATURE:		PROJEC	Т:				
		am - Fishway	Modifications		Washoe Pr	oject		
	Existin	ng Fishway M	odifications			-		
	Replac	ement of Lac	dder #1 - Concrete	WOID:	OA227	ESTIM/	TE LEVEL:	Appraisal
				REGION:	MP	UNIT PI	RICE LEVEL:	Oct-12
				FILE:	C:\JZ- Files\2012	JWZ Projects	Marble Bluff - Feasib Est\[To	tal Est - Marble Bluff Fishway
			Summary Sheet		- 12-2012.xlsx]Ex	ample - FC Su	mmary Sheet (3)	
PLANT ACCOUNT	РАҮ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Subtotal (abox	+ 1)					\$769 955 OO
		Subtotal (shee						\$768,855.00
		Subtotal (shee						\$124,500.00 \$397,887.50
		Subtotal						\$1,291,242.50
		Mobilizatio	n	5%	+/-			\$65,000.00
		Subtotal with	Mobilization					\$1,356,242.50
		Contract C	cost Allowances (Sum of):	15%	+/-			\$193,757.50
		Design	Contingencies, 15% (+/-)					
		APS, 0	% (+/-). Type of procurement: A	Assumes sealed	d bids, full and	d open com	petition	
		CONTRACT C	COST					\$1,550,000.00
			on Contingencies	25%	+/-			\$400,000.00
		FIELD COST	(Unit Price Level Oct 2012)					\$1,950,000.00
		Non-Contr	act Costs		To b	e determin	led by the appropria	te responsible office
		CONSTRUCTION COST						te responsible office
			opriate use and terminology, see	e Reclamation N	/lanual, Direct			09-02 and 09-03.
		QUAN	ITITIES			P	RICES	
BY			CHECKED	BY			CHECKED	
		_		Jerry Zande				
DATE PF	REPARE	D	PEER REVIEW / DATE	DATE PRE	PARED		PEER REVIEW / DA	ATE
				04/25/13				

PLANT	Existine Replace	n - Fishway Modifications g Fishway Modifications ement of Ladder #1 - Concrete	WOID:	Washoe Pro	-			
PLANT	Replace		WOID:	ΩΔ227	FOTUL			
PLANT		ement of Lauder #1 - Concrete	WOID.			ATE LEVEL:	Appraisal	
			REGION:	MP		RICE LEVEL:	Oct-12	
	EM EM			FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff Fi - 12-2012.xlsx]Example - FC Summary Sheet (3)				
	РАҮ ІТЕМ	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
	Δ.	11071117171011						
		MOBILIZATION						
		REMOVAL OF EXISTING STRUCTURES	68140					
		Assume removal, haul off and disposal of						
		Include cost of transportation and disposal						
		structures are 1'-0" thick and reinforced						
		Concrete Fish Ladder #1						
	a-01	Concrete (walls, floor, baffles & transition	าร)	260	CY	\$125.00	\$32,500.	
	a-02	Handrails		320	LF	\$12.00	\$3,840.	
	a-03	24" Concrete Pipe		120	LF	\$62.00	\$7,440.	
	a-04	EXCAVATION		3,200	CY	\$13.50	\$43,200.	
		Common, removal and disposal (max 3 i	miles)					
	a-05	COMPACTED BACKFILL Structural, hauled in from borrow (max 3	miles)	3,000	CY	\$20.00	\$60,000.	
	a-06	CAST-IN-PLACE CONCRETE		460	CY	\$1,050.00	\$483,000.	
		Includes 8' high wall 9' wide slab					· · ·	
	a-07	CONCRETE REINFORCEMENT rebar calculated assuming 150 lb/cy of c	oncrete	69,000	LB	\$1.55	\$106,950.	

	a-08	CEMENTIOUS MATERIAL cement calculated assuming 0.282 ton/c	v of concrete	130	TON	\$200.00	\$26,000.	
	a-09	TRANSITION RIPRAP 4-10" diam. well graded riprap (≈1.5 ton/		8	CY	\$150.00	\$1,200.0	
		•						
;	a-10	GRAVEL SURFACING 12' X 4" access road along the entire fish	nway	75	CY	\$63.00	\$4,725.	
		12 A + access road along the entire list	iway					
		SUBTOTAL THIS SHEE	Т				\$768,855.	
	QUANTITIES				Р	PRICES		
BY				_		CHECKED		
Bryan Heine				Jerry Zander DATE PREPARED PEER REVIEW / DATE				
DATE PREI 11/06/12		D PEER REVIEW / DATE	DATE BBES	ADED		PEER REVIEW / DATE		

FEATU		RECLAMATION	LOTIMA	PROJECT:						
	Bluff Dan	n - Fishway Modification g Fishway Modifications		•	Washoe Pro	oject				
		g Fishway Modifications ement of Ladder #1 - Co		WOID:	OA227	FSTIMA	TE LEVEL:	Appraisal		
	поршо	ment of Ludder #1 oc	norcie	REGION:	MP			Oct-12		
				FILE:	C:\JZ- Files\2012 \	MP UNIT PRICE LEVEL: Oct-12 IZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff File-2012.xlsx]Example - FC Summary Sheet (3)				
PLANT ACCOUNT	РАУ ІТЕМ	DESCI	RIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
	a-11	METALWORK								
	a-11	Handrails			880	LF	\$65.00	\$57,200.0		
		Along viewing a	rea and bridge		860		\$63.00	φ37,200.0		
	a-12	HDPE PIPE								
		24" diameter			450	LF	\$104.00	\$46,800.		
	a-13	DEWATERING minimal dewatering based on 1972 grou			1	LS	\$10,500.00	\$10,500.		
	a-14	CONTROL OF SURFAC	E WATER		1	LS	\$10,000.00	\$10,000.		
		3' high sandbag coff	erdam at upstream end c	of						
вү		QUANTITIES	SUBTOTAL THIS SHEET	BY		P	RICES	\$124,500.0		
Bryan H	einer	Jason W		Jerry Zande	r					
-	REPARE		EVIEW / DATE	DATE PREF			PEER REVIEW / DAT	E		
11/06/12			fford/ 10/16/12	04/25/13						

FEATU	EATURE:		PROJECT:					
Marble E	Bluff Dam	- Fishway Mo	odifications		Washoe Pro	oject		
	Existing	r Fishway Mod	difications					
	Replace	ement of Ladde	er #1 - Concrete	WOID:	OA227	ESTIMA	TE LEVEL:	Appraisal
	Metal B	affles		REGION:	MP	UNIT PE	RICE LEVEL:	Oct-12
				FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff - 12-2012.xlsx]Example - FC Summary Sheet (3)				
PLANT ACCOUNT	РАҮ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		METALMODIA	,					
	45	METALWORK			405.000	l D	A 0.50	
	a-15		DM WEIRS/BAFFLES		135,000	LB	\$8.50	\$1,147,500.00
			lual baffles include custom metal wo					
			kimately (2300#/baffle & 400#/guide)				
		assum	ne epoxy coating					
			SUBTOTAL THIS SHEET					\$1,147,500.00
		QUAN	NTITIES			Р	RICES	
BY			CHECKED	BY			CHECKED	
Bryan He			Jason Wagner	Jerry Zande				
DATE PR)	PEER REVIEW / DATE	DATE PREI	PARED		PEER REVIEW / DAT	E
11/06/12				04/25/13				

FEATU Marble	EATURE: arble Bluff Dam - Fishway Modifications Existing Fishway Modifications Replacement of Ladder #1 - Concrete			PROJEC	CT: Washoe Pr	oject				
		•		WOID:	OA227	ESTIMA	TE LEVEL:	Appraisal		
				REGION:	MP	UNIT PE	RICE LEVEL:	Oct-12		
			Summary Sheet	FILE:	FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff - 12-2012.xlsx]Example - FC Summary Sheet (3)					
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		Subtotal (shee	et 1)					\$768,855.00		
		Subtotal (shee						\$124,500.00		
		Subtotal (shee	· · · · · · · · · · · · · · · · · · ·					\$1,147,500.00		
		Subtotal						\$2,040,855.00		
		Mobilizatio	ın	5%	+/-			\$100,000.00		
		Subtotal with		0,0	.,			\$2,140,855.00		
		Contract C	Cost Allowances (Sum of):	15%	+/-			\$359,145.00		
			Contingencies, 15% (+/-) % (+/-). Type of procurement:	Assumes seale	ed bids, full and	l open com	petition			
		CONTRACT C	COST					\$2,500,000.00		
			on Contingencies (Unit Price Level Oct 2012)	25%	+/-			\$600,000.00 \$3,100,000.0 0		
		Non-Contr						te responsible office		
		CONSTRUCT	ION COST		To b	e determir	ned by the appropria	te responsible office		
		Ref.: For appl	ropriate use and terminology, see	e Reclamation	Manual, Direct	ives and St	tandards FAC; 09-01,	09-02 and 09-03.		
			ITITIES				RICES			
BY			CHECKED	BY Jerry Zand	or		CHECKED			
DATE PF	REPARE	ED .	PEER REVIEW / DATE	DATE PRE			PEER REVIEW / D/	ATE		
				04/25/13	04/25/13					

				SHEET_1_OF_3_					
FEATU	JRE:			PROJEC					
Marble E		n - Fishway Mo			Washoe Pro	ject			
		g Fishway Mod							
	Replace	ement of Ladd	er #1 - Rock	WOID:	OA227		TE LEVEL:	Appraisal	
				REGION:	MP	UNIT PF	RICE LEVEL:	Oct-12	
				FILE:	C:\JZ- Files\2012 J - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total nmary Sheet (3)	Est - Marble Bluff Fishway	
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		MOBILIZATIO	N						
		REMOVAL OF	F EXISTING STRUCTURES	68140					
		Assume re	emoval, haul off and disposal of						
		Include co	ost of transportation and disposal						
		structures	are 1'-0" thick and reinforced						
		Concrete I	Fish Ladder #1						
	c-01	Concre	ete (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.00	
	c-02	Handra	ails		320	LF	\$12.00	\$3,840.00	
	c-03	24" Co	oncrete Pipe		120	LF	\$62.00	\$7,440.00	
						6) (
	c-04	EXCAVATION		<u> </u>	5,000	CY	\$13.50	\$67,500.00	
		Comm	non, removal and disposal (max 3 n	niles)					
	c-05	COMPACTED	BACKFILL		2,200	CY	\$20.00	\$44,000.00	
		Structi	ural, hauled in from borrow (max 3	miles)					
	- 00	LADDEDLINI	NO DIDDAD		0.000	0)/	#00.00	#4.40.000.00	
	c-06	LADDER LINI	nG - RIPRAP diam. well graded riprap (≈1.5 ton/o	21/)	2,200	CY	\$68.00	\$149,600.00	
		410 (ulam. Well graded riprap (~ 1.0 tollic	·y)					
	c-07	GEOTEXTILE	FABRIC		5,700	SY	\$4.70	\$26,790.00	
		make	allowance for overlapping joints 3 f	eet					
	c-08	GRAVEL SUF			200	CY	\$63.00	\$12,600.00	
		12' X 2	4" access road along the fishway						
		ROCK CHEVE	RON WEIRS		39	WEIRS	+		
		indivia	lual weirs include one 4.5' and two	3'					
	c-09		eter boulder		39	EACH	\$810.00	\$31,590.00	
	c-10	3' diamete	er boulder		78	EACH	\$660.00	\$51,480.00	
	c-11	Grout in pl	lace		35	CY	\$650.00	\$22,750.00	
			CUPTOTAL TURCOUSES	-				¢4E0 000 00	
	SUBTOTAL THIS SHEET QUANTITIES					D	RICES	\$450,090.00	
BY						г	CHECKED		
	Bryan Heiner Jason Wagner			BY Jerry Zand	er				
	DATE PREPARED PEER REVIEW / DATE			DATE PRE			PEER REVIEW / DAT	E	
11/06/12			Brent Mefford/ 10/16/12	04/25/13			11, 1, 1, 1, 1		
							•		

FEATU	EATURE:		PROJECT:					
Marble E	Bluff Dan	ı - Fishway Mo	odifications		Washoe Pr	oject		
	Existing	g Fishway Mod	difications					
	Replace	ement of Laddo	er #1 - Rock	WOID:	OA227	ESTIMA	TE LEVEL:	Appraisal
				REGION:	MP	UNIT PR	RICE LEVEL:	Oct-12
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa	JWZ Projects\N ample - FC Sur	Marble Bluff - Feasib Est\[Tota nmary Sheet (3)	l Est - Marble Bluff Fishway
PLANT ACCOUNT	РАҮ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
	b-13	DEWATERING	G		1	LS	\$27,000.00	\$27,000.00
			to specify drain type				, ,	
			137+93 to 138+08 @ avg. 1.8 ft dra	wdown				
			out 12' long by 50' wide					
			1972 groundwater data					
	a-14	CONTROL OF	SURFACE WATER		1	LS	\$10,000.00	\$10,000.00
			ndbag cofferdam at upstream end o	f			, ,	
			, gravel drain and intermittent sump					
			·					
			SUBTOTAL THIS SHEET			_		\$37,000.00
		QUAN	NTITIES			Р	RICES	
BY			CHECKED	BY			CHECKED	
Bryan He			Jason Wagner	Jerry Zande				
DATE PF 11/06/12			PEER REVIEW / DATE Brent Mefford/ 10/16/12	DATE PRE 04/25/13	PARED		PEER REVIEW / DAT	[E
				04/25/13				

FEATU Marble	rature: orble Bluff Dam - Fishway Modifications Existing Fishway Modifications Replacement of Ladder #1 - Rock			PROJEC	T: Washoe Pi	roject			
		•		WOID:	OA227	ESTIM/	ATE LEVEL:	Appraisal	
	•			REGION:	MP		RICE LEVEL:	Oct-12	
			Summary Sheet	FILE:					
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		Subtotal (shee						\$450,090.00 \$37,000.00	
		Subtotal						\$487,090.00	
		Mobilizatio	n	5%	+/-			\$24,000.00	
		Subtotal with	Mobilization					\$511,090.00	
		Contract C	Cost Allowances (Sum of):	15%	+/-			\$78,910.00	
		Design	Contingencies, 15% (+/-)						
		APS, 0	0% (+/-). Type of procurement: /	Assumes seale	d bids, full and	d open com	petition		
		CONTRACT C	OST					\$590,000.00	
			on Contingencies	25%	+/-			\$140,000.00	
		FIELD COST	(Unit Price Level Oct 2012)					\$730,000.00	
		Non-Contr			+			te responsible office	
		CONSTRUCT	ION COST		10 0	be determi	ned by the appropria	te responsible office	
			opriate use and terminology, see	e Reclamation	Manual, Direc			09-02 and 09-03.	
		QUAN	ITITIES			F	PRICES		
BY			CHECKED	BY Jerry Zand	er		CHECKED		
DATE PF	REPARE	D	PEER REVIEW / DATE	DATE PRE 04/25/13	PARED		PEER REVIEW / DA	ATE	

FEAT				PROJECT		•		
Marble		n - Fishway Mod			Washoe Pro	oject		
		g Fishway Modi ement of Ladde		WOID:	OA227	FSTIMA	ATE LEVEL:	Appraisal
	перис	ement of Ladde	1 #2 - Odificiete	REGION:	MP		RICE LEVEL:	Oct-12
				FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff - 12-2012.xlsx]Example - FC Summary Sheet (3)				
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		MOBILIZATION	N					
		REMOVAL OF	EXISTING STRUCTURES	68140				
		Assume rei	moval, haul off and disposal of					
		Include cos	et of transportation and disposal					
		structures a	are 1'-0" thick and reinforced					
		Concrete F	ish Ladder #2					
	a-01	Concret	te (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.
	a-02	Handra	ils		320	LF	\$12.00	\$3,840.
	a-03	24" Cor	ncrete Pipe		120	LF	\$62.00	\$7,440.
	a-04	EXCAVATION			3,200	CY	\$13.50	\$43,200.
		Commo	on, removal and disposal (max 3 n	niles)				
	a-05	COMPACTED Structur	BACKFILL ral, hauled in from borrow (max 3	miles)	3,000	CY	\$20.00	\$60,000.
	a-06	CAST-IN-PLAC	CE CONCRETE		460	CY	\$1,050.00	\$483,000.
			high wall 9' wide slab				, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	*,
	a-07		EINFORCEMENT alculated assuming 150 lb/cy of co	oncrete	69,000	LB	\$1.55	\$106,950.0
	a-08	CEMENTIOUS	MATERIAI		130	TON	\$200.00	\$26,000.
	a 00		calculated assuming 0.282 ton/cy	of concrete	100	1014	Ψ200.00	Ψ20,000.
	a-09	TRANSITION F	RIPRAP iam. well graded riprap (≈1.5 ton/o	cy)	8	CY	\$150.00	\$1,200.0
	a-10	GRAVEL SURI	FACING		75	CY	\$63.00	\$4,725.
			access road along the entire fish	way	.0		\$33.33	4 .,. 20.
			SUBTOTAL THIS SHEET	г				\$768,855.
	QUANTITIES					P	RICES	7. 23,000.
ВҮ				BY		•	CHECKED	
- · Bryan H	einer		Jason Wagner	Jerry Zande				
-	ATE PREPARED PEER REVIEW / DATE			DATE PREPARED PEER REVIEW / DATE				
11/06/12			04/25/13					

			SHEET _Z_ OF _4_					
FEAT	JRE:			PROJEC [*]				
Marble	Bluff Dan	ı - Fishway Mo	difications		Washoe Pro	oject		
	Existing	g Fishway Mod	lifications					
	Replace	ement of Ladde	er #2 - Concrete	WOID:	OA227	ESTIM <i>A</i>	ATE LEVEL:	Appraisal
				REGION:	MP	UNIT PI	RICE LEVEL:	Oct-12
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa	Marble Bluff - Feasib Est\[Total mmary Sheet (3)	Est - Marble Bluff Fishway	
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		METALWORK	,					
	- 11	METALWORK Handrails	•		880	LF	ФОБ 00	ФЕ 7 000 00
	a-11		viewing area and bridge		660		\$65.00	\$57,200.00
	a-12	HDPE PIPE						
		24" diamet	er		450	LF	\$104.00	\$46,800.00
	d-13	DEWATERING	<u> </u>		1	LS	\$64,000.00	\$64,000.00
		from sta: 8	to specify drain type 18+00 to 89+75 @ avg. 2.0 ft drawd out 175' long by 50' wide	down				
		based on 1	1972 groundwater data					
	a-14	3' high san	SURFACE WATER odbag cofferdam at upstream end of gravel drain and intermittent sump		1	LS	\$10,000.00	\$10,000.00
			SUBTOTAL THIS SHEET	•				\$178,000.00
		QUAN	ITITIES			P	RICES	
BY				BY			CHECKED	
Bryan H	einer		Jason Wagner	Jerry Zande	r			
DATE P	REPAREI	D	PEER REVIEW / DATE	DATE PREF	PARED		PEER REVIEW / DAT	E
11/06/12	11/06/12 Brent Mefford/ 10/16/12			04/25/13				

FEATU	JRE:		LOTIMA	PROJECT:					
	Bluff Dan	ı - Fishway Mod			Washoe Pro	oject			
Existing Fishway Modifications Replacement of Ladder #2 - Concrete Concrete Baffles				WOID: OA227 ESTIMATE LEVEL:			ATE LEVEL:	Appraisal	
				REGION:	MP	UNIT PRICE LEVEL:		Oct-12	
				FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff Fishway - 12-2012.xlsx]Example - FC Summary Sheet (3)					
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
	b-15	CAST-IN-DI AC	CE CONCRETE		115	CY	\$1,250.00	\$143,750.0	
	D-13		les with 2.3 CY/baffle		113	O1	ψ1,230.00	ψ143,730.0	
		oo ban	00 Will 2.0 0 1/ballio						
	b-16	CONCRETE R	EINFORCEMENT		17,250	LB	\$1.55	\$26,737.5	
		<u> </u>	alculated assuming 150 lb/cy of co	oncrete	·				
	b-17	CEMENTIOUS	MATERIAL		33	TON	\$200.00	\$6,600.0	
		cement	t calculated assuming 0.282 ton/cy	of concrete					
	b-18	METALWORK							
		Each Baffle	e contains custom metal work:		24,000	LB	\$9.20	\$220,800.0	
		4X corr	ner supports 1/4"X7.5"X7.5'						
			lbs each)						
			ıstable panels 1/4"X23"(unbent)X7	7.5'					
		(14	7 lbs each)						
			SUBTOTAL THIS SHEET	г				\$397,887.	
		OLIAN	TITIES	PRICES					
ВҮ		WUAIN	CHECKED	вү					
Bryan Heiner Jason Wagner				Jerry Zandei					
DATE PREPARED PEER REVIEW / DATE				DATE PREP			PEER REVIEW / DATE		
11/06/12 Brent Mefford/ 10/16/12				04/25/13			. LEN NEVIEW / DAIL	-	

FEATURE: Marble Bluff Dam - Fishway Modifications Existing Fishway Modifications			PROJEC	T: Washoe Pr	oject					
		-	dder #2 - Concrete	WOID:	OA227	ESTIM <i>A</i>	TE LEVEL:	Appraisal		
				REGION:	REGION: MP UNIT PRICE LEVEL: Oct-12					
			Summary Sheet	FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Ex		Marble Bluff - Feasib Est\[To mmary Sheet (3)	tal Est - Marble Bluff Fishway		
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		Subtotal (shee	et 1)					\$768,855.00		
		Subtotal (shee	et 2)					\$178,000.00		
		Subtotal (shee	et 3)					\$397,887.50		
		Subtotal						\$1,344,742.50		
		Mobilizatio	nn	5%	+/-			\$67,000.00		
		Subtotal with		3,0	- ''			\$1,411,742.50		
		Contract C	Cost Allowances (Sum of):	15%	+/-			\$188,257.50		
		Design	Contingencies, 15% (+/-)							
		APS, 0	0% (+/-). Type of procurement:	Assumes seale	d bids, full and	d open com	petition			
		CONTRACT C	COST					\$1,600,000.00		
	Construction Contingencies				+/-			\$400,000.00		
		FIELD COST	(Unit Price Level Oct 2012)					\$2,000,000.00		
		Non-Contr			+		ned by the appropria			
		CONSTRUCT	ION COST		100	e determir	ned by the appropria	te responsible office		
			ropriate use and terminology, see	e Reclamation	Manual, Direct			09-02 and 09-03.		
QUANTITIES			PRICES							
			BY CHECKED							
			Jerry Zander			ATE				
			DATE PREPARED PEER REVIEW / DATE 04/25/13				AIC.			

a-02 Handrails 320 LF \$12.00 \$3,840. a-03 24" Concrete Pipe 120 LF \$62.00 \$7,440. a-04 EXCAVATION 3,200 CY \$13.50 \$43,200. Common, removal and disposal (max 3 miles) \$10.00 CY \$10.00 \$60,000. Structural, hauled in from borrow (max 3 miles) \$10.00 CY \$10.00 \$60,000. Structural, hauled in from borrow (max 3 miles) \$10.00 CY \$10.00 \$60,000. CAST-IN-PLACE CONCRETE 460 CY \$1,050.00 \$483,000. Includes 8' high wall 9' wide slab \$1.55 \$106,950. rebar calculated assuming 150 lb/cy of concrete \$10.00 CY \$1.00 CY					SHEET_1_OF_4_					
WOID:	FEATU	IRE:			PROJEC					
MOID: OA227 ESTIMATE LEVEL: Appraisal REGION: MP UNIT PRICE LEVEL: Oct-12 FILE: COLL-PRICED APPRAISAL PRICE COLL-PRICED APPRAISAL PRICE COLL-PRICED APPRAISAL PRICE COLL-PRICED APPRAISAL PRICE PRICE COLL-PRICE PRICE PRICE PRICE PRICE COLL-PRICE PRICE PRIC	Marble E		-			Washoe Pro	ject			
REGION: MP										
FILE: CNJZ: FlaceDDITZ_AVIZ ProgressMaretic Bluff - Feasib Ext[Total Eart - Morths Bluff Far 15 2012 Abilighton price - PC Surrowy Bheat (3) MOBILIZATION		Replace	ement of Ladde	er #2 - Concrete		OA227			Appraisal	
12-2012 xed/Enampso - FC Summery Shoot (3) 20					REGION:	MP	UNIT PF	RICE LEVEL:	Oct-12	
MOBILIZATION REMOVAL OF EXISTING STRUCTURES 68140					FILE:				Est - Marble Bluff Fishway	
REMOVAL OF EXISTING STRUCTURES 68140	PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
Assume removal, haul off and disposal of Include cost of transportation and disposal structures are 1'-0" thick and reinforced Concrete Fish Ladder #2 a-01 Concrete (wills, floor, baffles & transitions) 260 CY \$125.00 \$32,500. a-02 Handrails 320 LF \$12.00 \$3,840. a-03 24" Concrete Pipe 120 LF \$62.00 \$7,440. a-04 EXCAVATION 3,200 CY \$13.50 \$43,200. Common, removal and disposal (max 3 miles) a-05 COMPACTED BACKFILL 3,000 CY \$20.00 \$60,000. Structural, hauled in from borrow (max 3 miles) a-06 CAST-IN-PLACE CONCRETE 460 CY \$1,050.00 \$483,000. Includes 8' high wall 9' wide slab a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950. a-08 CEMENTIOUS MATERIAL 130 TON \$20.00 \$26,000. Cement calculated assuming 0.282 ton/cy of concrete a-08 CEMENTIOUS MATERIAL 130 TON \$20.00 \$26,000. TRANSITION RIPRAP 8 CY \$150.00 \$1,200. a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET \$768,855. PRICES BY GUANTITIES PY Bryan Heiner Jernicus Assuming DASS CHECKED BY Jenny Zander			MOBILIZATIO	N						
Include cost of transportation and disposal structures are 1"-0" thick and reinforced			REMOVAL OF	EXISTING STRUCTURES	68140					
Structures are 1'-0" thick and reinforced			Assume re	emoval, haul off and disposal of						
Concrete Fish Ladder #2			Include co	st of transportation and disposal						
a-01 Concrete (walls, fitor, baffles & transitions) 260 CY \$125.00 \$32,500 a-02 Handrails 320 LF \$12.00 \$3,840 a-03 24" Concrete Pipe 120 LF \$62.00 \$7,440 a-04 EXCAVATION 3,200 CY \$13.50 \$43,200 Common, removal and disposal (max 3 miles)			structures	are 1'-0" thick and reinforced						
a-02		Concrete Fish Ladder #2								
a-02		a-01	Concre	ete (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.00	
a-04 EXCAVATION 3,200 CY \$13.50 \$43,200. Common, removal and disposal (max 3 miles) a-05 COMPACTED BACKFILL 3,000 CY \$20.00 \$60,000. Structural, hauled in from borrow (max 3 miles) a-06 CAST-IN-PLACE CONCRETE 460 CY \$1,050.00 \$483,000. Includes 8' high wall 9' wide slab a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950. rebar calculated assuming 150 lb/cy of concrete a-08 CEMENTIOUS MATERIAL 130 TON \$200.00 \$26,000. cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (=1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET \$768,855. PRICES BY CHECKED BY CHECKED Bryan Heiner Jerney Jerry Zander		a-02	Handra	ails		320	LF	\$12.00	\$3,840.00	
Common, removal and disposal (max 3 miles)		a-03	24" Co	ncrete Pipe		120	LF	\$62.00	\$7,440.00	
Common, removal and disposal (max 3 miles)										
a-05 COMPACTED BACKFILL 3,000 CY \$20.00 \$60,000.		a-04	EXCAVATION	l		3,200	CY	\$13.50	\$43,200.00	
Structural, hauled in from borrow (max 3 miles)			Common, removal and disposal (max 3 r		niles)					
a-06 CAST-IN-PLACE CONCRETE		a-05	COMPACTED BACKFILL			3,000	CY	\$20.00	\$60,000.00	
Includes 8' high wall 9' wide slab			Structu	ural, hauled in from borrow (max 3 i	miles)					
Includes 8' high wall 9' wide slab										
a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950.		a-06				460	CY	\$1,050.00	\$483,000.00	
rebar calculated assuming 150 lb/cy of concrete			Includes 8	' high wall 9' wide slab				+		
a-08 CEMENTIOUS MATERIAL 130 TON \$200.00 \$26,000. cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES PRICES BY Bryan Heiner Jason Wagner Price S CHECKED BY Jerry Zander		a-07	CONCRETE F	REINFORCEMENT		69,000	LB	\$1.55	\$106,950.00	
cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (≈1.5 ton/cy) 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway \$768,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander			rebar d	calculated assuming 150 lb/cy of co	oncrete					
cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (≈1.5 ton/cy) 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway \$768,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander										
a-09 TRANSITION RIPRAP		a-08	•		_	130	TON	\$200.00	\$26,000.00	
4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET \$768,855. QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner Jerry Zander			cemen	t calculated assuming 0.282 ton/cy	of concrete					
4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET \$768,855. QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner Jerry Zander		a-09	TRANSITION	RIPRAP		8	CY	\$150.00	\$1,200.00	
SUBTOTAL THIS SHEET \$768,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander					cy)			¥100100	¥1,=0000	
SUBTOTAL THIS SHEET \$768,855. QUANTITIES PRICES BY CHECKED BY Bryan Heiner Jason Wagner Jerry Zander		5.40					CV	000.00	Ø4.705.00	
SUBTOTAL THIS SHEET \$768,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander		a-10	1		wav	/5	UΥ	\$63.00	\$4,725.00	
QUANTITIESPRICESBYCHECKEDBYCHECKEDBryan HeinerJason WagnerJerry Zander			12 7 4	access road along the entire fish	way					
BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander				SUBTOTAL THIS SHEET	-				\$768,855.00	
Bryan Heiner Jason Wagner Jerry Zander			QUAN	ITITIES			Р	RICES		
	вү	CHECKED			BY CHECKED					
DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE	Bryan He	Bryan Heiner Jason Wagner			Jerry Zande	er				
									≣	
11/06/12 Brent Mefford/ 10/16/12 04/25/13	11/06/12	/06/12 Brent Mefford/ 10/16/12			04/25/13					

		DDO JECT							
FEATU			PROJECT:						
Marble I		ı - Fishway Modifications		Washoe Pro	oject				
	Existing	g Fishway Modifications							
	Replace	ement of Ladder #2 - Concrete		WOID: 0A227 ESTIMATE LEVEL:			Appraisal		
			REGION:	REGION: MP UNIT PRICE LEVEL:					
			FILE:	C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total E - 12-2012.xlsx]Example - FC Summary Sheet (3)					
PLANT ACCOUNT	РАУ ІТЕМ	DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		METALWOOM							
		METALWORK				A			
	a-11	Handrails		880	LF	\$65.00	\$57,200.00		
		Along viewing area and bridge							
	a-12	HDPE PIPE							
	a 12	24" diameter		450	LF	\$104.00	\$46,800.00		
	d-13 DEWATERING			1	LS	\$64,000.00	\$64,000.00		
	contractor to specify drain type								
		from sta: 88+00 to 89+75 @ avg. 2.0 ft dra	wdown						
		zone is about 175' long by 50' wide							
		based on 1972 groundwater data							
	a-14			1	LS	\$10,000.00	\$10,000.00		
		3' high sandbag cofferdam at upstream end							
		work area, gravel drain and intermittent sur	пр ритр						
	+								
		SUBTOTAL THIS SHE	ĒΤ				\$178,000.00		
	QUANTITIES				F	RICES			
BY	BY CHECKED					CHECKED			
Bryan He	Bryan Heiner Jason Wagner		Jerry Zander						
DATE P	ATE PREPARED PEER REVIEW / DATE		DATE PREPARED PEER REVIEW / DATE						
11/06/12	1/06/12 Brent Mefford/ 10/16/12		04/25/13						

FEATU	FEATURE:			PROJECT:					
Marble E	Bluff Dan	n - Fishway Mo	odifications		Washoe Pro	oject			
	Existing	g Fishway Mod	difications						
	Replace	ement of Ladd	er #2 - Concrete	WOID:	OA227	ESTIMA	TE LEVEL:	Appraisal	
	Metal B	affles		REGION:	MP	UNIT PE	RICE LEVEL:	Oct-12	
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total mmary Sheet (3)	Est - Marble Bluff Fishway	
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		METALWORK	<u> </u>						
	a-15		OM WEIRS/BAFFLES		135,000	ΙB	\$8.50	\$1,147,500.00	
	a 15	•	Jual baffles include custom metal wo	ork	133,000		ψ0.50	ψ1,147,300.00	
	approximately (2300#/baffle & 400#/guid								
				7)					
		assum	ne epoxy coating						
	SUBTOTAL THIS SHEET							\$1,147,500.00	
	QUANTITIES			PRICES					
вү				BY CHECKED					
Bryan He			Jerry Zander						
			DATE PREPARED PEER REVIEW / DATE			E			
11/06/12 Brent Mefford/ 10/16/12			04/25/13						

FEATURE:			PROJEC [®]	T:							
		am - Fishway	Modifications		Washoe Pr	oject					
	Existin	ng Fishway M	odifications			-					
	Replac	ement of Lac	dder #2 - Concrete	WOID:	OA227	ESTIM/	TE LEVEL:	Appraisal			
				REGION:	REGION: MP UNIT PRICE LEVEL: Oct-12						
				FILE:							
			Summary Sheet		- 12-2012.xlsx]Ex	ample - FC Su	mmary Sheet (3)				
PLANT ACCOUNT	РАҮ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT			
		Cubtotal (ab a	÷ 4\					\$760.0EE.00			
		Subtotal (shee						\$768,855.00			
		Subtotal (shee	· · · · · · · · · · · · · · · · · · ·					\$178,000.00 \$1,147,500.00			
		Subtotal						\$2,094,355.00			
		Mobilizatio	n .	5%	+/-			\$105,000.00			
		Subtotal with		3 /0	T/-			\$2,199,355.00			
			Cost Allowances (Sum of):	15%	+/-			\$300,645.00			
			Contingencies, 15% (+/-)	1070	.,			φουσ,υ-ισ.σσ			
			0% (+/-). Type of procurement: /	Assumes sealed	d bids, full and	d open com	petition				
		CONTRACT C	COST	25%				\$2,500,000.00			
	Construction Contingencies FIELD COST (Unit Price Level Oct 2012)				+/-			\$700,000.00			
								\$3,200,000.00			
		Non-Contr			To b	e determi	ned by the appropria	te responsible office			
		CONSTRUCT	ION COST		To b	e determi	ned by the appropria	te responsible office			
			ropriate use and terminology, see	e Reclamation N	/Ianual, Direct			09-02 and 09-03.			
QUANTITIES			PRICES								
			BY CHECKED								
			Jerry Zander			\					
			DATE PREPARED PEER REVIEW / DATE			AIE					
			04/25/13								

				SHEET_1_OF_3_					
FEATU	IRE:			PROJEC					
Marble E		n - Fishway Mo			Washoe Pro	oject			
		g Fishway Mod							
	Replace	ement of Ladd	er #2 - Rock	WOID:	OA227		TE LEVEL:	Appraisal	
				REGION:	MP	UNIT PF	RICE LEVEL:	Oct-12	
				FILE:	C:\JZ- Files\2012 J - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total nmary Sheet (3)	Est - Marble Bluff Fishway	
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
		MOBILIZATIO	N						
		REMOVAL OF	EXISTING STRUCTURES	68140					
		Assume re	emoval, haul off and disposal of						
		Include co	est of transportation and disposal						
		structures are 1'-0" thick and reinforced							
		Concrete I	Fish Ladder #2						
	c-01	Concre	ete (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.00	
	c-02	Handra	ails		320	LF	\$12.00	\$3,840.00	
	c-03	24" Co	oncrete Pipe		120	LF	\$62.00	\$7,440.00	
	c-04	EXCAVATION	l		3,500	CY	\$13.50	\$47,250.00	
		Comm	on, removal and disposal (max 3 n	niles)					
	c-05	COMPACTED BACKFILL			3,300	CY	\$20.00	\$66,000.00	
		Structi	ural, hauled in from borrow (max 3	miles)					
	c-06	LADDER LINI		,	2,200	CY	\$68.00	\$149,600.00	
		4-10" (diam. well graded riprap (≈1.5 ton/d	<i>y)</i>					
	c-07	GEOTEXTILE	FABRIC		5,700	SY	\$4.70	\$26,790.00	
		make a	allowance for overlapping joints 3 f	eet					
							***	4	
	c-08	GRAVEL SUR			200	CY	\$63.00	\$12,600.00	
		12 X 2	4" access road along the fishway						
		ROCK CHEVE	RON WEIRS		39	WEIRS	+		
			lual weirs include one 4.5' and two	3'					
	c-09 4.5' diameter boulder				39	EACH	\$810.00	\$31,590.00	
	c-10	3' diameter boulder			+	EACH	\$660.00	\$51,480.00	
	c-11	Grout in pl	ace		35	CY	\$650.00	\$22,750.00	
			011576741 7112 6117					M 4 M 4 C 4C C -	
		CUA	SUBTOTAL THIS SHEET				DICEC	\$451,840.00	
DV	QUANTITIES CHECKED					Р	RICES		
BY Brian Ha				BY	or		CHECKED		
	yan Heiner Jason Wagner PEER REVIEW / DATE			Jerry Zande DATE PRE			PEER REVIEW / DAT	E	
11/06/12				04/25/13	IANED		I LEN NEVIEW / DAT	_	
55/12	/06/12 Brent Mefford/ 10/16/12			3 3/ 10					

FEATURE:			PROJECT:						
Marble I	Bluff Dan	n - Fishway Mo	odifications		Washoe Pro	oject			
	Existing	g Fishway Mod	difications						
	Replace	ement of Ladd	ler #2 - Rock	WOID:	OA227	ESTIM/	ATE LEVEL:	Appraisal	
				REGION:	MP	UNIT PI	RICE LEVEL:	Oct-12	
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total mmary Sheet (3)	Est - Marble Bluff Fishway	
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
	c-13	DEWATERIN	G		1	LS	\$40,000.00	\$40,000.00	
			r to specify drain type						
			93+60 to 94+08 @ avg. 1.85 ft draw	/down					
			oout 48' long by 50' wide						
	based on 1972 groundwater data								
			5						
	a-14	CONTROL O	F SURFACE WATER		1	LS	\$10,000.00	\$10,000.00	
	3' high sandbag cofferdam at upstream end						, ,		
			n, gravel drain and intermittent sump						
			,						
			SUBTOTAL THIS SHEET	•				\$50,000.00	
		QUA	NTITIES			F	RICES		
вү	BY CHECKED			вү			CHECKED		
Bryan He	Bryan Heiner Jason Wagner			Jerry Zande	er				
DATE PI	DATE PREPARED PEER REVIEW / DATE			DATE PRE	PARED		PEER REVIEW / DAT	E	
11/06/12	<u>!</u>		Brent Mefford/ 10/16/12	04/25/13					
11/06/12 Brent Mellord/ 10/16/12						-			

FEATU	FEATURE:			PROJECT:					
Marble	Bluff D	am - Fishway	/ Modifications		Washoe P	roject			
	Existir	ng Fishway M	lodifications						
	Replac	cement of Lac	dder #2 - Rock	WOID:	OA227	ESTIMA	ATE LEVEL:	Appraisal	
				REGION:	MP	UNIT P	RICE LEVEL:	Oct-12	
				FILE:	C:\JZ- Files\2012	2 JWZ Projects	\Marble Bluff - Feasib Est\[To	otal Est - Marble Bluff Fishwa	
	_	_	Summary Sheet		- 12-2012.xlsx]Ex	ample - FC Sι	ımmary Sheet (3)		
r F	ΕM								
PLANT ACCOUNT	РАҮ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
∢	а.								
		0.14 + 14 1						A454 040 00	
		Subtotal (shee	<u> </u>					\$451,840.00	
		Subtotal (shee	et 2)					\$50,000.00	
		+					+		
		+					+		
		+					+		
		+					+		
		Subtotal						\$501,840.00	
		Mobilizatio	<u> </u>	5%	+/-			\$25,000.00	
		Subtotal with		376	+/-			\$25,000.00 \$526,840.00	
		+	Cost Allowances (Sum of):	15%	+/-			\$83,160.00	
			n Contingencies, 15% (+/-)	1370	τ/-			ψ05,100.00	
			0% (+/-). Type of procurement:	Assumes seale	l d bids. full and	d open com	npetition		
		CONTRACT C			,		1	\$610,000.00	
		+	on Contingencies	25%	+/-			\$150,000.00	
			(Unit Price Level Oct 2012)	2070	.,			\$760,000.00	
			· · · · · · · · · · · · · · · · · · ·					¥ 100,000	
		Non-Contr	ract Costs		To k	e determi	ned by the appropria	te responsible office	
		CONSTRUCT						te responsible office	
		Ref.: For app	ropriate use and terminology, see	e Reclamation N	Manual, Direc	tives and S	tandards FAC; 09-01,	09-02 and 09-03.	
		QUAN	NTITIES			F	RICES		
BY			BY CHECKED						
		Jerry Zander							
DATE PREPARED PEER REVIEW / DATE		DATE PREPARED PEER REVIEW / DATE			ATE				
			04/25/13						
				04/25/13					

a-02					SHEET_1_OF_4_					
Resisting Fishway Modifications Replacement of Ladder #3 - Concrete Region: MP UNIT PRICE LEVEL: Oct-12	FEATU	IRE:			PROJEC					
MOID: OA227 ESTIMATE LEVEL: Appraisal REGION: MP UNIT PRICE LEVEL: Oct-1- FILE: CLUR-REGION: MP UNIT PRICE LEVEL: Action of the file: MP UNIT PRICE LEVEL: And Unit Price Level: MP UNIT PRICE LEVEL: Action of the file: MP UNIT PRICE LEVEL: And UNIT PRICE LEVEL: Action of the file: MP UNIT PRICE LEVEL: Action of the file: MP UNIT PRICE	Marble E		-			Washoe Pro	ject			
REGION: MP										
FILE: CNZ. Filesciet 2 JMZ Progeostivatide Buil - Feate Ext[Total Ear - Markle Buill Fish 12 2012 Analytic PED Sentrory Breat (i) Page		Replace	ement of Ladde	er #3 - Concrete					Appraisal	
12.2012.insigle-ample. PC Summary Sheet (s)					REGION:	MP	UNIT PF	RICE LEVEL:	Oct-12	
MOBILIZATION					FILE:				Est - Marble Bluff Fishway	
REMOVAL OF EXISTING STRUCTURES 68140	PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT	
Assume removal, haul off and disposal of Include cost of transportation and disposal structures are 1'-0' thick and reinforced Concrete [Fish Ladder #3			MOBILIZATIO	N						
Include cost of transportation and disposal structures are 1'-0" thick and reinforced			REMOVAL OF	EXISTING STRUCTURES	68140					
Structures are 1°-0° thick and reinforced Concrete Fish Ladder #3 Concrete (walls, floor, baffles & transitions) 260 CY \$125.00 \$32,500.			Assume re	emoval, haul off and disposal of						
Concrete Fish Ladder #3			Include co	st of transportation and disposal						
a-01 Concrete (walls, floor, baffles & transitions) 260 CY \$125.00 \$32,500. a-02 Handrails 320 LF \$12.00 \$3,840. a-03 24" Concrete Pipe 120 LF \$62.00 \$7,440. a-04 EXCAVATION 3,200 CY \$13.50 \$43,200. Common, removal and disposal (max 3 miles)			structures	are 1'-0" thick and reinforced						
a-02		Concrete Fish Ladder #3								
a-02		a-01	Concre	ete (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.00	
a-04 EXCAVATION a-05 COMPACTED BACKFILL a-05 COMPACTED BACKFILL 3,100 CY \$20.00 \$62,000.0 Structural, hauled in from borrow (max 3 miles) a-06 CAST-IN-PLACE CONCRETE 460 CY \$1,050.00 \$483,000.0 Includes 8' high wall 9' wide slab a-07 CONCRETE REINFORCEMENT rebar calculated assuming 150 lb/cy of concrete a-08 CEMENTIOUS MATERIAL 130 TON \$200.00 \$26,000.0 cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200.0 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725.0 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES PRICES BY Bryan Heiner Jason Wagner Jerry Zander PEER REVIEW / DATE		a-02 Handrails				320	LF	\$12.00	\$3,840.00	
Common, removal and disposal (max 3 miles)		a-03	24" Co	ncrete Pipe		120	LF	\$62.00	\$7,440.00	
Common, removal and disposal (max 3 miles)										
a-05 COMPACTED BACKFILL 3,100 CY \$20.00 \$62,000.00 Structural, hauled in from borrow (max 3 miles) a-06 CAST-IN-PLACE CONCRETE 460 CY \$1,050.00 \$483,000.00 Includes 8' high wall 9' wide slab a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950.00 rebar calculated assuming 150 lb/cy of concrete a-08 CEMENTIOUS MATERIAL 50 TON \$200.00 \$26,000.00 cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200.00 4-10" diam. well graded riprap (=1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES BY Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE		a-04	EXCAVATION	l		3,200	CY	\$13.50	\$43,200.00	
Structural, hauled in from borrow (max 3 miles)			Common, removal and disposal (max 3 n		niles)					
a-06 CAST-IN-PLACE CONCRETE		a-05	COMPACTED BACKFILL			3,100	CY	\$20.00	\$62,000.00	
Includes 8' high wall 9' wide slab			Structu	ural, hauled in from borrow (max 3 i	miles)					
Includes 8' high wall 9' wide slab										
a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950.0 rebar calculated assuming 150 lb/cy of concrete a-08 CEMENTIOUS MATERIAL 130 TON \$200.00 \$26,000.0 cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200.0 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725.0 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET PRICES BY CHECKED By Bryan Heiner Date PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE		a-06				460	CY	\$1,050.00	\$483,000.00	
rebar calculated assuming 150 lb/cy of concrete			Includes 8	' high wall 9' wide slab						
a-08 CEMENTIOUS MATERIAL cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP a-09 TRANSITION RIPRAP a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING b-12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES BY CHECKED BY Bryan Heiner DATE PREPARED CHECKED BY DATE PREPARED CHECKED S200.00 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$26,000.1 \$1,200.0 \$1,200.0 \$1,200.0 \$4,725.0 \$4,725.0 \$63.00 \$4,725.0 \$770,850.0 \$770,855.0 \$770,855.0 \$770,855.0 \$770,855.0 \$770,855.0 \$770,855.0 \$770,855.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,850.0 \$770,85		a-07	CONCRETE F	REINFORCEMENT		69,000	LB	\$1.55	\$106,950.00	
a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200.00 4-10" diam. well graded riprap (≈1.5 ton/cy) 75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway \$75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway \$770,855.00 \$770,855.00 QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE			rebar d	calculated assuming 150 lb/cy of co	ncrete					
a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200.00 4-10" diam. well graded riprap (≈1.5 ton/cy) 75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway \$75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway \$770,855.00 \$770,855.00 QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE										
a-09 TRANSITION RIPRAP a-09 TRANSITION RIPRAP 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES PRICES BY Bryan Heiner Jason Wagner DATE PREPARED B CY \$150.00 \$1,200.		a-08	•			130	TON	\$200.00	\$26,000.00	
4-10" diam. well graded riprap (≈1.5 ton/cy) 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway 50 \$4,725.00 SUBTOTAL THIS SHEET \$770,855.00 QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner DATE PREPARED PEER REVIEW / DATE			cemen	t calculated assuming 0.282 ton/cy	of concrete					
4-10" diam. well graded riprap (≈1.5 ton/cy) 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725.00 12' X 4" access road along the entire fishway \$770,855.00 SUBTOTAL THIS SHEET \$770,855.00 QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner DATE PREPARED PEER REVIEW / DATE		a-09	TRANSITION	RIPRAP		8	CY	\$150.00	\$1,200.00	
SUBTOTAL THIS SHEET \$770,855.0 QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE					sy)			¥100100	¥1,=0000	
SUBTOTAL THIS SHEET \$770,855.0 QUANTITIES PRICES BY CHECKED BY Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE		5.40					CV	000.00	Ø4.705.00	
SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE		a-10	1		Way	/5	UΥ	\$63.00	\$4,725.00	
QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE			12 7 4	access road along the entire listi	way					
BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE				SUBTOTAL THIS SHEET	•				\$770,855.00	
Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE			QUAN	ITITIES			Р	RICES		
DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE	вү	CHECKED			BY CHECKED					
	Bryan He	Bryan Heiner Jason Wagner			Jerry Zander					
						PARED		PEER REVIEW / DATI	≣	
11/06/12 Brent Mefford/ 10/16/12 04/25/13	11/06/12	/06/12 Brent Mefford/ 10/16/12			04/25/13					

				DDO IFOT:						
FEATU				PROJECT:						
Marble l		n - Fishway Mo			Washoe Pro	oject				
	Existing	g Fishway Mod	lifications							
	Replace	ement of Ladde	er #3 - Concrete	WOID:	OA227	ESTIMATE LEVEL:		Appraisal		
				REGION:	Oct-12					
				FILE:	FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Mar - 12-2012.xlsx]Example - FC Summary Sheet (3)					
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
	0.11	METALIMORK								
	a-11	METALWORK			000	LF	ФС <u>Г</u> 00	ФБ7 000 00		
		Handrails			880	LF	\$65.00	\$57,200.00		
		Along \	viewing area and bridge							
	a-12	HDPE PIPE								
	24" diameter				450	LF	\$104.00	\$46,800.00		
	- 40	DEMATERIES				1.0	040.500.00	#40.500.00		
	a-13 DEWATERING minimal dewatering is anticipated				1	LS	\$10,500.00	\$10,500.00		
		based on 1	1972 groundwater data							
	a-14	CONTROL OF	SURFACE WATER		1	LS	\$10,000.00	\$10,000.00		
		3' high san	ndbag cofferdam at upstream end o	of						
		work area,	gravel drain and intermittent sump	ритр						
			SUBTOTAL THIS SHEET	,				\$124,500.00		
	QUANTITIES					Р	RICES	·		
вү			BY			CHECKED				
Bryan He	ryan Heiner Jason Wagner			Jerry Zander						
DATE P	ATE PREPARED PEER REVIEW / DATE		DATE PREPARED PEER REVIEW / DATE							
11/06/12	1/06/12 Brent Mefford/ 10/16/12		04/25/13							

				SHEET 3_OF 4_						
FEATU	JRE:			PROJECT:						
Marble l		n - Fishway Mo g Fishway Mod			Washoe Pro	oject				
			er #3 - Concrete	WOID:	WOID: OA227 ESTIMATE LEVEL:			Appraisal		
	-	te Baffles		REGION:	MP		RICE LEVEL:	Oct-12		
				FILE:		 WZ Projects	Marble Bluff - Feasib Est\[Total E			
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
	b-15	CAST-IN-PLA	CE CONCRETE		115	CY	\$1,250.00	\$143,750.00		
		50 bafi	fles with 2.3 CY/baffle							
	b-16	-	REINFORCEMENT	<u> </u>	17,250	LB	\$1.55	\$26,737.50		
	rebar calculated assuming 150 lb/cy of o									
	b-17 CEMENTIOUS MATERIAL				33	TON	\$200.00	\$6,600.00		
	cement calculated assuming 0.282 ton/c				30		720000	+ -, 55 5.50		
	b-18	METALWORK								
	Each Baffle contains custom metal work: 4X corner supports 1/4"X7.5"X7.5'				24,000	LB	\$9.20	\$220,800.00		
	(48 lbs each) 2X adjustable panels 1/4"X23"(unbent)X			7.5'						
			17 lbs each)							
	-									
	†									
			SUBTOTAL THIS SHEET	Г				\$397,887.50		
		QUAN	ITITIES			Р	RICES			
BY				BY			CHECKED			
	Bryan Heiner Jason Wagner			Jerry Zander						
	PATE PREPARED PEER REVIEW / DATE 1/06/12 Brent Mefford/ 10/16/12			DATE PREPARED 04/25/13 PEER REVIEW / DATE						
1 1/00/12	1/06/12 Brent Mefford/ 10/16/12			04/25/13						

Marble l	FEATURE: Marble Bluff Dam - Fishway Modifications Existing Fishway Modifications				CT: Washoe Pr	oject		
		•	dder #3 - Concrete	WOID:	OA227	ESTIM <i>A</i>	TE LEVEL:	Appraisal
				REGION:	MP	UNIT PI	RICE LEVEL:	Oct-12
			Summary Sheet	FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Ex			tal Est - Marble Bluff Fishway
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		Subtotal (shee	et 1)					\$770,855.00
		Subtotal (shee						\$124,500.00
		Subtotal (shee						\$397,887.50
		Subtotal						\$1,293,242.50
		Mobilizatio	n	5%	+/-			\$65,000.00
		Subtotal with		370	17-			\$1,358,242.50
			Cost Allowances (Sum of):	15%	+/-			\$191,757.50
		Design	Contingencies, 15% (+/-) (+/-). Type of procurement: /	Assumes seale	ed bids, full and	d open com	petition	
		CONTRACT C	COST					\$1,550,000.00
			on Contingencies (Unit Price Level Oct 2012)	25%	+/-			\$400,000.00 \$1,950,000.0 0
		Non-Contr						te responsible office te responsible office
		CONSTRUCT	ION COST		10.0	e determir	led by the appropria	te responsible office
		Ref.: For app	opriate use and terminology, see	Reclamation	<u>I</u> Manual, Direct	ives and St	tandards FAC; 09-01,	09-02 and 09-03.
		QUAN	ITITIES			P	RICES	
			BY Jerry Zando	er		CHECKED		
DATE PREPARED PEER REVIEW / DATE			DATE PREPARED PEER REVIEW / DATE 04/25/13			ATE		

a-02			RECLAMATION	ESTIMA	SHEET_1_OF_4_						
Replacement of Ladder #3 - Concrete Region: MP	FEATU	IRE:			PROJEC						
MOID: OA227 ESTIMATE LEVEL: Appraisal REGION: MP OUNT PRICE LEVEL: Oct-1- FILE: CLUE-REGION: MP OUNT PRICE LEVEL: CLUE-REGION: MP OUNT PRICE PRICE PRICE PRICE PRICE OCC-1- FILE: CLUE-REGION: MP OUNT PRICE PRICE PRICE PRICE PRICE OCC-1- FILE: CLUE-REGION: MP OUNT PRICE PRIC	Marble E		-			Washoe Pro	ject				
REGION: MP											
FILE: C.V.Z. Floed/012 JWZ Protest/Market Bluff - Feasib Ent/Total Ear - Martine Bluff Fair 12 2022 Abd/Sparryte* FC Surmary States (I) Page		Replace	ement of Ladde	er #3 - Concrete		OA227			Appraisal		
DESCRIPTION CODE QUANTITY UNIT UNIT PRICE AMOUNT					REGION:	MP	UNIT PF	RICE LEVEL:	Oct-12		
MOBILIZATION REMOVAL OF EXISTING STRUCTURES 68140					FILE:				Est - Marble Bluff Fishway		
REMOVAL OF EXISTING STRUCTURES 68140	PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
Assume removal, haul off and disposal of Include cost of transportation and disposal structures are 1'-0" thick and reinforced Concrete [Fish Ladder #3			MOBILIZATIO	N							
Include cost of transportation and disposal structures are 1'-0" thick and reinforced			REMOVAL OF	EXISTING STRUCTURES	68140						
Structures are 1'-0" thick and reinforced Concrete Fish Ladder #3			Assume re	emoval, haul off and disposal of							
Concrete Fish Ladder #3			Include co	st of transportation and disposal							
a-01 Concrete (walls, floor, baffles & transitions) 260 CY \$125.00 \$32,500. a-02 Handrails 320 LF \$12.00 \$3,840. a-03 24" Concrete Pipe 120 LF \$62.00 \$7,440. a-04 EXCAVATION 3,200 CY \$13.50 \$43,200. Common, removal and disposal (max 3 miles)			structures	are 1'-0" thick and reinforced							
a-02			Concrete F	Fish Ladder #3							
a-02		a-01	Concre	ete (walls, floor, baffles & transition	s)	260	CY	\$125.00	\$32,500.00		
a-04 EXCAVATION a-05 COMPACTED BACKFILL a-05 COMPACTED BACKFILL a-06 CAST-IN-PLACE CONCRETE a-07 CONCRETE REINFORCEMENT rebar calculated assuming 150 lb/cy of concrete a-08 CEMENTIOUS MATERIAL a-09 TRANSITION RIPRAP a-09 TRANSITION RIPRAP a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING SUBTOTAL THIS SHEET QUANTITIES BY Bryan Heiner Date PREPARED PEER REVIEW / DATE OCCUMPACTED BACKFILL 3,200 CY \$13.50 \$43,200. \$443,200. \$443,200. \$443,200. \$440. \$440. \$440. \$440. \$440. \$440. \$440. \$440. \$440. \$40. \$440. \$40		a-02	Handra	ails		320	LF	\$12.00	\$3,840.00		
Common, removal and disposal (max 3 miles)		a-03	24" Co	ncrete Pipe		120	LF	\$62.00	\$7,440.00		
Common, removal and disposal (max 3 miles)											
a-05 COMPACTED BACKFILL 3,100 CY \$20.00 \$62,000.		a-04	EXCAVATION	l		3,200	CY	\$13.50	\$43,200.00		
Structural, hauled in from borrow (max 3 miles)			Comm	on, removal and disposal (max 3 m	niles)						
a-06 CAST-IN-PLACE CONCRETE		a-05	COMPACTED	BACKFILL		3,100	CY	\$20.00	\$62,000.00		
Includes 8' high wall 9' wide slab			Structu	ural, hauled in from borrow (max 3 i	miles)						
Includes 8' high wall 9' wide slab											
a-07 CONCRETE REINFORCEMENT 69,000 LB \$1.55 \$106,950.		a-06				460	CY	\$1,050.00	\$483,000.00		
rebar calculated assuming 150 lb/cy of concrete			Includes 8	' high wall 9' wide slab							
a-08 CEMENTIOUS MATERIAL cement calculated assuming 0.282 ton/cy of concrete a-09 TRANSITION RIPRAP a-09 TRANSITION RIPRAP a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING a-10 GRAVEL SURFACING b-12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES BY CHECKED BY Bryan Heiner DATE PREPARED CHECKED BY DATE PREPARED CEMENTIOUS MATERIAL 130 TON \$200.00 \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$26,000. \$1,200.		a-07	CONCRETE F	REINFORCEMENT		69,000	LB	\$1.55	\$106,950.00		
a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (≈1.5 ton/cy) 5 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway 5 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway 5 CY \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE			rebar o	calculated assuming 150 lb/cy of co	ncrete						
a-09 TRANSITION RIPRAP 8 CY \$150.00 \$1,200. 4-10" diam. well graded riprap (≈1.5 ton/cy) 5 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway 5 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway 5 CY \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE											
a-09 TRANSITION RIPRAP a-09 TRANSITION RIPRAP A-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 12' X 4" access road along the entire fishway SUBTOTAL THIS SHEET QUANTITIES PRICES BY Bryan Heiner Jason Wagner DATE PREPARED B CY \$150.00 \$1,200. \$1,200. \$4,725. CY \$63.00 \$4,725. \$770,855. \$770,855. CHECKED BY CHECKED Jason Wagner DATE PREPARED PEER REVIEW / DATE		a-08	•			130	TON	\$200.00	\$26,000.00		
4-10" diam. well graded riprap (≈1.5 ton/cy) 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway \$770,855. SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner DATE PREPARED PEER REVIEW / DATE		cement calculated assuming 0.282 ton/c									
4-10" diam. well graded riprap (≈1.5 ton/cy) 4-10" diam. well graded riprap (≈1.5 ton/cy) a-10 GRAVEL SURFACING 75 CY \$63.00 \$4,725. 12' X 4" access road along the entire fishway \$770,855. SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED Bryan Heiner Jason Wagner DATE PREPARED PEER REVIEW / DATE		a-09	TRANSITION	RIPRAP		8	CY	\$150.00	\$1,200.00		
SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE					sy)			¥100100	¥1,=0000		
SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE		5.40	ODAVEL OUT	TEACINIC.			CV	000.00	Ø4.705.00		
SUBTOTAL THIS SHEET \$770,855. QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE PEER REVIEW / DATE		a-10	1		Way	/5	UΥ	\$63.00	\$4,725.00		
QUANTITIES PRICES BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE			12 7 4	access road along the entire listi	way						
BY CHECKED BY CHECKED Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE				SUBTOTAL THIS SHEET	•				\$770,855.00		
Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE			QUAN	ITITIES			Р	RICES			
DATE PREPARED PEER REVIEW / DATE DATE PREPARED PEER REVIEW / DATE	вү			CHECKED	вү	BY CHECKED					
	Bryan He	Bryan Heiner Jason Wagner			Jerry Zande	erry Zander					
	DATE PREPARED PEER REVIEW / DATE				PARED		PEER REVIEW / DATI	=			
11/06/12 Brent Mefford/ 10/16/12 04/25/13	11/06/12			Brent Mefford/ 10/16/12	04/25/13						

	luff Dam Existing	n - Fishway Modifications n Fishway Modifications nement of Ladder #3 - Concrete	WOID: REGION:	Washoe Pro		ATE LEVEL:	Appraisal
i	Existing Replace	Fishway Modifications	WOID: REGION:	OA227		ATF I EVEL:	Annraisal
,	Replace		REGION:		ESTIM/	ATF I FVFI :	Annraisal
		ement of Ladder #3 - Concrete	REGION:		ESTIM/	ATF I FVFI:	Annraisal
PLANT ACCOUNT	PAY ITEM						
PLANT ACCOUNT	PAY ITEM			MP	UNIT P	RICE LEVEL:	Oct-12
PLANT ACCOUNT	PAY ITEM		FILE:	C:\JZ- Files\2012	IWZ Projects\ mple - FC Su	Marble Bluff - Feasib Est\[Total E mmary Sheet (3)	st - Marble Bluff Fishwa
		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT
		METALWORK					
	a-11	Handrails		880	LF	\$65.00	\$57,200.00
	a-11			000	-	\$65.00	φ37,200.00
		Along viewing area and bridge					
	a-12	HDPE PIPE					
	u 12	24" diameter		450	LF	\$104.00	\$46,800.00
						·	. ,
	a-13	DEWATERING		1	LS	\$10,500.00	\$10,500.00
		minimal dewatering is anticipated					
		based on 1972 groundwater data					
	a-14	CONTROL OF SURFACE WATER		1	LS	\$10,000.00	\$10,000.00
		3' high sandbag cofferdam at upstream end c	f				
	work area, gravel drain and intermittent sum						
		SUBTOTAL THIS SHEET					\$124,500.00
		QUANTITIES			F	PRICES	ψ12 -1 ,300.00
BY		CHECKED	вү			CHECKED	
Bryan Hei	iner	Jason Wagner	Jerry Zande	r			
DATE PRI			DATE PREPARED PEER REVIEW / DATE				
11/06/12		Brent Mefford/ 10/16/12	04/25/13				

FEATURE:				PROJECT:						
Marble E	Bluff Dam	ı - Fishway Mo	odifications	Washoe Project						
	Existing	g Fishway Mod	difications							
	Replace	ement of Ladd	er #3 - Concrete	WOID:	OA227	ESTIMA	TE LEVEL:	Appraisal		
	Metal B	affles		REGION:	MP	UNIT PE	RICE LEVEL:	Oct-12		
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total mmary Sheet (3)	Est - Marble Bluff Fishway		
PLANT ACCOUNT	РАҮ ІТЕМ	DESCRIPTION			QUANTITY	UNIT	UNIT PRICE	AMOUNT		
		METALWOOD	,							
	45	METALWORK			405.000	l D	A 0.50			
	a-15		DM WEIRS/BAFFLES		135,000	LB	\$8.50	\$1,147,500.00		
			lual baffles include custom metal wo							
			kimately (2300#/baffle & 400#/guide)						
		assum	ne epoxy coating							
	SUBTOTAL THIS SHEET							\$1,147,500.00		
QUANTITIES				PRICES						
BY CHECKED			BY			CHECKED				
Bryan He			Jason Wagner	Jerry Zande						
DATE PR		ס	PEER REVIEW / DATE	DATE PREI	PARED		PEER REVIEW / DAT	E		
11/06/12 Brent Mefford/ 10/16/12				04/25/13						

FEATU Marble	Bluff D	am - Fishway ng Fishway M	Modifications	PROJEC	PROJECT: Washoe Project						
		-	dder #3 - Concrete	WOID:	OA227	ESTIMATE LEVEL:		Appraisal			
					MP		RICE LEVEL:	Oct-12			
			Summary Sheet	FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Ex			ital Est - Marble Bluff Fishway			
PLANT ACCOUNT	PAY ITEM	W E E DESCRIPTION		CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT			
		Subtotal (shee	et 1)					\$770,855.00			
		Subtotal (shee	·					\$124,500.00			
		Subtotal (shee	•					\$1,147,500.00			
		Subtotal						\$2,042,855.00			
		Mobilizatio	on	5%	+/-			\$100,000.00			
		Subtotal with	Mobilization					\$2,142,855.00			
		Contract C	Cost Allowances (Sum of):	15%	+/-			\$357,145.00			
			n Contingencies, 15% (+/-) 0% (+/-). Type of procurement: //	Assumes seale	ed bids, full and	d open com	petition				
		CONTRACT C	COST					\$2,500,000.00			
	Construction Contingencies FIELD COST (Unit Price Level Oct 2012)			25%	+/-			\$600,000.00 \$3,100,000.00			
		Non Contr			Tab	a data main	d but the annual	to many and it is a ffine			
		Non-Contr						te responsible office te responsible office			
			ropriate use and terminology, see	e Reclamation	Manual, Direct			09-02 and 09-03.			
QUANTITIES				PRICES							
BY			CHECKED	BY Jerry Zand	BY CHECKED Jerry Zander						
DATE PREPARED PEER REVIEW / DATE				DATE PRE 04/25/13	PARED		PEER REVIEW / DA	ATE			

FEATURE: PROJECT: Marble Bluff Dam - Fishway Modifications **Washoe Project Existing Fishway Modifications** WOID: **OA227** ESTIMATE LEVEL: Replacement of Ladder #3 - Rock **Appraisal** MΡ UNIT PRICE LEVEL: REGION: Oct-12 FILE: C:\JZ- Files\2012 JWZ Projects\Marble Bluff - Feasib Est\[Total Est - Marble Bluff Fishway - 12-2012.xlsx]Example - FC Summary Sheet (3) PLANT PAY ITEN DESCRIPTION CODE QUANTITY UNIT UNIT PRICE AMOUNT MOBILIZATION REMOVAL OF EXISTING STRUCTURES 68140 Assume removal, haul off and disposal of Include cost of transportation and disposal structures are 1'-0" thick and reinforced Concrete Fish Ladder #3 CY c-01 Concrete (walls, floor, baffles & transitions) 260 \$125.00 \$32,500.00 LF c-02 Handrails 320 \$12.00 \$3,840.00 LF c-03 24" Concrete Pipe 120 \$62.00 \$7,440.00 CY **EXCAVATION** 5,600 \$75,600.00 c-04 \$13.50 Common, removal and disposal (max 3 miles) c-05 COMPACTED BACKFILL 3,400 CY \$20.00 \$68,000.00 Structural, hauled in from borrow (max 3 miles) LADDER LINING - RIPRAP 2.200 CY \$149,600.00 c-06 \$68.00 4-10" diam. well graded riprap (≈1.5 ton/cy) SY c-07 GEOTEXTILE FABRIC 5,700 \$4.70 \$26,790.00 make allowance for overlapping joints 3 feet c-08 GRAVEL SURFACING 200 CY \$63.00 \$12,600.00 12' X 4" access road along the fishway 39 WEIRS ROCK CHEVRON WEIRS individual weirs include one 4.5' and two 3' c-09 4.5' diameter boulder 39 EACH \$810.00 \$31,590.00 3' diameter boulder 78 EACH \$660.00 \$51,480.00 c-10 c-11 Grout in place 35 CY \$650.00 \$22,750.00 SUBTOTAL THIS SHEET \$482,190.00 **QUANTITIES PRICES** BY **CHECKED** ΒY **CHECKED** Bryan Heiner Jason Wagner Jerry Zander DATE PREPARED PEER REVIEW / DATE DATE PREPARED **PEER REVIEW / DATE** 11/06/12 Brent Mefford/ 10/16/12 04/25/13

FEATURE:				PROJECT:						
Marble l	Bluff Dan	n - Fishway Mo	odifications	Washoe Project						
Existing Fishway Modifications						_				
	Replace	ement of Ladd	er #3 - Rock	WOID:	OA227		ATE LEVEL:	Appraisal		
				REGION:	MP	UNIT PI	RICE LEVEL:	Oct-12		
				FILE:	C:\JZ- Files\2012 - 12-2012.xlsx]Exa		Marble Bluff - Feasib Est\[Total mmary Sheet (3)	Est - Marble Bluff Fishway		
PLANT ACCOUNT	РАУ ІТЕМ		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT		
	d-14	DEWATERIN	G		1	LS	\$30,000.00	\$30,000.00		
	<u> </u>	•	to specify drain type		·		φοσ,σσσ.σσ	400,000.00		
			48+93 to 49+05 @ avg. 2.0 ft drawa	lown						
			oout 12' long by 50' wide							
			1972 groundwater data							
	a-14	CONTROL OF	F SURFACE WATER		1	LS	\$10,000.00	\$10,000.00		
		<u> </u>	ndbag cofferdam at upstream end o	f		-	, 1,111	* -,		
			, gravel drain and intermittent sump							
			, 3	, ,						
	SUBTOTAL THIS SHEET							\$40,000.00		
QUANTITIES				PRICES						
BY CHECKED				BY			CHECKED			
Bryan He	einer		Jason Wagner	Jerry Zande	r					
DATE P	REPAREI	D	PEER REVIEW / DATE	DATE PREI	DATE PREPARED PEER REVIEW / DATE			E		
11/06/12			Brent Mefford/ 10/16/12	04/25/13						

FEATU Marble	Bluff D	am - Fishway ng Fishway M	Modifications odifications	PROJEC	PROJECT: Washoe Project						
		•	dder #3 - Rock	WOID:	OA227	ESTIMATE LEVEL:		Appraisal			
	•			REGION:	MP		RICE LEVEL:	Oct-12			
			Summary Sheet	FILE:			\Marble Bluff - Feasib Est\[To ummary Sheet (3)	tal Est - Marble Bluff Fishway			
PLANT ACCOUNT	PAY ITEM		DESCRIPTION	CODE	QUANTITY	UNIT	UNIT PRICE	AMOUNT			
		Subtotal (shee						\$482,190.00 \$40,000.00			
		Subtotal						\$522,190.00			
		Mobilizatio	n	5%	+/-			\$26,000.00			
		Subtotal with Mobilization						\$548,190.00			
		Contract C	Cost Allowances (Sum of):	15%	+/-			\$81,810.00			
		Design Contingencies, 15% (+/-)									
		APS, 0	0% (+/-). Type of procurement: /	Assumes seale	d bids, full and	d open com	petition				
		CONTRACT C					\$630,000.00				
		Construction Contingencies			+/-			\$160,000.00			
		FIELD COST	(Unit Price Level Oct 2012)					\$790,000.00			
	Non-Contract Costs CONSTRUCTION COST				+		ned by the appropria				
		CONSTRUCT	ION COST		10 0	be determi	ned by the appropria	te responsible office			
			opriate use and terminology, see	e Reclamation	Manual, Direc			09-02 and 09-03.			
		QUAN	ITITIES			F	PRICES				
BY CHECKED				BY Jerry Zand	BY CHECKED Jerry Zander						
DATE PREPARED PEER REVIEW / DATE				DATE PRE 04/25/13	PARED		PEER REVIEW / DATE				

APPENDIX B DESIGN DRAWINGS

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