Upper San Juan Watershed Enhancement Partnership (WEP) Multiple Use Project

WSRF Grant - POGGI PDAA 202000002332

Final Report
April 2020

PREPARED BY:
Mountain Studies Institute

SUBMITTED TO:
Colorado Water Conservation Board

Background

In 2018, the CWCB and Southwest Basin Roundtable (SWBRT) generously awarded funding to support Mountain Studies Institute (MSI), Trout Unlimited (TU), and Western Wildscapes (WW) coordination of a steering committee and stakeholder group to facilitate a community-led process to assess water needs and develop a Stream Management Plan (SMP) for the San Juan River Basin. Envisioned as a three-phase process, the ultimate purpose of this larger project is to initiate and implement the SMP process, which seeks opportunities to conserve the San Juan Basin streams and their uses with wide-ranging community support, decisions based on local input, and relevant science and assessments.

During Phase I of this process, a stakeholder group and steering committee were established to guide a community-led process in understanding environmental and recreational water supply needs in the San Juan River Basin and to identify opportunities to engage in collaborative projects that benefit all water uses, including agricultural, municipal, environmental and recreation. This group is now called the Upper San Juan Watershed Enhancement Partnership, or WEP for short.

During a field trip in May 2019, the WEP steering committee visited four sites along the San Juan River, near Pagosa Springs, to visually inspect sites, explore project options, engage multiple water user groups involved as well as the potential benefits, challenges, and resources for each site. Due to the significant knowledge and experience within the WEP, the steering committee identified an opportunity for a multiple use project that could benefit several stakeholder groups on the San Juan River. One site was chosen to develop a concept design plan with a site assessment, mapping, and project identification with costs estimates and narratives to serve as a smaller demonstration project of the types of opportunities possible through a SMP process. Local business, Riverbend Engineering, was selected as the subcontractor of MSI to conduct field surveys and create concept design plans related to this project.

Project outcomes could benefit the largest and most senior irrigation ditch in Archuleta County, which is also a municipal water supply, could restore two or more miles of fish habitat, and could provide badly needed river access that would significantly benefit recreation and the area's tourism economy. To further discussions of this opportunity with both potential partners and the public, a concept level design was needed to guide project development and stakeholder engagement. This final report provides details on all deliverables (see Attachment A), budget accounting, and next steps as well as descriptions of how the project complements the Upper San Juan Watershed Enhancement Partnership's stream management planning process.

Task Accomplishments

Task 1 Deliverables: Conduct field survey of project area locations of key project components

- Riverbend staff conducted basic field survey of project area at locations of key project components such as head gate locations, infrastructure orientations, sizes, heights, boat ramp locations and access road location and bank stabilization locations and how they interface with river channel plan and profile. Riverbend utilized survey grade GPS equipment to create a topographic survey of the individual project areas. Overall slope, head gate elevations, boat ramp locations and various sediment bars were surveyed in detail.

Task 2 Deliverables: Conduct gauge data analysis for San Juan River

- Determine annual/seasonal/diurnal flow variations and expected flood flow values to understand breadth of design flow considerations for river improvements. Riverbend analyzed flow data from nearby gauges on the San Juan River. Peak flows and average daily flows were considered for a variety of improvement conditions. USGS stream stat program was used to develop return interval flows for 2, 5, 10, 50 and 100-year flow values. This information was incorporated into design drawings.

Task 3 Deliverables: Assess general channel geomorphic conditions

- Basic channel survey measuring key channel geometry parameters. Sediment analysis, photo documentation of riparian health and project areas. A variety of photo points were established to document the different riparian conditions in the project area. The GPS survey data was used to measure channel geometry characteristics and sediment deposition areas.

Task 4 Deliverables: Assess general channel geomorphic conditions

- Map with approximate property boundaries, bridge and road locations, general utility locations, FEMA floodplain boundaries. This data was included in the concept design drawings with aerial imagery and FEMA map service center Flood plain and Floodway boundaries.

Task 5 Deliverables: Assess general channel geomorphic conditions

- Riverbend created Concept Design drawings of improvement features, preliminary budget and brief narratives for each component of design and overall project approach.

Next Steps

MSI, the steering committee and subcontractor, Riverbend Engineering, have reviewed the initial concept design maps and costs estimates to determine an outreach strategy to share design plans with involved stakeholders and eventually the broader public. Feedback from involved parties and the public will help refine project designs and begin a dialogue over mutual benefits for private and public users. Initial presentations to involved homeowner associations in March received positive input and creative suggestions (i.e. seasonal recreation access) to accommodate homeowners' requests and maintain cooperative goals of project designs. Outreach and refinement will continue in the coming months, using volunteer hours and other WEP funding to support the continued progress of this multiple use project.

In hopes of continuing the collaborative spirit with funders, partners and other watershed groups conducting SMP processes, MSI and steering committee members of the WEP are happy to share project plan updates and lessons learned through in-person presentations to the SWBRT in 2020, if requested.

Budget Accounting

Through the Water Supply Reserve Fund grant, the CWCB and Southwest Basin Roundtable generously contributed to components to develop a concept design plan for a multiple use project (Tables 1-3). These project components were successful. We were able to conduct the field surveys, data analysis, as well as develop engineer designs and cost estimates for project options. The Upper San Juan Watershed Enhancement Partnership greatly appreciates the support of Roundtable and CWCB in helping the partnership conduct these critical steps in hopes to better understand options at this site, enhance potential for a demonstration project for the broader effort, increase knowledge of the water needs and potential improvements in the Upper San Juan sub-basin.

Table 1: Budget

Task	Description	SWBRT WSFR Funds	TU Cash Funds	TNC Cash Funds	MSI Cash Funds	Other Funding In-Kind	Total
1	Field survey of key project components	$ 1,500	$ 150	$ 150	$ 40	$ 360	$ 2,200
2	Gauge data analysis for San Juan River	$ 1,500	$ 150	$ 150	$ 40	$ 360	$ 2,200
3	General channel geomorphic assessment	$ 1,500	$ 150	$ 150	$ 40	$ 360	$ 2,200
4	Create base map of project site	$ 1,500	$ 150	$ 150	$ 40	$ 360	$ 2,200
5	Create concept design drawings, cost estimates and narrative	$ 1,500	$ 150	$ 150	$ 40	$ 360	$ 2,200
	TOTAL	**$ 7,500**	**$ 750**	**$ 750**	**$ 200**	**$ 1800**	**$ 11,000**

Table 2: Total Cost Distribution of WSRF Funds

Task	WSRF Funds Available	WSRF Funds utilized as of 4/2/2020	
		Concept Design Contractor Tasks	MSI Administrative Indirect Fee (10%)
1	$ 1,500	$ 1,500	$ 0
2	$ 1,500	$ 1,500	$ 0
3	$ 1,500	$ 1,500	$ 0
4	$ 1,500	$ 1,500	$ 0
5	$ 1,500	$ 1,500	$ 0
Total	**$ 7,500**	**$ 7,500**	$ 0

Table 3: Detailed Total Cost Distribution for Concept Design Contractor Tasks

Tasks	Concept Design Contractor Tasks	Senior engineer hrs $110.00	Field Tech hrs $75.00	Office staff hrs $65.00	Labor Totals	mileage @ $0.55/mi	Total for task
1	Gauge Analysis	6	3		$ 885		
2	GPS Survey of key features of project	4	4		$ 740	24 miles	
3	Geomorphic Assessment	6	6		$ 1,110	12 miles	
2	Concept Design bank stabilization	8	3		$ 1,105		
4	Concept Design River Diversion Structure	10	3		$ 1,325		
5	Concept Design Habitat Enhancement	8	3		$ 1,105		
3	Concept Design Road Access, Parking Area, Boat Ramp	12	3		$ 1,545		
7	Concept Design Narrative/Preliminary Budget	8	4	5	$ 1,505		
8	Meetings with project partners	6			$ 660		
Subtotal for Construction Phase Services:		68	29	5	$ 9,980	$ 20	$ 10,000

January 21, 2020

Upper San Juan River Improvement Project Design Narrative

Riverbend Engineering, LLC (Riverbend) was contracted by the San Juan Watershed Enhancement Partnership (SJWEP) for to develop a concept level plan and cost estimate for a multi-faceted river improvement project located near San Juan River Village on the upper San Juan River. This location was identified to address water needs for a variety of user groups including agricultural, recreational, environmental, and municipal. The key components of the project include:

- Landslide Bank Stabilization and Park Ditch Diversion Improvements
- Flood Conveyance Improvements and Habitat Improvements @ San Juan River Village
- River Access and Parking Improvements @ South Property Boundary

Park Ditch Diversion Improvements

The existing diversion structure at the Park Ditch diversion consists of a combination of imported large rock, concrete rubble, wire mesh, and native river rock. Large annual flows can move portions of the diversion material requiring large machinery to enter the river and rebuild the structure. The existing configuration of material can create a significant hazard for boaters, fisherman, and swimmers, and in addition, the existing diversion may be a barrier to migration of native and nonnative fish species. Recent landslide events upstream of the structure could also contribute to changes in the main river channel alignment which would lead to difficulty in maintaining water delivery to the Park Ditch headgate.

The major goals of the proposed design are:

1) Remove all dangerous steel and concrete rubble from the river bottom;
2) Minimize the future required maintenance in the river channel by creating a stable diversion structure
3) Create interstitial space at the appropriate slope between large rocks adequate for fish passage;
4) Stabilize and revegetate the river banks near the diversion to maintain the bank integrity; and
5) Create a safe low flow channel for boater passage sediment transport through the diversion structure.

The existing diversion structure will be removed and a large rock and grout diversion structure will be installed at the diversion location. Adequate existing native material and imported large rocks will be used in the construction of the new diversion structure and the newly vegetated bench on the sides of the river bank. Non-native and potentially hazardous material excavated from the existing structure will be hauled away and disposed of properly.

As a result of saturated soils from a wetter than average winter in 2019, a significant soil failure occurred in the spring just upstream of the diversion on the southside of the river. As opposed to trying to remove the recently deposited soil and reestablish the previous river alignment the concept design advocates stabilizing the new land slide depositions in place, and make adjustments to the river's alignment and width, so that the system can be more self-sustaining over time. Rock sills and deflectors would be utilized to stabilize the new banks and to protect bankful bench floodplain areas from erosion.

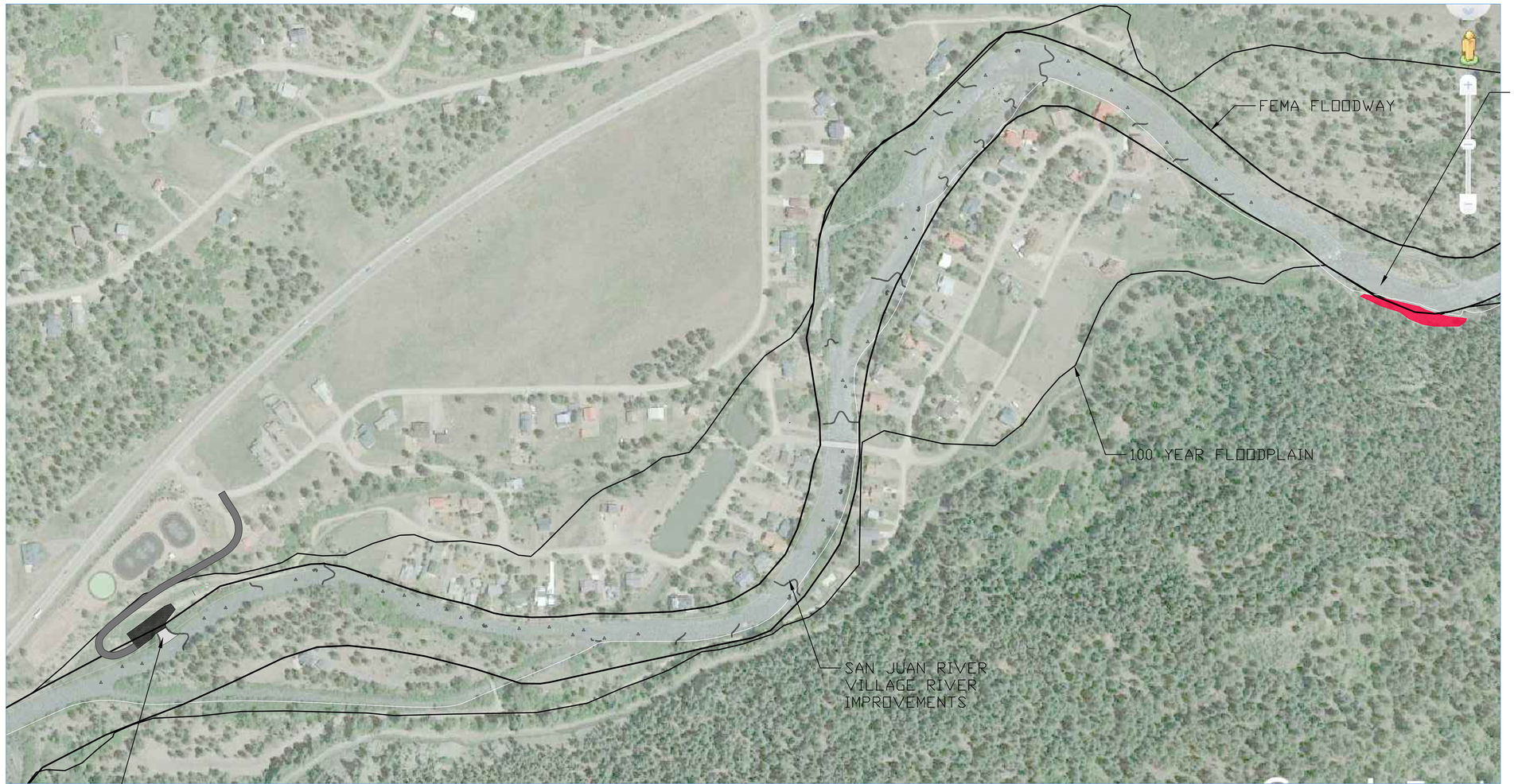
San Juan River Village River Flood Conveyance and Habitat Improvements

The proposed design approach is focused on two primary goals for restoration of this section of the San Juan River. The first is to restore the flood capacity that was significantly reduced during recent large sediment deposition events within the active channel. The second is to enhance the habitat component of the low flow channels. The foundation for success in aquatic and riparian restoration work is a functioning river system. This means transporting pulses of sediment, accommodating overbank floods, sustaining vigorous populations of fish, aquatic insects, and riparian vegetation. Riverbend's design encourages the river to maintain a stable condition, and we try to do this with limited amounts of obvious man-made structure. Our goal is to leave behind a naturally aesthetic and functioning riverine ecosystem, where natural channel evolution can proceed. In this location, where there is significant infrastructure near the river, we must balance the natural systems with protection of property and structures. The associated cost estimate for this portion is broken into two phases. The first phase would be focused on restoring flood conveyance and channel efficiency and the second phase would be directed at enhanced fish habitat.

River Access Improvements

The proposed new access portion of the project involves construction of approximately 1000 feet of a new two-lane gravel access road, 10,000 square foot parking area, and new boat ramp into the San Juan River. The access road would be entirely located on existing San Juan River Village Metro District property and would be constructed in accordance with Archuleta County Road and Bridge Design Standards. The overall road slope would be 8% or less and would be design to try and balance the amount of soil cut and fill required. The access road would also create an additional ingress/egress for the over 50 properties located in the valley bottom.

The parking area would be a gravel surface directly connected to the boat ramp. The boat ramp would be orientated to the river to allow ease of use at a variety of river flows. The ramp would be defined by large boulders extending into the river with a compacted crushed rock surface.



PRELIMINARY
NOT FOR CONSTRUCTION

N

0 100 200 400 600

SCALE IS 1" = 200 FT ON 24x36 SIZE SHEET
ALL OTHER SIZE SHEETS USE SCALE BAR

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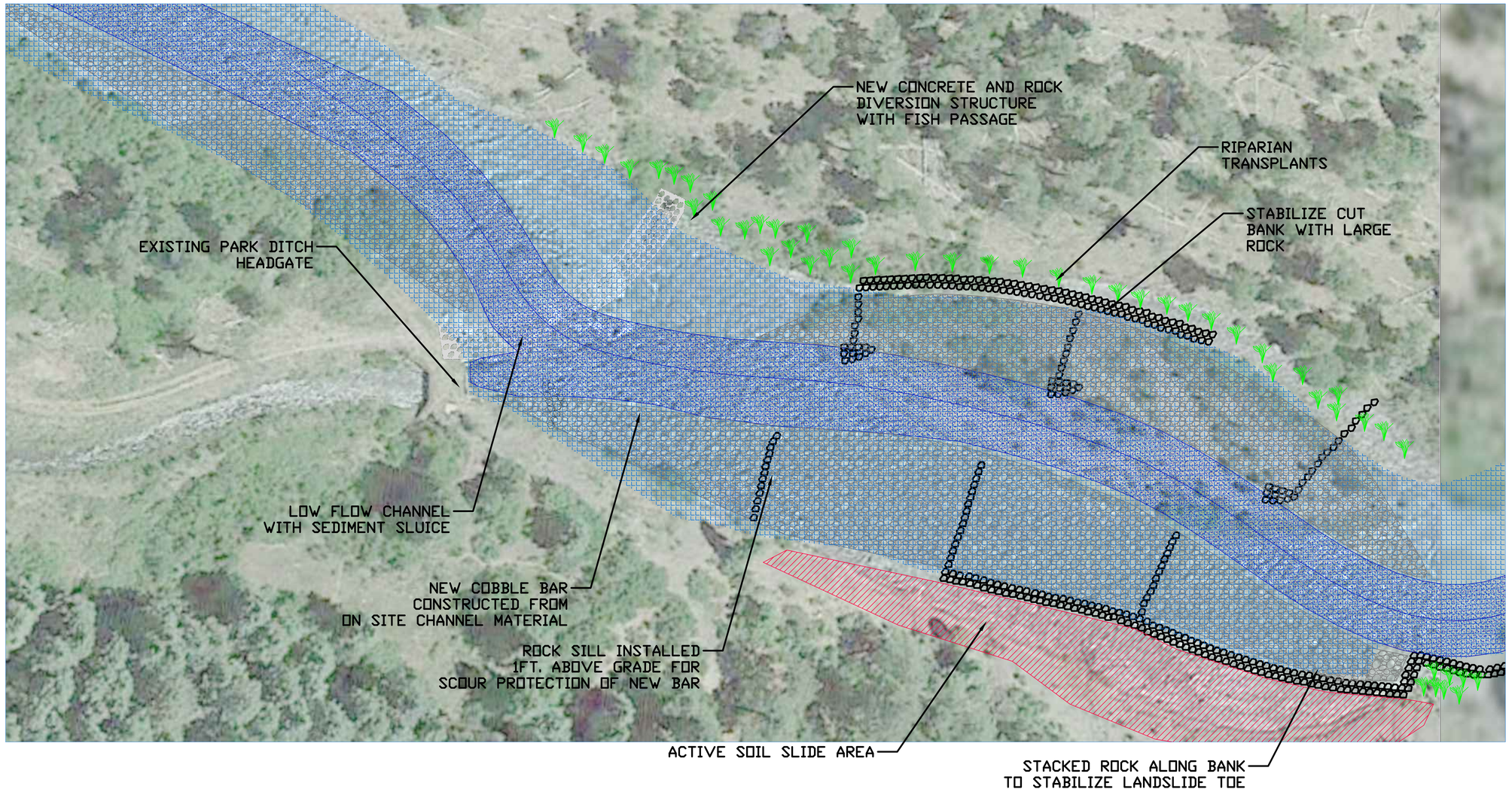
102 3RD STREET PAGOSA SPRINGS CO 81147
Tel: 970 264 1195 www.riverrestoration.com

WEP SAN JUAN RIVER PROJECT

SAN JUAN RIVER
@SJRV CONCEPT PLAN
OVERVIEW

SCALE 1"=200 FT | 1/17/20

Sheet 1 of 5



PARK DITCH DIVERSION IMPROVEMENT PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

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0 15 30 60 90

SCALE IS 1" = 30 FT ON 24x36 SIZE SHEET
ALL OTHER SIZE SHEETS USE SCALE BAR

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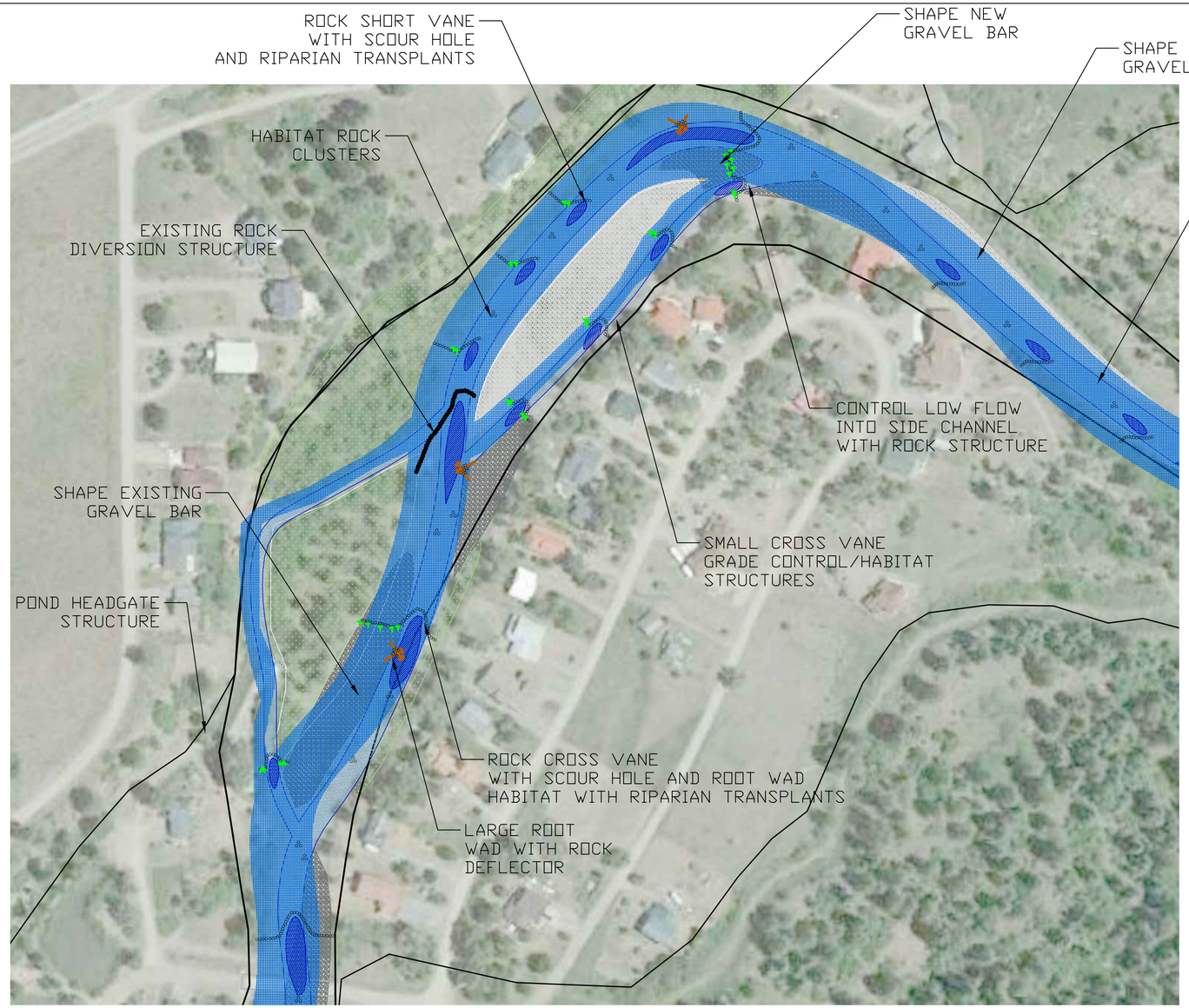
WEP UPPER SAN JUAN RIVER	Sheet
PARK DITCH DIVERSION CONCEPT PLAN	1 of 5
SCALE 1"=30 FT	1/17/20



SAN JUAN RIVER VILLAGE RIVER IMPROVEMENT PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

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0 50 100 200 300

SCALE IS 1" = 100 FT ON 24x36 SIZE SHEET
ALL OTHER SIZE SHEETS USE SCALE BAR

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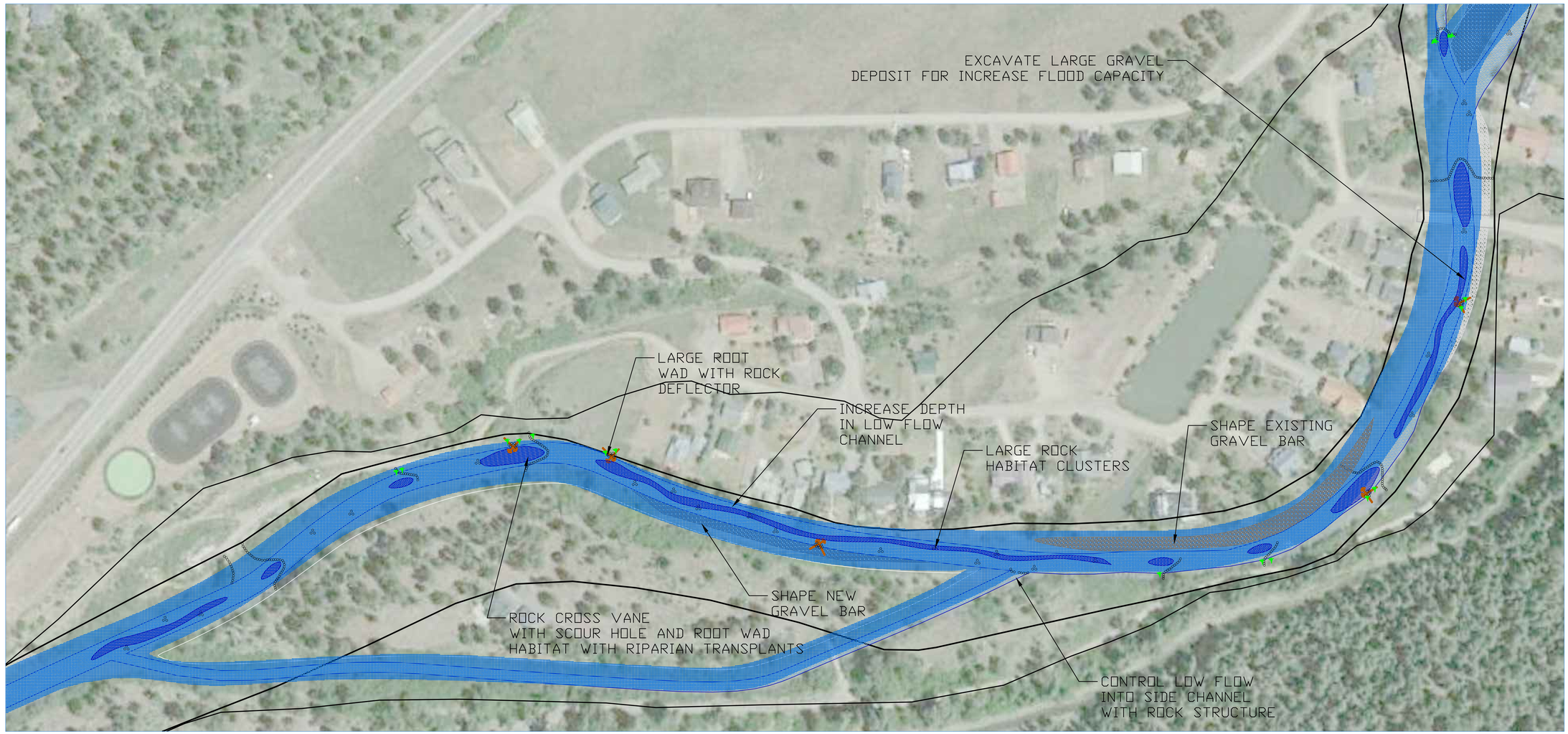
WEP UPPER SAN JUAN RIVER

SJRV RIVER HABITAT/FLOOD
CAPACITY IMPROVEMENT
PLAN
UPPER SECTION

SCALE 1"=200 FT | 1/17/20

Sheet 3 of 5



SAN JUAN RIVER VILLAGE RIVER IMPROVEMENT PLAN LOWER SECTION

PRELIMINARY
NOT FOR CONSTRUCTION

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SCALE IS 1" = 100 FT ON 24x36 SIZE SHEET
ALL OTHER SIZE SHEETS USE SCALE BAR

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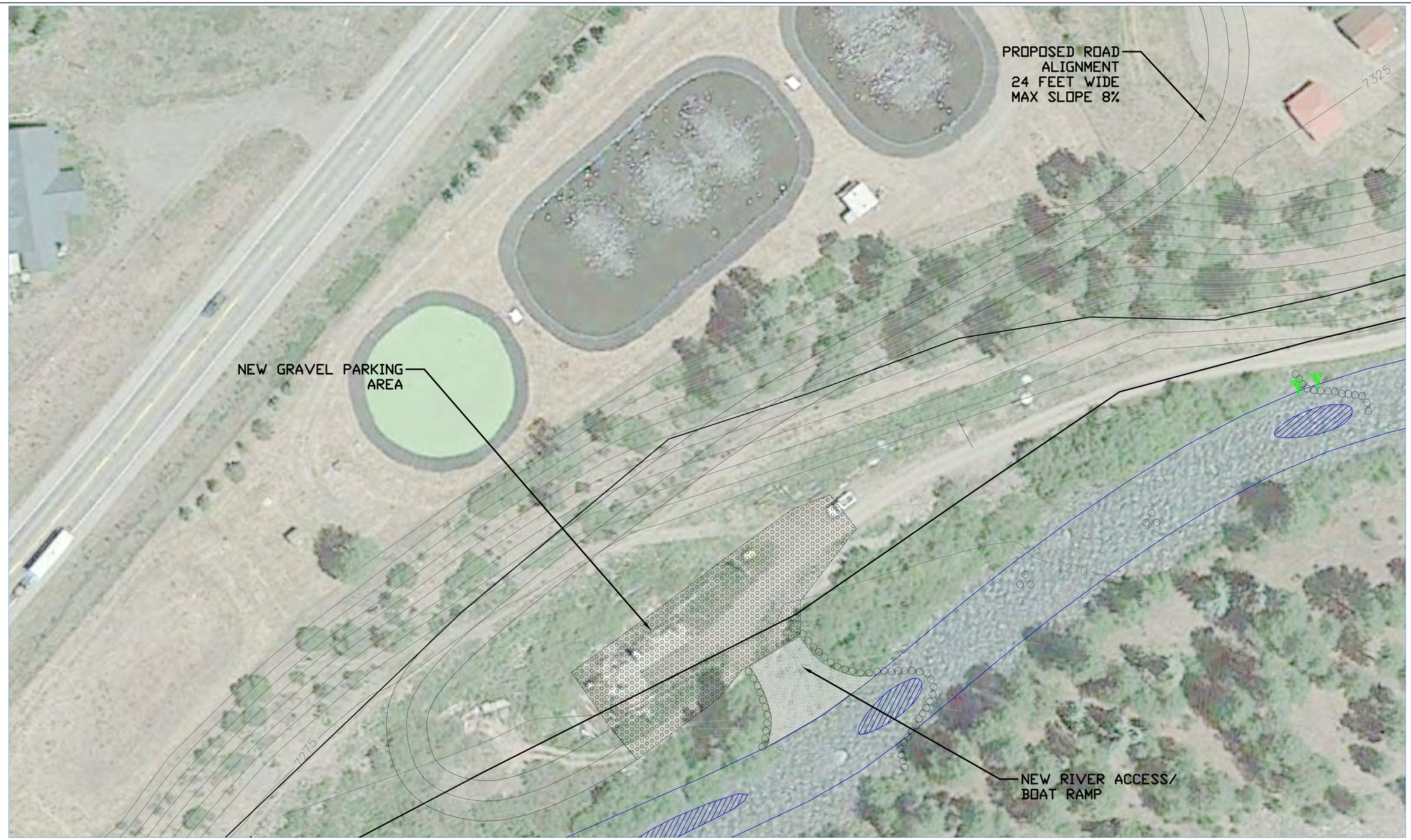
WEP UPPER SAN JUAN RIVER

SJRV RIVER HABITAT/FLOOD CAPACITY IMPROVEMENT PLAN
LOWER SECTION

SCALE 1"=200 FT | 1/17/20

Sheet 4 of 5



RIVER ACCESS PLAN

PRELIMINARY
NOT FOR CONSTRUCTION

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SCALE IS 1" = 30 FT ON 24x36 SIZE SHEET
ALL OTHER SIZE SHEETS USE SCALE BAR

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WEP SAN JUAN RIVER PROJECT

PARK DITCH DIVERSION
CONCEPT PLAN
RIVER ACCESS

SCALE 1"=30 FT | 1/17/20

Sheet 5 of 5

Upper San Juan River Improvement Project

Park Ditch Diversion Improvements

Materials	UNIT	Estimated Quantity	Estimated Cost per Unit	COST ($)
Large Rocks 4-5 ft	Each	600	300	$180,000.00
Concrete	Cubic Yards	150	200	$30,000.00
Willow Transplants	EA	100	40	$4,000.00
Large Rock Rip Rap	CY	150	90	$13,500.00
Small Rock Rip Rap	CY	200	70	$14,000.00
80 mil Geomembrane	SF	1200	3	$3,600.00
			Subtotal	$214,000.00
Construction				
Remove and Dispose of existing diversion	Cubic Yard	1000	45	$45,000.00
Place Concrete around large boulders	Cubic Yard	150	300	$45,000.00
Place large boulders with excavator with thumb	Each	600	150	$90,000.00
Subgrade Prep	Cubic Yard	1000	10	$10,000.00
Install Membrane	Square Foot	1200	3	$3,600.00
Install Rock Rip Rap	Cubic Yard	500	65	$32,500.00
Channel shaping up and downstream	Cubic Yard	1000	10	$10,000.00
Dewatering Cost During Construction	Lump Sum	1	50000	$50,000.00
Transplant Willows	Each	100	40	$4,000.00
Mobilization	Lump Sum	1	10000	$10,000.00
			Construction Subtotal	$300,100.00
			Subtotal:	$514,100.00
			Final Design/Permitting /Environmental (15%)	$77,115.00
			Contingency (10%)	$59,121.50
			Total	$650,336.50

Upper San Juan River Improvement Project

San Juan River Village Phase I River Improvements (6000

Materials	UNIT	Estimated Quantity	Estimated Cost per Unit	COST ($)
Willow Transplants	EA	100	20	$2,000.00
			Materials Subtotal	$2,000.00
Construction				
Channel shaping up and downstream	Cubic Yard	1500	8	$12,000.00
Remove excess channel material	Cubic Yard	5000	10	$50,000.00
Transplant Willows	Each	100	40	$4,000.00
			Construction Subtotal	$66,000.00
			Subtotal:	$68,000.00
			Final Design/Permitting /Environmental (15%)	$10,200.00
			Contingency (10%):	$7,820.00
			Total	$86,020.00

Upper San Juan River Improvement Project

San Juan River Village Phase II River Improvements (6000

Materials	UNIT	Estimated Quantity	Estimated Cost per Unit	COST ($)
Large Rocks 5 ft	Each	1200	200	$240,000.00
Medium size rocks 3-4'	Each	100	100	$10,000.00
Large tree root wads	Each	20	150	$3,000.00
			Materials Subtotal	$253,000.00
Construction				
Place large boulders with excavator with thumb	Each	1600	100	$160,000.00
Remove excess channel material	Cubic Yard	5000	10	$50,000.00
	0.0		Construction Subtotal	$210,000.00
			Subtotal:	$463,000.00
			Final Design/Permitting /Environmental (15%)	$69,450.00
			Contingency (10%):	$53,245.00
			Total	$585,695.00

Upper San Juan River Improvement Project

River Access Improvements

Materials	UNIT	Estimated Quantity	Estimated Cost per Unit	COST ($)
Large Rocks 5 ft	Each	50	200	$10,000.00
Road Base (6" thick)	Cubic yards	650	50	$32,500.00
Road Gravel 3/4 - (3" thick)	Cubic Yards	300	60	$18,000.00
Boat Ramp 4" screened	Cubic Yards	50	50	$2,500.00
			Materials Subtotal	$63,000.00
Construction				
Construct Access Road (25' wide)	Linear ft	1000	40	$40,000.00
Place large boulders with excavator with thumb	Each	50	150	$7,500.00
Clear and Grub (road and parking area)	Linear ft	1100	12	$13,200.00
Spread and compact base material	Linear ft	1100	10	$11,000.00
Spread and compact 3/4 gravel	Linear ft	1100	10	$11,000.00
Construct Boat Ramp	Lump sum	1	15000	$15,000.00
			Construction Subtotal	$97,700.00
			Subtotal:	$160,700.00
			Final Design/Permitting /Environmental (15%)	$24,105.00
			Contingency (10%)	$18,480.50
			Total	$203,285.50