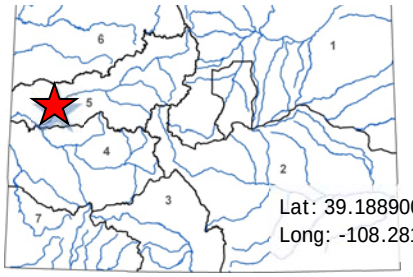
COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Roller Dam Electrical and Control Systems Upgrades Project (Part 2)

Grand Valley Water Users Association

November 2018 Board Meeting

Water Plan Grant Application



LOCATION	
County/Counties:	Mesa
Drainage Basin:	Colorado

DETAILS	
Total Project Cost:	$229,540
Water Plan Grant Request:	$100,000
Other CWCB Funding:	$0
Other Funding Amount:	$0
Applicant Match:	$129,540
Project Type(s): IPP, Construction	
Project Category(Categories): Agricultural	
Measurable Result: Improved operations and reliability leading to efficiency savings	

The Roller Dam diverts water from the Colorado River into the Government Highline Canal for irrigation and hydropower purposes under senior water rights that collectively make up the "Cameo Call" from the Colorado River. The water provided serves approximately 39,000 irrigated acres in the Grand Valley and is used to produce hydropower at the Grand Valley Power Plant (GVPP). Return flows from the GVPP return to the Colorado River at the head of the 15 Mile Reach, which helps maintain flows in that reach for several listed endangered species and recreation.

The Roller Dam, which was constructed in the early 1900's, is in need of extensive upgrading and rehabilitation. Beginning in 2015, several stakeholders including the Grand Valley Water Users Association (GVWUA), Bureau of Reclamation (BOR), Colorado River Water Conservation District (CRWCD), and the Nature Conservancy met to the identify and prioritize Roller Dam and Canyon Facilities needs that support the implementation of multi-purpose/multi-benefit projects within the Colorado River Basin. This multi-stakeholder effort was funded in part by a CWCB Water Supply Reserve Account Grant and resulted in the development of the Roller Dam and Canyon Facilities Master Plan ("Master Plan" which identifies priority, rehabilitation needs of the Roller Dam and associated facilities and developed implementation plans for the top five projects.

The second priority project identified in the Master Plan is upgrading the electrical and control systems at the Roller Dam and Canal headgate to improve the operations and reliability of the Roller Dam headgates in the case of a power disruption, provide an alternative source of power for fish passage, and lead to the automation of the operation of the Government Highline Canal headgate; reducing maintenance costs and improving delivery efficiency. The total project cost is $453,638. Part 1 of the electrical upgrade project is underway and funded in part through a Water Supply Reserve Fund Grant approved by the Colorado River Basin Roundtable and the CWCB Board. GVWUA is requesting $100,000, 50% of the total project cost, through Colorado's Water Plan Grant Program to implement Part 2 of this project including upgrading the Roller Dam electrical system and providing alternative source power to the fish passage. Matching funds and in-kind services will be provided by GVWUA, Orchard Mesa Irrigation District, and the BOR. The Colorado River Basin Roundtable, United States Fish and Wildlife Service, and BOR support the project.

Overall, this project meets several goals of Colorado's Water Plan including encouraging collaboration with diverse stakeholders and supporting updates and improvements to Colorado's aging agricultural infrastructure, especially where improvements provide multiple benefits. This project will also improve water delivery system operations, capacity and reliability of the Roller Dam and canal headgates, maintain a critical water right, and preserve the agricultural economy of the Grand Valley.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: June 2018

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Water Storage Projects	Anna.Mauss@state.co.us
Conservation, Land Use Planning	Kevin.Reidy@state.co.us
Engagement & Innovation Activities	Ben.Wade@state.co.us
Agricultural Projects	Alexander.Funk@state.co.us
Environmental & Recreation Projects	Chris.Sturm@state.co.us

FINAL SUBMISSION: Submit all application materials in one email to waterplan.grants@state.co.us in the original file formats [Application (word); Statement of Work (word); Budget/Schedule (excel)]. Please do not combine documents. In the subject line, please include the funding category and name of the project.

Water Project Summary

Name of Applicant	Grand Valley Water Users Association (GVWUA)
Name of Water Project	Roller Dam Electrical and Control Systems Upgrades Projects (Part 2)
CWP Grant Request Amount	$100,000
Other Funding Sources Reclamation WaterSMART	***~$25,000 Cash ~$104,540 In-Kind and other grants Continue to have on-going dialogue with potential partners***
Other Funding Sources GVWUA and OMID Cash	
Other Funding Sources _____	
Applicant Funding Contribution	$129,540
Total Project Cost	$229,540

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: June 2018

Name of Grantee(s)	Grand Valley Water Users Association (on behalf of project partners)
Mailing Address	1147 24 Road, Grand Junction, CO 81505-9639
FEIN	84-0402700
Organization Contact	Mark Harris
Position/Title	General Manager
Email	mharris@gvwua.com
Phone	970-242-5065
Grant Management Contact	Mark Harris/Angie Fowler
Position/Title	General Manager/Engineering Consultant
Email	mharris@gvwua.com/angief@sgm-inc.com
Phone	970-242-5065 / 970-384-9027
Name of Applicant (if different than grantee)	
Mailing Address	
Position/Title	
Email	
Phone	

Description of Grantee/Applicant

Provide a brief description of the grantee's organization (100 words or less).

Grand Valley Water Users Association (GVWUA) is the managing entity of a portion of the federally owned Grand Valley Project (GVP). The GVP facilities include the Roller Dam on the Colorado River in De Beque Canyon, the 55-mile-long Government Highline Canal (GHC), 150 miles of project operated laterals, 100 miles of drainage ditches and a hydroelectric power plant [Grand Valley Power Plant (GVPP]. The Roller Dam and upper portions of the GHC are the primary elements that were identified as needing rehabilitation in the Dam and Canyon Facilities Master Planning efforts.

Current project partners include:

- Orchard Mesa Irrigation District (OMID)
- Palisade Irrigation District (PID)
- Mesa County Irrigation District (MCID)

On-going communication with other potential partners will continue in an effort to share costs as there are many other beneficiaries of this project and the other top 5 identified projects.

Last Updated: June 2018

	Type of Eligible Entity (check one)
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
x	**Private Incorporated:** Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
	Non-governmental organizations (NGO): Organization that is not part of the government and is non-profit in nature.
	Covered Entity: As defined in Section 37-60-126 Colorado Revised Statutes.

	Type of Water Project (check all that apply)
	Study
x	Construction
x	Identified Projects and Processes (IPP) – ***One of the top five projects that supports the larger Roller Dam Rehabilitation Project identified as a CBRT Top Basinwide Project in the BIP***
	Other

	Category of Water Project (check the primary category that applies and include relevant tasks)	
	Water Storage - Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap. *Applicable Exhibit A Task(s):*	
	Conservation and Land Use Planning - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. *Applicable Exhibit A Task(s):*	
	Engagement & Innovation - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website. *Applicable Exhibit A Task(s):*	
x	Agricultural - Projects that provide technical assistance and improve agricultural efficiency. *Applicable Exhibit A Task(s):* ***Task 1- Replace Roller Dam wiring, provide redundancy on DC power supply, and deliver power to the new headgate motors and alternative power source for the fish passage.***	
	Environmental & Recreation - Projects that promote watershed health, environmental health, and recreation. *Applicable Exhibit A Task(s):*	
	Other	Explain:

Last Updated: June 2018

Location of Water Project	
Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.	
County/Counties	Mesa County
Latitude	39.188990°
Longitude	-108.281816°

Water Project Overview
Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain. The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule. ***Please see the Related Studies Section of this Application for more information regarding previous phases of the Roller Dam Rehabilitation Master Planning efforts.***
The Roller Dam diverts water into the GHC for irrigation and hydropower purposes under the "Cameo Call". The irrigation water is delivered to four irrigation entities, which, in turn, provide irrigation water to approximately 41,000 acres of lands in the Grand Valley. The hydropower water (800 cfs) is used to produce hydropower at the GVPP, which has an electrical generation capacity of about 3.5 megawatts. Return flows from the GVPP are redirected back to the Colorado River at the head of the 15-Mile Reach, which helps to maintain flows for the endangered fish (in that reach). The existing electrical power systems were installed at the Roller Dam at the time of construction, nearly 100 years ago. Electrical power was originally provided by generators and batteries and later adapted to AC utility power when it became available. Part 1 of the project will commence in Fall 2018 and extend a new three phase utility service to the Roller Dam; replace the dam service equipment and install an on-site standby generator. Part 2, included in this application, will upgrade the Roller Dam electrical system to meet current electrical code requirements and provide alternative power source to the fish passage.

Last Updated: June 2018

Measurable Results		
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:		
	New Storage Created (acre-feet)	
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive	
	Existing Storage Preserved or Enhanced (acre-feet)	
X (15 miles or 79,200 feet specifically for the Endangered Fish Program; additional stream length along the Colorado River unknown/not quantified)	Length of Stream Restored or Protected (linear feet)	
X (3,669 AF/day during irrigation season and 1,587 AF/day non-irrigation season) OR 1.025 MAF/year	Efficiency Savings (indicate acre-feet/year OR dollars/year)	
	Area of Restored or Preserved Habitat (acres)	
	Quantity of Water Shared through Alternative Transfer Mechanisms	
X (see "Other" explanation)	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning	
X (see "Other" explanation)	Number of Coloradans Impacted by Engagement Activity	
X	Other	Explain: Continued operations of the Roller Dam supports critical agricultural, non-consumptive, municipal and industrial needs and aligns with the Colorado River Basin Implementation Plan (BIP) and other objectives of the Colorado Water Plan, local and regional watershed and water supply planning efforts, to name a few. This project will improve the operations and reliability of the Roller Dam headgates and rollers and essentially enables everything else that will lead to increased efficiency savings and improve the management of Pre-Compact water rights. The existing utilities and power supply were installed at the Roller Dam at the time of construction, nearly 100 years ago. Utility power was not available and the electrical power was provided by on-site generators and stored in batteries.

Last Updated: June 2018

Water Project Justification

Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).

The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)

Basin Implementation Plan

The Roller Dam Electrical and Control Systems Upgrades Project (Parts 1 and 2) (Electrical Upgrades Project) was identified as the second rehabilitation need (out of five) in the Master Plan Phase 1 Dam and Canyon Facilities Report. The Master Plan Phase 2 Dam and Canyon Facilities Project (just completed July 2018) developed 100% design drawings for 4 out of the 5 rehabilitation needs (note the number one rehabilitation need, the Upper Canyon Lining project was already underway and completed in March 2018). The Roller Dam Electrical and Control Systems Upgrades Project Part 1 will be underway in Fall of 2018. This Project (Part 2) aims to improve an existing water supply system (the Roller Dam and associated GHC) by upgrading and getting into compliance the electrical and control systems that operate the Roller Dam and GHC diversion structure headgates. The specific objectives of this project are to: 1) improve water delivery system operations, capacity and reliability of the Roller Dam and canal headgates; 2) sustain the ecological health of the river; and 3) preserve the agricultural economy of the Grand Valley. These objectives align with several statewide, regional, and local planning documents, including, but not limited to the BIP themes and the Colorado Water Plan.

The Roller Dam Improvements were identified as a project to "Sustain Agriculture" and "Assure Dependable Basin Administration" on page 121 of the BIP. The Roller Dam Electrical and Control System Upgrades project is part of the Grand Valley Roller Dam Rehabilitation Project that was identified as a top project basinwide in 2015 (BIP, pg. 127). The larger project identifies with all six Colorado River BIP themes. The Roller Dam Electrical and Control Systems Upgrades Project Part 2 (Electrical Upgrades Project) aligns with three BIP themes (BIP, pg. 43):

1. Sustain Agriculture by reducing agricultural water shortages by improving the dam operations
2. Protect and Restore Healthy Streams, Rivers, Lakes, and Riparian Areas by providing a new and reliable power source to the USFWS fish screen at the dam and delivering water to the GVPP which, in turn, provides water to the upper portion on the 15-Mile Reach.
3. Assure Dependable Basin Administration by protecting the senior Grand Valley irrigation diversions through improvements in the electrical power supply of the Roller Dam (Cameo Call).

Education Action Plan

GVWUA has provided tours of the Roller Dam and various infrastructure elements to over 300 stakeholders. GVWUA has also developed a brochure that summarizes the Roller Dam Rehabilitation Project progress. GVWUA will also provide an article on the Roller Dam electrical upgrade project that can be used by the Colorado Basin Roundtable continuing education and outreach efforts regarding regional water projects. All education opportunities aid in the implementation of the CBRT Education Action Plan.

Colorado Water Plan

This project (Electrical Upgrades Part 2) also supports the goals of the Colorado Water Plan by supporting the specific Colorado BIP themes and CWP Critical Action Plan elements. Specifically, this project aligns with three of the grant categories including agriculture, environmental/recreation, and water storage and supply. A summary of how this project aligns with these categories is provided below.

Agriculture:

Last Updated: June 2018

Agriculture is the main category that this project aligns with and that funds are being requested. This project will support agricultural efficiencies and modernize diversion of water at the headgates. This project will also meet a defined need in the BIP, as explained above. The project avoids adverse effects to environmental interests, supports rural economic development, addresses critical water use issues facing Colorado's agricultural sector and maintain agricultural viability.

Environmental and Recreation:

The Roller Dam provides water to the GVPP which in turn, return flows to the Colorado River at the head of the 15-Mile Reach, maintaining flows in that reach for the endangered fish. Thus, the Roller Dam provides sustainability of endangered and threatened fish species within the 15-Mile Reach of the Colorado River.

Water Storage and Supply:

The Roller Dam provides water that benefits multiple stakeholder interests including, but not limited to, non-consumptive water users relying on the continued operation of the GVPP and the Endangered Fish Recovery Program/15-Mile Reach. The project was also identified as a Top Basinwide project in the Colorado River BIP.

Statewide Water Supply Initiative

The 2010 SWSI report provides information supporting Colorado's existing and future water needs; summarizing the results of several analysis that identified the water availability within Colorado's Basins and non-consumptive and consumptive (M&I and Agriculture) water needs. Two of the 7 objectives of the Consumptive Needs Assessment (Section 4.1) specific to agriculture were to: "update the current agricultural demands and shortages" and "update the consumptive demand forecast to 2050 for the agricultural sector." While this specific project does not aim to *quantify* the specific demands and shortages of the agricultural sector, it will support more accurate measurement of the water diversions at the GHC and provide more efficiencies of these diversions, ultimately leading to reduced shortages (by only diverting the amount of water demanded/needed).

Related Studies

Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.

GRAND VALLEY WATER USERS ASSOCIATION STUDIES AND PROJECTS

These projects are complimentary to the water supply reserve account grant program. The following related studies are interconnected and build upon and support an overall management approach, aligning and meeting the objectives of the CWCB, the CWP, and Colorado Basin Roundtable.

- **Master Plan Phase 1**
  - The Colorado Basin Roundtable (CBRT) identified the Roller Dam Rehabilitation project as a Basinwide "Top Priority" in its Basin Implementation Plan (BIP). The Roller Dam Rehabilitation project addressed the rehabilitation needs of the Grand Valley Project Diversion Dam (commonly known as the "Roller Dam") and the portion of the GHC immediately below the Roller Dam. This project supports the maintenance of the Cameo Call; improve water delivery system operations, capacity and reliability; sustain the ecological health of the Colorado River; and preserve the agricultural economy of the Grand Valley.
  - The efforts to fully understand the rehabilitation needs of these facilities are ongoing and dynamic. This Dam and Canyon Facilities Master Plan (Phase 1) was only the first step in assessing and defining these rehabilitation needs. It is anticipated that the conclusions and recommendations of this and future studies will continually provide dynamic input to the rehabilitation efforts. The GVWUA and other partnering agencies received a Water Supply Reserve Account Grant to fund Phase 1 of the Roller Dam and Canyon Facilities Master Plan which:

Last Updated: June 2018

Related Studies

- Identified and prioritized the rehabilitation needs of the Roller Dam and Canyon Facilities (structural, cosmetic, environmental, etc.);
- Developed implementation plans for the top five (5) needs, specifically addressing the project costs, hydropower potential, funding opportunities, schedule, and list of potential teaming partners and sponsors and;
- Recommended actions for Phase 2 of the Master Planning efforts, including remediation and/or upgrades as appropriate, are underway.

- **Master Plan Phase 2**
  - The Master Plan Phase 2 Dam and Canyon Facilities Master Plan Project provided the next step to rehabilitating and upgrading the Roller Dam and the portion of the GHC immediately below the Roller Dam while maintaining the Cameo Call, improving water delivery system operations, capacity and reliability, sustaining the ecological health of the river and preserving the agricultural economy of the Grand Valley. Phase 1 identified five priority projects, one of which is already complete (Upper Canyon Canal Lining). The other top projects include: 1) upgrade the Roller Dam Electrical and Control Systems, 2) rehabilitate the Canal Headworks, 3) rehabilitate the Roller Tracks and Canal Concrete, and 4) replace the Radial Gates at the Canal Station 22 spillway. Phase 2 of the project developed 100% design level drawings, construction cost estimates, and specifications for these four top projects. These efforts also included permitting support for each project. A Funding Plan was also developed to support the construction of all four projects.
  - Several agencies/groups helped fund this effort including BOR Field Services Grant, CWCB Supply Reserve Fund Grant, Colorado River Water Conservation District, and in-kind.

- **Roller Dam Electrical and Controls Systems Upgrades Project (Part 1)**
  - Part 1 will extend the utility system, bury the overhead service lines, replace the service equipment at the dam, and install an on-site standby generator. Other sub tasks include adding new service entrances at all buildings except the dam tender's house and new branch circuits and lights in the machine room.
  - CWCB funding is pending approval in September 2018.

- **Upper Canal Improvements (Top Master Plan Phase 1 Project)**
  - One component of the Roller Dam Master Plan has already been designed and constructed, the Upper Canal Improvements Project. This project addresses the rehabilitation of the top 500 feet of the canal, immediately below the Roller Dam. Reclamation provided the design work and attendant pricing estimates for reshaping the canal prism and replacing the concrete liner currently in place. SGM developed the technical and professional assistance, construction drawings and specifications, for the final design. Construction was completed March 23, 2018.

- **Water Management Plan**
  - GVWUA received a CWCB Water Supply Reserve Account Grant in the amount of $45,000 to fund a comprehensive update to the Water Management Plan (WMP), a critical component to long-term maintenance, asset management, water stewardship, and most importantly, created a funding plan to accomplish those projects – whose costs will be in the millions. The objective of the WMP project was to prepare a conditional assessment and operational analysis of the 50 miles of the canal below the outfall of Tunnel No. 3, identify and document water losses, identify priority projects, conduct a benefits analysis, ascertain environmental concerns, determine costs associated with the projects and create a strategic funding plan to implement the

Related Studies

priority projects. The WMP project will also allow the GVWUA to implement certain provisions of the Colorado River Cooperative Agreement (CRCA, Section 7, specific to conservation and avoidance of Colorado Compact issues). The WMP project began in fall 2015 and concluded in 2017.

- **Reclamation Salinity Program- Government Highline Canal – Reach 1A Lower Section Lining Project**
  - The Reach 1A Salinity Lining Replacement project was undertaken by GVWUA and included approximately $160,000 of replacement work on Stage 1A of the Government Highline Canal. The overall purpose of the Reach 1A Lower Section Lining project was to install approximately 4,774 feet of PVC liner to an unlined and open section of the Government Highline Canal. The lined section of canal was earthen and originally designed with a trapezoidal cross section with a 30-foot bottom and 2:1 side slopes. Over the years the slopes eroded and sloughed. In some sections heavy vegetation grew along the sides down to the high-water surface line in the canal. The improvements included lining with 2 layers of geotextile fabric on either side of a 30 mil PVC liner covered with a protective 3-inch shotcrete layer. A gravel underdrain was installed. The total project award is $3.6 million. GVWUA performed approximately $40,000 of the work in FY 2015, portions of the work in FYs 2016 and 2017.

- **Power Canal Capacity Report (December 2015)**
  - The Power Canal Capacity Report evaluated potential to increase diversions to the Grand Valley Power Plant in the event Conserved Consumptive Use credits, available through a water bank, were needed and could be put to beneficial use through the power plant. The report concluded that in most years some excess capacity of approximately 5,000 AF per irrigation season is available however many operational issues would need to be worked out before implementing this type of a program. The report also highlighted the need for more consistent and accurate flow measurement in the power canal.

BUREAU OF RECLAMATION STUDIES AND PROJECTS

The Reclamation reports are also complimentary studies.

- **Grand Valley Diversion Dam Review of Operations and Maintenance (RO&M) Program Examination Reports**
  - The rehabilitation needs of the Dam and Canyon facilities have been documented by the Reclamation as part of special investigations and their ongoing maintenance and operations obligations. The Roller Dam has been examined approximately every seven (7) years since 1949 as required under the Reclamation's Review of Operation and Maintenance (RO&M) Program.
- **GVWUA RO&M Program Examination Reports**
  - Program examination reports have been prepared by Reclamation since 1954 for the GVWUA system. The examination reports address the existing condition of the "Government Highline Canal from the Grand Valley Diversion Dam (Roller Dam) to the end of the approximately 55-mile long canal system. Other facilities examined include the Price-Stub Pumping Plant, tunnels, facilities added to the system by the Colorado River Basin Salinity Control Project, various control gates and checks, the drain system and other features." The reports included years 1991, 1996, 2002, 2008, and 2014.
- **1991 Rehabilitation and Betterment Study**
  - In 1991 Reclamation developed a study to summarize the concerns identified in the previous RO&M reports to support GVWUA with a federal grant application. The study

Last Updated: June 2018

Related Studies

reiterated several of the identified concerns as well as contributed several new concerns, many of which remain a high priority today. A cost estimate was prepared by Reclamation as part of the study. The grant request was ultimately unsuccessful, and the projects identified found alternate funding to address the concerns or remained unaddressed.

- This study identified the following top concerns to be addressed at the Dam and Canyon Facilities including, but not limited to:
  - Repair the concrete surface of the diversion dam
  - Replace two of the roller gates on the left side of the diversion dam with a permanent ogee crest
  - Rehabilitate the roller gates
  - Modify the roller gates to provide additional head on the canal works
  - Upgrade the dc and ac power systems to comply with current codes
  - Repair the river training wall
  - Line the first 600 feet of the canal
  - Replace two spillway radial gates on the canal
  - Repair the concrete on the canal headworks and place a guardrail alongside the gate hoists
  - Miscellaneous work between the dam and the inlets to the Power Canal and Tunnel No. 3 (cleaning and reshaping the canal), investigate the canal prism and remove any obstructions and build-up canal freeboard where necessary to safely carry the maximum canal diversion requirements, and upgrading the canal foot bridge and gauging station.
- This study also concluded that:
  - The dc electrical system should be upgraded to comply with current codes instead of converted to AC power - most cost effective.
  - Modification to the entrance of the tunnel will not reduce head loss through Tunnel No. 3.

- **March 2011 Hydropower Resource Assessment at Existing Reclamation Facilities**
  - Reclamation evaluated potential hydropower production sites across the United States in 2011. Out of the 530 sites evaluated, the Grand Valley Diversion Dam was identified as the 18th best site for hydropower development based on benefit cost ratio, and the 5th best in the Upper Colorado Region. However, the assessment identified the site had constraints that may impact the cost and viability to construct hydropower including: fish and wildlife, recreation, historical/archaeological.
  - The report stated the Grand Valley Diversion Dam could produce approximately 2.0 megawatts (MW) of installed capacity with a design flow of 2,260 cfs and 14 feet of design head. The cost for construction was estimated at approximately $9 million dollars.

Last Updated: June 2018

Previous CWCB Grants, Loans or Other Funding
List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.
GVWUA 2018 **Grand Valley Project- Roller Dam Electrical and Control Systems Upgrades Project (Part 1)** Colorado Basin Roundtable May 21, 2018 Colorado Basin Roundtable Meeting Approval September 2018 CWCB pending approval % of CWCB Colorado Basin Roundtable Funding of total project cost was about 27%* **GVWUA 2017** **Grand Valley Roller Dam Rehabilitation Phase 2 Master Plan** Colorado Basin Roundtable March 22-23, 2017 Board Meeting Approval POGG1 PDAA 201700000873 % of CWCB Colorado Basin Roundtable Funding of total project cost was about 31%* **GVWUA 2016** **Grand Valley Project – Government Highline Canal Top 500 Feet Lining Project – Canyon Canal Improvement** Colorado Basin Roundtable September 2016 CWCB Board Meeting Approval CT GG12017-770 % of CWCB Colorado Basin Roundtable Funding of total project cost was about 33%* **July 2016** **ATM Project (NOT WSRF)** December 2017 CWCB Board Meeting Approval CTGG1 2018-653 **GVWUA 2015** **Grand Valley Roller Dam Rehabilitation Master Plan Phase 1** Colorado Basin Roundtable September 28, 2015 CWCB Board Meeting Approval POGGI 2016-394 GV Roller Dam Rehabilitation Phase 1 Project in the Colorado River Basin % of CWCB Colorado Basin Roundtable Funding of total project cost was about 65%* *typical overall project costs were greater than the costs presented in the grants.
Taxpayer Bill of Rights
The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.
NA

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: June 2018

Submittal Checklist	
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
X	Statement of Work(1)
X	Budget & Schedule(1)
X	Engineer's statement of probable cost (projects over $100,000)
X	Letters of Matching and/or Pending 3rd Party Commitments(1)
Exhibit C	
X	Map (if applicable)(1)
X	Photos/Drawings/Reports
X	Letters of Support (Optional)
	Certificate of Insurance (General, Auto, & Workers' Comp.) (2)
	Certificate of Good Standing with Colorado Secretary of State(2)
	W-9(2)
	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: Jan 16, 2018

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**July 30, 2018**
Name of Grantee:	**Grand Valley Water Users Association**
Name of Water Project:	**Roller Dam Electrical and Control Systems Upgrades Project- Part 2**
Funding Source:	**Water Plan Grant**

Water Project Overview:

The Roller Dam diverts water into the Government Highline Canal (GHC) for irrigation and hydropower purposes under very senior water rights that collectively make up the "Cameo Call." The irrigation water is provided to four irrigation entities, which provide irrigation water to approximately 41,000 acres of lands in the Grand Valley. The hydropower water is used to produce hydropower at the Grand Valley Power Plant (GVPP), which has a water right is 800 cfs and an electrical generation capacity of about 3.5 megawatts. Return flows from the GVPP return to the Colorado River at the head of the 15 - Mile Reach, which help maintain flows in that reach for the endangered fish. The existing electrical power systems were installed at the Roller Dam at the time of construction, nearly 100 years ago. Utility power was not available at that time, so electrical power was originally provided by generators and batters and later adapted to AC utility power when it became available.

The existing Roller Dam has an overhead three phase service from Xcel Energy. The largest load on the dam is a motor-generator which converts AC power to DC power. The DC power is then used to operate the seven roller gate motors. Each roller gate motor is 10 hp DC. The Canal head gates are powered by a single 5 hp AC motor which transmits power to the gates via an elaborate bevel gear arrangement. The remainder of the power consumption at the dam is for house power and tools. It appears that there is very little if any automation on the roller gate controls. The head gates are controlled with a rudimentary mechanical level switch located downstream on the canal. The existing dam power distribution system and the DC motors powering the gates are obsolete and in need of replacement. The existing motors are served by a DC power buss which is obsolete and does not provide the redundancy needed to power this facility.

The engineering drawings for Part 1 have been completed and the project is expected to commence in Fall 2018. Part 1 scope of work included the following: extend new three phase utility service, bury the overhead service lines on the property, replace the service equipment at the dam, and install an on-site standby generator serving the entire site. Other sub-parts include adding new service entrances at all out-buildings and reconnecting the existing motor/generator in the machine room which is supplying DC power to the gates.

Part 2 of the project will pick up the new electrical service extended to the dam building in Part 1 of this project and rewire the dam and headgates. Included in the scope will be; replace Roller Dam wiring and upgrading the electrical system; deliver power alternative power source to the fish passage, replacing AC and DC feeders to the roller gate motors; new power to the headgate motors; and lights, switches, and receptacles throughout the Roller Dam. Part 2 will begin once Part 1 is complete.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: Jan 16, 2018

Project Objective: The project objective is to Upgrade electrical system inside the Roller Dam.

Tasks

Task 1 – Replace Roller Dam wiring, provide redundancy on DC power supply, and deliver power to the new headgate motors and alternative power source to the fish passage.

Description of Task:

The wiring across the Roller Dam to each roller gate motor will be replaced to meet code requirements including wiring for lights, switches, and receptacles in the Roller Dam. More outlets and lighting will also be added, including 220-volt welder plugs, to facilitate easier maintenance and safety during night operations. Since new wiring will be added to the dam, a new electrical power panel will also be added near the USFWS fish passage. The new panel will allow the USFWS to gain power from the dam rather than use the 20-kW propane generator (currently used) to power hoists and a pump which fills the fish holding tanks.

Method/Procedure:

The engineering for the new power system has been completed as part of Master Plan Phase II, Part 1. SGM and other consultants will utilize the engineering for the new power system to complete the following procedure to complete Task 1.

1. Install two DC drives, each capable of operating roller gate motors.
2. Run new AC and DC feeders to each roller gate motor to meet current code requirements.
3. Replace AC distribution in power house and on dam including transformers and power distribution panels.
4. Install new programmable logic controller (PLC) based control wiring and operating stations for manual headgate control. Connect to existing SCADA system.
5. Add in new lighting, switches, and receptacles in the Roller Dam building.
6. Add in 220-volt welder plugs by each gate house.
7. Reconnect / rewire existing equipment to remain active.
8. Install electrical power panel for the fish passage.
9. Disconnect existing DC motor-generator and switch to new power supply.

Deliverable:

The Roller Dam electrical system will meet current electrical code requirements and the new wiring will provide redundancy on the DC power supply. Also, the USFWS will have access to a redundant/alternative power source.

Budget and Schedule

This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements

Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Last Updated: Jan 16, 2018

Reporting Requirements

Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that:

- Summarizes the project and how the project was completed.
- Describes any obstacles encountered, and how these obstacles were overcome.
- Confirms that all matching commitments have been fulfilled.
- Includes photographs, summaries of meetings and engineering reports/designs.

The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

Project costs not covered by those or other grants, and are therefore the responsibility of the grantee, will be eligible for CWCB funds at the following percentages of project costs:

	Percent of Project Costs		
Type of Activity	Recommended Grant Funding Request	Max Grant Funding Request (All CWCB Sources)	Minimum Funding Match (Non-CWCB Sources)
Engineering & Construction	20%	50%	50%
Feasibility Study	50%	50%	50%
Reducing Agricultural Dry Up	50%	80%	20%
Conservation/Efficiency Methods	50%	80%	20%
Educational Efforts	50%	80%	20%
Environmental Conservation	50%	80%	20%
Watershed Improvements	50%	80%	20%
Stream Improvements	50%	80%	20%
Land Use Planning	20%	50%	50%
Recreational Projects	20%	80%	20%

Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided to CWCB in hard copy and electronic format as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following:
(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Water Plan Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.
(b) Accountability: Per Water Plan Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Water Plan Grant Guidelines, Progress Reports must be

Last Updated: Jan 16, 2018

Performance Measures
submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment. (c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary. (d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

SGM
www.sgm-inc.com

July 27, 2018

Chris Sturm
Colorado Water Conservation Board
1313 Sherman Street, Room 721
Denver, CO 80203

Dear Mr. Sturm,

SGM serves as the engineer for Grand Valley Water Users Association (GVWUA) and developed the cost estimate (statement of probable costs) for the Roller Dam Electrical and Control Systems Upgrades Project Part 2. The cost estimate is reflected in the detailed budget under Budget & Schedule.

The cost estimate was developed as part of the Master Plan Phase 2 Project which, in part, developed 100% design level drawings for the Roller Dam Electrical and Control Systems Upgrade Project. The design level drawings are included in the grant application. SGM coordinated with electrical and control systems vendors and obtained quotes that support and justify the cost estimate.

We appreciate your consideration of this request.

Sincerely,

Angie Fowler, PE
Project Manager

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Detailed Budget Estimate
Fair and Reasonable Estimate

Date: 7/27/2018
Name of Applicant: Grand Valley Water Users Association
Name of Water Project: Roller Dam Electrical and Control Systems Upgrades Project- Part 2

Task1: Upgrade electrical system in Roller Dam, replace Roller Dam wiring, provide redundancy on DC power supply and deliver power to the new headgate motors and alternative power source to the fish passage

Sub-tasks

Equipment/Wire/Cable Direct Costs	Item	Quantity	Unit Cost	Sub-total
	100A, 3PH,600V, FUSED DISCONNECT	3	$1,400	$ 4,200.00
	100A, 2P,240V, FUSED DISCONNECT	6	$800	$ 4,800.00
	250A, 1PH,240V, LOAD PANEL	1	$2,000	$ 2,000.00
	30 KVA 3PH, TRANSFORMER	1	$4,000	$ 4,000.00
	30 KVA 3PH, TRANSFORMER	1	$4,000	$ 4,000.00
	50A, 3P, MANUAL TRANSFER SWITCH	1	$800	$ 800.00
	100A, 3P, 600V FUSE BOX	1	$800	$ 800.00
	100A, 3P, 600V FUSE BOX	1	$800	$ 800.00
	60A, 3P MANUAL DISCONNECT	1	$250	$ 250.00
	CONTACTOR	6	$1,200	$ 7,200.00
	DC DRIVE	2	$9,500	$ 19,000.00
	(4) 2P BREAKERS	4	$200	$ 800.00
	(16) 1P BREAKERS	16	$50	$ 800.00
	JUNCTION BOXES	20	$20	$ 400.00
	LIGHTS	20	$150	$ 3,000.00
	SWITCHES	10	$25	$ 250.00
	RECEPTACLES 2P	20	$200	$ 4,000.00
	2 #2 CU, 1"GRC	650	$2	$ 1,300.00
	2# 12 CU, 3/4" EMT	255	$6	$ 1,530.00
	3 #4 CU, 1" EMT	20	$20	$ 400.00
	4# 1 CU, 1.5 EMT	30	$30	$ 900.00
	MULTIWIRE BRANCH CIRCUIT RIGID	480	$20	$ 9,600.00
	US1	15	$8	$ 120.00
	Sub-total Equipment/Wire/Cable			*$ 70,950.00*

Installation of Electrical	Item	Hours Per Quantity / Cost per linear foot	Hourly Rate	Sub-total
	100A, 3PH,600V, FUSED DISCONNECT	4	$75	$900
	100A, 2P,240V, FUSED DISCONNECT	4	$75	$1,800
	250A, 1PH,240V, LOAD PANEL	8	$75	$600
	30 KVA 3PH, TRANSFORMER	16	$75	$1,200
	30 KVA 3PH, TRANSFORMER	16	$75	$1,200
	50A, 3P, MANUAL TRANSFER SWITCH	8	$75	$600
	100A, 3P, 600V FUSE BOX	4	$75	$300
	100A, 3P, 600V FUSE BOX	4	$75	$300
	60A, 3P MANUAL DISCONNECT	4	$75	$300
	CONTACTOR	4	$75	$1,800
	DC DRIVE	24	$75	$3,600
	(4) 2P BREAKERS	1	$75	$300
	(16) 1P BREAKERS	1	$75	$1,200

	JUNCTION BOXES	2	$75	$1,500

	LIGHTS	2	$75	$3,000
	SWITCHES	1	$75	$750
	RECEPTACLES 2P	2	$75	$3,000
	2 #2 CU, 1"GRC	650	$30	$19,500
	2# 12 CU, 3/4" EMT	255	$20	$5,100
	3 #4 CU, 1" EMT	20	$30	$600
	4# 1 CU, 1.5 EMT	30	$40	$1,200
	MULTIWIRE BRANCH CIRCUIT RIGID	480	$60	$28,800
	UNDERGROUND SERVICE 1	15		$0
	Sub-total Labor			*$ 77,550.00*
Engineering	**Item**	**# of Hours**	**Hourly Rate**	**Sub-total**
	Miscellaneous (20% of cost)			$ 29,700.00
	Contingency (15% of cost)			$ 26,730.00
	Project Management	140	161	$ 22,540.00
	Sub-total Engineering			*$ 78,970.00*

TOTAL	**$227,470.00**

Preliminary
Not For Construction
60% DD

SGM
118 West Sixth Street, Suite 200
Glenwood Springs, CO 81601
970.945.1004 www.sgm-inc.com

GVWUA
Grand Valley Roller Dam

#	Revision	Date	By
1			
2			
3			
4			
5			

Overall Site Plan

Job No.	2015-0516.010
Drawn by	TC
Date	10/05/2017
Checked by	BC
File	24x36

E0.0

THE COLORADO BASIN ROUNDTABLE
C/O P.O. BOX 1120
GLENWOOD SPRINGS, COLORADO 81602

July 29, 2018

Chris Sturm
Colorado Water Conservation Board
Colorado Water Plan Grants
1313 Sherman Street, Rom 721
Denver CO
(303) 866-3441

Dear Chris and staff,

The Colorado Basin Roundtable wholeheartedly supports the Grand Valley Water Users Association's Colorado Water Plan grant request Part 2 of its Electrical and Control Systems Upgrades Project at the Roller Dam. We have supported this work previously through the Water Supply Reserve Fund grant process and are well familiar with the details of the work. The GVWUA is to be commended for its methodical and well planned work to improve its infrastructure. It is critical work for western Colorado due to the importance of the senior irrigation water rights that define the Grand Valley.

The Roller Dam, for its role in providing irrigation and even drinking water to the Grand Valley, is a top project cited in our Basin Implementation Plan. This grant request is asking for agricultural funding from the CWP grant program, which comports with a chief finding of our BIP that sustaining agriculture is paramount to protecting western Colorado water, economy and more.

Sincerely yours,

Jim Pokrandt
Chair, Colorado Basin Roundtable