

Colorado Department of Public Health & Environment  
Erick Worker  
Project Manager, Grants & Loans Unit  
4300 Cherry Creek Drive South  
Denver, CO 80246-1530

October 28, 2020  
2019-09-005  
SL# 802

Reference: Blue Mountain Water District Drinking Water Revolving Fund  
Project Needs Assessment (PNA) Review  
DWRP Project No. 090711D-Q

Dear Mr. Worker:

VISTA ENGINEERING, L.L.C. is submitting this letter, on behalf of the Blue Mountain Water District Board, to provide clarification and/or attention to items listed in the PNA Review letter.

### **Project Components**

This project includes three components: Construct a 100,000-gallon storage tank, replace Pump Station #3 pumps and control panel, and replace water meters. The following discussion provides information regarding the new storage tank.

The District's existing distribution system includes two storage tanks, one in Zone 2 and one in Zone 3. This project includes adding a storage tank to Zone 2. The water distribution system requires storage to provide operational storage (OS), equalization storage (EQ), fire storage (FS), and emergency storage (EM). A portion of the District's existing storage tanks will provide fire storage. The new storage tank will provide equalization and emergency storage. No portion of the requested DWRP funds will be used for fire storage.

#### **1.0 OPERATIONAL STORAGE**

Operational storage is defined as the volume of the tank system that supplies water to the distribution system during the pump's off-cycle. This volume was set to prevent excessive cycling of the pumps. This volume is additive to the other components of storage, and provides a factor of safety to the other components of storage. The District's distribution system is operated with Call-On-Demand pumping protocol. In the early years of the District, water demands were met with pump-off cycles approximately equal to pump-on cycles. The storage tank system filled completely during the night. At

current water use, high daily demands have required the pump-on cycles to approach continuous pumping.

American Water Works Association (AWWA) M31 manual recommends operational storage to be 25% to 35% of maximum day demand.<sup>1</sup>

Operational storage for this project was estimated at 0.35(31,746 gpd) or 11,111 gallons, and rounded up to 12,000 gallons.

### 1.1 EQUALIZATION STORAGE

Equalization storage is provided when the pumping capacity cannot meet the daily peak demands. Currently, during high-demand periods, the tank system gains volume during the night, but requires several days to completely fill. The difference between maximum day and average day was approximately 10,000 gpd. A factor of safety of 2 was applied to the equalization storage to compensate for hourly peaks that were not reflected in the flow records. Equalization storage for this project was estimated at 2(10,000 gpd) or 20,000 gallons.

### 1.2 FIRE STORAGE

Fire storage is a required component of water distribution system storage. As a point of reference, a fire storage volume was estimated that would provide recommended needed fire flow (NFF) capacity based on land use. The AWWA recommendation was NFF of 1,000 gpm for a duration of 2 hours, or 120,000 gallons.<sup>2</sup> The intent of this project was to increase storage capacity, with a portion designated as fire storage. The AWWA recommendation would not be met. Fire storage will be provided by the existing storage tank. The new tank will provide equalization and emergency storage.

The District has identified pressure and fire flow quantity limitations to providing fire flows to the community. The subject was formally identified in a resolution of the Board of Directors of Blue Mountain Water District, dated February 10, 1999. Providing fire storage was a component of this project, but not the primary purpose.

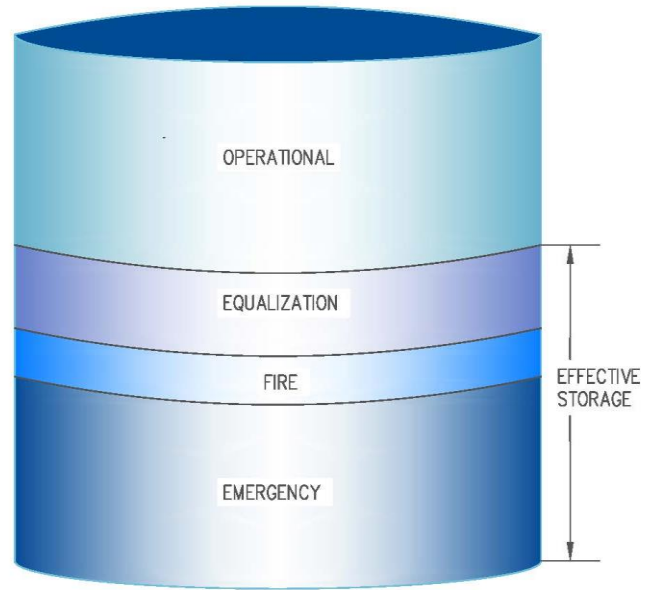


Figure 1 Storage Tank Components

<sup>1</sup> Distribution System Requirements for Fire Protection, M31, American Water Works Association, 2008, page .

<sup>2</sup> Distribution System Requirements for Fire Protection, M31, American Water Works Association, 2008, page 9.

### 1.3 EMERGENCY STORAGE

Emergency storage is a component of water distribution system storage, and provides water during emergency events. Emergency storage is required to provide customers water service during periods of power loss during storm events, in the event of a line break on the transmission line between the water treatment plant and the storage tank, and similar unusual emergency events. Historically, winter storm events have caused multiple-day power loss to the community and water system. A 500-yr rainstorm event during 2013 caused flooding that resulted in a water main break. Storm event duration has been three to four days. At a budget daily water demand of 25,000 gallons per day (gpd), emergency storage is recommended to be 75,000 gpd to 100,000 gpd.

### 1.4 TOTAL STORAGE

When the District was formed in the late 1970s, storage requirements were met with the two storage tanks. Now, approximately forty years later, the District is near build-out, with twice the customers, and additional storage is required. Recommended storage volume is listed in the following table:

Table 1 Storage Volume

STORAGE	VOLUME (gallons)
Operational	12,000
Equalization	20,000
Fire Storage	28,000
Emergency	100,000
TOTAL	160,000

### 1.5 PROJECT COST

An estimated cost breakdown for the three portions of this project are attached: 100,000-gal tank, replace Pump Station #3 pumps, and replace water meters. None of the project funds will be used for fire storage.

#### **Final Environmental Determination**

This project will coordinate reviews with SHPO, U.S. Fish and Wildlife, and Colorado Parks and Wildlife prior to finalization of the environmental decision.

#### **Public Participation**

The District will hold a public meeting to inform the Blue Mountain Water District's customers. Information provided will include a discussion of project alternatives, the preferred alternative, any projected rate increases, and construction related and/or environmental impacts of the project.

**Technical, Managerial, Financial (TMF) capacity assessment**

The TMF criteria was met in the PNA submittal. No items requiring further attention and funding through the DWRF was recommended.

**State Revolving Fund (SRF) bidding requirements**

SRF Required Specifications will be included in the bid package.

Please contact me with questions or comments. My office telephone number is 719.347.3130, my cell number is 303.810.2703, and my e-mail address is Sherri.Jones@vista-engineering.com.

Sincerely,  
VISTA ENGINEERING, L.L.C.



Sherri D. Jones, P.E.  
Senior Project Manager

Enclosure

cc:	Thomas Bishop,	Blue Mountain WD
	Joe Tamburini,	Blue Mountain WD
	Bill Rech,	Blue Mountain WD
	Mark Henderson,	WQCD GLU Unit Manager
	Andrea Sestokas,	WQCD ES Review Engineer
	Matt Alms,	WQCD Compliance Specialist
	Desiree Santerre,	DOLA
	Austin Reichel,	CWRPDA

BLUE MOUNTAIN WATER DISTRICT				
DISTRIBUTION SYSTEM UPGRADE PROJECT				
OPINION OF PROBABLE COST (OPC)				
TANK #2A (100,000 gallon)				
			UNIT	LINE ITEM
COMPONENT	QUANTITY	UNITS	COST	COST
Concrete, placed	266	yd <sup>3</sup>	\$950	\$252,335
Riser	2	ea	\$3,800	\$7,600
Hatch & Safety Ladder	2	ea	\$4,300	\$8,600
Vent Pipe, 6" φ	20	ft	\$20	\$400
Tank Hatch, vent, etc install	30	%	\$4,980	\$4,980
Tideflex Mixing Header	1	ea	\$14,131	\$14,131
Tideflex Install	30	%	\$4,239	\$4,239
Clearing & Grubbing	2,500	yd <sup>2</sup>	\$5	\$12,500
Excavation	900	yd <sup>3</sup>	\$10	\$9,000
Gravel Base, placed	150	yd <sup>3</sup>	\$75	\$11,250
Yard Piping, 6 inch, install	200	ft	\$200	\$40,000
Yard Valves, 6 inch	6	ea	\$300	\$1,800
Silt Fence, installed	400	ft	\$10	\$4,000
Final Grade, Reseed	2,500	yd <sup>2</sup>	\$4	\$10,000
Mobilization/Demob	1	ea	\$15,000	\$15,000
Temporary Services	1	ea	\$20,000	\$20,000
Electrical, I&C	1	ea	\$10,000	\$10,000
Subtotal				\$425,835
General Conditions	12	%		\$51,100
Subtotal				\$476,935

REPLACE PUMP STATION #3 PUMPS				
			UNIT	LINE ITEM
COMPONENT	QUANTITY	UNITS	COST	COST
2-pump skid, 75 gpm @ 500 ft	1	ea	\$34,590	\$34,590
Freight	1	ea	\$500	\$500
Start-up Services	2	days	\$750	\$1,500
Piping modifications	1	ea	\$5,000	\$5,000
Associated Labor Costs	25	%	\$8,648	\$8,648
Subtotal				\$50,238

REPLACE WATER METERS				
			UNIT	LINE ITEM
COMPONENT	QUANTITY	UNITS	COST	COST
Neptune R900 Transceiver	1	ea	\$2,776	\$2,776
Neptune NGO App	1	ea	\$20	\$20
Neptune MACH 10 Ultrasonic Meters	115	ea	\$310	\$35,650
Associated Labor Costs	25	%	\$8,913	\$8,913
Subtotal				\$47,359
PROJECT TOTAL				\$574,531