Pueblo West Metropolitan District
Department of Utilities
20 W. Palmer Lake Dr.
Pueblo West, CO 81007

October 30, 2020

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, Colorado 80203

Reference: PWMD Water Efficiency Plan Final Submittal

To Whom It May Concern:

The Pueblo West Metropolitan District (District) completed the update to the Water Efficiency Plan in accordance with the Colorado Water Conservation Board's (CWCB) Guidelines. The District previously obtained approval from the CWCB in August 2012 for the initial Water Conservation Plan.

A draft of the Water Conservation Plan went out for comment on March 22, 2020 for a period of 60 days. It was advertised through the District's website and the Pueblo Chieftain. There were no public comments.

On October 26, 2020, the District Board approved and adopted the updated Water Efficiency Plan and is prepared to continue with the implementation of this Plan. A final copy will be provided to the CWCB.

Sincerely,
Pueblo West Metropolitan District

By: _____
Katherine Kallenbach
Utilities Program Coordinator

WATER CONSERVATION PLAN UPDATE

FOR THE

PUEBLO WEST METROPOLITAN DISTRICT

PUEBLO WEST Colorado

AUGUST 18, 2020

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EXECUTIVE SUMMARY

Water providers seeking financial assistance from the State who deliver more than 2,000 acre-feet (AF) of water annually are required by Colorado Revised Statutes 37-60-126 to create and file a Water Conservation Plan at the Colorado Water Conservation Board (CWCB) Office of Water Conservation and Drought Planning. The PWMD Water Conservation Plan (Plan) is an effort to satisfy the above requirements and manage the District's available water supply through conservation planning. This report is an update to the District's Water Conservation Plan from 2012. The District's water supply system and future customer demand has been evaluated in order to determine appropriate strategies to better manage demands on the water supply of the growing community. A review of historic average daily water consumption per water connection tap since 2002 indicates an approximate 10% reduction in water use. It is difficult to quantify the savings attributable to individual water conservation efforts, since numerous efforts have been underway over the last eight years. This plan update has been developed with a 20-year planning horizon, but has established water reduction goals in five-year increments to allow for continued evaluation of the efficacy of various conservation efforts.

The Pueblo West Metropolitan District (PWMD or District) was established on September 16, 1969 and is located in Pueblo County, Colorado approximately seven miles west of the City of Pueblo. The community offers convenient access to outdoor recreation and tourism destinations, as well as local businesses and shopping districts. Although the community has the essence of a small town, it remains a growing community in Southern Colorado.

In 2018, District customers used 5,481 AF or 1,786 million gallons (MG) of water. Based on current and historical water use patterns, the District will be required to provide 7,218 AF of water in 2038 (20-year planning horizon) to support customer demand. Acquiring additional water sources has proven to be difficult and if feasible, is often not economically practical. Based on the current available water supply, the water demand at buildout could lead to a shortfall of water, particularly during drought conditions. The buildout condition was determined by calculating the number of water tap connections that are possible given the current boundaries of the service area. There are 18,373 taps in the District at buildout. For buildout conditions, the projected annual demand is 8,212 AF, based on current demands. The annual water supply portfolio (excluding groundwater sources) consists of 7,405. AF.

Based on current projections, the District's demand will exceed their current annual water supply portfolio in 2041. Water conservation measures are recommended for implementation to prolong the time when demand exceeds supply. This Plan discusses options for reducing the annual water demand by 9.9 percent by 2038 in order to provide sufficient water to the District's customers at buildout. This reduction equates to a water savings of 714 AF. The Plan provides information on the District's water system, historical and future water demand, capital improvement projects, and the methodology used in the water conservation planning process. The District should review annually the efficacy of conservation measures and update projections for total water demand, and weigh the annual savings against the cost of producing water, as well as against future planned upgrades for supply and treatment.

WATER CONSERVATION GOALS

In 2001, the District began incorporating water conservation measures and programs in order to initiate water conservation efforts. Conservation measures and programs currently in use within the District include the following:

- Water Conservation and Drought Contingency Plan;
- Public education and outreach;
- Utilization of water treatment backwash waste water for non-potable irrigation purposes;
- Information regarding conservation efforts presented on District's website;
- Design and construction of non-potable reuse water at the District's wastewater treatment facility; and
- Demonstration xeriscape garden and xeriscape gardening classes.

The amount of water use reduction that can be attributed to the implementation of these programs is difficult to calculate, however the residential annual per capita water use has decreased nine percent over ten years. One of the goals of this Plan is to develop a preliminary monitoring plan that the District will be able to use to track the success of various water conservation measures. The District should review annually the effectiveness of the conservation measures and update projections for total water demand and weigh the annual savings against the cost of producing water, as well as against future planned upgrades for supply and treatment.

To develop water conservation goals, the CWCB method was used. This process is an iterative process and includes:

- Determining an initial water saving goal estimate;
- Selecting water conservation measures and programs to meet the initial goal;
- Evaluating the water savings from the water conservation measures and programs; and
- Comparing the expected water savings to the initial goals.

This Plan has established a 9.9 percent reduction goal in overall water use over a 20-year planning period. The analysis of historical and current water use patterns for the District's customer categories demonstrated that the majority of the District's water demand is associated with outdoor (irrigation) water use. In order to most effectively achieve the water conservation goals, customer categories with the highest outdoor water use are the focus of the water conservation measures and programs. As discussed above, water conservation goals were established in five-year increments to provide opportunity for evaluation and assessment of the effectiveness of the measures and programs throughout the planning period. A summary of the District's water conservation goals are shown in Table ES 1.

Table ES 1. Water Conservation Goals

Water Use Categories Phase 1	Total Projected Water Use	Water Savings from Selected Programs	Amount of Conservation from Programs Selected	Adjusted Conservation Goals	
	A.F.	A.F.	%	A.F.	%
2023					
Residential	29,321	2,228	7.6%	2,228	7.6%
Commercial	4,789	434	9.1%	434	9.1%
Non - Residential	2,174	74	3.4%	74	3.4%
TOTAL	**36,285**	**2,736**	**7.5%**	**2,736**	**7.5%**
2028					
Residential	55,598	4,922	8.85%	4,922	8.9%
Commercial	9,059	815	9.0%	815	9.0%
Non - Residential	3,986	156	3.9%	156	3.9%
TOTAL	**68,644**	**5,893**	**8.6%**	**5,893**	**8.6%**
2033					
Residential	83,225	7,920	9.52%	**7,920**	**9.5%**
Commercial	13,535	1,535	11.3%	**1,535**	**11.3%**
Non - Residential	5,798	246	4.2%	**246**	**4.2%**
TOTAL	**102,559**	**9,701**	**9.5%**	**9,701**	**9.5%**
2038					
Residential	112,199	11,157	9.9%	11,157	9.9%
Commercial	18,216	2,158	11.8%	2,158	11.8%
Non - Residential	7,610	344	4.5%	344	4.5%
TOTAL	**138,025**	**13,658**	**9.9%**	**13,658**	**9.9%**

EVALUATION OF CONSERVATION MEASURES AND PROGRAMS

To determine the most effective options for meeting the District's water conservation goals, a list of programs and measures was developed. The preliminary list of alternatives is separated into measures and programs that address water supply and those that address water demand.

Preliminary screening criteria were developed to select which water conservation measures would be considered for further evaluation. The alternatives selected for further evaluation must meet the following criteria:

- Address high outdoor consumption categories;
- Financially feasible;
- Results for program evaluation are quantifiable; and
- Satisfy the CWCB specified statute for required measures and programs.

The alternatives selected for further evaluation were analyzed using a cost-benefit analysis and were ranked based on the cost of each program per 1,000 gallons of water saved at each of the interim years. Ranking of the measures at each of the interim periods was completed in order to

develop an implementation plan. A list of the rankings for the planning period is provided in Table ES 2.

Table ES 2. 2038 Water Conservation Measure Ranking

Rank	Conservation Measure or Program	Cost per 1000 Gallons Saved
1	Pressure Management	$ 0.65
2	Leak Detection & Repair Program	$ 0.75
3	Water Meter Testing and Replacement Program	$ 1.87
4	Water Restrictions - Hour/Days	$ 3.28
5	New Landscape Lawn Permits	$ 3.37
6	Designated Water Conservation Officer	$ 5.18
7	Irrigation, Turf and Landscape Standards for New Construction	$ 8.38
8	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	$ 9.99
9	Practical Turf for Sports Fields	$ 18.80
10	Irrigation Scheduling	$ 20.63
11	Residential Indoor Water Audit	$ 22.09
12	Commercial and Residential Rain and Wind Sensor Requirement	$ 32.29

IMPLEMENTATION PLAN

In order to provide the most cost effective and efficient method to implement the Plan, the District has developed a staged approach, which will occur over the next ten years. The selected conservation measures are ranked number 1 through number 10. The implementation schedule, comments on requirements for implementation, and the associated costs are provided in Table ES 3.

It is recommended that the Plan's implementation begin immediately after the Plan's approval to meet the conservation goal milestones. To track the success of the Plan, a preliminary monitoring plan was created and should be conducted annually. A formal update on the progress of the Plan is required by the CWCB within seven years.

Table ES 3. Water Conservation Plan Implementation Schedule

Conservation Measures and Programs	Implementation Cost	Annual Costs (after 1st year)	% of Total Water Savings	Comments for Implementation Consideration
Phase 1				
Pressure Management	$6,500		17.21%	Public communication, funding, staff availability
Water Meter Testing and Replacement Program	$7,500		15.05%	Staff availability, third party coordination, funding
Leak Detection & Repair Program	$26,500		15.05%	Staff availability, third party coordination, funding
Designated Water Conservation Officer	$65,000		15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	$2,000		0.74%	Public communication, funding, staff availability, third party coordination, water conservation officer
Water Restrictions - Hour/Days	$6,000		34.31%	Public communication, funding, staff availability
Evaluation of Synthetic Turf for all newly constructed sports fields	$5,000		TBD	Staff availability, third party coordination, funding
Total Cost Phase 1 =	***$118,500***			
Phase 2				
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Water Restrictions - Hour/Days	--	$7,500	34.31%	Public communication, funding, staff availability
Total Cost Phase 2 =	***$197,300***			

Table ES 4. Water Conservation Plan Implementation Schedule (continued)

Conservation Measures and Programs	Implementation Cost	Annual Costs (after 1st year)	% of Total Water Savings	Comments for Implementation Consideration
Phase 3				
Commercial and Residential Rain Sensor Requirement	$6,250		0.29%	Public communication, funding, staff availability, water conservation officer
Irrigation, Turf and Landscape Standards for New Construction	$6,250		0.24%	Public communication, funding, staff availability, water conservation officer
Irrigation Scheduling	$6,000		0.24%	Public communication, funding, staff availability, water conservation officer
New Landscape Lawn Permits	$6,500		7.25%	Public communication, funding, staff availability, water conservation officer
Water Restrictions - Hour/Days	--	$7,500	34.31%	
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Total Cost Phase 3 =	***$203,800***			
Phase 4				
New Landscape Lawn Permits	--	$3,700	7.25%	
Water Restrictions - Hour/Days	--	$7,500	34.31%	
Commercial and Residential Rain and Wind Sensor Requirement	--	$17,500	0.29%	
Irrigation, Turf and Landscape Standards for New Construction	--	$5,000	0.24%	
Irrigation Scheduling	--	$17,500	0.24%	
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	0.74%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Total Cost =	***$463,550***			
Total Implementation Costs =	***$353,800***			
Total Annual Costs (Full Implementation) =	***$263,500***			

SECTION 1 – INTRODUCTION

PURPOSE

The Pueblo West Metropolitan District (PWMD or District) was established on September 16, 1969 and is located in Pueblo County, Colorado approximately seven miles west of the City of Pueblo. The community offers convenient access to outdoor recreation and tourism destinations, as well as local businesses and shopping districts. Although the community has the essence of a small town, it remains a growing community in Southern Colorado.

Since the District's inception, it has been providing high quality water service to its customers and is committed to continuing this practice as the community continues to grow. Water supplies are becoming less available due to the regional increases in population, imposing a need for the implementation of water management programs, including conservation.

Water providers seeking financial assistance who deliver more than 2,000 acre-feet (AF) of water annually are required by Colorado Revised Statutes 37-60-126 to create and file a Water Conservation Plan for the Colorado Water Conservation Board (CWCB) Office of Water Conservation and Drought Planning. This Water Conservation Plan (Plan) is an effort to satisfy the above requirements and maximize the District's available water supply by appropriate planning.

This Plan is an update to the 2012 Plan which established a 9.0 percent reduction goal in overall water use over a 20-year planning period. The water demand over the most recent five years has demonstrated a reduction in overall water use in support of the exiting Plan goals.

The District's water supply system and future customer demand has been evaluated to determine appropriate strategies to better manage demands on the water supply of the growing community. The plan has been developed with a 20-year planning horizon, but has established water reduction goals in five-year increments to allow for regular evaluations of conservation efforts.

SECTION 2 –EXISTING WATER SYSTEM PROFILE

CHARACTERISTICS OF PUEBLO WEST METROPOLITAN DISTRICT WATER SUPPLY SYSTEM

POPULATION AND SERVICE AREA

The PWMD is located in Pueblo County, Colorado, seven miles west of the City of Pueblo, and is one of two metropolitan districts within the County. The service area is all within the District Boundary, which encompasses approximately 31,000 acres (48.4 square miles). The District is not anticipated to expand outside of the existing service area boundaries. Therefore, all maps provided show the existing service boundary and the 20-year planning area boundary. The service area boundary is shown in Figure 1.

The topography of the District has rolling hills and generally slopes from the north to south towards the Arkansas River (south boundary of the service area). Elevation ranges from 4,900 feet at the lower elevation to 5,420 feet in the northwest corner of the District.

The District currently serves 11,744 water tap connections. From 2008 to 2018, the District has seen an 8 percent increase in population, from 27,697 to 30,137 residents. The historical population and annual growth rate recorded by the District from 2008 to 2018 is provided in Table 1. Historical population estimates for the PWMD are calculated using the number of water tap connections in the District during December of the year recorded. (Current District population is calculated based on the number of water tap connections in the District, the U.S. Census Density figure of 2.7 persons per household, and a 0.91 correction factor to account for commercial water tap connections.)

Table 1. Historical Population 2008 – 2018

Year	Estimated Population Served	Percent Increase
2008	27,697	1.8%
2009	27,972	1.0%
2010	28,174	0.7%
2011	28,282	0.4%
2012	28,374	0.3%
2013	28,480	0.4%
2014	28,570	0.3%
2015	28,713	0.5%
2016	29,011	1.0%
2017	29,491	1.6%
2018	30,137	2.1%

NORTH STORAGE TANKS

DISTRICT BOUNDARY

APPROX BOUNDARY OF E. INDUSTRIAL BLVD. PROPERTY

APPROX BOUNDARY OF HWY 50 & McCULLOCH PROPERTY

APPROX LOCATION OF EXIST WELLS (TYP)

DESERT HAWK GOLF COURSE

WATER TREATMENT PLANT AND STORAGE TANKS

WASTEWATER TREATMENT FACILITY

PUEBLO RESERVOIR

RAW WATER PUMP STATION

HIGHWAY 50

50

INTERSTATE 25

25

PUEBLO

N

6,600' 0 6,600' 13,200'

SCALE: 1" = 6,600' (1.25 MILES)

JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Phone: 303.444.1951
E-mail: info@jvajva.com

CONSULTING ENGINEERS

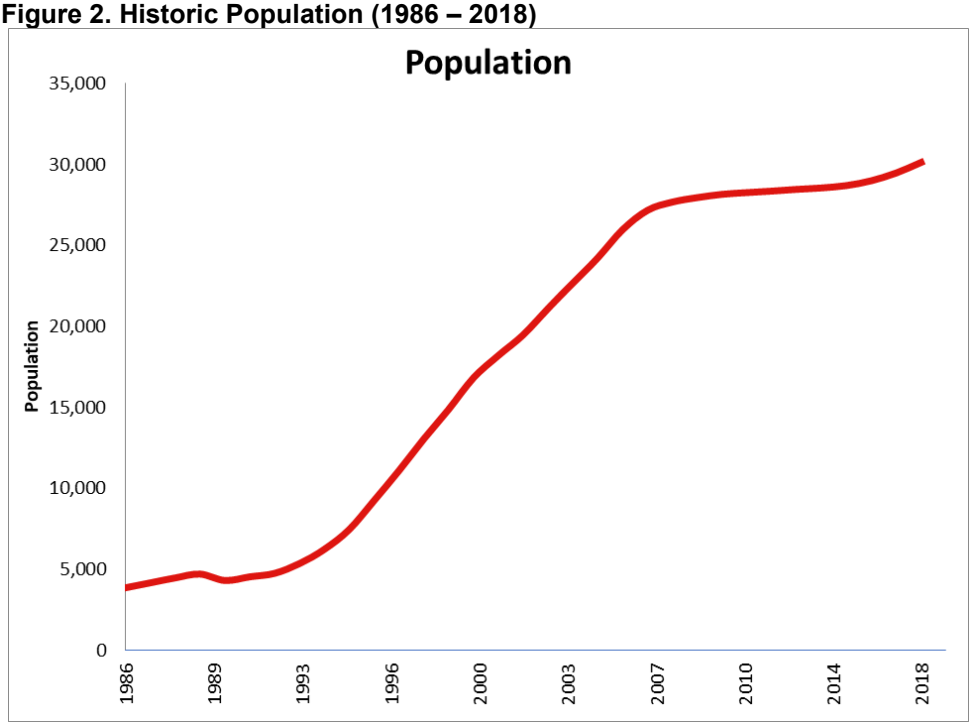
FIGURE 1 - DISTRICT BOUNDARY AND EXISTING FACILITIES

PWMD WATER CONSERVATION PLAN

NOVEMBER 2019

The data presented in Table 1 demonstrates that the high population growth the District was experiencing from 2001 to 2006 has decreased in the past ten years (2008 to 2018), to an average growth rate of 0.9 percent. A graph of the District's population based on District data from 1986 to 2018 is provided in Figure 2.

Figure 2. Historic Population (1986 – 2018)



SERVICE CONNECTIONS AND WATER DEMAND

In 2018, the District provided an annual average of 4.6 million gallons per day (MGD) of treated water with a maximum month average of 7.8 MGD during June. Additional analysis of the District's current and historic water demand are provided in Section 3.

The number of water tap connections for the PWMD from 2009 to 2018 based on District data and the associated growth rate are provided in Table 2.

Table 2. Historical Water Tap Connections 2008 – 2018

Year	Total Water Taps	Percent Increase
2008	10,793	1.0%
2009	10,900	1.0%
2010	10,979	0.7%
2011	11,021	0.4%
2012	11,057	0.3%
2013	11,098	0.4%
2014	11,133	0.3%
2015	11,189	0.5%
2016	11,305	1.0%
2017	11,492	1.6%
2018	11,744	2.1%

Water demand within the District was classified based on customer category. There are six user categories in the District: residential, commercial, duplex, multi-family, non-residential, and non-potable. The water demand for each user category is presented in Table 3 as a percentage of the total number of water connection taps and a percentage of the total water demand.

Table 3. 2018 Water Demand Per User Category

Category	Number of Taps	2018 Percentage of Total Taps	2018 Percentage of Total Water Use
Residential	10,944	94.84%	76.20%
Commercial	340	2.68%	13.20%
Duplex	336	1.91%	1.90%
Multi – Family	63	0.50%	1.20%
Non – Residential	8	0.06%	0.30%
Non – Potable	1	0.01%	7.30%

The District's largest water use category is residential, with roughly 95 percent of the total taps and 76 percent of the total water demand. Water use in the commercial category is approximately 13 percent.

EXISTING FACILITIES

The existing water system consists of raw water storage and delivery, filtration, disinfection, chemical feed, treated water storage and distribution, and pump stations.

WATER TREATMENT SYSTEM

PWMD owns and operates a public water system (PWSID #CO-0151650) that serves the District. The PWMD Water Treatment Plant (WTP) is located at 20 Palmer Lake Drive in Pueblo West, Colorado. The location of the existing WTP is shown on Figure 1.

The original WTP was constructed in 1970. Major improvements were completed in 1993, 2001, and 2013. The existing WTP has a capacity of 21 MGD and a firm capacity of 16 MGD. From the Pueblo Reservoir, raw water is pumped nearly four miles while gaining 431 feet to the constant head tank at the WTP. Before entering the constant head tank, a chlorine dioxide solution is injected to the raw water. Raw water is transferred by gravity from the constant head to the original treatment building and newer treatment building (2001) through a 24-inch ductile iron pipe and 36-inch ductile iron pipe, respectively. The WTP currently houses nine prepackaged treatment units in the two locations (Treatment Units 4 thru 12). Treatment Units 1 thru 3 were taken out of service when the 2001 expansion project came online. After filtration, chlorine is added and a clearwell and onsite storage tanks allow for disinfection. Three high service pump stations send finished water into the distribution system.

Potable Water Distribution And Storage

The District's distribution system consists of approximately 400 miles of pipe, five pump stations and is divided into five pressure zones. The majority of the distribution system was installed between 1976 and 1978. It is anticipated that the older water distribution system valves and fittings will need to be replaced due to deterioration caused by locally corrosive soils. This deterioration ultimately results in water leaks.

The WTP is located in Zone 3, which is the largest zone extending to the western and northern District boundaries. Zone 1 and Zone 2, located to the southwest and to the east, respectively, are each fed though pressure reducing valves (PRVs) from Zone 3. The southern end of the District is considered Zone 4 and is supplied through both the Zone 4 Booster Station and the North Tank Farm Booster Station. Zone 5 is located at the northern end of the District and is supplied via the North Tank Farm Booster Station.

The system is served by four pressure zones ranging in elevation from 4,850 to 5,465 feet, with an approximate pressure range of 40 pounds per square inch (psi) to 155 psi. The average pressure in the distribution system is 98 psi. Table 4 shows the approximate lengths and diameters of the water distribution system pipes. The PWMD's distribution system is shown in Figure 3.

Table 4. Miles of Pueblo West Distribution System Pipeline

Diameter	Total Length (Miles)
6 inch	249.9
8 inch	132.5
10 inch	8.1
12 inch	10.6
14 inch	0.0
18 inch	6.3
24 inch	10.9

The potable water storage facilities consist of seven tanks with a combined storage capacity of approximately 12 MG. Three finished water storage tanks, each with a storage of 1 MG, are located adjacent to the existing WTP. The other four storage tanks are located on the northern boundary

of the District at the North Tank Farm. The combined storage capacity of the North Tanks is approximately 9 MG. The District currently has the ability to store approximately 24 hours of water on the peak day. These faculties are shown on Figure 1.

As water demand increases, the District will no longer have sufficient water storage capacity to store 24 hours of water to meet the peak day demand. The proposed West Side Distribution Tank will provide additional capacity as well as improve water quality, but it is not planned until 2026. The peak day demand will exceed the existing storage capacity.

SOURCES OF WATER SUPPLY

The existing water supply sources for the District include trans-mountain surface water, non-tributary groundwater, and tributary surface water. The District's surface water rights include shares of the Twin Lakes Reservoir and Canal Company, restricted access to the Wheel Ranch Ditch Company, shares of the Colorado Canal/Lake Meredith Company, and access to Hill Ranch water sources. The non-tributary groundwater is provided via 18 groundwater wells. The groundwater wells were used as the District's original water supply source, and are currently not used by the District due to poor production and water quality. As required by the 1996 Safe Drinking Water Act amendments, the Colorado Department of Public Health and Environment (CDPHE) conducted a *Source Water Assessment* for the District water supply in 2004 in accordance with Colorado's Source Water Assessment and Protection Program (SWAP).

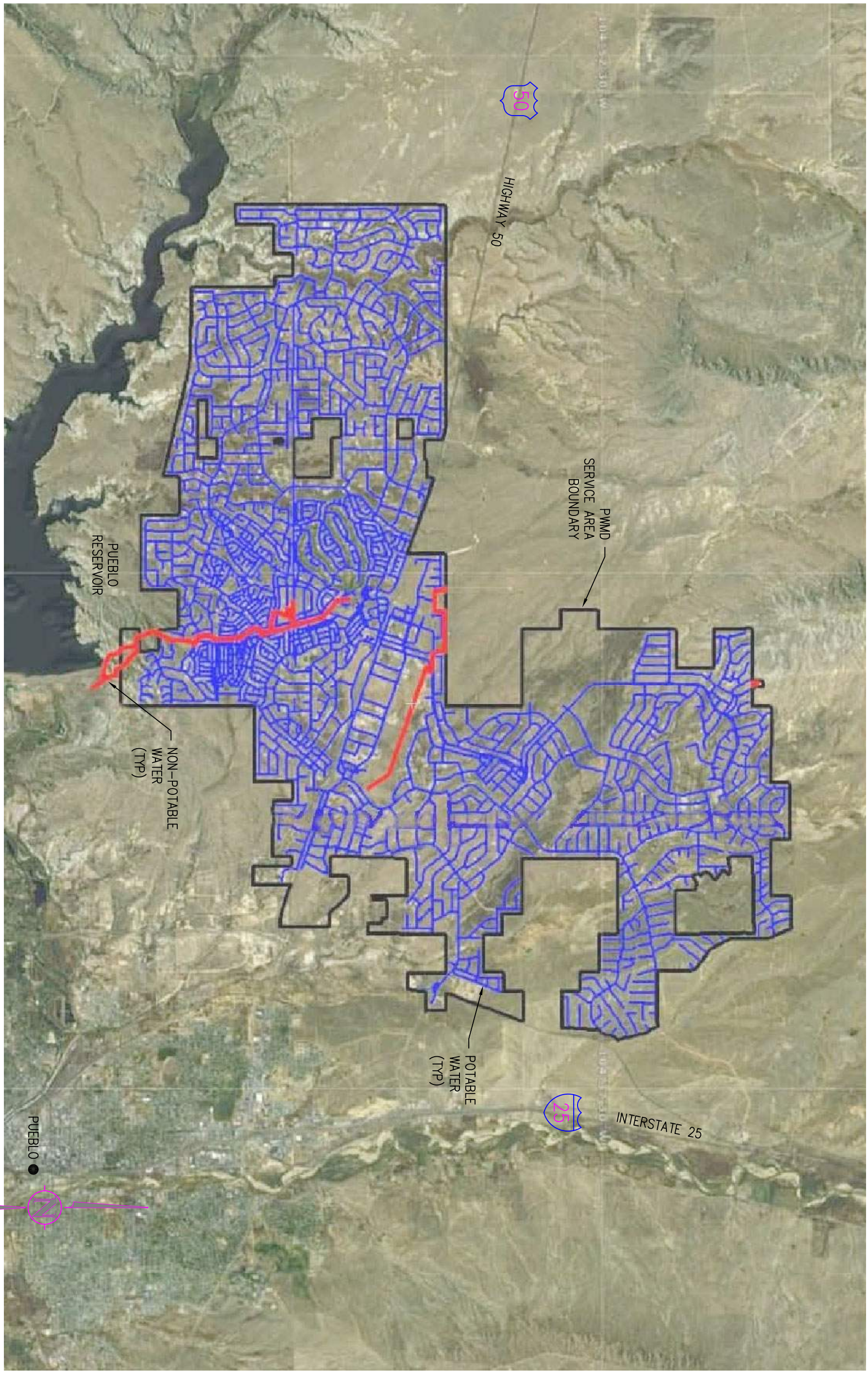


FIGURE 3 - EXISTING WATER DISTRIBUTION SYSTEM
PWMD WATER CONSERVATION PLAN
DECEMBER 2019

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JVA, Incorporated
1319 Spruce Street
Boulder, CO 80302
Phone: 303.444.1951
E-mail: info@jvajva.com

A summary of the water rights owned by the District are provided in Table 5. The average annual yield represents the potential yield of the water rights over a long period, typically 40 to 50 years. The firm yield is the amount of water that can be continuously supplied based on historical hydrologic conditions. The quantities in Table 5 are the results from two studies conducted by WRC Engineering, Inc, Raw Water Storage Needs and Alternative Analysis (March, 2010) and Water Supply Analysis (November, 1998). The water supply portfolio developed in these studies take into account the District's water reuse credits and the reuse credits that are attained through the construction of the Wildhorse Pipeline Project. These reports are provided in Appendix A.

Table 5. Water Supply Portfolio (Water Rights) at year end 2018

Water Right Name or Source	Number of Shares or Units Owned	Average Annual Yield	Firm Yield
		(AF)	(AF)
Twin Lakes Water	5,898 shares	5,593	2,104
Non-Tributary Groundwater	5,392 AF/yr	625	450
Hill Ranch	1,914 AF/yr	1,665	716
Colorado Canal Company/ Lake Meredith Company	295	139	0
Wheel Ranch Ditch	14.6 AF/yr	29	0
Total		8,329	3,270

Twin Lakes Reservoir and Canal Company

As noted in Table 5, the District owns 5,901 shares of the Twin Lakes Reservoir and Canal Company. The district most recently purchased additional shares in 2018. Water from this source originates in the Twin Lakes Reservoir and is released to the Pueblo Reservoir on a demand basis at which point it is pumped to the WTP. The Twin Lakes Dam is located on Lake Creek, which is a tributary of the Arkansas River, 13 miles south of Leadville, Colorado. The reservoir was constructed between 1963 and 1967 by the cities of Aurora and Colorado Springs as part of the U.S. Bureau of Reclamation's Frying Pan-Arkansas Project.

In 1975, as growth and water demand in the District continued to increase, the District purchased shares of the Twin Lakes Reservoir and Canal Company. The District currently utilizes this source as its primary water supply. The average annual yield from this source is 5,606 AF based on 0.95 AF per share. During "dry-year" conditions, the firm yield from this source is 2,104 AF, or 0.37 AF per share.

Non – Tributary Groundwater Supply

The non-tributary groundwater supply source was the original source for the District. Before the acquisition of shares of the Twin Lakes Reservoir and Canal Company, the groundwater provided all water for the system. This source is provided by 18 adjudicated wells that withdraw water from beneath the Purgatoire and Dakota formations. The groundwater wells are not currently used by the District as a primary water supply source due to water quality concerns and the poor yield. The wells are very deep which makes pumping incredibly costly. The well water is known to contain high dissolved solids and radionuclides making treatment and residual disposal cost prohibitive.

The District's water rights allow for a maximum of 5,392.4 AF per year to be withdrawn from the wells. Based on the *Water Supply Analysis*, the actual average yield from this source is 894 AF annually. This annual yield will be utilized for consistency within the District's planning documents.

Hill Ranch

The Hill Ranch water rights were acquired in 2001. Additional studies and planning requirements have been in progress since that time to allow this source to be included as part of the District's water supply. This source is estimated to be available for inclusion in the District's supply in the next few years. At the time of this report update, the District was still developing the measuring devices and working on revegitation.

For this Plan, the Hill Ranch yield information was obtained from the Raw Water Storage Needs and Alternatives Analysis dated March, 2010 by WRC Engineering (Appendix A). The average annual yield from this supply is approximately 1,660 AF with a firm yield of 716 AF.

Colorado Canal Company/Lake Meredith

The Colorado Canal Company and Lake Meredith Company were originally a part of the Twin Lakes Reservoir and Canal Company. In the 1970s, the Colorado Springs Utilities Company purchased a controlling interest in the Twin Lakes Reservoir and Canal Company, which lead to the separation of the water rights into four distinct companies.

The average annual yield from this source is 0.47 AF per share, or 139 AF per year. During "dry conditions", there is no water available from this source.

Wheel Ranch Ditch

The PWMD's Wheel Ranch Ditch shall have a volumetric limitation of 292 acre-feet of gross diversion for any consecutive 20-year period. The maximum diversion rate of this tributary is 1.5 cubic feet per second (cfs). In the 1998 Water Supply Analysis, it was noted that water from this water right is restricted to irrigation use at the Pueblo West Golf Course.

For the purpose of this Plan, the water from this source is considered usable for non-potable and irrigation only. Annual average yield from this source is 30 AF and there is no water available during "dry conditions".

System Limitations

Understanding the current system's limitations is a key component to developing conservation goals. In order to set effective water conservation goals, an awareness of the conditions and challenges of operating and maintaining the existing system is necessary. Current system limitations are predominately associated with available water supply for future demand and facilities to provide adequate treatment and storage to meet this demand. These limitations are discussed further below.

Statewide Water Supply Initiative

The Statewide Water Supply Initiative (SWSI) was developed by the CWCB to evaluate water resources and water resource management options for Colorado's water supply. An update to the 2003 SWSI was completed in 2010. In 2016, the CWCB launched an update and upgrade of the state's supply and demand projection data and tools underpinning Colorado's Water Plan. The process has come to be known as the Analysis and Technical Update to Colorado's Water Plan (or simply, Technical Update, formerly "SWSI"). The Technical Update was released in September 2019. The Technical Update projects a statewide annual water demand decrease from 2015 to 2050 of approximately 21,000 AF. This is a decrease from 1,899,900 AF in 2015 to 1,878,900 AF in 2050 under the cooperative growth scenario. The Executive Summary of this document is provided in Appendix B.

Growth

The population of the District has experienced a steady increase over the past two decades, as demonstrated in Figure 2. The projected 2050 water demand for the District is 8,224 AF annually, which corresponds to an ultimate population of 45,329 and buildout water tap connection capabilities of 17,664 taps.

Based on the current available water supply, the water demand at buildout could lead to a shortfall of water, particularly during drought conditions. The District is aware of the increasing stress on the water supply in the Arkansas Basin and the increasing water demand and is evaluating options to address these limitations through water storage, water acquisition and water conservation measures.

System Additions

In order to provide the District with adequate water treatment capacity for buildout, the WTP was expanded in 2013 and has planned one additional phases of expansion, bringing the final plant capacity to 26 MGD.

The WTP current capacity is 21 MGD. The second phase of the WTP expansion is scheduled to be completed in 2022, for a total system capacity of 26 MGD.

Water Costs and Pricing

Water Sales and Revenue

The Comprehensive Annual Financial Report for the PWMD Water Fund for 2014 thru 2018 was utilized to develop a summary of revenues from water sales and is provided in Table 6. Additional information from the Financial Reports are provided in Appendix C.

Table 6. Summary of Water Fund Revenues 2014-2018

Revenue	2014	2015	2016	2017	2018
Water usage	$7,029,050	$6,719,285	$7,640,016	$7,053,460	$8,331,239
Transfer fees	$34,083	$17,936	$20,295	$29,758	$16,629
Penalty billing fee	$99,497	$201,290	$95,215	$97,390	$95,881
Turn on fees	$47,991	$43,141	$42,016	$40,509	$46,187
Hydrant water	$72,798	$45,359	$62,844	$58,636	$78,526
Tap connection/ Plant investment fees	$432,684	$885,723	$1,457,269	$2,339,962	$3,273,745
Interest	$46,137	$39,217	$81,027	$134,172	$247,038
Other	$84,425	$62,055	$241,408	$126,734	$64,214
Transfers In	$308,762	$308,863	$306,729	$347,678	$306,788
Total	**$8,155,427**	**$8,322,869**	**$9,946,819**	**$10,228,299**	**$12,460,247**

CONNECTION AND MONTHLY USAGE

The PWMD water tap connection fee is the sum of the fees for the Water Plant Investment Fund (WPIF) and tap fees for parts and labor. The 2011 water connection fees are based on water tap size and a summary is provided in Table 7.

PWMD water rates consist of a readiness to serve (RTS) rate and a usage rate based on consumption. The RTS rate is a monthly fixed charge based on the customer's water tap size that recovers a portion of the cost of infrastructure and facilitates the delivery and treatment of water. The RTS rate is assessed to each customer connected to the water system, regardless of water consumption. A summary of the RTS rates are provided in Table 7.

Table 7. 2018 Connection Fees and Readiness to Serve Rates

Rate Class	Water Connection Fee	Readiness to Serve
Domestic Water		
3/4 inch	$11,082	$18.78
1 inch	$17,325	$20.49
1-1/2 inch	$34,663	$24.84
2 inch	$55,458	$30.25
3 inch	$103,976 - $121,329	$47.23
4 inch	Calculated upon request	$64.75
6 inch	Calculated upon request	$111.43
8 inch	Calculated upon request	$167.68
10 inch	Calculated upon request	$233.47
12 inch	Calculated upon request	$413.88
Non-Potable (Raw Water)		
4 inch	Calculated upon request	$5.20
6 inch	Calculated upon request	$5.94
8 inch/ Desert Hawk G.C.	Calculated upon request	$6.05
10 inch	Calculated upon request	$6.26
12 inch	Calculated upon request	$7.03

Usage charges are based on customer classification and the amount of water consumed each month. The District uses an increasing block rate structure for water usage charges. The 2018 use charges are shown in Table 8. The rates for the 5,000 to 10,000 gallon block and greater than 10,000 gallon block were increased by 35 percent over the 2018 rate. The complete 2018 water rates are provided in Appendix D.

Table 8. 2018 Water Use Rates

Rate Class	Water Use	Water Use	Water Use
	1 – 5,000 gal/1000	5,000 – 10,000 gal/1000	> 10,000 gal/1000
Residential/Irrigation	$2.09	$3.14	$5.50
Multiplex (4 or more units per meter)	$3.36	$3.36	$3.36
Commercial/Industrial	$3.79	$3.79	$3.79
Non-Potable/Desert Hawk Golf Course	$1.15	$1.15	$1.15
Hydrant Water	$5.52	$5.52	$52.52
Duplex/Triplex (2 or 3 units per meter)	$2.44	$3.66	$6.29

CURRENT POLICIES AND PLANNING INITIATIVES

The District requires that all water connection services be metered. Meter size for each new connection is approved by the District and is based on occupancy and irrigation requirements. There are currently no other limitations in the District's Rules and Regulations pertaining to new connections that limit or restrict irrigation.

PLANNING EFFORTS

WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

PWMD incorporated a Water Conservation and Drought Contingency Plan (WCDP) to the Rules and Regulations (Article 12) on June 11, 2002. The WCDP is designed to escalate conservation measures as shortage of the water supply increases. The plan consists of five stages that are implemented as dictated by available water supply. Table 9 outlines the drought mitigation stages of the WCDP. The complete WCDP is provided in Appendix E.

Table 9. WCDP Stages

Stage	Criteria For Stage Implementation
One: Conservation State	• Available two year water supply is 90% or less of the current two year nominal use • Water demand reaches 90% of treatment capacity for four consecutive days • Distribution system limits supply capabilities
Two: Water Warning	• Available two year water supply is 80% or less of the current two year nominal use • Water demand reaches 96% of treatment capacity for four consecutive days • Distribution system limits supply capabilities
Three: Water Emergency	• Available two year water supply is 70% or less of the current two year nominal use • Water demand reaches 100% of treatment capacity for four consecutive days • Short term deficiencies in the water distribution system limits supply capabilities, such as system outage due to failure or damage of water system components
Four: Water Crisis	• Available two year water supply is 60% or less of the current two year nominal use • Water demand reaches 110% of treatment capacity for four consecutive days • Short term deficiencies in the water distribution system limits supply capabilities, such as system outage or failure • Inability to maintain or replenish adequate volumes of water storage to provide for public health and safety
Five: Emergency Water Shortage	• Major water line breaks or pump or system failures occur that cause a loss of capability to provide water service. • Natural or manmade contamination of the water supply sources

The following action items are implemented using the WCDP and dependent on stage:

- Reduction of water consumption by specified percentage
- Reduction of irrigation
- Restriction of hydrant use
- Restrictions to vehicle washing
- Increase of water use charge
- Elimination of outdoor water use
- Implementation of fines for water use violations

Rate Study and Capital Improvements Planning

The District has previously contracted Red Oak Consultants and Raftelis Financial Consultants to develop a rate studies and JVA to evaluate the capital improvement alternatives. These projects include water supply acquisition; improvements associated with water return credits, dam improvements, water distribution pipelines, additional storage tanks, and meter and valve maintenance and replacement programs. These options will be discussed further in Section 4.

Current Water Conservation Activities

In efforts to conserve water, the District currently employs techniques such as public education, reuse of WTP backwash (BW) waste, and the WCDP discussed in the previous section.

Public Education

Public education can be highly effective in water conservation efforts. Information on water conservation is provided on the District's website consisting of xeriscaping guidelines and a list of water conservation tips as outlined by the National Wildlife Federation (NWF). A copy of the information provided on the District's website is available in Appendix E.

Results of conservation efforts from public education are difficult to quantify and it is unknown at this time how conservation literature has affected the District's water demand.

Water Treatment Plant BW Waste Used for Irrigation

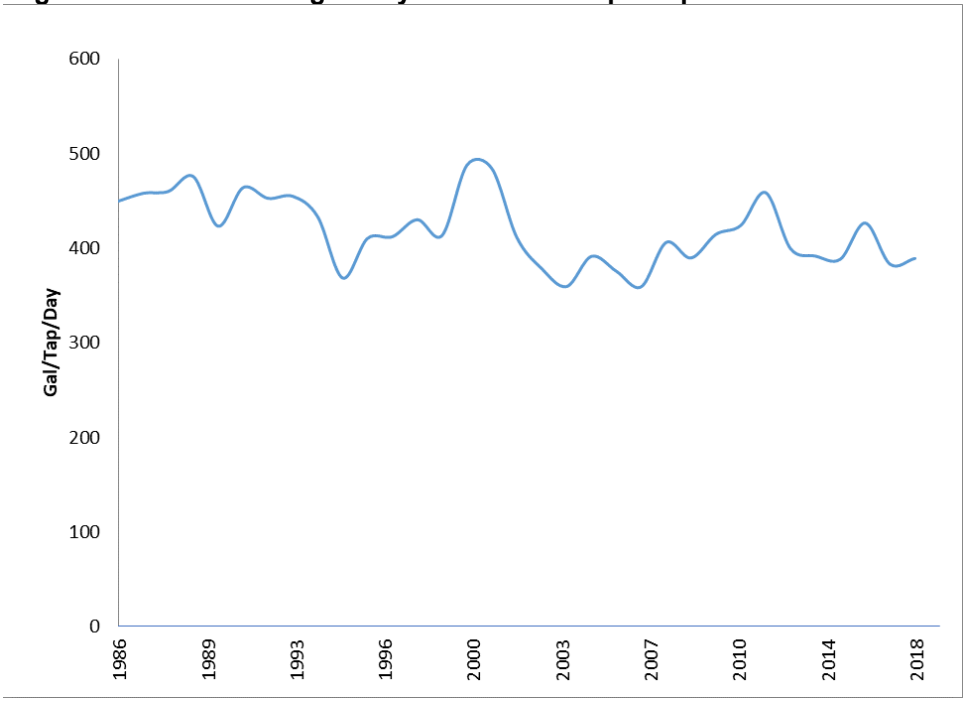
In a majority of water treatment facilities, the BW waste is not reused, but is transferred to the sanitary sewer system for treatment at a wastewater facility. At the PWMD WTP, the BW waste is sold to the Desert Hawk Golf Course as non-potable water for irrigation. The average annual water used by the golf course is shown in Table 10. The reuse of WTP BW waste is the largest quantifiable conservation measure utilized by the District. The average water used by the Golf Course is 112 MG per year (based on the most recent ten years), which is a direct water savings for the District.

Table 10. Water Consumption of Desert Hawk Golf Course

Year	Total Annual Water Demand (MG)
2008	121
2009	117
2010	123
2011	114
2012	129
2013	104
2014	104
2015	91
2016	114
2017	93
2018	118

Since its implementation in 2002, the WCDP has demonstrated an annual decrease in water consumption of approximately 10.2 percent. This estimate is based on the 442 average gallons of use per tap per day prior to 2002, to the 397 average gallons of use per tap per day between 2002 and 2018. The decrease in water consumption that results from the WCDP implementation is shown in Figure 4.

Figure 4. Historic Average Daily Water Consumption per Water Connection Tap



SECTION 3 – WATER USE AND DEMAND FORECAST

CURRENT WATER USE

In 2018, the District provided an annual average of 4.61 MGD of treated water (sum of all metered entry points into the distribution system) to approximately 28,100 customers with an average maximum month delivery of 8.09 MGD. Peak daily demand conditions typically occur in June or July. Details regarding historic water consumption are provided in Appendix F.

A summary of historic annual water use is provided in Table 11. An extended monthly compilation of this table is available in Appendix F. Historic water consumption from 1986 through 2010 is shown in Figure 5.

Table 11. Summary of Historic Annual Water Demand

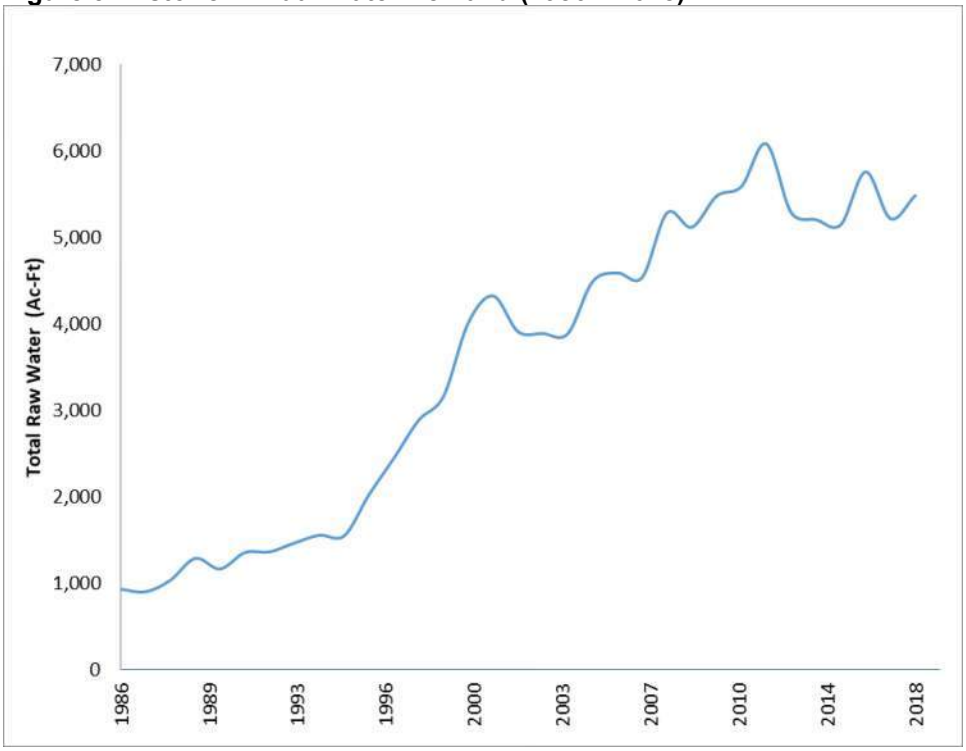
Year	Total Number of Water Taps	Total Raw Water Pumped	Total Treated Water Production
		(MG)[a]	(MG)[b]
2014	11,128	1,695	1,623
2015	11,189	1,676	1,610
2016	11,305	1,874	1,811
2017	11,492	1,699	1,595
2018	11,744	1,786	1,685

[a] Total raw water pumped to WTP
[b] Sum of all metered entry points into the distribution system

SYSTEM WATER LOSSES

In order to evaluate the water demand the system water losses were analyzed using the American Water Works Association (AWWA) Free Water Audit Software and existing data from the WTP. Using this software, the apparent losses (non-physical losses due to meter inaccuracies, data handling errors, etc.) and real losses (physical losses from the distribution system) were estimated. In 2012 the real losses were approximately 6.65 percent of the total raw water pumped. On average, over the past five years, the total losses have been approximately 5.7 percent of the total raw water pumped to the WTP.

Figure 5. Historic Annual Water Demand (1986 – 2018)



USE BY CUSTOMER CATEGORY

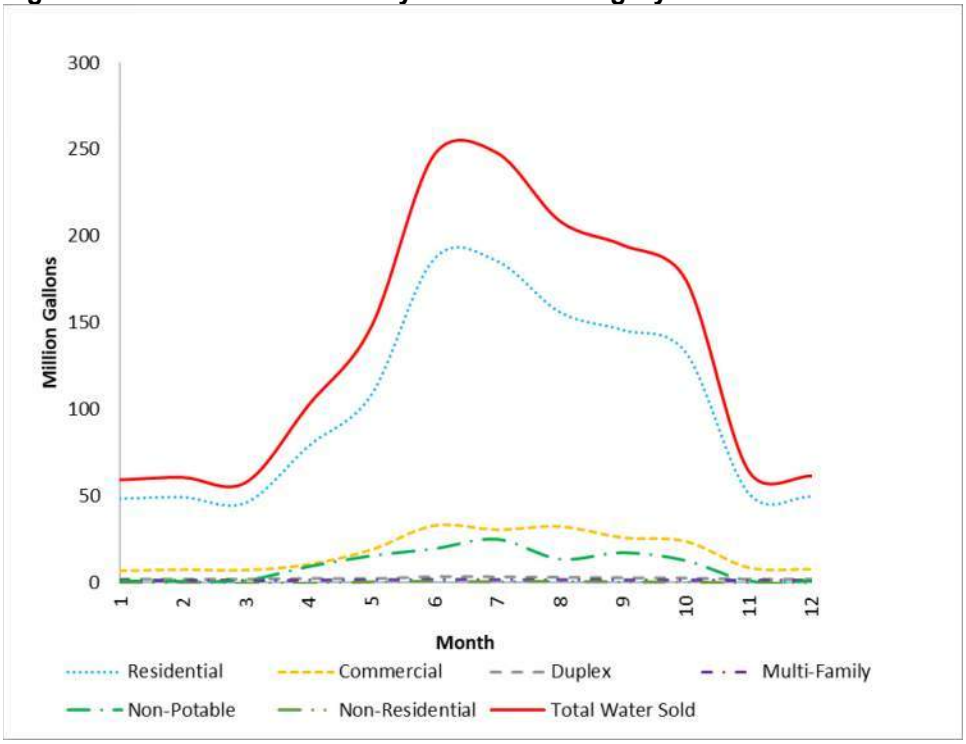
The total number of water tap connections as of December 2018 was 11,744. These connections are divided into six customer categories as discussed in Section 2. The monthly demand for each user category from 2018 is presented in Table 12. This table includes the total water sold and the amount of water sold per user category.

Table 12. 2018 Total Monthly Water Usage

Month	Residential	Commercial	Duplex	Multi-Family	Non-Potable	Non-Residential	Total Water Sold
	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)
January	48.3	6.9	1.9	1.4	1.0	0.028	59.6
February	49.2	7.6	2.0	1.4	0.8	0.017	61.0
March	45.9	7.4	1.9	1.3	1.5	0.013	58.0
April	78.7	10.5	2.4	1.5	9.3	0.021	102.6
May	108.4	19.1	2.2	1.7	15.5	0.754	147.8
June	187.1	33.2	3.7	2.2	19.5	0.996	246.7
July	185.7	30.7	3.6	1.9	24.9	0.838	247.6
August	156.1	32.6	3.2	1.9	13.6	0.992	208.4
September	145.8	26.1	2.9	1.8	17.2	0.674	194.6
October	132.8	24.0	2.7	1.6	12.7	0.714	174.6
November	51.4	8.8	1.9	1.5	1.1	0.008	64.6
December	49.5	7.8	1.9	1.5	1.0	0.006	61.7
Total	1239.0	214.7	30.3	19.9	118.1	5.1	1627.0

The water demand per user category from 2018 is shown graphically in Figure 6. Throughout the year, the largest demand is from the residential category, which is predominantly single family residential. Single family residential is differentiated from duplex and multi-family because of their higher irrigation use.

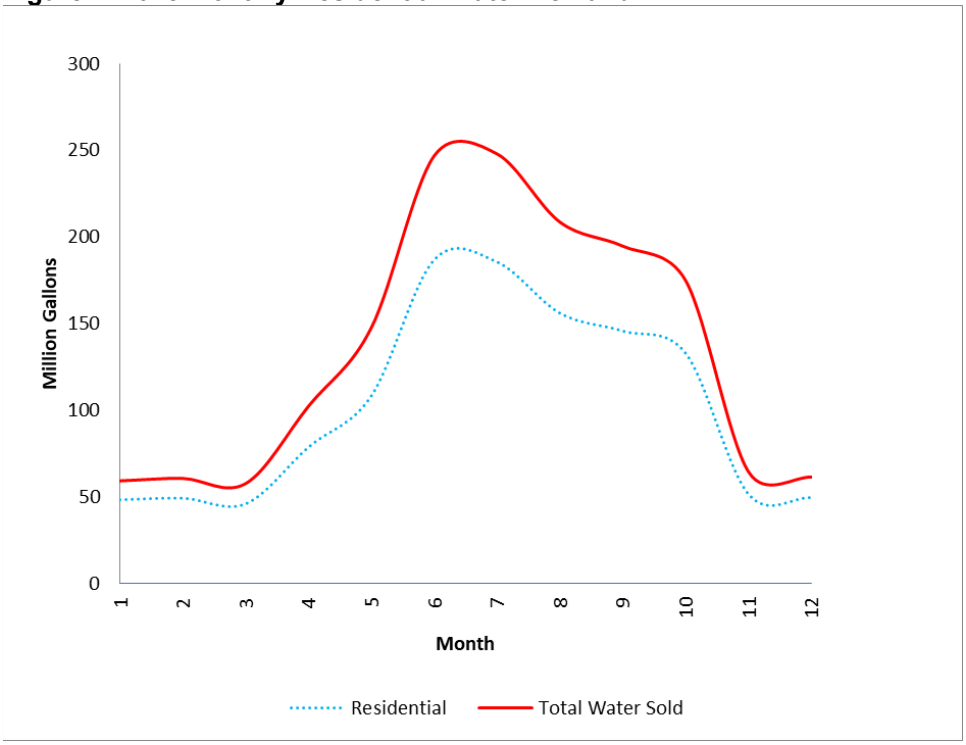
Figure 6. 2018 Water Demand by Customer Category



RESIDENTIAL WATER USE

Residential water use includes indoor and outdoor use and has the highest water demand 76.2 percent of potable water demand. Residential water demand compared to total water demand is shown in Figure 7.

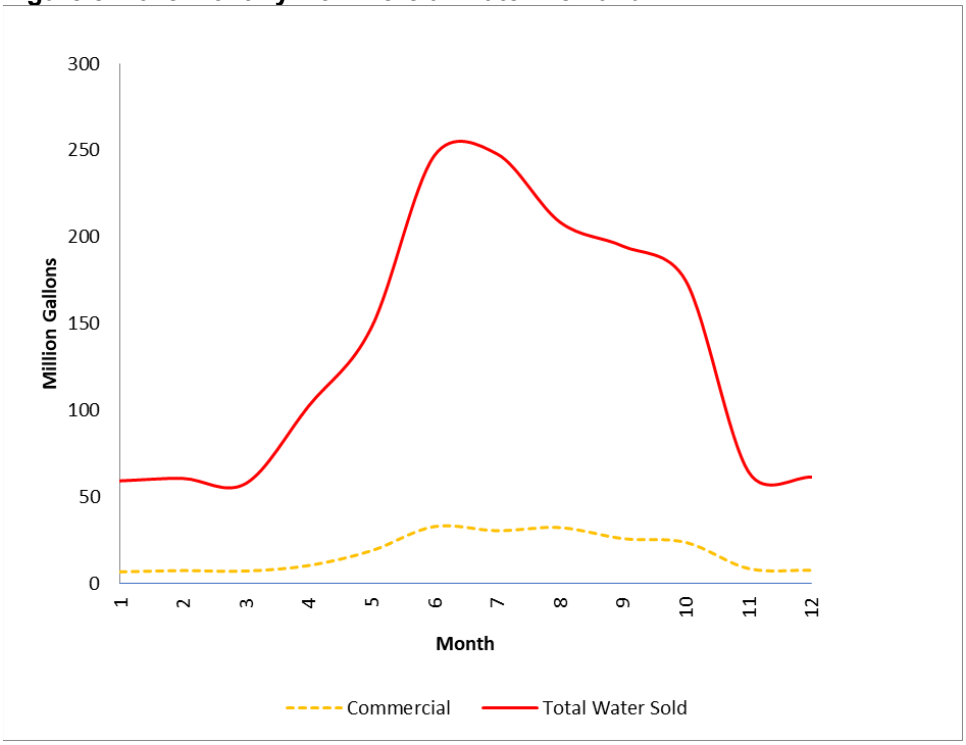
Figure 7. 2018 Monthly Residential Water Demand



COMMERCIAL WATER USE

Commercial water users include car washes, retail stores, office buildings, restaurants, hotels, schools, and other similar businesses. This category includes indoor and outdoor demand. Water demand for this group is 13.2 percent of potable water demand.

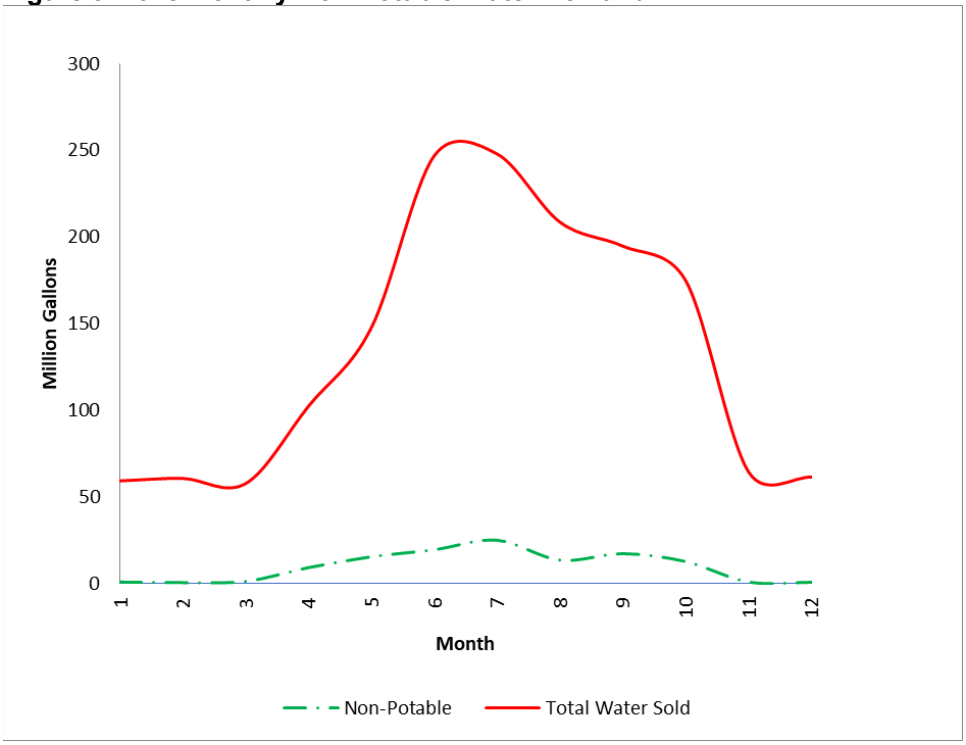
Figure 8. 2018 Monthly Commercial Water Demand



NON-POTABLE (DESERT HAWK GOLF COURSE)

The Desert Hawk Golf Course uses WTP BW waste (non-potable water) for golf course irrigation. This is the only current non-potable water application in the District. Non-potable water demand is 7.3 percent of the District's water demand. Figure 9 shows the non-potable demand as a portion of the total water demand.

Figure 9. 2018 Monthly Non-Potable Water Demand



Multi-Family

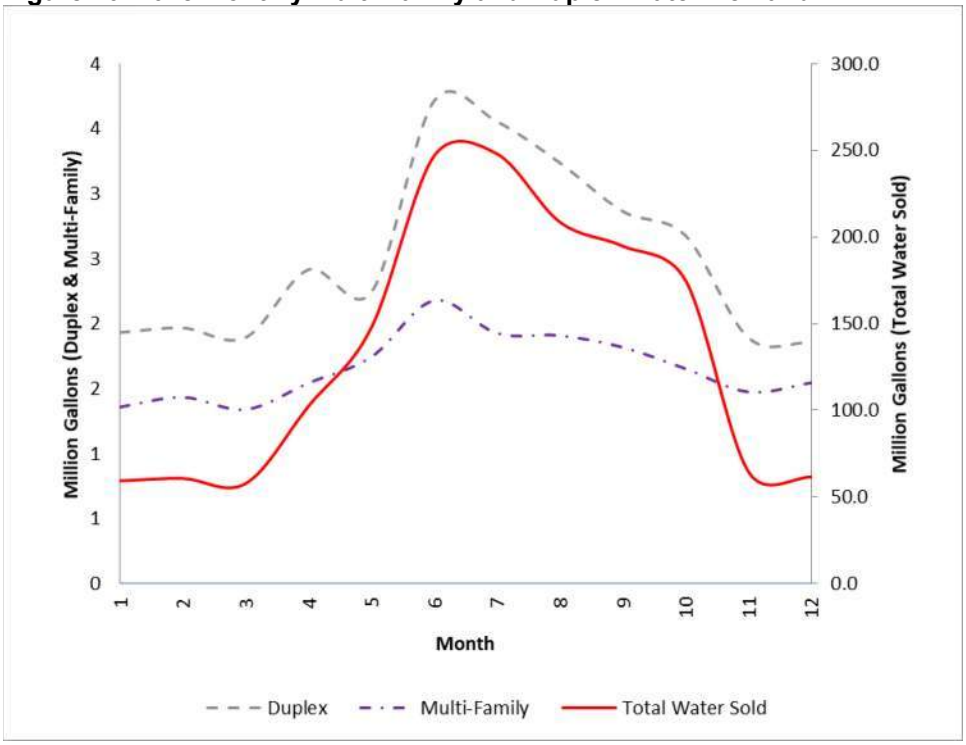
The multi-family category consists of multiplex units with four or more persons in one home, residences with three persons or less, and some duplex users. This group includes indoor and minor outdoor water use. Water demand from this user category is 1.2 percent of potable water demand.

Duplex

The duplex category consists of residences of three persons or less and duplex or triplex units. This group includes indoor and minor outdoor use. Water use from this user category is 1.9 percent of potable water demand.

Water demands for the duplex and multi-family user categories as a portion of total water demand are shown in Figure 10.

Figure 10. 2018 Monthly Multi-Family and Duplex Water Demand



NON-RESIDENTIAL

Non-residential water users in the District are customers who use water for irrigation purposes only, including parks, sports complexes, and other irrigated areas. Water use from this user group is 0.31 percent of potable water use. This category is a small percentage of the total water demand and is therefore not displayed graphically.

TAP AND WATER USE SUMMARY

The total number of water tap connections for each user category is presented in Table 13. Historical data for the number of taps per user category is not readily available. Historical data, shown in Table 14 for 2014 thru 2018 are based on percentage of taps per category in 2018.

Table 13. Count of Connected Taps (Meters)

Year	Schools	Duplex /Tri-Plex	Residential/ Irrigation	Multiplex (4 or More)	Commercial/ Industrial	Hydrant	Non-Potable	Fire	Total Number of Connected Taps (Meters)*
2014		337	10,358	64	323	24	1	25	11,132
2015		337	10,411	64	326	25	1	25	11,189
2016	14	336	10,522	64	324	25	1	27	11,313
2017	14	336	10,700	64	330	25	1	27	11,497
2018	14	336	10,944	65	342	33	1	27	11,762

[a] calculated by Data West at year end billing period

Annual water use for each user category is shown in Table 14 from 2014 through 2018. Historical data shown is based on percentage of water used by each group in 2018.

Table 14. Annual Estimated Water Use by Category

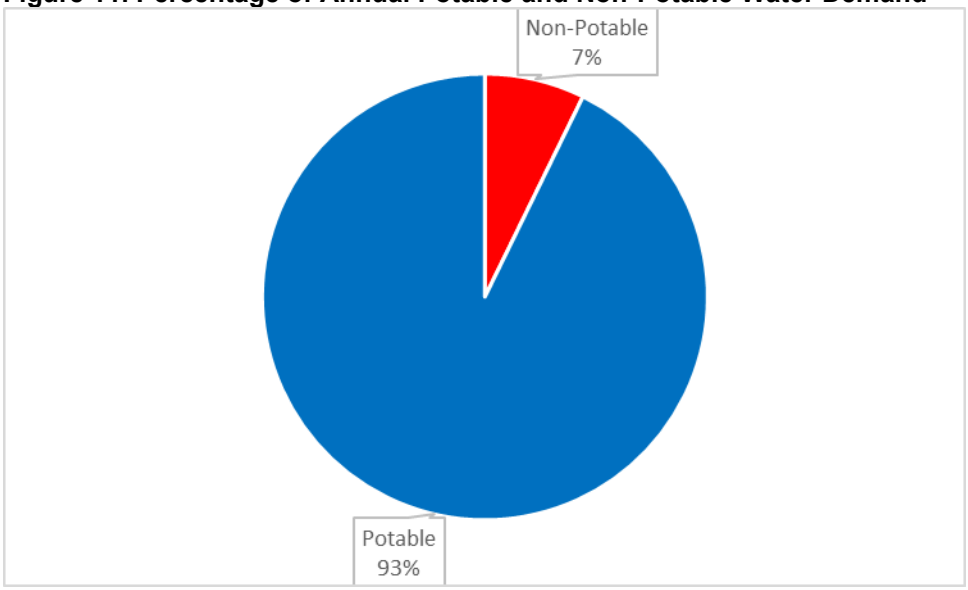
Year	Residential	Commercial	Multi-Family	Duplex	Non-Residential	Non-Potable	Total Water Use
	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)	(MG)
2014	1,518	47	9	47	2	0.1	1,623
2015	1,506	47	9	46	2	0.1	1,610
2016	1,694	53	10	52	2	0.2	1,811
2017	1,492	47	9	46	2	0.1	1,595
2018	1,582	49	9	49	2	0.1	1,691

POTABLE AND NON-POTABLE WATER USE

Currently, the District distributes non-potable WTP BW waste to Desert Hawk Golf Course for irrigation purposes. All other water (metered and non-metered) from the WTP is potable water. Non-potable monthly consumption (Desert Hawk Golf Course) for 2018 was shown in Figure 9.

The percentage of the District's 2018 annual water demand that was non-potable versus potable is shown in Figure 11. The District's annual non-potable water demand is 7.2 percent of the total water demand.

Figure 11. Percentage of Annual Potable and Non-Potable Water Demand



INDOOR AND OUTDOOR WATER USE

The indoor and outdoor use patterns were analyzed by comparing water consumption during the three winter months (December, January, February), when typically no outdoor water use is occurring, with the three major irrigation months (June, July, August). The total annual water consumption for the three winter and three summer months is shown in Figure 12 for 2008 thru 2018.

The average daily water use during the summer and winter months was calculated. To determine the indoor water demand, the winter average consumption was subtracted from the summer average. The difference is assumed as the outdoor water consumption. Figure 13 shows the indoor versus outdoor average water demand from June thru August.

Figure 12. Total Water Consumption Winter Months and Summer Months0

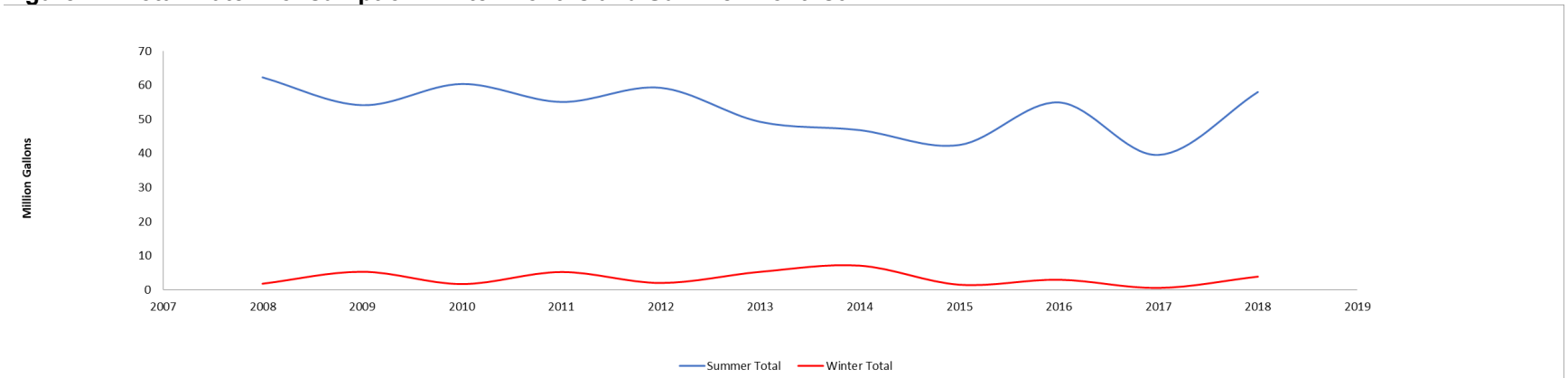


Figure 13. Indoor and Outdoor Average Daily Water Demand (Summer Months)

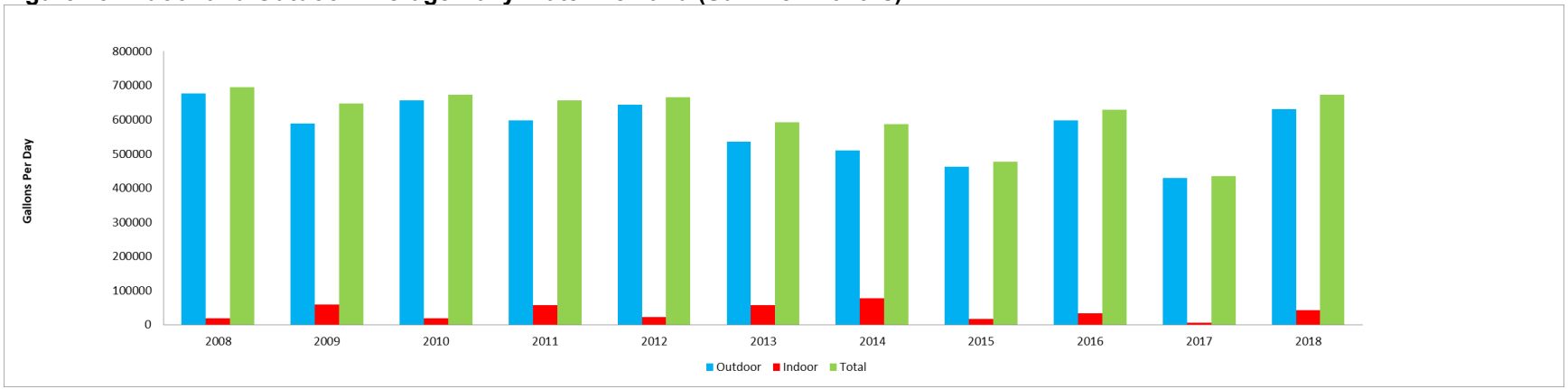


Table 15 is comparison of the summer versus winter water usage per user category. For example, the residential use is 3.6 times higher in the summer months versus the month months.

Table 15. Comparison of Summer Water Consumption to Winter Water Consumption

Category	Ratio of Summer vs. Winter
Residential	3.6
Commercial	4.3
Duplex	1.8
Multi-Family	1.4
Non-Residential	55.4
Non-Potable	20.9

Per Capita Water Use

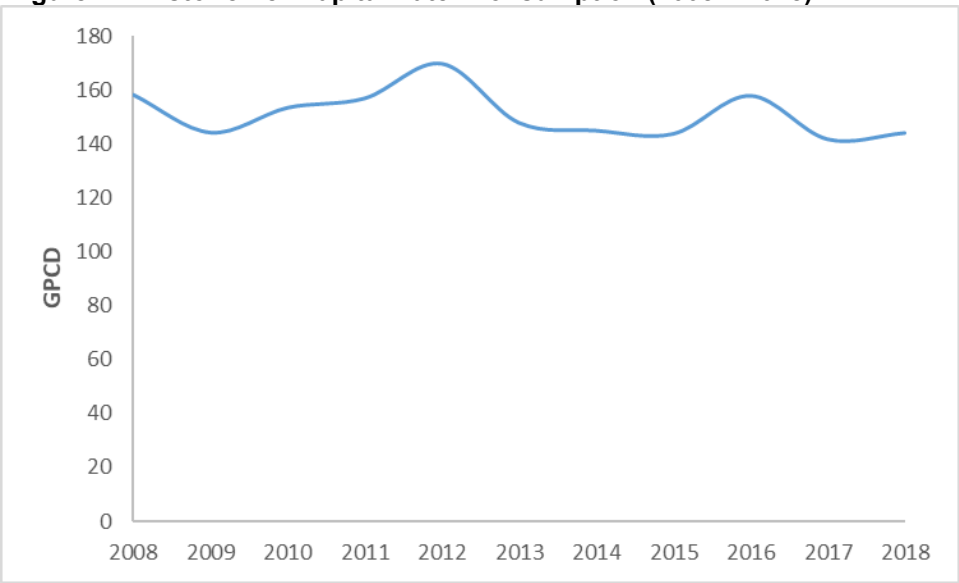
Average per person water demand was evaluated and a summary is presented in Table 16.

Table 16. Historical per Capita Water Use

Year	Population	Average Total Water Demand	Maximum Day Water Demand	Average Residential Water Demand	Residential Annual Per Capita Water Use
		(MGD)	(MGD)	(MGD)	(gpcd)
2008	27,697	4.38	9.49	3.34	158
2009	27,972	4.03	9.70	3.07	144
2010	28,174	4.32	9.48	3.29	153
2011	28,282	4.44	9.94	3.38	157
2012	28,374	4.82	10.53	3.67	170
2013	28,480	4.21	10.50	3.21	148
2014	28,570	4.14	9.23	3.15	145
2015	28,713	4.12	8.47	3.14	144
2016	29,011	4.58	9.85	3.49	158
2017	29,491	4.18	9.64	3.18	142
2018	30,137	4.34	9.30	3.31	144

The total annual average per capita water use is 151 gallons per capita per day between 2008 and 2018. The residential annual per capita water use calculated in 2008 was 158 gallons per capita per day, and the residential annual per capita water use calculated in 2018 is 144 gallons per capita per day, a decrease of nine percent over ten years. Over the past ten years, the maximum residential annual per capita water use occurred in 2012 at 170 gallons per capita per day, resulting in a decrease of overall decrease of 15 percent.

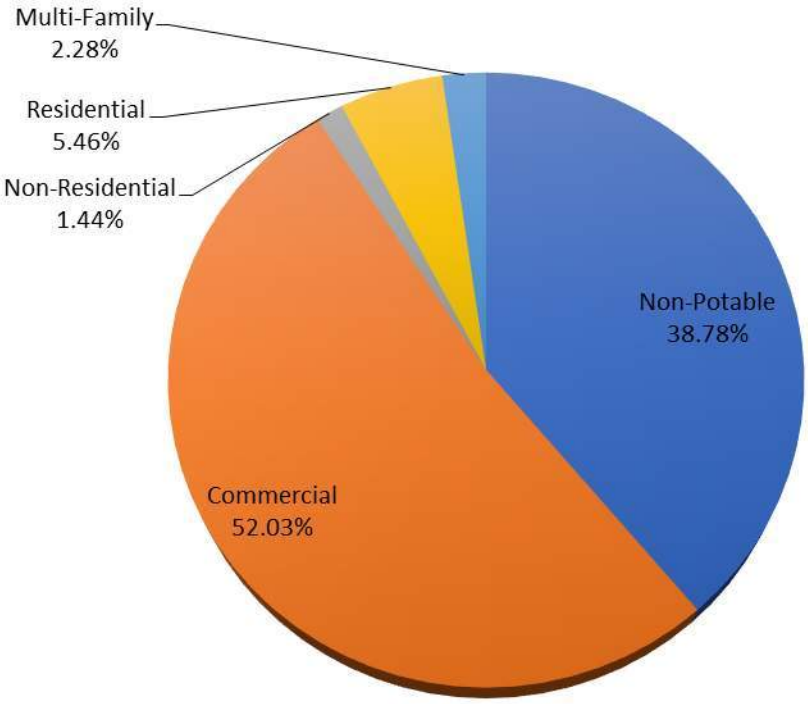
Figure 14. Historic Per Capita Water Consumption (2008 – 2018)



TOP 50 WATER USERS

To identify areas with the largest potential for water savings, the 50 customers with the highest use from 2014 to 2018 were evaluated. The customers were grouped according to their user category to determine the prevalence of each customer classification among the high consumption accounts. Figure 15 shows that 52 percent of the "top users" are from the commercial category. The largest water consumer is the Desert Hawk Golf Course (non-potable category). Two of the four non-residential customers are in the Top 50 user category. These two accounts are District owned irrigation accounts. There are 35 commercial connections, 9 residential connections, four multi-family connections, and one non-residential connection in the top 50.

Figure 15. User Category Percentage of Top 50 Water Customers



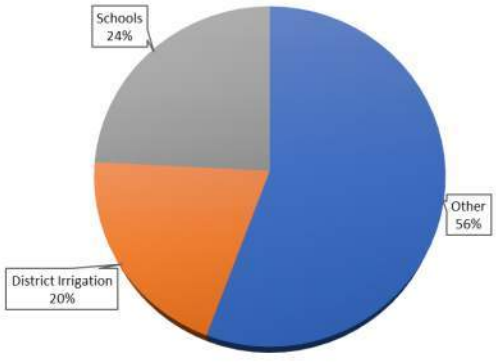
The District irrigation accounts and school/institution accounts contribute significantly to the overall commercial category. Therefore, the monthly water consumption for these accounts during 2018 was compared to all commercial users and is provided in Table 17.

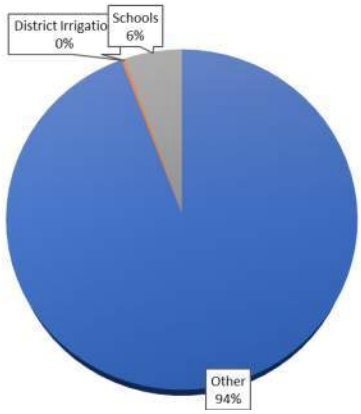
Table 17. Commercial Water Demand

Month	Commercial Water Demand	District Irrigation Accounts Monthly Water Demand	School Monthly Water Demand
	(MG)	(MG)	(MG)
January	1.934	0.029	0.20
February	1.969	0.016	0.31
March	1.896	0.001	0.26
April	2.418	0.158	0.66
May	2.245	3.429	2.66
June	3.716	6.385	3.84
July	3.554	6.461	3.65
August	3.237	6.58	4.16
September	2.865	3.824	3.36
October	2.676	3.394	2.83
November	1.892	0.035	0.12
December	1.857	0.028	0.10
Total	**30.259**	**30.34**	**22.1565**

The percentage of the summer water consumption in the commercial category represented by the District accounts and the schools/institutions is shown in Figure 16. The percentage of the winter water consumption in the commercial category represented by the District accounts and the schools/institutions is shown in Figure 17. During the summer, the District accounts and the schools/institutions account for 44.3 percent of the commercial category water consumption. District accounts and the schools/institutions account for 5.8 percent of the commercial category water consumption during the winter months.

Figure 16. Summer Commercial Use Percentage **Figure 17. Winter Commercial Use Percentage**





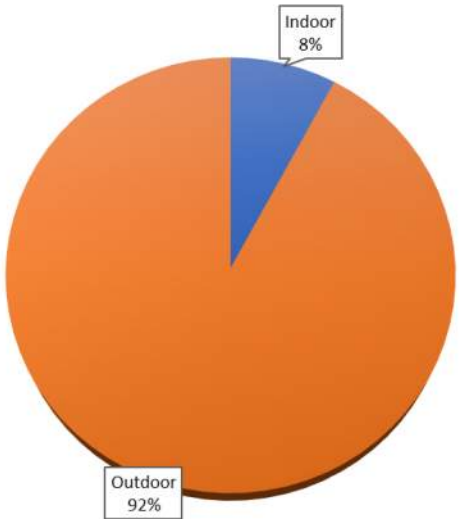
SCHOOLS/INSTITUTIONS

The average monthly school and institution demand was calculated and is provided in Table 18. The percentage of indoor consumption versus outdoor consumption for the schools/institutions is provided in Figure 18. Irrigation accounts for the majority of schools/institutional outdoor water demand.

Table 18. Average Monthly Water Demand for Schools and Institutions

Month	Daily Water Demand (gpd)	Monthly Water Demand (MG)
January	6,597	0.20
February	11,054	0.31
March	8,306	0.26
April	22,117	0.66
May	85,742	2.66
June	128,083	3.84
July	117,871	3.65
August	134,274	4.16
September	111,900	3.36
October	91,403	2.83
November	3,967	0.12
December	3,065	0.10

Figure 18. Schools/Institutions Outdoor Water Demand Percentage



PARKS AND DISTRICT IRRIGATION

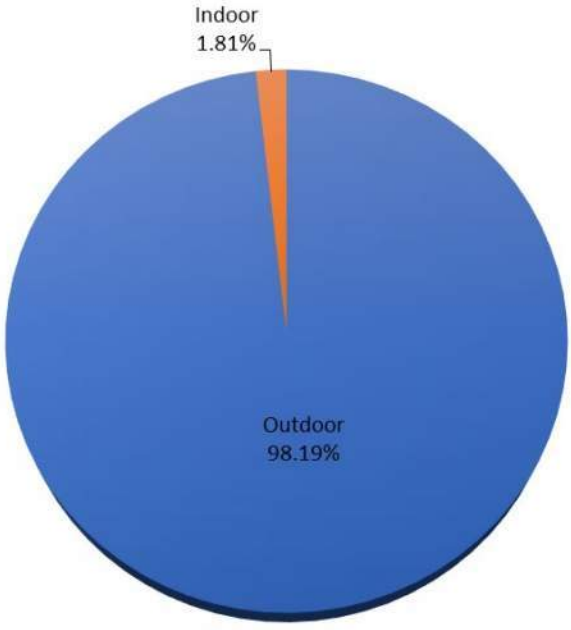
District accounts that provide irrigation to sports fields, parks, and other maintained areas contribute five accounts to the top 50 water users. A summary of the water demand for these accounts is shown in Table 19. The percentage of indoor versus outdoor water consumption for

these accounts is shown in Figure 19. As for schools, irrigation accounts for the majority of water consumption in the summer.

Table 19. Average Monthly Water Demand for District Owned Irrigation

Month	Daily Water Demand (gpd)	Monthly Water Demand (MG)
January	935	0.03
February	571	0.02
March	32	0.00
April	5,267	0.16
May	110,613	3.43
June	212,833	6.39
July	208,419	6.46
August	212,258	6.58
September	127,467	3.82
October	109,484	3.39
November	1,167	0.04
December	903	0.03

Figure 19. Parks and District Irrigation Outdoor Water Demand Percentage



DEMAND FORECAST

FORECASTING METHOD

Future water demand was projected by utilizing the Pueblo Area Council of Governments (PACOG) Metropolitan Planning Organization (MPO) data for projected population growth and

household growth through 2038. To determine the District's projected population growth, the PACOG population growth rate was applied. To determine the District's water tap connection growth rate, the PACOG household growth rate was applied.

Table 20. PACOG Projected Growth Rate for Pueblo West

Year	Population Annual Growth Rate	Household Annual Growth Rate
2018 – 2028	9.98%	11.74%
2028 – 2038	9.07%	9.07%
2038 – 2048	8.32%	8.32%

The buildout condition was determined by calculating the number of water tap connections that are possible given the current boundaries of the service area. Each of the lots within the District has a physical address regardless of current occupancy or development condition. The District's mapping software for the water distribution system correlates each physical address to the water tap connection account number. Addresses without an existing water tap connection are entered into the system as a "buildout connection". There are 14,348 estimated taps in the District in 2038.

The future water demand was projected using the average water consumption between 2000 and 2018 of 158 gallons per person per day. This average was applied to the population projections to determine future water demand. No water conservation measures have been taken into account in this projection; therefore, the water demand per person is assumed constant through buildout conditions. To calculate the projected annual water demand per user category the proportions calculated in Section 2 were assumed constant and were applied to the total projected water demand.

Future Demand

Detailed calculations for future water demand and projections are provided in **Error! Reference source not found.**. A summary of projected water tap connections, population, and potable water use are provided in Table 21.

Table 21. Projections: Water Taps, Population, Average Daily Demand (MGD)

Year	Number of Water Taps	Population	Residential Water Use	Commercial Water Use	Multi Family Water Use	Duplex Water Use	Non-Residential Water Use	Total Potable Water Use
			76.15%	13.20%	1.22%	1.86%	0.31%	
2018	11,744	30,137	3.48	0.60	0.06	0.085	0.014	4.24
2023	12,669	32,511	3.85	0.67	0.06	0.094	0.016	4.69
2028	13,594	34,885	4.13	0.72	0.07	0.101	0.017	5.03
2033	14,519	37,259	4.41	0.76	0.07	0.108	0.018	5.37
2038	15,444	39,632	4.69	0.81	0.08	0.115	0.019	5.71

Projected water demand was converted to AF in order to compare with available water supply. The annual total AF by user category is summarized in Table 22.

Table 22. Annual Demand Projections (AF)

Year	Residential Water Use	Commercial Water Use	Multi Family Water Use	Duplex Water Use	Non-Residential Water Use	Non-Potable Water Use	Total Water Use
	76.15%	13.20%	1.22%	1.86%	0.31%	7.26%	
2018	4,174	723	67	102	17	398	5,481
2023	4,561	790	73	111	19	435	5,989
2028	4,876	845	78	119	20	465	6,403
2033	5,191	900	83	127	21	495	6,816
2038	5,506	954	88	134	22	525	7,230

Average summer and winter daily demand projections for the highest outdoor use categories (residential, commercial, and non-residential) were calculated in five-year increments for the 20-year planning period ending in 2038. The previously established summer versus winter use ratios were used to determine the future demand and these projections are shown in Table 23.

Table 23. Summer and Winter Average Daily Demand Projections (MGD)

Year	Residential		Commercial		Multi Family		Duplex		Non – Residential	
	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
2018	2.72	0.76	0.49	0.11	0.03	0.02	0.055	0.03	0.0140	0.0003
2023	3.01	0.84	0.54	0.13	0.04	0.03	0.060	0.03	0.0154	0.0003
2028	3.23	0.90	0.58	0.13	0.04	0.03	0.065	0.04	0.0166	0.0003
2033	3.45	0.96	0.62	0.14	0.04	0.03	0.069	0.04	0.0177	0.0003
2038	3.67	1.02	0.66	0.15	0.04	0.03	0.074	0.04	0.0188	0.0003

SECTION 4 – PROFILE PROPOSED FACILITIES

The District is currently in the process of conducting a rate study and developing a 10-year capital improvements plan (CIP). The goal of the CIP is to identify areas of the water treatment and distribution system that will require maintenance, expansion, and replacement and to appropriately allocate funds to those projects. Projects currently under review for inclusion in the planning budget include:

- Water supply acquisition
- Improvements associated with water return credits
- Dam improvements
- Water distribution pipelines
- Additional storage tanks
- Meter and valve maintenance and replacement

A number of the projects proposed for inclusion are independent of water demand. A summary of the CIP projects that pertain to increasing water supply sources, increasing efficiency of water supply return credits, and providing adequate storage for peak conditions are presented in Table 24.

Table 24. CIP Water Projects: Water Supply and Storage

Project	Projected Year of Financing	Estimated Cost
Additional Shares of Water	Annually	$ 1,500,000
ROY Storage	2020	$ 2,050,000
SDS Partner Share	2020	$ 280,000
Replace High Service Pump Production 4	2021	$ 84,033
Treatment Plant Filters 1-3 Replacement	2022	$ 1,500,000
Westside Well Development	2023	$ 1,000,000
Pueblo Board of Water Works Connection	2026	$ 2,000,000
South/North Outlet Works Intertie	2027	$ 2,000,000

Note: 2019 CIP Water Projects excluded

Several CIP projects can potentially be delayed or eliminated if water demand decreases through successful conservation efforts. A list of these projects is included in Table 25.

Table 25. CIP Water Projects Water Demand Dependent

Project	Projected Year of Financing	Estimated Cost
Continue looping of water mains	Annually	$ 600,000
Infrastructure Replacement Program	Annually	$ 6,281,453
Raw Water Storage Preliminary Cost	2021	$ 4,500,000
River Pump Station Upgrades	2023	$ 123,000
West Side Distribution phase 2	2025	$ 2,000,000
West Side Distribution phase 3	2025	$ 2,160,000
West Side Distribution Tank	2026	$ 2,160,000
Continue looping of water mains	2026	$ 600,000
Purcell Blvd Main Extension	2027	$ 5,000,000
River Pump Station Discharge Pipe	2027	$ 1,000,000

Note: 2019 CIP Water Projects excluded

The District is currently reviewing these projects for final budgetary prioritization and a decision is expected early in 2020.

SECTION 5 – WATER CONSERVATION GOALS

WATER CONSERVATION GOALS

The development of water conservation goals is a long-term process that begins by quantifying the future water demand and determining where water consumption can be reduced. The District's primary goal for water conservation is to balance the water demand with the amount of water available. Available water supplies are limited in the State of Colorado and in the Arkansas Basin. Opportunities to increase available supply water are also limited, which dictates the need for water conservation strategies.

The evaluation of the future water demand and existing water supply were used to develop goals and identify future water savings as a percentage of future estimated water demand. For buildout conditions, the projected annual demand is 8,212 AF. The existing annual water available during an average year and including the use of groundwater is 8,299 AF. The District has expressed a desire to exclude groundwater from the supply portfolio for this Plan due to the high costs associated with pumping and treating this water. The water from the groundwater wells has shown elevated levels of total dissolved solids and radionuclides, which lead to expensive treatment and waste disposal alternatives. The depth of the wells and the poor water quality make this source cost prohibitive. The available water supply without the use of the groundwater is 7,405 AF.

The original 2012 Conservation Plan established a goal to reduce water consumption by 9.0 percent over the 20-year planning horizon. For this update, the projected annual average in 2038 prior to conservation efforts is 7,230 AF. To balance the water available with the future water demand at buildout, this Plan's goal is approximately 714 AF annually, or 9.9 percent of the 2038 water demand. While the District has water supply available in excess of the projected 2038 demand, the conservation goal is recommended to position the District for the build-out condition of 8,212 AF (after the 20-year planning period of this plan).

Through collaboration efforts with the District's representatives, conservation alternatives were identified and prioritized. The following conservation alternatives have been identified:

- Reduce outdoor water demand
- Manage distribution system pressure
- WTP meter accuracy
- Meter replacement and leak detection

In order to most effectively reach the water demand reduction goal, the primary targets of the conservation efforts are the high outdoor water consumption categories. Since the Desert Hawk Golf Course already uses non-potable water, conservation measures will target potable water demand categories only. For a reduction goal of 9 percent of the total water demand over the 20-year period, the reduction goals per user category were established and are provided in Table 26.

Table 26. 20 Year Water Conservation Goals (2038)

Category	Annual Water Use 2038	Total Water Use (2018 – 2038)	Reduction Goals for Planning Horizon (2018 – 2038)	
	AF	AF	%	AF
Residential	5,903	112,199	8.7%	9,802.0
Commercial	953	18,216	12.0%	2,186.0
Non-Residential (Irrigation)	362	7,610	12.0%	913.2
Total Demand	**7,218**	**138,025**	**9%**	**12,901**

To meet the nine percent water demand reduction goal, interim reduction periods have been established. This concept provides tools for analysis of the water conservation goals set forth in this Plan. An increase in water reduction every five years will be used to track the District's progress through the planning horizon. The water reduction targets for the interim years are provided in Table 27.

Table 27. Water Demand Reduction Targets

Year	Use for Planning Period	Total Reduction Goals	
	AF	%	AF
2018 – 2023	36,285	2%	726
2018 – 2028	68,644	4%	2,746
2018 – 2033	102,559	7%	7,179
2013 – 2038	138,029	9%	12,423

The reduction target, for the three interim periods by use category, are provided in Table 28 thru Table 30. The water conservation measures and programs evaluated to meet these goals will be discussed in Sections 6 thru 9.

Table 28. Incremental Water Conservation Goals: 5 year

Category	Water Use for Target Period	Total Reduction Goals	
	AF	%	AF
Residential	29,321	1.7%	504
Commercial	4,789	2.7%	130
Non-Residential (Irrigation)	2,174	4.2%	92
Total Demand	**36,285**	**2%**	**726**

Table 29. Incremental Water Conservation Goals: 10 year

Category	Water Use for Target Period	Total Reduction Goals	
	AF	%	AF
Residential	55,598	3.7%	2070
Commercial	9,059	4.7%	428
Non-Residential (Irrigation)	3,986	6.2%	248
Total Demand	**68,644**	**4%**	**2,746**

Table 30. Incremental Water Conservation Goals: 15 year

Category	Water Use for Target Period	Total Reduction Goals	
	AF	%	AF
Residential	83,225	6.6%	5,496
Commercial	13,535	8.1%	1,097
Non-Residential (Irrigation)	5,798	10.1%	586
Total Demand	**102,559**	**7%**	**7,179**

The 20-year water conservation goals (2038) are shown in Table 27.

SECTION 6 – CONSERVATION MEASURES AND PROGRAMS

WATER CONSERVATION MEASURES AND PROGRAMS

In order to determine the most effective methods to meet the District's water conservation goals, a list of potential programs and measures was developed and evaluated. The list is separated into categories that address water supply and those that address water demand. Conservation efforts pertaining to water supply primarily address maintenance of the distribution system. Demand side measures include education programs, audits, rebates and regulations. This list is provided as Table 31 and consist of the following:

- Supply Side Measures and Programs - Maintenance Programs
    - Water Reuse System - Water rights credits: the water supply portfolio developed in these studies take into account the District's water reuse credits and the reuse credits that are attained through the construction of the Wildhorse Pipeline Project.
    - Water Reuse System - Treated Wastewater: Colorado Water Court Decree Nos. 85CW134 (A) and (B) allow for the exchange and reuse of sewered return flows to the Arkansas River below the Pueblo Reservoir Dam. Currently, treated wastewater effluent water is discharged into a dry drainage that confluences with Wildhorse Creek before flowing into the Arkansas River. The measuring exchange point is near the Arkansas River, and due to evaporation and groundwater infiltration, the District loses up to 50 percent of its measured flow between the wastewater discharge and the Arkansas River measuring point. The District plans to install the Wildhorse Pipeline to capture the effluent and other return flows from below the wastewater treatment plant in Pesthouse Gulch and then pipe these diverted flows to a measuring point near the Arkansas River on Wildhorse Creek. Additionally, a large portion of the District is served by on-site wastewater treatment systems (OWTSs), which discharge effluent from an individual residence to the groundwater. The Wildhorse Pipeline Project will also capture groundwater returns from the OWTSs. This project will allow the District to exchange approximately 400 more acre-feet (AF) per year without the purchase of any additional water rights.
    - Water Meter Testing and Replacement Program: Accuracy of existing water production meters is fundamental for evaluating water conservation efforts and success. This measure implements a program to maintain and replace inaccurate meters.
    - Leak Detection & Repair Program: Measure includes leak detection for the District's water distribution system and subsequent replacement and repair as required. The District is currently in the process of developing the leak detection program. Preliminary efforts to develop this program have focused on initial leak detection efforts and leak testing methods. Initial leak detection efforts will focus on valve testing and replacement as the system's valves have been in service for 30-40 years on average and leaks have already been identified surrounding the system's valves. The

District will be using sonic leak detection methods until the condition of the valves are suitable for pressure testing methods to be incorporated.
    - Pressure Management: Reduction of pressure in high pressure zones and throughout the distribution system to an average pressure of 80 psi. Reducing system pressure will reduce water loss through the distribution system caused by leaks and increase efficiency of irrigation systems.

- Demand Side Measures and Programs – Education Programs

    - Water-Saving Demonstration: This measure provides water-saving demonstrations throughout the community that highlight innovative water conservation ideas.
    - School Programs and Presentations: The water conservation office will inform, involve and educate the local public schools on issues related to water management and the importance of water conservation.
    - Information and Understandable Water Bill: This measure provides transparent access to information to allow for users to understands their water bill in a readable and comprehensive format.
    - Water Bill Inserts with Conservation Information: The water bill, when coupled with quarterly educational brochures on minimizing water use can be a powerful tool and encourage users to practice conservation.
    - Xeriscape Gardening Class: This measure allows for the District to facilitate Xeriscape Gardening Classes to educate users on water-conserving landscape to reduce or eliminate plant watering.
    - Xeriscape Demonstration Garden: This measure allows for a District owned Xeriscape Demonstration Garden for users to see examples of water-saving landscape ideas.
    - Designated Water Conservation Officer: A full time employee (8 hours per day, 40 hours per week) to conduct water conservation activities.

- Demand Side Measures and Programs – Audits, Rebates and Incentives

    - Commercial Irrigation Design/Retrofit Rebate: This measure would encourage water conservation in commercial irrigation design and retrofits by offering a financial incentive in proportion to overall water conservation. The design would pass an inspection prior to plant material installation.
    - Residential Indoor Water Audit: This measure would require homeowners with toilets with higher flow than 1.6 gpm to replace their existing toilets. All future construction would be required to install 1.6 gpm toilets.
    - Residential Outdoor Water Audit: Requires all properties in the District that will be landscaped (new or replacement) to pass an inspection prior to plant material installation.
    - District Owned Facilities Indoor Water Audit: This measure would require an indoor water audit on District Owned Facilities.
    - District Owned Facilities Outdoor Water Audit: This measure would require an outdoor water audit on District Owned Facilities.
    - Annual Irrigation Audit and $500 Irrigation Rebate for Large Users: Measure will offer free water audits to the large outdoor irrigation customers and provide a rebate to those customers electing to receive audits. The rebate will have a maximum value of $500

per customer and can be applied to water efficiency measures indicated by the water audit.

- Demand Side Measures and Programs – Audits, Rebates and Incentives

    - Water restrictions - Hour/Days: This measure further restricts outdoor water use during the summer months (May - September). Outdoor water use will not be permitted between 11 a.m. and 6 p.m. during these months.
    - Water Rate Structure Changes: This measure would utilize a rate structure to encourage conservation. Conservation pricing structures include increasing unit prices with increased consumption such as inverted block rates, base rates and excess use rates such as water budget rates, and seasonal rates. Seasonal rate structures may include additional charges for upper block (outdoor) usage or excess-use surcharges for commercial customers to reduce demand during summer months. The goal of conservation pricing is to develop long run consumption patterns consistent with cost.
    - District Ran Sensor Equipment: This measure would require installation of a rain and wind sensor on all irrigation systems that are installed (or renovated) in the District and all new developments. Rain and wind sensors are installed to turn off irrigation systems when it is raining or during periods of high winds in order to reduce unnecessary water consumption.
    - Practical Turf for Sports Fields: This measure would require all schools and institutions, as well as District owned natural grass fields to be replaced with synthetic turf fields.
    - Irrigation Scheduling: This policy restricts the amount of the customer's lot which can be irrigated. Policy affects new residential, commercial, and non-residential (irrigation) categories. The 10% value was obtained from the City of Evans Conservation Plan (2009). Other municipalities use 20% (Albuquerque, New Mexico), 35% (Marin Municipal Water District in California), etc. The 10% value can be adjusted to in a follow up evaluation based on District habits. The weather in Pueblo West is variable, and most existing and new residents do not irrigate consistently.

SCREENING CRITERIA

Screening criteria were developed to select which water conservation measures would be further evaluated to meet the goals established in Section 5. Each of the measures in Table 31 were screened to determine if further evaluation is appropriate. Several measures will require additional planning efforts to make the final determination if future evaluation is warranted. Further evaluation is warranted at this time if the following criteria are met:

- Address high outdoor consumption categories
- Potential to be financially feasible
- Quantifiable results
- Satisfies the CWCB specified statute for required measures and programs

The measures selected for further evaluated are provided in Table 32.

Table 31. Initial Conservation Measures and Programs Screening

	Conservation Measure or Program	Existing	Further Evaluation	Comment
Supply side measures and programs	**Maintenance Programs**			
	Water Reuse System - Water rights credits	Yes	No	Currently in use
	Water Reuse System - Treated Wastewater	Yes	No	Currently in use
	Water Meter Testing and Replacement Program	Yes	No	Currently in use
	Leak Detection & Repair Program	Yes	No	Currently in use
	Pressure Management	Yes	Yes	Currently in use
Demand side measures and programs	**Education Programs**			
	Water-Saving Demonstration	Yes	No	Re-evaluate with future planning efforts
	School Programs and Presentations	Yes	No	Re-evaluate with future planning efforts
	Informative and Understandable Water Bill	Yes	No	Currently in use
	Water Bill Inserts with Conservation Information	No	Yes	Re-evaluate with future planning efforts
	Xeriscape Gardening Class	No	Yes	Re-evaluate with future planning efforts
	Xeriscape Demonstration Garden	Yes	No	Currently in use
	Designated Water Conservation Officer	Yes	No	Currently one officer
	Audits, Rebates and Incentives			
	Commercial Irrigation Design/Retrofit Rebate	No	Yes	Evaluate with future planning efforts
	Residential Indoor Water Audit	Yes	Yes	Evaluate with future planning efforts
	Residential Outdoor Water Audit	Yes	Yes	Evaluate with future planning efforts
	District Owned Facilities Indoor Water Audit	No	Yes	Evaluate with future planning efforts
	District Owned Facility Outdoor Water Audit (Large Users and Non)	No	Yes	Evaluate with future planning efforts
	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	No	Yes	Option will be evaluated
	Regulations and Standards			
	Water restrictions - Hour/Days	Yes	Yes	Implemented in the WCDP. Evaluate implications of more frequent use
	Water Rate Structure Changes	Yes	No	A rate study is being conducted and is not incorporated as part of this Conservation Plan
	District Rain Sensor Equipment	No	Yes	Option will be evaluated
	Practical Turf for Sports Fields	No	Yes	Option will be evaluated
	Irrigation Scheduling	No	Yes	Evaluate with future planning efforts

Table 32. Conservation Measures for Further Evaluation

Conservation Measure or Program
Maintenance Programs
Pressure Management
Education Programs
Water Bill Inserts with Conservation Information
Audits, Rebates and Incentives
Commercial Irrigation Design/Retrofit Rebate
Residential Indoor Water Audit
Residential Outdoor Water Audit
District Owned Facilities Indoor Water Audit
District Owned Facility Outdoor Water Audit (Large Users and Non)
Annual Irrigation Audit and $500 Irrigation Rebate for Large Users
Regulations and Standards
Water restrictions - Hour/Days
District Rain Sensor Equipment
Irrigation, Turf and Landscape Standards for New Construction
Practical Turf for Sports Fields
Irrigation Scheduling

SECTION 7 – EVALUATION AND SELECTION

The initial screening discussed in Section 6 resulted in 12 options for further evaluation in this Plan. The water conservation planning process requires long-term, continued evaluation of program success and shortfalls. During a subsequent planning effort with PWMD, 16 additional options from the initial screening were noted as measures of interest to be evaluated in the future.

COST AND WATER SAVINGS OF CONSERVATION OPTIONS

To develop cost and water savings, the method outlined in the AWWA Water Conservation Programs – A Planning Manual was used in conjunction with the Guidebook of Best Practices for Municipal Water Conservation in Colorado, as well as, papers and planning documents from Arizona, Texas, California, Colorado, the Environmental Protection Agency, and Amy Vickers, Handbook of Water Use and Conservation. The details of the cost-benefit evaluation are provided in Appendix .

All programs were evaluated beginning in year one (2018) in order to assess the options across a consistent time frame; however, measures will be implemented as described in Sections 7 and 8, over five year increment periods. Annual water savings have been calculated, as well as water savings at each of the five-year milestones to evaluate the most effective implementation methods to meet the District's goals.

In the cost-benefit analysis, the costs to the District include: projected lost revenue from water savings, one-time implementation costs, annual material costs, annual labor costs, and staff requirements. Cost values for this evaluation are approximate and are for planning purposes only. To develop an understanding of the ultimate cost to the District over the planning period, all programs were evaluated at full implementation. Rankings of the programs were determined by comparing the cost of each program per 1,000 gallons of water saved at each of the interim years. Ranking the measures at each of the interim periods was completed to develop an implementation plan.

Table 33 thru Table 36 provide a summary of the cost-benefit analysis for each of the four interim phases. Total costs to the District and estimated water savings for each of the planning phases are shown along with rankings for the conservation measures. Information on each of the measures and how they were evaluated is provided in Appendix .

Table 33. Cost-Benefit Analysis Summary for Phase 1 (2018 - 2023)

	Conservation Measure or Program	# of Participants Annually	Annual Water Savings (gallons)	5 Year Water Savings (gallons)	Annual Revenue Loss Due to Decreased Use	Total Cost			Annual Cost	5 Year Total Cost	Cost per 1000 Gallons Saved	Rank
						One Time Labor and Material Cost	Annual Labor	Annual Materials				
Supply measures and programs	**Maintenance Programs**											
	Water Meter Testing and Replacement Program	-	30,718,764	153,593,819	$0	$7,500	$500	$65,000	$65,500	$335,000	$2.18	3
	Leak Detection & Repair Program	3	30,718,764	153,593,819	$0	$0	$11,500	$15,000	$26,500	$132,500	$0.86	2
	Pressure Management	-	30,718,764	153,593,819	$0	$6,500	$2,500	$20,000	$22,500	$119,000	$0.77	1
Demand measures and programs	**Education Programs**											
	Designated Water Conservation Officer	-	28,020,514	140,102,569	$89,017	$0	$65,000	$0	$65,000	$770,086	$5.50	6
	Audits, Rebates and Incentives											
	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	12	1,558,943	7,794,713	$5,176	$2,000	$700	$9,600	$10,300	$79,378	$10.18	8
	Regulations and Standards											
	Water Restrictions - Hour/Days	-	62,112,139	310,560,694	$196,905	$6,000	$7,500	$0	$7,500	$1,028,027	$3.31	4
	Residential Indoor Water Audit	250	72,347	361,737	$227	$2,500	$1,250	$0	$1,250	$9,886	$27.33	10
	Commercial and Residential Rain and Wind Sensor Requirement	-	634,793	3,173,966	$2,011	$6,250	$17,500	$0	$17,500	$103,807	$32.71	11
	Irrigation, Turf and Landscape Standards for New Construction	-	1,057,989	5,289,944	$3,352	$6,250	$5,000	$0	$5,000	$48,012	$9.08	7
	Practical Turf for Sports Fields	-	6,146,511	30,732,556	$20,406	$1,603,500	$15,000	$0	$15,000	$1,780,532	$57.94	12
	New Landscape Lawn Permits	10	17,512,821	87,564,105	$55,636	$6,500	$2,700	$1,000	$3,700	$303,179	$3.46	5
	Irrigation Scheduling	-	1,057,989	5,289,944	$3,352	$6,000	$17,500	$0	$17,500	$110,262	$20.84	9

Table 34. Cost-Benefit Analysis Summary for Phase 2 (2023 - 2028)

	Conservation Measure or Program	# of Participants Annually	Annual Water Savings (gallons)	10 Year Water Savings (gallons)	Annual Revenue Loss Due to Decreased Use	Total Cost			Annual Cost	10 Year Total Cost	Cost per 1000 Gallons Saved	Rank
						One Time Labor and Material Cost	Annual Labor	Annual Materials				
Supply measures and programs	**Maintenance Programs**											
	Water Meter Testing and Replacement Program	-	32,239,123	322,391,232	$0	$7,500	$500	$65,000	$65,500	$662,500	$2.05	3
	Leak Detection & Repair Program	3	32,239,123	322,391,232	$0	$0	$11,500	$15,000	$26,500	$265,000	$0.82	2
	Pressure management	-	32,239,123	322,391,232	$0	$6,500	$2,500	$20,000	$22,500	$231,500	$0.72	1
Demand measures and programs	**Education Programs**											
	Designated Water Conservation Officer	-	29,523,765	295,237,652	$93,793	$0	$65,000	$0	$65,000	$1,587,929	$5.38	6
	Audits, Rebates and Incentives											
	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	12	1,558,311	15,583,106	$5,174	$2,000	$700	$9,600	$10,300	$156,736	$10.06	8
	Regulations and Standards											
	Water Restrictions - Hour/Days	-	65,444,346	654,443,461	$207,469	$6,000	$7,500	$0	$7,500	$2,155,690	$3.29	4
	Residential Indoor Water Audit	250	72,479	724,788	$228	$2,500	$1,250	$0	$1,250	$17,276	$23.84	10
	Commercial and Residential Rain and Wind Sensor Requirement	-	611,210	6,112,099	$1,937	$6,250	$17,500	$0	$17,500	$200,618	$32.82	12
	Irrigation, Turf and Landscape Standards for New Construction	-	1,018,683	10,186,832	$3,228	$6,250	$5,000	$0	$5,000	$88,530	$8.69	7
	Practical Turf for Sports Fields	-	6,146,511	61,465,111	$20,406	$1,603,500	$15,000	$0	$15,000	$1,957,564	$31.85	11
	New Landscape Lawn Permits	10	18,452,353	184,523,532	$58,621	$6,500	$2,700	$1,000	$3,700	$629,706	$3.41	5
	Irrigation Scheduling	-	1,018,683	10,186,832	$3,228	$6,000	$17,500	$0	$17,500	$213,280	$20.94	9

Table 35. Cost-Benefit Analysis Summary for Phase 3 (2028 - 2033)

	Conservation Measure or Program	# of Participants Annually	Annual Water Savings (gallons)	15 Year Water Savings (gallons)	Annual Revenue Loss Due to Decreased Use	Total Cost			Annual Cost	15 Year Total Cost	Cost per 1000 Gallons Saved	Rank
						One Time Labor and Material Cost	Annual Labor	Annual Materials				
Supply measures and programs	**Maintenance Programs**											
	Water Meter Testing and Replacement Program	-	33,759,483	506,392,239	$0	$7,500	$500	$65,000	$65,500	$990,000	$1.96	3
	Leak Detection & Repair Program	3	33,759,483	506,392,239	$0	$0	$11,500	$15,000	$26,500	$397,500	$0.78	2
	Pressure Management	-	33,759,483	506,392,239	$0	$6,500	$2,500	$20,000	$22,500	$344,000	$0.68	1
Demand measures and programs	**Education Programs**											
	Designated Water Conservation Officer	-	31,027,017	465,405,248	$98,569	$0	$65,000	$0	$65,000	$2,453,528	$5.27	6
	Audits, Rebates and Incentives											
	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	12	1,558,387	23,375,801	$5,174	$2,000	$700	$9,600	$10,300	$234,108	$10.01	8
	Regulations and Standards											
	Water Restrictions - Hour/Days	-	68,776,553	1,031,648,301	$218,033	$6,000	$7,500	$0	$7,500	$3,388,990	$3.29	4
	Residential Indoor Water Audit	250	72,560	1,088,405	$228	$2,500	$1,250	$0	$1,250	$24,668	$22.66	10
	Commercial and Residential Rain and Wind Sensor Requirement	-	608,511	9,127,666	$1,928	$6,250	$17,500	$0	$17,500	$297,675	$32.61	12
	Irrigation, Turf and Landscape Standards for New Construction	-	1,014,185	15,212,777	$3,214	$6,250	$5,000	$0	$5,000	$129,459	$8.51	7
	Practical Turf for Sports Fields	-	6,146,511	92,197,667	$20,406	$1,603,500	$15,000	$0	$15,000	$2,134,596	$23.15	11
	New Landscape Lawn Permits	10	19,391,885	290,878,280	$61,605	$6,500	$2,700	$1,000	$3,700	$986,080	$3.39	5
	Irrigation Scheduling	-	1,014,185	15,212,777	$3,214	$6,000	$17,500	$0	$17,500	$316,709	$20.82	9

Table 36. Cost-Benefit Analysis Summary for Phase 4 (2033 - 2038)

	Conservation Measure or Program	# of Participants Annually	Annual Water Savings (gallons)	20 Year Water Savings (gallons)	Annual Revenue Loss Due to Decreased Use	Total Cost			Annual Cost	20 Year Total Cost	Cost per 1000 Gallons Saved	Rank
						One Time Labor and Material Cost	Annual Labor	Annual Materials				
Supply measures and programs	**Maintenance Programs**											
	Water Meter Testing and Replacement Program	-	35,279,842	705,596,839	$0	$7,500	$500	$65,000	$65,500	$1,317,500	$1.87	3
	Leak Detection & Repair Program	3	35,279,842	705,596,839	$0	$0	$11,500	$15,000	$26,500	$530,000	$0.75	2
	Pressure Management	-	35,279,842	705,596,839	$0	$6,500	$2,500	$20,000	$22,500	$456,500	$0.65	1
Demand measures and programs	**Education Programs**											
	Designated Water Conservation Officer	-	32,530,268	650,605,359	$103,344	$0	$65,000	$0	$65,000	$3,366,883	$5.18	6
	Audits, Rebates and Incentives											
	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	12	1,559,378	31,187,560	$5,177	$2,000	$700	$9,600	$10,300	$311,543	$9.99	8
	Regulations and Standards											
	Water Restrictions - Hour/Days	-	72,108,761	1,442,175,213	$228,596	$6,000	$7,500	$0	$7,500	$4,727,925	$3.28	4
	Residential Indoor Water Audit	250	72,560	1,451,206	$228	$2,500	$1,250	$0	$1,250	$32,057	$22.09	11
	Commercial and Residential Rain and Wind Sensor Requirement	-	611,629	12,232,571	$1,938	$6,250	$17,500	$0	$17,500	$395,013	$32.29	12
	Irrigation, Turf and Landscape Standards for New Construction	-	1,019,381	20,387,618	$3,230	$6,250	$5,000	$0	$5,000	$170,855	$8.38	7
	Practical Turf for Sports Fields	-	6,146,511	122,930,222	$20,406	$10	$15,000	$0	$15,000	$2,311,628	$18.80	9
	New Landscape Lawn Permits	10	20,331,417	406,628,350	$64,590	$6,500	$2,700	$1,000	$3,700	$1,372,302	$3.37	5
	Irrigation Scheduling	-	1,019,381	20,387,618	$3,230	$6,000	$17,500	$0	$17,500	$420,605	$20.63	10

Based on the results in the tables above, the cost incurred by the District per 1,000 gallons ranges from $0.65 to $58. Excluding the minimum and maximum, the average cost per 1,000 gallons is approximately $12.05. The highest-ranking conservation measures were predominantly related to maintenance of the supply side, to minimize system losses. Other low cost options included implementation of a more restrictive water irrigation schedule during the summer and the regulations pertaining to new landscape permits.

Comparison of Benefits and Costs

The rankings for each of the four phases are shown in Table 37 thru Table 40. The rankings are reflective of the cost to the District per 1,000 gallons of water saved.

Table 37. Rankings for Phase 1 Water Conservation Measures 2018 – 2023

Rank	Conservation Measure or Program	Cost per 1000 Gallons Saved
1	Pressure Management	$0.77
2	Leak Detection & Repair Program	$0.86
3	Water Meter Testing and Replacement Program	$2.18
4	Water Restrictions - Hour/Days	$3.31
5	New Landscape Lawn Permits	$3.46
6	Designated Water Conservation Officer	$5.50
7	Irrigation, Turf and Landscape Standards for New Construction	$9.08
8	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	$10.18
9	Irrigation Scheduling	$20.84
10	Residential Indoor Water Audit	$27.33
11	Commercial and Residential Rain and Wind Sensor Requirement	$32.71
12	Practical Turf for Sports Fields	$57.94

Table 38. Rankings for Phase 2 Water Conservation Measures 2023 – 2028

Rank	Conservation Measure or Program	Cost per 1000 Gallons Saved
1	Pressure management	$0.72
2	Leak Detection & Repair Program	$0.82
3	Water Meter Testing and Replacement Program	$2.05
4	Water Restrictions - Hour/Days	$3.29
5	New Landscape Lawn Permits	$3.41
6	Designated Water Conservation Officer	$5.38
7	Irrigation, Turf and Landscape Standards for New Construction	$8.69
8	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	$10.06
9	Irrigation Scheduling	$20.94
10	Residential Indoor Water Audit	$23.84
11	Practical Turf for Sports Fields	$31.85
12	Commercial and Residential Rain and Wind Sensor Requirement	$32.82

Table 39. Rankings for Phase 3 Water Conservation Measures 2028 – 2033

Rank	Conservation Measure or Program	Cost per 1000 Gallons Saved
1	Pressure Management	$0.68
2	Leak Detection & Repair Program	$0.78
3	Water Meter Testing and Replacement Program	$1.96
4	Water Restrictions - Hour/Days	$3.29
5	New Landscape Lawn Permits	$3.39
6	Designated Water Conservation Officer	$5.27
7	Irrigation, Turf and Landscape Standards for New Construction	$8.51
8	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	$10.01
9	Irrigation Scheduling	$20.82
10	Residential Indoor Water Audit	$22.66
11	Practical Turf for Sports Fields	$23.15
12	Commercial and Residential Rain and Wind Sensor Requirement	$32.61

Table 40. Rankings for Phase 4 Water Conservation Measures 2033 – 2038

Rank	Conservation Measure or Program	Cost per 1000 Gallons Saved
1	Pressure Management	$0.65
2	Leak Detection & Repair Program	$0.75
3	Water Meter Testing and Replacement Program	$1.87
4	Water Restrictions - Hour/Days	$3.28
5	New Landscape Lawn Permits	$3.37
6	Designated Water Conservation Officer	$5.18
7	Irrigation, Turf and Landscape Standards for New Construction	$8.38
8	Annual Irrigation Audit and $500 Irrigation Rebate for Large Users	$9.99
9	Practical Turf for Sports Fields	$18.80
10	Irrigation Scheduling	$20.63
11	Residential Indoor Water Audit	$22.09
12	Commercial and Residential Rain and Wind Sensor Requirement	$32.29

Evaluation Criteria 1

In order to determine which of the measures to select for implementation, the following additional criteria were used:

- Corresponds to existing Capital Improvements Plan
- Financial limitations
- Staff limitations
- Board and staff approval
- Public acceptance

Selected Conservation Measures and Programs

Based on the evaluation criteria specified above, the District has decided to proceed with ten of the evaluated measures. The practical turf for sports fields and water efficient toilets for existing residential customers will not be included in the implementation plan.

The practical turf for sports fields was evaluated for replacement of existing fields; the cost per 1000 gallons for installing synthetic turf for new field areas was not evaluated. It is recommended that the District reevaluate the cost per 1000 gallons for all new sports fields or other areas requiring irrigation within the initial five-year period. This recommendation will be added to the Plan's implementation schedule.

The water efficient toilets for existing residential customers were eliminated due to the minimal amount of customers affected and therefore, the small water savings associated. In addition, the majority of toilets that were installed prior to 1993 are reaching the end of their useful life and will likely be replaced regardless of the implementation of a District regulation.

The ten options selected for implementation have been compared to the conservation goals for the four phases established in Section 5 and are summarized in Table 41.

Table 41. Conservation Measure Water Savings & Water Conservation Plan Goals

Conservation Measures and Programs	PHASE 1		PHASE 2		PHASE 3		PHASE 4	
	gal	A.F.	gal	A.F.	gal	A.F.	gal	A.F.
Residential Conservation								
SAVINGS GOALS	**164,246,623**	**504**	**674,521,471**	**2,070**	**1,790,950,752**	**5,496**	**3,193,989,568**	**9,802**
Water Meter Testing and Replacement Program	116,964,902	359.0	245,507,659	753.4	385,628,270	1,183.4	537,326,735	1,649.0
Leak Detection & Repair Program	116,964,902	359.0	245,507,659	753.4	385,628,270	1,183.4	537,326,735	1,649.0
Pressure Management	116,964,902	359.0	245,507,659	753.4	385,628,270	1,183.4	537,326,735	1,649.0
Designated Water Conservation Officer	116,628,095	357.9	245,769,975	754.2	387,425,640	1,189.0	541,595,090	1,662.1
Annual Irrigation Audit and $500 Irrigation Rebate for Large Users		-		-		-		-
Water Restrictions - Hour/Days	258,525,610	793.4	544,790,110	1,671.9	858,793,502	2,635.5	1,200,535,784	3,684.3
Residential Indoor Water Audit		-						
Commercial and Residential Rain and Wind Sensor Requirement		-		-	7,658,438	23.5	10,272,353	31.5
Irrigation, Turf and Landscape Standards for New Construction		-		-	4,254,688	13.1	8,560,295	26.3
Practical Turf for Sports Fields		-		-		-		-
New Landscape Lawn Permits		-	76,803,117	235.7	161,427,350	495.4	253,872,699	779.1
Irrigation Scheduling		-		-	4,254,688	13.1	8,560,295	26.3
SUM	726,048,412	2,228	1,603,886,179	4,922	2,580,699,114	7,920	3,635,376,719	11,157
Commercial Conservation								
SAVINGS GOALS	**42,428,916**	**130.2**	**139,430,960**	**428**	**357,433,967**	**1,097**	**712,295,421**	**2,186**
Water Meter Testing and Replacement Program	20,271,004	62.2	42,548,547	130.6	66,832,631	205.1	93,123,254	285.8
Leak Detection & Repair Program	20,271,004	62.2	42,548,547	130.6	66,832,631	205.1	93,123,254	285.8
Pressure Management	20,271,004	62.2	42,548,547	130.6	66,832,631	205.1	93,123,254	285.8
Designated Water Conservation Officer	22,626,971	69.4	1,632,396	5.0	75,164,295	230.7	105,074,650	322.5
Annual Irrigation Audits and $500 Irrigation Rebate for Large Users	7,794,713	23.9	15,583,106	47.8	23,375,801	71.7	31,187,560	95.7
Water Restrictions - Hour/Days	50,156,451	153.9	105,694,514	324.4	166,614,188	511.3	232,915,473	714.8
Residential Indoor Water Audit		-		-		-		-
Commercial and Residential Rain Sensor Requirement	403,994	1.2	979,438	3.0	1,469,228	4.5	1,960,217	6.0
Irrigation, Turf and Landscape Standards for New Construction		-		-	816,238	2.5	1,633,514	5.0
Practical Turf for Sports Fields		-		-		-		-
New Landscape Lawn Permits		-	14,900,542	45.7	31,318,456	96.1	49,253,742	151.2
10% of Lot Irrigation Restriction		-		-	816,238	2.5	1,633,514	5.0
SUM	141,795,140	435	266,435,639	818	500,072,337	1,535	703,028,433	2,158
Non - Residential Conservation								
SAVINGS GOALS	**29,892,599**	**91.7**	**29,892,599**	**92**	**190,902,697**	**586**	**297,575,439**	**913**
Water Meter Testing and Replacement Program	477,761	1.5	1,002,814	3.1	1,575,158	4.8	2,194,794	6.7
Leak Detection & Repair Program	477,761	1.5	1,002,814	3.1	1,575,158	4.8	2,194,794	6.7
Pressure Management	20,271,004	62.2	42,548,547	130.6	66,832,631	205.1	93,123,254	285.8
Designated Water Conservation Officer	847,504	2.6	1,785,941	5.5	2,815,313	8.6	3,935,619	12.1
Annual Irrigation Audits and $500 Irrigation Rebate for Large Users		-		-		-		-
Water Restrictions - Hour/Days	1,878,633	5.8	3,958,836	12.1	6,240,611	19.2	8,723,956	26.8
Residential Indoor Water Audit		-		-		-		-
Commercial and Residential Rain Sensor Requirement		-		-		-		-
Irrigation, Turf and Landscape Standards for New Construction		-		-		-		-
Practical Turf for Sports Fields		-		-		-		-
New Landscape Lawn Permits	-	-	558,107	1.7	1,173,047	3.6	1,844,821	5.7
10% of Lot Irrigation Restriction		-		-		-		-
SUM	23,952,662	74	50,857,059	156	80,211,918	246	112,017,237	344

Now that the water savings for each of the conservation measures has been evaluated, the conservation goals established in Section 5 are reassessed. In summary, to meet the 2038 reduction goals, a majority of the programs must be implemented during the first phase. This increases the water demand reductions for the first three interim periods to percentages that are greater than established in Section 5. This summary is available in Table 42 thru Table 45. The implementation schedule for the conservation measures is discussed in Section 8.

Table 42. Water Conservation Goal Comparison Phase 1

Water Use Categories Phase 1	Total Projected Water Use	Preliminary Conservation Goals		Water Savings from Selected Programs	Amount of Conservation from Programs Selected	Adjusted Conservation Goals	
	A.F.	A.F.	%	A.F.	%	A.F.	%
Residential	29,321	504	1.7%	2,228	7.6%	2,228	7.6%
Commercial	4,789	130	2.7%	434	9.1%	434	9.1%
Non - Residential	2,174	92	4.2%	74	3.4%	74	3.4%
TOTAL	**36,285**	**726**	**2.0%**	**2,736**	**7.5%**	**2,736**	**7.5%**

Table 43. Water Conservation Goals Comparison Phase 2

Water Use Categories Phase 2	Total Projected Water Use	Preliminary Conservation Goals		Water Savings from Selected Programs	Amount of Conservation from Programs Selected	Adjusted Conservation Goals	
	A.F.	A.F.	%	A.F.	%	A.F.	%
Residential	55,598	2,070	3.7%	4,922	8.85%	4,922	8.9%
Commercial	9,059	428	4.7%	815	9.0%	815	9.0%
Non - Residential	3,986	248	6.2%	156	3.9%	156	3.9%
TOTAL	**68,644**	**2,746**	**4.0%**	**5,893**	**8.6%**	**5,893**	**8.6%**

Table 44. Conservation Goals Comparison Phase 3

Water Use Categories Phase 3	Total Projected Water Use	Preliminary Conservation Goals		Water Savings from Selected Programs	Amount of Conservation from Programs Selected	Adjusted Conservation Goals	
	A.F.	A.F.	%	A.F.	%	A.F.	%
Residential	83,225	5,496	6.6%	7,920	9.52%	**7,920**	**9.5%**
Commercial	13,535	1,097	8.1%	1,535	11.3%	**1,535**	**11.3%**
Non - Residential	5,798	586	10.1%	246	4.2%	**246**	**4.2%**
TOTAL	**102,559**	**7,179**	**7.0%**	**9,701**	**9.5%**	**9,701**	**9.5%**

Table 45. Conservation Goals Comparison Phase 4

Water Use Categories Phase 4	Total Projected Water Use	Preliminary Conservation Goals		Water Savings from Selected Programs	Amount of Conservation from Programs Selected	Adjusted Conservation Goals	
	A.F.	A.F.	%	A.F.	%	A.F.	%
Residential	112,199	9,802	8.7%	11,157	9.9%	11,157	9.9%
Commercial	18,216	2,186	12.0%	2,158	11.8%	2,158	11.8%
Non - Residential	7,610	913	12.0%	344	4.5%	344	4.5%
TOTAL	**138,025**	**12,901**	**9.3%**	**13,658**	**9.9%**	**13,658**	**9.9%**

The projected water savings from the implemented conservation measures were similar to the initial conservation goals for the 20-year planning horizon. The residential category water demand reduction percentage was increased from 8.7 percent to 9.9 percent. The commercial category water demand percentage remained decreased from 12 percent to 11.8 percent. The non-residential category was not capable of meeting the12 percent reduction goal using the selected measures and was reduced to 4.5 percent. Overall, percent reduction in water demand for the planning horizon is 9.9 percent, which is consistent with the district's nine percent water conservation goal.

SECTION 8 – INTEGRATE RESOURCES AND MODIFY DEMAND FORECAST

IMPLEMENTATION SCHEDULE

In order to evaluate the modified water demand projection resulting from the conservation measures, an implementation schedule was established. Table 46 is a proposed implementation plan for the District through the planning horizon. To meet the nine percent reduction goal, all of the selected measures are scheduled to be implemented prior to 2038. This table does not include the effects of existing conservation measures and how these measures may impact water demand in the future because the success of these efforts have not been quantified.

The annual costs at full implementation of this Plan are estimated as $263,500. The water savings from these programs decrease the necessity for acquiring additional water supply during the planning horizon. As a result, it is possible that a portion of the $1.3 million that is budgeted annually for water acquisition could be used to fund these programs. It is important to note that the cost estimates for these measures are preliminary and are not reflective of an extensive economic investigation or design of these measures. The District should review annually the efficacy of conservation measures and update projections for total water demand, and weigh the annual savings against the cost of producing water, as well as against future planned upgrades for supply and treatment.

The actual implementation of this program will depend on District staff availability, funding, and time required for public and District Board approval.

SECTION 9 – IMPLEMENTATION AND MONITORING THE CONSERVATION PLAN

The Plan's implementation schedule was outlined in Section 8 and Table 46. The continued monitoring and assessment of the Plan is paramount to its success. This is the primary reason why a Water Conservation Officer is considered a primary component of the Plan. Establishing a staff member to evaluate the success and shortcomings of the conservation measures on an annual basis allows the District to adjust these measures based on consumption patterns. In addition, the District's Water Conservation Officer has been and will continue to work with Pueblo County's Community Development Director and Economic Manager to successfully implement the Plan.

The following sub sections further discuss the next steps for Plan implementation and the proposed continued monitoring.

EVALUATION OF THE WATER CONSERVATION PLAN

The Water Conservation Officer will be responsible for reviewing the water consumption data from the District's billing department on an annual basis to assess the Plan's ability to meet the water conservation goals. Specifically, the outdoor consumption for the targeted user categories will be assessed to verify the water conservation results.

Supply side conservation measures will be evaluated annually by establishing a balance on the water produced versus the water distributed in order to more accurately assess system losses. The monitoring efforts that will be implemented to assess the success of the measures and programs are shown in Table 48.

Table 48. Monitoring Water Conservation Measures

Conservation Measures and Programs	Individual Customer Water Use	Customer Class Water Use	Unaccounted for Water	Peak & Annual Treated & Total Water Demand
	(A)	(B)	(C)	(D)
Pressure Management	X		X	X
Water Meter Testing & Replacement Program			X	X
Leak Detection & Repair Program			X	X
Designated Water Conservation Officer	X	X		X
Annual Irrigation Audit and $500 Irrigation Rebate for Large Users		X		X
Water Restrictions – Hours/Days	X	X		X
Commercial & Residential Rain Sensor Requirement	X	X		X
New Lawn Landscape Permits	X			X
Irrigation, Turf & Landscape Standards for New Construction	X	X		X
10% Lot Irrigation Restriction	X	X		X

(A) Individual customer water use prior and post implementation will be monitored to verify savings
(B) These options target specific customer categories that will be monitored to verify savings

Table 46. Water Conservation Implementation Plan

Conservation Measures and Programs	Implementation Cost	Annual Costs (after 1st year)	% of Total Water Savings	Comments for Implementation Consideration
Phase 1				
Pressure Management	$6,500		17.21%	Public communication, funding, staff availability
Water Meter Testing and Replacement Program	$7,500		15.05%	Staff availability, third party coordination, funding
Leak Detection & Repair Program	$26,500		15.05%	Staff availability, third party coordination, funding
Designated Water Conservation Officer	$65,000		15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	$2,000		0.74%	Public communication, funding, staff availability, third party coordination, water conservation officer
Water Restrictions - Hour/Days	$6,000		34.31%	Public communication, funding, staff availability
Evaluation of Synthetic Turf for all newly constructed sports fields	$5,000		TBD	Staff availability, third party coordination, funding
Total Cost Phase 1 =	***$118,500***			
Phase 2				
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Water Restrictions - Hour/Days	--	$7,500	34.31%	Public communication, funding, staff availability
Total Cost Phase 2 =	***$197,300***			

Conservation Measures and Programs	Implementation Cost	Annual Costs (after 1st year)	% of Total Water Savings	Comments for Implementation Consideration
Phase 3				
Commercial and Residential Rain Sensor Requirement	$6,250		0.29%	Public communication, funding, staff availability, water conservation officer
Irrigation, Turf and Landscape Standards for New Construction	$6,250		0.24%	Public communication, funding, staff availability, water conservation officer
Irrigation Scheduling	$6,000		0.24%	Public communication, funding, staff availability, water conservation officer
New Landscape Lawn Permits	$6,500		7.25%	Public communication, funding, staff availability, water conservation officer
Water Restrictions - Hour/Days	--	$7,500	34.31%	
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	15.48%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Total Cost Phase 3 =	***$203,800***			
Phase 4				
New Landscape Lawn Permits	--	$3,700	7.25%	
Water Restrictions - Hour/Days	--	$7,500	34.31%	
Commercial and Residential Rain and Wind Sensor Requirement	--	$17,500	0.29%	
Irrigation, Turf and Landscape Standards for New Construction	--	$5,000	0.24%	
Irrigation Scheduling	--	$17,500	0.24%	
Pressure Management	--	$22,500	17.21%	
Water Meter Testing and Replacement Program	--	$65,500	15.05%	
Leak Detection & Repair Program	--	$26,500	15.05%	
Designated Water Conservation Officer	--	$65,000	0.74%	
Annual Irrigation Audit for Large Users and $500 Irrigation Rebate	--	$10,300	0.74%	
Total Cost =	***$463,550***			
Total Implementation Costs =	***$353,800***			
Total Annual Costs (Full Implementation) =	***$263,500***			

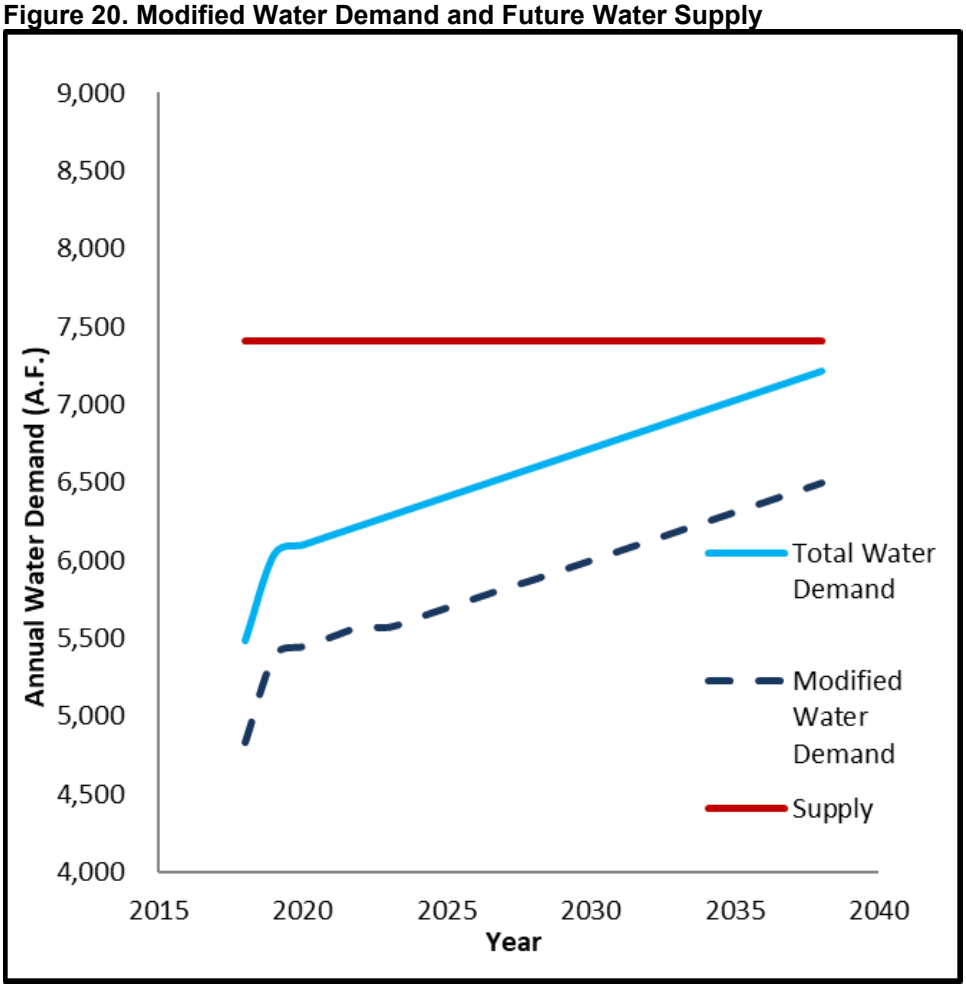
DEMAND FORECAST MODIFIED FOR WATER CONSERVATION MEASURES

Taking into account the annual water savings of the Plan, the future water demand projection has been modified to account for the annual water savings from the implemented conservation measures. The water supply, future demand (prior to conservation measures) and modified future demand data is provided in Table 47. The modified future demand projection is shown in Figure 20 compared to the water demand projections established in Section 3.

Table 47. Future Water Supply and Demand Comparison

Year	Annual Water Supply	Annual Water Demand (No Conservation)	Annual Water Savings from Conservation Measures	Modified Annual Water Demand After Conservation Measures
	(AF)	(AF)	(A.F)	(AF)
2019	7,405	6,036	653	5,384
2020	7,405	6,099	653	5,446
2021	7,405	6,161	653	5,508
2022	7,405	6,223	653	5,570
2023	7,405	6,285	715	5,570
2024	7,405	6,347	715	5,632
2025	7,405	6,410	715	5,695
2026	7,405	6,472	715	5,757
2027	7,405	6,534	715	5,819
2028	7,405	6,596	721	5,875
2029	7,405	6,659	721	5,937
2030	7,405	6,721	721	5,999
2031	7,405	6,783	721	6,062
2032	7,405	6,845	721	6,124
2033	7,405	6,907	721	6,186
2034	7,405	6,970	721	6,248
2035	7,405	7,032	721	6,311
2036	7,405	7,094	721	6,373
2037	7,405	7,156	721	6,435
2038	7,405	7,218	721	6,497
2039	7,405	7,281	721	6,559

Figure 20. Modified Water Demand and Future Water Supply



PROJECT SPECIFIC SAVINGS

As discussed in Section 4, there are capital improvement projects currently being evaluated pertaining to water supply acquisition, water treatment capacity, and increasing water storage. The modified water demand forecast could delay or eliminate the need for these projects, listed in Table 25. The cost savings and timeline will depend on the results of the rate study and capital improvement planning that is underway. The implications of the conservation efforts on these projects will be reevaluated as more information on the projects' costs and schedule is available.

FORECAST MODIFICATIONS AND BENEFITS OF CONSERVATION

The modified water demand allows the District to meet the average annual water supply with available water sources as shown in Figure 20. The decrease in demand has allowed the District to meet its water conservation goal of balancing the water demand with the available water supply through the 20-year planning horizon.

The District should review annually the efficacy of the conservation measures and update projections for total water demand and weigh the annual savings against the cost of producing water, as well as against future planned upgrades for supply and treatment. In addition, the District

infrastructure is aging, and the distribution system requires routine maintenance of 400 miles of main spread out over 45 square miles. By identifying and repairing leaks, the water is returned to the District's portfolio.

Once implemented, the water conservation efforts developed in this Plan have the potential to reduce District spending on water supply acquisition, decrease the need for additional water storage, and mitigate stress on the available water supply. Information on proposed capital improvement projects and their timeline will assist the District in quantifying the financial benefits and implications of this Plan.

SECTION 9 – IMPLEMENTATION AND MONITORING THE CONSERVATION PLAN

The Plan's implementation schedule was outlined in Section 8 and Table 46. The continued monitoring and assessment of the Plan is paramount to its success. This is the primary reason why a Water Conservation Officer is considered a primary component of the Plan. Establishing a staff member to evaluate the success and shortcomings of the conservation measures on an annual basis allows the District to adjust these measures based on consumption patterns. In addition, the District's Water Conservation Officer has been and will continue to work with Pueblo County's Community Development Director and Economic Manager to successfully implement the Plan.

The following sub sections further discuss the next steps for Plan implementation and the proposed continued monitoring.

EVALUATION OF THE WATER CONSERVATION PLAN

The Water Conservation Officer will be responsible for reviewing the water consumption data from the District's billing department on an annual basis to assess the Plan's ability to meet the water conservation goals. Specifically, the outdoor consumption for the targeted user categories will be assessed to verify the water conservation results.

Supply side conservation measures will be evaluated annually by establishing a balance on the water produced versus the water distributed in order to more accurately assess system losses. The monitoring efforts that will be implemented to assess the success of the measures and programs are shown in Table 48.

Table 48. Monitoring Water Conservation Measures

Conservation Measures and Programs	Individual Customer Water Use	Customer Class Water Use	Unaccounted for Water	Peak & Annual Treated & Total Water Demand
	(A)	(B)	(C)	(D)
Pressure Management	X		X	X
Water Meter Testing & Replacement Program			X	X
Leak Detection & Repair Program			X	X
Designated Water Conservation Officer	X	X		X
Annual Irrigation Audit and $500 Irrigation Rebate for Large Users		X		X
Water Restrictions – Hours/Days	X	X		X
Commercial & Residential Rain Sensor Requirement	X	X		X
New Lawn Landscape Permits	X			X
Irrigation, Turf & Landscape Standards for New Construction	X	X		X
10% Lot Irrigation Restriction	X	X		X

(A) Individual customer water use prior and post implementation will be monitored to verify savings
(B) These options target specific customer categories that will be monitored to verify savings

(C) These options target supply side measures and will be monitored by calculating any unaccounted for water losses
(D) The overall water conservation will be determined by quantifying the peak and annual water use

Plan Revisions

It is recommended that the Plan is reevaluated at five-year increments using the annual data from the District analysis as discussed above. The purpose of the five-year evaluations is to determine if the conservation measures and costs are consistent with the information and goals provided in this Plan. During these evaluations, the modified water conservation targets for each of the phases will be compared to the water consumption reduction observed in the user categories. Adjustments to the Plan can be made during these periods to more effectively meet the conservation goals of the 20-year planning period.

Approval and Adoption

The District advertised for a 60-day public review comment period on March 22, 2020 in the Pueblo Chieftain. The draft plan was made available for public comment electronically on the District's website, and two hard copies were available at the Pueblo West Library and at the District office. A letter was also sent to the Colorado Water Conservation Board at this time requesting any comments. No comments were received. The public notice, affidavit of publication, letter to CWCB and final board resolution (pending) are included with Appendix H.

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APPENDIX A – PWMD WATER SUPPLY AND STORAGE ANALYSIS

WRC ENGINEERING, INC.

March 22, 2010

Mr. Larry Howe-Kerr
District Manager
Pueblo West Metropolitan District
P.O. Box 7005
Pueblo West, Colorado 81007

WRC File: 1611/93

RE: Pueblo West Metropolitan District Raw Water
Storage Needs and Alternatives Analysis

Dear Mr. Howe-Kerr:

The purpose of this analysis is to assist Pueblo West Metropolitan District (Pueblo West) in the evaluation and acquisition of long term raw water storage. This analysis is divided into three parts. The first part presents the analysis and results of a determination of the volume of storage needed for Pueblo West at full buildout. The second part presents potential storage options and associated information and financial aspects of the potential storage options. The final part provides analysis and recommendations for long term storage and water rights acquisitions.

I. RAW WATER STORAGE REQUIREMENTS

The purposes of long term raw water storage include: a) Maximize the use of Pueblo West's water rights, b) Provide drought protection, c) Provide opportunities to enhance Pueblo West's water portfolio, and d) Provide operational flexibility for water deliveries.

Pueblo West's current water portfolio includes the following water assets:

- About 5,766 Shares of Twin Lakes Reservoir and Canal Company; Average annual yield estimated at 5,420 A.F./Yr.
- Hill Ranch: Average annual yield estimated at 1,600 A.F./Yr.
- About 360 Shares Colorado Canal Company and Lake Meredith Company: Average annual yield estimated at 120 A.F./Yr.
- Wheel Ranch Ditch: Average annual yield estimated at 30 A.F./Yr.

The above estimated yields are based upon the following considerations and assumptions:

- Reuse Water: Average annual yield estimated at 2,880 A.F./Yr.
- Estimated 85% of full Hill Ranch dry-up
- Includes 10% transit loss for Twin Lakes delivery to Pueblo Reservoir
- Piping of reusable water from source to the Arkansas River
- Estimated 50% return of non-sewered return flows

- Sufficient ultimate storage to obtain full water right yields
- Estimated 87% of total supply is reusable
- Loss of 300 A.F./Yr. average to PFMP
- Yields excludes reservoir evaporation

The total estimated average annual yield of Pueblo West's water rights, if fully utilized, would be an average of about 10,050 A.F./Yr. Full utilization requires sufficient storage and exchange capacity to fully utilize these water rights. The stated yields represents the average yield of these water rights over a long time period, such as 40 to 50 years. If storage were not available, Pueblo West would need to rely on the "firm yield" of these water rights, such "firm yield" defined as the minimum yield expected to be available in every year over the planning period. Entities that base their water supply on a firm yield water rights typically need little storage but the expense of obtaining such water rights is very high. A more economical approach, which is the approach we have been pursuing for Pueblo West, includes a water portfolio with both high firm yield water rights (water available every year) and good average yield water rights (some water available in dry years and a lot of water available in average and wet years). This combination approach uses storage to "firm up" the average yield water to provide Pueblo West with a water rights portfolio which results in a secure year by year water supply.

The amount of needed raw water storage is related to the monthly and yearly yield of Pueblo West's water portfolio as related to the monthly water demands of Pueblo West. For purposes of this analysis, the full buildout demand of Pueblo West is estimated to be about 10,000 A.F./Year. The monthly distribution of Pueblo West's water demand was estimated based upon the historic average monthly water usage distributions.

To determine the minimum amount of storage needed for Pueblo West, a monthly spreadsheet analysis was prepared which analyzed Pueblo West's water demands against a historic estimate of Pueblo West's monthly water portfolio yield. When yield exceeded demand, water was placed in storage. When demand exceeded yield, water was withdrawn from storage. The spreadsheet models a 49-year historic yield period which includes both severe drought periods and extreme wet periods.

The results of the spreadsheet model shows a need for a minimum 26,000 A.F. of raw water storage (see Exhibit A). The 26,000 A.F. of storage results in only 10,000 A.F. remaining in storage during two drought years in the study period.

A typical response to drought would be mandatory water restrictions which we have estimated could, in such a severe drought, save about 10% in water demand or 1,000 A.F. in such a year. Even with this reduction, this amount of storage would leave Pueblo West

vulnerable to water shortages if back to back severe droughts occur in the future. Since the future cannot be predicted, we recommend that Pueblo West maintain, at full build out, at least one and one-half to two years of demand in carry over storage. Thus, based upon Pueblo West's current water portfolio, Pueblo West should plan on securing a minimum of 31,000 to 36,000 A.F. of raw water storage volume at or upstream of Pueblo Reservoir.

II. RAW WATER STORAGE OPTIONS

Raw water storage options in the Arkansas River Basin in the amount needed by Pueblo West are fairly limited. The options can be separated into three categories:

A) Pueblo Reservoir Contracts
B) Allocated Space in Existing Reservoirs
C) Proposed Reservoirs or Enlargements of Existing Reservoirs

These options are described in the following sections and are shown on Exhibit B.

A) Pueblo Reservoir Contracts

Pueblo West currently holds a contract with the United States Bureau of Reclamation (USBR) for "Excess Capacity" in Pueblo Reservoir in the amount of 9,000 A.F. The terms of the contract allow the USBR to spill Pueblo West's water "if and when" there is insufficient space for storage of other waters stored in Pueblo Reservoir which are senior in priority to Pueblo West's contract for storage space. Spills from Pueblo Reservoir typically occurs only in wet years. but cannot be predicted more than six to nine months in advance.

Pueblo West could potentially contract for more storage space in Pueblo Reservoir but will be subject to future contract negotiations and renewals (if available) and may be limited by the total contract space available as compared to the total demand for storage space by other entities requesting storage contracts in Pueblo Reservoir. Currently, there are two separate efforts to secure long term "if and when" storage space in Pueblo Reservoir. The Southern Delivery System (SDS) project (which includes a proposed 10,000 A.F. allocation for Pueblo West), and Southeastern Colorado Water Conservation District's (SECWCD) recent proposal for a long term contract for former Preferred Storage Options Plan (PSOP) participants (which includes a previously estimated storage allocation for Pueblo West of 5,500 A.F.). The SDS contract will likely be issued since the environmental permitting needed to allow a contract to be entered into by the USBR has been completed. It is unknown whether the SECWCD contract will come to fruitation. Irregardless, it is not likely

that Pueblo West could secure 31,000 to 36,000 A.F. of "if and when" storage in Pueblo Reservoir.

As mentioned, Pueblo West has a one-year contract with the USBR for 9,000 A.F. of storage space in Pueblo Reservoir. The charge to Pueblo West for this storage space is currently $24.17/A.F. plus a yearly charge for a total yearly cost of about $283,000. If Pueblo West were to contract for the 31,000 to 36,000 A.F. of needed capacity, using current costs, the charge would be $975,000 to $1,132,000 per year. If such a contract were to extend for 40 years, the maximum allowed contract duration, the total cost (excluding inflation) would be from about $39 M to about $45 M, or about $1,260 per A.F. of storage capacity.

B) Existing Reservoirs

There are several existing reservoirs in the Arkansas River Basin upstream of Pueblo Reservoir. However, the storage capacity in these reservoirs are already owned by other entities. Only Twin Lakes Reservoir has capacity for sale as part of purchase of water shares in the Twin Lakes Reservoir and Canal Company. Pueblo West currently has use of about 6,330 A.F. of storage capacity in Twin Lakes by virtue of its water shares ownership. Additional shares have historically become available which Pueblo West has continued to purchase. However, the storage capacity in Twin Lakes is primarily used for regulation of Twin Lakes water and not as carryover storage. As such, additional Twin Lakes shares provides more water supply but not carryover storage.

C) Proposed Reservoirs or Expansions of Existing Reservoirs

In early 2000, the SECWCD issued a final study of storage options in the Arkansas Basin called the PSOP. This study evaluated 31 potential storage options and narrowed the list down to eight preferred options. For purposes of Pueblo West, the options from this study which are still feasible and would meet the storage need of Pueblo West include Pueblo Reservoir contract storage (known in the study as Fry-Ark Project Re-operations, previously discussed) and Turquoise Reservoir enlargement. Enlargement of Pueblo Reservoir does not appear to be feasible at this time. In addition, other entities have proposed new reservoirs or enlargement of existing reservoirs in which there may be a potential for Pueblo West to participate. These new reservoirs, or enlargements, including Pueblo West's more recent proposed reservoir, are described as follows:

1. Aurora's Box Creek Reservoir

The City of Aurora (COA) has proposed construction of Box Creek Reservoir in the upper Arkansas River basin near Leadville. A final reservoir size has not been determined but current estimates place the likely capacity at about 20,000 A.F. We have been unable, in the short amount of time in which to prepare this report, to secure an estimated cost for this reservoir. The COA is currently conducting tests on the ability for fens currently located in the reservoir site to be relocated and survive at another site. Our understanding is that if this turns out not to work, then this reservoir site is infeasible for reservoir construction.

2. Turquoise Reservoir Expansion

The enlargement of Turquoise Reservoir considered two options; an 11,950 A.F. enlargement and a 19,600 A.F. enlargement. Neither of these options would meet Pueblo West's total storage need by itself. It is also unlikely that the USBR, the owner of Turquoise Reservoir, would allow all of the enlarged storage space to be allocated just to Pueblo West. In fact, in the PSOP study, both proposed expansions were allocated primarily to existing Turquoise Reservoir storage owners (Turquoise Reservoir is an enlargement of a previously existing Sugarloaf Reservoir as part of the Fry-Ark Project. Several entities own storage space in Turquoise Reservoir from the original reservoir and from the expansion, even though the reservoir itself is owned by the USBR). The estimated cost of enlargement of Turquoise Reservoir in 2000 was $8.3 M for the 11,950 A.F. of enlargement ($690/A.F.) and $14.5 M for the 19,600 A.F. of enlargement ($740/A.F.).

3. Clear Creek Reservoir Expansion

The Pueblo Board of Water Works (PBWW) is the owner of Clear Creek Reservoir which has a current capacity of 11,400 A.F. The proposed reservoir enlargement would increase the reservoir capacity by 18,600 A.F. to a total storage capacity of 30,000 A.F. The estimated construction cost of the enlargement was $46 M in 2005, or about $2,500/A.F. Pueblo West would need to obtain approval from PBWW if Pueblo West were to secure a portion of the proposed reservoir enlargement. In addition, the amount of the enlargement allocated to Pueblo West, even if it were the total enlargement capacity, is less than Pueblo West's storage needs.

4. Pueblo West Alternative Reservoir

A potential alternative reservoir site for Pueblo West has been identified near Parkdale on a small south tributary to the Arkansas River. Conceptual layouts of the reservoir site and dam locations indicates the possible storage capacity of the site from 18,700 A.F. to 23,800 A.F. The site benefits from having a minimum tributary drainage area. This allows construction of a dam with no emergency spillway since the reservoir can store more than an entire probable maximum precipitation event. Water would need to be pumped into the site for storage with reservoir releases made by gravity back to the Arkansas River. The estimated cost of this reservoir and associated pumping equipment/pipeline is about 27 M for 18,700 A.F. ($1450/ A.F.) and about $34 M for 23,800 A.F. ($1,430 / A.F.).

III. ANALYSIS AND RECOMMENDATIONS

There are several considerations which factor into the selection of a raw water storage alternative. For Pueblo West, these primarily consist of: diversity of storage locations, availability of storage volume and necessary stream flow volumes, probability of securing storage at a given site, ability to have majority ownership and control of the reservoir, relative risk in securing needed storage, and cost.

We highly recommend that Pueblo West secure storage in more than one location. This reduces the risks associated with having a single storage location which, if damaged or rendered reduced in capacity, could leave Pueblo West at risk. This also provides Pueblo West more flexibility in future water exchanges and opportunities to share risks and costs with other water providers. Critical to Pueblo West is the location of storage and the assurance that physical water is available to place into storage, preferably by exchange, or by pumping. Unfortunately, there are not very many sites to choose from, most of which are owned by some other entity from whom Pueblo West would need to obtain approval for use of their storage space, either existing or in an enlargement or new reservoir.

Where possible, we also recommend that Pueblo West either solely own or have majority ownership in a reservoir. This allows Pueblo West to have control over all aspects of the storage reservoir for maximum flexibility in operations and decisions which Pueblo West will need to make from time to time. This is especially important in new reservoir or enlargements of reservoirs where Pueblo West will want to minimize the risk that such project ultimately cannot be constructed or secured. For example, if the fens at Aurora's Box Creek Reservoir site can not be successfully relocated, that site become useless and several years of time will have been wasted. Last, but not least, the cost to secure the storage capacity must be minimized and be within the financial capacity of Pueblo West.

Considering all of the above, we recommend the following:

1. Secure a long term contract for 10,000 A.F. of "if and when" storage in Pueblo Reservoir.

2. Discuss with PBWW the potential for participating in a Clear Creek Reservoir enlargement and obtain pertinent information on such enlargement if a favorable response is received from PBWW.

3. Discuss with the USBR and appropriate parties the status of discussions on Turquoise Reservoir enlargement. Secure current pertinent information on reservoir enlargement feasibility.

4. Pursue investigations needed to determine feasibility of the Parkdale Reservoir site for raw water storage. Once initial investigations are completed, pursue potential for leasing a small amount (up to 4,000 or 5,000 A.F.) of capacity to other water providers.

5. Continue to pursue additional water right acquisitions including Twin Lakes shares or other opportunities for dry-year firm yield water. Additional firm yield water will reduce the required storage volumes.

If Pueblo West secures 10,000 A.F. of "if and when" storage in Pueblo Reservoir, then Pueblo West's goal should be to acquire 21,000 A.F. to 26,000 A.F. in the presented alternative reservoir sites.

If you have any questions regarding this analysis, please do not hesitate to call.

Respectfully submitted,

WRC ENGINEERING, INC.

Alan J. Leak, P.E.
Project Manager

ajl/mag

cc: Mr. Steve Harrison
Mr. Tom Mullans, Esq.
Mr. Robert F.T. Krassa, Esq.

Exhibit A

PUEBLO WEST METROPOLITAN DISTRICT

NET STORAGE REQUIREMENTS ANALYSIS

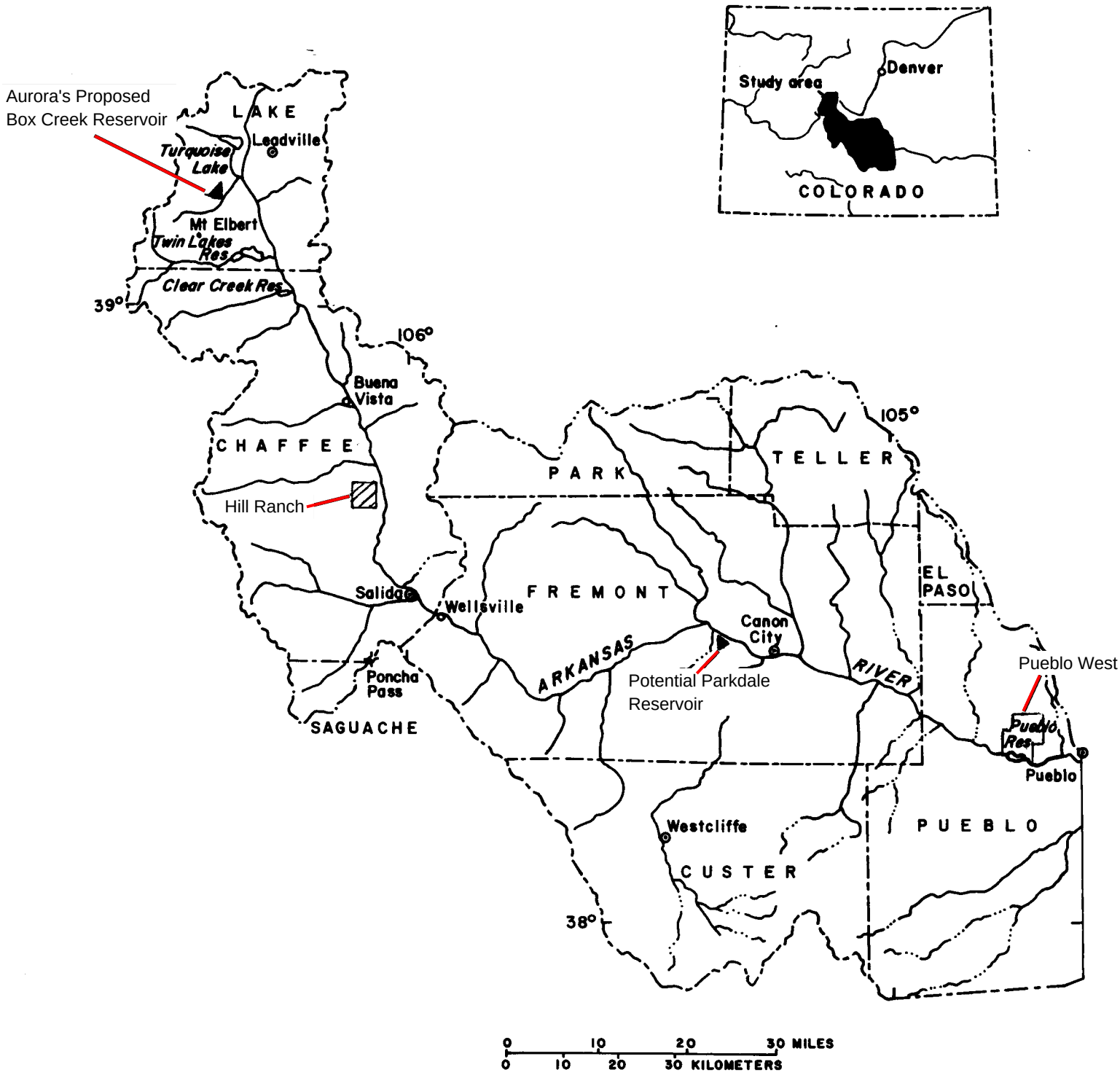
SIMULATED PWMD END-OF-MONTH STORAGE CONTENTS (ACRE-FEET)

26000 =MINIMUM REQUIRED RESERVOIR STORAGE (ACRE-FEET) FOR 10,000 ACRE-FEET CARRY-OVER STORAGE

YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL CHANGE
												23143	
1950	22853	22557	22064	21289	21176	23073	22999	22414	21834	21599	21304	21019	-2124.33
1951	20748	20471	19999	19149	19381	21863	22788	22529	22036	21917	21669	21420	401.53
1952	21210	20971	20546	19806	20446	23966	24669	24712	24459	24464	24254	24067	2646.84
1953	23812	23546	23086	22345	22035	24322	24956	25119	24885	24617	24360	24107	40.40
1954	23805	23502	22999	22390	22896	23230	22919	22351	21592	21253	20987	20682	-3425.92
1955	20375	20067	19559	18955	19432	20450	20359	20155	19800	19300	18999	18694	-1987.99
1956	18406	18113	17621	16866	17679	19490	19293	18623	17891	17525	17248	16964	-1729.91
1957	16822	16643	16297	15594	15709	18976	19823	19860	19564	19357	19277	19215	2251.50
1958	18976	18723	18275	17417	18017	19479	19076	18485	17888	17500	17256	17035	-2180.34
1959	16753	16466	15985	15147	15095	17528	17449	16778	16102	15626	15372	15100	-1935.17
1960	14828	14549	14078	13361	13464	16212	16612	16145	15533	15238	14983	14727	-372.44
1961	14464	14190	13726	12945	13428	15532	15222	15013	15105	15220	15076	14873	145.40
1962	14661	14428	14016	13422	14212	17072	18361	17991	17530	17212	17013	16832	1959.32
1963	16543	16247	15757	15036	15572	16065	15555	15132	14660	14422	14139	13869	-2963.34
1964	13581	13298	12811	11931	12102	13457	13727	13360	12764	12373	12093	11812	-2056.34
1965	11659	11472	11102	10300	10674	14155	15121	15074	14795	14668	14555	14455	2642.47
1966	14183	13901	13428	12836	13802	14874	14859	14421	13925	13693	13434	13179	-1275.21
1967	12904	12623	12148	11355	11750	13699	14193	13723	13054	12860	12612	12339	-840.15
1968	12112	11870	11432	10668	10854	13872	14153	14051	13672	13616	13419	13211	871.73
1969	12986	12749	12310	11707	12988	15307	16057	15711	15434	15219	15040	14837	1625.84
1970	14667	14473	14093	13276	14470	18304	19113	18699	18460	18176	17981	17817	2979.76
1971	17548	17270	16800	16050	16071	18766	19461	18886	18305	17949	17684	17432	-384.90
1972	17142	16847	16369	15514	15938	18701	18581	17974	17385	17099	16900	16669	-762.61
1973	16448	16214	15795	14946	15095	18048	19484	19183	18843	18725	18520	18327	1657.47
1974	18066	17790	17318	16451	17636	19159	18903	18392	17796	17444	17185	16919	-1407.85
1975	16683	16432	15997	15140	14846	17492	19391	19126	18462	18027	17810	17605	686.60
1976	17328	17047	16569	15786	16227	18186	18221	17773	17305	16964	16686	16419	-1186.39
1977	16118	15813	15312	14651	14791	15606	15022	14560	14049	13721	13434	13127	-3292.30
1978	12852	12568	12100	11316	11036	14082	14811	14327	13587	13132	12872	12612	-514.60
1979	12389	12148	11721	10888	11426	14767	14993	14826	14450	14198	13965	13753	1140.44
1980	13541	13310	12900	12218	12527	14832	14865	14261	13739	13577	13369	13191	-561.43
1981	12879	12567	12055	11333	11449	12960	13125	12613	12231	12029	11753	11457	-1733.71
1982	11218	10963	10524	10000	10432	13751	15123	15005	14548	14438	14273	14086	2628.17
1983	13898	13683	13288	12521	12410	16288	18447	19128	18863	18758	18602	18470	4384.01
1984	18332	18154	17807	17166	17115	18759	19018	19110	18749	18694	18568	18490	20.79
1985	18297	18078	17682	16983	17893	19300	19569	19561	19100	19070	18943	18816	325.77
1986	18608	18377	17964	17438	18119	22121	23199	23010	22661	22545	22394	22238	3421.75
1987	22023	21787	21366	20719	21938	22903	22921	22611	22182	22173	21974	21781	-456.49
1988	21482	21181	20682	19905	20196	22398	22734	21888	21247	21293	20988	20685	-1096.48
1989	20425	20155	19694	19058	20214	21927	22121	21502	20804	20508	20262	20048	-637.08
1990	19814	19561	19078	18408	18417	20512	20982	20901	20546	20592	20364	20154	106.19
1991	19897	19634	19176	18361	18451	20647	20844	20402	19948	19569	19313	19048	-1106.48
1992	18748	18451	18035	17206	17517	18226	18327	17863	17352	17166	16952	16690	-2357.28
1993	16407	16114	15678	14781	15642	19279	20827	20689	20557	20647	20457	20264	3573.47
1994	20053	19812	19328	18521	20351	23755	23438	22866	22433	22218	21977	21758	1494.79
1995	21508	21249	20769	20057	19815	24377	24310	24620	24894	25304	25133	24967	3208.97
1996	24754	24514	24036	23294	24251	25546	25342	24797	24388	24137	23901	23701	-1266.77
1997	23473	23217	22786	21947	22729	25330	25911	25730	25148	25018	24888	24705	1004.22
1998	24489	24249	23856	23044	23091	24697	25634	25482	25076	25162	25000	24773	68.31
Ave:	17567	17307	16857	16112	16547	18844	19243	18927	18482	18286	18066	17846	
Min	11218	10963	10524	10000	10432	12960	13125	12613	12231	12029	11753	11457	
Max.	24754	24514	24036	23294	24251	25546	25911	25730	25148	25304	25133	24967	

NOTE: Green colored cells represent minimum and maximum storage contents in the simulation period.

Exhibit B


Aurora's Proposed
Box Creek Reservoir
Study area
Denver
COLORADO
LAKE
Leadville
Turquoise Lake
Mt Elbert
Twin Lakes Res
Clear Creek Res
39°
106°
Buena Vista
CHAFFEE
Hill Ranch
PARK
105°
TELLER
EL PASO
Salida
Wellsville
FREMONT
Canon City
ARKANSAS
RIVER
Potential Parkdale
Reservoir
Pueblo West
Pueblo Res
Pueblo
Poncha Pass
SAGUACHE
Westcliffe
PUEBLO
CUSTER
38°
0 10 20 30 MILES
0 10 20 30 KILOMETERS

WRC ENGINEERING, INC.

November 19, 1998

Mr. Kirk Relford, Manager
Pueblo West Metropolitan District
109 East Industrial Boulevard
Pueblo West, Colorado 81007

WRC File: 1611/43

RE: Pueblo West Metropolitan District Water Supply Analysis
of
Twin Lakes and Colorado Canal/Lake Meredith Water Rights

Dear Mr. Relford:

Per the request of the Pueblo West Metropolitan District's (PWMD) Water Attorney Robert F.T. Krassa, WRC Engineering, Inc. (WRC) has conducted an analysis of the potential use of additional Twin Lakes and/or Colorado Canal/Lake Meredith paired water shares for supplying the ultimate water demands of PWMD. The purpose of this analysis is to assist PWMD in determining which water shares should be acquired to meet these ultimate water demands as well as other associated activities (i.e. reservoir construction) necessary to physically provide this water to the PWMD water system. For this analysis, we have relied on information readily available to us in order to meet the time constraints to complete this analysis. Further refinements to this analysis will be performed as additional or more comprehensive information becomes available and as changes occur in PWMD's current Water Court Case (85CW134B) for reuse of non-sewered return flows.

We have attempted to be as brief as possible in the written portion of this report due to the volumous nature of the background information and calculations for this analysis. Additional supporting materials can be provided upon request.

I. PWMD WATER DEMANDS

WRC , as part of the engineering analysis needed to support Part B of Case Nº. 85CW134, has prepared estimates of PWMD's ultimate water demands based upon historic water usage within PWMD. This analysis results in an average annual water requirement for PWMD at full buildout of about 9,460 A.F. We estimate that this value could vary from about 8,080 A.F. in wet years to 10,840 A.F. in dry years (ignoring watering restrictions or conservation measures). The increase in use in dry years is due to additional lawn watering required to make up for a lack of precipitation. Unfortunately, these dry periods are also when raw water sources are less dependable. Thus, a lawn watering restriction policy is suggested to reduce the demand in these dry periods. For the purposes of this analysis, the 9,460 A.F./year average water demand will be used.

II. EXISTING WATER RIGHTS

The existing water supply sources for PWMD consist of transmountain surface water, non-tributary ground water, and tributary surface water. The transmountain surface water comes from the District's ownership of 5766.41 shares (approximately 11.63 percent) out of an approximate total of 49,588 shares outstanding capital stock for the Twin Lakes Reservoir and Canal Company. The non-tributary ground water is provided through 18 adjudicated wells (Case Nº 80CW160 and 80CW171) which withdraw water from the Dakota and Purgatoire formations. The said decrees provide the District the right to withdraw up to 5392.4 acre-feet per year from said wells. Historically, Pueblo West used these wells as its original water supply source and pumped up to 894 A.F./Yr. from said wells. The wells now are currently used only as backup sources to the surface water diversions.

The Arkansas River basin surface water sources include three sources. The first, Twin Lakes Reservoir and Canal Company includes water from Lake Creek, a tributary of the Arkansas River, in addition to delivering trans-mountain water. Two separate tributary storage rights totaling approximately 54,452 acre-feet were granted to Twin Lakes Reservoir and Canal Company with an adjudication date of July 14, 1913 and appropriation dates of 1886 and 1887. The second source of tributary water is PWMD ownership of the Wheel Ranch Ditch water right decreed on December 22, 1896, with a maximum diversion rate of 1.5 cfs. Water from this right is currently restricted to irrigation use at the Pueblo West Golf Course and limited to diversions of 292 A.F. in any 20-year period. The third source of tributary water is PWMD's ownership of 263 shares of Colorado Canal/Lake Meredith paired water rights.

PWMD's water supply is also derived from reusable (100% consumptive) sewered return-flows decreed in Case Nº. 86CW134A which are currently instantaneously exchanged from the confluence of Dry Creek and the Arkansas River upstream to Pueblo Reservoir. Finally, in Part B of Case Nº. 86CW134, PWMD has applied for reuse of reusable (100% consumptive) non-sewered return flows occurring from deep percolation of lawn irrigation, distribution system leakage, and septic system return flows. The Part B case is still pending in Division 2 Water Court. The reusable water is water that originates from non-tributary wells and from transmountain component of Twin Lakes shares.

III. TWIN LAKES RESERVOIR AND CANAL COMPANY YIELD ANALYSIS

WRC's base yield analysis of the Twin Lakes Reservoir and Canal Company Water rights was performed using water supply records from November 1989 through August of 1998 since records of the allocation of transmountain (Colorado River) versus native (Arkansas River) water were not kept prior to November of 1989. This allocation is important since the transmountain water is totally consumable whereas the native water is not. Therefore, through PWMD's reuse and exchange plan, the value of the totally consumable portion of Twin Lakes' water can be realized.

A summary of the diversion records of the Twin Lakes water rights are presented in Table -1. Table -2 presents the yield of the Twin Lakes water rights on a per share basis. In summary, the average annual yield of said Twin Lakes water for 1989 - 1998 has been 0.25 A.F./share of native water (22.9%) and 0.84 A.F./share of transmountain water (77.1%) for a total of 1.09 A.F./share total yield. The lowest total annual yield in this period occurred in 1996 where the native yield was 0.11 A.F./share (13.6%) and the transmountain yield was 0.70 A.F./share (86.4%) for a total of 0.81 A.F./share. Records prior to 1989 indicate that the lowest total annual yield has been about 0.53 A.F./share in 1977 with an estimated native portion of 0.07 A.F./Share (13.2%).

For purposes of this analysis, we have assumed an average year yield of 1.09 A.F./share (with 22.9% as native water) and a dry year yield of 0.53 A.F./share (with 13.2% as native water). This yield is available at Twin Lakes Reservoir and must be reduced to account for reservoir evaporation (about 3%) and transit losses to Pueblo Reservoir for PWMD's use (about 10%). It should be noted that a contract exchange of PWMD's water in Twin Lakes for another entities water in Pueblo Reservoir, when possible, will not be charged the 10% transit loss.

IV. COLORADO CANAL/LAKE MEREDITH YIELD ANALYSIS

A detailed yield analysis of the Colorado Canal/Lake Meredith water system was prepared as part of the Water Court Case Nºs. 84CW62, 84CW63, and 84CW64. For purposes of this study, WRC has applied the conditions of the final decree in said cases to the historic records to develop an expected yield based upon decreed conditions. The results of this analysis is presented in Table -3. In summary, the average annual yield of the Colorado Canal and Lake Meredith shares are 0.32 A.F./share of Colorado Canal Water and 0.15 A.F./share of Lake Meredith water for a total yield of 0.47 A.F./paired shares. In a dry year, the yield is reduced to 0.00 A.F./shares for Colorado Canal water (1977) and -0.082 A.F./share of Lake Meredith water (1954). The paired shares provide for a total dry year yield of -0.05 A.F./paired shares (1954). This yield would be the total yield available at the confluence of the Lake Meredith outlet at the Arkansas River and assumes one month of evaporation charged to the Lake Meredith shares. The negative yield results from return flow obligations from previous years diversions per the decree.

The yield numbers presented above are the yields available at the time of diversion into the Colorado Canal. The yield to PWMD at Pueblo Reservoir will be less than these values due to a number of variable factors. Specifically, PWMD's can only use the Colorado Canal/Lake Meredith yield by exchanging said yield to Pueblo Reservoir. There will be times when there is no immediate exchange capacity and PWMD's water would need to remain in Lake Meredith for an extended time. The longer this water is held in Lake Meredith, the more evaporation of PWMD's water will occur, thus reducing it's effective yield to the District. In addition, when exchange capacity is available, PWMD may not be able to exchange all available exchange water to Pueblo Reservoir since such exchange would likely exceed PWMD's immediate demand (This would not be a problem if raw water storage were available either in or adjacent to Pueblo Reservoir). The effect of these limitations will be to reduce the average yield of the paired shares by an estimated 0.0 to 0.07 A.F./paired shares. Some opportunity may exist for contract (paper) exchanges with other entities with water in Pueblo Reservoir and Lake Meredith through which the loss of water due to the above described limitations can be minimized..

V. ESTIMATED YIELD OF THE REUSE AND EXCHANGE CASE Nº. 86CW134

The current yield analysis for the reusable waters resulting from the Reuse and Exchange Case is included in WRC's July 1998 report for said case. Since the final allocation of reusable and non-reusable water is not currently known, the reusable return flow yield used for the purposes of this report is based upon the total estimated return flows as compared to the total diversions to PWMD. This yield is then reduced by the proportion of reusable water to total water in the system. Using this methodology, we have considered two estimates. The first, labeled "optimistic" would be the yield expected assuming the objectors in the Part "B" case accept the July 1998 analysis results. The second, labeled "conservative", is based upon an assumed resolution of the Part "B" case with some concessions made to objectors.

Thus, the estimated total returns for the various return flow sources and locations are as follows:

Return Flow Source	Optimistic Returns (Percent of Total Diversions)	Conservative Returns (Percent of Total Diversions)
Sewered Returns (Dry Creek at Arkansas River)	14	14
Non-Sewered Returns (Arkansas River Upstream of Pueblo Reservoir)	11	8
Non-Sewered Returns (Arkansas River Downstream of Pueblo Reservoir)	18	14
Non-Sewered Returns (Fountain Creek at Arkansas River)	3	2
Total	45	37

The return flow values all represent the yield at the Arkansas River. The yield of the non-sewered return flows downstream of Pueblo Reservoir will be reduced further since they can only be used by exchange or by storage in Lake Meredith. Therefore, for the purposes of this analysis, the yield of these return flows are further reduced by 25 percent.

VI. ESTIMATED YIELD OF THE NON-TRIBUTARY DAKOTA/PURGATOIRE FORMATION WELLS

The decrees for the District's non-tributary Dakota/Purgatoire Formation wells allow for diversions of up to 5392.4 A.F per year. However, information is currently unavailable as to the long term impact of using said wells at this rate on the water levels of the non-tributary acquifer. Therefore, for this analysis, we have used a conservative well yield based upon the average pumping rate of the wells previously used to supply water to the District assuming they would be pumped 70% of the time. Based upon this assumption, the maximum yield of these wells for the purposes of this analysis is estimated to be 1709 A.F./Year.

VII. VALUE OF TWIN LAKES AND COLORADO CANAL/LAKE MEREDITH PAIRED SHARES

The fair market value of a water right is generally accepted in Colorado to be the value resulting from negotiations between a knowledgeable buyer and a knowledgeable seller dealing at arms length. As such, there is no "fixed price" for water rights. Therefore, for purposes of this report, we have estimated the value of the subject water rights based upon information provided by Mr. Alan Ringle of the Twin Lakes and Colorado Canal/Lake Meredith companies and other information available in our office.

Twin Lakes shares have in recent years been sold in the range of $10,000 to $15,000 per share with the smaller quantities demanding the higher price. We expect this analysis will be dealing with much larger quantity of shares than is represented by the above figures. Therefore, for this analysis, we have used an estimate value of $8,500 per share. However, the amount of shares remaining in the hands of individual farmers (rather than municipalities) is not large and prices will increase.

Colorado Canal/Lake Meredith paired shares have in recent years been sold in the range of $2,000 to $2,500 per share. Our understanding is that the current value of said shares is around $2,500 per share which was used for the purposes of this analysis.

VIII. WATER SUPPLY ANALYSIS

The water supply analysis consisted of evaluating three sources of providing additional water supplies to PWMD:

- Use the non-tributary Dakota/Purgatoire Formation wells
- Acquiring additional shares of Twin Lakes water
- Acquiring additional shares of Colorado Canal/Lake Meredith water

For each of these sources, analysis included evaluation of both average and dry year conditions as well as optimistic and conservative Part B yield estimates. A discussion of each of the proposed additional water supply sources and results is presented in the following sections.

In addition to the above analysis, the use of additional raw water storage was examined in order to increase the overall dry year yield of the additional water sources. This evaluation considered possible reservoir storage at or near Pueblo Reservoir and at Lake Meredith. Additional reservoir storage further upstream of Pueblo Reservoir would be beneficial to PWMD only if a) said storage could directly store releases from Twin Lakes reservoir and additional well pumping was used, or b) if PWMD were to file for the right to exchange water from Pueblo Reservoir to an upstream reservoir. The availability of additional exchange capacity considering all of the senior exchanges upstream of Pueblo Reservoir is currently unknown. In addition, a suitable and feasible storage site for re-regulating Twin Lakes releases is not currently known. Therefore, for the purposes of this study, additional raw water storage further upstream of Pueblo Reservoir was not evaluated and a study of senior exchanges upstream of Pueblo Reservoir is not recommended at this time.

A. USE OF NON-TRIBUTARY DAKOTA/PURGATOIRE FORMATION WELLS (SCENARIO 1)

We understand that water produced from some of these wells is high in total dissolved solids (TDS). Therefore, we have assumed that water from these wells could not be discharged directly into the water distribution system. Therefore, for this water source, we have assumed that a well water collection system would be constructed to pipe all well water to the District's current water treatment plant for mixing with low TDS water. The cost to construct such a system is estimated to be around $5.2 million.

Presented in Tables - 4 through - 7 are the results of the yield analysis using only the Dakota/Purgatoire Formation wells as an additional water source.

B. ACQUISITION OF ADDITIONAL SHARES OF TWIN LAKES WATER (SCENARIO 2)

Presented in Tables - 8 through - 11are the results of the yield analysis using additional shares of Twin Lakes water. The analysis shows that acquisition of additional Twin Lakes shares alone will not meet the dry year demands of the PWMD within reasonable cost constraints. Therefore, pumping of the Dakota/Purgatoire Formation wells is included in the dry year analysis.

C. ACQUISITION OF ADDITIONAL COLORADO CANAL/LAKE MEREDITH PAIRED SHARES (SCENARIO 3)

Presented in Tables - 12 through - 15 are the results of the yield analysis using additional Colorado Canal/Lake Meredith paired shares. The analysis shows that

acquisition of additional Colorado Canal/Lake Meredith shares alone nor with additional well pumping will not meet the PWMD's dry year demands.

D. WELL PUMPING AND ADDITIONAL STORAGE (SCENARIO 4A)

Presented in Table - 16 is the results of the yield analysis assuming reservoir storage is used to augment dry-year requirements assuming well use only. Reservoir storage is assumed to cost $2,800/A.F.

E. ADDITIONAL TWIN LAKES SHARES AND ADDITIONAL STORAGE (SCENARIO 4B)

Presented in Table - 17 is the results of the yield analysis assuming reservoir storage is used to augment dry-year requirements assuming only acquisition of additional Twin Lake shares.

F. ADDITIONAL COLORADO CANAL/LAKE MEREDITH SHARES, ADDITIONAL STORAGE, AND WELL PUMPING (SCENARIO 4C)

Presented in Table - 18 is the results of the yield analysis assuming reservoir storage is used to augment dry-year requirements assuming acquisition of additional Colorado Canal/Lake Meredith Shares as well as pumping of PWMD's Dakota and Purgatoire Formation wells.

G. ANALYSIS DISCUSSION

A review of this analysis points out several factors critical to a decision regarding purchase of Twin Lakes and/or Colorado Canal Company Shares. These factors are as follows:

1. The yield of Twin Lakes shares is significantly more consistent than that of Colorado Canal/Lake Meredith shares. Therefore, more storage space is needed for use of Colorado Canal/Lake Meredith shares to provide an equivalent "firm" yield.

2. The Dakota and Purgatoire Formation wells should not be used for a continuous water supply until data is obtained to determine the potential for significant changes in aquifer levels due to increased pumping of these wells. The wells, however, can provide a significant benefit to reduce risks of lessened water supplies in a single or multiple year dry cycles.

3. A mixture of water supply sources lessens the risk of using only a single water source.

4. The current estimated cost per acre-foot of average annual yield of totally consumable water from Twin Lakes ($10,120) is significantly higher than that of Colorado Canal/Lake Meredith water ($5,320). However, Twin Lakes shares do provide single use (native) water in addition to the totally consumable (transmountain) water.

5. The physical, legal, and administrative system needed to fully use Colorado Canal/Lake Meredith water is significantly more complicated and contains more unknowns than that using Twin Lakes water.

6. Siting of a reservoir near Pueblo West or acquisition for use of additional Pueblo Reservoir storage space has not been completed nor is its feasibility currently known. Therefore, there is currently more risk involved in the

planning stages in relying on the need for these storage spaces than for systems that do not need additional storage space.

Considering these factors, the following water supply options could be used to meet both average and dry year demands at PWMD:

Option 1: Use Dakota/Purgatoire Wells and Acquire Additional Twin Lakes Shares (Scenario 2D, Table - 11)

Requirements:	Well Collection System	$ 5.2 M
	3778 Shares Twin Lakes	$32.4 M
	Total Estimated Capital Cost	$37.6 M

Operation in Average Year - No well pumping
Operation in Dry Year - Pump 1709 A.F. from wells

Option 2: Use Dakota/Purgatoire Wells and Acquire Raw Water Storage (Scenario 4A, Table - 16)

Requirements:	Well Collection System	$ 5.2 M
	3334 A.F. Storage Reservoir/Space	$ 9.4 M
	Total Estimated Capital Cost	$14.6 M

Operation in Average Year: Pump wells at 788 A.F./Year and fill storage reservoir/space
Operation in Dry Year: Pump wells at 1709 A.F./Year and release stored water

Option 3: Acquire Additional Twin Lakes Shares and Raw Water Storage (Scenario 4B, Table - 17)

Requirements:	2342 Shares Twin Lakes	$ 19.9 M
	4690 A.F. Storage Reservoir/Space	$ 13.2 M
	Total Estimated Capital Cost	$ 33.1 M

Operation in Average Year: Fill storage reservoir/space
Operation in Dry Year: Release stored water

Option 4: Use Dakota/Purgatoire Wells and Acquire Additional Colorado Canal/Lake Meredith Shares and Raw Water Storage (Scenario 4C, Table -18)

Requirements:	1791 Shares Colorado Canal/Lake Meredith	$ 4.5 M
	Well Collection System	$ 5.2 M
	3306 A.F. Storage Reservoir/Space	$ 9.9 M
	Total Estimated Capital Cost	$19.6 M

Operation in Average Year: Fill storage reservoir/space
Operation in Dry Year: Pump wells at 1709 A.F./Year and release stored water

Based upon the current information, Option 4 appears to be the best alternative given that its estimated cost is $13.5 million less than alternatives using additional Twin Lakes shares. Option 2 is not recommended at this time since it requires continuous pumping of the Dakota/Purgatoire Formation wells.

Further investigation is necessary of Option 4 before the final cost, the final number of shares, and the final storage space required for this option can be determined at a higher level of certainty. However, the level of certainty examined in this study does allow a recommendation for future acquisition of Colorado Canal/Lake Meredith shares in lieu of Twin Lakes Shares.

IX. RECOMMENDATION FOR WATER RIGHTS SUPPLIED BY INCLUSIONS

The PWMD currently does not have adequate water supply's to meet projected water demands at full buildout. Therefore, a condition of inclusion of developable property into PWMD should require the includer to purchase water rights to be conveyed to PWMD which, through PWMD's water supply system, are adequate to fully meet the water demands of the including property. The previous analysis has recommended that Colorado Canal/Lake Meredith shares be acquired to meet the PWMD's future demands. However, for inclusions, the PWMD should require the includer to provide water rights which give the same level of service as is currently enjoyed by the PWMD's residents. Since the current system is almost exclusively served by Twin Lakes water, Twin Lakes shares based on a dry year yield would be a reasonable requirement. If the PWMD desires to provide the includer an option of providing Colorado Canal/Lake Meredith shares, then issues in addition to the quantity of shares to purchase should be considered as follows:

1. In order to fully use Colorado Canal/Lake Meredith water and firm up its yield, raw water storage at or near Pueblo Reservoir is required. A proportionate cost of such a reservoir should be factored into and charged to the includer. 56.7 * 2500 per share

2. Currently, greater risks exist for use of Colorado Canal/Lake Meredith water versus Twin Lakes water due to the need to exchange said water in order to use it at PWMD and the current lack of a firm raw water storage location near PWMD. An additional "cost of risk" should be factored into and charged to the includer.

The rational for these two recommendations is that without upstream storage, the PWMD could loss 50% or more of the Colorado Canal/Lake Meredith yield to evaporation in Lake Meredith. Also, until PWMD obtains a significantly greater share of the total Colorado Canal/Lake Meredith water rights, PWMD will have less control over when Colorado Canal/Lake Meredith water can be diverted and exchanged.

In the long term, PWMD's ownership of a larger share of the Colorado Canal/Lake Meredith water rights and a firm raw water storage location will allow PWMD the flexibility to more fully use said water with reduced risks and loss of raw water. It is the future reduced risks and the current high cost of Twin Lakes water which with give PWMD added value in pursuing future purchases` of Colorado Canal/Lake Meredith shares.

As always, if you have any questions or comments, please do not hesitate to call.

Respectfully Submitted,

WRC ENGINEERING, INC.

Alan J. Leak, P.E.
Project Manager

ajl/jlb

Enclosures: As stated

cc: Rich Hayes
Robert Krassa
Tom Mullans
Ralph Adkins

TABLE-1

TWIN LAKES ACCOUNTING (TOTAL DIVERSIONS IN ACRE-FEET)

NATIVE (ARKANSAS) WATER

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											571	881		
1990	698	540	250	0	535	0	0	74	0	0	270	780	3147	3549
1991	328	382	441	0	0	0	0	0	0	0	251	123	1525	2201
1992	48	43	822	0	0	0	0	0	0	0	695	297	1905	1287
1993	192	113	674	0	2576	6282	0	0	0	0	612	703	11152	10829
1994	673	500	221	0	9764	9909	0	0	0	0	479	824	22370	22382
1995	583	499	296	1805	2020	27788	2122	89	0	0	645	1229	37076	36505
1996	810	630	271	0	1505	635	0	0	0	0	721	1065	5637	5725
1997	815	560	783	0	0	11563	38	1370	0	262	1147	921	17459	17177
1998	842	675	1144	781	1449	2502	0	431					7824	
TOTAL	4989	3942	4902	2586	17849	58679	2160	1964	0	262	4820	5942	108095	99655
AVERAGE	554	438	545	287	1983	6520	240	218	0	33	603	743	12164	12457

TRANSMOUNTAIN (COLORADO) WATER

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											86	91		
1990	80	63	59	56	6403	26857	7202	274	67	206	534	206	42007	41444
1991	201	102	79	260	7876	23994	7494	1192	703	131	291	326	42649	42772
1992	80	108	110	705	13270	17302	8755	402	31	42	262	207	41274	41422
1993	104	95	75	68	10009	28927	16937	3583	1863	567	573	450	63251	62697
1994	320	192	71	922	11685	19021	3566	11	11	312	216	98	36425	37134
1995	21	22	30	165	1416	15494	0	8460	2678	1239	726	531	30782	29839
1996	158	93	92	326	14812	13419	1008	365	13	1582	38	31	31937	33125
1997	10	4	10	157	10658	9145	7199	398	938	1131	596	326	30572	29719
1998	117	40	32	20	8373	18150	14430	2859					44021	
TOTAL	1091	719	558	2679	84592	172309	66591	17544	6304	5210	3236	2175	362918	318152
AVERAGE	121	80	62	298	9389	19145	7399	1949	788	651	405	272	40559	39769

TRANSMOUNTAIN (COLORADO) WATER (USBR EXCHANGE)*

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											165	175		
1990	175	154	168	147	166	109	117	201	202	255	165	175	2034	2034
1991	175	154	168	147	166	109	117	201	202	255	165	175	2034	2034
1992	175	154	168	147	166	109	117	201	202	255	177	183	2054	2034
1993	183	165	179	177	101	182	159	376	373	295	106	136	2432	2550
1994	132	95	100	0	189	187	107	0	0	378	177	183	1548	1430
1995	183	161	178	172	154	74	0	271	390	324	177	183	2267	2267
1996	183	171	183	177	183	0	114	83	0	94	177	183	1548	1548
1997	183	165	183	177	183	28	118	71	248	183	177	183	1899	1899
1998	183	165	183	177	183	183	205	403					1682	
TOTAL	1572	1384	1510	1321	1491	981	1054	1807	1617	2039	1321	1401	17498	15796
AVERAGE	175	154	168	147	166	109	117	201	202	255	165	175	2033	1975

TOTAL ALL SOURCES

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989	#VALUE!	0	0	0	0	0	0	0	0	0	822	1147	0	0
1990	953	757	477	203	7104	26966	7319	549	269	461	969	1161	47188	47027
1991	704	638	688	407	8042	24103	7611	1393	905	386	707	624	46208	47007
1992	303	305	1100	852	13436	17411	8872	603	233	297	1134	687	45233	44743
1993	479	373	928	245	12686	35391	17096	3959	2236	862	1291	1289	76835	76076
1994	1125	787	392	922	21638	29117	3673	11	11	690	872	1105	60343	60946
1995	787	682	504	2142	3590	43356	2122	8820	3068	1563	1548	1943	70125	68611
1996	1151	894	546	503	16500	14054	1122	448	13	1676	936	1279	39122	40398
1997	1008	729	976	334	10841	20736	7355	1839	1186	1576	1920	1430	49930	48795
1998	1142	880	1359	978	10005	20835	14635	3693	0	0	0	0	53527	
TOTAL	7652	6045	6970	6586	103842	231969	69805	21315	7921	7511	9377	9518	488511	433603
AVERAGE	850	672	774	732	11538	25774	7756	2368	990	939	1172	1190	54756	54200

*NOTE: RECORDS OF USBR EXCHANGES NOT AVAILABLE FOR NOV. 1989 TO OCT. 1992. THEREFORE, AVERAGE VALUES FOR REMAINING YEARS WERE USED IN THESE YEARS.

TABLE-2

TWIN LAKES ACCOUNTING (TOTAL DIVERSIONS PER SHARE IN ACRE-FEET)

NATIVE (ARKANSAS) WATER

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											0.012	0.018		
1990	0.014	0.011	0.005	0.000	0.011	0.000	0.000	0.001	0.000	0.000	0.005	0.016	0.063	0.072
1991	0.007	0.008	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.002	0.031	0.044
1992	0.001	0.001	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.014	0.006	0.038	0.026
1993	0.004	0.002	0.014	0.000	0.052	0.127	0.000	0.000	0.000	0.000	0.012	0.014	0.225	0.218
1994	0.014	0.010	0.004	0.000	0.197	0.200	0.000	0.000	0.000	0.000	0.010	0.017	0.451	0.451
1995	0.012	0.010	0.006	0.036	0.041	0.560	0.043	0.002	0.000	0.000	0.013	0.025	0.748	0.736
1996	0.016	0.013	0.005	0.000	0.030	0.013	0.000	0.000	0.000	0.000	0.015	0.021	0.114	0.115
1997	0.016	0.011	0.016	0.000	0.000	0.233	0.001	0.028	0.000	0.005	0.023	0.019	0.352	0.346
1998	0.017	0.014	0.023	0.016	0.029	0.050	0.000	0.009					0.158	
TOTAL	0.101	0.079	0.099	0.052	0.360	1.183	0.044	0.040	0.000	0.005	0.097	0.120	2.180	2.010
AVERAGE	0.011	0.009	0.011	0.006	0.040	0.131	0.005	0.004	0.000	0.001	0.012	0.015	0.245	0.251

TRANSMOUNTAIN (COLORADO) WATER

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											0.002	0.002		
1990	0.002	0.001	0.001	0.001	0.129	0.542	0.145	0.006	0.001	0.004	0.011	0.004	0.847	0.836
1991	0.004	0.002	0.002	0.005	0.159	0.484	0.151	0.024	0.014	0.003	0.006	0.007	0.860	0.863
1992	0.002	0.002	0.002	0.014	0.268	0.349	0.177	0.008	0.001	0.001	0.005	0.004	0.832	0.835
1993	0.002	0.002	0.002	0.001	0.202	0.583	0.342	0.072	0.038	0.011	0.012	0.009	1.276	1.264
1994	0.006	0.004	0.001	0.019	0.236	0.384	0.072	0.000	0.000	0.006	0.004	0.002	0.735	0.749
1995	0.000	0.000	0.001	0.003	0.029	0.312	0.000	0.171	0.054	0.025	0.015	0.011	0.621	0.602
1996	0.003	0.002	0.002	0.007	0.299	0.271	0.020	0.007	0.000	0.032	0.001	0.001	0.644	0.668
1997	0.000	0.000	0.000	0.003	0.215	0.184	0.145	0.008	0.019	0.023	0.012	0.007	0.617	0.599
1998	0.002	0.001	0.001	0.000	0.169	0.366	0.291	0.058					0.888	
TOTAL	0.022	0.014	0.011	0.054	1.704	3.475	1.343	0.354	0.127	0.105	0.065	0.044	7.319	6.416
AVERAGE	0.002	0.002	0.001	0.006	0.189	0.386	0.149	0.039	0.016	0.013	0.008	0.005	0.818	0.802

TRANSMOUNTAIN (COLORADO) WATER (USBR EXCHANGE)*

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											0.003	0.004		
1990	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.004	0.004	0.005	0.003	0.004	0.041	0.041
1991	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.004	0.004	0.005	0.003	0.004	0.041	0.041
1992	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.004	0.004	0.005	0.004	0.004	0.041	0.041
1993	0.004	0.003	0.004	0.004	0.002	0.004	0.003	0.008	0.008	0.006	0.002	0.003	0.049	0.051
1994	0.003	0.002	0.002	0.000	0.004	0.004	0.002	0.000	0.000	0.008	0.004	0.004	0.031	0.029
1995	0.004	0.003	0.004	0.003	0.003	0.001	0.000	0.005	0.008	0.007	0.004	0.004	0.046	0.046
1996	0.004	0.003	0.004	0.004	0.004	0.000	0.002	0.002	0.000	0.002	0.004	0.004	0.031	0.031
1997	0.004	0.003	0.004	0.004	0.004	0.001	0.002	0.001	0.005	0.004	0.004	0.004	0.038	0.038
1998	0.004	0.003	0.004	0.004	0.004	0.004	0.004	0.008					0.034	
TOTAL	0.032	0.028	0.030	0.027	0.030	0.020	0.021	0.036	0.033	0.041	0.027	0.028	0.353	0.319
AVERAGE	0.004	0.003	0.003	0.003	0.003	0.002	0.002	0.004	0.004	0.005	0.003	0.004	0.041	0.040

TOTAL ALL SOURCES

YEAR	JAN.	FEB.	MAR.	APR.	MAY	MONTH JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	TOTAL	WATER YEAR TOTAL
1989											0.017	0.023		
1990	0.019	0.015	0.010	0.004	0.143	0.544	0.148	0.011	0.005	0.009	0.020	0.023	0.952	0.948
1991	0.014	0.013	0.014	0.008	0.162	0.486	0.153	0.028	0.018	0.008	0.014	0.013	0.932	0.948
1992	0.006	0.006	0.022	0.017	0.271	0.351	0.179	0.012	0.005	0.006	0.023	0.014	0.912	0.902
1993	0.010	0.008	0.019	0.005	0.256	0.714	0.345	0.080	0.045	0.017	0.026	0.026	1.549	1.534
1994	0.023	0.016	0.008	0.019	0.436	0.587	0.074	0.000	0.000	0.014	0.018	0.022	1.217	1.229
1995	0.016	0.014	0.010	0.043	0.072	0.874	0.043	0.178	0.062	0.032	0.031	0.039	1.414	1.384
1996	0.023	0.018	0.011	0.010	0.333	0.283	0.023	0.009	0.000	0.034	0.019	0.026	0.789	0.815
1997	0.020	0.015	0.020	0.007	0.219	0.418	0.148	0.037	0.024	0.032	0.039	0.029	1.007	0.984
1998	0.023	0.018	0.027	0.020	0.202	0.420	0.295	0.074					1.079	
TOTAL	0.154	0.122	0.141	0.133	2.094	4.678	1.408	0.430	0.160	0.151	0.189	0.192	9.851	8.744
AVERAGE	0.017	0.014	0.016	0.015	0.233	0.520	0.156	0.048	0.020	0.019	0.024	0.024	1.104	1.093

*NOTE: RECORDS OF USBR EXCHANGES NOT AVAILABLE FOR NOV. 1989 TO OCT. 1992. THEREFORE, AVERAGE VALUES FOR REMAINING YEARS WERE USED IN THESE YEARS.

TABLE-3
COLORADO CANAL / LAKE MEREDITH ACCOUNTING

COLORADO CANAL RETURN FLOW CALCULATIONS

YEAR	C.C. DIVS. (AF)	C.C. DIVS./SHARE (AF)	L. M. DIVS. (AF)	L. M. DIVS./SHAR (AF)	C.C. CONSUMABLE WATER PER SHARE (AF)	L.M. CONSUMABLE WATER PER SHARE (AF)	TOTAL C.C / L.M CONSUMABLE WATER PER SHARE (AF)
1954	4995	0.101	0	0.000	0.031	-0.046	-0.015
1955	19354	0.390	0	0.000	0.263	-0.029	0.233
1956	5307	0.107	0	0.000	0.054	-0.017	0.036
1957	78588	1.583	9015	0.222	1.186	0.115	1.300
1958	35426	0.714	24813	0.611	0.491	0.309	0.800
1959	8689	0.175	13641	0.336	0.084	0.153	0.237
1960	19908	0.401	35259	0.868	0.265	0.425	0.690
1961	22693	0.457	9131	0.225	0.322	0.079	0.401
1962	36546	0.736	32411	0.798	0.535	0.386	0.921
1963	6556	0.132	4200	0.103	0.067	0.017	0.084
1964	2126	0.043	0	0.000	0.010	-0.020	-0.010
1965	63445	1.278	28791	0.709	0.953	0.353	1.306
1966	11570	0.233	0	0.000	0.140	-0.020	0.120
1967	14575	0.294	0	0.000	0.192	-0.013	0.179
1968	22561	0.455	5758	0.142	0.315	0.064	0.379
1969	37325	0.752	23646	0.582	0.548	0.297	0.845
1970	32698	0.659	8174	0.201	0.466	0.086	0.552
1971	8743	0.176	20063	0.494	0.096	0.237	0.333
1972	3764	0.076	11829	0.291	0.031	0.126	0.157
1973	34088	0.687	36753	0.905	0.505	0.448	0.953
1974	3656	0.074	16516	0.407	0.034	0.174	0.208
1975	12278	0.247	1714	0.042	0.172	-0.009	0.163
1976	3453	0.070	7736	0.190	0.036	0.078	0.113
1977	659	0.013	4950	0.122	0.003	0.052	0.055
1978	10995	0.221	0	0.000	0.163	-0.007	0.155
1979	34231	0.690	4630	0.114	0.514	0.054	0.568
1980	45982	0.926	25927	0.638	0.678	0.325	1.003
1981	9988	0.201	12980	0.320	0.112	0.146	0.258
1982	32929	0.663	17887	0.440	0.470	0.206	0.676
1983	56935	1.147	52807	1.300	0.834	0.645	1.479
TOTAL	680063	13.700	408631	10.059	9.568	4.611	14.179
AVERAGE	22669	0.457	13621	0.335	0.319	0.154	0.473

TABLE-4

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 1A: AVERAGE YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4232
		NATIVE	1257
		TOTAL	5489
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1146
		U/S PUEBLO RES.	900
		D/S PUEBLO RES.	1471
		FOUNTAIN CREEK	245
		TOTAL	3763
	DAKOTA WELLS:		84
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	124
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$5,200,000

TABLE-5

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 1B: AVERAGE YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4232
		NATIVE	1257
		TOTAL	5489
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1146
		U/S PUEBLO RES.	655
		D/S PUEBLO RES.	1103
		FOUNTAIN CREEK	163
		TOTAL	3067
	DAKOTA WELLS:		780
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	124
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$5,200,000

TABLE-6

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 1C: DRY YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1277
		U/S PUEBLO RES.	1003
		D/S PUEBLO RES.	1640
		FOUNTAIN CREEK	273
		TOTAL	4194
	DAKOTA WELLS:		2610
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$5,200,000

TABLE-7

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 1D: DRY YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1277
		U/S PUEBLO RES.	730
		D/S PUEBLO RES.	1230
		FOUNTAIN CREEK	182
		TOTAL	3419
	DAKOTA WELLS:		3385
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$5,200,000

TABLE-8

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 2A: AVERAGE YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4304
		NATIVE	1278
		TOTAL	5583
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1143
		U/S PUEBLO RES.	898
		D/S PUEBLO RES.	1468
		FOUNTAIN CREEK	245
		TOTAL	3754
	DAKOTA WELLS:		0
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	124
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	98
	2. COST TO PURCHASE (AT $8500/SHARE):	$833,000
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$6,033,000

TABLE-9

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 2B: AVERAGE YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4891
		NATIVE	1453
		TOTAL	6344
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1118
		U/S PUEBLO RES.	639
		D/S PUEBLO RES.	1077
		FOUNTAIN CREEK	159
		TOTAL	2993
	DAKOTA WELLS:		0
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	124
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	898
	2. COST TO PURCHASE (AT $8500/SHARE):	$7,633,000
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$12,833,000

TABLE-10

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 2C: DRY YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	3152
		NATIVE	479
		TOTAL	3631
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1258
		U/S PUEBLO RES.	989
		D/S PUEBLO RES.	1616
		FOUNTAIN CREEK	270
		TOTAL	4133
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	2076
	2. COST TO PURCHASE (AT $8500/SHARE):	$17,646,000
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$22,846,000

TABLE-11

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 2D: DRY YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	3849
		NATIVE	585
		TOTAL	4435
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1244
		U/S PUEBLO RES.	711
		D/S PUEBLO RES.	1198
		FOUNTAIN CREEK	177
		TOTAL	3330
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	3812
	2. COST TO PURCHASE (AT $8500/SHARE):	$32,402,000
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$37,602,000

TABLE-12

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 3A: AVERAGE YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4232
		NATIVE	1257
		TOTAL	5489
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1146
		U/S PUEBLO RES.	900
		D/S PUEBLO RES.	1471
		FOUNTAIN CREEK	245
		TOTAL	3763
	DAKOTA WELLS:		0
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	208
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	179
	4. COST TO PURCHASE (AT $2500/SHARE):	$447,500
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$5,647,500

TABLE-13

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 3B: AVERAGE YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	4232
		NATIVE	1257
		TOTAL	5489
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1146
		U/S PUEBLO RES.	655
		D/S PUEBLO RES.	1103
		FOUNTAIN CREEK	163
		TOTAL	3067
	DAKOTA WELLS:		0
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	903
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	1659
	4. COST TO PURCHASE (AT $2500/SHARE):	$4,147,500
	5. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$9,347,500

TABLE-14

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 3C: DRY YEAR - OPTIMISTIC

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1272
		U/S PUEBLO RES.	999
		D/S PUEBLO RES.	1633
		FOUNTAIN CREEK	272
		TOTAL	4176
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		8542

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. NOT FEASIBLE	$0
	TOTAL COST	$0

TABLE-15

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 3D: DRY YEAR - CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	0
	REUSE WATER:	WWTF RETURNS	1274
		U/S PUEBLO RES.	728
		D/S PUEBLO RES.	1227
		FOUNTAIN CREEK	182
		TOTAL	3412
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	TOTAL SUPPLY:		7777

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. NOT FEASIBLE	$0
	TOTAL COST	$0

TABLE-16

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 4A1: 2-YR CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	14
	REUSE WATER:	WWTF RETURNS	1274
		U/S PUEBLO RES.	728
		D/S PUEBLO RES.	1227
		FOUNTAIN CREEK	182
		TOTAL	3412
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	STORAGE RELEASE:		1683
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. STORAGE REQUIRED (ACRE FOOT):	3366
	6. STORAGE COST (AT $2800/ACRE FOOT)	$9,424,800
	7. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$14,624,800

TABLE-17

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 4B1: 2 -YR CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	3258
		NATIVE	496
		TOTAL	3754
	WHEEL RANCH DITCH:		
		NATIVE	14
	REUSE WATER:	WWTF RETURNS	1254
		U/S PUEBLO RES.	717
		D/S PUEBLO RES.	1208
		FOUNTAIN CREEK	179
		TOTAL	3358
	DAKOTA WELLS:		0
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-13
	STORAGE RELEASE:		2361
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	2342
	2. COST TO PURCHASE (AT $8500/SHARE):	$19,907,000
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	0
	4. COST TO PURCHASE (AT $2500/SHARE):	$0
	5. STORAGE REQUIRED (ACRE FOOT):	4722
	6. STORAGE COST (AT $2800/ACRE FOOT)	$13,221,600
	7. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$38,328,600

TABLE-18

PUEBLO WEST METROPOLITAN DISTRICT
FUTURE WATER RIGHTS ANALYSIS
SCENARIO 4C1: 2- YR CONSERVATIVE

			(A. F.)
TOTAL ANNUAL WATER DEMAND			9460
SOURCES:	TWIN LAKES:	TRANSMOUTAIN	2317
		NATIVE	352
		TOTAL	2670
	WHEEL RANCH DITCH:		
		NATIVE	29
	REUSE WATER:	WWTF RETURNS	1273
		U/S PUEBLO RES.	728
		D/S PUEBLO RES.	1226
		FOUNTAIN CREEK	181
		TOTAL	3408
	DAKOTA WELLS:		1709
	COLORADO CANAL / LAKE MEREDITH:		
		REUSABLE	-103
	STORAGE RELEASES:		1776
	TOTAL SUPPLY:		9460

NOTES:	1. NUMBER OF TWIN LAKES SHARES TO PURCHACE:	0
	2. COST TO PURCHASE (AT $8500/SHARE):	$0
	3. COLO. CANAL / LAKE MER. SHARES TO PURCHASE:	1791
	4. COST TO PURCHASE (AT $2500/SHARE):	$4,477,500
	5. STORAGE REQUIRED (ACRE FOOT):	3552
	6. STORAGE COST (AT $2800/ACRE FOOT)	$9,945,600
	7. WELL COLLECTION SYSTEM	$5,200,000
	TOTAL COST	$19,623,100

APPENDIX B – CWCB TECHNICAL UPDATE 2019
EXECUTIVE SUMMARY

ANALYSIS & TECHNICAL UPDATE TO THE

COLORADO WATER PLAN

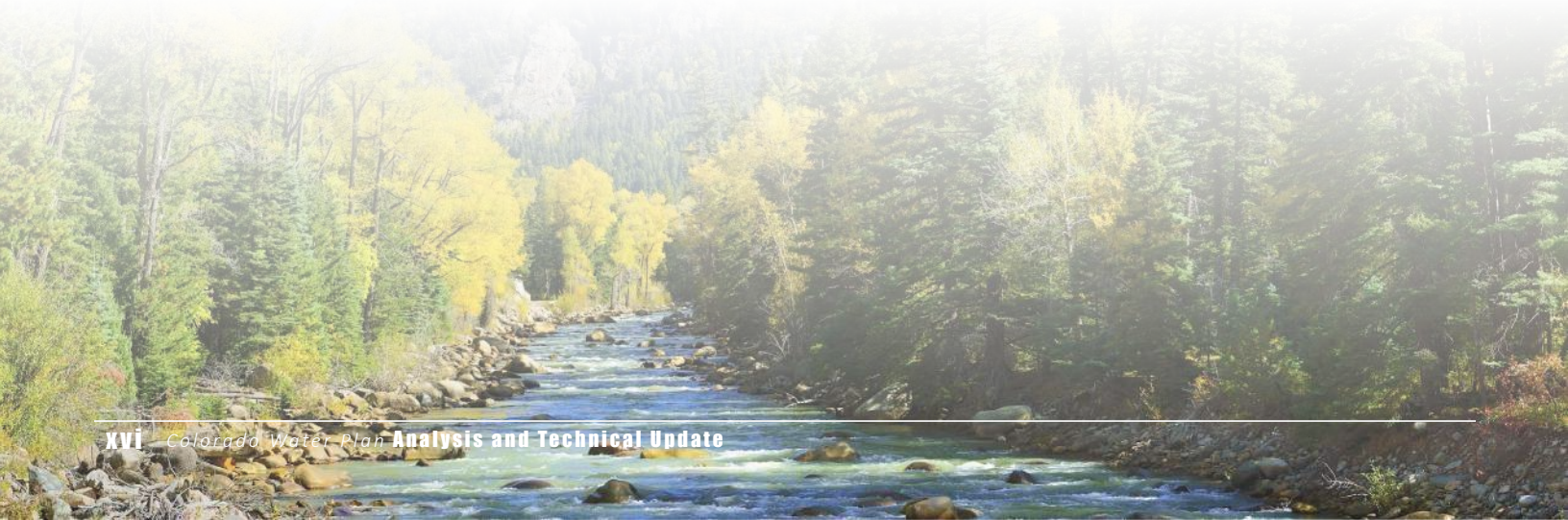
Clean and reliable water supplies are essential to our way of life. All of us—agricultural producers, urbanites, environmentalists, and recreationalists—depend on it for quality of life, a vibrant economy, and a healthy environment. These are the reasons we call Colorado home, the qualities that attract new Colorado residents, and the drivers of the Colorado Water Plan.

Colorado's water supplies are highly variable, and our demands are growing. Throughout Colorado's history, and increasingly in recent decades, we have experienced severe drought conditions, extreme flooding events, population booms, and economic recessions. These extremes often reflect larger shifts that highlight the importance of resilience in our water supplies and thoughtful, collaborative planning—the heart of the Colorado Water Plan (Water Plan).

The Water Plan provides a framework for developing resilient responses to our water-related challenges. It articulates a vision for collaborative and balanced water solutions led by the Colorado Water Conservation Board (CWCB) and our grassroots basin roundtable structure. This vision recognizes the evolving nature of water resource planning and implementation.

Following the launch of the Water Plan and Basin Implementation Plans (BIP) in 2015, the CWCB initiated the process of updating the underlying water supply and demand analyses in 2016, culminating in this report. The work began with the input of Technical Advisory Groups (TAG)—a group of representatives from across the state who provided expertise and advice on methods for the next phase of analysis. The resulting "Technical Update" (formerly known as the Statewide Water Supply Initiative or SWSI) establishes a new approach to statewide water analysis and data sharing.

The Technical Update and its related insights and tools build on a nearly 15-year legacy of CWCB water supply planning initiatives that began with the first SWSI in 2004. It also leverages a 27-year investment in statewide water modeling efforts, which began in 1992. To that end, this Technical Update provides a significant improvement in the scope, science, and approach to water supply planning (in SWSI I, SWSI II, and SWSI 2010). This approach positions Colorado for a streamlined and robust evaluation of its future water needs.



1 CHANGES IN THE APPROACH

The Colorado Water Plan set an adaptive management framework for future water planning activities and described five planning scenarios under which demands, supplies, and gaps were to be estimated. The scenarios included new considerations, such as climate change, that were not a part of prior SWSIs. In addition, the CWCB has continued to work with the Division of Water Resources to develop and refine consumptive use and surface water allocation models that were not ready for use in earlier analyses. As a result of these factors, the Technical Update takes a different and more robust approach to estimating future gaps.

The new methodology provides basin roundtables with datasets and tools that can be used to develop enhanced implementation strategies to meet Colorado's water needs.

New Analysis Needs

The Technical Update estimates future available water supplies and gaps under the five planning scenarios described in the Water Plan. Previous SWSIs were conducted prior to the Water Plan and, therefore, did not consider the scenarios. The scenarios incorporate water supply and demand drivers associated with the potential effects of climate change, population growth, and other factors.

New Planning Process

In their BIPs, the basin roundtables cataloged various projects and methods to mitigate future water supply gaps. The Technical Update focuses on developing tools and more detailed datasets to help basin roundtables update their portfolios of projects and methods for meeting future water needs in a targeted manner, with forthcoming updates to their BIPs.

New Models and Data Sets

New analysis tools and datasets have been developed since SWSI 2010. Consumptive use and surface water allocation models developed through Colorado's Decision Support Systems (CDSS) are now available in most river basins. The CDSS tools allow the evaluation of water availability gaps under a variety of hydrologic conditions. Municipal water demand and conservation data are available via HB10-1051 reporting. The availability of these new tools and datasets allows for a more robust approach to assessing future water availability and potential gaps.

REFINED OBJECTIVES

Given the new planning concepts described above, the overall objectives of the Technical Update are to:

1. **Update** and **recharacterize** future gaps
2. **Evaluate** environmental and recreational issues with new tools
3. **Create** user-friendly standardized tools, basin datasets, and information

2 NEW METHODS

The CWCB undertook a collaborative approach to developing methodologies for the Technical Update through the use of TAGs. Four TAGs were formed that provided input on scenario quantification, agricultural demands, municipal and industrial (M&I) demands, and environment and recreational tools (E&R). TAG participants included water stakeholders, subject matter experts, and basin roundtable members from each basin across the state.

New Features and Improved Data

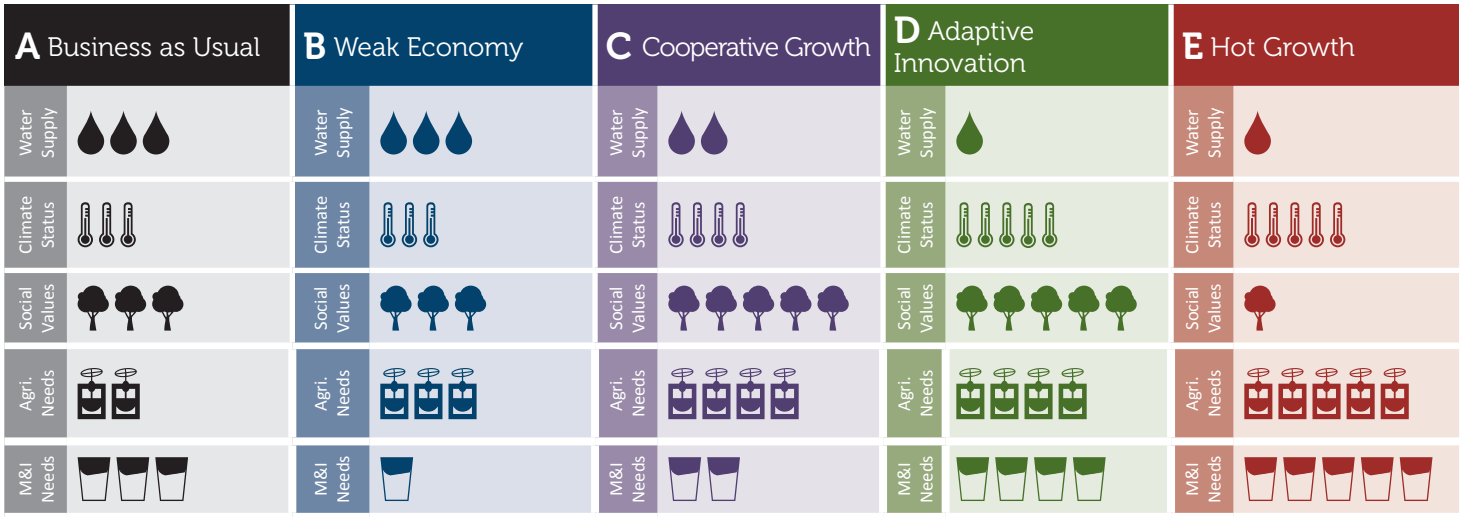
Section 2 of the Technical Update (Volume 1) summarizes the methodologies used to estimate current and future municipal and industrial (M&) and agricultural demands, water supplies and potential gaps, and tools for evaluating environment and recreation needs. Technical memoranda (see Volume 2) provide additional details.

The methodologies used for the Technical Update built on previous datasets and new and improved data sources and, to the extent possible, leveraged Colorado's investment in models developed through CDSS. Highlights of the new methodologies are described below.

Incorporation of scenario planning: Scenario planning is a new feature of the Technical Update and forms the context under which specific methodologies were developed. The five scenarios used come directly from the Colorado Water Plan (also shown on the following page).

- **"1051" water usage data:** New data describing recent municipal water usage was employed to estimate municipal water demands. The data are collected and reported by water providers pursuant to House Bill 2010-1051 ("1051"), which requires that the CWCB implement a process for reporting water use and conservation data by covered entities. This type of data was not available in prior SWSI efforts.
- **CDSS Tools:** The technical analyses made extensive use of modeling tools available through CDSS. CDSS is a water management system developed by the CWCB and the Division of Water Resources for each of Colorado's major water basins. Tools in CDSS include Hydrobase (a vast database of statewide water-related data), GIS data, surface water allocation models, and models that quantify consumptive use from crops and other vegetation. CDSS tools are available in most basins in the state. In basins where particular CDSS tools are not available, alternative methodologies were used to estimate demands and potential future gaps.
- **Consideration of climate change:** Three of the five planning scenarios include assumptions related to a hotter and drier future climate. Projections of future climate conditions were not a part of SWSI 2010 and can have a significant influence on hydrology, water use, and estimated gaps.
- **Quantification of an agricultural gap:** Water demands and shortages for irrigated crops at the field level were estimated in SWSI 2010, but were not quantified using surface water modeling. Using the full suite of modeling tools available from CDSS made it possible to estimate agricultural gaps in the Technical Update under current and planning scenario conditions. Agricultural gaps are described in two ways:
  - » *1. Total Gap:* The overall shortage of agricultural water supplies to meet diversion demands required to provide full crop consumptive uses.
  - » *2. Incremental Gap:* The degree to which the gap could increase beyond what agriculture has historically experienced under water shortage conditions.
- **Improved environment and recreation tools:** The Technical Update built on prior SWSI efforts and improved the data associated with environment and recreation attributes statewide. In addition, an Environment and Recreation (E&R) Flow Tool (Flow Tool) was developed to help assess potential flow conditions and associated ecological health in river segments in each basin. The Flow Tool was built on the framework of the Watershed Flow Evaluation Tool, a Colorado-specific application of a framework for assessing environmental flow needs at a regional scale previously developed with CWCB support. The tool uses flow data from the surface water allocation modeling developed for the Technical Update.

Figure ES.1 CWP Planning Scenarios Key Drivers Graphical Summary



A. Business as Usual

Recent trends continue into the future. Few unanticipated events occur. The economy goes through regular economic cycles but grows over time. By 2050, Colorado's population is expected to be close to 9 million. Single-family homes dominate, but there is a slow increase of denser developments in large urban areas. Social values and regulations remain the same, but streamflows and water supplies show increased stress. Regulations are not well coordinated and create increasing uncertainty for local planners and water managers. Willingness to pay for social and environmental mitigation of new water development slowly increases. Municipal water conservation efforts slowly increase. Oil-shale development continues to be researched as an option. Large portions of agricultural land around cities are developed by 2050. Transfer of water from agriculture to urban uses continues. Efforts to mitigate the effects of the transfers slowly increase. Agricultural economics continue to be viable, but agricultural water use continues to decline. The climate is similar to the observed conditions of the 20th century.

B. Weak Economy

The world's economy struggles, and the state's economy is slow to improve. Population growth is lower than currently projected, which is slowing the conversion of agricultural land to housing. The maintenance of infrastructure, including water facilities, becomes difficult to fund. Many sectors of the state's economy, including most water users and water-dependent businesses, begin to struggle financially. There is little change in social values, levels of water conservation, urban land use patterns, and environmental regulations. Regulations are not well coordinated and create increasing uncertainty for local planners and water managers. Willingness to pay for social and environmental mitigation decreases due to economic concerns. Greenhouse gas emissions do not grow as much as currently projected, and the climate is similar to the 20th century observed conditions.

C. Cooperative Growth

Environmental stewardship becomes the norm. Broad alliances form to provide for more integrated and efficient planning and development. Population growth is consistent with current forecasts. Mass transportation planning concentrates more development in urban centers and in mountain resort communities, thereby slowing the loss of agricultural land and reducing the strain on natural resources compared to traditional development. Coloradans embrace water and energy conservation. New water-saving technologies emerge. Eco-tourism thrives. Water development controls are more restrictive and require both high water-use efficiency and environmental and recreational benefits. Environmental regulations are more protective, and include efforts to re-operate water supply projects to reduce effects. Demand for more water-efficient foods reduces water use. There is a moderate warming of the climate, which results in increased water use in all sectors, in turn affecting streamflows and supplies. This dynamic reinforces the social value of widespread water efficiency and increased environmental protection.

D. Adaptive Innovation

A much warmer climate causes major environmental problems globally and locally. Social attitudes shift to a shared responsibility to address problems. Technological innovation becomes the dominant solution. Strong investments in research lead to breakthrough efficiencies in the use of natural resources, including water. Renewable and clean energy become dominant. Colorado is a research hub and has a strong economy. The relatively cooler weather in Colorado (due to its higher elevation) and the high-tech job market cause population to grow faster than currently projected. The warmer climate increases demand for irrigation water in agriculture and municipal uses, but innovative technology mitigates the increased demand. The warmer climate reduces global food production, which increases the market for local agriculture and food imports to Colorado. More food is bought locally, which increases local food prices and reduces the loss of agricultural land to urban development. Higher water efficiency helps maintain streamflows, even as water supplies decline. Regulations are well defined, and permitting outcomes are predictable and expedited. The environment declines and shifts to becoming habitat for warmer-weather species. Droughts and floods become more extreme. More compact urban development occurs through innovations in mass transit.

E. Hot Growth

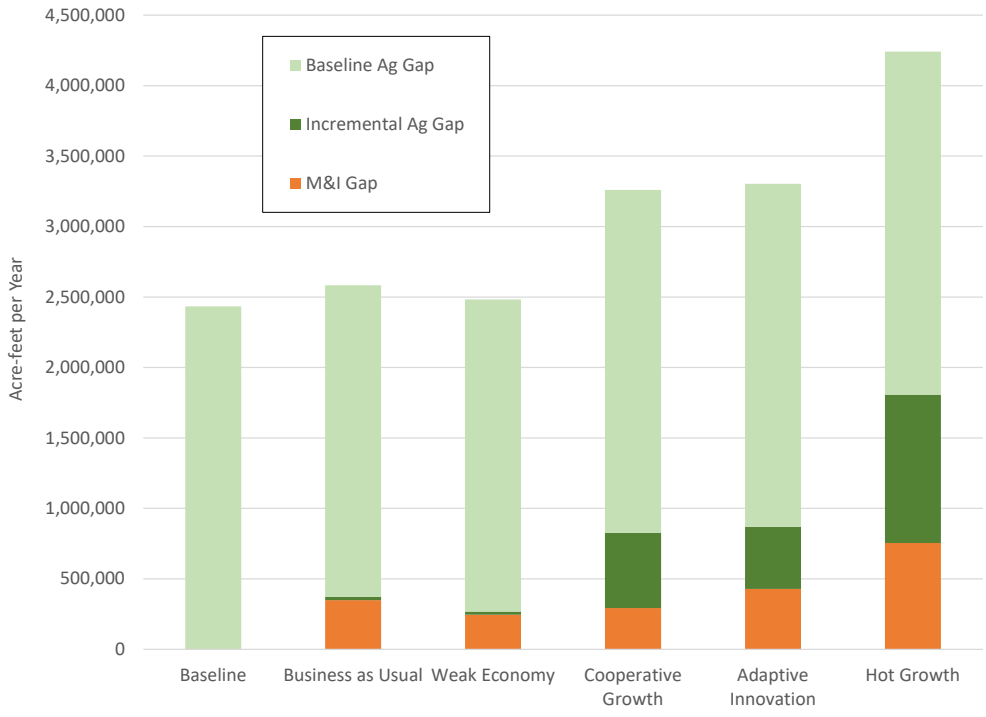
A vibrant economy fuels population growth and development throughout the state. Regulations are relaxed in favor of flexibility to promote and pursue business development. A much warmer global climate brings more people to Colorado with its relatively cooler climate. Families prefer low-density housing, and many seek rural properties, ranchettes, and mountain living. Agricultural and other open lands are rapidly developed. A hotter climate decreases global food production. Worldwide demand for agricultural products rises, which greatly increases food prices. Hot and dry conditions lead to a decline in streamflows and water supplies. The environment degrades and shifts to becoming habitat for species adapted to warmer waters and climate. Droughts and floods become more extreme. Communities struggle unilaterally to provide services needed to accommodate rapid business and population growth. Fossil fuel is the dominant energy source, and there is large production of oil shale, coal, natural gas, and oil in the state.

3 REVISITING THE GAPS

Statewide gaps may vary substantially, depending on future climate conditions and population increases, which underscores the need to take an adaptive approach to developing water management strategies and projects and methods to fill potential future gaps (see figure ES.2).

- **Agriculture** currently experiences a gap, and it is projected to increase statewide. Increases may be modest under the *Business as Usual* and *Weak Economy* scenarios but may be more substantial under scenarios that assume a hotter and drier future climate (the *Cooperative Growth*, *Adaptive Innovation*, and *Hot Growth* scenarios) due to decreasing supply and increasing crop irrigation requirements.
- **M&I** users do not currently experience a gap, but a growing population and potential impacts from climate change are projected to create gaps. Projected M&I gaps vary based on assumptions regarding future population and climate conditions but may be reduced by conservation measures.
- **E&R** gaps were not directly quantified but tools were developed to help evaluate potential risks that impact aquatic habitat, species and boating due to flow conditions. These potential future risks are documented in various sections of the Technical Update but are not a part of the gap estimates below.

Figure ES.2 Summary of Statewide Gap Estimates by Planning Scenario



COMPARING THE 2015 WATER PLAN GAP NUMBERS TO GAPS IN

THE TECHNICAL UPDATE

SIMILAR GAPS. ABSENT PROJECTS. LOWER POPULATION. LOWER DEMANDS.

1 Gaps Absent Projects

Gap projections in the Technical Update do not include estimates of basin-identified project yields. This is primarily due to a lack of specific project data that would allow projects to be modeled. Forthcoming basin plan updates will reevaluate projects and consider strategies to address gaps.

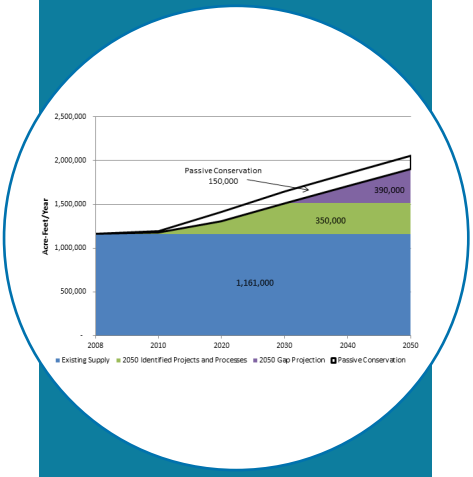
2 Gaps Across Scenarios

Unlike past projections that estimated high, medium and low gaps at 2050, the Technical Update identifies 2050 gaps for each of the Water Plan's five scenarios.

3 Gap Influences

Some of the main drivers (population, climate) and assumptions (storage operations) heavily influence the gaps in the Technical Update. Population projections, while lower than in previous analyses, remain a major driver of demands. Climate change is included in three of the five scenarios, which drives irrigation, streamflow and storage timing. Modeled storage operations maximize the use of stored water to meet demands and lower gaps.

GAPS SHOWN IN THE 2015 WATER PLAN



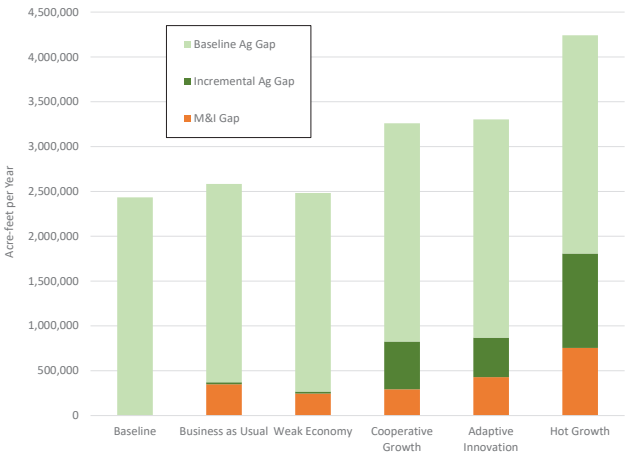
190,000 - 630,000 AFY
2050 M&I GAP

250,000 - 750,000 AFY
2050 M&I GAP

1,722,000 AFY
2050 AG SHORTAGE

23,000 - 1,053,000 AFY
2050 INCREMENTAL AG GAP

GAPS SHOWN IN THE 2019 TECHNICAL UPDATE



4 Gap Mitigation

When basins reevaluate plans it will be important to evaluate core projects that represent low-regret actions to meet future needs under any scenario. The Adaptive Innovation scenario, for example, illustrates how adaptive actions (e.g. efficiency) can help offset impacts from climate change and population growth.

5 Gaps: Max, Average & Incremental

Gaps are shown in a manner that reflects the difference in how M&I and agriculture plan in any given year. Feedback on earlier studies suggested that agriculture gaps may have been overstated because many agricultural producers live with annual shortages (especially in over-appropriated basins).

To address this, agricultural gaps are expressed in terms of average and incremental gaps—the degree to which gaps may increase in the future. Maximum agricultural gaps can also be found in the Technical Update results. At the same time, M&I gaps are primarily expressed in terms of maximums, which is consistent with firm yield planning.

AGRICULTURAL IMPACTS

The Colorado Water Plan identifies that up to 700,000 acres of agriculture could come out of production if agricultural transfers ("buy and dry") are exclusively used to meet future M&I demands. Because the Technical Update did not quantify basin projects, roundtables will evaluate how gaps should be met in the forthcoming basin plan updates. The Technical Update indicates that where municipal boundaries expand, agriculture is likely to be lost. This urbanization could result in the loss of more than 152,400 irrigated acres. Additionally, stakeholders identified that planned agricultural to M&I water transfers could result in a loss of up to 76,000 acres of agriculture in the South Platte and Arkansas basins alone.

SIGN OF CONCERN

Scenarios with moderate and significant climate impacts show shifts to earlier runoff seasons which will likely impact storage, irrigation, and streamflows.

SIGN OF SUCCESS

The statewide baseline per capita systemwide municipal demand has decreased from 172 gpcd ito nearly 164 gpcd. That represents about a 5 percent reduction in demands between 2008 and 2015.

4 KEY RESULTS

The Technical Update generated a rich dataset throughout Colorado that describes agricultural and M&I water demands, potential gaps, and available water supply under current conditions and under each of the five planning scenarios. The data and results are provided for basin roundtables and others to use for water planning purposes.

Key results and findings of the Technical Update pertaining to statewide agricultural and M&I demands and gaps, as well as findings related to environment and recreation attributes in potential future conditions, are summarized below.

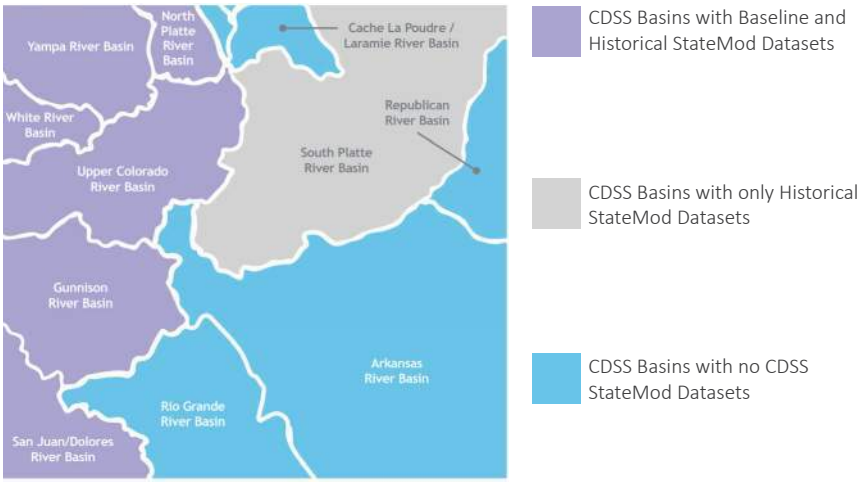
Summary of Key Statewide Results

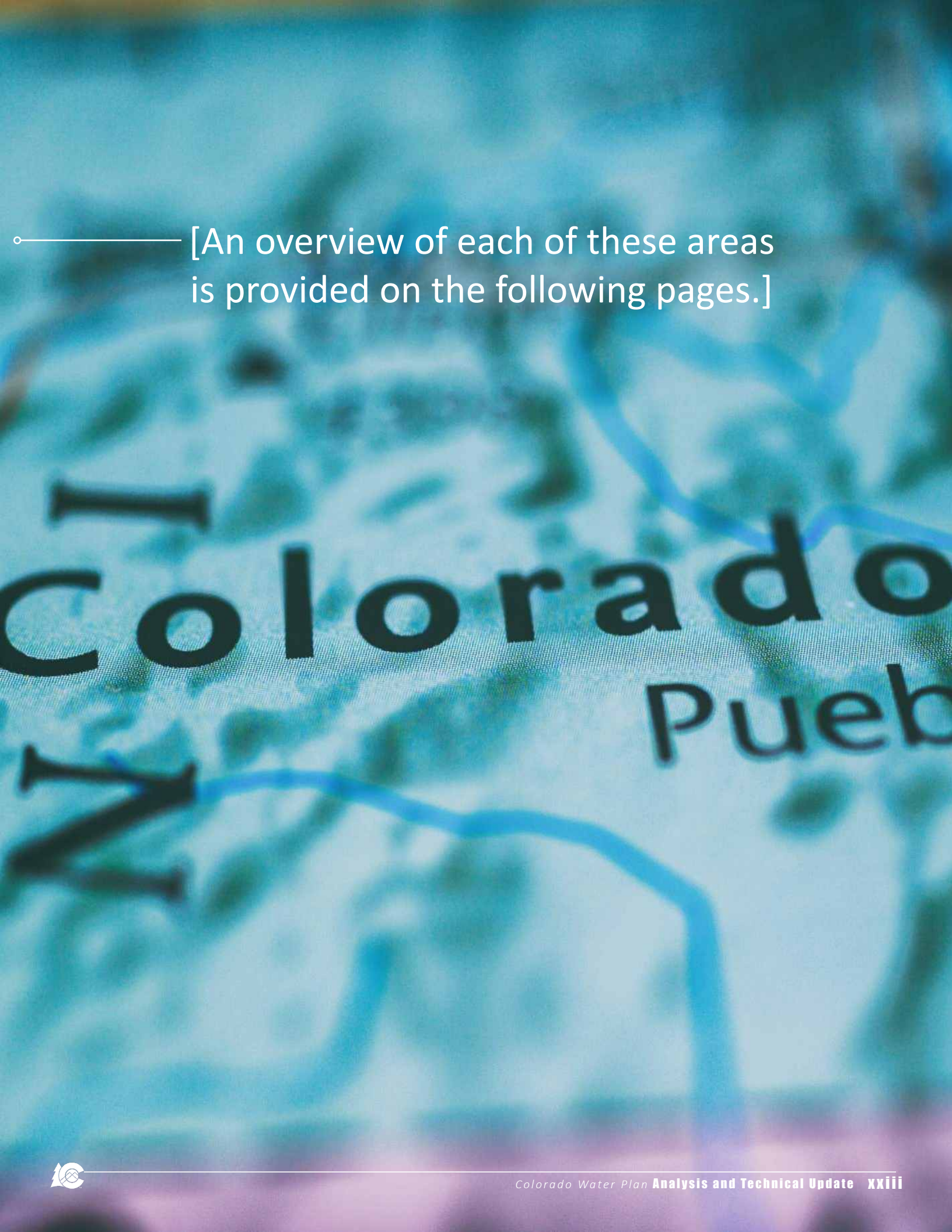
Agricultural	Environmental and Recreational	Municipal and Industrial
• Agriculture currently experiences gaps, and gaps may increase in the future if climate conditions are hotter (which increases irrigation water demand) and supplies diminish (due to drier hydrology). • Irrigated acreage is projected to decrease in most basins due to urbanization, planned agricultural-to-municipal water transfers, and groundwater sustainability issues. • Gaps under the Adaptive Innovation scenario are significantly less than *Hot Growth* despite similar assumptions related to future climate conditions, which demonstrates the potential benefits of higher system efficiencies and emerging technologies that could reduce consumptive use; however, in return flow driven systems, conservation in one area could impact water supplies downstream, so thoughtful approaches are necessary.	• Climate change and its impact on streamflow will be a primary driver of risk to E&R assets. • Projected future stream flow hydrographs in most locations across the state show earlier peaks and potentially drier conditions in the late summer months under scenarios with climate change. • Drier conditions in late summer months could increase risk to coldwater and warmwater fish due to higher water temperatures and reduced habitat. The degree of increased risk is related to the level of stream flow decline. • Instream flow rights and recreational in-channel diversion water rights may be met less often in climate-impacted scenarios.	• Municipal and industrial users do not currently experience a gap, but increasing population and potentially hotter and drier future climate conditions will create a need for additional supply despite efforts to conserve water. • Conservation efforts, however, can create significant future benefits in lowering the gap, as demonstrated by comparing the *Adaptive Innovation* and *Hot Growth* scenarios (which have similar assumptions on population and climate).

BASIN MODELING

CDSS surface water allocation models (StateMod) were used in basins where they are available to evaluate streamflows and gaps. Baseline data sets were used to assess available water supplies under current conditions; these data sets were modified to estimate future water supplies in the planning scenarios. In basins where the CDSS program has not been fully implemented, the methodology was modified using available tools and water supply information, such as historical streamflow data.

Figure ES.3 Map of CDSS Model Availability by Basin





[An overview of each of these areas is provided on the following pages.]

Agricultural Diversion Demands

Agricultur diversion demand represents the amount of water that would need to be diverted or pumped to meet the full crop irrigation water requirement (IWR) or full crop consumptive use. The diversion demand does not reflect historical irrigation supplies because irrigators often operate under water short conditions and do not have enough supply to fully irrigate their crops.

Current statewide total agricultural diversion demand is approximately 13 million acre-feet (AF), with more than 80 percent of that demand attributable to surface water supplies (though groundwater is the primary source of supply in some basins). The South Platte, Arkansas, Gunnison, and Rio Grande basins have the highest demands for irrigation diversions.

Future agricultural diversion demands will be affected by urbanization, planned agricultural projects that add irrigated acreage, aquifer sustainability, and climate change. Emerging technologies that increase system efficiency and/or reduce crop consumptive use of water may reduce water supply shortages and potentially reduce the amount of water diverted or pumped.

Future statewide agricultural diversion demand estimates range from 10 million AF in the *Adaptive Innovation* scenario to 13.5 million AF in the *Hot Growth* scenario. Urbanization, transfers of agricultural water to municipalities, and declining aquifer levels are projected to cause reductions in irrigated lands across the state (in some basins more than others), leading to reduced overall diversion demand compared to current demand. In scenarios that assume a hotter and drier climate, the impact of acreage loss on diversion demand could be offset by higher crop water requirements, which could lead to an overall increase in demands (see the *Cooperative Growth* and *Hot Growth* scenarios). The *Adaptive Innovation* scenario has the lowest statewide agricultural diversion demand due to assumptions of higher system efficiencies and emerging technologies that reduce crop water demands.

Figure ES.4 Current Average Annual Agricultural Diversion Demand by Basin

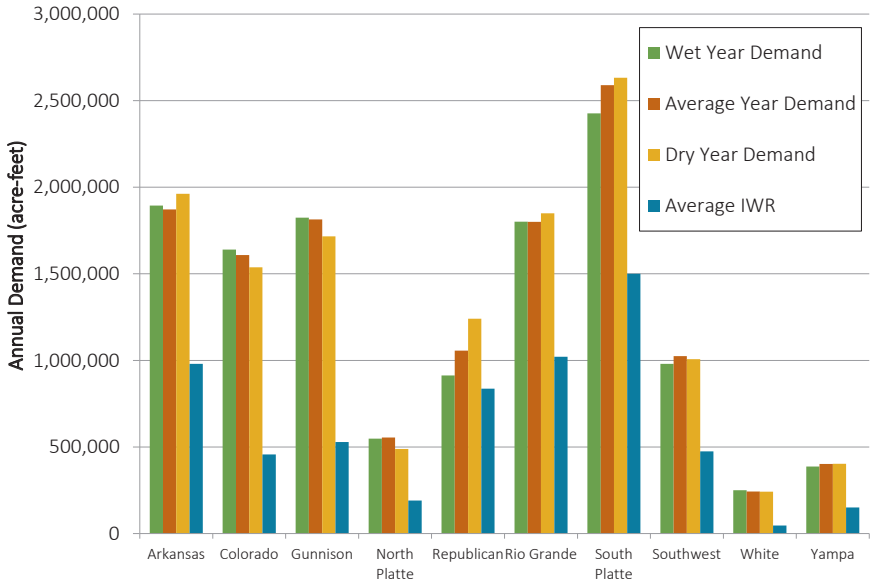
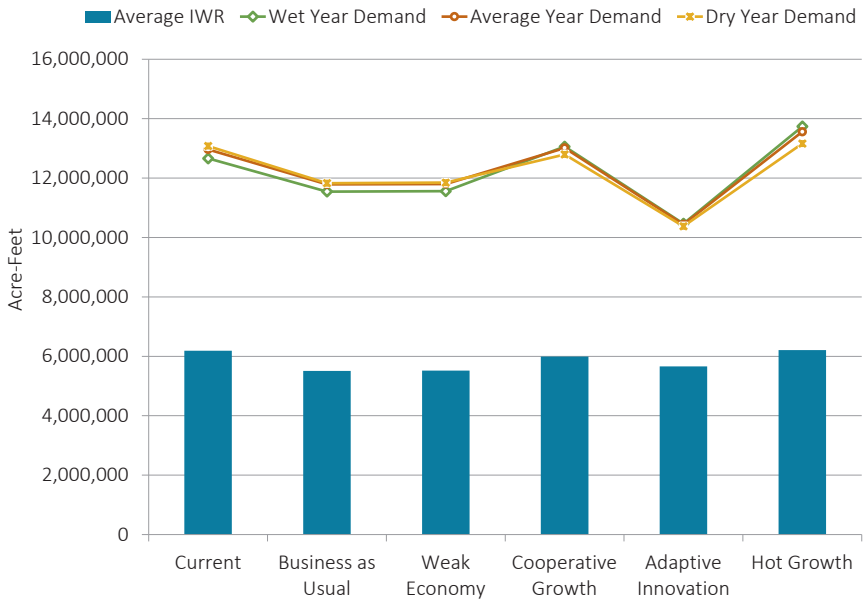
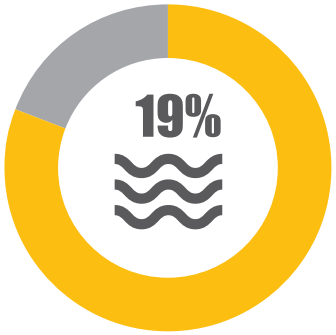


Figure ES.5 Future Statewide Average Annual Agricultural Diversion Demand Estimates for Planning Scenarios



TECHNICAL UPDATE / AGRICULTURAL FINDINGS



Demand for groundwater is approximately 19 percent of the overall demand. Groundwater demands occur primarily in the Arkansas, Republican, Rio Grande, and South Platte basins where irrigation from wells is prominent.

Based on known agricultural water transfers currently in water court or deemed to be highly likely by agricultural stakeholders, the estimates of planned buy and dry gransfers in the Technical Update (33,000 - 76,000 acres) are almost three times higher on the upper end than the data that informed the Water Plan (26,200 acres).

In all basins where significant agriculture comes out of production, diversion demands will go down due to the decrease in irrigation even as the plant demand for irrigation (were those lands to be irrigated) increases.

20% UNMET DEMAND

On average, approximately 80 percent of the overall agricultural diversion demand is currently met (and 20 percent is unmet) on a statewide basis, though this varies in each basin.

Agricultural diversion demands statewide are projected to decrease in three of the five scenarios by up to 9 percent compared to current conditions. In *Adaptive Innovation*, decreased demand from loss of irrigated lands will be offset, in part, by climate-driven irrigation demand increases; however, increased efficiency and decreased consumptive use show a 20 percent reduction in diversion demands. In *Hot Growth*, irrigated lands are projected to be lost, but climate change could more than offset that loss, resulting in an overall 5 percent increase in diversion demands.

700K ACRE LOSS STILL POSSIBLE

The Colorado Water Plan identifies that up to 700,000 acres of agriculture could come out of production if agricultural transfers (buy and dry) are used to meet future M&I demands. Because the Technical Update did not re-quantify basin projects, roundtables will need to evaluate how gaps could and should be met when updating projects (and project data). The Technical Update does indicate that where municipal boundaries expand, agriculture is likely to be lost. This urbanization could result in the loss of 152,400 irrigated acres.

M&I Diversion Demands

Current and future diversion demands for municipal water users are driven by population and water usage rates. Population estimates were based on State Demography Office (SDO) projections and adjusted upward or downward (depending on the scenario) based on historical growth statistics. The current population statewide is 5.7 million people and is projected to grow to 8.5 million by the year 2050 according to the SDO. High and low statewide projections developed for the Technical Update range from 7.7 million to 9.3 million people.

The statewide baseline per capita systemwide demand has decreased from 172 gallons per capita per day (gallons per capita per day) in SWSI 2010 to approximately 164 gpcd, which is nearly a 5 percent reduction in demand between 2008 and 2015. The reduction is associated with improved data availability, conservation efforts, and ongoing behavioral changes. Projected future per capita demands vary from 143 to 169 gpcd (see Figure ES.6), depending on the scenario. Scenario assumptions can create offsetting factors. For example, projected decreases in outdoor demand resulting from implementation of conservation measures in some scenarios was offset by increases in outdoor demand due to climate change.

Total statewide municipal diversion demands are shown in Figure ES.7, along with population projections. In general, overall municipal demands are projected to increase and generally in proportion to population increases; however, in *Adaptive Innovation*, projected municipal demands are similar to the *Business as Usual* demands despite the increased population projections and hotter and drier climate assumed for *Adaptive Innovation*, which demonstrates the potential benefits of increased water conservation measures.

Statewide baseline SSI water demands are comprised of four major industrial uses. Baseline and projected SSI demands for all planning scenarios were calculated. With the exception of *Hot Growth*, the updated projections for all planning scenarios were below SWSI 2010 estimates, primarily due to changes in assumptions for thermoelectric demands related to regulations that require an increase in power generation from renewable sources.

Figure ES.6 Statewide per Capita Demand for Five Planning Scenarios

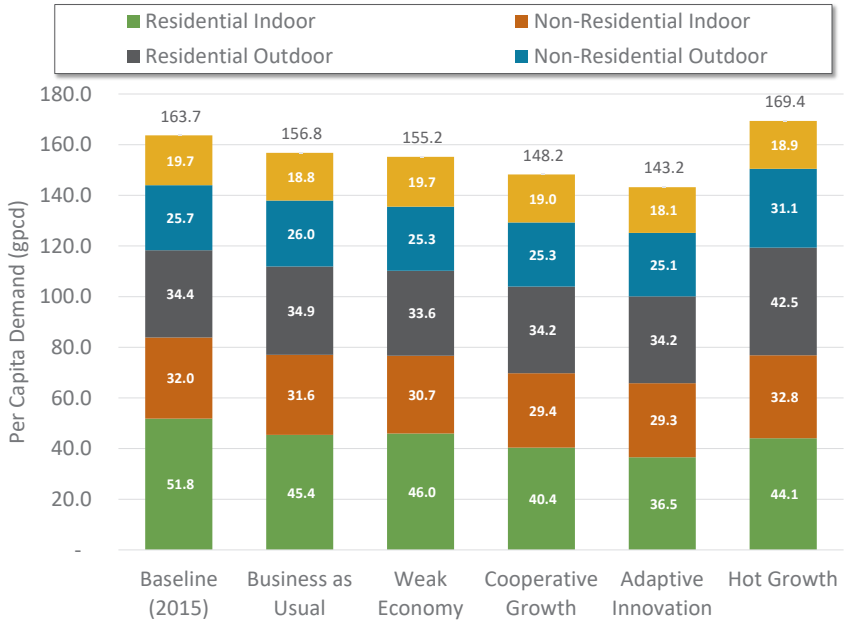
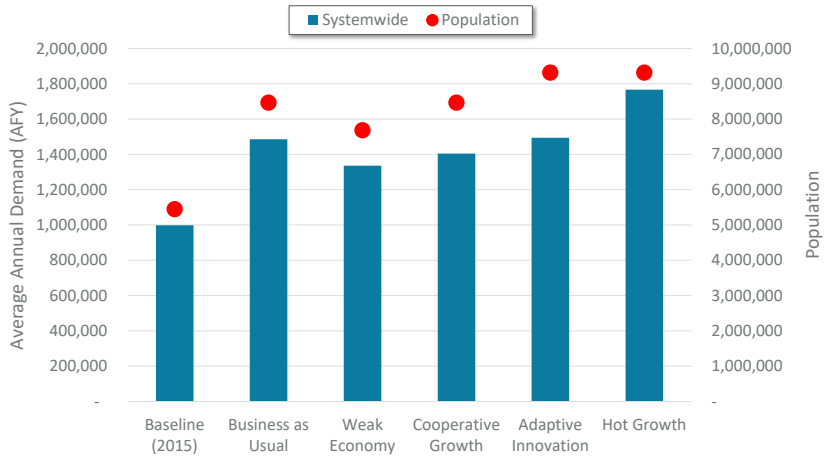
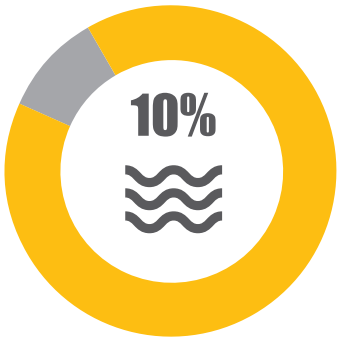


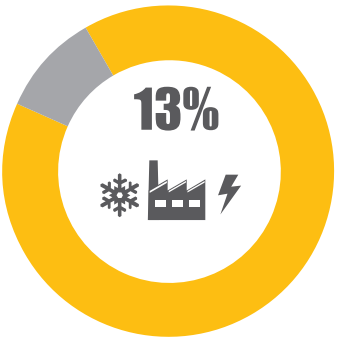
Figure ES.7 Statewide Baseline and Projected Population and Municipal Demands



TECHNICAL UPDATE / M&I FINDINGS



M&I demands comprise approximately 10 percent of the combined agricultural and M&I statewide demands that are currently met with existing water supplies and projects.



On average, SSI demands account for 13 percent of the total M&I demands. This includes snowmaking; and thermoelectric, energy development, and large industrial users.

Per capita baseline system demand has decreased from 172 to 164 gpcd—a 5 percent reduction in demands between 2008 - 2015.

Adaptive Innovation shows a 13 percent decrease in gpcd (from 164 to 143 gpcd) compared to current conditions. Total municipal demand in *Adaptive Innovation* tracks closely with *Business As Usual*. This highlights how social values that prioritize water conservation and water saving technologies could help mitigate impacts from climate and population.

While per capita usage is expected to decrease in all but *Hot Growth*, overall statewide M&I water demand is projected to increase from 35 percent in *Weak Economy* to 77 percent in *Hot Growth* over current demands. Even at that highest level, it is still lower than Water Plan due to the revised population projections, which are lower than previously estimated.

Current population (5.4 million) is 5 percent less than the Water Plan's projected 2015 levels. The State Demography Office estimates that Colorado will grow to 8.5 million by 2050.

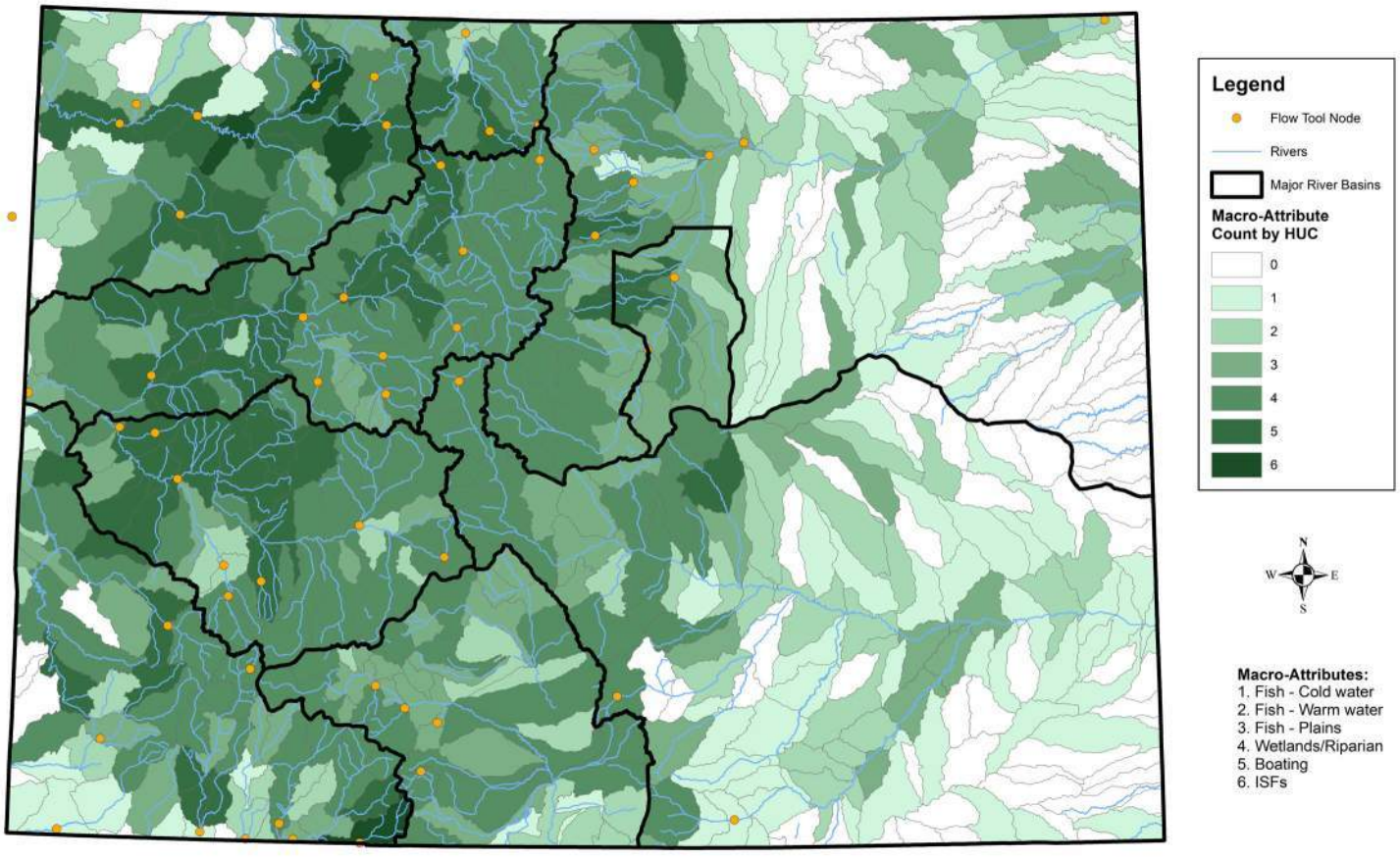
Environment and Recreation

The Colorado Environment and Recreation Flow Tool (Flow Tool) helps basin roundtables refine, categorize, and prioritize their portfolio of E&R projects and methods through an improved understanding of flow needs and potential flow impairments, both existing and projected. The Flow Tool uses hydrologic data from CDSS, additional modeled hydrologic data for various planning scenarios, and established flow-ecology relationships to assess risks to flows and E&R attribute categories at preselected gages across the state. The Flow Tool is a high-level tool that is intended to provide guidance during Stream Management Plan development and BIP development.

The Flow Tool estimates the response of E&R attributes in rivers under various hydrologic scenarios. The flow-ecology relationships in the Flow Tool were first developed as part of the Watershed Flow Evaluation Tool and were patterned after similar relationships that have been developed across the globe to inform water management. Flow-ecology science quantifies the relationship between specific flow statistics (e.g., average magnitude of peak flow, the ratio of flow in August and September to mean annual flow) and the risk status (low to very high) for environmental attributes under the flow scenario being analyzed. Data-derived relationships have been developed for riparian/wetland plants (cottonwoods), coldwater fish (trout), warmwater fish (bluehead sucker, flannelmouth sucker, and roundtail chub), and Plains fish. Other metrics were developed with basic, well-established relationships between hydrology and stream ecology. Relationships for recreational boating were also developed with stakeholders during Watershed Flow Evaluation Tool development.

The Flow Tool incorporates data from 54 nodes in the water supply and gap analysis; the tool visualizes changes in flow regime and risks to E&R attributes under existing and future conditions associated with the five planning scenarios.

Figure ES.8 Gages Included in the Flow Tool



TECHNICAL UPDATE / E&R FINDINGS

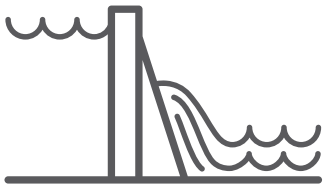
Projected future streamflow hydrographs in most locations across the state show potentially drier conditions in the late summer months under scenarios with climate change that suggest air temperatures could increase by 3.78°F to 4.15°F by 2050.

Instream Flow (ISF) and recreational in-channel diversions (RICD) water rights may be met less often in climate-impacted scenarios that see more consistent temperature increases and more variable precipitation and runoff conditions.

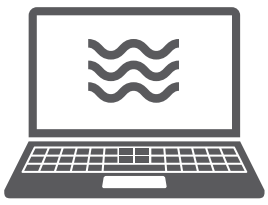
↑ 1 MONTH

Peak runoff may shift as much as one month earlier, which could lead to drier conditions in summer months and produce multiple implications for storage, irrigation and streamflow.

Under climate change scenarios, runoff and peak flows may occur earlier, and result in possible mismatches between peak flow timing and species' needs. Drier conditions in late summer months could increase risk to coldwater and warmwater fish due to higher water temperatures and reduced habitat.



In mountainous regions with infrastructure, risks to E&R assets may vary. Streams that are already depleted may see increased risks in scenarios with climate change; however, some streams may be sustained by reservoir releases, which will help moderate risks in scenarios with climate change.



The Flow Tool created as part of the Technical Update was designed to compare modeling outputs from the five planning scenarios against baseline (existing) and naturalized (unimpaired) flow conditions. Key outputs include a comparison of monthly flow regimes relative to ecological-flow indicators, building off past stakeholder-driven efforts in Colorado.

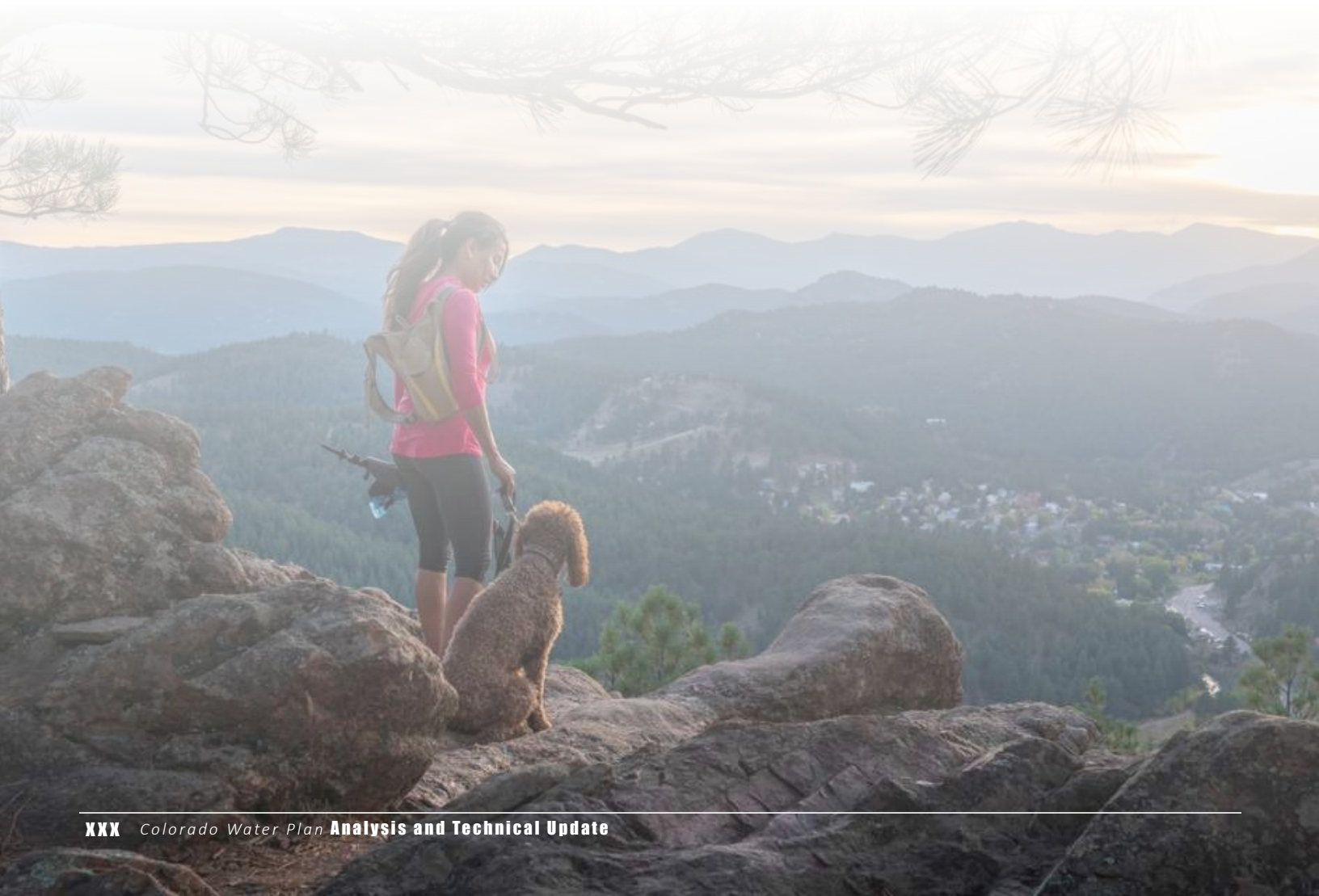
5 INSIGHTS, TOOLS & RECOMMENDATIONS

The Technical Update developed a variety of high-level analyses on the topics of public perceptions, alternative transfer methods (ATM), water reuse, storage opportunities, and economic impacts. The intent of these analyses was to provide insight into various issues that will be valuable for basin roundtables as they update their BIPs and consider solutions to address potential future gaps. Findings from these analyses are included in Section 5 of the Technical Update (Volume 1).

The Technical Update also developed several tools for basin roundtables to use when updating their BIPs. During the Technical Update, several types of data from existing BIPs were reviewed that indicated the need to improve the completeness and uniformity of basin project information. In addition, the Technical Update included the development of tools like a Project Cost Estimating Tool and E&R Flow Tool.

A list of recommendations aims to allow basins flexibility in the BIP update process to tailor approaches to best suit basin goals while at the same time providing a framework for standardization across the BIP updates. This iterative process is meant to support statewide water supply planning, cross-basin dialogue, project funding, enhanced future supply analyses, revised basin goals, and updated project lists.

Integrating Technical Update findings with the BIPs, project lists and, ultimately, the Colorado Water Plan update ensures state water planning will continue to be informed by the best available data.



APPENDIX C – COMPREHENSIVE ANNUAL FINANCIAL REPORT WATER FUND SUMMARIES

PUEBLO WEST METROPOLITAN DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
WATER FUND
YEAR ENDED DECEMBER 31, 2018

	Final Budget	Actual Budget Basis	Variance With Final Budget Positive (Negative)
REVENUES AND OTHER FINANCING SOURCES			
Water usage	$ 7,449,784	$ 8,345,916	$ 896,132
Transfer fees	15,000	16,629	1,629
Penalty billing fee	100,000	95,881	(4,119)
Turn on fees	40,000	46,187	6,187
Hydrant water	61,000	78,526	17,526
Tap connection fees/plant investment fees	1,236,000	3,273,745	2,037,745
Interest	80,000	247,038	167,038
Transfers in	-	306,788	306,788
Other	7,000	64,213	57,213
Prior year unexpended balance	9,005,216	-	(9,005,216)
TOTAL REVENUES AND OTHER FINANCING SOURCES	17,994,000	12,474,923	(5,519,077)
EXPENDITURES			
Current -			
Salaries	1,738,165	1,639,788	98,377
Payroll taxes	132,024	118,127	13,897
Employee pension and benefits	488,874	379,626	109,248
Operating parts, material and supplies	805,082	611,581	193,501
Repairs and maintenance	556,282	497,688	58,594
Uniforms and safety	27,628	26,072	1,556
Training, education and travel	46,273	22,275	23,998
Legal expense	65,000	124,074	(59,074)
Outside services	1,234,007	694,729	539,278
Insurance	49,400	59,402	(10,002)
Utilities	1,082,700	1,029,321	53,379
Lease and rental	10,000	9,280	720
Water assessments	683,713	593,482	90,231
Office	100,686	67,016	33,670
Capital outlay	10,473,666	419,874	10,053,792
Debt service -			-
Principal	425,000	435,000	(10,000)
Interest costs	75,500	92,872	(17,372)
TOTAL EXPENDITURES	17,994,000	6,820,207	11,173,793
NET CHANGE IN FUND BALANCE	$ -	$ 5,654,716	$ 5,654,716

PUEBLO WEST METROPOLITAN DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
WATER FUND
YEAR ENDED DECEMBER 31, 2017

	Final Budget	Actual Budget Basis	Variance With Final Budget Positive (Negative)
REVENUES AND OTHER FINANCING SOURCES			
Water usage	$ 7,160,500	$ 7,053,460	$ (107,040)
Transfer fees	15,000	29,758	14,758
Penalty billing fee	100,000	97,390	(2,610)
Turn on fees	40,000	40,509	509
Hydrant water	35,700	58,636	22,936
Tap connection fees/plant investment fees	1,187,500	2,339,962	1,152,462
Interest	45,000	134,172	89,172
Other	7,000	126,734	119,734
Prior year unexpended balance	8,657,424	-	(8,657,424)
TOTAL REVENUES AND OTHER FINANCING SOURCES	17,248,124	9,880,621	(7,367,503)
EXPENDITURES			
Current -			
Salaries	1,571,777	1,496,097	75,680
Payroll taxes	119,721	108,228	11,493
Employee pension and benefits	430,467	351,328	79,139
Operating parts, material and supplies	1,088,638	756,283	332,355
Repairs and maintenance	436,076	311,313	124,763
Uniforms and safety	17,175	17,561	(386)
Training, education and travel	46,272	15,418	30,854
Legal expense	55,000	71,704	(16,704)
Outside services	1,223,058	772,348	450,710
Insurance	48,100	47,923	177
Utilities	1,114,350	1,081,748	32,602
Lease and rental	9,500	8,102	1,398
Water assessments	634,938	568,942	65,996
Office	86,052	61,646	24,406
Capital outlay	9,866,500	1,459,125	8,407,375
Debt service -			
Principal	425,000	425,000	-
Interest costs	75,500	78,363	(2,863)
TOTAL EXPENDITURES	17,248,124	7,631,129	9,616,995
NET CHANGE IN FUND BALANCE	$ -	$ 2,249,492	$ 2,249,492

PUEBLO WEST METROPOLITAN DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
WATER FUND
YEAR ENDED DECEMBER 31, 2016

	Final Budget	Actual Budget Basis	Variance With Final Budget Positive (Negative)
REVENUES AND OTHER FINANCING SOURCES			
Water usage	$ 7,140,000	$ 7,703,748	$ 563,748
Transfer fees	15,000	20,295	5,295
Penalty billing fee	100,000	95,215	(4,785)
Turn on fees	40,000	42,016	2,016
Hydrant water	35,700	62,844	27,144
Tap connection fees/plant investment fees	534,375	1,457,269	922,894
Interest	40,000	81,027	41,027
Other	7,000	72,427	65,427
Prior year unexpended balance	5,840,285	-	(5,840,285)
TOTAL REVENUES AND OTHER FINANCING SOURCES	13,752,360	9,534,841	(4,217,519)
EXPENDITURES			
Current -			
Salaries	1,443,385	1,409,993	33,392
Payroll taxes	110,269	101,029	9,240
Employee pension and benefits	335,211	277,931	57,280
Operating parts, material and supplies	950,996	720,315	230,681
Repairs and maintenance	486,190	470,765	15,425
Uniforms and safety	26,725	14,158	12,567
Training, education and travel	41,451	21,462	19,989
Legal expense	50,000	39,681	10,319
Outside services	989,226	602,082	387,144
Insurance	46,000	54,563	(8,563)
Utilities	1,026,350	1,060,077	(33,727)
Lease and rental	8,300	8,440	(140)
Water assessments	553,041	493,403	59,638
Southern delivery system	-	147,021	(147,021)
Office	83,866	64,193	19,673
Contingency	68,500	-	68,500
Capital outlay	6,952,550	652,086	6,300,464
Debt service -			
Principal	525,000	525,000	-
Interest and issuance costs	55,300	71,915	(16,615)
TOTAL EXPENDITURES	13,752,360	6,734,114	7,018,246
NET CHANGE IN FUND BALANCE	$ -	$ 2,800,727	$ 2,800,727

PUEBLO WEST METROPOLITAN DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
WATER FUND
YEAR ENDED DECEMBER 31, 2015

	Final Budget	Actual Budget Basis	Variance With Final Budget Positive (Negative)
REVENUES AND OTHER FINANCING SOURCES			
Water usage	$ 7,000,000	$ 6,719,285	$ (280,715)
Transfer fees	15,000	17,936	2,936
Penalty billing fee	90,000	201,290	111,290
Turn on fees	35,000	43,141	8,141
Hydrant water	50,000	45,359	(4,641)
Tap connection fees/plant investment fees	534,375	885,723	351,348
Interest	50,000	39,217	(10,783)
Other	2,000	62,055	60,055
Prior year unexpended balance	3,957,368	-	(3,957,368)
TOTAL REVENUES AND OTHER FINANCING SOURCES	11,733,743	8,014,006	(3,719,737)
EXPENDITURES			
Current -			
Salaries	1,304,807	1,271,724	33,083
Payroll taxes	98,766	94,632	4,134
Employee pension and benefits	309,958	239,750	70,208
Operating parts, material and supplies	869,071	488,892	380,179
Repairs and maintenance	248,989	205,726	43,263
Uniforms and safety	35,355	30,507	4,848
Training, education and travel	22,995	6,965	16,030
Legal expense	50,000	28,999	21,001
Outside services	996,710	385,203	611,507
Insurance	46,000	39,905	6,095
Utilities	988,790	982,280	6,510
Lease and rental	12,000	9,528	2,472
Water assessments	544,296	500,721	43,575
Southern delivery system	-	159,776	(159,776)
Office	88,114	59,357	28,757
Capital outlay	5,538,400	256,262	5,282,138
Debt service -			
Principal	360,000	360,000	-
Interest	219,492	219,141	351
TOTAL EXPENDITURES	11,733,743	5,339,368	6,394,375
NET CHANGE IN FUND BALANCE	$ -	$ 2,674,638	$ 2,674,638

PUEBLO WEST METROPOLITAN DISTRICT
SCHEDULE OF REVENUES, EXPENDITURES AND CHANGES IN FUND BALANCE
BUDGET AND ACTUAL
WATER FUND
YEAR ENDED DECEMBER 31, 2014

	Final Budget	Actual Budget Basis	Variance With Final Budget Positive (Negative)
REVENUES AND OTHER FINANCING SOURCES			
Water usage	$ 7,776,000	$ 7,029,050	$ (746,950)
Transfer fees	7,500	34,083	26,583
Penalty billing fee	85,000	99,497	14,497
Turn on fees	35,000	47,991	12,991
Hydrant water	40,000	72,798	32,798
Tap connection fees/plant investment fees	359,250	432,684	73,434
Interest	50,000	46,137	(3,863)
Bond proceeds	6,200,000	-	(6,200,000)
Other	2,000	84,425	82,425
Prior year unexpended balance	2,107,602	-	(2,107,602)
TOTAL REVENUES AND OTHER FINANCING SOURCES	16,662,352	7,846,665	(8,815,687)
EXPENDITURES			
Current -			
Salaries	1,297,555	1,326,962	(29,407)
Payroll taxes	98,599	96,245	2,354
Employee pension and benefits	304,804	245,372	59,432
Operating parts, material and supplies	940,499	550,146	390,353
Repairs and maintenance	295,063	289,580	5,483
Uniforms and safety	15,125	6,518	8,607
Training, education and travel	10,875	8,087	2,788
Legal expense	91,000	43,417	47,583
Outside services	957,460	517,928	439,532
Insurance	80,700	61,853	18,847
Utilities	1,033,394	954,167	79,227
Lease and rental	11,500	9,542	1,958
Water assessments	703,050	393,421	309,629
Southern delivery system	-	1,337,978	(1,337,978)
Office	84,142	56,395	27,747
Capital outlay	9,768,789	3,733,579	6,035,210
Debt service -			
Principal	335,000	335,000	-
Interest	634,797	234,216	400,581
TOTAL EXPENDITURES	16,662,352	10,200,406	6,461,946
NET CHANGE IN FUND BALANCE	$ -	$ (2,353,741)	$ (2,353,741)

APPENDIX D – PWMD 2018 WATER RATES AND FEES

APPENDIX A January 1, 2018

Water Rates

Readiness to Serve (RTS) Domestic *

Meter Size	Rate Code	RTS
3/4"	2	$ 18.78
1"	3	$ 20.49
1 1/2"	5	$ 24.84
2"	6	$ 30.25
3"	7	$ 47.23
4"	8	$ 64.75
6"	9	$ 111.43
8"	10	$ 167.68
10"	11	$ 233.47
12"	12	$ 413.88

Water Usage Charge / 1000 GAL

Customer Class	Rate Code	1 - 5,000 GAL	5,001 - 10,000 GAL	> 10,000 GAL
Residential/Irrigation	41	$ 2.09	$ 3.14	$ 5.50
Multiplex 4 + Units/Meter	42	$ 3.36	$ 3.36	$ 3.36
Commercial/Industrial	43	$ 3.79	$ 3.79	$ 3.79
Non-potable/Golf Course	44/48	$ 1.15	$ 1.15	$ 1.15
Hydrant Water	45	$ 5.52	$ 5.52	$ 5.52
School 1 1/2"	37	$ 4.83	$ 4.83	$ 4.83
School 2"	38	$ 4.83	$ 4.83	$ 4.83
School 3"	39	$ 4.83	$ 4.83	$ 4.83
		1-10,000 GAL	10,001-20,000 GAL	> 20,001 Gal
Duplex 2 Units / Meter	40	$ 2.44	$ 3.66	$ 6.42
Triplex 3 Units / Meter	40	$ 2.44	$ 3.66	$ 6.42

* For Non-potable, Hydrant meter and Fire protection RTS see next page

Sewer Rates

Readiness to Serve (RTS) Based on water meter size

Meter Size	Rate Code	RTS
3/4"	100	$ 21.78
1"	101	$ 23.39
1 1/2"	102	$ 26.78
2"	103	$ 31.14
3"	104	$ 42.90
4"	105	$ 55.86
6"	106	$ 91.92
8"	107	$ 135.39
10"	108	$ 186.34
12"	109	$ 331.65

Debt service charge, Sewer	
Debt Service Charges	$ 5.00

Sewer Usage Charge Based on customer class

Customer Class	Rate Code	Charge / 1,000 GAL	
Residential 3 or less Units/Meter	51	$ 3.15	Average Water Use January and February
Multiplex 4 or more Units/Meter	53	$ 3.15	Actual Water Use Each Month
Auto Steamcleaning	56 *	$ 3.15	Actual Water Use Each Month
Bakery, Wholesale	57 *	$ 5.88	Actual Water Use Each Month
Bars without dining facilities	58 *	$ 3.75	Actual Water Use Each Month
Car Wash	59 *	$ 3.15	Actual Water Use Each Month
Department and Retail Stores	60 *	$ 3.15	Actual Water Use Each Month
Hospital and Convalescent	61 *	$ 3.34	Actual Water Use Each Month
Hotel with Dining facilities	62 *	$ 3.75	Actual Water Use Each Month
Hotel Motel without dining	63 *	$ 3.15	Actual Water Use Each Month
Industrial laundry	64 *	$ 3.15	Actual Water Use Each Month
Laundromat	65 *	$ 3.15	Actual Water Use Each Month
Laundry Commercial	66 *	$ 3.15	Actual Water Use Each Month
Market with garbage grinders	67 *	$ 4.61	Actual Water Use Each Month
Mortuary	68 *	$ 3.15	Actual Water Use Each Month
Professional office	69 *	$ 3.15	Actual Water Use Each Month
Repair Shop / Service Station	70 *	$ 3.34	Actual Water Use Each Month
Restaurant	71 *	$ 5.88	Actual Water Use Each Month
School / College	72 *	$ 3.15	Actual Water Use Each Month
Soft Water Service	73 *	$ 3.15	Actual Water Use Each Month
All Others	74 *	$ 3.15	Actual Water Use Each Month
Industrial	75 *	$ 3.15	Actual Water Use Each Month

* May be subject to load surcharge based on current rules and regulations

Effective 1/1/2018

APPENDIX A January 1, 2018

Water Rates

RTS Non-potable (Raw Water)

Meter Size		Rate Code	RTS
4"		16	$ 5.20
6"		17	$ 5.94
8"/ Desert Hawk GC		18/29	$ 6.05
10"		19	$ 6.26
12"		20	$ 7.03

RTS Hydrant Meter

Meter Size		Rate Code	RTS
1 1/2"		24	$ 90.31

RTS Fire Protection Meter

Meter Size		Rate Code	RTS
< or = 3"		30	$ 15.92
4"		31	$ 19.42
6"		32	$ 26.53
8"		33	$ 33.96

Effective 1/1/2018

APPENDIX A January 1, 2018 - No Change

Water connection fees are the sum of the Water Plant Investment Fund (PIF) and the Tap Fee for parts and labor. Larger meter sizes will be computed upon customer request for connection.
Additional equipment such as backflow preventers may be required, at customer cost, for connection to the water system as set forth in the regulations.

Water Fees and Charges

Meter size	Water PIF	Tap Fee	Water Connection
3/4" Displacement or Multi-jet	$ 11,082.00	$ 1,278.00	$ 12,360.00
1" Displacement or Multi-jet	$ 17,325.00	$ 2,344.00	$ 19,669.00
1 1/2" Displacement or Class I Turbine	$ 34,663.00	$ 3,963.00	$ 38,626.00
2" Compound Displacement Class I & II Turbine	$ 55,458.00	$ 5,814.00	$ 61,272.00
3" Displacement	$ 103,976.00	$ 10,902.00	$ 114,878.00
3" Compound	$ 110,929.00	$ 10,902.00	$ 121,831.00
3" Class I & II Turbine	$ 121,329.00	$ 10,902.00	$ 132,231.00

Wastewater connection fees are the sum of the Wastewater Plant Investment Fund (PIF) and the Tap Fee for parts and labor. Larger sizes will be computed upon customer request for connection.
3/4" water meter requires a 4" sewer tap and a 1" to 3" water meter requires a 6" sewer tap.
Larger than 3" water meter may require a larger sewer tap size dependent upon use.
Additional equipment such as grease interceptors may be required, at customer cost,
for connection to the wastewater system.

Wastewater Fees and Charges

Meter size	Wastewater PIF	Tap Fee	Wastewater Connection
3/4" Displacement or Multi-jet	$ 6,804.00	$ 1,084.00	$ 7,888.00
1" Displacement or Multi-jet	$ 10,178.00	$ 1,114.00	$ 11,292.00
1 1/2" Displacement or Class I Turbine	$ 20,353.00	$ 1,114.00	$ 21,467.00
2" Compound Displacement Class I & II Turbine	$ 32,565.00	$ 1,114.00	$ 33,679.00
3" Displacement	$ 61,062.00	$ 1,114.00	$ 62,176.00
3" Compound	$ 65,129.00	$ 1,114.00	$ 66,243.00
3" Class I & II Turbine	$ 71,234.00	$ 1,114.00	$ 72,348.00

Hydrant Meter Charges	
Fire Hydrant Meter Deposit	$ 1,755.00

Effective 1/1/2018

APPENDIX A-1
OTHER FEES, CHARGES AND PENALTIES

AFTER HOURS SERVICE REQUESTS

The minimum fee for after hours service	$105.00
Over-time hourly rate	$35.00 per hour

METER TESTS FEES

METER SIZE	FEE
¾"	$40.00
1"	$40.00
1-1/2"	$40.00
2"	$120.00
3"	$120.00
4"	$120.00
6"	$185.00
8" or larger	$200.00

OTHER FEES, CHARGES AND PENALTIES

Service charge for non-sufficient or dishonored checks	$25.00
Service charge for re-deposit of non-sufficient or dishonored checks	Up to $10.00
Service charge for filing lien	$50.00
Delinquent payment penalty	Up to $15.00
Meter re-reads	$15.00
Meter reading for final billing (unless on normal meter reading day)	$15.00
Transfer charge for new accounts	$15.00
Turn Off Fee	$50.00
Turn On Fee	$50.00
Meter Tampering Fee	$100.00
Meter Removal Fee	$50.00
Meter Re-install Fee	$50.00
Unauthorized Use of Fire Hydrant	$250.00

APPENDIX E – WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN AND PUBLIC EDUCATION INFORMATION ON WATER CONSERVATION

Rules & Regulations

Rules & Regulations of Pueblo West Metropolitan District, Pueblo West, Colorado

TITLE 4 WATER AND SEWER

Article 1. DEFINITIONS

4.1.1 Applicant.

The person making application for a permit to connect to a District waste water or water facility and shall be the owner of the premises to be served by the waste water or water facility for which a permit is requested, or his authorized agent.

4.1.2 Building Drain.

That part of the lowest horizontal piping of a drain system which receives the discharge from soil, waste and other drainage pipes inside the walls of a building, and conveys it to the sewer service line which shall be no more than five feet outside the interface of the building wall.

4.1.3 Cross Connection.

Any physical connection between the piping system between any building water service and any water supply other than the District water supply, whereby water from another source may be forced or drawn into the District distribution mains.

4.1.4 Fixture.

Any sink, tub, shower, water closet or any other facility connected by drain to a sewer.

4.1.5 Floatable Oil.

Oil, fat or grease in a physical state, such that it will separate by gravity from waste water by treatment in an approved pre-treatment facility. The waste water shall be considered free of floatable fat, if it is properly treated and the waste water does not interfere with the collection system.

4.1.6 Garbage.

Shall mean the animal and vegetable waste resulting from the handling, preparation, cooking and serving of foods and the handling, storage and sale of produce.

4.1.7 Interceptor.

The device designed and installed so as to separate and retain deleterious, hazardous or undesirable matter from normal wastes and permit normal sewage or liquid waste to discharge into the disposal terminal by gravity.

4.1.8 Natural Outlet.

Any outlet into a water course, pond, ditch, lake or other body of surface or ground water.

4.1.9 Outside Sewer.

A sanitary sewer beyond the limits of the District not subject to the control or jurisdiction of the District.

4.1.10 Permit.

The written authorization required pursuant to this or any other rule, regulation or resolution of the District for the installation of any sewer or water works.

4.1.11 pH.

The logarithm of the reciprocal of the hydrogen ion concentration. The concentration is the weight of hydrogen ions in grams per liter of solution. Neutral water, for example, has a pH value of seven and hydrogen ion concentration of 10/7.

4.1.12 Plumbing System Unit.

All plumbing fixtures and traps or soil waste and vent pipes and all sanitary sewer pipes within a building and extending to the building's sewer connection.

4.1.13 Properly Shredded Garbage.

Shall mean the wastes from the preparation, cooking and dispensing of food that have been shredded to such a degree that all particles will be carried freely under the flow conditions normally prevailing in public sewers with no particle greater than one-half inch (1.27 centimeters) in any dimension.

4.1.14 Slug.

Shall mean any discharge of water or waste water which in concentration of any given constituent or in quantity of flow exceeds for any period longer than 15 minutes, more than five times the average 24-hour concentration. A slug also means any flows during normal operation which shall adversely effect the collection system and/or performance of the waste water treatment works.

4.1.15 Storm Drain.

Shall mean the drain or sewer for conveying water, ground water, sub-surface water or unpolluted water from any source.

4.1.16 Suspended Solids.

Shall mean total suspended matter that either floats on the surface of, or is in suspension in, water, waste water or other liquids and that is removable by laboratory filtering as prescribed in "Standard Methods for the Examination of Water and Waste Water." and referred to as non-filterable residue.

4.1.17 Water Meter Set.

Shall mean the complete unit required for measuring water delivered to the customer's property. This complete unit includes the meter(s), can and top, or vault, all valves, piping, and special appurtenances inside the can or vault.

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4.1.18 Water Service Line.

A “water service line” is the pipe carrying water from the District’s water main in the public street, alley, or dedicated right-of-way to a building or other point of use on the property. All costs for the installation, maintenance, and/or replacement of these shall be borne by the property owner except for those installed prior to the implementation date of this revision.

Article 2. GENERAL CONDITIONS OF OWNERSHIP AND OPERATION OF WATER AND SEWER SYSTEMS.

4.2.2 Responsibilities of District.

The District is responsible for the operation and maintenance of the sewage collection system, water distribution system and treatment works, which operation and maintenance shall be carried out in a sound and economical manner, in accordance with these Rules and Regulations. It shall not be liable or responsible for inadequate treatment or interruption of service brought about by circumstances beyond its control.

The District is generally responsible for providing capital facilities, and shall endeavor to plan for, capitalize and build adequate capital improvements as rapidly as possible consistent with fiscal responsibility and the best interests of the District; but the District shall not be liable or responsible for failure to approve additional services when capacity is exceeded by demand.

4.2.2 Liability of District.

It is expressly stipulated that no claim for damage shall be made against the District by reason of the following: blockage in the system causing the backup of effluent; damage caused by “smoking” of lines to determine drainage connections to District lines; breakage of service mains by District personnel and interruption of service and the conditions resulting therefrom; breaking of any service or supply line, pipe, cock, or meter by any employee of the District; failure of the water supply; shutting off or turning on water in the water mains; making of connections or extensions; damage caused by water running or escaping from open or defective faucets; burst service pipes or other facilities not owned by the District; damage to water heaters, boilers, or other appliances resulting from shutting water off, or for turning it on, or from inadequate or sporadic pressures, or for doing anything to the system of the District deemed necessary by the Board of Directors or their agents. The District shall have no responsibility for notification to customers of any of the foregoing conditions. The District hereby reserves the right to cut off the water supply at any time, for any reason deemed appropriate. This

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paragraph shall not relieve the District from liability for negligence of its employees, if such liability would otherwise have existed.

4.2.3 Ownership of Facilities.

All existing and future mains and treatment works connected with and forming an integral part of the water and sewage system shall become and are the property of the District, unless any contract with owner or customer provides otherwise. Said ownership will remain valid whether the mains and treatment works are constructed, financed, paid for, or otherwise acquired by the District, or by other persons.

That portion of all existing or future sewer service lines extending from the main to each unit or building and all existing or future water service lines extending from the curb cock and box to each unit or building for each customer that is connected with and forms an integral part of the District's system, shall become and is the property of the customer. This principle shall not be changed by the fact the District might construct, finance, pay for, repair, maintain or otherwise affect the customer's service line.

4.2.4 Inspection Powers and Authority of District Agents.

The Manager and other duly authorized employees of the District, bearing proper credentials and identification, shall be permitted to enter upon all properties within the District, for the purpose of inspection, observation, measurement, sampling, and testing any of the water or waste water facilities, in accordance with the provisions of these Rules and Regulations.

4.2.5 Unauthorized Tampering with System.

a.No unauthorized person shall uncover, make any connection with or opening onto, use, alter, or disturb any sewer or water main or appurtenance without first obtaining a written permit from the District.

b.No person shall maliciously, willfully, or negligently break, damage, destroy, uncover, deface, or tamper with any portion of the District's system, including fire hydrants, manholes, valves and other appurtenances.

4.2.6 Liability for Violation.

a. Any person violating any of the provisions of the Rules and Regulations of the District shall become liable to the District for any expense, loss or damage incurred by the District by reason of such violation.

b. Any person who shall, without authorization, tamper with the District's water or sewer system shall be charged with a misdemeanor and upon conviction thereof shall be fined in an amount as established by the Court.

c. All persons shall be held strictly responsible for any and all acts of their agents or employees done under or contrary to the provisions of these rules or regulations.

d. Any person violating any of these rules or regulations shall be subject to the termination of water and/or wastewater service at the discretion of the Board. In addition, the District may avail itself of any civil remedies available to it. Upon any disconnection of water or sewer service, the District Manager shall estimate the cost of disconnection from and reconnection to the District's system and users shall deposit the cost, as estimated, of disconnection and reconnection before user is reconnected to the system. The District Manager shall refund any part of the deposit remaining after payment of any and all costs of disconnection and reconnection.

e. If disconnected, during the period of such disconnection human habitation of such premises may constitute a public nuisance and the District, in its discretion, may cause proceedings to be brought for the abatement of the occupancy of said premises by humans during the period of such disconnection. In such event, and as a condition of reconnection, reasonable attorney's fees and costs of suit shall be paid to the District.

4.2.7 Customer Responsibility for Maintenance.

Each customer shall be responsible for maintaining the entire length of the service line serving his property from the building to the District laterals. Leaks or breaks in the service line shall be repaired by the property owner within seventy-two (72) hours of obtaining knowledge of the leak or from the time of notification of such condition by the District. If satisfactory progress toward repairing said leak has not been completed within the time period allowed or if an emergency situation is deemed to exist, the Manager shall shut off this service until the leak or break has been repaired. In addition, the District shall have the right to effect the repair and collect the cost therefore from the customer. Such cost shall constitute a perpetual lien against the property of such customer securing payment of such cost, whether or not such lien against the property is formalized.

4.2.8 Connection Mandatory.

The owner of any premises, houses, buildings or properties used for any purposes, situated within the District and within four hundred (400) feet of a District sanitary sewer or water line shall, in accordance with C.R.S. 32-1-1006(a), connect such building directly with the water or sewer line of the District within twenty (20) days after written notice sent by registered or certified mail to do so. If such connection is not begun within twenty (20) days, the District may thereafter connect the premises to the sewer and/or water system and shall have a perpetual lien on and against the premises for the cost of making the connection and any such lien may be foreclosed in the same manner as provided by the laws of this State for the foreclosure of mechanic's liens. Connection charges shall be as set forth in (Appendix A). **Revised: February 23, 2016 per Resolution No. 2016-11.**

4.2.9 Modification, Waiver or Suspension of Rules.

Any person who, by reason of special circumstances, is of the opinion that any provision of these rules and regulations is unjust or inequitable as applied to his premises, may make written application to the Board stating the special circumstances, citing the provision complained of, and requesting suspension or modification of that provision as applied to his premises.

a. The Board may, on its own motion, find that by reason of special circumstances any provision of these rules and regulations should be suspended or modified as applied to a particular case; and may, by resolution or motion, order such suspension or modification for such case during the period of such special circumstances or any part thereof.

b. Any such waiver, suspension or modification shall be in writing, signed by the Board or Manager. Such waiver, suspension or modification shall not be deemed an amendment of the rules and regulations nor as a precedent for any other special circumstances.

Article 3. SEWER REGULATIONS.

4.3.1 General.

The District is responsible for protecting public health, safety and welfare by controlling substances, materials, waters or wastes deposited in water courses, subsurface drainages and ground waters. The District's sewer system is designed for the disposal of water contaminated by biodegradable wastes and therefore establishes these regulations regarding discharges into the public sewer system.

4.3.2 Special Permit Wastes.

The substances, materials, waters or wastes, described herein may be discharged into the District's system only by special permit issued by the District. Such special permit shall ensure that such discharges shall be in concentrations or quantities which will not harm either the sewers, wastewater treatment process or equipment; will not have an adverse effect on the receiving stream; or will not otherwise endanger the lives, public health, public safety, public welfare, public property or constitute a nuisance. The District may set limitations lower than the limitations established in the regulations below if, in its opinion, more severe limitations are necessary to meet the above objectives. In determining the acceptability of the foregoing substances the District shall give consideration to such factors as the quantity of subject waste in relation to flows and velocities of the sewers, materials of construction of the sewers, the wastewater treatment process employed, capacity of the wastewater treatment plant, degree of treatability of the waste and the wastewater treatment plant, and other pertinent factors. The limitations or restrictions on materials or characteristics of waste or waste waters discharged to the sanitary sewer which shall not be discharged without a special permit from the District shall apply, but are not limited, to the following:

a. Wastewater having a temperature higher than 150 degrees F (65 degrees C).

b. Wastewater containing more than 25 mg. per liter of petroleum oil, non-biodegradable cutting oils, or product of mineral oil origin.

c. Wastewater from industrial plants containing floatable oils, fat, or grease.

d. Any garbage that has not been properly shredded (see 4.1.13). Garbage grinders may be connected to sanitary sewers from homes, hotels, institutions, restaurants, hospitals, catering establishments or similar places where garbage originates from the preparation of food in kitchens for the purpose of consumption on the premises or when served by caterers.

e. Any waters or wastes containing iron, chromium, copper, zinc and similar objectionable or toxic substances to such degree that any such material received in the composite wastewater at the wastewater treatment works exceeds the limits established by the District Manager for such materials.

f. Any waters or wastes containing odor-producing substances exceeding limits which may be established by the District Manager.

g. Any radioactive wastes or isotopes of such half-life or concentration as may exceed limits established by the District Manager in compliance with applicable state or federal
regulations.

h. Quantities of flow, concentrations, or both which constitute a "slug" as defined herein.

i. Waters or waste containing substances which are not amenable to treatment or reduction by the wastewater treatment process employed, or are amenable to treatment only to such degree that the wastewater treatment plant effluent cannot meet the requirements of other agencies having jurisdiction over discharge to the receiving waters.

j. Public or private swimming pool wastes, storm water, surface water, groundwater, roof run-off, subsurface drainage, cooling water, or unpolluted industrial process waters.

k. Any septic tank sludge, gasoline, benzine, naphtha, fuel oil, or other flammable or explosive liquids, solid or gas.

l. Any waters containing toxic or poisonous solids or gases in sufficient quantity, either singly or by interaction with other wastes to injure or interfere with the sewage treatment process.

m. Any waters or wastes having a pH lower than 5.5 or having any other corrosive property capable of causing damage or hazard to structures, equipment or personnel of the wastewater works, ashes, cinders, sand, mud, straw, shavings, metal, glass, rags, feathers, tar, plastics, wood, underground garbage, whole blood, paunch manure, hair and fleshings, entrails and paper dishes, cups, milk containers, either whole or ground by garbage grinders in quantities capable of causing obstruction to the flow of sewers.

n. Manufacturing and industrial wastes.

o. Any other waters or wastes, whether liquid, solid or gas, capable of adverse interaction with other water or wastes in the public sewer system releasing obnoxious gases, forming suspended solids which interfere with or cause obstructions to the collection system or otherwise create a condition deleterious to structures and treatment processes.

4.3.3 Special Permit Procedure.

Application for a special permit for authorization to discharge the aforementioned water shall be made in writing to the District and shall describe the type of waste proposed to be discharged, the frequency of discharge, the expected duration of the special permit, and other pertinent information which may be requested by the District Manager or Board of Directors. If the special permit is granted, said special permit authorization shall be in writing from the District and shall state all terms and conditions of the permit.

Said terms and conditions may include the pretreatment alternatives and waste reporting alternatives stated below, but by no means are limited to such special conditions or reporting requirements.

4.3.4 Pretreatment Alternatives.

Among the types of pretreatment requirements which may be included in the terms and conditions of a special permit are the following:

a. Require pretreatment to an acceptable condition for discharge to the public sewer.

b. Require control over the quantities and rates of discharge.

c. Require payment to cover the added cost of handling and treating the wastes not covered by existing taxes or sewer charges under the provisions of the District's existing tap fees and service charge schedule.

d. In considering the above alternatives the District shall give consideration to the economic impact of each alternative on the discharger. If the District permits the pretreatment or equalization of waste flows, the design and installation of the plants and equipment shall be subject to the review and approval of the District.

4.3.5 Waste Reporting.

As part of the terms and conditions of any special permit or to determine whether a special permit may be required of a particular user the District may require a user of sewer services to provide the following:

a. Peak rate and volume of wastewater discharged over a specified period of time.

b. Chemical analysis of wastewater.

c. Information on raw materials, processes and products affecting wastewater volume and quality.

d. Quantity and disposition of specific liquid, sludge, oil, solvent or the materials important to sewer use control.

e. A plot plan of sewers on the users' property showing sewer and pretreatment facility location.

f. Details of systems to prevent and control the losses of materials through spills into the District's sewer.

g. The owner of any property serviced by sewer which may require a special permit may be required to install a suitable structure, such as a manhole, together with necessary meters and other appurtenances in the building's sewer to facilitate observation, sampling and measurement of the wastes. Such structures, when required, shall be accessibly and safely located and shall be constructed in accordance with the plans approved by the District. The structure shall be installed by the owner at his expense and shall be maintained by him so as to be safe and accessible at all times.

h. Where pretreatment or flow equalization facilities are provided or required for any waters or wastes, they shall be maintained in satisfactory and effective operation by the owner, at his expense.

4.3.6 Standards.

All measurements, tests, and analyses of the characteristics of waters and wastes shall be determined in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater", published by the American Public Health Association. Sampling methods, locations, times, durations and frequencies are to be determined on an individual basis, subject to approval by the District.

4.3.7 Prior Agreement.

No statement contained in this Article shall be construed as preventing any special agreement or arrangement between the District and any industrial concern whereby an industrial waste of unusual strength or character may be accepted by the District for treatment.

Article 4. WATER REGULATIONS.

4.4.1 General.

This section is intended to provide general regulations regarding use of the District's water system. All applicants for and users of service and connections to the system shall be required to accept such conditions of pressure, supply and service as are provided by the distribution system at the location of the service connection and hold the District harmless for any damages arising out of low pressure, high pressure, inadequate supply or interruptions of service. The District specifically does not accept responsibility for the maintenance of pressure and it reserves the right to discontinue service while making repairs, replacement and connections or performing other work in the operation of the water system. Consumers dependent upon a continuous supply should provide emergency storage.

4.4.2 Supply to Separate Structures.

Except as provided elsewhere or by special agreement, each house or structure for

which the application for water service is hereafter made which fronts on a public street or private road shall have a separate service connection, including a separate meter.

4.4.3 Ground Wire Attachments.

All persons are forbidden to attach any ground wire or wires to any plumbing which is or may be connected to a service connection

or main belonging to the District unless such plumbing is adequately connected to an effective driven ground installation on the premises. The District will hold the customer liable for any damage to its property occasioned by such ground wire attachments.

4.4.4 Cross Connections.

All persons must comply with local, state and federal laws governing the separation of dual water systems or installation of backflow protective devices to protect the public water supply from the damage of cross connections. Backflow protective devices must be installed as near the service as possible and shall be open to test and inspection by the District. Plans for installation of backflow protective devices must be approved by the District prior to installation.

a. In special circumstances when the customer is engaged in the handling of especially dangerous or corrosive liquids or industrial process waters, the District may require the customer to eliminate certain plumbing or piping connections as an additional precaution and as a protection of the backflow preventive devices.

b. As a protection to the customer's plumbing system, a suitable pressure relief valve must be installed and maintained by him, at his expense, when check valves or other protective devices are used. The relief valve shall be installed between the check valves and the water heater.

c. Whenever backflow protection has been found necessary on a water supply line entering a customer's premises, then any and all water supply lines from the District's mains entering such premises, building or structures shall be protected by an approved backflow device, regardless of the use of the additional water supply line.

d. The double check valve or other approved backflow protection devices may be inspected and tested periodically for water tightness by the District. The devices shall be serviced, overhauled, or replaced whenever they are found defective and all costs of repair and maintenance shall be borne by the customer.

e. The service of water to any premises may be immediately discontinued by the District if any defect is found in the check valve installation or other protective devices, or

if it is found that dangerous unprotected cross-connections exist. Service will not be restored until such defects are corrected.

4.4.5 Additional Service Connection Rules.

Not more than one service connection for domestic or commercial supplies shall be installed for one building except under special conditions. A service connection shall not be used to supply adjoining property or a building under different ownership. When property with a service connection is divided, each service connection shall be considered as belonging to the lot or parcel of land which it directly enters.

4.4.6 Ingress and Egress.

Representatives from the District shall have the right of ingress and egress to the customer's premises at reasonable hours for any purpose reasonable connected with the furnishing of water service.

4.5.1 Water Meters Required.

All building services shall be metered. A sum of money shall be deposited with the District prior to installation of the facilities to pay all or a portion of the cost of said installation. The building service connection between the curb cock and box and main, whether located on public or private property, is the property of the District for purposes of the District reserving the right to repair, replace and maintain it as well as to remove it upon discontinuance of service.

4.5.2 Building and Service Connections.

The District will furnish and install a service of such size and at such location as the applicant requests provided such requests are reasonable. The service will be installed from its water distribution main to the curb line or property line of the premises which may abut on the street, or other thoroughfares, or on the District's right- of-way or easement.

a. All metered service connections will be charged the applicable connection charge. The applicant shall deposit an amount equal to the cost of such meter size as determined by the District Manager.

b. Only duly authorized employees or agents of the District will be permitted to install that portion of a service connection from the District's main to the curb cock and box. The remaining portion of the building's service line from the curb cock and box

to the building shall be installed by the customer's contractor, at the customer's expense, in accordance with all applicable requirements of the District. The cost of the curb cock and box as well as the line from the District main to said curb cock and box shall be considered part of the connection charge.

c. The provisions of this part 2 shall not apply to Subdivisions or Re-subdivisions of existing lots or parcels.

4.5.3 Meter Installations.

Upon application and payment of the connection charges, the District will install a proper sized meter in a frost proof box at the property line of the applicant.

4.5.4 Size and Location.

The District reserves the right to determine the size of service connections and their location with respect to the boundaries of the premises served. The laying of the service line to the curb cock and box should not be done until the location of the service connection has been approved by the District. The service between the curb cock and box and the building served by the installation shall be the property of the customer and shall be maintained by the customer at his expense. The minimum meter sizes and sizes of customer service line between the meter and the building served shall be based on the total residential units including irrigation, or their equivalent to be served.

Total Minimum Meter Minimum Customer Units Size Service Line Size*

1 (less than 1 acre) 3/4" 1"
1 (1 acre or more) 1" 1-1/4"
2 1" 1-1/4"
3 to 5 1-1/2" 2"
6 to 9 2" 2-1/2"
10 to 29 3" 4"
30 to 59 4" 4" to 6"
Over 59 6" plus 6" to 8"

*Distance or length not to exceed 100 feet without increasing service line size.

The customer service lines must be large enough to provide a minimum pressure of 30 P.S.I. in the building at maximum probable flow as calculated in accordance with the Uniform Plumbing Code. Minimum size of customer service line to each unit from internal distribution line shall not be less than 3/4".

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In addition, the maximum flow must not exceed the following limits through the meter.

Meter Size Maximum Peak Flow

3/4" 25 G.P.M.
1" 40 G.P.M.
1-1/2" 80 G.P.M.
2" 128 G.P.M.
3" 240 G.P.M.
4" 400 G.P.M.
6" 800 G.P.M.

4.5.5 Change in Location of Meter Equipment.

Meter equipment moved for the convenience of the customer will be relocated at the customer's expense. Meters moved to protect the District's property will be moved at the District's expense.

4.5.6 Curb Cock.

When circumstances dictate, the District may require that a curb cock be installed. When this added requirement is made the District will furnish the required curb cock and box. Upon installation, the curb cock and box shall remain the District's property. If the curb cock is damaged by the customer's use to the extent that replacement is necessary, such replacement shall be at the customer's expense.

4.5.7 Meter Tests - Deposits.

All meters shall be tested prior to installation and no meter will be installed which registers more than two percent (2%) fast. Meters shall be tested upon the customer's request upon receipt of a testing deposit set forth in (Appendix A). Should the meter register more than two percent (2%) fast, the service deposit shall be refunded to the customer; but should the meter register less than two percent (2%) fast, the deposit shall be retained by the District, and, in addition, the customer shall be required to pay any testing cost in excess of the deposit.

4.5.8 Adjustment for Meter Errors - Fast Meters.

If a meter tested at the request of a customer pursuant to Section 4.5.7 is found to be more than two percent (2%) fast, the excess charges for the time service was rendered the customer requesting the test, or for a period of six months, whichever shall be the lesser, shall be refunded to the customer.

4.5.9 Adjustment for Meter Errors - Slow Meters.

If a meter tested at the request of a customer pursuant to paragraph 5.7 is

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found to be more than twenty-five percent (25%) slow, in the case of domestic service, or more than five percent (5%) slow for other than domestic services, the District may bill the customer for the amount of the undercharge based upon corrected meter readings for the period, not exceeding six months, that the meter
was in use.

4.5.10 Non-Registering Meters.

If a meter is found to be not registering, the charges for service shall be at the minimum rate or based on the estimated consumption from previous consumption for a comparable period or by such other method as is determined by the District and its decision shall be final.

4.5.11 Meter re-reads.

Customers are entitled to one meter re- read each calendar year at no charge. Subsequent meter re-reads will be charged to the customer's account at the rate specified in (Appendix A) if less than a discrepancy of ten thousand (10,000) gallons is found to exist when the recorded reading has been adjusted to compensate for any consumption since the recorded reading.

Article 6. PRIVATE FIRE PROTECTION.

4.6.1 Payment of Cost.

The applicant for private fire protection service not now installed shall pay the total actual cost of installation of the service from the water main to the customer's premises, including the cost of a detector check meter or other suitable and equivalent device, valve, and meter box, said installation to become the property of the District. The District may agree to install the connection and meter at cost plus ten percent (10%).

4.6.2 No Connection to Other System.

There shall be no connections between this fire protection system and any other water distribution system on the premises.

4.6.3 Use.

There shall be no water used through the fire protection service except to extinguish fires and for testing the fire fighting equipment.

4.6.4 Meter Rates.

Any consumption recorded on the meter will be charged for at double the regular service rates except that no charge will be made for water used to extinguish accidental fires where such fires have been reported to the duly authorized fire protection agency.

4.6.5 Monthly Rates.

The monthly rates for private fire protection shall be established in the District's Schedule of Rates (Appendix A).

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4.6.6 Water for Fire Storage Tanks.

Occasionally, water may be obtained from a private fire service for filling a tank connected with the fire service, but only if written permission is secured from the District in advance and an approved means of measurement is available. The regular water rates will be applied.

4.6.7 Violation of Agreement.

If water is used from a private fire service in violation of the agreement or of these regulations, the District may, at its option, discontinue and remove the service.

4.6.8 Water Pressure and Supply.

The District assumes no responsibility for loss or damage due to lack of water or pressure, either high or low, and merely agrees to furnish such quantities and pressures as are available in its general distribution system. The service is subject to shutdowns and variations required by the operation of the system.

4.6.9. Rules.

The following rules shall apply to fire service connections:

a. Valve. When a fire service connection is installed, the valve governing same will be closed and sealed and remain so until a written order is received from the owner of the premises to have the water turned on.

b. Meter. If the District does not require a meter, and if water is used through a fire service connection for any other purpose than extinguishing of fires, the District shall have the right to place a meter on the fire service connection at the owner's expense, or shut off the entire water supply from such premises.

c. Additional Service. The District shall have the right to take a domestic, commercial, or industrial service connection from the fire service connection at the curb to supply the same premises as those to which the fire service connection belongs. The District shall

also have the right to determine the proportion of the installation costs properly chargeable to each service connection, if such segregation of costs shall become necessary.

d. Check Valves. The District reserves the right to install on all fire service connections a check valve of a type approved by the National Board of Fire Underwriters, and to equip the same with a bypass meter at the expense of the owner of the property.

Article 7. TEMPORARY WATER SERVICE.

4.7.1 Duration of Service.

Temporary service connection shall be discontinued and terminated within six (6) months after installation unless an extension of time is granted in writing by the District.

4.7.2 Deposit.

An applicant shall deposit, in advance, the charge as reflected in (Appendix A) for temporary water service. In addition there shall also be an installation, removal, and relocation charge.

4.7.3 Installation of Operation.

All facilities for temporary service to the customer connection shall be made by the District and shall be operated in accordance with its instructions.

4.7.4 Responsibility for Meters and Installation.

The customer shall use all possible care to prevent damage to the meter or to any other loaned facilities of the District which are involved in furnishing the temporary service from the time they are installed until they are removed, or until 48 hours notice in writing has been given to the District that the contractor or other person is through with the meter or meters and the installation. If the meter or other facilities are damaged, the cost of making repairs shall be paid by the customer.

4.7.5 Temporary Service from a Fire Hydrant.

If temporary service is supplied from a fire hydrant, a permit for the use of a hydrant shall be obtained from the District. It is specifically prohibited to operate the valve of any fire hydrant other than by the use of a spanner wrench designed for this purpose. Any user of water service by fire hydrant permitted by the District, must inform the District daily of any use of water from any particular hydrant and must identify the hydrant by hydrant number and location to the District. The District shall charge a deposit for a hydrant meter, a permit fee and a charge for water use from any hydrant as set forth in Appendix A.

4.7.6 Unauthorized Use of Hydrants.

Tampering with any fire hydrant for the unauthorized use of water therefrom, or for any other purpose, is a misdemeanor, punishable by law.

4.7.7 Charge for Unauthorized Use of Fire Hydrants.

In the event any person, other than organized fire protection agencies, makes any connection to a fire hydrant without written permission from the District, a charge of Two Hundred Fifty Dollars ($250.00) shall

be paid to the District by the person making such connection. Any such unauthorized connection shall be immediately disconnected upon discovery thereof.

4.7.8 From Other Than Fire Hydrant.

A temporary service connection from a primary source other than a fire hydrant may be procured upon application to the District. Such connection shall be in accordance with this Article.

Article 8. SERVICE LINE SPECIFICATIONS.

4.8.1 Specifications.

Minimum specifications for the construction of sewer service lines and water service lines have been adopted by the District. All installations of these service lines shall comply with said specifications.

4.8.2 Licensed Plumber Required.

Water and sewer service lines shall be installed by a plumber duly licensed by the State of Colorado in accordance with these regulations at the expense of the property owner. The water service line runs from the building to the corporation stop which corporation stop shall be installed by the District. The District will connect the water lateral line from the main to the corporation stop. The sewer service line runs from the building being served to the District lateral sewer. The District will connect the sewer lateral line service to the sewer main.

4.8.3 Backfill and Cover.

All service lines and laterals shall be installed with a minimum of four (4) feet of cover. Excavation, trench shaping, pipe bedding, and backfilling are subject to approval of the District's inspector who shall inspect all service lines before they are backfilled. Backfill shall be so compacted that no line will be broken by settlement. All backfills of cuts in public rights-of-way shall be in compliance with the requirements of the District, the County, and the State of Colorado.

4.8.4 Service Installation Prior to Paving.

The District requires all building service lines (both water and sewer) to be installed prior to street paving and be installed to the property lines as directed by the District at the time the main lines are constructed.

4.8.5 Inspection.

The applicant for the building sewer or water service permit shall notify the District Manager when the building sewer or water service is ready for inspection and connection to the public water or sewer system. The connection shall be made under his supervision or that of his designated deputy.

4.8.6 Other Permits.

No permits issued by the District shall be taken as authority for the making of any cut in public road or street nor in lieu of any permit required by any other regulatory body.

4.8.7 Barricades.

All excavation for building, sewer or water service installation shall be adequately guarded with barricades and lights so as to protect the public from hazard. Streets, sidewalks, parkways, and other public property disturbed in the course of the work shall be restored in a manner satisfactory to the District, County or other regulatory body.

4.8.8 Unspecified Material.

Before any water service line or sewer service line may be installed with materials not specified in these rules and regulations, written approval therefor must be obtained from the District.

4.8.9 Disconnections.

No water or sewer service line shall be disconnected from the District laterals or mains without the authorization of the District Manager, who shall specify how the same shall be discontinued.

4.8.10 SURFACE AND SUBSURFACE WATER DIVERSION

a. In any structures erected on the property which is connected to the District Sewer System, if a sump for rain, surface or subsurface water or a subsurface, exterior drainage system is installed, a pump shall be installed and it shall be connected to a drainage system that shall discharge to atmosphere and it shall not be connected to the District's sewage collection system.

b. Should any property be found in violation of this regulation, the District may terminate water service to said property without notice. Water service shall not be renewed to the property until the violation is corrected. In addition, the District may charge a fee equal to the fee determined by paragraph 4.10.8 The Unauthorized Connection Fee plus all actual costs of the District for inspection, administration and legal fees to insure the correction of the violation and for any collection of any amounts due.

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Article 9. CONSTRUCTION OF MAIN LINE EXTENSIONS.

4.9.1 Specifications.

Minimum specifications for construction of sewer main extensions or water main extensions have been adopted by the District. All installations of these extensions shall comply with said specifications.

4.9.2 Sewer and Water Main Extension Applications.

A developer or constructor desiring the District to serve any undeveloped area must submit to the Board a preliminary map of the area to be developed, a work plan for all water and sewer facilities to be constructed, and a cost estimate for such water and sewer facilities, including an inflation factor. If appropriate, all such plans for the extension shall be submitted to the District's Engineer for comment and recommendations prior to the Board acting to approve, approve with conditions, or disapprove the submitted documents.

4.9.3 Processing of Sewer or Water Main Extensions with the State of Colorado, the County or Other Local Entity.

The District assumes no responsibility for the processing of or decision not to process an application for main line extension before the Colorado Department of Health, the County or any other agency. The decision to process or not to process such an application rests solely with the developer or constructor of the main line and the District assumes no esponsibility or liability for that decision.

4.9.4 Location of Main Extensions and Additions, and Service Line Stub-Out Installation.

Water or sewer mains shall be installed in roads or streets which the District, the County, the State Highway Department or other public agency has accepted for maintenance as a public right-of-way, as well as any easements granted for the use of the District. All lateral lines and service line stub-outs shall be installed to the property line at the time of construction of the main. All such main lines, laterals and stub-outs shall be constructed prior to paving.

4.9.5 Procedure for Main Extension Construction.

If applicant has agreed to the engineering layout or design and preliminary cost estimated for the work, he shall enter into a standard line extension contract with the District, covering standard regulations and specifications for line extensions and he shall either:

a. Deposit, in advance, with the District an amount equal to the cost of the contract to be let, including engineering expenses, administration and legal costs so that the District can construct the line extension through contract or with its own forces.

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b. If the cost of the work shall increase through change order, the applicant shall be so notified and no change order shall be approved until the deficiency is added to the deposit. Upon completion of the work, the final cost shall be certified by the Manager or his designee and any overage refunded to or deficiency made up by the applicant.

c. All daily inspection fees on main construction required by the County, State Highway Department or local governments shall be paid by the plumber, contractor or others doing work in the District.

d. The applicant shall be responsible for "oversizing" main extensions as required by the District. Any oversizing required of the applicant shall be paid by the applicant, which may be subject to a recovery agreement allowing the applicant certain rights to recover from a subsequent extender, either of extender of mains beyond that of the applicant or of any connection to the main installed by the applicant.

4.9.6 District Installed Main Lines.

Nothing contained herein shall prohibit the District from constructing and paying for main line extensions. If so constructed and paid for by the District, the District shall have the authority to contract with the developer, if any, for the repayment of the District's costs in so extending the main lines. Additionally, a "main extension hookup fee" shall be imposed by the District in excess of the normal tap fee and plant investment fee in sufficient amounts to recover from each owner of a lot or property which may be served by the main line extension the pro-rata share of the cost of the main line extension.

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4.9.7 Main Extension Hook-Up Fee.

a. A main extension hookup fee shall be charged and assessed to all lots and/or properties which may be served by any main extension. The property owners or lot owners will be charged an amount equal to the total cost of the construction of the main extension divided by the number of lots and/or properties which may be served by the main extension.

b. Should a main extension be constructed and paid by any developer or other private party, upon collection of the main extension hookup fee by the District the District shall pay these funds to the person or entity that constructed and paid for the main extension.

c. If the main extension is constructed and paid for by the District the District shall assess a main extension hookup fee against the property in the pro-rata amounts set forth in sub-paragraph a. above to each lot or property.

d. No water or sewer tap shall be issued unless the main extension hookup fee is paid in full either at the time of application for a tap or at any time prior to that date.

e. The amount of the main extension hookup fee charged for each lot or property which may be served by a main extension shall be adjusted on January 15th of each year in an amount equal to the percentage set forth in the Engineering News Record Construction Cost Index.

f. The assessment for the main extension hookup fee shall constitute a perpetual lien on and against the lot or property which may be served by the main extension until the fee is paid.

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Article 10. APPLICATION AND PERMIT FOR SERVICE.

4.10.1 Connection Permit.

a. Before any connection is made to the sewer or water mains a permit therefor shall be obtained from the District and the required charges therefor paid. Application for a water and sewer connection permit shall be made to the District on forms furnished by the District, which shall give a full description of the work to be done, the address of the unit to be served, the name of the licensed plumber to perform the work under the permit and such other information as may be required by the District. In addition, each application must be accompanied by a Certificate of Approval of the plans and specifications issued by the Pueblo West Committee of Architecture and no application will be considered until the Certificate of Approval is received. Any permit may be revoked if the installation or use of a water or sewer service line is not made in accordance with these regulations and any prescribed specification

of the County and the District.

b. Plant Investment Fee, Water and Sewer - A Water Plant Investment Fee and a Sewer Plant Investment Fee shall be charged at the time of receipt by the District of an application for water service. The Water Plant Investment Fee and the Sewer Plant Investment shall be collected at the time of receipt of the application by the District. If either the Water Plant Investment Fee or the Sewer Plant Investment Fee is not paid at the time the application is submitted, the application shall not be accepted or processed by the District. The Water Plant Investment Fee and the Sewer Plant Investment Fee to be charged and then collected is set forth in (Appendix A) to the Rules and Regulations. The Sewer Plant Investment Fee shall not apply to property that does not connect to the District's sewage collection system.

4.10.2 Separate Permit.

Not more than one connection to the water or sewer mains shall be allowed under each permit. A permit shall be limited to one building. No combination of permits shall be allowed and each water and each sewer permit is separate from any other permit. No permit issued by the District shall be taken as authority for the making of any cut in a public road or street, nor shall such District permit be in lieu of any permit required by any other regulatory body.

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4.10.3 Denial of Application.

The District reserves the exclusive right to deny application for service when, in the opinion of the Board, the service applied for would create an excessive seasonal or other demand on the facilities. Denial may also be based upon an unresolved obligation between the District and the applicant, inadequate documentation or easements for main lines serving the property, or other valid reasons.

4.10.4

Cancellation of Application and Refund of Fees. The District reserves the right to revoke any application previously granted, before service has been provided. Application for service does not bind the applicant to "use the service". Such application shall be retained along with the fees paid, by the District, for a period of twelve (12) months. If the applicant has not then requested service, the application will be deemed to be canceled. The District may retain the fees paid until refund is requested; or may continue assessment of minimum service charges. The District shall, upon request, refund to applicant all sums paid less a processing fee of 20% thereof.

4.10.5 Inclusions.

Service will be furnished only to property which is included within and subject to the rules and regulations and taxation of the District, subject to the further provisions of these rules and regulations. It shall be incumbent upon the applicant to furnish satisfactory evidence of inclusion whenever such evidence is requested by the District. A formal request for inclusion into the District shall be made to the District in its standard form by the applicant, accompanied by a non-refundable payment of $300.00 toward legal fees and costs of publication. Any additional costs which may occur shall be assessed and paid prior to approval by the Board.

4.10.6 Service Outside the District.

No service shall be provided property outside of the District except upon express written approval of the Board. Charges for furnishing service outside the District shall be at the discretion of the Board, but no service shall be furnished property outside the District unless the charge therefor equals at least the cost of service plus the estimated mill levy and tap fees for which such property would be responsible if it were a part of the District. In every case where the District furnishes service to property outside the District, the District reserve the right to discontinue the service when, in the judgment of the Board, it is in the best interests of the District to do so and such license shall be considered a revocable license.

4.10.7 Change in Customer's Equipment or Service.

a. No change in the customer's equipment or service shall be made without prior approval of the District being first obtained. Any change in a customer's equipment or service which increases the level of service provided by the District shall require a re-determination and payment of an increased tap fee and monthly service charge. The re-determined tap fee shall allow a credit for previously paid tap fees. Changes in a customer's equipment or service which results in a decrease in the service provided by the District shall not result in a reduction or refund of tap fees.

b. When the building served by the tap authorization is destroyed, the tap authorization is terminated unless specific written authorization for continuance thereof is given by the District Manager.

c. When the building served by the tap authorization, to include mobile homes and modular homes, is moved from the property, the installed meter shall be removed and the property shall revert to the Availability of Service (AOS) charges unless specific written authorization for continuance of service is granted by the District Manager. If the water service meter is removed, a reinstallation service charge of one hundred dollars ($100.00) must be paid after property application and approval has been effected.

4.10.8 Unauthorized Connection Fee. An unauthorized connection fee equal to two times the amount of the normal tap fee in addition to the normal tap connection fee shall be payable by persons tapping onto the District's lines without prior payment of connection fees, approval of application or adequate inspection of lines.

Article 11. RATES, CHARGES, AND BILLING.

4.11.1

a. General. The information contained in this Article is pertinent to all rates and charges of whatever nature to be levied for the provision of sewer and/or water services. Said rates and charges as established herein, and attached as (Appendix A), are in existence and effect at this time, under provisions of these rules and regulations and under the applicable statutes of the State of Colorado. Nothing contained herein shall limit the

Board from modifying rates and charges, from modifying any classification or from effecting such modification without prior notice, except for Availability of Service charges, which notice shall be provided per C.R.S. 32-1-1006(1)(h), et seq.

b. Sewer Service Charges. The District Manager shall review the total annual cost of operation and maintenance annually, in conjunction with the development and preparation of the District's annual budget, as well as each user's contribution percentage, for the purpose of revising the service charge system as necessary to assure equity of the established charge system and to assure that sufficient funds are obtained to adequately operate and maintain the sewer system treatment facilities.

Excess of revenues collected from a class of users compared to the costs of operations and maintenance attributable to that class of users shall be applied to that class' cost projected for the following year and the rates will be adjusted accordingly.

4.11.2 Application of this Section. The rates, charges and other information shown herein shall apply only to customers within the District and shall apply only to sewer and/or water service. These provisions shall in no way obligate the District with respect to any special agreement user. In those situations where, in the Board's sole discretion, the monthly service charges or tap fees provided herein do not represent a fair, reasonable and equitable charge for the intended use, the Board may adjust said rates.

4.11.3 Billings.

The term "monthly" for billing purposes shall mean the period between any two consecutive readings by the District of the meter(s) at the customer's property and such readings are to be taken as nearly as practicable every thirty (30) days.

Should the District be unable to read the meter(s) because of inclement weather conditions, the District Manager may authorize the estimation of meter readings. The basis for the estimation will be the customers consumption experience during the most recent like billing period. (e.g. December current year, vs. December prior year.) If the next reading shows that the bill for the amount of water delivered since the previous reading is not equal to as much as the minimum charge (RTS plus no-charge water) for each month that has passed since the previous meter reading, then the customer shall pay the minimum charge for each month since the last regular reading.

Failure to receive a bill in no way exempts the customer from payment for services rendered. The District will mail to the

customer, at the service address shown on the application, or to another mailing address designated by the customer, a bill for water and sewer services delivered, and it shall be conclusively presumed that the customer received said bill by mail within seventy-two (72) hours after the bill was mailed.

4.11.4 Nonpayment.

Service shall be revocable by the District upon nonpayment of valid fees owing to the District. If bills are not paid within thirty (30) days after mailing by the District, the District may issue a notice, in writing, that disconnection will occur after ten (10) days of the date of mailing by first class mail, personal delivery or posting on the building being serviced. Said notice shall set forth:

a. The reason for disconnection;

b. The manner in which the District may be contacted for the purpose of resolving the obligation; and

c. That there exists an opportunity for a hearing prior to disconnection.

If the obligation is not resolved within the time prescribed, service to the property shall be revoked by blocking or disconnecting the appropriate water or sewer line, either public or private, serving the property, and/or the District may proceed to foreclose the lien created by C.R.S. 32-1-1001 (1)(j) and 4.11.6 of these Rules and Regulations. All costs of disconnection and collection will be assessed to the customer.

4.11.5 Liability for Payment.

All fees, rates, tolls, penalties or charges shall constitute a perpetual lien on and against the property served and any such lien may be foreclosed in the same manner as provided by the laws of the State for the foreclosure of mechanic's liens. If the District takes any action to collect the payment of any customer's account which is late, the customer, in addition to any other damages assessed, shall be responsible for all turn off and turn on fees, all costs of the District, including reasonable attorney fees and court costs necessary to or incidental to the collection of said account.

It is the responsibility of the Purchaser of property to ascertain that the water and/or sewer account is paid to date of sale. (See Section 4.11.12e).

All charges for water and sewer service shall be billed directly to the owner of the property. All delinquent bills are the responsibility of the property owner and if service is turned off due to late payment or nonpayment all charges including delinquent payments must be paid before service shall be turned on to the property.

4.11.6 Uncollectible Accounts.

When any valid charges by the District become uncollected or uncollectible for any reason including, but not limited to, tax sale, foreclosure, bankruptcy or any other reason, service authorization to the property will terminate. Restoration of service will be authorized upon payment of the then current tap or connection fees as if it were a new service.

4.11.7 Cash Deposit.

The District shall require a cash deposit from all builders, contractors or agents thereof to ensure payment of costs incurred during construction. Any excess of deposit over actual costs shall be refunded to the building contractor or agent thereof. The District may require, at any time, from any customer or prospective customer, a cash deposit intended to ensure payment of current bills; such deposit will not exceed an estimated ninety (90) days' bill for such customer.

4.11.8 Turn off and Turn on Fees.

If services are turned off for any reason the turn off fee as set forth in (Appendix A) shall be charged. Upon payment of any fees or for any other reason upon the District turning on service to a property, a turn on fee as set forth in Appendix A shall be charged. It shall be illegal for any person other than authorized employees or officials of the District to turn off or turn on services.

If services to a property have been turned off, the property owner shall pay a turn on fee as set forth in Appendix A before the District shall turn on service to the property.

4.11.9 Availability of Service Charge.

A monthly service charge for water service availability shall be levied and opposed against property not connected to and serviced by District's water or sewer facilities where lines have been installed within 100 feet of the property line of the property. The monthly charge shall be billed and collected semi-annually in January and July each year for each month of non-use after line installation has been completed, or where the non-user's property has been disconnected for any reason from the District's sewer or water services, for each month of non-use after such disconnection. The Availability of Service Charges shall be as set forth in Appendix A.

4.11.10 Distribution of Billings.

The District reserves the right to issue only one bill for a multi-unit structure or developments; to issue one bill for all units serviced by a condominium or homeowners' association. In all instances owner of the property remains ultimately liable for all charges, fees, deposits, penalties, interest or other sums due in relation to water and sewer service provided by the District.

4.11.11 After Hours Service Requests.

If a customer requests service on other than regular work days (Monday through Friday) and outside of regular work hours (7:30 a.m. through 4:30 p.m.) which results in a "call-out" of a District representative, and it is determined that the emergency is on a customer's property (i.e. a leak, break or other problem is on the customer's side of the meter) a minimum fee set forth in Appendix A shall be charged to cover the minimum employee call-out cost. If costs exceed the minimal call-out costs, the prevailing over-time hourly rate set forth in Appendix A will be added to the minimum charge as required.

4.11.12 Other Fees, Charges and Penalties.

a. A service charge will be levied against any account for which payment has been attempted with a dishonored check. The amount of the service charge is set forth in (Appendix A).

b. If for reason of non-payment of Availability of Service charges it is deemed necessary to file a lien against property, a service charge will be added to defray related costs involved. Subsequent payments will be first applied to penalties, then to any interest and lastly to the Availability of Service charge. The amount of the service charge is set forth in Appendix A.

c. All fees, charges and other payments due the District on any account are payable twenty-five (25) days from the billing date. Any payment received by the District more than twenty-five (25) days from the billing date shall be considered delinquent and the party responsible for paying the fee, charge or other payment shall be assessed and charged a penalty as set forth in (Appendix A). All payments received by the District shall be first applied to any penalties or interest charges assessed and then against sewer charges, and lastly against water charges.

d. A "transfer charge" shall be made for any change of responsible parties listed on the account. The charge shall be levied against the new responsible party. The amount of the charge is as listed in Appendix A.

e. The final reading fee as set forth in Appendix A shall be charges should any customer request a final reading for transfer or for turn off unless the final reading is on the normal meter reading date for that property. If the transfer of ownership of the property occurs the final billing shall be paid within three (3) days of the date of transfer of the property. If the final billing is not paid within three (3) days of the date of transfer, the District shall turn off water service to the property.

f. A wastewater debt service fee for retirement of the principal of the loan received by the District for the biosolids capital project at the wastewater treatment plant shall be charged to all sewer/wastewater service accounts. The amount of said charge is set forth in (Appendix A), RATES AND CHARGES and shall be effective for the first billing date in the year 2012 and all subsequent monthly billings until the loan principal and interest has been repaid in full

ARTICLE 12. WATER CONSERVATION AND DROUGHT CONTINGENCY PLAN

4.12.1 PURPOSE.

This Water Conservation and Drought Contingency Plan is adopted for the purpose of conserving the available water supply and protecting the integrity of the District's water system with particular regard of domestic water use, sanitation and fire protection and to protect and preserve public health, welfare and safety and minimize the adverse impacts of water supply, shortage or other water supply emergency conditions.

4.12.2 DEFINITIONS.

The following definitions shall apply to provisions of this Article 12. Two Year Normal Water Usage shall be defined as the number of 3/4 inch equivalent water taps supplying water to water users within the District existing on May 1 of any year multiplied times ½ acre foot of water multiplied times 2.

Two Year Water Supply shall be defined as the amount of water in storage plus the amount of water estimated to be available to the District by Twin Lakes Reservoir & Canal Company for the then current water year as determined by Twin Lakes Reservoir & Canal Company from time to time.

System Water Demand shall be defined as the amount of water produced and used by District water users on a daily, weekly or monthly basis as set forth in these Regulations.

Landscape Watering shall be defined as watering with underground sprinkler systems or with stationary or movable sprinklers attached to a hose (not hand held) of grass lawns.

Stage 1 – Conservation State – a water conservation state or Stage 1 of the Water Conservation and Drought Contingency Plan shall be in effect if any of the following criteria are met:

a. The District's available two year water supply falls to 90% or less of the current two year normal usage; or

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b. The system water demand reaches 90% of treatment capacity daily for four (4) consecutive days; or

c. Deficiencies in the District's distribution system limit supply capabilities.

Stage 2 – Water Warning –a water warning state or Stage 2 of the Water Conservation and Drought Contingency Plan shall be in effect if any of the following criteria are met:

a. The District's available two year water supply falls to 80% or less of the current two year normal usage; or

b. The system water demand reaches 96% of treatment capacity daily for four (4) consecutive days; or

c. Deficiencies in the District's water distribution system limit supply capabilities.

Stage 3 – Water Emergency – a water emergency state or Stage 3 of the Water Conservation and Drought Contingency Plan shall be in effect if any of the following criteria are met:

a. The District's available two year water supply falls to 70% or less of the current two year normal usage; or

b. The system water demand reaches 100% of treatment capacity daily for four (4) consecutive days; or

c. Short term deficiencies in the District's water distribution system limit supply capabilities such as but not limited to system outage due to failure or damage of major water system components.

Stage 4 – Water Crisis – a water crisis state or Stage 4 of the Water Conservation and Drought Contingency Plan shall be in effect if any of the following criteria are met:

a. The District's available two year water supply falls to 60% or less of the current two year normal usage; or

b. The system water demand reaches 110% of treatment capacity daily for four (4) consecutive days; or

c. Short term deficiencies in the District's water distribution system that limit supply capabilities such as system outage or failure; or

d. Inability to maintain or replenish adequate volumes of water in storage to provide for public health and safety.

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Stage 5 – Emergency Water Shortage – an emergency water shortage state or Stage 5 of the Water Conservation and Drought Contingency Plan shall be in effect if any of the following criteria are met:

a. Major water line breaks or pump or system failures occur which cause unprecedented loss of capability to provide water service; or

b. Natural or manmade contamination of the water supply sources.

4.12. 3 SYSTEM MONITORING

A. The District Manager or his or her designee shall monitor the water system and the demand conditions for water usage of the District and shall determine when conditions warrant initiation or termination of each stage of the Water Conservation and Drought Contingency Plan.

4.12.4 REQUIREMENTS AND RESTRICTIONS FOR STAGE 1 – CONSERVATION STATE

When the District Manager determines that Stage 1 or Conservation State water or supply shortage is in effect he shall give notice and request all water users to voluntarily conserve water and voluntarily adhere to the following water use restrictions. The goal is to reduce total monthly water use by 10% of the previous year's usage. The following water use restrictions shall be mandatory for District owned facilities.

a. Landscape watering for each landscaped area shall be limited to two (2) days per week and that such irrigation shall only occur between the hours of 12:01 a.m. and 7:00 a.m. and between the hours of 7:00 p.m. and 12:00 midnight. each day.

b. Hydrant use for road compaction or other uses other than as required for fire fighting shall be eliminated. Where available reuse or well water will be used by the District for road compaction and construction.

c. Vehicle washing shall be reduced except where health, safety and welfare of the public is contingent upon frequent vehicle cleansing.

d. Limit irrigation of flowers, shrubs, trees and ornamental gardens to hand held garden hose, soaker hose, bucket or drip irrigation system.

e. Request that all water users conserve and minimize or discontinue water use for all non-essential purposes.

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B. WATER RESTRICTIONS FOR STAGE 2 – WATER WARNING

When the District Manager determines that Stage 2 or water warning state is in effect he shall give notice and request all water users to voluntarily conserve water. The goal is to reduce total monthly water use by 20% from the previous year's usage. The following water use restrictions shall be in effect.

a. All water restrictions set forth for Stage 1 – Conservation State set forth above.

b. The implementation of a temporary conservation water use charge by the addition of a charge for consumption of all water above 25,000 gallons per month shall be charged at the rate of $6.00 per thousand gallons.

This temporary water conservation rate shall apply to rate code number 41 set forth in Appendix A of the Rates and Charges of the Rules and Regulations of the District.

c. Contracts and supplying of potable water outside the District shall be suspended where applicable.

C. WATER RESTRICTIONS FOR STAGE 3 – WATER EMERGENCY

When the District Manager determines that Stage 3 or water emergency state is in effect he shall give notice and request all water users to conserve water and adhere to the following water use restrictions. The goal is to reduce total monthly water use by 30% from the previous year's usage. The following water use restrictions shall be mandatory for all water users.

a. All requirements of Stage 1 – Conservation State and Stage 2 – Water Warning shall remain in effect.

b. Landscape watering shall be limited to two (2) days per week only between the hours of 12:01 a.m. and 7:00 a.m. and between the hours of 7:00 p.m. and 12 midnight on the day corresponding to the last two (2) digits of the service address as set forth below.

1. Addresses that end in numbers 00 through 33 will be restricted to watering on Monday and Thursday only.

2. Addresses that end in numbers 34 through 66 will be restricted to watering on Tuesday and Friday only.

3. Addresses that end in number 67 through 99 will be restricted to watering on Wednesday and Saturday only.

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No watering shall be allowed from 12:01 a.m. to 12 midnight on Sundays. The lowest address number will identify properties having multiple addresses for one water meter. If no address exists for the property the District Manager or his or her designee will assign an address to the property for the purposes of this Article.

c. The water usage rate for consumption greater than 10,000 gallons but less than 25,000 gallons per month shall be increased to $4.00 per thousand gallons for all customers in rate code number 41 as set forth in Appendix A – Rates and Charges of the Rules and Regulations of the District.

d. Limit irrigation of flowers, shrubs, trees and ornamental gardens to hand held garden hose, soaker hose, bucket or drip irrigation system.

D. WATER RESTRICTIONS FOR STAGE 4 – WATER CRISIS

When the District Manager determines that Stage 4 or water crisis state is in effect he shall give notice and request all water users to conserve water and adhere to the following water use restrictions. The goal is to reduce total monthly water use by an amount so the District is able to provide essential potable water for domestic use. The following water use restrictions shall be mandatory for all water users.

a. All requirements of Stage 1 – Conservation State, Stage 2 – Water Warning and Stage 3 – Water Emergency shall remain in effect during Stage 4 – Water Crisis.

b. There shall be no outside water usage permitted during a Stage 4 - Water Crisis.

E. STAGE 5 – EMERGENCY WATER SHORTAGE

The District Manager shall determine what stage or stages and which water restrictions shall be implemented and the specific water use restrictions necessary to protect the water system and provide adequate water supply for public consumption and hygiene. The goal is to reduce total monthly water use to allow the water system to recover from the emergency condition.

4.12.5 FAILURE TO REACH GOALS

If the water reduction goal of each stage set forth above has not been met the District Manager is authorized to declare a higher stage state of conservation necessary to achieve the required water use reduction.

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4.12.6 VIOLATIONS.

a. A water customer violates the restrictions of the Water Conservation and Drought Contingency Plan if he or she makes, causes or permits a use of water supplied by the District in violation of any of the restrictive measures implemented by the District Manager as set forth above after notice has been given pursuant to Section 4.12.9.

b. No person shall allow the use of water supplied by the District for residential, commercial, industrial, agriculture, governmental or any other purpose in a manner contrary or in violation of any provision of this Article or in an amount in excess of that permitted by this Article for any water conservation stage in effect at the time pursuant to notice as set forth in Section 4.12.9.

4.12.6 PENALTIES.

a. Any water customer found in violation of the mandatory restrictions as set forth above shall be penalized as follows:

1.A warning shall be issued for the first violation.

2.A penalty in the amount of $50.00 shall be assessed for a second violation.
3.A penalty in the amount of $500.00 shall be assessed for a third violation or for any violations in excess of three (3).

b. Each day that one or more of the provisions of the water restrictions set forth in this Article are violated shall constitute a separate violation. If a person commits three or more violations of the restrictions in each time period for which the restrictions have been implemented, after due notice to the customer as set forth in Section 4.11.4 of these Rules and Regulations, the District shall discontinue water service to the premises where such violations occur. Service to any premises where service has been discontinued shall be restored only upon payment of all fees pursuant to this Title 4 and any other costs incurred by the District in discontinuing service. Should any customer contest the finding of a violation by the

District the customer shall be entitled to a hearing before the District Manager if notice of such contest is received by the District within ten (10) days of the date of mailing of the Notice.

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4.12.8 VARIANCE, WAIVER, OR SUSPENSION OF RESTRICTIONS

a. Any person requesting a variance, wavier or suspension of the provisions of this Article shall file a petition for such variance with the District Manager within five (5) days after notice of a particular water conservation stage has been given by the District Manager. The Petition shall include:

1. The name and address of the petitioner.

2. The purpose of the water use claimed by the petitioner which cannot meet the restrictions.

3. The specific provisions of the Plan from which the petitioner is requesting relief.

4. A detailed statement as to how the specific provisions of the Plan adversely affect the petitioner or what damage or harm will occur to the petitioner or others if the petitioner complies with the restrictions in place.

5. A description of the relief requested.

6. The period of time for which the variance is sought.

7. Alternative water use restrictions or other measures that petitioner has taken or proposed to take to meet the goal of the water use reduction.

8. Other pertinent information.

b. The Manager or his or her designee may grant a temporary variance for existing water uses otherwise prohibited under this Article if he or she determines that failure to grant such a variance will cause an emergency condition adversely effecting the health, sanitation or fire protection for the public or the person requesting such variance and if one or more of the following conditions are met.

1. Compliance with the provisions of this Article cannot be technically accomplished during the duration of the water supply shortage or other condition for which the restrictions are in effect.

2. Alternative methods can be implemented which achieve the same level of reduction in water use.

c. Any variance granted by the District Manager or his or her designee shall be subject to the following conditions unless waived by the District Manager.

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1. Variance granted shall include a time table for compliance.

2. Variances granted shall expire when restrictions for any particular water conservation stage is no longer in effect or if the petitioner fails to meet specified requirements whichever shall occur first.

4.12.9 NOTICES.

a. The District shall give notice of all increased rates pursuant to any provisions of this Article by mailing said notice to all water customers at least two (2) weeks prior to the beginning of any billing cycle.

b. The District shall give notice for any landscape watering restrictions two (2) weeks before said restriction goes into effect by mailing said notice to all water customers of the District.

c. In addition to the two (2) weeks mailing notice the District shall request that notification be given to the public by publication in a newspaper in general circulation within the District and shall attempt to give notice by requesting that radio and television stations disseminate the landscape watering restriction notice.

4.12.10 TEMPORARY MODIFICATIONS.

a. The District Manager, at the direction of the Board of Directors, may provide temporary modifications to the plan as it relates to hours of watering for landscape watering and for the watering of flowers, shrubs, trees and ornamental gardens.

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GET OUTSIDE

Water Conservation Tips

DANIELLE BRIGIDA | FEBRUARY 12, 2008

I don't think I need to emphasize how important water is. However, I do want to say that v the number of issues we are facing we aren't paying enough attention to what makes up 7 our bodies.

The need for water conservation is becoming more and more apparent as drought and ot environmental pressures like global warming are affecting our water resources.

More Than Just the Basic Water Conservation Tips

Conserving Water: General Tips

- Turn down your water heater when you are going on a long trip.
- Keep a lookout for water saving appliances. Like this great find by Groovy Green: Eco friendly washing machine.
- Check your water meter while no water is being used in your house. If it moves, you leak.

Conserve Water in the Bathroom

- Avoid flushing the toilet unnecessarily. In other words, don't use it for a garbage. Dis of tissues, insects and other similar waste in the trash rather than the toilet.
- Test for a leaking toilet by adding food coloring to the tank (not the bowl). Without flushing, note if any color appears in the bowl after 30 minutes.

- Don't let the water run when washing, brushing and shaving. Turn it on and off as ne
- Take showers instead of baths. A ten minute shower with a low-flow showerhead use the water of a regular bath.
- If your shower takes a while to heat up, and you have to let the water run, put bucke the shower to capture the water for watering plants, washing vegetables, water for p washing your car and bike.
- If you are designing your own bathroom, think about putting in the Japanese style of that is deeper but more compact – water cools more slowly requiring less input of h water.
- Get a small sand timer that lasts about 3 minutes and bring it in the shower. Most pe can have a shower in six minutes.
- Look into devices that divert water into a bucket from the shower while the water is warming up via a hose.
- Repair dripping faucets or toilets, which use enormous amounts of water.

Conserve Water in the Kitchen

- Avoid washing dishes under a stream of water. Turn off the water in between dishes. only a full dishwasher and clothes washer.
- If you like a drink of cold water, but you have to let the tap run for a while before the gets
  cold, instead keep a pitcher of water in the fridge.
- Save the water from steaming or boiling vegetables for houseplants, vegetable broth soup or stir fry liquid.
- Wash food in a bowl or pot of water rather than in running water. This works especia well for herbs because you can swish them around and the dirt will come off their m surfaces. Let the herbs sit a minute and the dirt will sink to the bottom while the her float at the top.
- Do not use water to thaw meat. Use the microwave instead.
- Avoid using your garbage disposal system in your sink. It uses lots of water to run. **Compost your scraps instead.**

Conserve Water Outdoors

- Mulch planting beds with newspaper, leaves, bark, or wood chips. Mulches retain soi moisture and improve soil quality.
- Water your plantings with a soaker hose or a drip irrigation system. Less water evapo this way than with a sprinkler, and you target your watering.
- Use a timing device with any watering system.
- Use “wasted” water for your plants. A rain barrel or cistern that captures rainfall fror roof is a great garden reservoir. In some areas, gray water – water from bathing or wa clothes – can legally be diverted to garden use. Use water from your fish tank when y clean it in the garden because it contains great nutrients. Empty dehumidifiers in th garden.
- Get a squeeze nozzle for your hose. That way you only use water when you need it.
- If you have a swimming pool, keep it covered when not in use.
- Sweep sidewalks with a broom, not a stream of water.
- Group plants according to water needs so you can water with the least amount appropriate.
- Plant native plants that don’t require extra watering.
- When washing your car, use a bucket and sponge rather than letting the hose run.
- When mowing your lawn, set the blades a little higher (at least three inches) and you will require less watering.
- Test to see if your garden needs watering by putting a screwdriver into the soil. If it g easily, you don’t need to water.
- Weed your garden because weeds take the water away from your other plants.

Get Outside | *composting*, *Gardening*, *recycling*, *Texas water policy*, *tips*, *water*

APPENDIX F – PWMD HISTORICAL WATER CONSUMPTION DATA AND CALCULATIONS

Historical Demand and Production

Month	Total Raw Water Pumped	Treated Water Production	Metered Water Sales	Desert Hawk	Process Water ClO2
	MG	MG	MG	MG	
Jan-14	77.393	76.344	57.575	1.516	0.253
Feb-14	70.03	71.096	56.983	1.662	0.359
Mar-14	85.821	82.424	50.939	0.473	0.278
Apr-14	114.79367	113.355	71.569	6.051	0.363
May-14	180.707	174.357	130.829	8.541	0.495
Jun-14	229.288	218.9	157.064	13.327	0.571
Jul-14	217.32	208.799	210.858	21.599	0.674
Aug-14	204.338	197.711	168.81	11.901	0.674
Sep-14	198.585	193.722	176.933	17.762	0.641
Oct-14	142.13	138.447	161.548	13.185	0.686
Nov-14	88.484	84.825	82.007	6.93	0.364
Dec-14	83.327	77.965	57.314	1.442	0.348
Jan-15	85.516	82.365	61.593	0	0.354
Feb-15	74.778	74.243	54.793	0	0.306
Mar-15	182.263	88.055	52.091	0.25	0.299
Apr-15	135.711	133.068	87.862	9.942	0.382
May-15	119.234	116.419	107.086	5.184	0.522
Jun-15	175.634	166.568	101.935	4.78	0.447
Jul-15	224.738	212.265	155.942	12.328	0.616
Aug-15	216.127	211.573	191.04	25.367	0.678
Sep-15	216.641	212.154	183.325	13.689	0.674
Oct-15	153.433	151.146	148.076	12.279	0.612
Nov-15	94.751	92.906	102.292	4.544	0.586
Dec-15	85.134	85.13	57.203	2.287	0.489
Jan-16	86.718	85.902	60.24	0	0.573
Feb-16	82.421	82.62	55.296	0.621	0.491
Mar-16	94.697	95.146	60.469	3.459	0.478
Apr-16	136.01	132.688	84.832	5.77	0.54
May-16	177.578	174.886	107.865	8.541	0.454
Jun-16	231.606	227.65	155.68	17.841	0.577
Jul-16	239.143	229.717	209.793	17	0.656
Aug-16	225.723	219.346	194.272	20.084	0.672
Sep-16	212.062	207.873	164.27	14.282	0.628
Oct-16	179.858	170.31227	171.509	15.511	0.741
Nov-16	113.929	112.491	116.018	10.658	0.649
Dec-16	92.406	91.509	59.092	0.494	0.529
Jan-17	92.311	91.58	61.959	0.001	0.542
Feb-17	82.533	82.785	59.808	0	0.483
Mar-17	108.181	105.405	55.866	3.333	0.4
Apr-17	113.6	111.462	83.977	9.153	0.503
May-17	139.241	136.841	101.27	9.218	0.545
Jun-17	218.925	217.591	124.044	10.835	0.543
Jul-17	225.613	218.459	213.723	18.791	0.776
Aug-17	188.894	187.06	164.008	9.943	1.034
Sep-17	182.722	183.766	181.021	17.427	0.926
Oct-17	115.246	113.653	119.467	6.402	0.57
Nov-17	82.788	82.034	78.7	6.017	0.514
Dec-17	81.933	83.117	64.017	2.015	0.462
Jan-18	85.358	83.844	57.503	1.047	0.443
Feb-18	72.375	72.677	59.178	0.75	0.468
Mar-18	97.484	97.759	55.555	1.456	0.426
Apr-18	132.323	129.942	91.819	9.313	0.618
May-18	217.233	216.664	130.811	15.504	0.545
Jun-18	237.44	237.54	223.675	19.507	1.546
Jul-18	233.362	233.851	219.605	24.895	1.434
Aug-18	208.219	200.497	191.525	13.56	1.575
Sep-18	197.953	197.262	174.47	17.248	1.377
Oct-18	115.964	120.664	159.086	12.749	1.297
Nov-18	82.621	83.534	61.684	1.082	0.839
Dec-18	85.58	86.264	59.158	0.97	0.815

Month	Total Raw Water Pumped	Treated Water Production	Metered Water Sales	Desert Hawk	Process Water ClO2
	MG	MG	MG	MG	
2014	1692.2	1637.9	1382.4	104.4	5.7
2015	1764.0	1625.9	1303.2	90.7	6.0
2016	1872.2	1830.1	1439.3	114.3	7.0
2017	1632.0	1613.8	1307.9	93.1	7.3
2018	1765.9	1760.5	1484.1	118.1	11.4

Historical Demand and Production

Month	Process Water - Cl2	Other Water Consumption (Tankers)	Total Process Water	Real Losses (Leaks)
Jan-14	0.466	0.002	58.296	
Feb-14	0.54	0.015	57.897	
Mar-14	0.372	0.247	51.836	
Apr-14	0.57	0.029	72.531	
May-14	0.801	0.068	132.193	
Jun-14	0.92	0.102	158.657	
Jul-14	1.169	0.047	212.748	
Aug-14	1.159	0.59	171.233	
Sep-14	1.013	0.203	178.79	
Oct-14	1.093	0.01	163.337	
Nov-14	0.629	0.007	83.007	
Dec-14	0.487	0.006	58.155	
Jan-15	0.576	0.018	62.541	
Feb-15	0.443	0.008	55.55	
Mar-15	0.463	0	52.853	
Apr-15	0.585	0.084	88.913	
May-15	0.795	0.026	108.429	
Jun-15	0.782	0.049	103.213	
Jul-15	1.052	0.041	157.651	
Aug-15	1.201	0.007	192.926	
Sep-15	1.13	0.014	185.143	
Oct-15	1.075	0.002	149.765	
Nov-15	0.959	0.041	103.878	
Dec-15	0.688	0.025	58.405	
Jan-16	0.654	0.029	61.496	0.0023
Feb-16	0.604	0.042	56.433	0.0098
Mar-16	0.651	1.266	62.864	0.0091
Apr-16	0.815	0.056	86.243	0.0029
May-16	0.748	0.059	109.126	0.0029
Jun-16	0.975	0.559	157.791	0.0042
Jul-16	1.181	0.026	211.656	0.0047
Aug-16	1.203	0.037	196.184	0.1220
Sep-16	1.083	0.056	166.037	0.1716
Oct-16	1.435	0.215	173.9	0.1231
Nov-16	1.134	0.103	117.904	0.0784
Dec-16	0.755	0.021	60.397	0.1262
Jan-17	0.766	0.096	63.363	0.0023
Feb-17	0.63	0.013	60.934	0.0098
Mar-17	0.531	0.809	57.606	0.0091
Apr-17	0.633	0.017	85.13	0.0029
May-17	0.844	0.424	103.083	0.0029
Jun-17	0.93	0.389	125.906	0.0042
Jul-17	1.349	0.375	216.223	0.0047
Aug-17	1.223	0.185	166.45	0.1220
Sep-17	1.227	0.42	183.594	0.1716
Oct-17	0.87	0.1	121.007	0.1231
Nov-17	0.688	0.14	80.042	0.0784
Dec-17	0.615	0.11	65.204	0.1262
Jan-18	0.558	0.018	58.522	3.9236
Feb-18	0.558	0.016	60.22	0.9273
Mar-18	0.517	0.061	56.559	0.6111
Apr-18	0.756	0.06	93.253	15.6364
May-18	0.877	0.033	132.266	8.5921
Jun-18	1.872	0.057	227.15	0.3971
Jul-18	1.571	0.102	222.712	1.1181
Aug-18	1.586	0.121	194.807	0.0842
Sep-18	1.432	0.035	177.314	0.0923
Oct-18	1.449	0.029	161.861	13.4121
Nov-18	0.977	0.03	63.53	0.2658
Dec-18	0.752	0.038	60.763	6.3349

Month	Process Water - Cl2	Other Water Consumption (Tankers)	Total Process Water	Real Losses (Leaks)
2014	9.2	1.3	1398.7	0.0
2015	9.7	0.3	1319.3	0.0
2016	11.2	2.5	1460.0	0.7
2017	10.3	3.1	1328.5	0.7
2018	12.9	0.6	1509.0	51.4

APPENDIX G – COST-BENEFIT EVALUATION FOR WATER CONSERVATION OPTIONS

Supply Side Meter Testing and Replacement Program

Description: Accuracy of existing water production meters is fundamental for evaluating water conservation efforts and success. This measure implements a program to maintain and replace inaccurate meters.

Program Length =	**20**	**yrs**
Planning Period =	2018 - 2038	

Evaluation of Approximate Water Savings

Annual Estimated Savings Rate =	1.50%	
Phase 1 Estimated Annual Water Production =	2,047,917,590	gal
Total Water Production - Phase 1 =	10,239,587,950	gal
Phase 1 Annual Water Savings =	30,718,764	gal
Total Savings for Phase 1 (2018) =	153,593,819	gal
Phase 2 Estimated Annual Water Production =	2,149,274,881	gal
Total Water Production - Phase 2 =	21,492,748,810	gal
Phase 2 Annual Water Savings =	32,239,123	gal
Total Savings for Phase 2 (2023) =	322,391,232	gal
Phase 3 Estimated Annual Water Production =	2,250,632,172	gal
Total Water Production - Phase 3 =	33,759,482,580	gal
Phase 3 Annual Water Savings =	33,759,483	gal
Total Savings for Phase 3 (2028) =	506,392,239	gal
Planning Period Annual Water Production =	2,351,989,462	gal
Total Water Production - Planning Period =	47,039,789,240	gal
Planning Period Annual Water Savings =	35,279,842	gal
Estimated Savings for Planning Period (2033) =	**705,596,839**	gal

Comments:

The District's UARL (unavoidable real loss: the lowest amount of leakage the system can achieve using best technology) is approximately 1% of treated water. The current system leakage/loss rate is estimated at approximately 10%.

An annual water savings of 1.50% is assumed.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$	-
Third Party Costs =	$	5,000.00
Evaluation and Follow-up Costs =	$	2,500.00
Total One Time Labor/Material Costs =	**$**	**7,500.00**

Costs are approximate and for planning purposes only.

One time third party cost is an estimate of initial meter troubleshooting and calibration fees.

Labor Costs

Staff Hours =	10	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$500.00	/yr
Annual Labor =	**$500.00**	**/yr**

Material Costs

Annual Materials =	**$65,000.00**

Comments:

Annual material costs are associated with the meter maintenance program in the Capital Improvements Project alternatives.

Annual Cost Estimate =	**$65,500.00**

	2023	2028	2033	2028
Estimated Total Cost	$335,000.00	$662,500.00	$990,000.00	$1,317,500.00
Cost Per 1000 Gallons Saved	**$2.18**	**$2.05**	**$1.96**	**$1.87**

Leak Detection and Repair

Description: Measure includes leak detection for the District's water distribution system and subsequent replacement and repair as required. The District is currently in the process of developing the leak detection program. Preliminary efforts to develop this program have focused on initial leak detection efforts and leak testing methods. Initial leak detection efforts will focus on valve testing and replacement as the system's valves have been in service for 30-40 years on average and leaks have already been identified surrounding the system's valves. The District will be using sonic leak detection methods until the condition of the valves are suitable for pressure testing methods to be incorporated. Development of the leak detection program is still in the preliminary phases, additional details are not available at this time.

Program Length =	**20**	**yrs**
Planning Period =	2018 - 2038	

Evaluation of Approximate Water Savings

Annual Estimated Savings Rate =	1.50%	
Phase 1 Estimated Annual Water Production =	2,047,917,590	gal
Total Water Production - Phase 1 =	10,239,587,950	gal
Phase 1 Annual Water Savings =	30,718,764	gal
Total Savings for Phase 1 (2018) =	153,593,819	gal
Phase 2 Estimated Annual Water Production =	2,149,274,881	gal
Total Water Production - Phase 2 =	21,492,748,810	gal
Phase 2 Annual Water Savings =	32,239,123	gal
Total Savings for Phase 2 (2023) =	322,391,232	gal
Phase 3 Estimated Annual Water Production =	2,250,632,172	gal
Total Water Production - Phase 3 =	33,759,482,580	gal
Phase 3 Annual Water Savings =	33,759,483	gal
Total Savings for Phase 3 (2028) =	506,392,239	gal
Planning Period Annual Water Production =	2,351,989,462	gal
Total Water Production - Planning Period =	47,039,789,240	gal
Planning Period Annual Water Savings =	35,279,842	gal
Estimated Savings for Planning Period (2033) =	**705,596,839**	gal

Comments:

The District's real and apparent losses are approximately 12 percent of the total treated water. From the AWWA water audit evaluation the average "real loss" (physical water loss) rate is approximately 10%.

Leak detection will be performed annually with a goal of inspecting 1% of the distribution lines annually.

An annual water savings of 1.50% is assumed.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$0.00
Third Party Costs =	$0.00
Total One Time Labor/Material Costs =	**$0.00**

Costs are approximate and for planning purposes only.

Labor Costs

Staff Hours =	30	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$1,500.00	/yr
Third Party Costs =	$8,000.00	/yr
Evaluation and Follow-up Costs =	$2,000.00	/yr
Annual Labor =	**$11,500.00**	**/yr**

Assumed a third party consultant will be used for leak detection. This could also be performed by District staff.

Material Costs

Unit Costs =	$5,000.00	/Participant
Number of Participants =	3	/yr
Gallons Saved Per Unit Per Year (2038)	11,759,947.31	gal
Annual Materials =	**$15,000.00**	

Comments:

Assume that 10 valves are replaced annually for leak repair.

Annual Cost Estimate =	**$26,500.00**

	2023	2028	2033	2038
Estimated Total Cost	$132,500.00	$265,000.00	$397,500.00	$530,000.00
Cost Per 1000 Gallons Saved	**$0.86**	**$0.82**	**$0.78**	**$0.75**

Pressure Management

Description: Reduction of pressure in high pressure zones and throughout the distribution system to an average pressure of 80 psi. Reducing system pressure will reduce water loss through the distribution system caused by leaks and increase efficiency of irrigation systems.

Program Length =	**20**	**yrs**
Planning Period =	2018 - 2038	

Evaluation of Approximate Water Savings

Annual Estimated Savings Rate =	1.50%	
Phase 1 Estimated Annual Water Production =	2,047,917,590	gal
Total Water Production - Phase 1 =	10,239,587,950	gal
Phase 1 Annual Water Savings =	30,718,764	gal
Total Savings for Phase 1 (2023) =	153,593,819	gal
Phase 2 Estimated Annual Water Production =	2,149,274,881	gal
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Total Savings for Phase 2 (2028) =	322,391,232	gal
Phase 3 Estimated Annual Water Production =	2,250,632,172	gal
Total Water Production - Phase 3 =	33,759,482,580	gal
Phase 3 Annual Water Savings =	33,759,483	gal
Total Savings for Phase 3 (2033) =	506,392,239	gal
Planning Period Annual Water Production =	2,351,989,462	gal
Total Water Production - Planning Period =	47,039,789,240	gal
Planning Period Annual Water Savings =	35,279,842	gal
Estimated Savings for Planning Period (2038) =	**705,596,839**	gal

Comments:

The District's current average pressure throughout the system is 98 psi. Pressure zones 1 and 2 have average pressures between 140 - 160 psi.

Pressure zone 1 has an average pressure of 142 psi and 1,120 water connections as of December 2011, with a total of 1,730 possible connections in this zone at build out.

Ultimate goal is to reduce system pressure to 80 psi average and 90 psi maximum.

Costs are approximate and for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$0.00
Third Party Costs =	$4,500.00
Evaluation and Follow-up Costs =	$2,000.00
Total One Time Labor/Material Costs =	**$6,500.00**

Labor Costs

Staff Hours =	50	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$2,500.00	/yr
Annual Labor =	**$2,500.00**	**/yr**

Material Costs

Annual Materials =	**$20,000.00**
Annual Cost Estimate =	**$22,500.00**

Potential annual material costs are associated with addressing pressure concerns, installing pressure reducing valves, etc.

	2023	2028	2033	2038
Estimated Total Cost	$119,000.00	$231,500.00	$344,000.00	$456,500.00
Cost Per 1000 Gallons Saved	**$0.77**	**$0.72**	**$0.68**	**$0.65**

Water Conservation Officer

Description: Evaluation of hiring a full time employee (8 hours per day, 40 hours per week) to conduct water conservation activities

Program Length = **20** **years**
Planning Period = 2018 - 2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 4.0%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	583,140,473	23,325,619
Commercial	113,134,853	4,525,394
Non-Residential	4,237,518	169,501
Annual Projected Water Savings =	28,020,514 gal	
Estimated Savings for Phase 1 =	140,102,569 gal	

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	614,424,936	24,576,997
Commercial	119,204,339	4,768,174
Non-Residential	4,464,853	178,594
Annual Projected Water Savings =	29,523,765 gal	
Estimated Savings for Phase 2 =	295,237,652 gal	

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	645,709,400	25,828,376
Commercial	125,273,826	5,010,953
Non-Residential	4,692,189	187,688
Annual Projected Water Savings =	31,027,017 gal	
Estimated Savings for Phase 3 =	465,405,248 gal	

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	676,993,863	27,079,755
Commercial	131,343,312	5,253,732
Non-Residential	4,919,524	196,781
Annual Projected Water Savings =	32,530,268 gal	
Estimated Savings for Planning Period =	650,605,359 gal	

Comments:

The role of the Conservation Officer will initially be to target outdoor water users. The responsibility of this position can be re-assessed as the Plan is implemented.

Outdoor water use is approximated conservatively for four months of the year by multiplying the projected outdoor daily demand by 120 days. These values are an average annual approximation for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$0.00
Third Party Costs =	$0.00
Total One Time Labor/Material Costs =	**$0.00**

Labor Costs

Staff Hours =	- /yr
Hourly Cost =	$0.00
Annual Staff Costs =	$65,000.00 /yr
Third Party Costs =	$0.00 /yr
Evaluation and Follow-up Costs =	$0.00 /yr
Annual Labor =	**$65,000.00 /yr**

Material Costs

Unit Costs =	$0.00
Number of Participants =	0 /Participant
Gallons Saved Per Unit Per Year	0 /yr
Annual Materials =	**$0.00** gal
Annual Cost Estimate =	**$65,000.00**

Comments:

Costs are approximate and for planning purposes only.

Full time salary employee.

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.36

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenues, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Period	$325,000.00	$650,000.00	$975,000.00	$1,300,000.00
Annual Revenue Loss Due to Conservation	$89,017.29	$93,792.91	$98,568.53	$103,344.15
Period Revenue Loss	$445,086.45	$937,929.11	$1,478,527.99	$2,066,883.09
Estimated Cost Plus Revenue Loss	$770,086.45	$1,587,929.11	$2,453,527.99	$3,366,883.09
Cost Per 1000 Gallons Saved	**$5.50**	**$5.38**	**$5.27**	**$5.18**

Commercial and High Irrigation Demand User Audits and Rebates

Description: Measure will offer free water audits to the large outdoor irrigation customers and provide a rebate to those customers electing to receive audits. The rebate will have a maximum value of $500 per customer and can be applied to water efficiency measures indicated by the water audit.

Program Length = **20** **years**
Planning Period = 2018-2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 17.0%

Phase 1 - 2023

Customer Category	Average Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Commercial	764,188	12	1,558,943

Annual Projected Water Savings = 1,558,943 gal
Estimated Savings for Phase 1 = 7,794,713 gal

Phase 2 - 2028

Customer Category	Average Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Commercial	763,878	12	1,558,311

Annual Projected Water Savings = 1,558,311 gal
Estimated Savings for Phase 2 = 15,583,106 gal

Phase 3 - 2033

33	Average Outdoor Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Commercial	763,915	12	1,558,387

Annual Projected Water Savings = 1,558,387 gal
Estimated Savings for Phase 3 = 23,375,801 gal

Planning Period - 2038

Customer Category	Average Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Commercial	764,401	12	1,559,378

Annual Projected Water Savings = 1,559,378 gal
Estimated Savings for Planning Period = 31,187,560 gal

Comments:

This effort will identify high commercial water users and offer free water audits and a $500 water efficiency rebate to those customers who participate in the water audit. Elidgibility of the rebates is contingent on the results of the District water audit.

Assumes 10 commercial water audits are performed each year.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs = $2,000.00
Third Party Costs = $0.00
Total One Time Labor/Material Costs = **$2,000.00**

Labor Costs

Staff Hours = 10 /yr
Hourly Cost = $50.00
Annual Staff Costs = $500.00 /yr
Third Party Costs = $0.00 /yr
Evaluation and Follow-up Costs = $200.00 /yr
Annual Labor = **$700.00 /yr**

Material Costs

Unit Costs = $300.00
Number of Participants = 12 /yr
Unit Costs (Rebates) = $500.00
Number of Participants = 12 /yr
Annual Materials = **$9,600.00** gal

Annual Cost Estimate = **$10,300.00**

Comments:

Costs are approximate and for planning purposes only.

One time labor costs are associated with program development and policy planning required for initial start up and implementation.

Annual labor cost include coordination with third party consultants, and reviewing program progress and success.

The approximate cost of hiring a consultant for commercial audits is approximately $300 per audit.

Each rebate is assumed at the maximum potential value of $500 per customer.

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Commercial/Industrial (43)	$3.32

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenue, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Period	$53,500.00	$105,000.00	$156,500.00	$208,000.00
Annual Revenue Loss Due to Conservation	$5,175.69	$5,173.59	$5,173.84	$5,177.13
Period Revenue Loss	$25,878.45	$51,735.91	$77,607.66	$103,542.70
Estimated Cost Plus Revenue Loss	$79,378.45	$156,735.91	$234,107.66	$311,542.70
Cost Per 1000 Gallons Saved	**$10.18**	**$10.06**	**$10.01**	**$9.99**

Water Restrictions

Description: This measure further restricts outdoor water use during the summer months (May - September). Outdoor water use will not be permitted between 11 a.m. and 6 p.m. during these months.

Program Length = **20** **years**
Planning Period = 2018-2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 7.0%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	738,644,599	51,705,122
Commercial	143,304,147	10,031,290
Non-Residential	5,367,523	375,727

Annual Projected Water Savings = 62,112,139 gal
Estimated Savings for Phase 1 = 310,560,694 gal

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	778,271,586	54,479,011
Commercial	150,992,163	10,569,451
Non-Residential	5,655,481	395,884

Annual Projected Water Savings = 65,444,346 gal
Estimated Savings for Phase 2 = 654,443,461 gal

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	817,898,573	57,252,900
Commercial	158,680,179	11,107,613
Non-Residential	5,943,439	416,041

Annual Projected Water Savings = 68,776,553 gal
Estimated Savings for Phase 3 = 1,031,648,301 gal

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	857,525,560	60,026,789
Commercial	166,368,195	11,645,774
Non-Residential	6,231,397	436,198

Annual Projected Water Savings = 72,108,761 gal
Estimated Savings for Planning Period = 1,442,175,213 gal

Comments:

Conservation measure targets outdoor water use.

The outdoor water use restriction approximated as in effect for May - September (152 days). This measure is the only option utilizing the maximum irrigation period to demonstrate the difference between the existing WCDP and a more stringent regulation. Other outdoor water use measures utilize June - September (approximately 120 days) as a conservative estimate. These values are an average annual approximation for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs = $6,000.00
Third Party Costs = $0.00
Total One Time Labor/Material Costs = **$6,000.00**

Labor Costs

Staff Hours = 150 /yr
Hourly Cost = $50.00
Annual Staff Costs = $7,500.00 /yr
Third Party Costs = $0.00 /yr
Evaluation and Follow-up Costs = $0.00 /yr
Annual Labor = **$7,500.00 /yr**

Material Costs

Unit Costs = $0.00
Number of Participants = 0 /Participant
Gallons Saved Per Unit Per Year 0 /yr
Annual Materials = **$0.00** gal

Annual Cost Estimate = **$7,500.00**

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.32

Comments:

Costs are approximate and for planning purposes only.

One time labor costs are associated with program development and policy planning required for initial start up and implementation.

Annual labor costs include continued research and development of program, public notification of restrictions and annual enforcement/inspection.

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenue, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Perio	$43,500.00	$81,000.00	$118,500.00	$156,000.00
Annual Revenue Loss Due to Conservation	$196,905.38	$207,469.01	$218,032.64	$228,596.26
Period Revenue Loss	$984,526.89	$2,074,690.07	$3,270,489.53	$4,571,925.27
Estimated Cost Plus Revenue Loss	$1,028,026.89	$2,155,690.07	$3,388,989.53	$4,727,925.27
Cost Per 1000 Gallons Saved	**$3.31**	**$3.29**	**$3.29**	**$3.28**

Water Efficient Toilets for Existing and New Construction

Description: This measure would require homeowners with toilets with higher flow than 1.6 gpm to replace their existing toilets. All future construction would be required to install 1.6 gpm toilets.

Program Length = **20** **years**
Planning Period = 2018 - 2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 0.5%

Phase 1 - 2023

Customer Category	Average Indoor Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Residential	57,878	250	72,347
Annual Projected Water Savings =		72,347	gal
Estimated Savings for Phase 1 =		361,737	gal

Phase 2 - 2028

Customer Category	Average Indoor Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Residential	57,983	250	72,479
Annual Projected Water Savings =		72,479	gal
Estimated Savings for Phase 2 =		724,788	gal

Phase 3 - 2033

Customer Category	Average Indoor Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Residential	58,048	250	72,560
Annual Projected Water Savings =		72,560	gal
Estimated Savings for Phase 3 =		1,088,405	gal

Planning Period - 2038

Customer Category	Average Indoor Water Use (gallons/tap)	Number of Participants	Estimated Annual Water Savings (gallons)
Residential	58,048	250	72,560
Annual Projected Water Savings =		72,560	gal
Estimated Savings for Planning Period =		1,451,206	gal

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$2,500.00
Third Party Costs =	$0.00
Total One Time Labor/Material Costs =	**$2,500.00**

Labor Costs

Staff Hours =	40	/yr
Hourly Cost =	$25.00	
Annual Staff Costs =	$1,000.00	/yr
Third Party Costs =	$0.00	/yr
Evaluation and Follow-up Costs =	$250.00	/yr
Annual Labor =	**$1,250.00**	**/yr**

Material Costs

Unit Costs =	$0.00	
Number of Participants =	250	/yr
Gallons Saved Per Unit Per Year (2033)	290.24	/yr
Annual Materials =	**$0.00**	gal
Annual Cost Estimate =	**$1,250.00**	

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14

Comments:

Conservation measure targets indoor water use. Majority of the District's population growth and construction occurred after the 1993 regulation for 1.6 gpm toilets.

The number of existing homes with the potential for low flow toilets was determined base on the number of connections prior to 1993, approximately 2,000.

All new construction is already required to install toilets with a 1.6 gpm maximum flow and therefore have not been included.

Assumes 500 toilets are replaced each period.

Comments:

Costs are approximate and for planning purposes only.

One time labor costs are associated with program development and policy planning required for initial start up and implementation.

Annual labor cost include coordination with customers required to purchase new fixtures and reviewing program progress and success.

Material costs will be evaluated with future planning efforts, to determine the feasibility of rebates and incentives for this program.

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenue, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Period	$8,750.00	$15,000.00	$21,250.00	$27,500.00
Annual Revenue Loss Due to Conservation	$227.17	$227.58	$227.84	$227.84
Period Revenue Loss	$1,135.85	$2,275.83	$3,417.59	$4,556.79
Estimated Cost Plus Revenue Loss	$9,885.85	$17,275.83	$24,667.59	$32,056.79
Cost Per 1000 Gallons Saved	**$27.33**	**$23.84**	**$22.66**	**$22.09**

Commercial and Residential Rain and Wind Sensor Requirement

Description: This measure would require installation of a rain and wind sensor on all irrigation systems that are installed (or renovated) in the District and all new developments. Rain and wind sensors are installed to turn off irrigation systems when it is raining or during periods of high winds in order to reduce unnecessary water consumption.

Program Length = **20** **years**
Planning Period = 2018 - 2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 6.0%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added and Renovations	Estimated Annual Water Savings (gallons)
Residential	50,549	176	533,795
Commercial	251,240	7	100,998
Annual Projected Water Savings =		634,793	gal
Estimated Savings for Phase 1 =		3,173,966	gal

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,528	169	513,266
Commercial	251,138	7	97,944
Annual Projected Water Savings =		611,210	gal
Estimated Savings for Phase 2 =		6,112,099	gal

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,531	168	510,563
Commercial	251,150	7	97,949
Annual Projected Water Savings =		608,511	gal
Estimated Savings for Phase 3 =		9,127,666	gal

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,563	169	513,618
Commercial	251,310	7	98,011
Annual Projected Water Savings =		611,629	gal
Estimated Savings for Planning Period =		12,232,571	gal

Comments:

Conservation measure targets outdoor water use.

Outdoor water use is approximated conservatively for four months of the year by multiplying the projected outdoor daily demand per tap by 120 days. These values are an average approximation for planning purposes only.

Assumes 10 residential and 2 commercial renovations occur each year in additional to the number of new taps.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$6,250.00
Third Party Costs =	$0.00
Total One Time Labor/Material Costs =	**$6,250.00**

Labor Costs

Staff Hours =	350	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$17,500.00	/yr
Third Party Costs =	$0.00	/yr
Evaluation and Follow-up Costs =	$0.00	/yr
Annual Labor =	**$17,500.00**	**/yr**

Material Costs

Unit Costs =	$0.00	
Number of Participants =	0	/Participant
Gallons Saved Per Unit Per Year	0	/yr
Annual Materials =	**$0.00**	gal

Annual Cost Estimate = **$17,500.00**

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.32

Comments:

Costs are approximate and for planning purposes only.

One time costs are associated with program development and policy planning required for initial start up and implementation.

Labor cost include continued research and development of program, annual inspection of new tap connections and review of program progress and success.

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenues, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Period	$93,750.00	$181,250.00	$268,750.00	$356,250.00
Annual Revenue Loss Due to Conservation	$2,011.43	$1,936.83	$1,928.36	$1,938.16
Period Revenue Loss	$10,057.15	$19,368.29	$28,925.33	$38,763.11
Estimated Cost Plus Revenue Loss	$103,807.15	$200,618.29	$297,675.33	$395,013.11
Cost Per 1000 Gallons Saved	**$32.71**	**$32.82**	**$32.61**	**$32.29**

Turf/Landscape/Irrigation System Standards for New Development

Description: Implement irrigation, landscape, and/or turf standards as part of building permit review process. This policy regulates the landscape standards and affects new residential, commercial, and non-residential (irrigation) users.

Program Length = **20** **years**
Planning Period = 2018 - 2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 10.0%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,549	176	889,658
Commercial	251,240	7	168,331
Annual Projected Water Savings =		1,057,989	gal
Estimated Savings for Phase 1 =		5,289,944	gal

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,528	169	855,444
Commercial	251,138	7	163,240
Annual Projected Water Savings =		1,018,683	gal
Estimated Savings for Phase 2 =		10,186,832	gal

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,531	168	850,938
Commercial	251,150	7	163,248
Annual Projected Water Savings =		1,014,185	gal
Estimated Savings for Phase 3 =		15,212,777	gal

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,563	169	856,029
Commercial	251,310	7	163,351
Annual Projected Water Savings =		1,019,381	gal
Estimated Savings for Planning Period =		20,387,618	gal

Comments:

Conservation measure targets outdoor water use.

Outdoor water use is approximated conservatively for four months of the year by multiplying the projected outdoor daily demand per tap by 120 days. These values are an average approximation for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$6,250.00
Third Party Costs =	$0.00
Total One Time Labor/Material Costs =	**$6,250.00**

Labor Costs

Staff Hours =	100	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$5,000.00	/yr
Third Party Costs =	$0.00	/yr
Evaluation and Follow-up Costs =	$0.00	/yr
Annual Labor =	**$5,000.00**	**/yr**

Material Costs

Unit Costs =	$0.00	
Number of Participants =	0	/Participant
Gallons Saved Per Unit Per Year	0	/yr
Annual Materials =	**$0.00**	gal

Annual Cost Estimate = **$5,000.00**

Comments:

Costs are approximate and for planning purposes only.

One time costs are associated with program development and policy planning required for initial start up and implementation.

Labor cost include continued research and development of program, annual inspection of new tap connections and review of program progress and success.

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.32

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenues, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Period	$31,250.00	$56,250.00	$81,250.00	$106,250.00
Annual Revenue Loss Due to Conservation	$3,352.38	$3,228.05	$3,213.93	$3,230.26
Period Revenue Loss	$16,761.92	$32,280.48	$48,208.89	$64,605.19
Estimated Cost Plus Revenue Loss	$48,011.92	$88,530.48	$129,458.89	$170,855.19
Cost Per 1000 Gallons Saved	**$9.08**	**$8.69**	**$8.51**	**$8.38**

Practical Turf for Sports Fields and District Irrigation Areas

Description: This measure would require all schools and institutions, as well as District owned natural grass fields to be replaced with synthetic turf fields.

Program Length = **20** **years**
Planning Period = 2018-2038

Evaluation of Approximate Water Savings

Estimated Annual Savings = 10.0%

Customer	Average Outdoor Water Use (gallons/yr)	Estimated Water Savings (gallons/yr)
PWMD Sports Complex (Tract No. 100-0-26)	5,721,667	572,167
PWMD Sprinkler (Tract No. 100-0-25)	2,042,333	204,233
PWMD Wastewater Utility	707,889	70,789
PWMD Cattail Crossing	2,055,000	205,500
PWMD Lovell Park	5,177,333	517,733
School: 661 W Capistrano Ave	19,319,778	1,931,978
School: 386 E Hahns Peak Ave	-	-
School: 500 S Spaulding Ave	2,883,222	288,322
School: 484 S Maher Dr	5,477,333	547,733
School: 451 S Gilia Dr	41,444	4,144
School: 1047 S Camino De Bravo	7,952,444	795,244
School: 935 S Palomar Dr	5,654,667	565,467
School: 579 E Earl Dr.	1,262,667	126,267
School: 1267 W Oro Grande Dr.	3,169,333	316,933

Estimated Annual Savings =	6,146,511	gal
Estimated Savings for Phase 1 (2023) =	30,732,556	gal
Estimated Savings for Phase 2 (2028) =	61,465,111	gal
Estimated Savings for Phase 3 (2033) =	92,197,667	gal
Estimated Savings for Planning Period (2038) =	**122,930,222**	gal

Comments:

The outdoor water use for each of these accounts was averaged using meter data from 2016 - 2018. The indoor water use (January and February average) was subtracted from each of the months to determine the outdoor use. For this calculation it was assumed that there are no plans for additional schools/institutions or District sports fields/irrigation areas during the 20 year planning period. It is also assumed that outdoor water consumption will not increase for these customers during the planning period.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs =	$1,500.00	
Third Party Costs =	$0.00	
One Time Material Costs (Unit Cost) =	$400,500.00	per synthetic field
Number of Fields =	4	
Gallons Saved Per Field Per Year =	1,570,422	gal/field/yr
One Time Materials =	$1,602,000.00	
Total One Time Labor/Material Costs =	**$1,603,500.00**	

Labor Costs

Staff Hours =	300	/yr
Hourly Cost =	$50.00	
Annual Staff Costs =	$15,000.00	
Evaluation and Follow-up Costs =	$0.00	
Annual Labor =	**$15,000.00**	

Material Costs

Unit Costs =	$0.00	
Number of Participants =	0	
Annual Materials =	**$** -	

Annual Cost Estimate = **$15,000.00**

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Commercial/Industrial (43)	$3.32

Annual Revenue Loss Due to Conservation = **$20,406.42**

Costs are approximate and for planning purposes only.

One time labor costs include costs associated with program development and policy planning required for initial start up and implementation.

One time material costs are only calculated for District systems and are reflective of the approximate cost per synthetic field. Gallons saved per unit in this calculation refers to District facilities.

Comments:

Annual labor costs include inspection of institutions. Annual maintenance of the turf is not included as that is assumed to be included in existing budgets for maintenance of the existing natural grass fields.

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenue, as rates will change over the course of the planning period.

	2023	2028	2033	2028
Estimated Total Cost For Perio	$1,678,500.00	$1,753,500.00	$1,828,500.00	$1,903,500.00
Annual Revenue Loss Due to Conservation	$20,406.42	$20,406.42	$20,406.42	$20,406.42
Period Revenue Loss	$102,032.08	$204,064.17	$306,096.25	$408,128.34
Estimated Cost Plus Revenue Loss	$1,780,532.08	$1,957,564.17	$2,134,596.25	$2,311,628.34
Cost Per 1000 Gallons Saved	**$57.94**	**$31.85**	**$23.15**	**$18.80**

New and Replacement Lawn/Landscape Permit

Description: Requires all properties in the District that will be landscaped (new or replacement) to pass an inspection prior to plant material installation

Program Length = **20** **years**
Planning Period = 2018-2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 2.5%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	583,140,473	14,578,512
Commercial	113,134,853	2,828,371
Non-Residential	4,237,518	105,938

Annual Projected Water Savings = 17,512,821 gal
Estimated Savings for Phase 1 = 87,564,105 gal

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	614,424,936	15,360,623
Commercial	119,204,339	2,980,108
Non-Residential	4,464,853	111,621

Annual Projected Water Savings = 18,452,353 gal
Estimated Savings for Phase 2 = 184,523,532 gal

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	645,709,400	16,142,735
Commercial	125,273,826	3,131,846
Non-Residential	4,692,189	117,305

Annual Projected Water Savings = 19,391,885 gal
Estimated Savings for Phase 3 = 290,878,280 gal

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons)	Estimated Annual Water Savings (gallons)
Residential	676,993,863	16,924,847
Commercial	131,343,312	3,283,583
Non-Residential	4,919,524	122,988

Annual Projected Water Savings = 20,331,417 gal
Estimated Savings for Planning Period = 406,628,350 gal

Comments:

Conservation measure targets outdoor water use.

Outdoor water use is approximated conservatively for four months of the year by multiplying the projected outdoor daily demand per tap by 120 days. These values are an average approximation for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs = $6,500.00
Third Party Costs = $0.00
Total One Time Labor/Material Costs = **$6,500.00**

Labor Costs

Staff Hours = 50 /yr
Hourly Cost = $50.00
Annual Staff Costs = $2,500.00 /yr
Third Party Costs = $0.00 /yr
Evaluation and Follow-up Costs = $200.00 /yr
Annual Labor = **$2,700.00 /yr**

Material Costs

Unit Costs = $100.00
Number of Participants = 10 /Participant
Gallons Saved Per Unit Per Year (2033) = 2,033,141.75 gallons
Annual Materials = **$1,000.00** /yr

Annual Cost Estimate = **$3,700.00**

Comments:

Costs are approximate and for planning purposes only.

One time costs are associated with program development and policy planning required for initial start up and implementation.

Annual labor costs include continued research and development of program, coordination with third party consultant and review of program progress and success.

This duty can be provided by the water conservation officer or a third party consultant.

Third party consultant can be utilized for approximately $100 per inspection.

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.36

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenue, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Perio	$25,000.00	$43,500.00	$62,000.00	$80,500.00
Annual Revenue Loss Due to Conservation	$55,635.81	$58,620.57	$61,605.33	$64,590.10
Period Revenue Loss	$278,179.03	$586,205.70	$924,080.00	$1,291,801.93
Estimated Cost Plus Revenue Loss	$303,179.03	$629,705.70	$986,080.00	$1,372,301.93
Cost Per 1000 Gallons Saved	**$3.46**	**$3.41**	**$3.39**	**$3.37**

10% Lot Irrigation Restriction

Description: This policy restricts the amount of the customer's lot which can be irrigated. Policy affects new residential, commercial, and non-residential (irrigation) categories. The 10% value was obtained from the City of Evans Conservation Plan (2009). Other municipalities use 20% (Albuquerque, New Mexico), 35% (Marin Municipal Water District in California), etc. The 10% value can be adjusted to a less conservative estimate in a follow up evaluation if deemed appropriate.

Program Length = **20** **years**
Planning Period = 2018 - 2038

Evaluation of Approximate Water Savings

Estimated Annual Water Savings = 10.0%

Phase 1 - 2023

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,549	176	889,658
Commercial	251,240	7	168,331

Annual Projected Water Savings = 1,057,989 gal
Estimated Savings for Phase 1 = 5,289,944 gal

Phase 2 - 2028

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,528	169	855,444
Commercial	251,138	7	163,240

Annual Projected Water Savings = 1,018,683 gal
Estimated Savings for Phase 2 = 10,186,832 gal

Phase 3 - 2033

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,531	168	850,938
Commercial	251,150	7	163,248

Annual Projected Water Savings = 1,014,185 gal
Estimated Savings for Phase 3 = 15,212,777 gal

Planning Period - 2038

Customer Category	Average Outdoor Water Use (gallons/tap)	Number of New Taps Added	Estimated Annual Water Savings (gallons)
Residential	50,563	169	856,029
Commercial	251,310	7	163,351

Annual Projected Water Savings = 1,019,381 gal
Estimated Savings for Planning Period = 20,387,618 gal

Comments:

Conservation measure targets outdoor water use.

Outdoor water use is approximated conservatively for four months of the year by multiplying the projected outdoor daily demand per tap by 120 days. These values are an average approximation for planning purposes only.

Associated Costs

Costs to Water Provider:

One Time Labor and Material Costs

One Time Staff Labor Costs = $6,000.00
Third Party Costs = $0.00
Total One Time Labor/Material Costs = **$6,000.00**

Labor Costs

Staff Hours = 350 /yr
Hourly Cost = $50.00
Annual Staff Costs = $17,500.00 /yr
Third Party Costs = $0.00 /yr
Evaluation and Follow-up Costs = $0.00 /yr
Annual Labor = **$17,500.00 /yr**

Material Costs

Unit Costs = $0.00
Number of Participants = 0 /Participant
Gallons Saved Per Unit Per Year = 0 /yr
Annual Materials = **$0.00** gal

Annual Cost Estimate = **$17,500.00**

Comments:

Costs are approximate and for planning purposes only.

One time costs are associated with program development and policy planning required for initial start up and implementation.

Labor cost include continued research and development of program, annual inspection of new connections and review of program progress and success.

2018 Water Rates for Use (per 1000 gallons)

Category	Rate
Residential and Irrigation (41)	$3.14
Commercial/Industrial (43)	$3.32

Average rates from 2018 for the mid range water use category (5,000 - 10,000 gal/1000) were used. Rates are provided for planning purposes only and are not reflective of projected revenues, as rates will change over the course of the planning period.

	2023	2028	2033	2038
Estimated Total Cost For Perio	$93,500.00	$181,000.00	$268,500.00	$356,000.00
Annual Revenue Loss Due to Conservation	$3,352.38	$3,228.05	$3,213.93	$3,230.26
Period Revenue Loss	$16,761.92	$32,280.48	$48,208.89	$64,605.19
Estimated Cost Plus Revenue Loss	$110,261.92	$213,280.48	$316,708.89	$420,605.19
Cost Per 1000 Gallons Saved	**$20.84**	**$20.94**	**$20.82**	**$20.63**

APPENDIX H – PUBLIC REVIEW PROCESS

Comments Requested on Pueblo West Metropolitan District Water Conservation Draft Plan

Pueblo West, CO: The Pueblo West Metropolitan District (District) has updated the 2012 Water Conservation Draft Plan (Plan), which summarizes strategies for water conservation. The Draft Plan describes how proposed water conservation programs and measures can be implemented to more efficiently use the District's water resources. These efforts can ultimately serve to reduce water system operating costs and postpone the need for investments in District infrastructure, which may result in reducing the need for future water rate increases.

In 2001, the District began incorporating water conservation measures and programs in order to initiate water conservation efforts. The amount of water use reduction that can be attributed to the implementation of these programs is difficult to calculate, however the residential annual per capita water use has decreased nine percent over ten years.

A copy of the Draft Plan, prepared by JVA Inc., on behalf of the District, is available for review and comments for a 60-day period, after which it will be considered for approval by the District Board. The Draft Plan describes the existing conditions in the District including per capita consumption of water, water losses in the distribution system, existing water conservation programs, and describes new programs the District may consider to postpone the need to invest in new water treatment facilities and alternate supply sources.

The Draft Plan is available for review at the Pueblo West Metropolitan District office at 20 West Palmer Lake Drive, Pueblo West, CO 81007, or on-line at www.pueblowestmetro.com under News. The public comment period will extend until 5 PM on Friday May 29, 2020. Comments must be submitted in writing to:

PWMD
C/O Katherine Kallenbach
20 W. Palmer Lake Dr.
Pueblo West, Colorado 81007

Or via email to: water@pwmd-co.us

The Draft Plan will be presented to the District board for approval following the public comment period. For questions, please contact the Utilities Program Coordinator, Katherine Kallenbach at (719) 547-5040.

PROOF OF PUBLICATION AFFIDAVIT

THE PUEBLO CHIEFTAIN

STATE OF COLORADO,)
) **s.s.**
County of Pueblo,)

I, Amanda Bengtson do solemnly swear that I am an employee of THE PUEBLO CHIEFTAIN; that the same is a weekly newspaper printed, in whole or in part and published in the County of Pueblo, State of Colorado, and has a general circulation therein; that said newspaper has been published continuoulsy and uninterruptedly in said County of Pueblo for a period of more than 52 consecutive weeks next prior to the first publication of the annexed legal notice or advertisment; that said newpaper has been admitted to the United States Mail as a as a second class matter under the provisions of the act of March 3rd, 1987, or any amendment thereof duly qualified for publishing legal notices and advertisements within the meaning of the laws of the State of Colorado of which is attached a true copy from said newspaper and was published on the following dates:

PUBLISHED: 3/22

In witness whereof, I have hereunto set my hand this 4 day of June A.D. 2020.

[signature]

• • • • • • • • • • • • • • •

Subscribed and sworn to before me, a Notary Public in and for the County of Pueblo, State of Colorado,

this 4 day of June A.D. 2020.

[signature]
Notary Public

Comments Requested on Pueblo West Metropolitan District Water Conservation Draft Plan

Pueblo West, CO: The Pueblo West Metropolitan District (District) has updated the 2012 Water Conservation Draft Plan (Plan), which summarizes strategies for water conservation. The Draft Plan describes how proposed water conservation programs and measures can be implemented to more efficiently use the District's water resources. These efforts can ultimately serve to reduce water system operating costs and postpone the need for investments in District infrastructure, which may result in reducing the need for future waterrate increases.

In 2001, the District began incorporating water conservation measures and programs in order to initiate water conservation efforts. The amount of water use reduction that can be attributed to the implementation of these programs is difficult to calculate, however the residential annual per capita water use has decreased nine percent over ten years.

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Or via email to: water@pwmd-co.us

The Draft Plan will be presented to the District board for approval following the public comment period. For questions, please contact the Utilities Program Coordinator, Katherine Kallenbach at (719) 547-5040.

PU0000185068-01

CRYSTAL ALBERS
NOTARY PUBLIC - STATE OF COLORADO
NOTARY ID 20154007131
MY COMMISSION EXPIRES FEB 25, 2023

Pueblo West Metropolitan District
Department of Utilities
20 W. Palmer Lake Dr.
Pueblo West, CO 81007

Pueblo West
COLORADO

March 23, 2020

Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, Colorado 80203

Reference: Pueblo West Metropolitan District Draft Water Conservation Plan Submittal

To Whom it May Concern:

The Pueblo West Metropolitan District (District) has completed an update to the Water Conservation Plan in accordance with the Colorado Water Conservation Board's (CWCB) Guidelines. The District was assisted by JVA, Incorporated with the update to the Water Conservation Plan. The District previously obtained approval from the CWCB in August 2012 for the initial Water Conservation Plan.

A draft of the Water Conservation Plan went out for comment on March 22, 2020 for a period of 60 days. It was advertised through the District's website and the Pueblo Chieftain. The District is requesting conditional approval pending public comments. Once the public comment period is over, the District will incorporate any comments from the CWCB and the public to adopt and implement the plan. A final copy will be provided to the CWCB after that time.

Please contact me with any comments or questions, or if there are additional requirements prior to the approval of this Plan at kkallenbach@pwmd-co.us.

Sincerely,

Pueblo West Metropolitan District

By:

Katherine Kallenbach
Utilities Program Coordinator