2020 Urban Water Management Plan

Prepared for
Rainbow Municipal Water District
3707 Old Highway 395
Fallbrook, CA 92028
June 2021

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List of Abbreviations

Act	Urban Water Management Planning Act
AF	acre-feet
AFY	acre-foot per year
AWWA	American Water Works Association
BLS	Bureau of Labor Statistics
CEQA	California Environmental Quality Act
CII	commercial, industrial, and institutional
CIMIS	California Irrigation Management Information System
CIP	Capital Improvement Program
CWC	California Water Code
Delta	Sacramento-San Joaquin River Delta
District	Rainbow Municipal Water District
DMM	demand management measure
DRA	Drought Risk Assessment
DWR	California Department of Water Resources
FPUD	Fallbrook Public Utility District
FY	fiscal year
GIS	geographic information system
GPCD	gallons per capita per day
Guidebook	DWR Guidebook for Urban Water Suppliers
I-15	Interstate 15
IPR	indirect potable reuse
IRWMP	Integrated Regional Water Management Plan
kWh	kilowatt hours
manual	Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use
MGD	million gallons per day
MWD	Metropolitan Water District of Southern California
PSAWR	Permanent Special Agricultural Water Rate
SANDAG	San Diego Association of Governments
SB X7-7	Senate Bill X7-7
SDLAFCO	San Diego Local Agency Formation Commissions
SLRWRP	San Luis Rey Water Reclamation Plant
SR-76	State Route-76
TSAWR	Transitional Special Agriculture Water Rate
UWMP	Urban Water Management Plan
Water Authority	San Diego County Water Authority
WSCP	Water Shortage Contingency Plan
WWTP	wastewater treatment plant

Section 1

Introduction

This 2020 Urban Water Management Plan (UWMP) has been prepared for the Rainbow Municipal Water District (District) in accordance with the requirements of California's Urban Water Management Planning Act (Act) and related provisions of the California Water Code (CWC).

The remainder of this section provides an overview of the Act, relations to other planning efforts, UWMP organization, and a lay description.

1.1 Overview

The Act establishes as state policy that, *"the management of urban water demands, and efficient use of water shall be actively pursued to protect both the people of the state and their water resources."* To advance that goal, the Act requires that urban water suppliers develop UWMPs to assess current demands and supplies over a 20-year planning horizon and address methods to ensure reliable and adequate water service to meet the needs of the various categories of customers during normal, dry, and multiple dry years. The UWMP documents that the water supplies available to the District customers are adequate to meet demands over the required 20-year planning period.

The mission of the District is to provide its customers reliable, high quality water and water reclamation services in a fiscally sustainable manner. Together with the San Diego County Water Authority (Water Authority) and Metropolitan Water District of Southern California (MWD), the District works to provide a reliable supply to its customers through water management, conservation, and careful planning.

1.2 Urban Water Management Planning and the California Water Code

The UWMP was prepared in accordance with the Act. The Act is defined by the CWC, Division 6, Part 2.6, and Sections 10610 through 10657. The Act became part of the CWC with the passage of Assembly Bill 797 during the 1983-1984 regular session of the California legislature. The Act requires every urban water supplier providing water for municipal purposes to more than 3,000 connections or supplying more than 3,000 acre-feet (AF) of water annually to adopt and submit a UWMP every five years to the California Department of Water Resources (DWR). The Act regulates the contents of the UWMP as well as how urban water suppliers should adopt and implement the UWMP and the associated Water Shortage Contingency Plan (WSCP).

This 2020 UWMP includes newly required and recently revised components to address the expansion and revision of the Act, including but not limited to:

- Lay description
- Description of current and projected land uses in the service area
- Five previous years of system water losses
- Water savings
- Description of climate change impacts

- Energy intensity analysis
- Groundwater Sustainability Plan or alternative for underlying basins
- Seismic risk assessment and mitigation plan
- Five-year Drought Risk Assessment
- Water Shortage Contingency Plan with revised prescriptive elements and separate adoption requirements

1.3 UWMPs in Relation to Other Planning Efforts

The District's 2020 UWMP integrates with other District planning efforts and with related planning efforts of the Water Authority, the County of San Diego, and others. Key related planning efforts are listed below:

- **San Diego County Water Authority Regional UWMP:** Information on demands from the District's UWMP have been coordinated with the Water Authority for presentation in its 2020 Regional UWMP.
- **San Diego Association of Governments (SANDAG) Regional Plan:** The District's projections of future water demands are based on demographic projections made by SANDAG as part of its 2020 Regional Plan. The SANDAG projections are fully consistent with the adopted land use plans of the County of San Diego and each of the various municipalities within the county.
- **San Diego County General Plan:** As noted in the SANDAG Regional Plan description above, the District's water demand projections are consistent with the adopted General Plan land uses of the County of San Diego. The County will be able to use the District's UWMP as needed to provide documentation of available water supplies relative to any land use decisions that come before the County during the five-year life of the current UWMP.
- **Metropolitan Water District of Southern California UWMP:** Information on supplies provided to the Water Authority were noted and integrated into the District's UWMP.
- **San Diego Integrated Regional Water Management Plan:** See description below in Section 1.4.

1.4 Integrated Regional Water Management Plan

California legislation that was passed in 2000 promotes the development of Integrated Regional Water Management Plans (IRWMPs). The process involves an integrated approach to water management planning by providing the framework for local agencies to cooperatively manage local and imported water supplies and improve water supply quality, quantity, and reliability. Many of the IRWMP elements are also part of an UWMP.

The San Diego IRWMP, recently updated in 2019, supports the District's and the Water Authority's UWMPs by promoting regional planning and supporting projects that aim to increase water supply reliability and improve surface water and groundwater quality. IRWM planning and funding has helped to make water supply projects possible in the areas of seawater desalination, recycled water, local surface water, and groundwater, which are part of the region's projected mix of water resources. The IRWM program also supports water conservation, another key element of the District's and the Water Authority's UWMPs.

The District participated in the development of the San Diego IRWMP, a copy of which can be found at http://www.sdirwmp.org/. The watershed boundaries of the San Diego IRWMP planning region are shown in Figure 1-1.

Figure 1-1. San Diego IRWMP Watersheds

1.5 UWMP Organization

The District's UWMP follows the organization outlined in the *Final Guidebook for Urban Water Suppliers* (Guidebook) developed by DWR (2021). The summary below presents the remaining sections in this UWMP. Additionally, table numbering throughout this plan matches the numbering of the tables required by DWR, except in instances where the table label contains a letter (i.e., Table 6-7A). In this case, the letter indicates that the table is not required by DWR but has been added to the UWMP to provide additional tabulated information.

- **Section 2 – Plan Preparation** provides information on the District's process for developing this UWMP, including coordination and outreach.
- **Section 3 – System Description** provides a description of the service area, climate, water supply facilities, distribution system, demographics, land use, and historical and projected population.
- **Section 4 – System Water Use** presents historical and projected water use.
- **Section 5 – Baselines and Targets** presents baseline and target water consumption amounts and demonstrates that the 2020 water use target was met.
- **Section 6 – Water Supplies** describes and quantifies the current and projected sources of water available to the District including potential recycled water uses. A description and quantification of energy intensity is also presented.

- **Section 7 – Water Supply Reliability** describes the current water supply reliability, the 20-year projection, and 5-year drought risk assessment.
- **Section 8 – Water Shortage Contingency Planning** provides reference to the District's water shortage contingency plan. The full WSCP is in Appendix D.
- **Section 9 – Demand Management Measures** (DMMs) presents and addresses DMMs to promote conservation and to reduce demand on the District's water supply.
- **Section 10 – Plan Adoption, Submittal, and Implementation** describes the steps taken to adopt and submit the UWMP and the WSCP.
- **Section 11 – References** provides a list of references used to support plan development.
- Appendices A through F provide relevant supporting documents. DWR has provided a checklist of the items that must be addressed in each UWMP in accordance with the Act. The checklist makes it simple to identify exactly where in the UWMP each item has been addressed. The checklist has been completed for this UWMP and is provided in Appendix A. All tables in the UWMP tie to and are dictated by the DWR Guidebook unless noted otherwise.

1.6 Lay Description

The District provides water services to the County of San Diego's unincorporated communities of Rainbow and Bonsall, a portion of the unincorporated community of Fallbrook, and small portions of the City of Oceanside. The District's boundaries cover approximately 78 square miles. Between 2015 and 2020, the District annexed the area of Campus Park West, a commercial development that has yet to be constructed. The District has grown slightly in comparison to its previous 2015 UWMP but anticipates limited new residential development over the current UWMP planning horizon until 2045. However, the District also expects to see a continued decline in agricultural water use during this planning period.

Water demands in the District service area have declined significantly over the last 15 years, and the District expects to see an overall continued decline in water use. The drop in demands has occurred in response to increasing water prices, periods of drought-induced water use restrictions, declining agricultural consumption due to market conditions, improvements in agricultural irrigation efficiency, and increased customer conservation measures. Additionally, under the Water Authority's Transitional Special Agricultural Water Rate (TSAWR) program, certain agricultural water customers agree to conservation cutbacks during shortages in exchange for discounted water. The program is now known as the Permanent Special Agricultural Water Rate (PSAWR) program, effective January 1, 2021.

The District's water demand projections from 2020 to 2045 are based upon past demands. The District identified fiscal year (FY) 2004 as a peak demand year. The peak demand year was then compared to current demands and the overall trend was evaluated. The overall trend shows a decline in total demand from FY 2004 to FY 2020 by approximately 55 percent.

Currently, the District is wholly reliant on imported water sources that are delivered through both the Water Authority's and MWD's facilities but purchased through the Water Authority. The Water Authority determined that it has adequate water supplies to cover the demands for all of its retailers, including the District, for normal year, single dry year, and multiple dry year scenarios. The District is continually planning for worst case scenarios such as droughts and other natural disasters that may impact water supply availability. The District has an Emergency Response Plan in place to rapidly respond to emergency supply issues. Additionally, the District plans to initiate the Imported Water Return Flow Reclamation Project to provide a source of local water supply by 2030, which would add

2,000 acre-feet per year (AFY) or approximately 14 percent of the 2020 total demand. In addition, the District has in place a contractual arrangement with the Fallbrook Public Utility District to provide emergency access to a local water supply from the Santa Margarita Conjunctive Use Project in the event of an interruption of imported water supplies.

Section 2

Plan Preparation

This section presents the basis for preparing the UWMP, units of measure, coordination, and outreach.

2.1 Application of UWMP Act to the District

The District has prepared this UWMP in accordance with the Act and the CWC. The District is subject to the Act because it satisfies the definition of an "Urban Water Supplier" operating a "Public Water System" and has over 3,000 connections and/or supplies over 3,000 AFY, as described in Section 1. Required District identification information is summarized in Table 2-1.

Table 2-1. Public Water System Identification

Public Water System Number	Public Water System Name	Number of Municipal Connections 2020	2020 Volume of Water Supplied (AF)
3710016	Rainbow MWD	8,254	14,297
	Total	8,254	14,297

2.2 Regional Planning and Compliance

The Act allows groups of water agencies to form Regional Alliances for reporting on per capita water use targets. The District is not part of a regional alliance. Required plan identification information is presented in Table 2-2.

Table 2-2. Plan Identification

Select	Type of Plan	
X	Individual UWMP	
	No	Water Supplier is also a member of a Regional UWMP
	No	Water Supplier is also a member of a Regional Alliance
No	Regional UWMP	

2.3 Units of Measure

The District reports its data on a fiscal year (FY) basis. Water supplies and demands are reported on an AF volume basis and may sometimes be referred to in AFY to represent the total volume of water referenced for a full FY. Both of these units are maintained consistently throughout the UWMP. Required UWMP information is summarized in Table 2-3.

Table 2-3. Units of Measure	
Type of Agency	
X	Agency is a retailer
Fiscal or Calendar Year	
X	UWMP tables are in Fiscal Years
Units of Measure Used in UWMP	
X	Acre-Feet (AF) (1 AF = 325,851 gallons)

2.4 Coordination and Public Outreach

This section describes the District's coordination efforts with their wholesaler, as well as other agencies and communities in their service area.

2.4.1 Wholesale and Retail Coordination

The District is wholly reliant on imported water sources that are delivered through both the Water Authority's and MWD's facilities but purchased through the Water Authority. The District has coordinated the preparation of its UWMP with the Water Authority and has provided the Water Authority with projected water demands in five-year increments through 2045. Required UWMP information is summarized in Table 2-4.

Table 2-4. Water Supplier Information Exchange	
Wholesale Water Supplier Name	
Potable Water	Metropolitan Water District of Southern California
Potable Water	San Diego County Water Authority

2.4.2 Coordination with Other Agencies and the Community

The District coordinated the preparation of its UWMP with appropriate local agencies, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practical. Notifications of the update of the 2020 UWMP and WSCP were sent via email on March 25, 2021, which was at least 60 days prior to the public hearing. Notifications were sent to the County of San Diego, the Water Authority, Fallbrook Public Utility District, and the City of Oceanside.

The draft UWMP and draft WSCP were made available on the District's website beginning on May 11, 2021. Within 30 days of their adoption, copies of the final UWMP and final WSCP were sent to DWR, the California State Library, and the County of San Diego, and are posted on the District's website and made available for review in hardcopy form at the District's offices during normal working hours.

Section 3

Rainbow Service Area

This section describes the District's water system. It contains a description of factors that impact water demand such as service area climate and population.

3.1 Service Area Boundaries

The District serves the County of San Diego's unincorporated communities of Rainbow and Bonsall, a portion of the unincorporated community of Fallbrook, and small portions of the City of Oceanside. The District's boundaries cover approximately 78 square miles. The northern part of the District is located north of the San Luis Rey River and straddles Interstate 15 (I-15) while the southern part of the District is located west of I-15 and straddles the San Luis Rey River. The District's service area boundaries are shown in Figure 3-1 on the following page, and they include a northern, central, and southern region.

The District provides water service to all of the area within its boundaries and sewer service to a smaller area within the San Luis Rey river valley.

3.2 Annexations

Between 2015 and 2020, the District annexed the area of Campus Park West, a yet to be constructed commercial development in the vicinity of Interstate 15 and State Highway 76. Additionally, the District has filed an application with the San Diego Local Agency Formation Commission (SDLAFCO) to annex the Citro residential development. The annexation was approved by SDLAFCO on May 3, 2021. This annexation contains an area of approximately 275 acres for a development projected to contain approximately 880 homes.

3.3 Governance

The District was formed in 1953 under the Municipal Water District Act of 1911 (Section 7100 et. seq. of the CWC). The District joined the Water Authority and MWD in 1954, acquiring the right to purchase and distribute imported water throughout its service area.

The District is governed by a five-member elected Board of Directors which sets ordinances, policies, taxes, and rates for providing sewer and potable water services within the District's service area.

3.4 Climate

The District's climate is mild, varying from a low mean daytime temperature of 69 degrees in the winter to a high mean daytime temperature of 86 degrees in the summer. The average annual rainfall of approximately 15 inches occurs primarily from December through March. Figure 3-2 and Figure 3-3 summarize the monthly average temperature and rainfall conditions collected from Station 62 of the California Irrigation Management Information System (CIMIS) database from the earliest data point in 1986 through 2020 (www.cimis.water.ca.gov).

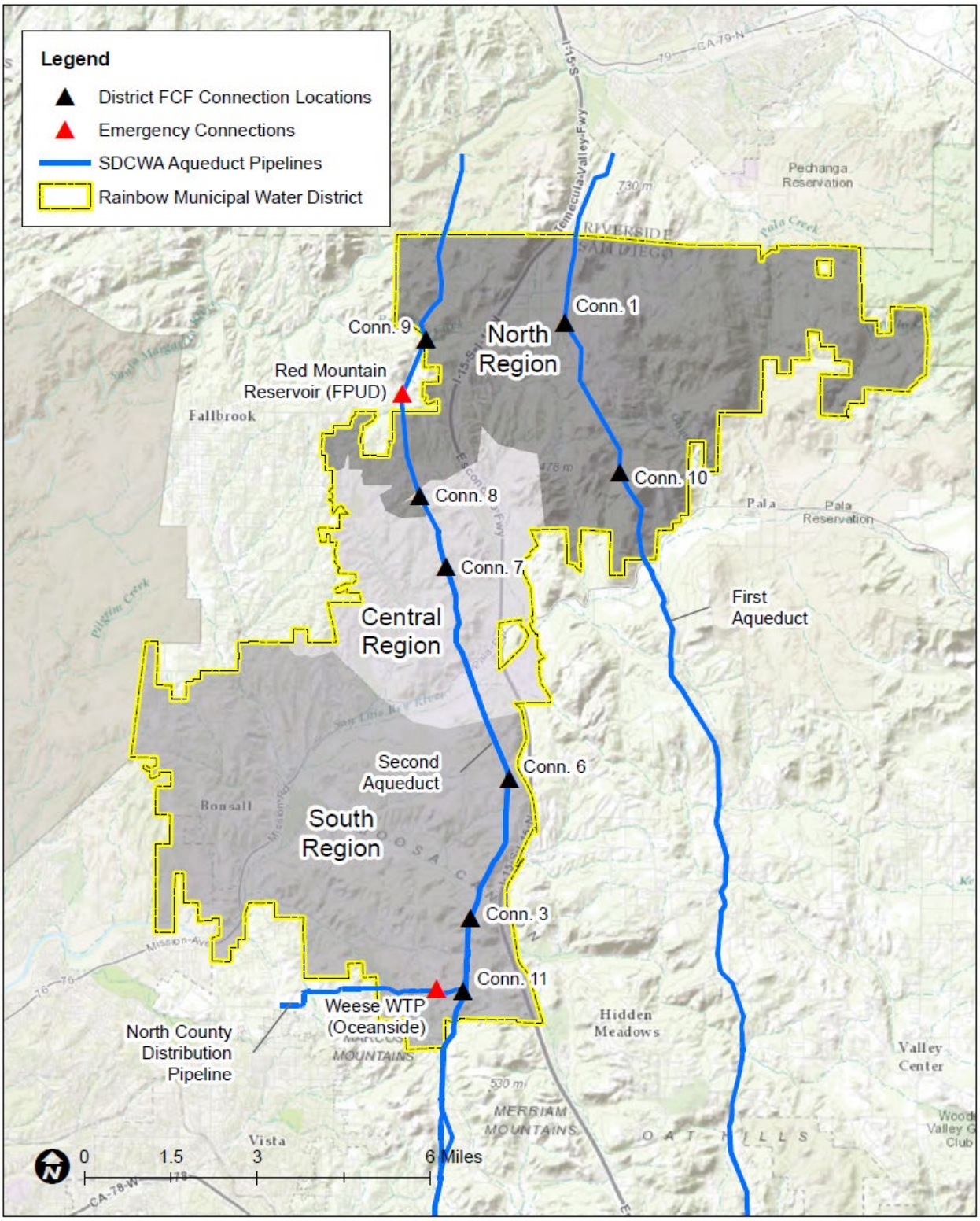


Figure 3-1. Rainbow Municipal Water District Service Area

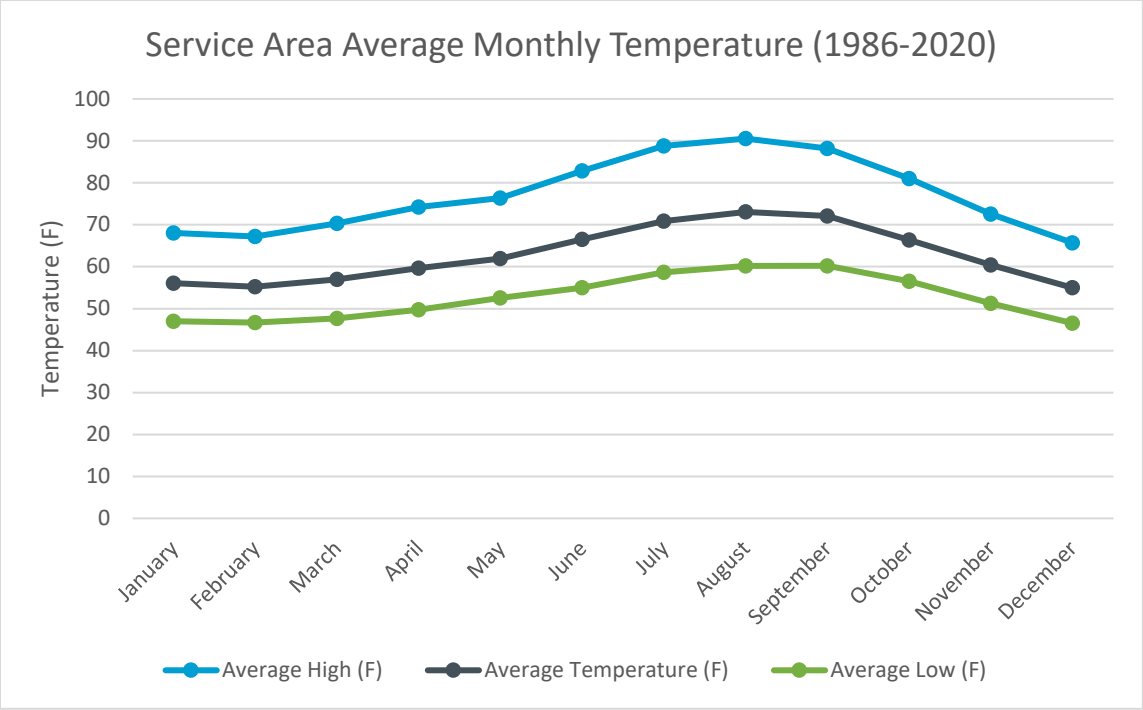


Figure 3-2. Service Area Average Monthly Temperature from Station 62 (1986-2020)

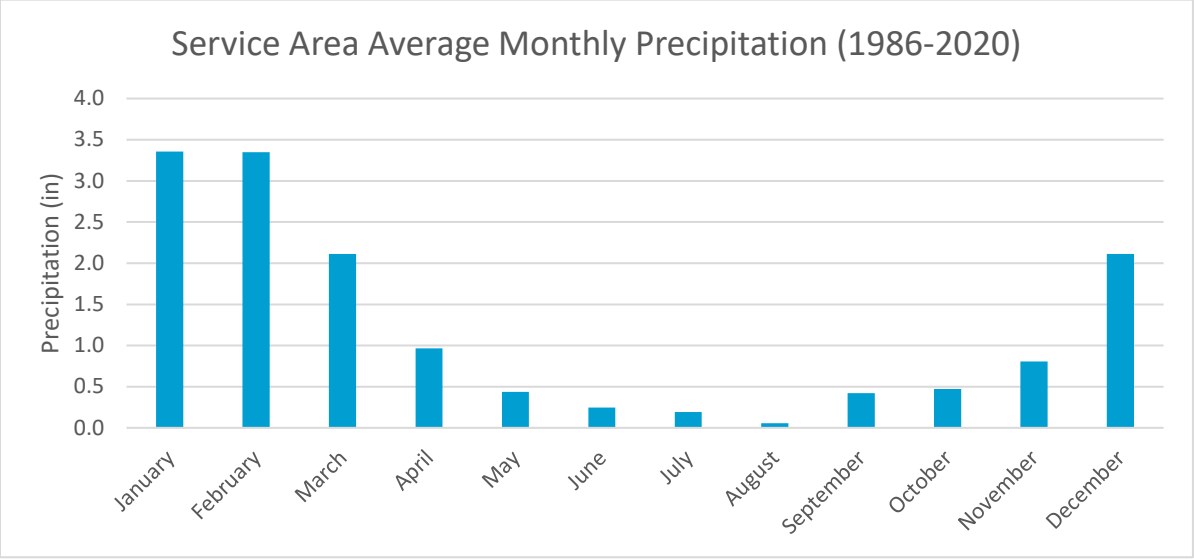


Figure 3-3. Service Area Average Monthly Precipitation Station 62 (1986-2020)

3.5 Population

To facilitate the projection of the District's future water demands, it is important to have well supported estimates of future population totals. The Water Authority coordinated with SANDAG to obtain the estimated 2020 population and projections through 2045 for all of its member agencies. The Water Authority shared the population information with the District. SANDAG collects and analyzes land use, population, and economic information within the County of San Diego in order to develop a number of useful projections such as population. SANDAG updated their population

methodology since the 2015 UWMP to include information from the California Department of Finance. The Water Authority provided SANDAG with individual member agency boundaries via a geographic information system (GIS), so the population data is specific to the District's boundary.

The District has grown very little in the last five years in comparison to the growth in the period between 2010 and 2015, but now the District anticipates increasing levels of development over the current UWMP planning horizon. The projected increase in population reflects the maximum amount of residential development allowable under the last update to the San Diego County General Plan. Current and projected future District population counts are summarized in Table 3-1.

It should be noted here that the current development approval environment in the unincorporated areas of San Diego County is such that the maximum values listed below are unlikely to be achieved.

Table 3-1. Current and Projected Service Area Population

Population Served	2020	2025	2030	2035	2040	2045
	21,841	22,678	25,862	29,614	31,058	31,819

Projections based on SANDAG Series 14 growth forecast (Version 17).

3.6 Socioeconomics

According to the Data USA, which uses Bureau of Labor Statistics (BLS) data, Rainbow and Bonsall have a median household income of approximately $68,000 and $84,000, respectively and a median property value of $446,000 and $691,000, respectively. Between 2016 and 2018, females between the ages of 55 and 64 were the largest demographic living in poverty, and the overall poverty rate was between seven and 13 percent. Approximately eight percent of people in the area were uninsured and 32 percent were insured through Medicare and Medicaid.

3.7 Service Area Land Uses

Most of the District is mountainous and consists of hills and valleys with a mix of primarily intermittent streams and some perennial streams and rivers. The topography ranges in elevation from 150 to 2,451 feet above mean sea level. The San Luis Rey River crosses diagonally through the District from the northeast to the southwest, and several smaller creeks divide the area, including Gopher Canyon, Moosa Canyon, and Tamarack Creeks. Much of the area still remains in its natural state of chaparral, oak, and coastal sage vegetation.

The land uses for the service area of the District are heavily agricultural, and water for agriculture accounts for more than half of District water sales. Agricultural crops include avocados, citrus, and tomatoes. Other land uses include commercial nurseries and livestock. Commercial land use in the District is very limited and is concentrated along the I-15 and State Route-76 (SR-76) corridors. In some areas, land use is transitioning from primarily agricultural use to now include a significant component of rural residential development along with multiple dense, large scale residential and mixed-use developments planned for the near future. It should be noted that land use planning trends have recently discouraged large scale residential development in rural areas of San Diego County, so other than currently approved projects the potential for additional large-scale development is limited.

Section 4

Water Use

This section presents the historical and projected retail water demands by customer type, climate change considerations, distribution system water losses, and water savings.

4.1 Existing Use by Customer Class

Total water use in the District during FY 2020 is presented in Table 4-1. Water use is broken into five water use categories plus water losses.

Table 4-1. Demands for Potable and Non-Potable Water – Actual Fiscal Year (FY) 2020

Use Type		FY 2020 Actual	
Use Category	Additional Description	Level of Treatment When Delivered	Volume (AF)
Single Family		Drinking Water	3,266
Multi-Family		Drinking Water	280
Commercial		Drinking Water	745
Institutional/Governmental		Drinking Water	43
Agricultural		Drinking Water	8,876
Losses	Non-Revenue Water, including apparent and real losses	Drinking Water	1,087
		Total	14,297

Volumes reported for individual customer classes are metered sales, exclusive of non-revenue water (real and apparent losses).

4.2 Projected Future Water Use

The following section describes the methodology used to determine the District's demand projections.

4.2.1 Approach / Methodology

The District forecasts future water demands using existing unit demands as a baseline and scales these based on the net effects of growth, conservation, agricultural outlook, and other factors. The forecast methodology is outlined below.

1. **Past Demands.** The District identified FY 2004 as a peak demand year. The peak demand year was then compared to current demands and the overall trend was evaluated. The overall trend shows a decline in total demand by approximately 55 percent since FY 2004.
2. **New development.** New residential development demands are generated using unit demand factors that reflect the anticipated decline from the baseline unit use factors per connection. The unit use factors are applied to the corresponding water connection projections for the planning period.

3. **Reduced demands due to additional conservation efficiencies and other factors.** The District projects unit use rates will continue to decline over time in response to increased water rates, conservation education, and shifting landscape preferences.
4. **Change in Agricultural demands.** Agricultural demands are forecast based on declining irrigated acreage, increasing agricultural irrigation efficiencies, and price-elasticity of demand response to projected increased water prices.

4.2.2 Projected Potable Water Demands

District water demands peaked in FY 2004 at approximately 33,300 AF and have subsequently declined by more than 55 percent due to the factors described below. As reported in Table 4-1, FY 2020 total water demand was 14,297 AF, which is the lowest demand recorded for the District since before the early 1980s. The District projects that future demands will continue to decline at an overall rate of four percent every five years, as shown in Table 4-2. Note that the District does not deliver any non-potable water at this time, so it is not included in the table.

Table 4-2. Projected Water Demands

Use Type		Projected Water Use (AF)				
	Additional Description (as needed)	2025	2030	2035	2040	2045
Single Family		3,141	3,015	2,895	2,779	2,668
Multi-Family		269	258	248	238	229
Commercial		717	688	660	634	608
Institutional/Governmental		41	40	38	37	35
Agricultural		8,537	8,195	7,867	7,552	7,251
Losses	Non-Revenue, including real losses	1,045	1,004	964	925	888
	Total	13,750	13,200	12,672	12,165	11,679

Notes:

(1) Projections were developed by the District.

(2) Volumes reported for individual customer classes are projected metered sales, exclusive of non-revenue water and actual losses.

(3) Commercial includes use by schools.

(4) Projections by water use type are based upon percentage of total 2020 actual demand for each water use type.

The overall trend in declining demand results from increased conservation efforts by District customers and a loss of acreage in agricultural production. The overall drop in demand has also occurred in response to increasing water prices, periods of drought-induced water use restrictions, and a downward trend in agricultural market conditions for the area. The District was participating in the TSAWR program established by the Water Authority, which was originally enacted in 2008. TSAWR has evolved into PSAWR as of January 1, 2021. Under TSAWR/PSAWR, certain agricultural water customers agree to conservation-based cutbacks during water shortages in exchange for discounted water rates. Although some agricultural sectors, such as nurseries, have seen growth in business and increases in water demands, there is an overall downward trend for agricultural water use, due to increased agricultural efficiencies, water costs, market conditions, and aging groves.

4.2.3 Climate Change – Influence on Water Demands

The District considered climate change factors when conducting the water demand projections. In FY 2020, agricultural demands accounted for 62 percent of the District's water use. Climate change is expected to bring warmer temperatures and drier conditions to the region, which would typically result in an increase in agricultural unit water use per acre. However, any demand increases related to hotter and drier conditions in the agricultural sector are outweighed by the overall significant downward trend in total agricultural acreage. Coupled with the reasons described in Section 4.2.2, agricultural acreage is also expected to decrease due to climate change related inhospitable agricultural land conditions which prohibit cost effective agricultural production due to high imported water costs.

4.2.4 Projected Recycled Water Demands

The District does not currently deliver any recycled water. The District has previously evaluated recycled water development projects and found these to be infeasible. There are no future plans for recycled water development at this time. Additional discussions on the District's local supply development plans are presented in Section 6.

4.2.5 Projected Total Water Demands

The District's total projected demands are summarized in Table 4-3.

Table 4-3. Total Water Demands, AF

	2020	2025	2030	2035	2040	2045
Potable and Raw Water Demands [1] (from Tables 4-1 and 4-2)	14,297	13,750	13,200	12,672	12,165	11,679
Recycled Water Demand (from Table 6-4)	0	0	0	0	0	0
Total Water Demand	14,297	13,750	13,200	12,672	12,165	11,679

(1) The District does not have any raw water demands. All demands shown are for potable water.

4.3 Distribution System Water Loss

Distribution system water losses result from leaks from pipelines and storage facilities. The District has calculated losses using the American Water Works Association (AWWA) Manual M36, *Water Audits and Loss Control Programs*, and the corresponding AWWA calculation worksheets documented in Appendix L of DWR's 2020 UWMP Guidebook. The analysis distinguishes between real losses, which are actual losses due to leaks from pipelines, storage reservoirs, and service connections; and apparent losses, which consist of water that is put to beneficial use, but which is not recorded as metered water sales due primarily to under-registering customer meters. The worksheets are provided as Appendix B. The audit results are summarized in Table 4-4.

Table 4-4. Water Loss Audit Reporting			
End of Reporting Period	Volume of Water Loss (AF)		
	Real (1)	Apparent (2)	Total
07/2020	143	598	741
07/2019	4	833	837
07/2018	50	1,250	1,300
07/2017	719	851	1,570
12/2015 (3)	204	949	1,153

(1) Real losses are actual losses due to leaks.

(2) Apparent losses consist of water that is beneficially used but not recorded as metered sales.

(3) Prior to FY17, Water Loss Audit reporting was done on a calendar year basis.

4.4 Estimating Future Water Savings

The District's water demand forecasting methodology, as summarized in Section 4.2.1, specifically accounts for future water savings resulting from conservation and other factors. Related information required for the UWMP is summarized in Table 4-5.

Table 4-5. Inclusion in Water Use Projections	
Are Future Water Savings Included in Projections?	Yes
Page Number(s) where Described	4-2
Are Lower Income Residential Demands Included in Projections?	Yes

4.5 Water Use for Lower Income Households

The District's water demand forecasting methodology, as summarized in Section 4.2.1, incorporates the existing and planned housing in the District's service area, as outlined in the County of San Diego's General Plan. These housing elements, inclusive of low-income housing, are included in the demographic summaries and forecasts of SANDAG on which the District water demand forecasts are based. According to SANDAG's Regional Housing Needs Assessment Plan for the 2021-2029 planning period, 16.6 percent of existing households in the unincorporated region of the County of San Diego are considered low income and 22.5 percent are considered very low income. In 2020, this equates to approximately 8,540 people and 5,600 AFY based on the average 2020 gallons per capita per day (GPCD).

Section 5

Baselines and Targets

This section describes the District's Senate Bill X7-7 (SB X7-7) GPCD baseline and target development based on the analysis conducted as part of the 2015 UWMP. Compliance with the 2020 target is presented.

5.1 SB X7-7 Water Conservation Act of 2009

In 2009, the legislature approved, and the Governor signed SB X7-7, the Water Conservation Act of 2009. The Act required urban water agencies to achieve a reduction in per capita water use of 20 percent by 2020, relative to certain specified baseline conditions.

As a part of SB X7-7, urban water suppliers were required to develop a 2015 interim target and a 2020 urban water use target to meet the Act's water conservation intent. In 2010, DWR released a manual titled *Methodologies for Calculating Baseline and Compliance Urban Per Capita Water Use* (manual), which provided retail water agencies with specific requirements and methodologies for setting water use efficiency goals and compliance standards for 2020.

In the 2015 UWMP, the District updated the calculations presented in the 2010 UWMP to utilize refined annual population estimates developed by SANDAG and referenced 2000 and 2010 census data at the census block level. These revised population counts resulted in minor changes to the District's 2015 and 2020 per capita use targets, reducing the target values by approximately four percent in comparison to the target values reported in the District's 2010 UWMP. The complete set of SB X7-7 calculation tables, also known as the Verification Form, are included in Appendix C.

5.2 Baseline Periods and Targets

SB X7-7 requires agencies to develop baseline per capita water use and to develop reduced per capita consumption targets in order to comply with the conservation goals to achieve 20 percent reduction by 2020. The baseline periods can be 10- or 15-years and must end between December 31, 2004 and December 31, 2010. In the 2010 UWMP, the manual provided four alternative methods for calculating baselines and targets. The District selected Method 1 for use in the 2010 UWMP and identified a baseline period of 1999 through 2008. Water suppliers must also calculate a five-year baseline to confirm that the selected 2020 target meets the minimum water use reduction requirements and is a continuous five-year period that ends no earlier than December 31, 2007 and no later than December 31, 2010. The District selected a baseline between 2003 and 2007. The per capita use target level for 2020 is summarized in Table 5-1.

Table 5-1. Per Capita Use Baselines and Targets Summary

Baseline Period	Start Year	End Year	Average Baseline GPCD	Confirmed 2020 Target GPCD
10-Year	1999	2008	1,503	1,202
5-Year	2003	2007	1,515	

Actual per capita water use in the District for FY 2020 was determined by converting the total water use, reported as 14,297 AFY in Table 4-1, to 12,775,142 gallons per day and dividing this by the total population for 2020, reported as 21,841 people in Table 3-1. Although it is allowable to adjust the per capita water use by deducting the agricultural water use, the baselines and targets that were developed in 2015 included agricultural use. Thus, agricultural water use is included in the 2020 compliance calculations as well. The actual per capita water use in the District for FY 2020 was 585 GPCD, which is less than the SB 7X-7 2020 target level of 1,202 GPCD. This indicates the District is in compliance with the SB 7X-7 2020 target. SB X7-7 2020 compliance information is summarized in Table 5-2. Additionally, a series of tables that compose the DWR Compliance Form, are included in Appendix C.

Table 5-2. Per Capita Use 2020 Compliance

	Optional Adjustments			
Actual 2020 GPCD	Total Adjustments GPCD	Adjusted 2020 GPCD	2020 GPCD (adjusted if applicable)	Did Supplier Achieve Targeted Reduction for 2020?
585	0	585	585	Yes

Section 6

System Supplies

This chapter describes the existing and planned supplies of water available to the District, including the District's current supply of water purchased from the Water Authority and the District's plans for the development of local groundwater supply projects.

6.1 Purchased or Imported Water

The District is wholly reliant on imported water sources that are delivered through both the Water Authority's and MWD's facilities but purchased through the Water Authority. Currently, the Water Authority's potable water supply is produced by the Water Authority Carlsbad Seawater Desalination Project, the Water Authority Twin Oaks Valley Water Treatment Plant in San Marcos, and the MWD Skinner Water Treatment Plant in Riverside County. The vast majority of water served to the District comes from the Skinner Water Treatment Plant. A complete description of the Water Authority supplies can be found in its 2020 UWMP (www.sdcwa.org/uwmp).

MWD has two main sources of supply, the California State Water Project and the Colorado River. A complete description of all of MWD and its supplies can be found in MWD's Regional UWMP (http://www.mwdh2o.com/PDF_About_Your_Water/Draft_Metropolitan_WSCP_February_2021.pdf). The District has relied upon the water supply information provided by the Water Authority in preparing the District's 2020 UWMP and for the purposes of fulfilling the requirements of the Act.

6.2 Existing and Verifiable Local Supplies

The District does not currently obtain any of its supply from local sources. The District has studied opportunities to develop local recycled water and groundwater supplies. These future local supply opportunities are addressed in Section 6.3.

6.2.1 Groundwater

The District does not currently utilize groundwater as an existing source of supply. The District is continuing to evaluate opportunities for development of groundwater supplies from the San Luis Rey River Basin (9-7), as further described in Section 6.3. This basin is currently identified as a medium priority basin. There is no historical groundwater pumping to report, and this is documented in Table 6-1.

Table 6-1. Groundwater Volume Pumped (AF)

☑	Supplier does not pump groundwater.					
Groundwater Type	Location or Basin Name	2016	2017	2018	2019	2020
	None	--	--	--	--	--
	Total	0	0	0	0	0

6.2.2 Surface Water

The District does not currently utilize local surface water as an existing source of supply. Several small surface water bodies, most notably the San Luis Rey River, run through the District. While the river may see larger flows during storm events, water flow is minimal most of the year. River flows are insufficient for diversion for use as a water supply. The District has no plans to develop surface water within its service area as a water supply.

6.2.3 Stormwater

The District does not currently utilize stormwater as an existing source of supply. The district is rural and is largely undeveloped and in an undisturbed state, and its terrain is dominated by mountains and valleys making stormwater capture infrastructure infeasible. The District has no plans to develop stormwater as a water supply within its service area.

6.2.4 Recycled Water

The District does not own or operate any recycled water distribution facilities and does not currently utilize recycled water as an existing source of supply. Additional information on wastewater generation and treatment, agency coordination, and the District's actions to encourage the use of recycled water are addressed below.

6.2.4.1 Wastewater Collection and Treatment

The District has a contract in place with the City of Oceanside in which the District owns 1.5 million gallons per day (MGD) of sewage treatment capacity in the City of Oceanside's San Luis Rey Water Reclamation Plant (SLRWRP). The District's sewer service area includes over 2,745 connections mainly along the SR-76 corridor. The remainder of the service area is more rural and uses private septic tank systems. The District conveys the wastewater collected by its system to the SLRWRP via a wastewater line located along North River Road. Although 1.5 MGD capacity is available, the District does not currently produce that volume of wastewater, and in 2020 conveyed 0.8 MGD to the Oceanside plant. Wastewater collection volume estimates are shown in Table 6-2.

Table 6-2. Wastewater Collection within the District Service Area

Wastewater Collection		Recipient of Collected Wastewater				
Wastewater Collection Agency	Volume Metered or Estimated?	Volume (AF) from Service Area 2020	Receiving Entity	Treatment Plan Name	WWTP Located in the District	Operation Contracted to Third Party?
The District	Metered	883	City of Oceanside	San Luis Rey WWTP	No	No
	Total	883				

There is currently no wastewater treatment or discharge within the District service area, as presented in Table 6-3.

Table 6-3. Wastewater Treatment and Discharge Within the District Service Area							
☑	No wastewater is treated or disposed of within the UWMP service area. The Supplier will not complete the table below.						
Wastewater Treatment Plant Name	Discharge Location	Disposal Method	Treats Flow from Outside Service Area?	Treatment Level	2020 Volumes (AF) Volume Treated	Recycled Within Service Area	Recycled Outside of Service Area
				Total	0	0	0

6.2.4.2 Recycled Water Use

Recycled water has many potential uses, primarily exterior uses such as agricultural or landscape irrigation, wildlife habitat enhancement, wetlands maintenance, industrial reuse, groundwater recharge, indirect potable reuse, and others.

Currently, the District does not have any verifiable plans for the development of recycled water. Therefore, the supply tables show no projected recycled water beneficial uses, and there are no current or recycled water uses in the service area. The required DWR tables reflecting this are presented in Table 6-4 and Table 6-5.

Table 6-4. Current and Projected Recycled Water Uses Within Service Area (AF)								
Beneficial Use Type	General Description	Level of Treatment	2020	2025	2030	2035	240	2045
Agricultural irrigation			--	--	--	--	--	--
Landscape irrigation			--	--	--	--	--	--
Golf course irrigation			--	--	--	--	--	--
Commercial use			--	--	--	--	--	--
Industrial use			--	--	--	--	--	--
Geothermal/other energy			--	--	--	--	--	--
Recreational impoundment			--	--	--	--	--	--
Wetlands or wildlife habitat			--	--	--	--	--	--
Groundwater recharge (IPR)			--	--	--	--	--	--
Indirect potable reuse			--	--	--	--	--	--
Direct potable reuse			--	--	--	--	--	--
		Total	0	0	0	0	0	0

Table 6-5. Projected vs. Actual 2020 Recycled Water Use (AFY)		
Use Type	2015 Projection for 2020	Actual 2020 Use
Agricultural irrigation	--	--
Landscape irrigation (excludes golf course)	--	--
Golf course irrigation	--	--
Commercial use	--	--
Industrial use	--	--
Geothermal and other energy production	--	--
Seawater intrusion barrier	--	--
Recreational impoundment	--	--
Wetlands or wildlife habitat	--	--
Groundwater recharge (IPR)	--	--
Surface water augmentation (IPR)	--	--
Direct potable reuse	--	--
Total	0	0

6.2.4.3 Projects to Expand Recycled Water Use

As part of its Water Master Plan Update completed in 2016, the District completed a concept study which detailed how a wastewater treatment plant could be constructed within the District, the potential benefits of such a system, the potential recycled water demand available, and the system that would be needed to serve recycled water for that demand. As part of the concept study, the District coordinated with the City of Oceanside to explore wastewater treatment and recycled water opportunities. The District concluded the project was not feasible at this time (Atkins, 2016).

Currently, the District does not have any planned actions to encourage and optimize the future use of recycled water within the District service area as shown in Table 6-6. However, should the State develop manageable direct potable reuse regulations, there is a significant opportunity for reuse of wastewater in such a system. The main driver of infeasibility for recycled water use was the capital cost of the distribution system. A direct potable reuse project could utilize existing distribution system assets, thus lowering the cost considerably.

Table 6-6. Projects to Expand Future Recycled Water Use			
☑	Supplier does not plan to expand recycled water use in the future. Supplier will not complete the table below but will provide narrative explanation		
Name of Action	Description	Planned Implementation Year	Expected Increase in Recycled Use (AFY)
-	-	-	-
		Total	-

6.2.5 Desalinated Water Opportunities

The District currently does not have its own source of desalinated supply. However, the District's plans for the possible development of a brackish groundwater desalting project are described in Section 6.3. Additionally, desalination has recently become a source of supply for the Water Authority with the completion and operation of the Poseidon Carlsbad Desalination Project in Carlsbad, which adds 50 MGD of desalinated water to the Water Authority supply portfolio. However, the water from the Carlsbad plant cannot reach most of the District's service area due to system hydraulic constraints.

6.2.6 Exchanges or Transfers

The UWMP Act encourages transfers and exchanges of water between agencies in order to improve the reliability and quality of agency water supplies. Although the District relies entirely upon water purchased from the Water Authority, it participates in emergency transfers with neighboring agencies in order to improve reliability. The District has interconnections with the City of Oceanside at the City's Weese Water Treatment Plant and with the Fallbrook Public Utility District (FPUD). In addition to the existing interconnections, the District's Capital Improvement Program (CIP) from the 2016 Water Master Plan Update describes the plan to develop additional interconnections to the FPUD system. The proposed new interconnections would provide additional reliability to some of the District's water pressure zones which need additional fire flow capacity or supply redundancy. Regional exchanges and transfers being pursued by the District and the Water Authority are documented in the Water Authority's UWMP.

6.3 Possible Future Local Supplies

The District has conducted and reviewed studies of two possible local supply projects, as described below.

6.3.1 Recycled Water Project

Considering recent drought conditions within southern California, the District has contemplated whether construction of its own water recycling project would be more cost effective and resource-efficient than continued conveyance of wastewater flows to the City. As previously noted in Section 6.2.4.3, the District concluded the project is not feasible at this time.

6.3.2 Groundwater Desalter

In January 2016 the District completed a preliminary study (West Yost Associates, 2016) examining the feasibility of developing local San Luis Rey River basin groundwater resources for District use. The project would include a well field, and either the construction of a Rainbow groundwater desalting plant or another appropriate form of treatment. The study examined a project developing up to 4,000 AFY of new treated supply. The water to be treated originates as District-supplied imported water to the basin that percolates to the groundwater as a result of agricultural irrigation and return flows from septic systems. As such, the District classifies the project as an Imported Water Return Flow Reclamation Project.

The District has been evaluating the findings of the preliminary study and will soon commence further action on the project. Although the results of the study appear promising, the District recognizes that additional engineering and environmental evaluations will be necessary to confirm project feasibility and sizing. For purposes of this UWMP, the District anticipates that a Phase I groundwater project would be sized for production of approximately 2,000 AFY beginning in 2030,

Further expansions to higher capacities may be possible but are subject to various planning uncertainties.

6.3.3 Summary of Possible Local Supply Volumes

For the purposes of supply planning, supply projects are categorized as Verifiable, Planned, or Conceptual. **Verifiable** projects are those projects that have a high level of certainty of being completed, such that they can be relied on as an assured component of the future supply portfolio. They meet California Environmental Quality Act (CEQA) requirements, have permits, and/or contracts have been executed. **Planned** projects are those that have been subject to affirmative feasibility investigations, but which have additional permitting, environmental, and/or financial approval hurdles remaining before they are implemented. **Conceptual** projects are proposed project concepts that have not been subject to formal study or that have significant uncertainties or obstacles to implementation.

For formal UWMP reporting, the District includes verifiable and planned projects in its official projections of future supply availability. Currently, there is one planned project as summarized in Table 6-7 below.

Table 6-7. Expected Future Water Supply Projects or Programs

Name of Future Projects or Programs	Joint Project with other agencies?	Description	Planned Implementation Year	Planned for Use in Year Type	Expected Supply (AFY)
Imported Water Return Flow Reclamation Project	No	San Luis Rey River basin groundwater well field, and the construction of a groundwater desalting plant or another appropriate form of treatment	2030	All	2,000

6.4 Summary of Existing and Planned Sources of Water

Section 6 has served to identify all of the District's existing, planned, and potential water supply sources available to meet the District's anticipated demands. Table 6-8 lists the District's sources of supply for FY 2020, and Table 6-9 lists the District's projected sources and volume of verifiable or planned supply for the UWMP's planning horizon.

Table 6-8. FY 2020 Water Supplies – Actual

Water Supply	Additional Detain on Water Supply	FY 2020	
		Volume (AF)	Water Quality
Purchased or Imported Water	San Diego County Water Authority	14,297	Drinking Water
	Total	14,297	

Table 6-9. Water Supplies - Projected						
Water Supply	Description	Projected Water Supply, AF				
		2025	2030	2035	2040	2045
Purchased or Imported Water	San Diego County Water Authority	13,750	13,200	12,672	12,165	11,679
Groundwater	Imported Water Return Flow Reclamation project	0	2,000	2,000	2,000	2,000
Recycled Water		0	0	0	0	0
	Total	13,750	15,200	14,672	14,165	13,679

Only "Verifiable" and "Planned" projects are included in this table.

6.5 Climate Change – Influence on Water Supply

The Water Authority has evaluated the potential influence of climate change on its supply, on which the District is reliant for its potable supply. The following summarizes the Water Authority's analysis and is excerpted from the March 2021 draft of their UWMP.

[Excerpt from Water Authority Draft UWMP, March 2021]

When evaluating the effects of climate change on long-term water supply planning, a distinction should be made between climate and weather. Weather consists of the short-term (i.e., minutes to months) changes in the atmosphere. Climate is how the atmosphere behaves over relatively long periods of time. Climate change refers to changes in long-term averages of daily weather conditions. Changes to climate will be gradual, providing water supply agencies the ability to adapt planning strategies to manage for the supply uncertainties. The effect on supply would be captured in each five-year update to the UWMP.

Researchers have concluded that increasing atmospheric concentrations of greenhouse gases, such as carbon dioxide, are causing the Earth's air temperature to rise. While uncertainties remain regarding the exact timing, magnitude, and regional impacts of the temperature and potential precipitation changes due to climate change, researchers have identified several areas of concern that could influence long-term water supply reliability. These potential areas are listed below:

- **Loss of Natural Snowpack Storage**. Rising temperatures reduce snowpack in the Sierra Nevada because more precipitation falls as rain, and snowmelt occurs sooner. Snowpack in the Sierra Nevada is the primary source of supply for the State Water Project. Snowpack is often considered a large surface "reservoir," where water is slowly released between April and July each year. Much of the state's water infrastructure was designed to capture the slow spring runoff and deliver it during the drier summer and fall months. The California Department of Water Resources projects that the Sierra snowpack will experience a 25 to 40 percent reduction from its historic average by 2050.
- **Sea Level Rise**. Rising sea levels could increase the risk of damage to water and water recycling facilities from storms, high-tide events, and erosion of levees. A potential catastrophic levee breach in the Delta could interrupt supplies from the State Water Project, potentially reducing supply deliveries to the San Diego region from Metropolitan. In addition, rising sea levels could cause saltwater intrusion into the Delta, degrading drinking water quality. More freshwater releases from upstream reservoirs would be required to repel the sea to maintain salinity levels for municipal, industrial, and agricultural uses.
- **Changes in Average Precipitation and Runoff Volume**. The effect of climate change on overall precipitation and runoff volumes is still unclear and highly uncertain. For example, a number of studies conclude that the flow of the Colorado River may be reduced by climate change, but a wide disparity exists on the predicted volume of that change. Yield from local

surface water resources could potentially be reduced if annual runoff volumes are reduced due to a decline in precipitation or if an increase occurs in evapotranspiration in reservoirs. Research has yet to clarify how precipitation levels may be impacted by climate change.

- **Change in Frequency and Intensity of Droughts**. Warming temperatures, combined with potential changes in rainfall and runoff patterns, could exacerbate the frequency and intensity of droughts.

6.6 Energy Intensity

Water energy intensity is the total amount of energy used per AF to power the water management processes occurring within the District's operational control. The District has selected to report its energy intensity using the total utility approach option as outlined in the DWR 2020 Guidebook. Energy used in the Water Authority's water supply process or in the transmission to the District from the Water Authority is not included in this analysis. Energy usage for each applicable water distribution facility is provided by the associated electricity meter and reported in kilowatt-hours (kWh). For the analysis, the annual volume of water entering the distribution system was summed for the period from July 1, 2019 to June 30, 2020. There is no electrical billing data to exactly match this period, so the best matched data from June 19, 2019 to June 18, 2020 was used to determine the energy consumed. Table 6-10 presents an estimated energy intensity for the total utility, summing energy intensity for all water system facilities during the 2020 FY. The energy intensity for the 2020 FY was 150 kWh/AF.

Table 6-10. Energy Intensity-Total Utility Approach

Urban water supplier:	Rainbow Municipal Water District			
Water delivery product:	Retail potable water deliveries			
DWR Table O-1B: Energy Intensity - Total Utility Approach				
Enter start date for reporting period	7/1/2019	Urban Water Supplier Operational Control		
End date	6/30/2020			
		Sum of All Water Management Processes	Non-Consequential Hydropower	Net utility
		Total utility		
Volume of water entering process (AF)		14,297	0	14,297
Energy consumed (kWh)		2,147,875	0	2,147,875
Energy intensity (kWh/AF)		150	0.0	150
Quantity of self-generated renewable energy				
0	kWh			
Data quality				
Metered data				
Data quality narrative:				
Energy data was collected from monthly San Diego Gas and Electric bills based on electric meter readings.				
Narrative:				
Energy consumption data is for retail potable deliveries treatment, storage, and conveyance systems.				

Section 7

Water Supply Reliability

Currently, the District is wholly reliant on imported water sources that are delivered through both the Water Authority's and MWD's facilities but purchased through the Water Authority. Therefore, the water supply reliability assessment in this chapter is based upon the Water Authority assessment from its 2020 UWMP (www.sdcwa.org/uwmp). The District investigated several water resources projects that would reduce dependence on the Water Authority, as described in Section 6. The planned Imported Water Return Flow Reclamation Project is included in this reliability assessment from 2030 onward. The water recycling project was determined infeasible, although should direct potable reuse regulations come to fruition a future project could be developed.

7.1 Constraints on Water Sources

The supply from the Water Authority is very consistent in quantity and quality and has sufficient capacity to meet peak demands without any delivery constraints. The District meets or exceeds all state and federal water quality standards for drinking water. The District does not anticipate any shortage or impact to availability of supply. The Water Authority's Regional UWMP Section 7 provides additional information on supply reliability.

7.2 Reliability by Type of Year

Historically, the Water Authority supply has been very reliable with only occasional supply reductions during droughts in California or the Colorado River Watershed. Table 7-1 shows the basis of water year data. This data is based on the Water Authority's 2020 UWMP, where 2015 was selected as the representative single-dry year and 2011-2015 as the multiple dry-years based upon historical drought conditions. In the table, the volume available reflects the volume supplied by the Water Authority to the District for the given year.

Table 7-1. Basis of Water Year Data

Year Type	Base Year	Volume Available, AF	% of Average Supply
Average Year	2013	22,104	100%
Single-Dry Year	2015	20,062	91%
Multiple-Dry Years 1st Year	2011	18,495	84%
Multiple-Dry Years 2nd Year	2012	20,819	94%
Multiple-Dry Years 3rd Year	2013	22,104	100%
Multiple-Dry Years 4th Year	2014	23,217	105%
Multiple-Dry Years 5th Year	2015	20,062	91%

Volumes based on potable deliveries supplied by the Water Authority to the District.

7.3 Supply and Demand Assessment

The following section describes the District's normal year, single dry year, and multiple dry year supply and demand assessment.

7.3.1 Normal Year Supply and Demand Assessment

If the Water Authority's and the District's supplies are developed as planned, no shortages are anticipated within the District's service area in a normal year through 2045. As part of the preparation of its UWMP, the Water Authority identified the water demands for all of its retailers. The Water Authority determined that it has adequate water supplies to cover the demands for all of its retailers, including the District, for a normal year. Table 7-2 provides normal year supply and demand comparisons. Beginning in 2030, the supply totals include the planned local supply project, Imported Water Return Flow Reclamation.

Table 7-2. Normal Year Supply and Demand Comparison

	2025	2030	2035	2040	2045
Supply totals (AF)	13,750	15,200	14,672	14,165	13,679
Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
Deficit (AF)	0	0	0	0	0
% of Demands	0%	0%	0%	0%	0%

7.3.2 Dry Year Supply and Demand Assessments

Similar to the normal year, if the Water Authority and the District's supplies are developed as planned, no shortages are anticipated within the District's service area for a single dry-year or multiple dry-years. the Water Authority determined that it has adequate water supplies to cover the demands for all of its retailers, including the District, for the single dry-year and multiple dry-year scenarios. Additional shortages are handled through the use of the Water Authority's carryover storage and management actions such that there are no shortages to member agencies for the single and multiple dry-year scenarios. The Water Authority's dry-year supplies are described in further detail in Section 9.4 of its UWMP.

Dry year demands are assumed equal to normal year demands, where the net of dry-year water use increases and dry-year water conservation result in no overall change. The Water Authority supply to the District will equate to demand, less local supplies. As such, the single dry year supply and demand comparison in Table 7-3 and the multiple dry year comparison in Table 7-4 show no shortage of supply.

Table 7-3. Single Dry Year Supply and Demand Comparison					
	2025	2030	2035	2040	2045
Supply totals (AF)	13,750	13,200	12,672	12,165	11,679
Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
Deficit (AF)	0	0	0	0	0
% of Demands	0%	0%	0%	0%	0%

(1) Per the Water Authority Draft 2020 Regional UWMP, Section 9.4, no single dry-year event supply shortages are anticipated within the Water Authority service area through 2045.

(2) Demands assumed equal to normal year demands, with net of dry-year increase and dry-year conservation resulting in no overall change.

Table 7-4. Multiple Dry Years Supply and Demand Comparison						
		2025	2030	2035	2040	2045
First Year	Supply totals (AF)	13,750	13,200	12,672	12,165	11,679
	Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
	Deficit (AF)	0	0	0	0	0
	% of Demands	0%	0%	0%	0%	0%
Second Year	Supply totals (AF)	13,750	13,200	12, 672	12,165	11,679
	Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
	Deficit (AF)	0	0	0	0	0
	% of Demands	0%	0%	0%	0%	0%
Third Year	Supply totals (AF)	13,750	13,200	12, 672	12,165	11,679
	Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
	Deficit (AF)	0	0	0	0	0
	% of Demands	0%	0%	0%	0%	0%
Fourth Year	Supply totals (AF)	13,750	13,200	12, 672	12,165	11,679
	Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
	Deficit (AF)	0	0	0	0	0
	% of Demands	0%	0%	0%	0%	0%
Fifth Year	Supply totals (AF)	13,750	13,200	12, 672	12,165	11,679
	Demand totals (AF)	13,750	13,200	12,672	12,165	11,679
	Deficit (AF)	0	0	0	0	0
	% of Demands	0%	0%	0%	0%	0%

Notes:

(1) Per the Water Authority Draft 2020 Regional UWMP, the Water Authority anticipates meeting the District's demands in multiple dry-years.

(2) Demands assumed equal to normal year demands, with net of dry-year increase and dry-year conservation resulting in no overall change.

7.4 Regional Supply Reliability

The Water Authority and its member agencies are considering many options to maximize the use of local water resources and minimize the need to import water from other regions including groundwater, water recycling, potable reuse, and seawater desalination. The County of San Diego has limited local surface water and groundwater resources, and these are currently being managed to the fullest yield possible. In addition to the multiple dry year scenarios noted above, the Water Authority goes through a traditional scenario planning process to assess potential supply and demand management risks (Section 10 of the Water Authority Draft UWMP, March 2021).

7.5 Drought Risk Assessment

Table 7-5 presents the five-year Drought Risk Assessment (DRA), which is a total water supply and use comparison. It is based on the scenario that the next five years are five-consecutive-year drought years. It calculates the potential supply surplus or shortages, and it allows the District to include shortfall mitigation from WSCP demand reduction measures and supply augmentation, as necessary.

Table 7-5. Five-Year DRA

2021	Total	Notes
Gross Water Use	14,198	Interpolation of demand projections between 2020 and 2025
Total Supplies	18,495	Based on lowest year of supply, 2011 (Table 7-1)
Surplus/Shortfall without WSCP Action	4,297	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	Not required due to surplus.
WSCP - use reduction savings benefit	-	Not required due to surplus.
Revised Surplus/(shortfall)	-	Not required due to surplus.
Resulting % Use Reduction from WSCP action	-	Not required due to surplus.
2022	**Total**	**Notes**
Gross Water Use [Use Worksheet]	14,086	Interpolation of demand projections between 2020 and 2025
Total Supplies [Supply Worksheet]	18,495	Based on lowest year of supply, 2011 (Table 7-1)
Surplus/Shortfall without WSCP Action	4,409	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	Not required due to surplus.
WSCP - use reduction savings benefit	-	Not required due to surplus.
Revised Surplus/(shortfall)	-	Not required due to surplus.
Resulting % Use Reduction from WSCP action	-	Not required due to surplus.
2023	**Total**	**Notes**
Gross Water Use [Use Worksheet]	13,974	Interpolation of demand projections between 2020 and 2025
Total Supplies [Supply Worksheet]	18,495	Based on lowest year of supply, 2011 (Table 7-1)
Surplus/Shortfall without WSCP Action	4,521	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	Not required due to surplus.

Table 7-5. Five-Year DRA		
WSCP - use reduction savings benefit	-	Not required due to surplus.
Revised Surplus/(shortfall)	-	Not required due to surplus.
Resulting % Use Reduction from WSCP action	-	Not required due to surplus.
2024	**Total**	**Notes**
Gross Water Use [Use Worksheet]	13,862	Interpolation of demands between 2020 and 2025
Total Supplies [Supply Worksheet]	18,495	Based on lowest year of supply, 2011 (Table 7-1)
Surplus/Shortfall without WSCP Action	4,633	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	Not required due to surplus.
WSCP - use reduction savings benefit	-	Not required due to surplus.
Revised Surplus/(shortfall)	-	Not required due to surplus.
Resulting % Use Reduction from WSCP action	-	Not required due to surplus.
2025	**Total**	**Notes**
Gross Water Use [Use Worksheet]	13,750	Interpolation of demands between 2020 and 2025
Total Supplies [Supply Worksheet]	18,495	Based on lowest year of supply (Table 7-1)
Surplus/Shortfall without WSCP Action	4,745	Surplus
Planned WSCP Actions (use reduction and supply augmentation)		
WSCP - supply augmentation benefit	-	Not required due to surplus.
WSCP - use reduction savings benefit	-	Not required due to surplus.
Revised Surplus/(shortfall)	-	Not required due to surplus.
Resulting % Use Reduction from WSCP action	-	Not required due to surplus.

The basis of the key inputs in the DRA water supply and use comparison are described below. In all DRA years the District has a surplus of supplies.

Gross water use – The District's projected water use from 2021-25. The gross water use does not include water use reduction as a result of the implementation of any necessary demand reduction actions by WSCP stage, as described in the WSCP in Appendix D.

Total supplies – The supplies presented reflect the worst-case scenario. 2011 was the lowest year of supply, as identified in Table 7-1, so the volume of this supply was assumed for this scenario.

Surplus/shortfall without WSCP Action – Total supplies minus gross water use prior to any demand reduction or supply augmentation actions from the WSCP.

WSCP–supply augmentation benefit – Sum of estimated supply augmentation benefits for the associated water shortage stage.

WSCP–use reduction savings benefit – Sum of estimated water savings from demand reduction actions for the associated water shortage stage.

Revised Surplus/(shortfall) – Total supplies after accounting for supply augmentation benefits and demand reduction actions for the associated water shortage stage.

Resulting percent Use Reduction from WSCP action – WSCP–use reduction savings benefit divided by Gross Water Use.

Section 8

Water Shortage Contingency Planning

The District's WSCP and the associated required DWR tables are presented as a separate document in Appendix D. It will be considered for Board adoption on May 25, 2021.

Section 9

Demand Management Measures

Water conservation is an available method to reduce water demands, thereby reducing water supply needs. This section presents a description of the District's water conservation program and water DMMs.

9.1 Conservation Program Implementation

Water conservation DMMs and the District's compliance status are described in the following sections.

9.1.1 Water Waste Prevention Ordinances

Ordinance 16-10 declares the prevention of water waste, unreasonable water use, or unreasonable method of water use. It also declares that water be conserved for the public welfare. It will be revised to align with the demand reduction actions outlined in the 2020 WSCP, which declare specific demand reduction and conservation measures for pre-defined water shortage stages. Refer to the WSCP in Appendix D for additional information.

DMM Status. The implementation of this DMM is ongoing. The District will continue to enforce this regulation. In some cases, fines may be issued.

9.1.2 Metering

The District is fully metered. Customer service staff utilize database software to identify water reading spikes. Meter reading staff respond to unusual conditions by either visiting the site or meter where spikes are occurring, notifying the customer, and/or making appropriate repairs.

DMM Status. This DMM is on track.

9.1.3 Conservation Pricing

Ordinance 19-04 contains all information regarding water and wastewater service charges for the District. The District's rate structure incentivizes water conservation by using a tiered rate structure where the variable rate portion of the water rates are at a higher rate for the use of larger volumes of water.

The District's water rates are structured to proportionately allocate the cost of providing water service among customer classes and each service area. The rate structure is comprised of four components:

1. District operation and maintenance fixed charges
2. Water Authority fixed charge
3. Variable rate
4. Pumping charge

The rate structure for residential (single and multi-family) and non-residential customers has three tiers based on water use.

DMM Status. The implementation of this DMM is ongoing.

9.1.4 Public Education and Outreach

The District prepares monthly newsletters and posts them to the District website for public viewing. The District's website also includes conservation information on their water use efficiency management page (https://www.rainbowmwd.com/water-use-efficiency-management).

The Water Authority and MWD collaborate with the District to operate public outreach campaigns and school education programs, which extend to the District's service area. The public outreach campaigns and school programs focus on water education and conservation practices.

DMM Status. The District's newsletter program is ongoing. The Water Authority will continue to provide public education and outreach campaigns to the District's service area.

9.1.5 Programs to Assess and Manage Distribution System Real Loss

The District's progress to assess and manage the system's real losses consists of ongoing leak detection and repair within the system, focused on the high-probability leak areas. The District conducts water audits and leak detection and repair on an ongoing basis. The District conducted a water loss audit (Appendix B) for each year since the last UWMP, from 2016 – 2020.

DMM Status. The District is in compliance with this DMM. This DMM is currently being implemented and will continue to be implemented as part of the District's ongoing operations and maintenance program.

9.1.6 Water Conservation Program Coordination and Staffing Support

The District's Customer Service and Communications Supervisor coordinates water conservation practices and programs and establishes an annual program budget based on available funding and resources. The District also hires part-time staff as needed to aid in water conservation program implementation activities.

The contact information for water conservation coordination is:

- Cynthia Gray
- Customer Service and Communications Supervisor

  Phone number: (760) 728-1178 ext. 101
  Email: Cgray@rainbowmwd.com

DMM Status. The implementation of this DMM is ongoing.

9.1.7 Other Demand Management Measures

The Water Authority offers various programs to its retailers' service areas. Customers in the District's service area can take part in the following conservation and rebate programs:

- Plumbing retrofits, such as low-flow showerhead distribution
- Residential leak monitoring system from Flume
- Residential weather-based irrigation controller program
- Residential landscape survey program
- High-efficiency washing machine rebates
- Vouchers for WaterSense toilets
- Commercial, industrial, institutional (CII) voucher program

DMM Status. The implementation of these DMMs is ongoing.

Section 10

Plan Adoption, Submittal, Implementation

This section contains information required by the Act to document compliance with plan adoption, submittal, and implementation requirements.

10.1 Notice of Public Hearing

On March 25, 2021, the District provided emailed notification letters to the county and city within its service area and to other water utilities with which the District coordinates. The notification letters inform the recipients that the UWMP and WSCP are being updated and prepared, and the public hearings will be held for the UWMP and WSCP in 60 days or more from the notification date. Notified entities are listed in Table 10-1.

Table 10-1. Notification to Cities and Counties

Entity	60 Day Notice of Preparation	Notice of Public Hearing
San Diego County	X	X
The Water Authority	X	X
Fallbrook Public Utility District	X	X
City of Oceanside	X	X

In addition, the District will provide legal public notice of the May 25, 2021 public hearings and regularly scheduled Board meeting via advertisement in the Daily Journal newspaper beginning two weeks prior to the hearings. The notice will indicate the time and place of the hearings as well as the location where the plans are available for public inspection. Copies of the notices are included in Appendix E.

10.2 Public Hearing and Adoption

The District held public hearings to receive comments on the Draft 2020 UWMP and Draft 2020 WSCP. The hearings were held on May 25, 2021 at 1 pm. On the same day following the hearings, the District's Board of Directors approved the adoption of the 2020 UWMP and 2020 WSCP. Copies of the adoption resolutions will be included in Appendix F.

10.3 Plan Submittal

The District 2020 UWMP and WSCP will be submitted to DWR in advance of the July 1st due date. The plans and associated data files will be submitted using the DWR Water Use Efficiency data online plan submittal tool. Copies of the plans will also be submitted to the County of San Diego, the

City of Oceanside, and to the California State Library Government Publications Section within 30 days of plan adoption.

10.4 Public Availability

The adopted 2020 UWMP and WSCP will be available for public review at http://www.rainbowmwd.com/ no later than 30 days after filing a copy of the UWMP and WSCP with DWR.

Section 11

References

Atkins. Rainbow Municipal Water District Water and Wastewater Master Plan Update. March 2016.

Bureau of Labor Statistics (BLS) via DataUSA. February 2021. https://datausa.io/profile/geo

Department of Water Resources (DWR). 2020 Urban Water Management Plans Guidebook for Urban Water Suppliers. April 2021.

Metropolitan Water District of Southern California. Draft 2020 Urban Water Management Plan. February 2021.

Rainbow Municipal Water District (District). 2015 Urban Water Management Plan. 2016.

Regional Water Management Group and Regional Advisory Committee. San Diego Integrated Regional Water Management Plan. May 2019. https://sdirwmp.org/2019-irwm-plan-update

San Diego Association of Governments (SANDAG). 2050 Regional Growth Forecast. 2020.

SANDAG. 6th Cycle Regional Housing Needs Assessment Plan. July 2020.

San Diego County. San Diego County General Plan. August 2011.

San Diego County Office of Emergency Services and Unified Disaster Council. Multi-Jurisdictional Hazard Mitigation Plan. October 2017.

San Diego County Water Authority (The Water Authority). Draft 2020 Urban Water Management Plan. March 2021.

The Water Authority 2013 Water Facilities Master Plan, Appendix E: "Analysis of Potential Climate Effects on Water Authority Demands."

Appendix A: DWR UWMP Checklist

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Chapter 1	10615	A plan shall describe and evaluate sources of supply, reasonable and practical efficient uses, reclamation and demand management activities.	Introduction and Overview	1
Chapter 1	10630.5	Each plan shall include a simple description of the supplier's plan including water availability, future requirements, a strategy for meeting needs, and other pertinent information. Additionally, a supplier may also choose to include a simple description at the beginning of each chapter.	Summary	1.6
Section 2.2	10620(b)	Every person that becomes an urban water supplier shall adopt an urban water management plan within one year after it has become an urban water supplier.	Plan Preparation	1
Section 2.6	10620(d)(2)	Coordinate the preparation of its plan with other appropriate agencies in the area, including other water suppliers that share a common source, water management agencies, and relevant public agencies, to the extent practicable.	Plan Preparation	2.4
Section 2.6.2	10642	Provide supporting documentation that the water supplier has encouraged active involvement of diverse social, cultural, and economic elements of the population within the service area prior to and during the preparation of the plan and contingency plan.	Plan Preparation	10
Section 2.6, Section 6.1	10631(h)	Retail suppliers will include documentation that they have provided their wholesale supplier(s) - if any - with water use projections from that source.	System Supplies	2.4
Section 2.6	10631(h)	Wholesale suppliers will include documentation that they have provided their urban water suppliers with identification and quantification of the existing and planned sources of water available from the wholesale to the urban supplier during various water year types.	System Supplies	N/A
Section 3.1	10631(a)	Describe the water supplier service area.	System Description	3.1
Section 3.3	10631(a)	Describe the climate of the service area of the supplier.	System Description	3.4
Section 3.4	10631(a)	Provide population projections for 2025, 2030, 2035, 2040 and optionally 2045.	System Description	3.5
Section 3.4.2	10631(a)	Describe other social, economic, and demographic factors affecting the supplier's water management planning.	System Description	3.6
Sections 3.4 and 5.4	10631(a)	Indicate the current population of the service area.	System Description and Baselines and Targets	3.4
Section 3.5	10631(a)	Describe the land uses within the service area.	System Description	3.7
Section 4.2	10631(d)(1)	Quantify past, current, and projected water use, identifying the uses among water use sectors.	System Water Use	4.1 and 4.2
Section 4.2.4	10631(d)(3)(C)	Retail suppliers shall provide data to show the distribution loss standards were met.	System Water Use	4.3
Section 4.2.6	10631(d)(4)(A)	In projected water use, include estimates of water savings from adopted codes, plans and other policies or laws.	System Water Use	4.2
Section 4.2.6	10631(d)(4)(B)	Provide citations of codes, standards, ordinances, or plans used to make water use projections.	System Water Use	4.2
Section 4.3.2.4	10631(d)(3)(A)	Report the distribution system water loss for each of the 5 years preceding the plan update.	System Water Use	4.3
Section 4.4	10631.1(a)	Include projected water use needed for lower income housing projected in the service area of the	System Water Use	4.5

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Section 4.5	10635(b)	Demands under climate change considerations must be included as part of the drought risk	System Water Use	4.2 and 7.5
Chapter 5	10608.20(e)	Retail suppliers shall provide baseline daily per capita water use, urban water use target, interim urban water use target, and compliance daily per capita water use, along with the bases for determining those estimates, including references	Baselines and Targets	5.2
Chapter 5	10608.24(a)	Retail suppliers shall meet their water use target by December 31, 2020.	Baselines and Targets	5.2
Section 5.1	10608.36	Wholesale suppliers shall include an assessment of present and proposed future measures, programs, and policies to help their retail water suppliers achieve targeted water use reductions.	Baselines and Targets	N/A
Section 5.2	10608.24(d)(2)	If the retail supplier adjusts its compliance GPCD using weather normalization, economic adjustment, or extraordinary events, it shall provide the basis for, and data supporting the adjustment.	Baselines and Targets	N/A
Section 5.5	10608.22	Retail suppliers' per capita daily water use reduction shall be no less than 5 percent of base daily per capita water use of the 5 year baseline. This does not apply if the suppliers base GPCD is at or below	Baselines and Targets	N/A
Section 5.5 and Appendix E	10608.4	Retail suppliers shall report on their compliance in meeting their water use targets. The data shall be reported using a standardized form in the SBX7-7 2020 Compliance Form.	Baselines and Targets	Appendix C
Sections 6.1 and 6.2	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought.	System Supplies	7
Sections 6.1	10631(b)(1)	Provide a discussion of anticipated supply availability under a normal, single dry year, and a drought lasting five years, as well as more frequent and severe periods of drought, *including changes in supply due to climate change.*	System Supplies	7
Section 6.1	10631(b)(2)	When multiple sources of water supply are identified, describe the management of each supply in relationship to other identified supplies.	System Supplies	6.1 and 6.2
Section 6.1.1	10631(b)(3)	Describe measures taken to acquire and develop planned sources of water.	System Supplies	6.3
Section 6.2.8	10631(b)	Identify and quantify the existing and planned sources of water available for 2020, 2025, 2030, 2035, 2040 and optionally 2045.	System Supplies	6.4
Section 6.2	10631(b)	Indicate whether groundwater is an existing or planned source of water available to the supplier.	System Supplies	6.2.1, 6.3.2, and 6.4
Section 6.2.2	10631(b)(4)(A)	Indicate whether a groundwater sustainability plan or groundwater management plan has been adopted by the water supplier or if there is any other specific authorization for groundwater management. Include a copy of the plan or authorization.	System Supplies	6.3.2
Section 6.2.2	10631(b)(4)(B)	Describe the groundwater basin.	System Supplies	6.2.1 and 6.3.2
Section 6.2.2	10631(b)(4)(B)	Indicate if the basin has been adjudicated and include a copy of the court order or decree and a description of the amount of water the supplier has the legal right to pump.	System Supplies	N/A

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Section 6.2.2.1	10631(b)(4)(B)	For unadjudicated basins, indicate whether or not the department has identified the basin as a high or medium priority. Describe efforts by the supplier to coordinate with sustainability or groundwater agencies to achieve sustainable groundwater conditions.	System Supplies	6.2.1
Section 6.2.2.4	10631(b)(4)(C)	Provide a detailed description and analysis of the location, amount, and sufficiency of groundwater pumped by the urban water supplier for the past five years	System Supplies	6.2.1
Section 6.2.2	10631(b)(4)(D)	Provide a detailed description and analysis of the amount and location of groundwater that is projected to be pumped.	System Supplies	6.3.2
Section 6.2.7	10631(c)	Describe the opportunities for exchanges or transfers of water on a short-term or long- term	System Supplies	6.2.6
Section 6.2.5	10633(b)	Describe the quantity of treated wastewater that meets recycled water standards, is being discharged, and is otherwise available for use in a recycled water project.	System Supplies (Recycled Water)	6.2.4
Section 6.2.5	10633(c)	Describe the recycled water currently being used in the supplier's service area.	System Supplies (Recycled Water)	6.2.4
Section 6.2.5	10633(d)	Describe and quantify the potential uses of recycled water and provide a determination of the technical and economic feasibility of those uses.	System Supplies (Recycled Water)	6.2.4 and 6.3.1
Section 6.2.5	10633(e)	Describe the projected use of recycled water within the supplier's service area at the end of 5, 10, 15, and 20 years, and a description of the actual use of recycled water in comparison to uses previously projected.	System Supplies (Recycled Water)	6.2.4 and 6.4
Section 6.2.5	10633(f)	Describe the actions which may be taken to encourage the use of recycled water and the projected results of these actions in terms of acre-feet of recycled water used per year.	System Supplies (Recycled Water)	6.2.4
Section 6.2.5	10633(g)	Provide a plan for optimizing the use of recycled water in the supplier's service area.	System Supplies (Recycled Water)	6.2.4
Section 6.2.6	10631(g)	Describe desalinated water project opportunities for long-term supply.	System Supplies	6.2.5
Section 6.2.5	10633(a)	Describe the wastewater collection and treatment systems in the supplier’s service area with quantified amount of collection and treatment and the disposal methods.	System Supplies (Recycled Water)	6.2.4.1
Section 6.2.8, Section 6.3.7	10631(f)	Describe the expected future water supply projects and programs that may be undertaken by the water supplier to address water supply reliability in average, single-dry, and for a period of drought lasting 5 consecutive water years.	System Supplies	6.4 and 6.5
Section 6.4 and Appendix O	10631.2(a)	The UWMP must include energy information, as stated in the code, that a supplier can readily	System Suppliers, Energy Intensity	6.6
Section 7.2	10634	Provide information on the quality of existing sources of water available to the supplier and the manner in which water quality affects water management strategies and supply reliability	Water Supply Reliability Assessment	7.1
Section 7.2.4	10620(f)	Describe water management tools and options to maximize resources and minimize the need to import water from other regions.	Water Supply Reliability Assessment	7.4

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Section 7.3	10635(a)	Service Reliability Assessment: Assess the water supply reliability during normal, dry, and a drought lasting five consecutive water years by comparing the total water supply sources available to the water supplier with the total projected water use over the next 20 years.	Water Supply Reliability Assessment	7.3
Section 7.3	10635(b)	Provide a drought risk assessment as part of information considered in developing the demand management measures and water supply projects.	Water Supply Reliability Assessment	7.5
Section 7.3	10635(b)(1)	Include a description of the data, methodology, and basis for one or more supply shortage conditions that are necessary to conduct a drought risk assessment for a drought period that lasts 5	Water Supply Reliability Assessment	7.5
Section 7.3	10635(b)(2)	Include a determination of the reliability of each source of supply under a variety of water shortage conditions.	Water Supply Reliability Assessment	7.3 and 7.5
Section 7.3	10635(b)(3)	Include a comparison of the total water supply sources available to the water supplier with the total projected water use for the drought period.	Water Supply Reliability Assessment	7.5
Section 7.3	10635(b)(4)	Include considerations of the historical drought hydrology, plausible changes on projected supplies and demands under climate change conditions, anticipated regulatory changes, and other locally applicable criteria.	Water Supply Reliability Assessment	7.3
Chapter 8	10632(a)	Provide a water shortage contingency plan (WSCP) with specified elements below.	Water Shortage Contingency Planning	Appendix D
Chapter 8	10632(a)(1)	Provide the analysis of water supply reliability (from Chapter 7 of Guidebook) in the WSCP	Water Shortage Contingency Planning	Appendix D, Section 2
Section 8.10	10632(a)(10)	Describe reevaluation and improvement procedures for monitoring and evaluation the water shortage contingency plan to ensure risk tolerance is adequate and appropriate water shortage mitigation strategies are implemented.	Water Shortage Contingency Planning	Appendix D, Section 11
Section 8.2	10632(a)(2)(A)	Provide the written decision-making process and other methods that the supplier will use each year to determine its water reliability.	Water Shortage Contingency Planning	Appendix D, Section 3
Section 8.2	10632(a)(2)(B)	Provide data and methodology to evaluate the supplier's water reliability for the current year and one dry year pursuant to factors in the code.	Water Shortage Contingency Planning	Appendix D, Section 3
Section 8.3	10632(a)(3)(A)	Define six standard water shortage levels of 10, 20, 30, 40, 50 percent shortage and greater than 50 percent shortage. These levels shall be based on supply conditions, including percent reductions in supply, changes in groundwater levels, changes in surface elevation, or other conditions. The shortage levels shall also apply to a catastrophic interruption of supply.	Water Shortage Contingency Planning	Appendix D, Section 4
Section 8.3	10632(a)(3)(B)	Suppliers with an existing water shortage contingency plan that uses different water shortage levels must cross reference their categories with the six standard categories.	Water Shortage Contingency Planning	Appendix D, Section 4. Existing WSCP revised to new shortage levels.
Section 8.4	10632(a)(4)(A)	Suppliers with water shortage contingency plans that align with the defined shortage levels must specify locally appropriate supply augmentation	Water Shortage Contingency Planning	Appendix D, Section 5.2 and Table 5-2
Section 8.4	10632(a)(4)(B)	Specify locally appropriate demand reduction actions to adequately respond to shortages.	Water Shortage Contingency Planning	Appendix D, Section 5.1 and Table 5-1

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Section 8.4	10632(a)(4)(C)	Specify locally appropriate operational changes.	Water Shortage Contingency Planning	Appendix D, Section 5.2 and Table 5-2
Section 8.4	10632(a)(4)(D)	Specify additional mandatory prohibitions against specific water use practices that are in addition to state-mandated prohibitions are appropriate to local conditions.	Water Shortage Contingency Planning	Appendix D, Section Table 5-1
Section 8.4	10632(a)(4)(E)	Estimate the extent to which the gap between supplies and demand will be reduced by implementation of the action.	Water Shortage Contingency Plan	Appendix D, Section Table 5-1 and Table 5-3
Section 8.4.6	10632.5	The plan shall include a seismic risk assessment and mitigation plan.	Water Shortage Contingency Plan	Appendix D, Section 6.1 and WSCP Appendix A
Section 8.5	10632(a)(5)(A)	Suppliers must describe that they will inform customers, the public and others regarding any current or predicted water shortages.	Water Shortage Contingency Planning	Appendix D, Section 7
Section 8.5 and 8.6	10632(a)(5)(B) 10632(a)(5)(C)	Suppliers must describe that they will inform customers, the public and others regarding any shortage response actions triggered or anticipated to be triggered and other relevant communications.	Water Shortage Contingency Planning	Appendix D, Section 7
Section 8.6	10632(a)(6)	Retail supplier must describe how it will ensure compliance with and enforce provisions of the WSCP.	Water Shortage Contingency Planning	Appendix D, Section 8.1 and 8.2
Section 8.7	10632(a)(7)(A)	Describe the legal authority that empowers the supplier to enforce shortage response actions.	Water Shortage Contingency Planning	Appendix D, Section 9
Section 8.7	10632(a)(7)(B)	Provide a statement that the supplier will declare a water shortage emergency Water Code Chapter 3.	Water Shortage Contingency Planning	Appendix D, Section 9
Section 8.7	10632(a)(7)(C)	Provide a statement that the supplier will coordinate with any city or county within which it provides water for the possible proclamation of a local emergency.	Water Shortage Contingency Planning	Appendix D, Section 9
Section 8.8	10632(a)(8)(A)	Describe the potential revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix D, Section 10.1
Section 8.8	10632(a)(8)(B)	Provide a description of mitigation actions needed to address revenue reductions and expense increases associated with activated shortage response actions.	Water Shortage Contingency Planning	Appendix D, Section 10.2
Section 8.8	10632(a)(8)(C)	Retail suppliers must describe the cost of compliance with Water Code Chapter 3.3: Excessive Residential Water Use During Drought	Water Shortage Contingency Planning	Appendix D, Section 10.3
Section 8.9	10632(a)(9)	Retail suppliers must describe the monitoring and reporting requirements and procedures that ensure appropriate data is collected, tracked, and analyzed for purposes of monitoring customer compliance.	Water Shortage Contingency Planning	Appendix D, Section 11
Section 8.11	10632(b)	Analyze and define water features that are artificially supplied with water, including ponds, lakes, waterfalls, and fountains, separately from swimming pools and spas.	Water Shortage Contingency Planning	Appendix D, Section 5.1.1

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Sections 8.12 and 10.4	10635(c)	Provide supporting documentation that Water Shortage Contingency Plan has been, or will be, provided to any city or county within which it provides water, no later than 30 days after the submission of the plan to DWR.	Plan Adoption, Submittal, and Implementation	10.3
Section 8.14	10632(c)	Make available the Water Shortage Contingency Plan to customers and any city or county where it provides water within 30 after adopted the plan.	Water Shortage Contingency Planning	Appendix D, Section 12.2
Sections 9.1 and 9.3	10631(e)(2)	Wholesale suppliers shall describe specific demand management measures listed in code, their distribution system asset management program, and supplier assistance program.	Demand Management Measures	N/A
Sections 9.2 and 9.3	10631(e)(1)	Retail suppliers shall provide a description of the nature and extent of each demand management measure implemented over the past five years. The description will address specific measures listed in code.	Demand Management Measures	9
Chapter 10	10608.26(a)	Retail suppliers shall conduct a public hearing to discuss adoption, implementation, and economic impact of water use targets (recommended to discuss compliance).	Plan Adoption, Submittal, and Implementation	10.1 and 10.2
Section 10.2.1	10621(b)	Notify, at least 60 days prior to the public hearing, any city or county within which the supplier provides water that the urban water supplier will be reviewing the plan and considering amendments or changes to the plan. Reported in Table 10-1.	Plan Adoption, Submittal, and Implementation	10.1
Section 10.4	10621(f)	Each urban water supplier shall update and submit its 2020 plan to the department by July 1, 2021.	Plan Adoption, Submittal, and Implementation	10.3
Sections 10.2.2, 10.3, and 10.5	10642	Provide supporting documentation that the urban water supplier made the plan and contingency plan available for public inspection, published notice of the public hearing, and held a public hearing about the plan and contingency plan.	Plan Adoption, Submittal, and Implementation	Appendix E
Section 10.2.2	10642	The water supplier is to provide the time and place of the hearing to any city or county within which the supplier provides water.	Plan Adoption, Submittal, and Implementation	10.2
Section 10.3.2	10642	Provide supporting documentation that the plan and contingency plan has been adopted as prepared or modified.	Plan Adoption, Submittal, and Implementation	Appendix F
Section 10.4	10644(a)	Provide supporting documentation that the urban water supplier has submitted this UWMP to the California State Library.	Plan Adoption, Submittal, and Implementation	10.3
Section 10.4	10644(a)(1)	Provide supporting documentation that the urban water supplier has submitted this UWMP to any city or county within which the supplier provides water no later than 30 days after adoption.	Plan Adoption, Submittal, and Implementation	10.3
Sections 10.4.1 and 10.4.2	10644(a)(2)	The plan, or amendments to the plan, submitted to the department shall be submitted electronically.	Plan Adoption, Submittal, and Implementation	Appendix F
Section 10.5	10645(a)	Provide supporting documentation that, not later than 30 days after filing a copy of its plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	10.4

2020 Guidebook Location	Water Code Section	Summary as Applies to UWMP	Subject	2020 UWMP Location (Section Number)
Section 10.5	10645(b)	Provide supporting documentation that, not later than 30 days after filing a copy of its water shortage contingency plan with the department, the supplier has or will make the plan available for public review during normal business hours.	Plan Adoption, Submittal, and Implementation	10.4
Section 10.6	10621(c)	If supplier is regulated by the Public Utilities Commission, include its plan and contingency plan as part of its general rate case filings.	Plan Adoption, Submittal, and Implementation	N/A
Section 10.7.2	10644(b)	If revised, submit a copy of the water shortage contingency plan to DWR within 30 days of adoption.	Plan Adoption, Submittal, and Implementation	N/A

Appendix B: AWWA Water Loss Audits

2020 Fiscal Year Water Loss Audit

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Michael Powers	
Email Address:	mpowers@rainbowmwd.com	
Telephone | Ext.:	760-728-1178	105
Name of City / Utility:	Rainbow Municipal Water District	
City/Town/Municipality:	Fallbrook, CA	
State / Province:	California (CA)	
Country:	USA	
Year:	2020	Financial Year
Start Date:	07/2019	Enter MM/YYYY numeric format
End Date:	06/2020	Enter MM/YYYY numeric format
Audit Preparation Date:	9/24/2020	
Volume Reporting Units:	Acre-feet	
PWSID / Other ID:	CA3710016	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2020 7/2019 - 6/2020

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

	Grading	Value		Grading	Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water imported:	7	14,400.000	acre-ft/yr	8	0.21%		acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 14,369.823 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

	Grading	Value		Pcnt:	Value:	
Billed metered:	9	13,609.309	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	n/a		acre-ft/yr			
Unbilled unmetered:	6	19.500	acre-ft/yr		19.500	acre-ft/yr

Use buttons to select percentage of water supplied OR value

AUTHORIZED CONSUMPTION: ? 13,628.809 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 741.014 acre-ft/yr

Apparent Losses

	Grading	Value		Pcnt:	Value:	
Unauthorized consumption:		35.925	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

	Grading	Value		Pcnt:	Value:	
Customer metering inaccuracies:	8	552.303	acre-ft/yr	3.90%		acre-ft/yr
Systematic data handling errors:	7	10.000	acre-ft/yr		10.000	acre-ft/yr

Apparent Losses: ? 598.227 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: ? 142.787 acre-ft/yr

WATER LOSSES: 741.014 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: ? 760.514 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

	Grading	Value	
Length of mains:	9	335.0	miles
Number of active AND inactive service connections:	9	8,592	
Service connection density:		26	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 8 158.0 psi

COST DATA

	Grading	Value	
Total annual cost of operating water system:	10	$40,434,571	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$5.67	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	8	$1,873.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 79 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Unauthorized consumption
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2020 | 7/2019 - 6/2020

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 79 out of 100 ***

System Attributes:

	Apparent Losses:	598.227	acre-ft/yr
+	Real Losses:	142.787	acre-ft/yr
=	**Water Losses:**	**741.014**	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	548.85	acre-ft/yr
	Annual cost of Apparent Losses:	$1,477,533	
	Annual cost of Real Losses:	$267,440	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	5.3%	
	Non-revenue water as percent by cost of operating system:	4.4%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	62.16	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	380.51	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	142.79	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.26	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	100% imported water from SDCWA
Vol. from own sources: Master meter error adjustment:	
Water imported:	100% imported water from SDCWA
Water imported: master meter error adjustment:	
Water exported:	n/a
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	Maintenance estimated use due to operational flushing, fire suppression and fire flow testing.
Unauthorized consumption:	The default is selected because we don't have any data to confirm or deny that our unauthorized consumption is any different then theoretical norms.
Customer metering inaccuracies:	In 2017, the District tested a statistically significant percentage of the Customer meters. This testing found an average meter inaccuracy of 6.4% District Wide. The District then kicked off a District Wide meter replacement project. Over 400 meters were replaced by June 2020. Meter replacement is ongoing.
Systematic data handling errors:	
Length of mains:	The Length of mains was calculated based on the District's GIS information. This information is continuously updated and validated by our District staff in the field through corrections sent to Nobel Systems for incorporation into the data set.
Number of active AND inactive service connections:	The GIS info is tied to the customer billing information. Field validation is accomplished when our meter crews pick up reads for our monthly billing.
Average length of customer service line:	
Average operating pressure:	Based on the model of our distribution system calibrated by fire hydrant flow test. This Average was calculated by taking the average pressure of the two nodes at the end of each pipe, multiplying that pressure by the length of pipe, summing the results and then dividing by the total length of pipes in the model. The model from which the pressure data was taken is a detailed model of the distribution system which has been calibrated using fire flow test data from fire hydrants around the district.
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	This number is calculated by the average cost per unit of all customer classes except Commercial and Single Family due to the fact that they represent less the 10 percent of our customer base.
Variable production cost (applied to Real Losses):	We calculate a melded rate by taking our total dollars sent to SDCWA (fixed and variable) and divide it by the total acre feet bought.

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Rainbow Municipal Water District (CA3710016)	
Reporting Year:	2020	7/2019 - 6/2020
Data Validity Score:	79	

		Water Exported 0.000			Billed Water Exported	Revenue Water 0.000
Own Sources (Adjusted for known errors) 0.000	System Input 14,369.823	Water Supplied 14,369.823	Authorized Consumption 13,628.809	Billed Authorized Consumption 13,609.309	Billed Metered Consumption (water exported is removed) 13,609.309	Revenue Water 13,609.309
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 19.500	Unbilled Metered Consumption 0.000	Non-Revenue Water (NRW) 760.514
					Unbilled Unmetered Consumption 19.500	
			Water Losses 741.014	Apparent Losses 598.227	Unauthorized Consumption 35.925	
					Customer Metering Inaccuracies 552.303	
					Systematic Data Handling Errors 10.000	
Water Imported 14,369.823				Real Losses 142.787	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

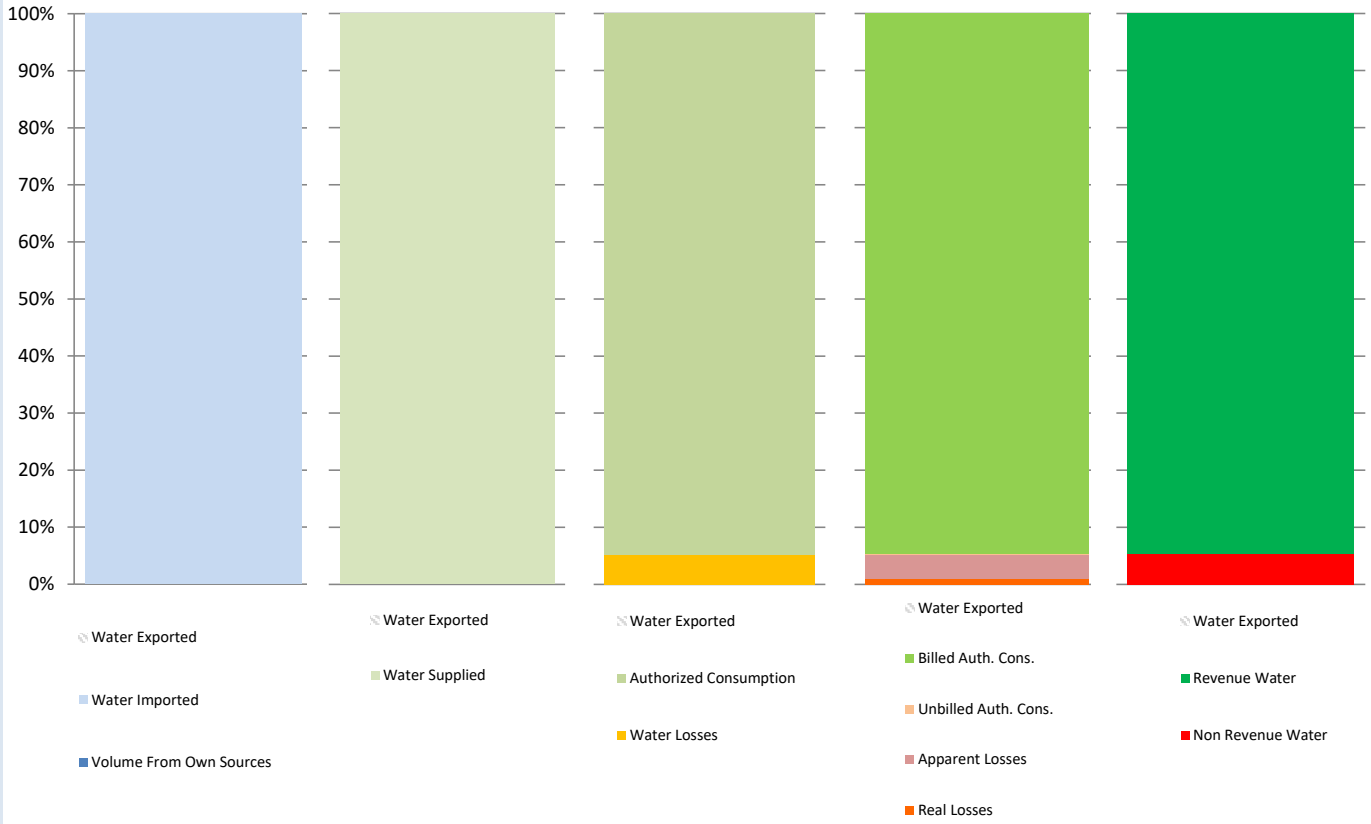
Water Audit Report for: Rainbow Municipal Water District (CA3710016)

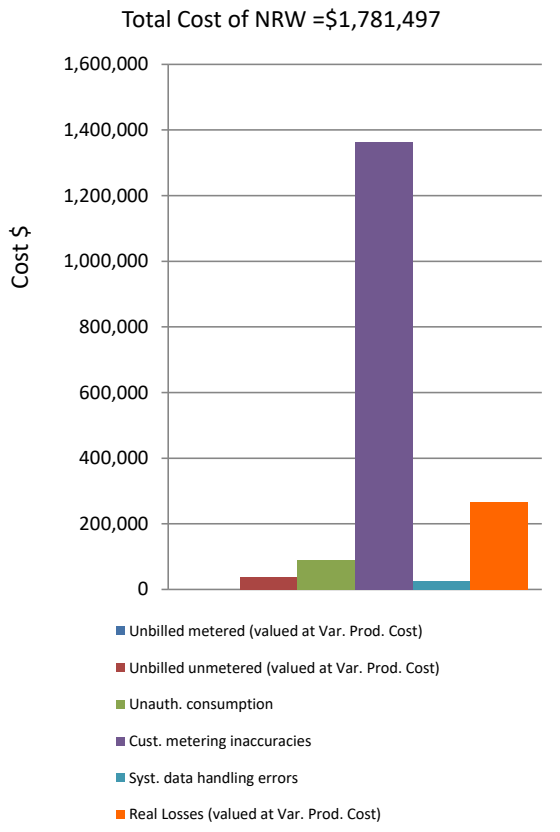
Reporting Year: 2020 | 7/2019 - 6/2020

Data Validity Score: 79

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





2019 Fiscal Year Water Loss Audit

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Cythina Gray	
Email Address:	cgray@rainbowmwd.com	
Telephone | Ext.:	760-728-1178	101
Name of City / Utility:	Rainbow Municipal Water District	
City/Town/Municipality:	Fallbrook, CA	
State / Province:	California (CA)	
Country:	USA	
Year:	2018	Financial Year
Start Date:	07/2018	Enter MM/YYYY numeric format
End Date:	06/2019	Enter MM/YYYY numeric format
Audit Preparation Date:	9/15/2019	
Volume Reporting Units:	Acre-feet	
PWSID / Other ID:	CA3710016	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

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Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

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The values entered in the Reporting Worksheet are used to populate the Water Balance

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A graphical summary of the water balance and Non-Revenue Water components

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Presents the possible grading options for each input component of the audit

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Diagrams depicting possible customer service connection line configurations

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Use this sheet to understand the terms used in the audit process

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Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

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If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2018 7/2018 - 6/2019

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:		Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr						acre-ft/yr
Water imported:	7	14,654.200	acre-ft/yr	8	0.25%				acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr						acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 14,617.656 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	9	13,771.000	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	n/a		acre-ft/yr			
Unbilled unmetered:	4	10.000	acre-ft/yr		10.000	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 13,781.000 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

836.656 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		36.544	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	8	786.082	acre-ft/yr	5.40%		acre-ft/yr
Systematic data handling errors:	7	10.000	acre-ft/yr		10.000	acre-ft/yr

Apparent Losses: 832.627 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 4.029 acre-ft/yr

WATER LOSSES: 836.656 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 846.656 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	323.0	miles
Number of active AND inactive service connections:	9	8,200	
Service connection density:		25	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	8	158.0	psi

COST DATA

Total annual cost of operating water system:	10	$36,000,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	9	$3.85	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	8	$1,654.00	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 78 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Unauthorized consumption
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2018 | 7/2018 - 6/2019

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 78 out of 100 ***

System Attributes:

	Apparent Losses:	832.627	acre-ft/yr
+	Real Losses:	4.029	acre-ft/yr
=	**Water Losses:**	**836.656**	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	526.95	acre-ft/yr
	Annual cost of Apparent Losses:	$1,396,365	
	Annual cost of Real Losses:	$6,664	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	5.8%	
	Non-revenue water as percent by cost of operating system:	3.9%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	90.65	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	11.14	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	4.03	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.01	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	100% imported water from SDCWA
Vol. from own sources: Master meter error adjustment:	Inaccuracy meter testing report pending fro SDWA for caluclating the percentage. 0.25 % entered as approximation.
Water imported:	100% imported water from SDCWA
Water imported: master meter error adjustment:	
Water exported:	n/a
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	Maintenance estimated use due to operational flushing, fire suppression and fire flow testing.
Unauthorized consumption:	The default is selected because we don't have any data to confirm or deny that our unauthorized consumption is any different then theoretical norms.
Customer metering inaccuracies:	Significant meter replacement program results in lower Customer meter errors since last year.
Systematic data handling errors:	
Length of mains:	The Length of mains was calculated based on the District's GIS information. This information is continuously updated and validated by our District staff in the field through corrections sent to Nobel Systems for incorporation into the data set.
Number of active AND inactive service connections:	The GIS info is tied to the customer billing information. Field validation is accomplished when our meter crews pick up reads for our monthly billing.
Average length of customer service line:	
Average operating pressure:	Based on the model of our distribution system calibrated by fire hydrant flow test. This Average was calculated by taking the average pressure of the two nodes at the end of each pipe, multiplying that pressure by the length of pipe, summing the results and then dividing by the total length of pipes in the model. The model from which the pressure data was taken is a detailed model of the distribution system which has been calibrated using fire flow test data from fire hydrants around the district.
Total annual cost of operating water system:	
Customer retail unit cost (applied to Apparent Losses):	This number is calculated by the average cost per unit of all customer classes except Commercial and Single Family due to the fact that they represent less the 10 percent of our customer base.
Variable production cost (applied to Real Losses):	We calculate a melded rate by taking our total dollars sent to SDCWA (fixed and variable) and divide it by the total acre feet bought. Reviewed atleast anually by a third party.

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Rainbow Municipal Water District (CA3710016)	
Reporting Year:	2018	7/2018 - 6/2019
Data Validity Score:	78	

Own Sources (Adjusted for known errors)
0.000

Water Imported
14,617.656

System Input
14,617.656

Water Exported
0.000

Water Supplied
14,617.656

Authorized Consumption
13,781.000

Billed Authorized Consumption
13,771.000

Billed Water Exported
13,771.000

Billed Metered Consumption (water exported is removed)
13,771.000

Billed Unmetered Consumption
0.000

Revenue Water
0.000

Revenue Water
13,771.000

Unbilled Authorized Consumption
10.000

Unbilled Metered Consumption
0.000

Unbilled Unmetered Consumption
10.000

Water Losses
836.656

Apparent Losses
832.627

Unauthorized Consumption
36.544

Customer Metering Inaccuracies
786.082

Systematic Data Handling Errors
10.000

Real Losses
4.029

Leakage on Transmission and/or Distribution Mains
Not broken down

Leakage and Overflows at Utility's Storage Tanks
Not broken down

Leakage on Service Connections
Not broken down

Non-Revenue Water (NRW)
846.656

AWWA Free Water Audit Software:
Dashboard

WAS v5.0

American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

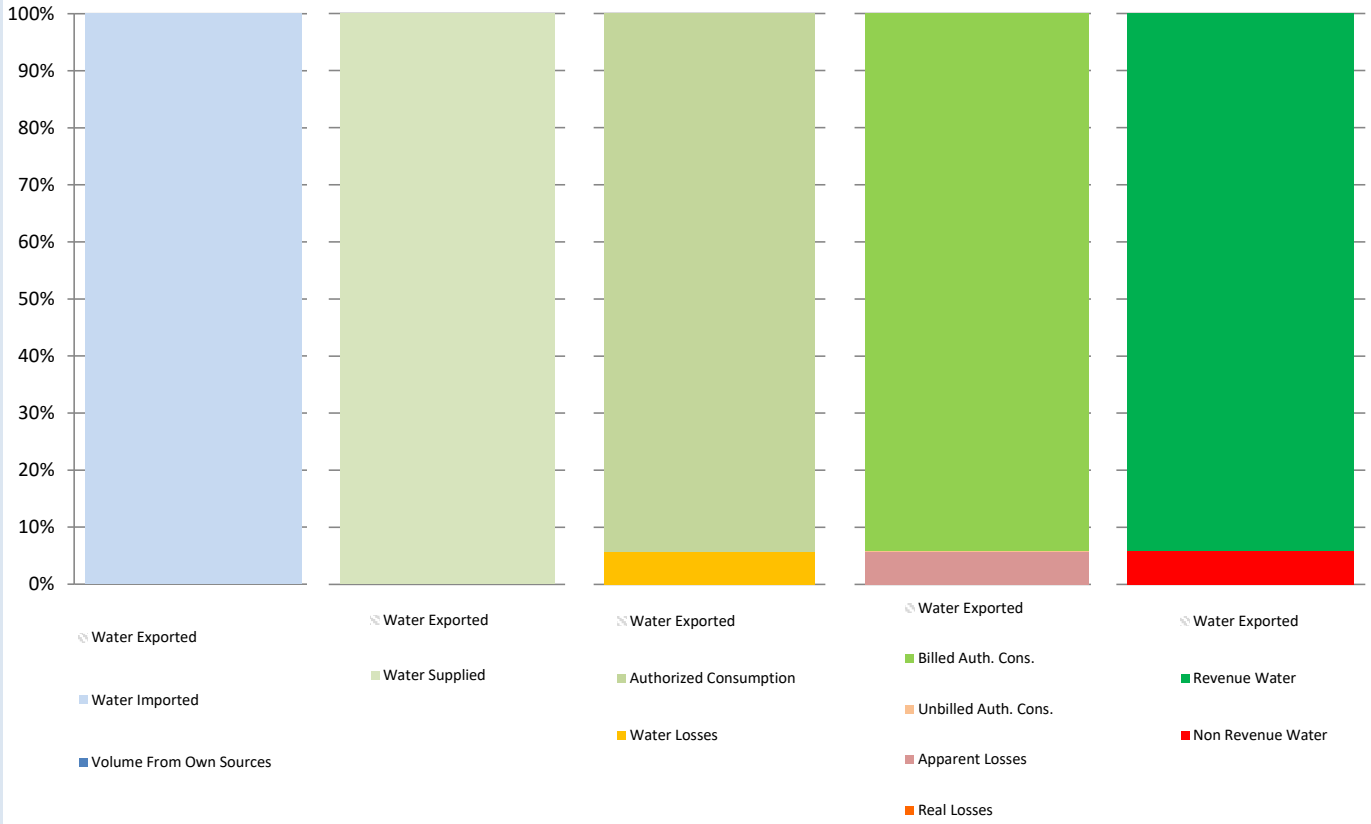
Water Audit Report for: Rainbow Municipal Water District (CA3710016)

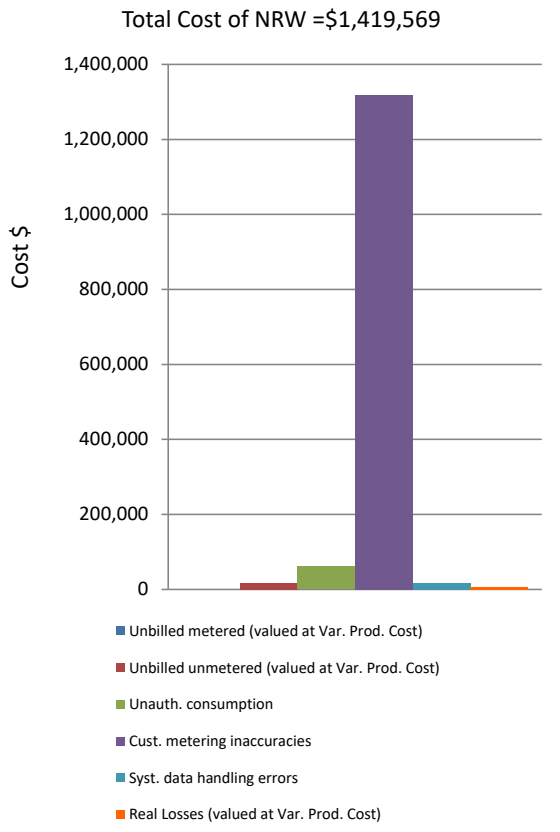
Reporting Year: 2018 | 7/2018 - 6/2019

Data Validity Score: 78

○ Show me the VOLUME of Non-Revenue Water

◉ Show me the COST of Non-Revenue Water





2018 Fiscal Year Water Loss Audit

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Please begin by providing the following information

Name of Contact Person:	Cythina Gray
Email Address:	cgray@rainbowmwd.com
Telephone | Ext.:	760-728-1178
Name of City / Utility:	Rainbow Municipal Water District
City/Town/Municipality:	Fallbrook, CA
State / Province:	California (CA)
Country:	USA
Year:	2018 Financial Year
Start Date:	07/2017 Enter MM/YYYY numeric format
End Date:	06/2018 Enter MM/YYYY numeric format
Audit Preparation Date:	9/15/2018
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	CA3710016

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

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Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

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AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2018 7/2017 - 6/2018

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

					Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water imported:	7	19,227.000	acre-ft/yr	8			acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 19,227.000 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	9	17,917.000	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	n/a		acre-ft/yr			
Unbilled unmetered:	2	10.000	acre-ft/yr		10.000	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 17,927.000 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption)

1,300.000 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:	2	15.000	acre-ft/yr		15.000	acre-ft/yr
Customer metering inaccuracies:	8	1,225.094	acre-ft/yr	6.40%		acre-ft/yr
Systematic data handling errors:	7	10.000	acre-ft/yr		10.000	acre-ft/yr

Apparent Losses: 1,250.094 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 49.906 acre-ft/yr

WATER LOSSES: 1,300.000 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,310.000 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	322.0	miles
Number of active AND inactive service connections:	9	8,120	
Service connection density:		25	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 3 158.0 psi

COST DATA

Total annual cost of operating water system:	10	$36,000,000	$/Year
Customer retail unit cost (applied to Apparent Losses):	9	$3.49	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	8	$1,169.00	$/acre-ft

☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 75 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Unauthorized consumption
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2018 | 7/2017 - 6/2018

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 75 out of 100 ***

System Attributes:

	Apparent Losses:	1,250.094	acre-ft/yr
+	Real Losses:	49.906	acre-ft/yr
=	**Water Losses:**	**1,300.000**	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	523.87	acre-ft/yr
	Annual cost of Apparent Losses:	$1,900,448	
	Annual cost of Real Losses:	$58,340	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	6.8%	
	Non-revenue water as percent by cost of operating system:	5.5%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	137.44	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	138.36	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	49.91	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.10	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	100% imported water from SDCWA
Vol. from own sources: Master meter error adjustment:	N/A
Water imported:	100% imported water from SDCWA
Water imported: master meter error adjustment:	Calibrations being done but no meter accuracy testing.
Water exported:	N/A
Water exported: master meter error adjustment:	N/A
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	Lacking robust mechanisms for recording. Currently looking into ways to increase data collection capabilities.
Unauthorized consumption:	Current financial software is inadequate upgrade expected late 2018
Customer metering inaccuracies:	6.40%
Systematic data handling errors:	10 acre-ft/yr
Length of mains:	322 miles
Number of active AND inactive service connections:	8120
Average length of customer service line:	
Average operating pressure:	Based on model of our distribution system calibrated by fire hydrant flow test
Total annual cost of operating water system:	Current financial software is inadequate upgrade expected late 2018
Customer retail unit cost (applied to Apparent Losses):	$3.49
Variable production cost (applied to Real Losses):	$1,169.00

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Rainbow Municipal Water District (CA3710016)	
Reporting Year:	2018	7/2017 - 6/2018
Data Validity Score:	75	

Own Sources (Adjusted for known errors) *0.000*

Water Imported *19,227.000*

System Input *19,227.000*

Water Exported *0.000*

Water Supplied *19,227.000*

Billed Water Exported *0.000*

Revenue Water *0.000*

Authorized Consumption *17,927.000*

Billed Authorized Consumption *17,917.000*

- **Billed Metered Consumption (water exported is removed)** *17,917.000*
- **Billed Unmetered Consumption** *0.000*

Revenue Water 17,917.000

Unbilled Authorized Consumption *10.000*

- **Unbilled Metered Consumption** *0.000*
- **Unbilled Unmetered Consumption** *10.000*

Non-Revenue Water (NRW) *1,310.000*

Water Losses *1,300.000*

Apparent Losses *1,250.094*

- **Unauthorized Consumption** *15.000*
- **Customer Metering Inaccuracies** *1,225.094*
- **Systematic Data Handling Errors** *10.000*

Real Losses *49.906*

- **Leakage on Transmission and/or Distribution Mains** *Not broken down*
- **Leakage and Overflows at Utility's Storage Tanks** *Not broken down*
- **Leakage on Service Connections** *Not broken down*

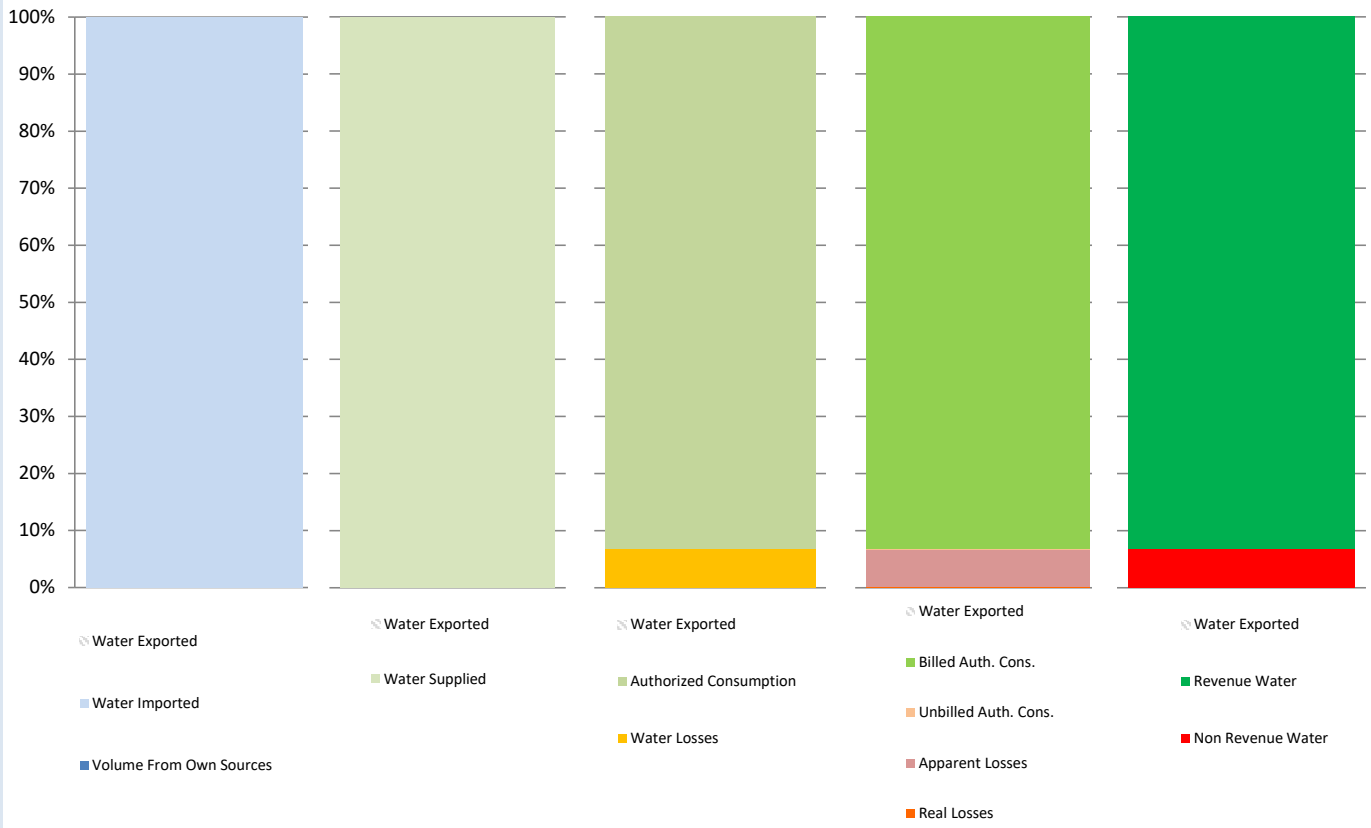
AWWA Free Water Audit Software:
Dashboard

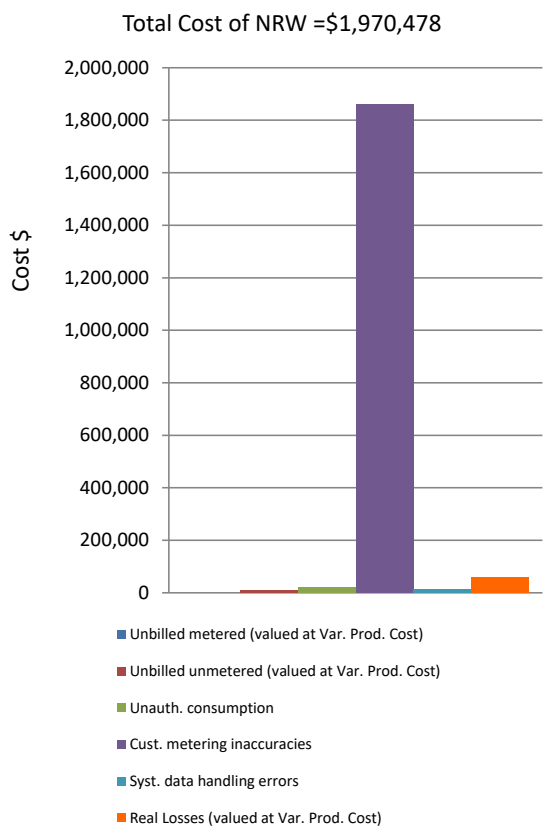
WAS v5.0
American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for: Rainbow Municipal Water District (CA3710016)
Reporting Year: 2018 7/2017 - 6/2018
Data Validity Score: 75

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





2017 Fiscal Year Water Loss Audit

AWWA Free Water Audit Software v5.0

This spreadsheet-based water audit tool is designed to help quantify and track water losses associated with water distribution systems and identify areas for improved efficiency and cost recovery. It provides a "top-down" summary water audit format, and is not meant to take the place of a full-scale, comprehensive water audit format.

Auditors are strongly encouraged to refer to the most current edition of AWWA M36 Manual for Water Audits for detailed guidance on the water auditing process and targetting loss reduction levels

The spreadsheet contains several separate worksheets. Sheets can be accessed using the tabs towards the bottom of the screen, or by clicking the buttons below.

Please begin by providing the following information

Name of Contact Person:	Cythina Gray
Email Address:	cgray@rainbowmwd.com
Telephone | Ext.:	760-728-1178
Name of City / Utility:	Rainbow Municipal Water District
City/Town/Municipality:	Fallbrook, CA
State / Province:	California (CA)
Country:	USA
Year:	2017 Financial Year
Start Date:	07/2016 Enter MM/YYYY numeric format
End Date:	06/2017 Enter MM/YYYY numeric format
Audit Preparation Date:	9/15/2017
Volume Reporting Units:	Acre-feet
PWSID / Other ID:	

The following guidance will help you complete the Audit

All audit data are entered on the ***Reporting Worksheet***

- Value can be entered by user
- Value calculated based on input data
- These cells contain recommended default values

Use of Option (Radio) Buttons: Pcnt: 0.25% Value:

Select the default percentage by choosing the option button on the left

To enter a value, choose this button and enter a value in the cell to the right

The following worksheets are available by clicking the buttons below or selecting the tabs along the bottom of the page

Instructions
The current sheet. Enter contact information and basic audit details (year, units etc)

Reporting Worksheet
Enter the required data on this worksheet to calculate the water balance and data grading

Comments
Enter comments to explain how values were calculated or to document data sources

Performance Indicators
Review the performance indicators to evaluate the results of the audit

Water Balance
The values entered in the Reporting Worksheet are used to populate the Water Balance

Dashboard
A graphical summary of the water balance and Non-Revenue Water components

Grading Matrix
Presents the possible grading options for each input component of the audit

Service Connection Diagram
Diagrams depicting possible customer service connection line configurations

Definitions
Use this sheet to understand the terms used in the audit process

Loss Control Planning
Use this sheet to interpret the results of the audit validity score and performance indicators

Example Audits
Reporting Worksheet and Performance Indicators examples are shown for two validated audits

Acknowledgements
Acknowledgements for the AWWA Free Water Audit Software v5.0

If you have questions or comments regarding the software please contact us via email at: wlc@awwa.org

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Rainbow Municipal Water District
Reporting Year: 2017 | 7/2016 - 6/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

				Pcnt:	Value:	
Volume from own sources:	n/a	0.000	acre-ft/yr			acre-ft/yr
Water imported:	7	16,958.000	acre-ft/yr	7		acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr			acre-ft/yr

Enter negative % or value for under-registration
Enter positive % or value for over-registration

WATER SUPPLIED: 16,958.000 acre-ft/yr

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

			Pcnt:	Value:	
Billed metered:	7	15,370.000	acre-ft/yr			
Billed unmetered:	n/a		acre-ft/yr			
Unbilled metered:	n/a		acre-ft/yr			
Unbilled unmetered:	4	18.000	acre-ft/yr		18.000	acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

AUTHORIZED CONSUMPTION: 15,388.000 acre-ft/yr

WATER LOSSES (Water Supplied - Authorized Consumption) 1,570.000 acre-ft/yr

Apparent Losses

				Pcnt:	Value:	
Unauthorized consumption:		42.395	acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	3	808.947	acre-ft/yr	5.00%		acre-ft/yr
Systematic data handling errors:	7	0.000	acre-ft/yr	0.25%		acre-ft/yr

Systematic data handling errors are likely, please enter a positive, non-zero value; otherwise grade = 1 (not displayed)

Apparent Losses: 851.342 acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: 718.658 acre-ft/yr

WATER LOSSES: 1,570.000 acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: 1,588.000 acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	9	315.0	miles
Number of active AND inactive service connections:	9	7,800	
Service connection density:		25	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line: (length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure:	3	158.0	psi

COST DATA

Total annual cost of operating water system:	10	$36,000,000	$/Year	
Customer retail unit cost (applied to Apparent Losses):	4	$3.42	$/100 cubic feet (ccf)	
Variable production cost (applied to Real Losses):	5	$1,115.00	$/acre-ft	☐ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 60 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Water imported
2: Customer metering inaccuracies
3: Systematic data handling errors

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Rainbow Municipal Water District
Reporting Year: 2017 | 7/2016 - 6/2017

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 60 out of 100 ***

System Attributes:

	Apparent Losses:	851.342	acre-ft/yr
+	Real Losses:	718.658	acre-ft/yr
=	**Water Losses:**	**1,570.000**	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	508.67	acre-ft/yr
	Annual cost of Apparent Losses:	$1,268,289	
	Annual cost of Real Losses:	$801,303	Valued at **Variable Production Cost**

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	9.4%	
	Non-revenue water as percent by cost of operating system:	5.8%	Real Losses valued at Variable Production Cost
Operational Efficiency:	Apparent Losses per service connection per day:	97.44	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	2,036.75	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi

	From Above, Real Losses = Current Annual Real Losses (CARL):	718.66	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	1.41	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software:
User Comments

Use this worksheet to add comments or notes to explain how an input value was calculated, or to document the sources of the information used.

General Comment:	

Audit Item	Comment
Volume from own sources:	100% imported water from SDCWA
Vol. from own sources: Master meter error adjustment:	
Water imported:	
Water imported: master meter error adjustment:	
Water exported:	n/a
Water exported: master meter error adjustment:	
Billed metered:	
Billed unmetered:	
Unbilled metered:	

Audit Item	Comment
Unbilled unmetered:	
Unauthorized consumption:	Increase in construction in area
Customer metering inaccuracies:	
Systematic data handling errors:	
Length of mains:	
Number of active AND inactive service connections:	
Average length of customer service line:	
Average operating pressure:	Based on model of our distribution system calibrated by fire hydrant flow test
Total annual cost of operating water system:	New financial software is inadequate
Customer retail unit cost (applied to Apparent Losses):	
Variable production cost (applied to Real Losses):	

AWWA Free Water Audit Software: Water Balance

WAS v5.0

Water Audit Report for:	Rainbow Municipal Water District	
Reporting Year:	2017	7/2016 - 6/2017
Data Validity Score:	60	

		Water Exported *0.000*	Billed Water Exported			Revenue Water 0.000
Own Sources (Adjusted for known errors) *0.000*	System Input *16,958.000*	Water Supplied *16,958.000*	Authorized Consumption *15,388.000*	Billed Authorized Consumption *15,370.000*	Billed Metered Consumption (water exported is removed) *15,370.000*	Revenue Water 15,370.000
					Billed Unmetered Consumption *0.000*	
				Unbilled Authorized Consumption *18.000*	Unbilled Metered Consumption *0.000*	Non-Revenue Water (NRW) *1,588.000*
					Unbilled Unmetered Consumption *18.000*	
			Water Losses *1,570.000*	Apparent Losses *851.342*	Unauthorized Consumption *42.395*	
					Customer Metering Inaccuracies *808.947*	
					Systematic Data Handling Errors *0.000*	
Water Imported *16,958.000*				Real Losses *718.658*	Leakage on Transmission and/or Distribution Mains *Not broken down*	
					Leakage and Overflows at Utility's Storage Tanks *Not broken down*	
					Leakage on Service Connections *Not broken down*	

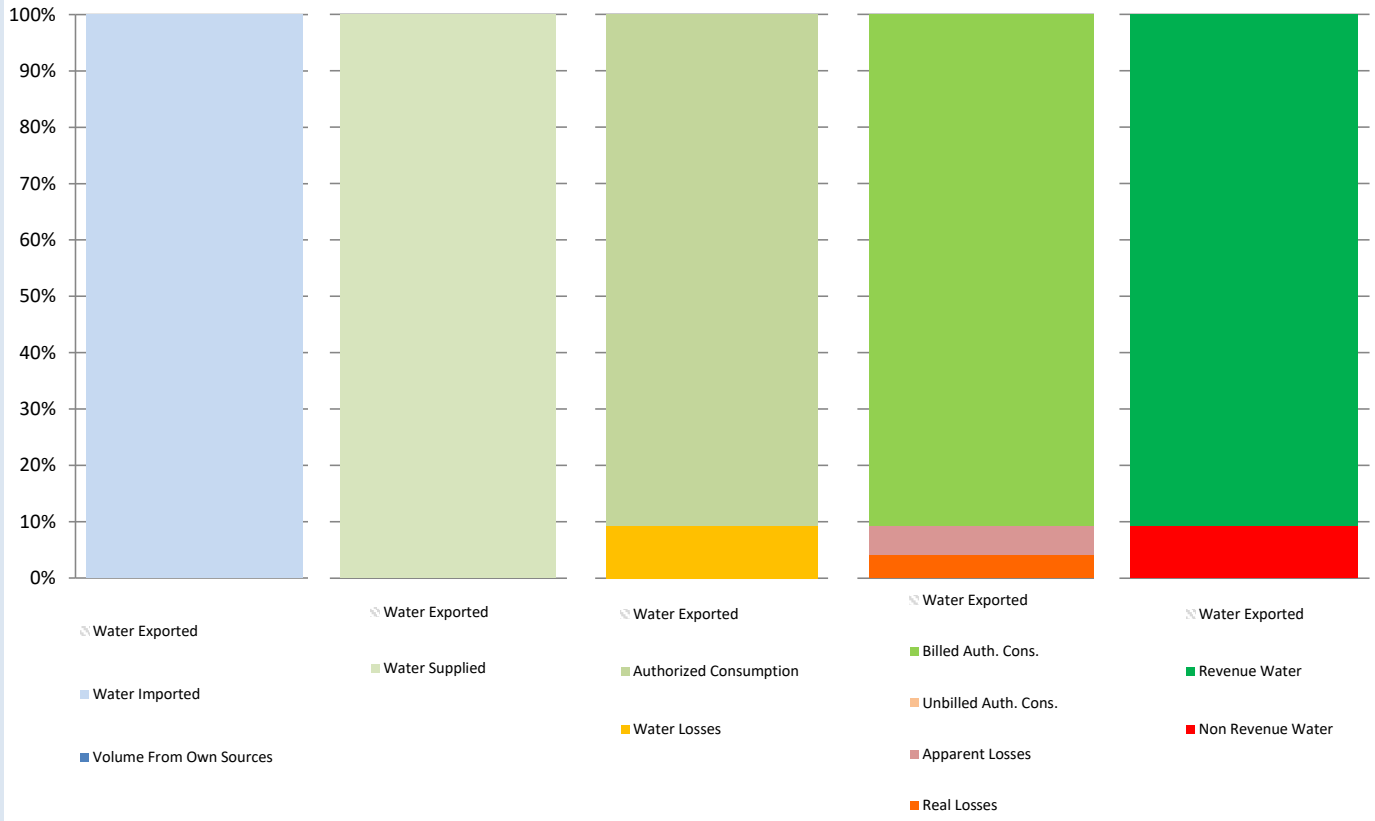
AWWA Free Water Audit Software:
Dashboard

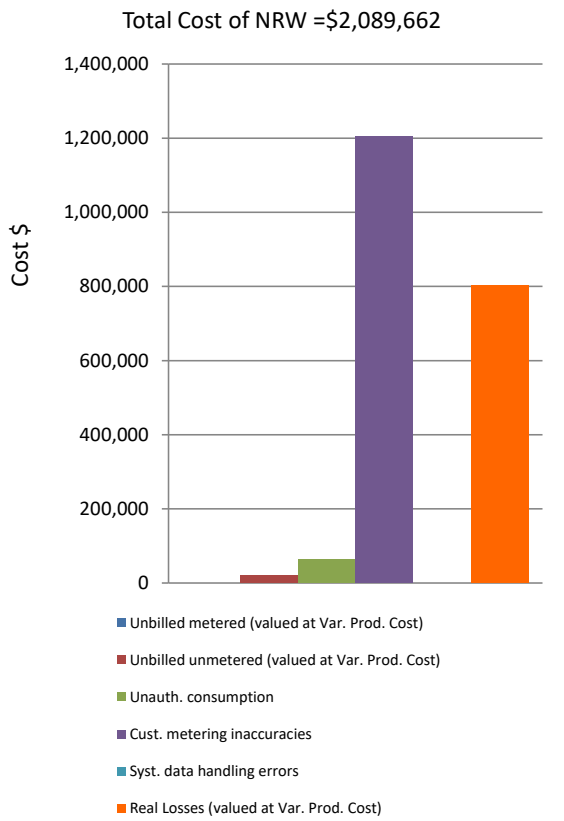
WAS v5.0
American Water Works Association.

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for:	**Rainbow Municipal Water District**	
Reporting Year:	**2017**	**7/2016 - 6/2017**
Data Validity Score:	**60**	

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





2015 Calendar Year Water Loss Audit

AWWA Free Water Audit Software:
Reporting Worksheet

WAS v5.0

? Click to access definition
+ Click to add a comment

Water Audit Report for: Rainbow Municipal Water District
Reporting Year: 2015 | 1/2015 - 12/2015

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

Master Meter and Supply Error Adjustments

WATER SUPPLIED

						Pcnt:	Value:	
Volume from own sources:	n/a		acre-ft/yr					acre-ft/yr
Water imported:	10	17,867.800	acre-ft/yr		9	0.50%		acre-ft/yr
Water exported:	n/a		acre-ft/yr					acre-ft/yr
WATER SUPPLIED:		**17,778.905**	acre-ft/yr					

Enter negative % or value for under-registration
Enter positive % or value for over-registration

AUTHORIZED CONSUMPTION

Click here: ? for help using option buttons below

				Pcnt:	Value:	
Billed metered:	7	16,402.810	acre-ft/yr			
Billed unmetered:			acre-ft/yr			
Unbilled metered:	4	1.000	acre-ft/yr			
Unbilled unmetered:		222.236	acre-ft/yr	1.25%		acre-ft/yr

Default option selected for Unbilled unmetered - a grading of 5 is applied but not displayed

AUTHORIZED CONSUMPTION: **16,626.046** acre-ft/yr

Use buttons to select percentage of water supplied **OR** value

WATER LOSSES (Water Supplied - Authorized Consumption) **1,152.859** acre-ft/yr

Apparent Losses

			Pcnt:	Value:	
Unauthorized consumption:		44.447 acre-ft/yr	0.25%		acre-ft/yr

Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed

Customer metering inaccuracies:	6	863.358	acre-ft/yr	5.00%	acre-ft/yr
Systematic data handling errors:		41.007	acre-ft/yr	0.25%	acre-ft/yr

Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed

Apparent Losses: **948.813** acre-ft/yr

Real Losses (Current Annual Real Losses or CARL)

Real Losses = Water Losses - Apparent Losses: **204.046** acre-ft/yr

WATER LOSSES: **1,152.859** acre-ft/yr

NON-REVENUE WATER

NON-REVENUE WATER: **1,376.095** acre-ft/yr

= Water Losses + Unbilled Metered + Unbilled Unmetered

SYSTEM DATA

Length of mains:	7	315.0	miles
Number of active AND inactive service connections:	9	7,839	
Service connection density:		25	conn./mile main

Are customer meters typically located at the curbstop or property line? Yes

Average length of customer service line:

(length of service line, beyond the property boundary, that is the responsibility of the utility)

Average length of customer service line has been set to zero and a data grading score of 10 has been applied

Average operating pressure: 3 175.0 psi

COST DATA

Total annual cost of operating water system:	9	$38,367,342	$/Year
Customer retail unit cost (applied to Apparent Losses):	10	$3.41	$/100 cubic feet (ccf)
Variable production cost (applied to Real Losses):	10	$1,450.00	$/acre-ft

☑ Use Customer Retail Unit Cost to value real losses

WATER AUDIT DATA VALIDITY SCORE:

*** YOUR SCORE IS: 81 out of 100 ***

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Unbilled metered
2: Billed metered
3: Customer metering inaccuracies

AWWA Free Water Audit Software:
System Attributes and Performance Indicators

Water Audit Report for: Rainbow Municipal Water District
Reporting Year: 2015 | 1/2015 - 12/2015

*** YOUR WATER AUDIT DATA VALIDITY SCORE IS: 81 out of 100 ***

System Attributes:

	Apparent Losses:	948.813	acre-ft/yr
+	Real Losses:	204.046	acre-ft/yr
=	Water Losses:	1,152.859	acre-ft/yr
?	Unavoidable Annual Real Losses (UARL):	564.55	acre-ft/yr
	Annual cost of Apparent Losses:	$1,409,363	
	Annual cost of Real Losses:	$303,090	Valued at Customer Retail Unit Cost

Return to Reporting Worksheet to change this assumpiton

Performance Indicators:

Financial:	Non-revenue water as percent by volume of Water Supplied:	7.7%	
	Non-revenue water as percent by cost of operating system:	5.3%	Real Losses valued at Customer Retail Unit Cost
Operational Efficiency:	Apparent Losses per service connection per day:	108.06	gallons/connection/day
	Real Losses per service connection per day:	N/A	gallons/connection/day
	Real Losses per length of main per day*:	578.29	gallons/mile/day
	Real Losses per service connection per day per psi pressure:	N/A	gallons/connection/day/psi
	From Above, Real Losses = Current Annual Real Losses (CARL):	204.05	acre-feet/year
?	Infrastructure Leakage Index (ILI) [CARL/UARL]:	0.36	

* This performance indicator applies for systems with a low service connection density of less than 32 service connections/mile of pipeline

AWWA Free Water Audit Software: Water Balance

WAS v5.0

American Water Works Association.

Water Audit Report for:	Rainbow Municipal Water District
Reporting Year:	2015 (1/2015 - 12/2015)
Data Validity Score:	81

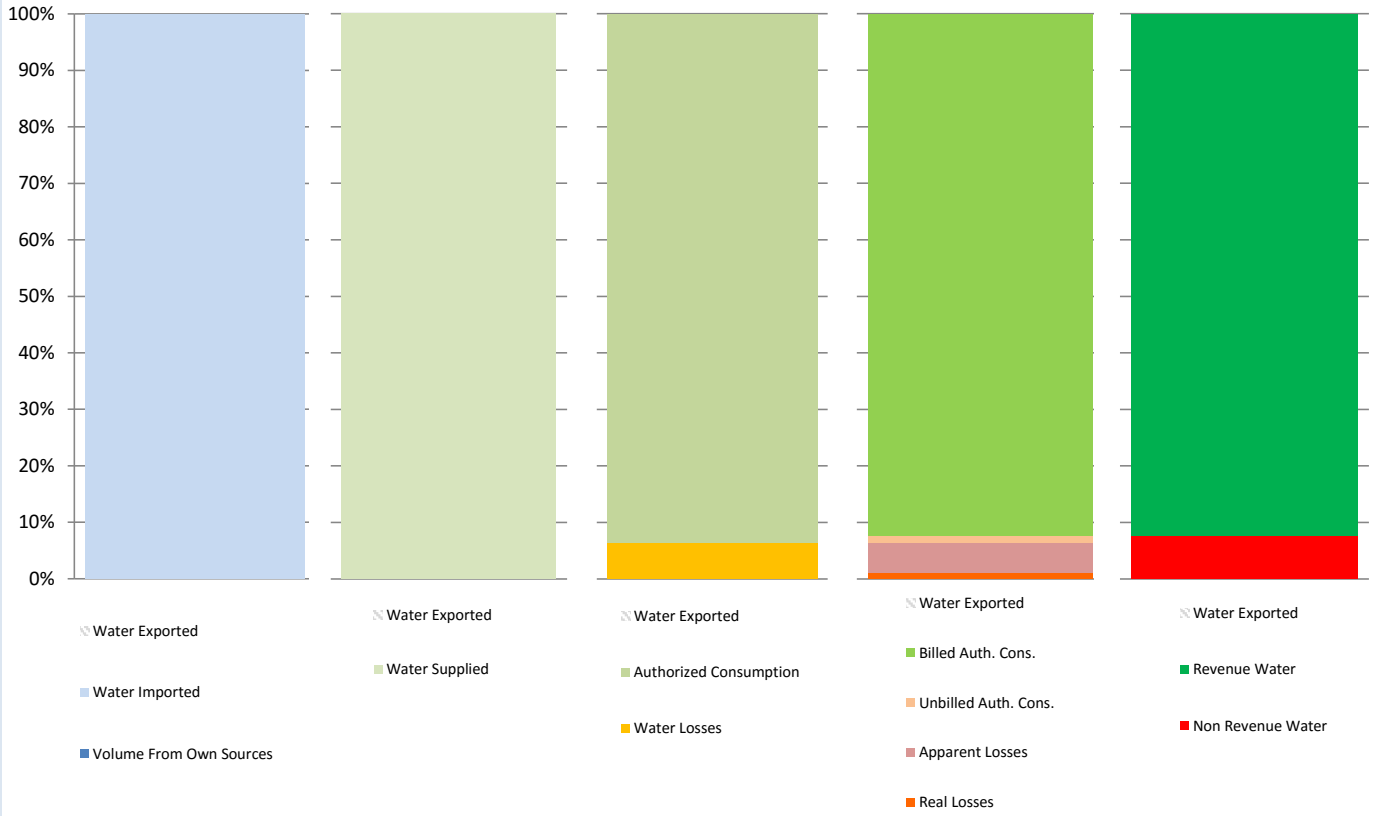
		Water Exported 0.000	Billed Water Exported			Revenue Water 0.000
Own Sources (Adjusted for known errors) 0.000	System Input 17,778.905	Water Supplied 17,778.905	Authorized Consumption 16,626.046	Billed Authorized Consumption 16,402.810	Billed Metered Consumption (water exported is removed) 16,402.810	Revenue Water 16,402.810
					Billed Unmetered Consumption 0.000	
				Unbilled Authorized Consumption 223.236	Unbilled Metered Consumption 1.000	Non-Revenue Water (NRW) 1,376.095
					Unbilled Unmetered Consumption 222.236	
			Water Losses 1,152.859	Apparent Losses 948.813	Unauthorized Consumption 44.447	
					Customer Metering Inaccuracies 863.358	
					Systematic Data Handling Errors 41.007	
Water Imported 17,778.905				Real Losses 204.046	Leakage on Transmission and/or Distribution Mains Not broken down	
					Leakage and Overflows at Utility's Storage Tanks Not broken down	
					Leakage on Service Connections Not broken down	

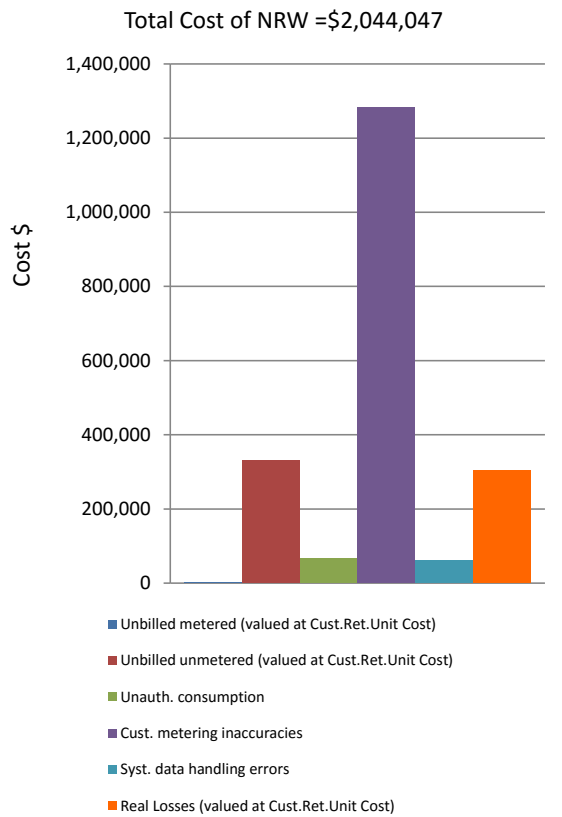
AWWA Free Water Audit Software:
Dashboard

The graphic below is a visual representation of the Water Balance with bar heights propotional to the volume of the audit components

Water Audit Report for:	**Rainbow Municipal Water District**	
Reporting Year:	**2015**	**1/2015 - 12/2015**
Data Validity Score:	**81**	

○ Show me the VOLUME of Non-Revenue Water
◉ Show me the COST of Non-Revenue Water





Appendix C: SB X7-7 Verification and Compliance Forms

1. 2015 Verification Form - Baselines and Targets Calculation Worksheets
2. 2020 Compliance Form

2015 Verification Form Tables

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SB X7-7 Table-1: Baseline Period Ranges			
Baseline	**Parameter**	**Value**	**Units**
10- to 15-year baseline period	2008 total water deliveries	27,198	Acre Feet
	2008 total volume of delivered recycled water	0	Acre Feet
	2008 recycled water as a percent of total deliveries	0.00%	Percent
	Number of years in baseline period[1]	10	Years
	Year beginning baseline period range	1999	
	Year ending baseline period range[2]	2008	
5-year baseline period	Number of years in baseline period	5	Years
	Year beginning baseline period range	2003	
	Year ending baseline period range[3]	2007	

[1] *If the 2008 recycled water percent is less than 10 percent, then the first baseline period is a continuous 10-year period. If the amount of recycled water delivered in 2008 is 10 percent or greater, the first baseline period is a continuous 10- to 15-year period.*

[2] *The ending year must be between December 31, 2004 and December 31, 2010.*

[3] *The ending year must be between December 31, 2007 and December 31, 2010.*

NOTES: Potable per SDCWA

SB X7-7 Table 2: Method for Population Estimates	
Method Used to Determine Population (may check more than one)	
☐	**1. Department of Finance** (DOF) DOF Table E-8 (1990 - 2000) and (2000-2010) and DOF Table E-5 (2011 - 2015) when available
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☑	**4. Other*** DWR recommends pre-review

* Estimates per San Diego Association of Governments (SANDAG). Data provided by SANDAG 4/5/16. Custom data sort to Rainbow service area boundary, per shape file provided by District 2015. SANDAG methodology uses census data for 2000 and 2010, at census block level.

SB X7-7 Table 3: Service Area Population		
Year		Population
10 Year Baseline Population		
Year 1	1999	16,045
Year 2	2000	16,178
Year 3	2001	17,201
Year 4	2002	17,099
Year 5	2003	17,122
Year 6	2004	17,882
Year 7	2005	17,899
Year 8	2006	18,039
Year 9	2007	18,145
Year 10	2008	18,242
5 Year Baseline Population		
Year 1	2003	17,122
Year 2	2005	17,882
Year 3	2006	17,899
Year 4	2007	18,039
Year 5	2008	18,145
2015 Compliance Year Population		
	2015	20,279

NOTES: Estimates per San Diego Association of Governments (SANDAG). Data provided by SANDAG 4/5/16. Custom data sort to Rainbow service area boundary, per shape file provided by District 2015. SANDAG methodology uses census data for 2000 and 2010, at census block level.

SB X7-7 Table 4: Annual Gross Water Use								
			Deductions					
	Baseline Year *Fm SB X7-7 Table 3*	**Volume Into Distribution System** *Fm SB X7-7 Table(s) 4-A*	Exported Water	Change in Dist. System Storage (+/-)	Indirect Recycled Water *Fm SB X7-7 Table 4-B*	Water Delivered for Ag Use	Process Water *Fm SB X7-7 Table(s) 4-D*	**Annual Gross Water Use**
10 Year Baseline - Gross Water Use								
Year 1	1999	25,177			0		0	25,177
Year 2	2000	29,859			0		0	29,859
Year 3	2001	27,329			0		0	27,329
Year 4	2002	31,633			0		0	31,633
Year 5	2003	28,995			0		0	28,995
Year 6	2004	33,300			0		0	33,300
Year 7	2005	25,273			0		0	25,273
Year 8	2006	30,501			0		0	30,501
Year 9	2007	33,186			0		0	33,186
Year 10	2008	27,198			0		0	27,198
10 year baseline average gross water use								**29,245**
5 Year Baseline - Gross Water Use								
Year 1	2003	28,995			0		0	28,995
Year 2	2005	33,300			0		0	33,300
Year 3	2006	25,273			0		0	25,273
Year 4	2007	30,501			0		0	30,501
Year 5	2008	33,186			0		0	33,186
5 year baseline average gross water use								**30,251**
2015 Compliance Year - Gross Water Use								
2015		20,062			0		0	20,062

NOTES: : The Agricultural Use deduction is optional per SBx7-7 and the DWR Methodology guidebook. By not deducting its agricultural usage, the District satisfies its agricultural water management reporting throuth its UWMP, and is not subject to separate agricultural water management plan requirements.

SB X7-7 Table 4-A: Volume Entering the Distribution System(s)
Complete one table for each source.

Name of Source	SDCWA
This water source is:	
☐	The supplier's own water source
☑	A purchased or imported source

Baseline Year *Fm SB X7-7 Table 3*		Volume Entering Distribution System	Meter Error Adjustment* *Optional (+/-)*	Corrected Volume Entering Distribution System
10 Year Baseline - Water into Distribution System				
Year 1	1999	25,177		25,177
Year 2	2000	29,859		29,859
Year 3	2001	27,329		27,329
Year 4	2002	31,633		31,633
Year 5	2003	28,995		28,995
Year 6	2004	33,300		33,300
Year 7	2005	25,273		25,273
NOTES: F	2006	30,501		30,501
Year 9	2007	33,186		33,186
Year 10	2008	27,198		27,198
5 Year Baseline - Water into Distribution System				
Year 1	2003	28,995		28,995
Year 2	2005	33,300		33,300
Year 3	2006	25,273		25,273
Year 4	2007	30,501		30,501
Year 5	2008	33,186		33,186
2015 Compliance Year - Water into Distribution System				
2015		20,062		20,062

** Meter Error Adjustment - See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES: Sole source of District supply.

SB X7-7 Table 5: Gallons Per Capita Per Day (GPCD)				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Annual Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use (GPCD)
10 Year Baseline GPCD				
Year 1	1999	16,045	25,177	1,401
Year 2	2000	16,178	29,859	1,648
Year 3	2001	17,201	27,329	1,418
Year 4	2002	17,099	31,633	1,652
Year 5	2003	17,122	28,995	1,512
Year 6	2004	17,882	33,300	1,662
Year 7	2005	17,899	25,273	1,261
Year 8	2006	18,039	30,501	1,509
Year 9	2007	18,145	33,186	1,633
Year 10	2008	18,242	27,198	1,331
10 Year Average Baseline GPCD				**1,503**
5 Year Baseline GPCD				
Baseline Year *Fm SB X7-7 Table 3*		Service Area Population *Fm SB X7-7 Table 3*	Gross Water Use *Fm SB X7-7 Table 4*	Daily Per Capita Water Use
Year 1	2003	17,122	28,995	1,512
Year 2	2005	17,882	33,300	1,662
Year 3	2006	17,899	25,273	1,261
Year 4	2007	18,039	30,501	1,509
Year 5	2008	18,145	33,186	1,633
5 Year Average Baseline GPCD				**1,515**
2015 Compliance Year GPCD				
2015		20,279	20,062	883
NOTES:				

SB X7-7 Table 6: Gallons per Capita per Day *Summary From Table SB X7-7 Table 5*	
10 Year Baseline GPCD	1,503
5 Year Baseline GPCD	1,515
2015 Compliance Year GPCD	883
NOTES:	

SB X7-7 Table 7: 2020 Target Method *Select Only One*		
Target Method		Supporting Documentation
☑	Method 1	SB X7-7 Table 7A
☐	Method 2	SB X7-7 Tables 7B, 7C, and 7D *Contact DWR for these tables*
☐	Method 3	SB X7-7 Table 7-E
☐	Method 4	Method 4 Calculator
NOTES:		

SB X7-7 Table 7-A: Target Method 1 20% Reduction	
10 Year Baseline GPCD	2020 Target GPCD
1503	1202
NOTES: Target = 80% of Baseline	

SB X7-7 Table 7-F: Confirm Minimum Reduction for 2020 Target			
5 Year Baseline GPCD *From SB X7-7 Table 5*	Maximum 2020 Target*	Calculated 2020 Target *Fm Appropriate Target Table*	Confirmed 2020 Target
1515	1440	1202	1202
** Maximum 2020 Target is 95% of the 5 Year Baseline GPCD*			
NOTES:			

SB X7-7 Table 8: 2015 Interim Target GPCD		
Confirmed 2020 Target *Fm SB X7-7 Table 7-F*	10 year Baseline GPCD *Fm SB X7-7 Table 5*	2015 Interim Target GPCD
1,202	1,503	1,352
NOTES: Interim Target = 90% Baseline		

SB X7-7 Table 9: 2015 Compliance					
Actual 2015 GPCD	2015 Interim Target GPCD	Optional Adjustments		2015 GPCD *(Adjusted if applicable)*	Did Supplier Achieve Targeted Reduction for 2015?
		TOTAL Adjustments	Adjusted 2015 GPCD		
883	1352	0	883	883	YES
NOTES:					

2020 Compliance Form Tables

Brown AND Caldwell

SB X7-7 Table 0: Units of Measure Used in 2020 UWMP* *(select one from the drop down list)*
Acre Feet
**The unit of measure must be consistent throughout the UWMP, as reported in Submittal Table 2-3.*
NOTES:

SB X7-7 Table 2: Method for 2020 Population Estimate	
Method Used to Determine 2020 Population (may check more than one)	
☑	**1. Department of Finance** (DOF) or **American Community Survey** (ACS)
☐	**2. Persons-per-Connection Method**
☐	**3. DWR Population Tool**
☐	**4. Other** DWR recommends pre-review
NOTES: 1) SANDAG Series 14 (version 17) includes DOF methodology.	

SB X7-7 Table 3: 2020 Service Area Population	
2020 Compliance Year Population	
2020	21,841
NOTES:	

SB X7-7 Table 4: 2020 Gross Water Use							
		2020 Deductions					
Compliance Year 2020	**2020 Volume Into Distribution System** *This column will remain blank until SB X7-7 Table 4-A is completed.*	**Exported Water ***	**Change in Dist. System Storage*** (+/-)	**Indirect Recycled Water** *This column will remain blank until SB X7-7 Table 4-B is completed.*	**Water Delivered for Agricultural Use***	**Process Water** *This column will remain blank until SB X7-7 Table 4-D is completed.*	**2020 Gross Water Use**
	14,297	-	-	-	-	-	**14,297**

*** Units of measure (AF, MG , or CCF)** must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.

NOTES:

SB X7-7 Table 4-A: 2020 Volume Entering the Distribution System(s), Meter Error Adjustment

Complete one table for each source.

Name of Source	SDCWA
This water source is *(check one)* **:**	
☐	The supplier's own water source
☑	A purchased or imported source

Compliance Year 2020	Volume Entering Distribution System [1]	Meter Error Adjustment [2] *Optional (+/-)*	Corrected Volume Entering Distribution System
	14,297	-	14,297

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.* [2] ***Meter Error Adjustment*** *- See guidance in Methodology 1, Step 3 of Methodologies Document*

NOTES

SB X7-7 Table 4-B: 2020 Indirect Recycled Water Use Deduction *(For use only by agencies that are deducting indirect recycled water)*

2020 Compliance Year	2020 Surface Reservoir Augmentation					2020 Groundwater Recharge			Total Deductible Volume of Indirect Recycled Water Entering the Distribution System
	Volume Discharged from Reservoir for Distribution System Delivery[1]	Percent Recycled Water	Recycled Water Delivered to Treatment Plant	Transmission/ Treatment Loss[1]	Recycled Volume Entering Distribution System from Surface Reservoir Augmentation	Recycled Water Pumped by Utility[1,2]	Transmission/ Treatment Losses[1]	Recycled Volume Entering Distribution System from Groundwater Recharge	
	14,297	0%	-	-	-	-	-	-	-

[1] ***Units of measure (AF, MG , or CCF)*** *must remain consistent throughout the UWMP, as reported in SB X7-7 Table 0 and Submittal Table 2-3.*

[2] *Suppliers will provide supplemental sheets to document the calculation for their input into "Recycled Water Pumped by Utility". The volume reported in this cell must be less than total groundwater pumped - See Methodology 1, Step 8, section 2.c.*

SB X7-7 Table 5: 2020 Gallons Per Capita Per Day (GPCD)		
2020 Gross Water *Fm SB X7-7 Table 4*	**2020 Population** *Fm SB X7-7 Table 3*	**2020 GPCD**
14,297	21,841	**584**
NOTES:		

SB X7-7 Table 9: 2020 Compliance							
Actual 2020 GPCD[1]	Optional Adjustments to 2020 GPCD Enter "0" if Adjustment Not Used			TOTAL Adjustments[1]	Adjusted 2020 GPCD [1] *(Adjusted if applicable)*	2020 Confirmed Target GPCD [1, 2]	**Did Supplier Achieve Targeted Reduction for 2020?**
	Extraordinary Events[1]	Weather Normalization[1]	Economic Adjustment[1]				
585	-	-	-	-	585	1202	**YES**

[1] *All values are reported in GPCD*

[2] ***2020 Confirmed Target GPCD*** *is taken from the Supplier's SB X7-7 Verification Form Table SB X7-7, 7-F.*

NOTES:

Appendix D: Water Shortage Contingency Plan

2020 Water Shortage Contingency Plan

Prepared for
Rainbow Municipal Water District
Fallbrook, California
May 2021

Prepared By:

In association with:

451 A Street, Ste 1500
San Diego, CA 92101
(858) 514-8822

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List of Abbreviations

AFY	acre-feet per year
AMI	advanced metering infrastructure
Annual Assessment	annual water supply and demand assessment
CWC	California Water Code
District	Rainbow Municipal Water District
DWR	Department of Water Resources
EOC	Emergency Operations Center
ERP	Emergency Response Plan
SCADA	supervisory control and data acquisition system
PSAWR	Permanent Special Agriculture Water Rate
UWMP	Urban Water Management Plan
Water Authority	San Diego County Water Authority
WSCP	Water Shortage Contingency Plan

Section 1

Introduction

The Water Shortage Contingency Plan (WSCP) documents how Rainbow Municipal Water District (District) will respond in the event of a water shortage. A water shortage means that the available water supply cannot sufficiently meet the normally expected customer water use at a given point in time. This WSCP provides guidance for managing and mitigating a potential shortage of water supply. In the event of any water shortage emergencies, this WSCP should be followed in coordination with the District's emergency response plan.

The San Diego County Water Authority (Water Authority) is a wholesale water supplier that provides 100 percent of the supply to the District in normal years. The Water Authority has their own WSCP that guides their response to a water shortage.

The WSCP is an element of the District's Urban Water Management Plan (UWMP), both of which are updated every five years in accordance with the California Water Code and submitted to the Department of Water Resources (DWR). The WSCP must be able to be amended separately from the UWMP. As such there is the flexibility to be able to separate the WSCP from the UWMP for future needs.

The WSCP is structured as recommended by DWR in the 2020 Urban Water Management Plan Guidebook. The WSCP consists of the following elements:

- **Section 2:** Water Supply Reliability Analysis Summary
- **Section 3:** Annual Water Supply and Demand Assessment Procedures
- **Section 4:** Six Standard Water Shortage Stages
- **Section 5:** Shortage Response Actions
- **Section 6:** Emergency Response Plan
- **Section 7:** Communication Protocols
- **Section 8:** Compliance and Enforcement
- **Section 9:** Legal Authorities
- **Section 10:** Financial Consequences of WSCP Activation
- **Section 11:** Monitoring and Reporting
- **Section 12:** WSCP Refinement, Adoption, Submittal, and Availability

Section 2

Water Supply Reliability Analysis Summary

The water supply reliability analysis is documented in Section 7 of the UWMP. To comply with the Water Code, the analysis is summarized in this section. The reliability of supplies and the key issues that may create shortage conditions relative to the District's water supply portfolio are summarized below.

2.1 Water System Reliability

The water system reliability analysis to meet demands in normal, single dry, and multiple dry years over a five-year drought period is described narratively and in tabulated format in Section 7 of the UWMP. Historically, the Water Authority supply has been very reliable with only occasional supply reductions during droughts impacting California or the Colorado River Watershed. The District anticipates there will be no supply shortages within the District's service area in a normal year, single dry-year or multiple dry- years through 2045.

2.2 Key Risks for a Potential Shortage Condition

Though the District's supply is highly reliable, there are scenarios that could result in the District declaring water shortage stage conditions. For example, water shortage stages may be declared if the California Governor enacts an Executive Order calling for water demand reductions. Below is a list of the key risks to the District that could potentially result in a shortage condition.

- Regional drought circumstances that lead to water supply allocations/cutbacks from the Water Authority
- Regulatory restrictions enacted upon imported supplies
- Earthquakes or other hazards that may cause catastrophic failure of conveyances for water supplies imported via the Water Authority, which partially originate from the State Water Project or the Colorado River Aqueduct

Section 3

Annual Water Supply and Demand Assessment Procedures

The annual water supply and demand assessment (Annual Assessment) shall be conducted annually and submitted to DWR on or before July 1 of each year beginning with the first Annual Assessment due by July 1, 2022. The Annual Assessment forecasts near-term water supply conditions to ensure shortage response actions are triggered in a timely manner. The Annual Assessment is submitted to DWR with information on anticipated water supply shortages, triggered shortage response actions, compliance and enforcement actions, and communication actions consistent with this WSCP.

This section presents the decision-making process that the District will use each year to determine its water supply reliability. The District will conduct an annual water supply and demand assessment that follows the steps illustrated in Figure 3-1 and described below. The decision-making process also includes the key data inputs and assessment methodology that will be used to evaluate the District's water supply and demand. The evaluation criteria, unconstrained demand, water supply, infrastructure considerations, and other factors are included in the steps. Once DWR finalizes the Annual Assessment guidelines, this process may be modified.

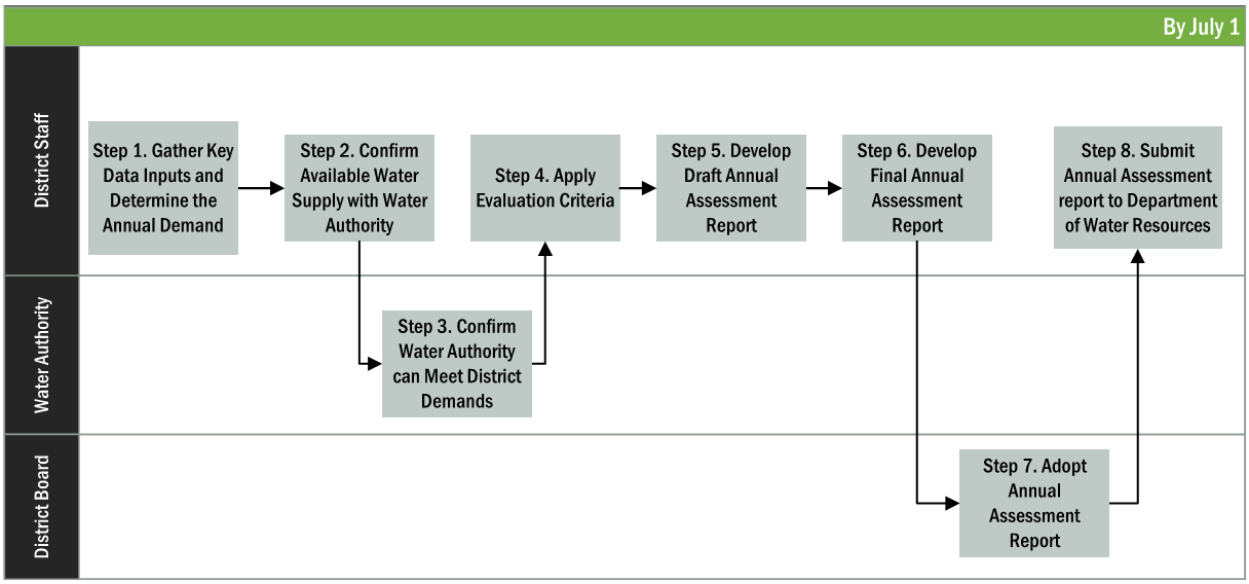

Figure 3-1. Annual Assessment Procedure and Decision-Making Process

Step 1. District Gathers Key Data Inputs and Determines the Unconstrained Demand

Prior to March 1st of each year, the District will estimate unconstrained customer demand for the current year and one dry year using a method similar to that used by the District for its 2020 UWMP water demand projections. DWR defines unconstrained customer demand as the District's water use before any projected demand reduction response actions are implemented due to WSCP activation. The projections shall be based on recent water use, while considering impacts on demand from

changing agricultural demands, climate patterns, potential service area expansion or population growth, and other influencing factors.

Step 2. District Coordinates with Water Authority to Confirm Available Water Supply

Prior to March 1st of each year, the District will coordinate with the Water Authority to confirm that their available water supply will meet the District's unconstrained demand. The District receives 100 percent of its supply from the Water Authority without supply limitations in normal years. In times of drought, the Water Authority may determine a reduced annual water allocation for their member agencies based on a predetermined methodology.

Step 3: Water Authority Confirms Supply

The Water Authority will confirm whether the available water supply can meet the District's water demands for the current year and one subsequent dry year. The Water Authority will determine their methodology for this analysis, but the basis of this methodology is as follows:

- Consider hydrological and regulatory conditions in the current year when making their determination.
- Consider how dry-year hydrological and regulatory conditions in the subsequent year may impact their water supplies
- Identify any water transmission or storage infrastructure constraints that may impact water supply deliveries to the District
- Provide descriptive text of the available water supply to the District for both scenarios

Step 4. Apply Evaluation Criteria

The Annual Assessment is based on evaluating the key data inputs to determine water supply reliability. The water supply and demand information will be compared in an Excel table or other tool using a DWR specified timestep (i.e., monthly data, quarterly, or annual data), and reliability will be assessed by considering local conditions, potential supply uncertainties, and any possible constraints on water distribution infrastructure from events such as planned maintenance, construction, equipment outages, etc.

Step 5. Develop Draft Annual Assessment Report

The District will compile the draft Annual Assessment report using the key data inputs, evaluation criteria, and results of the analysis. The report will contain a description and quantification of each source of water supply for the current year and one subsequent dry year. The report will also identify and quantify any anticipated water supply shortages. If any water shortages are anticipated, the report will indicate which water shortage level of the Water Shortage Contingency Plan to recommend for initiation.

Step 6. Develop Final Annual Assessment Report

The District will conduct an internal review and approval process of the draft, in order to prepare the Final Annual Assessment Report. The Final Report will be submitted to the District's Board of Directors for approval.

Step 7. Adopt Annual Assessment Report

The District's Board of Directors will review and adopt the Annual Assessment report, declaring a water shortage if necessary.

Step 8. Submit Annual Assessment Report to DWR

The District will submit the Annual Assessment report to DWR on or before July 1st of each year.

Section 4

Six Standard Water Shortage Stages

The District has developed a six-stage WSCP that defines the shortage levels based upon the percent of water supply shortage in comparison to unconstrained demand, as shown in Table 4-1. The District's WSCP contains six-stages to provide a consistent regional and statewide approach to conveying the relative severity of water supply shortage conditions. The six standard water shortage levels correspond to progressively increasing estimated shortage conditions and align with the response action the District would implement to meet the severity of the impending shortages.

Table 4-1. Water Shortage Contingency Plan Levels (DWR Table 8-1)

Shortage Level	Percent Shortage Range[1]	Water Shortage Condition
1	Up to 10%	Water supply conditions are sufficient to meet 90 to 100% of projected unconstrained demand for the next two years.
2	Up to 20%	Water supply conditions are sufficient to meet 80 to 90% of projected unconstrained demand for the next two years.
3	Up to 30%	Water supply conditions are sufficient to meet 70 to 80% of projected unconstrained demand for the next two years.
4	Up to 40%	Water supply conditions are sufficient to meet 60 to 70% of projected unconstrained demand for the next two years.
5	Up to 50%	Water supply conditions are sufficient to meet 50 to 60% of projected unconstrained demand for the next two years.
6	>50%	Water supply conditions are sufficient to meet less than 50% of projected unconstrained demand for the next two years.

Notes: Water shortage condition is based on unconstrained demand compared to projected supply. Projected supply is based on water deliveries from the Water Authority.

Section 5

Shortage Response Actions

Shortage response actions are aligned with the defined shortage levels defined in Table 4-1. Shortage response actions include locally appropriate supply augmentation actions and locally appropriate demand reduction actions such as operational changes, mandatory prohibitions against specific water use practices, and state mandated prohibitions. Each shortage response action is intended to reduce a portion of the gap between supplies and demand. The percent of water demand reduction for each action is estimated in Section 5.1.

5.1 Demand Reduction Actions

Prioritized use of available potable water during shortages is based on the difference between basic needs (i.e., drinking, toilet flushing) and discretionary uses (i.e., landscape irrigation), and legal requirements set forth in the California Water Code (CWC), Sections 350-358. Water reduction actions implemented during shortages will not affect the following water use types:

- Minimum health and safety allocations for interior residential needs (includes single family, multifamily, hospitals and convalescent facilities, retirement and mobile home communities, student housing, firefighting, and public safety)
- Commercial, industrial, institutional/governmental operations, where water is used for manufacturing, to meet minimum health and safety allocations for employees and visitors, or to maintain jobs and economic base of the community, but not for landscape uses
- Commercial growers or nurseries

Locally appropriate demand reduction actions to adequately respond to shortages are specified in Table 5-1 on page 5-3. Table 5-1 includes:

- Demand reduction actions by shortage level. All demand reduction actions in lower levels continue to be implemented as the shortage level increases, unless otherwise noted in the table.
- Estimated annual reduction in water by volume and percent for each demand reduction action.
- Customer Outreach/Penalty, charge, or other enforcement for each demand reduction action.

The assumptions and references for the estimated annual reduction in water by volume are provided in Attachment A.

5.1.1 Special Water Feature Distinction

Water features that are not pools or spas are analyzed and defined separately from pools and spas in the WSCP. Non-pool or non-spa water features including ponds, lakes, waterfalls, and fountains that do not require the use of potable water for health and safety considerations, are defined as decorative water features and recreational water features and are included as such in the response actions and are enforced and monitored as part of the WSCP process.

Under all conditions and stages, the WSCP prohibits using potable water in an ornamental fountain or other decorative water feature, except where the water is part of a recirculating system. At Shortage Level 4 all decorative water features that use potable water must be drained and kept dry.

5.2 Supply Augmentation and Other Actions

Locally appropriate supply augmentation actions and operational changes are listed in Table 5-2. Because the District is reliant on water deliveries from the Water Authority, localized supply augmentation options are currently limited.

Table 5-1. Demand Reduction Actions (DWR Table 8-2)					
Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *(AFY)*	How much is this going to reduce the shortage gap? (%)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
1 through 5	Landscape - Restrict or prohibit runoff from landscape irrigation	43	0.30	Prohibit the application of potable water on outdoor landscapes in a manner that causes excessive runoff such that water flows onto adjacent property, non-irrigated areas, private and public walkways, roadways, parking lots or structures.	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 6	Other - Require automatic shut off hoses	43	0.30	Prohibit the use of a hose that dispenses potable water to wash a motor vehicle, except where the hose is fitted with a shut-off nozzle or device attached to it that causes it to cease dispensing water immediately when not in use. [a]	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 6	Other - Prohibit use of potable water for washing hard surfaces	87	0.61	Prohibit the application of potable water to driveways and sidewalks.	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 6	Water Features - Restrict water use for decorative water features, such as fountains	43	0.30	Prohibit the use of potable water in a fountain or other decorative water feature, except where the water is part of a recirculating system.	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 5	Landscape - Other landscape restriction or prohibition	43	0.30	Prohibit the application of potable water to outdoor landscapes during and within 48 hours after measurable rainfall. [a]	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 6	CII - Restaurants may only serve water upon request	4	0.03	Prohibit the serving of drinking water other than upon request in eating or drinking establishments, including but not limited to restaurants, hotels, cafes, cafeterias, bars, or other public places where food or drink are served and/or purchased.	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1	Landscape - Limit landscape irrigation to specific days	760	5.31	Limit residential and commercial landscape irrigation to no more than three (3) assigned days per week on a schedule established by the General Manager and posted by the District. [a]	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 5	Landscape - Prohibit certain types of landscape irrigation	16	0.11	Prohibit the irrigation with potable water of ornamental turf on public street medians.	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1
1 through 5	Landscape - Prohibit certain types of landscape irrigation	129	0.90	Prohibit the irrigation with potable water of landscapes outside of newly constructed homes and buildings in a manner inconsistent with regulations or other requirements established by the California	None in Shortage Level 1, Customer Outreach/Penalty above Shortage Level 1

Table 5-1. Demand Reduction Actions (DWR Table 8-2)					
Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *(AFY)*	How much is this going to reduce the shortage gap? (%)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
				Building Standards Commission and the Department of Housing and Community Development.	
2 through 5	Landscape - Limit landscape irrigation to specific days	1,140	7.97	Limit residential and commercial landscape irrigation to no more than two (2) assigned days per week on a schedule established by the General Manager and posted by the District. [a]	Customer Outreach/Penalty
2 through 5	Landscape - Limit landscape irrigation to specific times	597	4.17	Limit lawn watering and landscape irrigation using sprinklers to no more than ten (10) minutes per watering station per assigned day. This provision does not apply to landscape irrigation systems using water efficient devices, including but not limited to weather-based controllers, drip/micro-irrigation systems and stream rotor sprinklers. [a]	Customer Outreach/Penalty
2 through 6	Offer Water Use Surveys	574	4.01	Offer District customers water use surveys to identify existing passive leaks or inefficiencies in plumbing or irrigation systems.	Incentive
3 through 6	Moratorium or Net Zero Demand Increase on New Connections	129	0.90	No new potable water service shall be provided, no new temporary meters or permanent meters shall be provided, and no statements of immediate ability to serve or provide potable water service (such as, will serve letters, certificates, or letters of availability) shall be issued, unless (1) a valid, unexpired building permit has already been issued for the project; (2) In the opinion of the District Board of Directors the project is necessary to protect the public's health, safety, and welfare; or (3) The applicant provides substantial evidence of an enforceable binding commitment that water demands for the project will be offset prior to the provision of a new water meter(s) to the satisfaction of the District.	None
3 through 5	Landscape - Prohibit certain types of landscape irrigation	557	3.89	Water landscaped areas, including trees and shrubs located on residential and commercial properties, and not irrigated by a landscape irrigation system governed by section 5 (b) (1), on the same schedule set forth in section 5 (b) (1) by using a bucket, hand-held hose with positive shut-off nozzle, or low-volume non-spray irrigation. [a]	Customer Outreach/Penalty

Table 5-1. Demand Reduction Actions (DWR Table 8-2)					
Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *(AFY)*	How much is this going to reduce the shortage gap? (%)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
3 and 4	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	132	0.92	Repair all leaks within seventy-two (72) hours of notification by the District unless other arrangements are made with the General Manager.	Customer Outreach/Penalty
3 through 6	Other water feature or swimming pool restriction	43	0.30	Stop filling or re-filling swimming pools, spas, ornamental fountains, lakes, ponds, or other water features, except to the extent needed to sustain aquatic life, provided that such animals are of significant value and have been actively managed within the water feature prior to declaration of a drought response level under this ordinance.	Customer Outreach/Penalty
4 through 5	Landscape - Limit landscape irrigation to specific days	611	4.27	During the months of November through May, landscape irrigation is limited to no more than once per week on a schedule established by the General Manager and posted by the District. This section shall not apply to commercial growers or nurseries.	Customer Outreach/Penalty
4 through 6	Other water feature or swimming pool restriction	43	0.30	All decorative water features that use potable water must be drained and kept dry	Customer Outreach/Penalty
4 through 6	Other - Prohibit vehicle washing except at facilities using recycled or recirculating water	43	0.30	Stop washing vehicles except at commercial carwashes that re-circulate water, or by high pressure/low volume wash systems.	Customer Outreach/Penalty
4	Other	1,322	9.24	The District may establish up to a 10% reduction in water allocation for any property served by the District. [b]	Customer Outreach/Penalty
5	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	66	0.46	Repair all leaks within forty-eight (48) hours of notification by the District unless other arrangements are made with the General Manager.	Customer Outreach/Penalty
5	Other	2,645	18.84	The District may establish up to a 20% reduction in water allocation for any property served by the District [b]	Customer Outreach/Penalty
6	Landscape - Prohibit all landscape irrigation	1,942	13.57	Stop all landscape irrigation [ac]	Customer Outreach/Penalty
6	Other - Customers must repair leaks, breaks, and malfunctions in a timely manner	397	2.77	Repair all water leaks within twenty-four (24) hours of notification by the District unless other arrangements are made with the General Manager	Customer Outreach/Penalty

Table 5-1. Demand Reduction Actions (DWR Table 8-2)					
Shortage Level	Demand Reduction Actions	How much is this going to reduce the shortage gap? *(AFY)*	How much is this going to reduce the shortage gap? (%)	Additional Explanation or Reference	Penalty, Charge, or Other Enforcement?
6	Other	3,967	27.72	The District may establish up to a 30% reduction in water allocation for any property served by the District. [b]	Customer Outreach/Penalty

Notes:

a. *This reduction action shall not apply to commercial growers or nurseries.*

b. *The District may establish a water allocation for any property served by the District using a method that does not penalize persons for previous implementation of conservation methods or the installation of water saving devices. The decision to establish a water allocation and the method utilized to determine the amount of the allocation shall be at the sole discretion of District.*

c. *If recycled water is available, it may be used to (1) maintain trees and shrubs on a limited schedule and by using a bucket, hand-held hose with a positive shut-off nozzle, or low-volume non-spray irrigation, (2) maintain existing landscaping necessary for fire protection as specified by the Fire Marshal of the local fire protection agency having jurisdiction over the property to be irrigated, (3) maintain existing landscaping for erosion control, (4) maintain landscaping within active public facilities, including parks and playing fields, day care centers, school grounds, cemeteries, and golf course greens, provided that such irrigation does not exceed two (2) days per week, (5) provide watering of livestock, and (6) supply public works projects and actively irrigated environmental mitigation projects.*

Table 5-2. Supply Augmentation and Other Actions (DWR Table 8-3)				
Shortage Level	Supply Augmentation Methods and Other Actions by Water Supplier	How much is this going to reduce the shortage gap? *(AFY)*	How much is this going to reduce the shortage gap? *(%)*	Additional Explanation or Reference
1 through 6	Expand Public Information Campaign	217.30	1.5	Offer workshops, increased use of bill inserts
2 through 6	Expand Public Information Campaign	43.46	0.3	Promotion of District-wide advanced metering infrastructure (AMI) hourly water use data to communicate with customers. The District offers rebates for AMI capable meters to their customers so they can easily access insights into their water use.

5.3 Shortage Response Action Effectiveness

The purpose of implementing demand reduction and supply augmentation actions is to reduce water demand and increase other sources of supply to make up for the water shortage gaps. If implemented, the demand reduction and supply augmentation actions outlined in Table 5-1 and Table 5-2 will allow the District to sufficiently meet the water shortage gaps at each shortage level. Table 5-3 presents the WSCP shortage gap reduction goals and compares them to the total shortage gap reduction possible if all demand reduction and supply augmentation actions are implemented for the associated shortage level.

Table 5-3. Shortage Gap Reduction from Demand Reduction and Supply Augmentation Actions

	Shortage Level					
	1	2	3	4	5	6
WSCP Shortage Gap Reduction Goal (%)	10	20	30	40	50	>50
Shortage Gap Reduction due to Demand Reduction Actions (%) [a]	8	19	28	42	50	55
Shortage Gap Reduction due to Supply Augmentation Actions (%) [a]	2	2	2	2	2	2
Total Shortage Gap Reduction (%)	10	21	30	44	52	57

a. Based upon assumed reduction percentages from Table 5-1 and compared to total actual water use for 2020.

b. Based upon assumed supply augmentation percentages from Table 5-2 and compared to total actual water use for 2020.

Section 6

Emergency Response Plan

A catastrophic water shortage could occur when a natural disaster such as an earthquake results in damage to water supply conveyances, other state water infrastructure, or District water facilities. This could possibly result in deficient water supplies for the region and/or the District. In response to potential natural disasters and other emergencies, the District prepared an Emergency Response Plan (ERP) in 2018. The ERP includes standardized response and recovery procedures to minimize customer water service interruptions and to prevent, minimize, and mitigate human injury and infrastructure damage resulting from emergencies or disasters of human-made or natural origin. The information contained in the ERP is intended to prepare and guide staff and inform emergency response agencies. The ERP includes plans, procedures, lists, and identification of equipment that may be useful during an emergency. The ERP includes the following sections:

- **Section 1:** Introduction
- **Section 2:** Emergency Planning Process
- **Section 3:** Mutual Aid System
- **Section 4:** Water System Information and Hazard Identification
- **Section 5:** Preparedness Phase Operations
- **Section 6:** Response Phase Overview
- **Section 7:** EOC Staff Assignments and Responsibility
- **Section 8:** Restoration and Recovery Phase
- **Section 9:** Mitigation Phase

Additionally, the ERP provides specific guidelines for the four items listed below. These guidelines will give District emergency responders support when determining the necessary response actions to manage an incident in a timely manner.

- Establishing an Emergency Operations Center (EOC) including the location and resources required, as well as a secondary EOC if the primary EOC is compromised.
- Organization and responsibilities of the EOC personnel to evaluate and direct the overall response to the emergency.
- Strategies for emergency response, repair, and restoration of the water system.
- Responsibilities of District personnel during the emergency response.

6.1 Seismic Risk Assessment and Mitigation Plan

A seismic risk assessment of the District's critical water system assets, including storage tanks, pump stations, and critical transmission and distribution pipelines was conducted. This assessment includes a description of the likelihood of occurrence near the critical facilities, a list of the assets that may be impacted, potential impacts, and suggested mitigation measures. The seismic risk assessment is documented as a technical memorandum, and it is included as Attachment A.

Section 7

Communication Protocols

Timely and effective communication is a key element of water shortage contingency planning implementation. The District's communication protocols and procedures in the event of a water shortage are intended for activation only with District Board authorization. Under a water shortage condition, the District would assess the actual water supply and demand information and conditions to determine whether activating the WSCP is warranted. If activation is warranted, the General Manager will call for an emergency Board meeting to request District Board authorization, if needed. The District would recommend activation of the appropriate stage and request District Board authorization to initiate the measures necessary to achieve the appropriate demand reduction target. The public would be encouraged to understand and be involved in the decision-making process and provide feedback to the District Board on such an action.

The list below outlines the specific communication methods to inform customers, the public, interested parties, and local, regional, and the state government of any current or anticipated water shortage stage and the associated water demand reduction actions:

- Customers, the public, and other interested parties:
  - Announcements on District website homepage
  - Press releases via the River Village News
  - Public information and awareness program with workshops, park signage, water bill inserts, and educational programs at schools
- Local, regional, and state government
  - Email officials at cities and counties impacted by the water shortage
  - Email or place phone call to designated officials at regional and state level (DWR)

Section 8

Compliance and Enforcement

The District adopted Ordinance No 16-10: An Ordinance of Rainbow Municipal Water District Adopting a Drought Response Conservation Program in June 2016 which provides a description of penalties and the District's authority to fine or terminate water service. The ordinance will be revised in accordance with the water shortage stages, demand reduction actions, and other measures outlined in this WSCP. The ordinance will go before the District's Board for approval after the WSCP has been revised and adopted.

8.1 Ensuring Ordinance Compliance

When water shortage stages are enacted, the District will ensure compliance with the ordinance by launching education and communication programs with District customers. If violations are identified, the fines described in Section 8.2 may apply if the offender has already been issued a warning. In the event of a water shortage, customers participating in the Permanent Special Agriculture Water Rate (PSAWR) program must affirmatively accept the condition that service may be interrupted during water supply shortages before other classes of water service are interrupted. During shortages, the District notifies customers participating in PSAWR through, newsletters, mailers, and the District website.

8.2 Enforcement of Demand Reduction Actions

Any person who uses, causes to be used, or permits the use of water in violation of the ordinance is guilty of an offense punishable as outlined below. Each day that a violation of the ordinance occurs is a separate offense.

Similarly, the District will ensure compliance with and enforce provisions of the WSCP reduction actions taken at each shortage level as noted in Table 5-1 by the following means:

- Prior to issuing administrative fines for violations, the District will first conduct public outreach and issue a warning to customers not in compliance. The District will provide the customer with a fact sheet about water shortage demand reduction actions to explain why the measures are in place.
- Administrative fines may be levied for each subsequent violation, with increasing fees as follows:
  - $100 for a first violation.
  - $200 for a second violation within one year from occurrence of the first violation.
  - $500 for each additional violation within one year of the first violation.
- Installation of a flow-restricting device in the meter.
- Violations may be prosecuted as a misdemeanor punishable by imprisonment in the county jail for not more than 30 days or by a fine not exceeding $1,000, or by both as provided in CWC section 377.
- Willful violations of the mandatory conservation measures and water use restrictions applicable during a Level 6 Drought Emergency condition may be enforced by discontinuing service to the property at which the violation occurs, as provided by CWC section 356.

All remedies provided for herein shall be cumulative and not exclusive.

8.3 Exemptions and Appeals

If, due to unique circumstances, a specific requirement of this WSCP would result in undue hardship and disproportionate impact to a District customer, then an exemption may be granted or conditionally granted by following the procedures detailed below.

1. **Request an Exemption or Appeal.** The customer shall submit a letter to the District requesting an exemption or appeal.
2. **Provide supporting documentation.** The exemption application shall be accompanied by photographs, maps, drawings, and other information, including a written statement of the applicant.
3. **Basis is found to support exemption.** An exemption shall be granted only if the District finds, based on the information provided in the application, supporting documents, any additionally requested information, and the District's records of water use information for the property, all of the following:
   a. The exemption does not grant special privilege inconsistent with those available to all other District customers.
   b. Unique circumstances specific to the applicant are found to have a disproportionate impact on the property or use that exceeds the impacts to customers generally.
   c. The granted exemption will not cause harm to adjacent properties and will not impede the District's ability to fulfill the purpose of the WSCP.

The rationale and reason for the exemption request is not common, recurrent, or general in nature.

Approval Authority. The General Manager shall exercise approval authority and act upon any completed application no later than 30 days after submittal and may approve, conditionally approve, or deny the exemption. The applicant requesting the exemption shall be promptly notified in writing of any action taken. Unless specified otherwise at the time an exemption is approved, the variance applies to the subject property during the term of the mandatory shortage response.

Appeals to the District Board of Directors. An applicant may appeal a decision or condition of the General Manager on a variance application. The appeal must be in the form of a written request for a hearing and shall state the grounds for the appeal. At a public meeting, the District Board of Directors shall act as the approval authority and review the appeal. The decision of the District Board of Directors is final.

Section 9

Legal Authorities

The District's legal authority to enforce demand reduction measures during water shortages is codified by local ordinance, Rainbow Drought Ordinance 16-10: An Ordinance of Rainbow Municipal Water District Adopting a Drought Response Conservation Program.

The District shall declare a water shortage emergency condition in accordance with CWC Chapter 3 (commencing with Section 350) of Division 1 as stated below:

> "Declaration of water shortage emergency condition. The governing body of a distributor of a public water supply, whether publicly or privately owned and including a mutual water company, shall declare a water shortage emergency condition to prevail within the area served by such distributor whenever it finds and determines that the ordinary demands and requirements of water consumers cannot be satisfied without depleting the water supply of the distributor to the extent that there would be insufficient water for human consumption, sanitation, and fire protection."

The District shall coordinate with any city or county within which it provides water supply services for the possible proclamation of a local emergency under California Government Code, California Emergency Services Act (Article 2, Section 8558.)

Section 10

Financial Consequences of WSCP Activation

The financial consequence of implementing the WSCP include potential revenue reductions and expense increases for the District. The District has estimated the costs associated with the revenue losses and has developed mitigation actions to reduce these impacts.

10.1 Potential Revenue Reductions and Expense Increases

Upon implementation of a shortage stage and the associated reduction actions, the District anticipates that revenues generated from the quantity charge component of customers' bills would be reduced proportionately to the water shortage percentage. In addition to reduced revenues, the District may also experience increased expenses due to the need for staff to carry out monitoring and enforcement actions identified by each shortage stage.

10.2 Mitigation Actions to Address Revenue Reductions

Throughout extended water shortage periods, the District would attempt to avoid rate adjustments.

Potential mitigation actions include:

- Use of financial reserves - The District has financial reserves to address decreased water sales during a water shortage.
- Postponement of capital improvements - The District could delay work on non-essential capital improvements until water sales become more sustainable.

10.3 Cost of Compliance

For the District to ensure its customers comply with the ordinance and CWC Chapter 3.3, Excessive Residential Water Use During Drought, additional costs will be incurred. These costs are associated with the increased costs for monitoring and enforcement of water use reduction measures.

Section 11

Monitoring and Reporting

The District will monitor and report implementation of the WSCP by collecting, tracking, and analyzing appropriate data for the purposes of monitoring reduction in customer water demands, customer compliance, and meeting state reporting requirements. Potable water use figures are recorded daily by District staff. The District operates its water system on a computerized supervisory control and data acquisition system (SCADA), which allows instantaneous viewing of water system conditions.

During a Shortage level 1 or 2, District staff would compare the daily and monthly water distribution totals to the target distribution totals to verify that the appropriate reduction goal is being met. The District Engineering and CIP Program Manager reviews the monthly distribution reports and determines if further action is required to meet demand reduction goals. Monthly distribution reports shall be sent to the District Board. If reduction goals are not met, the District Engineering and CIP Program Manager would notify the District Board so that corrective action is considered and/or taken.

During a Shortage Level 3 and higher, the procedure described above would be followed, with the addition of a weekly distribution report to the General Manager.

Section 12

WSCP Refinement, Adoption, Submittal, and Availability

As part of the District's commitment to ensuring reliable supplies, the WSCP will be adopted by the District Board and made available to the public.

12.1 Refinement Procedures

The WSCP is routinely updated to ensure water demand reduction actions and supply augmentation measures continue to accurately reflect the District's planned response to water shortage outages. The modifications to this WSCP for 2020 were adjusted to comply with the 2019 CWC revisions. Experience with recent drought conditions and recommendations from the Water Authority for regional consistency in water shortage contingency planning also played a role in the revisions to this WSCP.

Review and update of the WSCP shall occur in parallel with the update of the UWMP, at a minimum of every five years. However, the WSCP may also be updated independently of the UWMP and with greater frequency, at the District's discretion.

12.2 Adoption, Submittal, and Availability

The updated WSCP shall be adopted, submitted, and made available as part of the same process for the 2020 UWMP per the CWC requirements. During each WSCP review and update process, the revised WSCP will go through internal review prior to adoption by the District's Board. The WSCP must be reviewed and adopted prior to or in conjunction with the UWMP review and adoption process. The WSCP may also be periodically amended independently of the UWMP, as needed. In either instance, the public review period and adoption process follows that which is defined in Government Code 6066. The associated notifications for the public hearing process and the Board adoption resolution for the WSCP are provided as appendices to the UWMP.

The updated WSCP shall be made available on the District's website no later than 30 days after it is adopted. The WSCP shall also be available as an appendix to the UWMP document, which will be posted to the District's website and DWR's public Water Use Efficiency data portal website. The UWMP and its WSCP appendix will also be submitted to the California State Library and be available for review in hardcopy format in the District's offices during normal working hours.

Attachment A: Seismic Risk Assessment and Mitigation Plan

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Technical Memorandum

Prepared for: Rainbow Municipal Water District

Project Title: 2020 Urban Water Management Plan

Project No.: 155487

Technical Memorandum

Subject: Water System Seismic Assessment

Date: April 14, 2021

To: Malik Tamimi, Project Manager

From: Cheryl Dilks, Project Manager

Copy to: J.P. Semper

Prepared by: Amber Pulido

Reviewed by: Paul Selsky, P.E.

Limitations:

This document was prepared solely for Rainbow Municipal Water District in accordance with professional standards at the time the services were performed and in accordance with the contract between Rainbow Municipal Water District and Brown and Caldwell dated July 24, 2020. This document is governed by the specific scope of work authorized by Rainbow Municipal Water District; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by Rainbow Municipal Water District and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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Section 1: Seismic Assessment Purpose and Methodology

The California Water Code (CWC), Section 10632.5, states that beginning January 1, 2020, the Urban Water Management Plan (UWMP) "shall include a seismic risk assessment and mitigation plan to assess the vulnerability of each of the various facilities of a water system and mitigate those vulnerabilities." In response to this CWC requirement, the Department of Water Resources (DWR) now requires that a seismic assessment be included as part of the UWMP. Water suppliers may comply with this requirement by submitting a local hazard mitigation plan if that plan addresses seismic risk for the water system or the Risk and Resilience Assessment (RRA) and associated Emergency Response Plan (ERP) mandated by America's Water Infrastructure Act (AWIA) of 2018. While there is a Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for San Diego County, there is no specific seismic assessment for the major water facilities in the Rainbow Municipal Water District (District). The District has not yet completed its RRA and ERP updated for AWIA compliance, so they are not referenced in this seismic assessment.

1.1 Purpose of Seismic Assessment

The purpose of this assessment is to comply with the CWC by conducting a seismic risk assessment of the District's critical water system assets, including storage tanks, pump stations, and critical transmission and distribution pipelines. This assessment includes a description of the likelihood of occurrence near the critical facilities, a list of the assets that may be impacted, potential impacts, and suggested mitigation measures.

1.2 Methodology

The seismic risk assessment uses the simplified approach outlined in the earthquake components of Tables 2b, 3b, 5b, 6b, 10b, and 11 from the U.S. Environmental Protection Agency (EPA)'s *Guidance for Small Community Water Systems on Risk and Resilience Assessments under AWIA.* Completed tables are attached to this TM as Attachment A. The District may choose to complete these tables for other water system risks at a later time.

Additionally, the District's 2016 Water and Wastewater Master Plan Update was used to extract detailed information about the critical system assets. The EPA's March 2018 *Earthquake Resilience Guide for Water and Wastewater Utilities* was used to determine the potential seismic impacts for the critical assets. San Diego County's MJHMP was relied upon to describe the seismic risk for the District's service area, and the EPA's Vulnerability Self-Assessment Tool (VSAT) 2.0 was used to determine the annual threat likelihood of earthquake in the District's area. Mitigation and resilience measures were determined using the EPA's *Earthquake Incident Action Checklist* (see Attachment B) and FEMA's *A Guide to Using HAZUS for Mitigation*.

Section 2: Seismic Risk for the District

In 2017, San Diego County updated its Multi-Jurisdictional Hazard Mitigation Plan (MJHMP). The MJHMP intends to enhance public awareness and local policies around hazard mitigation, create a tool for decision-making, promote compliance with State and Federal requirements, provide inter-jurisdictional coordination, and achieve regulatory compliance. The 2017 update includes an evaluation of seismic impacts and potential mitigation actions for certain areas of the county.

In the MJHMP, most hazards were given a risk level of high, medium, or low depending on several factors unique to the hazard. The plan also provided the likeliness of the hazard occurrence with either a "highly likely", "likely" or "somewhat likely" rating. Earthquakes in the San Diego region were determined to be a

"high" risk and "somewhat likely to occur." According to the MJHMP, there are several major active faults in San Diego County, including the Rose Canyon, La Nacion, Elsinore, San Jacinto, Coronado Bank, and San Clemente Fault Zone. The fault zones that are nearest the District's service area are the Elsinore and San Jacinto fault zones. The San Jacinto Fault is the most active fault in the county. It branches off the major San Andreas Fault as it passes through the San Bernardino Mountains. Two other faults that can generate moderately sized but potentially damaging earthquakes are the Rose Canyon and Elsinore Faults. The MJHMP suggests maximum likely magnitudes based on the Richter scale for local faults, as shown in Table 1.

Table 1. Maximum Earthquake Magnitudes for Nearby Faults

Fault	Maximum Magnitude
Coronado Bank	7.7
Elsinore	7.3
La Nacion	6.6
Rose Canyon	7.0
San Clemente	7.7
San Jacinto	7.3

Additionally, the EPA's VSAT Web 2.0 provides a database of earthquake likelihood values by zip code. Earthquake severities are based on ranges of Peak Ground Acceleration (PGA). Refer to Table 2 below for the annual likelihood of an earthquake occurring for zip code 92028 (Fallbrook).

Table 2. Earthquake Probability from VSAT 2.0

Earthquake Severity	Definition	Annual Threat Likelihood
EQ 1 – PGA 0.0 – 0.2	Earthquake with weak to light shaking, causing minimal structural damage.	100%
EQ 2 – PGA 0.2 – 0.4	Earthquake with moderate to strong shaking, causing light to moderate damage, particularly to poorly built or badly designed structures	0.24%
EQ 3 – PGA 0.4 – 0.8	Earthquake with very strong to severe shaking, causing moderate to heavy damage to integrity of masonry and frame structures.	0.097%
EQ 4 – PGA 0.8 – 1.1	Earthquake with violent shaking, causing heavy damage, partial building collapses, and potentially shifting structures off foundations; some underground pipes are broken.	0.012%
EQ 5 – PGA > 1.1	Earthquake with extreme shaking, causing very heavy damage to masonry, frame structures, foundations, dams, and bridges; considerable damage to underground pipelines; large landslides may occur.	0.0048%

Section 3: Seismic Risk Assessment

This section describes vulnerabilities to the District's critical assets by using EPA's *Guidance for Small Community Water Systems on Risk and Resilience Assessments under AWIA* as a guide.

3.1 Source Water

The District's supply is fully reliant upon purchased imported potable water from the San Diego County Water Authority (Water Authority), which relies upon two aqueducts to convey water to southern California. An earthquake may impact the source water supply if the aqueducts experience structural failure. Seismic assessment of the aqueducts and source water supply are covered under the Water Authority's and Metropolitan Water District of Southern California's seismic assessment components of their Water Shortage Contingency Plans.

3.2 Constructed Conveyances and Water Supply Connections

The purchased water is delivered to the District through eight District Flow Control Facility (FCF) locations (i.e., Water Authority Aqueduct Connections) and two emergency connection locations. An earthquake may cause structural failure at the FCFs and emergency connections, potentially causing water loss from pipe breakage or cracking.

3.3 Storage and Distribution Facilities

The District has 3 operational reservoirs, 13 enclosed storage tanks, 7 booster pump stations (PS), 6 emergency pumps, and 56 pressure regulating stations within the District's distribution system.

The District's storage and distribution facilities and potential earthquake impacts are described in the following sections.

3.3.1 Distribution Pipelines

The District's system includes 323 miles of distribution pipeline, ranging in diameter from 4-inch to 42-inches in diameter. Table 3 summarizes pipeline lengths by diameter. Ground shaking and liquefaction from earthquakes can cause pipes to crack at brittle joints and sink into the liquefied ground potentially causing significant sudden water loss, flood damage to nearby structures, and the inability to deliver water to some customers.

Table 3. Pipeline Summary by Diameter

Pipeline Diameter (inches)	Total Pipeline Length (miles)	Pipeline Diameter (inches)	Total Pipeline Length (miles)
4	4.5	20	10.9
6	65.1	22	1
8	114.7	24	5.8
10	17.7	27	0.3
12	42.2	30	0.6
14	20.3	36	0.4
16	27	42	0.6
18	11.7		
		Total Length of Pipe	323

3.3.2 Storage Facilities

The District has 3 operational reservoirs and 13 enclosed storage tanks. The three operational reservoirs are either concrete or asphalt lined. Reservoir failure from an earthquake can cause loss of control of water supply and downstream flooding of nearby structures.

There is one pre-stressed concrete tank, and the other 12 storage tanks are circular above-ground steel tanks. Some common earthquakes effects on above ground tanks are structural stability failure, water sloshing within the tank causing structural failure, sliding on the foundation, cracking or shearing of walls for concrete tanks, and elephant foot buckling for steel tanks.

Table 4 lists the operational reservoirs and storage tanks for the District and their associated pressure zones and storage capacities. Asset names have been changed to protect sensitive information.

Table 4. Storage Facilities

Storage Facility	Pressure Zone	Capacity (MG)
Tank/Reservoir 1	Magee	3.0
Tank/Reservoir 2(1)	Rainbow Heights	0.9
Tank/Reservoir 3	Rainbow Heights	4.0
Tank/Reservoir 4	Gomez	3.5
Tank/Reservoir 5	U-1	0.6
Tank/Reservoir 6	U-1	1.5
Tank/Reservoir 7	Vallecitos	0.4
Tank/Reservoir 8	Northside	22.8
Tank/Reservoir 9	North	7.8
Tank/Reservoir 10	North	4.0
Tank/Reservoir 11	Canonita	6.0
Tank/Reservoir 12	South	4.0
Tank/Reservoir 13	South	4.0
Tank/Reservoir 14	South	4.0
Tank/Reservoir 15 (1)	Pala Mesa	203.7
Tank/Reservoir 16	Pala Mesa	6.0
Tank/Reservoir 17	Morro Tank	4.0
Tank/Reservoir 18	Morro Res	151.5

(1) Out of Service Facility

3.3.3 Booster Pump Stations

There are seven booster PS facilities. The PS buildings are susceptible to structural damage from earthquakes, and the pump operations may be impacted by earthquake associated power outages. Liquefaction may occur, causing the entire facility and its assets, such as booster pumps, generators, and piping, to lose bearing strength and collapse from liquefaction of the soil underlying the structures. Table 5 lists the

District's booster pump stations, the total number of pumps in each facility, and capacity information. Asset names have been changed to protect sensitive information.

Table 5. Booster Pump Stations

Pump Station Name	Total Number of Pumps	Pump Station Capacity		
		Total Capacity		Firm Capacity
		gpm	MGD	MGD
PS 1	4	3,509	5.1	3.6
PS 2	3	1,615	2.3	1.5
PS 3	1	679	1.0	1.0
PS 4	2	6,296	5.8	3.2
PS 5	1	3,455	5.0	5.0
PS 6	4	4,552	6.6	4.1
PS 7	2	1,398	2.0	1.0

3.3.4 Other Water Distribution System Assets

The pressure regulating stations house one or more hydraulically actuated pressure reducing valves (PRV). Six pressure control stations have only one PRV. The other 50 stations have more than one PRV. In the event of an earthquake, these PRVs could crack or break, causing valve failure and localized flooding. Refer to the 2016 Master Plan for the full list of PRVs.

3.4 Electronic, Computer, or Other Automated Systems

The District has one centralized SCADA system to control their distribution system. Earthquakes commonly cause power outages due to damage to power lines, transformers, and generators which could disrupt SCADA functionality.

3.5 Operations and Maintenance of the System

This section describes critical assets related to the operation and maintenance of the District's system. An earthquake may cause structural damage to the administrative and operational buildings, which may then impact internal and external system communications.

Customer Center and Operations Center

The District has a customer service center and an operations center.

Power

The District receives its power supply from San Diego Gas & Electric (SDG&E). The District is subject to any associated earthquake impacts to SDG&E's facilities in the District's service area.

Section 4: Mitigation and Resilience Measures

This section discusses potential actions that could be taken to improve the resiliency of the system to earthquakes and mitigate the risk of failure. Strategies to improve the District's assets' resilience to earthquakes and enhancements to operational strategies to improve system resilience are described in the following sections.

4.1.1 Mitigation and Resilience for Water System Assets

To mitigate the threat of earthquakes to District FCFs, reservoirs, storage tanks, distribution pipelines, booster pumps, emergency pumps, emergency connections, and other District buildings, the District should first consider conducting a complete structural assessment of the assets to seismically evaluate their performance if subjected to earthquakes of varying degrees. This evaluation can identify the "high risk" assets that should take priority for replacement or seismic design retrofits in the future. Assets associated with source water resilience, such as aqueducts, shall be addressed by the Water Authority and MWD independently.

4.1.2 Operational Strategies to Improve Water System Resilience

Given the District's dependence on a wholesaler, improving reliability and redundancy can help strengthen preparedness and reduce response times in case of earthquake impacts to the Water Authority or MWD systems. The District could consider identifying interconnectivity strategies between nearby systems, such as City of Oceanside, Carlsbad Municipal Water District, and Vista Irrigation District to maximize reliability and resiliency. Although Water Authority supplies are considered reliable, improved interconnection with other systems could help address an earthquake event that may impact some or all District FCFs. Another strategy involves enhancing or establishing clear earthquake event communication protocols and documenting emergency equipment and other resources in advance. See Section 3.1.3 for further suggestions for the Emergency Response Plan (ERP).

The District should also consider identifying and updating lists of priority water customers (e.g., hospitals, dialysis clinics, schools) to develop a plan to restore water service to those customers first. Back-up supplies of water (bulk water delivery or bottled water supplies) should also be identified and documented in the ERP.

Because earthquakes will impact multiple utilities simultaneously, it is also recommended that the District establish coordination with SDG&E now to foster better communication and response times immediately after an earthquake. Sharing information with the power utility regarding critical asset locations could help facilitate faster power recovery to priority assets. Locations of back-up generators and fuel reserves should be updated regularly and included with the ERP.

4.1.3 Emergency Response Planning

The District should review and update their ERP to ensure all earthquake procedures, equipment lists, and emergency contacts are current. The current ERP specifically addresses earthquakes and procedures to follow in Section 4.1.1. To supplement this, the EPA's earthquake checklist in Attachment B can serve as a helpful guide for emergency planning and response. Additionally, the following are tools that can be used to revise an ERP:

- Earthquake Hazard Mitigation Handbook (Federal Emergency Management Agency [FEMA])
- Planning for an Emergency Drinking Water Supply (EPA)
    - Incident monitoring: USGS recent earthquake activity map (U.S. Geological Survey [USGS])
- Drinking Water Emergency Response Plan Guidelines (State Water Resources Control Board [SWRCB])

    - ERP Template from Division of Drinking Water (DDW)'s ERP Workshop
- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)

Finally, it is recommended that all District staff review the ERP, understand where the emergency operations center (EOC) is located, how it will be activated, and what their role is during an earthquake emergency. Desktop trainings and exercises for seismic scenarios are also suggested.

References

Atkins, Rainbow Municipal Water District Water and Wastewater Master Plan Update, Rainbow Municipal Water District, 2016.

County of San Diego – Office of Emergency Services, San Diego County – Unified District Council, Multi-Jurisdictional Hazard Mitigation Plan (MJHMP) for San Diego County, California, 2017.

Environmental Protection Agency (EPA), "Earthquake Resilience Guide for Water and Wastewater Utilities," Earthquake Resilience Guide for Water and Wastewater Utilities, March 2018, https://www.epa.gov/sites/production/files/2018-02/documents/180112-earthquakeresilienceguide.pdf.

Environmental Protection Agency (EPA), "Water Sector Incident Action Checklist – Earthquake," Incident Action Checklist – Earthquake, January 2015, https://www.epa.gov/sites/production/files/2015-06/documents/earthquake_1.pdf.

National Institute of Building Sciences for the Federal Emergency Management Agency, "A Guide to Using HAZUS for Mitigation," April 2002, https://www.fema.gov/pdf/plan/prevent/hazus/hazus_for_mitigation.pdf.

Attachment A: Guidance for Small Community Water Systems on Risk and Resilience Assessments under AWIA

Table 2b: Source Water (Natural Hazards)

Asset Category: *Source Water* **Examples of Assets in this Category:** Encompasses all sources that supply water to a water system. Possible examples include rivers, streams, lakes, source water reservoirs, groundwater, and purchased water.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Source Water* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Hurricane	Click or tap here to enter text.
☐ Flood	Click or tap here to enter text.
☒ Earthquake	The District's supply is fully reliant upon purchased imported potable water from the San Diego County Water Authority (Water Authority), which relies upon two aqueducts to convey water to southern California. An earthquake may impact the source water supply if the aqueducts experience structural failure. Seismic assessment of the aqueducts and source water supply are covered under the Water Authority's and Metropolitan Water District of Southern California's seismic assessment components of their Water Shortage Contingency Plans.
☐ Tornado	Click or tap here to enter text.

Asset Category: *Source Water* **Examples of Assets in this Category:** Encompasses all sources that supply water to a water system. Possible examples include rivers, streams, lakes, source water reservoirs, groundwater, and purchased water.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Source Water* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Ice storm	Click or tap here to enter text.
☐ Fire	Click or tap here to enter text.
☐ Other(s), enter below: Click or tap here to enter text.	Click or tap here to enter text.

Table 3b: Pipes and Constructed Conveyances, Water Collection, and Intake (Natural Hazards)

Asset Category: *Pipes and Constructed Conveyances, Water Collection, and Intake* **Examples of Assets in this Category:** Encompasses the infrastructure that collects and transports water from a source water to treatment or distribution facilities. Possible examples include holding facilities, intake structures and associated pumps and pipes, aqueducts, and other conveyances.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Pipes and Constructed Conveyances, Water Collection, and Intake* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Hurricane	Click or tap here to enter text.
☐ Flood	Click or tap here to enter text.
☒ Earthquake	The purchased water is delivered to the District through eight District Flow Control Facility (FCF) locations (i.e., Water Authority Aqueduct Connections) and two emergency connection locations. An earthquake may cause structural failure at the FCFs and emergency connections, potentially causing water loss from pipe breakage or cracking.
☐ Tornado	Click or tap here to enter text.
☐ Ice storm	Click or tap here to enter text.

Asset Category: *Pipes and Constructed Conveyances, Water Collection, and Intake* **Examples of Assets in this Category:** Encompasses the infrastructure that collects and transports water from a source water to treatment or distribution facilities. Possible examples include holding facilities, intake structures and associated pumps and pipes, aqueducts, and other conveyances.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Pipes and Constructed Conveyances, Water Collection, and Intake* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Fire	Click or tap here to enter text.
☐ Other(s), enter below: Click or tap here to enter text.	Click or tap here to enter text.

Table 5b: Storage and Distribution Facilities (Natural Hazards)

Asset Category: *Storage and Distribution Facilities* **Examples of Assets in this Category:** Encompasses all infrastructure used to store water after treatment, maintain water quality, and distribute water to customers. Possible examples include residual disinfection, pumps, tanks, reservoirs, valves, pipes, and meters.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Storage and Distribution Facilities* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Hurricane	Click or tap here to enter text.
☐ Flood	Click or tap here to enter text.
☒ Earthquake	The District's system includes 323 miles of distribution pipeline, ranging in diameter from 4-inch to 42-inches in diameter. There are 3 operational reservoirs, 13 enclosed storage tanks, 7 booster pump stations, 6 emergency pumps, and 56 pressure reducing stations within the distribution system. **Distribution Pipelines:** Ground shaking and liquefaction from earthquakes can cause pipes to crack at brittle joints and sink into the liquefied ground potentially causing significant sudden water loss, flood damage to nearby structures, and the inability to deliver water to some customers. **Storage Facilities** Reservoir failure from an earthquake can cause loss of control of water supply and downstream flooding of nearby structures. There is one pre-stressed concrete tank, and the other 12 storage tanks are circular above-ground steel tanks. Some common earthquakes effects on above ground tanks are structural stability failure, water sloshing within the tank causing structural failure, sliding on the foundation, cracking or shearing of walls for concrete tanks, and elephant foot buckling for steel tanks.

Asset Category: *Storage and Distribution Facilities* **Examples of Assets in this Category:** Encompasses all infrastructure used to store water after treatment, maintain water quality, and distribute water to customers. Possible examples include residual disinfection, pumps, tanks, reservoirs, valves, pipes, and meters.	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Storage and Distribution Facilities* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☒ Earthquake	**Booster Pump Stations** There are seven booster PS facilities. The PS buildings are susceptible to structural damage from earthquakes, and the pump operations may be impacted by earthquake associated power outages. Liquefaction may occur, causing the entire facility and its assets, such as booster pumps, generators, and piping, to lose bearing strength and collapse from liquefaction of the soil underlying the structures. **Pressure Reducing Valves** The pressure regulating stations house one or more hydraulically actuated pressure reducing valves (PRV). In the event of an earthquake, the PRVs could crack or break, causing valve failure and localized flooding.
☐ Tornado	
☐ Ice storm	Click or tap here to enter text.
☐ Fire	Click or tap here to enter text.

Table 6b: Electronic, Computer, or Other Automated Systems (including the security of such systems) (Natural Hazards)

Asset Category: *Electronic, Computer, or Other Automated Systems (including the security of such systems)* **Examples of Assets in this Category:** Encompasses all treatment and distribution process control systems, business enterprise information technology (IT) and communications systems (other than financial), and the processes used to secure such systems. Possible examples include the sensors, controls, monitors and other interfaces, plus related IT hardware and software and communications, used to control water collection, treatment, and distribution. Also includes IT hardware, software, and communications used in business enterprise operations. The assessment must account for the security of these systems (e.g., cybersecurity, information security).	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Electronic, Computer, or Other Automated Systems (including the security of such systems)* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Hurricane	Click or tap here to enter text.
☐ Flood	Click or tap here to enter text.
☒ Earthquake	The District has one centralized SCADA system to control their distribution system. Earthquakes commonly cause power outages due to damage to power lines, transformers, and generators which could disrupt SCADA functionality.
☐ Tornado	Click or tap here to enter text.

Asset Category: *Electronic, Computer, or Other Automated Systems (including the security of such systems)* **Examples of Assets in this Category:** Encompasses all treatment and distribution process control systems, business enterprise information technology (IT) and communications systems (other than financial), and the processes used to secure such systems. Possible examples include the sensors, controls, monitors and other interfaces, plus related IT hardware and software and communications, used to control water collection, treatment, and distribution. Also includes IT hardware, software, and communications used in business enterprise operations. The assessment must account for the security of these systems (e.g., cybersecurity, information security).	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Electronic, Computer, or Other Automated Systems (including the security of such systems)* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Ice storm	Click or tap here to enter text.
☐ Fire	Click or tap here to enter text.
☐ Other(s), enter below: Click or tap here to enter text.	Click or tap here to enter text.

Table 10b: The Operation and Maintenance of the System (Natural Hazards)

Asset Category: *The Operation and Maintenance of the System* **Examples of Assets in this Category:** Encompasses critical processes required for operation and maintenance of the water system that are not captured under other asset categories. Possible examples include equipment, supplies, and key personnel. Assessments may focus on the risk to operations associated with dependency threats like loss of utilities (e.g., power outage), loss of suppliers (e.g., interruption in chemical delivery), and loss of key employees (e.g., disease outbreak or employee displacement).	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Operation and Maintenance of the System* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Hurricane	Click or tap here to enter text.
☐ Flood	Click or tap here to enter text.
☒ Earthquake	An earthquake may cause structural damage to the administrative and operational buildings, which may then impact internal and external system communications. The District has a customer service center and a water operations center. The District receives its power supply from San Diego Gas & Electric (SDG&E). The District is subject to any associated earthquake impacts to SDG&E's facilities in the District's service area.
☐ Tornado	Click or tap here to enter text.
☐ Ice storm	Click or tap here to enter text.

Asset Category: *The Operation and Maintenance of the System* **Examples of Assets in this Category:** Encompasses critical processes required for operation and maintenance of the water system that are not captured under other asset categories. Possible examples include equipment, supplies, and key personnel. Assessments may focus on the risk to operations associated with dependency threats like loss of utilities (e.g., power outage), loss of suppliers (e.g., interruption in chemical delivery), and loss of key employees (e.g., disease outbreak or employee displacement).	
Natural Hazards Select the natural hazards in the left column that pose a significant risk to this asset category at the CWS.	**Brief Description of Impacts** If you select a natural hazard in the left column as a significant risk to the *Operation and Maintenance of the System* asset category, briefly describe in the right column how the natural hazard could impact this asset category at the CWS. Include effects on major assets, water service, and public health as applicable.
☐ Fire	Click or tap here to enter text.
☐ Other(s), enter below: Click or tap here to enter text.	Click or tap here to enter text.

Table 11: Countermeasures (Optional)[1]

Countermeasures (optional) List countermeasures in the left column the CWS could potentially implement to reduce risk from the malevolent acts and natural hazards that were selected.	**Brief Description of Risk Reduction or Increased Resilience** For each countermeasure, in the right column, describe how the countermeasure could reduce risk or increase resilience for CWS assets from malevolent acts or natural hazards that were selected in the analysis. A countermeasure may reduce risk across multiple malevolent acts, natural hazards and asset categories.
1. Mitigate the threat of earthquakes to water system assets.	To mitigate the threat of earthquakes to District FCFs, reservoirs, storage tanks, distribution pipelines, booster pumps, emergency pumps, emergency connections, and other District buildings, the District should first consider conducting a complete structural assessment of the assets to seismically evaluate their performance if subjected to earthquakes of varying degrees. This evaluation can identify the "high risk" assets that should take priority for replacement or design retrofits in the future.
2. Operational Strategies to Improve Water System Resilience.	Given the District's dependence on a wholesaler, improving reliability and redundancy can help strengthen preparedness and reduce response times in case of earthquake impacts to the Water Authority or MWD systems. The District could consider identifying interconnectivity strategies between nearby systems, such as City of Oceanside, Carlsbad Municipal Water District, and Vista Irrigation District to maximize reliability and resiliency. Although Water Authority supplies are considered reliable, improved interconnection with other systems could help address an earthquake event that may impact some or all District FCFs. Another strategy involves enhancing or establishing clear earthquake event communication protocols and documenting emergency equipment and other resources in advance. The District should also consider identifying and updating lists of priority water customers (e.g., hospitals, dialysis clinics, schools) to develop a plan to restore water service to those customers first. Back-up supplies of water (bulk water delivery or bottled water supplies) should also be considered and documented in the ERP. Because earthquakes will impact multiple utilities simultaneously, it is also recommended that the District establish coordination with SDG&E now to establish better communication and response times immediately after an earthquake. Sharing information with the power utility regarding critical asset locations could help facilitate faster power recovery to priority assets. Locations of back-up generators and fuel reserves should be updated regularly and included with the ERP.

[1] IMPORTANT NOTE: The assessment does not require a specific number of countermeasures. You may have fewer than five countermeasures or add more countermeasures on a separate sheet.

Attachment B: Earthquake Incident Action Checklist

Incident Action Checklist – Earthquake

The actions in this checklist are divided up into three "rip & run" sections and are examples of activities that water and wastewater utilities can take to: prepare for, respond to and recover from an earthquake. For on-the-go convenience, you can also populate the "My Contacts" section with critical information that your utility may need during an incident.

Earthquake Impacts on Water and Wastewater Utilities

An earthquake is caused by the shifting of tectonic plates beneath the Earth's surface. Ground shaking from moving geologic plates collapses buildings and bridges, and sometimes triggers landslides, avalanches, flash floods, fires and tsunamis. The strong ground motion of earthquakes has the potential to cause a great deal of damage to drinking water and wastewater utilities, particularly since most utility components are constructed from inflexible materials (e.g., concrete, metal pipes). Earthquakes create many cascading and secondary impacts that may include, but are not limited to:

- Structural damage to facility infrastructure and equipment
- Water tank damage or collapse
- Water source transmission line realignment or damage
- Damage to distribution lines due to shifting ground and soil liquefaction, resulting in potential water loss, water service interruptions, low pressure, contamination and sinkholes and/or large pools of water throughout the service area
- Loss of power and communication infrastructure
- Restricted access to facilities due to debris and damage to roadways

FEMA

The following sections outline actions water and wastewater utilities can take to prepare for, respond to and recover from an earthquake.

Example of Water Sector Impacts and Response to an Earthquake

East Bay Municipal Utility District Mitigates Earthquake Impacts

Following the 1989 Loma Prieta earthquake, the East Bay Municipal Utility District (EBMUD) in Oakland, California, began developing a comprehensive seismic program to increase their ability to recover from earthquake impacts and reduce water and wastewater service interruptions. Taking a proactive approach, EBMUD was the first US water utility to comprehensively retrofit its service area facilities to address seismic weaknesses.

The utility began by assessing its entire water distribution network to determine areas of improvement. Upgrades included installation of flexible joints and hoses to minimize pipe ruptures and to facilitate rerouting of water around broken pipes. The utility also created alternative transmission routes for pipes that cross fault zones.

EBMUD did a great deal of work to reinforce aqueducts to make them more resilient to earthquake impacts, including strengthening levees at aqueduct crossings and pipe foundations at river crossings, reinforcing pipe joints on buried portions of pipe, and strengthening pipe support structures on elevated portions of the aqueduct. The utility is also designing aqueduct interconnections to create bypasses around damaged segments after a levee failure or earthquake. These bypasses allow the utility to continue providing service to customers while permanent repairs are being made.

Since 1989, EBMUD has invested more than $350 million in their seismic program, which has been primarily funded by bonds that are being repaid through a seismic surcharge on customers' water bill of just over one dollar per month for single-family residential homes.

Source: EBMUD's 2011 "Earthquake Readiness: Protecting Life Safety and Public Health."

My Contacts and Resources

CONTACT NAME	UTILITY/ORGANIZATION NAME	PHONE NUMBER
	Local EMA	
	State EMA	
	State Primacy Agency	
	WARN Chair	
	Power Utility	

Planning

- Incident monitoring:
  - USGS recent earthquake activity map (U.S. Geological Survey [USGS])
  - NOAA National Weather Service tsunami alerts (National Oceanic and Atmospheric Administration [NOAA])
- Earthquake Hazard Mitigation Handbook (Federal Emergency Management Agency [FEMA])
- Earthquake Hazards Program (USGS)
- Earthquake Shaking Maps and Information for California Residents (Association of Bay Area Governments)
- Recent Earthquakes: Implications for U.S. Water Utilities (Water Research Foundation)
- Planning for an Emergency Drinking Water Supply (EPA)
- All-Hazard Consequence Management Planning for the Water Sector (Water Sector Emergency Response Critical Infrastructure Partnership Advisory Council [CIPAC] Workgroup)
- Vulnerability Self Assessment Tool (VSAT) (EPA)
- Tabletop Exercise Tool for Water Systems: Emergency Preparedness, Response, and Climate Resiliency (EPA)
- How to Develop a Multi-Year Training and Exercise (T&E) Plan (EPA)
- Make a Plan (FEMA)

Coordination

- Water/Wastewater Agency Response Network (WARN) (EPA)
- Community Based Water Resiliency (EPA)

Facility and Service Area

- Oregon Earthquake Resiliency Plan (see Chapter 8: Water and Wastewater Systems) (Oregon Seismic Safety Policy Advisory Commission)
- Seismic Guidelines for Water Pipelines (American Lifelines Alliance)

Power, Energy and Fuel

- EPA Region 1 Water/Wastewater System Generator Preparedness Brochure (EPA)

Documentation and Reporting

- Federal Funding for Utilities In National Disasters (Fed FUNDS) (EPA)

Mitigation

- Earthquake Publications: Building Designers, Managers and Regulators (FEMA)
- IS-323: Earthquake Mitigation Basics for Mitigation Staff (FEMA)
- HAZUS: FEMA's Methodology for Estimating Potential Losses from Disasters (FEMA)
- Earthquake Hazard Mitigation for Utility Lifeline Systems (FEMA)

Actions to Prepare for an Earthquake

Planning

- [ ] Review and update your utility's emergency response plan (ERP), and ensure all emergency contacts are current.
- [ ] Conduct briefings, training and exercises to ensure utility staff is aware of all preparedness, response and recovery procedures.
- [ ] Identify priority water customers (e.g., hospitals), obtain their contact information, map their locations and develop a plan to restore those customers first.
- [ ] Develop an emergency drinking water supply plan and establish contacts (potentially through your local emergency management agency [EMA] or mutual aid network) to discuss procedures, which may include bulk water hauling, mobile treatment units or temporary supply lines, as well as storage and distribution.
- [ ] Conduct a hazard vulnerability analysis in which you review historical records to understand the past frequency and intensity of earthquakes and how your utility may have been impacted. Consider taking actions to mitigate seismic impacts to the utility, including those provided in the "Actions to Recover from an Earthquake: Mitigation" section.
- [ ] Complete pre-disaster activities to help apply for federal disaster funding (e.g., contact state/local officials with connections to funding, set up a system to document damage and costs, take photographs of the facility for comparison to post-damage photographs).

Coordination

- [ ] Join your state's Water/Wastewater Agency Response Network (WARN) or other local mutual aid network.
- [ ] Coordinate with WARN members and other neighboring utilities to discuss:
  - Outlining response activities, roles and responsibilities and mutual aid procedures (e.g., how to request and offer assistance)
  - Conducting joint tabletop or full-scale exercises
  - Obtaining resources and assistance, such as equipment, personnel, technical support or water
  - Establishing interconnections between systems and agreements with necessary approvals to activate this alternate source. Equipment, pumping rates and demand on the water sources need to be considered and addressed in the design and operations
  - Establishing communication protocols and equipment to reduce misunderstandings during the incident
- [ ] Coordinate with other key response partners, such as your local EMA, to discuss:
  - How restoring system operations may have higher priority than establishing an alternative water source
  - Potential points of distribution for the delivery of emergency water supply (e.g., bottled water) to the public, as well as who is responsible for distributing the water
- [ ] Understand how the local and utility emergency operations center (EOC) will be activated and what your utility may be called on to do, as well as how local emergency responders and the local EOC can support your utility during a response. If your utility has assets outside of the county EMA's jurisdiction, consider coordination or preparedness efforts that should be done in those areas.
- [ ] Ensure credentials to allow access will be valid during an incident by checking with local law enforcement.

Actions to Prepare for an Earthquake *(continued)*

Communication with Customers

- [ ] Develop outreach materials to provide your customers with information they will need after an earthquake (e.g., clarification about water advisories, instructions for private well and septic system maintenance and information about earthquake mitigation).
- [ ] Review public information protocols with local EMA and public health/primacy agencies. These protocols should include developing water advisory messages (e.g., boil water) and distributing them to customers using appropriate mechanisms, such as reverse 911.

Facility and Service Area

- [ ] Inventory and order extra equipment and supplies, as needed:
  - Motors
  - Fuses
  - Chemicals (ensure at least a two week supply)
  - Cellular phones or other wireless communications device
  - Emergency Supplies
    - Tarps/tape/rope
    - Cots/blankets
    - First aid kits
    - Foul weather gear
    - Plywood
    - Flashlights/flares
    - Sandbags (often, sand must be ordered as well)
    - Bottled water
    - Batteries
    - Non-perishable food
- [ ] Ensure communication equipment (e.g., radios, satellite phones) works and is fully charged.
- [ ] Develop a GIS map of all system components and prepare a list of coordinates for each facility.
- [ ] Document pumping requirements and storage capabilities, as well as critical treatment components and parameters.
- [ ] Establish a seismically hardened or offsite facility to store essential records and equipment.
- [ ] Inspect utility for structural stability and consider implementing actions to improve the utility's ability to withstand damage from earthquakes, such as:
  - Secure fixtures, shelves and equipment
  - Anchor or stabilize utility equipment to withstand earthquake forces and movements
  - Reinforce, secure or improve utility transmission lines and connections to withstand earthquake forces, soil movements and differential settlements
  - Anchor or improve tank structures to withstand earthquake forces and movements

Personnel

- [ ] Identify essential personnel and ensure they are trained to perform critical duties in an emergency (and possibly without communication), including the shut down and start up of the system.
- [ ] Establish communication procedures with essential and non-essential personnel. Ensure all personnel are familiar with emergency evacuation and shelter in place procedures.
- [ ] Pre-identify emergency operations and clean-up crews. Establish alternative transportation strategies if roads are impassable.

Actions to Prepare for an Earthquake *(continued)*

- [ ] Consider how evacuations or limited staffing due to transportation issues (potentially all utility personnel) will impact your response procedures.
- [ ] Identify possible staging areas for mutual aid crews if needed in the response, and the availability of local facilities to house the crews.
- [ ] Encourage personnel, especially those that may be on duty for extended periods of time, to develop family emergency plans.

Power, Energy and Fuel

- [ ] Evaluate condition of electrical panels to accept generators; inspect connections and switches.
- [ ] Document power requirements of the facility; options for doing this may include:
  - Placing a request with the US Army Corps of Engineers 249th Engineer Battalion (Prime Power): http://www.usace.army.mil/249thEngineerBattalion.aspx
  - Using the US Army Corps of Engineers on-line Emergency Power Facility Assessment Tool (EPFAT): http://epfat.swf.usace.army.mil/
- [ ] Confirm and document generator connection type, capacity load and fuel consumption. Test regularly, exercise under load and service backup generators.
- [ ] Contact fuel vendors and inform them of estimated fuel volumes needed if utility is impacted. Determine your ability to establish emergency contract provisions with vendors and your ability to transport fuel if re-fueling contractors are not available. Develop a backup fueling plan and a prioritization list of which generators to fuel in case of a fuel shortage.
- [ ] Collaborate with your local power provider and EOC to ensure that your water utility is on the critical facilities list for priority electrical power restoration, generators and emergency fuel.

FEMA

Notes:

Actions to Respond to an Earthquake

Planning

- [ ] For coastal communities with an increased risk for tsunami activity following an earthquake; review the Tsunami Incident Action Checklist for more information.

Coordination

- [ ] Notify your local EMA and state regulatory/primacy agency of system status.
- [ ] If needed, request or offer assistance (e.g., water buffalos, water sampling teams, generators) through mutual aid networks, such as WARN.
- [ ] Assign a representative of the utility to the incident command post or the community's EOC.

Communication with Customers

- [ ] Notify customers of any water advisories and consider collaborating with local media (television, radio, newspaper, etc.) to distribute the message. If emergency water is being supplied, provide information on the distribution locations.

Facility and Service Area

Overall

- [ ] Conduct damage assessments of the utility to prioritize repairs and other actions.
- [ ] Check that back-up equipment and facility systems, such as controls and pumps, are in working order, and ensure that chemical containers and feeders are intact.

Drinking Water Utilities

- [ ] Inspect the utility and service area for damage. Identify facility components (e.g., valve boxes) and fire hydrants that have been buried, are inaccessible or have been destroyed.
- [ ] Investigate drinking water wells for damage caused by liquefaction. This could result in the loss of storage for groundwater or ground subsidence.
- [ ] Ensure pressure is maintained throughout the system and isolate those sections where it is not.
- [ ] Isolate and control leaks in water transmission and distribution piping.
- [ ] Turn off water meters at destroyed homes and buildings.
- [ ] Monitor water quality, develop a sampling plan and adjust treatment as necessary.
- [ ] Notify regulatory/primacy agency if operations and/or water quality or quantity are affected.
- [ ] Utilize pre-established emergency connections or setup temporary connections to nearby communities, as needed. Alternatively, implement plans to draw emergency water from pre-determined tanks or hydrants. Notify employees of the activated sites.

Notes:

Actions to Respond to an Earthquake *(continued)*

Wastewater Utilities

- [ ] Inspect the utility and service area, including lift stations, for damage, downed trees, and power availability. Inspect the sewer system for debris and assess the operational status of the mechanical bar screen. If necessary, run system in manual operation.
- [ ] Notify regulatory/primacy agency of any changes to the operations or required testing parameters.

Documentation and Reporting

- [ ] Document all damage assessments, mutual aid requests, emergency repair work, equipment used, purchases made, staff hours worked and contractors used during the response to assist in requesting reimbursement and applying for federal disaster funds. When possible, take photographs of damage at each work site (with time and date stamp). Proper documentation is critical to requesting reimbursement.
- [ ] Work with your local EMA on the required paperwork for public assistance requests.

Personnel

- [ ] Account for all personnel and provide emergency care, if needed. Caution personnel about known hazards resulting from earthquakes.
- [ ] Deploy emergency operations and clean-up crews (e.g., securing heavy equipment). Identify key access points and roads for employees to enter the utility and critical infrastructure; coordinate the need for debris clearance with local emergency management or prioritize it for employee operations.

Power, Energy and Fuel

- [ ] Use backup generators, as needed, to supply power to system components.
- [ ] Monitor and plan for additional fuel needs in advance; coordinate fuel deliveries to the generators.
- [ ] Maintain contact with electric provider for power outage duration estimates.

Notes:

Actions to Recover from an Earthquake

Coordination

- [ ] Continue work with response partners to obtain funding, equipment, etc.

Communication with Customers

- [ ] Assign a utility representative to continue to communicate with customers concerning a timeline for recovery and other pertinent information.

Facility and Service Area

- [ ] Complete damage assessments.
- [ ] Complete permanent repairs, replace depleted supplies and return to normal service.

FEMA

Documentation and Reporting

- [ ] Compile damage assessment forms and cost documentation into a single report to facilitate the sharing of information and the completion of state and federal funding applications. Visit EPA's web-based tool, Federal Funding for Utilities—Water/Wastewater—in National Disasters (Fed FUNDS), for tailored information and application forms for various federal disaster funding programs: http://water.epa.gov/infrastructure/watersecurity/funding/fedfunds/
- [ ] Develop a lessons learned document and/or an after action report to keep a record of your response activities. Update your vulnerability assessment, ERP and contingency plans.
- [ ] Revise budget and asset management plans to address increased costs from response-related activities.

Mitigation

- [ ] Identify mitigation and long-term adaptation measures that can prevent damage and increase utility resilience. Consider impacts related to earthquakes when planning for system upgrades (e.g., replacing pipes, wellheads and water tanks to address seismic weaknesses).

Notes:

Appendix E: Notices of Public Hearings

1. UWMP Notices
2. WSCP Notices

RAINBOW
MUNICIPAL WATER DISTRICT
Committed to Excellence

March 24, 2021

NOTICE OF PREPARATION FOR PUBLIC HEARING

RMWD'S 2020 Urban Water Management Plan & Water Shortage Contingency Plan

Ms. Helen Robbins-Meyer
Chief Administrative Officer
County of San Diego
5560 Overland Ave, Suite 130
San Diego, CA 92123

Via Email

Dear Ms. Meyer,

This letter is to inform you that Rainbow Municipal Water District (RMWD) is updating its Urban Water Management Plan (UWMP) and preparing a Water Shortage Contingency Plan (WSCP). The plans are updated every five years pursuant to California Water Code Section 10610-10610.4. The UWMP addresses water supply reliability and management by RMWD for at least the next 20 years, and the WSCP address RMWD's contingency plan for potential water shortages.

California Water Code Section 10621 requires urban water suppliers to notify the cities and counties within the supplier's water service area that the supplier will be reviewing the plans and considering amendments or changes through a public hearing process. RMWD will hold public hearings for the UWMP and WSCP within 60 days or more from the date of this letter. The two public hearings may occur on the same day. RMWD's Board must adopt the WSCP and the updated UWMP prior to RMWD's submittal of both plans to the California Department of Water Resources by the July 1, 2021 deadline.

In accordance with California Water Code, RMWD will make its 2020 UWMP and 2020 WSCP available for public review prior to holding the public hearings. Information on where to review the plans and the time and date for the public hearings will be communicated to the cities, county, and the public in future notices.

Please feel free to contact Malik Tamimi, Engineering Project Manager, at (760) 728-1178 x173 or mtamimi@rainbowmwd.com if you have any questions or would like additional information.

Sincerely,

Tom Kennedy
General Manager
Rainbow Municipal Water District

CC Chad Williams, RMWD Engineering and CIP Program Manager
Malik Tamimi, RMWD Engineering Project Manager
Cheryl Dilks, Brown and Caldwell

RAINBOW
MUNICIPAL WATER DISTRICT
Committed to Excellence

March 24, 2021

NOTICE OF PREPARATION FOR PUBLIC HEARING

RMWD'S 2020 Urban Water Management Plan & Water Shortage Contingency Plan

Mr. Tim Bombardier **Via Email**
Principal Water Resources Specialist
San Diego County Water Authority
4677 Overland Ave
San Diego, CA 92123

Dear Mr. Bombardier,

This letter is to inform you that Rainbow Municipal Water District (RMWD) is updating its Urban Water Management Plan (UWMP) and preparing a Water Shortage Contingency Plan (WSCP). The plans are updated every five years pursuant to California Water Code Section 10610-10610.4. The UWMP addresses water supply reliability and management by RMWD for at least the next 20 years, and the WSCP address RMWD's contingency plan for potential water shortages.

California Water Code Section 10621 requires urban water suppliers to notify the cities and counties within the supplier's water service area that the supplier will be reviewing the plans and considering amendments or changes through a public hearing process. RMWD will hold public hearings for the UWMP and WSCP within 60 days or more from the date of this letter. The two public hearings may occur on the same day. RMWD's Board must adopt the WSCP and the updated UWMP prior to RMWD's submittal of both plans to the California Department of Water Resources by the July 1, 2021 deadline.

In accordance with California Water Code, RMWD will make its 2020 UWMP and 2020 WSCP available for public review prior to holding the public hearings. Information on where to review the plans and the time and date for the public hearings will be communicated to the cities, county, and the public in future notices.

Please feel free to contact Malik Tamimi, Engineering Project Manager, at (760) 728-1178 x173 or mtamimi@rainbowmwd.com if you have any questions or would like additional information.

Sincerely,

Tom Kennedy
General Manager
Rainbow Municipal Water District

CC Chad Williams, RMWD Engineering and CIP Program Manager
Malik Tamimi, RMWD Engineering Project Manager
Cheryl Dilks, Brown and Caldwell

RAINBOW
MUNICIPAL WATER DISTRICT
Committed to Excellence

March 24, 2021

NOTICE OF PREPARATION FOR PUBLIC HEARING

RMWD'S 2020 Urban Water Management Plan & Water Shortage Contingency Plan

Mr. Jack Bebee **Via Email**
General Manager
Fallbrook Public Utility District
990 E. Mission Rd
Fallbrook, CA 92028

Dear Mr. Bebee,

This letter is to inform you that Rainbow Municipal Water District (RMWD) is updating its Urban Water Management Plan (UWMP) and preparing a Water Shortage Contingency Plan (WSCP). The plans are updated every five years pursuant to California Water Code Section 10610-10610.4. The UWMP addresses water supply reliability and management by RMWD for at least the next 20 years, and the WSCP address RMWD's contingency plan for potential water shortages.

California Water Code Section 10621 requires urban water suppliers to notify the cities and counties within the supplier's water service area that the supplier will be reviewing the plans and considering amendments or changes through a public hearing process. RMWD will hold public hearings for the UWMP and WSCP within 60 days or more from the date of this letter. The two public hearings may occur on the same day. RMWD's Board must adopt the WSCP and the updated UWMP prior to RMWD's submittal of both plans to the California Department of Water Resources by the July 1, 2021 deadline.

In accordance with California Water Code, RMWD will make its 2020 UWMP and 2020 WSCP available for public review prior to holding the public hearings. Information on where to review the plans and the time and date for the public hearings will be communicated to the cities, county, and the public in future notices.

Please feel free to contact Malik Tamimi, Engineering Project Manager, at (760) 728-1178 x173 or mtamimi@rainbowmwd.com if you have any questions or would like additional information.

Sincerely,

Tom Kennedy
General Manager
Rainbow Municipal Water District

CC Chad Williams, RMWD Engineering and CIP Program Manager
Malik Tamimi, RMWD Engineering Project Manager
Cheryl Dilks, Brown and Caldwell

RAINBOW
MUNICIPAL WATER DISTRICT
Committed to Excellence

March 24, 2021

NOTICE OF PREPARATION FOR PUBLIC HEARING

RMWD'S 2020 Urban Water Management Plan & Water Shortage Contingency Plan

Ms. Deanna Lorson **Via Email**
City Manager
City of Oceanside
300 North Coast Hwy
Oceanside, CA 92054

Dear Ms. Lorson,

This letter is to inform you that Rainbow Municipal Water District (RMWD) is updating its Urban Water Management Plan (UWMP) and preparing a Water Shortage Contingency Plan (WSCP). The plans are updated every five years pursuant to California Water Code Section 10610-10610.4. The UWMP addresses water supply reliability and management by RMWD for at least the next 20 years, and the WSCP address RMWD's contingency plan for potential water shortages.

California Water Code Section 10621 requires urban water suppliers to notify the cities and counties within the supplier's water service area that the supplier will be reviewing the plans and considering amendments or changes through a public hearing process. RMWD will hold public hearings for the UWMP and WSCP within 60 days or more from the date of this letter. The two public hearings may occur on the same day. RMWD's Board must adopt the WSCP and the updated UWMP prior to RMWD's submittal of both plans to the California Department of Water Resources by the July 1, 2021 deadline.

In accordance with California Water Code, RMWD will make its 2020 UWMP and 2020 WSCP available for public review prior to holding the public hearings. Information on where to review the plans and the time and date for the public hearings will be communicated to the cities, county, and the public in future notices.

Please feel free to contact Malik Tamimi, Engineering Project Manager, at (760) 728-1178 x173 or mtamimi@rainbowmwd.com if you have any questions or would like additional information.

Sincerely,

Tom Kennedy
General Manager
Rainbow Municipal Water District

CC Chad Williams, RMWD Engineering and CIP Program Manager
Malik Tamimi, RMWD Engineering Project Manager
Cheryl Dilks, Brown and Caldwell

Appendix F: Adoption Resolutions

1. UWMP Adoption Resolution
2. WSCP Adoption Resolution

RESOLUTION NO. 21-11

RESOLUTION OF THE BOARD OF DIRECTORS OF THE RAINBOW MUNICIPAL WATER DISTRICT ADOPTING 2020 URBAN WATER MANAGEMENT PLAN

WHEREAS, the Urban Water Management Planning Act (Water Code section 10620 – 10645) requires every urban water supplier as defined in the act to prepare and adopt an urban water management plan and revise this plan at least once every five (5) years (Water Code 10621); and

WHEREAS, Rainbow Municipal Water District is an urban water supplier within the meaning of the act; and

WHEREAS, the District has prepared its 2020 Urban Water Management Plan, made the plan available for public inspection, and held a public hearing thereon following publication within the jurisdiction of the District of a notice of the time and place of the hearing pursuant to Section 6066 of the Government Code; and

WHEREAS, it is in the interest of the District to adopt a revised water management plan;

NOW THEREFORE BE IT RESOLVED DETERMINED AND ORDERED by the Board of Directors of the Rainbow Municipal Water District as follows:

1. That the URBAN WATER MANAGEMENT PLAN FOR RAINBOW MUNICIPAL WATER DISTRICT, a copy of which is on file with the District be approved and adopted as the plan required by the Urban Water Management Planning Act.

2. That the District shall implement its updated plan.

3. That District staff is authorized and directed to file with the Department of Water Resources of the State of California a copy of the District's updated plan by July 1, 2021.

PASSED AND ADOPTED at an adjourned regular meeting of the Board of Directors of the Rainbow Municipal Water District held on May 25, 2021 by the following vote, to wit:

AYES: Directors Hamilton, Mack, and Rindfleisch
NOES: None
ABSENT: Directors Gasca and Moss
ABSTAIN: None

C. H. Hamilton III
Hayden Hamilton, Board President

ATTEST:

Dawn Washburn, Board Secretary

RESOLUTION NO. 21-10

RESOLUTION OF THE BOARD OF DIRECTORS OF THE RAINBOW MUNICIPAL WATER DISTRICT ADOPTING 2020 WATER SHORTAGE CONTINGENCY PLAN

WHEREAS, the Urban Water Management Planning Act (Water Code section 10620 – 10645) requires every urban water supplier as defined in the act to prepare and adopt a Water Shortage Contingency Plan as part of its urban water management plan (Water Code section 10632); and

WHEREAS, Rainbow Municipal Water District is an urban water supplier within the meaning of the act; and

WHEREAS, the District has prepared its 2020 Water Shortage Contingency Plan, made the plan available for public inspection, and held a public hearing thereon following publication within the jurisdiction of the District of a notice of the time and place of the hearing pursuant to Section 6066 of the Government Code; and

WHEREAS, it is in the interest of the District to adopt a revised water shortage contingency plan;

NOW THEREFORE BE IT RESOLVED DETERMINED AND ORDERED by the Board of Directors of the Rainbow Municipal Water District as follows:

1. That the WATER SHORTAGE CONTINGENCY PLAN FOR RAINBOW MUNICIPAL WATER DISTRICT, a copy of which is on file with the District be approved and adopted as the plan required by the Urban Water Management Planning Act.

2. That the District shall implement its updated plan.

3. That District staff is authorized and directed to file with the Department of Water Resources of the State of California a copy of the District's updated plan by July 1, 2021.

PASSED AND ADOPTED at an adjourned regular meeting of the Board of Directors of the Rainbow Municipal Water District held on May 25, 2021 by the following vote, to wit:

AYES: Directors Hamilton, Mack, and Rindfleisch
NOES: None
ABSENT: Directors Gasca and Moss
ABSTAIN: None

C. H. Hamilton, III

Hayden Hamilton, Board President

ATTEST:

Dawn Washburn, Board Secretary