SPECIAL MEETING OF THE BOARD OF DIRECTORS
PICO WATER DISTRICT
4843 S. Church Street
Pico Rivera, California, 90660

5:30 PM Thursday, November 16, 2023

AGENDA

Any member of the public may attend this meeting in person or by accessing the Zoom link below. Any member of the public wishing to make any comments to the Board may do so through that Zoom link. The meeting Chair will acknowledge such individual(s) at the appropriate time in the meeting prior to making his or her comment. Members of the public wishing to make a comment are asked to state their name for the record and will be provided three (3) minutes to comment, the Board secretary will alert those commenting when they only have 30 seconds remaining. All members of the public will be disconnected from the Zoom link immediately before the Board of Directors adjourns into Closed Session.

Join Zoom Meeting

https://us06web.zoom.us/j/9521779948?pwd=dGNxcXh3YitEc2NIVVdrUzVvNm4rZz09

Join by Telephone: +1 669 900 6833

Meeting ID: 952 177 9948 Passcode: **421745**

1. ROLL CALL.

2. PLEDGE OF ALLEGIENCE.

3. INVOCATION.

4. **TIME RESERVED FOR PUBLIC COMMENTS**.

*Members of the public shall be allowed three minutes to address the Board on any matter on the agenda and/or within the jurisdiction of the District, which is not on the Agenda. All comments should be addressed to the presiding officer of the meeting. Additional public comments shall be allowed when a listed agenda item is being considered, but such comments made at that time must be confined to the subject that is being discussed at the time such comments are made. Members of the public are asked to state their name for the record. Due to all Board Meetings being run as Zoom Meetings all participants will be placed on mute at the start of the meeting and when the meeting is open for public comment the participant will be asked to raise their hand through the button on the video conference screen if participating by video conference or by pressing *9 on their phone if participating by teleconference.*

5. **ADOPTION OF AGENDA**.

6. **ACTION/DISCUSSION ITEMS.**

A. Consider Board Approval of 2023 Water Master Plan Historical Data (2011-2020); Presentation by Civiltec Engineering - *Recommended action – that Board Discussion and Approve*

B. Consider Board Approval of Proposed Financial Plan; Presentation by Water Resources Economics – *Recommended action – that Board Discussion and Approve*

7. **TIME RESERVED FOR DIRECTORS' COMMENTS.**

8. **ADJOURNMENT.**

AGENDA POSTED ON: November 14, 2023

Next regularly scheduled meeting: December 06, 2023

NOTE: To comply with the Americans with Disabilities Act, if you need special assistance to participate in any Board meeting, please contact the District office at (562) 692-3756 at least 48 hours prior to a Board meeting to inform the District of your needs and to determine if accommodation is feasible.

Materials related to an item on this agenda submitted after distribution of the agenda packet are available for public review at the District office, located at 4843 S. Church Street, Pico Rivera, California.

ACTION / DISCUSSION ITEMS

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PICO WATER DISTRICT

2023 WATER MASTER PLAN HISTORICAL DATA(2011-2020)

STAFF REPORT

To: Honorable Board of Directors

From: Joe D. Basulto, General Manager

Meeting Date: November 16, 2023

Subject: Consider Board Approval of 2023 Water Master Plan Historical Data (2011-2020); Presentation by Civiltec Engineering

Recommendation:

Board Approve

Fiscal Impact:

Preparation for the Pico Water Districts Projects

Background:

Presentation by Civiltec Engineering of the 2023 Water Master Plan, overview assessment of operations for the District to consider to maintain infrastructure

2021 Water Master Plan

October 2023

Prepared for Pico Water District
4843 S. Church Street
Pico Rivera, CA 90660
562.692.3756

Prepared By:

CIVILTEC
engineering inc.
WWW.CIVILTEC.COM

Table of Contents

List of Figures

List of Tables

Executive Summary

General Description

The previous Pico Water District (PWD or District) Water Master Plan (WMP) was prepared in 2008. A 2021 WMP update is being prepared in order to evaluate the water system and to assist in planning for the future. The study period for the 2021 PWD Water Master Plan (WMP) Update is from January 2011 through December 2020.

PWD was formed in 1926 and was formerly known as "Pico County Water District". PWD's water service area encompasses approximately 1,470 acres (2.3 square miles) of the central portion of the City of Pico Rivera. The District's Sphere of Influence (SOI) is located north of the Santa Ana Freeway, south of the Pomona Freeway, east of the Rio Hondo River, and west of the San Gabriel River.

The PWD water system utilizes a single pressure zone for the entire District. Ground elevations in the area range from 147 feet to 189 feet with HGLs between 320 to 324 feet.

Population

The population of the District's service area determine future water consumption and production demands. Per the District's 2020 Urban Water Management Plan (UWMP), the population within the District is summarized as shown in the table below. It is estimated that there is a projected annual growth rate of approximately 0.21% between the years 2020 and 2045.

"Current and Projected Population"

Year	2020	2025	2030	2035	2040	2045
Population	23,121	23,360	23,601	23,845	24,091	24,340

Land Use

Land use within a provider's service area greatly affects water demand. A GIS database that overlays the land use for PWD was obtained from the Southern California Association of Governments (SCAG). PWD's service area contains the following land use categories: single and multi-family residential, commercial and retail services, educational institutions, communication and public facilities, and open space and recreation.

Water Demand

Water demand in a service area is affected by both customer usage and water loss. Examples of water loss include water quality sampling, flushing, pumping to waste, hydrant testing, fire suppression, unmetered construction water, street cleaning water, leaks, reconciliation of inaccurate meters, unauthorized uses, pipe breaks, and undocumented maintenance. Water loss is the difference between water produced and water consumed.

In order to determine water demand, the District provided water consumption data based on the billed water usage through their billing system from 2016 to 2020 and annual reports from 2011 to 2020. Historical water demand from 2011 through 2020 has been compared to production water data.

The tables below compare the historical water demand from 2011 to 2020 to the water produced and its corresponding annual water losses in AFY and GPM respectively. The water demands shown in the tables below only represent the potable water demand.

"Existing Historical Water Production and Water Consumption Demand (AFY)"

Year	Water Production (AFY)	Water Demand (AFY)	Water Loss (AFY)	Water Loss (%)
2011	3,212	3,130	82	2.6%
2012	3,207	3,124	83	2.6%
2013	3,309	3,228	81	2.4%
2014	3,153	3,011	142	4.5%
2015	2,755	2,717	37	1.4%
2016	2,763	2,686	77	2.8%
2017	2,822	2,748	74	2.6%
2018	2,799	2,753	45	1.6%
2019	2,646	2,429	216	8.2%
2020	2,825	2,698	127	4.5%
Average	**2,949**	**2,853**	**97**	**3.3%**

"Existing Historical Water Production and Water Consumption Demand (GPM)"

Year	Water Production (GPM)	Water Demand (GPM)	Water Loss (GPM)	Water Loss (%)
2011	1,992	1,941	51	2.6%
2012	1,988	1,937	51	2.6%
2013	2,052	2,001	50	2.4%
2014	1,955	1,867	88	4.5%
2015	1,708	1,685	23	1.4%
2016	1,713	1,665	48	2.8%
2017	1,750	1,704	46	2.6%
2018	1,735	1,707	28	1.6%
2019	1,640	1,506	134	8.2%
2020	1,752	1,673	79	4.5%
Average	**1,828**	**1,769**	**60**	**3.3%**

Peaking Factors (PF) compare peak demand conditions to the annual average to summarize water demand fluctuation in a distribution system. The Peaking Factors consist of Average Daily Demand (ADD), Maximum Daily Demand (MDD), Minimum Daily Demand (Min Day), and Peak Hour Demand (PHD).

The ADD was calculated by taking the average of the net production values provided by PWD for each year accordingly. The average ADD over the 10-year period was calculated to be 1,828 gpm.

The maximum production value during the study period was determined using the daily production values provided by PWD. The maximum production value within the study period is 4,304 gpm and occurred on Saturday, June 1st, 2013. This value, however, is considered to be an outlier since the following highest production value is only 3,291 gpm (which occurred on June 8th, 2014). Excluding the outlier and using the second highest production value, the maximum day demand of 3,291 gpm provides a peaking factor of 1.80.

PHD could not be determined due to the absence of hourly data. Using the CA Code Industry Standard[1] of 1.5 times the peaking factor for MDD, the PHD peaking factor came out to be 2.70.

"System Demands and Peaking Factor"

Demand Type	Demands (MGD)	Demands (gpm)	Peaking Factor
Average Day Demand (ADD)	2.631	1,827	1.00
Maximum Day Demand (MDD)	4.739	3,291	1.80
Peak Hour Demand (PHD)	7.104	4,936	2.70
*Peak Hour Demand (PHD)**	*10.524*	*7,308*	*4.00*
**peaking factor for PHD was 4.0 according to previous 2008 WMP design criteria.*			

Water Supply and Quality

PWD supplies potable water solely through groundwater pumped from the Central Ground Water Basin (Central Basin). The District does not use imported water, surface water or stormwater to meet its domestic water demands. If necessary, PWD could purchase supplemental treated import water from Central Basin Municipal Water District (CBMWD), who is a member agency of the Metropolitan Water District of Southern California (MWD). Although this is an option to increase PWD's water supply portfolio, PWD prefers to lease additional groundwater rights from the Central Basin if needed. Recycled water is supplied by the Los Angeles County Sanitation District (LACSD) through CBMWD and is used for landscape irrigation in the District's service area.

Groundwater production in Central Basin is restricted to adjudicated rights fixed by the Central Basin Judgement and managed by the court-appointed Watermaster, the California Department of Water Resources (DWR). The Central Basin was adjudicated in 1966 and the District was given an Allowed Pumping Allocation (APA) of 3,624 acre-ft per year (AFY). Member agencies of the Central Basin can also pump up to 20 percent more of its annual APA, provided that the over-extraction is made up the following year. The District's APA plus 20 percent carry-over rights combined equal 4,349 AFY.

Per- and poly-fluoroalkyl substances (PFAS) is the collective term for a group of chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Well monitoring has shown that currently all active production wells meet all state and federal water quality requirements aside from PFAS requirements. Some contaminants

[1] California Regulations Related to Drinking Water, Section 64554, Title 22 Code of Regulations.

are at or are more than half of the maximum level of a contaminant (MCL) and should be monitored so that they do not exceed the MCL.

Well No. 5A, 8 and 11 are either at or exceeded the response level (RL) for PFOA. The other two wells, No. 4A and 10, were below the NL and RL for PFOA and PFOS. As of 2021, a water treatment system designed to lower or eliminate the concentration of PFAS in groundwater pumped from wells was in the design phase. In January 2021, a Technical Memorandum (Tech Memo) by AKM Consulting Engineers acknowledged that Ion Exchange with PFAS selective resin would be the most preferable treatment technology.

The table below shows all the well contaminant levels extracted from the latest sampling. Only wells which have been active during the study period are shown. An "X" signifies the contaminant being at the MCL. An "O" signifies the contaminant being greater than or equal to 50% of the MCL. A blank cell means that the contaminant of that well is lower than 50% of the MCL. A "*" indicates that there was no sampling data during the study period.

"Well Contaminant Levels as of Last Sampling"

Contaminant Name	Well No. 2	Well No. 4A	Well No. 5A	Well No. 8	Well No. 9A	Well No. 10	Well No. 11
Specific Conductance	O	O	O		*	O	O
Total Dissolved Solids	O	O	O		*	O	O
Antimony	X	X	X	X	*	X	X
Cyanide	O	O	O	O	*	O	O
Mercury	O	O	O	O	*	O	O
Perchlorate	O	O	O	O	*	O	O
Thallium	O	O	O	O	*	O	O
1,1,2,2-Tetrachloroethane	O	O	O	O	*	O	O
1,2-Dichloroethane	X	X	X	X	*	X	X
1,3-Dichloropropene (Total)	X	X	X	X	*	X	X
Benzene	O	O	O	O	*	O	O
Carbon Tetrachloride	X	X	X	X	*	X	X
Vinyl Chloride	X	X	X	X	*	X	X
1,2,3-Trichloropropane	*	X	X	X	*	X	X
Di(2-ethylhexyl)phthalate	O	O	O	O	*	O	O

The table below shows all the PFAS contaminants as of the last sampling which are greater than or equal to the RL or greater than or equal to 50% of the RL. An "X" signifies the contaminant being greater than or equal to the RL. An "O" signifies the contaminant being greater than or equal to 50% of the RL. A blank cell means that the PFAS contaminant of that well is neither greater than or equal to the RL nor greater than or equal to 50% of the RL. A "*" indicates that there was no sampling data during the study period. There are no testing results for Well No. 2 as the well has been abandoned since 2018 and testing for PFAS only began in recent years. Similarly, Well No. 9A has no testing samples done for PFAS contaminants since it was abandoned in 2019.

"Well PFAS Contaminant Levels as of Last Sampling"

PFAS Name	Well No. 2	Well No. 4A	Well No. 5A	Well No. 8	Well No. 9A	Well No. 10	Well No. 11
Perfluorooctanoic acid (PFOA)	*	O	X	X	*	O	X
Perfluorooctanesulfonic acid (PFOS)	*		O		*	O	O

Well Nos. 4A, 5A, 8, and 10 are disinfected with sodium hypochlorite and Well No. 11 is disinfected with calcium hypochlorite. Treatment options should be considered for the contaminants which are currently at the MCL. These contaminants are antimony, 1,2-dichloroethane, 1,3-dichloropropene (total), carbon tetrachloride, vinyl chloride, and 1,2,3-Trichloropropane. Treatment methods approved by the EPA for removing antimony include Coagulation/filtration and Reverse Osmosis, however only Reverse Osmosis is recommended due to cost and space concerns. It is recommended that GAC treatment be used for 1,2-dichloroethane, 1,3-dichloropropene (total), carbon tetrachloride, vinyl chloride, and 1,2,3-Trichloropropane. Although perchlorate is not at the MCL, it is more than 50% of the MCL and is a contaminant of serious concern. Options to decrease its concentration should be considered. It is recommended to consider Ion Exchange treatment with a Strong Base Anion (SBA) resin. Zone isolation testing is recommended to be performed before implementing any treatment for contaminants.

Current Infrastructure

In order to meet customer water demand, the District has the following infrastructure:

- 58.9 miles of pipeline ranging from 2 to 16 inches in diameter
- 5,482 active metered service connections
- Five active wells
- One inactive well
- One abandoned well and three destroyed wells
- Four sodium hypochlorite disinfection stations and one calcium hypochlorite disinfection station
- One active emergency interconnection with City of Pico Rivera
- One 1.25 million gallon (MG) concrete storage reservoir (Cate Reservoir)
- One booster pump station with three operating booster pumps
- Total of 485 active fire hydrants; 339 active 6-inch fire hydrants and 146 active 4-inch wharf head hydrants, and
- One pressure zone with HGLs ranging between 320 feet and 324 feet

Analysis Results

The distribution system's performance, capacity, and all facilities were evaluated against the District's design criteria in Chapter 5. These criteria helped evaluate a replacement schedule for components and acts as a guide to develop infrastructure recommendations to meet future conditions.

Infrastructure Recommendations

- Buy and maintain one permanent generator at the Cate Reservoir Site (see Section 7.3.2)

Cyclical Replacement Recommendations

Over the next ten years, the following numbers of items should be scheduled for replacement based on their life cycles:

- 30,305 feet of pipe replacement (see Section 7.2.1)
- 2 pump replacements (see Section7.2.2)
- 2 well casing rehabilitation (see Section 7.2.3)
- 2,741 water meter replacements (see Section 7.2.5)
- Additional SCADA equipment/upgrades (see Section 7.2.6)

Capital Improvements Program

The Capital Improvement Program (CIP) is a set of projects recommended to be implemented within future years to meet existing deficiencies in the District's water system. Priority for projects are provided but is meant for the purposes of assisting with scheduling and implementation rather than being a rigid deadline. It is recommended to corroborate current conditions in the field with operations prior to implementation of these recommendations.

Individual projects are given relative priority based on perceived urgency. The capital projects and their associated costs are shown in the table below as well as Table 7-9 in the WMP. More detailed justification, description and cost for the pipeline CIPs are provided as Appendix 6.

"Capital Projects Costs"

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	High	Bartolo Ave Pipe Improvement	$416,000	$31,200	$31,200	$83,200	$561,600
	High	Paramount Blvd Pipe Improvement	$216,125	$16,210	$16,210	$43,225	$291,770
	High	De Land Ave & Lindsey Ave Pipe Improvement	$386,750	$29,010	$29,010	$77,350	$522,120

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	High	West Blvd & Tobias Ave Pipe Improvement	$333,125	$24,985	$24,985	$66,625	$449,720
	High	West Blvd (Speedway St) Pipe Improvement	$245,375	$18,405	$18,405	$49,075	$331,260
	High	Walnut Ave & Olympic Blvd Pipe Improvement	$890,500	$66,790	$66,790	$178,100	$1,202,180
	Med	Bradhurst St Pipe Improvement	$328,250	$24,620	$24,620	$65,650	$443,140
	Med	Loch Avon Dr, Townley Dr, Bexley Dr, Havenwood St, Loch Lomond Dr, Glencannon D Pipe Improvements	$2,089,750	$156,735	$156,735	$417,950	$2,821,170
	Med	Layman Ave Pipe Improvement	$143,000	$10,725	$10,725	$28,600	$193,050
	Med	Walnut Ave & Union Street Pipe Improvement	$313,625	$23,525	$23,525	$62,725	$423,400
	Med	Beverly Rd Pipe Improvement	$503,750	$37,785	$37,785	$100,750	$680,070
	Med	Crossway Dr & Carron Dr Pipe Improvement	$638,625	$47,900	$47,900	$127,725	$862,150
	Med	Rosemead Blvd Pipe Improvement	$76,375	$5,730	$5,730	$15,275	$103,110
	Med	Fishman Rd Pipe Improvement	$50,375	$3,780	$3,780	$10,075	$68,010
	Med	Loch Alene Ave, Lochinvar, and Bonnie Vale Pl Pipe Improvement	$596,375	$44,730	$44,730	$119,275	$805,110
	Med	Citronell Ave & Lindsey Ave Pipe Improvement	$442,000	$33,150	$33,150	$88,400	$596,700
	Med	Rosemead Blvd (Coffman Pico Rd) Pipe Improvement	$89,375	$6,705	$6,705	$17,875	$120,660
	Med	Olympic Blvd/Way & Beverly Rd Pipe Improvement	$497,250	$37,295	$37,295	$99,450	$671,290
	Med	Acacia Ave Pipe Improvement	$237,250	$17,795	$17,795	$47,450	$320,290

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	Med	Durfee Ave Pipe Improvement	$141,375	$10,605	$10,605	$28,275	$190,860
	Low	Call St & Lemoran Ave Pipe Improvement	$235,625	$17,675	$17,675	$47,125	$318,100
	Low	Whittier Blvd Pipe Improvement	$118,625	$8,900	$8,900	$23,725	$160,150
	Low	Rosemead Blvd (Red Rd) Pipe Improvement	$186,875	$14,020	$14,020	$37,375	$252,290
	Low	Haney St Pipe Improvement	$482,625	$36,200	$36,200	$96,525	$651,550
	Low	Beverly Blvd N Frontage Rd Pipe Improvement	$211,250	$15,845	$15,845	$42,250	$285,190
	Low	Rosemead Blvd (Bexley Dr) Pipe Improvement	$37,375	$2,805	$2,805	$7,475	$50,460
	Low	Loch Alene Ave Pipe Improvement	$729,925	$54,745	$54,745	$145,985	$985,400
	Low	Washington Blvd Pipe Improvement	$222,625	$16,700	$16,700	$44,525	$300,550
	Low	Rosemead Blvd (Danbridge St) Pipe Improvement	$26,000	$1,950	$1,950	$5,200	$35,100
Pump	Med	2 Pump Replacement	$200,000	NA*	NA*	$40,000	$240,000
	Med	VFD Conversion	$835,000	NA*	NA*	$167,000	$1,002,000
Well	High	2 Well Refurbishing/ Replacing	$600,000	$45,000	$45,000	$120,000	$810,000
	Med	Well Replacement (Well No.2)	$5,185,185	$388,889	$388,889	$1,037,037	$7,000,000
Inter-connections	Med	1 Interconnect	$555,555	$41,670	$41,670	$111,115	$750,010
	Med	1 Interconnect	$555,555	$41,670	$41,670	$111,115	$750,010
Generator	Med	1 Permanent Generator	$250,000	NA*	NA*	$50,000	$300,000
						Total Cost	**$25,548,470**

* = no cost needed for the improvement

Chapter 1 - Introduction

1.1 General Description

Pico Water District (PWD or District) was formed in 1926 and was formerly known as "Pico County Water District". PWD's water service area encompasses approximately 1,470 acres (2.3 square miles) of the central portion of the City of Pico Rivera. The customers of the District are all located within the City of Pico Rivera. The remainder of the city that is not within the District's service area is serviced by either Pico Rivera Water Authority (PRWA) or the San Gabriel Valley Water Company. The previous WMP was completed in 2008 and the District wishes to update its WMP to continue its efforts of improving its infrastructure.

1.2 Study Area

A sphere of influence (SOI) is the District's legal description of the probable physical boundaries and service area of a local agency, as regulated by the Local Agency Formation Commission (LAFCo) at the county level. The District's SOI boundary is located north of the Santa Ana Freeway, south of the Pomona Freeway, east of the Rio Hondo River, and west of the San Gabriel River. PWD's service area contains the following land use categories: single and multi-family residential, commercial and retail services, educational institutions, communication and public facilities, and open space and recreation. The District's SOI and Land Use are discussed in greater detail in Chapter 4.

1.3 Study Period

The study period for the 2021 PWD Water Master Plan (WMP) Update is from January 2011 through December 2020. The year 2013 was the highest water consumption year for the system hence the demands programmed into the hydraulic model will be for the year 2013.

1.4 Abbreviations

Following is a list of commonly used abbreviations that may be found in this WMP.

Table 1-1 "Common Abbreviations"

Abbreviation	Description
µg	Microgram
µS/cm	Microsiemens per centimeter
1,2,3 - TCP	1,2,3-Trichloropropane
AC	Acre
ACP	Asbestos Cement Pipe
ADD	Average Day Demand
AF	Acre-Feet
AFY	Acre-Feet Per Year
APA	Allowed Pumping Allocation
AWWA	American Water Works Association
BPS	Booster Pump Station
CBMWD	Central Basin Municipal Water District

Abbreviation	Description
CCR	California Code of Regulations
cfs	Cubic Feet Per Second
CII	Commercial, Institutional and Industrial
CIP	Capital Improvements Program
CIP	Cast Iron Pipe
Civiltec	Civiltec Engineering, Inc.
COMM	Commercial
COP	Copper
DDW	State Water Resources Control Board, Division of Drinking Water
DEM	Digital Elevation Models
DIP	Ductile Iron Pipe
District	Pico Water District
DU	Dwelling Units
DWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
FF	Fire Flow
fps	Feet Per Second
GIS	Geographic Information System
GPCD	Gallons Per Capita Per Day
gpm	Gallons Per Minute
HCF	Hundred Cubic-Feet
HGL	Hydraulic Grade Line
HP	Horsepower
IND	Industrial
INSTIT	Institutions
LACSD	Los Angeles County Sanitation District
LAFCo	Local Agency Formation Commission
LCR	Lead and Copper Rule
LPA	Local Primary Agency
LU	Land Use/Usage
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
MFR	Multi-Family Residential
MG	Million Gallons
mg/l	Milligrams Per Liter
MGD	Million Gallons Per Day
MH	Mobile Homes
MSL	Mean Sea Level
MTBE	Methyl Tertiary-Butyl Ether
MWD	Metropolitan Water District of Southern California
MWSE	Maximum Water Surface Elevation
NFPA	National Fire Protection Association
NL	Notification Level
OAL	Office of Administrative Law
OEHHA	California's EPA Office of Environmental Health Hazard Assessment
OSY	Operating Safe Yield
OU	Operable Unit
PF	Peaking Factors
PFAS	Per- and Poly-fluoroalkyl Substances

Abbreviation	Description
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PHD	Peak Hour Demand
POE	Point of Entry
POU	Point of Use
PPB	Parts Per Billion
PPT	Parts per trillion
PRV	Pressure Reducing Valve
PRWA	Pico River Water Authority
psi	Pounds Per Square Inch
PVC	Polyvinyl Chloride
PWD	Pico Water District
RFI	Request for Information
RL	Response Level
SBA	Strong Base Anion
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SDWA	Safe Drinking Water Act
SFR	Single Family Residential
SOI	Sphere of Influence
STL	Steel
SWP	State Water Project
TDH	Total Dynamic Head
TDS	Total Dissolved Solids
UNK	Unknown
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
VFD	Variable Frequency Drive
WMP	Water Master Plan
WRD	Water Replenishment District of Southern California
µg	Microgram
µS/cm	Microsiemens per centimeter

1.5 Acknowledgments

We, at ***Civiltec.***, would like to express our appreciation for the cooperation and valuable assistance of the Pico Water District management and staff. In particular, the efforts of the following individuals proved to be invaluable:

- Joe Basulto – General Manager
- Matthew Tryon – Director of Operations
- Henry Barrientos – Production Supervisor

Chapter 2 - Existing Facilities

2.1 General Description

The Pico Water District (PWD) water system is comprised of:

- One 1.25 million gallon (MG) concrete storage reservoir (Cate Reservoir)
- One booster pump station with three operating booster pumps
- Five active groundwater supply wells and one inactive ground water supply well
- 58.9 miles of pipelines ranging from 2 to 16 inches in diameter
- 5,482 active metered service connections
- Total of 485 active fire hydrants; 339 active 6-inch fire hydrants and 146 active 4-inch wharf head hydrants, and
- One pressure zone with HGLs ranging between 320 feet and 324 feet

The PWD water system utilizes a single pressure zone for the entire District. Ground elevations in the area range from 147 feet to 189 feet with HGLs between 320 to 324 feet. The existing system facilities consist of the Cate Reservoir, its three booster pumps, five active groundwater supply wells, four sodium hypochlorite disinfection stations and one calcium hypochlorite disinfection station. Due to the District's interconnected configuration, there is only one pressure zone within its service area and no pressure reducing stations are utilized.

2.2 Water Supply System Facilities

The PWD's water supply comes solely from groundwater. Groundwater is pumped from the Central Basin, a large alluvial groundwater basin found beneath the southeastern portion of the Los Angeles Coastal Plain. PWD is one of 29 water agencies with granted rights to extract groundwater from the Central Basin. The Watermaster is the California Department of Water Resources (DWR). The Water Replenishment District of Southern California is tasked with overseeing Central Basin's groundwater replenishment activities. It is primarily replenished from snowmelt in the Sierra Mountains and precipitation.

In 1966, the Central Basin was adjudicated and the District was allocated an annual pumping right of 3,624 AFY. This annual pumping right remains the same to this day. As of the calendar year 2020, the District has remained between 11 to 27 percent below its allowed annual pumping rights according to historical production data.

PWD's service area covers approximately 2.87 square miles of Pico Rivera (32% of the city's square mileage).

2.2.1 Groundwater Wells

The District currently has five active groundwater supply wells (4A, 5A, 8, 10, and 11), one inactive groundwater supply well (7), and one abandoned well (6). Wells No.1, 2, and 9A have been destroyed. The District's active wells range from ages 3 to 96 years old. The newest groundwater supply well, Well No.11, was drilled in 2018, began supplying water to the District in September 2020, and is the District's largest producer.

PWD's most recent inactive groundwater supply well, Well No.7, has been inactive since early 2012.

The active groundwater wells supply the District with a total maximum capacity of approximately 8,450 gpm (shown in Table 2-1 "Active Groundwater Well Summary"). PWD's inactive wells are shown in Table 2-2 and their abandoned wells are shown in Table 2-3.

Table 2-1 "Active Groundwater Well Summary"

Well No.	Year Drilled	Depth (ft)	Casing Diam.	Motor (HP)	Capacity (gpm)	Estimated Surface Elevation (ft)	Bowl Depth (ft)
4A	1983	420	18	125	1,050	176	157
5A	1983	917	18	150	1,600	163	248
8	1955	432	16	150	1,200	161	250
10	1925	500	24	150	1,200	186	168
11	2018	1040	20	300	3,000	165	318

Table 2-2 "Inactive Groundwater Well Summary"

Well No.	Year Drilled	Out of Service Year	Depth (ft)	Casing Diam. (in)	Shutdown Reasoning
7	1952	2012	405	16	Low Water Levels

Table 2-3 "Abandoned Groundwater Well Summary"

Well No.	Year Drilled	Out of Service Year	Status	Depth (ft)	Casing Diam. (in)	Shutdown Reasoning
6	1930	1979	Abandoned	293	12	No longer useful as a municipal-supply water

Table 2-4 "Destroyed Groundwater Well Summary"

Well No.	Year Drilled	Out of Service Year	Status	Depth (ft)	Casing Diam. (in)	Shutdown Reasoning
1	1927	2015	Destroyed	435	12	Standby well requested by State Department of Health Services.
2	1929	2018	Destroyed	410	14	Low Water Level
9A	1987	2019	Destroyed	1080	18	Iron concentrations consistently exceeded CDPH MCL

2.2.2 Cate Reservoir

The Cate Reservoir, named after one of the District's first directors (Harlan A. Cate), is a circular, mostly-buried, concrete reservoir built in 1959. It has a diameter of 86'-4", with a tank height of 30 feet. Due to a seismic study conducted in 2017, the maximum water depth for the reservoir is 23 feet, the operational capacity is approximately 1.01 MG, about 81 percent of its volumetric capacity. The Cate Reservoir is located in the southwest corner of the intersection of Lexington Road and Railton Street. Properties of the Cate Reservoir are shown in Table 2-5.

Table 2-5 "Cate Reservoir Summary"

	Base Elevation (ft)	HWL Elevation (ft)	Diameter (ft-in)	Depth (ft)	Geometry	Operational Capacity (MG)	Usable Capacity (MG)
Cate Reservoir	159	182	86-4	23	Circular	1.01	1.25

2.2.3 Cate Booster Pump Station

PWD has only one booster pump station in its water system. The booster pump station is used in combination with the District's groundwater wells to provide adequate flows to supply the District. The station consists of three booster pumps (1, 2, and 3) that are all installed on top of the Cate Reservoir. Electric motors operate each of the three pumps. These motors can operate separately or together in parallel. The attributes of the pumps and their motors are shown in Table 2-6.

Table 2-6 "Cate Reservoir Booster Pumps Summary"

Booster Pump No.	HP	Overall Plant Efficiency (%)	Capacity (gpm)	Total Head (ft)
1	40	59	960	150
2	25	73.1	500	115
3	40	73.2	1,050	148

2.2.4 Imported Water

PWD currently does not have any imported water connections with any local water agencies. Though the CBMWD purchases imported surface water from MWD, the District does not currently have a plan to connect to CBMWD's treated surface water interconnections in order to gain access to imported water. The closest feeder that would enable PWD to import water from CBMWD is approximately two miles west of the District.

CBMWD member agencies in the vicinity of the District receive imported water from the Weymouth Filtration Plant and/or the Jensen Filtration Plant. The Weymouth Filtration Plant is located in the City of La Verne and primarily treats Colorado River water along with some State Water Project (SWP) water. The Jensen Filtration Plant, which is located in Granada Hills in the San Fernando Valley, receives only SWP water with no water received from the Colorado River.

Although imported water would be possible to supplement the District's groundwater supply as well as provide an emergency backup water supply, it would not be feasible or reasonable for PWD and its customers. The District would like to remain an inter-looped system and continue to be 100% supplied by groundwater.

2.2.5 Emergency Interconnections

PWD currently has an emergency interconnection with the City of Pico Rivera to serve as a short-term emergency water supply shown in Table 2-7. The emergency interconnection is a one-way connection to receive water from the City of Pico Rivera. This interconnection is used during critical circumstances where the District is temporarily unable to produce a sufficient water supply to meet its water demands and/or fire protection requirements.

This emergency interconnection is supplied by the City of Pico Rivera's 10-inch water main, which feeds the 8-inch interconnection. The interconnection then discharges into the District's 12-inch water main to feed the distribution system if needed. The HGL of this emergency interconnection is not known. However, it is designed to flow in one direction from the City of Pico Rivera into PWD.

Table 2-7 "Emergency Interconnections"

Connection	Source	Size (in)	Capacity (gpm)
One-Way, Located near San Gabriel River Parkway and Beverly Boulevard	City of Pico Rivera	8	Never tested, estimated 500 to 1,000

2.3 System Operation

PWD's water supply system operates using pressure and flow set points registered in the SCADA system.

2.3.1 Pressure Set Points

All active wells and booster pumps in the system start when sensing low pressure set points. Active wells 5A, 8, 10, and 11 operate using variable frequency/speed drives that shut off the wells at high pressure set points. Low Flow GPM and active well 4A is driven by a constant-speed electric motor that is set to open at the pressure set point of 35 psi and shut off at the pressure set point of 78 psi. Table 2-8 contains all set points as provided by PWD's production operator. Although these are the typical set points for the listed facilities below, they could be manually adjusted by the District's operator if needed. The water model is programmed to operate a steady state scenario under the set points listed below.

Table 2-8 "Typical Set Points for Facilities"

Facility	Open Set Point (psi)	Shut Off Set Point (psi)	VFD Operated?	VFD Set Point (psi)
BP 1	55	70	No	NA
BP 2	45	68	No	NA
BP 3	40	74	No	NA
PRV	90	90	N/A	NA

Facility	Open Set Point (psi)	Shut Off Set Point (psi)	VFD Operated?	VFD Set Point (psi)
Well 4A	35	78	No	NA
Well 5A	64	80	Yes	70
Well 8	54	74	Yes	65
Well 10	45	76	Yes	65
Well 11	40	88	Yes	70

2.3.2 System Pressure

PWD maintains system pressure by the wells and booster pump station which range between 62 to 75 psi. The Cate Reservoir's high-water line does not operate as the HGL of the system but rather the HGL is set by the wells and booster pump station. Water typically fills the reservoir at night through a control valve on the inlet line of the reservoir. The control valve opens when the reservoir water level is 10-12 feet high and closes at 22 or 23 feet high.

2.4 Distribution System

The PWD water system is composed of both transmission and distribution pipelines that transport potable water extracted from the Central Basin through its wells to individual customers. The water system has approximately 58.9 miles of active pipelines ranging between 2 to 16 inches in diameter.

2.4.1 Transmission Pipelines

Transmission pipelines are used to transport large quantities of water from its source to facilities or between facilities. The District's transmissions pipelines are typically pipes that are larger than 12-inches and are composed mostly of AC, DIP, or PVC.

2.4.1 Distribution Pipelines

Distribution pipelines supply water to the community and fire hydrants within the District's pressure zone. The system supports 5,482 active metered service connections and 495 fire hydrants within the District. According to the water model database, the PWD distribution system has approximately 264,305 linear feet (LF) or 50.1 miles of pipeline. For a summary of pipeline sizes and material, see Table 2-9.

Common pipeline sizes in the water system are 4-inch, 6-inch and 8-inch. These pipeline sizes make up approximately 76 percent of the pipelines within the system. Asbestos cement pipe (ACP) is the most common pipeline material in this distribution system. Approximately 66 percent of the pipelines within the system are ACP. In addition, the PWD system contains approximately 5,775 LF of 12-inch and 30-inch recycled water mains, which are not included in Table 2-9.

Table 2-9 "Pipeline Summary by Material"

Size (in)	ACP (ft)	CIP (ft)	DIP (ft)	COP (ft)	PVC (ft)	STL (ft)	UNK (ft)	Total (ft)	Total (%)
2	-	-	-	-	-	1,088	-	1,088	0.3%

Size (in)	ACP (ft)	CIP (ft)	DIP (ft)	COP (ft)	PVC (ft)	STL (ft)	UNK (ft)	Total (ft)	Total (%)
2.5	-	-	-	-	-	87	-	87	0.0%
4	35,090	6,030	-	1,484	64	622	-	43,290	13.6%
6	80,507	2,983	-	2,401	4,131	3,206	388	93,615	29.4%
8	70,899	5,292	144	17,201	9,605	3,507	993	107,642	33.8%
10	3,602	1,009	-	1,028	-	-	-	5,639	1.8%
12	10,185	139	-	7,116	28,043	-	160	45,643	14.3%
14	9,986	-	-	1,213	-	-	-	11,199	3.5%
16	309	-	-	9,524	-	-	168	10,001	3.1%
Total (ft)	**210,577**	**15,453**	**144**	**39,968**	**41,844**	**8,510**	**1,709**	**318,204**	**100.0%**
Total (mi)	**39.88**	**2.93**	**0.03**	**7.57**	**7.92**	**1.61**	**0.32**	**60.27**	**-**
% of Material in Overall Distribution Water System	**66.2%**	**4.9%**	**0.0%**	**12.6%**	**13.2%**	**2.7%**	**0.5%**	**100%**	**-**

Chapter 3 - Water Supply

3.1 General Description

Pico Water District (District) supplies water to its customers through several production wells. Groundwater pumped from the Central Ground Water Basin (Central Basin) accounts for all the potable water supplied to customers in the District. The District does not use imported water, surface water or stormwater to meet its domestic water demands. Recycled water supplied by the Los Angeles County Sanitation District (LACSD) through the Central Basin Municipal Water District (CBMWD) is used for landscape irrigation in the District's service area.

The public agencies responsible for forming and implementing drinking water safety regulations for the District are the United States Environmental Protection Agency (EPA) and the California Division of Drinking Water (DDW) of the California State Water Resources Control Board (SWRCB). These Federal and State agencies have established standards that limit contaminant concentrations for drinking water in order to protect the health of the public. Some of the key regulations that were passed by these agencies include the Safe Drinking Water Act (SDWA), Title 22 California Code of Regulations, and Assembly Bill 756.

The District regularly tests and monitors the groundwater produced from its wells to ensure the safety of its drinking water. The water provided by the District currently meets and exceeds all Federal and State water quality requirements except for Per- and Poly-Fluoroalkyl Substance (PFA) standards. A water treatment system designed to lower or eliminate the concentration of PFAS in groundwater pumped from wells is currently in the design phase as of January 2021.

3.1.1 Safe Drinking Water Act

In 1974, the Safe Drinking Water Act (SDWA) was enacted and the EPA was given the authority to set drinking water quality standards for all drinking water delivered by public and private water suppliers in the United States. The SDWA consists of both primary and secondary standards. The purpose of primary standards is to protect public health. Primary standards include treatment requirements and performance requirements for drinking water called Maximum Contaminant Levels (MCLs). The MCL is the highest level of a contaminant that is allowed in drinking water. Primary MCLs are an enforceable standard to protect customers of water systems from adverse health effects. The SDWA also contains secondary drinking water regulations that establish MCLs for contaminants that may adversely affect odor or appearance of water. These secondary MCLs are not enforced. The SDWA Primary and Secondary MCLs can be found in Appendix 1.

The SDWA has also established processes for identifying and regulating drinking water contaminants to protect human health. In 1996, an amendment to the SDWA established regulations regarding the process of determining and testing proposed contaminants that should be regulated. The Candidate Contaminant List and the Unregulated Contaminant Monitoring Rule are scientifically rigorous processes for determining the appropriate status of currently unregulated contaminants.

The 1996 SDWA amendments also called for regulations to include important components such as source water protection and public information. Through these amendments to the SDWA, the EPA requires every public water system or community water supplier to provide a Consumer Confidence Report (CCR) every year. A CCR is an annual report that provides information on the quality of the local drinking water such as the water's source and any contaminants found in the water. These water suppliers must provide CCRs to their customers directly by mail or online. If a contaminant is at or higher than its MCL, it will be marked as a violation on a CCR. CCRs must explain these violations, how health might be affected due to them, and how they will be fixed.

3.1.2 Title 22 California Code of Regulations

The California Division of Drinking Water (DDW) of the SWRCB regulates potable drinking water standards for the state. The potable water quality standards listed in the Title 22 California Code of Regulations (CCR) include primary and secondary maximum contaminant levels (MCLs). Primary drinking water standards list primary MCLs that are established for specific contaminants in order to protect public health. Secondary drinking water standards list secondary MCLs that are established for chemicals or characteristics that relate to taste, odor, or appearance of drinking water. These State MCLs can be the same or in some cases can be more strict than Federal MCLs. The Title 22 California Code of Regulations (CCR) pertaining to state drinking water standards can be found in Appendix 2.

3.1.3 Current Regulations for Per- and Poly- Fluoroalkyl Substances (PFAS)

Per- and poly-fluoroalkyl substances (PFAS) is the collective term for a group of chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). These substances have been used in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, nonstick cookware and other materials designed to be water and lipid resistant. There is evidence that long-term exposure to these chemicals could cause harmful health effects.

In May 2016, the EPA issued a non-enforceable lifetime health advisory level of 70 parts per trillion (ppt) for the sum of PFOA and PFOS in drinking water. Health advisories are non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. The EPA advised municipalities to notify customers when reaching the advisory level and to give information to customers on the increased health risks.

Since then, California has established its own regulations for PFAS. Assembly Bill 756 (codified as Health and Safety Code section 116378) authorizes the State Water Resources Control Board (SWRCB) to order a water system to test for PFAS, notify their customers if the concentration is over the notification level, and take the water source out of service until water is treated if the concentration is over the response level. Notification levels (NLs) serve as a precaution to customers for when a MCL for the contaminant of drinking water has not been established. A response level (RL) is a concentration level of a contaminant in drinking water that warrants customer notification, further monitoring, and assessment. In August 2019, the SWRCB reduced the NLs from 14 to 5.1 parts per trillion (ppt) for PFOA and from 13 to 6.5 ppt for PFOS. In February 2020, the State Water Resources Control Board set new RLs of 10 ppt for PFOA and 40 ppt for PFOS. This new RL is a reduction of the previous level which used to be 70 ppt for the total concentration of PFOA and PFOS combined. The current NL and RL for PFOA and PFOS are shown in Table 3-1.

Table 3-1 "Current NL and RL for PFOA and PFOS"

California State Water Resources Control Board	Perfluorooctanoic Acid (PFOA)	Perfluorooctanesulfonic Acid (PFOS)
Notification Level (NL)	5.1 ppt	6.5 ppt
Response Level (RL)	10 ppt	40 ppt

3.1.4 New and Pending Legislation Related to Water Quality

There are currently some new and pending Federal and State legislation related to drinking water quality. Federal legislation related to drinking water quality is handled by the EPA while State legislation for California is taken care of by the DDW of the SWRCB. Table 3-2 summarizes the discussion below into legislation name/summary, whether the legislation is at the state or federal level, and the status of said legislation. All new and pending regulations should be taken into consideration by the District.

Table 3-2 "Summary of New and Pending Federal and State Legislation"

Legislation Name/Summary	Government Level	Status
Point-of-Use and Point-of-Entry Treatment	State	Effective as of March 2019
New NL and RL for PFOA and PFOS	State	Effective as of February 2020
Use of Lead-Free Pipes, Fittings, Fixtures, Solder, and Flux	Federal	Effective as of October 2020
Notification and Response Level for Perfluorobutane Sulfonic Acid (PFBS)	State	Effective as of March 2021
Notification Level Recommendations for Four Cyanotoxins	State	Effective as of May 2021
17 Alt. Test Procedures for Analysis of Contaminants Under SDWA	Federal	Effective as of May 2021
NPDWR – Lead and Copper Rule Revisions	Federal	Effective as of June 2021
Definition and Standard Testing Methodology for Microplastics	State	Effective as of July 2021
Revised Total Coliform Rule	State	Effective as of July 2021
Revisions to the Unregulated Contaminant Monitoring Rule	Federal	Pending
Hexavalent Chromium Maximum Contaminant Level (MCL)	State	Pending

Point-of-Use and Point-of-Entry Treatment

Assembly Bill 434 amended and adopted Health and Safety Code (H&SC) 116380 and 116552 pertaining to Point-of-Use (POU) and Point-of-Entry (POE) treatment. POU treatment devices treat water from a single outlet, faucet, or fixture in order to reduce contaminants in drinking water at one tap. POE treatment devices reduce contaminants in drinking water entering a single building. Under these H&SCs, SWRCB is required to adopt regulations that restricted the use of POU and POE in public water systems in order to promote centralized treatment.

In March 2016, under the Health and Safety Code 116380, the SWRCB adopted emergency regulations pertaining to the use of POU and POE treatment that remained in effect until

January 2018. In February 2018, the SWRCB adopted permanent regulations to fulfill statutory requirements. These regulations include requirements from section 116380 and 116552. Section 116380 limits the use of POU and POE treatment to water systems with less than two hundred service connections and section 116552 limits the use of POU and POE treatment to three years or until funding for centralized treatment becomes available. These new regulations were put into effect in March 2019.

New NL and RL for PFOA and PFOS

A Notification level (NL) is a concentration of a contaminant that serves as a precaution to customers for when a MCL has not been established. Response levels (RLs) are a concentration level of a contaminant in drinking water that warrants customer notification, further monitoring, and assessment.

In August 2019, the SWRCB changed the NLs to 5.1 ppt for PFOA and 6.5 ppt for PFOS. In February 2020, the SWRCB also changed the RLs to 10 ppt for PFOA and 40 ppt for PFOS. More details about legislation regarding PFAs (PFOA and PFOS) can be found in 3.1.3.

Use of Lead-Free Pipes, Fittings, Fixtures, Solder, and Flux

A change in existing regulations by the EPA codify aspects of the Reduction of Lead in Drinking Water Act of 2011 (RLDWA) was finalized in September 2020 and was put into effect in October 2020. The RLDWA amended section 1417 of the SDWA by revising the definition of lead free to lower the allowable maximum lead content of plumbing products and establishing a statutory method for calculating lead content. The EPA is also establishing regulations to require sufficient documentation to confirm that lead free requirements are met for products of any person who introduces products into commerce or uses these products in an installation or repair of any system providing water for potable use.

Data from the National Toxicology Program (NTP) shows that there are adverse health effects associated with lead exposure. With these new regulations, the EPA hopes to limit the sources of lead in drinking water and prevent adverse health effects that are caused by it.

Notification and Response Level for Perfluorobutane Sulfonic Acid (PFBS)

On March 5, 2021, the DDW issued a notification and response level for perfluorobutane sulfonic acid (PFBS) of 0.5 parts per billion (ppb) and 5 ppb, respectively. PFBS is a member of the class of chemicals known as PFAS. PFBS is used in numerous commercial products to offer water and stain repellant properties. There is evidence that long-term exposure to PFBS could cause harmful health effects related to the reduction of the thyroid hormone.

Preparation should be made to implement the new NL and RL in the District's water supply. Customers should be notified if the concentration of PFBS is over the notification level and if the concentration is over the response level, the water source should be taken out of service until water is treated.

Notification Level Recommendations for Four Cyanotoxins

On May 3, 2021, the Office of Environmental Health Hazard Assessment (OEHHA) submitted NL recommendations for four cyanobacterial toxins (cyanotoxins) to the SWRCB based on peer-reviewed studies. Cyanotoxins are toxins produced by cyanobacteria (blue-green algae) during algae blooms which have potential adverse health effects. A NL recommendation was given to anatoxin-a of 4 µg/L and recommended interim NLs were given for saxitoxins, microcystins, and cylindrospermopsin of 0.6 µg/L, 0.03 µg/L, and 0.3 µg/L, respectively. The NL recommendations and recommended interim NLs for these four cyanotoxins are listed in Table 3-3. These recommendations are currently being evaluated by the SWRCB. The District should prepare to include these recommended and recommended interim NLs if they are put into effect in the future.

Table 3-3 "Four Cyanotoxins Recommended Notification Levels"

Cyanotoxins	Recommended Notification Level (NL)
Anatoxin-a	4 µg/L
Saxitoxins	0.6 µg/L
Microcystins	0.03 µg/L
Cylindrospermopsin	0.3 µg/L

17 Alt. Test Procedures for the Analysis of Contaminants Under the SDWA

The EPA has approved of 17 alternative testing procedures that can be used in analyzing contaminants in drinking water for the purpose of determining compliance with the National Primary Drinking Water Regulations (NPDWR). Under the SDWA, the EPA is allowed to approve the use of alternative testing methods through publication in the Federal Register.

Effective May 26, 2021, 17 additional analytical methods are available for measuring the levels of contaminants in drinking water. The purpose of these new methods is to provide greater flexibility in timing and costs for water testing while still providing equally effective protection for public health. These changes allow public water systems, laboratories, and primary agencies to use new measurement techniques that have been approved of by the EPA. The 17 approved methods and the contaminants these methods can be used for can be found in Table 3-4. More detailed explanations of these methods can be found in the NPDWR (Appendix A to subpart C of 40 CFR part 141). The District should review these methods and determine whether using any of them in water monitoring for their service area would be beneficial.

Table 3-4 "Seventeen Additional Testing Procedures for the Analysis of Contaminants Under the SDWA"

Approved Method	Contaminant(s)
EPA Method 903.0, Revision 1.0 (USEPA 2021a)	Radium-226
EPA Method 903.1, Revision 1.0 (USEPA 2021b)	Radium-226
EPA Method 127	Total chlorine as monochloramine
D 6919-17 (ASTM 2017a)	Calcium, Magnesium, Sodium
D 4327-17 (ASTM 2017b)	Fluoride, Nitrate, Nitrite, Orthophosphate, Chloride, Sulfate
D 3697-17 (ASTM 2017c)	Antimony
D 3223-17 (ASTM 2017d)	Mercury
D 1688 A-17 (ASTM 2017e)	Copper
D 1688 C-17 (ASTM 2017e)	Copper

Approved Method	Contaminant(s)
D 1293-18 (ASTM 2018a)	pH
D 3454-18 (ASTM 2018b)	Radium-226
Bio-Rad - RAPID'E. coli 2 (REC2)	Total coliforms, E. coli
Maine Health Environmental Testing Laboratory - ME 531, Version 1.0	Carbofuran, oxamyl
Palintest - ChloroSense, Rev. 1,1	Free and total chlorine
Palintest - Method 1001, Rev. 1.1	Total recoverable lead
Palintest – ChlorodioX Plus, Rev. 1.1	Chlorine dioxide, chlorite
Neogen-Modified Colitag, Version 2.0	Total coliforms, E. coli

NPDWR – Lead and Copper Rule Revisions

The EPA will be revising the National Primary Drinking Water Regulations (NPDWR). The NPDWR, under the authority of the SDWA, will be implementing new Lead and Copper rule (LCR) revisions that will be effective beginning June 17, 2021.

Data from the National Toxicology Program (NTP) shows that there are adverse health effects associated with lead exposure. The source of much of this lead and copper in drinking water is due to the corrosion of plumbing material containing these substances. No safe blood lead level in children has been identified, so it is important to lower childhood blood lead levels as much as possible.

The new LCR requires water systems to monitor lead and copper levels at the consumers' taps and requires more actions than the previous rule. If the action levels for lead or copper are exceeded, installation or modifications to corrosion control treatment will be required until the MCL is lower than the action level. The EPA is establishing a new lead trigger level of 10 μg/L in addition to the 15 μg/L lead action level. At this trigger level, systems that currently treat for corrosion are required to reoptimize their existing treatment. Systems that do not currently treat for corrosion will be required to conduct a corrosion control study.

These LCR revisions will also require lead in drinking water testing and public education at schools and childcare facilities. These revisions will also improve the speed of lead service line replacements in water systems by strengthening requirements.

Definition and Standard Testing Methodology for Microplastics

In September 2018, Senate Bill No. 1422 was filed, adding section 116376 to the Health and Safety Code. This section stated that the SWRCB was required to adopt a definition for microplastics in drinking water by July 2020. The SWRCB was also required by July 2021 to adopt a standard testing methodology for microplastics, requirements for four years of testing and reporting, and rules for public disclosure and results. The final adopted resolution and definition of microplastics in drinking water was made publicly available in July 2020. The District should prepare to include the new definition and testing methodologies for microplastics in current drinking water testing and monitoring.

Revised Total Coliform Rule

The Federal Revised Total Coliform Rule (rTCR) became effective in April 2016. The new Coliform Treatment Technique requirement replaces the old Total Coliform MCL. A new E. coli MCL was also put in place.

Under the revisions, existing bacteriological sample siting plans were altered to identify repeat sample locations for each routine sample location, identify triggered source sampling needed to comply with the Groundwater Rule, and identify the sample schedule and rotation plan among sampling sites for collection of routine, repeat and triggered source sampling.

Within 24 hours of a total coliform-positive (TC-positive) sample result, the water system shall continue to collect a repeat sample set of 3 samples according to the plan developed. A water system will be required to do a Level 1 Assessment if one of two things take place: (1) if a water system collects more than 1 TC-positive sample in a month when collecting less than 40 routine and repeat samples per month or (2) collects more than 5-percent TC-positive samples in a month when collecting 40 or more routine and repeat samples per month. This Level 1 Assessment requires the water system to identify a possible cause and solution to the TC-positive samples. This assessment must be submitted to the local regulating agency (DDW District Office or County Health Office) within 30 days. Public notification (Tier 2) will be required within 30 days of the exceedance.

A water system will be required to do a Level 2 Assessment if any one of four things take place: (1) E. coli-positive repeat sample following TC-positive routine sample, (2) TC-positive repeat sample following an E. coli-positive routine sample, (3) failure to collect all required repeat samples following a E. coli-positive routine sample or (2) failure to test for E. coli when any repeat sample is TC-positive. When any of these four things take place, the water system must notify the local regulating agency (DDW District Office or County Environmental Health Office) by the end of the business day to schedule a Level 2 assessment. This Level 2 Assessment is performed by the local regulating agency to identify a possible cause and solution to the E. coli-positive samples. Public notification (Tier 1) will be required within 24 hours of the exceedance.

If a water system is seasonal, it must have an approved, written start-up procedure to comply with Federal RTCR requirements. This procedure should include the use of certified distribution operators to perform an inspection of water system components, disinfection and flushing, and coliform and chlorine residual monitoring. It should also include notification to the local regulating agency (DDW District Office or County Health Office) upon start-up.

All water systems will also be required to report results of coliform monitoring monthly. Specific revised monthly summary forms and instructions will be used for this.

California is currently in the process of implementing the federal rTCR. The SWRCB has announced that beginning July 1, 2021, the new California Revised Total Coliform Rule (rTCR) will become effective. These revisions reflect the federal revisions and include a new E.coli MCL and the new Coliform Treatment Technique requirement replacing the Total Coliform MCL.

Revisions to the Unregulated Contaminant Monitoring Rule

The EPA is proposing revisions to the Unregulated Contaminant Monitoring Rule (UCMR 5). The SDWA rule is being proposed would require all public water systems to collect national occurrence data for 29 PFAS and lithium. These contaminants are not currently subject to national primary drinking water regulations. This new rule would expand the collection of drinking water occurrence data to a broader group of PFAS as well as include lithium. If this legislation is passed, the District would need to expand drinking water monitoring and testing to these 29 PFAS and lithium. This legislation is currently pending.

Hexavalent Chromium Maximum Contaminant Level (MCL)

Hexavalent chromium has been known to be linked to causing cancer when inhaled. Other health risks associated with hexavalent chromium include liver, developmental and reproductive toxicity.

In order to limit the concentration of hexavalent chromium in drinking water, an MCL was issued by the California Department of Public Health (CDPH) before its Division of Drinking Water (DDW) transferred jurisdiction to the SWRCB. In July 2014, an MCL for hexavalent chromium of 10 ppb was approved of by the Office of Administrative Law.

On May 31, 2017, however, a judgement issued by the Superior Court of Sacramento County invalidated this MCL based on the fact that the CDPH had not properly considered the economic feasibility of compliance. The Superior Court of Sacramento County ruled that there had been no consideration of the ability of the general state population served by public water systems to pay for compliance to the new MCL.

In response to the Judgement, on February 2020, the SWRCB published a White Paper Discussion on the economic feasibility of complying with the MCL for hexavalent chromium. On April 27, 2020, the SWRCB held a public workshops to discuss this paper and other topics concerning the MCL. The SWRCB is currently evaluating the comments from said workshop regarding treatment technologies and cost estimating methodology. It has been projected that publication of a Notice of Proposed Rulemaking will be done in late spring or early summer of 2021. The District should monitor the progress of the rulemaking by the SWRCB concerning hexavalent chromium.

3.2 Water Supply

The District produces groundwater from the Central Ground Water Basin (Central Basin) using several wells located within the District's service area boundaries. The District does not use imported water, surface water or stormwater to meet its water demands, but uses recycled water for some of its non-potable water demands. The District maintains an emergency intertie in which water can be obtained in case of a critical event such as a natural disaster.

3.2.1 Groundwater Supply

The District produces its potable water supply using production wells pumping from the Central Ground Water Basin (Central Basin). The California Department of Water Resources (DWR) is the Watermaster and the Water Replenishment District of Southern California (WRD) is charged with overseeing groundwater replenishment activities in the Central Basin. The basin is replenished from snowmelt in the Sierra Mountains and precipitation. The WRD also replenishes the basin by spreading tertiary treated recycled water purchased from the Los Angeles Sanitation District and surface water from the Metropolitan Water District of Southern California (MWD).

The Central Basin is located in Los Angeles County and is a subbasin of Los Angeles Groundwater Basin. Central Basin is bounded by the Hollywood Basin on its north. The remainder of the northern boundary of Central Basin extends along the Merced Hills, Whittier Narrows, and Puente Hills. The DWR divided the Central Basin into four sections: the Los Angeles Forebay, the Montebello Forebay, the Whittier Area, and the Pressure Area. The eastern boundary of the Central Basin stops at the Orange County line. The southwest boundary of the Central Basin is known as the Newport-Inglewood Uplift.

Groundwater production in Central Basin is restricted to adjudicated rights fixed by the Central Basin Judgement and managed by the court-appointed Watermaster, the California Department of Water Resources (DWR). The Central Basin was adjudicated in 1966 and the District was given an Allowed Pumping Allocation (APA) of 3,624 acre-ft per year (AFY). Member agencies of the Central Basin can also pump up to 20 percent more of its annual APA, provided that the over-extraction is made up the following year. The District's APA plus 20 percent carry-over rights combined equal 4,349 AFY.

3.2.2 District Wells

The District owns several wells, five of which are currently operational. Well Nos. 4A, 5A, 8, 10 and 11 currently produce all the groundwater that serves customers in the District. Well No. 7 is currently inactive and Well No.6 has been abandoned. Well No.1 was destroyed in 2015, Well No.2 was destroyed in 2018 and Well No.9A was destroyed in 2019.

The production wells in the District are routinely monitored so that water quality standards are met. Water pumped from Well Nos. 4A, 5A, 8, and 10 are disinfected with sodium hypochlorite and Well No. 11 is disinfected with calcium hypochlorite at their well sites to meet water quality standards. According to the latest sample data for each of the wells, the water produced currently meets and exceeds all Federal and State water quality requirements except for PFAS requirements. Specifically, PFOA is over the RL in Well No. 5A, 8 and 11. The District is currently planning treatment for these wells. Some of the other drinking water contaminants are currently at or are greater than or equal to 50% of their MCL and should be monitored closely. These contaminants are discussed further in later sections of this report.

In January 2021, a Technical Memorandum by AKM Consulting Engineers showed data that Well No. 5A, 8 and 11 are at or exceeded the RL for PFOA. The other two wells, No. 4A and 10, were below the NL and RL for PFOA and PFOS. The District is assessing treatment options for the production wells to lower the MCL of PFAS. It is acknowledged in this Tech Memo by both AKM Consulting Engineers and the District that Ion Exchange with PFAS selective resin would be the most preferable treatment technology. A copy of this Technical Memorandum by AKM Consulting Engineers can be found in Appendix 3.

3.2.3 Recycled Water

The District's 2015 Urban Water Management Plan (UWMP) states that the District does not have a recycled water program, but that Central Basin Municipal Water District's (CBMWD) recycled water program is available to customers of the District. The District's 2015 UWMP can be found in Appendix 4. The recycled water obtained by the District comes from the Los Angeles County Sanitation District (LACSD) through CBMWD. The recycled water provided to the District comes from LACSD's San Jose Creek Water Reclamation Plant (SJCWRP). After treatment, the recycled water is delivered to the District through CBMWD's recycled water distribution system.

CBMWD promotes the use of recycled water to serve non-potable demands within its system as it is a more reliable water source than imported water. CBMWB provides financial assistance for plumbing retrofits necessary to receive recycled water and offers recycled water at a lower rate so that savings can be passed on to District customers that use recycled water.

In June 2008, CBMWD identified potential recycled water customers in the District's service area in its Recycled Water Master Plan Update. This plan update identified approximately 359 AFY of total recycled water uses for landscape irrigation in locations such as parks, highways, freeways, and schools.

Recycled water is currently used for landscape irrigation within the District's service area. To deliver additional recycled water to customers, additional transmission and distribution facilities would need to be constructed within the District's service area. The District plans to expand its use of recycled water over the next 20 years.

3.2.4 Surface Water

The District's potable water supply does not use surface water supplies. It is stated in the District's 2015 Urban Water Management Plan (UWMP) that WRD and other entities the District cooperates with use surface water for groundwater recharge of the Central Basin, but these activities are not directly conducted by the District.

3.2.5 Stormwater

The District's 2015 Urban Water Management Plan (UWMP) states that the District does not use stormwater to meet its water demands. Like surface water, WRD and other entities that the District cooperates with use stormwater for groundwater recharge of the Central Basin, but these activities are not directly conducted by the District.

3.2.6 Imported Water Connections

The District relies entirely on groundwater as its sole source of potable water supply. The District currently does not have any imported water connections with any local water agencies. Although the Central Basin Municipal Water District (CBMWD) purchases imported surface water from Metropolitan Water District of Southern California (MWD), the District currently has no connection to CBMWD's treated surface water interconnection.

3.2.7 Emergency Interties

The District's 2015 Urban Water Management Plan (UWMP) discusses the District's emergency interconnection with the City of Pico Rivera (one way to the District) that serves as a short-term emergency water supply. Emergency interconnections between water agencies are used during critical situations where one system or the other is temporarily unable to provide enough potable water to meet its water demands or fire protection needs. This emergency interconnection allows the District to continue serving water when there is a local water supply shortage due to earthquakes, fires, prolonged power outages, droughts, or other critical situations. The District's 2015 Urban Water Management Plan (UWMP) can be found in Appendix 4.

3.2.8 Water Supply Reliability

The District relies solely on groundwater pumped from the Central Basin to supply potable water demand. The District also uses recycled water supplied by LACSD through CBMWD for landscape irrigation. These two water supply sources allow the District to reliably supply customer demand.

The District's 2015 Urban Water Management Plan (UWMP) states that based on the management practices in the District and the history of the groundwater supply in the Central Basin, the District will be able to rely on the Central Basin for adequate supply over the next twenty years under single year and multiple year droughts. The District's 2015 Urban Water Management Plan (UWMP) can be found in Appendix 4.

3.3 Water Quality of Groundwater Wells

Well monitoring has shown that currently all active production wells meet all state and federal water quality requirements aside from PFAS requirements. Some contaminants are at or are more than half of the MCL and should be monitored so that they do not exceed the MCL.

Federal legislation related to drinking water quality is handled by the EPA while State legislation for California is taken care of by the DDW of the SWRCB. The District tests its drinking water based on requirements from either Federal or State drinking water standards, depending on which is more stringent. If California State standards are more stringent, the District follows those standards as opposed to Federal standards. The EPA's SDWA Primary and Secondary MCLs referenced in this section can be found in Appendix 1. The Title 22 California Code of Regulations (CCR) pertaining to state drinking water standards can be found in Appendix 2. Per- and poly-fluoroalkyl substances (PFAS) do not currently have any established MCLs, however there are NLs and RLs established by the SWRCB for PFOA and PFOS.

Table 3-5 shows well testing results of the well contaminants as of the last sampling which are at the MCL or greater than or equal to 50% of the MCL. Only wells which have been active during the study period are shown.

Table 3-5 "Well Contaminant Levels as of Last Sampling"

Contaminant Name	Well No. 2	Well No. 4A	Well No. 5A	Well No. 8	Well No. 9A	Well No. 10	Well No. 11
Specific Conductance	A	A	A	*	NA	A	A
Total Dissolved Solids	A	A	A	*	NA	A	A
Antimony	X	X	X	X	NA	X	X
Cyanide	A	A	A	A	NA	A	A
Mercury	A	A	A	A	NA	A	A
Perchlorate	A	A	A	A	NA	A	A
Thallium	A	A	A	A	NA	A	A
1,1,2,2-Tetrachloroethane	A	A	A	A	NA	A	A
1,2-Dichloroethane	X	X	X	X	NA	X	X
1,3-Dichloropropene (Total)	X	X	X	X	NA	X	X
Benzene	A	A	A	A	NA	A	A
Carbon Tetrachloride	X	X	X	X	NA	X	X
Vinyl Chloride	X	X	X	X	NA	X	X
1,2,3-Trichloropropane	NA	X	X	X	NA	X	X
Di(2-ethylhexyl)phthalate	A	A	A	A	NA	A	A
X = contaminant being at the MCL A = contaminant being > or = to 50% of the MCL * = contaminant being < 50% of the MCL NA = no sampling data during the study period							

Table 3-6 shows the results of well testing for PFAS contaminants as of the last sampling. There are no testing results for Well No. 2 as the well has been abandoned since 2018 and testing for PFAs only began in recent years. Similarly, Well No. 9A has no testing samples done for PFAS contaminants since it was abandoned in 2019.

Table 3-6 "Well PFAS Contaminant Levels as of Last Sampling"

PFAS Name	Well No. 2	Well No. 4A	Well No. 5A	Well No. 8	Well No. 9A	Well No. 10	Well No. 11
Perfluorooctanoic acid (PFOA)	NA	A	X	X	NA	A	X
Perfluorooctanesulfonic acid (PFOS)	NA	*	A	*	NA	A	A
X = contaminant being > or = to the RL A = contaminant being > or = to 50% of the RL * = contaminant being < 50% of the RL NA = no sampling data during the study period							

3.3.1 Per- and Poly- Fluoroalkyl Substances (PFAS)

Per- and poly-fluoroalkyl substances (PFAS) is the collective term for a group of chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). These substances have been used in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, nonstick cookware and other materials designed to be water and lipid resistant. There is evidence that long-term exposure to these chemicals could cause harmful health effects. The NLs established by the SWRCB are 5.1 ppt for PFOA and 6.5 ppt for PFOS. The RLs are 10 ppt for PFOA and 40 ppt for PFOS.

In January 2021, a Technical Memorandum by AKM Consulting Engineers showed water quality sampling data from 2020 for all five of the District's production wells. This data can be found in Table 3-7. Well No. 5A, 8 and 11 are either at or exceeded the RL for PFOA. The other two wells, No. 4A and 10, were below the NL and RL for PFOA and PFOS. The items that are higher than or equal to the RL are shown in red in Table 3-7. A water treatment system designed to lower or eliminate the concentration of PFAS in groundwater pumped from these wells is currently in the design phase as of January 2021. It has been acknowledged in this Tech Memo by both AKM Consulting Engineers and the District that Ion Exchange with PFAS selective resin would be the most preferable treatment technology. A copy of this Technical Memorandum by AKM Consulting Engineers can be found in Appendix 3.

Table 3-7 "2020 PWD Well Sampling Data for PFAS and RLs"

	Perfluorooctanesulfonic Acid (PFOS)	Perfluorooctanoic Acid (PFOA)
Well 4A	16 ppt	8.5 ppt
Well 5A	31 ppt	**11 ppt**
Well 8	17 ppt	**10 ppt**
Well 10	20 ppt	8.9 ppt
Well 11	24 ppt	**11 ppt**
Response Level (RL)	40 ppt	10 ppt

The PFOA concentration in Well Nos. 4A is more than 50% of the RL as of the last sampling. In Well No. 10, the PFOA is half of the RL and the PFOS concentration is more than 50% of the RL. The concentration of PFOA and PFOS should be monitored in these wells so that it does not exceed the RL. In Well Nos. 5A and 10, the PFOS concentration is also more than 50% of the RL, however, this is likely to decline upon the implementation of treatment that was discussed earlier in this section.

There are no testing results for Well No. 2 as the well was abandoned in 2018 and testing only began in recent years. Similarly, Well No. 9A has no testing samples done for PFAS contaminants as it was abandoned in 2019.

3.3.2 Specific Conductance

Specific conductance serves as an indicator of the presence of pollutants. The conductivity of water varies with temperature and is the measurement of the ability of water to conduct an electrical current. The conductivity of water is increased by the presence of dissolved substances such as salts and heavy metals. Therefore, high specific conductance could indicate high levels of contaminants. Specific conductance is neither a primary nor secondary drinking water standard by EPA standards. The Title 22 CCR, however, lists it as a secondary drinking water standard with an upper MCL of 1,600 µS/cm.

The most recent well samples show that the specific conductance is at or more than 50% of the MCL of 1,600 µS/cm in Well Nos. 2, 4A, 5A, 10, and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on April 16, 2013 gave a value of 920 µS/cm, which is more than 50% of the MCL.

Well No. 4A's last sample test for specific conductance on May 9, 2019 showed a value of 820 µS/cm while the MCL for this contaminant is 1,600 µS/cm. From 2011 to 2019, the samples for this well have varied between the lowest value of 820 µS/cm and the highest value of 970 µS/cm. There has been a trend downward since 2011, however, the last sample recorded of 820 µs/cm is still above 50% of the MCL and should be monitored.

Well No. 5A's last sample test for specific conductance on September 4, 2020 showed a value of 910 µS/cm while the MCL for this contaminant is 1,600 µS/cm. From 2011 to 2020, the samples for this well have varied between the lowest value of 830 µS/cm and highest value of 930 µS/cm. The last sample recorded of 910 µS/cm is above 50% of the MCL and should be monitored.

Well No. 9A was abandoned in 2019. There are no testing results for specific conductance in Well No. 9A that have been done during the study period.

The specific conductance in Well No. 10 has slowly increased from 770 µs/cm on June 15, 2011 to 930 µs/cm on the latest sample test taken on May 29, 2020. There are no clear patterns in the increase, so it cannot be foreseen when or if the specific conductance will rise about the MCL. However, the samples from Well No. 10 should be monitored as they have continuously risen over time and are above 50% of the MCL.

Well No. 11 has only had two sample tests taken for specific conductance. The values were 880 µs/cm on March 26, 2020 and 800 µs/cm on May 6, 2020. These two samples show that specific conductance is declining, however, there is not enough data to conclude any trends. The latest sample tests for Well No. 11 were either at or above 50% of the MCL and should be monitored.

3.3.1 Total Dissolved Solids (TDS)

Total Dissolved Solids (TDS) refer to any inorganic salts and small amounts of organic matter present in solution of water. TDS causes hardness, deposits, colored water, staining and salty taste in drinking water. TDS is a secondary drinking water standard under EPA standards and has a MCL of 500 mg/L. The Title 22 CCR, however, lists it as a secondary drinking water standard with an upper MCL of 1,000 mg/L. The 1,000 mg/L is the MCL that the District uses and so is discussed in this section.

The most recent well samples show that TDS levels are at or more than 50% of the MCL of 1,000 mg/L in Well Nos. 2, 4A, 5A, 10 and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on March 27, 2013 gave a value of 570 mg/L, which is more than 50% of the MCL.

Well No. 4A's last sample test for specific conductance on May 20, 2019 showed a value of 540 mg/L while the MCL for this contaminant is 1,000 mg/L. From 2011 to 2019, the samples for this well have varied between the lowest value of 540 mg/L and highest value of 600 mg/L. Although there has been a steady decrease in the concentration of TDS since 2014, the last sample recorded of 540 mg/L is above 50% of the MCL and should be monitored.

Well No. 5A's last sample test for specific conductance on September 4, 2020 showed a value of 550 mg/L while the MCL for this contaminant is 1,000 mg/L. From 2011 to 2020, the samples for this well have varied between the lowest value of 530 mg/L and highest value of 570 mg/L. The last sample recorded of 550 mg/L is above 50% of the MCL and should be monitored.

Well No. 9A was abandoned in 2019. There are no testing results for TDS in Well No. 9A that have been done during the study period.

Well No. 10's last sample test for specific conductance on May 29, 2020 showed a value of 530 mg/L while the MCL for this contaminant is 1,000 mg/L. From 2011 to 2020, the samples for this well have varied between the lowest value of 530 mg/L and highest value of 580 mg/L. Although there has been a decline in the concentration of TDS since 2014, the last sample recorded of 530 mg/L is above 50% of the MCL and should be monitored.

Well No. 11 has only had two sample tests taken for total dissolved solids. The values were 520 mg/L on March 26, 2020 and 500 mg/L on April 29, 2020. These two samples show that the concentration is declining, however, there is not enough data to conclude any trends. The latest sample tests for Well No. 11 were either at or above 50% of the MCL and should be monitored.

3.3.1 Antimony

Antimony can potentially cause health effects from long-term exposure above the MCL such as increase in blood cholesterol and decrease in blood sugar. Some of the sources of contamination in water include discharge from petroleum refineries, fire retardants, ceramics, electronics, and solder. The EPA's National Primary Drinking Water Regulations give an MCL of 6 μg/L for antimony.

The most recent well samples show that antimony is at the MCL of 6 μg/L in Well Nos. 2, 4A, 5A, 8, 10, and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on April 16, 2013 gave a value of 6 μg/L, which is at the MCL.

Well No. 9A was abandoned in 2019. There are no testing results for Antimony in Well No. 9A that have been done during the study period.

The levels of antimony in Well Nos. 4A, 5A, 8, and 10 rose drastically from 0 μg/L in 2011 to 6 μg/L in 2014. This concentration of 6 μg/L has been consistent in all samples since then as of the last sampling in 2019 for Well No. 4A and 2020 for Well Nos. 5A, 8 and 10. Antimony levels should be monitored in these wells so that they do not exceed the MCL.

Well No. 11 has only had two sample tests taken for antimony. The values were both 6 μg/L and they were taken on March 26, 2020 and May 6, 2020. The concentration of antimony for Well No. 11 is at the MCL and should be monitored.

3.3.1 Cyanide

Cyanide is an inorganic chemical that can cause adverse health effects such as nerve damage or thyroid problems. It contaminates water supplies by being discharged from steel/metal, plastic, and fertilizer factories. EPA primary drinking water standards have the MCL for cyanide of 0.2 mg/L. This is less strict than the Title 22 CCR MCL of 150 μg/L, therefore, the MCL evaluated for this discussion is 150 μg/L from the Title 22 CCR standards.

The most recent well samples show that cyanide levels are more than 50% of the MCL of 150 µg/L in Well Nos. 2, 4A, 5A, 8, 10, and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on April 16, 2013 gave a value of 100 µg/L, which is more than 50% of the MCL.

Well No. 9A was abandoned in 2019. There are no testing results for cyanide in Well No. 9A that have been done during the study period.

The cyanide concentration in Well Nos. 4A, 5A, 8 have jumped from 0 µg/L in 2011 to 100 µg/L in 2014. Similarly, Well No. 10 had a sample of 0 µg/L in 2012 which increased to 100 µg/L in 2015. The concentration after those readings has remained constant at 100 µg/L as of the most recent sample in May 2019 for Well No. 4A, September 2020 for Well Nos. 5A and 8, and May 2020 for Well No. 10. The last samples recorded in Well Nos. 4A, 5A, 8, and 10 of 100 µg/L is above 50% of the MCL and should be monitored.

Well No. 11 has only had two sample tests taken for cyanide. The values were both 100 µg/L and they were taken on March 26, 2020 and May 6, 2020. The concentration of cyanide for Well No. 11 is more than 50% of the MCL and should be monitored.

3.3.1 Mercury

Mercury is an inorganic chemical reasonably anticipated to cause kidney damage. Some of the sources of contamination in water include erosion of natural deposits, discharge from refineries and factories, and runoff from landfills and croplands. The EPA's National Primary Drinking Water Regulations give an MCL of 2 µg/L for mercury.

The most recent well samples show that mercury concentrations is at 50% of the MCL of 2 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on April 16, 2013 gave a value of 1 µg/L, which is at 50% of the MCL.

Well No. 9A was abandoned in 2019. There are no testing results for mercury in Well No. 9A that have been done during the study period.

The mercury concentration in Well Nos. 4A, 5A, and 8 have jumped from 0 µg/L in 2011 to 1 µg/L in 2014. Similarly, Well No. 10 had a sample of 0 µg/L in 2012 which increased to 1 µg/L in 2015. The concentration after these readings has remained constant at 1 µg/L as of the most recent sample in May 2019 for Well No. 4A, September 2020 for Well Nos. 5A and 8, and May 2020 for Well No. 10. The last sample recorded in these wells of 1 µg/L is at 50% of the MCL and should be monitored.

Well No. 11 has only had two sample tests taken for mercury. The values were both 1 µg/L and they were taken on March 26, 2020 and May 6, 2020. The concentration of mercury for Well No. 11 is at 50% of the MCL and should be monitored.

3.3.1 Perchlorate

Perchlorate is produced by industrial processes such as making rockets, missiles, and fireworks. It can cause adverse health effects related to perchlorate preventing the thyroid gland from receiving enough iodine and preventing thyroid hormone production. Insufficient thyroid hormone levels and negatively affect human growth and development.

Perchlorate is neither a primary nor secondary drinking water standard by EPA standards. However, it is a Title 22 CCR primary drinking water standard with an MCL of 6 µg/L.

The most recent well samples show that perchlorate concentrations are more than 50% of the MCL of 6 µg/L in Well Nos. 2, 4A, 5A, 8, 10, and 11.

Well No. 2 was abandoned in 2018. The concentration of perchlorate was 0 µg/L during the sample test on June 15, 2011. This jumped to 4 µg/L on June 12, 2013 and remained at the same value until the last sample on June 12, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for perchlorate in Well No. 9A that have been done during the study period.

Well Nos. 4A, 5A, 8, and 10 jumped from 0 µg/L in 2011 to 4 µg/L in 2013. The concentration of perchlorate in these wells has remained at 4 µg/L since that sample in 2013 as of the last sample taken on March 18, 2020. The last sample recorded in Well Nos. 4A, 5A, 8, and 10 of 4 µg/L is above 50% of the MCL and should be monitored.

Well No. 11 has only had two sample tests taken for perchlorate. The values were both 4 µg/L and they were taken on March 26, 2020 and May 6, 2020. The concentration of perchlorate for Well No. 11 is more than 50% of the MCL and should be monitored.

3.3.1 Thallium

Thallium is reasonably anticipated to cause hair loss and changes in blood as well as kidney, intestine and liver problems. Some of the sources of contamination in water are leaching from ore-processing sites and discharge from electronics, glass, and drug factories. The EPA's National Primary Drinking Water Regulations give an MCL of 2 µg/L for thallium.

The most recent well samples show that mercury concentrations are at 50% of the MCL of 2 µg/L in Well Nos. 2, 4A, 5A, 8, 10, and 11.

Well No. 2 was abandoned in 2018. The last sample test for Well No. 2 on April 16, 2013 gave a value of 1 µg/L, which is at 50% of the MCL.

Well No. 9A was abandoned in 2019. There are no testing results for thallium in Well No. 9A that have been done during the study period.

The thallium concentration in Well Nos. 4A, 5A, 8 and 10 have jumped from 0 µg/L in 2011 to 1 µg/L in 2014. The concentration after these readings has remained constant at 1 µg/L as of the most recent sample in May 2019 for Well No. 4A, September 2020 for Well Nos. 5A and 8, and May 2020 for Well No. 10. The last sample recorded in these wells of 1 µg/L is at 50% of the MCL and should be monitored.

Well No. 11 has only had two sample tests taken for thallium. The values were both 1 µg/L and they were taken on March 26, 2020 and May 6, 2020. The concentration of mercury for Well No. 11 is at 50% of the MCL and should be monitored.

3.3.1 1,1,2,2-Tetrachloroethane

1,1,2,2-Tetrachloroethane can cause adverse health effects such as liver and nervous system problems. It contaminates drinking water supplies by being discharged from industrial and agricultural chemical factories as well as being used in the production of TCE, pesticides, varnish, and lacquers. 1,1,2,2-Tetrachloroethane is neither a primary nor secondary drinking water standard by EPA standards. However, it is a Title 22 CCR primary drinking water standard with an MCL of 1 µg/L.

The most recent well samples show that 1,1,2,2-tetrachloroethane concentrations are more than 50% of the MCL of 1 µg/L in Well Nos. 2, 4A, 5A, 8, 10, and 11.

Well No. 2 was abandoned in 2018. The concentration of 1,1,2,2-tetrachloroethane was 0 µg/L during the sample test on July 17, 2012. This value rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for 1,1,2,2-tetrachloroethane in Well No. 9A that have been done during the study period.

The levels of 1,1,2,2-tetrachloroethane in Well Nos. 4A, 5A, 8, and 10 have risen from 0 µg/L on April 11, 2012 to 0.5 µg/L in September 12, 2012. This concentration of 0.5 µg/L has been consistent in all samples since then as of the last sampling in 2020 for Well Nos. 4A, 5A, 8 and 10. 1,1,2,2-tetrachloroethane levels should be monitored in these wells so that they do not exceed the MCL.

Well No. 11 has had three sample tests taken for 1,1,2,2-tetrachloroethane. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration of 1,1,2,2-tetrachloroethane for Well No. 11 is at 50% of the MCL and should be monitored.

3.3.1 1,2-Dichloroethane

1,2-Dichloroethane is a chemical compound that is reasonably anticipated to increase the risk of cancer. It contaminates water supplies by being discharged from industrial chemical factories. The EPA's National Primary Drinking Water Regulations give an MCL of 0.5 µg/L for 1,2-dichloroethane.

The most recent well samples show that 1,2-dichloroethane is at the MCL of 0.5 µg/L in Well Nos. 2, 4A, 5A, 8, and 10.

Well No. 2 was abandoned in 2018. The concentration of 1,2-dichloroethane was 0 µg/L during the sample test on July 17, 2012. This rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for 1,2-dichloroethane in Well No. 9A that have been done during the study period.

The 1,2-dichloroethane level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 0.5 µg/L. These wells have been consistently testing at 0.5 µg/L since September 12, 2012. These four wells should be monitored so that the 1,2-dichloroethane level does not exceed the MCL.

Well No. 11 has had three sample tests taken for 1,2-dichloroethane. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration in this well is at the MCL and should be monitored closely.

3.3.2 1,3-Dichloropropene (Total)

1,3-Dichloropropene is a chemical compound that is reasonably anticipated to increase the risk of cancer. The source of its contamination in water is due to its use in farming as a pesticide, specifically as a nematicide and soil fumigant. 1,3-Dichloropropene is neither a primary nor secondary drinking water standard by EPA standards. However, it is a Title 22 CCR primary drinking water standard with an MCL of 0.5 µg/L.

The most recent well samples show that 1,3-dichloropropene is at the MCL of 0.5 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The concentration of 1,3-dichloropropene was 0 µg/L during the sample test on July 17, 2012. This rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for 1,3-dichloropropene in Well No. 9A that have been done during the study period.

The 1,3-dichloropropene level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 0.5 µg/L. These wells have been consistently testing at 0.5 µg/L since September 12, 2012. These four wells should be monitored so that 1,3-dichloropropene levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for 1,3-dichloropropene. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration in this well is at the MCL and should be monitored closely.

3.3.3 Benzene

Benzene is reasonably anticipated to cause anemia, decrease in blood platelets, and increased risk of cancer. It contaminates water supplies by being discharged from plastics, dyes and nylon factories as well as being leached from gas storage tanks and landfills. EPA primary drinking water standards have an MCL for benzene of 0.005 mg/L. This is less strict than the Title 22 CCR MCL of 1 µg/L, therefore, the MCL evaluated for this discussion is 1 µg/L from the Title 22 CCR standards.

The most recent well samples show that benzene is at 50% of the MCL of 0.5 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The concentration of benzene was 0 µg/L during the sample test on July 7, 2012. This rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for benzene in Well No. 9A that have been done during the study period.

The benzene level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 0.5 µg/L. These wells have been consistently testing at 0.5 µg/L since September 12, 2012. These four wells should be monitored so that benzene levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for benzene. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration for benzene in Well No. 11 is at 50% of the MCL and should be monitored.

3.3.4 Carbon Tetrachloride

Carbon tetrachloride can potentially cause health effects from long-term exposure above the MCL such as increased risk of cancer and liver problems. Some of the sources of contamination in water include discharge from chemical plants and other industrial activities. The EPA's National Primary Drinking Water Regulations give an MCL of 0.5 µg/L for carbon tetrachloride.

The most recent well samples show that carbon tetrachloride is at the MCL of 0.5 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The concentration of carbon tetrachloride was 0 µg/L during the sample test on July 17, 2012. This rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for carbon tetrachloride in Well No. 9A that have been done during the study period.

The carbon tetrachloride level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 0.5 µg/L. These wells have been consistently testing at 0.5 µg/L since September 12, 2012. Carbon tetrachloride levels should be monitored in these four wells so that levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for carbon tetrachloride. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration in this well is at the MCL and should be monitored closely.

3.3.5 Vinyl Chloride

Vinyl chloride is a chemical compound that is reasonably anticipated to increase the risk of cancer. The source of its contamination in water is due to leaching from PVC pipes and discharge from plastic factories. EPA primary drinking water standards have the MCL for vinyl chloride of 0.002 mg/L. This is less strict than the Title 22 CCR MCL of 0.5 µg/L, therefore, the MCL evaluated for this discussion is 0.5 µg/L from the Title 22 CCR standards.

The most recent well samples show that vinyl chloride is at the MCL of 0.5 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The concentration of vinyl chloride was 0 µg/L during the sample test on July 17, 2012. This rose to 0.5 µg/L on April 16, 2013 and remained at the same value until the last sample on April 16, 2014.

Well No. 9A was abandoned in 2019. There are no testing results for vinyl chloride in Well No. 9A that have been done during the study period.

The vinyl chloride level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 0.5 µg/L. These wells have been consistently testing at 0.5 µg/L since September 12, 2012. Vinyl chloride should be monitored in these four wells so that levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for vinyl chloride. The values were all 0.5 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration in this well is at the MCL and should be monitored closely.

3.3.6 1,2,3-Trichloropropane (1,2,3 – TCP)

1,2,3-Trichloropropane (1,2,3 – TCP) is a manmade chemical that is reasonably anticipated to be a human carcinogen and cause cancer. Some of the sources of contamination in water include its use as a cleaning and degreasing solvent and its association with pesticide products. 1,2,3 – TCP is neither a primary nor secondary drinking water standard by EPA standards. However, it is a Title 22 CCR primary drinking water standard with an MCL of 0.005 µg/L.

The most recent well samples show that 1,2,3 – TCP is at the MCL of 0.005 µg/L in Well Nos. 4A, 5A, 8, and 10.

Well No. 2 was abandoned in 2018. There are no sample tests of 1,2,3 – TCP during the study period.

Well No. 9A was abandoned in 2019. There are no testing results for 1,2,3 – TCP in Well No. 9A that have been done during the study period.

The 1,2,3 – TCP level in Well Nos. 4A, 5A, 8 and 10 tested at 0.005 µg/L on March 19, 2018. This is the first sample test done during the study period. These wells have been consistently testing at 0.005 µg/L since March 19, 2018. 1,2,3 – TCP should be monitored closely in these four wells so that levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for 1,2,3 – TCP. The values were all 0.005 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration in this well is at the MCL and should be monitored closely.

3.3.7 Di(2-ethylhexyl)phthalate (DEHP)

Di(2-ethylhexyl)phthalate (DEHP) can potentially cause adverse health effects such as weight loss, liver enlargement, and reproductive difficulties. The source of its contamination in water is due to being discharged from rubber and chemical factories as well as being used as an inert ingredient in pesticides. EPA primary drinking water standards have an MCL for DEHP of 0.006 mg/L. This is less strict than the Title 22 CCR MCL of 4 µg/L, therefore, the MCL evaluated for this discussion is 4 µg/L from the Title 22 CCR standards.

The most recent well samples show that DEHP is more than 50% the MCL of 4 µg/L in Well Nos. 2, 4A, 5A, 8, 10 and 11.

Well No. 2 was abandoned in 2018. The concentration of DEHP was 0 µg/L during the sample test on July 17, 2012. This rose to 3 µg/L during the last sample on September 12, 2012.

Well No. 9A was abandoned in 2019. There are no testing results for DEHP in Well No. 9A that have been done during the study period.

The DEHP level in Well Nos. 4A, 5A, 8 and 10 tested at 0 µg/L in 2011 until September 12, 2012 where the level rose to 3 µg/L. These wells have been consistently testing at 3 µg/L since September 12, 2012. DEHP should be monitored in these four wells so that levels do not exceed the MCL.

Well No. 11 has had three sample tests taken for vinyl chloride. The values were all 3 µg/L and they were taken on March 26, 2020, May 6, 2020, and December 30, 2020. The concentration for DEHP in Well No. 11 is at 50% of the MCL and should be monitored.

Chapter 4 - Land Usage, Population and Water Requirements

4.1 General Description

A District's land usage is the primary driver of water demand. The land usage developed through city and county planners within the City of Pico Rivera's service area ultimately determines the shape of the environment and demographics that PWD will have to adapt to under future developments. Water requirements are updated and based on water consumption and production data provided.

4.2 Sphere of Influence

A sphere of influence (SOI) is the District's legal description of the probable physical boundaries and service area of a local agency, as regulated by the Local Agency Formation Commission (LAFCo) at the county level. Figure 4-1 illustrates the District's SOI.

4.3 Population – Existing and Projected

Per the District's 2020 UWMP, the population within the District is summarized as shown in Table 4-1. It is estimated that there is a projected annual growth rate of approximately 0.21% between the years 2020 and 2045.

Table 4-1 "Current and Projected Population"

Year	2020	2025	2030	2035	2040	2045
Population	23,121	23,360	23,601	23,845	24,091	24,340

This projected annual growth rate was used to determine the future water consumption and production demands as shown in Section 4.13 of this WMP update.

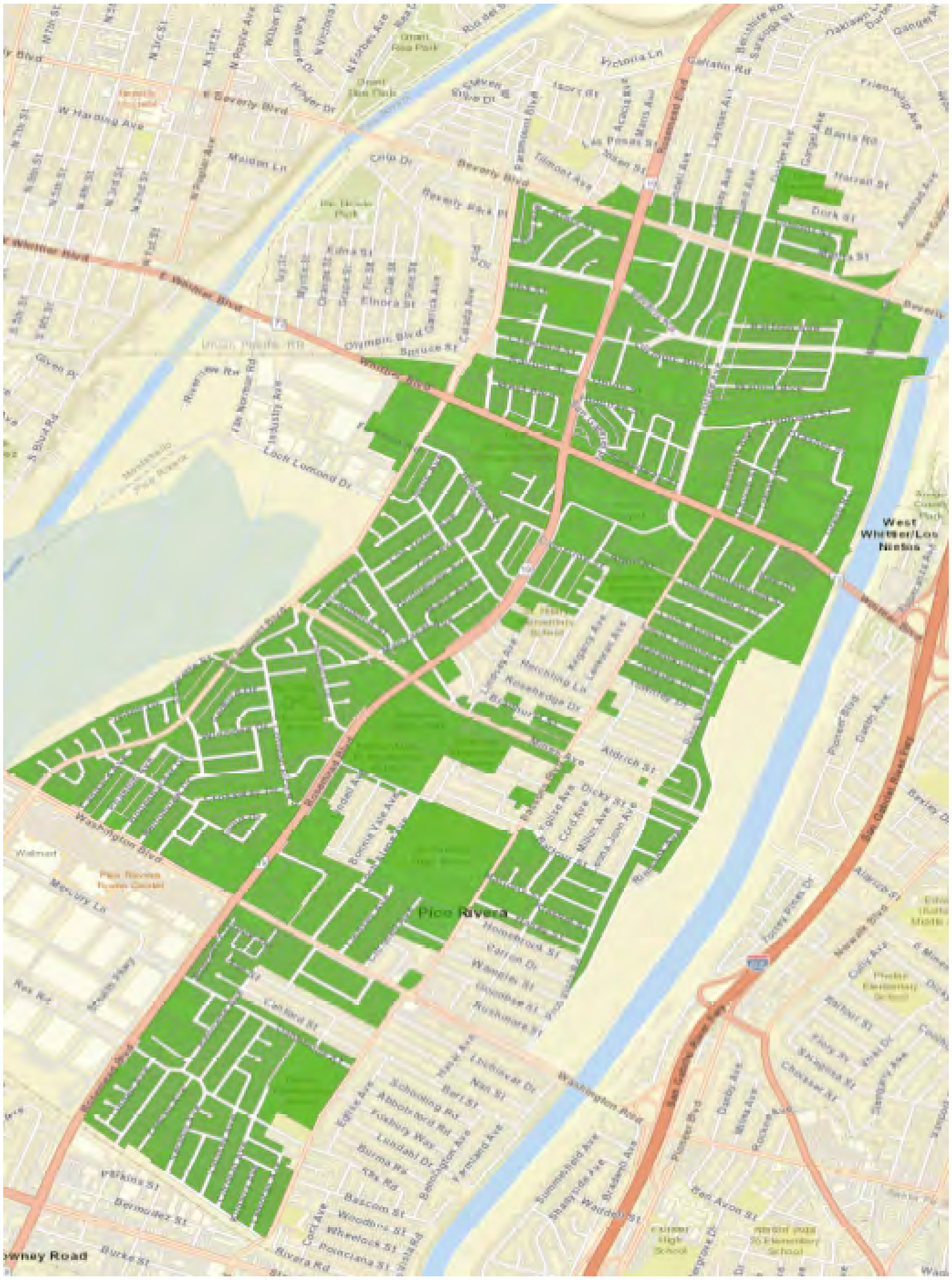
4.4 Land Usage – Existing and Proposed

Southern California Association of Governments (SCAG) provides a GIS database that overlays the PWD land usage.

The SCAG land use database was updated October 21, 2020 and the land use codes were last updated in 2016. The land use definitions and descriptions were developed by Aerial Information Systems, Inc. as a Modified Anderson Land Use Classification.

PWD's service area contains the following categories: Single and multi-family residential, commercial and retail services, educational institutions, communication and public facilities, and open space and recreation.

Figure 4-1"PWD Service of Influence"



4.5 Existing Water Demand

The District provided water consumption data based on the billed water usage through their billing system from 2016 to 2020 and annual reports from 2011 to 2020. Historical water demand from 2011 through 2020 has been compared to production water data. The District's historical production data from 2011-2020 is defined as the amount of water being produced in the wells minus the change in storage within the Cate Reservoir storage, resulting in the "Net Total Production". Table 4-2 and Table 4-3 compare the historical water demand from 2011 to 2020 to the water produced and its corresponding annual water losses in AFY and GPM respectively.

The water demands shown in the tables below only represent the potable water demand. PWD uses recycled water for their irrigation use. To only represent the potable water demand, irrigation meter readings were deducted and not included in the water demands for this analysis.

Table 4-2 "Existing Historical Water Production and Water Consumption Demand (AFY)"

Year	Water Production (AFY)	Water Demand (AFY)	Water Loss (AFY)	Water Loss (%)
2011	3,212	3,130	82	2.6%
2012	3,207	3,124	83	2.6%
2013	3,309	3,228	81	2.4%
2014	3,153	3,011	142	4.5%
2015	2,755	2,717	37	1.4%
2016	2,763	2,686	77	2.8%
2017	2,822	2,748	74	2.6%
2018	2,799	2,753	45	1.6%
2019	2,646	2,429	216	8.2%
2020	2,825	2,698	127	4.5%
Average	**2,949**	**2,853**	**97**	**3.3%**

Table 4-3 "Existing Historical Water Production and Water Consumption Demand (GPM)"

Year	Water Production (GPM)	Water Demand (GPM)	Water Loss (GPM)	Water Loss (%)
2011	1,992	1,941	51	2.6%
2012	1,988	1,937	51	2.6%
2013	2,052	2,001	50	2.4%
2014	1,955	1,867	88	4.5%
2015	1,708	1,685	23	1.4%
2016	1,713	1,665	48	2.8%
2017	1,750	1,704	46	2.6%
2018	1,735	1,707	28	1.6%
2019	1,640	1,506	134	8.2%
2020	1,752	1,673	79	4.5%
Average	**1,828**	**1,769**	**60**	**3.3%**

4.5.1 Water Loss

Water loss is the difference between water produced and water consumed. Water losses include pipe main flushing, hydrant testing, leaks and pipe breaks, inaccurate meters, unauthorized uses, and undocumented maintenance. As shown in Table 4-2 and Table 4-3, the average water loss over the past ten years is approximately 3.3%. For the most part, the District has been able to stay within 5% water loss except for the year 2019.

After reviewing past leak history for 2019, it was found that there were higher than average leaks in main pipelines during the span of this year. This higher amount of leakage is most likely the cause of this higher water loss percentage in 2019.

Table 4-1 and Table 4-2 represent the percentage of average water loss which, apart from 2017, has steadily decreased in recent years. In recent years, California has emphasized water conservation efforts across the state.

4.6 Peaking Factors

Peaking factors represent a water system's fluctuation in demand on a daily or hourly basis. They are utilized in the planning process to ensure the water system is sufficient when supplying the maximum demands the system may encounter beyond the average day demand (ADD). Both maximum day demand (MDD) and peak hour demand (PHD) are common peaking factors used for analyses. MDD is representative of the maximum volume of water delivered to the system in a single day. MDD normally occurs in the middle of summer. PHD is representative of the maximum water used in one hour during the year. This WMP uses peaking factors that are based on production and consumption during the 2011-2020 study period.

4.7 ADD

ADD serves as a benchmark and planning tool for long-term issues at the system level, such as supply acquisition and integrated resources management. The ADD was calculated by taking the average of the net production values provided by PWD for each year accordingly. The ADD is calculated to be 1,827 gpm.

4.8 MDD

MDD serves as a way to ensure the water system is capable of supplying and maintaining a high-level of service on the days of the largest demand. This is crucial in the planning stage to determine any potential issues.

The maximum production value during the study period was determined using the daily production values provided by PWD. The maximum production value within the study period is 4,304 gpm and occurred on Saturday, June 1st, 2013. This value, however, is considered to be an outlier since the following highest production value is only 3,291 gpm (which occurred on June 8th, 2014). Excluding the outlier and using the second highest production value, the maximum day demand of 3,291 gpm provides a peaking factor of 1.80. The peaking factor of 1.80 is calculated by comparing the average day demand of the study period (1,827 gpm) to the maximum day demand. MDD peaking factor is expressed as a ratio of MDD to ADD.

4.9 PHD

Peak hour demand is representative of the maximum flow rate delivered by the distribution system during any single hour of the year. PHD could not be determined due to the absence of hourly data. Using the CA Code Industry Standard[2] of 1.5 times the peaking factor for MDD, the PHD peaking factor came out to be 2.70.

Table 4-4 "System Demands and Peaking Factor"

Demand Type	Demands (MGD)	Demands (gpm)	Peaking Factor
Average Day Demand (ADD)	2.631	1,827	1.00
Maximum Day Demand (MDD)	4.739	3,291	1.80
Peak Hour Demand (PHD)	7.104	4,936	2.70
*Peak Hour Demand (PHD)**	*10.524*	*7,308*	*4.00*
**peaking factor for PHD was 4.0 according to pervious 2008 WMP design criteria.*			

4.10 Top Users

The top users in the PWD water system were determined from the provided consumption data. Billing data was used to determine the top users of the system and were provided in a monthly usage format from the years 2016-2020. By analyzing each year's ADD and comparing it to the calculated overall ADD (1,827 gpm), the year 2018 was identified to be the representative year for consumption. The top 15 users were ranked by their annual water consumption, from highest to lowest usage. Table 4-5 summarizes each user and their associated water consumption in the year 2018.

Table 4-5 "Top Users"

Rank	Type of Establishment	Water Demand (AF)	Water Demand (gpm)	% of Total Demand
1	Educational Institution	61.6	38.2	2.2%
2	City Facility	51.3	31.8	1.9%
3	Car Wash	39.2	24.3	1.4%
4	Assisted Living	32.9	20.4	1.2%
5	Educational Institution	31.0	19.2	1.1%
6	Educational Institution	24.4	15.1	0.9%
7	Educational Institution	22.4	13.9	0.8%
8	Commercial	20.9	13.0	0.8%
9	Commercial	18.2	11.3	0.7%
10	Educational Institution	16.8	10.4	0.6%
11	Educational Institution	16.4	10.2	0.6%
12	Residential	16.2	10.0	0.6%
13	Residential	14.0	8.7	0.5%
14	Assisted Living	13.1	8.1	0.5%
15	Residential	11.2	7.0	0.4%
		Total Top Users Usage	**241.6**	14.20%

[2] California Regulations Related to Drinking Water, Section 64554, Title 22 Code of Regulations.

4.11 Water Duty Factors

Water duty factors provide a basis for how future development will impact a water distribution system. The duty factors for the District were calculated by a statistical analysis of billing data and land use records. The water duty factors by land usage can be found in Table 4-6.

Table 4-6 "Water Duty Factors Summary"

Land Usage	Abbr.	AFY	GPM	AC	AFY/AC	GPM/AC
Single Family Residential	SFR	1,592	987	648	2.46	1.52
Multi-Family Residential	MFR	412	256	88	4.68	2.9
Mobile Homes	MH	10	6	3	3.01	1.87
Commercial	COMM	451	280	142	3.18	1.97
Industrial	IND	0	0	72	0.00	0.00
Institutions	INSTIT	226	140	103	2.19	1.36

4.12 Proposed Water Demand

Proposed water demand considers build out of current land use planning, population growth within the sphere of influence, and other factors. The demand projections for 2025 and beyond represent the average gallons per capita per day (GPCD) using data from 2020. The 2020 population as shown in Table 4-1 was 23,121 and the demand for the same year was approximately 2,825 AFY. With those values, the 2020 GPCD came out to approximately 109 GPCD. The distribution of demands among the water use sectors is proportional to the percentage of demand each water use sector is to the overall total of consumption demand.

Single Family Residential consists of 61 percent of the overall water demand in the year 2020. Multi-Family Residential and Commercial consists of 16 percent water demand overall while institutions consist of 7 percent. Mobile home and Industrial lots consist of less than one percent of the overall water demand in 2020. Table 4-7 shows the proposed water demands in AFY that were calculated.

Table 4-7 "Proposed Water Demand"

Land Usage	Abbr.	Demand 2020 (AFY)	Demand 2025 (AFY)	Demand 2030 (AFY)	Demand 2035 (AFY)	Demand 2040 (AFY)
Single Family Residential	SFR	1,597	1,736	1,754	1,772	1,790
Multi-Family Residential	MFR	418	454	458	463	468
Mobile Homes	MH	11	12	12	13	13
Commercial	COMM	418	454	459	463	468
Industrial	IND	0	1	1	1	1
Institutions	INSTIT	182	198	200	202	204
Total Consumption Data		**2,626**	**2,854**	**2,884**	**2,913**	**2,944**

4.13 Recycled Water Demand

Per District's 2015 Urban Water Management Plan (UWMP), the District does not have a recycled water program. As of 2011, however, the District has utilized recycled water provided by CBMWD to supply irrigation needs where applicable.

The historical usage of recycled water supplies for irrigation demands within the service area are shown in Table 4-8. The values for recycled water demand were obtained from the District's Annual Reports from 2014 to 2020. The values from 2011 to 2013 were obtained from the District's 2015 UWMP. The total potable water demand values are historical production values that can be found in Table 4-3.

Table 4-8 "Historical Recycled Water Use"

Calendar Year	Recycled Water Demand (AF)	Recycled Water Demand (gpm)	Total Potable Water Demand (gpm)	% of Recycled Water Used
2011	4.3	3	1,992	0.13%
2012	6.3	4	1,988	0.20%
2013	5.6	3	2,052	0.17%
2014	133.6	83	1,955	4.06%
2015	107.7	67	1,708	3.76%
2016	54.0	33	1,713	1.92%
2017	51.9	32	1,750	1.80%
2018	79.8	49	1,735	2.77%
2019	80.1	50	1,640	2.94%
2020	58.5	36	1,752	2.03%
Average	**58.2**	**36**	**1,829**	**1.93%**

Chapter 5 - Existing System Analysis

5.1 General Description

The analysis performed within this chapter utilized the calibrated water model, the system and water demand updates, and design and planning criteria. The purpose of this analysis is to establish a minimum level of service to ensure that a safe and dependable supply of water can be provided to the District's service area.

In the event that capacity cannot meet demand, improvements based on deficiency are identified and suggested. System assets and equipment are also evaluated based on their expected lifespan. Additionally, equipment replacement is scheduled and identified in the Capital Improvement Plan (CIP) which will be further discussed in detail in Chapter 7.

5.2 District Design Criteria

The water provided to the consumers shall meet all federal, state and local regulations governing water quality for potable use.

The water system shall be capable of providing the minimum fire flow as determined in the water master plan with the minimal residual pressure of 20 pounds per square inch (psi) in the distribution system pipelines.

5.2.1 System Pressures

Goal for Static System Pressure Range: 40 psi to 80psi

The water system shall be capable of providing at least 40 psi for the following demand periods: average day, maximum day, and peak hour.

Where system pressures exceed 80 psi, individual pressure regulators should be equipped at connection in accordance with the Uniform Plumbing Code.

Where practical, the maximum pressure at any connection should be limited to 80psi.

Under existing conditions, the existing PWD water system is within pressure ranges of 62 psi and 75 psi.

5.2.2 Fire Flow

Goal for Minimum Pressure During a Fire Flow Event: 20 psi

Under fire flow conditions, residual pressures should not fall below 20 psi when delivering the required fire flow rate. The minimum residual pressure requirement is established by the California Dept. of Public Health. This threshold provides a buffer against the possibility of negative pressure in the distribution system which could result in contamination ingress.

An exception to the 20-psi minimum is allowed for fire hydrants that are located so close to reservoirs that they are not be able to achieve the requirement for pressure residual. These hydrants shall be designated as "draft hydrants" and piping shall be sized from the reservoir to the hydrant to provide the fire flow requirement as close to the local static pressure as possible.

Fire Flow Requirement per Land Usage

For purposes of testing the adequacy of the existing system, fire flows are applied based on Land Use as shown in Table 2-6. These apply to any structure that is being altered, as required by City, County, State, and Federal codes and ordinances. Existing structures that are not being altered are grandfathered in based on the regulations at the time of their construction.

5.2.3 Pipeline Criteria

Transmission Pipelines

Transmission mains are intended to efficiently carry large volumes of water between facilities (i.e. well production, treatment, booster stations and storage). Energy losses along transmission corridors can be managed by controlling pipe velocity.

The primary methods for controlling pipe velocity are as follows:

- increase pipe diameter
- provide multiple flow pathways
- reduce flow rate

Regardless of the method used, efficiency drops off rapidly when pipe velocity exceeds 5 feet per second. Velocity and energy loss (i.e. feet of head loss per 1000 feet of pipe) are indirectly related measurements of transmission efficiency and should both be examined independently.

Dramatically over-sizing the transmission mains to reduce velocity can inadvertently increase detention time leading to certain water quality issues. As time increases between the points of production and delivery, complications due to stagnation and decay of disinfectant residual outweigh improvements in energy efficiency. Therefore, a balanced system will simultaneously keep energy loss and water quality degradation in check.

Transmission main capacity criteria are driven by efficiency and water quality management.

- *Maximum pipe velocity under normal operating conditions:* 5 feet per second.
- *Maximum energy loss under normal operating conditions:* 5 feet of head loss per 1000 feet of pipe

Distribution Pipelines

Distribution pipelines are responsible for carrying water to service connections and fire hydrants. In order to ensure a safe and reliable supply of water can be provided throughout the system, all distribution pipelines must follow the maximum velocity and head loss criteria.

The maximum velocity in any proposed pipeline should be in accordance with the following guidelines:

- *For Average Day, Maximum Day, and Peak Hour Analysis:*
  - Desired Range: 0 to 5 fps
  - Deficient Range: Over 5 fps
- *For Fire Flow Analysis:*
  - Desired Range: 0 to 10 fps
  - Deficient Range: Over 10 fps

Pipelines with velocities in the deficient range should be considered for replacement or paralleling.

Pipe analysis shall be performed by assuming that the Hazen Williams coefficient "C" for the various new pipe material be programmed based on Table 5-1 below.

Table 5-1 "Hazen Williams Coefficient by Age"

Pipeline Material	Age	"C" Factor
ACP	40-60	150 - 120
CIP	40-60	115-80
DIP	20	150 - 120
COP	40-60	130-100
PVC	20	150 - 120
STL	30-50	150 - 120

Both transmission and distribution pipelines within the system are within the velocity criteria under the existing average, max day, and peak hour scenarios.

New Pipeline Criteria

To meet pressure and velocity objectives, the minimum diameter for new pipelines shall be 8-inch. The General Manager may be able to permit a pipeline main to be sized as a 6-inch in short cul-de-sac streets when no fire hydrant is connected to the main as long as the pipe length does not exceed 600 feet.

In commercial and business areas, the minimum diameter for new pipelines shall be 12-inch.

These diameters shall not preclude the use of larger diameters when needed to meet the minimum fire flows or other criteria. All pipelines shall be looped (excluding short cul-de-sac streets) to prevent one pipeline outage from disrupting service to an area.

5.3 Supply Analysis

AWWA recommends that a water system and each pressure zone shall have at least two independent supply sources. Where two sources of supply are not practicable, the zone should have sufficient storage to meet all emergency criteria with the supply out of service.

The District's water system is inter-looped within itself and works as a single pressure zone. As such, it is recommended to have at least two independent supply sources. As of 2021, the sole source of supply for the District is from its five active groundwater wells but a one-way emergency interconnection exists with the City of Pico Rivera when additional supply is needed.

Essentially, PWD Zone 1 could be classified as a terminal zone. A terminal zone is defined as a zone that does not provide flow to other zones. With that said, Zone 1 must have sufficient capacity to meet MDD with the largest source of supply out of service. The primary supply provides the results of this application.

5.3.1 Primary Supply

The District's water supply come solely from its five active groundwater supply wells. The total water production capacity of these wells must be capable of meeting the system MDD when the largest single source of groundwater is out of service. The newest well of the PWD system, Well 11, is considered the largest source of supply for the District. This allows the District to maintain normal operations and maximize its groundwater rights regardless of the temporary loss of a single well due to unforeseen emergencies.

Although the District's water supply is solely from its groundwater wells, there is an existing one-way emergency interconnection with the City of Pico Rivera with a minimum capacity of 500 gpm as discussed in Chapter 2. With that, the supply analysis would include the emergency interconnection as part of its sources of supply under the supply analysis.

Table 5-2 illustrates the District's capacity to meet demands under various conditions. The emergency interconnection offers supply surplus and redundancy in meeting these demand scenarios with the exception of the ADD+FF and MDD+FF scenarios. Under the worst-case scenario, MDD+FF, there would be a deficit of 1,741 gpm as shown in the table below.

Table 5-2 "Supply Analysis – Largest Source Off (gpm)"

Demands and Supplies (gpm)	Total Well Capacity	Emergency Inter-connect (MIN capacity)	Domestic Demand	Fire Flow	Total Demand	Supply Surplus/ Deficit	Largest Source of Supply (Well 11)	Total with largest source out of service Supply - Surplus/ Deficit
ADD	8,050	500	1,827	0	1,827	6,723	3,000	3,723
ADD+FF	8,050	500	1,827	4,000	5,827	2,723	3,000	(277)
MDD	8,050	500	3,291	0	3,291	5,259	3,000	2,259
MDD+FF	8,050	500	3,291	4,000	7,291	1,259	3,000	(1,741)
PHD	8,050	500	4,936	0	4,936	3,614	3,000	614

5.3.1 Well Efficiency

In order to maintain well efficiency, is not recommended or feasible to have a well operating at 100% over the course of a year. Instead, it is preferable to operate a well four or five days a week (approximately 65% per year).

Operating a well at 100% over the course of the year can lead to poor water production, water quality, result in the pump or motor needing to be replaced or rebuilt more often, and cause the well to require more frequent rehabilitation. The District has five active groundwater supply wells and since there is a sufficient number of wells not to have any of them operate 100% of the time, it is recommended not to operate any of the wells above 65% per year.

Hydraulic testing was done by Southern California Edison for Wells 4A, 5A, 8, and 10 in order to determine the overall plant efficiency for each well site. At the time of this testing, Well 11 was not in service and so wasn't tested. The hydraulic testing results for the wells along with the booster pumps tested are summarized in Table 5-3. If several tests were done, the overall plant efficiency reported in Table 5-3 below is from the test with the highest pump speed.

Although Well 11 was not tested, we can assume that its efficiency is the same as its original efficiency as it was recently put in service in September 2020. Overall efficiency is the pump efficiency multiplied by the motor efficiency. Since the pump efficiency from the pump curve is 80.9% and the guaranteed motor efficiency is 95.0%, the overall well efficiency is calculated to be 76.9%. Table 5-3 shows this calculated efficiency for Well 11 along with the testing results of the other wells. It is recommended to have efficiency testing done for Well 11 after the first or second year of it being in service.

Table 5-3 "Results of Southern California Edison Hydraulic Testing"

Name of Pump	Year Tested	Overall Plant Efficiency (%)
Cate BP 1	2016	59.0
Cate BP 2	2016	73.1
Cate BP 3	2016	73.2
Well 4A	2016	62.3
Well 5A	2014	71.6
Well 8	2016	61.1
Well 10	2016	59.0
Well 11	2020*	76.9
*year Well was put in service.		

5.4 Storage Analysis

The District has a 1.25 MG storage tank but only has 1.01 MG of operational storage as discussed in Chapter 2 of the report. The storage tank is partially underground at about 15 feet below ground surface and 10 feet above. The Cate Reservoir is typically 80% full most of the time where refill stops at a high-water line of 22 feet.

Per California Code of Regulations, Title 22, Section 64554[3], for a water distribution system with 1,000 or more service connections, the system shall be able to meet four hours of PHD with source capacity, storage capacity and/or emergency source connections. The water distribution system's MDD and PHD requirements shall be met in the system as a whole and in each individual pressure zone. PWD solely utilizes its groundwater wells as its primary source of water. However, PWD is unique due to the way some of their sources are backed up.

Wells 11, 10 and 5A have a combined capacity of 5,800 gpm and are backup by onsite generators. These wells can meet normal and emergency system demands since they are backed up by generators in case of a power outage. Due to this, the generators are able to provide that redundant source of power under a maximum day event. The MDD for PWD under this study was calculated to be 3,291 gpm. This amount is approximately 56% of the total well capacity that is backed up by onsite generators. For this reason, PWD methodology to calculate for storage capacity is different than typical industry standards and is described below.

To calculate the storage capacity required for PWD, the sum of the operational storage and fire storage would be calculated and compared to the total operational storage capacity. Operational storage would represent 30% of MDD and fire storage would represent 2 hours of the maximum fire flow requirement in the district (4,000 gpm for the duration of 4 hours). The total required storage was calculated to be 1.90 MG creating a deficit of 0.89 MG as shown in Table 5-1 below.

$$Total\ Operational\ Storage\ Capacity\ (MG) - Total\ Required\ Storage\ (MG) = Storage\ \ Surplus/Deficit\ (MG)$$

$$Total\ Operational\ Storage\ Capacity\ (MG) - [Operational\ Storage\ (MG) + Fire\ Storage\ (MG)] = Storage\ \ Surplus/Deficit\ (MG)$$

$$1.01\ MG - [1.42\ MG + 0.48\ MG] = (0.89\ MG)$$

With that, it would be recommended to construct an additional reservoir of approximately 0.89 MG to meet capacity needs.

Table 5-4 "Storage Analysis"

Total Operational Capacity (MG)	Operational Storage (30% of MDD) (MG)	Fire Storage (2 hrs of 4,000 gpm) (MG)	Total Required Storage (MG)	Storage Surplus/ Deficit (gallons)
1.01	1.42	0.48	1.90	(0.89)

[3] California Code of Regulation, Title 22 – Section 64554 – New and Existing Source Capacity

5.5 Booster Station Capacity Analysis

The District has three booster pumps at the Cate Booster Pump Station with a total available capacity of 2,163 gpm. With the largest booster pump (No.3) out of service, the capacity decreases to 1,313 gpm.

The total capacity of the booster station with the largest pump out of service must be capable of offsetting the deficiency created between the combined production capacity with the largest single source out of service and the maximum day demand plus fire flow. Per Table 5-1, the deficiency is approximately 1,741 gpm.

$$Booster\ Pump\ Capacity\ with\ largest\ pump\ out\ of\ service\ (gpm)$$
$$+(MDD + FF\ Deficiency\ (gpm)) = Booster\ Pump\ Capacity\ Surplus/Deficit\ (gpm)$$

$$1{,}313\ gpm + (-1{,}741\ gpm) = (-428\ gpm)$$

Therefore, there would be a deficit of 428 gpm for the booster station capacity within the District's water system as shown in Table 5-4 below.

Table 5-5 "Booster Station Capacity Analysis"

Total BPS Capacity (gpm)	Total with largest pump out of service (gpm)	MDD+FF Deficiency (gpm)	Supply Surplus/ Deficit (gpm)
2,163	1,313	(1,741)	(428)

Chapter 6 - Computer Model

6.1 General Description

A computer model is comprised of a series of programmed fixed and variable data that work in coordination with each other to represent a hydraulic system. In order to analyze PWD's water distribution system, a computer model will be generated to simulate the system. This chapter will discuss the concept of the hydraulic model, its construction, and its calibration.

6.2 Modeling Software

The computer modeling software used to model PWD's water system is the InfoWater software developed by Innovyze. InfoWater is a sophisticated software package that utilizes geographic information system (GIS) as a visual interface. InfoWater operates using the Windows environment to perform steady state and extended period simulations of water distribution systems, which include reservoirs, pumps, pipes, tanks and control valves.

6.3 Model Construction

The PWD hydraulic model relies on programming fixed and variable data, which is used to perform hydraulic calculations.

6.3.1 Data Sources

To develop the PWD water model, the following information was used:

- GIS files
- Digital Elevation Model (DEM) –LA County 2006 Elevations model
- Annual Consumption Data
- PWD Water Production Summary
- Facility Drawings of booster pumps, active groundwater supply wells, and Cate Reservoir
- Southern California Edison (SCE) pump efficiency test results

6.3.2 Fixed Data

A set of fixed data must be programmed into the hydraulic model's database, which determines a large portion of the water model. Fixed data is gathered through a combination of plans and maps of infrastructure provided by PWD in tandem with other publicly available documents and files to compile the water model. Fix data includes but are not limited to:

- Political Data: lot lines, rights-of-way, identification of institutions and continuous structures, political boundaries

- Pipes: alignments, materials, diameters, years of installation and connectivity
- Plants: layouts, components (tanks, wells, pumps valves) connections to the grid
- PRVs (Pressure Reducing Valves): locations
- Pressure Zones: zone boundaries (facilities, valves)

6.3.3 Variable Data

Variable data is comprised of the dynamic attributes of a water distribution system that tend to change over time. Whilst variable data such as pump activity and valve settings can be controlled by PWD, variable data such as customer demand in the system or the pumping surface of the aquifer are outside of the District's control. Both types of variable data are incorporated into the hydraulic model.

6.3.4 Simulation Conditions

Before initiating the simulation of the water system, the engineer defines the parameters of the simulation to enable the software package to perform calculations on the water model. The parameters used to prepare the Water Master Plan update include:

- Steady State Simulation (a single solution associated with a specific instantaneous moment of time)
- Fire Flow Simulation (a series of steady state solutions that assumes a fire flow demand is applied to a designated hydrant location)
- Multi-Fire Flow Simulation (a steady state solution describing the performance of multiple hydrants flowing simultaneously)

The water model allows the engineer to save and recall any combination of fixed data, variable data and simulation conditions. These combinations are referred to as "scenarios" in the water model and represent a set of boundary conditions of interest to the engineer.

6.3.5 Output Data

Once a successful simulation has run, the water model returns the following output data:

- Pressure at each node
- Flow and energy losses through every pipe
- Performance of every valve, pump and tank

Data output format may be summarized in the form of tables, graphics or as a combination of both depending on the nature of the scenario.

6.3.6 Pump Efficiency Test

Pumps were programmed with pump data provided by PWD. Manufacturer pump curves were provided and were used to create operational settings for pumping facilities and control valves.

To program pumps in the water model, each pump must be able to respond to changes in intake and discharge pressure based on their respective performance curves. A performance curve shows the relationship between total dynamic head (H[4]) and flow (Q[5]).

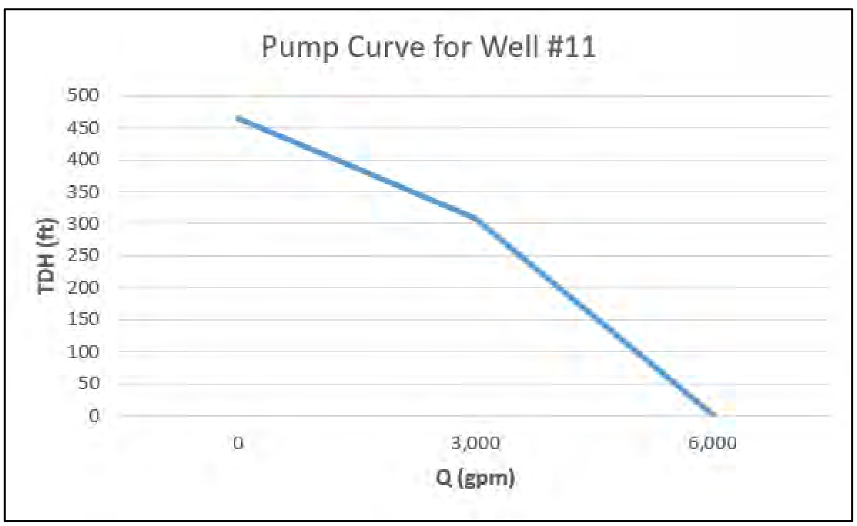
The performance curves are also classified as a design point curve or a multiple point curve. Design point curves take a single point of rated flow and rated head to generate a generic curve approximating the pump's actual performance. This is achieved by using manufacturer pump curves provided by PWD. The water model calculates a parabola that passes through the following set of points to approximate the curve:

- Design Point (H, Q)
- Shut-off Head (1.5H,0)
- Shut-off flow (0, 2Q)

Table 6-1 "Design Point Curve Data for Well Pump No.11"

Point	H (feet)	Q (gpm)
Shut-Off Flow	465	0
Design Point	310	3,000
Shut-Off Head	0	6,000

Using the input data above, a design point curve was created for the remaining wells. A sample design point curve for Well 11 is shown below.



6.3.7 Variable Frequency Drive (VFD)

The PWD system utilizes variable frequency drive (VFD) for all their well pumps with the exception of Well No.4. All their corresponding set points are provided in Table 2-8 and incorporated into the latest water model. None of the booster pumps have VFDs.

[4] H = Total Dynamic Head in feet, test data are from 2020
[5] Q = Flow Rate in gpm, test data are from 2020

6.3.8 Demand Allocation

Water demand is allocated into the water model by plotting its top users first and then distributing an average residential and commercial demand accordingly per its best corresponding land usage.

The top users of the PWD water system were determined from the provided 2018 consumption data. These user's demands were collected and placed within the computer model representative of their physical location in real life to simulate an appropriate water consumption and demand. Section 4.10 describes the top users and their demands on the system.

After totaling the consumption data and placing the demands from the top 20 users into the computer model, the remaining demand is distributed into the model. The remaining demand is distributed evenly on nodes along distribution mains, not including fire hydrants, fire hydrant tees, valves or nodes with a demand from a top user. The demands that were allocated were then increased by a common factor to take into consideration loss of water and so that the model runs on production summary values.

6.3.9 Development of Modeling Scenarios

Developing modelling scenarios is a crucial component of the construction of the model. Various scenarios are created within the model to assist with different facility sets, operation conditions, and data sets. For the PWD model, four different steady state scenarios were created. These scenarios are: Average Day Demand (ADD), Maximum Day Demand (MDD), Maximum Day Demand plus Fire Flow (MDD+FF), and Peak Hour Demand (PHD).

The ADD scenario would serve as a benchmark and as a planning tool for long-term issues at the system level, such as supply acquisition and integrated resource management.

The MDD scenario would serve as a planning tool at the pressure zone level. MDD is the peak loading for typical booster-reservoir pressure zones for analysis.

The MDD+FF scenario is intended to determine the system's capacity to meet the fire flow requirements under a worst-case scenario while maintaining a minimum residual pressure of 20 psi throughout the system.

The PHD scenario is a planning tool used to analyze the distribution system's capability to provide satisfactory supply for the entire system during the one hour in the maximum day with the highest demand.

6.4 Modeling Calibration

Prior to analyzing the PWD water system, calibration to the water model must take place. Calibration for this model was achieved by taking the steady state simulation and fine-tuning the model with the fire flow field results and real-world properties such as elevation and energy losses from roughness coefficients.

6.4.1 Steady State Calibration

Steady state calibration consists of confirming vertical control and energy losses due to friction in the water system.

Vertical control comprises of two operations, (1) Verifying elevations using online GIS, and (2) comparing historical system pressure reads and historical fire flow records to the model's results.

The PWD InfoWater model elevations were verified using Google Earth and digital elevation models (DEM) from USGS's LA County 2006 region. DEMs were used to import elevations into the water model. Once elevations were imported into the model, they were manually verified using Google Earth. Since the District does not have pressure monitoring stations in its water system, static pressures were determined through calculation and compared to the model to complete the vertical control. System monitoring locations and fire hydrants were then tested under maximum day plus fire flow scenarios to replicate fire flow tests.

System Monitoring Site

The District provided system pressure monitoring historical data from March 2021 through July 2021 from five difference site as additional data to use to calibrate and verify the accuracy of the hydraulic model. These five locations are distributed throughout the PWD service area. After calibrating the model with the fire flow tests provided, the average system pressures during the time frame of the historical data were obtained and compared to the model simulation results in the site area. **Error! Not a valid bookmark self-reference.** below shows the difference between the results of the pressure in the model compared to the average pressures of each individual site.

Table 6-2 "System Monitoring Locations"

Site #	Average Pressure (psi)	Model Simulation Pressure (psi)	Difference (%)
1	56	61	9%
2	69	72	4%
3	70	71	2%
4	70	75	6%
5	67	67	0%

Field Fire Flow Testing

Table 6-3 shows all hydrants tested during the steady state calibration. Observed results from field tests provided by PWD and the simulated results from the calibrated model can be compared for accuracy. During field testing, one fire hydrant was tested for flow and another fire hydrant was tested for pressure. Each simulated result for static pressure and residual pressure are within 10% of the observed result.

Table 6-3 "Fire Flow Calibration"

Hydrant Test No.	Fire Hydrant for Flow	Date of Fire Flow Test	Static Pressure (psi)			Residual Pressure (psi)			Flow Rate at 20 psi Residual Pressure (gpm)		
			Observed	Simulated	Diff (%)	Observed	Simulated	Diff (%)	Observed	Simulated	Diff (%)
1	E1-501	9/13/2021	70	73	-4%	62	64	-2%	2,838	1,830	36%
2	G1-504	9/13/2021	72	75	-4%	64	66	-3%	3,068	2,486	19%
3	D3-548	9/13/2021	72	69	4%	68	66	2%	4,215	1,832	57%
4	C2-502	8/31/2021	68	67	1%	62	63	-2%	3,110	934	70%
5	D4-511	8/31/2021	68	71	-4%	65	68	-5%	4,620	6,503	-41%
6	D2-502	8/31/2021	71	72	-1%	66	68	-3%	3,137	1,574	50%
7	G2-534	9/13/2021	70	73	-4%	62	64	-2%	3,248	2,698	17%
8	B3-523	9/13/2021	72	75	-4%	64	66	-3%	2,735	1,461	47%

All static and residual pressures are within acceptable range for calibration. PWD provided available fire flow results at 20 psi residual that take the following into consideration: static pressure, residual pressure, pitot gage pressure, and size of outlet diameter. There may be a need to run additional field fire flow tests to verify flows.

The hydraulic model takes into consideration the energy losses within the system caused by friction due to water flowing through pipelines. This is where age and roughness coefficient play a factor. The model utilizes the Hazen-Williams equation, an empirical formula applicable to turbulent flow and the roughness coefficient "C-factor" in calculations for energy loss. The roughness coefficients used in the model are shown in Table 5-1, and these coefficients were calculated by taking diameter, material, and age into consideration.

Chapter 7 - Asset Analysis and Recommended Capital Improvement Projects

7.1 Infrastructure Replacement Criteria

All components of the distribution system have a finite service life. Individual components may wear out prematurely or outlive their recommended life cycle; however, for planning purposes average life cycles should be considered when budgeting replacement costs. Two factors help identify system components whose replacement would create a net benefit to the District: age and performance indicator.

Table 7-1 displays each component that makes up the PWD's water system infrastructure and provides a methodology for identifying and corroborating cyclical replacement. Prior to replacement (or maintenance as indicated), both criteria should be met. The "Interval criterion" represents the age in years and in "Indication criterion" represents the condition. Age is derived from the average historical replacement cycle for a system component exceeding its recommended age that also exhibits poor condition should be considered a strong candidate for replacement.

Care should be taken to replace inefficient, worn or damaged infrastructure in a timely manner to avoid excessive repair costs and other vulnerabilities.

Table 7-1 "Infrastructure Replacement Criteria"

Component	Interval (years)	Indication
Pipelines	60	Frequent repair history, excessive energy losses
Pump/Motor Overhaul	15	Drop in efficiency below 65%
Pump/Motor Replacement	30	Frequent repair history, drop in efficiency
Well Rehabilitation	50	Decline in effective capacity
Generator Refurbishment/Replacement	25	Age, Frequent repair history and inspection
Production meter calibration	5	Drop in Accuracy
Production meter replacement	20	Drop in Accuracy and Reliability

7.2 Evaluation Based on Age and Condition

Budgeting for cyclical replacement is a statistical process. Using Table 7-1, it can be determined what components in PWD's water system infrastructure exceed their recommended age and exhibit poor condition. The components that meet both these requirements should be considered a candidate for maintenance or replacement.

The following items should be scheduled to be done:

   - Minimum of 30,305 feet for pipeline replacement

- 2 pump replacements
- 2,741 water meter replacements

- Additional SCADA equipment/upgrades

7.2.1 Pipeline Replacement

In 2012, the American Water Works Association (AWWA) published a report on water pipeline replacement called *Buried No Longer: Confronting America's Water Infrastructure Challenge*. In this report, it is suggested that asbestos concrete pipe in the western United States has an average service life of 105 years.

The majority of the District's water mains are asbestos concrete pipe (65.2%). The total length of the pipeline in the system can be used to calculate the length of pipe that is recommended to be replaced over a 10-year period. This report implies that an average of 3,030 feet of pipeline replacement should be scheduled per year or 30,305 feet over a 10-year period:

$$\left(\frac{length\ of\ pipe}{life\ cycle}\right)(10\ years) = \left(\frac{318{,}204\ feet}{105\ years}\right)(10\ years)$$

$$\cong 30{,}305\ feet\ of\ pipe\ over\ a\ 10\ year\ period$$

AC pipe has an average service life of 105 years but pipelines are generally recommended to be replaced around the year 60. Pipelines with an age over 65 and 85 were considered with a much higher weight than those below.

These pipelines should be considered for replacement if (1) there is a history of pipe breaks, (2) they were shown to be hydraulically deficient, (3) they are past their service life, or (4) the current pipe diameter could cause fire flow deficiency with future demand growth (4-inch pipelines).

It is crucial that pipelines are not hydraulically restricted and meet fire flow criteria. The District's pipeline leak history was also considered when identifying pipeline replacement candidates for CIPs. PWD's online Nobel System Geoviewer portal shows the latest information for leakage of pipelines. Leakage in pipelines that are of age were candidates for CIPs.

The pipeline ratings were developed according to number of pipe breaks, magnitude of fire flow deficiency, age and if current pipe diameter could cause future fire flow deficiency. A higher rating means that the pipeline should be a higher priority when choosing candidates for replacement.

Although it is estimated that approximately 30,305 feet of pipe should be replaced in a span of over 10 years, the total linear footage of pipeline replacement for this WMP was estimated to be approximately 32,755 feet as shown in the table below. The additional linear footage of pipeline accounts for potential projects that would improve the PWD system to meet fire flow requirements in areas that are currently deficient.

- There are three priority levels for the pipeline projects: High Priority: +/- 7,655 feet of pipeline replacements
- Medium Priority: +/- 18,915 feet of pipeline replacements

- Low Priority: +/- 6,185 feet of pipeline replacements

Table 7-2 shows the pipeline candidates selected sorted by highest priority and rating to lowest priority and rating. Appendix 5 displays a map of the pipeline replacement candidates within the system. Further details on these candidates will be given in Section 7.3.1.

Table 7-2 "Pipeline Replacement Candidates by Rating"

Priority	CIP #	Project Name	Proposed Pipe Diameter	LF of Improvement for CIP
High	1	Bartolo Ave Pipe Improvement	8	1,280
High	2	Paramount Blvd Pipe Improvement	8	665
High	3	De Land Ave & Lindsey Ave Pipe Improvement	8	1,190
High	4	West Blvd & Tobias Ave Pipe Improvement	8	1,025
High	5	West Blvd (Speedway St) Pipe Improvement	8	755
High	6	Walnut Ave & Olympic Blvd Pipe Improvement	8	2,740
Med	7	Bradhurst St Pipe Improvement	8	1,010
Med	8	Loch Avon Dr, Townley Dr, Bexley Dr, Havenwood St, Loch Lomond Dr, Glencannon D Pipe Improvements	8	6,430
Med	9	Layman Ave Pipe Improvement	8	440
Med	10	Walnut Ave & Union Street Pipe Improvement	8	965
Med	11	Beverly Rd Pipe Improvement	8	1,550
Med	12	Crossway Dr & Carron Dr Pipe Improvement	8	1,965
Med	13	Rosemead Blvd Pipe Improvement	8	235
Med	14	Fishman Rd Pipe Improvement	8	155
Med	15	Loch Alene Ave, Lochinvar, and Bonnie Vale Pl Pipe Improvement	8	1,835
Med	16	Citronell Ave & Lindsey Ave Pipe Improvement	8	1,360
Med	17	Rosemead Blvd (Coffman Pico Rd) Pipe Improvement	8	275
Med	18	Olympic Blvd/Way & Beverly Rd Pipe Improvement	8	1,530
Med	19	Acacia Ave Pipe Improvement	8	730
Med	20	Durfee Ave Pipe Improvement	8	435
Low	21	Call St & Lemoran Ave Pipe Improvement	8	725
Low	22	Whittier Blvd Pipe Improvement	8	365
Low	23	Rosemead Blvd (Red Rd) Pipe Improvement	8	575
Low	24	Haney St Pipe Improvement	8	1,485
Low	25	Beverly Blvd N Frontage Rd Pipe Improvement	8	650
Low	26	Rosemead Blvd (Bexley Dr) Pipe Improvement	8	115
Low	27	Loch Alene Ave Pipe Improvement	12	1,505
Low	28	Washington Blvd Pipe Improvement	8	685
Low	29	Rosemead Blvd (Danbridge St) Pipe Improvement	8	80

Priority	CIP #	Project Name	Proposed Pipe Diameter	LF of Improvement for CIP
			Total Linear Footage of CIP Projects	32,755

The total linear footage of the pipeline candidates is 32,755 feet.

7.2.2 Pump Maintenance and Replacement

PWD's active pumps are being considered for this pump maintenance and replacement analysis. Pumps at locations that are inactive (Well #7), abandoned (Well #6), or Destroyed are not considered.

A summary of the pumps within PWD is listed as follows:

- Per Table 2-1, there are five active well pumps.
- Per Table 2-6, there are three pumps at the Cate Reservoir.

In total, there are eight pumps that need to be considered in this analysis. The inactive or abandoned wells should not be considered for replacement unless they are reactivated.

Table 7-1 indicates that a pump and its motor should be overhauled at 15-year intervals and replaced once in a 30-year period. As a result, in a 30-year cycle, a pump and its motor is recommended to be overhauled once and replaced once. Table 7-3 and Table 7-4 show the dates of replacement for the well and reservoir pumps in the District's system and the remaining life of the pump before it needs to be overhauled or replaced as of 2022.

Table 7-3 "Active Well Remaining Pump Life"

Well	Year Pump In Service	Remaining Life of Pump (Overhaul)	Remaining Life of Pump (Replacement)	Overall Plant Efficiency (%)
4A	1983	(24)	(9)	62.3
5A	1985	(22)	(7)	71.6
8	1955	(52)	(37)	61.1
10	2010	3	18	59.0
11	2018	11	26	76.9

Table 7-4 "Active Booster Pump Remaining Pump Life"

Pump Station	Pump #	Year In Service	Remaining Life of Pump (Overhaul)	Remaining Life of Pump (Replacement)	Overall Plant Efficiency (%)
Cate Reservoir	1	2008	1	16	59.0
	2	2000	(7)	8	73.1
	3	2004	(3)	12	73.2

If a pump is over 30 years old and below the 65% efficiency rating threshold, it should be a candidate for replacement. The pumps listed in Table 7-5 are recommended candidates for replacements. A total of two pumps (Well 4A and Well 8) are older than 30 years and perform with an efficiency less than 65%. Well 5A has an efficiency above the 65% efficiency rating threshold, but is ready to be replaced. It is recommended for this pump to be replaced if determined from an inspection.

Table 7-5 "Pumps Candidates for Replacement"

Pump Name	Eff. (%)
Well 4A Pump	62.3
Well 8 Pump	61.1

Wells 4A and 8 are older than the 15-year threshold age to be overhauled, but are also within the criteria for being replaced. As a result, these should just be replaced instead of being overhauled. Similarly, Well 5A is eligible for replacement if determined from inspection.

The remaining candidates for overhaul without being eligible for replacement is Cate Reservoir Booster Pump #2 and #3. However, these both are performing above the 65% efficiency rating. Since the pumps are still performing within the limits of the design criteria, it is recommended for this pump to be closely monitored and overhauled if determined from an inspection.

7.2.3 Well Casing Rehabilitation

Wells should be rehabilitation within a 50-year period according to Table 7-1. Dates when the wells were last rehabilitation was provided by the District in Table 7-6. Per the table, Wells 8 and 10 need to be scheduled for rehabilitation during the ten-year period.

Table 7-6 "Remaining Life of Wells"

Well Identification	Last Year Rehabbed	Years Left before Rehabilitation needed
4A	1983	11
5A	1983	11
8	1955	(17)
10	1925	(47)
11	2018	46

7.2.4 Generators Refurbishment or Replacement

Generators should be refurbished or replaced within a 25-year period according Table 7-1. The PWD system uses portable generators. It is recommended to inspect each generator at the end of the life cycle to determine if replacement is necessary.

Table 7-7 "Remaining Life of Generators"

Pump Station	Manufacturer	Model	kW	kVA	Year	BHP
Well #11	Caterpillar	XQ400	400	500	2009	536
Well #10	77 Caterpillar	XQ200	200	227	2013	268
Well #5A	79 Caterpillar	XQ200	182	227.5	2014	244
District Yard	Caterpillar	XQ60	47.5	59.4	2018	64

7.2.5 Meter Replacement

The PWD system has a total of 5,482 active manual meters. Over a typical 10-year period, there should be 2,741 scheduled meter replacements as discussed with PWD staff:

$$\left(\frac{5{,}482\ meters}{20\ year\ cycle}\right)(10\ years) \cong 2{,}741\ new\ meters\ per\ 10\ year\ period$$

As of early June 2023, 3,451 meters have been replaced with 2,031 remaining to be converted to automated meter reading (AMR). These existing AMRs range from 5/8-inch to as large as 10-inch.

7.2.6 SCADA Improvements

In 2017, PWD's SCADA system had its system computer replaced which included hardware, software, and services to upgrade to a new and fully functional virtualized environment for the District's Wonderware SCADA system. The hardware upgrades included the installation of the latest version of Wonderware software licenses and replacement of the existing *SCADAlarm* software with new Win-911 Alarm Notification software.

In September 2020, the SCADA system incorporated Well #11 into its computer system.

In the near future, PWD would also like to further improve their SCADA system by implementing future updates to SCADA hardware, software and any necessary programming services. Programming services would include, but not limited to project management, engineering, SCADA programming, networking, startup and training. By implementing future updates to its SCADA system, PWD will be able to continue to keep their system up to date with the latest technology and their infrastructure well monitored.

7.3 Capital Improvement Projects

The Capital Improvement Program (CIP) is a set of projects recommended to be implemented within future years in order to meet existing deficiencies in the District's water system.

Individual projects are given relative priority based on perceived urgency. The priorities for projects are meant for the purpose of assisting with scheduling and implementation rather than being a rigid deadline. It is recommended to corroborate current conditions in the field with operations prior to implementation of these recommendations.

The estimates for capital projects are based on cost assumptions. The cost estimates for piping projects include approximate costs for trenching, pipe and pipe fittings, valves, street repair, hydrants, and service laterals. The unit costs associated with the cost estimates for capital projects are shown in Table 7-8.

Table 7-8 "Unit Cost Assumptions"

Category	Item	Unit Cost	Unit
	6-inch pipes	$230	$/foot
Pipes	8-inch pipes	$325	$/foot
	12-inch pipes	$485	$/foot
	16-inch pipes	$605	$/foot
Pump	Pump Overhaul	$25,000	$/pump
	Pump Replacement	$100,000	$/pump
	Pump Additions	$500,000	$/pump
Well	Well Refurbishment	$300,000	$/well
Meter	Meter Replacement	$600	$/meter
Generator	Generator Replacement	$250,000	$/generator
SCADA	Additional/Upgrade Equipment	$500,000	lump sum

Table 7-9 summarizes the Capital Projects to be considered for future planning and the costs associated with them. Construction costs are based on the unit cost assumptions shown in Table 7-8. The engineering fees are 7.5% of the construction cost, the admin and inspection, another 7.5%. and the contingency is 20% of the total estimated construction cost based on the unit cost assumptions listed in Table 7-8. The total cost of the capital projects is the sum of the construction, engineering, admin and inspection, and contingency costs as shown below.

Table 7-9 "Capital Projects Costs"

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	High	Bartolo Ave Pipe Improvement	$416,000	$31,200	$31,200	$83,200	$561,600
	High	Paramount Blvd Pipe Improvement	$216,125	$16,210	$16,210	$43,225	$291,770
	High	De Land Ave & Lindsey Ave Pipe Improvement	$386,750	$29,010	$29,010	$77,350	$522,120
	High	West Blvd & Tobias Ave Pipe Improvement	$333,125	$24,985	$24,985	$66,625	$449,720
	High	West Blvd (Speedway St) Pipe Improvement	$245,375	$18,405	$18,405	$49,075	$331,260
	High	Walnut Ave & Olympic Blvd Pipe Improvement	$890,500	$66,790	$66,790	$178,100	$1,202,180

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	Med	Bradhurst St Pipe Improvement	$328,250	$24,620	$24,620	$65,650	$443,140
	Med	Loch Avon Dr, Townley Dr, Bexley Dr, Havenwood St, Loch Lomond Dr, Glencannon D Pipe Improvements	$2,089,750	$156,735	$156,735	$417,950	$2,821,170
	Med	Layman Ave Pipe Improvement	$143,000	$10,725	$10,725	$28,600	$193,050
	Med	Walnut Ave & Union Street Pipe Improvement	$313,625	$23,525	$23,525	$62,725	$423,400
	Med	Beverly Rd Pipe Improvement	$503,750	$37,785	$37,785	$100,750	$680,070
	Med	Crossway Dr & Carron Dr Pipe Improvement	$638,625	$47,900	$47,900	$127,725	$862,150
	Med	Rosemead Blvd Pipe Improvement	$76,375	$5,730	$5,730	$15,275	$103,110
	Med	Fishman Rd Pipe Improvement	$50,375	$3,780	$3,780	$10,075	$68,010
	Med	Loch Alene Ave, Lochinvar, and Bonnie Vale Pl Pipe Improvement	$596,375	$44,730	$44,730	$119,275	$805,110
	Med	Citronell Ave & Lindsey Ave Pipe Improvement	$442,000	$33,150	$33,150	$88,400	$596,700
	Med	Rosemead Blvd (Coffman Pico Rd) Pipe Improvement	$89,375	$6,705	$6,705	$17,875	$120,660
	Med	Olympic Blvd/Way & Beverly Rd Pipe Improvement	$497,250	$37,295	$37,295	$99,450	$671,290
	Med	Acacia Ave Pipe Improvement	$237,250	$17,795	$17,795	$47,450	$320,290
	Med	Durfee Ave Pipe Improvement	$141,375	$10,605	$10,605	$28,275	$190,860
	Low	Call St & Lemoran Ave Pipe Improvement	$235,625	$17,675	$17,675	$47,125	$318,100
	Low	Whittier Blvd Pipe Improvement	$118,625	$8,900	$8,900	$23,725	$160,150

Category	Priority	Recommended Improvement	Construction Cost	Engineering Cost	Admin and Inspection Cost	Contin-gency	Total Cost
Pipeline	Low	Rosemead Blvd (Red Rd) Pipe Improvement	$186,875	$14,020	$14,020	$37,375	$252,290
	Low	Haney St Pipe Improvement	$482,625	$36,200	$36,200	$96,525	$651,550
	Low	Beverly Blvd N Frontage Rd Pipe Improvement	$211,250	$15,845	$15,845	$42,250	$285,190
	Low	Rosemead Blvd (Bexley Dr) Pipe Improvement	$37,375	$2,805	$2,805	$7,475	$50,460
	Low	Loch Alene Ave Pipe Improvement	$729,925	$54,745	$54,745	$145,985	$985,400
	Low	Washington Blvd Pipe Improvement	$222,625	$16,700	$16,700	$44,525	$300,550
	Low	Rosemead Blvd (Danbridge St) Pipe Improvement	$26,000	$1,950	$1,950	$5,200	$35,100
Pump	Med	2 Pump Replacement	$200,000	NA*	NA*	$40,000	$240,000
	Med	VFD Conversion	$835,000	NA*	NA*	$167,000	$1,002,000
Well	High	2 Well Refurbishing/ Replacing	$600,000	$45,000	$45,000	$120,000	$810,000
	Med	Well Replacement (Well No.2)	$5,185,185	$388,889	$388,889	$1,037,037	$7,000,000
Inter-connections	Med	1 Interconnect	$555,555	$41,670	$41,670	$111,115	$750,010
	Med	1 Interconnect	$555,555	$41,670	$41,670	$111,115	$750,010
Generator	Med	1 Permanent Generator	$250,000	NA*	NA*	$50,000	$300,000
						Total Cost	**$25,548,470**

* = no cost needed for the improvement

7.3.1 Pipeline CIPs

Priorities for pipeline projects were developed according to number of pipe breaks, magnitude of fire flow deficiency, age and if current pipe diameter could cause future fire flow deficiency. With the help of PWD staff, we were able to create a scoring matrix based on three categories. These categories and their corresponding weight on the matrix to determine priority is described below:

- Pipe Material, Diameter and Age (45% of score)
- Available Fire Flow Deficiencies (35% of score)
- History of Breaks on Main (20% of score)

Pipe Material, Diameter and Age:

This scoring was comprised of three individual components – material, diameter and age.

Most of the pipelines within PWD are ACP as shown in Table 2-9, and about 89% of the proposed capital improvement projects for pipelines are ACP.

If a pipeline was sized 8-inch or larger, then its diameter rating was zero (0). If it was sized a 4-inch but smaller than an 8-inch, then its diameter rating was a four (4). If it was sized smaller than a 4-inch, then the main would get a diameter rating of five (5), the highest possible rating.

As for the age, the rating was broken down as follows:

- Any pipeline main older than 100 years old (installation date of or before 1923), would receive an age rating of 5.
- Any pipeline main between 99 and 85 years (installation date between 1938 and 1924), would receive an age rating of 4.
- Any pipeline main between 84 and 65 years (installation date between 1958 and 1939), would receive an age rating of 3.
- Any pipeline main between 64 and 50 years (installation date between 1973 and 1957), would receive an age rating of 2.
- Any pipeline main between 49 and 30 years (installation date of 1993 and 1972), would receive an age rating of 1.
- Any pipeline main 29 years or newer (installation date of 1993 or newer), would receive an age rating of 0.

It is recommended to complete projects of higher priority first as they have a higher perceived urgency.

Cost estimates were estimated to include construction cost by incorporating proposed pipe diameter width, proposed trench width and approximate linear footage of pipeline improvements while incorporating industry-standard cost of approximate cost for trenching, pipe, fittings, labor/equipment cost, demolition cost, an additional 7.5% for engineering cost, 7.5% for administration and inspection, and 20% for contingency. Appendix 6 contains a breakdown of each pipeline CIP.

Appendix 5 shows all the priority pipeline CIPs based on high, medium, and low. The following improvements listed below (7.3.1.1-7.3.1.6) are based only on high priority.

7.3.1.1 Bartolo Ave Pipe Improvements

Description

Replace approximately 1,280 feet of 4-inch pipe with 8-inch DIP along Bartolo Avenue from Durfee Avenue to Tobias Avenue as shown in Figure 7-1.

Figure 7-1"Bartolo Ave Pipeline Improvements"

Justification

The existing pipeline is not meeting fire flow and is past its service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow is approximately 880 gpm. The pipeline was installed in 1927, is past its service life, and is due for replacement.

Estimate

The total cost to construct this project is estimated to be $416,000. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $561,600.

7.3.1.2 Paramount Blvd Pipe Improvements

Description

Replace approximately 665 feet of 6-inch pipe with 8-inch DIP along Paramount Boulevard from Calico Avenue to approximately 150 feet south of Beverly Boulevard as shown in Figure 7-2.

Figure 7-2 "Paramount Blvd Pipeline Improvements"

Justification

The existing pipeline is not meeting fire flow and is past its service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow is approximately 1,100 gpm. The pipeline was installed in 1950, is past its service life, and is due for replacement.

Estimate

The total cost to construct this project is estimated to be $216,125. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $291,770.

7.3.1.3 De Land Ave & Lindsey Ave Pipe Improvements

Description

Replace approximately 1,190 feet total of 4-inch pipe with 8-inch DIP along De Land Avenue and Lindsey Avenue from Whittier Boulevard to West Boulevard as shown in Figure 7-3.

Figure 7-3 "De Land Ave & Lindsey Ave Pipeline Improvements"

Justification

The existing pipelines are not meeting fire flow and are past their service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow is approximately 1,200 gpm. The pipeline was installed in 1947, is past its service life, and is due for replacement.

Estimate

The total cost to construct this project is estimated to be $386,750. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $522,120.

7.3.1.4 West Blvd & Tobias Ave Pipe Improvements

Description

Replace approximately 1,025 feet total of 4-inch pipe with 8-inch DIP along West Boulevard and Tobias Avenue, starting from Whittier Boulevard and ending at the dead end of West Boulevard as shown in Figure 7-4.

Figure 7-4 "West Blvd & Tobias Ave Pipeline Improvements"

Justification

The existing pipelines are not meeting fire flow and are past their service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow is approximately 1,200 gpm. The pipeline was installed in 1928, is past its service life, and is due for replacement.

Estimate

The total cost to construct this project is estimated to be $333,125. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $449,720.

7.3.1.5 West Blvd (Speedway Street) Pipe Improvements

Description

Replace approximately 755 feet total of 4-inch pipe with 8-inch DIP along West Boulevard from Acacia Avenue to Speedway Street as shown in Figure 7-5.

Figure 7-5 "West Blvd (Speedway Street) Pipeline Improvements"

Justification

The existing pipelines are not meeting fire flow and are past their service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow is approximately 460 gpm. The pipeline was installed in 1924, is past its service life, and is due for replacement.

Estimate

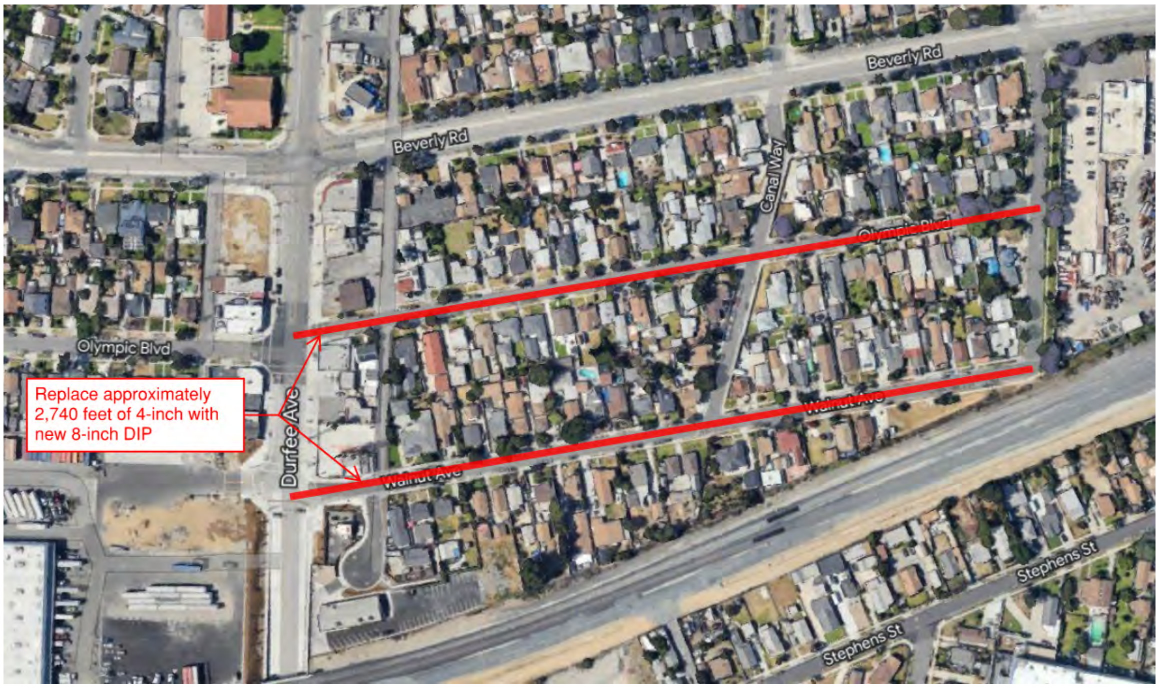
The total cost to construct this project is estimated to be $245,375. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $331,260.

7.3.1.6 Walnut Avenue & Olympic Blvd Pipe Improvements

Description

Replace approximately 2,740 feet total of 4-inch pipe with 8-inch DIP along Walnut Avenue and Olympic Boulevard from Durfee Avenue to Tobias Avenue as shown in Figure 7-6.

Figure 7-6 "Walnut Avenue & Olympic Blvd Pipeline Improvements"



Justification

The existing pipelines are not meeting fire flow and are past their service life. Upsizing the pipeline to 8-inch will meet the fire flow requirement of 1,500 gpm. Current fire flow ranges from approximately 690 gpm to 1,100 gpm. The pipeline was installed in 1924, is past its service life, and is due for replacement.

Estimate

The total cost to construct this project is estimated to be $890,500. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $1,202,180.

7.3.2 Well Pump CIPs

Well pump CIPs were developed through criteria based on age and replacement as indicated in Section 7.2.2. Based on their current ages, Well 4A and 8 Pumps are in need of replacement as opposed to overhauling. This replacement will keep the pump efficiency above design criteria and function as intended.

7.3.3 Generator CIPs

PWD uses portable generators with a recommended life cycle of 25 years. While portable generators are beneficial, it is recommended to buy and maintain a permanent generator at the Cate Reservoir Site. This way, the system can utilize the permanent generator and maintain functionality as soon as possible without any delay from transporting portable generators. Section 7.2.4 shows the status of the portable generators in the PWD system available for use.

7.3.4 Well CIPs

Well No. 8 and 10

Per Section 7.2.3, Well No.8 and No. 10 are due for refurbishment or replacement. They are over the recommended 50-year age. Wells are recommended to be refurbished in order to keep well performance water quality to standard. Performance of a well is indicative by the amount of groundwater accessible. Refurbishment allows for groundwater to be pulled through different areas of the well.

When the new MCLs for PFAS are updated, Well No.10 will most likely have to be shut down. There might be a possibility to drill a new Well No.10 in the future to meet future MCLs requirements.

Well No. 4A

At the moment, Well No.4 is meeting MCLs per the EPA criteria. However, with the legislative discussions occurring, those MCLs might change and could potentially affect whether or not Well No.4A remains as an active well for the water system. PWD will continue to closely monitor these legislative changes to determine whether or not this would require a new CIP to mitigate Well No.4A in the future.

Well No. 7

At the moment, Well No.7 is classified as “inactive” and has been since early 2012 due to low water levels. There are conversations within PWD of possibly replacing this inactive well with a new well but there is a lack of land to do so. A possible CIP in the future would be to conduct a well study to determine a new possible location for the replacement well for Well No.7.

New Well No. 2 Site - Along Tobias Avenue, north of West Blvd

A new replacement well should be constructed at the old Well No.2 site in order to maintain supply as shown in Figure 7-7 below. The new well may have an approximate capacity of 1,200 gpm and will need to include a PFAS Treatment Plant in order to meet current EPA standards. The new well will be located within a new building along with its appropriate treatment vessels. The new well will have a discharge line that will run through the PFAS treatment plant before being distributed into the water system.

Figure 7-7"Proposed Location of New Well"

The cost to construct this project is estimated to be $5,185,185. The total cost including engineering cost, administrative and inspection costs, and a 20% contingency cost is estimated to be $7,000,000.

7.3.5 Cate Booster Pump CIP

PWD has only one booster pump station as part of its water system. The booster pump station has three booster pumps that are soft starter controlled. Since these booster pumps lack variable speeds, PWD would like to create a CIP to potentially upgrade these booster pumps to VFDs (variable frequency drive) pumps.

By upgrading these existing pumps to VFDs, the District would have more flexibility when operating the VFD pumps. The cost for this potential CIP is estimated to be $1,002,000.

7.3.6 Interconnection CIPs

At the moment, PWD has one emergency interconnection with the City of Pico Rivera. As mentioned in Section 2.2.5, this interconnection is a one-way connection to receive water from the City of Pico Rivera but it is currently unable to produce sufficient water supply for either water demands and/or fire protection.

For that, the District would like to create a CIP to acquire two new possible interconnections with the City of Pico Rivera. Ideally each interconnection would be a two-way control valve that would be connected to the District's SCADA system, provide more or less the same pressure at the point of connection. The cost to construct each new interconnection is estimated to be approximately $750,010 per interconnection.

Possible Location No.1 – Rosemead Blvd and Dunlap Crossing Road

One location would be near the intersection of Rosemead Blvd and Dunlap Crossing Road. There is a 14-inch main that could connect to an existing 14-inch main that belongs to the City of Pico Rivera as shown in Figure 7-8 below.

Figure 7-8 "Possible Location of Future Interconnection No.1"

Possible Location No.2 – Passons Blvd and Nan Street

The second possible location would be near the intersection of Passons Blvd and Nan Street. There is an existing 12-inch main along Passons Blvd that could connect to an existing 12-inch main that belongs to the City of Pico Rivera along Nan Street as shown in Figure 7-9 Figure 7-8 below.

Figure 7-9 "Possible Location of Future Interconnection No.2"

PICO WATER DISTRICT
PICO RIVERA, CALIFORNIA

Prepared By

CIVILTEC
engineering inc.

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Civil, Water, Wastewater, Drainage, Transportation and Electrical/Controls Engineering, Construction Management and Surveying

<u>PICO WATER DISTRICT</u>

PROPOSED

FINANCIAL PLAN

STAFF REPORT

To: Honorable Board of Directors

From: Joe D. Basulto, General Manager

Meeting Date: November 16, 2023

Subject: Consider Board Approval of Proposed Financial Plan; Presentation by Water Resources Economics

Recommendation:

Board Approve Scenario 1

Fiscal Impact:

Improve District Funds with New Rate Schedule

Background:

Presentation by Water Resources Economics of Proposed Financial Plan;

Pico Water District

Water Rate Study Workshop

Special Board Meeting - November 16, 2023

Water Resources Economics

PROMOTING THE VALUE AND PRICE OF WATER SERVICE

Introductions

- Water Resources Economics Project Team
  - Sanjay Gaur, Project Manager
    - Email: sgaur@water-economics.com
    - Phone: 213-327-4405
  - Charles Diamond, Project Analyst
    - Email: cdiamond@water-economics.com
    - Phone: 916-844-6188

Agenda

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

- Goals of Today’s Workshop
- Rate Study Overview
- Financial Plan Assumptions
- Preliminary Financial Plan Scenarios
- Questions & Discussion
- Next Steps

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

Goals of Today's Workshop

- Provide background info on the rate study
- Solicit feedback on preliminary rate increase scenarios

Rate Study Overview

Rate Study Process

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1. **Policy framework**: Identify key policy objectives (revenue stability, customer affordability, conservation, etc.)
2. **Financial plan**: Develop multi-year cash flow projections to determine annual rate revenue requirement *(focus of today's workshop)*
3. **Cost-of-service analysis**: Allocate the rate revenue requirement to customers based on proportional use of the water system
4. **Rate design**: Identify appropriate rate structure changes and calculate proposed rates
5. **Documentation**: Develop a study report to provide transparency and defensibility

Proposition 218
(Article XIIIC and XIIID of California Constitution)

- Applies to property-related fees for service including retail water rates
- Water rate implications:
  - Rates must be proportional to and may not exceed the cost of providing water service
  - One customer class (residential, commercial, etc.) may not subsidize another customer class
  - Retail water agencies typically conduct a "cost-of-service analysis" at least once every 5 years to ensure a sufficient nexus between rates and costs
- Procedural requirements:
  - Rates must be adopted at a public hearing
  - All customers must be mailed a public hearing notice no fewer than 45 days before the hearing
  - Rates may not be adopted if a majority of customers submit a formal protest

Key Rate Study Drivers

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

- The currently adopted rates are insufficient due to:
  - New PFAS-related expenses
  - Inflationary impacts
  - Substantial 5-year planned capital expenditures
  - Significant reduction in prior year water demand

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

Current Potable Water Rates

- Current potable rate structure:
  1. **Volumetric Rate**: Uniform rate per hundred cubic feet (CCF) of water delivered
  2. **Infrastructure Charge**: Fixed charge to recover existing debt service (same for all meter sizes)
  3. **Meter Charges**: Fixed charge that increases with meter size
  4. **Fixed Private Fire Charges**: Fixed charge only applicable to customers with a private fire protection connection (fire sprinklers, etc.)

Volumetric Rates	FEB 14 2021	FEB 14 2022	FEB 14 2023	FEB 14 2024	FEB 14 2025
(All CCF)	$1.88*	$2.00*	$2.12*	$2.25*	$2.39*
Monthly Infrastructure Charge	**FEB 14 2021**	**FEB 14 2022**	**FEB 14 2023**	**FEB 14 2024**	**FEB 14 2025**
All Meters	$6.50	$6.50	$6.50	$6.50	$6.50
Monthly Meter Rates	**FEB 14 2021**	**FEB 14 2022**	**FEB 14 2023**	**FEB 14 2024**	**FEB 14 2025**
Meter Size					
Single Family Residential	$16.21	$17.19	$18.23	$19.33	$20.49
5/8"	$16.21	$17.19	$18.23	$19.33	$20.49
1"	$35.90	$38.06	$40.35	$42.78	$45.35
1 1/2"	$68.70	$72.83	$77.20	$81.84	$86.76
2"	$108.07	$114.56	$121.44	$128.73	$136.46
3"	$199.94	$211.94	$224.66	$238.14	$252.43
4"	$331.17	$351.05	$372.12	$394.45	$418.12
6"	$659.25	$698.81	$740.74	$785.19	$832.31
Fixed Private Fire Charges					
1 1/2"	$13.12	$13.91	$14.75	$15.64	$16.58
2"	$21.00	$22.26	$23.60	$25.02	$26.53
4"	$39.37	$41.74	$44.25	$46.91	$49.73
6"	$65.62	$69.56	$73.74	$78.17	$82.87
8"	$131.23	$139.11	$147.46	$156.31	$165.69
10"	$301.84	$319.96	$339.16	$359.51	$381.09

Current Recycled Water Rates

Water Resources Economics

PROMOTING THE VALUE AND PRICE OF WATER SERVICE

- Current recycled rate structure:
  1. **Volumetric Rate**: Uniform rate per CCF of water delivered (different from potable)
  2. **Meter Charges**: Fixed charge that increases with meter size (same as potable)

Volumetric Rates	**FEB 14 2021**	**FEB 14 2022**	**FEB 14 2023**	**FEB 14 2024**	**FEB 14 2025**
(All CCF)	$2.33*	$2.39*	$2.39*	$2.39*	$2.39*
Monthly Meter Rates	**FEB 14 2021**	**FEB 14 2022**	**FEB 14 2023**	**FEB 14 2024**	**FEB 14 2025**
Meter Size					
Single Family Residential	$16.21	$17.19	$18.23	$19.33	$20.49
5/8"	$16.21	$17.19	$18.23	$19.33	$20.49
1"	$35.90	$38.06	$40.35	$42.78	$45.35
1 1/2"	$68.70	$72.83	$77.20	$81.84	$86.76
2"	$108.07	$114.56	$121.44	$128.73	$136.46
3"	$199.94	$211.94	$224.66	$238.14	$252.43
4"	$331.17	$351.05	$372.12	$394.45	$418.12
6"	$659.25	$698.81	$740.74	$785.19	$832.31

Potential Rate Structure Changes

- **Infrastructure Charges:**
  - Currently the same for all meter sizes
  - May want to consider differentiating by meter size in proportion to meter capacity (i.e., larger meters pay more)

Financial Plan Assumptions

Water Resources Economics

PROMOTING THE VALUE AND PRICE OF WATER SERVICE

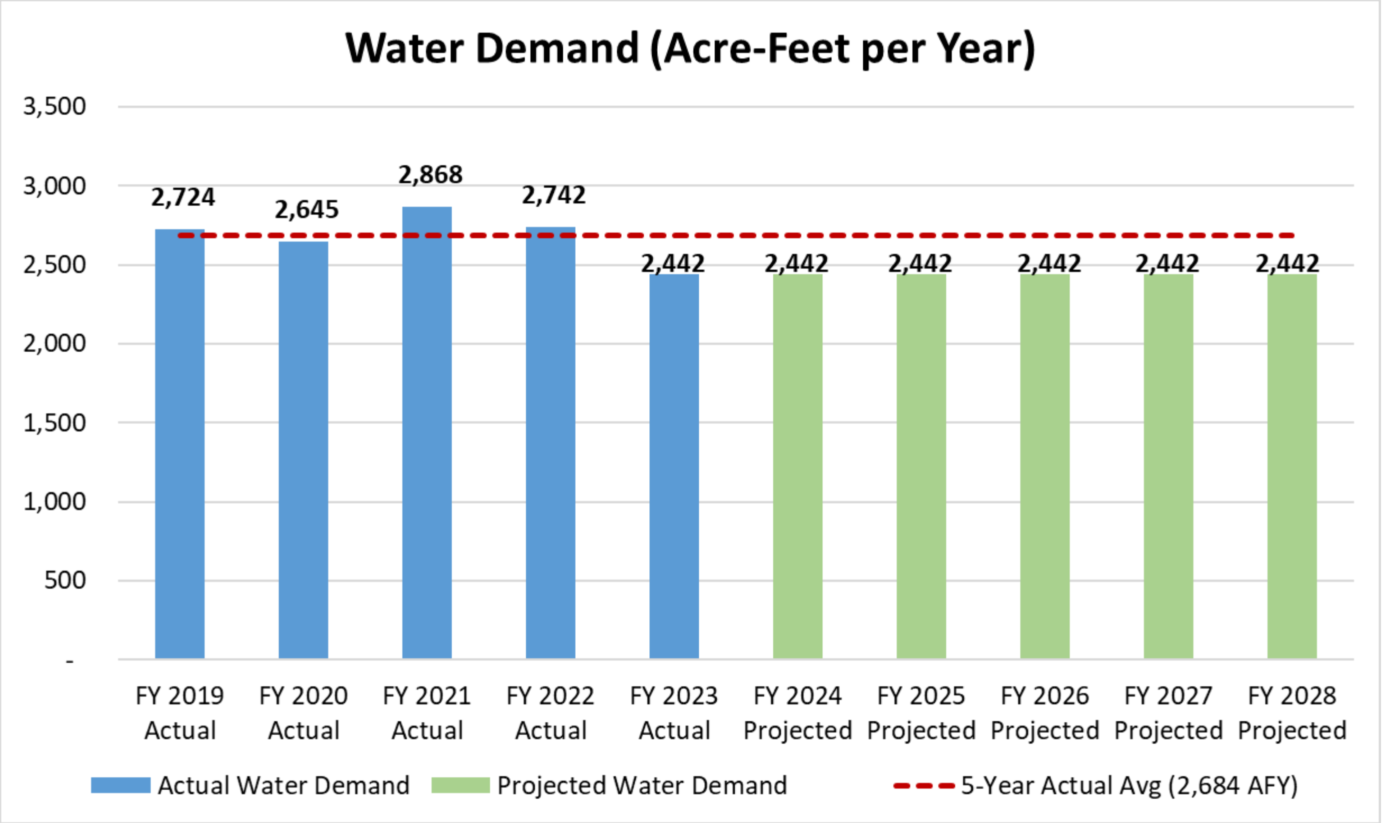
Financial Plan Overview

- Five-year projections of:
  - Revenues and expenses
  - Cash flow and reserve balances
  - Debt coverage (i.e., ability to meet debt obligations)
- Overall goal is to determine the magnitude of rate increases needed to:
  - Fund operating and capital expenses
  - Maintain sufficient reserves
  - Meet debt obligations

Financial Plan Assumptions: Customer Growth & Water Demand

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

- No new metered connections through FY 2028
- Annual water demand held constant at FY 2023 actual levels



Financial Plan Assumptions: Inflationary Assumptions

Water Resources Economics
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- O&M expenses:
  - General: 4%
  - Salaries: 5%
  - Benefits: 8%
  - Energy (SCE): 10%
  - Chemicals: 5%
  - WRD Groundwater Assessments & CBMWD Recycled Water: 5.5%
- Capital expenses:
  - CIP: 3%
- Non-Rate Revenue:
  - Miscellaneous Operating Revenue: 0%
  - House Rental Income: 5%

Financial Plan Assumptions:
5-Year Capital Improvement Plan (CIP)

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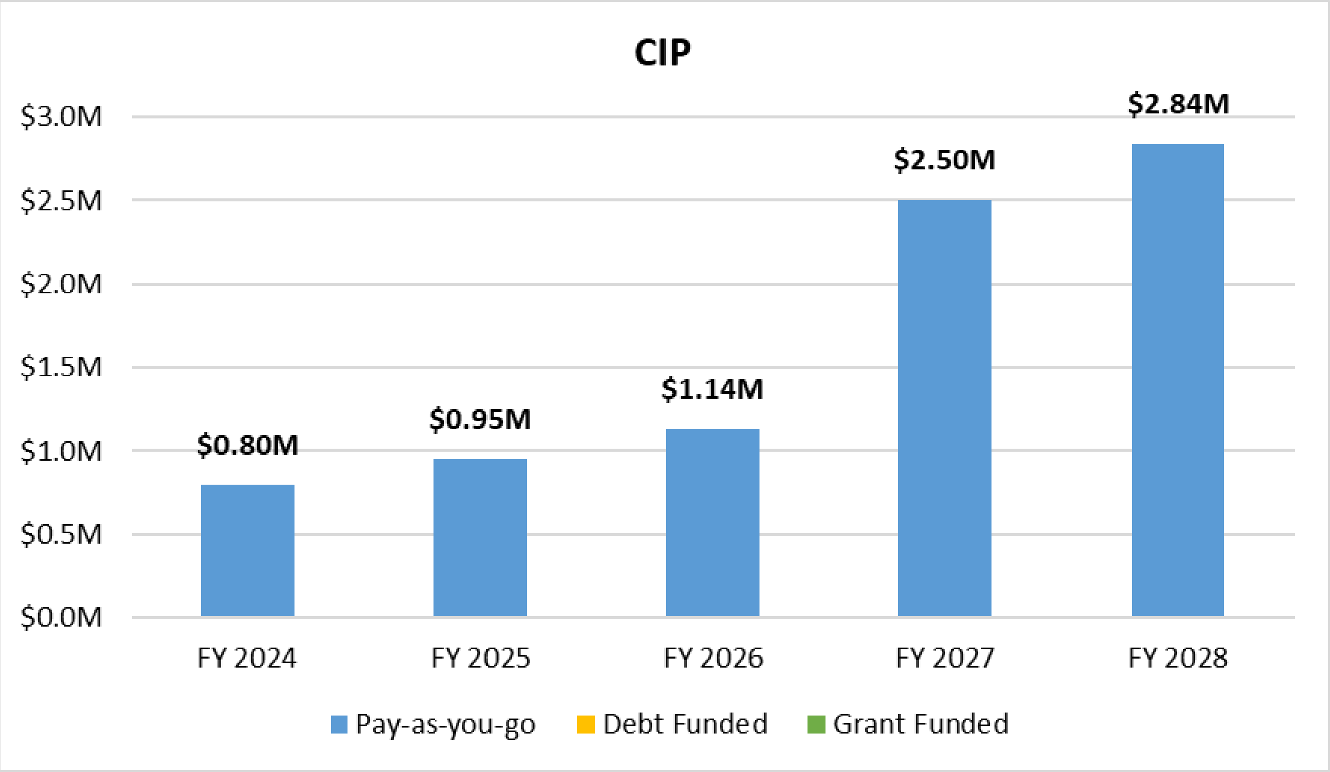
	CIP Projects	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028	5-Yr Total
1	Water Master Plan	$85,900					**$85,900**
2	Office & Board Room AC Upgrade	$25,000					**$25,000**
3	Tyler Document Management Program & Scanners	$17,000					**$17,000**
4	Utility Truck	$40,000					**$40,000**
5	New Service Truck				$131,127		**$131,127**
6	New Field Truck			$53,045			**$53,045**
7	Main Line Replacement	$50,000					**$50,000**
8	Hydrant Replacement	$12,500					**$12,500**
9	Service Line Replacement	$12,500					**$12,500**
10	Meter Replacemnt	$90,000	$329,600	$339,488	$349,673	$360,163	**$1,468,923**
11	Valve Replacement	$15,000					**$15,000**
12	Inter Connection #1 - City of Pico				$819,545		**$819,545**
13	SCADA - Upgrade					$562,754	**$562,754**
14	Rehab Well #4A - Transmission Main to Well #2 Site for PFAS Treatment				$546,364	$1,125,509	**$1,671,872**
15	Well #5A Waste Water Discharge Line	$200,000					**$200,000**
16	Well #5A - Refurbishment			$106,090			**$106,090**
17	Well #8 - Refurbishment					$112,551	**$112,551**
18	PFAS Vessel Media Replacement		$618,000	$636,540	$655,636	$675,305	**$2,585,481**
19	Other PFAS Capital Projects	$250,000					**$250,000**
	Total	**$797,900**	**$947,600**	**$1,135,163**	**$2,502,345**	**$2,836,282**	**$8,219,290**

Note: All project costs include 3% annual inflationary adjustments

Financial Plan Assumptions: 5-Year CIP Summary

Water Resources Economics
PROMOTING THE VALUE AND PRICE OF WATER SERVICE

- 5-year CIP total: $8.2 million
- Assumes 100% cash funding for CIP (i.e., pay-as-you go)



Note: CIP totals shown above include 3% annual inflationary adjustments

Financial Plan Assumptions: Reserve Policies

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- Current reserve targets based on fixed $ amounts per Board adopted resolution
- Recommended reserve targets based on formulas

Current Reserve Policy	Min	Max
1. Operating Reserve	$200,000	$750,000
2. Capital Improvement Reserve	$200,000	$2,000,000
3. Rate Stabilization Reserve	$80,000	$400,000
4. Administrative Facilities Reserve	$50,000	$200,000
Total Reserve Target	**$530,000**	**$3,350,000**

Recommended Reserve Policy	Min	Max
1. Operating Reserve	35% of annual operating expenses	35% of annual operating expenses
2. Capital Improvement Reserve	80% of annual average 5-year CIP	80% of annual average 5-year CIP
3. Rate Stabilization Reserve	N/A	20% of volumetric rate revenue
4. Emergency Reserve	N/A	$2,000,000
Total Reserve Target *(Projected FY 2024)*	**$2,709,396**	**$5,182,356**

Status Quo Financial Plan

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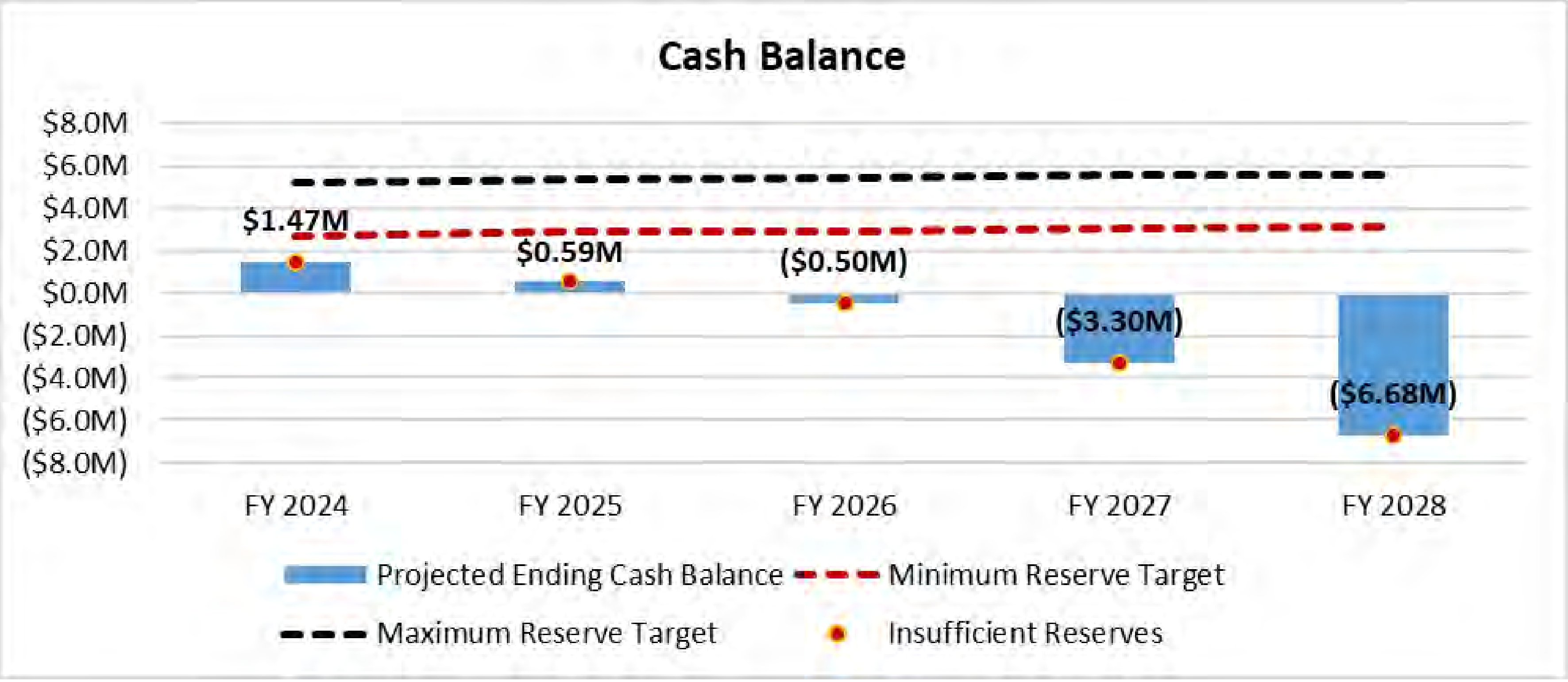
- Status quo financial plan based on currently adopted rate schedule:
  - Includes 6% adopted rate increases in Feb. 2024 & Feb. 2025
  - Reserves projected to be fully depleted in FY 2026
  - Debt coverage projected to fall below the required ratio in FY 2025

Description	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Revenues					
Revenue from Current Rates*	$4,352,262	$4,352,262	$4,352,262	$4,352,262	$4,352,262
Additional Revenue from Future Adopted Rate Increases**	$108,807	$376,471	$537,940	$537,940	$537,940
Miscellaneous Non-Rate Revenues	$191,600	$181,500	$163,137	$125,853	$65,956
Total Revenues	**$4,652,669**	**$4,910,233**	**$5,053,339**	**$5,016,055**	**$4,956,158**
O&M Expenses					
Source of Supply	$1,221,642	$1,288,482	$1,358,981	$1,433,339	$1,511,767
General & Administrative	$1,597,600	$1,781,861	$1,800,600	$1,944,101	$1,967,868
All Other O&M	$1,186,200	$1,372,310	$1,450,298	$1,533,456	$1,622,393
Total O&M Expenses	**$4,005,442**	**$4,442,653**	**$4,609,879**	**$4,910,896**	**$5,102,028**
Net Revenue	**$647,227**	**$467,581**	**$443,460**	**$105,159**	**($145,871)**
Capital Expenses					
Existing Debt Service	$401,048	$400,933	$400,814	$400,691	$400,562
Cash Funded CIP	$797,900	$947,600	$1,135,163	$2,502,345	$2,836,282
Total Capital Expenses	**$1,198,948**	**$1,348,533**	**$1,535,977**	**$2,903,035**	**$3,236,845**
Cash Balance					
Beginning Cash Balance	$2,021,412	$1,469,691	$588,738	($503,779)	($3,301,656)
Net Cash Flow	($551,721)	($880,953)	($1,092,517)	($2,797,877)	($3,382,715)
Ending Cash Balance	**$1,469,691**	**$588,738**	**($503,779)**	**($3,301,656)**	**($6,684,371)**
Reserve Target					
Minimum Reserve Target	*$2,709,396*	*$2,862,559*	*$2,921,225*	*$3,026,751*	*$3,093,782*
Maximum Reserve Target	*$5,172,599*	*$5,353,553*	*$5,428,985*	*$5,534,512*	*$5,601,542*
Minimum Reserve Target Met?	*No*	*No*	*No*	*No*	*No*
Debt Coverage					
Projected Debt Service Coverage Ratio	1.61x	1.17x	1.11x	0.26x	-0.36x
Required Debt Service Coverage Ratio	*1.20x*	*1.20x*	*1.20x*	*1.20x*	*1.20x*
Debt Coverage Requirement Met?	*Yes*	*No*	*No*	*No*	*No*

*Rate revenue from rates effective Feb. 2023
**Additional rate revenue resulting from the adopted 6% rate increases effective Feb. 2024 & Feb. 2025

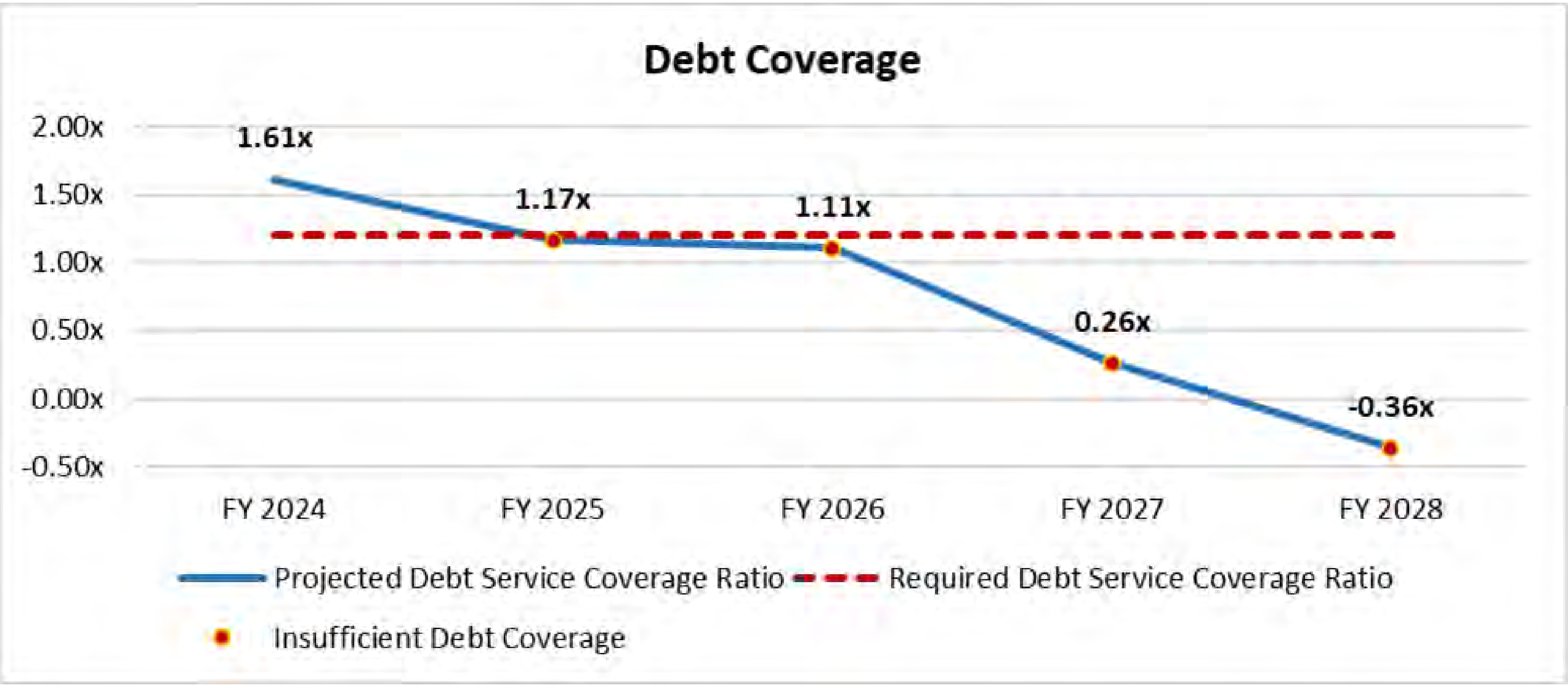
Status Quo Financial Plan

(Rate Increases: 6% in Feb. 2024 & Feb. 2025)



Status Quo Financial Plan

(Rate Increases: 6% in Feb. 2024 & Feb. 2025)



Preliminary Financial Plan Scenarios

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Preliminary Financial Plan Scenarios

- WRE and District staff developed two preliminary financial plan scenarios:

Fiscal Year	Rates Effective	Scenario 1 Rate Increases	Scenario 2 Rate Increases
FY 2024	Mar. 2024	35.0%	35.0%
FY 2025	Jan. 2025	20.0%	15.0%
FY 2026	Jan. 2026	12.0%	12.0%
FY 2027	Jan. 2027	12.0%	12.0%
FY 2028	Jan. 2028	12.0%	12.0%

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Preliminary Financial Plan Scenarios

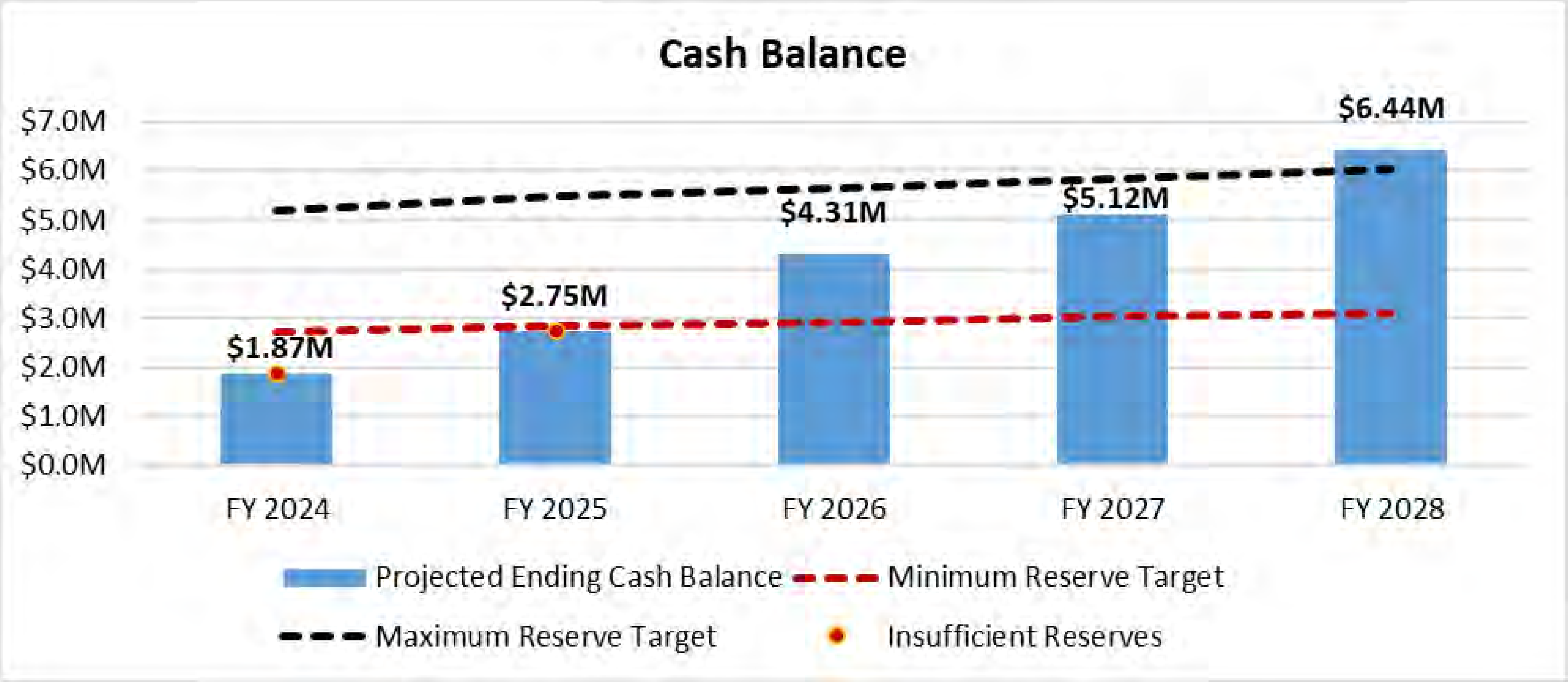
- Preliminary potable volumetric rates subject to refinements to cost-of-service analysis:

Fiscal Year	Rates Effective	Scenario 1 Potable Volumetric Rate (per CCF)	Scenario 2 Potable Volumetric Rate (per CCF)
Current	Feb. 2023	$2.12	$2.12
FY 2024	Mar. 2024	$2.72	$2.72
FY 2025	Jan. 2025	$3.27	$3.13
FY 2026	Jan. 2026	$3.67	$3.51
FY 2027	Jan. 2027	$4.12	$3.94
FY 2028	Jan. 2028	$4.62	$4.42

Notes:
-Proposed volumetric rates shown above do not go up by exactly 35% in FY 2024 due to the updated cost-of-service analysis
-Fixed charge increases are not shown above

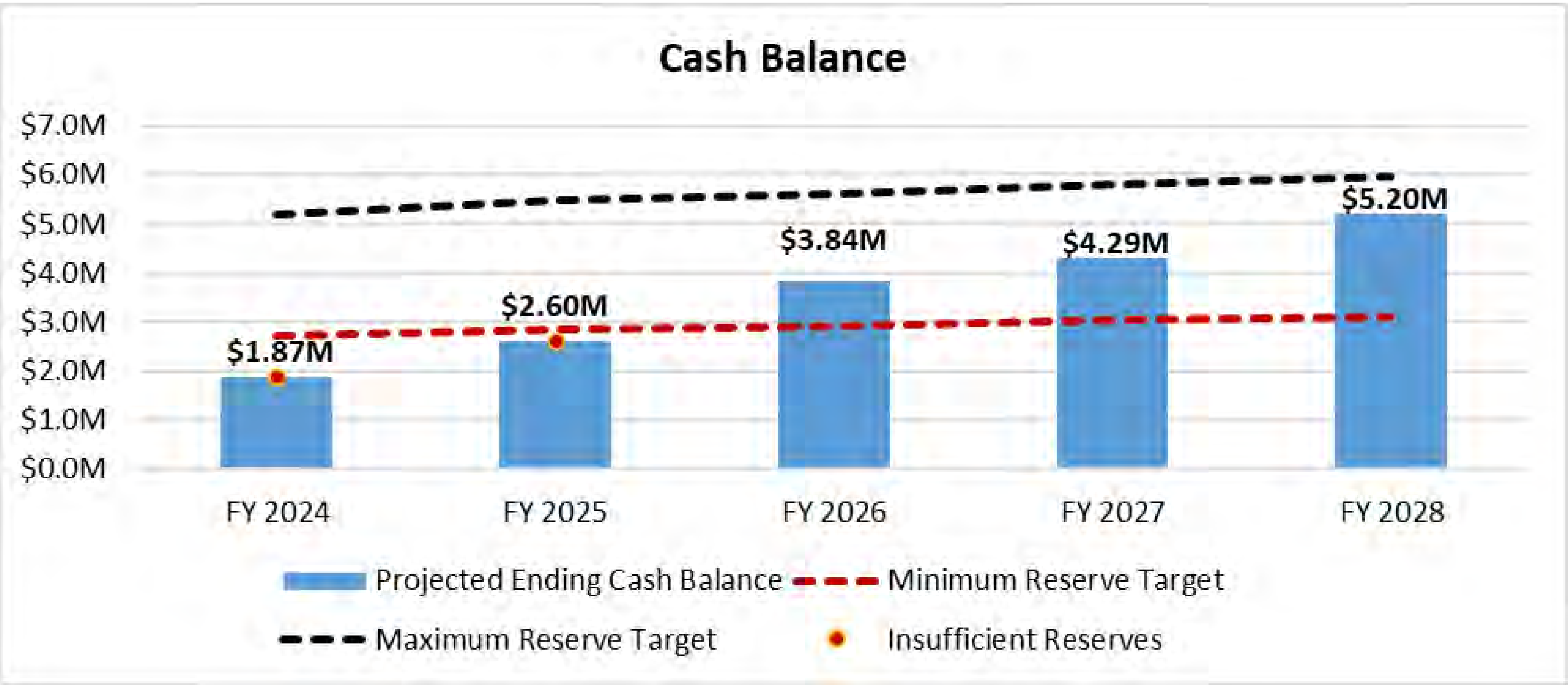
Financial Plan Scenario 1

(Rate Increases: 35% - 20% - 12% - 12% - 12%)



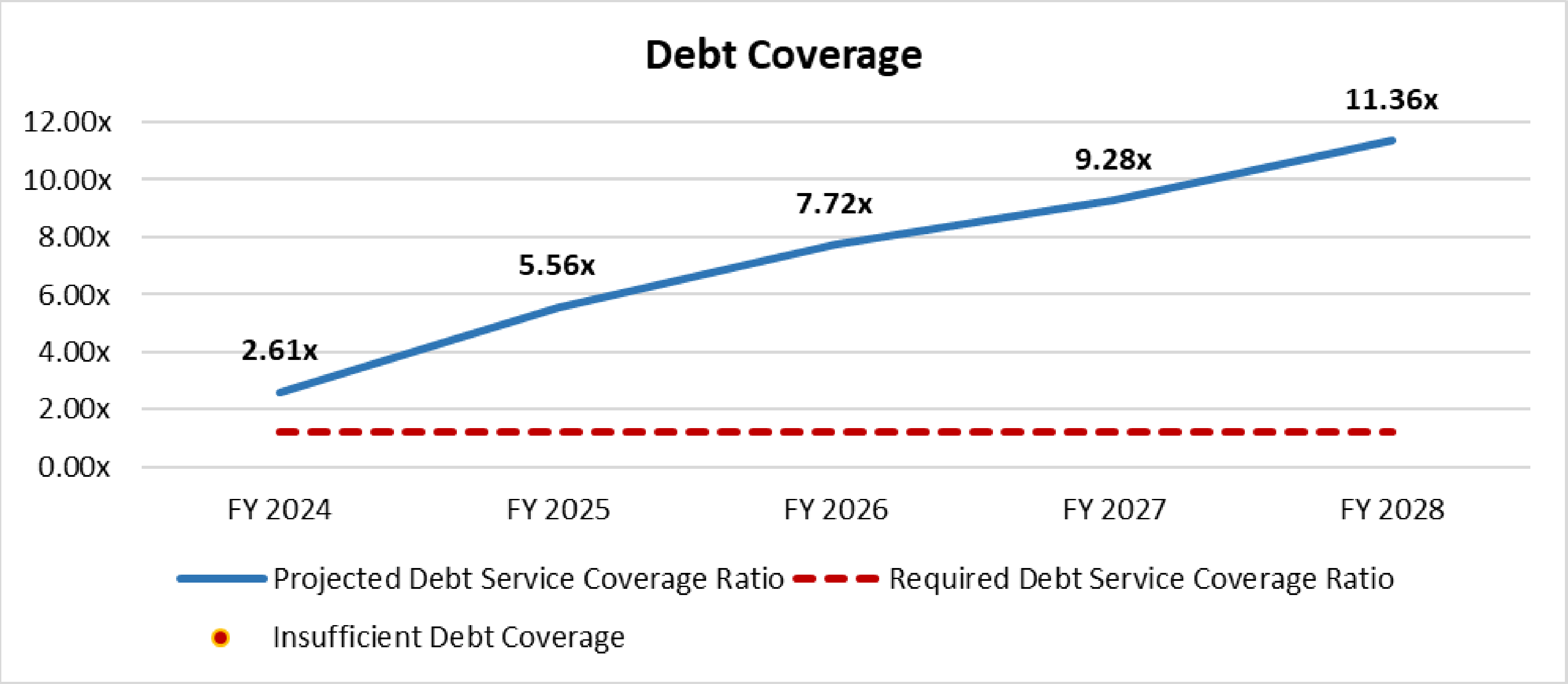
Financial Plan Scenario 2

(Rate Increases: 35% - 15% - 12% - 12% - 12%)



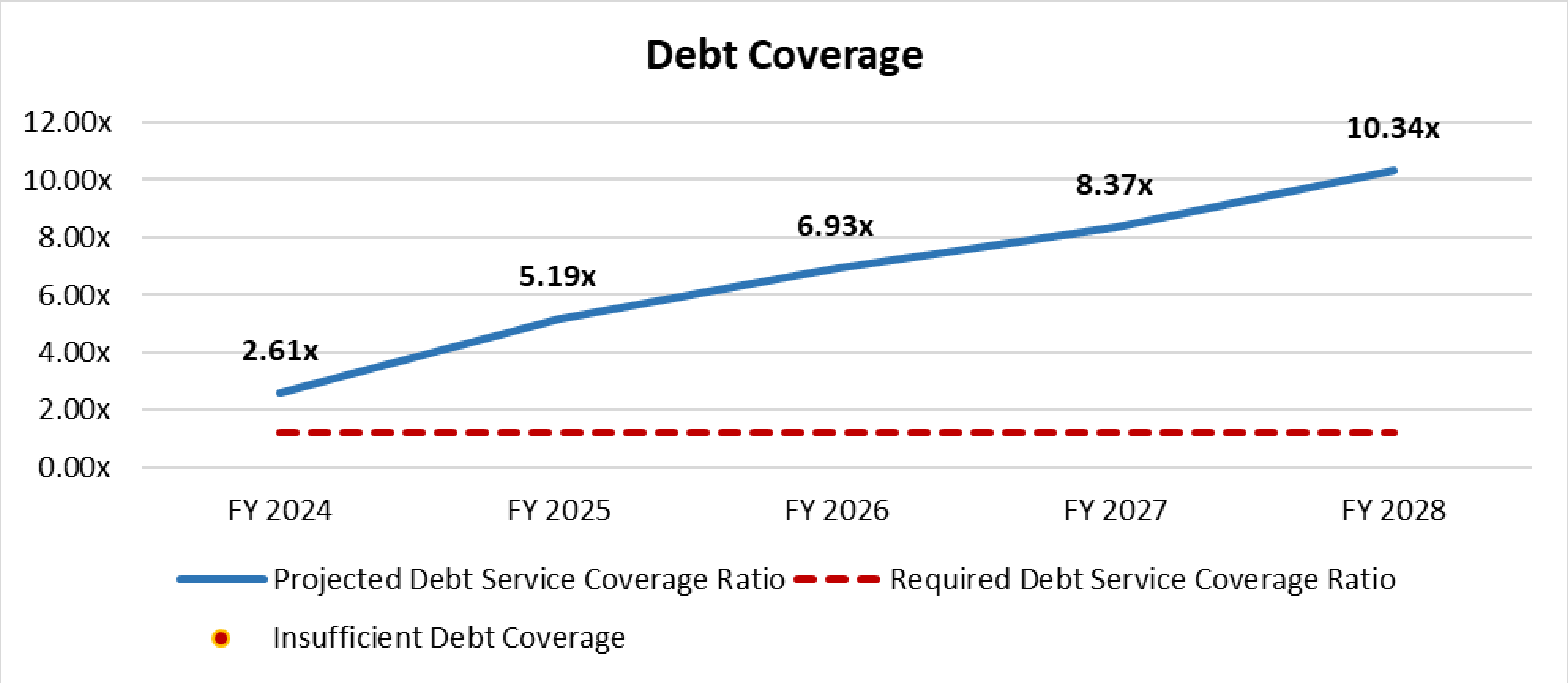
Financial Plan Scenario 1

(Rate Increases: 35% - 20% - 12% - 12% - 12%)

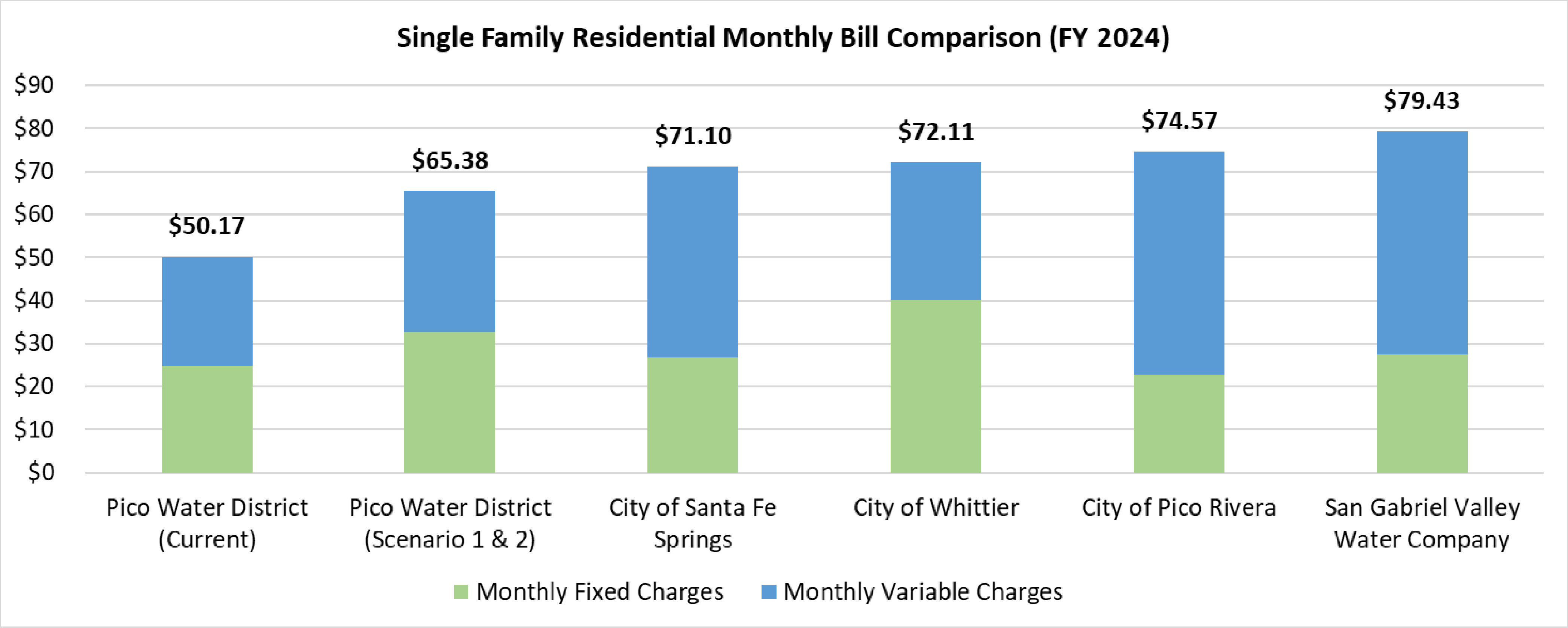


Financial Plan Scenario 2

(Rate Increases: 35% - 15% - 12% - 12% - 12%)



Preliminary Residential Bill Impacts: First Year Only (FY 2024)



Notes:

-All bills include fixed charges based on the smallest meter size available and variable charges based on 12 CCF per month (the District's residential monthly average)

-Proposed Pico Water District bills based on 35% proposed FY 2024 rate increase in Scenario 1 & 2; subject to refinements to WRE's preliminary cost-of-service and rate calculations

Preliminary Residential Bill Impacts: Multi-Year Comparison to City of Pico Rivera

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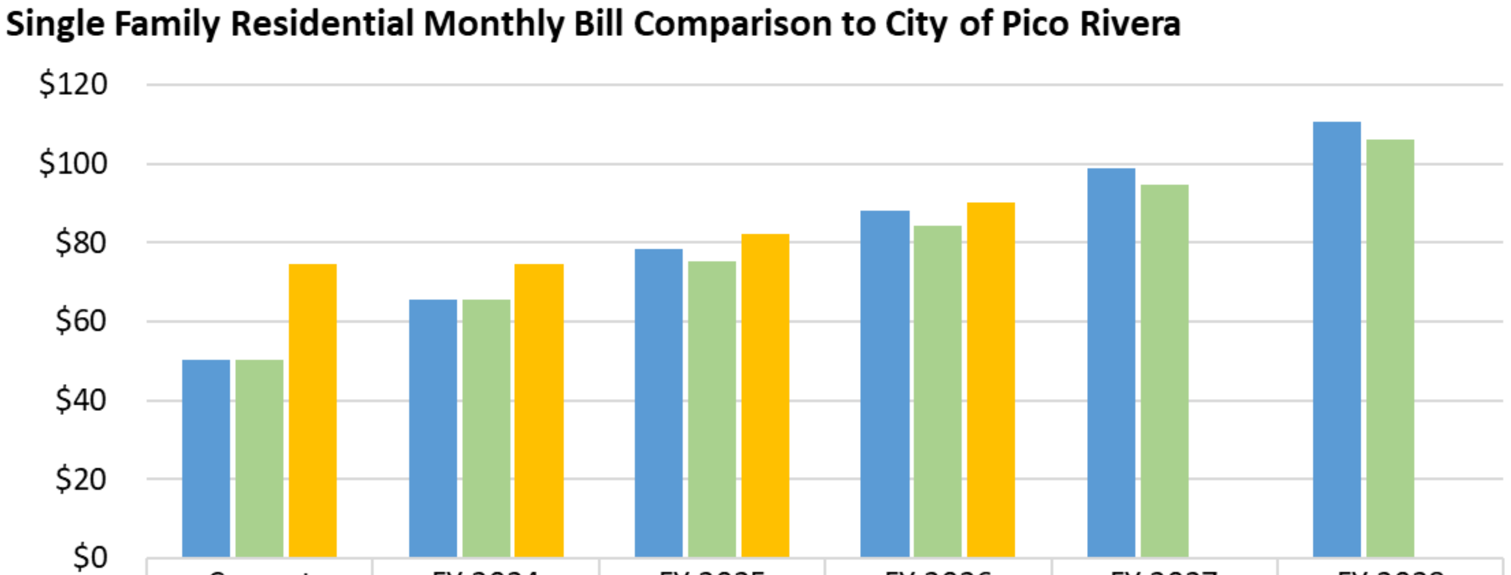

	Current	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Scenario 1	$50.17	$65.38	$78.53	$88.05	$98.74	$110.66
Scenario 2	$50.17	$65.38	$75.22	$84.31	$94.54	$105.98
City of Pico Rivera (Adopted)	$74.57	$74.57	$82.03	$90.23	N/A	N/A

Notes:
-All bills include fixed charges based on the smallest meter size available and variable charges based on 12 CCF per month (the District's residential monthly average)
-Proposed Pico Water District bills subject to refinements to WRE's preliminary cost-of-service and rate calculations
-City of Pico Rivera bills based on current rates and 10% adopted annual rate increases through FY 2026 (no rates have been adopted yet beyond FY 2026)

Questions & Discussion

Next Steps

- Refine the proposed financial plan options based on feedback today
- Complete the cost-of-service analysis and rate design
- Present refined rate options at another Board meeting (TBD)
- Develop a rate study report
- Provide support through the Prop 218 public hearing process

Water Resources Economics

PROMOTING THE VALUE AND PRICE OF WATER SERVICE

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