Elsinore Valley Municipal Water District

WATER SYSTEM MASTER PLAN

FINAL | April 2024

ELSINORE VALLEY

MUNICIPAL WATER DISTRICT

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Abbreviations

ADD	average day demand
AF	acre-feet
AFY	acre-feet per year
AL	action level
AVP	Auld Valley Pipeline
AWWA	American Water Works Association
Basin Plan	Santa Ana Water Pollution Control Plan
BBGWTP	Back Basin Groundwater Treatment Plant
Carollo	Carollo Engineers, Inc.
CCR	Consumer Confidence Report
CCT	corrosion control treatment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cfs	cubic feet per second
CIP	capital improvement plan
CLWTP	Canyon Lake Water Treatment Plant
CMLC	cement mortar lined and coated
COP	copper
CRA	Colorado River Aqueduct
Cr(VI)	Hexavalent Chromium
DBP	disinfection byproduct
DBPR	Disinfectants and Byproduct Rules
DDW	Division of Drinking Water
DU	dwelling units
DWR	Department of Water Resources
EDSA	Elsinore Division service area
EMWD	Eastern Municipal Water District
EPA	Environmental Protection Agency
EPS	extended-period simulation
EVMWD/ District	Elsinore Valley Municipal Water District
fps	feet per second
ft	feet
ft-msl	feet above mean sea level
FY	fiscal year
GAC	granular activated carbon
GALV	galvanized iron pipe
GIS	geographic information system
gpd	gallons per day

gpm	gallons per minute
GSP	Groundwater Sustainability Plan
GWMP	Groundwater Management Plan
GWR	Groundwater Rule
GWUDI	groundwater under the direct influence
HAA5	haloacetic acids
HFPO-DA	hexafluoropropylene oxide dimer acid
HGL	hydraulic grade line
hp	horsepower
HWL	high water level
IDSE	Initial Distribution System Evaluation
in	inches
IRIS	Integrated Risk Information System
IRP	Integrated Resources Plan
IX	ion exchange
LCRR	Lead and Copper Rule Revisions
LRAA	locational running annual average
LSL	lead service line
µg/L	micrograms per liter
MCL	maximum contaminant level
MCLGs	maximum contaminant level goals
MDBP	Microbial/Disinfection Byproducts
MDD	maximum day demand
MG	million gallons
mg/L	milligrams per liter
mgd	million gallons per day
MinDD	minimum day demand
MP	Master Plan
MRDL	maximum residual disinfectant level
MWD/ Metropolitan	Metropolitan Water District of Southern California
N/A	not applicable
ng/L	nanograms per liter
O&M	operations and maintenance
OEHHA	Office of Environmental Health Hazard Assessment
PF	peaking factor
PFAS	per- and polyfluorinated substances
PFBS	perfluorobutane sulfonate
PFNA	perfluorononanoic acid
PFOA	perfluorooctanoic acid
PFOS	perfluorooctanesulfonic acid

PFHxS	perfluorohexane sulfonate
PHD	peak hour demand
PHG	Public Health Goals
ppt	parts per trillion
PRV	pressure reducing valve
PS	pump station
psi	pounds per square inch
PVC	polyvinyl chloride
PZ	pressure zone
R&R	rehabilitation and replacement
RAA	running annual average
RfD	Reference Dose
SCADA	supervisory control and data acquisition
SCAG	Southern California Association of Governments
SDR	small diameter replacement
SWP	State Water Project
TBD	to be determined
TDH	total dynamic head
TDSA	Temescal Division Service Area
TL	trigger level
TOC	total organic carbon
TOU	time-of-use
TTHM	total trihalomethanes
TVP	Temescal Valley Pipeline
TVWD	Temescal Valley Water District
UCMR 3	third Unregulated Contaminant Monitoring Regulation
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WDF	Water duty factors
WMWD	Western Municipal Water District
WQP	water quality parameter
WSMP	Water System Master Plan
WTP	water treatment plant

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EXECUTIVE SUMMARY

The most recent Water System Master Plan (WSMP) prepared by Elsinore Valley Municipal Water District (EVMWD) was completed in 2016. Since then, there has been significant development within EVMWD's service area, resulting in population growth and increased demands for both potable and non-potable water supplies. However, water conservation and efficiency have also improved, and potable reuse regulations have advanced rapidly over the past decade. These factors have created a need to update the 2016 WSMP.

This WSMP has a planning horizon up to the year 2050 and evaluates EVMWD's potable water system under both existing and future conditions. Concurrently with the development of this WSMP, master plan updates are prepared for EVMWD's sewer collection and recycled water distribution systems. All three plans are based on the same set of growth and flow assumptions.

The purpose of this WSMP is to assist EVMWD in:

- Developing an infrastructure plan that balances reliability and cost.
- Creating an accurate and usable calibrated hydraulic model.
- Evaluating water system performance.
- Identifying needed capital improvement projects.
- Transferring knowledge to EVMWD's staff.

ES.1 Existing Water System

EVMWD provides water services to its Elsinore and Temescal Divisions, which encompass an area of 96 square miles, including the Cities of Lake Elsinore, Canyon Lake and Wildomar, as well as portions of the City of Murrieta and unincorporated areas of Riverside County. EVMWD's water system is primarily divided into two divisions, the Elsinore Division and the Temescal Domestic Service Area (TDSA).

The existing water system consists of 70 active storage reservoirs, 55 booster pumping stations, 13 groundwater wells, 44 pressure regulating stations, and approximately 743 miles of pipeline ranging from 4 to 42 inches in diameter. The existing water system components are summarized in Table ES.1, while the locations of the water facilities are shown on Figure ES.1.

The current water system is divided into 46 pressure zones (PZs), and each zone is labeled by the high-water level of the storage reservoir in that zone. For example, Zone 1601 has a hydraulic grade line (HGL) of 1,601 feet above mean sea level. EVMWD's PZs range in HGL from 1,258 feet to 3,544 feet above mean sea level (ft-msl). The largest PZ in both service area and demand service has an HGL of 1,434 and is also referred to as the "loop zone" because it surrounds and connects the distribution system around Lake Elsinore.

Table ES.1 Summary of Water Distribution System Components

Facility Type	Number
Water Treatment Plants	3
Groundwater Wells (Operating)	15
Storage Reservoirs (Active)	70
Booster PSs	55
Hydropneumatic Pump Stations	6
Pipeline (Miles)	743
Pressure Regulating Stations	44
Valves	20,422
Fire Hydrants	8,174
Imported Primary Supply Sources	2
Emergency Interconnections	5

Notes:
Abbreviations: PS - pump station.
(1) Source: Information presented is based on EVMWD's geographic information system (GIS) data.

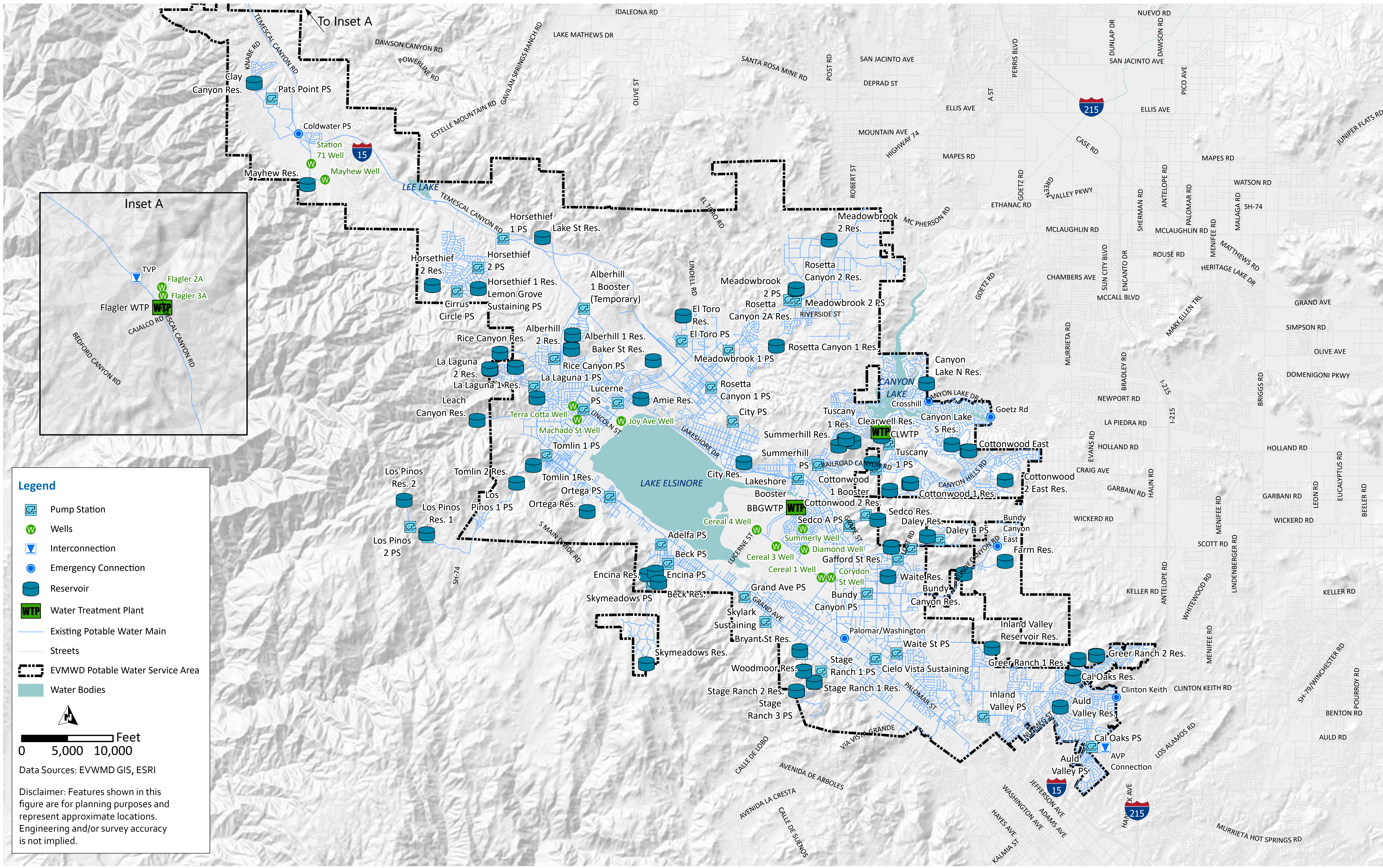

Figure ES.1 Water Distribution System Facilities

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ES.2 Existing and Projected Water Demands

EVMWD currently serves a population of approximately 165,000. Due to anticipated growth, the service area population is projected to increase to approximately 256,000 by the year 2050. This population and the demand forecast used in this WSMP are aligned with EVMWD's 2020 Urban Water Management Plan (UWMP).

This distribution of demand used for water system analysis was established based on GIS analysis of over 300 planned developments. Over half of these developments are within the city of Lake Elsinore with a large number planned in the city of Wildomar and unincorporated Riverside County as well. The cities of Canyon Lake and Murrieta have relatively few planned developments within EVMWD's service area.

The seasonal and daily variation of water demands was established based on analysis of historical production data. Maximum day demands (MDD) were determined by applying a peaking factor of 1.75 to the anticipated average day demands. Additionally, water demands vary throughout the day. For hydraulic model analysis purposes, a 24-hour demand pattern was developed with a peak hour demand (PHD) peaking factor of 2.6.

The projected population and demands through year 2050 are summarized in Table ES.2

Table ES.2 Population and Demand Forecast to 2050

Year	Population	Annual Water Demand(1) (AFY)	ADD (mgd)	MDD(2) (mgd)
2025	176,657	29,825	26.6	46.6
2030	190,310	32,130	28.7	50.2
2035	205,018	34,613	30.9	54.1
2040	220,863	37,288	33.3	58.3
2045	237,932	40,170	35.9	62.8
2050(3)	256,320	43,284	38.6	67.6

Notes:
Abbreviations: ADD - average day demand; AFY - acre-feet per year.
(1) Water demand includes both water consumption and system losses (and is equal to water production needs).
(2) Based on MDD/ADD peaking factor of 1.75.
(3) Extrapolated the 2020 UWMP forecast linearly from 2045 (with 1.5 percent annual growth rate).

Water demands are projected to increase from approximately 27,000 AFY in 2023 to 43,000 AFY in 2050, which reflects an average annual growth rate of 1.5 percent. A description of the land use and demand analysis used are included in Chapter 2 and Chapter 3, respectively.

ES.3 Existing and Projected Water Supplies

EVMWD delivers potable water from three primary sources, namely groundwater, local surface water, and imported water.

- Local groundwater pumped from 13 wells, some of which require treatment prior to use.
- Local surface water from Canyon Lake Reservoir and treated at the Canyon Lake Water Treatment Plant (CLWTP).
- Imported water purchased from Metropolitan Water District (MWD) via Western Municipal Water District (WMWD). Imported water is delivered at two locations, 1) the Temescal Valley Pipeline (TVP) connection and 2) the Auld Valley Pipeline (AVP) connection.

Historical water supply deliveries are depicted in Figure ES.2. As shown, the utilization of the water supply sources varies from year-to-year but imported water has been the largest source of water supply in recent years.

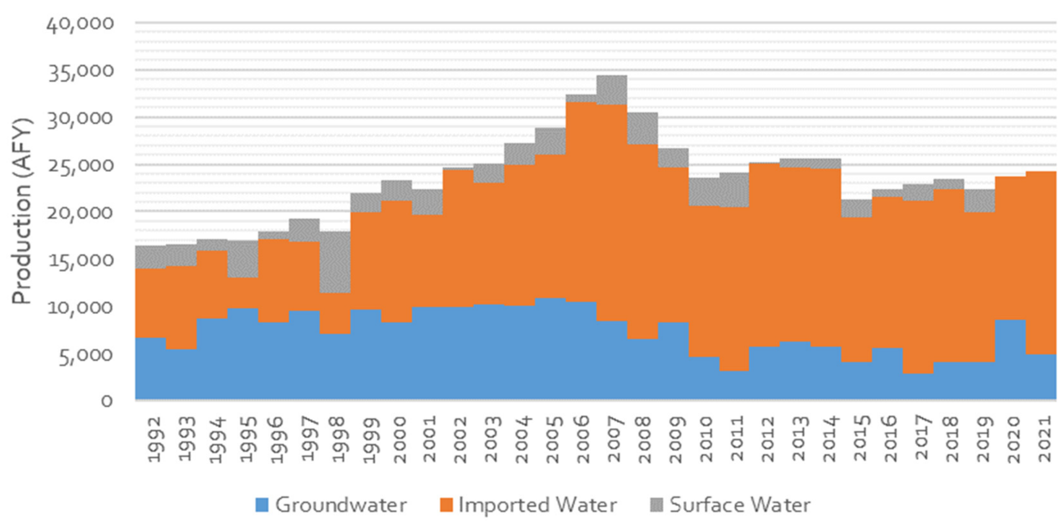

Figure ES.2 Historical Water Production by Supply Type From 1992 to 2021

As shown, water production increased steadily during the early 2000s until reaching a peak in 2007. Since then, water production has steadily declined and currently is stable around 24,000 AFY despite growth, reflecting the positive impacts of EVMWD's water conservation program. The existing water system facilities are described in detail in Chapter 4.

ES.4 System Evaluation

The adequacy of EVMWD's system under existing and future demand conditions was evaluated using an updated and calibrated hydraulic model of EVMWD's water distribution system. This model was used to evaluate system pressure, pipeline velocities, head loss, water levels in storage tanks, and adequacy of PS capacities under a variety of demand conditions. Recommendations are made to address these deficiencies. Additionally, the expected remaining useful life of groundwater wells, storage tanks, PSs, and pipelines was analyzed to develop age- and condition-based rehabilitation and replacement (R&R) programs.

The hydraulic model update is discussed in Chapter 5, while the evaluation criteria are described in Chapter 6. The hydraulic analyses under existing and future demand conditions are presented in Chapters 7 and 9, respectively.

ES.5 Improvement Recommendations

The water system recommendations identified in system evaluation include both capacity improvements to accommodate growth and R&R improvements to address aging infrastructure. A summary of the number of projects and facilities identified that require improvement, rehabilitation, and/or replacement is listed in Table ES.3

Table ES.3 Summary of Water System Improvements

Project Type	No. of Projects	Description
Low Pressure Improvements	18	5 miles total
Transmission and Distribution mains	23	33 miles total
PSs	32	10 existing PS expansions for growth; 9 PS upgrades for fire flow capacity; 13 new PS for growth
Storage Reservoirs	21	26.0 MG new capacity 4.8 MG replacement
PRV Stations	2	2 new PRV stations
Fire Flow Improvements	69	30 miles total
Supply Improvements	3	Canyon Lake WTP upgrades; 2 new wells
Pipeline R&R	TBD(1)	27 miles small diameter (< 8 inches) replacements 87 miles age replacements (≥ 8 inches)
Reservoirs R&R	5	1.9 MG total
PSs R&R	43	43 PS with 1 or more pump replacements
Wells R&R	13	4 well pump replacement 1x before 2050 9 well pump replacements2x before 2050

Notes:
Abbreviations: MG - million gallons; PRV - pressure reducing valve; TBD - to be determined.
(1) The number of pipeline replacement projects depends on future contracting and phasing.

ES.6 Capital Improvement Plan (CIP)

The purpose of the capital improvement plan (CIP) presented in this WSMP is to help guide EVMWD with the implementation of water distribution system improvements identified to meet the water demands projected through year 2050. It should be noted that this WSMP does not include the evaluation of EVMWD's water treatment plants and future water supply needs, as these are evaluated as part of EVMWD's Integrated Resources Plan. Hence, water supply and treatment related projects are not included in this water system CIP.

All projects identified during the existing and future system analyses, as well as during the facility assessment and age-based R&R analysis, are phased based on the following considerations:

- Anticipated construction of future land developments.
- The need to meet existing system deficiencies.
- Improvement of the water system reliability.
- Replacement of aging infrastructure.
- Combined cost of existing system improvements for each phase to approximately match the projected annual revenues to fund the projects.

The CIP projects have been phased in 6 planning periods from 2023 through 2050. The first phase starts in fiscal year (FY) 2023/2024 (hereafter 2023) and ends in FY 2025/2026 (hereafter 2025). The remaining projects are separated into 5 additional phases, each spanning five fiscal years from 2025-2030, 2030-2035, 2035-2040, 2040-2045, and 2045-2050. In addition to the phasing, CIP projects have been grouped by:

- Project Category (capacity or R&R improvements).
- Project Type (storage, PSs, wells, etc.).
- Ratepayer Class (existing or future ratepayers).

A summary table of the CIP is presented in Table ES.4. A summary of the cost by project type is also graphically shown on Figure ES.3, while the cost allocation by ratepayer class phase is shown on Figure ES.4.

Table ES.4 Summary of Water System Improvements

Project Type	Existing Ratepayers ($ Million)	Future Ratepayers ($ Million)	Total ($ Million)	Percent of Total
Low Pressure Improvements	$17.6	$0.0	$17.6	2 Percent
Transmission and Distribution Main	$15.7	$163.0	$178.7	17 Percent
PS	$2.6	$100.5	$103.0	10 Percent
Storage Reservoir	$35.1	$81.4	$116.5	11 Percent
Valves	$0.8	$0.0	$0.8	<0.1 Percent
Fire Flow Improvements	$111.1	$0.0	$111.1	10 Percent
Supply Improvements	$42.0	$51.0	$93.0	9 Percent
Subtotal Capacity Improvements	**$224.9**	**$395.8**	**$620.7**	**58 Percent**
Pipelines (R&R)	$389.0	$0.0	$389.0	36 Percent
Reservoirs (R&R)	$11.3	$0.0	$11.3	1 Percent
PSs (R&R)	$25.0	$0.0	$25.0	2 Percent
Wells (R&R)	$32.3	$0.0	$32.3	3 Percent
Subtotal R&R Projects	**$457.6**	**$0.0**	**$457.6**	**42 Percent**
Total	**$682.5**	**$395.8**	**$1,078.4**	**100 Percent**

As shown in Table ES.4, the total CIP cost is estimated at $1,078.4 million with $682.5 million (63 percent) for existing system improvements to be paid by existing rate payers and the remaining $395.8 million (37 percent) for projects needed to accommodate future growth to be paid by future rate payers. The difference in cost between existing and future ratepayers is largely due to the pipeline R&R projects which accounts for $389 million of the total CIP.

The distribution of projects between the capacity improvement projects and rehabilitation and repair projects are fairly balanced with the capacity improvement projects accounting for $621 million (58 percent) and the R&R projects accounting for $458 million (42 percent).

A complete listing of all proposed CIP improvement projects is presented in Table ES.1. The capacity improvements are depicted by project type on Figure ES.5 and by phase on Figure ES.6. Additional details regarding the CIP phasing rationale, cost estimating assumptions, and description of recommendations by project type is included in Chapter 9 of this WSMP, along with separate CIP maps by project phase.

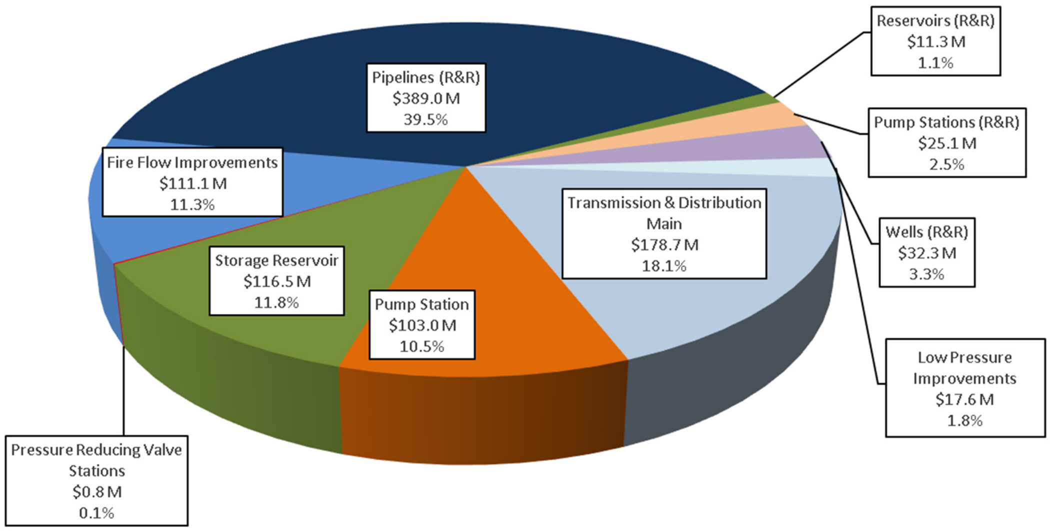

Figure ES.3 CIP Costs by Project Type

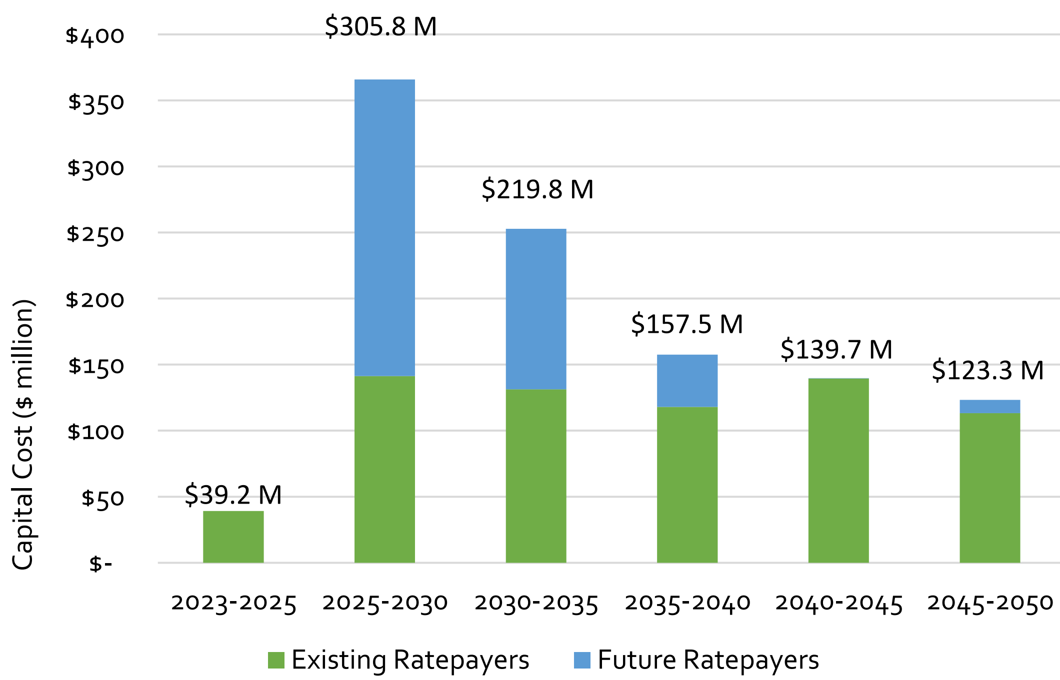

Figure ES.4 CIP Costs by Phase and Ratepayer Class

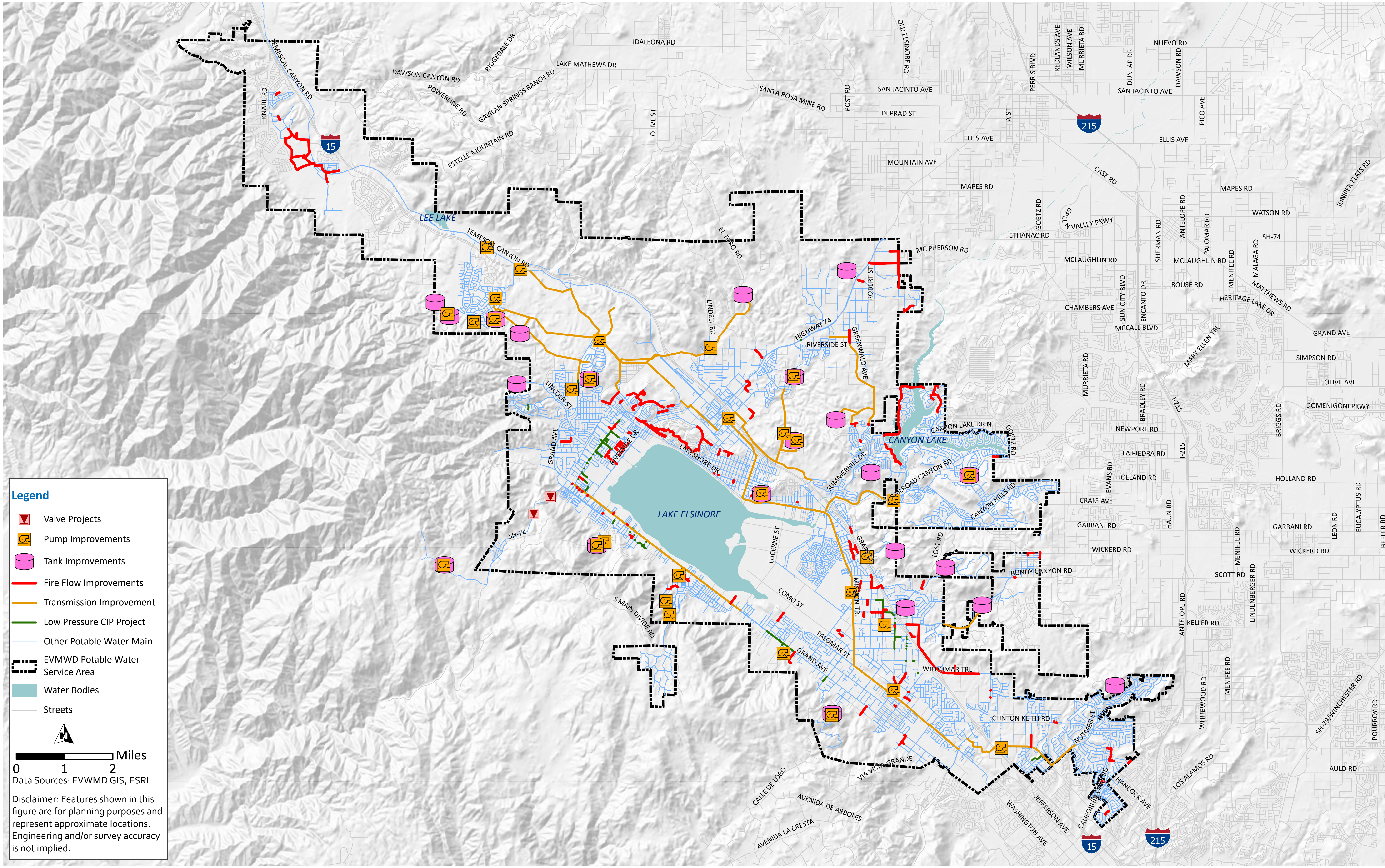

Figure ES.5 Potable Water Capital Improvement Projects by Type

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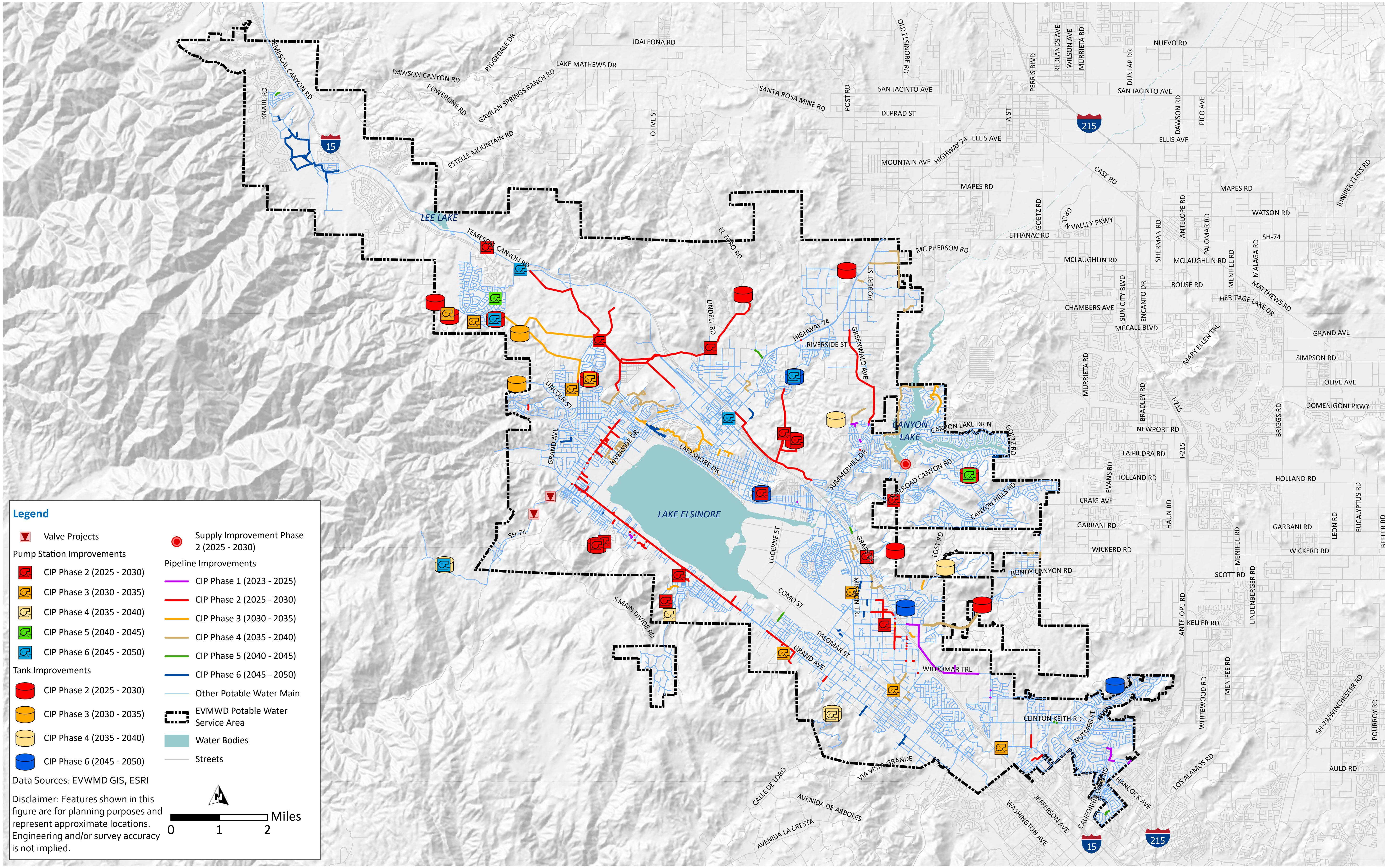

Figure ES.6 Capital Improvement Projects by Phase

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Table ES.5 Capital Improvement Plan (CIP)

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
Capacity Improvements					**$506,128,000**	**$179,350,000**	**$326,778,000**	**$16,298,000**	**$265,175,000**	**$106,732,000**	**$62,140,000**	**$3,290,000**	**$52,493,000**	**$506,128,000**
Low Pressure Improvements		Diameter (in)	Diameter (in)	Length (ft)	$17,608,000	$17,608,000	$-	$-	$17,608,000	$-	$-	$-	$-	$17,608,000
PW-LP1	PZ Adjustment for Falling Leaf Drive	12	12	400	$262,000	$262,000	$-	$-	$262,000	$-	$-	$-	$-	$262,000
PW-LP2	PZ Adjustment for Lake Street	12	12	1,000	$655,000	$655,000	$-	$-	$655,000	$-	$-	$-	$-	$655,000
PW-LP3	PZ Adjustment for Highway 74	8	12	40	$44,000	$44,000	$-	$-	$44,000	$-	$-	$-	$-	$44,000
PW-LP4	PZ Adjustment for Via Scenica	12	12	40	$61,000	$61,000	$-	$-	$61,000	$-	$-	$-	$-	$61,000
PW-LP5	PZ Adjustment near Almond Street	8	8	1,800	$983,000	$983,000	$-	$-	$983,000	$-	$-	$-	$-	$983,000
PW-LP6	PZ Adjustment near Canyon Drive	8	8	5,700	$3,114,000	$3,114,000	$-	$-	$3,114,000	$-	$-	$-	$-	$3,114,000
PW-LP7	PZ Adjustment near Robards Way	8	12	3,800	$2,489,000	$2,489,000	$-	$-	$2,489,000	$-	$-	$-	$-	$2,489,000
PW-LP8	PZ Adjustment near Tranquil Lane	8	8	200	$109,000	$109,000	$-	$-	$109,000	$-	$-	$-	$-	$109,000
PW-LP9	PZ Adjustment near Adelfa Street	12	12	3,000	$1,966,000	$1,966,000	$-	$-	$1,966,000	$-	$-	$-	$-	$1,966,000
PW-LP10	PZ Adjustment near Santa Rosa Drive	8	8	1,300	$745,000	$745,000	$-	$-	$745,000	$-	$-	$-	$-	$745,000
PW-LP11	PZ Adjustment near Blanche Drive	8	8	40	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
PW-LP12	PZ Adjustment for Grand Avenue	8	16	600	$473,000	$473,000	$-	$-	$473,000	$-	$-	$-	$-	$473,000
PW-LP13	PZ Adjustment for SH-74	8	8	100	$90,000	$90,000	$-	$-	$90,000	$-	$-	$-	$-	$90,000
PW-LP14	PZ Adjustment near Alvarado Street	8	8	1,500	$854,000	$854,000	$-	$-	$854,000	$-	$-	$-	$-	$854,000
PW-LP15	PZ Adjustment near Lincoln Street	16	16	5,500	$4,377,000	$4,377,000	$-	$-	$4,377,000	$-	$-	$-	$-	$4,377,000
PW-LP16-1	PZ Adjustment near Grand Avenue	12	12	40	$61,000	$61,000	$-	$-	$61,000	$-	$-	$-	$-	$61,000
PW-LP16-2	PZ Adjustment near Grand Avenue	12	12	1,800	$1,213,000	$1,213,000	$-	$-	$1,213,000	$-	$-	$-	$-	$1,213,000
PW-LP17	PZ Adjustment near Adelfa Street and McGrew Drive	8	8	40	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
Transmission and Distribution Main		Diameter (in)	Diameter (in)	Length (ft)	$178,703,000	$15,698,000	$163,005,000	$-	$121,198,000	$27,143,000	$30,362,000	$-	$-	$178,703,000
PW-TR1	2001 Horsethief 3 Zone Transmission	N/A	16	2,050	$1,620,000	$-	$1,620,000	$-	$1,620,000	$-	$-	$-	$-	$1,620,000
PW-TR2	1434 Zone Transmission in Alberhill Villages	N/A	24	5,400	$5,715,000	$-	$5,715,000	$-	$5,715,000	$-	$-	$-	$-	$5,715,000
PW-TR3	1601 Zone Transmission in Alberhill Villages	N/A	16/30	15,044	$16,846,000	$-	$16,846,000	$-	$-	$16,846,000	$-	$-	$-	$16,846,000
PW-TR5	1801 Zone Transmission in Alberhill Villages	N/A	16	13,041	$10,297,000	$-	$10,297,000	$-	$-	$10,297,000	$-	$-	$-	$10,297,000
PW-TR7A	Lucerne PS Suction/Discharge Pipeline	12	16/24	1,289	$1,073,000	$1,073,000	$-	$-	$1,073,000	$-	$-	$-	$-	$1,073,000
PW-TR7B	1434 Transmission from Temescal Canyon Road to Alberhill PS	N/A	24/ 36	7,424	$10,526,000	$2,631,000	$7,895,000	$-	$10,526,000	$-	$-	$-	$-	$10,526,000
PW-TR8	1434 Transmission from Alberhill PS to Baker/Nichols	N/A	36	6,257	$8,935,000	$-	$8,935,000	$-	$8,935,000	$-	$-	$-	$-	$8,935,000
PW-TR9	1434 Transmission from Baker/Nichols to Nichols/Collier	N/A	24	1,714	$1,814,000	$-	$1,814,000	$-	$1,814,000	$-	$-	$-	$-	$1,814,000
PW-TR10	1434 Transmission from Baker/Nichols to Baker Tank	N/A	24	4,154	$4,396,000	$-	$4,396,000	$-	$4,396,000	$-	$-	$-	$-	$4,396,000
PW-TR11	1601 Transmission from Alberhill PS to Nichols/Terra Cotta	N/A	16	3,200	$2,527,000	$-	$2,527,000	$-	$2,527,000	$-	$-	$-	$-	$2,527,000
PW-TR12	1601 Transmission in Terra Cotta Road	N/A	16	3,573	$5,640,000	$-	$5,640,000	$-	$5,640,000	$-	$-	$-	$-	$5,640,000
PW-TR13	1601 Transmission from Nichols/Terra Cotta to Nichols/Baker	N/A	16	3,450	$2,724,000	$-	$2,724,000	$-	$2,724,000	$-	$-	$-	$-	$2,724,000
PW-TR14	North Peak PS Suction/Discharge Pipeline	N/A	16	15,533	$12,265,000	$-	$12,265,000	$-	$12,265,000	$-	$-	$-	$-	$12,265,000
PW-TR15	1676 Transmission in Alberhill Ranch	N/A	16	4,332	$3,420,000	$-	$3,420,000	$-	$3,420,000	$-	$-	$-	$-	$3,420,000
PW-TR16	1434 Transmission in Grand Avenue	N/A	24	22,767	$24,097,000	$12,048,000	$12,049,000	$-	$24,097,000	$-	$-	$-	$-	$24,097,000
PW-TR20	1601 Spyglass Transmission from Dexter/3rd to Summerhill Area	N/A	30	12,397	$15,621,000	$-	$15,621,000	$-	$15,621,000	$-	$-	$-	$-	$15,621,000
PW-TR21	1601 Spyglass Transmission from Camino del Norte to Rosetta Canyon Road	N/A	16	8,177	$6,457,000	$-	$6,457,000	$-	$6,457,000	$-	$-	$-	$-	$6,457,000
PW-TR22	1801 Spyglass Transmission	N/A	16	3,470	$2,740,000	$-	$2,740,000	$-	$2,740,000	$-	$-	$-	$-	$2,740,000
PW-TR23	1801 Spyglass Transmission	N/A	16	1,425	$1,126,000	$-	$1,126,000	$-	$1,126,000	$-	$-	$-	$-	$1,126,000
PW-TR25	1801 Transmission in Greenwald Avenue	N/A	16/20	13,118	$10,718,000	$-	$10,718,000	$-	$10,718,000	$-	$-	$-	$-	$10,718,000
PW-TR26	1801 Transmission in North Tuscany Hills	N/A	16	6,422	$5,071,000	$-	$5,071,000	$-	$-	$-	$5,071,000	$-	$-	$5,071,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate[1,2,3,4] ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PW-TR31	1746 Bundy Gafford Zone Transmission	N/A	20/30	20,600	$24,189,000	$-	$24,189,000	$-	$-	$-	$24,189,000	$-	$-	$24,189,000
PW-TR32	1901 Ortega Transmission	N/A	8 / 16	1,673	$1,102,000	$-	$1,102,000	$-	$-	$-	$1,102,000	$-	$-	$1,102,000
PS		Capacity (gpm)	Capacity (gpm)	Horsepower (hp)	$103,018,000	$2,563,000	$100,455,000	$-	$62,161,000	$37,901,000	$404,000	$436,000	$2,116,000	$103,018,000
PW-PU-1	PZ 1601 (Horsethief 1) PS Upgrade	0	450	125	$538,000	$-	$538,000	$-	$-	$-	$-	$-	$538,000	$538,000
PW-PU-2	PZ 1601 (Rosetta Canyon 1) PS Upgrade	0	1300	250	$504,000	$-	$504,000	$-	$-	$-	$-	$-	$504,000	$504,000
PW-PU-3	PZ 1650 (Adelfa) PS Upgrade	0	650	75	$202,000	$96,000	$106,000	$-	$202,000	$-	$-	$-	$-	$202,000
PW-PU-4	PZ 1650 (Inland Valley) PS Upgrade	0	1700	150	$538,000	$14,000	$524,000	$-	$538,000	$-	$-	$-	$-	$538,000
PW-PU-5	PZ 1746 (Bundy Canyon) PS Upgrade	0	2600	100 / 125	$336,000	$-	$336,000	$-	$336,000	$-	$-	$-	$-	$336,000
PW-PU-6	PZ 1750 (Cottonwood) PS Upgrade	0	1000	200	$403,000	$230,000	$173,000	$-	$403,000	$-	$-	$-	$-	$403,000
PW-PU-7	PZ 1800 (Rice Canyon) PS Upgrade	0	1300	75	$403,000	$-	$403,000	$-	$-	$403,000	$-	$-	$-	$403,000
PW-PU-8	PZ 1801 (Horsethief 2) PS Upgrade	0	400	75	$302,000	$-	$302,000	$-	$-	$-	$-	$302,000	$-	$302,000
PW-PU-9	PZ 1801 (Rosetta Canyon 2) PS Upgrade	0	1300	50 / 150	$403,000	$-	$403,000	$-	$-	$-	$-	$-	$403,000	$403,000
PW-PU-10	PZ 1901 (Ortega) PS Upgrade	0	250	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-11	PZ 2001 (Horsethief 3) New PS	0	550	--	$4,200,000	$-	$4,200,000	$-	$-	$4,200,000	$-	$-	$-	$4,200,000
PW-PU-12	PZ 2001 (North Peak) New PS	0	450	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-13	PZ 2196 (Sedco) New PS	0	250	--	$2,520,000	$428,000	$2,092,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-14	PZ 1550 (Cielo Vista) PS Upgrade	0	1000	20	$134,000	$134,000	$-	$-	$-	$134,000	$-	$-	$-	$134,000
PW-PU-15	PZ 1600 (Skylark) PS Upgrade	0	1300	10	$202,000	$202,000	$-	$-	$-	$202,000	$-	$-	$-	$202,000
PW-PU-16	PZ 1850 (Canyon Lake Sustaining) PS Upgrade	0	600	30 / 40	$134,000	$134,000	$-	$-	$-	$-	$-	$134,000	$-	$134,000
PW-PU-17	PZ 1850 (Lemon Grove) PS Upgrade	0	350	8 / 25 / 150	$402,000	$402,000	$-	$-	$-	$-	$-	$-	$402,000	$402,000
PW-PU-18	PZ 1900 (Elderberry) New PS	0	100	--	$2,520,000	$-	$2,520,000	$-	$-	$2,520,000	$-	$-	$-	$2,520,000
PW-PU-19	PZ 1901 (Borchard) New PS	0	1800	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-20	PZ 1940 (Cirrus Circle) PS Upgrade	0	1400	15	$202,000	$202,000	$-	$-	$-	$202,000	$-	$-	$-	$202,000
PW-PU-21	PZ 2201 (Ortega) New PS	0	1700	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-22	PZ 2320 (Adelfa) New PS	0	1400	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-23	PZ 1800 (Spyglass) PS Upgrade	0	1650	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-24	PZ 1571 (City) PS Upgrade	0	900	50	$202,000	$48,000	$154,000	$-	$202,000	$-	$-	$-	$-	$202,000
PW-PU-25	PZ 1601 (Alberhill 1) PS Upgrade	0	3000	--	$8,400,000	$-	$8,400,000	$-	$8,400,000	$-	$-	$-	$-	$8,400,000
PW-PU-26	PZ 1925 (Spyglass) PS Upgrade	0	1800	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-27	PZ 2217 (Stage Ranch 2) PS Upgrade	0	1000	100	$202,000	$202,000	$-	$-	$-	$-	$202,000	$-	$-	$202,000
PW-PU-28	PZ 3300 (Skymeadows) PS Upgrade	0	1250	100	$202,000	$202,000	$-	$-	$-	$-	$202,000	$-	$-	$202,000
PW-PU-29	PZ 3544 (Los Pinos 2) PS Upgrade	0	1000	15	$269,000	$269,000	$-	$-	$-	$-	$-	$-	$269,000	$269,000
PW-PU-30	Temescal Valley Pipeline PS	0	20200		$15,120,000	$-	$15,120,000	$-	$15,120,000	$-	$-	$-	$-	$15,120,000
PW-PU-31	Mission Trails PS	0	8000		$15,120,000	$-	$15,120,000	$-	$-	$15,120,000	$-	$-	$-	$15,120,000
PW-PU-32	Inland Valley PS	0	15000	--	$15,120,000	$-	$15,120,000	$-	$-	$15,120,000	$-	$-	$-	$15,120,000
Storage Reservoir		Capacity (MG)	Capacity (MG)	Length (ft)	$116,474,000	$32,517,000	$83,957,000	$-	$55,843,000	$23,990,000	$14,213,000	$-	$22,428,000	$116,474,000
PW-T-1	1467 Waite Street Zone Additional Tank	0	0.6	--	$2,722,000	$1,679,000	$1,043,000	$-	$-	$-	$-	$-	$2,722,000	$2,722,000
PW-T-2	1571 City Tank Replacement	1.73	4.2	--	$11,995,000	$7,797,000	$4,198,000	$-	$-	$-	$-	$-	$11,995,000	$11,995,000
PW-T-3	1601 Alberhill Village Tank	0	6	--	$17,136,000	$-	$17,136,000	$-	$-	$17,136,000	$-	$-	$-	$17,136,000
PW-T-4	1601 Horsethief 1 Additional Tank	0	1.5	--	$6,048,000	$3,629,000	$2,419,000	$-	$6,048,000	$-	$-	$-	$-	$6,048,000
PW-T-5	1601 Rosetta Canyon 1 Additional Tank	0	0.7	--	$3,175,000	$-	$3,175,000	$-	$-	$-	$-	$-	$3,175,000	$3,175,000
PW-T-6	1622 Canyon Lake Additional Tank	0	2	--	$8,064,000	$7,258,000	$806,000	$-	$8,064,000	$-	$-	$-	$-	$8,064,000
PW-T-7	1676 Alberhill Zone New Tank	0	1	--	$4,536,000	$-	$4,536,000	$-	$4,536,000	$-	$-	$-	$-	$4,536,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate[1,2,3,4] ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PW-T-8	1746 Bundy Canyon Zone Additional Tank	0	1.5	--	$6,048,000	$242,000	$5,806,000	$-	$6,048,000	$-	$-	$-	$-	$6,048,000
PW-T-9	1800 Spyglass Zone New Tank	0	2.3	--	$8,114,000	$-	$8,114,000	$-	$8,114,000	$-	$-	$-	$-	$8,114,000
PW-T-10	1800 Rice Canyon/Alberhill 2 Zone New Tank	0	1.7	--	$6,854,000	$-	$6,854,000	$-	$-	$6,854,000	$-	$-	$-	$6,854,000
PW-T-11	1801 Horsethief 2 Zone Additional Tank	0	1.6	--	$6,451,000	$2,129,000	$4,322,000	$-	$6,451,000	$-	$-	$-	$-	$6,451,000
PW-T-12	1801 North Tuscany Hills New Tank	0	2.6	--	$9,173,000	$-	$9,173,000	$-	$-	$-	$9,173,000	$-	$-	$9,173,000
PW-T-15	1896 Meadowbrook 2 Additional Tank	0	1.3	--	$5,242,000	$-	$5,242,000	$-	$5,242,000	$-	$-	$-	$-	$5,242,000
PW-T-16	1901 Ortega Zone New Tank	0	0.5	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-T-18	2001 Horsethief 3 New Tank	0	0.8	--	$3,629,000	$-	$3,629,000	$-	$3,629,000	$-	$-	$-	$-	$3,629,000
PW-T-19	2001 North Peak Zone New Tank	0	0.7	--	$3,175,000	$-	$3,175,000	$-	$3,175,000	$-	$-	$-	$-	$3,175,000
PW-T-20	2050 Greer Ranch 2 Zone Additional Tank	0	1	--	$4,536,000	$4,400,000	$136,000	$-	$-	$-	$-	$-	$4,536,000	$4,536,000
PW-T-21	2196 Sedco Zone Tank Replacement	0	0.4	--	$2,016,000	$343,000	$1,673,000	$-	$2,016,000	$-	$-	$-	$-	$2,016,000
PW-T-22	1882 Stage Ranch 1 Zone Additional Tank	0	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$1,344,000	$-	$-	$1,344,000
PW-T-23	2309 Daley Zone Tank Replacement	0.088	0.2	--	$2,016,000	$2,016,000	$-	$-	$-	$-	$2,016,000	$-	$-	$2,016,000
PW-T-25	2748 Los Pinos 1 Additional Tank	0.1	0.25	--	$1,680,000	$1,680,000	$-	$-	$-	$-	$1,680,000	$-	$-	$1,680,000
Pressure Reducing Valve Stations		Diameter (in)	Diameter (in)	No.	$840,000	$840,000	$-	$-	$420,000	$-	$-	$-	$420,000	$840,000
PW-V1	PZ Tomlin 2 PS Pressure Reducing Valve Upgrade	0	8	1	$420,000	$420,000	$-	$-	$420,000	$-	$-	$-	$-	$420,000
PW-V2	PZ Los Pinos 1 PS Pressure Reducing Valve Upgrade	0	8	1	$420,000	$420,000	$-	$-	$-	$-	$-	$-	$420,000	$420,000
Fire Flow Improvements		Diameter (in)	Diameter (in)	Length (ft)	$111,096,000	$109,592,000	$1,504,000	$16,298,000	$7,265,000	$15,800,000	$41,350,000	$2,854,000	$27,529,000	$111,096,000
FF-01	Fire Flow Pipeline Improvement Project - Warm Springs Drive	6	Varies	20,600	$16,071,000	$16,071,000	$-	$-	$-	$-	$-	$-	$16,071,000	$16,071,000
FF-02	Fire Flow Pipeline Improvement Project - Canyon Hills Drive	6	12	500	$328,000	$328,000	$-	$-	$-	$-	$-	$328,000	$-	$328,000
FF-03	Fire Flow Pipeline Improvement Project - Richard Street	Varies	Varies	9,100	$6,313,000	$6,313,000	$-	$-	$-	$-	$6,313,000	$-	$-	$6,313,000
FF-04	Fire Flow Pipeline Improvement Project - Riverview Drive	N/A	8	1,600	$874,000	$874,000	$-	$-	$-	$-	$874,000	$-	$-	$874,000
FF-05	Fire Flow Pipeline Improvement Project - Greenwald Avenue	6	12	1,400	$917,000	$917,000	$-	$-	$917,000	$-	$-	$-	$-	$917,000
FF-06	Fire Flow Pipeline Improvement Project - El Toro Cut Off Road	N/A	12	1,200	$787,000	$787,000	$-	$-	$-	$-	$-	$787,000	$-	$787,000
FF-07	Fire Flow Pipeline Improvement Project - Allan Street	6 & 8	12	1,900	$1,245,000	$1,245,000	$-	$-	$-	$-	$1,245,000	$-	$-	$1,245,000
FF-08	Fire Flow Pipeline Improvement Project - 2nd Street	N/A	12	1,400	$917,000	$917,000	$-	$-	$-	$-	$-	$-	$917,000	$917,000
FF-09	Fire Flow Pipeline Improvement Project - W Graham Avenue	N/A	8	1,300	$711,000	$711,000	$-	$-	$-	$-	$711,000	$-	$-	$711,000
FF-10	Fire Flow Pipeline Improvement Project - Sunnyslope Avenue	Varies	Varies	12,700	$8,058,000	$8,058,000	$-	$-	$-	$8,058,000	$-	$-	$-	$8,058,000
FF-11	Fire Flow Pipeline Improvement Project - Lakeview Avenue	N/A	12	4,300	$2,817,000	$2,817,000	$-	$-	$-	$-	$-	$-	$2,817,000	$2,817,000
FF-12	Fire Flow Pipeline Improvement Project - Lash Street	Varies	Varies	3,500	$2,315,000	$2,315,000	$-	$-	$-	$2,315,000	$-	$-	$-	$2,315,000
FF-13	Fire Flow Pipeline Improvement Project - De Brask Avenue	2 & 4	Varies	1,100	$602,000	$602,000	$-	$-	$-	$602,000	$-	$-	$-	$602,000
FF-14	Fire Flow Pipeline Improvement Project - Dryden Street	2 to 8	Varies	13,600	$8,683,000	$8,683,000	$-	$-	$-	$-	$8,683,000	$-	$-	$8,683,000
FF-15	Fire Flow Pipeline Improvement Project - Raven Drive	6 & 8	Varies	8,200	$5,320,000	$5,320,000	$-	$-	$-	$-	$5,320,000	$-	$-	$5,320,000
FF-16	Fire Flow Pipeline Improvement Project - Zieglinde Drive	N/A	8	1,300	$711,000	$711,000	$-	$-	$711,000	$-	$-	$-	$-	$711,000
FF-17	Fire Flow Pipeline Improvement Project - Ficus Street	Varies	Varies	1,500	$973,000	$973,000	$-	$-	$-	$-	$-	$-	$973,000	$973,000
FF-18	Fire Flow Pipeline Improvement Project - Ulla Lane	6	12	600	$393,000	$393,000	$-	$-	$393,000	$-	$-	$-	$-	$393,000
FF-19	Fire Flow Pipeline Improvement Project - Oregon Street	N/A	8	400	$218,000	$218,000	$-	$-	$218,000	$-	$-	$-	$-	$218,000
FF-20	Fire Flow Pipeline Improvement Project - Kevin Place	N/A	8	300	$165,000	$165,000	$-	$-	$165,000	$-	$-	$-	$-	$165,000
FF-21	Fire Flow Pipeline Improvement Project - Macy Street	N/A	8	100	$56,000	$56,000	$-	$-	$-	$-	$-	$-	$56,000	$56,000
FF-22	Fire Flow Pipeline Improvement Project - Cedar Drive	8	8	200	$109,000	$109,000	$-	$-	$109,000	$-	$-	$-	$-	$109,000
FF-23	Fire Flow Pipeline Improvement Project - Sangston Drive	6 & 8	12	500	$656,000	$656,000	$-	$656,000	$-	$-	$-	$-	$-	$656,000
FF-24	Fire Flow Pipeline Improvement Project - Curtis Avenue	N/A	8	100	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
FF-25	Fire Flow Pipeline Improvement Project - Coleman Avenue	4 & 8	12	1,400	$917,000	$917,000	$-	$-	$-	$917,000	$-	$-	$-	$917,000
FF-26	Fire Flow Pipeline Improvement Project - Grand Avenue	4	12	1,000	$655,000	$655,000	$-	$-	$655,000	$-	$-	$-	$-	$655,000
FF-27	Fire Flow Pipeline Improvement Project - Stoneman Street	6 & 8	12	1,100	$721,000	$721,000	$-	$-	$-	$-	$-	$721,000	$-	$721,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
FF-28	Fire Flow Pipeline Improvement Project - Arbolado Lane	Varies	Varies	1,600	$886,000	$886,000	$-	$-	$886,000	$-	$-	$-	$-	$886,000
FF-29	Fire Flow Pipeline Improvement Project - Melinda Lane	Varies	Varies	900	$546,000	$546,000	$-	$-	$-	$-	$-	$-	$546,000	$546,000
FF-30	Fire Flow Pipeline Improvement Project - Wilson Street	8	12	1,200	$787,000	$787,000	$-	$-	$-	$-	$-	$-	$787,000	$787,000
FF-31	Fire Flow Pipeline Improvement Project - Leslie Street	N/A	8	1,700	$930,000	$930,000	$-	$-	$-	$-	$-	$-	$930,000	$930,000
FF-32	Fire Flow Pipeline Improvement Project - Illinois Street	Varies	Varies	1,000	$633,000	$633,000	$-	$-	$-	$-	$633,000	$-	$-	$633,000
FF-33	Fire Flow Pipeline Improvement Project - Gruwell Street	4 to 8	Varies	2,900	$1,900,000	$1,900,000	$-	$-	$-	$-	$1,900,000	$-	$-	$1,900,000
FF-34	Fire Flow Pipeline Improvement Project - Symphony Park Lane	8	12	700	$459,000	$459,000	$-	$-	$-	$-	$-	$459,000	$-	$459,000
FF-35	Fire Flow Pipeline Improvement Project - Colony Drive	Varies	Varies	500	$369,000	$369,000	$-	$-	$-	$-	$369,000	$-	$-	$369,000
FF-36	Fire Flow Pipeline Improvement Project - Pantera Court	8	12	2,800	$3,668,000	$3,668,000	$-	$3,668,000	$-	$-	$-	$-	$-	$3,668,000
FF-37	Fire Flow Pipeline Improvement Project - Jena Lane	N/A	12	1,400	$917,000	$917,000	$-	$-	$917,000	$-	$-	$-	$-	$917,000
FF-38	Fire Flow Pipeline Improvement Project Camelot Circle	Varies	Varies	300	$175,000	$175,000	$-	$-	$-	$-	$-	$175,000	$-	$175,000
FF-39	Fire Flow Pipeline Improvement Project - Wildomar Trail	Varies	Varies	12,800	$9,972,000	$9,972,000	$-	$9,972,000	$-	$-	$-	$-	$-	$9,972,000
FF-40	Fire Flow Pipeline Improvement Project - Canyon Drive	N/A	8	200	$109,000	$109,000	$-	$-	$-	$109,000	$-	$-	$-	$109,000
FF-41	Fire Flow Pipeline Improvement Project - Sunset Avenue	Varies	Varies	1,800	$1,006,000	$1,006,000	$-	$-	$-	$-	$1,006,000	$-	$-	$1,006,000
FF-42	Fire Flow Pipeline Improvement Project - Dial Road	6	12	1,000	$655,000	$655,000	$-	$-	$-	$655,000	$-	$-	$-	$655,000
FF-43	Fire Flow Pipeline Improvement Project - Almond Street	8	Varies	2,600	$1,650,000	$1,650,000	$-	$-	$1,650,000	$-	$-	$-	$-	$1,650,000
FF-44	Fire Flow Pipeline Improvement Project - Valencia Street	6 & 8	12	1,600	$1,049,000	$1,049,000	$-	$-	$-	$-	$-	$-	$1,049,000	$1,049,000
FF-45	Fire Flow Pipeline Improvement Project - Orchard Street	Varies	Varies	6,700	$4,794,000	$4,794,000	$-	$-	$-	$-	$4,794,000	$-	$-	$4,794,000
FF-46	Fire Flow Pipeline Improvement Project - Lewis Street	4 to 8	Varies	2,300	$1,420,000	$1,420,000	$-	$-	$-	$-	$-	$-	$1,420,000	$1,420,000
FF-47	Fire Flow Pipeline Improvement Project - Grape Street	N/A	8	700	$384,000	$384,000	$-	$-	$-	$-	$-	$384,000	$-	$384,000
FF-48	Fire Flow Pipeline Improvement Project - Park Way	N/A	8	100	$112,000	$112,000	$-	$112,000	$-	$-	$-	$-	$-	$112,000
FF-49	Fire Flow Pipeline Improvement Project - Ponte Russo	4 to 8	Varies	1,400	$1,890,000	$1,890,000	$-	$1,890,000	$-	$-	$-	$-	$-	$1,890,000
FF-50	Fire Flow Pipeline Improvement Project - Longhorn Drive	Varies	Varies	13,100	$9,502,000	$9,502,000	$-	$-	$-	$-	$9,502,000	$-	$-	$9,502,000
FF-51	Fire Flow Pipeline Improvement Project - Yosemite Place	6 to 10	12	4,800	$3,144,000	$3,144,000	$-	$-	$-	$3,144,000	$-	$-	$-	$3,144,000
FF-52	Fire Flow Pipeline Improvement Project - Railroad Canyon Road	8	12	700	$459,000	$459,000	$-	$-	$-	$-	$-	$-	$459,000	$459,000
FF-53	Fire Flow Hydrant Zone Adjustment - Temescal Canyon Road	N/A	N/A	N/A	$84,000	$84,000	$-	$-	$84,000	$-	$-	$-	$-	$84,000
FF-54	Fire Flow Hydrant Zone Adjustment - Horsethief 1 Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-55	Fire Flow Hydrant Zone Adjustment - Alberhill 1 PS	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-56	Fire Flow Hydrant Zone Adjustment - Alberhill 1A Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-57	Fire Flow Hydrant Zone Adjustment - Dryden Street	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-58	Fire Flow Hydrant Zone Adjustment - Grand Avenue	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-59	Fire Flow Hydrant Zone Adjustment - Crab Hollow Circle	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-60	Fire Flow Hydrant Zone Adjustment - Country Club Drive	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-61	Fire Flow Hydrant Zone Adjustment - Sunnyslope Avenue	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-62	Fire Flow Hydrant Zone Adjustment - 3rd Street	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-63	Fire Flow Hydrant Zone Adjustment	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-64	Fire Flow Hydrant Zone Adjustment - Rosetta Canyon 2A Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-65	Fire Flow Hydrant Zone Adjustment - El Cariso Truck Trail	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-66	Fire Flow Pipeline Improvement Project (Future Deficiency) - Longhorn Drive	6	8	1,000	$546,000	$-	$546,000	$-	$-	$-	$-	$-	$546,000	$546,000
FF-67	Fire Flow Pipeline Improvement Project (Future Deficiency) – White Street	6	8	1,000	$546,000	$-	$546,000	$-	$-	$-	$-	$-	$546,000	$546,000
FF-68	Fire Flow Pipeline Improvement Project (Future Deficiency) – Skylark Drive	8	12	500	$328,000	$-	$328,000	$-	$-	$-	$-	$-	$328,000	$328,000
FF-69	Fire Flow Hydrant Zone Adjustment (Future Deficiency) - 1434 PZ	N/A	N/A	N/A	$84,000	$-	$84,000	$-	$-	$-	$-	$-	$84,000	$84,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
Supply Improvements		Diameter (in)	Diameter (in)	Length (ft)	$91,000,000	$42,000,000	$51,000,000	$-	$60,000,000	$33,000,000	$-	$-	$-	$93,000,000
PW-WTP	Canyon Lake Water Treatment Plant Upgrades	N/A	N/A	N/A	$60,000,000	$42,000,000	$18,000,000	$-	$60,000,000	$-	$-	$-	$-	$60,000,000
PW-W1	Warm Springs Groundwater Wells	N/A	N/A	N/A	$13,000,000	$-	$13,000,000	$-	$-	$13,000,000	$-	$-	$-	$13,000,000
PW-W2	Temecula-Pauba Groundwater Wells	N/A	N/A	N/A	$20,000,000	$-	$20,000,000	$-	$-	$20,000,000	$-	$-	$-	$20,000,000
Rehabilitation and Replacement Projects					$497,933,000	$497,933,000	$-	$25,567,000	$41,345,000	$129,735,000	$73,899,000	$139,145,000	$88,242,000	$497,933,000
Pipelines		Diameter (in)	Diameter (in)	Length (ft)	$388,973,000	$388,973,000	$-	$-	$37,111,000	$114,515,000	$71,211,000	$102,322,000	$63,814,000	$388,973,000
PWRR-P-2030	Pipeline R&R Program	Varies	Varies	48,097	$26,978,000	$26,978,000	$-	$-	$26,978,000	$-	$-	$-	$-	$26,978,000
PWRR-P-2035	Pipeline R&R Program	Varies	Varies	107,903	$111,315,000	$111,315,000	$-	$-	$-	$111,315,000	$-	$-	$-	$111,315,000
PWRR-P-2040	Pipeline R&R Program	Varies	Varies	31,305	$17,357,000	$17,357,000	$-	$-	$-	$-	$17,357,000	$-	$-	$17,357,000
PWRR-P-2045	Pipeline R&R Program	Varies	Varies	252,734	$143,273,000	$143,273,000	$-	$-	$-	$-	$40,000,000	$53,273,000	$50,000,000	$143,273,000
PWRR-P-2050	Pipeline R&R Program	Varies	Varies	20,067	$11,766,000	$11,766,000	$-	$-	$-	$-	$-	$-	$11,766,000	$11,766,000
SDR-2030	Pipeline Small Diameter Replacement Program	≤8 / 10	8 / 10	18,475	$10,133,000	$10,133,000	$-	$-	$10,133,000	$-	$-	$-	$-	$10,133,000
SDR-2035	Pipeline Small Diameter Replacement Program	≤8	8	5,861	$3,200,000	$3,200,000	$-	$-	$-	$3,200,000	$-	$-	$-	$3,200,000
SDR-2040	Pipeline Small Diameter Replacement Program	≤8	8	25,375	$13,854,000	$13,854,000	$-	$-	$-	$-	$13,854,000	$-	$-	$13,854,000
SDR-2045	Pipeline Small Diameter Replacement Program	≤8	8	89,834	$49,049,000	$49,049,000	$-	$-	$-	$-	$-	$49,049,000	$-	$49,049,000
SDR-2050	Pipeline Small Diameter Replacement Program	≤8	8	3,752	$2,048,000	$2,048,000	$-	$-	$-	$-	$-	$-	$2,048,000	$2,048,000
Reservoirs		Existing Size (MG)	New Size (in)	Length (ft)	$11,290,000	$11,290,000	$-	$-	$-	$-	$-	$8,568,000	$2,722,000	$11,290,000
PWRR-T-1	Canyon Lake South Tank Replacement	1	1	--	$4,536,000	$4,536,000	$-	$-	$-	$-	$-	$4,536,000	$-	$4,536,000
PWRR-T-2	Gafford Street B Tank Replacement	0.6	0.6	--	$2,722,000	$2,722,000	$-	$-	$-	$-	$-	$-	$2,722,000	$2,722,000
PWRR-T-3	Los Pinos 1 Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-T-4	Los Pinos 2 Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-T-5	Skymeadows Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PSs		Pump (hp)	Pump (hp)	No.	$25,094,000	$25,094,000	$-	$10,783,000	$1,546,000	$436,000	$-	$10,783,000	$1,546,000	$25,094,000
PWRR-PS-1	Auld Valley PS	0	250	8	$1,344,000	$1,344,000	$-	$672,000	$-	$-	$-	$672,000	$-	$1,344,000
PWRR-PS-2	Beck Pumps	0	30	2	$134,000	$134,000	$-	$67,000	$-	$-	$-	$67,000	$-	$134,000
PWRR-PS-3	Bundy Canyon PS	0	100 / 125 / -	8	$874,000	$874,000	$-	$437,000	$-	$-	$-	$437,000	$-	$874,000
PWRR-PS-4	Cal Oaks PS	0	100	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-5	Canyon Lake Hydro	0	30 / 40	4	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-6	Farm PS	0	100 / -	6	$606,000	$606,000	$-	$404,000	$-	$-	$-	$202,000	$-	$606,000
PWRR-PS-8	Horsethief 2 PS	0	75	6	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-9	Lakeshore Booster	0	85	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-10	Lucerne PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-11	Ortega PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-12	Rice Canyon PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-13	Stage Ranch 1 PS	0	75	4	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-14	Stage Ranch 2 PS	0	100	4	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-15	Summerhill PS	0	100	6	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-16	Tuscany 1 PS	0	125	8	$1,076,000	$1,076,000	$-	$538,000	$-	$-	$-	$538,000	$-	$1,076,000
PWRR-PS-17	Tuscany 2 PS	0	25	4	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-18	Waite Street PS	0	50	8	$538,000	$538,000	$-	$269,000	$-	$-	$-	$269,000	$-	$538,000
PWRR-PS-19	Canyon Lake PS	0	100	4	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-20	Cielo Vista Hydro	0	20	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-21	City Booster	0	50	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-22	Cottonwood 1 Booster	0	200	3	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PWRR-PS-23	Cottonwood 2 Booster	0	60	2	$606,000	$606,000	$-	$303,000	$-	$-	$-	$303,000	$-	$606,000
PWRR-PS-24	Daley A PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-25	Daley B PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-26	Greer Ranch 1/Greer Ranch 2 PS	0	50	6	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-27	Horsethief 1 PS	0	125	4	$1,076,000	$1,076,000	$-	$538,000	$-	$-	$-	$538,000	$-	$1,076,000
PWRR-PS-28	La Laguna 1 PS	0	60	3	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-29	Lemon Grove Hydro	0	7.5	2	$804,000	$804,000	$-	$402,000	$-	$-	$-	$402,000	$-	$804,000
PWRR-PS-30	Los Pinos 1 PS	0	50	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-31	Los Pinos 2A PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-32	Los Pinos 2B PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-33	Meadowbrook 2 PS	0	40	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-34	Rosetta Canyon 1 PS	0	250	3	$1,008,000	$1,008,000	$-	$504,000	$-	$-	$-	$504,000	$-	$1,008,000
PWRR-PS-37	Skylark Hydro	0	10	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-38	Skymeadows PS	0	100	2	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-39	Tomlin 1 PS	0	50	1	$336,000	$336,000	$-	$168,000	$-	$-	$-	$168,000	$-	$336,000
PWRR-PS-40	Tomlin 2 PS	0	50	1	$336,000	$336,000	$-	$168,000	$-	$-	$-	$168,000	$-	$336,000
PWRR-PS-41	Inland Valley Booster	0	150	4	$1,076,000	$1,076,000	$-	$-	$538,000	$-	$-	$-	$538,000	$1,076,000
PWRR-PS-42	La Laguna 2 PS	0	25	3	$404,000	$404,000	$-	$-	$202,000	$-	$-	$-	$202,000	$404,000
PWRR-PS-43	Rosetta Canyon 2 PS	0	50	2	$806,000	$806,000	$-	$-	$403,000	$-	$-	$-	$403,000	$806,000
PWRR-PS-44	Woodmoor PS	0	75	4	$806,000	$806,000	$-	$-	$403,000	$-	$-	$-	$403,000	$806,000
PWRR-PS-45	Coldwater Booster	0	25	2	$134,000	$134,000	$-	$-	$-	$134,000	$-	$-	$-	$134,000
PWRR-PS-46	Encina PS	0	75	3	$302,000	$302,000	$-	$-	$-	$302,000	$-	$-	$-	$302,000
Wells		Number	Number	Number	$32,256,000	$32,256,000	$-	$12,096,000	$2,688,000	$-	$-	$14,784,000	$2,688,000	$32,256,000
PWRR-W1	Cereal No. 1 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W2	Cereal No. 3 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W3	Cereal No. 4 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W4	Corydon Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W5	Diamond Well	1	1	2	$2,688,000	$2,688,000	$-	$-	$1,344,000	$-	$-	$-	$1,344,000	$2,688,000
PWRR-W6	Joy Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W7	Lincoln Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W8	Lee Lake Well	0	1	1	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-W9	Machado Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W10	Mayhew Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W11	Station 71 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W12	Summerly Well	1	1	2	$2,688,000	$2,688,000	$-	$-	$1,344,000	$-	$-	$-	$1,344,000	$2,688,000
PWRR-W13	Terra Cotta Well	1	1	1	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
CIP Total					**$1,078,352,000**	**$682,513,000**	**$395,839,000**	**$39,177,000**	**$365,840,000**	**$252,785,000**	**$157,540,000**	**$137,747,000**	**$123,263,000**	**$1,078,352,000**
Annual Cost(5)					**N/A**	**N/A**	**N/A**	**$19,588,500**	**$73,168,000**	**$50,577,000**	**$31,508,000**	**$27,949,400**	**$24,652,600**	**$39,939,000**

Notes:
Abbreviations: ft - feet; gpm - gallons per minute; hp - horsepower; in - inches; N/A - not applicable.
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20 percent contingency of the baseline construction cost.
(3) Total project costs includes a 40 percent markup for engineering, construction management and environmental and legal and an 8 percent markup for project administration of the estimated construction cost.
(4) Total Mark-Up is 68 percent of the baseline construction costs.
(5) Annual cost is equivalent to the CIP total divided by the number of planning years.

Chapter 1

INTRODUCTION

This chapter provides an introduction to the Water System Master Plan (WSMP) for the Elsinore Valley Municipal Water District (EVMWD), beginning with the project background. The project objectives are presented, followed by a concise overview of the scope of work, team involvement and acknowledgements. This chapter concludes with a description of the organization of the WSMP report.

1.1 Project Background

The last WSMP for EVMWD was completed by MWH in 2016. Since then, there has been significant development within EVMWD's service area, resulting in population growth and increased demands for both potable and non-potable water supplies. However, water conservation and efficiency have also improved, and potable reuse regulations have advanced rapidly over the past decade. These factors have created a need to update the 2016 WSMP.

The aim of the current WSMP is to develop a document that will serve as a guideline for planning of the EVMWD's potable water system. This WSMP has a planning horizon up to the year 2050 and evaluates EVMWD's potable water system under both existing and future conditions.

This WSMP covers EVMWD's water service areas, which is composed of the Cities of Lake Elsinore and Canyon Lake, and portions of the City of Wildomar, Murrieta and un-incorporated Riverside County and Orange County land. The proposed developments within EVMWD's service area represent a significant opportunity for growth. Accordingly, the planning and sizing of new facilities to serve the new developments are a key focus of this WSMP. The objective is to ensure that EVMWD's recycled water system can meet the increased demands for potable water while optimizing efficiency and sustainability.

Concurrently with the development of this WSMP, Carollo Engineers, Inc. (Carollo) is updating the Recycled Water System Master Plan (RWSMP) and the Sewer System Master Plan (SSMP). All three plans are based on the same set of growth and flow assumptions. The RWSMP provides a phased recycled water system capital improvement plan (CIP) for EVMWD staff to use as a planning road map for future recycled water investment decisions. The SSMP evaluates the EVMWD's sewer collection system using existing and projected future wastewater flows, identifies system deficiencies, and recommends improvements. A CIP for the sewer collection system prioritizes these improvements.

1.2 Project Objectives

EVMWD's mission is to "manage its natural resources to provide reliable, cost-efficient, high-quality water and wastewater services for the communities they serve, while promoting conservation, environmental responsibility, education, community interaction, ethical behavior, and recognizing employees as highly valuable assets."

This WSMP is developed to assist EVMWD in achieving these objectives by meeting the following goals:

- Developing an infrastructure plan that balances reliability and cost.
- Creating an accurate and usable calibrated hydraulic model.
- Evaluating water system performance.
- Identifying needed capital improvement projects.
- Transferring knowledge to EVMWD's staff.

1.3 Scope of Work

The scope of work (SOW) of this WSMP consists of the following tasks:

- Update EVMWD's 24-hour hydraulic potable water model of EVMWD's system.
- Project potable water demands in the service area for year 2050.
- Identify timing and add locations of future developers in the hydraulic potable water model.
- Perform a Water supply analysis.
- Conduct storage, booster station, and system reliability analysis.
- Analyze the potable water distribution system under existing conditions.
- Analyze the potable water distribution system under future conditions.
- Prepare a replacement program for pipes and potable water facilities.
- Identify potable water system improvements.
- Prepare a capital improvement plan (CIP) for the potable water system.
- Consult EVMWD staff on the needs of the system.

As part of this WSMP, an updated 24-hour extended period simulation (EPS) computer model of the potable water system has been updated from the previous WSMP. The calibrated potable water model includes all water pipelines within EVMWD's system. Several scenarios were added to the potable water model which incorporates future system elements that will be required to meet the service conditions through 2050. The purpose of the model is to analyze the system under existing and future demand conditions, identify constraints and deficiencies in existing infrastructure, recommend mitigation measures, and develop conceptual infrastructure to serve future demands.

A comprehensive CIP has been prepared that includes all necessary system improvements required to meet the potable water system needs through the year 2050. The CIP identifies system deficiencies and improvements needed to address these deficiencies, maximize potable water opportunities, and proposes phasing and cost estimates for the recommended improvements. The CIP will provide EVMWD with a roadmap for future potable water system planning.

During the preparation of this WSMP, EVMWD staff provided numerous reports, maps, studies, and other sources of information. Additionally, pertinent materials were obtained from sources such as US Geological Survey (USGS), Esri, and others. These materials included water system maps, planning and development information, general plan land use, historical records, billing data, and detailed facility information. Meetings were also held throughout the project with EVMWD's engineering and planning, management, and operational staff to utilize their knowledge and information during the hydraulic model development and calibration stages. A complete list of reference documents is provided in Appendix A.

1.4 Authorization

This WSMP has been developed in accordance with the agreement between the EVWMD and Carollo dated December 16, 2021.

1.5 Acknowledgements

Carollo wishes to acknowledge and thank all of EVMWD's staff for their assistance and support in completing this project. Carollo would especially like to thank the following individuals:

- Parag Kalaria, Water Resources Director and Project Manager.
- Jason Dafforn, Engineering and Water Resources Director (former).
- Sudhir Mohleji, Principal Engineer.
- Jesus Gastelum, Senior Water Resources Planner/Engineer.
- Shane Sibbett, Civil Engineer.
- Matthew Bates, Engineering Manager (former).
- Mayra Cabrera, Principal Engineer.
- Jase Warner, Director of Operations.
- Tim Collie, Water Operations Manager.
- Shawn Gray, Water Production Superintendent.

1.6 Project Staff

The following Carollo staff was principally involved in the preparation of this WSMP:

- Principal-in-Charge: Eric Mills, P.E.
- Project Manager: Inge Wiersema, P.E.
- Project Engineer: Matthew Huang, P.E.
- Technical Reviewer: Anthony Herda, P.E.
- Lead Hydraulic Modeler: Ryan Hejka, P.E.
- Water Demands: Rachel Duncan, P.E.
- EDU Tool Developer: Andy Baldwin, P.E.
- Engineering Support Staff: Renjie Li; Mike Wetterau, P.E.; Vidula Bhadkamkar, P.E.
- GIS Specialists: Jackie Silber, GISP and Kevin Christensen.

1.7 Master Plan Outline

This document is divided into nine chapters. Chapter 1 serves as the introduction of the master plan. Chapter 2 discusses the study area and the land use. Chapter 3 focuses on the potable water production and demand for historical and future use. Chapter 4 provides an overview of the existing system, while Chapter 5 delves into the potable water system model. The planning and evaluation criteria used for this master plan is described in Chapter 6. Chapter 7 and Chapter 8 present the existing system analysis and the future system analysis, respectively. Based on these evaluations, Chapter 9 provides recommendations for the capital improvement program, along with associated costs. Supporting documents are included in appendices, while acronyms used in this WSMP are listed at the end of the Table of Contents.

Chapter 2

STUDY AREA AND LAND USE

This chapter describes Elsinore Valley Municipal Water District's (EVMWD's) service area, current and projected population served, and the land use within EVMWD's service area.

2.1 Study Area

EVMWD is a public non-profit agency that was created on December 23, 1950 that provides public water service, water supply development and planning, wastewater treatment and disposal, and recycled water service. EVMWD is a sub agency of Western Municipal Water District, a member agency of the Metropolitan Water District of Southern California (MWD).

The study area for this master plan is EVMWD's service area, which is located in southwestern Riverside County and eastern Orange County. EVMWD is located approximately 18 miles northwest from the city of Temecula, 25 miles west of the city of Hemet, and 22 miles southeast of the city of Corona. EVMWD provides water services to the cities of Lake Elsinore and Canyon Lake, and portions of the city of Wildomar, city of Murrieta, and unincorporated Riverside County and Orange County land, as shown on Figure 2.1. The unincorporated communities within EVMWD's service area include The Farm, Lakeland Village, Cleveland Ridge, Rancho Capistrano, El Cariso Village, Horsethief Canyon, Sedco Canyon, and Temescal Canyon.

The size of the EVMWD service area is approximately 98.5 square miles. The EVMWD service area has a high elevation of over 3,000 feet above mean sea level (ft msl) and a low elevation of roughly 1,250 ft msl. EVMWD is bordered by the Cleveland National Forest to the southwest, which are part of the Santa Ana Mountains. Because of these mountain ranges surrounding EVMWD, as well as flat areas surrounding the lake, EVMWD has a large number of pump stations (PS), as well as many pipes with minimal or very steep slopes.

The most prominent geographic feature of the EVMWD service area is Lake Elsinore, a roughly 3,000-acre natural freshwater lake that is fed by the San Jacinto River during wet weather and can overflow to the Santa Ana River and eventually to the Pacific Ocean. To sustain lake levels during drought periods, tertiary effluent from the EVMWD Regional Water Reclamation Facility is added to the Lake. Lake Elsinore sits in the center of the EVMWD service area.

EVMWD's service area also includes Canyon Lake, a 525-acre reservoir created in 1928 by the construction of the Railroad Canyon Dam. The reservoir is supplied by the San Jacinto River and Salt Creek and acts as a drinking water reservoir for EVMWD.

EVMWD's service area is divided into two separate divisions: the Elsinore Division and Temescal Division. The Temescal Division Service Area (TDSA) is located northwest of the Elsinore Division Service Area (EDSA) and is a self-sustained water division, hydraulically separated from the EDSA.

EVMWD serves a population of approximately 165,000 and provides potable water through 45,008 connections. The EDSA makes up most of EVMWD's service area, with approximately 44,301 connections, encompassing an area of 96 square miles. The TDSA covers an area approximately 2.5 square miles and has approximately 707 connections.

2.1.1 Service Area Population

Current population served and future population projections for the service area developed in support of EVMWD's 2020 Urban Water Management Plan (UWMP) were adopted for this Water System Master Plan (WSMP).

For the 2020 UWMP, the Department of Water Resources (DWR) Population Tool, the Southern California Association of Governments (SCAG) 2020–2045 Regional Transportation Plan, and staff input were considered for the current and projected population estimates. In recent years, the number of service connections within EVMWD's service area has grown at a rate of 1.5 percent per year, and this growth is expected to continue through 2050. Table 2.1 shows the current and projected population for the EVMWD service area.

Table 2.1 EVMWD Service Area Population Projection(1)

Year	EVMWD Population Served
2020	163,984
2025	176,657
2030	190,310
2035	205,018
2040	220,863
2045	237,932
2050	256,320

Notes:
(1) Source: 2020-2045 population estimates from EVMWD's 2020 UWMP (WSC, 2021), and the 2050 estimate was calculated using a continued growth rate of 1.5 percent per year.

2.2 Land Use

The general plans of the Cities of Lake Elsinore, Canyon Lake, Wildomar, and Murrieta, as well as Riverside and Orange County, guide development and establish long-range development policies within their jurisdictions that overlap with EVMWD's service area. Land use information is an integral component in determining the amount of future potable and recycled water use and wastewater generation within EVMWD's boundaries. The type of land use in an area will affect the volume and timing of water use as well as the volume, timing, and water quality characteristics of the wastewater generation. Adequately estimating the water use and generation of wastewater from various land use types is important in sizing and maintaining effective water and sewer system facilities.

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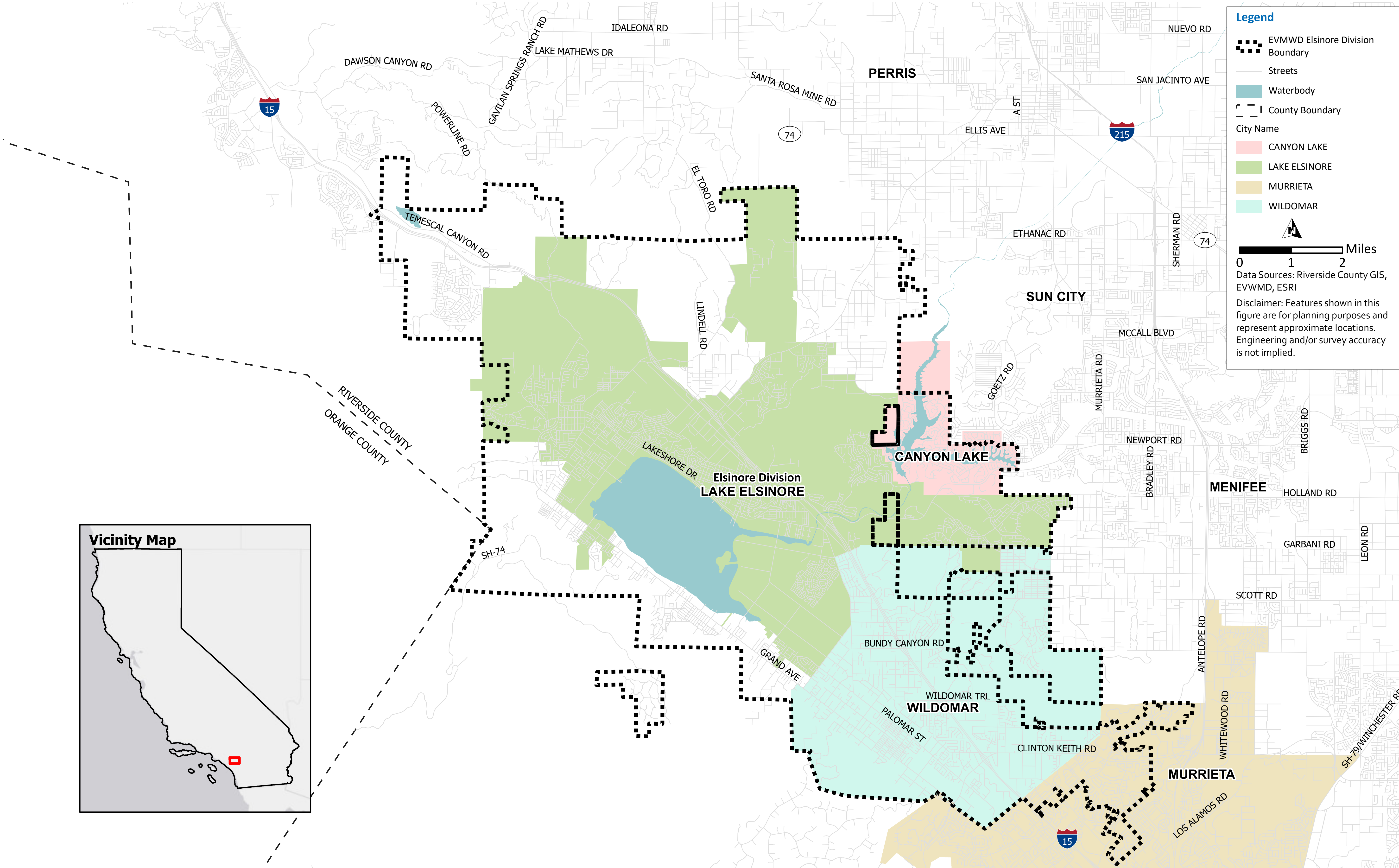

Figure 2.1 EVMWD Service Area

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Figure 2.2 shows the land uses within EVMWD's service area. Each land use category is defined, and the approximate percentage of EVMWD's service area comprised of that land use type is shown, in Table 2.2. Low density residential is the largest land use category in EVMWD's service area, with significant amounts of medium-density residential, industrial, and open-space land uses, as well. A large portion of the service area is categorized as vacant, under construction, or undevelopable, indicating a significant potential for growth.

Table 2.2 Land Use Designations

Land Use Category(1)	Percentage of EVMWD Service Area	Definition
Low-Density Residential	31%	This designation provides for single-family detached homes, secondary residential units, hobby farming and keeping of animals, public and quasi-public uses, and similar and compatible uses. Clustered single-family development may also be encouraged within this designation to minimize grading requirements and impacts to environmentally sensitive areas. Residential densities shall be between 1 and 6 dwelling units per net acre.
Medium-Density Residential	17%	This designation provides for typical single family detached and attached homes, duplexes, triplexes, fourplexes, multi-family residential units, group quarters, public and quasi-public uses, and similar and compatible uses. Residential densities shall be between 7 and 18 dwelling units per net acre.
High-Density Residential	1%	This designation provides for single-family attached homes, multi-family residential units, group quarters, public and quasi-public uses, and similar and compatible uses. Residential densities shall be between 19 and 24 units per net acre.
Commercial	2%	This designation provides for retail, services, restaurants, professional and administrative offices, hotels and motels, mixed-use projects, public and quasi-public uses, and similar and compatible uses.
Mixed Use	3%	This designation provides for a mix of residential and non-residential uses within a single proposed development area.
Industrial	6%	This designation provides for office and administrative uses, light industrial, research and development, industrial parks, warehouses, manufacturing, office-based firms, including office support facilities,

Land Use Category[1]	Percentage of EVMWD Service Area	Definition
		restaurants, medical clinics, public and quasi-public uses, and similar and compatible uses.
Open Space/ Recreational	9%	These designations provide for public and private areas of permanent open space and allows for passive and/or active private and public recreation. Open space and passive recreation areas include state and local parks, Bureau of Land Management lands, the Cleveland National Forest, and/or private undeveloped lands. Active recreation includes uses such as golf courses and also allows for commercial recreation facilities such as water-oriented recreational uses.
Public/ Institutional	3%	This designation indicates areas owned and maintained by public agencies such as school districts, water districts, utility companies, the County of Riverside, and the relevant city. Appropriate uses for this designation include schools, roads, drainage facilities, utility substations, sewage treatment plants, civic facilities and cemeteries, and similar and compatible uses.
Other[2]	29%	Includes land that is vacant, under construction, undevelopable, unknown zoning, floodways, and a small amount of agriculture.

Notes:
(1) Land use categories adapted from the City of Lake Elsinore's General Plan (2011).
(2) Not an officially designated land use category but used to capture land use types across jurisdictions that don't fit into another category.

2.2.1 Planned Developments

Since EVMWD's service area has a significant potential for additional growth, EVMWD tracks planned developments within each of the cities and unincorporated county areas within its boundaries in order to plan for their potential future water demand and wastewater collection needs. EVMWD is currently tracking over 300 planned developments. Over half of these developments are within the city of Lake Elsinore with a large number planned in the city of Wildomar and unincorporated Riverside County as well. The cities of Canyon Lake and Murrieta have relatively few planned developments within EVMWD's service area.

The full list of planned developments tracked by EVMWD is included in Appendix B. The size, character, and location of the planned developments contribute to the spatial allocation of projected future demands, as described in Chapters 3 and 8.

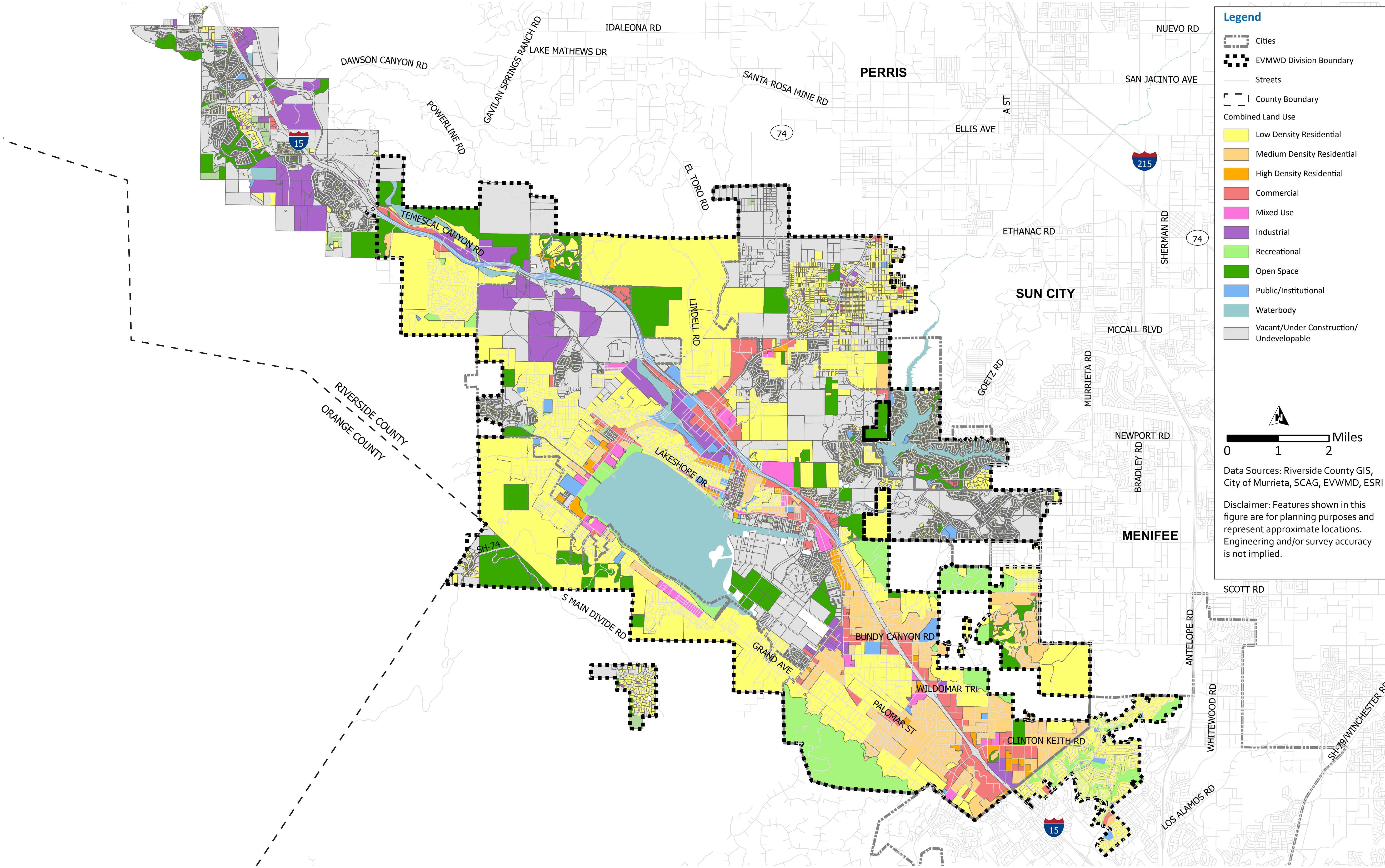

Figure 2.2 Service Area Land Use

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Chapter 3

WATER PRODUCTION AND DEMAND

This chapter describes the existing water supply sources, historical water production and consumption, and projected water demands for Elsinore Valley Municipal Water District's (EVMWD's) service area. The future water demands for the 2050 planning horizon were adapted from the forecast prepared for EVMWD's 2020 Urban Water Management Plan (UWMP).

3.1 Water Supply

EVMWD has three primary sources of potable water supply:

- Local groundwater pumped from EVMWD-owned wells and as needed, then treated and/or blended to meet regulatory limits such as arsenic, vanadium, etc.
- Local surface water from Canyon Lake Reservoir and treated at the Canyon Lake Water Treatment Plant (CLWTP).
- Imported water purchased from Metropolitan Water District (MWD) through Western Municipal Water District (WMWD); water is imported from the Temescal Valley Pipeline (TVP) connection, and the Auld Valley Pipeline (AVP) EM-17 connection.

EVMWD's water supply wells and corresponding groundwater basins, CLWTP, and TVP and AVP connections are shown on Figure 3.1. EVMWD also has a recycled water network that delivers non-potable, Title 22-compliant tertiary recycled water to customers in four service areas. Details regarding EVMWD's recycled water system can be found in the separate Recycled Water System Master Plan (Carollo, 2022).

Historical EVMWD water production over the past 30 years is summarized in Table 3.1 and graphically shown on Figure 3.2. Use of supplies varies from year-to-year but imported water has been the largest source of water supply in recent years. As shown, water production increased steadily during the early 2000's until reaching a peak in 2007 (35,799 acre-feet per year [AFY]). Water production has steadily declined since and currently is stable around 24,000 AFY despite growth, reflecting the impacts of EVMWD's water conservation program.

Table 3.1 EVMWD Annual Water Production From 1992 to 2021

Year	Groundwater, AFY (% of total)	Imported Water, AFY (% of total)	Local Surface Water, AFY (% of total)	Total, AFY
1992(1)	6,618 (40%)	7,387 (45%)	2,360 (14%)	16,365
1993(1)	5,467 (33%)	8,821 (53%)	2,217 (13%)	16,505
1994(1)	8,617 (50%)	7,302 (43%)	1,218 (7%)	17,137
1995(1)	9,696 (57%)	3,243 (19%)	4,055 (24%)	16,994
1996(1)	8,262 (46%)	8,839 (50%)	747 (4%)	17,848
1997(1)	9,418 (49%)	7,374 (38%)	2,404 (13%)	19,196
1998(1)	7,029 (39%)	4,373 (24%)	6,551 (36%)	17,953
1999(1)	9,549 (44%)	10,405 (48%)	1,948 (9%)	21,902
2000(1)	8,261 (35%)	12,914 (55%)	2,138 (9%)	23,313
2001(1)	9,940 (44%)	9,716 (43%)	2,723 (12%)	22,379
2002(1)	9,947 (40%)	14,503 (59%)	206 (1%)	24,656
2003(1)	10,144 (41%)	12,958 (52%)	1,917 (8%)	25,019
2004(1)	9,982 (37%)	14,905 (55%)	2,345 (9%)	27,232
2005(1)	10,889 (38%)	15,068 (52%)	2,913 (10%)	28,870
2006(1)	10,495 (32%)	21,146 (65%)	782 (2%)	32,423
2007(1)	8,445 (25%)	22,822 (66%)	3,128 (9%)	34,395
2008(1)	6,468 (21%)	20,645 (68%)	3,427 (11%)	30,540
2009(1)	8,286 (31%)	16,404 (61%)	2,011 (8%)	26,701
2010(1)	4,551 (19%)	15,995 (68%)	3,002 (13%)	23,548
2011(1)	3,045 (13%)	17,448 (72%)	3,697 (15%)	24,190
2012(1)	5,709 (23%)	19,353 (77%)	178 (1%)	25,240
2013(1)	6,232 (24%)	18,479 (72%)	932 (4%)	25,643
2014(1)	5,627 (22%)	18,883 (74%)	1,167 (5%)	25,677
2015(1)	4,051 (19%)	15,318 (72%)	1,964 (9%)	21,333
2016(2)	5,613 (25%)	15,945 (71%)	808 (4%)	22,366
2017(2,3)	2,866 (13%)	18,322 (80%)	1,709 (7%)	22,897
2018(2,3)	4,027 (17%)	18,276 (78%)	1,158 (5%)	23,461
2019(2,3)	4,067 (18%)	15,917 (71%)	2,414 (11%)	22,398
2020(2)	8,537 (36%)	15,115 (64%)	0 (0%)	23,652
2021(4)	4,899 (20%)	19,350 (80%)	0 (0%)	24,249
30-year Average	7,225 (31%)	14,241 (61%)	2,004 (8%)	23,469

Notes:
(1) EVMWD 2017 Integrated Resources Plan (IRP).
(2) EVMWD 2020 UWMP.
(3) The lower annual groundwater values for 2017, 2018, and 2019 are associated with decreased pumping in the Elsinore Basin due to in-lieu recharge CUP compliance. During in-lieu recharge, EVMWD decreased pumping by the same amount of imported water recharge. For these years, the annual imported volumes are larger because additional water was provided for in-lieu recharge purposes.
(4) "Water Production.xlsx".

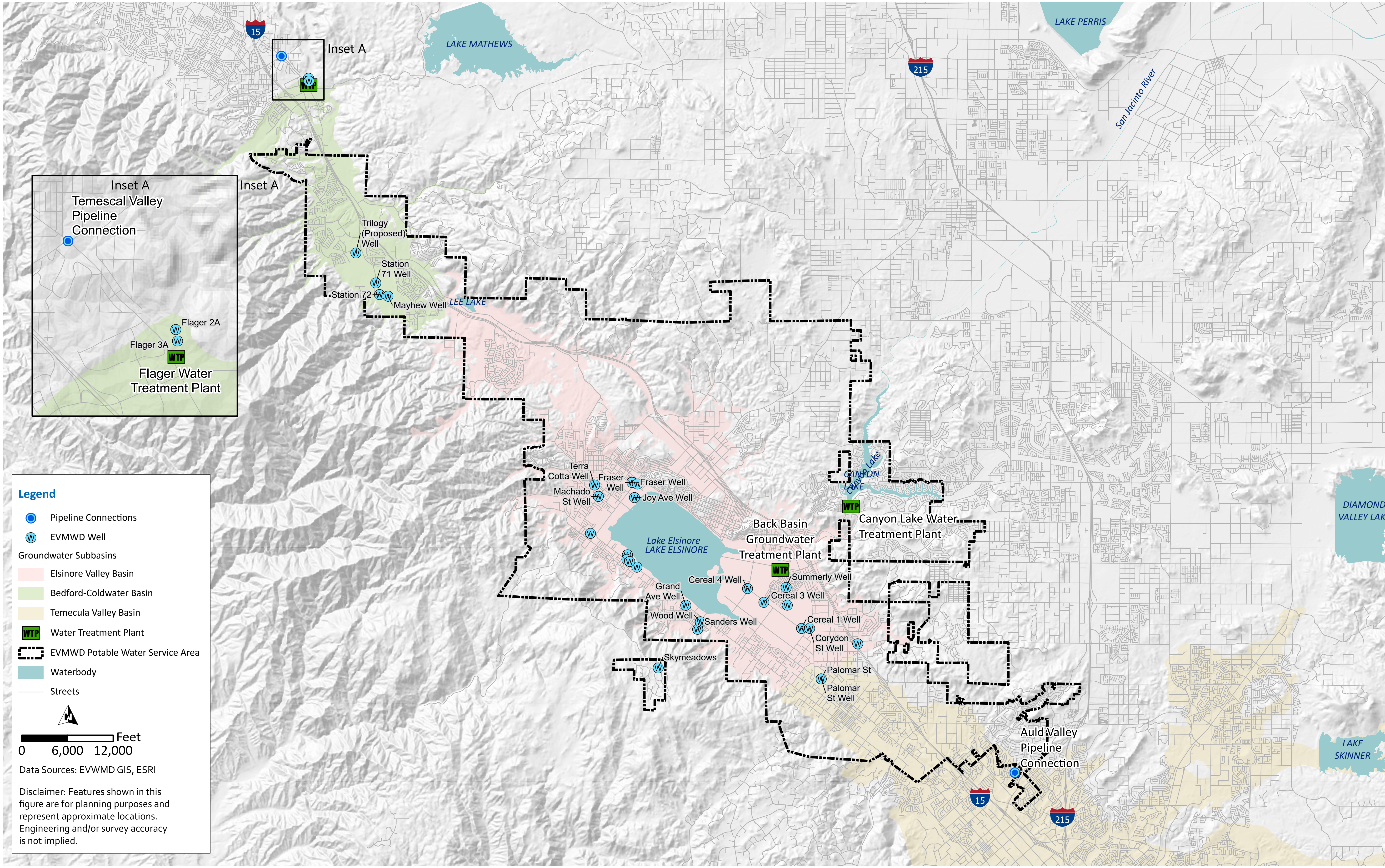

Figure 3.1 Water Supply Sources

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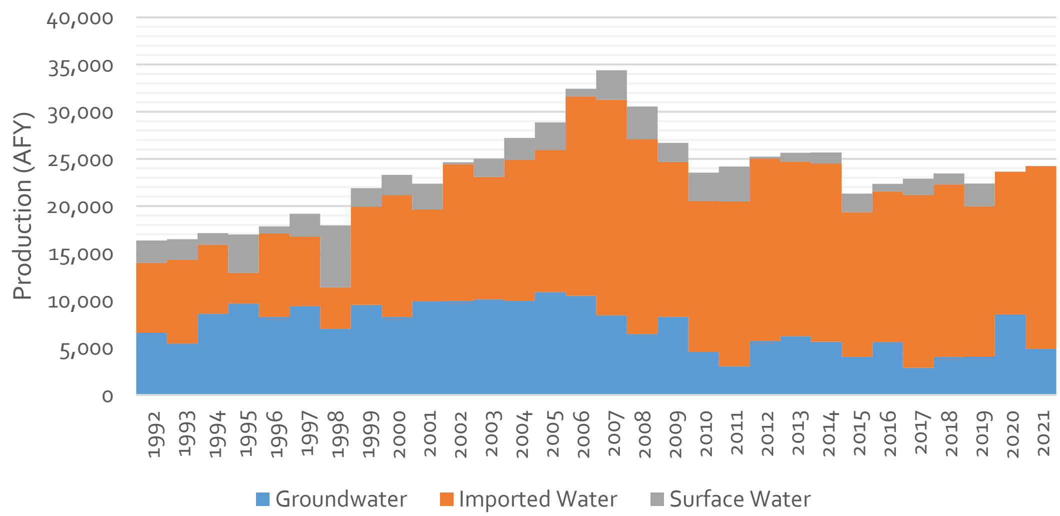

Figure 3.2 Historical Water Production by Supply Type From 1992 to 2021

3.1.1 Groundwater Wells

EVMWD pumps water from the Elsinore Valley Subbasin and the Bedford-Coldwater Subbasin, both of which underlie portions of the Elsinore Groundwater Basin. Per the 2021 *Elsinore Valley Subbasin Groundwater Sustainability Plan*, EVMWD is the primary producer of groundwater in the Elsinore Valley Subbasin, accounting for 99 percent of groundwater produced from the subbasin (Carollo, 2021).

EVWMD will limit pumping to approximately 5,700 AFY to be consistent with the safe yield that was defined for the Elsinore Area in the Elsinore Valley Groundwater Sustainability Plan (GSP) (Carollo, 2021). EVMWD has 10 wells in the Elsinore Valley Subbasin (Carollo, 2021) that extract water from a deep aquifer for the purpose of potable water supply. Two new municipal wells are planned for the Lee Lake Area of the Elsinore Valley Subbasin with an estimated yield of 1,000 AFY (Carollo, 2021). The Lee Lake wells are expected to be completed in 2024. In addition, EVMWD is planning to add an additional well within the boundaries of the Elsinore Valley Subbasin and the Temecula-Pauba aquifers in 2023. The implementation of these three new wells will bring EVMWD's total number of wells in the Elsinore Valley Subbasin up to 13.

EVMWD's groundwater facilities also include the Back Basin Groundwater Treatment Plant. The treatment plant provides centralized treatment for arsenic for two EVMWD wells, Cereal 3 and Cereal 4. The existing capacity of the plant is 3,500 gallons per minute (gpm) (approximately 5,600 AFY), with the ability to expand to 7,000 gpm (approximately 11,300 AFY). If the plant was expanded, then groundwater extracted from other wells could also be treated for arsenic

(Carollo, 2021). Currently, the Joy and Machado wells are blended together, and the Cereal 1, Corydon, Diamond, and Summerly wells are blended together for arsenic.

EVMWD also has two non-potable wells that have been used to augment Lake Elsinore water levels. Since the development of the 2005 Groundwater Management Plan (GWMP), the wells have only been used during drought conditions, which decreases natural runoff into the Lake. Recycled water replenishment is used more regularly to maintain the minimum lake elevation goal of 1,240 feet above mean sea level (ft-msl) in Lake Elsinore (Carollo, 2021).

EVMWD currently has four production wells in the Bedford-Coldwater Subbasin, which is located to the north of the Elsinore Valley Subbasin. Two of the four wells (Station 71 and Mayhew) are located in the Bedford Subbasin and serve the Elsinore Division while the other two (Flagler 2A and Flagler 3A) are in the Coldwater Subbasin and serve the Temescal Division and import water to the EVMWD's main service area. Per the 2021 Groundwater Sustainability Plan for the Bedford-Coldwater Subbasin, the subbasin is considered a low priority groundwater basin by the Department of Water Resources (DWR), and groundwater elevations have been relatively stable in recent years (Todd Groundwater, 2021). The sustainable yield of the Bedford-Coldwater Subbasin is estimated to be 6,000 AFY, shared between EVMWD, the City of Corona, and the Temescal Valley Water District (Todd Groundwater, 2021).

The Flagler Wells are treated at the Flagler Water Treatment Plant to achieve one log removal of Giardia.

Five-year production totals from the Elsinore Valley Subbasin and the Bedford-Coldwater Subbasin are shown in Table 3.2 along with the estimated safe yield for each basin. As shown, EVMWD typically produces more water from the 10 wells in the Elsinore Valley Subbasin than from the four wells in the Bedford-Coldwater Subbasin. Production from the Elsinore Valley Subbasin has accounted for an average of 75 percent of the total groundwater produced by EVMWD over the past five years.

Table 3.2 Groundwater Production by Basin (2017-2021)

Year	Elsinore Valley Subbasin Production (AFY)	Bedford-Coldwater Subbasin Production (AFY)	Total Groundwater Production (AFY)
2017	2,198	668	2,866
2018	3,713	244	3,957
2019	2,360	1,690	4,050
2020	6,688	1,788	8,476
2021	3,312	1,587	4,899

Year	Elsinore Valley Subbasin Production (AFY)	Bedford-Coldwater Subbasin Production (AFY)	Total Groundwater Production (AFY)
5-Year Average	3,654	1,195	4,850
Safe Yield	5,700	6,000	-

3.1.2 Local Surface Water

Lake Elsinore is a large local surface water body in EVMWD's service area with an estimated volume of approximately 60,000 acre-feet (AF). Per the Santa Ana Water Pollution Control Plan (Basin Plan) (SARWQCB, 2019), beneficial uses of the lake include recreation, warm water fishery, commercial, wildlife habitat, and rare threatened and endangered species. Lake Elsinore is not used for municipal water supply. Under average hydrologic conditions, there is insufficient precipitation and runoff to balance evaporation, resulting in declining water level in the lake. EVMWD provides recycled water and groundwater to Lake Elsinore to maintain lake levels at 1,240 ft-msl to comply with the Lake Elsinore Comprehensive Water Management Agreement.

Canyon Lake (also called Railroad Canyon Reservoir) is used by EVMWD as a local raw water source to produce potable water supply. Canyon Lake impounds flows from the San Jacinto River, Salt Creek, and local surface runoff (EVMWD, 2017). EVMWD owns all water and land rights within the footprint of Canyon Lake. Canyon Lake was originally constructed with a capacity of 12,000 AF. However, siltation decreased the capacity of the lake to approximately 8,000 AF. Raw water purchased from WMWD at connections WR-18A (Colorado River Aqueduct [CRA] water) and WR-31 (State Water Project [SWP] water) can be discharged into the San Jacinto River to flow downstream to fill Canyon Lake. EVMWD has not purchased WR-18A water due to concerns with salinity (Carollo, 2021). EVMWD has purchased water from WR-31 (Carollo, 2021).

EVMWD treats surface water from Canyon Lake at the CLWTP. The CLWTP is a conventional water treatment plant (WTP) with historical production typically limited to between 4.5 million gallons per day (mgd) and 7 mgd (approximately 5,000 AFY to 7,800 AFY) based on water quality conditions and operational limitations. The plant is currently being upgraded to provide 7 mgd plant capacity with granular activated carbon (GAC) or ion exchange (IX) processes to remove per- and polyfluorinated substances (PFAS). Construction on the CLWTP limited the yield from this treatment plant in 2020 and 2021, so additional groundwater and imported water was used in these years to meet demands as depicted on Figure 3.2. The ongoing plant upgrade will continue to limit EVMWD's ability to treat water from Canyon Lake, so EVMWD will continue to rely on imported water and groundwater to meet demands for the next several years.

3.1.3 Treated Imported Water

EVMWD purchases imported water from MWD through WMWD delivered through TVP and AVP.

The water delivered through AVP, using Eastern Municipal Water District's conveyance facilities, is treated at the MWD Skinner Filtration Plant. Source waters for the MWD Skinner Filtration Plant include water from the CRA and water from the SWP. EVMWD has the right to purchase or acquire a maximum flow rate of 37.5 cubic feet per second (cfs) (24.2 mgd or 27,100 AFY) through AVP, although this flow rate cannot be achieved hydraulically. To reserve capacity for maximum day demand (MDD) conditions, it is assumed EVMWD will be able to obtain 83 percent of source capacity (annual capacity divided by 1.2), or 31.1 cfs (20.0 mgd or 22,500 AFY) from the AVP on an annual basis during average year and wet years (MWH, 2016a).

Imported water from TVP is treated at MWD's Mills Filtration Plant. The source water for the MWD Mills Filtration Plant is water from the SWP. The treated water is conveyed to EVMWD via the Mills Gravity Pipeline. The TVP was designed to convey 41 cfs with the construction of a booster pumping station, although the current hydraulic capacity of the TVP is 19.6 cfs (14,190 AFY) based on gravity flow from the Mills Gravity Pipeline. Like the AVP, it is assumed that EVMWD can obtain up to 83 percent of the current hydraulic capacity, or 16.3 cfs (12,700 AFY) from the TVP on an annual basis (MWH, 2016a). EVMWD has the ability to increase its use of water from the Mills Filtration Plant with implementation of additional pumping capacity. Opportunities to expand TVP capacity are currently being studied.

3.2 Peaking Factors (PF)

This section describes EVMWD's water system's seasonal, hourly, and daily peaking factors (PF).

3.2.1 Seasonal Peaking Factors (PF)

The historical monthly water production for the period 2017 through 2021 along with average monthly PF, maximum month PFs, and minimum month PFs is presented in Table 3.3. The maximum month for each year was either July or August and is shown in blue text. The minimum month for each year was either January or February and is shown in orange text. The maximum month PF was calculated by dividing the maximum month by the average month for each year. From 2017 through 2021, the maximum month PFs ranged from 1.38 to 1.57 with an average of 1.42, which are typical values for water systems of this size in desert regions of Southern California. The minimum month peaking factor was also calculated by dividing the minimum month by the average month for each year and ranged between 0.39 and 0.62, with an average of 0.57.

Table 3.3 Annual Water Production Statistics From 2017 to 2021(3)

Month	Monthly Production (AF/month)						Average Monthly PF
	2017	2018	2019	2020	2021	Average	
January	1,140	1,310	1,346	1,225	1,393	1,283	0.65
February	979	1,247	756	1,391	1,240	1,122	0.57
March	1,380	1,493	972	1,302	1,720	1,373	0.69
April	1,766	2,042	1,833	1,325	1,863	1,766	0.89
May	2,247	2,253	1,982	2,099	2,211	2,158	1.09
June	2,334	2,293	2,181	2,570	2,533	2,382	1.20
July	2,471	2,916	2,777	2,669	2,757	2,718	1.37
August	2,758	2,684	3,026	3,008	2,591	2,813	1.42
September	1,742	2,403	2,628	2,609	2,793	2,435	1.23
October	2,673	2,163	2,408	2,310	1,886	2,288	1.16
November	2,070	1,869	1,924	1,902	1,949	1,943	0.98
December	1,705	1,245	1,243	1,719	1,314	1,445	0.73
Monthly Average	1,939	1,993	1,923	2,011	2,021	1,977	-
Maximum Month PF(1)	1.42	1.46	1.57	1.50	1.38	1.42	-
Minimum Month PF(2)	0.50	0.62	0.39	0.61	0.61	0.57	-

Notes:
Source: Historical EVMWD Production Records.
(1) Maximum Month PF = Maximum Month divided by the Average Month.
(2) Minimum Month PF = Minimum Month divided by the Average Month.
(3) Orange text indicates a minimum month and red text indicates a maximum month.

3.2.2 Daily Peaking Factors (PF)

Average day demand (ADD) is total water demand during a given year divided by the number of days in the year. ADD serves as a baseline for computing MDD and peak hour demand (PHD) PFs. The MDD is the highest daily demand in a given year, while the PHD is the highest hourly demand in a given year. PF are computed by dividing the MDD or PHD by the ADD.

These factors are used to analyze whether EVMWD has sufficient water supplies to meet MDD and evaluate the hydraulics of the water distribution system to identify any capacity deficiencies under both existing and future demand conditions. The MDD and PHD PF can vary from year-to-year based on weather conditions and other factors. Consequently, the highest peaking factor over several years is usually used for conservative planning purposes. These estimated future MDDs and PHDs are the demand conditions used to size water distribution system pipelines and facilities.

Historical monthly and daily production data are used to calculate these daily PF and are presented in Table 3.4.

Table 3.4 Historical Daily Demands and Maximum Day PF

Year	ADD (mgd)	MDD (mgd)	MDD PF
2017	20.7	33.0	1.59
2018	21.6	42.1	1.95
2019	19.8	35.1	1.77
2020	21.6	39.4	1.83
2021	21.8	35.1	1.61
5-year Average	**21.1**	**36.9**	**1.75**

Notes:
Source: Historical Production Records (16. Daily Production 5-yr.xlsx).

ADD previously reached a high of 30.0 mgd in 2007 Despite growth across the service area, ADD has since declined and remained relatively constant since 2017, ranging between 19.8 and 21.8 mgd (Table 3.5). The decline in ADD is likely in response to conservation adoption and gains in efficiency. From 2017 to 2021, MDD ranged between 33.0 and 42.1 mgd, resulting in MDD PF (MDD/ADD) varying between 1.59 and 1.95.

The 2007 WSMP assumed a 2.0 MDD peaking factor, while the 2016 WSMP recommended a lower peaking factor value of 1.75. Since the average MDD in the period 2017-2021 was also 1.75, the recommended MDD peaking factor for planning purposes is 1.75.

3.2.3 Hourly Peaking Factors (PF)

Water demands vary throughout the day. For hydraulic model analysis purposes, a 24-hour demand pattern is required to simulate this variation. To develop the hydraulic model for their system in 2021, EVMWD used consumption data to represent diurnal patterns for individual pressure zones (PZ) (WSC, 2021). Although diurnal patterns vary slightly between PZs, the diurnal pattern shown on Figure 3.3 for the Canyon Lake 1622 PZ is representative of typical diurnal patterns for EVMWD. The demands follow a typical diurnal pattern with the highest demand in the morning around 6:00 a.m. when residents and businesses start their day. A second smaller peak occurs around 8:00 p.m.

Diurnal multipliers are calculated by dividing the hourly demand by the ADD on that day for each hour. The highest multiplier on the diurnal pattern represents the PHD. As shown in Figure 3.3, the PHD peaking factor for this representative diurnal pattern is approximately 2.6.

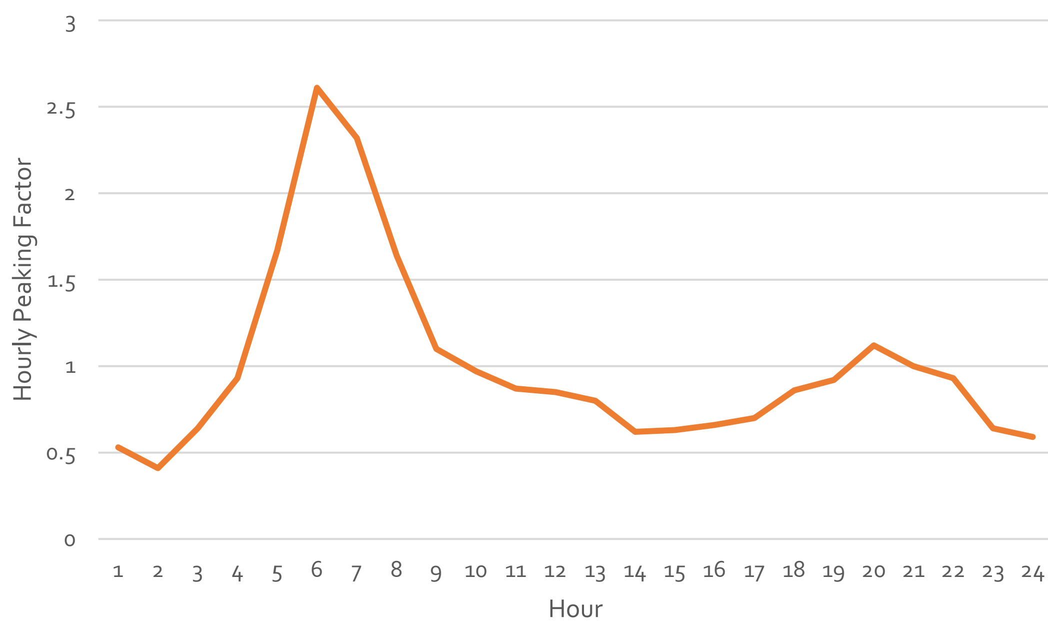

Figure 3.3 Canyon Lake 1622 Pressure Zone MDD Diurnal Pattern

3.3 Historical Water Consumption

Yearly water consumption information was obtained from EVMWD billing records for the previous five years (2017-2021) and combined with previous consumption documentation to summarize consumption data since 1992 in Table 3.5 and Figure 3.4. As shown on Figure 3.4 and Table 3.5, the total average water consumption increased from 14.6 mgd in 1992 to a peak of 30.0 mgd in 2007. The water demand declined to a low of 17.2 mgd in 2016 but rebounded to a recent high of 22.2 mgd.

Table 3.5 Historical Potable Water Consumption

Calendar Year	Consumption		Number of Service Connections	Demand Per Connection (AFY/Connection)
	Annual (AFY)	Daily (mgd)		
1992	16,365(1)	14.6	19,499(2)	0.839
1993	16,505(1)	14.7	20,185(2)	0.818
1994	17,137(1)	15.3	20,923(2)	0.819
1995	16,994(1)	15.2	21,758(2)	0.781
1996	17,848(1)	15.9	22,868(2)	0.780
1997	19,196(1)	17.1	23,790(2)	0.807
1998	17,953(1)	16.0	24,576(2)	0.731
1999	21,902(1)	19.6	25,453(2)	0.860
2000	23,313(1)	20.8	26,358(2)	0.884

Calendar Year	Consumption Annual (AFY)	Consumption Daily (mgd)	Number of Service Connections	Demand Per Connection (AFY/Connection)
2001	22,379(1)	20.0	27,427(2)	0.816
2002	24,656(1)	22.0	28,861(2)	0.854
2003	25,019(1)	22.3	31,537(2)	0.793
2004	27,232(1)	24.3	33,374(2)	0.816
2005	28,870(1)	25.8	34,735(2)	0.831
2006	32,423(1)	28.9	36,000(2)	0.901
2007	34,395(1)	30.7	36,866(2)	0.933
2008	30,540(1)	27.3	37,597(2)	0.812
2009	26,701(1)	23.8	37,930(2)	0.704
2010	23,548(1)	21.0	38,243(2)	0.616
2011	24,190(1)	21.6	38,442(2)	0.629
2012	25,240(1)	22.5	40,440(2)	0.624
2013	25,643(1)	22.9	41,159(2)	0.623
2014	25,677(1)	22.9	41,858(3)	0.613
2015	21,333(1)	19.0	42,393(3)	0.503
2016	22,366(4)	20.0	42,957(3)	0.521
2017	22,897(4)	20.4	43,858(3)	0.522
2018	23,461(4)	20.9	44,558(3)	0.527
2019	22,398(4)	20.0	44,892(3)	0.499
2020	23,652(4)	21.1	45,100(3)	0.524
2021	22,891(5)	20.4	45,680(5)	0.501

Sources:
(1) 2017 EVMWD IRP.
(2) 2016 EVMWD WSMP.
(3) CAFR, June 2021.
(4) 2020 EVMWD UWMP.
(5) Historical Billing Records (EVMWD, 2022).

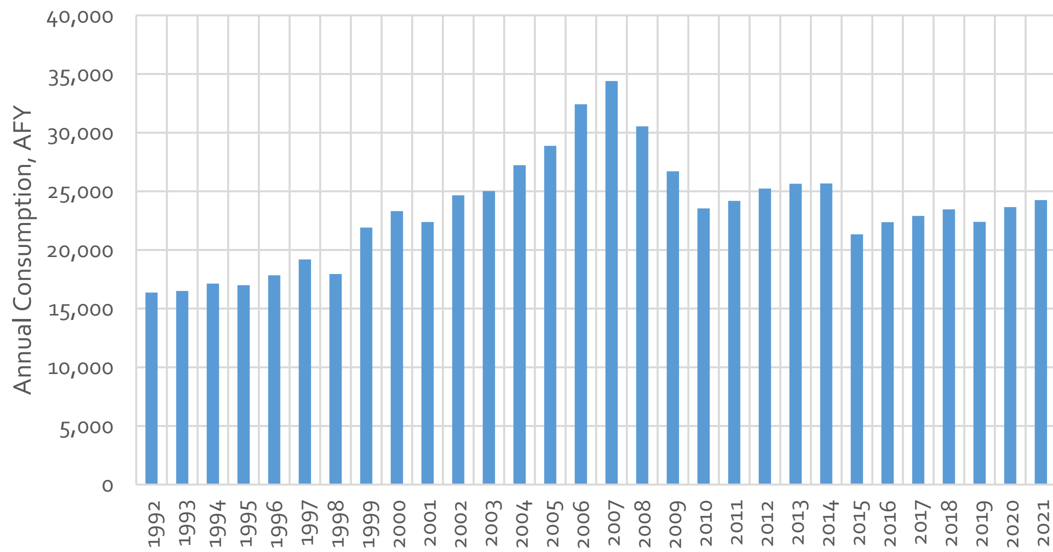

Figure 3.4 Historical Water Consumption in EVMWD's Service Area

Table 3.6 provides historical consumption by use type. The residential sector accounts for about 75 percent of all use. Likely in response to pandemic mitigation measures, residential water use increased slightly during 2020 and 2021 and accounted to 78 and 77 percent, respectively. Irrigation-only meters account for an additional 16 percent while the combined commercial and institutional customer classes account for 6 percent of use.

Table 3.6 Historical Potable Water Consumption by Customer Class

Use Type	Annual Consumption (AFY)					Average	
	2017	2018	2019	2020	2021	AFY	%
Residential	16,096	16,960	15,769	17,161	17,592	16,716	75%
Commercial	1,259	1,269	1,215	1,208	1,328	1,256	6%
Institutional/Government	116	121	117	82	92	106	<1%
Irrigation	3,691	3,884	3,171	3,227	3,521	3,499	16%
EVMWD(1)	33	2,315	21	22	19	482	2%
Agriculture					0.1	0	0%
Wholesale(2)	302	319	305	332	340	320	1%
Total Billing	**21,497**	**24,867**	**20,598**	**22,032**	**22,891**	22,377	100%

Notes:
(1) This includes water use at EVMWD's facilities.
(2) Sales to Farm Mutual Water Company.

3.3.1 Non-Revenue Water

The difference between water production and consumption (billed to customers) is defined as non-revenue water. American Water Works Association (AWWA) defines non-revenue water as the sum of Unbilled Authorized Consumption (water for firefighting, flushing, etc.) plus Apparent Losses (customer meter inaccuracies, unauthorized consumption, and systematic data handling errors) plus Real Losses (system leakage and storage tank overflows)[1].

The average volume of non-revenue water for the previous four years is shown in Table 3.7. Due to a system error in 2018, the three-year average best represents non-revenue water for planning. On average, EVMWD recorded approximately 1,978 AFY of non-revenue water over the past three years, which accounts for approximately 8 percent of the total water produced.

Table 3.7 Non-Revenue Water

Year	Water Produced (AFY)	Water Consumed (AFY)	Non-revenue Water (AFY)
2017	23,264	21,497	1,767
2018	23,919	24,867(1)	-948
2019	23,075	20,598	2,477
2020	24,131	22,032	2,099
2021	24,249	22,891	1,358
5- year Average	**23,728**	**22,377**	**1,351**
3- year Average (2019-2021)	**23,818**	**21,841**	**1,978**

Notes:
Source: Production and consumption data provided by EVMWD staff.
(1) According to the 2020 UWMP, EVMWD had a system error in 2018 which caused consumption to be higher than production.

3.4 Future Water Demand Projections

Future water demands for the service area developed in support of EVMWD's 2020 UWMP were adopted for the WSMP. While several scenarios of future demand were explored in the UWMP, the selected scenario assumed 1.5 percent constant annual growth in total production, a 10 percent buffer factor, and generally proportional increases in customer class demand. The UWMP projections were developed through year 2045 for all years ending in five and zero. Linear interpolation was used to project future water demands for interim years. To extend

[1] AWWA, 2012. Water Loss Control Terms Defined. http://www.awwa.org/Portals/0/files/resources/water%20knowledge/water%20loss%20control/water-loss-control-terms-defined-awwa.pdf

projections to 2050, the 1.5 percent annual growth was assumed to continue between 2045 and 2050.

Table 3.8 presents the water demand forecast through year 2050 for water consumption, production, and non-revenue water. Total water demand is projected to reach 43,284 AF by 2050. Figure 3.5 presents the demand forecast by use type to 2050, highlighting that future growth is expected to be similar to current patterns.

Table 3.8 Water Demand Forecast to 2050

Year	Water Consumption (AFY)	Non-Revenue Water (AFY)	Water Production (AFY)
2023	25,682	1,675	27,356
2024	26,840	1,751	28,591
2025	27,998	1,827	29,825
2026	28,431	1,855	30,286
2027	28,864	1,883	30,747
2028	29,296	1,912	31,208
2029	29,729	1,940	31,669
2030	30,162	1,968	32,130
2035	32,493	2,120	34,613
2040	35,004	2,284	37,288
2045	37,709	2,461	40,170
2050	40,632	2,652	43,284

Notes:
(1) Source: 2020 UWMP for years ending in 5 and 0 through 2045. Projections for 2023, 2024, 2026, 2027, 2028, and 2029 were calculated through linear interpolation and demand for 2050 was calculated by extrapolating the 1.5 percent growth rate.

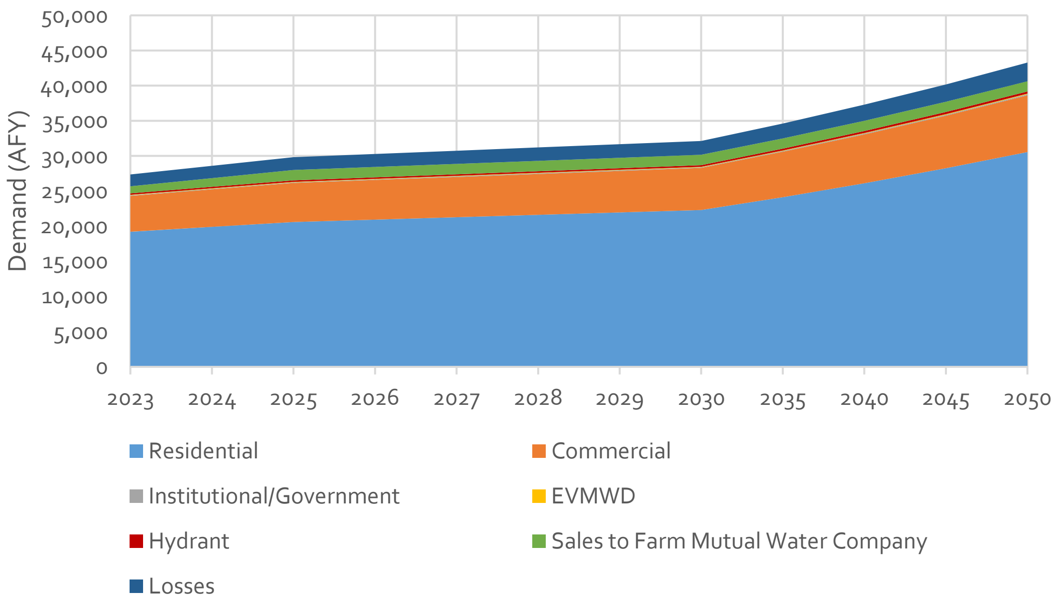

Figure 3.5 EVMWD Water Demand Forecast to 2050 by Use Type

3.5 Water Demand Projections - Planned Developments

As discussed in Chapter 2, EVMWD tracks planned developments within its service area and is currently tracking approximately 300 developments. Tracked planned developments are listed in Appendix B and shown on Figure 3.6.

3.5.1 Water Duty Factors (WDFs)

The future demand associated with these planned developments was estimated based on the land use type of development (e.g., commercial, high density residential, industrial, etc.) and the number of dwelling units (DUs) planned for the development, if applicable. Water billing data from 2017 through 2021 and land use information was used to develop water duty factors (WDFs) that estimate the relationship between land use type and water demand on a gallon per day (gpd) per acre basis. WDFs were calculated from the average demand for each land use category for each year from 2017 through 2021. To conservatively estimate demand for planning purposes, a 10 percent buffer was added. This 10 percent contingency accounts for system water losses as well as other potential demand variables. The resulting WDFs for each land use category are listed in Table 3.9, along with the WDFs from EVMWD's previous planning efforts in 2002, 2007, and 2015. WDFs have changed over the past 20 years as water use patterns, planning assumptions, and land use designations have changed. In general, WDFs increased from 2002 to 2007 and 2015 and have decreased since 2015. This is likely due to increased conservation since the 2012 through 2015 drought as well as changes in planning assumptions.

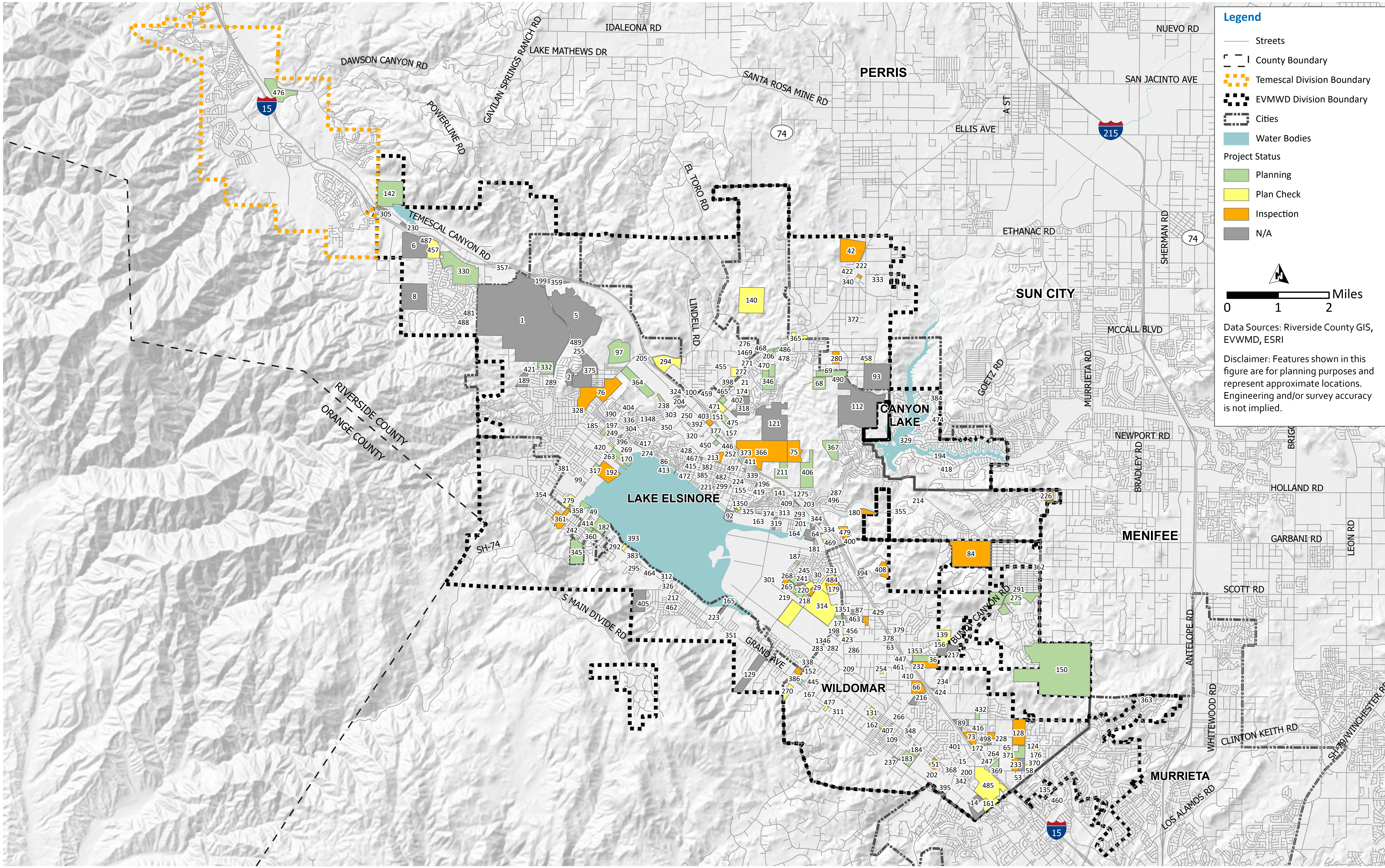

Figure 3.6 Planned Developments

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Table 3.9 WDFs by Land Use Category

Land Use Category	2002 WDF (gpd/acre)	2007 WDF (gpd/acre)	2015 WDF (gpd/acre)	2022 WDF (gpd/acre)
Business Park	900	1,200	1,200	800
General Commercial	1,700	2,500	2,500	2,300
Limited Industrial	700	900	900	700
Open Space - Recreation	200	2,000	2,300	2,300
Public Institutional	1,200	2,300	1,700	1,300
Hillside Residential(1)	150	250	250	1,400
Very Low Density Residential (0.1 – 0.5 DU/acre)	200	400	400	700
Low Density Residential (0.5-2 DU/acre)	650	800	1,000	1,200
Low Medium Density Residential (2-4 DU/acre)	1,400	2,000	2,000	2,000
Medium Density Residential (4-6 DU/acre)	1,500	2,300	2,300	2,200
Medium High Density Residential (6-12 DU/acre)	1,750	3,000	2,700	2,400
High Density Residential (12-24 DU/acre)	1,750	5,000	3,500	2,600
Mixed Use (24 DU/acre max)	1,700	2,300	2,300	1,700

Notes:
(1) The WDF for Hillside Residential has increased significantly due to changes in land use categorization. Previous plans calculated WDFs for a "Mountainous Residential" land use that had a very low DU density. The City of Lake Elsinore's general plan most recent General Plan land use combines Mountainous Residential land use with Hillside Residential land use, which is a denser type of land use with a correspondingly higher WDF. The Hillside Residential WDF calculated for this WSMP reflects that higher density.

3.5.2 Planned Development Water Demand

To estimate future demand associated with planned developments, each development was assigned a WDF based on the land use category of that development, and then the assigned WDF was multiplied by the size of the development parcel. If the number of DUs in a development was known, a duty factor of 500 gpd per DU was used to estimate demand. Table 3.10 is a summary of the development data and the estimated demand by City or planning area. Total estimated demand from planned developments is nearly 18,000 AFY, with the majority of this demand occurring in the City of Lake Elsinore.

Table 3.10 Estimated Demand From Planned Developments by City

City/Planning Area	Number of Planned Developments	Estimated Demand (AFY)
City of Lake Elsinore	183	11,825
City of Wildomar	82	3,736
City of Murrieta	3	42
City of Canyon Lake	5	28
Unincorporated Riverside County	53	2,268
Total	**326**	**17,899**

Planned developments are tracked by project status, consisting of three phases, namely: planning, plan check, and inspection. Projects in the inspection phase are assumed to be completed and become a water demand on EVMWD's system within the next year and projects in the plan check phase are assumed to be completed and become a water demand on EVMWD's system within three years. Projects in the planning phase are still subject to many uncertainties and are therefore assumed to be completed farther in the future but within the next 15 years. Other projects are tracked but not yet assigned a phase, and these projects are assumed to occur within the planning horizon of this WSMP, by 2050. The breakdown of known developments by project status are listed in Table 3.11.

Table 3.11 Estimated Demand From Planned Developments by Project Status

Project Status	Number of Planned Developments	Estimated Demand (AFY)
Inspection	57	1,445
Plan Check	51	2,081
Planning	149	7,651
N/A	69	6,722
Total	**326**	**17,899**

The difference between the projected 2050 demand of 43,284 AFY and the current (2021) demand of 24,249 AFY is 19,035 AFY, which closely aligns with the estimated demand from planned developments (17,899 AFY). This minor difference confirms that the estimated WDF listed in Table 3.9 are aligned with population-based demand forecast of the 2020 UWMP. The location and estimated demand associated with planned developments is a key component to spatially allocating future demand projections.

3.6 Water Demand Projections - Build Out

The build out demand for EVWMD's service area was estimated using the WDFs developed above and from land use information from the cities of Lake Elsinore, Murietta, Canyon Lake, and Wildomar and from Riverside County. The total acreage for each land use type was multiplied by the corresponding WDF to calculate the total estimated demand within the service area when it is completely built out according to current zoning. Total buildout demand is estimated to be approximately 101,000 AFY. Total acreage and estimated build out demand for each land use category is shown in Table 3.12.

Table 3.12 Build Out Demand Projection

Land Use Category	Acreage Within Service Area	WDF (gpd/acre)	Demand (mgd)	Demand (AFY)
Business Park	765	800	0.61	686
General Commercial	3,366	2,300	7.74	8,672
Limited Industrial	1,852	700	1.30	1,452
Open Space - Conservation	10,457	0	0	0
Open Space - Recreation	4,109	2,300	9.45	10,586
Public Institutional	883	1,300	1.15	1,286
Hillside Residential	6,777	1,400	9.49	10,628
Very Low Density Residential (0.1 - 0.5 DU/acre)	5,611	700	3.93	4,400
Low Density Residential (0.5-2 DU/acre)	4,504	1,200	5.41	6,055
Low Medium Density Residential (2-4 DU/acre)	7,400	2,000	14.80	16,578
Medium Density Residential (4-6 DU/acre)	13,892	2,200	30.56	34,233
Medium High Density Residential (6-12 DU/acre)	1,199	2,400	2.88	3,222
High Density Residential (12-24 DU/acre)	705	2,600	1.83	2,054
Mixed Use (24 DU/acre max)	525	1,700	0.89	1,000
Total	**62,046**	**-**	**90.0**	**100,852**

Given that the current demand served by EVMWD is approximately 24,000 AFY, estimated additional demand until buildout is approximately 77,000 AFY. Assuming demand continues to grow at about 1.5 percent per year, build out demand is projected to occur after year 2100 (mathematically in year 2123), well past the planning horizon of this WSMP. It is likely that land use and corresponding water use will change significantly over that time span, but the build out demand projections highlight that EVMWD's service area has a substantial potential for growth over the coming century.

3.7 Conclusion and Recommendations

This chapter has described the water supply sources, historical water production and PF, historical water consumption, and projected future water demands for EVMWD. Table 3.13 summarizes the existing demands and recommended PF and demand projections through 2050 to use in future water system analyses that are described in this chapter of this WSMP.

Table 3.13 Summary of Existing Demands, PF, and Demand Projections

Year	Annual Demand (AFY)	ADD (mgd)	MDD (mgd)
Peaking Factor	-	1.0	2.0
Existing(1)	24,249	21.6	43.3
2025	29,825	26.6	53.3
2030	32,130	28.7	57.4
2035	34,613	30.9	61.8
2040	37,288	33.3	66.6
2045	40,170	35.9	71.7
2050	43,284	38.6	77.3

Notes:
(1) Demand in 2021.

Chapter 4

EXISTING SYSTEM DESCRIPTION

4.1 Introduction

This chapter describes Elsinore Valley Municipal Water District's (EVMWD's) existing water system facilities and provides an understanding of the water system operations. The existing water system consists of 70 active storage reservoirs, 55 booster pumping stations, 13 groundwater wells, 44 pressure regulating stations, and approximately 743 miles of pipeline. A summary of the water system components is presented below in Table 4.1. The locations of the water facilities are shown on Figure 4.1. A hydraulic schematic representation of EVMWD's facilities and their interactions is presented on Figure 4.2.

Table 4.1 Summary of Water Distribution System Components

Facility Type	Number
Water Treatment Plants	3
Groundwater Wells (operating)	15
Storage Reservoirs (active)	70
Booster PS	55
Hydropneumatic PS	6
Pipeline (miles)	743
Pressure Regulating Stations	44
Valves	20,422
Fire Hydrants	8,174
Imported Primary Supply Sources	2
Emergency Interconnections	5

Notes:
Abbreviations: PS - pump station.
Source: Information presented is based on EVMWD’s GIS data.

This chapter describes the existing water system that is represented within the hydraulic model based on the information obtained from EVMWD’s Geographic Information System (GIS) Database.

4.2 Water Supplies

EVMWD obtains its water supplies from a variety of sources: groundwater, local surface water, and imported water.

Imported water is purchased from Metropolitan Water District of Southern California (MWD) through Western Municipal Water District (WMWD). EVMWD has capacity rights to a maximum flow rate of 37.5 cubic feet per second (cfs) (24.2 million gallons per day (mgd)) of imported treated water through the Auld Valley Pipeline (AVP) through Eastern Municipal Water District's (EMWD's) service connection EM-17 from MWD. EVMWD only has conveyance capacity rights for 9 cfs (4.8 mgd) of imported treated water from Mills Gravity Pipeline through the Temescal Valley Pipeline (TVP) from WMWD. EVMWD is expecting to purchase more in the future, based on increased peaking system demands, to a maximum amount matching TVP total capacity.

EVMWD can also purchase raw imported water through MWD connections WR-18A (Colorado River) and WR-31 (State Water Project [SWP]) to feed the San Jacinto River and be stored at Canyon Lake. This imported raw water and local surface water runoff can be treated at EVMWD’s Canyon Lake Water Treatment Plant (CLWTP), which currently has a capacity of approximately 7 mgd. The CLWTP is currently under construction and will be out of service until 2025.

EVMWD also has 13 groundwater wells that are used for water supply; some of the wells require treatment prior to use and as listed in Table 4.2.

Table 4.2 Groundwater Wells

Well	Groundwater Basin	Flow Rate (gpm)	Treatment
Cereal 1	Elsinore (Back Basin)	1,200	Blend with Summerly/Diamond/BBGWTP for arsenic
Cereal 3	Elsinore (Back Basin)	1,500	Treated at BBGWTP for arsenic
Cereal 4	Elsinore (Back Basin)	1,500	Treated at BBGWTP for arsenic
Corydon	Elsinore (Back Basin)	900	Blend with Summerly/Diamond/BBGWTP for arsenic
Diamond	Elsinore (Back Basin)	1,500	None
Joy Street	Elsinore (North Basin)	600	Blend with Machado for arsenic
Machado	Elsinore (North Basin)	800	None
Mayhew 2	Coldwater	500	None
Station 71	Coldwater	250	None
Summerly	Elsinore (Back Basin)	1,500	Blend with Diamond for PFAS
Terra Cotta	Elsinore (North Basin)	700	None

Well	Groundwater Basin	Flow Rate (gpm)	Treatment
Flagler Well 2	Bedford Basin	500	Disinfection only
Flagler Well 3A	Bedford Basin	400	Disinfection only
Lee Lake (2 wells)	Lee Lake Basin	500-600 each	Disinfection and treatment for PFAS
Palomar	Elsinore Basin	300	Disinfection and nitrate blending

Note:
Abbreviations: BBGWTP - Back Basin Groundwater Treatment Plant; gpm - gallons per minute; PFAS - per- and polyfluoroalkyl substances.
(1) References for above information:
Kennedy/Jenks. Palomar Well No. 2 Nitrate Blending Operations Plan. Prepared for EVMWD. 30 July 2021.
Waterworks Engineers. Flagler Wells Conversion Pipeline Project (Project No. 75877) Water Improvement Plans. Prepared for EVMWD. May 14, 2017.
Carollo Engineers, Inc. and Todd Groundwater. Elsinore Valley Basin Groundwater Sustainability Plan. Prepared for EVMWD. January 2022.

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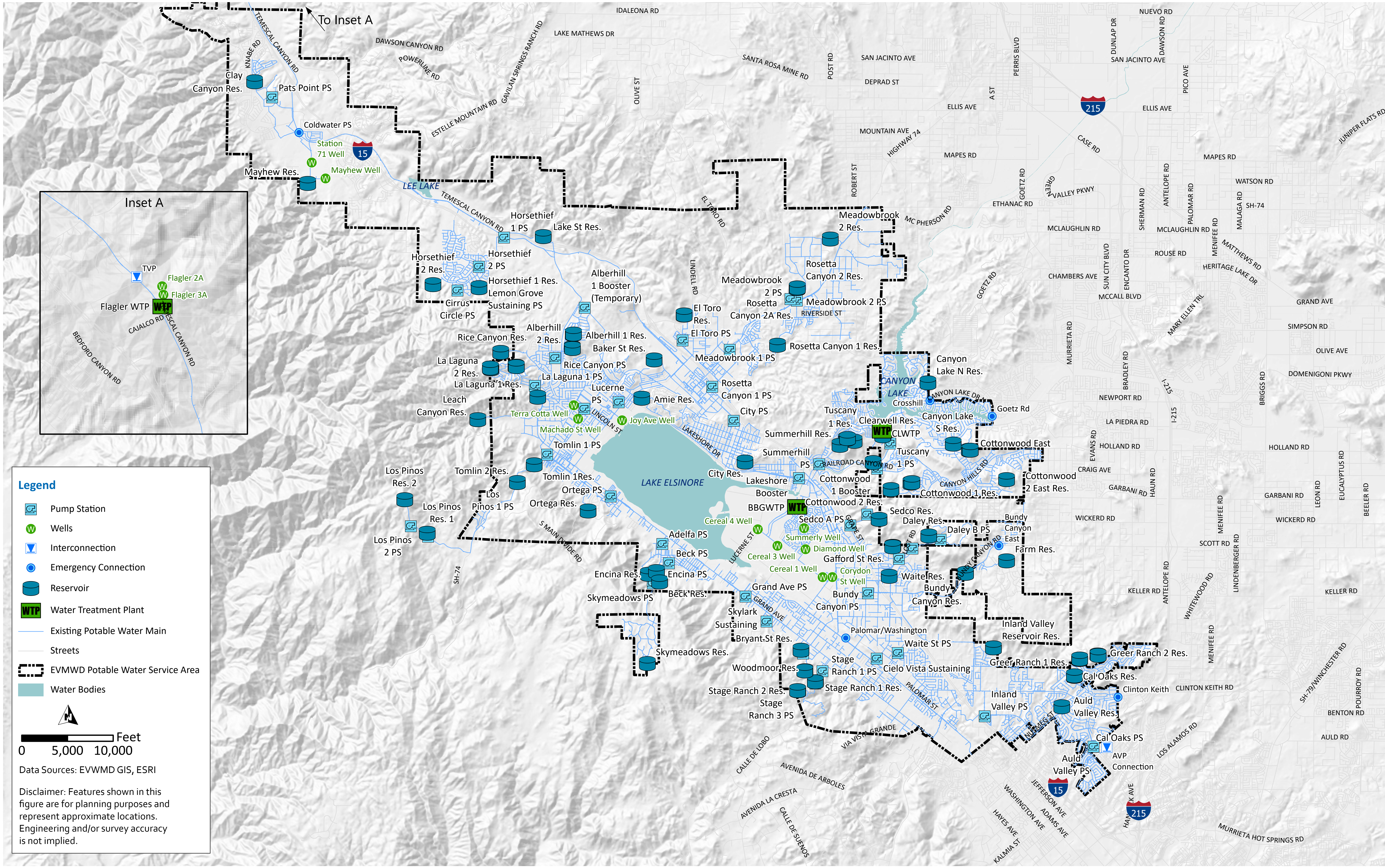

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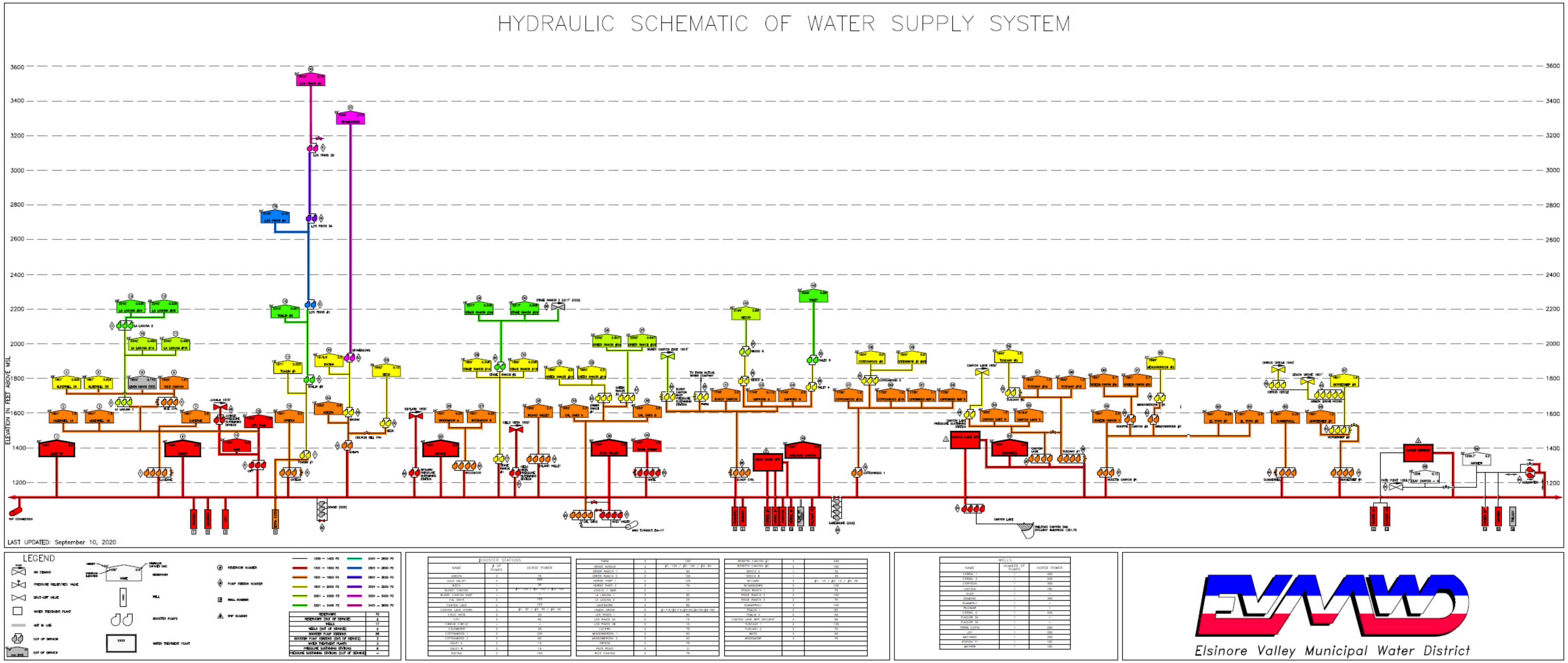

Figure 4.2 Hydraulic Schematic

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4.3 Pressure Zones (PZ)

The current water system is divided into 46 pressure zones (PZ), and each zone is labeled by the high water level of the storage reservoir in that zone. The 1601, 1650, 1800, 1746, 1801, and 1850 Zones consist of two or more service areas that are hydraulically isolated from each other, to create 46 PZ areas. For the purpose of this report, these six zones that are hydraulically isolated from each other are labeled by the high water level and the location.

The maximum hydraulic grade elevation for each PZ with a reservoir is determined by the high water level of the reservoir(s) feeding that zone. All PZs in the existing system are gravity-fed from storage reservoirs or by on demand PSs. Booster pumping stations are used to pump water from lower to higher PZs, where needed. The names of the existing PZs and their respective hydraulic characteristics are listed in Table 4.3 and the PZ boundaries are shown on Figure 4.3.

Table 4.3 EVMWD Pressure Zones (PZs)

PZ	Area (acres)	Area (square miles)	Hydraulic Grade Elevation (ft-msl)	Ground Elevation Range (ft-msl)
1258.4 Clay Canyon(1)	109	0.2	1258	984 – 1,162
1358.7 Mayhew(1)	1,176	1.8	1358	1,011 – 1,243
1434 Zone	16,945	26.5	1434	1,034 – 1,365
1464 Amie	107	0.2	1464	1,260 – 1,306
1501 Waite	1,429	2.2	1501	1,270 – 1,394
1550 Cielo Vista	29	0.05	1550	1,281 – 1,393
1600 Skylark Sustaining	23	0.04	1600	1,352 – 1,421
1601 Horsethief 1	412	0.6	1601	1,190 – 1,532
1601 Rosetta Canyon 1-El Toro	1,800	2.8	1601	1,290 – 1,509
1601 Summerhill-City-Ortega	4,927	7.7	1601	1,263 – 1,506
1601 Woodmoor	42	0.1	1601	1,308 – 1,430
1601 Zone	32	0.05	1601	1,258 – 1,519
1622 Canyon Lake	1,951	3.1	1622	1,326 – 1,589
1650 Adelfa	264	0.4	1650	1,263 – 1,569
1650 Amie Sustaining	25	0.04	1650	1,450 – 1,530
1650 Cal Oaks	2,355	3.7	1650	1,259 – 1,563
1701 Meadowbrook 1	409	0.6	1701	1,324 – 1,605
1746 Bundy Canyon	1,207	1.9	1746	1,329 – 1,659
1746 Cottonwood 1	878	1.4	1746	1,397 – 1,657

PZ	Area (acres)	Area (square miles)	Hydraulic Grade Elevation (ft-msl)	Ground Elevation Range (ft-msl)
1800 Rice Canyon-Leach Canyon	843	1.3	1800	1,444 – 1,715
1801 Tuscany 1-Rosetta Canyon 2	2,582	4.0	1801	1,364 – 1,711
1801 Horsethief 2	247	0.4	1801	1,458 – 1,708
1801 Zone	21	0.03	1801	1,364 – 1,711
1842 Beck	34	0.05	1842	1,450 – 1,679
1850 Canyon Lake Sustaining	111	0.2	1850	1,496 – 1,726
1850 Greer Ranch 1	234	0.4	1850	1,485 – 1,744
1850 Lemon Grove	59	0.1	1850	1,573 – 1,746
1871 Tomlin 1	20	0.03	1871	1,439 – 1,439
1882 Stage Ranch 1	47	0.07	1882	1,304 – 1,533
1896 Meadowbrook 2	2,356	3.7	1896	1,447 – 1,792
1900 Cirrus Circle	10	0.02	1900	1,776 – 1,825
1900 The Farm	1,610	2.5	1900	1,694 – 1,801
1913 Bundy Canyon East	235	0.4	1913	1,634 – 1,814
1916 Encina	44	0.07	1916	1,555 – 1,792
1934 Cottonwood 2	150	0.2	1934	1,534 – 1,818
1940 Tuscany Hills 2	128	0.2	1940	1,630 – 1,821
2001 La Laguna 1	164	0.3	2001	1,614 – 1,944
2050 Greer Ranch 2	222	0.4	2050	1,628 – 1,902
2201 Sedco	286	0.5	2201	1,538 – 1,932
2216 Daley	324	0.5	2216	1,638 – 2,146
2217 Stage Ranch 2	273	0.4	2217	1,989 – 1,993
2240 La Laguna 2	97	0.15	2240	1,914 – 2,130
2313 Tomlin 2	74	0.1	2313	1,814 – 2,202
2778 Los Pinos 1	188	0.3	2778	2,464 – 2,672
3300 Sky Meadows	456	0.7	3300	1,806 – 3,294
3544 Los Pinos 2	169	0.3	3544	2,720 – 3,479
Total	**45,991**	**71.9**		

Notes:
Abbreviations: ft-msl - feet above mean sea level.
(1) In Temescal Domestic Service Area (TDSA).

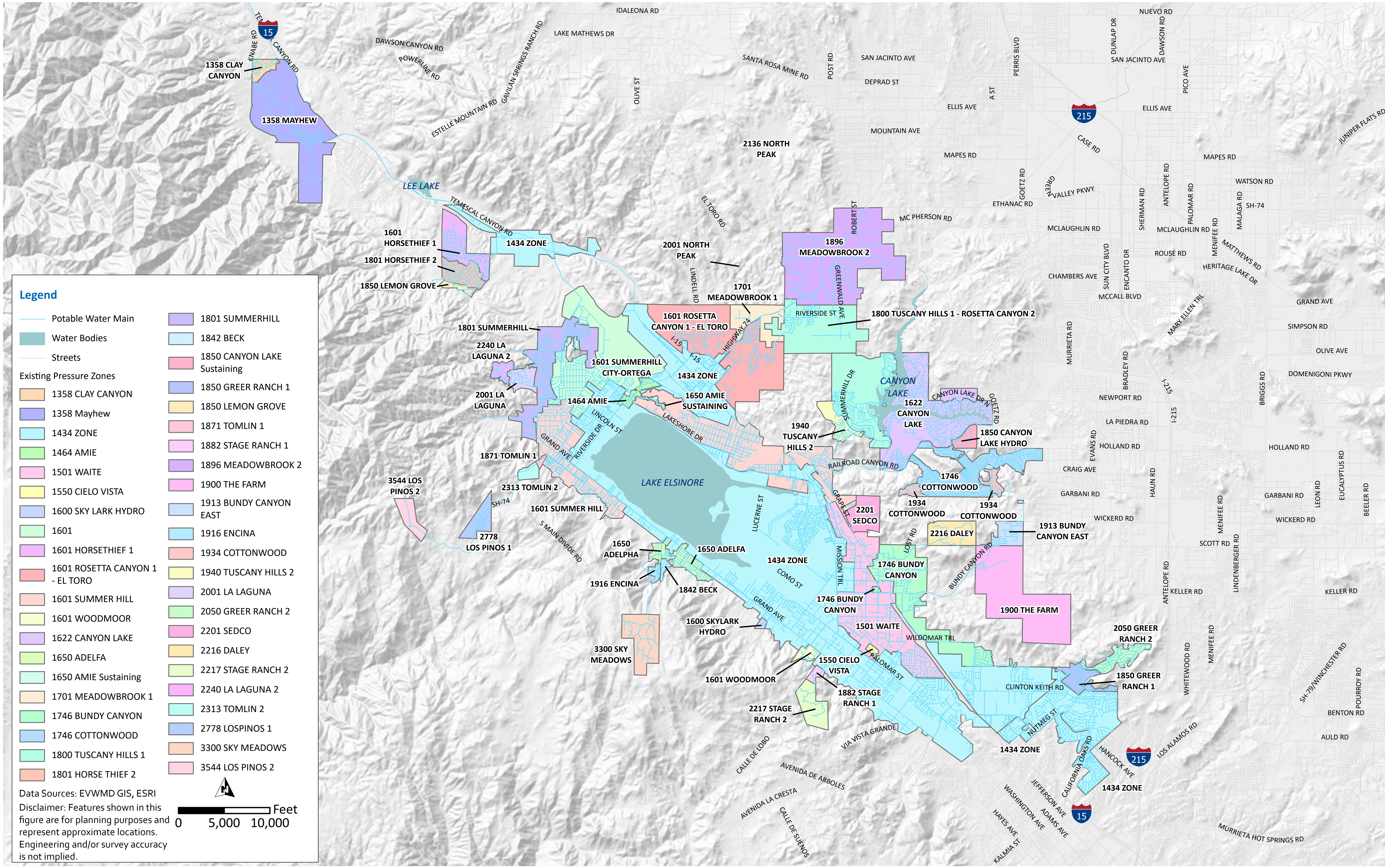

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Figure 4.3 Pressure Zones

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4.4 Booster Pumping Stations

EVMWD operates 55 booster pumping stations, and a total of 153 pumps, not including well pumps. Each booster PS has between one to five pumps, and the pumps vary in size from 7.5 horsepower (hp) to 250 hp. The individual booster pump capacities vary from about 15 gpm to 4,400 gallons per minute (gpm) (0.01 mgd to 6.3 mgd). These booster pumping stations either transfer water between zones or pump water from the AVP connections. The total capacity of all booster stations is approximately 127,800 gpm (184.0 mgd) with a total firm capacity of approximately 56,800 gpm (81.7 mgd). The booster pumping stations are operated when reservoirs in higher zones need replenishment, pressure in higher zones drop due to increased demand, or based upon time. Details of each booster station are summarized in Table 4.4. The booster pumping station locations are shown on Figure 4.1 and are schematically represented on Figure 4.2.

4.5 Water Storage Reservoirs

There are 70 active storage reservoirs within EVMWD's system. The storage reservoirs' capacities range from 0.05 million gallons (MG) to 8 MG, with a total reservoir capacity of 88 MG. The hydraulic grade elevation in each PZ is controlled by the high water elevation of the reservoirs that feed the zones by gravity. The characteristics of storage reservoirs in EVMWD's service area is presented in Table 4.5. Their locations are shown on Figure 4.1 and are schematically represented on Figure 4.2.

4.6 Pressure Regulating Stations

There are 44 pressure regulating stations in EVMWD's service area. Pressure regulating stations allow distribution systems to transfer water from a higher zone to a lower zone at a specified pressure setting without exceeding the allowable pressures in the lower zones and without draining the higher zones. The pressure regulating valve (PRV) reduces the pressure from the higher zone to a specified pressure for a lower zone.

Most pressure regulating stations have two or three PRVs: a main valve, and one or more supplemental valve(s). The main valve (the smallest in diameter) is normally operating and has the highest pressure setting. Water continuously flows through this main valve with a downstream pressure equal to the main valve's pressure setting. Supplemental valves are larger in diameter and have a slightly lower pressure setting than the main valve. If the downstream water pressure drops (due to large water demand or fire) below the supplemental valve's pressure setting, the supplemental valve will open to provide additional water. In the model, valve settings were input based on the information provided by EVMWD. Table 4.6 summarizes the details of all pressure regulating stations as modeled. The pressure regulating stations are shown in Figure 4.1 and are schematically represented on Figure 4.2.

Table 4.4 Booster Pump Characteristics

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)[1]	Flow Capacity (gpm)	Firm Capacity (gpm)
Adelfa	1	17309 Akley Street	1434	1650	75	2014	199.8	400	400
Adelfa	2	17309 Akley Street	1434	1650	75	2014	199.8	400	
Amie Sustaining	1	17211 Sunnyslope Avenue	1464	1650	No Data	No Data	120	20	0
Auld Valley	5	24281 Hancock Avenue	AVP	1434	250	1989	58	4,400	13,200
Auld Valley	6	24281 Hancock Avenue	AVP	1434	250	1989	62	4,400	
Auld Valley	7	24281 Hancock Avenue	AVP	1434	250	1989	53	4,400	
Auld Valley	8	24281 Hancock Avenue	AVP	1434	250	1989	78	4,400	
Beck	1	33420 Mitchell Drive	1581	1842	30	No Data	400	30	30
Beck	2	33420 Mitchell Drive	1581	1842	30	No Data	400	30	
Bundy Canyon	1	21785 Bundy Canyon Road	1434	1746	125	1994	342	400	1,200
Bundy Canyon	2	21785 Bundy Canyon Road	1434	1746	100	1994	327	800	
Bundy Canyon	3	21785 Bundy Canyon Road	1434	1746	100	1994	338	900	
Bundy Canyon East	1	23810 Bundy Canyon Road	1746	1913	No Data	2014	170	992	0
Cal Oaks	1	24281 Hancock Avenue	AVP	1650	100	1989	313	1,100	3,300
Cal Oaks	2	24281 Hancock Avenue	AVP	1650	100	1989	289	1,100	
Cal Oaks	3	24281 Hancock Avenue	AVP	1650	100	1989	312	1,100	
Cal Oaks	4	24281 Hancock Avenue	AVP	1650	100	1989	316	1,100	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Canyon Lake	1	202 Via De La Valle	1434	1622	100	No Data	215	1,300	3,900
Canyon Lake	2	202 Via De La Valle	1434	1622	100	No Data	214	1,300	
Canyon Lake	3	202 Via De La Valle	1434	1622	100	No Data	213	1,300	
Canyon Lake	4	202 Via De La Valle	1434	1622	100	No Data	213	1,300	
Canyon Lake Sustaining	1	30849 Blackhorse Drive	1622	1850	30	1970	147.2	300	300
Canyon Lake Sustaining	2	30849 Blackhorse Drive	1622	1850	40	1970	147.2	500	
Cielo Vista	1	35197 Orange Street	1434	1550	20	No Data	191.3	150	150
Cielo Vista	2	35197 Orange Street	1434	1550	20	No Data	192.7	150	
Cirrus Circle	1	27809 Cirrus Circle	1850	1940	No Data	No Data	540	70	140
Cirrus Circle	2	27809 Cirrus Circle	1850	1940	No Data	No Data	540	70	
Cirrus Circle	3	27809 Cirrus Circle	1850	1940	No Data	No Data	540	70	
City	1	521 N. Langstaff Street	1434	1571	50	No Data	194.5	850	1,700
City	2	521 N. Langstaff Street	1434	1571	50	No Data	174.9	850	
City	3	521 N. Langstaff Street	1434	1571	50	No Data	194.7	850	
Coldwater Booster	1	24636 Temescal Canyon Road	1358.7	1434	25	2012	150	500	500
Coldwater Booster	2	24636 Temescal Canyon Road	1358.7	1434	25	2012	199.8	500	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Cottonwood 1	1	21980 Railroad Canyon Road	1434	1750	200	2003	320	1,667	1,667
Cottonwood 1	2	21980 Railroad Canyon Road	1434	1750	200	2003	328	1,667	
Cottonwood 1	3	21980 Railroad Canyon Road	1434	1750	200	2019	328	1,667	
Cottonwood 2	1	113 Cedar Lane	1750	1934	60	2003	208	588	1,156
Cottonwood 2	2	113 Cedar Lane	1750	1934	60	2003	209	568	
Cottonwood 2	3	113 Cedar Lane	1750	1934	No Data	2003	173	588	
Daley A	1	22749 Lost Road	1746	2309	15	No Data	257	80	80
Daley A	2	22749 Lost Road	1746	2309	15	No Data	270	80	
Daley B	1	23245 Crab Hollow	2309	2309	15	No Data	336	120	120
Daley B	2	23245 Crab Hollow	2309	2309	15	No Data	323.4	120	
Encina	1	17255 Encina Drive	1650	1916.5	75	2011	272	750	1,500
Encina	2	17255 Encina Drive	1650	1916.5	75	2011	277	750	
Encina	3	17255 Encina Drive	1650	1916.5	75	2011	278	750	
Farm	1	23810 Bundy Canyon Road	1746	1900	100	1989	270.7	1,100	2,200
Farm	2	23810 Bundy Canyon Road	1746	1900	100	1989	268.7	1,100	
Farm	3	23810 Bundy Canyon Road	1746	1900	No Data	No Data	270	1,410	
Grand Avenue	1	18861 Grand Avenue	1434	1434	125	1989	106	1,000	2,500
Grand Avenue	2	18861 Grand Avenue	1434	1434	100	1989	79.5	1,500	
Grand Avenue	3	18861 Grand Avenue	1434	1434	60	1989	30	2,500	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Greer Ranch 1	1	35915 Evandel Road	1650	1850	No Data	2004	423.6	580	1,171
Greer Ranch 1	2	35915 Evandel Road	1650	1850	No Data	2004	428.8	602	
Greer Ranch 1	3	35915 Evandel Road	1650	1850	No Data	2004	425.7	591	
Greer Ranch 2	1	35915 Evandel Road	1650	2050	No Data	2004	420	621	1,216
Greer Ranch 2	2	35915 Evandel Road	1650	2050	No Data	2004	423	606	
Greer Ranch 2	3	35915 Evandel Road	1650	2050	No Data	2004	419	610	
Horsethief 1	1	26665 Hostettler Road	1434	1601	125	2000	194.5	956	375
Horsethief 1	2	26665 Hostettler Road	1434	1601	125	2000	192.6	1,220	
Horsethief 1	3	26665 Hostettler Road	1434	1601	125	2000	201.7	1,396	
Horsethief 1	4	26665 Hostettler Road	1434	1601	125	2000	No Data	No Data	
Horsethief 2	1	13630 Mountain Road	1601	1801	75	1991	225	900	1,800
Horsethief 2	2	13630 Mountain Road	1601	1801	75	1991	225	900	
Horsethief 2	3	13630 Mountain Road	1601	1801	75	1991	226	900	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Inland Valley	1	24225 Prielipp Road	1434	1650	150	2007	253	1,500	4,500
Inland Valley	2	24225 Prielipp Road	1434	1650	150	2007	253	1,500	
Inland Valley	3	24225 Prielipp Road	1434	1650	150	2007	205	1,500	
Inland Valley	4	24225 Prielipp Road	1434	1650	150	2007	205	1,500	
La Laguna 1	1	McVicker Canyon Park Road	1800	2040	60	2005	256	600	1,200
La Laguna 1	2	McVicker Canyon Park Road	1800	2040	60	2005	252	600	
La Laguna 1	3	McVicker Canyon Park Road	1800	2040	60	2005	250	600	
La Laguna 2	1	Gateway Drive	2040	2240	25	2006	208.5	256	512
La Laguna 2	2	Gateway Drive	2040	2240	25	2006	208.5	256	
La Laguna 2	3	Gateway Drive	2040	2240	25	2006	208.5	256	
Lakeshore	1	2087 Lakeshore	1434	1434	85	1991	46.2	4,000	12,000
Lakeshore	2	2087 Lakeshore	1434	1434	85	1991	42.7	4,000	
Lakeshore	3	2087 Lakeshore	1434	1434	85	1991	46	4,000	
Lakeshore	4	2087 Lakeshore	1434	1434	85	1991	48.1	4,000	
Lemon Grove	1	27697 Kachina Court	1601	1850	7.5	2002	300	35	370
Lemon Grove	2	27697 Kachina Court	1601	1850	7.5	2002	300	35	
Lemon Grove	3	27697 Kachina Court	1601	1850	25	2002	500	150	
Lemon Grove	4	27697 Kachina Court	1601	1850	25	2002	500	150	
Lemon Grove	5	27697 Kachina Court	1601	1850	150	2002	500	1,000	
Los Pinos 1	1	77 Grand-Ortega B3	2313	2748	50	No Data	559	270	270
Los Pinos 1	2	77 Grand-Ortega B3	2313	2748	50	No Data	582	270	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Los Pinos 2A	1	39251 Gen Pinchot Lower	2748	3544	15	No Data	750	90	90
Los Pinos 2A	2	39251 Gen Pinchot Lower	2778	3544	15	No Data	750	90	
Los Pinos 2B	1	39251 Gen Pinchot Upper	3544	3501/3544	15	No Data	385	90	90
Los Pinos 2B	2	39251 Gen Pinchot Upper	3544	3501/3544	15	No Data	327	90	
Lucerne	1	15070 Lincoln	1434	1601	75	1989	186	1,030	3,090
Lucerne	2	15070 Lincoln	1434	1601	75	1989	183	1,030	
Lucerne	3	15070 Lincoln	1434	1601	75	1989	187	1,030	
Lucerne	4	15070 Lincoln	1434	1601	75	1989	186	1,030	
Meadowbrook 1	1	222 Crimson Pillar Lane	1601	1701	50	2006	145	800	2,933
Meadowbrook 1	2	222 Crimson Pillar Lane	1601	1701	50	2006	147	800	
Meadowbrook 1	3	222 Crimson Pillar Lane	1601	1701	150	2006	225	1,333	
Meadowbrook 1	4	222 Crimson Pillar Lane	1601	1701	150	2006	231	1,333	
Meadowbrook 2	1	77 El Toro	1701	1896	40	2004	223	500	1,000
Meadowbrook 2	2	77 El Toro	1701	1896	40	2004	222	500	
Meadowbrook 2	3	77 El Toro	1701	1896	40	2004	226	500	
Ortega	1	15171 Anchor Way	1434	1601	75	1990	199.6	1,000	2,000
Ortega	2	15171 Anchor Way	1434	1601	75	1990	199.4	1,000	
Ortega	3	15171 Anchor Way	1434	1601	75	1990	199.8	1,000	
Ortega	4	15171 Anchor Way	1434	1601	75	1990	180.5	1,000	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Rice Canyon	1	16482 Orange Grove Way	1601	1800	75	1988	214	850	2,550
Rice Canyon	2	16482 Orange Grove Way	1601	1800	75	1988	214	850	
Rice Canyon	3	16482 Orange Grove Way	1601	1800	75	1988	215	850	
Rice Canyon	4	16482 Orange Grove Way	1601	1800	75	No Data	215	850	
Rosetta Canyon 1	1	761 Third Street	1434	1601	250	2005	340	2,400	4,800
Rosetta Canyon 1	2	761 Third Street	1434	1601	250	2005	320	2,400	
Rosetta Canyon 1	3	761 Third Street	1434	1601	250	2005	320	2,400	
Rosetta Canyon 2	1	222 Crimson Pillar Lane	1601	1801	50	2006	236	800	2,933
Rosetta Canyon 2	2	222 Crimson Pillar Lane	1601	1801	50	2006	236	800	
Rosetta Canyon 2	3	222 Crimson Pillar Lane	1601	1801	150	2006	236	1,333	
Rosetta Canyon 2	4	222 Crimson Pillar Lane	1601	1801	150	2006	236	1,333	
Sedco A	1	32660 Grape Street	1746	2196	20	No Data	335	160	0
Sedco B	1	32395 Elsinore Heights Drive	2196	2196	20	No Data	325	160	0
Skylark Sustaining	1	19613 Grand Avenue	1434	1600	10	No Data	No Data	100	200
Skylark Sustaining	2	19613 Grand Avenue	1434	1600	10	No Data	No Data	100	
Skylark Sustaining	3	19613 Grand Avenue	1434	1600	10	No Data	200	100	
Skymeadows	1	33850 Encina Drive	1916.5	3300	100	No Data	1490	175	175
Skymeadows	2	33850 Encina Drive	1916.5	3300	100	No Data	1472	175	
Stage Ranch 1	1	33440 Hixon Street	1434	1882	75	1977	459	500	500
Stage Ranch 1	2	33440 Hixon Street	1434	1882	75	1977	433.6	500	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Stage Ranch 2	1	34250 Enderlein Street	1882	2217	100	1977	462.4	500	500
Stage Ranch 2	2	34250 Enderlein Street	1882	2217	100	1977	441.7	500	
Summerhill	1	31636 Canyon Estates	1434	1601	100	1990	188	900	1,800
Summerhill	2	31636 Canyon Estates	1434	1601	100	1990	188	900	
Summerhill	3	31636 Canyon Estates	1434	1601	100	1990	190	900	
Tomlin 1	1	15049 Grand Avenue	1601	1871	50	No Data	378	436	436
Tomlin 1	2	15049 Grand Avenue	1601	1871	60	No Data	366	497	
Tomlin 2	1	77 Grand-Ortega B2	1871	2313	50	No Data	505	300	300
Tomlin 2	2	77 Grand-Ortega B2	1871	2313	60	No Data	502.7	300	
Tuscany Hills 1	1	200 Via De La Valle	1434	1800	125	1989	391.5	950	2,850
Tuscany Hills 1	2	200 Via De La Valle	1434	1800	125	1989	387	950	
Tuscany Hills 1	3	200 Via De La Valle	1434	1800	125	1989	390.6	950	
Tuscany Hills 1	4	200 Via De La Valle	1434	1800	125	1989	381.6	950	
Tuscany Hills 2	1	21 Bel Lucia	1800	1940	25	1990	190	400	400
Tuscany Hills 2	2	21 Bel Lucia	1800	1940	25	1990	193	400	
Waite	1	31820 Central	1434	1467	50	1988	78.3	1,465	3,000
Waite	2	31820 Central	1434	1467	50	1988	78.3	1,465	
Waite	3	31820 Central	1434	1467	50	1988	55.6	1,184	
Waite	4	31820 Central	1434	1467	10	1988	47.2	1,028	

Name	Unit No.	Location	Suction Zone	Discharge Zone	Pump (hp)	Year Installed	Total Dynamic Head (feet)(1)	Flow Capacity (gpm)	Firm Capacity (gpm)
Woodmoor PS	1	33295 Sweet Nectar Road	1434	1601	75	2007	200	940	2,820
Woodmoor PS	2	33295 Sweet Nectar Road	1434	1601	75	2007	200	940	
Woodmoor PS	3	33295 Sweet Nectar Road	1434	1601	75	2007	200	940	
Woodmoor PS	4	33295 Sweet Nectar Road	1434	1601	75	2007	200	940	

Notes:
(1) Data obtained from pump model and GIS data.

Table 4.5 Storage Reservoir Characteristics

Name/Description	Volume (MG)	PZ Served	Diameter (feet)	Height (feet)	Bottom Elevation (feet)	Overflow Elevation (feet)	Year Installed
Adelfa	0.8	1650	67	32	1620.34	1650	2011
Alberhill Ranch 1A	1.5	1601	95.1	33	1570	1601	2006
Alberhill Ranch 1B	1.5	1601	95.1	33	1570	1601	2006
Alberhill Ranch 2A	0.63	1801	67.1	28	1772.6	1801	2006
Alberhill Ranch 2B	0.63	1801	67.1	28	1772.6	1801	2006
Amie	0.3	1464	48	24	1441	1464	1984
Auld Valley	4.5	1434	155	32	1402	1434	1989
Baker Street	5.0	1434	148.7	32	1395.5	1434	1986
Beck	0.13	1842	30	24	1820	1842	1999
Bryant Street	5.0	1434	148.7	32	1395.5	1434	1987
Bundy Canyon	2.0	1746	110	32	1714.5	1746	1988
Cal Oaks 1	3.5	1650	122	40	1610	1650	1988
Cal Oaks 2	3.5	1650	122	40	1610	1650	1990
Canyon Lake N	1.0	1622	70	40	1581	1622	1979
Canyon Lake S	1.0	1618.5	73	32	1586.5	1618.5	1970
City	1.73	1579	96	32	1547	1579	1995
Clay Canyon 1	0.12	1258.4	26	32	1228.8	1258	1982
Clearwell	1.0	1434	80	29	1405	1434	2006
Cottonwood 2	0.5	1934	53	32	1902	1934	2003
Cottonwood 2 East	0.5	1934	56	32	1902	1934	2015
Cottonwood 1A	1.2	1750	82	32	1718	1750	2002
Cottonwood 1B	1.1	1750	76.5	32	1718	1750	2002

Name/Description	Volume (MG)	PZ Served	Diameter (feet)	Height (feet)	Bottom Elevation (feet)	Overflow Elevation (feet)	Year Installed
Cottonwood East A	1.1	1750	78	32	1718	1750	2006
Cottonwood East B	1.1	1750	78	32	1718	1750	2006
Daley	0.08	2309	25	22	2287	2309	1998
El Toro 1	0.25	1601	42	24	1577	1601	1988
El Toro 2	0.4	1601	53	25	1576	1601	1996
Encina	0.5	1916.5	47.5	46	1877	1916.5	1992
Farm	0.43	1900	67.7	16	1884	1900	1975
Gafford St A	0.1	1746	30	30	1716	1746	1984
Gafford St B	0.61	1746	59	30	1716	1746	1973
Greer Ranch 1A	0.5	1850	61.5	19	1831.8	1850	2004
Greer Ranch 1B	0.5	1850	61.5	19	1831.8	1850	2004
Greer Ranch 2A	0.65	2050	58.9	33	2019	2050	2004
Greer Ranch 2B	0.65	2050	58.9	33	2019	2050	2004
Horsethief 1	1.2	1601	80	32	1569	1601	1994
Horsethief 2	1.8	1801	98	32	1769	1801	1986
Inland Valley	2.4	1650	112	32	1617.5	1650	2007
La Laguna 1A	0.47	2040	61.6	23	2017.2	2040	2005
La Laguna 1B	0.47	2040	61.6	23	2017.2	2040	2005
La Laguna 2A	0.54	2240	49	26	2213.6	2240	2006
La Laguna 2B	0.54	2240	49	26	2212.2	2240	2006
Lake Street(1)	8.0	1434	200	32	1402	1434	1999
Leach Canyon	0.11	1800	34.2	16	1784	1800	1984
Los Pinos 1	0.1	2778	27	24	2754.1	2778	1967
Los Pinos 2	0.1	3501	27	24	3477	3501	1967

Name/Description	Volume (MG)	PZ Served	Diameter (feet)	Height (feet)	Bottom Elevation (feet)	Overflow Elevation (feet)	Year Installed
Lucerne	2.5	1601	118	32	1569.7	1601	1991
Mayhew	0.2	1358.7	32	30	1330.5	1358.7	1982
Meadowbrook 2	1.0	1896	85	27	1872	1896	1998
Ortega	2.2	1601	110	32	1570.7	1601	1990
Railroad Canyon	8.0	1434	200	33	1402.5	1434	1995
Rice Canyon	1.61	1800	106.9	24	1776	1800	1992
Rosetta Canyon 1	2.5	1601	117	31	1572	1601	2006
Rosetta Canyon 2A	0.7	1801	64.4	33	1770.5	1801	2006
Rosetta Canyon 2B	0.7	1801	64.4	33	1770.5	1801	2006
Sedco	0.088	2196	25	22	2174	2196	1998
Skymeadows	0.1	3300	27	24	3276	3300	1969
Stage Ranch 1A	0.05	1882	22	16	1862	1882	1977
Stage Ranch 1B	0.05	1882	22	16	1862	1882	1977
Stage Ranch 2A	0.05	2217	22	16	2201	2217	1977
Stage Ranch 2B	0.05	2217	22	16	2201	2217	1977
Summerhill	2.35	1601	114	32	1570	1601	1992
Tomlin 1	0.05	1871	19.6	23.8	1847.2	2313	2003
Tomlin 2	0.05	2313	19.6	23.8	1855	1871	2003
Tuscany Hills 1A	1.3	1800	84	34	1768	1800	1990
Tuscany Hills 1B	1.3	1800	84	34	1768	1800	1990
Tuscany Hills 2	1.0	1940	85	24	1916	1940	1990
Waite Street	2.5	1467	130	24	1443	1467	1968
Woodmoor A	0.25	1601	42	34	1574.07	1601	2007
Woodmoor B	0.25	1601	42	34	1574.07	1601	2007
Total	**88.20**						

Table 4.6 Pressure Regulating Stations

Name/Description	Valve Size (inches)	High (Suction) Zone	Low (Discharge) Zone	High Pressure (psi)(1)	Low Pressure (psi)(1)	Year Installed
Allegra	No Data	1701	1601	No Data	No Data	N/A
Brand/Cross Street	2/8	1842	1740	120	75	N/A
Church Hill/Hayes	4/8	1581	1581	145	100	2017
Clay Canyon	8	1358.7	1258.4	56	10	N/A
Crimson Pillar Lane	2/4/8	1801	1701	100	60	2005
Darcy Place and Nutmeg Street	2/4/6	1850	1850	120	80	2004
Della Cana Lane	3/6/12	1800	1640	120	60	2006
Elizabeth Lane and Prielipp Road	2/4/8	1650	1650	118	80	2017
Elsinore Heights Road	2/6	2201	2201	130	90	N/A
Gateway Drive and Solstice Court	4/6	2040	1928	72	62	2005
Golden Pheasant/Nutmeg	2/12	1650	1650	120	75	2011
Grape Street	4/8	1746	1746	130	75	2015
Greer Ranch 2050/1850	2/4/6	2050	1850	185	100	2004
Greer Road and Darcy Street	2/4/6	1850	1850	140	100	2004
Hillside Drive and Big Tee	2/4/8	1750	1750	95	65	2006
Horsetail Street and Iceplant Lane	2/4/6	2050	2050	130	95	2003
Laguna Avenue/ Trabuco Drive	4/8	1601	1601	110	35	2001
Lake Trail Circle	2.5/6	1601	No Data	No Data	No Data	2021
Lemon Street/ Gafford	4/12	1746	1746	100	100	2002
Lower Meadowbrook PS	2/4/8	1896	1896	140	105	2003
Lower Tuscany Hills PS	6	1800	1800	200	30	N/A
Machado Street/ Woodcrest Drive	8	1601	1434	120	60	2020
Manresa/Cal Oaks Road	2/8	1650	1650	95	50	2011

Name/Description	Valve Size (inches)	High (Suction) Zone	Low (Discharge) Zone	High Pressure (psi)(1)	Low Pressure (psi)(1)	Year Installed
Mourning Dove/ Cal Oaks Road	2/12	1650	1650	125	90	2011
Nutmeg and Jameson	2/8	1650	1650	165	120	2003
Orange/Bundy Canyon Road	4/6/8	1750	1750	160	80	1990
Orchid Tree Avenue and Pumpkin Street	2/4/6	2050	2050	145	110	2002
Prielipp Road and Summer Dain Lane	2/4/8	1650	1650	121	88	2017
Railroad Canyon Road	12	1750	No Data	121	No Data	1990
River Road	2/6	1896	1896	140	30	N/A
Riverside Street/ Crumpton	12	1801	1701	90	70	2020
Saradella/Cal Oaks Road	2/8	1650	1650	165	102	2011
Sedco	2/6	2201	2201	176	80	N/A
Silver Stirrup Drive	6	1801	1801	100	73	2015
Skylink Drive	2.5/8	1750	1750	150	115	2005
Spinning Wheel Drive	2/4/6	1650	1650	115	85	2011
Stage Ranch Lower PS	2/6	1882	1550	210	90	1977
Temescal Canyon/ Hostetler Road	4/8	1434	1413	109	100	N/A
Trellis Lane/ Highway 74	2/4/8		1701	n/a	49	2005
Upper Los Pinos PS	2/3	3501	3501	164	140	2001
Via De Lago/ Via de La Valle	2/6	1800	1800	125	95	1988
Via De La Valle/ Via De Lago	4/6/8	1800	1800	130	50	1989
Villa Roma/Villa Milano	3/6	1800	1640	110	55	N/A
Waite Street Reservoir PRV	2/4	1576	1576	125	86	1988

Name/Description	Valve Size (inches)	High (Suction) Zone	Low (Discharge) Zone	High Pressure (psi)(1)	Low Pressure (psi)(1)	Year Installed
Woodcrest/ Machado	2.5/6	1801	No Data	No Data	No Data	2021
3rd Street	2/4/8	1601	1434	120	80	2015

Notes:
Abbreviation: psi - pounds per square inch
(1) High pressure is the approximate suction pressure of the water entering the PRV. Low pressure is the approximate pressure setting for the PRV.

4.7 Distribution System Network

EVMWD's distribution system network consists of approximately 743 miles of pipeline, which range in diameter from 0 inch to 42 inches. The distribution of pipeline diameters is summarized in Table 4.7, and Figure 4.4 shows the pipelines colored by diameter. It should be noted that the numbers presented in Table 4.7 and Table 4.8 are based on the pipelines included in the GIS data, and does not include service laterals. As shown in Table 4.7, about 52 percent of the distribution system network consists of pipes with diameters between 6 inches and 8 inches, and 21.2 percent of the distribution system network comprises pipes that are 12 inches in diameter.

Approximately 80 percent of the pipelines in the model were installed between 1955 and 2020. The remaining 20 percent of the pipelines in the model have an unknown installation date. Approximately 38 percent of the pipelines in the model are about 20 years old. There are approximately 33 percent pipelines in the model that are between 20 and 40 years old. Roughly 8 percent of the pipelines in the model are between 40 and 60 years old and the remaining approximately percent of the pipelines in the model are over 60 years old.

The distribution of pipe age is shown in Table 4.8. Table 4.8 also summarizes the total lengths of pipelines by material type. The most common pipe material is polyvinyl chloride (PVC) and asbestos cement, which covers approximately 55.9 and 19 percent of the total pipeline length in the system, respectively. The remaining 25.1 percent of the distribution system is composed of multiple material types consisting of steel (6.1 percent), concrete (cement mortar lined and coated [CMLC]) (6.3 percent), copper (COP) (less than 1 percent), ductile iron pipe (11.1 percent), galvanized iron pipe (GALV) (less than 1 percent) material pipelines, and unknown or unlabeled material type (1.6 percent). Figure 4.5 shows the pipeline material by color.

Table 4.7 Summary of Pipelines by Diameter

Diameter (inches)	Total Length (feet)	Total Length (miles)	Percentage of Total Length
Less than 4	77,698	14.7	2.0%
4	263,802	50.0	6.7%
5	2,113	0.4	0.1%
6	663,540	125.7	16.9%
8	1,396,152	264.4	35.6%
10	114,032	21.6	2.9%
11	149	<1.0	<1.0%
12	830,275	157.2	21.2%
14	30,066	5.7	0.8%
16	158,953	30.1	4.1%
18	10,376	2.0	0.3%
20	77,282	14.6	2.0%
21	21,610	4.1	0.6%
24	84,597	16.0	2.2%
25	4,879	0.9	0.1%
27	6,840	1.3	0.2%
30	77,702	14.7	2.0%
33	13,354	2.5	0.3%
36	54,161	10.3	1.4%
42	34,632	6.6	0.9%
Total	3,922,213	742.8	100%

Table 4.8 Summary of Pipelines by Installation Period and Material Type

Material	Year									Material Totals		
	1950s	1960s	1970s	1980s	1990s	2000s	2010s	2020s	Unknown	Total (feet)	Total (miles)	Percent
Asbestos Cement	11,469	65,823	158,916	157,489	20,871	60	1,161	1,234	326,245	**743,269**	**140.8**	**19.0%**
Copper	0	0	0	0	0	0	341	0	76	**417**	**0.1**	**<1%**
Ductile Iron	53	0	42	702	33,927	329,072	54,419	197	17,518	**435,929**	**82.6**	**11.1%**
Galvanized Iron	0	0	0	0	0	0	0	0	143	**143**	**0.0**	**<1%**
PVC	3,137	4,264	6,526	379,790	590,105	845,285	166,267	38,617	159,082	**2,193,073**	**415.4**	**55.9%**
CMLC	18,954	52,780	14,591	67,890	32,869	25,723	340	27	33,445	**246,620**	**46.7**	**6.3%**
Steel	80,937	927	781	7,864	2,137	13,591	26	810	131,255	**238,327**	**45.1**	**6.1%**
Unknown	15	0	0	1,513	149	1,323	60	0	61,375	**64,435**	**12.2**	**1.6%**
Total (feet)	**114,564**	**123,794**	**180,856**	**615,247**	**680,058**	**1,215,054**	**222,614**	**40,886**	**729,141**	**3,922,213**	**742.8**	**100%**
Total (miles)	**21.7**	**23.4**	**34.3**	**116.5**	**128.8**	**230.1**	**42.2**	**7.7**	**138.1**			
Percent	**2.9%**	**3.2%**	**4.6%**	**15.7%**	**17.3%**	**31.0%**	**5.7%**	**1.0%**	**19%**			

4.8 Other Facilities and Assets

In addition to the facilities described, EVMWD's system includes many other smaller facilities, including valves, fire hydrants, customer meters, and a supervisory control and data acquisition (SCADA) system to control and monitor system facilities. EVMWD maintains and updates the GIS database for all of their facilities in EVMWD's service area.

4.8.1 Valves

EVMWD's distribution system network includes approximately 20,422 valves, which range in diameter from 1 inch to 42 inches. The distribution of valve diameters is summarized in Table 4.9. About 66 percent of the distribution system valves consist of valves that are 6 inches or 8 inches in diameter, while about 17 percent of the distribution system valves are 12 inches in diameter and the other 17 percent of distribution system valves are varying sizes. Table 4.10 shows the distribution of the valves by installation year.

Table 4.9 Summary of Valves by Diameter

Diameter (inches)	Total Number of Valves	Percentage of Total Valves
3 or less	220	1.1%
4	1,761	8.6%
5	1	<0.1%
6	8,095	39.6%
7	1	<0.1%
8	5,494	26.9%
10	245	1.2%
12	3,517	17.2%
13	1	<0.1%
14	51	0.3%
16	410	2.1%
18	35	0.2%
20	172	0.8%
21	24	0.1%
24	168	0.8%
27	6	<0.1%
30	94	0.5%

Diameter (inches)	Total Number of Valves	Percentage of Total Valves
33	5	<0.1%
36	56	0.3%
42	5	<0.1%
Unknown	61	0.3%
Total	**20,422**	**100.0%**

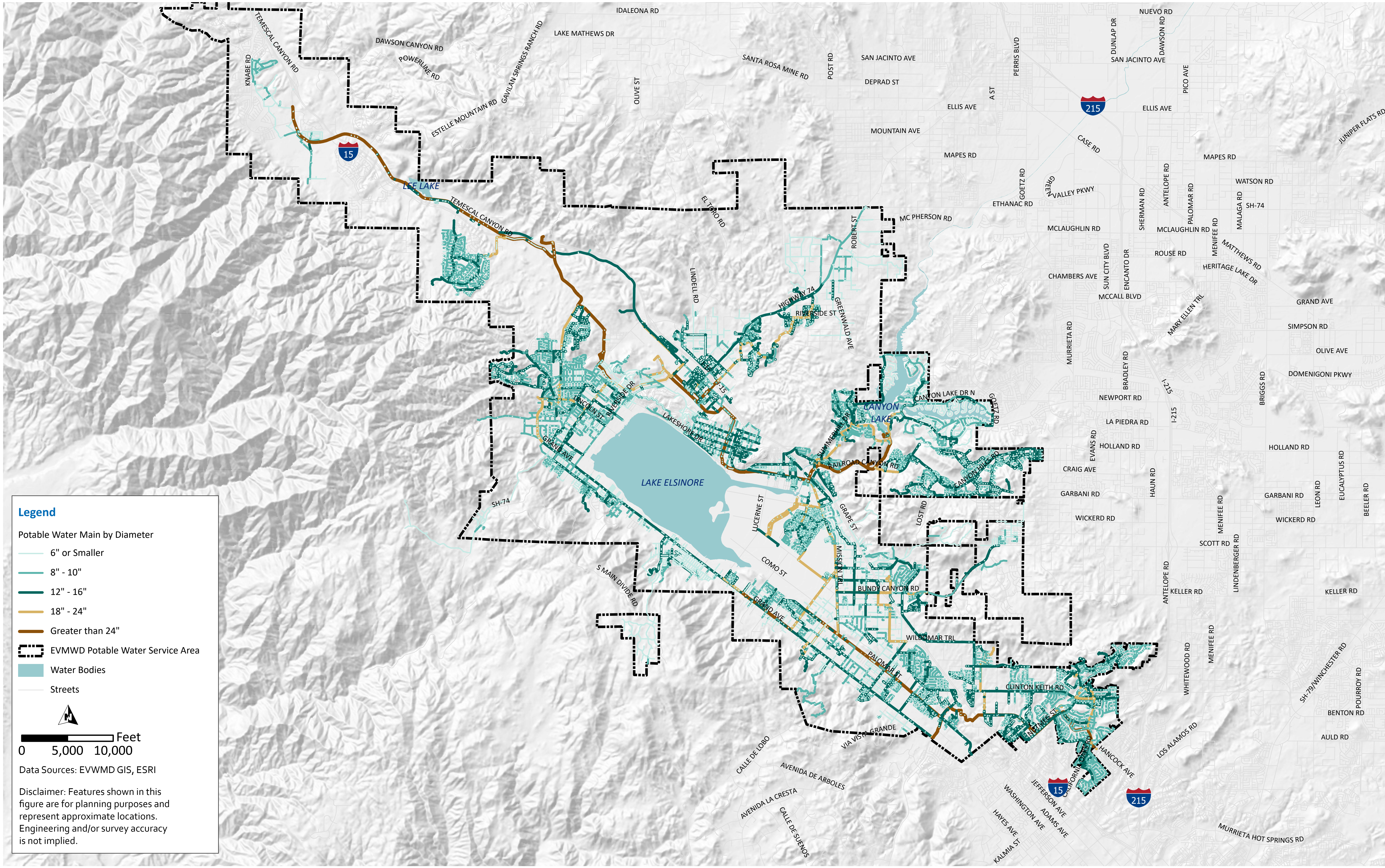

Figure 4.4 Pipeline by Diameter

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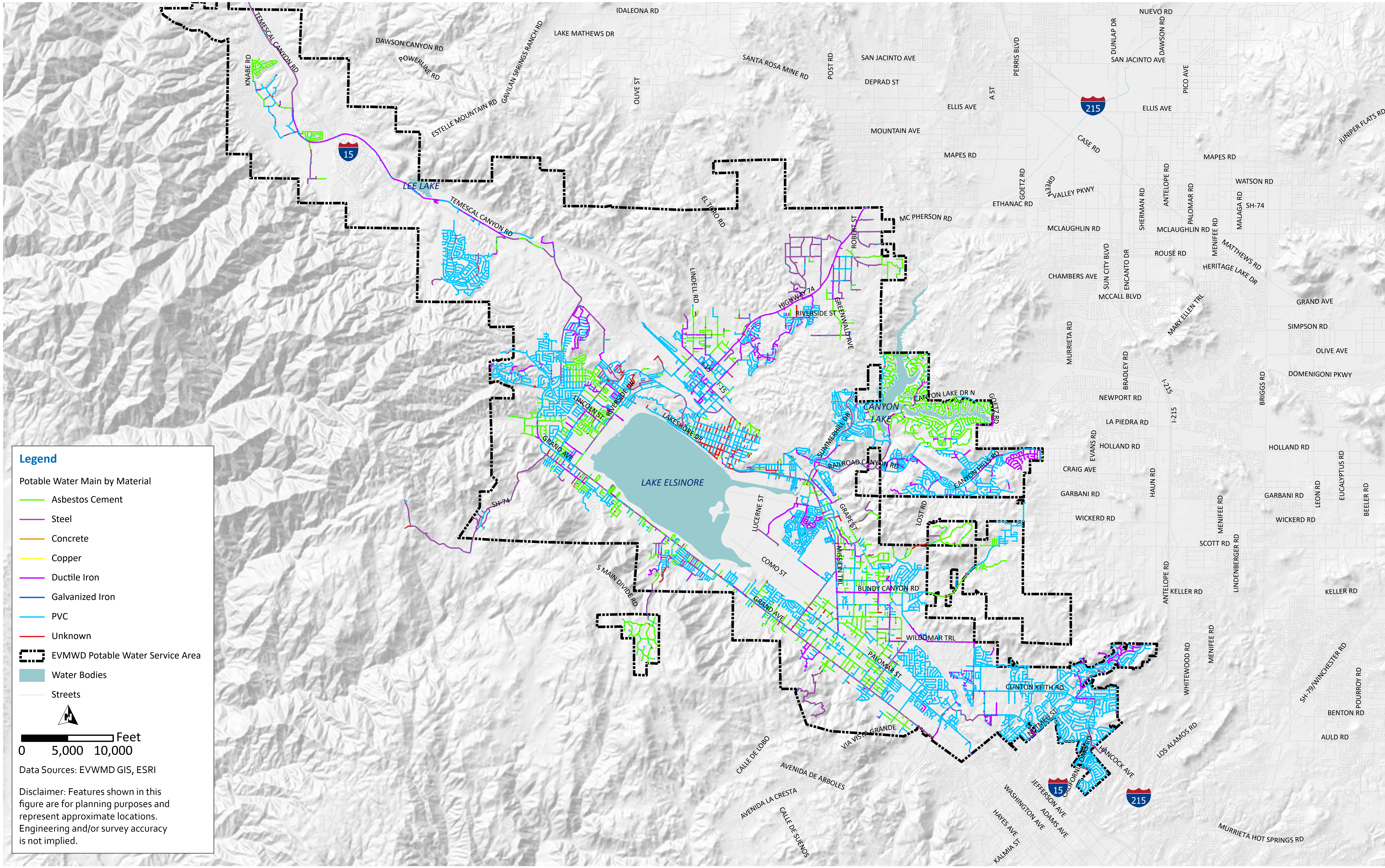

Figure 4.5 Pipeline Material

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Table 4.10 Summary of Valves by Installation Year

Installation Year	Total Number of Valves	Percentage of Total Valves
1955 to 1959	79	0.4%
1960 to 1969	228	1.1%
1970 to 1979	641	3.1%
1980 to 1989	2,828	13.8%
1990 to 1999	4,040	19.8%
2000 to 2010	7,575	37.1%
2011 to 2015	1,021	5.0%
2016 to 2021	1,343	6.6%
Unknown	2,667	13.1%
Total	**20,422**	**100.0%**

4.8.2 Fire Hydrants

EVMWD's distribution system network consists of approximately 8,174 active fire hydrants. Approximately 85 percent of the fire hydrant laterals are 6 inches in diameter, while the other 15 percent are 4 inches in diameter. Some 6-inch diameter hydrant laterals are reduced to 4-inch diameter hydrants above ground to accommodate wharf-head style hydrants. The distribution of fire hydrants by installation date is summarized in Table 4.11.

Table 4.11 Summary of Fire Hydrants by Installation Year

Installation Year	Total Number of Hydrants	Percentage of Total Hydrants
Pre 1959	30	0.4%
1960 to 1969	133	1.6%
1970 to 1979	340	4.2%
1980 to 1989	1,084	13.3%
1990 to 1999	1,475	18.0%
2000 to 2009	3,263	39.9%
2010 to 2019	732	9.0%
2020 to 2022	151	1.8%
Unknown	966	11.8%
Total	**8,174**	**100.0%**

Notes:
Source: Information presented is from EVMWD's Hydrant Shapefile.

4.8.3 SCADA

EVMWD has a SCADA system that allows EVMWD to remotely monitor and control system facilities within the water system. SCADA functionality includes monitoring tank levels, well status, booster pump status, and sounding alarms at the facilities. EVMWD also has the capability to turn pumps and wells on and off remotely. EVMWD's SCADA system provides information such as pump flow rates, pump on and off times, and tank levels. These three pieces of information, in particular, were used for the calibration portion of the WSMP, so modelled results could be compared to field values.

4.8.4 Emergency Inter-Connections

EVMWD has two inter-agency connections with WMWD and EMWD through the AVP and TVP that are used on a daily basis. During cold weather, they are periodically not used. EVMWD also has five emergency inter-connections: one with Temescal Valley Water District (TVWD), three with EMWD, and one with WMWD. These connections are normally closed and only opened during an emergency. The emergency interconnections are listed in Table 4.12.

Table 4.12 Emergency Interconnections

Location	Other Agency	Pipe Diameter (inches)	Direction
Bundy Canyon East	EMWD	6	From EMWD
Clinton Keith east of Greer Road	EMWD	8	From EMWD
Coldwater PS	TVWD	6	To TVWD
Crosshill	EMWD	4	To EMWD
Goetz Road (Under Construction)	EMWD	12	From EMWD
Palomar/Washington	WMWD	12	To WMWD

4.8.5 GIS

EVMWD maintains GIS data of its existing facilities. Data are stored as feature classes within a geodatabase, with separate feature classes for facility types. GIS data includes, among others, laterals, mains, meters, treatment plants, pumps, pressure regulating stations, hydrants, wells, reservoirs, and valves. Data for each facility includes installation year, material, diameter, etc. as appropriate. This data is updated as old facilities are repaired or replaced and as new facilities are installed.

Chapter 5

WATER DISTRIBUTION SYSTEM MODEL

5.1 Introduction

This chapter describes the processes utilized to update and validate the hydraulic model of Elsinore Valley Municipal Water District's (EVMWD's) potable water system. The updated model will be used to perform analyses of the system under existing demand conditions and future demand conditions, which are described in Chapter 7 and Chapter 8, respectively.

5.2 Hydraulic Model Update

The hydraulic model received at the start of this Water System Master Plan (WSMP) was the model that was upgraded recently in 2021 as summarized in the Potable Water Hydraulic Model Reference Model (WSC, 2021) included in Appendix C. The current model includes 759 miles of pipeline (44,889 segments), 43,057 junctions, 26 reservoirs, 170 pumps, 72 tanks, and 95 control valves.

The hydraulic model of the EVMWD potable water system is in Innovyze's InfoWater software, which is based on Esri's ArcGIS platform. As part of this WSMP, the following updates were made to the hydraulic model:

- Addition of new pipelines and facilities constructed since the model was last updated.
- Addition of pump and facility controls to reflect summer operations.
- Correction of demand allocation.
- Extended-period simulation (EPS) verification of existing facilities and infrastructure related to the 1434 Loop Zone.
- Facilities under construction and in design were added following verification.

5.2.1 Infrastructure Added for Consistency With GIS

After completing a review of EVMWD's hydraulic model it was found that the modeled system did not match EVMWD's geographic information system (GIS) data in some areas. The inconsistencies were updated in the model for major facilities and pipelines that could impact the model verification or analysis results. These types of model updates were based on EVMWD's GIS data and as-built drawings (when available). In addition to these changes, facility operations and controls were adjusted to reflect current operating conditions. New pipelines constructed and added to the GIS since the previous model update were added to the model.

Additionally, the demand allocation was reviewed, correcting locations where demands were previously allocated to model junctions at facilities or along transmission pipelines traversing through other pressure zones (PZs).

The following facilities were updated/added in the hydraulic model to reflect an existing system condition for verification purposes:

- Riverside Street pressure reducing valve (PRV) between the 1801 Rosetta Canyon 2 Zone and the 1701 Meadowbrook 1 Zone.
- Pipeline changes at Grand Avenue, Machado Street, and California Avenue/Street/Boulevard.
- PRV at Woodcrest and Machado at the intersection of Woodcrest Drive and Grand Avenue, converting area from the 1434 Loop Zone to being served from a PRV via the 1601 Ortega Zone.
- PRV at Lake Trail Circle, converting area from the 1434 Loop Zone to being served from a PRV via the 1601 Ortega Zone.
- Removal of Meadowbrook 1 Pump Station (PS).

A screenshot of the model is shown on Figure 5.1.

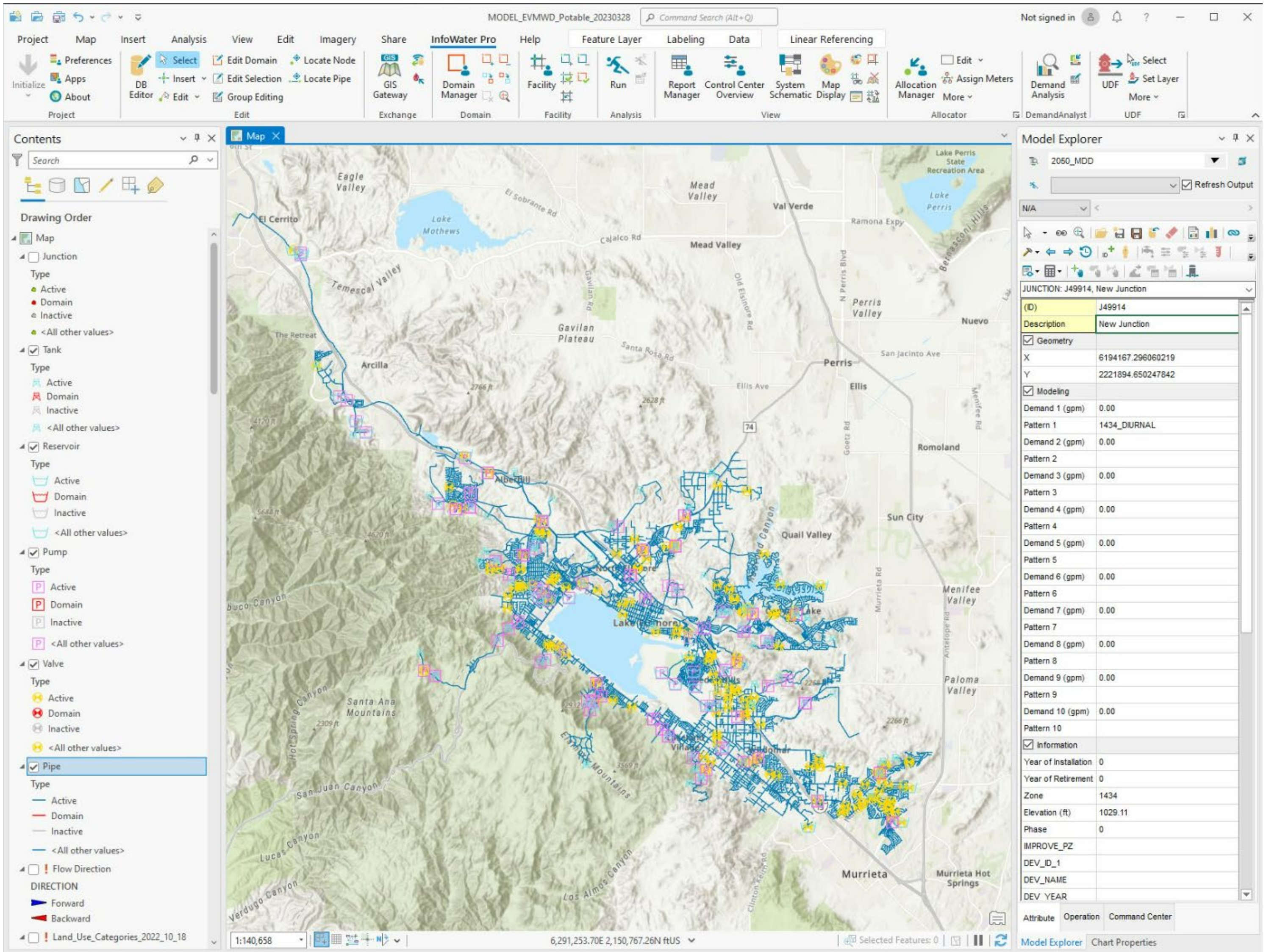


Figure 5.1 EVMWD Potable Water Hydraulic Model

5.3 Hydraulic Model Validation

This section summarizes the overall methodology employed to validate EVMWD's water system hydraulic model and the verification results, including a detailed description of each of the major components of the model validation process. The hydraulic model was validated in accordance with the American Water Works Association (AWWA) Manual on Distribution Network Analysis of Water Utilities (M-32).

After review of the model, it was determined that the 2021 verification did not accurately reflect a balance of water between the 1434 Loop Zone tanks, even during low-demand conditions when the model was verified, with some tanks filling in the model, ending up over 20 feet higher than in the field data. In the maximum day demand (MDD) scenario, the 1434 Loop Zone tanks drained completely. Due to the concern of head losses in the 1434 Loop Zone and the potential need for large transmission pipelines to convey flow through the 1434 Loop Zone, a hydraulic model validation was performed for the 1434 Loop Zone under high-demand conditions. The model verification effort discussed below resolved this concern in the model.

5.3.1 Model Verification Data Collection

Carollo Engineers, Inc.(Carollo) coordinated closely with EVMWD staff to collect supervisory control and data acquisition (SCADA) data that were required to validate the hydraulic model. This section summarizes the data collection process that was conducted.

- SCADA and Metropolitan Water District of Southern California (MWD) Flow Data Gathering: Field testing and data gathering for model verification took place for the period from June 1 to June 20, 2022. The major facilities in the system where SCADA data was available are summarized in Table 5.1. This data was primarily used to generate the EVMWD's diurnal pattern and for EPS model verification.

Table 5.1 SCADA Data Received Used for Model Validation

Facility Type/Name	Type of SCADA Data Received
Level Data	
Baker Street Tank	Level
Railroad Canyon Tank	Level
Bryant Street Tank	Level
Auld Valley Tank	Level
Clearwell Tank	Level
Lake Street Tank	Level

Facility Type/Name	Type of SCADA Data Received
Flow Data	
Canyon Lake Booster	Flow
Temescal Valley Pipeline TVP Connection	Flow
Canyon Lake Water Treatment Plant(1)	Flow
Flagler Well 2A(1)	Flow
Flagler Well 3A(1)	Flow
Joy Well	Flow
Machado Well	Flow
Summerly Well(1)	Flow
Diamond Well(1)	Flow
Cereal Well 3	Flow
Cereal Well 4	Flow
Cereal Well 1	Flow
Corydon Well	Flow
Terra Cotta Well	Flow
Adelfa Booster	Flow
Auld Valley Booster	Flow
Bundy Canyon Booster	Flow
Cielo Vista Booster	Flow
City Booster	Flow
Coldwater Booster 1	Flow
Coldwater Booster 2	Flow
Grand Avenue Booster(1)	Flow
Horsethief Booster 1	Flow
Inland Valley Booster	Flow
Lakeshore Booster 1	Flow
Lucerne Booster	Flow
Ortega Booster	Flow
Rosetta Canyon Booster 1	Flow
Skylark Booster	Flow
Stage Ranch Booster 1	Flow
Summerhill Booster	Flow
Tuscany Booster 1	Flow
Waite Booster	Flow
Woodmoor Booster	Flow

Facility Type/Name	Type of SCADA Data Received
Pressure Data	
Alberhill Recharge Booster 1 Suction	Pressure
Bundy Canyon Booster Suction	Pressure
City Booster Suction	Pressure
Coldwater Booster Discharge	Pressure
Cottonwood Booster 1 Suction	Pressure
Canyon Lake Booster Suction	Pressure
Grand Booster Discharge	Pressure
Grand Booster Suction	Pressure
Horsethief Booster 1 Suction	Pressure
Inland Valley Booster Suction	Pressure
Lakeshore Booster Discharge	Pressure
Lakeshore Booster Suction	Pressure
Lucerne Booster Suction	Pressure
Ortega Booster Suction	Pressure
Rosetta Canyon Booster 1 Suction	Pressure
Stage Ranch Booster 1 Suction	Pressure
Summerhill Booster Suction	Pressure
Tuscany Booster 1 Suction	Pressure
Waite Booster Suction	Pressure
Woodmoor Booster Suction	Pressure
Cereal Well 1 Discharge	Pressure
Cereal Well 3 Discharge	Pressure
Cereal Well 4 Discharge	Pressure
Corydon Well Discharge	Pressure
Diamond Well Discharge	Pressure
Joy Well Discharge	Pressure
Lincoln Well Discharge	Pressure
Machado Well Discharge	Pressure
Summerly Well Discharge	Pressure
TVP Connection Discharge	Pressure

Notes:
Abbreviation: TVP - Temescal Valley Pipeline.
(1) These locations were off during the verification period.

5.3.2 Diurnal Pattern Development

A diurnal curve represents the demand fluctuation in a water system over a 24-hour period. A diurnal curve was created for the demand pattern for the verification period. The diurnal pattern calculations were based on the actual demand values, which were summed for a total system hourly demand and then normalized into a pattern. This diurnal pattern for June 2022 is shown on Figure 5.2, which more accurately represents the diurnal pattern during a high demand period. The normalized flow on Figure 5.2 was calculated by the ratio of measured hourly flow over the daily average flow and is a unitless number.

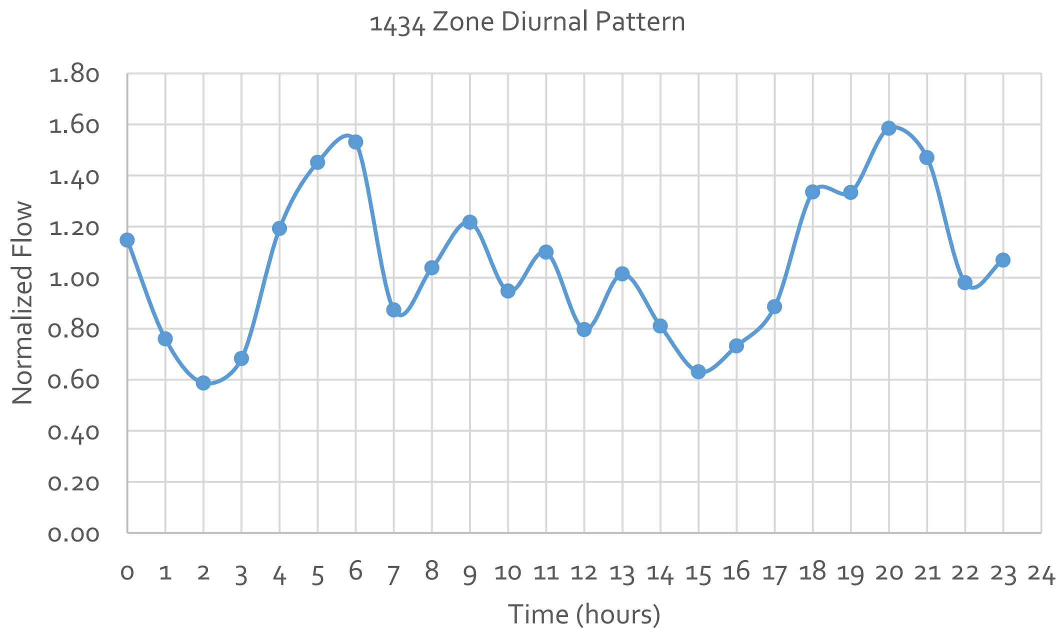


Figure 5.2 1434 Loop Zone Diurnal Pattern

As shown on Figure 5.2, the diurnal curve of the 1434 Loop Zone reflects the two morning and evening peaks but they are not as prominently higher than the rest of the day as typically seen in most water distribution systems. As the largest PZ and receiving water from most of the EVMWD's major water supply sources, including imported water connections and groundwater wells, the 1434 Loop Zone has a unique function within the entire distribution system. The 1434 Loop Zone receives, on average, 89 percent of all annual water supplies, contains only 25 percent of the EVMWD's entire water demand, and serves as a water source for the upper PZs that comprise 74 percent of the EVMWD's water demand. With PSs turning on and off throughout the day to supply the higher-PZs, the resultant diurnal curve shows the two largest demand peaks around 6:00 a.m. and 8:00 p.m., with four additional smaller peaks throughout the day that are most likely due to SCADA data as 15 minute averages rather than instantaneous levels.

5.3.3 Model Validation Methodology and Results

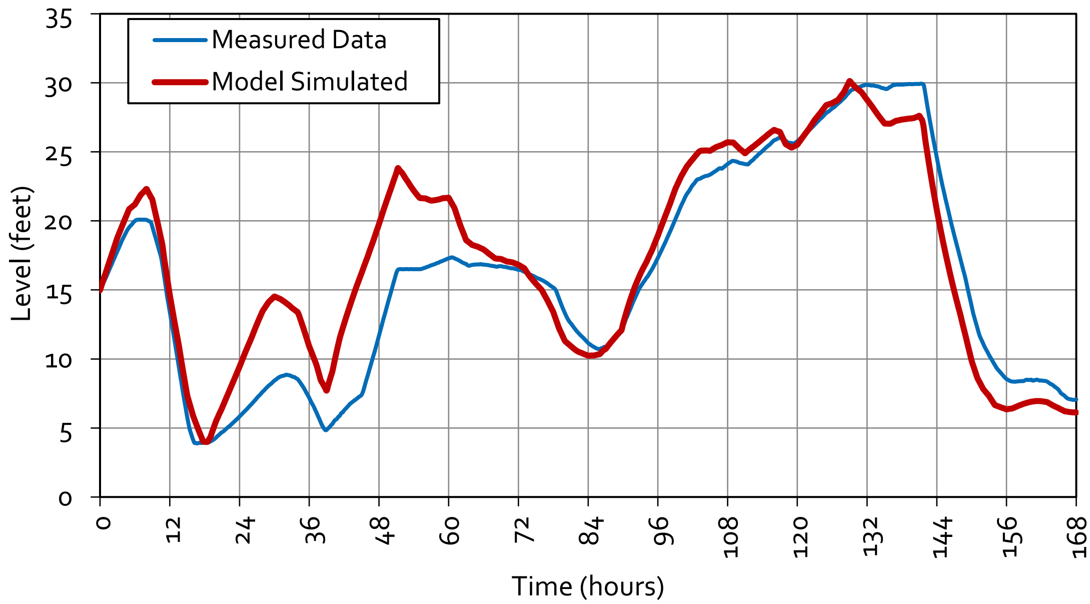
The purpose of a water system hydraulic model is to estimate, or predict, how the water distribution system will respond under a given set of conditions.

Validation was performed for a hydraulic model scenario consisting only of EVMWD's 1434 Loop Zone. Various methods and types of data sets can be utilized, including historical SCADA data, fire flow testing, and C-factor testing. For this project, the model validation was limited to the use of historical SCADA data.

The following steps were taken as part of the model verification:

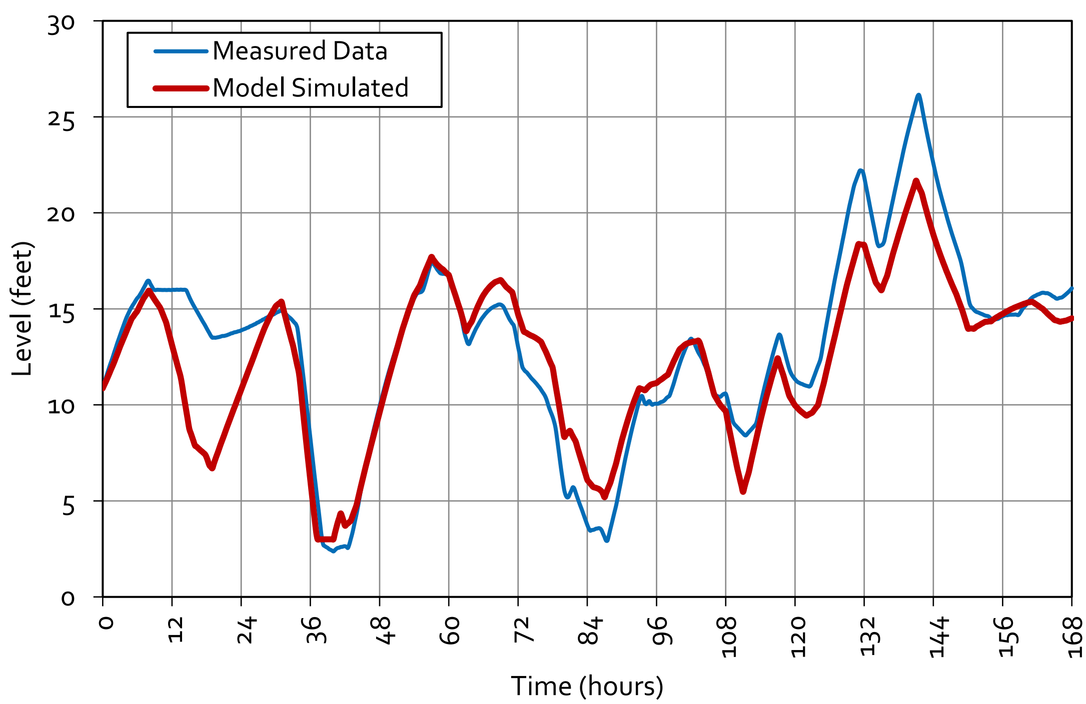
1. A seven-day verification period was selected. It was determined that June 13 to 19, 2022, was the most appropriate verification week. June 16, 2022 was chosen because the field data was comprehensively available with no irregular operations and had reasonably high demands.
2. A new scenario was created for the 1434 Loop Zone only (new demand set, new tank set, new control set, new query set).
3. A diurnal pattern was created for the 1434 Loop Zone for selected dates of verification, as shown on Figure 5.2.
4. The demands in the model were rescaled to dates of verification. The calculated daily demand for the verification day for the 1434 Loop Zone was estimated to be 13,056 gallons per minute (gpm) for June 16, 2022.
5. Demands were assigned to PS's locations as a proxy for PSs pumping out of the 1434 Loop Zone and diurnal patterns were created.
6. Initial status was set for tank levels.
7. Initial statuses and controls were set for water supplies.
8. The model was run, and modifications were made as needed to achieve reasonable results.

The EPS validation compared model-simulated PS flows, PS discharge pressures, tank levels, and PRV station status (if available) to the field-measured data. In addition, model-simulated pressures at the pressure logger locations were compared to the actual field pressures recorded during the verification day. The complete set of model validation results are shown in Appendix D, while the 1434 Loop Zone tanks are shown on Figure 5.3 through Figure 5.7.



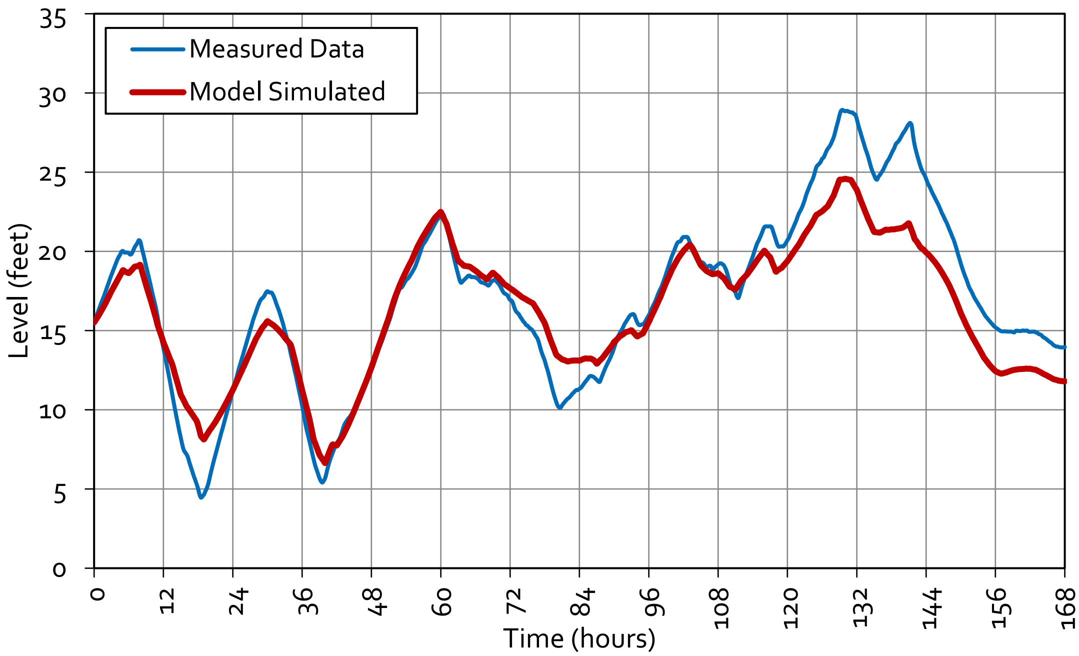
Note: Data reflects June 13-19, 2022.

Figure 5.3 Auld Valley Tank Comparison Data for Model Verification



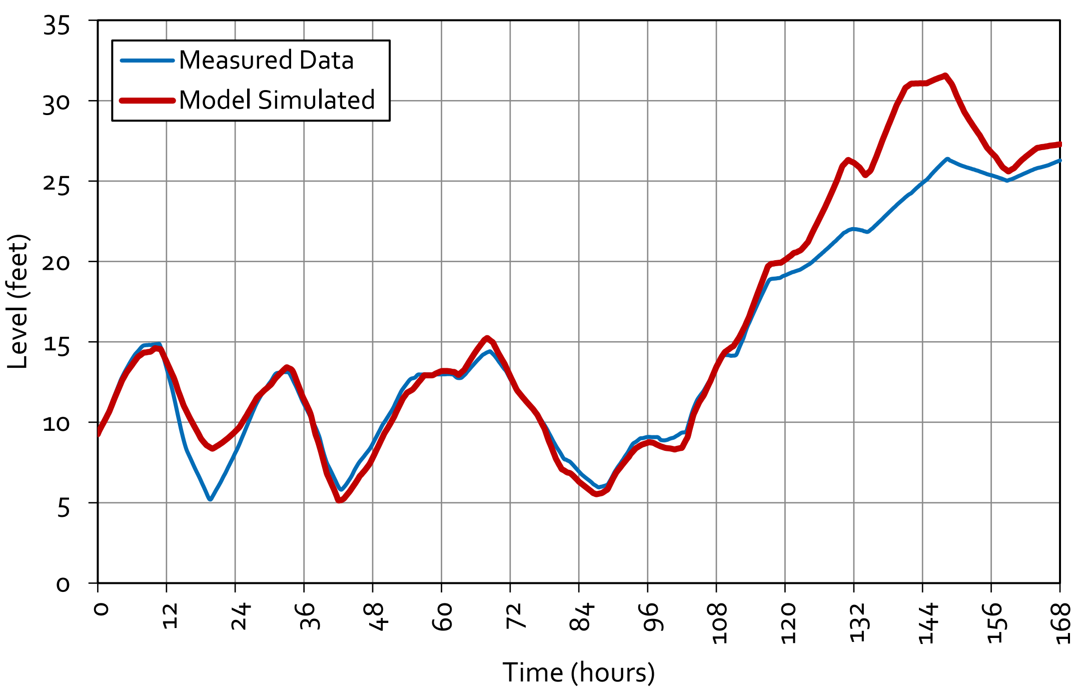
Note: Data reflects June 13-19, 2022.

Figure 5.4 Baker Tank Comparison Data for Model Verification



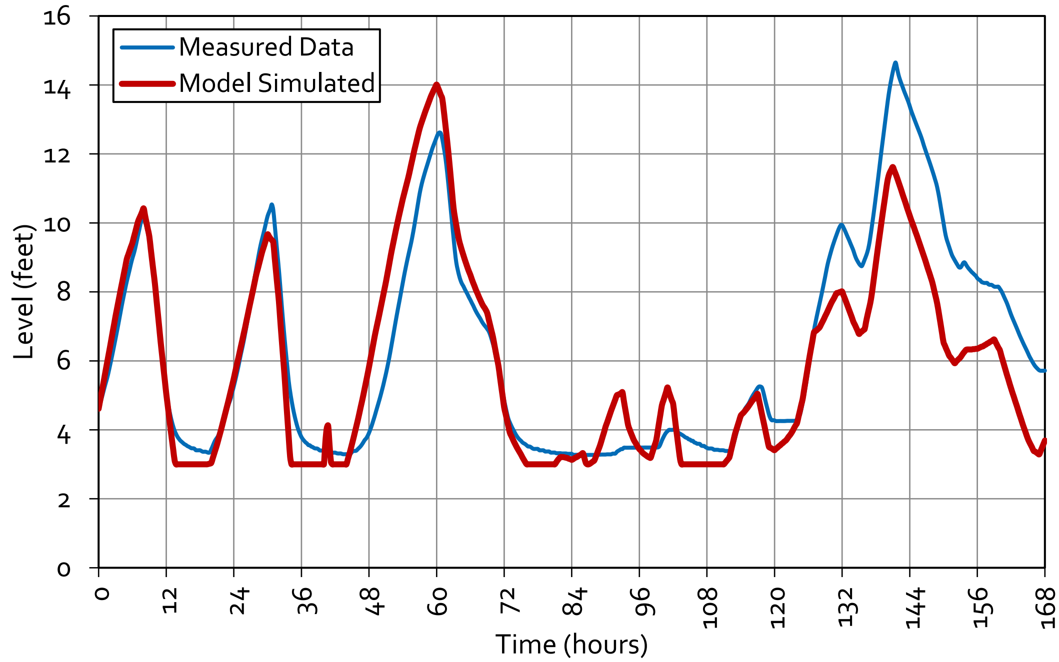
Note: Data reflects June 13-19, 2022.

Figure 5.5 Bryant Tank Comparison Data for Model Verification



Note: Data reflects June 13-19, 2022.

Figure 5.6 Lake Street Tank Comparison Data for Model Verification



Note: Data reflects June 13-19, 2022.

Figure 5.7 Railroad Canyon Tank Comparison Data for Model Verification

The following modifications were made in the hydraulic model for the validation:

- Adjustment of pumping water levels to reflect groundwater levels during the time of model verification.
- Adjustment of pump curves to reflect field data.
- Addition of minor losses at groundwater well blending facilities to account for the mixing.
- Moving demands allocated to well collecting pipelines.
- Correcting connections of model pipelines (especially in the Back Basin area) where tees and crosses did not connect in the hydraulic model.

With these changes, the model verification is very good and closely reflects field data as shown in Table 5.2.This provides confidence in the model results, and, therefore, the hydraulic model can be used to perform hydraulic analyses for EVMWD's water distribution system, recognizing that conveyance and transmission pipelines are an important consideration in this WSMP with expected growth in demands.

Table 5.2 Comparison of Model and Field Data for Validation

Parameter	Average Percent Difference
Tank Levels	0.12 feet
Flows	10%
Pressures	2.4 pounds per square inch

5.4 Model Setup for System Analyses

After the model validation, the hydraulic model was set up for scenarios for the existing system and for existing and future system analysis. EPS model scenarios were created for average day demands (ADDs) and MDDs. Two sets of scenarios for existing system analyses were created: one based on what is currently operational (so the current system can be evaluated) and one including projects currently in construction (for existing system analysis).

To allow these scenarios to operate properly, pump controls were modified (mostly in the MDD scenario) so that tanks would not drain completely. As operations staff changes tank control setpoints on a regular basis, the control levels added to the model are generally representative of how EVMWD operations staff run the booster pumps. These scenarios are useful to EVMWD to evaluate the existing water system as it currently exists.

EVMWD is committed to implementing projects that are currently under construction without modification; therefore, they are used part of the existing system analysis.

The following facilities were updated/added in the hydraulic model for existing system analysis. These facilities were under construction at the time this report was written:

- Lee Lake Wells.
- Palomar Well.
- Auld Valley PS new pumps.
- Changes to the Skymeadows system.
- Changes to the Tomlin system.
- Changes to the pipeline configuration at Grand Avenue, Machado Street, and California Street.
- Alberhill 1 and 2 PSs.
- Pipeline and PRV changes at Ranspot Avenue and Peeler Avenue.
- Add PRV at California Oaks Road and Tarragona Drive.
- 18-inch diameter pipeline from Malaga Road on Lakeview Terrace and PRV.
- Horsethief 2 Reservoir (second reservoir at the same site).
- 20-inch diameter interconnect with Eastern Municipal Water District (EMWD) at Goetz Road.
- Alegria PRV from the 1701 Meadowbrook 1 Zone to the 1601 Rosetta Canyon 1 Zone.

Chapter 6

PLANNING AND EVALUATION CRITERIA

This section presents the planning and evaluation criteria and methodologies for analysis used to evaluate the existing potable water distribution system and its facilities and to size future system improvements.

6.1 Planning Criteria

Planning criteria are established for the evaluation of the Elsinore Valley Municipal Water District's (EVMWD) potable water system. The criteria are developed using the typical planning criteria used in the systems of similar water utilities, local codes, engineering judgment, and commonly accepted industry standards. The "industry standards" are typically ranges of values that are acceptable for the criteria in question and, therefore, are used more as a check to confirm that the values being developed are reasonable. The design criteria and analytical methodologies used to conduct this evaluation are presented in Table 6.1.

Table 6.1 Water System Evaluation Criteria

Description	Value	Units
System Pressures	125	psi
Maximum Pressure - MinDD Conditions	125	psi
Minimum Pressure - PHD Conditions, New Facilities	60	psi
Minimum Pressure - PHD Conditions, Existing Facilities	40	psi
Minimum Pressure - MDD With Fire Flow Conditions	20	psi
Maximum Pipeline Velocity		
Transmission Pipelines (≥ 12-inch diameter) - PHD Conditions	6	fps
Transmission Pipelines in 1434 Loop Zone Between Reservoirs - PHD Conditions	3	fps
Distribution Pipelines (<12-Inch Diameter) - PHD Conditions	4	fps
Existing Pipelines Under MDD Plus Fire Flow Conditions	10	fps
Pumping Station Suction Piping - MDD Conditions	8	fps

Description	Value	Units
Maximum Head Loss		
Transmission Pipelines (≥ 12-Inch Diameter) - PHD Conditions	3	ft/1,000 ft
Distribution Pipelines (<12-Inch Diameter) - PHD Conditions	15	ft/1,000 ft
Fire Fighting Capabilities		
Parks (2 Hours)	1,000	gpm
Single Family Residential (2 DU/Acre or Less, 2 Hours)	1,000	gpm
Single Family Residential (Greater Than 2 DU/Acre, 2 Hours)	1,250	gpm
Medium Residential (2 Hours)	1,500	gpm
Multi-Family Residential (2 Hours)	2,500	gpm
Commercial (2 Hours)	2,500	gpm
Schools and Public Facilities (4 Hours)	4,000	gpm
Industrial (3 Hours)	3,500	gpm
Reservoir Storage Volume		
Operational Storage Volume	30 Percent of MDD	MG
Fire Fighting	Highest Fire Flow Requirement per Zone Under MDD	MG
Emergency Storage Volume	100 Percent of MDD	MG
PS Capacity		
By PZ, For Zones With Gravity Storage	MDD With Firm Transfer/Booster Capacity Between Zones	
By PZ, For Zones Without Gravity Storage	PHD With Firm Transfer/Booster Capacity Between Zones and PHD+Fire With Total Transfer/Booster Capacity Between Zones	
Supply Capacity		
Entire System	Entire System MDD With Largest Source Out of Service	
By PZ	MDD With Firm Transfer/Booster Capacity Between Zones	

Notes:
Abbreviations: DU - dwelling units, fps - feet per second, gpm - gallons per minute, MDD - maximum day demand, MG - million gallons, MinDD - minimum day demand; PHD - peak hour demand, PS - pump station; psi - pounds per square inch'
PZ - pressure zone.

6.1.1 System Pressures

Minimum system pressures are evaluated under two different scenarios: PHD and MDD plus fire flow. The minimum pressure criterion for normal PHD conditions is 60 psi, however, the minimum pressure criteria for existing pipelines for normal PHD conditions is 40 psi. The minimum pressure criterion under MDD with fire flow conditions is 20 psi. The pressure analysis is limited to demand nodes in the hydraulic model, because only locations with service connections need to meet such pressure requirements per California regulations. Lower pressures are acceptable for junctions at water system facilities and on transmission pipelines that have no service demands; however, no pressure shall be less than 5 psi except for short lengths near reservoir inlets and outlets where the water main is on premises owned, leased, or controlled by the EVMWD per California regulations.

The hydraulic analysis is performed using the calibrated 24-hour extended period simulation (EPS) model developed for EVMWD, which is based on EVMWD's geographic information system (GIS), water demands, operating conditions, and facility controls.

6.1.2 Pipeline Velocities and Head Losses

Pipeline velocities are evaluated with the hydraulic model and are tailored for the type of pipeline as listed in Table 6.1. These criteria are intended to minimize head loss and optimize pipeline sizing.

The maximum velocity for distribution system pipelines (less than 12-inch diameter) under PHD conditions is 4 fps provided that the system pressures are sufficient. Maximum velocities under PHD with fire flow conditions should not exceed 10 fps to minimize potential for system hydraulic surge and to limit pressure drops during fires. This criterion does not apply to flow in fire hydrant laterals.

The design velocity for transmission mains should consider energy requirements and pipeline length to determine the optimal diameter rather than use a fixed velocity criterion. The maximum velocity for transmission pipelines (greater than or equal to 12-inch in diameter) shall be 6 fps under PHD conditions. One special condition for maximum velocity of transmission pipelines is the pipelines in the 1434 (Loop) Zone. In the Loop Zone, due to the long distances between the storage reservoirs with the same elevation, the dynamic head loss needs to be minimized to allow for reservoirs to be able to fill and balance. For this reason, transmission pipelines between the reservoirs in the 1434 Loop Zone have a maximum velocity of 3 fps under MDD conditions.

Suction pipelines at booster stations, should not exceed 8 fps under MDD conditions based on trade-offs between pipeline cost and energy usage.

Maximum head loss criteria are 15 feet per 1,000 feet of pipe for distribution system pipelines (less than 12-inch diameter) and 3 feet per 1,000 feet of pipes for transmission pipelines (greater or equal to 12-inch diameter).

6.1.3 Storage

The total storage required for a water system is evaluated in three parts: 1) storage for operational use, 2) storage for firefighting, and 3) storage for emergencies. These three components are determined by PZ in order to evaluate the ability of the water system to meet the storage criteria on both an inter-zone basis as well as a system-wide basis. These three storage components are discussed in more detail below.

6.1.3.1 Operational Storage

Operational storage is defined as the quantity of water that is required to balance daily fluctuations in demand and water production. It is necessary to coordinate the water source production rates and the available storage capacity in a water system to provide a continuous treated water supply to the system. Water systems are usually designed to supply the average demand on the maximum day and use reservoir storage to supply water for peak hour flows that typically occur in the mornings and late afternoons. This operational storage is replenished during off-peak hours that typically occur during nighttime, when the demand is less. The American Water Works Association (AWWA) recommends that an operational supply volume ranges from one-quarter to one-third of the demand experienced during one maximum day. It is recommended that each PZ have an operational storage of at least 30 percent of MDD.

6.1.3.2 Fire Flow Storage and Criteria

The fire flow requirements for the various land use types are listed in Table 6.1. Fire flow storage is determined based on the highest fire flow requirement of each PZ multiplied by the corresponding duration. The fire flow duration is dependent on the fire flow criteria and is based on requirement of Riverside County Fire Department, fire code, and Carollo Engineer, Inc.'s (Carollo's) experience on similar systems. For flows less than or equal to 2,500 gpm, the fire flow storage volume is based on a duration of 2 hours. Similarly, for flows of 3,500 gpm a duration of 3 hours is used, and for flows of 4,000 gpm a duration of 4 hours is used.

For example, if the highest fire flow of a zone is 4,000 gpm for a duration of 4 hours, the required fire flow storage for that zone is 0.96 MG. For analysis purposes, it is assumed that there will only be one fire per PZ at any one time.

6.1.3.3 Emergency Storage

The volume of water that is needed during an emergency is usually based on the estimated amount of time expected to lapse before the emergency is corrected.

Possible emergencies include earthquakes, water contamination, several simultaneous fires, unplanned electrical outages, pipeline ruptures, or other unplanned events. The occurrence and magnitude of emergencies are difficult to predict; therefore, the emergency storage criterion is based on past experience and engineering judgment. Typically, emergency storage is set as a percentage of MDD. However, this percentage needs to be based on the water system layout and facilities. Water systems that have only one source of supply are more vulnerable in emergencies such as an earthquake or supply outage than water systems with a large number of groundwater wells that are located throughout the distribution system. For the purposes of the Water System Master Plan (WSMP), it is assumed that the emergency storage criterion for EVMWD's system is 1.0 times MDD.

6.1.4 Pumping Capacity

EVMWD's water distribution system is evaluated for the adequacy of booster pumping capacity under existing and build-out demand conditions. For PZs within EVMWD's service area with reservoir storage, there should be adequate booster pumping capacity to provide firm pumping capacity sufficient to meet MDD. Firm capacity is defined as the combined pump capacity at the PS with the largest booster pump out of service.

For zones without storage, there should be adequate booster pumping capacity to provide firm capacity to meet PHD or total capacity sufficient to meet PHD plus the highest fire flow demand. Total capacity is defined as the combined capacity at the PS with all pumps operational.

6.1.5 Supply Capacity

The water supply reliability is evaluated for the entire system and on a PZ basis using a spreadsheet model that calculates the water supply balance by PZ, including zone transfers. The firm capacity, all sources with the exception of the largest source, is used as the available supply for most scenarios. Ideally, the system demands should be met under MDD conditions with the largest source out of service. The hydraulic model is used to verify that 1) the system can move water between zones according to the required transfers calculated using the spreadsheet model, 2) system pressure criteria are met, and 3) that transfer requirements are met using the firm capacity of booster stations. Additionally, the hydraulic model is used to confirm system operations under various operational conditions, such as wet summers when groundwater supplies are not used.

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Chapter 7

EXISTING SYSTEM ANALYSIS

This chapter describes the evaluation of the water distribution system under existing conditions. Hydraulic deficiencies are based on evaluations and infrastructure improvements are recommended to address the deficiencies. The following information is presented in this chapter for existing demand conditions:

- A description of the criteria used for the distribution system evaluation.
- An evaluation of the distribution system for system pressures under different demand conditions.
- An evaluation of the distribution system for residual system pressures under fire flow conditions.
- An evaluation of the adequacy of the storage and pumping facilities within Elsinore Valley Municipal Water District's (EVMWD's) service area.
- Supply analyses, both system-wide and by pressure zone (PZ).

The evaluation criteria and analytical methodologies used to conduct this evaluation are presented in detail in Chapter 6 of this Water System Master Plan (WSMP). Recommendations are made for each of these evaluations, which are combined in a summary of recommendations and proposed improvements at the end of this section.

7.1 Existing System Distribution Analysis

The distribution system analysis consists of evaluations conducted in sequence. That is, improvements identified in the existing system evaluation are included in the future system evaluation and improvements identified in the second evaluation are included in the third evaluation, etc. The phasing of the recommended improvements is explained further in the Capital Improvement Plan (CIP), presented in Chapter 9.

The EVMWD hydraulic model is used to evaluate the system pressures for the following scenarios:

- Meet peak hour demand (PHD) while maintaining a minimum pressure of 40 pounds per square inch (psi) at all demand junctions with tanks starting at 70 percent full and normal pumping operations for existing developments. Although new developments were not analyzed in this section it is important to note that all new developments need to have a minimum pressure of 60 psi.

- Meet minimum day demand (MinDD) while not exceeding a maximum pressure of 125 psi with tanks starting at 70 percent full and normal pumping operation.
- Meet PHD while maintaining a maximum velocity of 6 feet per second (fps) on transmission (12-inch diameter and greater) pipelines and 4 fps on distribution (smaller than 12-inch diameter) pipelines. Transmission pipelines in the 1434 Zone were evaluated with a maximum velocity of 3 fps to minimize head loss between the tanks. Tanks started at 70 percent full and pumps were operating normally.
- Meet maximum day demand (MDD) and fire flow while maintaining a minimum residual pressure of 20 psi at all demand junctions with tanks starting at 70 percent full and pumps operating normally.

7.1.1 Minimum Pressure During PHD

The model was run for 24 hours under MDD conditions using the diurnal pattern which contained the PHD factor. The water level in all reservoirs was initialized at 70 percent full and all pumps were set to operate normally. The minimum pressure criterion under PHD conditions is 40 psi. This criterion only applies to locations where there are service connections and does not apply to junctions on transmission mains or junctions near water facilities (such as reservoirs, wells, etc.) because there are no customer demands at these locations.

The evaluation was performed for nearly 18,100 demand junctions (out of approximately 43,500 model junctions total). The hydraulic simulation identified 442 junctions in several areas within the system with pressures below 40 psi. All junctions with pressures below 40 psi are shown on Figure 7.1. Thirty-nine low-pressure regions were identified and analyzed to assess the cause of the deficiency and to determine any necessary recommendations. Table 7.1 shows the severity of the pressure deficiency in each of the low-pressure areas throughout the system. As shown, there are 17 pipeline CIP projects recommended for these 39 low pressure areas, with a combined length of 4.8 miles ranging in diameter from 8 to 16 inches.

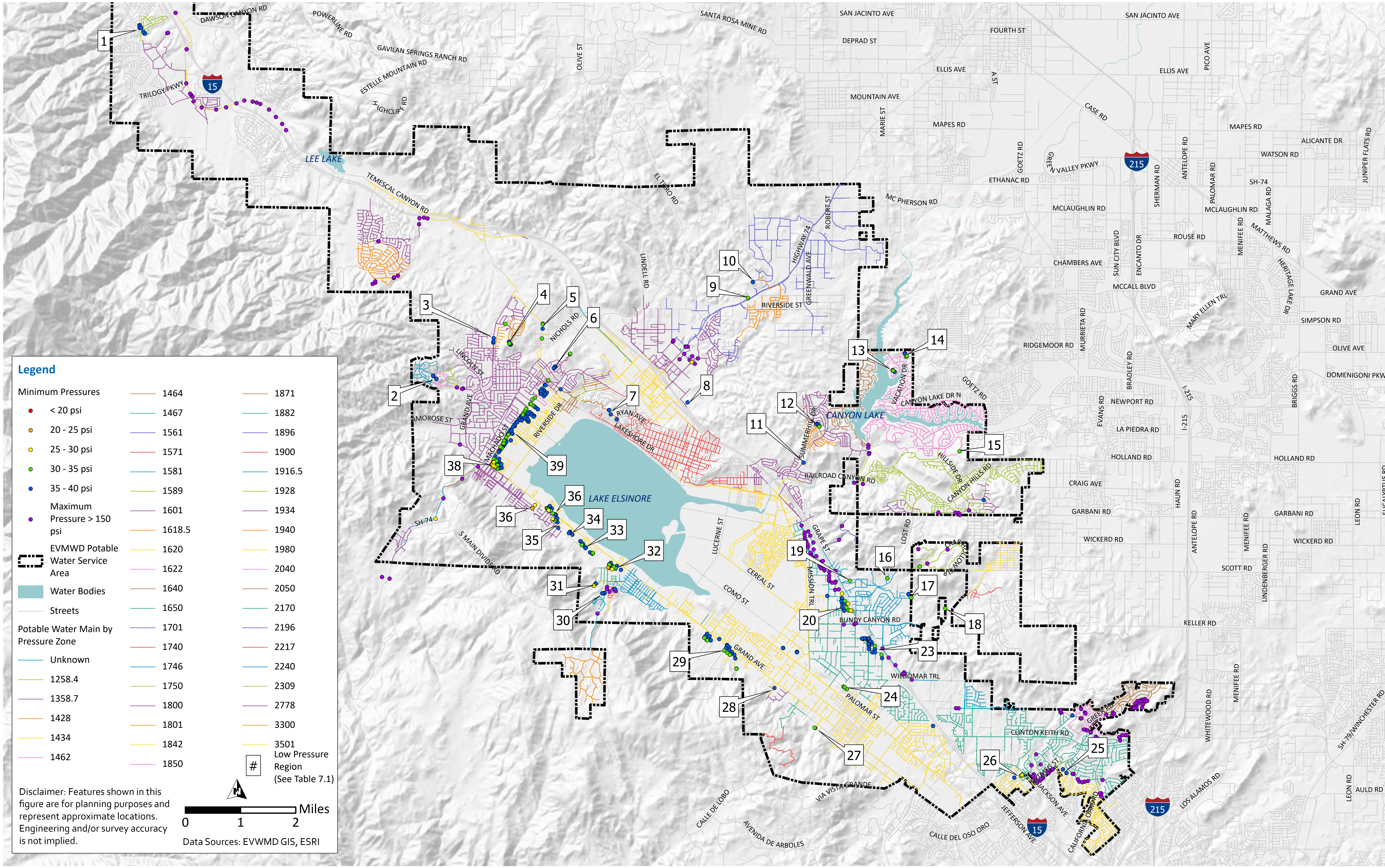

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Table 7.1 Existing Low Pressure Areas

Area	Minimum Pressure (psi)	Recommendation	Pipe Length (feet)	Diameter (feet)	New CIP-ID
1	>39	None.	N/A	N/A	Slightly deficient. No project.
2	35-40	Build parallel pipeline to La Laguna 2 Zone on Falling Leaf Drive.	400	12	Project PW-LP1.
3	35-40	Build parallel pipeline from 1800 Rice Canyon Alberhill 2 Zone.	1,000	12	Project PW-LP2.
4	35-40	None.	N/A	N/A	Slightly deficient. No project.
5	34-40	Rezone into 1601 Lucerne Alberhill 1. Switch zone when pipe for Dev 375 is built.	N/A	N/A	Elevation limited. No project.
6	33-40	Recommend individual user to install private pump if there are pressure complaints.	N/A	N/A	Elevation limited. No project.
7	37-40	Confirm Amie Sustaining PS head is set to 1,650 feet.	N/A	N/A	Adjust settings.
8	>38	Rezone with new 1601 developments.	N/A	N/A	Slightly deficient. No project.
9	30-35	Connect to 1896 Meadowbrook 2.	40	8	Project PW-LP3.
10	>39	Recommend individual user with deficiency to install private pump.	N/A	N/A	Slightly deficient. No project.
11	>38	None. Irrigation use and no complaints.	N/A	N/A	Slightly deficient. No project.
12	34-40	Connect to 1940 Tuscany 2.	40	12	Project PW-LP4.
13	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Some users already have pumps.
14	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Some users already have pumps.

Area	Minimum Pressure (psi)	Recommendation	Pipe Length (feet)	Diameter (feet)	Recommendation
15	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Elevation limited. No project.
16	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Elevation limited. No project.
17	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Elevation limited. No project.
18	30-35	Recommend individual user with deficiency to install private pump.	N/A	N/A	Elevation limited. No project.
19	30	Increase PRV pressure setting from 55 psi to 65 psi.	N/A	N/A	Adjust settings.
20	25-30	Build parallel pipe from 1561 Orange Bundy.	1,800	8	Project PW-LP5.
21	>38	Recommend individual user with deficiency to install private pump.	N/A	N/A	Slightly deficient. No project.
22	>38	Recommend individual user with deficiency to install private pump.	N/A	N/A	Slightly deficient. No project.
23	30-35	Build parallel pipe from 1561 Orange Bundy.	5,700	8	Project PW-LP6.
24	25-30	Increase Cielo Vista PS Head from 1,480 feet to a minimum of 1,500 feet.	N/A	N/A	Adjust settings.
25	>38	Recommend individual user with deficiency to install private pump.	N/A	N/A	Slightly deficient. No project.
26	>39	Build parallel pipe from 1601 Inland Valley.	3,800	12	Project PW-LP7.
27	30-35	Recommend individual user with deficiency to install private pump. Connect to Future 1882 Stage Ranch 1.	N/A	N/A	Elevation limited. No project.
28	35-40	Build parallel pipe from 1601 Woodmoor.	200	8	Project PW-LP8.
29	30-35	Connect to Future 1620 Adelfa.	4,100	12	Project PW-LP16.

Area	Minimum Pressure (psi)	Recommendation	Pipe Length (feet)	Diameter (feet)	Recommendation
30	35-40	Connect to 1916.5 Encina.	40	8	Project PW-LP17.
31	30-35	Connect to Future 1916 Encina with Dev 405. If there are pressure complaints beforehand, recommend individual user to install private pump.	N/A	N/A	Elevation limited. No project.
32	30-35	Build parallel pipe from 1650 Adelfa.	3,000	12	Project PW-LP9.
33	30-35	Connect to 1601 Ortega. If there are pressure complaints beforehand, recommend individual user to install private pump.	3,600	12	Project PW-LP18.
34	35-40	Connect to 1601 Ortega. Install individual pressure regulators on 40 services.	1,300	8	Project PW-LP10.
35	29-35	Connect to 1601 Ortega. Move VA-6127 and adjust zone breaks. Install individual pressure regulators on 40 services.	40	8	Project PW-LP11.
36	25-30	Build parallel pipe from 1601 Ortega and add PRV to make 1501 zone.	600	16	Project PW-LP12.
37	25-30	Connect to 1601 Ortega. Adjust zone breaks. Build some short pipeline connections.	100	8	Project PW-LP13.
38	25-30	Connect to 1601 Ortega. Adjust zone breaks. Build some short pipeline connections. Build parallel 1434 Zone transmission.	1,500	8	Project PW-LP14.
39	35-40	Connect to 1601 Lucerne Alberhill 1. Build parallel 1434 Zone transmission.	5,500	16	Project PW-LP15.

Notes:
Abbreviations: N/A - not applicable; PRV - pressure reducing valve; PS - pump station.

After careful review of these junctions, it was observed that the pressure deficiencies fall into one or more of the following categories:

Slightly Deficient - Over half of the deficient junctions presented on Figure 7.1 never drop below 35 psi under PHD. The temporary small drop below the requirement on the highest demand hour for the year is not significant enough to justify existing infrastructure improvements. Additionally, many of these deficiencies were addressed when fire flow pipeline improvements were implemented. Before growth can occur in these areas it was recommended that developers and or EVMWD make necessary improvements to meet the 40 psi minimum pressure requirements. No new specific projects were identified in these areas and thus no specific recommendations were made.

Elevation Limited - Low pressures in some locations are due to high ground elevations relative to the hydraulic grade line (HGL) of the PZ, resulting in low static pressures. For the cases where there are existing customers, and there are no current complaints, it was recommended to take no action at this time. If complaints did become an issue, existing customers should install individual pumps. Areas where low pressures are affecting many homes were addressed with a CIP project. Before growth can occur in these areas it is recommended that developers and or EVMWD make necessary improvements to meet the 40 psi minimum pressure requirements.

Table 7.1 identifies the recommendation or exception for not having a recommendation for each of the 39 low pressure areas.

Low pressure deficiencies were addressed using the model to plan and size projects to supply the areas from a higher PZ. The projects are listed in Table 7.1 and shown on Figure 7.2. Higher focused area maps for these projects are included on Figure 7.3 through Figure 7.7.Separate CIP project maps are shown in Chapter 9.

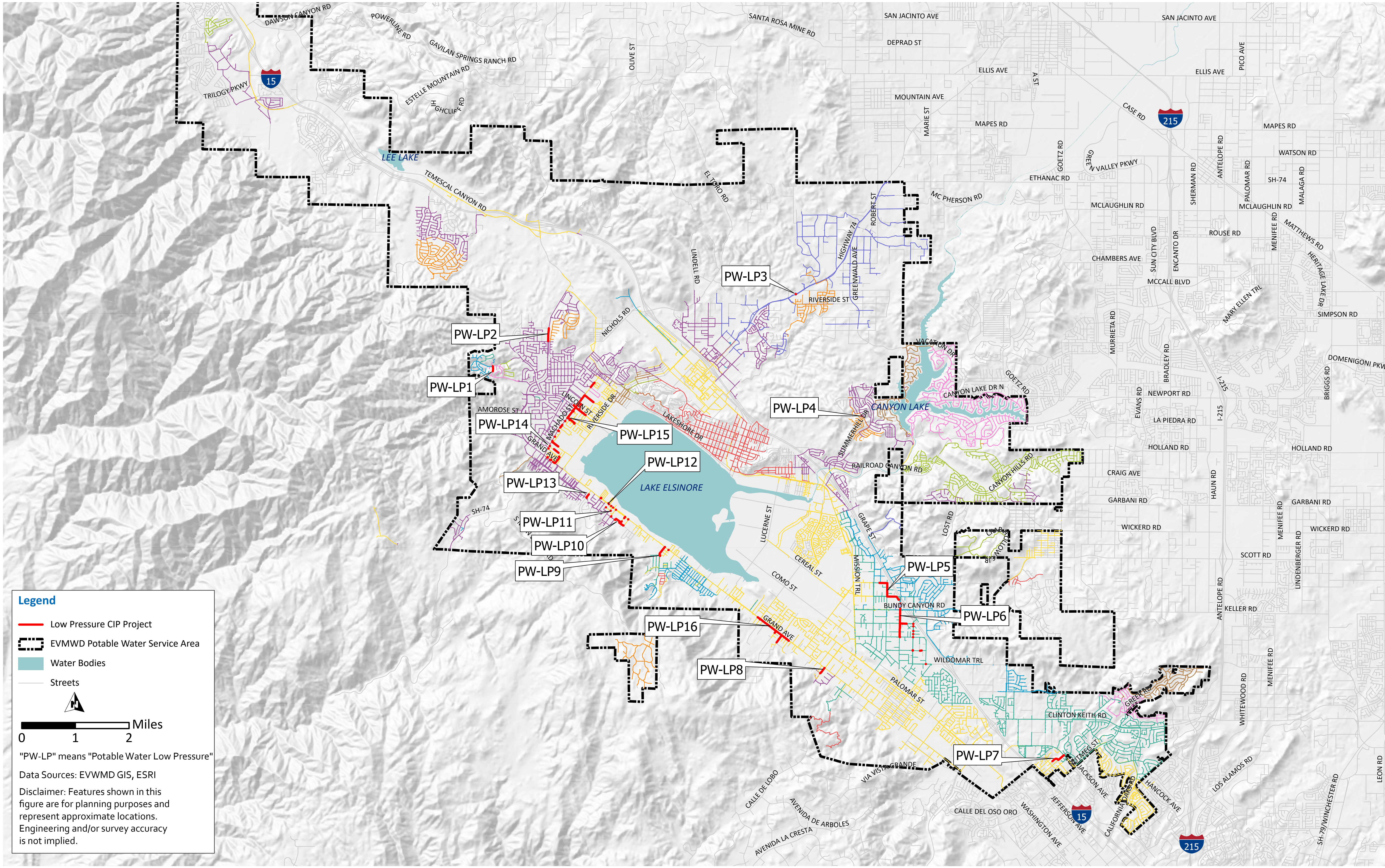

Figure 7.2 Low Pressure Improvements

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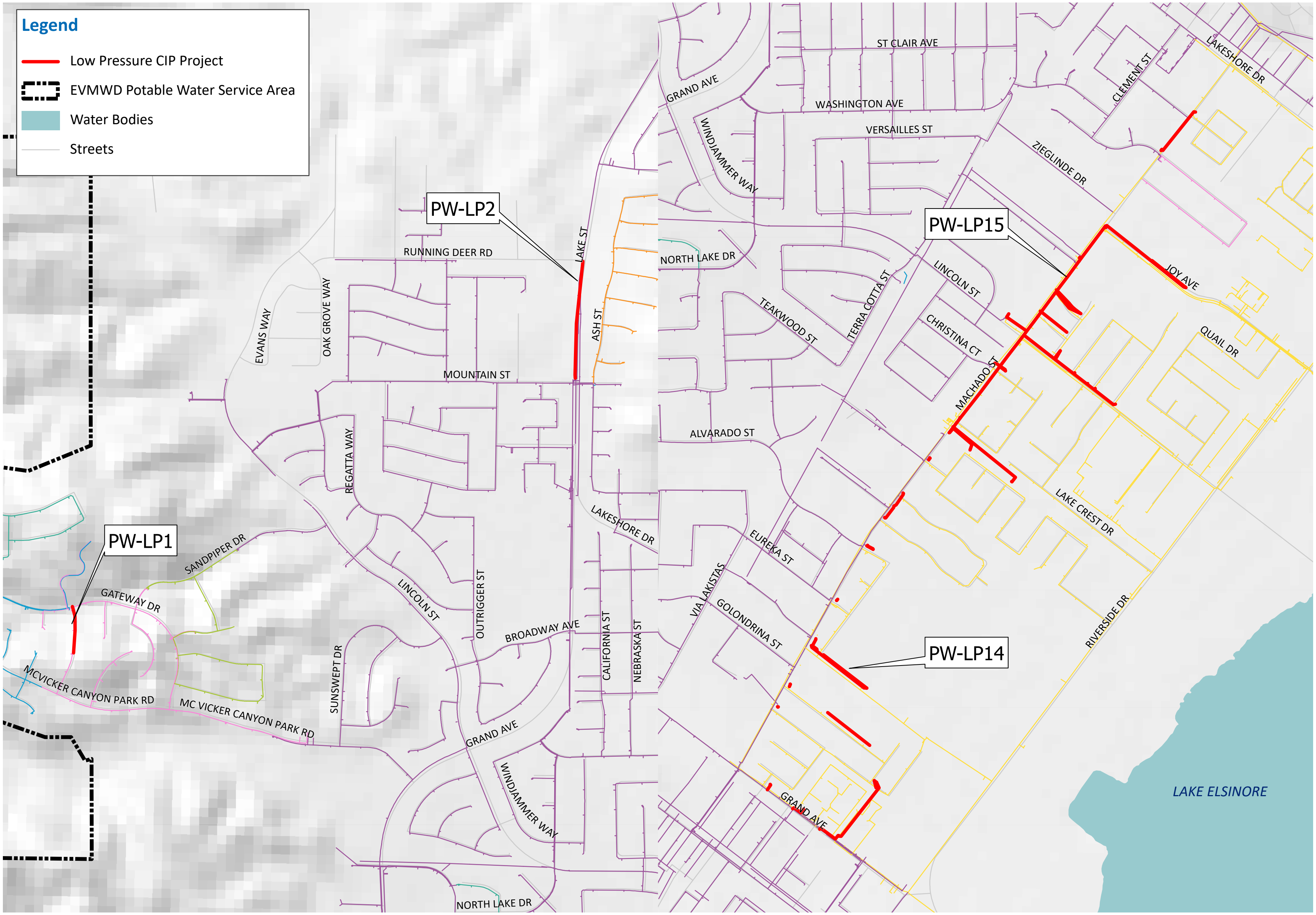

Figure 7.3 Low Pressure Improvement Projects 1, 2, 14, and 15 Detail Map

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Figure 7.4 Low Pressure Improvement Project 3 Detail Map

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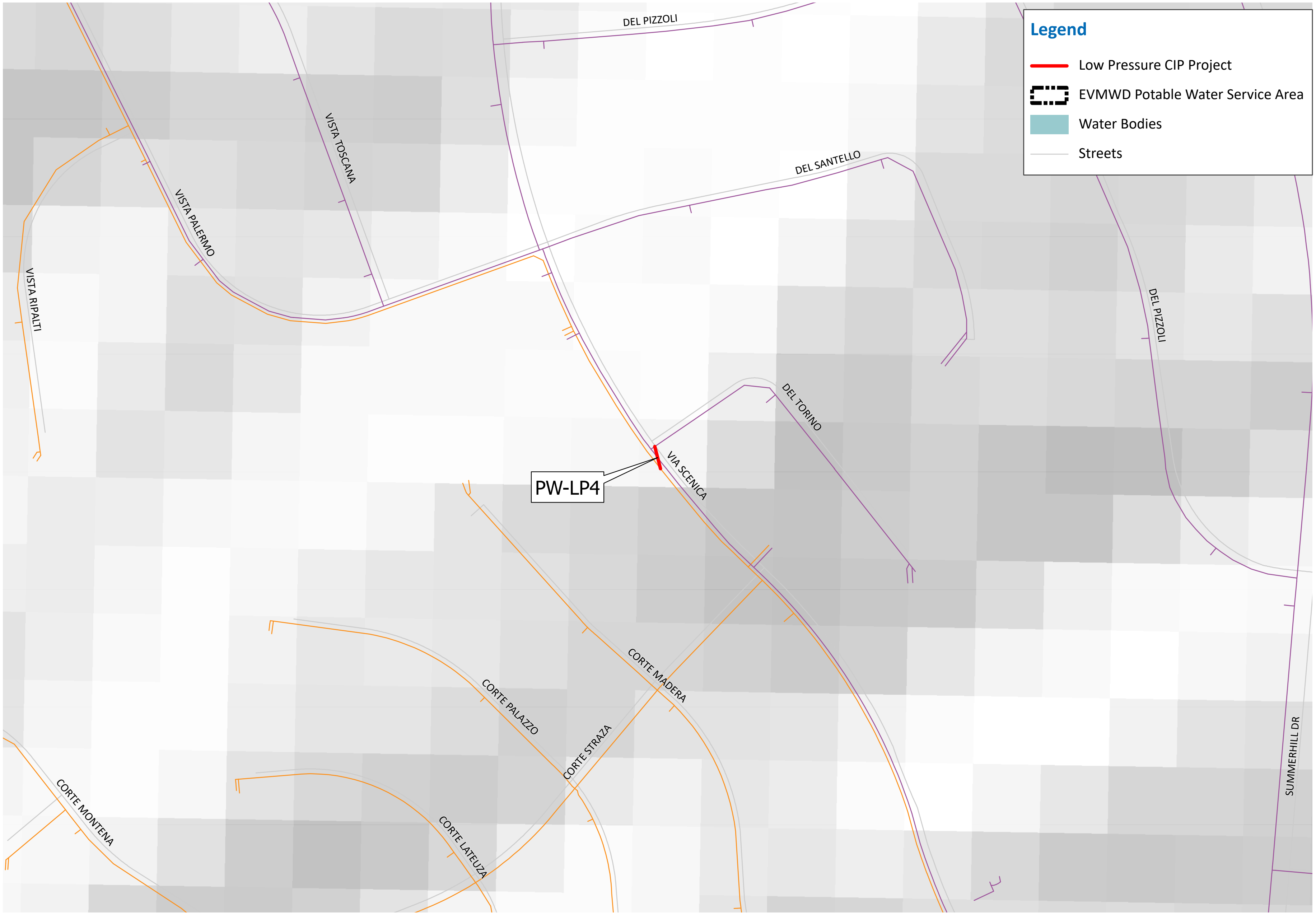

Figure 7.5 Low Pressure Improvement Project 4 Detail Map

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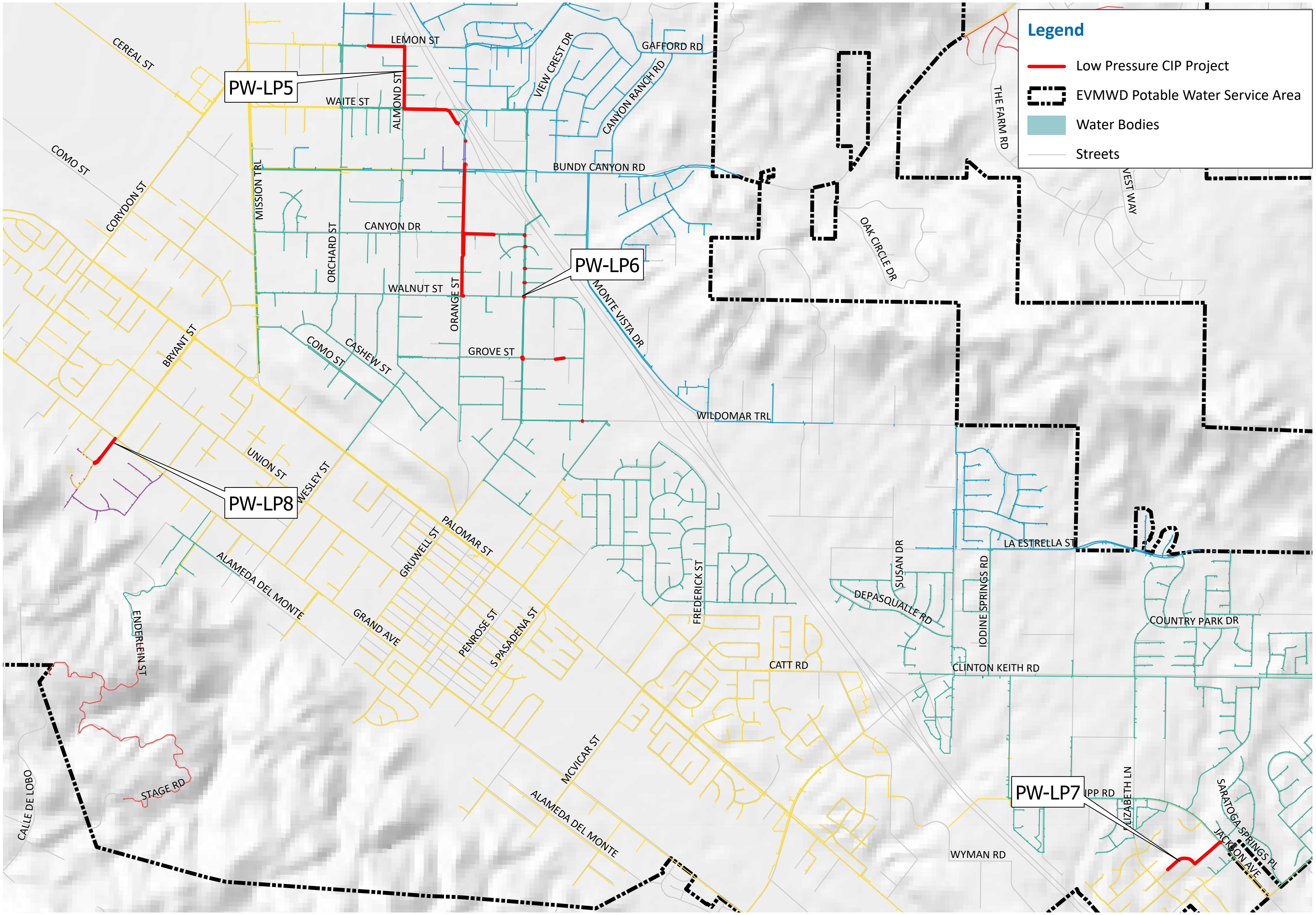

Figure 7.6 Low Pressure Improvement Projects 5, 6, 7, and 8 Detail Map

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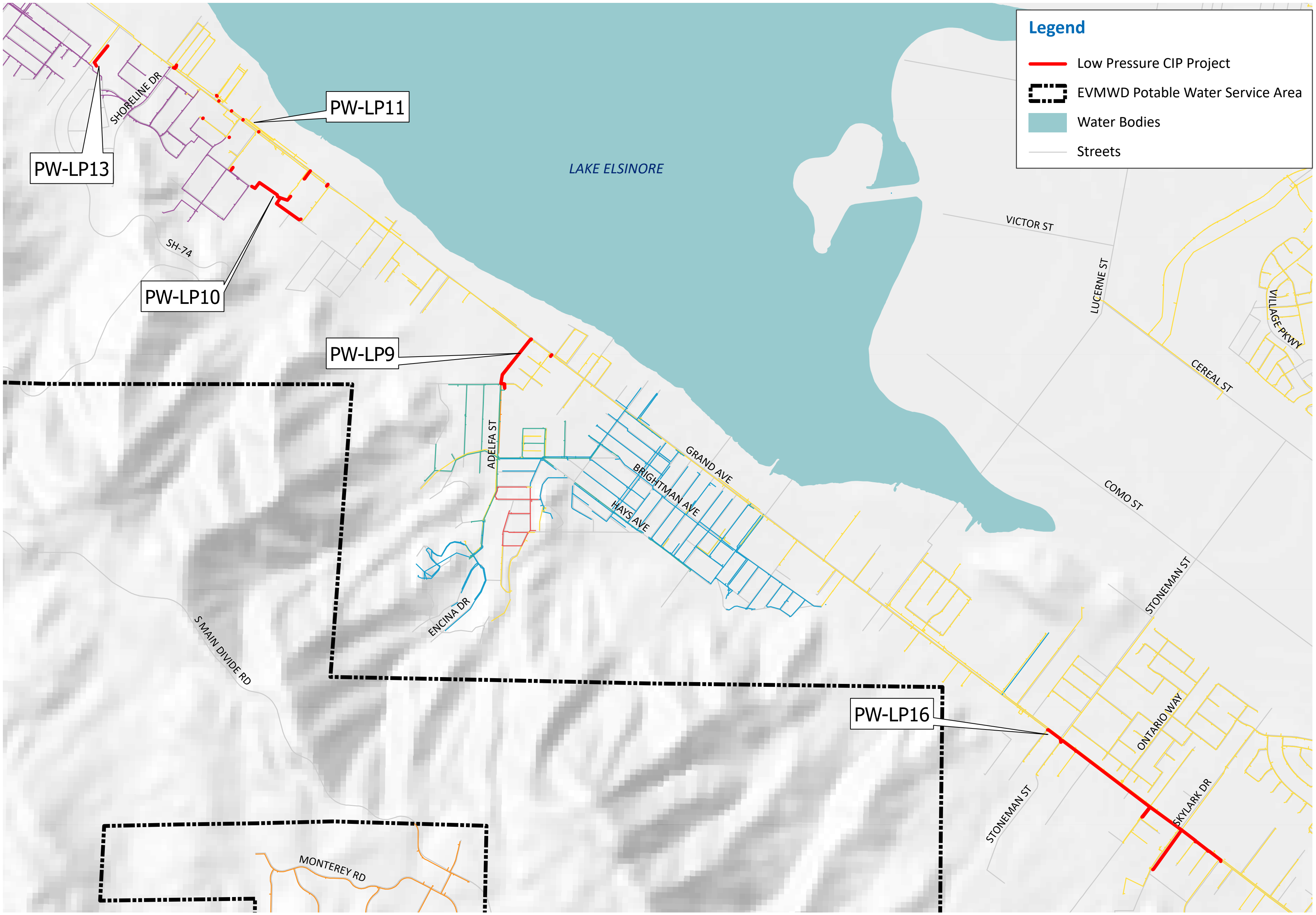

Figure 7.7 Low Pressure Improvement Projects 9, 10, 11, 13, and 16 Detail Map

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7.1.2 Maximum Pressure During MinDD

The hydraulic model was also used to identify areas where the maximum pressure exceeds 125 psi. This evaluation was conducted under MinDD conditions. High pressures at these demand junctions generally varied between 125 psi and 200 psi with some pressures reaching as high as 250 psi along the Temescal Valley Pipeline (TVP). These high-pressure areas are depicted on Figure 7.8. High pressures were mostly found in the lowest portions of the PZs where static pressures increased due to lower ground elevations. High pressures can cause leaks in the distribution system as well as an increased risk of pipe breaks.

These high pressure areas can in some cases be remedied by creating a new PZ with a lower HGL than the HGL of the parent PZ. Based on discussions with the EVMWD's Operations staff, it was inferred that these high pressures did not affect normal distribution system operations. It was assumed that individual pressure regulating valves were installed in this area to reduce pressures to 80 psi as required per the Uniform Plumbing Code. Future developments in this part of the system should also include the installation of pressure regulators at the meter connections.

7.1.3 Maximum Velocity During PHD

The hydraulic model was also used to identify areas where the maximum velocity exceeds 6 fps in transmission mains or 4 fps in distribution mains under PHD conditions. The transmission mains in the 1434 Zone had a special maximum velocity criterion of 3 fps to minimize head losses between the tanks. These criteria are based on head loss and energy consumption considerations.

This evaluation was conducted on a 24-hour simulation of under MDD conditions that include the PHD. The purpose of checking a system for high velocity pipelines is to assess the location of hydraulic bottlenecks that increase system head loss. These bottlenecks prevent water from easily flowing from one portion of a zone to another. In many cases, these high velocity pipelines did not incur much head loss and did not significantly affect system performance. Figure 7.9 shows the high velocity distribution and transmission pipelines throughout the system.

In the entire model, only 74 transmission pipeline segments exceed 6 fps (out of 11,340 segments). The highest pipeline velocity was 14 fps, but the total head loss in that pipeline was only 1 foot because the pipeline was less than 1 foot long. In the 1434 Zone, where there is a desire to minimize head loss in order to allow for balancing of flow between storage reservoirs, 254 out of 4,243 transmission pipeline segments exceed a head loss of 3 fps. Some of these are major transmission pipelines, therefore, recommendations are made to address some of these sections. For the distribution pipelines, 269 out of 33,538 have velocities above 4 fps.

Recommendations are only made to address pipelines with high velocities where they impact system pressure, ability to convey water through the system, or at such a high level that there are other concerns with the high velocities. There are three sections of transmission pipelines that have high velocities that are recommended for parallel or replacement:

- The 30-inch and 24-inch diameter transmission main in the 1434 Zone, from the intersection of Lake Street and Temescal Canyon Road, running down Nichols Road, Terra Cotta Road, Lash Street, Shrier Drive, Strickland Avenue, Turnbull Avenue, and Baker Street to the intersection of Highway 74 to the Temescal Wash, has a maximum velocity of 4 fps. This pipeline length of approximately 6 miles limits the amount of water that can enter the system from the TVP. This velocity will be further exacerbated in future conditions due to growth and the installation of the Temescal Valley PS to increase supply from the TVP. A recommendation to parallel this pipeline is made as part of the future system recommendations (see Chapter 8) to account for growth.
- The 14-inch diameter pipeline on the west side of Lake Elsinore in the 1434 Zone, in Grand Avenue, from Riverside Drive to Windward Way, shows a maximum velocity of 3.4 fps. This pipeline is approximately 1 mile in length. This velocity is above the 1434 Zone transmission capacity. A replacement pipeline is recommended as part of the future system recommendations (see Chapter 8), with the sizing based on growth.
- The 12-inch diameter suction and discharge pipelines to and from Rice Canyon PS have velocities as high as 9.2 fps. This pipeline in Orange Grove Way from Lake Street to Palm View Street and in Palm View Street from Orange Grove Way to Notnil Way require upsizing. The total length of this pipeline is 1,300 feet. A parallel 16-inch diameter pipeline is recommended to support this PS, with the sizing based on growth.

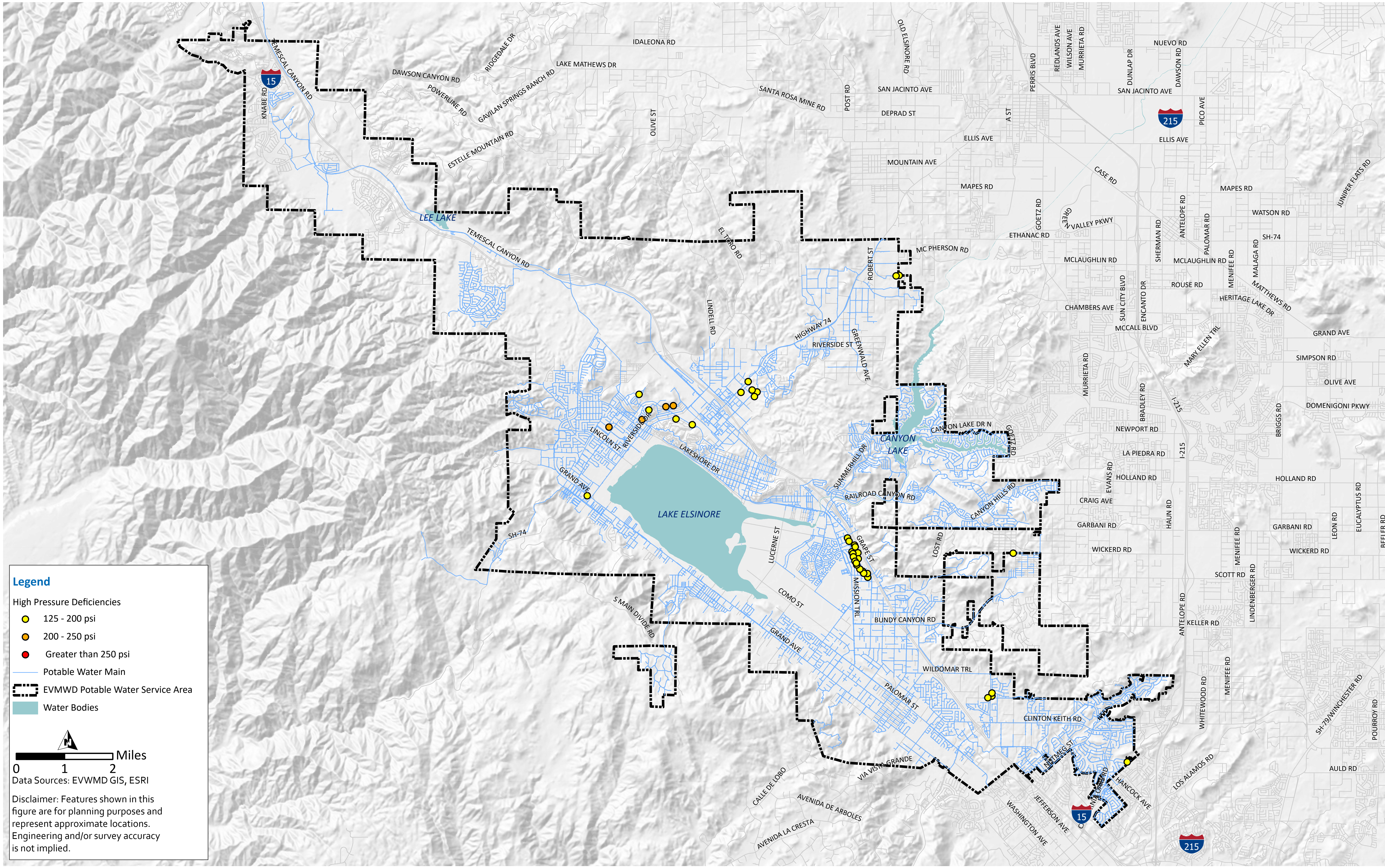

Figure 7.8 Existing High Pressure Deficiencies

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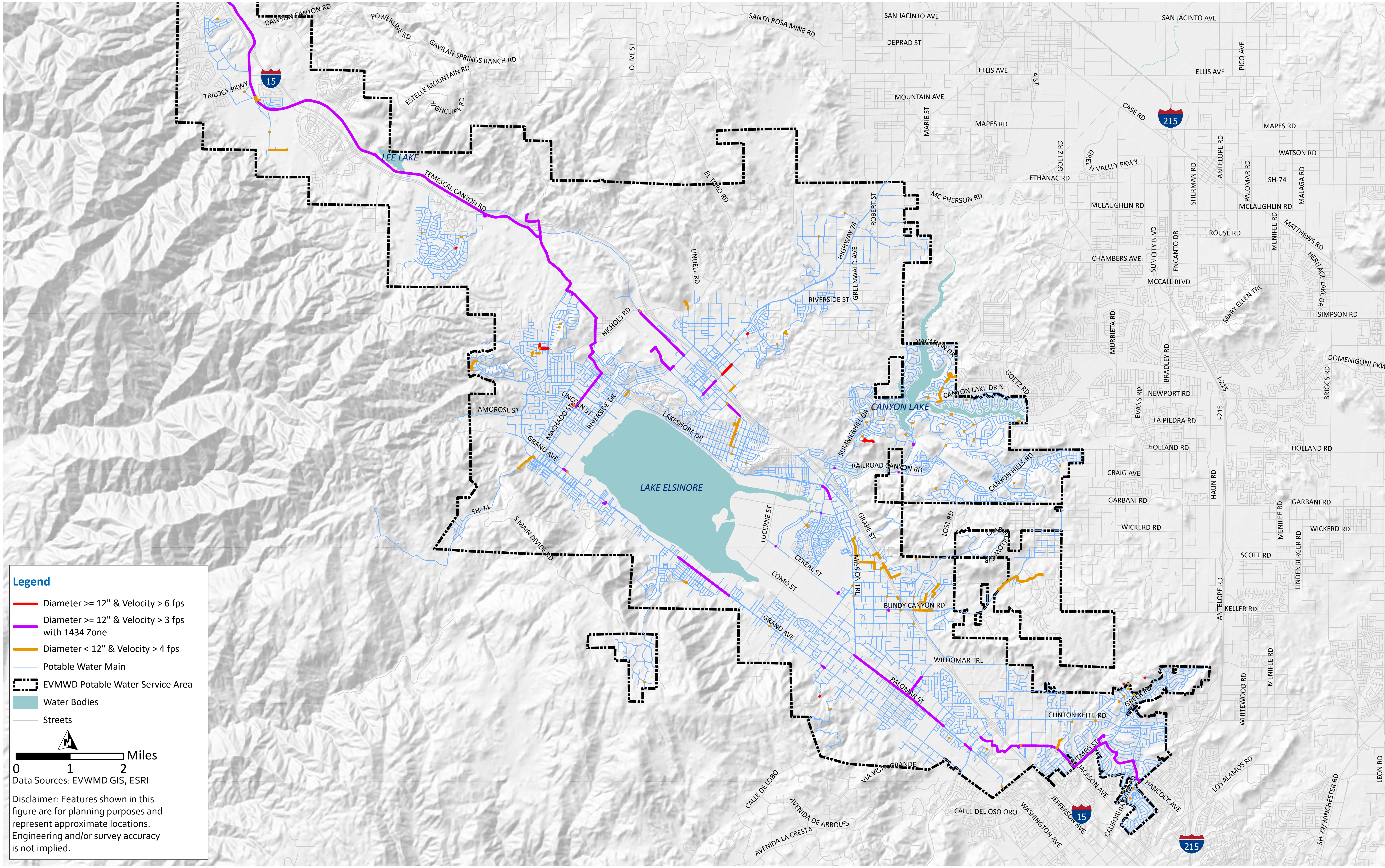

Figure 7.9 Existing Velocity Deficiencies

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7.1.4 Residual Pressure With MDD Plus Fire Flow

The hydraulic model was used to evaluate the impact of fire flows on the distribution system. For this analysis, the InfoWater Pro fire flow simulation was used, which can systematically check the available fire flow at each hydrant on a system-wide basis. Required fire flows were assigned to each fire hydrant junction based on the existing land use category of adjacent parcel/parcels within the coverage of the hydrant, as shown on Figure 2.2. This figure doesn't show all of EVMWD's hydrants only the hydrants nearest the model junctions. The fire flow requirements varied by land use type and range from 1,000 gallons per minute (gpm) to 4,000 gpm as listed in Table 7.2. Figure 7.10 shows the allocated fire flow requirements throughout the system. In cases where there were multiple land uses served by a hydrant, the most stringent required fire flow from Table 7.2 was applied to the hydrant.

Table 7.2 Required Fire Flow Based on Land Use Type

Land Use Type	Required Fire Flow (gpm)	Duration (hours)
Industrial (IND)	4,000	4
Public/Institutional (PUB)	3,500	3
Commercial (COM)	2,500	2
High-Density Residential (HDR)	2,500	2
Medium-Density Residential	1,500	2
Low-Density Residential (LDR)	1,250	2
Park	1,000	2
Rural	1,000	2

Each of the hydrants in the service area was correlated to a junction in the model that was designated as a hydrant. The hydrant junction was then assigned the highest fire flow demand for all the parcels nearest to that junction. Using the MDD as the base system demand, the model then computed the residual pressure at the required fire flow for each hydrant junction. Demands that cannot supply MDD plus fire flow at a minimum residual pressure of 20 psi were identified as deficient.

As shown in Table 7.2, some of the land use categories had a fire flow requirement that is 2,500 gpm or greater. These high fire flow demands typically cannot be met by a single hydrant. To simulate the use of multiple hydrants, the multi-fire flow modeling tool was used, which evaluates system performance under the condition when multiple fire hydrants are opened simultaneously. Only adjacent hydrants that are within 400 feet of the hydrant in question were used for the multi-fire flow simulation. If the residual pressure requirements are met while using the multi-fire flow tool, then no fire flow deficiency exists.

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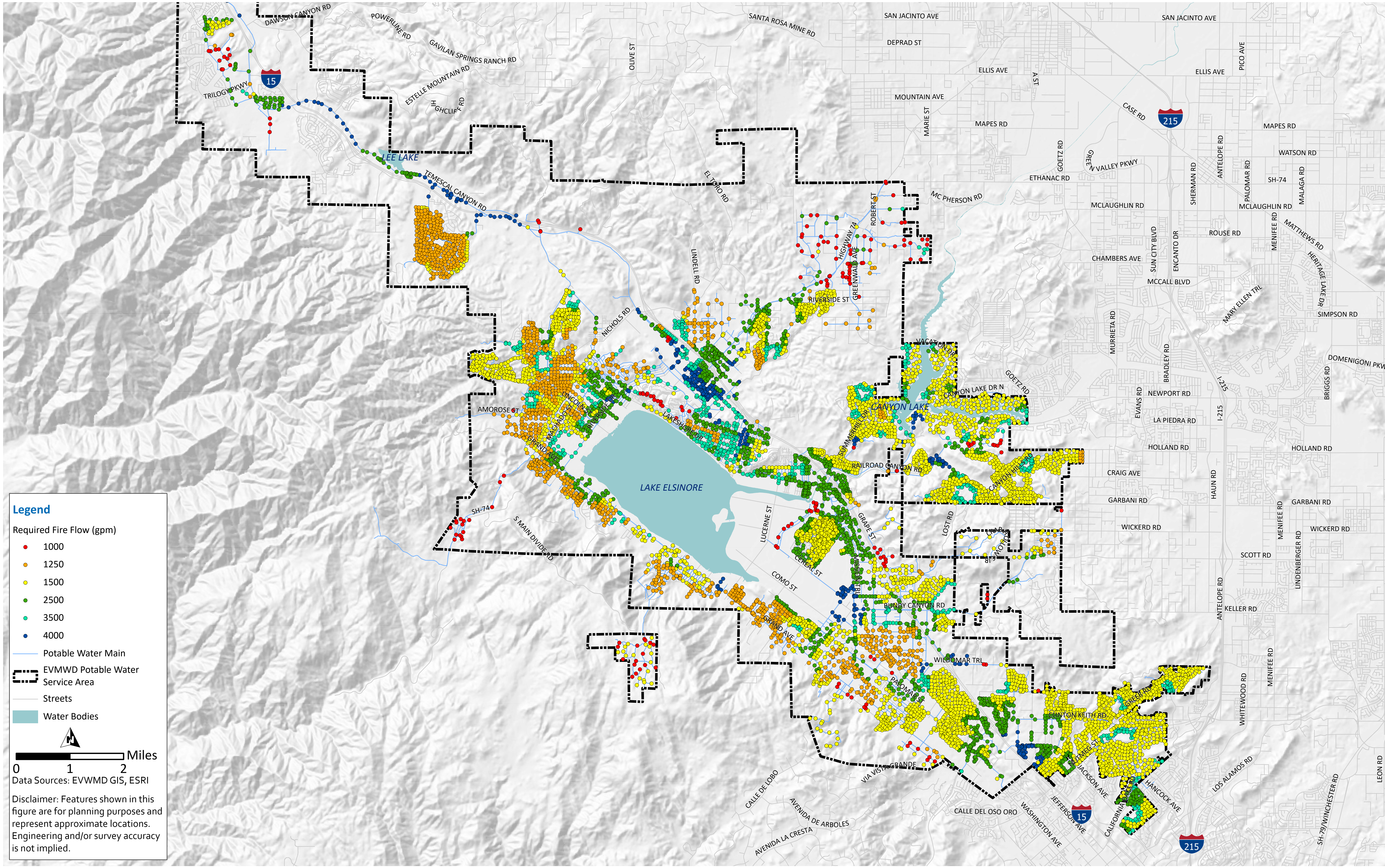

Figure 7.10 Fire Flow Requirement

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The model shows that approximately 9 percent of the system, a total of 775 hydrant junctions did not meet the fire flow demands. Fire flow deficiencies are shown on Figure 7.11 as a percentage of the fire flow available while maintaining the residual pressure of 20 psi. The fire flow deficiencies may include areas where smaller diameter pipelines may have provided sufficient fire flow capacity based on the fire flow requirements when the pipes were originally installed.

7.1.4.1 Small Diameter Replacement (SDR) Program

Many potable water distribution systems contain small diameter pipelines that are decades old. These pipelines may be sufficient to supply MDD and PHD but are undersized for the fire flow requirements based on existing land use zoning. Note, some small diameter pipelines may have provided sufficient fire flow capacity when the pipes were originally installed but may no longer provide sufficient fire flow capacity based on current fire flow requirements. As a first step in correcting fire flow deficiencies in the system all water mains less than 8 inches in diameter that have any impact on fire flow are recommended for replacement with an 8-inch diameter pipeline. This small diameter replacement (SDR) program did not include small diameter pipelines that are dead end lines and did not have hydrants attached (it is assumed that fire protection is provided to these locations from the nearest hydrant on larger lines) or any small diameter pipelines where upsizing would not address fire flow deficiencies. Table 7.3 summarizes the SDR program. Figure 7.12 shows the fire flow deficiencies that are addressed with the SDR and highlights the pipelines included in the SDR program. The combined pipeline length of these improvements is approximately 71.6 miles.

For areas where the available fire flow is greater than 50 percent of the fire flow requirement, pipe upsizing may be advantageous during one of the following events:

- Developer construction project.
- Developer request for land subdivision and/or change in land use designations.
- Pipeline replacement due to age and condition.
- Simultaneously with other projects in the area (resurfacing streets, replacing sewer mains, etc.).

Table 7.3 Small Diameter Replacement (SDR) Program

Diameter	Total Length (feet)	Total Length (miles)
Less than 4-inch	6,000	1.1
4-inch	136,300	25.8
5-inch	800	0.2
6-inch	235,000	44.5
Total	**378,100**	**71.6**

7.1.4.2 Fire Flow Improvement Projects

Specific fire flow improvement projects were developed for the remaining fire flow deficiencies by increasing pipeline diameters and creating loops in the system. All fire flow pipeline improvement projects are shown on Figure 7.13, which also shows the fire flow deficiencies that were addressed with the specific projects. The fire flow pipeline improvement projects with corresponding IDs are summarized in Table 7.4, including if the projects address hydrant junction locations where the model indicates that less than 50 percent of the required fire flow is available. As shown, there are 52 fire flow improvement projects that range from 8 to 20-inch in diameter. The combined pipeline length of these improvements is approximately 28.5 miles, including 22 miles of replacements and 6.5 miles of new/parallel pipelines.

The hydraulic model results showed some fire flow deficiencies at hydrant junctions that are adjacent to higher elevation PZs. For these fire flow deficiencies, it was recommended that the hydrant be moved to the higher elevation PZ. There were also some fire flow deficiencies where PS improvement projects are recommended. Table 7.5 summarizes the remaining 13 fire flow improvement projects, including if the projects address hydrant junction locations where the model indicates that less than 50 percent of the required fire flow is available. Detailed figures showing the hydrant locations can be found in the CIP factsheets. Note, the projects listed in Table 7.5 are not shown on Figure 7.13.

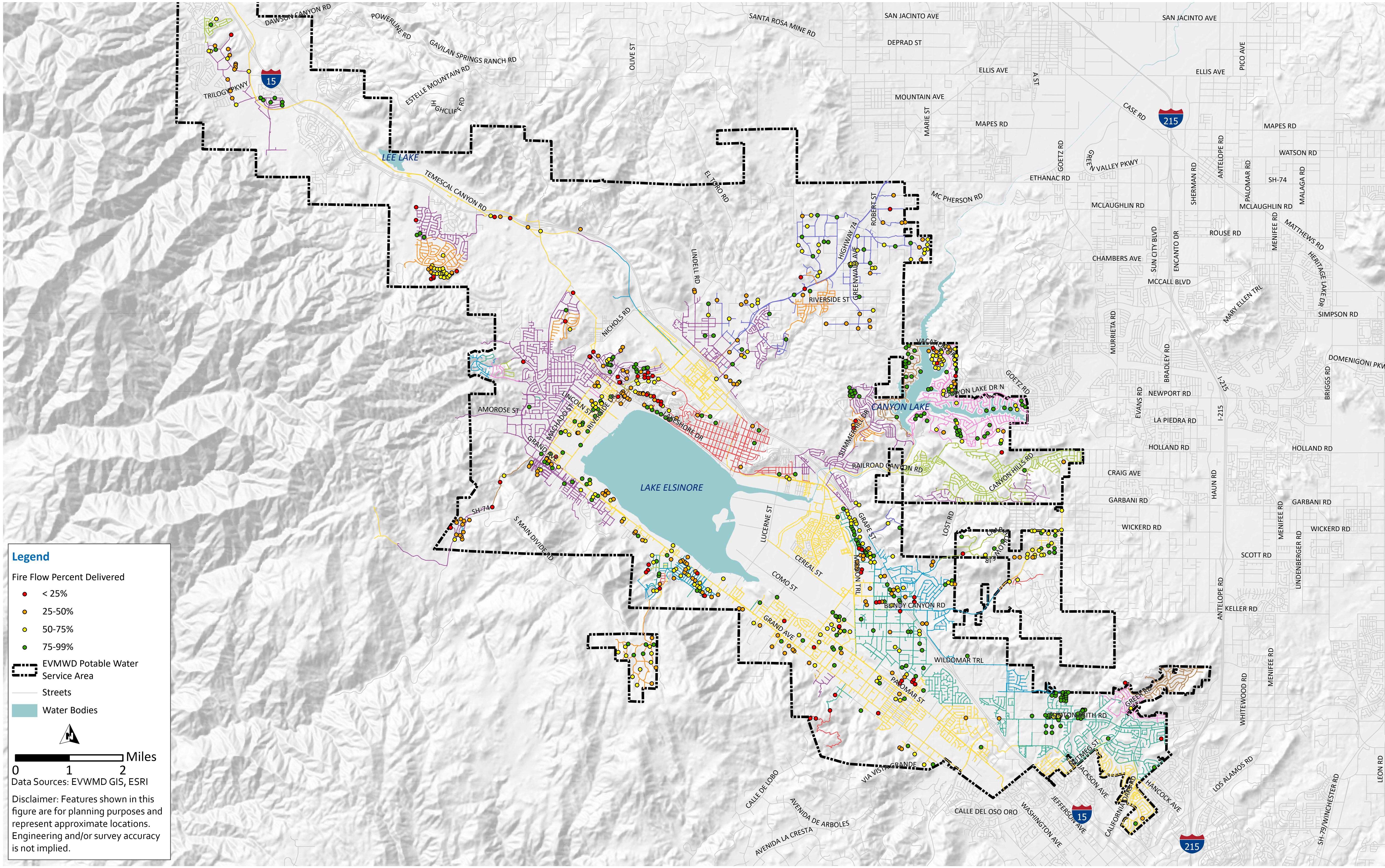

Figure 7.11 Fire Flow Percent Delivered

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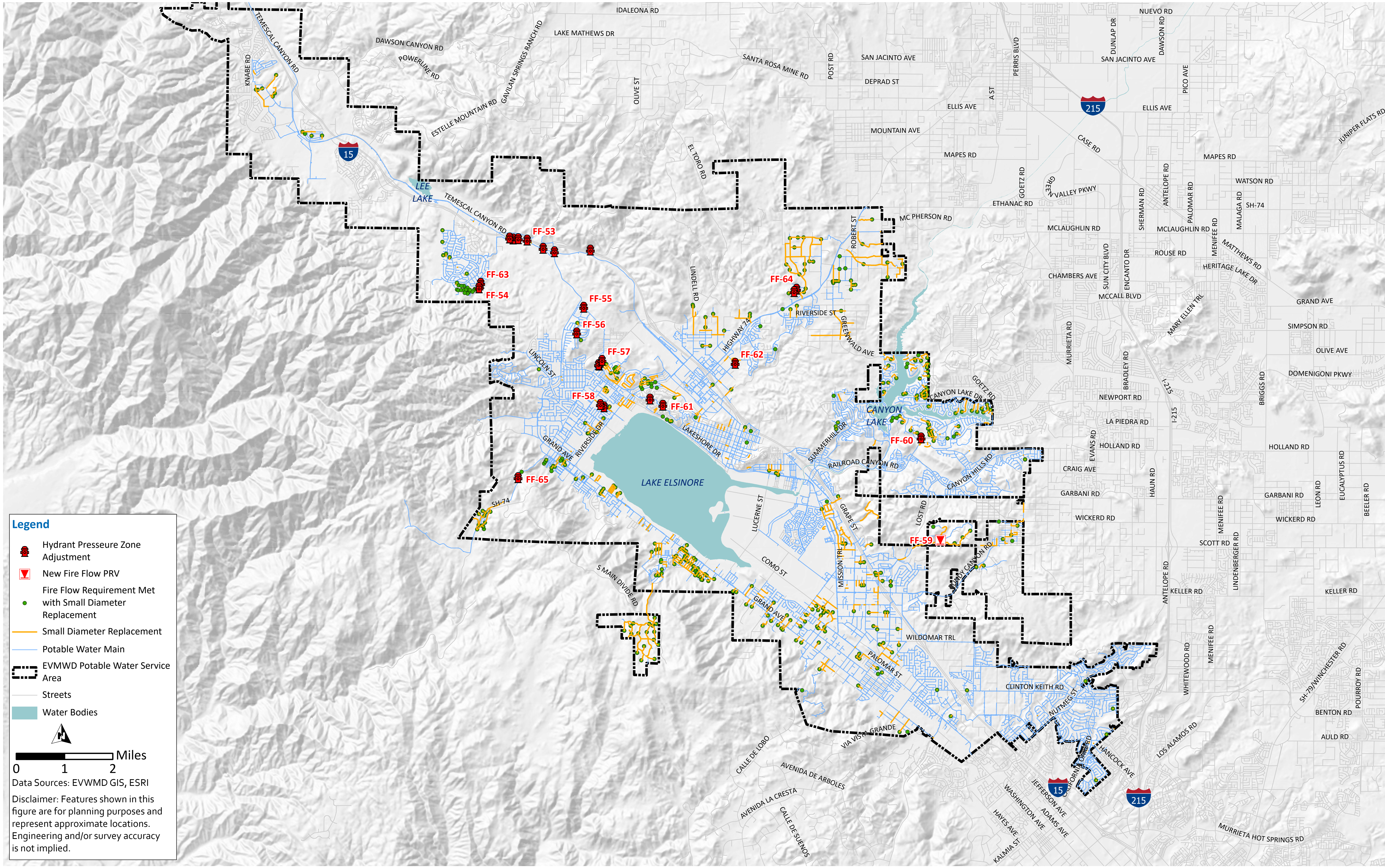

Figure 7.12 Fire Flow Deficiencies Resolved With Small Diameter Replacements

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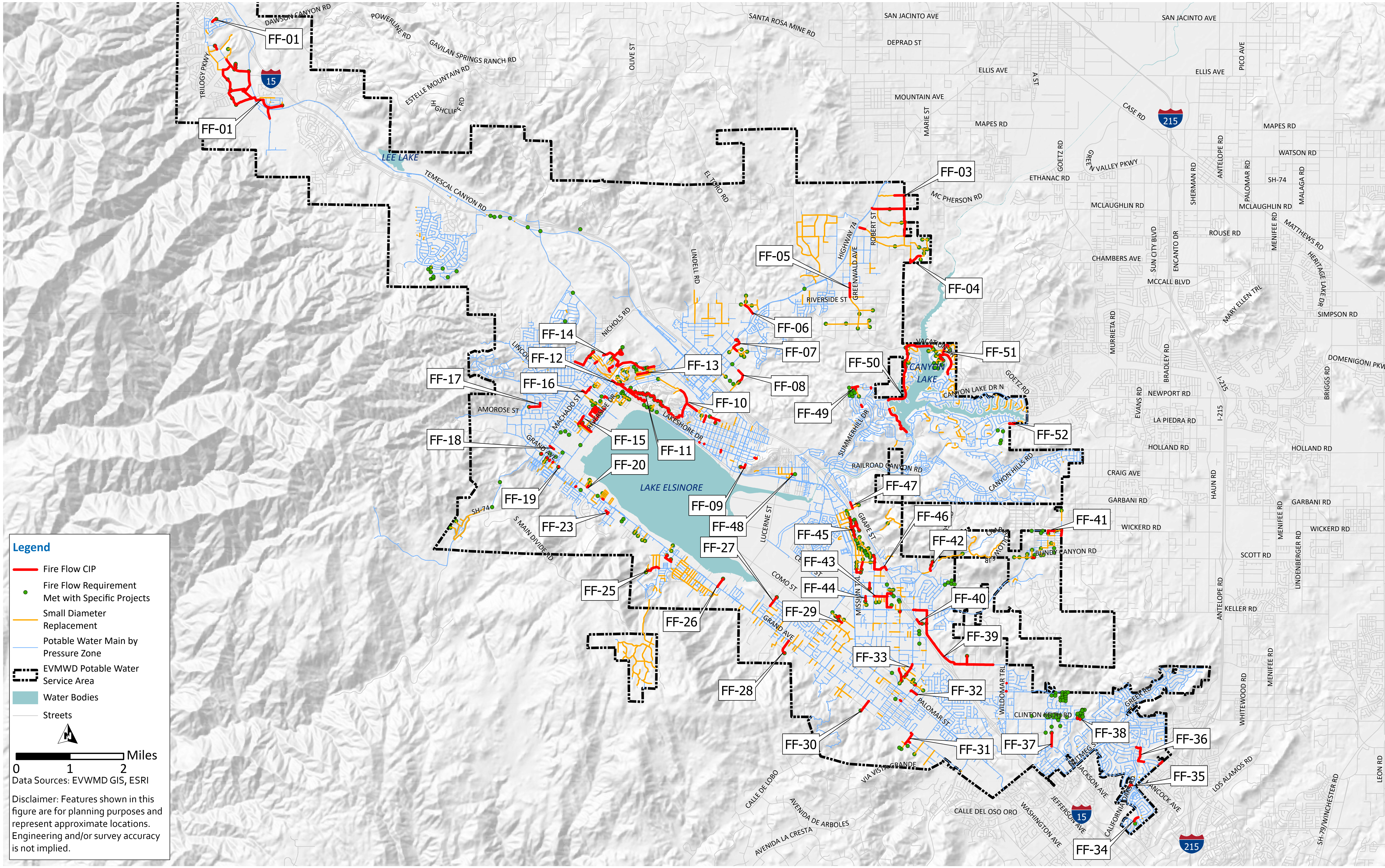

Figure 7.13 Fire Flow Improvements

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Table 7.4 Fire Flow Pipeline Improvement Projects

CIP ID	Project Description	PZ	Project Notes	8-inch Diameter			12-inch Diameter			16-inch Diameter			20-inch Diameter		
				Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)
FF-01	Replace existing pipeline and build new pipeline near Warm Springs Drive and Temescal Canyon Road.	1358.7 Mayhew	Includes hydrant junctions with less than 50 percent fire flow available.	100	-	**100**	3,400	-	**3,400**	15,400	-	**15,400**	-	1,700	**1,700**
FF-02	Replace existing pipeline near Canyon Hills Drive.	1258.4 Clay Canyon		-	-	**-**	500	-	**500**	-	-	**-**	-	-	**-**
FF-03	Replace existing pipeline and build new pipeline near Richard Street and Theda Street.	1896 Meadowbrook 2	Includes hydrant junctions with less than 50 percent fire flow available.	-	600	**600**	100	5,300	**5,400**	3,100	-	**3,100**	-	-	**-**
FF-04	Build new pipeline near Riverview Drive.	N/A	Includes hydrant junctions with less than 50 percent fire flow available.	-	1,600	**1,600**	-	-	**-**	-	-	**-**	-	-	**-**
FF-05	Replace existing pipeline near Greenwald Avenue.	1896 Meadowbrook 2		-	-	**-**	1,400	-	**1,400**	-	-	**-**	-	-	**-**
FF-06	Build new pipeline near El Toro Cut Off Road.	N/A		-	-	**-**	-	1,200	**1,200**	-	-	**-**	-	-	**-**
FF-07	Replace existing pipeline near Allan Street.	1701 Meadowbrook 1	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	1,900	-	**1,900**	-	-	**-**	-	-	**-**
FF-08	Build new pipeline near 2nd Street and Cambern Avenue.	N/A	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	-	1,400	**1,400**	-	-	**-**	-	-	**-**
FF-09	Build new pipeline near W Graham Avenue.	1571 City and 1434	Includes one hydrant junction with less than 50 percent fire flow available.	-	1,300	**1,300**	-	-	**-**	-	-	**-**	-	-	**-**
FF-10	Replace existing pipeline and build new pipeline near Sunnyslope Avenue.	1571 City	Includes hydrant junctions with less than 50 percent fire flow available.	400	2,000	**2,400**	10,300	-	**10,300**	-	-	**-**	-	-	**-**
FF-11	Build new pipeline near Lakeview Avenue and Skyline Drive.	N/A	Includes one hydrant junction with less than 50 percent fire flow available.	-	-	**-**	-	4,300	**4,300**	-	-	**-**	-	-	**-**
FF-12	Replace existing pipeline and build new pipeline near Skyline Drive and Lash Street.	1601 Lucerne Alberhill 1 and 1464 Amie	Includes hydrant junctions with less than 50 percent fire flow available.	100	200	**200**	2,800	-	**2,800**	400	-	**400**	-	-	**-**
FF-13	Replace existing pipeline and build new pipeline near De Brask Avenue.	1464 Amie	Includes one hydrant junction with less than 50 percent fire flow available.	600	500	**1,100**	-	-	**-**	-	-	**-**	-	-	**-**
FF-14	Replace existing pipeline and build new pipeline near Dryden Street and Gunnerson Street.	1601 Lucerne Alberhill 1	Includes one hydrant junction with less than 50 percent fire flow available.	-	2,100	**2,100**	10,000	1,500	**11,500**	-	-	**-**	-	-	**-**
FF-15	Replace existing pipeline and build new pipeline near Raven Drive and Amber Lane.	1434		-	500	**500**	7,700	-	**7,700**	-	-	**-**	-	-	**-**
FF-16	Build new pipeline near Machado Street and Zieglinde Drive.	N/A		-	1,300	**1,300**	-	-	**-**	-	-	**-**	-	-	**-**
FF-17	Replace existing pipeline near Ficus Street and Lake Trail Circle.	1601 Ortega		100	-	**100**	1,400	-	**1,400**	-	-	**-**	-	-	**-**

CIP ID	Project Description	PZ	Project Notes	8-inch Diameter			12-inch Diameter			16-inch Diameter			20-inch Diameter		
				Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)
FF-18	Replace existing pipeline near Ulla Lane.	1434		-	-	**-**	600	-	**600**	-	-	**-**	-	-	**-**
FF-19	Build new pipeline near Grand Avenue and Oregon Street.	1601 Ortega	Includes hydrant junctions with less than 50 percent fire flow available.	-	400	**400**	-	-	**-**	-	-	**-**	-	-	**-**
FF-20	Build new pipeline near Kevin Place.	N/A		-	300	**300**	-	-	**-**	-	-	**-**	-	-	**-**
FF-21	Build new pipeline near Macy Street and Lake Terrace Drive.	N/A		-	100	**100**	-	-	**-**	-	-	**-**	-	-	**-**
FF-22	Replace existing pipeline near Grand Avenue and Cedar Drive.	1434	Includes hydrant junctions with less than 50 percent fire flow available.	200	-	**200**	-	-	**-**	-	-	**-**	-	-	**-**
FF-23	Replace existing pipeline near Via Sola and Sangston Drive.	1601 Ortega		-	-	**-**	500	-	**500**	-	-	**-**	-	-	**-**
FF-24	Replace existing pipeline and build new pipeline near Maiden Lane and Curtis Avenue.	1434	Includes one hydrant junction with less than 50 percent fire flow available.	100	-	**-**	-	-	**-**	-	-	**-**	-	-	**100**
FF-25	Replace existing pipeline near Alta Vista Street and Coleman Avenue.	1650 Adelfa	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	1,400	-	**1,400**	-	-	**-**	-	-	**-**
FF-26	Replace existing pipeline near Grand Avenue.	1434		-	-	**-**	1,000	-	**1,000**	-	-	**-**	-	-	**-**
FF-27	Replace existing pipeline near Stoneman Street.	1434		-	-	**-**	1,100	-	**1,100**	-	-	**-**	-	-	**-**
FF-28	Replace existing pipeline near Arbolado Lane.	1434	Includes one hydrant junction with less than 50 percent fire flow available.	1,500	-	**1,500**	100	-	**100**	-	-	**-**	-	-	**-**
FF-29	Replace existing pipeline and build new pipeline near Melinda Lane and Beecher Street.	1434		-	400	**400**	500	-	**500**	-	-	**-**	-	-	**-**
FF-30	Replace existing pipeline near Wilson Street.	1434		-	-	**-**	1,200	-	**1,200**	-	-	**-**	-	-	**-**
FF-31	Build new pipeline near Leslie Street and Alameda Del Monte.	1434	Includes hydrant junctions with less than 50 percent fire flow available.	-	1,700	**1,700**	-	-	**-**	-	-	**-**	-	-	**-**
FF-32	Build new pipeline near Cedar Street and Illinois Street.	1434	Includes one hydrant junction with less than 50 percent fire flow available.	-	200	**200**	-	800	**800**	-	-	**-**	-	-	**-**
FF-33	Replace existing pipeline and build new pipeline near Gruwell Street and Orange Street.	1467 Waite	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	1,600	1,300	**2,900**	-	-	**-**	-	-	**-**
FF-34	Replace existing pipeline near Symphony Park Lane.	1434		-	-	**-**	700	-	**700**	-	-	**-**	-	-	**-**
FF-35	Replace existing pipeline near Colony Drive and Calle Toga.	1434		-	-	**-**	200	-	**200**	300	-	**300**	-	-	**-**

CIP ID	Project Description	PZ	Project Notes	8-inch Diameter			12-inch Diameter			16-inch Diameter			20-inch Diameter		
				Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)	Upsize Existing (feet)	New Pipe (feet)	Total (feet)
FF-36	Replace existing pipeline near Medina Court and Pantera Court.	1650 Cal Oaks	Includes one hydrant junction with less than 50 percent fire flow available.	-	-	**-**	2,800	-	**2,800**	-	-	**-**	-	-	**-**
FF-37	Build new pipeline near Jena Lane.	N/A		-	-	**-**	-	1,400	**1,400**	-	-	**-**	-	-	**-**
FF-38	Build new pipeline near Camelot Circle and Carrington Street.	N/A		-	200	200	-	100	100	-	-	-	-	-	-
FF-39	Replace existing pipeline and build new pipeline near Monte Vista Drive and Wildomar Trail.	1746 Bundy Gafford		-	-	**-**	900	100	**1,000**	11,700	100	**11,800**	-	-	**-**
FF-40	Build new pipeline near Canyon Drive and Orange Street.	1467 Waite	Includes hydrant junctions with less than 50 percent fire flow available.	-	200	**200**	-	-	**-**	-	-	**-**	-	-	**-**
FF-41	Build new pipeline near Sunset Avenue and Orange Street.	N/A	Includes hydrant junctions with less than 50 percent fire flow available.	-	1,600	**1,600**	-	200	**200**	-	-	**-**	-	-	**-**
FF-42	Replace existing pipeline near Dial Road.	1746 Bundy Gafford	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	1,000	-	**1,000**	-	-	**-**	-	-	**-**
FF-43	Replace existing pipeline near Almond Street and Waite Street.	1467 Waite	Includes hydrant junctions with less than 50 percent fire flow available.	500	-	**500**	2,100	-	**2,100**	-	-	**-**	-	-	**-**
FF-44	Replace existing pipeline near Jo Ann Court and Valencia Street.	1434	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	1,600	-	**1,600**	-	-	**-**	-	-	**-**
FF-45	Replace existing pipeline near Orchard Street and Lakeview Terrace.	1746 Bundy Gafford	Includes one hydrant junction with less than 50 percent fire flow available.	-	-	**-**	3,700	-	**3,700**	3,000	-	**3,000**	-	-	**-**
FF-46	Replace existing pipeline and build new pipeline near Lewis Street and Orchard Street.	1467 Waite	Includes hydrant junctions with less than 50 percent fire flow available.	-	800	**800**	1,500	-	**1,500**	-	-	**-**	-	-	**-**
FF-47	Build new pipeline near Grape Street.	1601 Summerhill		-	700	**700**	-	-	**-**	-	-	**-**	-	-	**-**
FF-48	Build new pipeline near Park Way and Avenue 6.	N/A		-	100	**100**	-	-	**-**	-	-	**-**	-	-	**-**
FF-49	Replace existing pipeline and build new pipeline near Ponte Russo and Del Copparo.	1800 Tuscany 1		-	-	**-**	1,200	-	**1,200**	-	200	**200**	-	-	**-**
FF-50	Replace existing pipeline near Vacation Drive and Longhorn Drive.	1640 Canyon Lake West		100	-	**100**	6,100	-	**6,100**	6,900	-	**6,900**	-	-	**-**
FF-51	Replace existing pipeline near Yosemite Place and Vacation Drive.	1622 Canyon Lake	Includes hydrant junctions with less than 50 percent fire flow available.	-	-	**-**	4,800	-	**4,800**	-	-	**-**	-	-	**-**
FF-52	Replace existing pipeline near Railroad Canyon Road.	1622 Canyon Lake		-	-	**-**	700	-	**700**	-	-	**-**	-	-	**-**
Total				**3,600**	**16,800**	**20,300**	**74,800**	**17,600**	**92,400**	**40,800**	**300**	**41,100**	**0**	**1,700**	**1,700**

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Table 7.5 Additional Fire Flow Improvement Projects

Project ID	Description	Project Notes	Hydrant IDs	Hydrant Locations
FF-53	Move hydrants from 6-inch diameter pipe on Temescal Canyon Road to 30-inch diameter pipe.	Includes hydrant junctions with less than 50 percent fire flow available.	FH-39739	Temescal Canyon Road
			FH-39740	Temescal Canyon Road
			FH-39741	Temescal Canyon Road
			FH-39742	Temescal Canyon Road
			FH-3997	Temescal Canyon Road
			FH-93	14881 Temescal Canyon Road
			FH-4484	Lake Street
			FH-96	Walker Canyon Road
FF-54	Move hydrant near the Horsethief 1 Tank from 1601 Horsethief 1 PZ to 1801 Horsethief 2 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-9963	27651 Kachina Court
FF-55	Move hydrant near the Alberhill 1 PS from 1434 PZ to 1601 Lucerne Alberhill 1 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-4019	Nicholas Road
FF-56	Move hydrant near the Alberhill 1A and 1B Tanks from 1601 Lucerne Alberhill 1 PZ to 1800 Rice Canyon Alberhill 2 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-8778	Alberhill Ranch Road
FF-57	Move hydrants on Dryden Street between Lash Street and Arnold Avenue from 1434 PZ to 1601 Lucerne Alberhill 1 PZ.	Includes hydrant junctions with less than 50 percent fire flow available.	FH-4064	Lash Avenue
			FH-4065	Lash Avenue
			FH-9811	Dryden Street
FF-58	Move hydrant on Grand Avenue between Morro Way and Bonnie Lea Drive from 1434 PZ to 1601 Ortega PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-3758	15153 Joy Street
			FH-3757	15195 Joy Street

Project ID	Description	Project Notes	Hydrant IDs	Hydrant Locations
FF-59	Add PRV at Daley B 2 PS to serve hydrant on Crab Hollow Circle in 2309 Daley PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-6729	23120 Crab Hollow Circle
FF-60	Move hydrant on Country Club Drive from 1622 Canyon Lake to 1750 Cottonwood 1 PZ.		FH-1703	Railroad Canyon Road
FF-61	Move hydrants on Sunnyslope Avenue from 1650 Amie Hydro PZ to 1571 City PZ.	Includes hydrant junctions with less than 50 percent fire flow available.	FH-10293	17375 Sunny Slope Avenue
			FH-10292	30100 Grant Circle
FF-62	Move hydrant at 3rd Street and Conard Avenue from 1434 PZ to 1701 Meadowbrook 1 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-420	3rd and Conard
FF-63	Move hydrant on State Highway 74 near the Meadowbrook 2 PS from 1701 Meadowbrook 1 PZ to 1896 Meadowbrook 2 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-238	28705 Highway 74
FF-64	Move hydrants near the Rosetta Canyon 2A and 2B Tanks from 1801 Rosetta Canyon 2 PZ to 1896 Meadowbrook 2 PZ.	Includes hydrant junctions with less than 50 percent fire flow available.	FH-8454	Walnut Street
			FH-8453	20270 Walnut Street
FF-65	Move hydrant on El Cariso Truck Trail from 2313 Tomlin 2 PZ to 2748 Los Pinos 1 PZ.	Includes one hydrant junction with less than 50 percent fire flow available.	FH-6265	Perry Road

7.2 Existing System Storage Evaluation

The existing distribution system contains 70 active storage reservoirs with a total active storage volume of approximately 88.2 million gallons (MG). The storage and emergency supply analyses are performed for each PZ. As discussed in Chapter 6, the total amount of required storage is a combination of the following three components:

- Operational storage.
- Fire flow storage.
- Emergency storage.

The operational storage criterion is 30 percent of MDD for the EVMWD system. Fire flow storage should provide sufficient water for the highest fire flow requirement of the zone evaluated. Emergency storage is set at 100 percent of MDD. Surplus capacity in lower PZs is not used to offset deficits in higher PZs due to the requirement for pumping.

The required storage was compared with the actual storage for the entire system and by PZ. A summary of the required and available storage volumes by PZ is presented in Table 7.6. This table indicates that EVMWD has a net surplus of approximately 9 MG in storage capacity for the existing system. The 1434 Zone alone had 11.3 MG of surplus storage available. However, for the system storage evaluation calculations, the surplus storage in the 1434 Zone was not used to address any deficiencies in the higher PZs since it is not a reliable source of water during an emergency. More specifically, if an emergency occurred (power outage, etc.), the surplus capacity in the lower zone cannot be delivered to the higher zone by gravity, and therefore is not a dependable water source.

A zone by zone comparison of available and required storage depicts largest deficits in the Canyon Lake, Waite, and the City PZs. In most cases, it is ideal to have all emergency and fire storage within the zone it is serving. An exception to this rule is when a zone is connected to a higher zone with surplus storage. In emergencies, a PRV can be used to transfer water from higher zones to lower zones even in an emergency where the power is out. This method also helps reduce the total amount of storage and acts as a buffer for PZs that might need large storage improvements in the future based on development but are only slightly deficient in the existing system.

Some smaller zones (Tomlin 1, Tomlin 2, Los Pinos 2, Skymeadows, Stage Ranch 2) did not have enough storage to meet fire flow demand. Instead of adding a storage tank to these areas solely for fire flow conditions, which could result in poor water age due to typically low demands in these zones, a designated fire pump or PRV was recommended at each of these PSs to meet fire flow demands. Therefore, a fire pump was recommended at Los Pinos 2, Skymeadows, and Stage Ranch 2 PS to meet fire demands in their respective zones. Similarly, PRVs were recommended to bring water down from higher zones at Tomlin 2 and Los Pinos 1 PS to meet fire demands in the Tomlin 1 and Tomlin 2 zones, respectively.

A detailed phasing plan and maps for the storage improvements are presented in Section 8. Recommendations from the existing system storage evaluation are summarized in Table 7.6.

Table 7.6 Existing Storage Evaluation

Description/Criteria	MDD (mgd)	Fire Flow Required (gpm)	Fire Duration (Hours)	Operational Storage (30% of MDD)	Fire Storage (MG)	Emergency Storage (1 MDD)	Total Volume Required (MG)	Storage Tanks (MG)	Surplus Storage (MG)	Recommended Storage (MG)	2016 MP Recommendation (MG)	Comments
Entire System	**37.89**	**4,000**	**4**	**11.37**	**17.31**	**37.89**	**66.56**	**88.41**	**21.87**	**-**	**-**	**-**
1358.7 (Mayhew, Clay Canyon)	0.55	4,000	4	0.17	0.96	0.55	1.67	0.32	(1.35)	-	(0.78)	No recommendations for TDSA. Increased storage compared to 2016 MP due to change in fire flow requirement.
1434 (Loop Zone)	9.39	4,000	4	2.82	0.96	9.39	13.16	31.50	18.34	-	11.32	Lower base demand than 2016 MP.
1464 (Amie)	0.01	1,000	2	0.00	0.12	0.01	0.13	0.3	0.17	-	0.00	Zone included as part of City Zone.
1467 (Waite)	1.45	4,000	4	0.43	0.96	1.45	2.84	2.50	(0.34)	0.3	(0.70)	No recommendation for Waite.
1571 (City)	1.80	4,000	4	0.54	0.96	1.80	3.30	1.73	(1.57)	3.30	(1.82)	New tank with HWL of 1,600 feet. Higher elevation recommended to match other 1,600 feet zone tanks. Existing tank to be abandoned. Size increase in future.
1601 (Rosetta Canyon 1, El Toro)	1.10	2,500	2	0.33	0.30	1.10	1.73	3.15	1.42	-	0.28	No recommendation for Rosetta Canyon 1. Increased excess capacity compared to 2016 MP due to decrease in demands.
1601 (Horsethief 1)	1.09	3,500	3	0.33	0.63	1.09	2.04	1.20	(0.84)	1.10	(1.08)	Size increase in future.
1601 (Summerhill)	0.75	2,500	2	0.23	0.30	0.75	1.28	2.35	1.07	-	0.36	Lower fire flow requirement than 2016 MP.
1601 (Lucerne, Alberhill 1)	1.91	3,500	3	0.57	0.63	1.91	3.11	5.50	2.39	-	2.17	No recommendation for Lucerne, Alberhill 1.
1601 (Ortega)	1.05	2,500	2	0.32	0.30	1.05	1.67	2.20	0.53	-	(0.59)	No recommendation. Sufficient capacity in Lucerne and Alberhill 1 for now.
1601 (Woodmoor)	0.14	1,250	2	0.04	0.15	0.14	0.33	0.50	0.17	-	0.23	No recommendation for Woodmoor.
1622 (Canyon Lake N and S)	2.33	3,500	3	0.70	0.63	2.33	3.66	2.00	(1.66)	2.00	(2.31)	Lower base demand than 2016 MP.
1650 (Adelfa)	0.37	1,500	2	0.11	0.18	0.37	0.66	0.8	0.14	-	(0.66)	Lower fire flow requirement than 2016 MP.
1650 (Cal Oaks)	2.02	3,500	3	0.61	0.63	2.02	3.25	7.00	3.75	-	3.14	No recommendation for Cal Oaks or Inland Valley. Increased excess capacity compared to 2016 MP due to decrease in demands.
1650 (Inland Valley)	1.39	4,000	4	0.42	0.96	1.39	2.76	2.40	(0.36)	-		

Description/Criteria	MDD (mgd)	Fire Flow Required (gpm)	Fire Duration (hours)	Operational Storage (30% of MDD)	Fire Storage (MG)	Emergency Storage (1 MDD)	Total Volume Required (MG)	Storage Tanks (MG)	Surplus Storage (MG)	Recommended Storage (MG)	2016 MP Recommendation (MG)	Comments
1746 (Bundy Canyon, Gafford)	1.31	4,000	4	0.39	0.96	1.31	2.66	2.61	(0.05)	-	(0.99)	Lower base demand than 2016 MP.
1750 (Cottonwood 1, Cottonwood East)	2.54	3,500	3	0.76	0.63	2.54	3.93	4.60	0.67	-	2.12	Significantly increased demands from 2016 MP.
1801 (Rice Canyon, Alberhill 2)	1.27	3,500	3	0.38	0.63	1.27	2.28	2.86	0.58	-	0.12	Lower fire flow requirement than 2016 MP.
1800 (Tuscany Hills 1)	1.57	3,500	3	0.47	0.63	1.58	2.68	2.60	(0.08)	-	0.00	Recommendation included in future.
1801 (Rosetta Canyon 2)	0.77	2,500	2	0.23	0.30	0.77	1.31	1.40	0.09	-	0.37	Increased base demand from 2016 MP with Meadowbrook 1 removed from service.
1801 (Horsethief 2)	1.29	3,500	3	0.39	0.63	1.29	2.31	1.80	(0.51)	0.50	(0.36)	Size increase in future.
1842 (Beck)	0.04	1,500	2	0.01	0.18	0.04	0.23	0.13	(0.10)	-	(0.06)	Zone to be eliminated and combined with 1916.5 Encina.
1850 (Greer Ranch 1)	0.43	3,500	3	0.13	0.63	0.43	1.19	1.00	(0.19)	-	(0.68)	Lower fire flow requirement than 2016 MP. Existing PRVs from Greer Ranch 2 can serve Greer Ranch 1 in case of emergency.
1871 (Tomlin 1)	0.00	1,500	2	0.00	0.18	0.00	0.18	0.022	(0.16)	0.20	0.18	Incorrect size in 2016 MP.
1882 (Stage Ranch 1)	0.04	1,000	2	0.01	0.12	0.04	0.18	0.096	(0.08)	0.10	(0.38)	Lower base demand than 2016 MP.
1896 (Meadowbrook 2)	0.49	4,000	4	0.15	0.96	0.49	1.60	1.00	(0.60)	0.60	(0.09)	Higher fire flow demand than 2016 MP. Size increase in future.
1900 (The Farm)	0.00	2,500	2	0.00	0.30	0.00	0.30	0.43	0.13	-	-	The Farm maintains their own storage.
1916.5 (Encina)	0.01	1,500	2	0.00	0.18	0.01	0.20	0.50	0.30	-	0.34	
1934 (Cottonwood 2)	0.59	1,250	2	0.18	0.15	0.59	0.92	1.00	0.08	-	0.30	Increased base demand from 2016 MP.
1940 (Tuscany Hills 2)	0.29	1,250	2	0.09	0.15	0.29	0.53	1.00	0.47	-	0.32	
2040 (La Laguna 1)	0.16	1,500	2	0.05	0.18	0.16	0.39	0.93	0.54	-	0.46	
2050 (Greer Ranch 2)	1.04	3,500	3	0.31	0.63	1.04	1.98	1.29	(0.69)	1.00	(0.94)	Lower fire flow demand than 2016 MP.
2196 (Sedco)	0.02	1,000	2	0.01	0.12	0.02	0.14	0.088	(0.05)	0.15	0.74	Replace existing Sedco Tank. Incorrect size in 2016 MP. Size increase in future.
2217 (Stage Ranch 2)	0.06	1,000	2	0.02	0.12	0.06	0.20	0.096	(0.10)	-	(0.45)	Lower base demand than 2016 MP. Add fire pump at Stage Ranch 2 PS.

Description/Criteria	MDD (mgd)	Fire Flow Required (gpm)	Fire Duration (hours)	Operational Storage (30% of MDD)	Fire Storage (MG)	Emergency Storage (1 MDD)	Total Volume Required (MG)	Storage Tanks (MG)	Surplus Storage (MG)	Recommended Storage (MG)	2016 MP Recommendation (MG)	Comments
2240 (La Laguna 2)	0.48	1,250	2	0.15	0.15	0.48	0.78	1.07	0.29	-	0.49	Increased base demand from 2016 MP.
2309 (Daley)	0.03	1,000	2	0.01	0.12	0.03	0.15	0.088	(0.07)	0.20	0.71	Replace existing Daley Tank. Incorrect size in 2016 MP.
2313 (Tomlin 2)	0.00	1,000	2	0.00	0.12	0.00	0.12	0.051	(0.07)	0.15	0.18	Incorrect size in 2016 MP.
2748 (Los Pinos 1)	0.03	2,500	2	0.01	0.30	0.03	0.34	0.10	(0.24)	0.25	(0.07)	Replace existing Los Pinos 1 Tank. Higher fire flow demand than 2016 MP.
3300 (Skymeadows)	0.06	1,250	2	0.02	0.15	0.06	0.22	0.10	(0.12)	0.15	(0.16)	Add fire pump at Skymeadows PS.
3544 (Los Pinos 2)	0.01	1,000	2	0.00	0.12	0.01	0.13	0.10	(0.03)	-	(0.03)	Add fire pump at Los Pinos 2 PS.

Notes:
Abbreviations: HWL -high water level; MP - Master Plan; TDSA - Temescal Division Service Area.

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7.3 Existing System Booster Pump Evaluation

Similar to the evaluation of the system storage, it is important that each zone have sufficient pumping capacity to meet MDD in that zone while transferring the water needed to supply higher PZs. In this analysis, the firm transfer PS capacity was defined as the total PS capacity with the largest pump unit out of service. The firm capacity, rather the total design capacity, was used to account for redundancy needs in the system in case of an outage or planned repair.

It should be noted that the methodology for calculating firm capacity was modified from the 2016 MP as the hydraulic model was used to calculate firm capacity for the analysis presented in this WSMP. The existing booster pump capacity analysis for zones with and without gravity storage are listed in Table 7.7 and Table 7.8, respectively.

As shown, four PSs were identified as being deficient under existing conditions, namely the City, Adelfa, Cottonwood 1, and Sedco PSs. To address these Sedco PS capacity deficiencies, it is recommended that the current PS with two pumps in series be replaced with a single PS with parallel pumps sized for future demand conditions.

Zones without gravity storage were evaluated separately to determine whether demands can be met for PHD and PHD plus fire flow conditions. The criteria used for these zones were meeting PHD with firm transfer capacity or PHD plus fire flow with total firm transfer capacity.

All pumped zones without gravity storage that have a fire flow demand were shown to have a deficiency due to a lack of, or insufficient, fire pump capacity. These PSs are Cielo Vista, Skylark, Canyon Lake Sustaining, Lemon Grove, and Cirrus Circle. All of these PSs require a new fire pump. The Bundy Canyon East PS also did not have sufficient fire storage, but this zone can be fed from the 1900 Farm Zone in case of fire, and therefore did not require a separate fire pump. The Amie Sustaining PS only has one pump, and therefore, requires a redundant pump; there is no fire flow requirement for the Amie Sustaining Zone as the fire flow recommendations presented earlier recommend that all the fire hydrants on the Amie Sustaining Zone be moved to the 1571 City Zone.

A detailed phasing plan and maps for the booster pump improvements are presented in Section 8.

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Table 7.7 Existing Booster Pump Capacity Evaluation - Zones With Storage

Description/Criteria	In-Zone MDD (gpm)	Higher Zone MDD (gpm)	Total MDD (gpm)	Firm Pumping Capacity (gpm)	Firm Pumping Capacity, Adjusted for 16-Hour Operations (gpm)	Pumping Surplus (gpm)	Pumping Surplus adjusted for 16-Hour Operations for Deficient Zones (gpm)	2016 MP Surplus (gpm)	Comments
1358.7 (Mayhew, Clay Canyon)	382	0	382	250	250	(132)	(198)	7	No recommendations made for TDSA as zone can be served from the TVP. Existing capacity is lower due to groundwater well taken out of service.
1434 (AVP, TVP, CLWTP, Wells)	6,500	17,366	23,866	42,456	42,456	18,590	12,393	7,866	Lower demand compared to 2016 MP.
1467 (Waite)	1,006		1,006	2,227	1,484	479	319	804	Higher firm pumping capacity compared to 2016 MP.
1571 (City)	1,248	4	1,252	1,661	1,107	(145)	(217)	318	Size increase in future.
1601 (Horsethief 1)	755	908	1,662	3,841	2,561	898	599	853	No recommendation.
1601 (Lucerne)	1,327	1,330	2,657	2,832	1,888	(769)	(1,153)	445	Addressed by Alberhill 1 PS, currently under construction.
1601 (Ortega)	730	33	763	2,327	1,551	788	526	982	No recommendation.
1601 (Rosetta Canyon 1)	764	880	1,644	6,479	4,319	2,675	1,783	2,776	No recommendation.
1601 (Summerhill)	524		524	2,497	1,665	1,141	760	1,247	No recommendation.
1601 (Woodmoor)	99		99	2,055	1,370	1,271	848	2,739	No recommendation.
1622 (Canyon Lake)	1,594	26	1,620	3,768	2,512	893	595	1,937	No recommendation.
1650 (Adelfa)	256	71	327	182	121	(206)	(309)	461	Size increase in future.
1650 (Cal Oaks)	1,400	721	2,121	3,137	2,091	(30)	(45)	3,905	No recommendation.
1650 (Inland Valley)	962		962	1,642	1,095	133	89		No recommendation.
1746 (Bundy Canyon)	850	458	1,308	2,008	1,339	31	20	(1,528)	Difference in demand in The Farm.
1750 (Cottonwood)	1,761	412	2,173	2,732	1,821	(351)	(527)	278	Higher demand compared to 2016 MP. Size increase in future.
1800 (Rice Canyon and Alberhill 2)	879	451	1,330	2,483	1,656	326	217	320	No recommendation.
1800 (Tuscany Hills 1)	1,093	204	1,298	2,383	1,589	291	194	1,287	Increased demands compared to 2016 MP.
1801 (Horsethief 2)	819		819	1,984	1,322	503	335	1,221	Increased demands compared to 2016 MP.
1801 (Rosetta Canyon 2)	537	343	880	3,217	2,144	1,264	843	2,545	Increased demands due to elimination of Meadowbrook 1 PS.
1842 (Beck)	24		24	187	125	100	67	7	No recommendation.
1850 (Greer Ranch 1)	298		298	1,837	1,225	927	618	107	Significantly decreased demands compared to 2016 MP.
1871 (Tomlin 1)	2	31	33	537	358	325	217	398	No recommendation.
1882 (Stage Ranch 1)	30	42	72	462	308	236	157	78	Significantly decreased demands compared to 2016 MP.
1896 (Meadowbrook 2)	343		343	1,066	711	368	245	580	No recommendation.
1900 (The Farm)	369		369	2,200	1,467	1,098	732	(125)	Significantly decreased demands compared to 2016 MP.
1916.5 (Encina)	9	39	48	899	599	551	367	1,418	No recommendation.
1934 (Cottonwood 2)	412		412	1,122	748	336	224	181	Increased demands.
1940 (Tuscany Hills 2)	204		204	1,563	1,042	837	558	130	Increased pumping capacity.
2040 (La Laguna 1)	114	336	451	1,288	859	408	272	832	Increased demand compared to 2016 MP.
2050 (Greer Ranch 2)	721		721	1,227	818	97	65	321	No recommendation.

Description/Criteria	In-Zone MDD (gpm)	Higher Zone MDD (gpm)	Total MDD (gpm)	Firm Pumping Capacity (gpm)	Firm Pumping Capacity, Adjusted for 16-Hour Operations (gpm)	Pumping Surplus (gpm)	Pumping Surplus adjusted for 16-Hour Operations for Deficient Zones (gpm)	2016 MP Surplus (gpm)	Comments
2196 (Sedco)	12		12	0	0	(12)	(18)	147	No parallel pump under existing conditions. Suggest eliminating Sedco A and B and constructing new PS sized for future demands.
2217 (Stage Ranch 2)	42		42	671	447	405	270	272	Decreased demands compared to 2016 MP.
2240 (La Laguna 2)	336		336	523	349	12	8	298	Increased demand compared to 2016 MP.
2309 (Daley)	18		18	90	60	42	28	96	Lower pumping capacity.
2313 (Tomlin 2)	1	30	31	213	142	111	74	264	Lower pumping capacity.
2748 (Los Pinos 1)	22	8	30	280	187	157	104	235	Lower pumping capacity.
3300 (Skymeadows)	39		39	158	105	66	44	100	No recommendation.
3544 (Los Pinos 2)	8		8	136	91	83	55	83	No recommendation.

Notes:
Abbreviations: AVP - Auld Valley Pipeline; CLWTP - Canyon Lake Water Treatment Plant.

Table 7.8 Existing Booster Pump Capacity Evaluation - Zones With Pumped Storage

Description/Criteria	In-Zone MDD (gpm)	Higher Zone MDD (gpm)	Total MDD (gpm)	PHD (gpm) for Zones Without Storage	Fire Flow (gpm) for Zones Without Storage	PHD+Fire Flow (gpm) for Zones Without Storage	Firm Pumping Capacity (gpm)	Firm Pumping Capacity, Adjusted for 16-Hour Operations	Total Pumping Capacity (gpm) for Zones Without Storage	Pumping Surplus (No Storage, PHD/Firm)	Pumping Surplus (No Storage, MDD+Fire/Total)	Pumping Surplus	Comments
1550 (Cielo Vista)	15		15	37	1,250	1,287	150	100	300	113	(987)	(987)	Fire pump required.
1600 (Skylark)	3		3	8	1,500	1,508	200	133	300	192	(1,208)	(1,208)	Fire pump required.
1650 (Amie Sustaining)	4		4	10	0	10	0	0	20	(10)	10	(10)	Single pump. Parallel pump recommended. No fire flow for this zone.
1850 (Canyon Lake Sustaining)	26		26	64	1,250	1,314	300	200	800	236	(514)	(514)	Fire pump required.
1850 (Lemon Grove)	74	15	88	184	1,500	1,684	370	247	1,370	186	(314)	(314)	Fire pump required.
1913 (Bundy Canyon East)	59		59	146	1,500	1,646	0	0	992	(146)	(654)	(654)	Not a concern. Can be met from the Farm
1940 (Cirrus Circle)	6		6	15	1,500	1,515	140	93	210	125	(1,305)	(1,305)	Fire pump required.
Total													

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7.4 Pipeline Replacement Plan

EVMWD's water system geographic information system (GIS) currently has approximately 743 miles of potable water pipelines. As a full asset-management analysis is beyond the scope of this WSMP, a desktop level pipeline replacement analysis was conducted along with planning level cost estimates using a number of general planning assumptions.

Based on the hydraulic modeling analysis:

- 67.1 miles of pipeline 4-inch and 6-inch diameter and smaller need to be upsized for fire protection and due to old age. These 67.1 miles of SDR were assumed to be replaced to avoid developing excessive individual fire flow projects and only included small pipes that were leading to deficient hydrant. There are still many other small diameter pipes in the distribution that will need to be replaced at the end of their useful life.
- Of the 52 fire flow projects, 21.9 miles have been identified as pipeline replacement.

These pipeline replacement projects total 89 miles and should be the first pipelines in the system to be replaced.

The remaining 654 miles (743 - 89) of pipeline were evaluated based on their remaining useful life. It was assumed that the average useful life for all pipeline materials is 75 years. Since the oldest pipeline in EVMWD's distribution system was installed in 1955 no pipelines will exceed their useful life until 2030. Some pipelines in EVMWD's GIS had an unknown age. Installation ages were estimated using the know age distribution of similar pipeline material type. The distribution of installation dates for the different pipeline materials were sampled and curves were developed for each material type. Finally, the installation age curves were applied to the pipelines with the unknown age.

Figure 7.14 shows the length of pipelines that need to be replaced, which was organized by planning year. As seen on Figure 7.14, approximately 83.9 miles of pipeline need to be replaced by 2050 with the average pipeline replacement rate of 3.4 miles per year between 2025 and 2050. The remaining 584.7 miles of pipe were outside the planning horizon for this WMP and will require approximately 11 miles of pipe to be replaced per year. EVMWD will need to significantly step up their pipeline replacement program in 2025 as parts of their distribution system begins to reach the end of its useful life. A majority of the distribution system was developed between 1980 and 1985 and between 1995 and 2000 which results in a major pipeline replacement effort being needed in in 2060 and 2075.

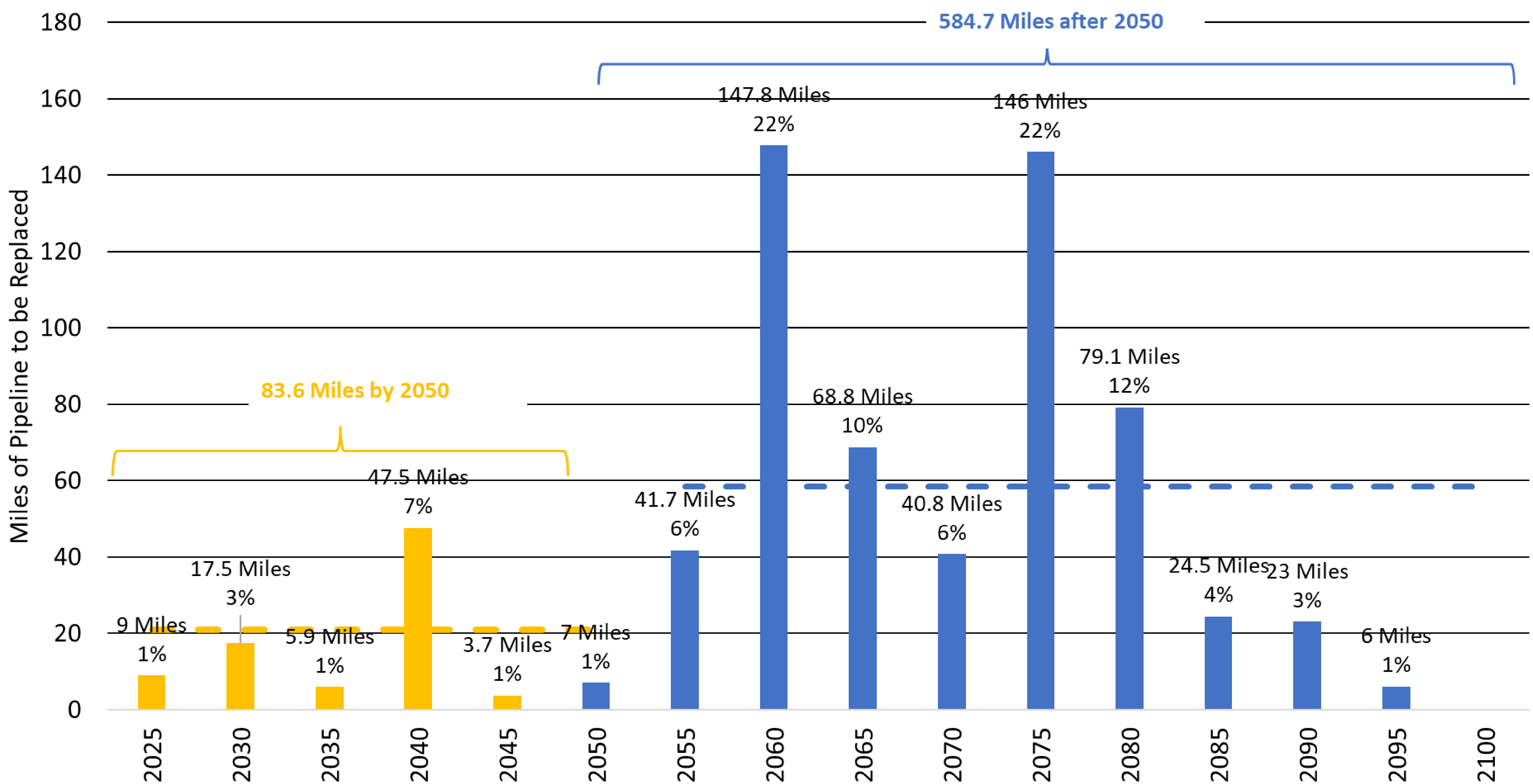
While most of the system pipelines have a known year of installation, about 34.2 percent of the pipelines had an unknown year of installation. It was recommended that the EVMWD perform a detailed investigation to determine the year of installation of all pipelines and the physical condition of the pipes due to replacement in the next decades before replacements are implemented. A proactive coupon testing program was recommended to be put in place before 2030 when the first 10 miles of the water distribution rehabilitation and replacement program would start based on this high-level capital planning effort.

The 83.9 miles of pipeline that need to be replace by 2050 were further broken down by diameter and shown in Table 7.9. The information in Table 7.9. was used to estimate the replacement cost by planning year. The pipeline replacement by planning year is shown on Figure 7.15. Only 13 miles of pipe are due for replacement in 2025 and these projects are grouped into the 2030 planning period.

Table 7.9 Pipeline Replacement by Planning Period and Diameter

Diameter (inches)(1)	Replacement Year						
	2025	2030	2035	2040	2045	2050	Total
8	13	43,316	9,168	28,863	204,370	12,834	**298,564**
10	-	1,173	3,695	2,442	35,536	5,306	**48,152**
12	-	2,694	35	-	12,826	1,129	**16,684**
14	-	-	1,799	-	-	-	**1,799**
16	-	-	14,864	-	-	136	**14,999**
24	-	103	30,472	-	-	-	**30,575**
36	-	66	32,357	-	-	-	**32,423**
Total (feet)	**-**	**47,352**	**92,390**	**31,305**	**252,732**	**19,404**	**443,197**
Total (miles)	**0.0**	**9.0**	**17.5**	**5.9**	**47.9**	**3.7**	**83.9**

Notes:
(1) pipelines less than 8-inch diameter were assumed to be replaced with 8-inch diameter.



Notes: Dotted lines indicate the average miles of pipeline to be replaced between 2025 and 2050 and between 2050 and 2100, respectively.

Figure 7.14 Pipeline Replacement by Planning Period

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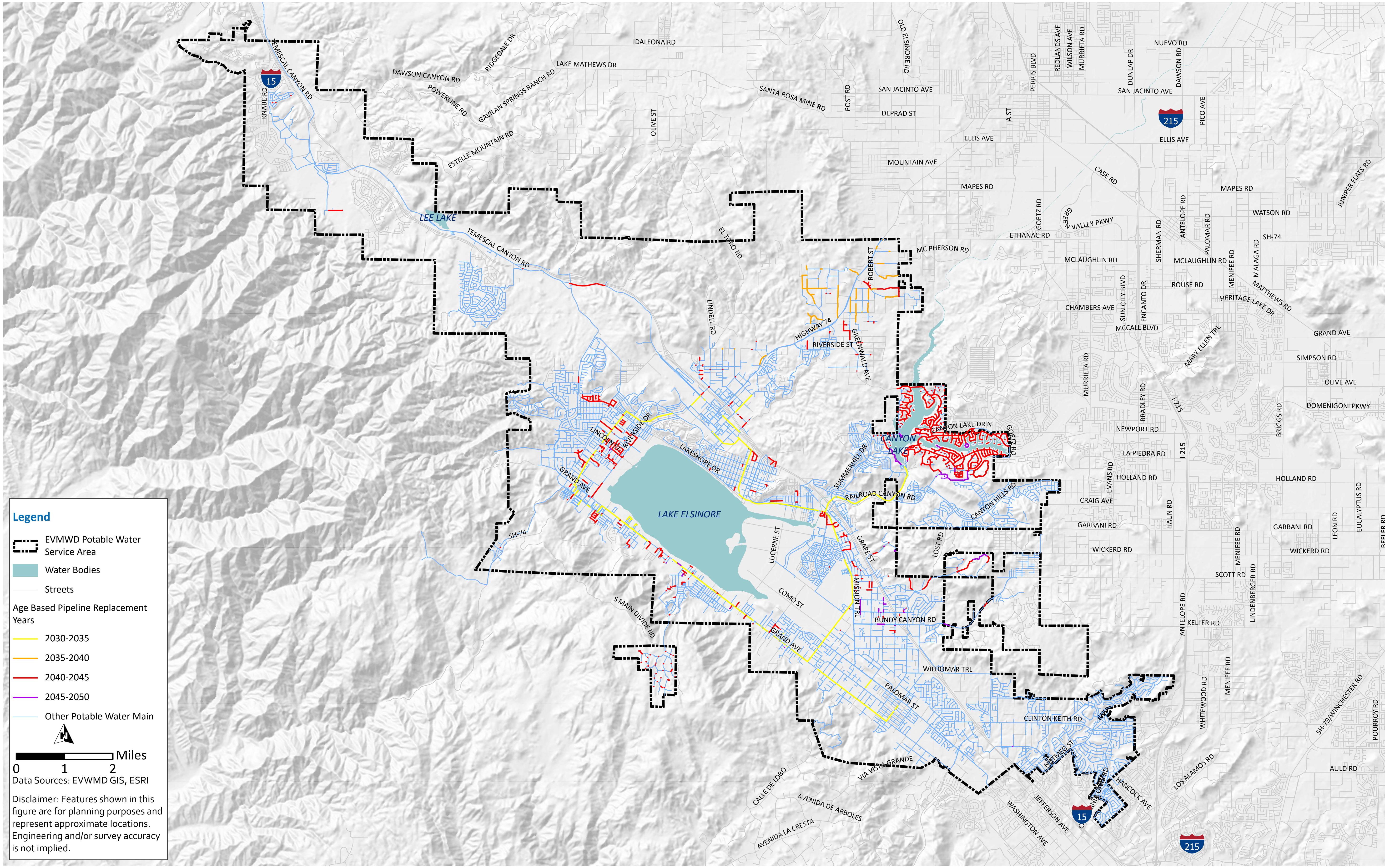

Figure 7.15 Age Based Pipeline Replacement

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7.5 Reservoir Replacement Plan

The existing distribution system consists of 70 reservoirs installed between 1967 and 2015. Based on the 75-year useful life criteria discussed in Section 5 for reservoirs, six reservoirs will need to be replaced within the planning horizon. Reservoirs will require continued maintenance, which is covered separately in the CIP presented in Section 9. These six reservoirs are shown in Table 7.10. A total of 2.4 MG of storage will need to be replaced by 2050.

Table 7.10 Reservoir Replacement Recommended Phasing

Reservoir Name	Installation Year	Pump and Motor Replacement Phasing	Replacement Size (MG)
Canyon Lake S	1970	2040-2045	1.0
Gafford Street B	1973	2045-2050	0.6
Los Pinos 1	1967	2040-2045	0.1
Los Pinos 2	1967	2040-2045	0.1
Skymeadows	1969	2040-2045	0.1
Waite Street	1968	2040-2045	0.5
Total			**2.4**

7.6 Pump Replacement Plan

The existing distribution system consists of 51 booster pumping stations, with a total of almost 150 pumps. About one-quarter of the booster stations (and associated pumps) have an unknown installation date. The remaining three-quarters were installed between 1955 and 2014. The expected useful life for pumps and motors is 20 years. Many of the pumps were past due for replacement and were recommended to be replaced before 2025. Based on the design life criteria, pumps that are scheduled for replacement between 2023 and 2025 will likely need to be replaced again in the 2040-2045 horizon. Similarly, pumps that are scheduled for replacement between 2025-2030 will likely need to be replaced again in the 2045-2050 horizon. Because each individual booster pump was not given an installation date, the installation date of the entire booster station was used to represent all the pumps within a station. The recommended pump replacements are shown in Table 7.11, which only includes the pumps and motor/electrical equipment but no PS building and pipeline appurtenances. Because installation dates of individual pumps may differ within a booster station, and individual booster station life depends on many factors besides age, it is important to use these replacement schedules as a general guideline and make replacements based on the physical conditions, hydraulic function, and energy usage of each booster pump.

Table 7.11 Age Based Booster Replacement Recommended Phasing

Pump Name	Installation Year	Number of Pumps	Pump and Motor Replacement Phasing
Adelfa	2014	2	2035-2040
Amie Sustaining	1984	1	2023-2025 and 2040-2045
Auld Valley	1989	4	2023-2025 and 2040-2045
Beck	1999	2	2023-2025 and 2040-2045
Bundy Canyon	1994	3	2023-2025 and 2040-2045
Bundy Canyon East	2014	1	2035-2040
Cal Oaks	2009	4	2030-2035
Canyon Lake	19701	4	2023-2025 and 2040-2045
Canyon Lake Sustaining	1970	2	2023-2025 and 2040-2045
Cielo Vista	2011	2	2035-2040
Cirrus Circle	2005	3	2025-2030 and 2040-2050
City	19951	3	2023-2025 and 2040-2045
Coldwater Booster	2012	2	2035-2040
Cottonwood 1	2003	3	2025-2030 and 2040-2050
Cottonwood 2	2003	3	2025-2030 and 2040-2050
Daley A	19981	2	2023-2025 and 2040-2045
Daley B	19981	2	2023-2025 and 2040-2045
Encina	2011	3	2035-2040
Farm	1989	3	2023-2025 and 2040-2045
Grand Avenue	1989	3	2023-2025 and 2040-2045
Greer Ranch 1	2004	3	2025-2030 and 2040-2050
Greer Ranch 2	2004	3	2025-2030 and 2040-2050
Horsethief 1	20001	4	2023-2025 and 2040-2045
Horsethief 2	1991	3	2023-2025 and 2040-2045
Inland Valley	2007	4	2030-2035
La Laguna 1	2005	3	2025-2030 and 2040-2050
La Laguna 2	2006	3	2030-2035
Lakeshore	1991	4	2023-2025 and 2040-2045
Lemon Grove	2002	5	2025-2030 and 2040-2050
Los Pinos 1	19671	2	2023-2025 and 2040-2045
Los Pinos 2A	19671	2	2023-2025 and 2040-2045
Los Pinos 2B	19671	2	2023-2025 and 2040-2045
Lucerne	1989	4	2023-2025 and 2040-2045

Pump Name	Installation Year	Number of Pumps	Pump and Motor Replacement Phasing
Meadowbrook 2	2004	3	2025-2030 and 2040-2050
Ortega	1990	4	2023-2025 and 2040-2045
Rice Canyon	1988	4	2023-2025 and 2040-2045
Rosetta Canyon 1	2005	2	2025-2030 and 2040-2050
Rosetta Canyon 2	2006	4	2030-2035
Sedco A	1998[1]	1	2023-2025 and 2040-2045
Sedco B	1998[1]	1	2023-2025 and 2040-2045
Skylark Sustaining	1996[1]	3	2023-2025 and 2040-2045
Skymeadows	1969[1]	2	2023-2025 and 2040-2045
Stage Ranch 1	1977	2	2023-2025 and 2040-2045
Stage Ranch 2	1977	2	2023-2025 and 2040-2045
Summerhill	1990	3	2023-2025 and 2040-2045
Tomlin 1	2003[1]	2	2025-2030 and 2040-2050
Tomlin 2	2003[1]	2	2025-2030 and 2040-2050
Tuscany Hills 1	1989	4	2023-2025 and 2040-2045
Tuscany Hills 2	1990	2	2023-2025 and 2040-2045
Waite	1988	4	2023-2025 and 2040-2045
Woodmoor PS	2007	4	2030-2035

Notes:
(1) Age of booster PS is unknown. The installation date of the associated reservoir was used for approximation.

As shown in Table 7.11, 30 PSs have pumps that exceeded their useful life. It is impractical for EVMWD to replace all of these pumps between 2023-2025, and, therefore, pump efficiency tests should be analyzed every few years to better prioritize the replacement of the booster pumps. It is also recommended that the EVMWD perform a detailed investigation to determine the year of installation and physical condition of the pumps with unknown year of installation before replacing them.

7.7 Well Replacement Plan

The existing distribution system consists of 13 wells installed between 1982 and 2022. The expected useful life for well pumps and motors and electrical equipment is 20 years, and the actual well and casing are assumed to have an estimated useful life of 75 years. None of the well casings were past their useful life before 2050. Many of the pumps were past due for replacement and are recommended to be replaced between now and 2025. Based on the design life criteria, pumps that are scheduled for replacement between 2023 and 2030 will likely need to be replaced again in the planning horizon. The recommended pump replacements are shown in Table 7.12. It is important to use these replacement schedules as a general guideline and make replacements based on the physical conditions, hydraulic function, and energy usage of each booster pump. Pump efficiency tests should be analyzed every few years to better prioritize the replacement of the well pumps.

Table 7.12 Age Based Well Pump Replacement Recommended Phasing

Well Name	Installation Year	Well Pump Replacement Phasing
Cereal No. 1 Well	1987	2023-2025 and 2040-2045
Cereal No. 3 Well	1993	2023-2025 and 2040-2045
Cereal No. 4 Well	1993	2023-2025 and 2040-2045
Corydon Street Well	1983	2023-2025 and 2040-2045
Diamond Well (A2)	2008	2025-2030 and 2045-2050
Joy Street Well	2003	2023-2025 and 2040-2045
Lincoln Street Well	N/A	Unknown
Lee Lake Well	2012	2040-2045
Machado Street Well	2001	2023-2025 and 2040-2045
Mayhew Well (4)	1982	2023-2025 and 2040-2045
Station 71 Well (4)	1982	2023-2025 and 2040-2045
Summerly (C5) Well	2008	2025-2030 and 2045-2050
Terra Cotta Well	2014	2040-2045

7.8 Drinking Water Regulations

Selected existing and potential federal and state drinking water regulations and water quality issues that have potential impact on the current and future water supply of EVMWD are described below. This WSMP is not intended to provide an all-inclusive discussion of drinking water regulations. This information presented is current as of March 2023:

- Groundwater Rule (GWR).
- Per- and Polyfluoroalkyl Substances (PFAS).

- Microbial/Disinfection Byproducts (MDBP) Rules.
- Hexavalent Chromium (Cr(VI)).
- Arsenic.
- Manganese.
- Microplastics.
- Lead and Copper Rule Revisions (LCRR).

7.8.1 Groundwater Rule (GWR)

The GWR applies to public water systems that use groundwater as a source of drinking water. This rule was put in place to help prevent fecal contaminant in water systems of which groundwater is more susceptible to this than surface water. To comply with the GWR, public water systems must complete the following:

1. Perform routine sanitary surveys of systems that require the evaluation of eight critical elements of a public water system and the identification of significant deficiencies.
2. Monitor systems that identified a positive sample during regular Total Coliform monitoring or assessment monitoring targeted at high-risk systems. This is triggered if the drinking water is not treated to remove 4-log of viruses.
3. Implement corrective action for any system with a significant deficiency or source water fecal contamination.
4. Monitor compliance with 4-log inactivation or removal of viruses by treatment technique.

7.8.2 PFAS

On March 14, 2023, the Environmental Protection Agency (EPA) released its proposed regulation for PFAS in drinking water. The draft National Primary Drinking Water Regulations proposes a maximum contaminant level (MCL) of 4 parts per trillion (ppt) for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). Four additional PFAS (GenX, perfluorobutane sulfonate [PFBS], perfluorononanoic acid [PFNA], and perfluorohexane sulfonate [PFHxS]) are also included under the draft regulation. The EPA proposes the use of a Hazard Index, a tool to evaluate public health risks based on exposure to chemical mixtures. Although hazard indices have been used in other government programs, like the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the EPA has not previously used this on drinking water standards. The Hazard Index for the PFAS mixture is 1.0 (unitless Hazard Index). Maximum contaminant level goals (MCLGs) for each PFAS are 0 ppt for PFOA and PFOS and 1 (unitless Hazard Index) for the PFAS mixture. These are summarized in Table 7.13.

The proposed regulation will undergo a public comment period for the next 60 days. Then, the EPA will review the provided feedback and finalize the regulation.

Table 7.13 Proposed MCLG and Proposed MCL

Compound	Proposed MCLG	Proposed MCL (Enforceable Levels)
PFOA	0	4.0 ppt (ng/L)
PFOS	0	4.0 ppt
PFNA	1.0 (unitless) Hazard Index	1.0 (unitless) Hazard Index
PFHxS		
PFBS		
HFPO-DA (commonly referred to as GenX Chemicals		

Notes:
Abbreviations: HFPO-DA - hexafluoropropylene oxide dimer acid; ng/L - nanograms per liter.

EVMWD has concentrations of PFAS above the proposed MCL in some of their water supplies. PFOA concentrations have been recorded as high as 7.8 ppt in blended Temescal groundwater and as high as 4.7 ppt in the TVP supplies, both of which are above the proposed MCL. PFOS concentrations as high as 6.3 ppt have been recorded in Elsinore Basin groundwater and as high as 5.9 ppt in TVP supplies. EVMWD is currently undergoing studies to determine how to address the PFAS concentrations in their water supplies.

7.8.3 Microbial/Disinfection Byproducts (MDBP) Rules

The EPA identified eight contaminants covered by MDBP as candidates for regulatory revision as part of the six-year review process. The eight candidates are: Chlorite, *Cryptosporidium*, haloacetic acids (HAA5), Heterotrophic Bacteria, *Giardia lamblia*, *Legionella*, total trihalomethanes (TTHMs), and viruses. The changes in monitoring requirements in Stage 1 and Stage 2 Disinfectants and Byproduct Rules (DBPR) are shown in Table 7.14.

Table 7.14 Changes in TTHM/HAA5 Monitoring Requirements

Monitoring Frequency	Category	Stage 1 DBPR	Stage 2 DBPR
Routine Monitoring	Number of Samples	Based on source water type, population, and number of treatment plants or wells.	Based on source water type and population.
	Sample Locations	At location of maximum residence time.(1)	Based on IDSE requirements.(2)
	Compliance Calculation	RAA must not exceed the MCL for TTHM or HAA5.	LRAA must not exceed the MCL for TTHM or HAA5.
Reduced Monitoring	Eligibility	TTHM/HAA5	All systems need TTHM RAA < 0.040 mg/L and HAA5 < 0.030 mg/L. Subpart H systems also need source water TOC RAA at location prior to treatment < 4.0 mg/L.(3,4) The Stage 2 DBPR left eligibility unchanged but specifies that Subpart H systems must take source water TOC samples every 30 days. Subpart H systems on reduced monitoring must take source water TOC samples every 90 days to qualify for reduced monitoring.

Notes:
Abbreviations: IDSE - Initial Distribution System Evaluation; LRAA - locational running annual average; mg/L - milligrams per liter; RAA - running annual average; TOC - total organic carbon.
(1) Subpart H systems serving ≥ 10,000 must have at least 25 percent of samples at the location of maximum residence time; the remaining samples must be representative of average residence time.
(2) All systems are required to satisfy their IDSE requirement by July 10, 2010.
(3) Subpart H systems are water systems that use surface water or groundwater under the direct influence (GWUDI) of surface water.
(4) Groundwater systems serving < 10,000 must meet these RAA for 2 years; can also qualify for reduced monitoring if the TTHM RAA ≤ 0.020 mg/L and a HAA5 RAA ≤ 0.015 mg/L for 1 year.

The regulated disinfection byproduct (DBP) and compliance with MCL and maximum residual disinfectant level (MRDLs) (routine monitoring) are shown in Table 7.15.

Table 7.15 DBP Regulated Contaminants and Disinfectants

Regulated Contaminants	Stage 1 DBPR		Stage 2 DBPR	
	MCL (mg/L)	MCLG (mg/L)	MCL (mg/L)	MCLG (mg/L)
TTHM	0.080	-	Unchanged(1)	-
Chloroform	-	0	-	Unchanged(1)

Regulated Contaminants	Stage 1 DBPR		Stage 2 DBPR	
	MCL (mg/L)	MCLG (mg/L)	MCL (mg/L)	MCLG (mg/L)
Bromodichloromethane	-	0.06	-	Unchanged(1)
Dibromochloromethane	-	0	-	Unchanged(1)
Bromoform				
HAA5	0.060	-	Unchanged(1)	-
Monochloroacetic Acid	-	-	-	0.07
Dichloroacetic Acid	-	0	-	Unchanged(1)
Trichloroacetic Acid	-	0.3	-	0.2
Bromoacetic Acid	-	-	-	-
Dibromoacetic Acid	-	-	-	-
Chlorite	1.0	0.8	Unchanged(1)	Unchanged(1)

Notes:
(1) Stage 2 DBPR did not revise the MCL or MRDL for this contaminant/disinfectant.

Surface water treatment rules require that microbial inactivation must be met at least:

- 99.99% (4-log) removal/inactivation of viruses.
- 99.9% (3-log) removal/inactivation of *Giardia lamblia.*
- 99% (2-log) removal of *Cryptosporidium.*

According to the 2021 EVMWD Consumer Confidence Report (CCR), EVMWD samples for the regulated DBP contaminants were below the MCL in MDBP rules. Neither total coliform bacteria nor *E. coli* violated the MDBP rules.

7.8.4 Hexavalent Chromium (Cr(VI))

The national primary drinking water regulation that established the MCL for total chromium of 0.1 mg/L was promulgated in 1991. The Safe Drinking Water Act requires EPA to periodically review the national primary drinking water regulation for each contaminant and revise the regulation, if appropriate. EPA reviewed total chromium as part of the second six-year review that was announced in March 2010. The EPA noted in March 2010 that it had initiated a reassessment of the health risks associated with chromium exposure and that EPA did not believe it was appropriate to revise the national primary drinking water regulation while that effort was in process.

In September 2010, EPA released a draft of the scientific human health assessment (Toxicological Review of Hexavalent Chromium) for public comment and external peer review. When this human health assessment is finalized EPA will carefully review the conclusions and consider all relevant information to determine if the current chromium standard should be revised.

To assess the levels of chromium-6 in drinking water, EPA is requiring a selected number of systems to perform chromium-6 monitoring under the third Unregulated Contaminant Monitoring Regulation (UCMR 3). The UCMR 3 requires many but not all public water systems to monitor chromium-6 for a one-year period.

The 2022 EPA Integrated Risk Information System (IRIS) assessment results in a reference dose that is 3.3 fold lower than the current reference dose. This translates to a Cr(VI) concentration in drinking water of 0.035 micrograms per liter (µg/L). In contrast the MCL in California has been 10 µg/L since July 1, 2014 and the current federal MCL is 100 µg/L for total chromium.

EVMWD has detected the concentration of Cr(VI) above 0.035 µg/L in some samples in their CCR 2021 ranging from Non-Detected to 3.9 µg/L. None of the samples exceeded the MCL of 10 µg/L in California. It is recommended that EVMWD continue to monitor the status of the Cr(VI) rulemaking process as new rules have the potential to affect EVMWD groundwater supplies.

7.8.5 Arsenic

The current MCL for arsenic is 10 µg/L, which was set by the United States Environmental Protection Agency (USEPA) in 2006. However, Office of Environmental Health Hazard Assessment (OEHHA's) Public Health Goal (PHG) is 0.004 µg/L (SWRCB, 2023). Although the USEPA is not currently reviewing the federal set arsenic regulation, the California Division of Drinking Water (DDW) is currently reviewing its MCL to see if it technically and economically feasible to reduce the MCL, so the standard is closer to the PHG goal.

While EVMWD currently treats or blends water from their groundwater wells to meet the arsenic rule, if California DDW reduces the MCL, this would have an impact on EVMWD operations. EVMWD should monitor DDW activity to determine whether new rules will impact groundwater supplies.

7.8.6 Manganese

EVMWD is currently required to notify and respond to manganese levels of 500 µg/L and 5,000 µg/L respectively. Additionally, a secondary MCL exists at 50 µg/L, which is based off aesthetic concerns (SWRCB, 2023). In February 2023, the DDW proposed new notification and responses levels for manganese of 20 µg/L and 200 µg/L (SWRCB, 2023). The manganese concentrations from EVMWD were between non-detection and 42 µg/L in 2021, which did not violate MCL. However, some concentrations of manganese in EVMWD might potentially exceed the new notification level and it may require concern.

7.8.7 Microplastics

In August 2022, the SWRCB released a handbook which established methods for testing and reporting of microplastics in drinking water. For the next four years, the City along with other public utilities across the state are required to test and report for the presence of microplastics (SWRCB, 2023). This reporting period will inform the creation of MCL for the contaminant. The four-year monitoring period has not officially started because SWRCB is resolving logistical challenges that prevent the testing and reporting from taking place (SWRCB, 2023). The monitoring period is tentatively set to start during the summer of 2023.

7.8.8 Lead and Copper Rule Revisions (LCRR)

Table 7.16 summarizes rule requirements within each of the six key areas. development of a lead service line (LSL) inventory, potential action in the event of an individual lead concentration above 15 µg/L, potential revisions to the lead and copper compliance sampling locations, notification requirements until all service line materials are confirmed, and sampling requirements for schools and childcare facilities.

The EVMWD is charged with implementing the LCRR for the State of California. The LCRR provides leeway for state implementation of the rule, particularly related to requirements for the LSL inventory. The following paragraphs elaborate on the LCRR requirements anticipated to most significantly impact EVMWD, along with relevant state-specific considerations.

Table 7.16 Summary and Insight for Lead and Copper Rule Revisions (LCRR)

Focus Area	Rule Requirement
Identifying Areas Most Impacted	• Complete an LSL inventory. • Systems without LSLs must demonstrate their absence.
Strengthening Treatment Requirements	• 10 µg/L TL in addition to the current 15 µg/L AL. • If the TL is exceeded based on 90th percentile lead concentrations, systems must re-optimize CCT or conduct a study if CCT is not currently in place. • Calcium hardness adjustment is no longer a lead CCT option and phosphate inhibitors must be orthophosphate. • Calcium, conductivity, and temperature analyses are no longer required as part of the WQP sampling. • If an individual tap sample exceeds 15 µg/L, systems must collect a follow-up sample, conduct WQP monitoring at or near the site (0.5-mile radius, similar PZ), and perform a corrective action. This is termed a "find-and-fix" approach.

Focus Area	Rule Requirement
Systematically Replacing LSL	• Systems with lead above the TL must develop a goal for LSL replacement; 3 percent LSL replaced per year with systems above the AL. • No partial LSLs can be conducted. • Utilities must replace their portion of an LSL within 45 days if the customer replaces their portion.
Increasing Sample Reliability	• Prioritize sample collection from sites served by LSLs. • For sites with LSLs, the fifth liter should be collected. • Collect samples in wide-mouth bottles with no cleaning, flushing, etc. prior to sample collection.
Improving Risk Communication	• Utilities must notify individual tap sample consumers within 3 days of a 15 µg/L sample detection. • Utilities must inform customers served by an LSL or lead status unknown service line. • Consumer Confidence Report must provide updated health effects language and information regarding LSL replacement programs. • Utilities must notify system-wide customers of lead AL exceedance within 24 hours. • Systems must improve public access to lead information, including LSL locations, and respond to requests for LSL information, deliver educational materials to customers during water-related work that could disturb LSLs, and provide increased information to health care providers.
Protecting Children in Schools and Childcare Facilities	• Develop a list of schools and childcare facilities by the 2024 compliance deadline. • Test 20 percent of licensed childcare facilities and elementary schools each year. • Provide testing to secondary schools on request. • Provide information and communicate results to users of the facility, parents, Primacy Agency, and the local or state health department.

Notes:
Abbreviations: AL - action levels; CCT - corrosion control treatment; TL - trigger level; WQP - water quality parameter.

EVMWD completed drinking water lead testing at all K-12 public schools in the service areas during 2018-19, according to the request by EPA. None of the schools exceeded the AL of 15 µg/L nor TL of 10 µg/L for Lead in tap waters. None of the samples also exceeded the AL for Copper.

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Chapter 8

FUTURE SYSTEM ANALYSIS

This Chapter describes the evaluation of the water distribution system under future demand conditions within Elsinore Valley Municipal Water District's (EVMWD's) service area. Hydraulic deficiencies based on the evaluations are identified and infrastructure improvements are recommended to address the deficiencies. The hydraulic model is used to create scenarios in five-year increments through the year 2050.Transmission pipeline, booster, and storage improvement needs are evaluated at each horizon based on the criteria defined in Chapter 6 and demands described in Chapter 3. The following analyses were performed under future system demand conditions:

- Supply analysis.
- Analysis and update of pressure zone (PZ) boundaries.
- Transmission analysis of conveyance and sizing for future developments.
- An evaluation of the adequacy of the storage and pumping facilities.
- Fire flow analysis.

The recommended improvements discussed in this Chapter are summarized in the Capital Improvement Plan (CIP) described in Chapter 9. Before any future system analyses were performed, it was assumed that all the existing system recommendations presented in Chapter 7 would be implemented.

8.1 Future System Supply Capacity Analysis

The existing water supplies for EVMWD consists of groundwater, Canyon Lake Water Treatment Plant (CLWTP), Auld Valley Pipeline (AVP), and Temescal Valley Pipeline (TVP) (gravity fed). These four water sources currently supply the system with 60.9 million gallons per day (mgd). There is an additional capacity of 0.4 mgd and 0.9 mgd of supply being added to EVMWD's supplies with the current Palomar Well and Lee Lake Wells, respectively. With these projects that are underway, EVMWD's supply capacity increase to a total of 62.2 mgd.

The existing and future supply and demand capacity comparison is shown in Table 8.1 and is graphically presented on Figure 8.1. This comparison demonstrates the existing and future supply surplus and deficit under maximum day demand (MDD) conditions with all supplies active, without well supplies, and without the Elsinore Basin Wells.

Table 8.1 Supply Capacity and MDD Capacity Comparison

Supply/Demand (mgd)	2022	2025	2030	2035	2040	2045	2050
Demands							
ADD	21.6	26.6	28.7	30.9	33.3	35.9	38.6
MDD	37.8	46.6	50.2	54.1	58.3	62.8	67.6
Supplies							
AVP	24.2	24.2	24.2	24.2	24.2	24.2	24.2
TVP	12.7	12.7	12.7	12.7	12.7	12.7	12.7
CLWTP	7.0(1)	7.0	7.0	7.0	7.0	7.0	7.0
Back Basin Wells(2)	11.7	11.7	11.7	11.7	11.7	11.7	11.7
North Basin Wells(2)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Coldwater Basin Wells	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Flagler Wells(3)	1.3	1.3	1.3	1.3	1.3	1.3	1.3
Palomar Well(4)	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Lee Lake Wells(5)	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Total Supplies	**62.2**	**62.2**	**62.2**	**62.2**	**62.2**	**62.2**	**62.2**
Total Without Wells	**43.9**	**43.9**	**43.9**	**43.9**	**43.9**	**43.9**	**43.9**
Total Without Elsinore Basin Wells	**47.1**	**47.1**	**47.1**	**47.1**	**47.1**	**47.1**	**47.1**
Total Supply Balance With All Supplies in Service(6)	24.4	15.7	12.0	8.2	4.0	(0.6)	(5.3)
Balance Without Wells(6)	6.1	(2.7)	(6.4)	(10.2)	(14.4)	(19.0)	(23.7)
Balance Without Elsinore Basin Wells(6)	9.3	0.6	(3.1)	(7.0)	(11.2)	(15.7)	(20.4)

Notes:
Abbreviations: ADD - average daily demand.
(1) CLWTP is temporarily out of service due to construction.
(2) Wells are located in the Elsinore groundwater basin.
(3) Wells are located in the Bedford groundwater basin.
(4) Well is currently pending and is anticipated to be online in 2023.
(5) Well is currently pending.
(6) Supply Balance is calculated using MDD.

As demonstrated in Table 8.1 and on Figure 8.1, proactive supply portfolio management will be required as demand increases in the future. The existing supply capacities should be sufficient to supply ADD through the 2050 demand horizon and MDD through the 2045 demand horizon. However, EVMWD will need to construct additional supply capacity before 2050. Currently the Temescal Valley Pump Station (PS) is planned which will increase the supply to EVMWD to 29.0 mgd in approximately 2035 (PW-PU-30).

EVMWD is also updating their Integrated Resources Plan in parallel to this WSMP to evaluate their need for additional water supplies.

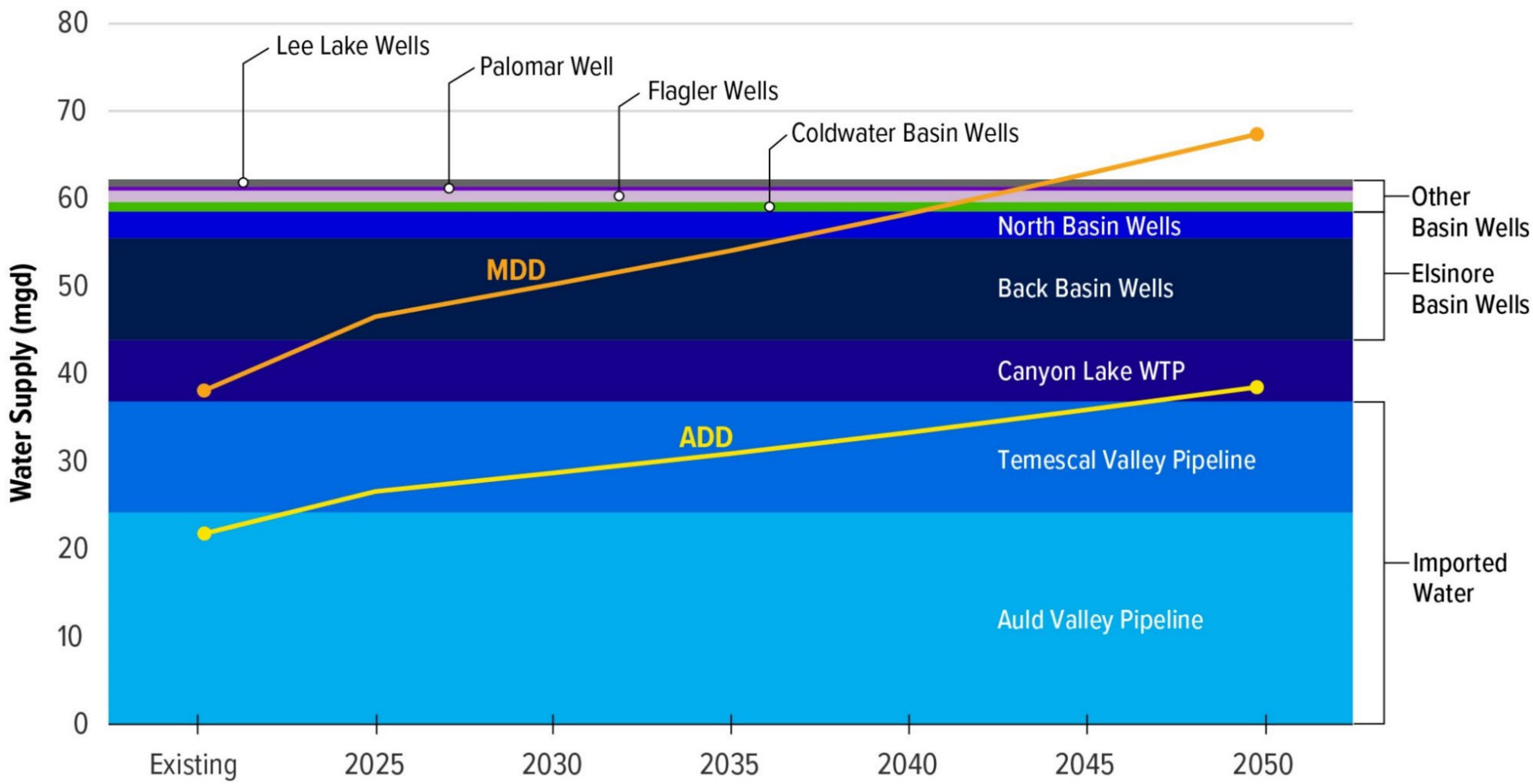

Figure 8.1 Existing Supply and Demand Comparison

Currently, EVMWD could meet MDD with only imported water and treated water from CLWTP and without any groundwater supplies. By the 2025 planning horizon, EVMWD will need to rely on some wells to be in service in addition to imported water from Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD), as well as treated water from the CLWTP.

8.2 Future System Pressure Zones (PZs)

As the cities and communities within EVMWD's service area further develop, it is important to have a PZ map based on topography to plan the best service options for new development. In the existing system, pressures are planned to fall within the range of 40 pounds per square inch (psi) to 125 psi. As described in the Existing System Evaluation in Chapter 7, there are areas of individual customers that fall outside of this range. Likewise, in future system zone delineation, there are some cases where pressures will be expected to fall outside the recommended pressure ranges to avoid very small pressure reducing valves (PRV) PZs or hydrostatic zones.

The minimum pressure for developments in new developments is 60 psi per the criteria adopted by the Board of Directors in 2015. This higher pressure requirement is due to multi-story development and fire protection, with a standard higher than the 40 psi requirement which was traditionally used.

When delineating new PZs in currently undeveloped areas, the existing hydraulic grade lines (HGLs) were maintained where possible to allow EVMWD to interconnect the new zones with the existing zones where the HGLs were similar, as development and expansion allows. United States Geological Survey (USGS) elevation maps were used to determine the elevation of the vacant land and then either assign it to an existing PZ, where minimum and maximum pressures would allow; otherwise, new pressures zones were developed. Additionally, the low-pressure improvements from Chapter 7 required some PZs to be shifted, which was also accounted for when delineating the future PZs. The proposed new PZ configuration that incorporated all the known future system developments is illustrated on Figure 8.2.

8.3 Future System Transmission Analysis

The hydraulic model was used to identify the best alignments and size future transmission pipes for conveyance of MDD through the future distribution system as well as sizing of the future transmission pipes that serve as backbone pipes to future developments.

The transmission analysis for the future system is based on the planning criteria defined in Chapter 6. The maximum velocity limit in transmission pipes under peak hour demand (PHD) conditions is 6 feet per second (fps), with the exception of the transmission pipes in the 1434 Zone with a maximum velocity criterion of 3 fps due to large distances between the tanks.

Growth related transmission improvements play an important role in the future system, since many of the new developments are not in areas previously covered by the distribution network. The transmission improvements needed to serve future developments were added to the model and sized accordingly. The growth-related transmission improvements do not include the entire distribution network required to serve all customers within proposed large developments. A backbone transmission system was sized for each new development area to transfer water throughout the service area to facilities serving the future developments. Additionally, new pumps and conveyance piping to move water from one side of the 1434 Loop Zone were also recommended.

The transmission recommendations are summarized in Table 8.2 and shown on Figure 8.3. Additionally, descriptions of each project are listed in Section 8.7.

As shown in Table 8.2, there are 25 new transmission main recommendations ranging from 16 to 36 inches in diameter. These transmission pipes have a combined length of 154,400 feet or nearly 30 miles. As shown on Figure 8.3, the majority located in the 1434 Loop Zone to improve conveyance between the reservoirs under a variety of supply and outage configurations.

Table 8.2 Future System Transmission Recommendations

CIP/Map ID	Description	Diameter (inches)	Length (feet)	Phase
PW-TR1	2001 Horsethief 3 Zone Transmission	16	2,100	2023-2025
PW-TR2	1434 Zone Transmission in Alberhill Villages	24	5,400	2025-2030
PW-TR3	Zone 1601 Pipeline in Alberhill Villages	30	10,500	2025-2030
PW-TR5	Mountainous Northwest Pipeline (1801) in Alberhill Villages	16	15,500	2030-2035
PW-TR7A	Lucerne PS Suction/Discharge Pipeline	36	1,100	2023-2025
PW-TR7B	1434 Transmission from Temescal Canyon Road to Alberhill PS	24/36	7,500	2025-2030
PW-TR8	1434 Transmission from Alberhill PS to Baker/Nichols	36	6,300	2025-2030
PW-TR9	1434 Transmission from Baker/Nichols to Nichols/Collier	24	1,800	2025-2030
PW-TR10	1434 Transmission from Baker/Nichols to Baker Tank	24	4,200	2025-2030
PW-TR11	1601 Transmission from Alberhill PS to Nichols/Terra Cotta	16	3,200	2025-2030
PW-TR12	Zone 1601 Pipeline in Terra Cotta Road	16	3,600	2025-2030
PW-TR13	1601 Transmission from Nichols/Terra Cotta to Nichols/Baker	16	3,500	2025-2030
PW-TR14	North Peak PS Suction/Discharge Pipeline	16	15,600	2025-2030
PW-TR15	Zone 1676 Pipeline in Alberhill	16	4,400	2025-2030
PW-TR16	1434 Transmission in Grand Avenue	24	22,800	2023-2025
PW-TR20	Zone 1601 Pipeline from Dexter/3rd to Summerhill Area	30	12,400	2025-2030
PW-TR21	Porto Romano Pipeline (1601) from Camino del Norte to Rosetta Canyon Road	16	8,200	2025-2030
PW-TR22	1801 Spyglass Transmission	16	3,500	2025-2030
PW-TR23	1801 Spyglass Transmission	16	1,500	2025-2030
PW-TR25	1801 Transmission in Mauricio Street	16	13,100	2025-2030
PW-TR26	1801 Transmission in North Tuscany Hills	16	6,500	2035-2040
PW-TR31	1746 Bundy Gafford Zone Transmission	20	5,800	2023-2025
PW-TR32	1901 Ortega Transmission	8/16	1,700	2035-2040
Total		**16-36**	**154,400**	

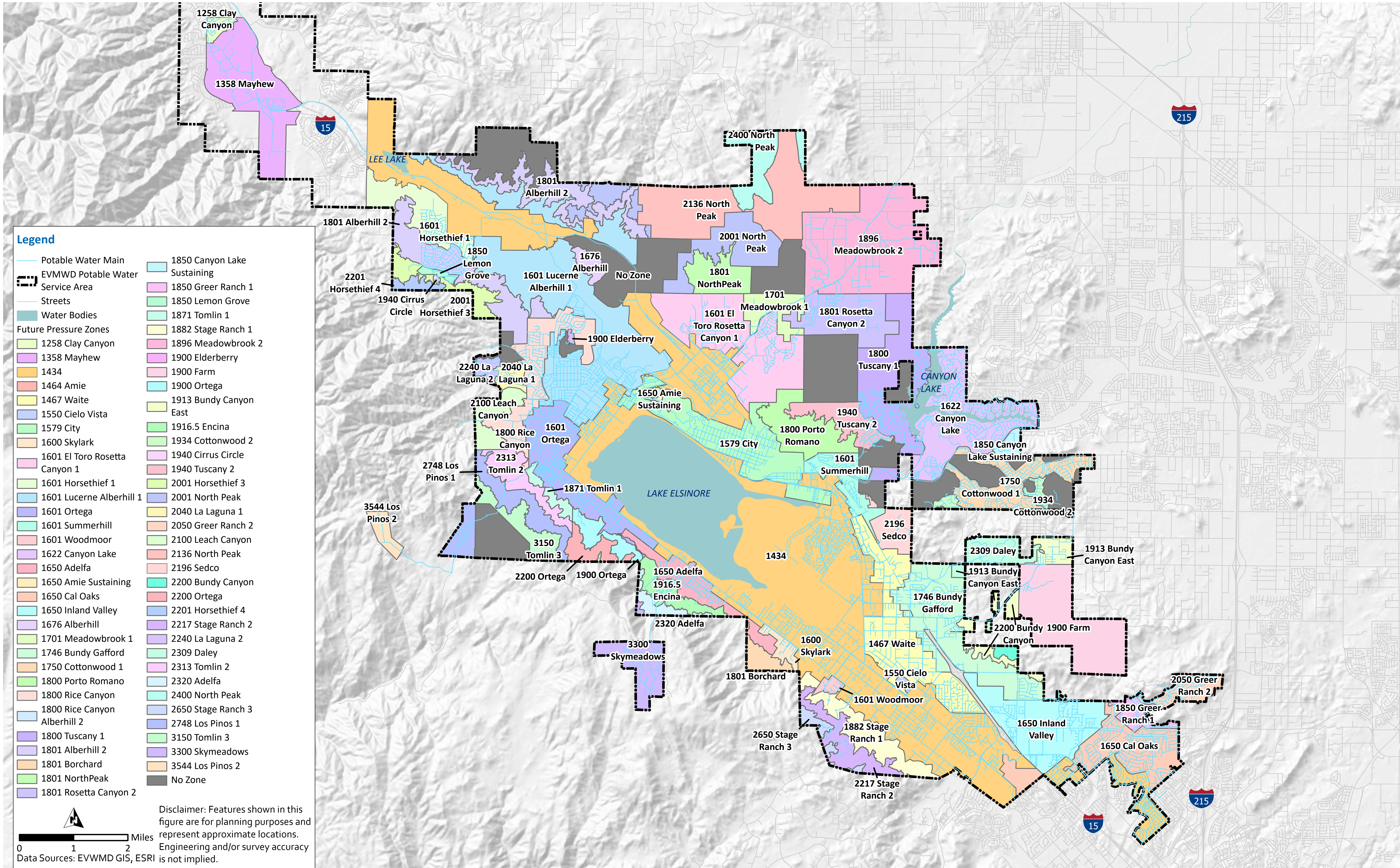

Figure 8.2 Future Pressure Zone Boundaries

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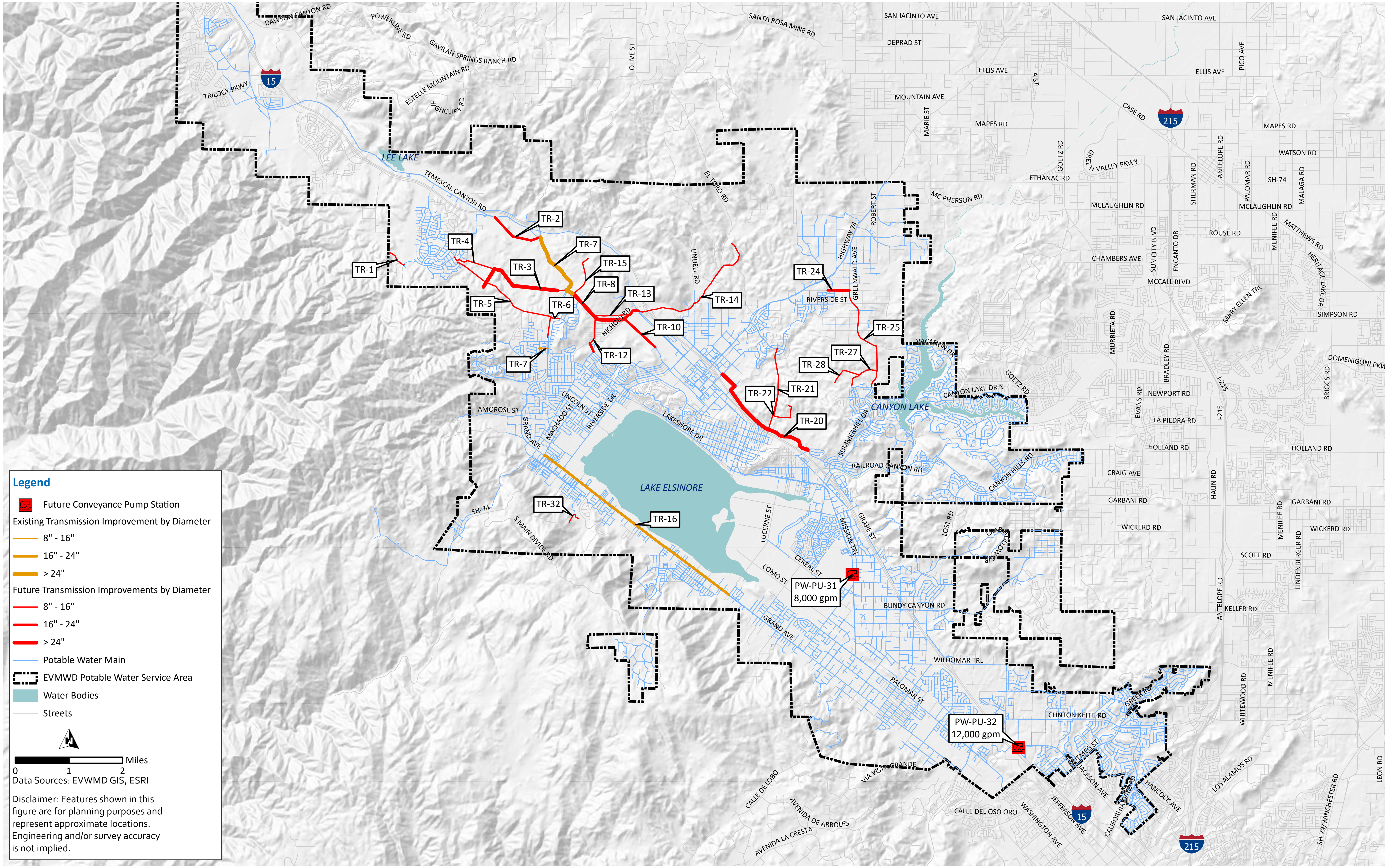

Figure 8.3 Future System Transmission Recommendations

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8.4 Future System Storage Evaluation

The storage and emergency supply analyses are performed for each PZ and for each future planning year through the master plan horizon of year 2050. As discussed in Chapter 6, total required storage is a combination of the following three components:

1. Operational storage.
2. Fire flow storage.
3. Emergency storage.

The storage balance using all three components under 2050 demand conditions for each PZ are summarized in Table 8.3.

As shown, the system-wide sum of the storage deficits in 2050 is 30.5 million gallons (MG). The system-wide sum of the existing storage deficits is 9.3 MG. Hence, 21.2 MG (70 percent) of the total future storage deficit can be attributed to future growth. The recommendations to address these future deficiencies, are summarized in Table 8.4 and shown on Figure 8.4. A total of 22 new storage recommendations are made with a total volume of 31 MG. These improvements can be categorized as follows:

- PZs with existing system storage deficiencies that will require even more capacity to accommodate future growth:
  - 1467 Waite Zone.
  - 1571 City Zone.
  - 1601 Horsethief 1 Zone.
  - 1622 Canyon Lake Zone.
  - 1746 Bundy Canyon/Gafford Zone.
  - 1801 Horsethief 2 Zone.
  - 1882 Stage Ranch 1 Zone.
  - 1896 Meadowbrook 2 Zone.
  - 2050 Greer Ranch 2 Zone.
  - 2196 Sedco Zone.
  - 2309 Daley Zone.
  - 2758 Los Pinos 1 Zone.
- PZs with new storage recommendations due to growth:
  - 1601 Alberhill 1 Zone.
  - 1601 Rosetta Canyon 1 Zone.
  - 1800 Rice Canyon/Alberhill 2 Zone.
  - 1801 Rosetta Canyon 2 Zone.

- PZs with deficits that are addressed from storage or storage recommendations in other PZs:
  - 1358.7 Mayhew Zone and 1258.4 Clay Canyon Zone (Temescal Domestic Service Area).
  - 1601 Lucerne Zone.
  - 1601 Ortega Zone.
  - 1650 Inland Valley Zone.
  - 1800 Tuscany Hills 1 Zone.
  - 1850 Greer Ranch 1 Zone.
  - 1871 Tomlin 1 Zone (to be served by PRV from 2778 Los Pinos 1 Zone, see Chapter 7).
  - 2217 Stage Ranch 2 Zone (to be served by fire pump from 1882 Stage Ranch 1 Zone, see Chapter 7).
  - 2313 Tomlin 2 Zone (to be served by PRV from 2778 Los Pinos 1 Zone, see Chapter 7).
  - 3300 Skymeadows Zone (to be served by fire pump from 1916.5 Encina Zone, see Chapter 7).
  - 3544 Los Pinos 2 Zone (to be served by fire pump from 2748 Los Pinos 1 Zone, see chapter 7).
- New storage tanks serving new PZs:
  - 1800 Spyglass Zone.
  - 1901 Ortega Zone.
  - 2001 Horsethief 3 Zone.
  - 2001 North Peak Zone.

The total recommended storage is less in this WSMP compared to the 2016 Water System Master Plan. This is because the total projected demand in 2050 is lower than the 2040 projected demand in the 2016 Water System Master Plan, due to generally lower demands per capita.

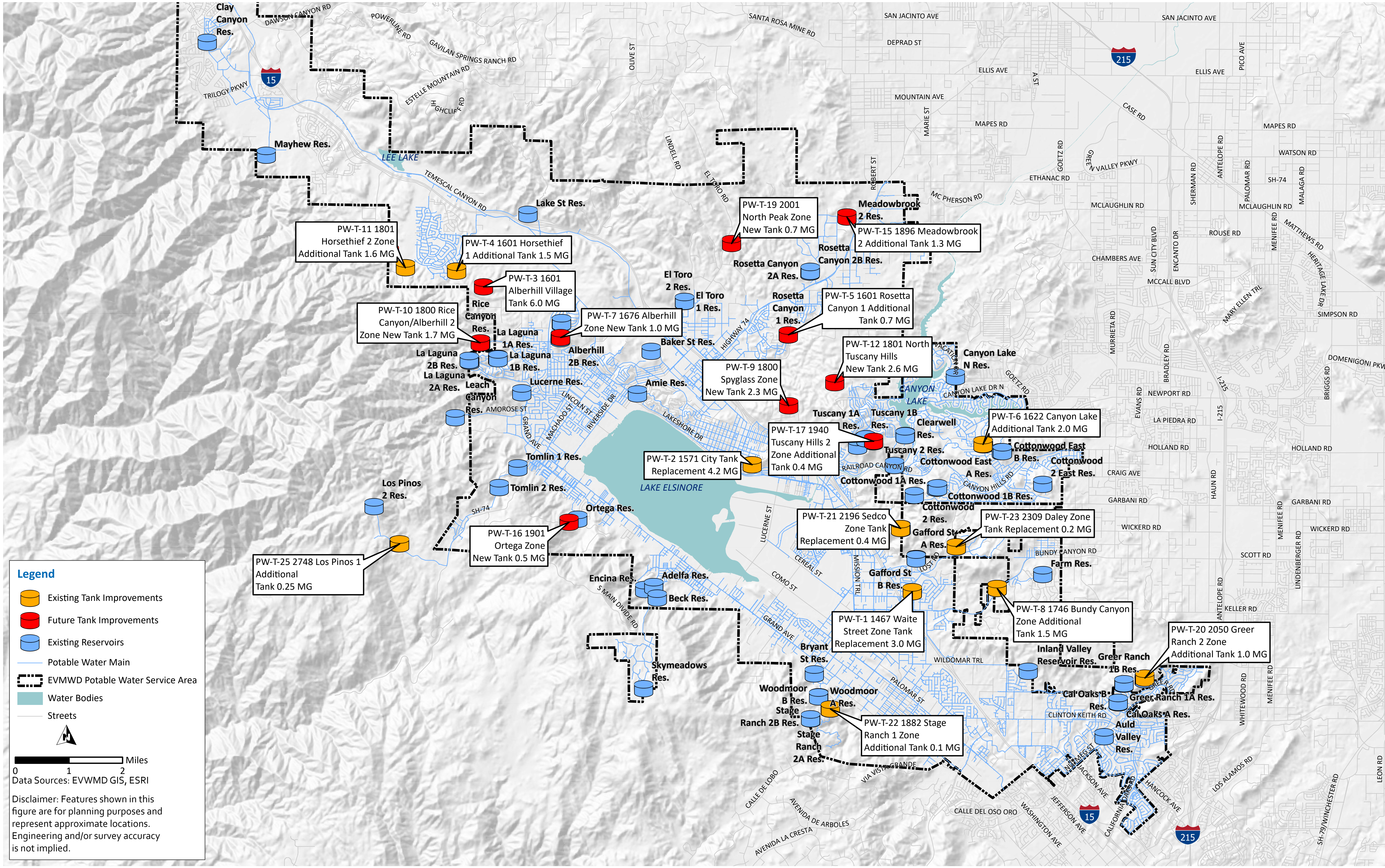

Figure 8.4 Future System Storage Recommendations

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Table 8.3 Future System Storage Capacity Evaluation for 2050

Description/Criteria	MDD (mgd)	Fire Flow Required (gpm)	Fire Duration (hours)	Operational Storage (30% of MDD)	Fire Storage (MG)	Emergency Storage (1 MDD)	Total Volume Required (MG)	Storage Tanks (MG)	Surplus Storage (MG)	Recommended Storage (MG)	2016 MP Recommendation (MG)	Comments
1358.7 (Mayhew, Clay Canyon)	0.67	4,000	4	0.20	0.96	0.67	1.83	0.32	(1.51)	0.00	N/A	No Recommendation.
1434 (Loop Zone)	16.04	4,000	4	4.81	0.96	16.04	21.82	31.50	9.68	0.00	(5.11)	No Recommendation.
1464 (Amie)	0.01	1,000	2	0.00	0.12	0.01	0.13	0.30	0.17	0.00	N/A	No Recommendation.
1467 (Waite)	1.60	4,000	4	0.48	0.96	1.60	3.05	2.50	(0.55)	0.60	N/A	No Recommendation.
1571 (City)	2.45	4,000	4	0.73	0.96	2.45	4.14	1.73	(2.41)	4.20	(4.29)	New tank with HWL of 1,600 feet. Existing tank to be abandoned.
1601 (Alberhill 1)	4.97	3,500	3	1.49	0.63	4.97	7.08	3.00	(4.08)	6.00	(7.16)	New tank in Alberhill Villages area.
1601 (Horsethief 1)	1.52	3,500	3	0.46	0.63	1.52	2.61	1.20	(1.41)	1.50	N/A	New tank at Horsethief 1 site.
1601 (Lucerne)	2.03	3,500	3	0.61	0.63	2.03	3.26	2.50	(0.76)	0.00	N/A	No Recommendation.
1601 (Ortega)	1.61	2,500	2	0.48	0.3	1.61	2.40	2.20	(0.20)	0.00	(1.11)	No recommendation; Covered by recommendation in Alberhill.
1601 (Rosetta Canyon 1)	2.72	2,500	2	0.82	0.3	2.72	3.84	3.15	(0.69)	0.70	(1.00)	New tank at Rosetta Canyon 1 site.
1601 (Summerhill)	1.13	2,500	2	0.34	0.3	1.13	1.77	2.35	0.58	0.00	(0.11)	No Recommendation.
1601 (Woodmoor)	0.14	1,250	2	0.04	0.15	0.14	0.34	0.50	0.16	0.00	0.23	No Recommendation.
1622 (Canyon Lake N & S)	2.47	3,500	3	0.74	0.63	2.47	3.84	2.00	(1.84)	2.00	(3.89)	New tank at Canyon Lake South.
1650 (Adelfa)	0.39	1,500	2	0.12	0.18	0.39	0.68	0.80	0.12	0.00	(0.91)	No Recommendation.
1650 (Cal Oaks)	2.68	3,500	3	0.80	0.63	2.68	4.12	7.00	2.88	0.00	(0.63)	No Recommendation.
1650 (Inland Valley)	2.42	4,000	4	0.73	0.96	2.42	4.11	2.40	(1.71)	0.00	N/A	No recommendation; Cal Oaks can supply deficiency.
1676 (Alberhill)	0.32	2,500	2	0.10	0.3	0.32	0.72	0.00	(0.72)	1.00	N/A	New tank.
1746 (Bundy Canyon)	2.30	4,000	4	0.69	0.96	2.30	3.95	2.61	(1.34)	1.50	(2.16)	New tank at Bundy Canyon site.
1750 (Cottonwood 1)	2.91	3,500	3	0.87	0.63	2.91	4.41	4.60	0.19	0.00	0.31	No Recommendation.
1800 (Spyglass)	1.54	2,500	2	0.46	0.3	1.54	2.30	0.00	(2.30)	2.30	(1.68)	New tank.
1800 (Rice Canyon, Alberhill 2)	2.96	3,500	3	0.89	0.63	2.96	4.48	2.86	(1.62)	1.70	(1.66)	New tank at Rice Canyon.
1800 (Tuscany Hills 1)	2.78	3,500	3	0.83	0.63	2.78	4.25	2.60	(1.65)	0.00	(0.81)	New tank at North Tuscany Hills.
1801 (Horsethief 2)	2.08	3,500	3	0.62	0.63	2.08	3.34	0.00	(3.34)	1.60	(0.80)	New tank at Horsethief 2.
1801 (Rosetta Canyon 2)	1.54	2,500	2	0.46	0.3	1.54	2.31	1.40	(0.91)	2.60	0.06	New tank at North Tuscany Hills to cover Rosetta Canyon and Tuscany Hills deficiency.
1842 (Beck)	0.00	1,500	2	0.00	0.18	0.00	0.18	0.13	(0.05)	0.00	N/A	No Recommendation.
1850 (Greer Ranch 1)	0.44	3,500	3	0.13	0.63	0.44	1.20	1.00	(0.20)	0.00	(0.81)	No Recommendation.
1871 (Tomlin 1)	0.00	1,500	2	0.00	0.18	0.00	0.18	0.02	(0.16)	0.00	(0.07)	Add PRV for fire at Tomlin 2 PS in lieu of new tank.

Description/Criteria	MDD (mgd)	Fire Flow Required (gpm)	Fire Duration (hours)	Operational Storage (30% of MDD)	Fire Storage (MG)	Emergency Storage (1 MDD)	Total Volume Required (MG)	Storage Tanks (MG)	Surplus Storage (MG)	Recommended Storage (MG)	2016 MP Recommendation (MG)	Comments
1882 (Stage Ranch 1)	0.04	1,000	2	0.01	0.12	0.04	0.18	0.10	(0.08)	0.096	(0.13)	New tank at Stage Ranch 1 (same size as existing).
1896 (Meadowbrook 2)	0.97	4,000	4	0.29	0.96	0.97	2.22	1.00	(1.22)	1.30	(1.41)	New tank at Meadowbrook 2.
1900 (The Farm)	0.00	2,500	2	0.00	0.3	0.00	0.30	0.43	0.13	0.00	N/A	No Recommendation.
1901 (Ortega)	0.23	1,250	2	0.07	0.15	0.23	0.45	0.00	(0.45)	0.50	N/A	New tank in new zone.
1916.5 (Encina)	0.29	1,500	2	0.09	0.18	0.29	0.56	0.50	(0.06)	0.00	0.28	No Recommendation.
1934 (Cottonwood 2)	0.60	1,250	2	0.18	0.15	0.60	0.93	1.00	0.07	0.00	0.20	No Recommendation.
1940 (Tuscany Hills 2)	0.42	1,250	2	0.13	0.15	0.42	0.70	1.00	0.30	0.40	0.26	New tank at Tuscany Hills 2.
2001 (Horsethief 3)	0.48	1,250	2	0.14	0.15	0.48	0.78	0.00	(0.78)	0.80	N/A	New tank in new zone.
2001 (North Peak)	0.38	1,000	2	0.12	0.12	0.38	0.62	0.00	(0.62)	0.70	N/A	New tank in new zone.
2040 (La Laguna 1)	0.16	1,500	2	0.05	0.18	0.16	0.39	0.93	0.54	0.00	0.42	No Recommendation.
2050 (Greer Ranch 2)	1.06	3,500	3	0.32	0.63	1.06	2.01	1.29	(0.71)	1.00	(1.17)	New tank at Greer Ranch 2; slightly extra storage to cover Greer Ranch 1 deficiency.
2196 (Sedco)	0.20	1,000	2	0.06	0.12	0.20	0.38	0.09	(0.29)	0.40	0.72	Replace existing Sedco Tank.
2217 (Stage Ranch 2)	0.06	1,000	2	0.02	0.12	0.06	0.20	0.10	(0.10)	0.00	(0.11)	Add fire pump at Stage Ranch 2 PS (1,000 gpm) in lieu of storage.
2240 (La Laguna 2)	0.50	1,250	2	0.15	0.15	0.50	0.80	1.07	0.27	0.00	0.44	No Recommendation
2309 (Daley)	0.03	1,000	2	0.01	0.12	0.03	0.15	0.09	(0.07)	0.20	0.66	New tank replacing existing tank.
2313 (Tomlin 2)	0.00	1,000	2	0.00	0.12	0.00	0.12	0.05	(0.07)	0.00	(0.07)	Add PRV for fire at Los Pinos 1 PS in lieu of new tank.
2748 (Los Pinos 1)	0.03	2,500	2	0.01	0.3	0.03	0.34	0.10	(0.24)	0.25	(0.10)	No Recommendation.
3300 (Skymeadows)	0.06	1,250	2	0.02	0.15	0.06	0.23	0.10	(0.13)	0.00	(0.22)	Add fire pump at Skymeadows PS (1,250 gpm) in lieu of storage.
3544 (Los Pinos 2)	0.01	1,000	2	0.00	0.12	0.01	0.13	0.10	(0.03)	0.00	(0.03)	Add fire pump at Los Pinos 2 PS (1,000 gpm) in lieu of storage.
Entire System	**65.28**	**4,000**	**4**	**19.58**	**18.96**	**65.28**	**103.82**	**86.62**	**(17.20)**			

Notes:
Abbreviations: gpm - gallons per minute; HWL -high water level MP - master plan.

Table 8.4 Future System Storage Recommendations

Map ID	Description	Zone	Additional Size (MG)(1)	Phasing
PW-ET-1	1467 Waite Street Zone Tank Replacement	1467	0.6	2023-2025
PW-ET-2	1571 City Tank Replacement	1571	4.2	2023-2025
PW-FT-3	1601 Alberhill Villages Tank	1601	6	2030-2035
PW-ET-4	1601 Horsethief 1 Additional Tank	1601	1.5	2023-2025
PW-FT-5	1601 Rosetta Canyon 1 Additional Tank	1601	0.7	2045-2050
PW-ET-6	1622 Canyon Lake Additional Tank	1622	2	2023-2025
PW-FT-7	1676 Alberhill Zone New Tank	1676	1	2025-2030
PW-ET-8	1746 Bundy Canyon Zone Additional Tank	1746	1.5	2023-2025
PW-FT-9	1800 Spyglass Zone New Tank	1800	2.3	2025-2030
PW-FT-10	1800 Rice Canyon/Alberhill 2 Zone New Tank	1800	1.7	2030-2035
PW-ET-11	1801 Horsethief 2 Zone Additional Tank	1801	1.6	2023-2025
PW-FT-12	1801 North Tuscany Hills New Tank	1801	2.6	2035-2040
PW-ET-15	1896 Meadowbrook 2 Additional Tank	1896	1.3	2023-2025
PW-FT-16	1901 Ortega Zone New Tank	1901	0.5	2025-2030
PW-FT-17	1940 Tuscany Hills 2 Zone Additional Tank	1940	0.4	2045-2050
PW-FT-18	2001 Horsethief 3 New Tank	2001	0.8	2025-2030
PW-FT-19	2001 North Peak Zone New Tank	2001	0.7	2025-2030
PW-ET-20	2050 Greer Ranch 2 Zone Additional Tank	2050	1	2023-2025
PW-ET-21	2196 Sedco Zone Tank Replacement	2196	0.4(2)	2023-2025
PW-ET-22	1882 Stage Ranch 1 Zone Additional Tank	1882	0.1	2023-2025
PW-ET-23	2309 Daley Zone Tank Replacement	2309	0.2(2)	2023-2025
PW-ET-25	2748 Los Pinos 1 Additional Tank	2748	0.25	2023-2025
Total			**31.35**	

Notes:
(1) Capacities shown in this table are total recommendations above existing and cover both existing and future system deficiencies.
(2) Replacement of existing tank.

As shown on Table 8.4, a total of 22 storage improvements are recommended to be built between now and the 2050 planning horizon. The 2039 Daley Tank is sized at 0.2 MG and is planned to replace the existing 0.09 MG tank. The 2196 Sedco Tank is sized at 0.4 MG and is planned to replace the existing 0.09 MG tank. The remaining tanks are recommended to be new tanks.

8.5 Future System Booster Station Evaluation

Similar to the evaluation of the existing system booster pump evaluation, it is important that each zone have sufficient pumping capacity to meet MDD in that zone while transferring the water needed to supply higher PZs for each planning year through the master plan horizon of year 2050. In this analysis, a firm pumping capacity (i.e., largest pump at each pumping station is out of service) is used, which provides redundancy in the system. The analysis also assumes that the booster PSs will operate for 16 hours per day to allow for time-of-use (TOU) operations. The analysis performed for the 2050 planning horizon for each PZ with gravity storage is summarized in Table 8.5 and pumped zones in Table 8.6.

As shown in Table 8.5, the total existing firm capacity in the system is 106,000 gpm, and the total capacity required in 2050 is 93,000 gpm. By 2050, approximately 33 percent of the booster stations will become deficient and will require additional pumping capacity. The deficit is addressed with a total of 30 booster station improvements totaling 40,900 gpm (28.4 mgd).

These booster station recommendations are listed in Table 8.7 and shown on Figure 8.5. Details for these booster recommendations are further described by PZ in Section 8.7.

These improvements can be categorized as follows:

- PZs with existing system booster pump capacity deficiencies that will require even more capacity to accommodate future growth:
  - 1571 City Zone.
  - 1601 Alberhill 1 Zone.
  - 1650 Adelfa Zone.
  - 1650 Cal Oaks and 1650 Inland Valley Zones.
  - 1750 Cottonwood 1 Zone.
- PZ with booster station recommendations due to growth only:
  - 1434 Loop Zone.
  - 1601 Horsethief 1 Zone.
  - 1601 Rosetta Canyon 1 Zone.
  - 1746 Bundy Canyon/Gafford Zone.
  - 1800 Rice Canyon/Alberhill 2 Zone.
  - 1800 Tuscany Hills Zone (note that recommendations are for the 1801 Rosetta Canyon Zone, tying these two zones together).
  - 1801 Horsethief 2 Zones.

  - 1900 Farm Zone.
  - 2196 Sedco Zone.
- New PZs:
  - 1676 Alberhill 2 Zone.
  - 1800 Spyglass Zone.
  - 1900 Elderberry Zone.
  - 1901 Borchard Zone.
  - 1901 Ortega Zone.
  - 1925 Spyglass Zone.
  - 2001 Horsethief 3 Zone.
  - 2001 North Peak Zone.
  - 2001 Ortega 3 Zone.
  - 2320 Adelfa Zone.
- PZs with deficits that are primarily driven by insufficient storage and/or booster pumping for fire flow:
  - 1550 Cielo Vista Zone.
  - 1600 Skylark Zone.
  - 1850 Canyon Lake Sustaining Zone.
  - 1850 Lemon Grove Zone.
  - 1940 Cirrus Circle Zone.

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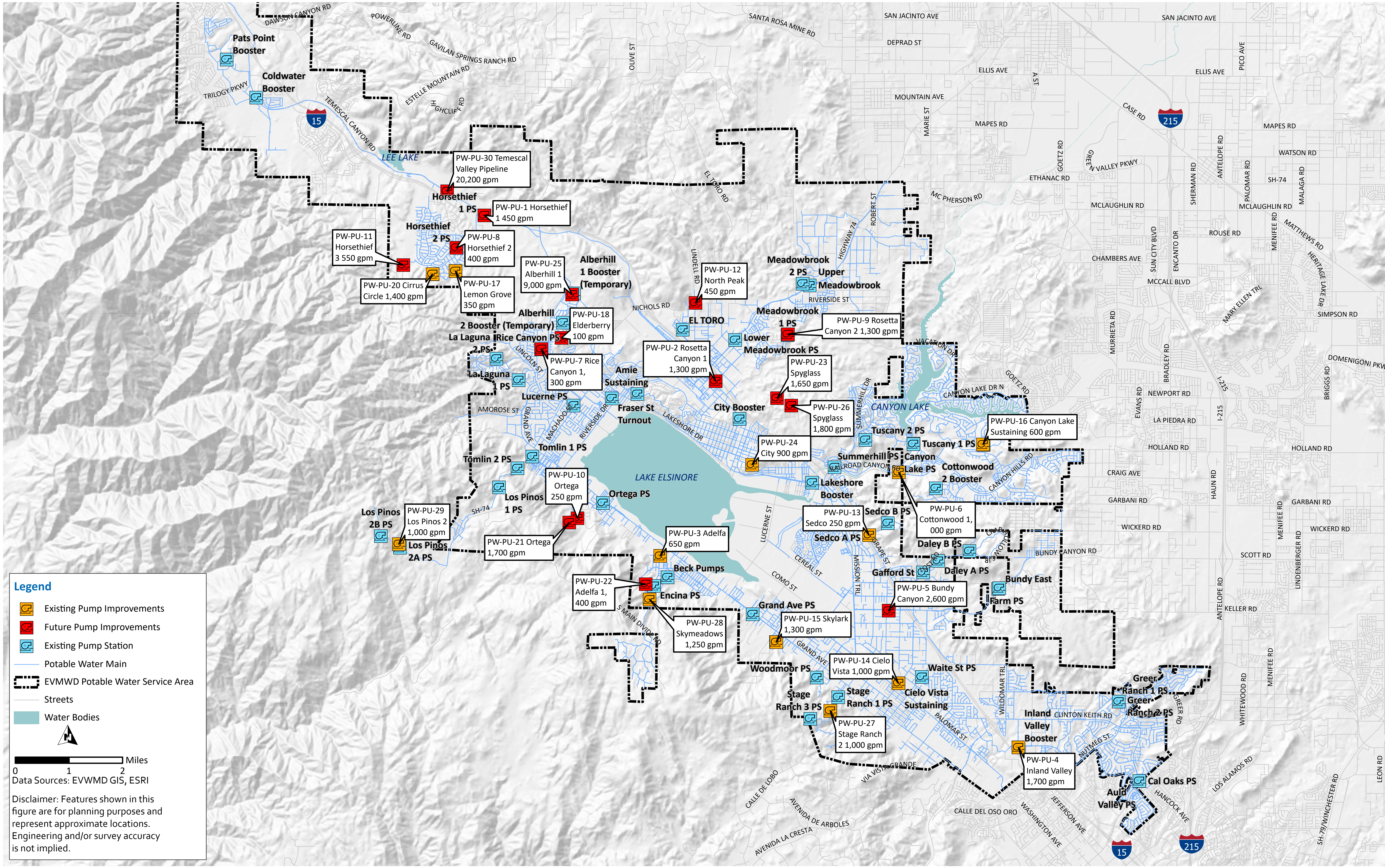

Figure 8.5 Future System Booster Station Recommendations

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Table 8.5 Future Booster Station Capacity Evaluation for 2050 - Zones With Gravity Storage

PZ	In-Zone 2050 MDD (gpm)	Higher Zone MDD (gpm)	Total MDD (gpm)	Firm Pumping Capacity (gpm)	Firm Pumping Capacity, Adjusted for 16-Hour Operations (gpm)	Pumping Surplus (gpm)	Pumping Surplus Adjusted for 16-Hour Operations for Deficient Zones (gpm)	2016 MP Surplus (gpm)	Comments
1358.7 (Mayhew, Clay Canyon)	463	0	463	250	250	(213)	(320)	(14)	
1434 (AVP, TVP, CLWTP, Wells)	10,894	32,421	43,314	42,456	42,456	(858)	(1,287)	(19,461)	
1467 (Waite)	1,114		1,114	2,227	1,484	371	247	476	
1571 (City)	1,699	4	1,703	1,661	1,107	(596)	(893)	(1,004)	Expand existing station.
1601 (Alberhill 1)	3,448	2,516	5,964	0	0	(5,964)	(8,947)	(5,586)	New PS. Alberhill 1 is already in the model, but might be undersized.
1601 (Horsethief 1)	1,057	1,791	2,848	3,841	2,561	(287)	(431)	1,031	New pump.
1601 (Lucerne)	1,406		1,406	2,832	1,888	482	321	Combined with Alberhill 1	
1601 (Ortega)	1,121	195	1,316	2,327	1,551	235	157	692	
1601 (Rosetta Canyon 1)	1,891	2,813	4,704	6,479	4,319	(385)	(577)	296	Expand PS.
1601 (Summerhill)	785		785	2,497	1,665	880	587	610	
1601 (Woodmoor)	100		100	2055	1,370	1,270	846	2,739	
1622 (Canyon Lake)	1,689	26	1,715	3,768	2,512	797	531	1,090	
1650 (Adelfa)	270	264	533	182	121	(412)	(618)	19	Expand existing station.
1650 (Cal Oaks)	1,862	736	2,598	3,137	2,091	(507)	(760)	1,699	Do nothing; additions to Inland Valley.
1650 (Inland Valley)	1,681		1,681	1,642	1,095	(587)	(880)	Combined with Cal Oaks	Expand PS.
1676 (Alberhill)	225		225	0	0	(225)	(337)	(729)	New PS currently in design.
1746 (Bundy Canyon)	1,418	1963	3,381	2,008	1,339	(2,043)	(3,064)	(3,479)	Expand PS; will also need a larger discharge transmission pipeline.
1750 (Cottonwood)	2,021	418	2,439	2,732	1,821	(618)	(927)	(745)	Expand PS.
1800 (Spyglass)	856	212	1,067	0	0	(1,067)	(1,601)	(387)	New PS; feeding from 1601 Rosetta Canyon 1. See previous MP for approximate location.
1800 (Rice Canyon & Alberhill 2)	2,024	493	2,516	2,483	1,656	(861)	(1,291)	(677)	Expand Rice Canyon PS.
1800 (Tuscany Hills 1)	1,932	292	2,225	2,383	1,589	(636)	(954)	827	Expansion at Rosetta Canyon 2 rather than here.
1801 (Horsethief 2)	1,365	335	1,701	1,984	1,322	(378)	(568)	1,031	Expand Horsethief 2 PS.
1801 (Rosetta Canyon 2)	1,071	675	1,746	3,217	2,144	399	266	778	Expand Rosetta Canyon 2 PS.
1842 (Beck)	2		2	187	125	122	82	Zone to be Eliminated	
1850 (Greer Ranch 1)	303		303	1,837	1,225	922	614	(84)	

PZ	In-Zone 2050 MDD (gpm)	Higher Zone MDD (gpm)	Total MDD (gpm)	Firm Pumping Capacity (gpm)	Firm Pumping Capacity, Adjusted for 16-Hour Operations (gpm)	Pumping Surplus (gpm)	Pumping Surplus Adjusted for 16-Hour Operations for Deficient Zones (gpm)	2016 MP Surplus (gpm)	Comments
1871 (Tomlin 1)	2	31	33	537	358	324	216	383	
1882 (Stage Ranch 1)	30	43	73	462	308	235	157	392	
1896 (Meadowbrook 2)	675		675	1,066	711	36	24	(127)	
1900 (The Farm)	1,626		1,626	2,200	1,467	(159)	(238)	(341)	
1901 (Ortega)	11	151	161	0	0	(161)	(242)	New Zone	New PS from 1601 Ortega, at tank.
1916.5 (Encina)	168	73	241	899	599	358	239	1,359	
1934 (Cottonwood 2)	418		418	1,122	748	329	220	123	
1940 (Tuscany Hills 2)	292		292	1,563	1,042	750	500	100	
2001 (Horsethief 3)	335		335	0	0	(335)	(503)	New Zone	New PS at 1801 Horsethief 2 Tank.
2001 (North Peak)	267		267	0	0	(267)	(401)	New Zone	New PS from 1601 El Toro Rosetta Canyon zone; location probably near El Toro Tanks, see previous MP.
2040 (La Laguna 1)	114	346	460	1,288	859	399	266	786	
2050 (Greer Ranch 2)	736		736	1,227	818	83	55	197	
2196 (Sedco)	139		139	0	0	(139)	(208)	140	Suggest eliminating Sedco A and B and constructing single new PS with 225 gpm firm capacity.
2217 (Stage Ranch 2)	43		43	671	447	404	269	453	
2240 (La Laguna 2)	346		346	523	349	2	2	273	
2309 (Daley)	19		19	90	60	41	28	65	
2313 (Tomlin 2)	1	31	31	213	142	110	74	249	
2748 (Los Pinos 1)	23	8	31	280	187	156	104	221	
3300 (Skymeadows)	40		40	158	105	65	43	70	
3544 (Los Pinos 2)	8		8	136	91	83	55	83	

Table 8.6 Future Booster Station Capacity Evaluation for 2050 - Zones With Pumped Storage

PZ	PHD (gpm)	Fire Flow (gpm)	PHD+Fire Flow (gpm)	Firm Pumping Capacity (gpm)	Total Pumping Capacity (gpm)	Pumping Surplus (PHD/Firm, gpm)	Pumping Surplus (No Storage, MDD+Fire/Total, gpm)	Recommendation for Additional Capacity (gpm)
1550 (Cielo Vista)	37	1,250	1287	150	300	113	(987)	1000
1600 (Skylark)	62	1,500	1562	200	300	138	(1,262)	1300
1650 (Amie Sustaining)	10	0	10	0	20	(10)	10	0
1850 (Canyon Lake Sustaining)	65	1,250	1315	300	800	235	(515)	600
1850 (Lemon Grove)	187	1,500	1687	370	1370	183	(317)	350
1900 (Elderberry)	82	0	82	0	0	(82)	(82)	100
1901 (Borchard)	519	1,250	1769	0	0	(519)	(1,769)	1800
1913 (Bundy Canyon East)	449	1,500	1949	0	992	(449)	(957)	0[1]
1925 (Spyglass)	529	1,250	1779	210	70	(319)	(1,709)	1800
1940 (Cirrus Circle)	15	1,500	1515	140	210	125	(1,305)	1400
2201 (Ortega)	376	1,250	1626	0	0	(376)	(1,626)	1700
2320 (Adelfa)	82	1,250	1332	0	0	(82)	(1,332)	1400

Notes:
(1) No recommendation for this zone because fire flow can be delivered from 1900 The Farm Zone.

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Table 8.7 Future System Booster Recommendations

Map ID	Description	TDH (feet)	Additional Capacity(1) (gpm)	Phase
PW-FPU-1	PZ 1601 (Horsethief 1) PS Upgrade	195	450	2045-2050
PW-FPU-2	PZ 1601 (Rosetta Canyon 1) PS Upgrade	340	1,300	2045-2050
PW-EPU-3	PZ 1650 (Adelfa) PS Upgrade	200	650	2023-2025
PW-FPU-4	PZ 1650 (Inland Valley) PS Upgrade	250	1,700	2025-2030
PW-EPU-5	PZ 1746 (Bundy Canyon) PS Upgrade	340	2,600	2023-2025
PW-EPU-6	PZ 1750 (Cottonwood) PS Upgrade	330	1,000	2023-2025
PW-FPU-7	PZ 1800 (Rice Canyon) PS Upgrade	215	1,300	2030-2035
PW-FPU-8	PZ 1801 (Horsethief 2) PS Upgrade	225	400	2040-2045
PW-FPU-9	PZ 1801 (Rosetta Canyon 2) PS Upgrade	235	1,300	2045-2050
PW-EPU-10	PZ 1901 (Ortega) PS Upgrade	200	250	2023-2025
PW-FPU-11	PZ 2001 (Horsethief 3) New PS	200	550	2030-2035
PW-FPU-12	PZ 2001 (North Peak) New PS	400	450	2025-2030
PW-EPU-13	PZ 2196 (Sedco) New PS	325	250	2023-2025
PW-EPU-14	PZ 1550 (Cielo Vista) PS Upgrade	195	1,000	2023-2025
PW-EPU-15	PZ 1600 (Skylark) PS Upgrade	200	1,300	2023-2025
PW-EPU-16	PZ 1850 (Canyon Lake Sustaining) PS Upgrade	215	600	2023-2025
PW-EPU-17	PZ 1850 (Lemon Grove) PS Upgrade	500	350	2023-2025
PW-FPU-18	PZ 1900 (Elderberry) New PS	125	100	2030-2035
PW-FPU-19	PZ 1901 (Borchard) New PS	470	1,800	2025-2030
PW-EPU-20	PZ 1940 (Cirrus Circle) PS Upgrade	540	1,400	2023-2025
PW-FPU-21	PZ 2201 (Ortega) New PS	300	1,700	2025-2030
PW-FPU-22	PZ 2320 (Adelfa) New PS	405	1,400	2025-2030
PW-FPU-23	PZ 1800 (Spyglass) PS Upgrade	200	1,650	2025-2030
PW-EPU-24	PZ 1571 (City) PS Upgrade	195	900	2023-2025
PW-FPU-25	PZ 1601 (Alberhill 1) PS Upgrade	200	9,000	2025-2030
PW-FPU-26	PZ 1925 (Spyglass) PS Upgrade	150	1,800	2025-2030
PW-FPU-27	PZ 2217 (Stage Ranch 2) PS Upgrade	460	1,000	2025-2030
PW-FPU-28	PZ 3300 (Skymeadows) PS Upgrade	1,490	1,250	2025-2030
PW-FPU-29	PZ 3544 (Los Pinos 2) PS Upgrade	750	1,000	2025-2030
PW-FPU-30	TVP PS	40	20,200	2025-2030

Notes:
Abbreviations: TDH - total dynamic head.
(1) Capacities shown in this table are total recommendations above existing and cover both existing and future system deficiencies.

8.6 Future Fire Flow Analysis

A future fire flow analysis was run for the 2050 MDD conditions. The future fire flow analysis followed the same steps as the existing analysis described in Chapter 7. This future analysis assumes that the existing system fire flow recommendations, as well as the small diameter pipeline replacements, have been incorporated.

Six locations that meet fire flow requirements under existing system conditions do not meet fire flow requirements under 2050 MDD conditions. Growth in surrounding regions lead these locations to be deficient in fire flow while fire flow can be met at these locations under existing conditions. Specific fire flow improvement projects were developed for the future fire flow deficiencies by increasing pipeline diameters as summarized in Table 8.7. The future fire flow improvement projects are shown in Figure 8.6, which also shows the location of the fire flow deficiencies that were addressed with the specific projects. In total, the three future fire flow improvement projects recommend replacing approximately 2,000 feet of 6-inch diameter pipe with 8-inch diameter pipe and replacing approximately 500 feet of 8-inch diameter pipe with 12-inch diameter pipe.

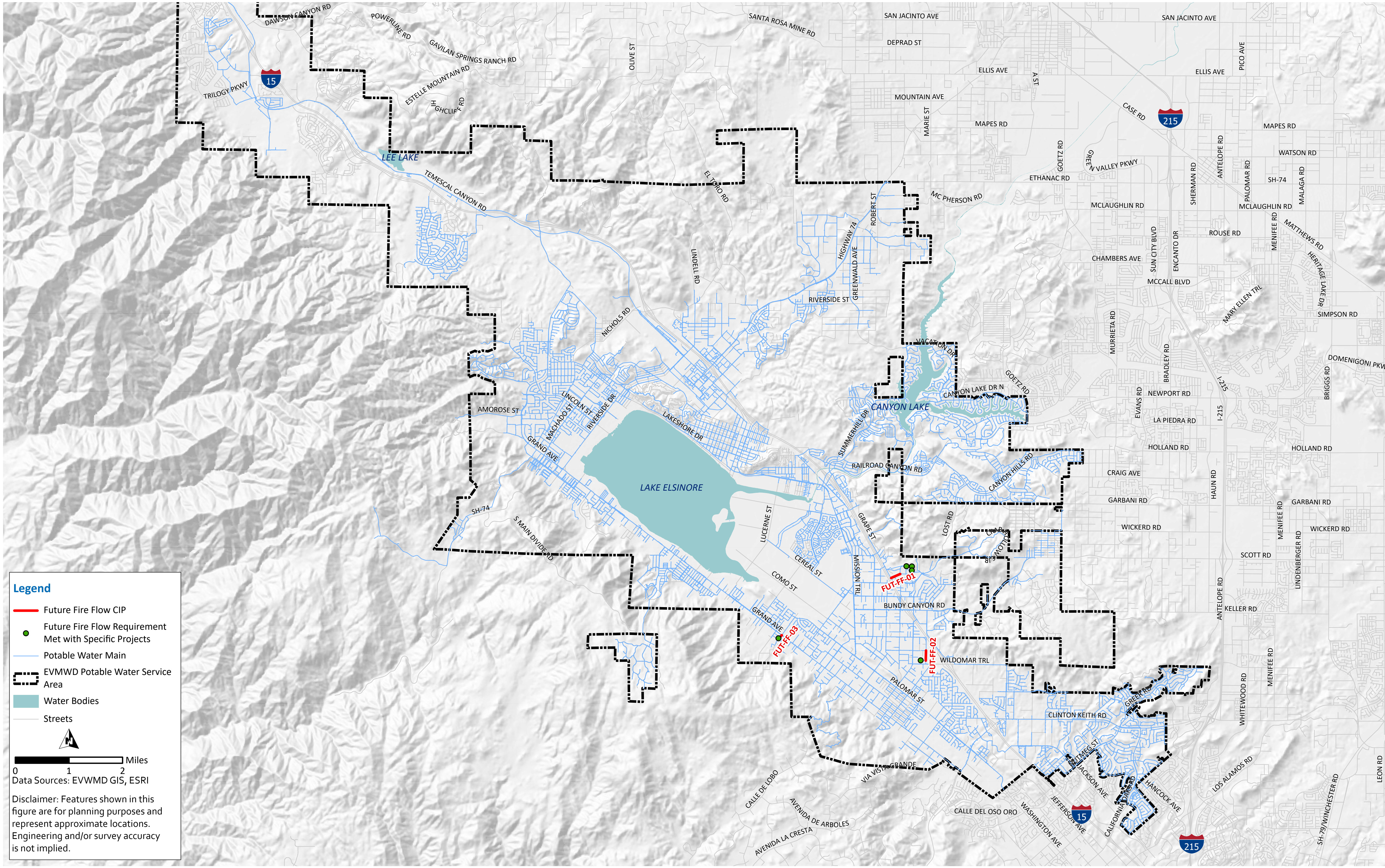

Figure 8.6 Future Fire Flow Improvements

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Table 8.8 Future System Fire Flow Improvement Recommendations - Upsized Pipe

CIP ID	Project Description	PZ	Upsize 6-inch Diameter to 8-inch Diameter (feet)	Upsize 8-inch Diameter to 12-inch Diameter (feet)
FF-66	Replace existing pipeline on Windtree Ave between Grape Street and Woodcreek Lane.	1746 Bundy Gafford	1,000	
FF-67	Replace existing pipeline on White Street between Chetlee Lane and Grove Street.	1561 Orange Bundy	1,000	
FF-68	Replace existing pipeline on Skylark Drive.	1434		500
Total			**2,000**	**500**

The hydraulic model results showed one fire flow deficiency at hydrant junction that is adjacent to higher elevation PZs. For this fire flow deficiency, it was recommended that the hydrant be moved to the higher elevation PZ, as summarized in Table 8.9.

Table 8.9 Future System Fire Flow Improvement Recommendations - Hydrant Modifications

Project ID	Description	Hydrant ID	Hydrant Location
FF-69	Move hydrant from 1434 PZ to 1601 El Toro Rosetta Canyon 1 PZ	FH-3689	29910 Ohana Circle

8.7 Future System Infrastructure Recommendations by Pressure Zone (PZ)

The infrastructure needed to meet the planning criteria defined in Chapter 5 is discussed below on a zone-by-zone basis. It is important to note that the recommendations in future systems have various degrees of uncertainty and are greatly dependent on the timing of future development in comparison to the demand projections described in Chapter 3. The following subsections describe the changes necessary to keep up with future growth requirements in the water distribution system.

8.7.1 Zone 1434 - Loop Zone

Nearly all the water sources for the EVMWD system directly feed the 1434 Loop Zone. The 1434 Loop Zone also has five storage tanks located over a linear distance of about 20 miles, each roughly 5 miles away from each other. Each of the tanks has the same high water elevation. Depending on which supply sources are used, EVMWD may have difficulty maintaining level in various tanks, even when the velocity criteria listed in Chapter 6 are met.

For EVMWD to maintain sufficient water levels in the 1434 Loop Zone tanks, either larger transmission pipelines or PSs will be required between each of the five tanks. During higher demand periods, especially as MDD increases in the future, the need for additional infrastructure to move water between the five tanks becomes needed. As the two imported water sources, AVP and TVP are located at the two extremes of the water system, in the south and in the north, moving water to the middle of the system, where customers are located, will become more difficult as demands increase. While the groundwater wells and CLWTP are located in the middle of the Loop Zone distribution system, these supplies are insufficient to boost pressures under a variety of conditions. For example, due to existing conjunctive use agreements, EVMWD has limited use of groundwater supplies during wet years, which means that there needs to be sufficient infrastructure to move water into the middle of the system.

As part of this Master Plan, hydraulic model runs were performed for 2050 MDD, the maximum capacity of the Auld Valley connection using the AVP as the only source, and the future maximum capacity of the Temescal Valley connection using the TVP as the only source. Alternatives were developed using additional transmission pipes to move water, PSs to move water, and a recommended alternative that combines both pipelines and PSs. The locations of the potential transmission main and PSs are depicted on Figure 8.7. PSs are more difficult to operate because they would split up the 1434 Loop Zone into multiple PZs rather than allowing it to be operated as a single PZ. A life cycle cost evaluation was performed to determine whether PSs or transmission pipes would be more cost effective. The economic evaluation for each PS, using the capacity cost estimates methodology in chapter 9, assuming a discount rate of 2 percent over 75 years, is shown in Table 8.10.

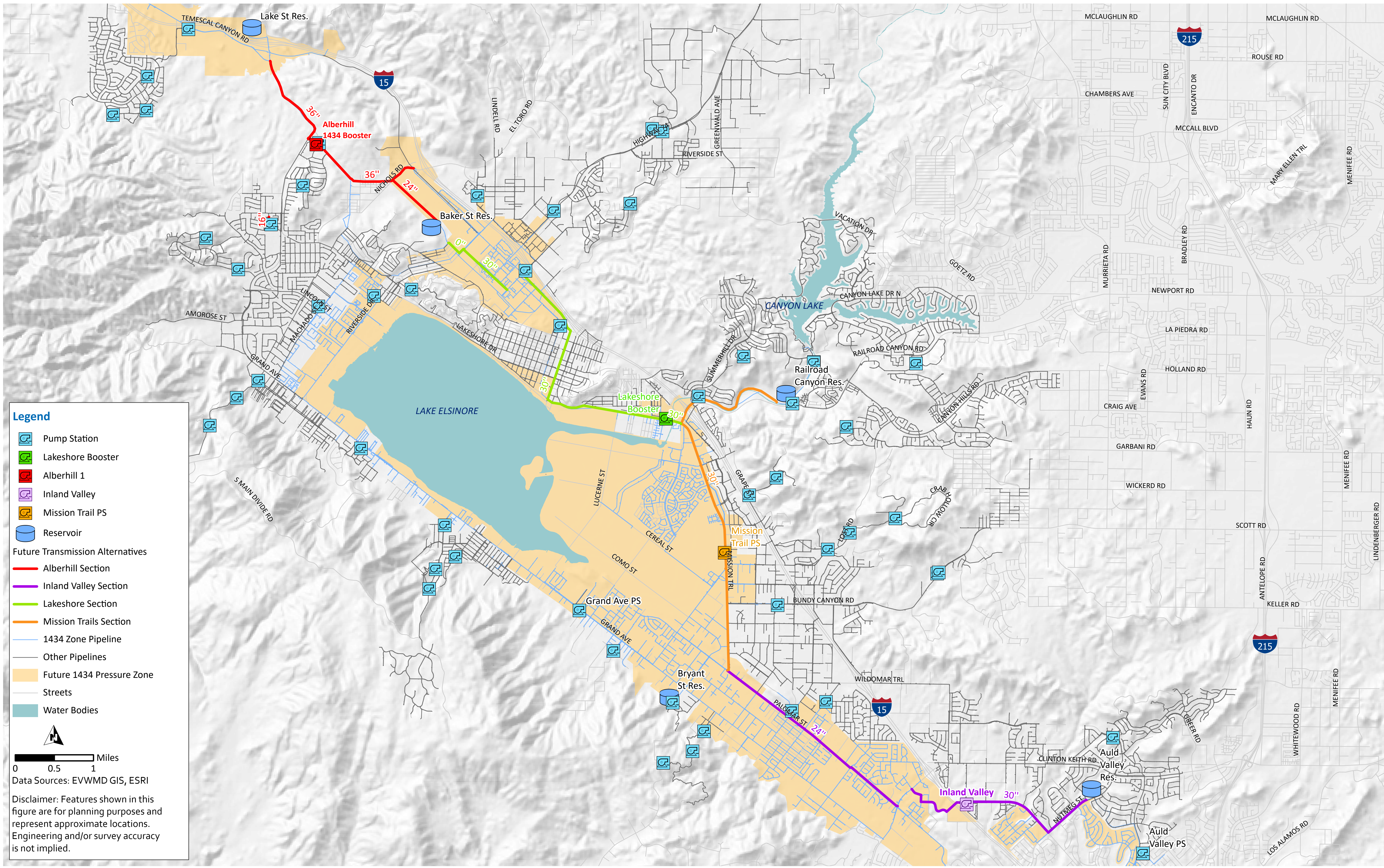

Figure 8.7 1434 Loop Zone Transmission Alternatives

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Table 8.10 1434 Zone Pump Station (PS) vs. Pipeline Cost Evaluation

PS Location	Tanks Served	PS Capital Cost ($M)	PS Energy and O&M Cost ($M)	PS Total Cost ($M)(1)	Pipe Capital Cost ($M)
Alberhill 1434	Lake Street and Baker Street	$9.0	$18.2	$27.2	$25.7(2)
Lakeshore (existing)	Baker Street and Railroad Canyon	$6.5	$7.1	$13.6	$31.3
Mission Trail 1434 (PW-PU31)	Railroad Canyon and Bryant Street	$6.5	$7.1	$13.6	$33.0
Inland Valley 1434 (PW-PU32)	Bryant Street and Auld Valley	$0.0	$12.1	$21.1	$33.5

Notes:
Abbreviations: O&M - operations and maintenance.
(1) It is present worth cost over the 75-year time period assumed.
(2) The pipelines associated with this project are recommended as PW-TR7, PW-TR8, PW-TR9, and PW-TR10.

Based on this life cycle cost evaluation and fine-tuning of the recommendations using the hydraulic model, the recommended projects are PSs along Mission Trail between Bryant Street Tank and the Back Basin and at the Inland Valley PS where the existing pipeline crosses the I-15 Freeway as shown on Figure 8.7. The Mission Trail PS (PW-PU31) should be located off Mission Trail between Lewis and Lemon Streets, sized at a firm capacity of 8,000 gpm at approximately 70 feet TDH, pumping in both directions to allow for operational flexibility. The Inland Valley 1434 PS (PW-PU32) should be sized at a firm capacity of 15,000 gpm at approximately 120 feet TDH, pumping toward the north. Additionally, Lakeshore PS will need to be maintained.

The recommended transmission pipelines are a 36-inch diameter pipeline from the intersection of Temescal Canyon Road and Lake Street to the suction of the Alberhill PS (PW-TR-7), a 36-inch diameter pipeline from the suction of Alberhill PS to the intersection of Nichols and Baker Street (PW-TR8), a 24-inch diameter pipeline in Nichols Road from Baker Street to the existing 24-inch pipeline in Collier Avenue (PW-TR-9), and a 24-inch diameter pipeline in Baker Street from Nichols Road to the Baker Street Tank (PW-TR-10). These pipelines are recommended to be constructed prior to 2030, with PW-TR-7 as the highest priority section of this pipeline.

On the west side of Lake Elsinore, due to the limited capacity in the existing 14-inch diameter pipeline, a 24-inch diameter pipeline (PW-TR-16) is recommended in Grand Avenue from Machado Avenue (connecting to existing 21-inch diameter pipeline) to Turtle Dove Drive (connecting to existing 24-inch diameter pipeline). With the additional Grand Avenue pipeline, Grand Avenue PS can be abandoned. This pipeline is recommended to be constructed prior to 2025, as this bottleneck has been a concern for a couple decades.

Additionally, by 2030 an additional 20,200 gpm firm booster pump capacity (PW-PU-30) is recommended along the existing TVP to deliver increased flows from the Mills Water Treatment Plant into the system.

8.7.2 Zone 1467

There is a future storage deficit in the 1467 Waite Zone. A new 0.6 MG reservoir (PW-T-1) is recommended at the existing 1467 Waite tank site before 2025.

8.7.3 Zone 1550 - Cielo Vista

An additional 1,000 gpm fire pump (PW-PU-14) is recommended at the existing Cielo Vista PS to meet fire flow demands in the Zone.

8.7.4 Zone 1571 - City

There is an existing and future storage deficit in the 1571 City Zone. A new 4.2 MG reservoir (PW-T-2) is recommended to replace the existing 1571 City tank before 2025. It is recommended that the new tank have a high-water elevation of 1,600 feet to match other 1600 Zone tanks. Also, by 2025 an additional 900 gpm firm booster pump capacity (PW-PU-24) is recommended at the existing 1571 City PS to address existing system deficiencies and meet the increased demands in the Zone.

8.7.5 Zone 1600 - Skylark

An additional 1,300 gpm fire pump (PW-PU-15) is recommended at the existing 1600 Skylark PS to meet the fire flow requirements of this zone.

8.7.6 Zone 1601 - Lucerne Alberhill 1

EVMWD has a series of 1601 PZs, which are hydraulically connected together. From north to south, they are Horsethief 1, Lucerne, Alberhill 1, City (currently at 1579), Rosetta Canyon 1/El Toro, and Summerhill. The Lucerne, Alberhill 1, City, and Summerhill zones are already connected together hydraulically. 1601 Horsethief 1 is planned to be connected to the other 1601 PZs once the Alberhill Villages development is completed. 1601 Rosetta Canyon 1/El Toro PZ will be connected once development in the Spyglass area is complete. While these zones are all connected together hydraulically, they each have their own tanks and PSs and function semi-autonomously.

It is recommended that the 1601 Lucerne and 1601 Alberhill 1 Zones be split into two separate operating PZs once the 1601 Alberhill 1 PS has been completed (currently in construction). Due to insufficient capacity in the Lucerne PS, the zone would be split just south of the suction to the Rice Canyon PS, such that Rice Canyon PS will take suction from the 1601 Alberhill 1 Zone.

There is a future storage deficit in the 1601 Alberhill Zone. A new 6.0 MG Alberhill Villages Tank (PW-T-3) is recommended to be constructed in the Alberhill Villages development between the existing 1601 Alberhill zone and 1601 Horsethief zones, south of the I-15 freeway, before 2035.

The following transmission pipelines will be needed to expand the 1601 Alberhill 1 PZ before 2030 to accommodate the growth in the zone as well as new developments, which should also interconnect to the 1601 PS to the 1601 El Toro/Rosetta Canyon Zone to the east:

- 7,700 feet of 30-inch diameter 1601 Zone transmission main (PW-TR3) will need to be constructed to connect the new Alberhill Villages Tank to the future development in the area and tie into the 1601 Alberhill 1 Zone PS to the east when the Alberhill Villages development commences, most likely in the 2030 to 2035 time frame.
- 3,400 feet of 16-inch diameter 1601 Zone transmission pipe (PW-TR4) will need to connect the 1601 Alberhill 1 Zone in the Alberhill Villages area to the 1601 Horsethief 1 Zone at Buckskin Trail Drive and Silver Cloud Court, most likely in the 2030 to 2035 time frame.
- 3,200 feet of 16-inch diameter 1601 Alberhill 1 Zone transmission pipe (PW-TR11) will be needed to connect the 1601 Alberhill 1 Zone PS to the intersection of Nichols Road and Terra Cotta Road. This pipe should be constructed prior to 2030 as Nichols Road is developed.
- 3,600 feet of 16-inch diameter transmission pipe (PW-TR12) from the intersection of Nichols Road and Terra Cotta Road will be needed to be installed to the south to connect to the existing 1601 Alberhill 1 Zone pipe at the intersection of Dryden Street and Arnold Avenue. This pipe should be constructed prior to 2030 as the road through this region is developed.
- 3,500 feet of 16-inch diameter transmission pipe (PW-TR13) will be needed to connect the 1601 Alberhill 1 transmission pipe from the intersection of Nichols Road and Terra Cotta Road to the existing 1601 Alberhill 1 Zone pipe at the intersection of Nichols Road and Collier Avenue. This pipe should be constructed prior to 2030 as Nichols Road is developed.
- 6,300 feet of 16-inch diameter transmission pipe (PW-TR-14) will be needed to connect to the planned 1601 Alberhill 1 Zone pipe at the intersection of Nichols Road and Collier Avenue to the existing 1601 El Toro Rosetta Canyon 1 PZ at the intersection of Nichols Road and El Toro Road, crossing the I-15 Freeway. This transmission main will be needed as development occurs in this area, probably prior to 2030.

The 1601 Alberhill 1 PS is currently under construction with a capacity of 6,000 gpm. However, by 2030, a total firm capacity of 9,000 gpm will be needed, and therefore, an additional 3,000 gpm of pumping capacity (PW-PU-25) will be recommended at the existing 1601 Alberhill/Horsethief PS to meet the increased demands in the Zone. The PS building will need to be expanded to accommodate more pumps and/or another site may be needed.

8.7.7 Zone 1601 - Horsethief 1

To address the future storage deficit in the 1601 Horsethief 1 Zone, a new 1.5 MG reservoir (PW-T4) is recommended at the existing 1601 Horsethief 1 Tank site before 2025. Also, by 2050 an additional 450 gpm firm booster pump capacity (PW-PU-1) is recommended at the existing Horsethief 1 PS to meet the increased demands in the Zone.

8.7.8 Zone 1601 - Rosetta Canyon 1

To address the storage deficit in the 1601 Rosetta Canyon 1 Zone in 2050, a new 0.7 MG reservoir (PW-T-5) is recommended at the existing 1601 Rosetta Canyon 1 tank site before 2050. Also, by 2050 an additional 1,300 gpm firm booster pump capacity (PW-PU-2) is recommended at the existing Rosetta Canyon PS to meet the increased demands in the Zone.

The biggest changes for the 1601 Rosetta Canyon zone are the transmission pipes that will serve the area south of the current zone in the Spyglass area. About 12,400 feet of new 30-inch diameter transmission line (PW-TR20) will need to be installed between 2025 and 2030 from the discharge of the 1601 Rosetta Canyon PS, along Dexter and Camino del Norte, to the 1601 Summerhill Zone. Additionally, about 8,200 feet of new 16-inch diameter transmission line (PW-TR21) will need to be installed to provide service between Rosetta Canyon Road and Camino del Norte, tying into the Spyglass development.

8.7.9 Zone 1622 - Canyon Lake

The Canyon Lake zone has an existing storage deficit, which is projected to grow to 1.84 MG by 2050. It is recommended to add a 2.0 MG (PW-T-6) tank, possibly at the existing Canyon Lake South site, to provide sufficient storage.

8.7.10 Zone 1650 - Adelfa

By 2025 an additional 650 gpm firm booster pump capacity (PW-PU-3) is recommended at the existing Adelfa PS to address the existing system deficiency and meet the increased demands in the Zone.

8.7.11 Zone 1650 - Inland Valley

By 2030 an additional 1,700 gpm firm booster pump capacity (PW-PU-4) is recommended at the existing Inland Valley PS to meet the increased demands in the

Zone. This booster pump is sized to meet the deficiency in both the Cal Oaks and Inland Valley portions of the 1650 Zone.

8.7.12 Zone 1676 - Alberhill Ridge

The 1676 Alberhill Ridge Zone is a new zone. It will be fed from the 1676 Alberhill 2 PS (currently under construction). The zone will require approximately 4,400 feet of a 12-inch diameter transmission main (PW-TR15) and a new 1 MG reservoir (PW-T-7), with timing expected prior to 2030 but depend on growth in the Alberhill Ranch area.

8.7.13 Zone 1746 - Bundy Canyon

To address the future storage deficit in the 1746 Bundy Canyon Zone, a new 1.5 MG reservoir (PW-T-8) is recommended at the existing 1746 Bundy Canyon tank site before 2025. Also, by 2025 an additional 2,600 gpm firm booster pump capacity (PW-PU-5) is recommended at the existing 1746 Bundy Canyon PS to meet the increased demands in the Zone. Along with the booster PS, 5,800 feet of 20-inch diameter pipeline (PW-TR31) is needed to replace the existing 10-inch diameter transmission pipeline in Bundy Canyon Road, from the existing 20-inch diameter pipeline east of Oak Canyon Drive to the Bundy Canyon Tank. This pipeline should be constructed prior to 2025.

8.7.14 Zone 1750 - Cottonwood 1

By 2025 an additional 1,000 gpm firm booster pump capacity (PW-PU-6) is recommended at the existing 1750 Cottonwood 1 PS to meet the existing system deficiency and increased demands in the 1750 and 1934 Zones.

8.7.15 Zone 1800 - Rice Canyon/Alberhill 2

To address the future storage deficit in the 1800 Rice Canyon/Alberhill 2 Zone, a new 1.7 MG reservoir (PW-T-10) is recommended at the existing 1800 Rice Canyon/Alberhill 2 tank site before 2035. Also, by 2035 an additional 1,300 gpm firm booster pump capacity (PW-PU-7) is recommended at the existing 1800 Rice Canyon/Alberhill 2 PS to meet the increased demands in the Zone. However, this booster pump cannot be constructed without the suction and discharge pipeline upsize recommended in Chapter 7.

8.7.16 Zone 1800 - Spyglass

To address the In the new 1800 Spyglass Zone, a new 2.3 MG reservoir (PW-T-9) is recommended at a new location within the Spyglass development before 2030. Also, by 2030, a new booster PS with 1,650 gpm firm booster pump capacity (PW-PU-23) is recommended to meet the demands in the Zone. This PS should be off the 1601 El Toro Rosetta Canyon 1 Zone transmission line, which is planned to be in a new location in the Spyglass development. The PS will pump to the 1800 Spyglass Zone through the Spyglass development via 3,500 feet of 16-inch diameter transmission pipe (PW-TR22). An additional 1,500 feet of 16-inch diameter transmission pipe (PW-TR23) is planned to connect the future developments and the PW-TR22 pipe to the proposed 1800 Spyglass Tank.

8.7.17 Zone 1801 - Horsethief 2

To address the storage deficit in the 1801 Horsethief 2 Zone, a new 1.6 MG reservoir (PW-T-11) is recommended at the existing 1801 Horsethief Tank site before 2025. Also, by 2040, an additional 400 gpm firm booster pump capacity (PW-PU-8) is recommended at the existing 1801 Horsethief 2 PS to meet the increased demands in the Zone.

8.7.18 Zone 1801 - Rosetta Canyon 2/Tuscany 1

By 2050, an additional 1,300 gpm firm booster pump capacity (PW-PU-9) is recommended at the existing 1801 Rosetta Canyon 2 PS to meet the increased demands in the 1801 Rosetta Canyon 2 and 1800 Tuscany Hills 1 Zones.

To address the future storage deficit in the 1801 Tuscany 1 Zone, a new 2.6 MG reservoir (PW-T-12) is recommended near the North Tuscany Hills development area before 2040.

The following transmission pipe will be needed to expand the 1801 Tuscany 1 PZ to accommodate the growth in the zone as well as new developments, which are planned to the north and to interconnect to the 1801 Rosetta Canyon 2 Zone to the north:

- 2,100 feet of 20-inch diameter pipeline in Mauricio Street from Steele Valley Road to Greenwald Avenue (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 11,000 feet of 16-inch diameter pipeline from Greenwald Avenue and Mauricio Street to the existing 16-inch diameter pipeline in Summerhill Drive in Tuscany Hills (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 6,400 feet of 16-inch diameter pipeline within the North Tuscany Hills area and to the proposed 2.6 MG reservoir (PW-TR26), needed between 2035 and 2040, with dates depending on date of development.

8.7.19 Zone 1850 - Canyon Lake Sustaining

An additional 1,600 gpm fire pump (PW-PU-16) is recommended at the existing 1850 Canyon Lake Sustaining PS to meet the fire flow requirements of this zone.

8.7.20 Zone 1850 - Lemon Grove

An additional 350 gpm booster pump (PW-PU-17) is recommended at the existing 1850 Lemon Grove PS to meet the fire flow requirements of this zone.

8.7.21 Zone 1882 - Stage Ranch 1

To address the existing storage deficit in the 1882 Stage Ranch 1 Zone, a new 0.1 MG reservoir (PW-T-22) is recommended at the existing 1882 Stage Ranch 1 tank site.

8.7.22 Zone 1896 - Upper Meadowbrook

To address the existing and future storage deficit in the 1896 Upper Meadowbrook Zone, a new 1.3 MG reservoir (PW-T-15) is recommended at the existing 1896 Upper Meadowbrook tank site before 2025.

8.7.23 Zone 1900 - Elderberry

By 2025, a new PS with firm capacity of 100 gpm (PW-PU-18) is recommended at the 1801 Alberhill 2 Tank site. This PS is called the 1900 Elderberry PS. There are no fire demands in this proposed 1900 Elderberry Zone as fire demands can be met from the 1801 Rice Canyon/Alberhill 2 Zone.

8.7.24 Zone 1901 - Borchard

The 1901 Borchard Zone is expected to be needed by 2030 to supply new development in Wildomar west of Grand Avenue. A new PS with 1,800 gpm capacity (PW-PU-19) is recommended to meet demands of new development. It is expected that the PS will be needed by 2030 and will be located at approximately Grand Avenue and Borchard Road.

8.7.25 Zone 1901 - Ortega

The 1901 Ortega Zone is expected to be needed by 2040 to supply new development around the existing 1601 Zone Ortega Tank. A new PS with 250 gpm firm booster pump capacity (PW-PU-10) will be needed, along with 1,700 feet of 16-inch transmission main (PW-TR32), and a new 0.5 MG reservoir (PW-T-16) with a high water elevation of 1,901 feet. This zone and storage tank would further supply the 2201 Ortega Zone at even higher elevations.

8.7.26 Zone 1925 - Spyglass

The 1925 Spyglass Zone is expected to be needed by 2030 to supply new development in the Spyglass development with ground elevations above 1,660 feet. A new PS with 1,800 gpm capacity (PW-PU-19) is recommended to meet demands of new development, covering both operational and fire flows.

8.7.27 Zone 1940 - Cirrus Circle

An additional 1,400 gpm fire pump (PW-PU-20) is recommended at the existing 1940 Cirrus Circle PS to meet the fire flow requirements of this zone.

8.7.28 Zone 1940 - Tuscany Hills 2

To address the future storage deficit in the 1940 Tuscany Hills 2 Zone, a new 0.4 MG reservoir (PW-T-17) is recommended at the existing 1940 Tuscany Hills 2 tank site before 2050.

8.7.29 Zone 2001 - Horsethief 3

The 2001 Horsethief 3 Zone is expected to be needed by 2025 to supply new development in the Horsethief area above 1,660 feet elevation. A new PS with 550 gpm firm booster pump capacity (PW-PU-11) will be needed, along with 2,100 feet of 16-inch transmission main (PW-TR1), and a new 0.8 MG reservoir (PW-T-18) with a high water elevation of 1,901 feet. Additionally, EVMWD could consider connecting the 1850 Lemon Grove and 1940 Cirrus Circle Zones into the 2001 Horsethief 3 Zone rather than constructing fire pumps for those two zones.

8.7.30 Zone 2001- North Peak

The 2001 North Peak Zone is expected to be needed by 2030 to supply new development. A new PS with 450 gpm firm booster pump capacity (PW-PU-12) will be needed, along with 9,300 feet of 16-inch transmission main (PW-TR14), and a new 0.7 MG reservoir (PW-T-19) with a high water elevation of 2,001 feet.

The new PS should be located at approximately and take suction from the 1601 El Toro/Rosetta Canyon Zone and the proposed 16-inch transmission main discussed in the 1601 Alberhill 1 Zone. The pipeline would traverse along El Toro Road, partially in the 1601 El Toro/Rosetta Canyon Zone, via the proposed booster PS, and to the North Peak development. Previous master plans had also identified the potential of North Peak development at higher elevations above those that could be served in the 2001 Zone, but those developments are not likely to be constructed prior to 2050 and therefore have not been included as part of this WSMP.

8.7.31 Zone 2050 - Greer Ranch 2

To address the existing and future storage deficit in the 2050 Greer Ranch 2 Zone, a new 1 MG reservoir (PW-T-20) is recommended at the existing 2050 Greer Ranch 2 tank site. As both 1850 Greer Ranch 1 Zone and 2050 Greer Ranch 2 Zone have storage deficiencies, this recommendation adds storage at the Greer Ranch 2 site, where water can be delivered via PRV to the 1850 Greer Ranch 1 Zone during fire or emergency conditions.

8.7.32 Zone 2196 - Sedco

The 2196 Sedco Zone is currently fed by two booster pump stations, Sedco A and Sedco B, in series with each other, each with a single booster PS. As there is growth expected in this area, it is recommended that the 2196 Sedco Zone be reconstructed with a new 0.4 MG reservoir (PW-T-21) is at the existing 2196 Sedco tank site and a new booster PS with 250 gpm firm booster pump capacity (PW-PU-13). The tank would replace the existing 88,000 gallon tank. This project should be completed by 2025, depending on the date for new development in this zone.

8.7.33 Zone 2201 - Ortega

The 2201 Ortega Zone is expected to be needed by 2040 to supply new development above the existing 1601 Zone Ortega Tank. A new PS with 1,700 gpm booster pump capacity (PW-PU-21) will be needed operational for fire flow needs, serving customers at elevations above 2,060 feet from storage in the proposed 1901 Ortega Zone Tank.

8.7.34 Zone 2217 - Stage Ranch 2

A new 1,000 gpm fire pump (PW-PU-27) is recommended at the existing 2217 Stage Ranch 2 PS to meet the fire flow demands in the Zone.

8.7.35 Zone 2309 - Daley Zone

To address existing and future storage deficits in the 2309 Daley Zone, a new 0.2 MG reservoir (PW-T-23) is recommended at the existing 2309 Daley tank site to replace the existing 88,000 gallon tank.

8.7.36 Zone 2320 - Adelfa

The 2320 Adelfa Zone is expected to be needed by 2025 to supply new development above the existing 1916.5 Encina Tank. A new PS with 1,400 gpm booster pump capacity (PW-PU-22) will be needed for operational and fire flow needs.

8.7.37 Zone 2748 - Los Pinos 1

To address the future storage deficit in the 2748 Los Pinos 1 Zone, a new 0.25 MG reservoir (PW-T-25) is recommended at the existing 2748 Los Pinos 1 tank site before 2025. This tank would serve customers with fire flow deficiencies in the 1871 Tomlin 1, 2313 Tomlin 2, 2748 Los Pinos 1, and 3544 Los Pinos 2 Zones.

8.7.38 Zone 3300 - Skymeadows

An additional 1,250 gpm booster pump (PW-PU-28) to deliver fire flow is recommended at the existing 3300 Skymeadows PS to meet the fire flow demands in the Zone.

8.7.39 Zone 3544 - Los Pinos 2

Additional 1,050 gpm booster pumps (PW-PU-29) to deliver fire flow are recommended at the existing 3544 Los Pinos 2A and 2B PSs to meet the fire flow demands in the Zone.

Chapter 9

CAPITAL IMPROVEMENT PLAN

9.1 Introduction

This section presents the recommended capital improvement plan (CIP) for Elsinore Valley Municipal Water District's (EVMWD) water distribution system through the year 2050. The recommended projects allow EVMWD to address existing system deficiencies, replace aging infrastructure, and provide the facilities necessary to meet future growth. The major categories of facilities associated with the water distribution system consist of distribution pipes, storage tanks, pump stations (PS), wells, and pressure reducing valve (PRV) stations.

It should be noted that this Water System Master Plan (WSMP) does not include the evaluation of EVMWD’s water treatment plants and future water supply needs, as these are evaluated as part of EVMWD’s Integrated Resources Plan (IRP). Hence, water supply and treatment related projects are not included in this water system CIP.

9.2 Phasing

The phasing of system improvements is based upon the following considerations:

- Anticipated construction of future land developments.
- The need to meet existing system deficiencies.
- Improvement of the water system reliability.
- Replacement of aging infrastructure.
- Combined cost of existing system improvements for each phase to approximately match the projected annual revenues to fund the projects.

All projects identified during the existing and future system analyses, as well as during the facility assessment, are phased based on system needs and the considerations listed above. Projects are categorized into six planning horizons starting in fiscal year (FY) 2023/2024 (hereafter 2023). The first near-term phase includes the most urgent projects and system improvements to serve near-term developments planned in 2023-2025. The remaining projects are separated into five additional phases, each spanning 5 years from 2025-2030, 2030-2035, 2035-2040, 2040-2045, and 2045-2050.

Improvements to address existing system deficiencies that affect the ability of EVMWD to provide a reliable water supply to its customers are the highest priority and are assigned to the 2023-2025 planning horizon. Improvements that address existing system deficiencies that are considered less critical are placed in later phasing periods. The prioritization of projects provides EVMWD with a practical and cost-balanced CIP that focuses on the most urgent projects first. The phasing of existing system projects is presented as a planning guideline and is subject to the availability of funds. The phasing of infrastructure that addresses future growth up to year 2050 is based on information provided by EVMWD for planned developments within the service area and expected dates of construction. The actual timing of future facilities will be dependent upon the actual rate of growth and the timing of new developments expected in the service area.

9.3 Cost Estimating Basis

The opinion of probable construction cost (OPCC) is developed based on costs obtained from industry manufacturers, Carollo Engineers, Inc's. (Carollo's) experience on similar water master planning projects and bid histories from comparable projects implemented by EVMWD. Some key cost assumptions are as follows:

- All costs are in 2023 U.S. dollars and are consistent with the AACE International guidelines for developing planning-level estimates (Class 4). Due to significant uncertainties related to the development of future construction costs, cost escalation is not included in this CIP.
- Costs are adjusted to the Engineering News Record Greater Los Angeles Construction Cost Index used of 14,033 in February 2023.
- The cost estimates do not include costs for land acquisition, easements, permits, and/or right-of-way acquisition.
- 20 percent of construction costs are added to the baseline construction cost estimate as a construction cost contingency.
- 40 percent of additional markups are included in the cost estimate for engineering, construction management, planning, administration, and environmental and legal services. This markup is added to the total of the baseline construction cost plus the construction cost contingency.

And example calculation of these mark-ups for a hypothetical $1 million project is shown below. As shown, the combined multiplier for construction cost to derive the capital cost of each project is 1.68.

Baseline Construction Cost	**$1,000,000**
Construction Cost Contingency (20%)	$200,000
Construction Cost subtotal	***$1,200,000***
Engineering (10%)	$120,000
Construction Management (10%)	$120,000
Permitting and Administration (10%)	$120,000
Environmental and Legal Services (10%)	$120,000
Capital Cost	**$1,680,000**

The unit construction costs for different assets used for the water system CIP are summarized in Table 9.1 through Table 9.6.

Table 9.1 Unit Pipeline Cost

Diameter (inches)	Unit Construction Cost ($/diameter-inches/feet)	Baseline Construction Cost ($/linear-feet)(1)
4	$60	$240
6	$52	$310
8	$41	$325
10	$39	$390
12	$33	$390
14	$34	$470
16	$29	$470
18	$32	$570
20	$29	$570
24	$26	$630
30	$25	$750
36	$24	$850
42	$24	$1,000
48	$24	$1,150

Notes:
(1) All unit construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area Engineering News Record (ENR) index of 14,033 (February 2023).

Table 9.2 Unit Storage Tank Costs

Size Range (MG)	Unit Construction Cost ($/gallon)(1,2)
0.1	$8.00
0.2	$6.00
0.3	$4.00
0.5	$3.00
1	$2.70
2	$2.40
3	$2.10
4	$2.00
5	$1.70
10	$1.70

Notes:
Abbreviations: MG - million gallons.
(1) Assumes Welded Steel on Grade for storage tanks costs.
(2) All unit construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area ENR index of 14,033 (February 2023).

Table 9.3 Pressure Regulating Station Costs

PRV Size	Construction Cost ($/PRV)(1)
1-2 valves < 8 inches	$150,000
2-3 valves 8 inches and up	$250,000

Notes:
(1) All construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area ENR index of 14,033 (February 2023).

Table 9.4 New PS Costs

Power (gpm)	Construction Cost ($/gpm)(1)
500	$1,500,000
1,000	$2,500,000
2,000	$3,500,000
3,000	$5,000,000
5,000	$6,500,000
10,000	$9,000,000

Notes:
Abbreviations: gpm - gallons per minute.
(1) All construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area ENR index of 14,033 (February 2023).

Table 9.5 PS Motor and Pump Replacement Unit Costs

Size (hp)	Construction Cost ($/hp)(1)
0-50	$40,000
50-100	$60,000
100-200	$80,000
200-500	$100,000

Notes:
Abbreviations: hp - horsepower.
(1) All unit construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area ENR index of 14,033 (February 2023).

Table 9.6 Miscellaneous Costs

Project	Construction Cost ($/each)(1)
Well Equipping	$2,500,000
Well Drilling	$2,000,000
Well Rehabilitation (per Well)	$305,000
Portable Pump	$125,000
New Hydrant	$25,000
Backup Power Generator (per PS)	$305,000

Notes:
(1) All construction costs are in 2023 dollars and based on adjustments for the Greater Los Angeles Area ENR index of 14,033 (February 2023).

9.4 Recommended Improvement Program

The CIP costs were developed using the unit costs from Table 9.1 through Table 9.6 along with the required project sizing, such as length of pipelines; volume of storage tanks; PS capacities; and sizing of other improvements identified during the system analyses. The CIP was created for assets required to meet existing hydraulic deficiencies and planned future growth within the defined planning horizons up until the year 2050. The CIP projects are categorized as capacity based improvement projects and rehabilitation and replacement (R&R) projects.

The capacity based improvement projects consist of capital projects required to address future hydraulic deficiencies in the distribution system. In the CIP the capacity improvement projects are grouped into the following categories:

- Low pressure improvements.
- Transmission and distribution mains.
- PSs.
- Storage reservoirs.
- PRV Stations.
- Fire flow improvements.

The R&R projects consist of capital projects required to replace existing aging infrastructure that is already beyond its anticipated end of useful life (EUL) or will be beyond its EUL by the planning horizon of this WSMP, namely year 2050. In the CIP the R&R projects are grouped into the following categories:

- Pipelines R&R.
- Reservoirs R&R.
- PSs R&R.
- Wells R&R.

In the CIP the recommended projects are given an alphanumeric project identification (ID) code referred to CIP ID to easily identify them in the model and in figures throughout this WSMP. CIP IDs are separated based on the project improvements type as follows:

- PW-LP = Low pressure capacity improvement projects.
- PW-TR = Transmission capacity improvement projects.
- PW-PU = PS capacity improvement projects.
- PW-T = Reservoir (Tank) capacity improvement projects.
- PW-V = Valve capacity improvement projects.
- FF = Fire Flow capacity improvement projects.
- PWRR-P-YYYY = pipeline replacement program projects for year YYYY where YYYY is the proposed replacement phase for the project.

- SDR-YYYY = Small diameter replacement program projects for year YYYY where YYYY is the proposed replacement phase for the project.
- PWRR- T = Reservoir (Tank) replacement program projects.
- PWRR- PS = PS replacement program projects.
- PWRR-W = Well replacement projects.

As noted in the introduction, CIP projects were defined in Chapter 7 and Chapter 8 of this WSMP and are grouped in by the improvement types previously presented in this section. A summary of the CIP projects is presented in Table 9.7.

Each project listed in Table 9.7 has a detailed project sheet which is provided in Appendix E. The project information sheets have specific information about the capital project which includes the following:

- CIP ID.
- Project name.
- Project map which shows the location of the projects.
- System type which is Potable water for the projects in this WSMP.
- Description which describes the project need.
- Details which list the project elements as well as the cost and phasing of each project element.
- Cost allocation between existing and future ratepayers.

The following sections of this WSMP provide a summary of the phasing and breakdown of existing verses future user cost for each category of the CIP.

Table 9.7 Capital Improvement Plan

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
Capacity Improvements					**$506,128,000**	**$179,350,000**	**$326,778,000**	**$16,298,000**	**$265,175,000**	**$106,732,000**	**$62,140,000**	**$3,290,000**	**$52,493,000**	**$506,128,000**
Low Pressure Improvements		Diameter (in)	Diameter (in)	Length (ft)	$17,608,000	$17,608,000	$-	$-	$17,608,000	$-	$-	$-	$-	$17,608,000
PW-LP1	PZ Adjustment for Falling Leaf Drive	12	12	400	$262,000	$262,000	$-	$-	$262,000	$-	$-	$-	$-	$262,000
PW-LP2	PZ Adjustment for Lake Street	12	12	1,000	$655,000	$655,000	$-	$-	$655,000	$-	$-	$-	$-	$655,000
PW-LP3	PZ Adjustment for Highway 74	8	12	40	$44,000	$44,000	$-	$-	$44,000	$-	$-	$-	$-	$44,000
PW-LP4	PZ Adjustment for Via Scenica	12	12	40	$61,000	$61,000	$-	$-	$61,000	$-	$-	$-	$-	$61,000
PW-LP5	PZ Adjustment near Almond Street	8	8	1,800	$983,000	$983,000	$-	$-	$983,000	$-	$-	$-	$-	$983,000
PW-LP6	PZ Adjustment near Canyon Drive	8	8	5,700	$3,114,000	$3,114,000	$-	$-	$3,114,000	$-	$-	$-	$-	$3,114,000
PW-LP7	PZ Adjustment near Robards Way	8	12	3,800	$2,489,000	$2,489,000	$-	$-	$2,489,000	$-	$-	$-	$-	$2,489,000
PW-LP8	PZ Adjustment near Tranquil Lane	8	8	200	$109,000	$109,000	$-	$-	$109,000	$-	$-	$-	$-	$109,000
PW-LP9	PZ Adjustment near Adelfa Street	12	12	3,000	$1,966,000	$1,966,000	$-	$-	$1,966,000	$-	$-	$-	$-	$1,966,000
PW-LP10	PZ Adjustment near Santa Rosa Drive	8	8	1,300	$745,000	$745,000	$-	$-	$745,000	$-	$-	$-	$-	$745,000
PW-LP11	PZ Adjustment near Blanche Drive	8	8	40	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
PW-LP12	PZ Adjustment for Grand Avenue	8	16	600	$473,000	$473,000	$-	$-	$473,000	$-	$-	$-	$-	$473,000
PW-LP13	PZ Adjustment for SH-74	8	8	100	$90,000	$90,000	$-	$-	$90,000	$-	$-	$-	$-	$90,000
PW-LP14	PZ Adjustment near Alvarado Street	8	8	1,500	$854,000	$854,000	$-	$-	$854,000	$-	$-	$-	$-	$854,000
PW-LP15	PZ Adjustment near Lincoln Street	16	16	5,500	$4,377,000	$4,377,000	$-	$-	$4,377,000	$-	$-	$-	$-	$4,377,000
PW-LP16-1	PZ Adjustment near Grand Avenue	12	12	40	$61,000	$61,000	$-	$-	$61,000	$-	$-	$-	$-	$61,000
PW-LP16-2	PZ Adjustment near Grand Avenue	12	12	1,800	$1,213,000	$1,213,000	$-	$-	$1,213,000	$-	$-	$-	$-	$1,213,000
PW-LP17	PZ Adjustment near Adelfa Street and McGrew Drive	8	8	40	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
Transmission and Distribution Main		Diameter (in)	Diameter (in)	Length (ft)	$178,703,000	$15,698,000	$163,005,000	$-	$121,198,000	$27,143,000	$30,362,000	$-	$-	$178,703,000
PW-TR1	2001 Horsethief 3 Zone Transmission	N/A	16	2,050	$1,620,000	$-	$1,620,000	$-	$1,620,000	$-	$-	$-	$-	$1,620,000
PW-TR2	1434 Zone Transmission in Alberhill Villages	N/A	24	5,400	$5,715,000	$-	$5,715,000	$-	$5,715,000	$-	$-	$-	$-	$5,715,000
PW-TR3	1601 Zone Transmission in Alberhill Villages	N/A	16/30	15,044	$16,846,000	$-	$16,846,000	$-	$-	$16,846,000	$-	$-	$-	$16,846,000
PW-TR5	1801 Zone Transmission in Alberhill Villages	N/A	16	13,041	$10,297,000	$-	$10,297,000	$-	$-	$10,297,000	$-	$-	$-	$10,297,000
PW-TR7A	Lucerne PS Suction/Discharge Pipeline	12	16/24	1,289	$1,073,000	$1,073,000	$-	$-	$1,073,000	$-	$-	$-	$-	$1,073,000
PW-TR7B	1434 Transmission from Temescal Canyon Road to Alberhill PS	N/A	24/ 36	7,424	$10,526,000	$2,631,000	$7,895,000	$-	$10,526,000	$-	$-	$-	$-	$10,526,000
PW-TR8	1434 Transmission from Alberhill PS to Baker/Nichols	N/A	36	6,257	$8,935,000	$-	$8,935,000	$-	$8,935,000	$-	$-	$-	$-	$8,935,000
PW-TR9	1434 Transmission from Baker/Nichols to Nichols/Collier	N/A	24	1,714	$1,814,000	$-	$1,814,000	$-	$1,814,000	$-	$-	$-	$-	$1,814,000
PW-TR10	1434 Transmission from Baker/Nichols to Baker Tank	N/A	24	4,154	$4,396,000	$-	$4,396,000	$-	$4,396,000	$-	$-	$-	$-	$4,396,000
PW-TR11	1601 Transmission from Alberhill PS to Nichols/Terra Cotta	N/A	16	3,200	$2,527,000	$-	$2,527,000	$-	$2,527,000	$-	$-	$-	$-	$2,527,000
PW-TR12	1601 Transmission in Terra Cotta Road	N/A	16	3,573	$5,640,000	$-	$5,640,000	$-	$5,640,000	$-	$-	$-	$-	$5,640,000
PW-TR13	1601 Transmission from Nichols/Terra Cotta to Nichols/Baker	N/A	16	3,450	$2,724,000	$-	$2,724,000	$-	$2,724,000	$-	$-	$-	$-	$2,724,000
PW-TR14	North Peak PS Suction/Discharge Pipeline	N/A	16	15,533	$12,265,000	$-	$12,265,000	$-	$12,265,000	$-	$-	$-	$-	$12,265,000
PW-TR15	1676 Transmission in Alberhill Ranch	N/A	16	4,332	$3,420,000	$-	$3,420,000	$-	$3,420,000	$-	$-	$-	$-	$3,420,000
PW-TR16	1434 Transmission in Grand Avenue	N/A	24	22,767	$24,097,000	$12,048,000	$12,049,000	$-	$24,097,000	$-	$-	$-	$-	$24,097,000
PW-TR20	1601 Spyglass Transmission from Dexter/3rd to Summerhill Area	N/A	30	12,397	$15,621,000	$-	$15,621,000	$-	$15,621,000	$-	$-	$-	$-	$15,621,000
PW-TR21	1601 Spyglass Transmission from Camino del Norte to Rosetta Canyon Road	N/A	16	8,177	$6,457,000	$-	$6,457,000	$-	$6,457,000	$-	$-	$-	$-	$6,457,000
PW-TR22	1801 Spyglass Transmission	N/A	16	3,470	$2,740,000	$-	$2,740,000	$-	$2,740,000	$-	$-	$-	$-	$2,740,000
PW-TR23	1801 Spyglass Transmission	N/A	16	1,425	$1,126,000	$-	$1,126,000	$-	$1,126,000	$-	$-	$-	$-	$1,126,000
PW-TR25	1801 Transmission in Greenwald Avenue	N/A	16/20	13,118	$10,718,000	$-	$10,718,000	$-	$10,718,000	$-	$-	$-	$-	$10,718,000
PW-TR26	1801 Transmission in North Tuscany Hills	N/A	16	6,422	$5,071,000	$-	$5,071,000	$-	$-	$-	$5,071,000	$-	$-	$5,071,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate[1,2,3,4] ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PW-TR31	1746 Bundy Gafford Zone Transmission	N/A	20/30	20,600	$24,189,000	$-	$24,189,000	$-	$-	$-	$24,189,000	$-	$-	$24,189,000
PW-TR32	1901 Ortega Transmission	N/A	8 / 16	1,673	$1,102,000	$-	$1,102,000	$-	$-	$-	$1,102,000	$-	$-	$1,102,000
PS		Capacity (gpm)	Capacity (gpm)	Horsepower (hp)	$103,018,000	$2,563,000	$100,455,000	$-	$62,161,000	$37,901,000	$404,000	$436,000	$2,116,000	$103,018,000
PW-PU-1	PZ 1601 (Horsethief 1) PS Upgrade	0	450	125	$538,000	$-	$538,000	$-	$-	$-	$-	$-	$538,000	$538,000
PW-PU-2	PZ 1601 (Rosetta Canyon 1) PS Upgrade	0	1300	250	$504,000	$-	$504,000	$-	$-	$-	$-	$-	$504,000	$504,000
PW-PU-3	PZ 1650 (Adelfa) PS Upgrade	0	650	75	$202,000	$96,000	$106,000	$-	$202,000	$-	$-	$-	$-	$202,000
PW-PU-4	PZ 1650 (Inland Valley) PS Upgrade	0	1700	150	$538,000	$14,000	$524,000	$-	$538,000	$-	$-	$-	$-	$538,000
PW-PU-5	PZ 1746 (Bundy Canyon) PS Upgrade	0	2600	100 / 125	$336,000	$-	$336,000	$-	$336,000	$-	$-	$-	$-	$336,000
PW-PU-6	PZ 1750 (Cottonwood) PS Upgrade	0	1000	200	$403,000	$230,000	$173,000	$-	$403,000	$-	$-	$-	$-	$403,000
PW-PU-7	PZ 1800 (Rice Canyon) PS Upgrade	0	1300	75	$403,000	$-	$403,000	$-	$-	$403,000	$-	$-	$-	$403,000
PW-PU-8	PZ 1801 (Horsethief 2) PS Upgrade	0	400	75	$302,000	$-	$302,000	$-	$-	$-	$-	$302,000	$-	$302,000
PW-PU-9	PZ 1801 (Rosetta Canyon 2) PS Upgrade	0	1300	50 / 150	$403,000	$-	$403,000	$-	$-	$-	$-	$-	$403,000	$403,000
PW-PU-10	PZ 1901 (Ortega) PS Upgrade	0	250	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-11	PZ 2001 (Horsethief 3) New PS	0	550	--	$4,200,000	$-	$4,200,000	$-	$-	$4,200,000	$-	$-	$-	$4,200,000
PW-PU-12	PZ 2001 (North Peak) New PS	0	450	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-13	PZ 2196 (Sedco) New PS	0	250	--	$2,520,000	$428,000	$2,092,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-PU-14	PZ 1550 (Cielo Vista) PS Upgrade	0	1000	20	$134,000	$134,000	$-	$-	$-	$134,000	$-	$-	$-	$134,000
PW-PU-15	PZ 1600 (Skylark) PS Upgrade	0	1300	10	$202,000	$202,000	$-	$-	$-	$202,000	$-	$-	$-	$202,000
PW-PU-16	PZ 1850 (Canyon Lake Sustaining) PS Upgrade	0	600	30 / 40	$134,000	$134,000	$-	$-	$-	$-	$-	$134,000	$-	$134,000
PW-PU-17	PZ 1850 (Lemon Grove) PS Upgrade	0	350	8 / 25 / 150	$402,000	$402,000	$-	$-	$-	$-	$-	$-	$402,000	$402,000
PW-PU-18	PZ 1900 (Elderberry) New PS	0	100	--	$2,520,000	$-	$2,520,000	$-	$-	$2,520,000	$-	$-	$-	$2,520,000
PW-PU-19	PZ 1901 (Borchard) New PS	0	1800	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-20	PZ 1940 (Cirrus Circle) PS Upgrade	0	1400	15	$202,000	$202,000	$-	$-	$-	$202,000	$-	$-	$-	$202,000
PW-PU-21	PZ 2201 (Ortega) New PS	0	1700	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-22	PZ 2320 (Adelfa) New PS	0	1400	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-23	PZ 1800 (Spyglass) PS Upgrade	0	1650	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-24	PZ 1571 (City) PS Upgrade	0	900	50	$202,000	$48,000	$154,000	$-	$202,000	$-	$-	$-	$-	$202,000
PW-PU-25	PZ 1601 (Alberhill 1) PS Upgrade	0	3000	--	$8,400,000	$-	$8,400,000	$-	$8,400,000	$-	$-	$-	$-	$8,400,000
PW-PU-26	PZ 1925 (Spyglass) PS Upgrade	0	1800	--	$5,880,000	$-	$5,880,000	$-	$5,880,000	$-	$-	$-	$-	$5,880,000
PW-PU-27	PZ 2217 (Stage Ranch 2) PS Upgrade	0	1000	100	$202,000	$202,000	$-	$-	$-	$-	$202,000	$-	$-	$202,000
PW-PU-28	PZ 3300 (Skymeadows) PS Upgrade	0	1250	100	$202,000	$202,000	$-	$-	$-	$-	$202,000	$-	$-	$202,000
PW-PU-29	PZ 3544 (Los Pinos 2) PS Upgrade	0	1000	15	$269,000	$269,000	$-	$-	$-	$-	$-	$-	$269,000	$269,000
PW-PU-30	Temescal Valley Pipeline PS	0	20200		$15,120,000	$-	$15,120,000	$-	$15,120,000	$-	$-	$-	$-	$15,120,000
PW-PU-31	Mission Trails PS	0	8000		$15,120,000	$-	$15,120,000	$-	$-	$15,120,000	$-	$-	$-	$15,120,000
PW-PU-32	Inland Valley PS	0	15000	--	$15,120,000	$-	$15,120,000	$-	$-	$15,120,000	$-	$-	$-	$15,120,000
Storage Reservoir		Capacity (MG)	Capacity (MG)	Length (ft)	$116,474,000	$32,517,000	$83,957,000	$-	$55,843,000	$23,990,000	$14,213,000	$-	$22,428,000	$116,474,000
PW-T-1	1467 Waite Street Zone Additional Tank	0	0.6	--	$2,722,000	$1,679,000	$1,043,000	$-	$-	$-	$-	$-	$2,722,000	$2,722,000
PW-T-2	1571 City Tank Replacement	1.73	4.2	--	$11,995,000	$7,797,000	$4,198,000	$-	$-	$-	$-	$-	$11,995,000	$11,995,000
PW-T-3	1601 Alberhill Village Tank	0	6	--	$17,136,000	$-	$17,136,000	$-	$-	$17,136,000	$-	$-	$-	$17,136,000
PW-T-4	1601 Horsethief 1 Additional Tank	0	1.5	--	$6,048,000	$3,629,000	$2,419,000	$-	$6,048,000	$-	$-	$-	$-	$6,048,000
PW-T-5	1601 Rosetta Canyon 1 Additional Tank	0	0.7	--	$3,175,000	$-	$3,175,000	$-	$-	$-	$-	$-	$3,175,000	$3,175,000
PW-T-6	1622 Canyon Lake Additional Tank	0	2	--	$8,064,000	$7,258,000	$806,000	$-	$8,064,000	$-	$-	$-	$-	$8,064,000
PW-T-7	1676 Alberhill Zone New Tank	0	1	--	$4,536,000	$-	$4,536,000	$-	$4,536,000	$-	$-	$-	$-	$4,536,000
PW-T-8	1746 Bundy Canyon Zone Additional Tank	0	1.5	--	$6,048,000	$242,000	$5,806,000	$-	$6,048,000	$-	$-	$-	$-	$6,048,000
PW-T-9	1800 Spyglass Zone New Tank	0	2.3	--	$8,114,000	$-	$8,114,000	$-	$8,114,000	$-	$-	$-	$-	$8,114,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PW-T-10	1800 Rice Canyon/Alberhill 2 Zone New Tank	0	1.7	--	$6,854,000	$-	$6,854,000	$-	$-	$6,854,000	$-	$-	$-	$6,854,000
PW-T-11	1801 Horsethief 2 Zone Additional Tank	0	1.6	--	$6,451,000	$2,129,000	$4,322,000	$-	$6,451,000	$-	$-	$-	$-	$6,451,000
PW-T-12	1801 North Tuscany Hills New Tank	0	2.6	--	$9,173,000	$-	$9,173,000	$-	$-	$-	$9,173,000	$-	$-	$9,173,000
PW-T-15	1896 Meadowbrook 2 Additional Tank	0	1.3	--	$5,242,000	$-	$5,242,000	$-	$5,242,000	$-	$-	$-	$-	$5,242,000
PW-T-16	1901 Ortega Zone New Tank	0	0.5	--	$2,520,000	$-	$2,520,000	$-	$2,520,000	$-	$-	$-	$-	$2,520,000
PW-T-18	2001 Horsethief 3 New Tank	0	0.8	--	$3,629,000	$-	$3,629,000	$-	$3,629,000	$-	$-	$-	$-	$3,629,000
PW-T-19	2001 North Peak Zone New Tank	0	0.7	--	$3,175,000	$-	$3,175,000	$-	$3,175,000	$-	$-	$-	$-	$3,175,000
PW-T-20	2050 Greer Ranch 2 Zone Additional Tank	0	1	--	$4,536,000	$4,400,000	$136,000	$-	$-	$-	$-	$-	$4,536,000	$4,536,000
PW-T-21	2196 Sedco Zone Tank Replacement	0	0.4	--	$2,016,000	$343,000	$1,673,000	$-	$2,016,000	$-	$-	$-	$-	$2,016,000
PW-T-22	1882 Stage Ranch 1 Zone Additional Tank	0	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$1,344,000	$-	$-	$1,344,000
PW-T-23	2309 Daley Zone Tank Replacement	0.088	0.2	--	$2,016,000	$2,016,000	$-	$-	$-	$-	$2,016,000	$-	$-	$2,016,000
PW-T-25	2748 Los Pinos 1 Additional Tank	0.1	0.25	--	$1,680,000	$1,680,000	$-	$-	$-	$-	$1,680,000	$-	$-	$1,680,000
Pressure Reducing Valve Stations		Diameter (in)	Diameter (in)	No.	$840,000	$840,000	$-	$-	$420,000	$-	$-	$-	$420,000	$840,000
PW-V1	PZ Tomlin 2 PS Pressure Reducing Valve Upgrade	0	8	1	$420,000	$420,000	$-	$-	$420,000	$-	$-	$-	$-	$420,000
PW-V2	PZ Los Pinos 1 PS Pressure Reducing Valve Upgrade	0	8	1	$420,000	$420,000	$-	$-	$-	$-	$-	$-	$420,000	$420,000
Fire Flow Improvements		Diameter (in)	Diameter (in)	Length (ft)	$111,096,000	$109,592,000	$1,504,000	$16,298,000	$7,265,000	$15,800,000	$41,350,000	$2,854,000	$27,529,000	$111,096,000
FF-01	Fire Flow Pipeline Improvement Project - Warm Springs Drive	6	Varies	20,600	$16,071,000	$16,071,000	$-	$-	$-	$-	$-	$-	$16,071,000	$16,071,000
FF-02	Fire Flow Pipeline Improvement Project - Canyon Hills Drive	6	12	500	$328,000	$328,000	$-	$-	$-	$-	$-	$328,000	$-	$328,000
FF-03	Fire Flow Pipeline Improvement Project - Richard Street	Varies	Varies	9,100	$6,313,000	$6,313,000	$-	$-	$-	$-	$6,313,000	$-	$-	$6,313,000
FF-04	Fire Flow Pipeline Improvement Project - Riverview Drive	N/A	8	1,600	$874,000	$874,000	$-	$-	$-	$-	$874,000	$-	$-	$874,000
FF-05	Fire Flow Pipeline Improvement Project - Greenwald Avenue	6	12	1,400	$917,000	$917,000	$-	$-	$917,000	$-	$-	$-	$-	$917,000
FF-06	Fire Flow Pipeline Improvement Project - El Toro Cut Off Road	N/A	12	1,200	$787,000	$787,000	$-	$-	$-	$-	$-	$787,000	$-	$787,000
FF-07	Fire Flow Pipeline Improvement Project - Allan Street	6 & 8	12	1,900	$1,245,000	$1,245,000	$-	$-	$-	$-	$1,245,000	$-	$-	$1,245,000
FF-08	Fire Flow Pipeline Improvement Project - 2nd Street	N/A	12	1,400	$917,000	$917,000	$-	$-	$-	$-	$-	$-	$917,000	$917,000
FF-09	Fire Flow Pipeline Improvement Project - W Graham Avenue	N/A	8	1,300	$711,000	$711,000	$-	$-	$-	$-	$711,000	$-	$-	$711,000
FF-10	Fire Flow Pipeline Improvement Project - Sunnyslope Avenue	Varies	Varies	12,700	$8,058,000	$8,058,000	$-	$-	$-	$8,058,000	$-	$-	$-	$8,058,000
FF-11	Fire Flow Pipeline Improvement Project - Lakeview Avenue	N/A	12	4,300	$2,817,000	$2,817,000	$-	$-	$-	$-	$-	$-	$2,817,000	$2,817,000
FF-12	Fire Flow Pipeline Improvement Project - Lash Street	Varies	Varies	3,500	$2,315,000	$2,315,000	$-	$-	$-	$2,315,000	$-	$-	$-	$2,315,000
FF-13	Fire Flow Pipeline Improvement Project - De Brask Avenue	2 & 4	Varies	1,100	$602,000	$602,000	$-	$-	$-	$602,000	$-	$-	$-	$602,000
FF-14	Fire Flow Pipeline Improvement Project - Dryden Street	2 to 8	Varies	13,600	$8,683,000	$8,683,000	$-	$-	$-	$-	$8,683,000	$-	$-	$8,683,000
FF-15	Fire Flow Pipeline Improvement Project - Raven Drive	6 & 8	Varies	8,200	$5,320,000	$5,320,000	$-	$-	$-	$-	$5,320,000	$-	$-	$5,320,000
FF-16	Fire Flow Pipeline Improvement Project - Zieglinde Drive	N/A	8	1,300	$711,000	$711,000	$-	$-	$711,000	$-	$-	$-	$-	$711,000
FF-17	Fire Flow Pipeline Improvement Project - Ficus Street	Varies	Varies	1,500	$973,000	$973,000	$-	$-	$-	$-	$-	$-	$973,000	$973,000
FF-18	Fire Flow Pipeline Improvement Project - Ulla Lane	6	12	600	$393,000	$393,000	$-	$-	$393,000	$-	$-	$-	$-	$393,000
FF-19	Fire Flow Pipeline Improvement Project - Oregon Street	N/A	8	400	$218,000	$218,000	$-	$-	$218,000	$-	$-	$-	$-	$218,000
FF-20	Fire Flow Pipeline Improvement Project - Kevin Place	N/A	8	300	$165,000	$165,000	$-	$-	$165,000	$-	$-	$-	$-	$165,000
FF-21	Fire Flow Pipeline Improvement Project - Macy Street	N/A	8	100	$56,000	$56,000	$-	$-	$-	$-	$-	$-	$56,000	$56,000
FF-22	Fire Flow Pipeline Improvement Project - Cedar Drive	8	8	200	$109,000	$109,000	$-	$-	$109,000	$-	$-	$-	$-	$109,000
FF-23	Fire Flow Pipeline Improvement Project - Sangston Drive	6 & 8	12	500	$656,000	$656,000	$-	$656,000	$-	$-	$-	$-	$-	$656,000
FF-24	Fire Flow Pipeline Improvement Project - Curtis Avenue	N/A	8	100	$56,000	$56,000	$-	$-	$56,000	$-	$-	$-	$-	$56,000
FF-25	Fire Flow Pipeline Improvement Project - Coleman Avenue	4 & 8	12	1,400	$917,000	$917,000	$-	$-	$-	$917,000	$-	$-	$-	$917,000
FF-26	Fire Flow Pipeline Improvement Project - Grand Avenue	4	12	1,000	$655,000	$655,000	$-	$-	$655,000	$-	$-	$-	$-	$655,000
FF-27	Fire Flow Pipeline Improvement Project - Stoneman Street	6 & 8	12	1,100	$721,000	$721,000	$-	$-	$-	$-	$-	$721,000	$-	$721,000
FF-28	Fire Flow Pipeline Improvement Project - Arbolado Lane	Varies	Varies	1,600	$886,000	$886,000	$-	$-	$886,000	$-	$-	$-	$-	$886,000
FF-29	Fire Flow Pipeline Improvement Project - Melinda Lane	Varies	Varies	900	$546,000	$546,000	$-	$-	$-	$-	$-	$-	$546,000	$546,000
FF-30	Fire Flow Pipeline Improvement Project - Wilson Street	8	12	1,200	$787,000	$787,000	$-	$-	$-	$-	$-	$-	$787,000	$787,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
FF-31	Fire Flow Pipeline Improvement Project - Leslie Street	N/A	8	1,700	$930,000	$930,000	$-	$-	$-	$-	$-	$-	$930,000	$930,000
FF-32	Fire Flow Pipeline Improvement Project - Illinois Street	Varies	Varies	1,000	$633,000	$633,000	$-	$-	$-	$-	$633,000	$-	$-	$633,000
FF-33	Fire Flow Pipeline Improvement Project - Gruwell Street	4 to 8	Varies	2,900	$1,900,000	$1,900,000	$-	$-	$-	$-	$1,900,000	$-	$-	$1,900,000
FF-34	Fire Flow Pipeline Improvement Project - Symphony Park Lane	8	12	700	$459,000	$459,000	$-	$-	$-	$-	$-	$459,000	$-	$459,000
FF-35	Fire Flow Pipeline Improvement Project - Colony Drive	Varies	Varies	500	$369,000	$369,000	$-	$-	$-	$-	$369,000	$-	$-	$369,000
FF-36	Fire Flow Pipeline Improvement Project - Pantera Court	8	12	2,800	$3,668,000	$3,668,000	$-	$3,668,000	$-	$-	$-	$-	$-	$3,668,000
FF-37	Fire Flow Pipeline Improvement Project - Jena Lane	N/A	12	1,400	$917,000	$917,000	$-	$-	$917,000	$-	$-	$-	$-	$917,000
FF-38	Fire Flow Pipeline Improvement Project Camelot Circle	Varies	Varies	300	$175,000	$175,000	$-	$-	$-	$-	$-	$175,000	$-	$175,000
FF-39	Fire Flow Pipeline Improvement Project - Wildomar Trail	Varies	Varies	12,800	$9,972,000	$9,972,000	$-	$9,972,000	$-	$-	$-	$-	$-	$9,972,000
FF-40	Fire Flow Pipeline Improvement Project - Canyon Drive	N/A	8	200	$109,000	$109,000	$-	$-	$-	$109,000	$-	$-	$-	$109,000
FF-41	Fire Flow Pipeline Improvement Project - Sunset Avenue	Varies	Varies	1,800	$1,006,000	$1,006,000	$-	$-	$-	$-	$1,006,000	$-	$-	$1,006,000
FF-42	Fire Flow Pipeline Improvement Project - Dial Road	6	12	1,000	$655,000	$655,000	$-	$-	$-	$655,000	$-	$-	$-	$655,000
FF-43	Fire Flow Pipeline Improvement Project - Almond Street	8	Varies	2,600	$1,650,000	$1,650,000	$-	$-	$1,650,000	$-	$-	$-	$-	$1,650,000
FF-44	Fire Flow Pipeline Improvement Project - Valencia Street	6 & 8	12	1,600	$1,049,000	$1,049,000	$-	$-	$-	$-	$-	$-	$1,049,000	$1,049,000
FF-45	Fire Flow Pipeline Improvement Project - Orchard Street	Varies	Varies	6,700	$4,794,000	$4,794,000	$-	$-	$-	$-	$4,794,000	$-	$-	$4,794,000
FF-46	Fire Flow Pipeline Improvement Project - Lewis Street	4 to 8	Varies	2,300	$1,420,000	$1,420,000	$-	$-	$-	$-	$-	$-	$1,420,000	$1,420,000
FF-47	Fire Flow Pipeline Improvement Project - Grape Street	N/A	8	700	$384,000	$384,000	$-	$-	$-	$-	$-	$384,000	$-	$384,000
FF-48	Fire Flow Pipeline Improvement Project - Park Way	N/A	8	100	$112,000	$112,000	$-	$112,000	$-	$-	$-	$-	$-	$112,000
FF-49	Fire Flow Pipeline Improvement Project - Ponte Russo	4 to 8	Varies	1,400	$1,890,000	$1,890,000	$-	$1,890,000	$-	$-	$-	$-	$-	$1,890,000
FF-50	Fire Flow Pipeline Improvement Project - Longhorn Drive	Varies	Varies	13,100	$9,502,000	$9,502,000	$-	$-	$-	$-	$9,502,000	$-	$-	$9,502,000
FF-51	Fire Flow Pipeline Improvement Project - Yosemite Place	6 to 10	12	4,800	$3,144,000	$3,144,000	$-	$-	$-	$3,144,000	$-	$-	$-	$3,144,000
FF-52	Fire Flow Pipeline Improvement Project - Railroad Canyon Road	8	12	700	$459,000	$459,000	$-	$-	$-	$-	$-	$-	$459,000	$459,000
FF-53	Fire Flow Hydrant Zone Adjustment - Temescal Canyon Road	N/A	N/A	N/A	$84,000	$84,000	$-	$-	$84,000	$-	$-	$-	$-	$84,000
FF-54	Fire Flow Hydrant Zone Adjustment - Horsethief 1 Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-55	Fire Flow Hydrant Zone Adjustment - Alberhill 1 PS	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-56	Fire Flow Hydrant Zone Adjustment - Alberhill 1A Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-57	Fire Flow Hydrant Zone Adjustment - Dryden Street	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-58	Fire Flow Hydrant Zone Adjustment - Grand Avenue	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-59	Fire Flow Hydrant Zone Adjustment - Crab Hollow Circle	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-60	Fire Flow Hydrant Zone Adjustment - Country Club Drive	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-61	Fire Flow Hydrant Zone Adjustment - Sunnyslope Avenue	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-62	Fire Flow Hydrant Zone Adjustment - 3rd Street	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-63	Fire Flow Hydrant Zone Adjustment	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-64	Fire Flow Hydrant Zone Adjustment - Rosetta Canyon 2A Tank	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-65	Fire Flow Hydrant Zone Adjustment - El Cariso Truck Trail	N/A	N/A	N/A	$42,000	$42,000	$-	$-	$42,000	$-	$-	$-	$-	$42,000
FF-66	Fire Flow Pipeline Improvement Project (Future Deficiency) - Longhorn Drive	6	8	1,000	$546,000	$-	$546,000	$-	$-	$-	$-	$-	$546,000	$546,000
FF-67	Fire Flow Pipeline Improvement Project (Future Deficiency) – White Street	6	8	1,000	$546,000	$-	$546,000	$-	$-	$-	$-	$-	$546,000	$546,000
FF-68	Fire Flow Pipeline Improvement Project (Future Deficiency) – Skylark Drive	8	12	500	$328,000	$-	$328,000	$-	$-	$-	$-	$-	$328,000	$328,000
FF-69	Fire Flow Hydrant Zone Adjustment (Future Deficiency) - 1434 PZ	N/A	N/A	N/A	$84,000	$-	$84,000	$-	$-	$-	$-	$-	$84,000	$84,000
Supply Improvements		Diameter (in)	Diameter (in)	Length (ft)	$91,000,000	$42,000,000	$51,000,000	$-	$60,000,000	$33,000,000	$-	$-	$-	$93,000,000
PW-WTP	Canyon Lake Water Treatment Plant Upgrades	N/A	N/A	N/A	$60,000,000	$42,000,000	$18,000,000	$-	$60,000,000	$-	$-	$-	$-	$60,000,000
PW-W1	Warm Springs Groundwater Wells	N/A	N/A	N/A	$13,000,000	$-	$13,000,000	$-	$-	$13,000,000	$-	$-	$-	$13,000,000
PW-W2	Temecula-Pauba Groundwater Wells	N/A	N/A	N/A	$20,000,000	$-	$20,000,000	$-	$-	$20,000,000	$-	$-	$-	$20,000,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate[1,2,3,4] ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
Rehabilitation and Replacement Projects					$497,933,000	$497,933,000	$-	$25,567,000	$41,345,000	$129,735,000	$73,899,000	$139,145,000	$88,242,000	$497,933,000
Pipelines		Diameter (in)	Diameter (in)	Length (ft)	$388,973,000	$388,973,000	$-	$-	$37,111,000	$114,515,000	$71,211,000	$102,322,000	$63,814,000	$388,973,000
PWRR-P-2030	Pipeline R&R Program	Varies	Varies	48,097	$26,978,000	$26,978,000	$-	$-	$26,978,000	$-	$-	$-	$-	$26,978,000
PWRR-P-2035	Pipeline R&R Program	Varies	Varies	107,903	$111,315,000	$111,315,000	$-	$-	$-	$111,315,000	$-	$-	$-	$111,315,000
PWRR-P-2040	Pipeline R&R Program	Varies	Varies	31,305	$17,357,000	$17,357,000	$-	$-	$-	$-	$17,357,000	$-	$-	$17,357,000
PWRR-P-2045	Pipeline R&R Program	Varies	Varies	252,734	$143,273,000	$143,273,000	$-	$-	$-	$-	$40,000,000	$53,273,000	$50,000,000	$143,273,000
PWRR-P-2050	Pipeline R&R Program	Varies	Varies	20,067	$11,766,000	$11,766,000	$-	$-	$-	$-	$-	$-	$11,766,000	$11,766,000
SDR-2030	Pipeline Small Diameter Replacement Program	≤8 / 10	8 / 10	18,475	$10,133,000	$10,133,000	$-	$-	$10,133,000	$-	$-	$-	$-	$10,133,000
SDR-2035	Pipeline Small Diameter Replacement Program	≤8	8	5,861	$3,200,000	$3,200,000	$-	$-	$-	$3,200,000	$-	$-	$-	$3,200,000
SDR-2040	Pipeline Small Diameter Replacement Program	≤8	8	25,375	$13,854,000	$13,854,000	$-	$-	$-	$-	$13,854,000	$-	$-	$13,854,000
SDR-2045	Pipeline Small Diameter Replacement Program	≤8	8	89,834	$49,049,000	$49,049,000	$-	$-	$-	$-	$-	$49,049,000	$-	$49,049,000
SDR-2050	Pipeline Small Diameter Replacement Program	≤8	8	3,752	$2,048,000	$2,048,000	$-	$-	$-	$-	$-	$-	$2,048,000	$2,048,000
Reservoirs		Existing Size (MG)	New Size (in)	Length (ft)	$11,290,000	$11,290,000	$-	$-	$-	$-	$-	$8,568,000	$2,722,000	$11,290,000
PWRR-T-1	Canyon Lake South Tank Replacement	1	1	--	$4,536,000	$4,536,000	$-	$-	$-	$-	$-	$4,536,000	$-	$4,536,000
PWRR-T-2	Gafford Street B Tank Replacement	0.6	0.6	--	$2,722,000	$2,722,000	$-	$-	$-	$-	$-	$-	$2,722,000	$2,722,000
PWRR-T-3	Los Pinos 1 Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-T-4	Los Pinos 2 Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-T-5	Skymeadows Tank Replacement	0.1	0.1	--	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PSs		Pump (hp)	Pump (hp)	No.	$25,094,000	$25,094,000	$-	$10,783,000	$1,546,000	$436,000	$-	$10,783,000	$1,546,000	$25,094,000
PWRR-PS-1	Auld Valley PS	0	250	8	$1,344,000	$1,344,000	$-	$672,000	$-	$-	$-	$672,000	$-	$1,344,000
PWRR-PS-2	Beck Pumps	0	30	2	$134,000	$134,000	$-	$67,000	$-	$-	$-	$67,000	$-	$134,000
PWRR-PS-3	Bundy Canyon PS	0	100 / 125 / -	8	$874,000	$874,000	$-	$437,000	$-	$-	$-	$437,000	$-	$874,000
PWRR-PS-4	Cal Oaks PS	0	100	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-5	Canyon Lake Hydro	0	30 / 40	4	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-6	Farm PS	0	100 / -	6	$606,000	$606,000	$-	$404,000	$-	$-	$-	$202,000	$-	$606,000
PWRR-PS-8	Horsethief 2 PS	0	75	6	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-9	Lakeshore Booster	0	85	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-10	Lucerne PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-11	Ortega PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-12	Rice Canyon PS	0	75	8	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-13	Stage Ranch 1 PS	0	75	4	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-14	Stage Ranch 2 PS	0	100	4	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-15	Summerhill PS	0	100	6	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-16	Tuscany 1 PS	0	125	8	$1,076,000	$1,076,000	$-	$538,000	$-	$-	$-	$538,000	$-	$1,076,000
PWRR-PS-17	Tuscany 2 PS	0	25	4	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-18	Waite Street PS	0	50	8	$538,000	$538,000	$-	$269,000	$-	$-	$-	$269,000	$-	$538,000
PWRR-PS-19	Canyon Lake PS	0	100	4	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-20	Cielo Vista Hydro	0	20	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-21	City Booster	0	50	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-22	Cottonwood 1 Booster	0	200	3	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-23	Cottonwood 2 Booster	0	60	2	$606,000	$606,000	$-	$303,000	$-	$-	$-	$303,000	$-	$606,000
PWRR-PS-24	Daley A PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-25	Daley B PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-26	Greer Ranch 1/Greer Ranch 2 PS	0	50	6	$806,000	$806,000	$-	$403,000	$-	$-	$-	$403,000	$-	$806,000
PWRR-PS-27	Horsethief 1 PS	0	125	4	$1,076,000	$1,076,000	$-	$538,000	$-	$-	$-	$538,000	$-	$1,076,000

Project		Existing Size/Type	Proposed Size/Type	Proposed Amount	CIP Cost Estimate(1,2,3,4) ($)	Existing User Cost ($)	Future User Cost ($)	CIP Phasing ($)						Total Cost ($)
								Near-Term						
								2023-2025	2025-2030	2030-2035	2035-2040	2040-2045	2045-2050	
PWRR-PS-28	La Laguna 1 PS	0	60	3	$604,000	$604,000	$-	$302,000	$-	$-	$-	$302,000	$-	$604,000
PWRR-PS-29	Lemon Grove Hydro	0	7.5	2	$804,000	$804,000	$-	$402,000	$-	$-	$-	$402,000	$-	$804,000
PWRR-PS-30	Los Pinos 1 PS	0	50	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-31	Los Pinos 2A PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-32	Los Pinos 2B PS	0	15	2	$268,000	$268,000	$-	$134,000	$-	$-	$-	$134,000	$-	$268,000
PWRR-PS-33	Meadowbrook 2 PS	0	40	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-34	Rosetta Canyon 1 PS	0	250	3	$1,008,000	$1,008,000	$-	$504,000	$-	$-	$-	$504,000	$-	$1,008,000
PWRR-PS-37	Skylark Hydro	0	10	3	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-38	Skymeadows PS	0	100	2	$404,000	$404,000	$-	$202,000	$-	$-	$-	$202,000	$-	$404,000
PWRR-PS-39	Tomlin 1 PS	0	50	1	$336,000	$336,000	$-	$168,000	$-	$-	$-	$168,000	$-	$336,000
PWRR-PS-40	Tomlin 2 PS	0	50	1	$336,000	$336,000	$-	$168,000	$-	$-	$-	$168,000	$-	$336,000
PWRR-PS-41	Inland Valley Booster	0	150	4	$1,076,000	$1,076,000	$-	$-	$538,000	$-	$-	$-	$538,000	$1,076,000
PWRR-PS-42	La Laguna 2 PS	0	25	3	$404,000	$404,000	$-	$-	$202,000	$-	$-	$-	$202,000	$404,000
PWRR-PS-43	Rosetta Canyon 2 PS	0	50	2	$806,000	$806,000	$-	$-	$403,000	$-	$-	$-	$403,000	$806,000
PWRR-PS-44	Woodmoor PS	0	75	4	$806,000	$806,000	$-	$-	$403,000	$-	$-	$-	$403,000	$806,000
PWRR-PS-45	Coldwater Booster	0	25	2	$134,000	$134,000	$-	$-	$-	$134,000	$-	$-	$-	$134,000
PWRR-PS-46	Encina PS	0	75	3	$302,000	$302,000	$-	$-	$-	$302,000	$-	$-	$-	$302,000
Wells		Number	Number	Number	$32,256,000	$32,256,000	$-	$12,096,000	$2,688,000	$-	$-	$14,784,000	$2,688,000	$32,256,000
PWRR-W1	Cereal No. 1 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W2	Cereal No. 3 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W3	Cereal No. 4 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W4	Corydon Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W5	Diamond Well	1	1	2	$2,688,000	$2,688,000	$-	$-	$1,344,000	$-	$-	$-	$1,344,000	$2,688,000
PWRR-W6	Joy Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W7	Lincoln Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W8	Lee Lake Well	0	1	1	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
PWRR-W9	Machado Street Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W10	Mayhew Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W11	Station 71 Well	1	1	2	$2,688,000	$2,688,000	$-	$1,344,000	$-	$-	$-	$1,344,000	$-	$2,688,000
PWRR-W12	Summerly Well	1	1	2	$2,688,000	$2,688,000	$-	$-	$1,344,000	$-	$-	$-	$1,344,000	$2,688,000
PWRR-W13	Terra Cotta Well	1	1	1	$1,344,000	$1,344,000	$-	$-	$-	$-	$-	$1,344,000	$-	$1,344,000
CIP Total					**$1,078,352,000**	**$682,513,000**	**$395,839,000**	**$39,177,000**	**$365,840,000**	**$252,785,000**	**$157,540,000**	**$137,747,000**	**$123,263,000**	**$1,078,352,000**
Annual Cost(5)					**N/A**	**N/A**	**N/A**	**$19,588,500**	**$73,168,000**	**$50,577,000**	**$31,508,000**	**$27,949,400**	**$24,652,600**	**$39,939,000**

Notes:

Abbreviations: PZ - pressure zone.

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20 percent contingency of the baseline construction cost.

(3) Total project costs includes a 40 percent markup for engineering, construction management and environmental and legal and an 8 percent markup for project administration of the estimated construction cost.

(4) Total Mark-Up is 68 percent of the baseline construction costs.

(5) Annual cost is equivalent to the CIP total divided by the number of planning years.

9.4.1 Capacity Based Capital Improvement Projects

The existing hydraulic deficiencies in EVMWD's water distribution system that need to be addressed in the CIP are described in the existing system evaluation section (Chapter 7). Other than the Temescal Valley Pipeline PS, no other supply capacity projects are included in this CIP. Additionally, Chapter 8 identified the future projects needed to address the anticipated future deficiencies based on growth.

The total cost to address the existing and planned capacity deficiencies in EVMWD is approximately $620 million. A majority of this cost, $396 million or 64 percent, is attributed to projected future growth and is allocated to be funded by future users. The remaining 36 percent or $225 million is due to existing deficiencies and the cost is allocated to be funded by existing users.

9.4.1.1 Low Pressure Improvements

There are 18 low pressure improvement projects totaling nearly 5 miles with an estimated capital cost of approximately $17.6 million. As shown in Table 9.7, all of the cost of low pressure improvements are allocated to existing users and are phased in the 2025-2030 planning period because they are a response to the existing low pressure deficiencies.

9.4.1.2 Transmission and Distribution Mains

There are 23 transmission and distribution main projects totaling more than 33 miles with an estimated capital cost of approximately $179 million. As shown in Table 9.7, the following three projects, which had been previously identified as deficient pipelines in the 2016 WSMP, total to $16 million are allocated to existing users and are phased in the 2026-2030 planning period:

- PW-TR7A: Lucerne PS suction and discharge pipelines.
- PW-TR7B: 1434 Zone Transmission main from Temescal Canyon Road to Alberhill PS.
- PW-TR16: 1434 Zone Transmission main in Grand Avenue.

The remaining 27 distribution main projects total nearly $163 million and are growth-related projects, which are needed to increase conveyance capacity to:

- Serve future developments.
- Move water between the northwest and southeast portions of the 1434 PZ.
- Move water to and from planned PSs and storage reservoirs.

These 20 projects are allocated to be funded by future users. These projects are phased to occur with the anticipated timing of new developments, PS and/or storage projects. As shown in Table 9.7, a majority of these are phased in the 2025-2030 planning period, except for four projects. Two of the growth related projects are phased in the 2030-2035, while two other projects are phased in the

2045-2040 planning period. The timing of these projects may be adjusted based on development needs.

9.4.1.3 Pump Stations (PSs)

There are 32 PS projects with an estimated capital cost of approximately $103 million. As shown in Table 9.7, 8 of the projects are allocated to existing users, 19 of the projects are allocated to future users and 5 are include cost sharing of both existing and future users. Ten of the PS projects are needed due to growth in the PZ and require another pump to be installed at the existing PS. Nine of the PS projects are required to increase the fire pumping capacity in the zone, and 13 new PSs are required. Additionally, PW-PS-25 is an upgrade of the Alberhill 1 PS. The fire pump projects are:

- PW-PS-14: PZ 1550 (Cielo Vista) PS Upgrade.
- PW-PS-15: PZ 1600 (Skylark) PS Upgrade.
- PW-PS-16: PZ 1850 (Canyon Lake Sustaining) PS Upgrade.
- PW-PS-17: PZ 1850 (Lemon Grove) PS Upgrade.
- PW-PS-20: PZ 1940 (Cirrus Circle) PS Upgrade.
- PW-PS-26: PZ 1925 (Spyglass) PS Upgrade.
- PW-PS-27: PZ 2217 (Stage Ranch 2) PS Upgrade.
- PW-PS-28: PZ 3300 (Skymeadows) PS Upgrade.
- PW-PS-29: PZ 3544 (Los Pinos 2) PS Upgrade.

The new PS projects are:

- PW-PS-10: PZ 1901 (Ortega) New PS.
- PW-PS-11: PZ 2001 (Horsethief 3) New PS.
- PW-PS-12: PZ 2001 (North Peak) New PS.
- PW-PS-13: PZ 2196 (Sedco) PS Replacement.
- PW-PS-18: PZ 1900 (Elderberry) New PS.
- PW-PS-19: PZ 1901 (Borchard) New PS.
- PW-PS-21: PZ 2201 (Ortega) New PS.
- PW-PS-22: PZ 2320 (Adelfa) New PS.
- PW-PS-23: PZ 1800 (Spyglass) New PS.
- PW-PS-30: Temescal Valley Pipeline PS.
- PW-PS-31: Mission Trails PS (for 1434 Zone Transmission).
- PW-PS-32: Inland Valley PS (for 1434 Zone Transmission).

Approximately $256 million is allocated to be funded by existing users and $100 million is allocated to future users. The phasing of the pumping projects is based on the planning year that the pumping deficiency occurs. As shown in Table 9.7, a majority of these are phased in the 2025-2030 planning period, but the timing of these may be adjusted based on development needs.

9.4.1.4 Storage Reservoirs

There are 21 storage reservoir projects which include adding 26.0 MG of new storage to EVMWD and replacing 4.8 MG of existing storage. The storage CIP projects total an estimated capital cost of approximately $116 million. As shown in Table 9.7, the following three projects, have been identified as replacement projects and total to $2.4 million and are allocated primarily to existing users:

- PW-T-2: 1571 City Tank Replacement.
- PW-T-21: 2196 Sedco Zone Tank Replacement.
- PW-T-23: 2309 Daley Zone Tank Replacement.

The remaining 18 tank projects total $100 million and are growth related projects which are needed to increase storage capacity in their respective PZs. As shown in Table 9.7, 3 of the projects are allocated to existing users, 10 of the projects are allocated to future users and 8 are allocated to both existing and future users. Most of the tank projects are phased in the 2025-2030 planning period, except for 10 projects, which are phased in later planning periods based on growth in the respective PZs. The timing of these projects may be adjusted based on development needs.

9.4.1.5 PRV Stations

There are two PRV Station projects each with an estimated capital cost of approximately $0.4 million totaling to $0.8 million. As shown in Table 9.7, both projects are allocated to existing users. Project PW-V1: PZ Tomlin 2 PS PRV is phased in the 2025-2030 planning period and Project PZ Los Pinos 1 PS PRV Station Upgrade is phased in the 2045-2050 planning period.

9.4.1.6 Fire Flow Improvements

There are 69 fire flow projects totaling nearly 30 miles with an estimated capital cost of approximately $111 million. It is important to note that, when the distribution system was built, the hydrants likely met the fire flow criteria at the time of construction. The recent 2022 California Fire Code was used for the hydraulic modeling analysis. This analysis identified fire flow deficiencies, which resulted in a need for these fire improvement projects. Note that other identified fire flow deficiencies may be addressed as part of the small pipeline diameter program as discussed in the age-based CIP discussed later in this chapter.

In general, fire flow projects should occur when a development project occurs in the vicinity of a fire flow project. There are 52 fire flow pipeline improvement projects identified under existing demand conditions (FF-1 through FF-52) and three fire flow pipeline improvement projects that are identified under future demand conditions (FF-66 through FF-68). In addition to improving pipelines to address fire flow deficiencies, there are 27 projects to reconfigure hydrant laterals to connect to the higher PZ pipeline these projects are referred to as hydrant zone adjustment projects, which include 26 existing hydrant zone adjustment projects (FF-53 through FF-65) and one future hydrant zone adjustment project (FF-69).

Five of the fire flow projects are located near schools and are recommended to be prioritized and phased in the planning period 2023-2025. These high priority fire flow projects are estimated to cost a total to approximately $16.2 million and include:

- FF-23: Fire Flow Pipeline Improvement Project - Sangston Drive.
- FF-36: Fire Flow Pipeline Improvement Project - Pantera Court.
- FF-39: Fire Flow Pipeline Improvement Project - Wildomar Trail.
- FF-48: Fire Flow Pipeline Improvement Project - Park Way.
- FF-49: Fire Flow Pipeline Improvement Project - Ponte Russo.

The remaining fire flow projects were phased based on the severity of the fire flow deficiency expressed as the percentage of required flow that can be delivered at 20 pounds per square inch [psi]). For example, a location with a current fire flow requirement of 3,000 gpm that can only meet 1,000 gpm at 20 psi, would be designated as only able to deliver 33 percent of the required flow and prioritized in the 2030-2035 planning period.

These projects were phased based on the percentage of available fire flow available at the fire hydrants before the project is implemented. The phasing and percent available flow grouping is as follows:

- 2025-2030: Projects for sites where the available flow is less than 25 percent of the current fire flow requirement.
- 2030-2035: Projects for sites where the available flow is between 25 and 50 percent of the current fire flow requirement.
- 2035-2040: Projects for sites where the available flow is between 50 and 75 percent of the current fire flow requirement.
- 2040-2045 and 2045-2050: Projects for sites where the available flow is greater than 75 percent of the current fire flow requirement; costs split over both timeframes.

All of the fire flow projects addressing existing deficiencies (FF-1 through FF-65) were allocated to the existing users totaling approximately $109.5 million. The fire flow projects addressing future deficiencies were allocated to future users and total approximately $1.5 million.

9.4.1.7 Supply Improvements

There are three supply improvement projects with a total estimated capital cost of $93 million. The Canyon Lake Water Treatment Plant Upgrades, phased for 2026-2030 is estimated to cost $60 million and is split 80 percent to existing ratepayers and 20 percent to future ratepayers. Additional groundwater wells in the

Warm Springs and Temecula-Pauba subbasins are estimated to cost approximately $33 million and are phased for 2030-2035.

9.4.2 Age and Condition Based Capital Improvement Projects

Age based asset replacement was determined using the useful life method. The useful life method sets a typical "useful life" for an asset based on the asset's material type. Once the asset has surpassed its typical useful life, the asset is added to the CIP list for recommended replacement. It is recognized that age in itself is not sufficient grounds for replacing an asset, however, the costs in this CIP define the approximate amount of funds EVMWD should expect to expend for replacement of existing assets. Further evaluation will be necessary to identify the date and prioritization of replacement of any specific asset.

The useful life assigned to the different facilities present in EVMWD's system is listed in Table 9.8. The useful life is determined based on EVMWD's experience on similar facilities in EVMWD service area. Pipelines smaller than 8 inches in diameter that surpass their useful life shall be replaced with 8-inch diameter pipelines to meet EVMWD's standards for pipes connected to fire hydrants.

Table 9.8 Typical Useful Life of Assets

Asset	Typical Useful Life (Years)
Pipelines	75
Storage Tanks	75
PS Buildings	75
Pumps, Electrical, and Instrumentation Equipment	20
Wells	75
Well Pumps, Motors, Electrical, and Instrumentation Equipment	20

The total cost of the R&R projects is approximately $434 million which is all attributed to existing users.

9.4.2.1 Pipelines

EVMWD's leak history was analyzed to determine if there was a correlation between useful life based on installation date or material type. The analysis did not provide any conclusive results; therefore, the repair and rehabilitation program was based off the anticipated useful life of pipelines to be 75 years as show in Table 9.8. There are two types of pipeline rehabilitation and repair projects identified in this CIP.

- The first category consists of small diameter replacements which are prefixed with SDR-YYYY in the CIP where YYYY is the planning year the pipelines are expected to be needed to be replaced. These pipes are less than 8-inch in diameter and should be upsized to an 8-inch diameter per the fire flow analysis in Chapter 7 of this WSMP. These pipes are phased to be replaced at the end of their useful life. These projects should be prioritized over the PWRR-P projects. There are approximately 27 miles of pipe that need to be upsized before 2050. These projects are assumed to be funded by existing users and are phased as follows:

- **SDR-2030:** includes approximately 3.5 miles of pipeline replacements which should occur in the 2025-2030 phase and is anticipated to cost approximately $10.1 million.
- **SDR-2035:** includes approximately 1.1 miles of pipeline replacements which should occur in the 2030-2035 phase and is anticipated to cost approximately $3.2 million.
- **SDR-2040:** includes approximately 4.8 miles of pipeline replacements which should occur in the 2035-2040 phase and is anticipated to cost approximately $13.9 million.
- **SDR-2045:** includes approximately 17.0 miles of pipeline replacements which should occur in the 2040-2045 phase and is anticipated to cost approximately $49.0 million.
- **SDR-2050:** includes approximately 0.7 miles of pipeline replacements which should occur in the 2045-2050 phase and is anticipated to cost approximately $2.0 million.

- The second category consists of general pipeline replacements which are prefixed with PWRR-P-YYYY in the CIP where YYYY is the planning year the pipelines need to be replaced. Approximately 87 miles of pipes are anticipated to exceed their useful lives during the planning years shown in this CIP. These pipes do not include pipes that are identified as small diameter replacement projects. Additionally, these pipes are planned to be replaced in kind with the same diameter pipe except where the diameter is less than 8-inch in which case it is assumed to be replaced with an 8-inch diameter pipe. The pipeline replacement projects cost approximately $310.7 million by 2050. These projects are assumed to be funded by existing users and are phased as follows:
  - **PWRR-P-2030:** includes approximately 9.1 miles of pipeline replacements which should occur in the 2025-2030 phase and is anticipated to cost approximately $27.0 million.
  - **PWRR-P-2035:** includes approximately 20.4 miles of pipeline replacements which should occur in the 2030-2035 phase and is anticipated to cost approximately $111.3 million.
  - **PWRR-P-2040:** includes approximately 5.9 miles of pipeline replacements which should occur in the 2035-2040 phase and is anticipated to cost approximately $17.4 million.

- **PWRR-P-2045: i**ncludes approximately 47.9 miles of pipeline replacements which should occur in the 2040-2045 phase and is anticipated to cost approximately $143.2 million.
- **PWRR-P-2050:** includes approximately 3.8 miles of pipeline replacements which should occur in the 2045-2050 phase and is anticipated to cost approximately $11.7.0 million.

The largest number of the PWRR-P projects would theoretically require replacement in the period 2040-2045. However, this results in a large fluctuation of the annual costs between planning periods. To keep the annual costs per planning period more constant, these projects were distributed in three 5-year planning periods between 2035 and 2050. Approximately one third of the projects ($40 million) were accelerated from the 2040-2045 phase to the 2035-2040 phase, while approximately one third of the projects ($50 million) was postponed from the 2040-2045 phase to the 2045-2050 phase to even out annual expenditures. EVMWD will need to continue condition assessment monitoring and leak tracking to further refine the prioritization of R&R pipeline replacements.

9.4.2.2 Reservoirs

The average usefully life for reservoirs was assumed to be 75 years as seen in Table 9.8. Hence, 75 years was added to the installation date of EVMWD's potable water reservoirs and it was determined that five reservoirs would need to be replaced before 2050. These projects are estimated to cost approximately $38.6 million and are allocated to be funded by existing users. These reservoir projects are phased as follows:

- PWRR-T-1: Canyon Lake South Tank Replacement is expected to require replacement in the 2040-2045 planning period and costs approximately $4.5 million.
- PWRR-T-2: Gafford Street B Tank Replacement is expected to require replacement in the 2045-2050 planning period and costs approximately $2.7 million.
- PWRR-T-3: Los Pinos 1 Tank Replacement is expected to require replacement in the 2040-2045 planning period and costs approximately $1.3 million.
- PWRR-T-4: Los Pinos 2 Tank Replacement is expected to require replacement in the 2040-2045 planning period and costs approximately $1.3 million.
- PWRR-T-5: Skymeadows Tank Replacement is expected to require replacement in the 2040-2045 planning period and costs approximately $1.3 million.

9.4.2.3 Pump Stations (PSs)

The average usefully life for booster pumps was assumed to be 20 years for pumps and equipment and 70 years for the buildings as listed in Table 9.8. This analysis was presented in Chapter 7, and it was determined that 43 PSs have one or more pumps that are expected to require replacement before 2050, and no PS building needs to be replaced.

It was determined that 37 of these PSs have pump(s) that are already past their 20 years useful life period and are phased for replacement in the 2023-2025 planning period. These 37 projects are anticipated to be funded by existing users and cost approximately $10.8 million. The 20-year replacement period occurs again for these 37 pumps in the 2040-2045 planning period. Hence, existing users should expect to fund approximately $10.8 million again in the 2040-2045 planning period.

Four of the PSs R&R projects have pump(s) that will pass their 20 years useful life period in the 2025-2030 planning period. These four projects are also allocated to existing users and are estimated to cost approximately $1.5 million. The 20-year replacement period occurs again for these four pumps in the 2045-2050 planning period. Hence, existing users should expect to fund approximately $1.5 million again in the 2050-2050 planning period.

The remaining two PSs have pump(s) that will pass their 20 years useful life period in the 2030-2035 planning period. These two projects are anticipated to be funded by existing users and are estimated to cost approximately $0.4 million.

9.4.2.4 Wells

The average usefully life for well pumps was assumed to be 20 years as seen in Table 9.8. The well useful life analysis was presented in Chapter 7, and it was determined that 13 well pumps need to be replaced before 2050, including nine well pumps that will need to be replaced twice before 2050.

Nine existing wells have a well pump that is already past its 20 years useful life period and should be considered for replacement in the 2023-2025 planning period. These nine projects are:

- PWRR-W1: Cereal No. 1 Well.
- PWRR-W2: Cereal No. 3 Well.
- PWRR-W3: Cereal No. 4 Well.
- PWRR-W4: Corydon Street Well.
- PWRR-W6: Joy Street Well.
- PWRR-W7: Lincoln Street Well.
- PWRR-W9: Machado Street Well.

- PWRR-W10: Mayhew Well.
- PWRR-W11: Station 71 Well.

These nine well pump replacement projects are allocated to the existing users and are estimated to cost approximately $12.1 million. The 20-year replacement period occurs again for these 11 pumps in the 2040-2045 planning period. Hence, existing users will need to fund approximately $12.1 million again in the 2040-2045 planning period.

Two of EVMWD's existing wells (PWRR-W5: Diamond Well, and PWRR-12: Summerly Well) have a well pump that will pass their 20 years useful life period in the 2025-2030 planning period. These two projects are allocated to existing users and are estimated to cost approximately $2.7 million. The 20-year replacement period occurs again for these two pumps in the 2045-2050 planning period. Hence, existing users will need to fund approximately $2.7 million again in the 2045-2050 planning period.

The last two wells (PWRR-W8: Lee Lake Well, and PWRR-W13: Terra Cotta Well) have a well pump that will pass their 20 years useful life period and are phased for replacement in the 2040-2045 planning period. These two projects are anticipated to be funded by existing users and cost approximately $2.7 million.

None of the wells are expected to reach its 75 year life span prior to 2050.

9.4.3 CIP Project Summary

The CIP projects have been phased in six planning periods from 2023 through 2050 and categorized by ratepayer class (existing or future), project category (capacity improvement or rehabilitation and repair), and by facility type (pipeline, storage, PSs, etc.).

A summary table of the CIP is presented in Table 9.9. A summary of the cost allocation by the ratepayer class (existing or future) and project type is shown graphically on Figure 9.1 and a summary of the cost allocation by ratepayer class (existing or future) by phase is shown on Figure 9.1.

As shown in Table 9.9 the total CIP cost is estimated at $1.08 billion with $683 million (63 percent) for existing system improvements to be paid by existing rate payers and the remaining $396 million (37 percent) for projects needed to accommodate future growth to be paid by future rate payers. The difference in cost between existing and future ratepayers is largely due to the pipeline R&R projects which accounts for $389 million of the total CIP cost as shown on Figure 9.2.

The distribution of projects between the capacity improvement projects and rehabilitation and repair projects are fairly balanced with the capacity improvement projects accounting for $621 million (58 percent) and the R&R projects accounting for $458 million (42 percent).

A summary of the cost by ratepayer class and project type is shown in Table 9.9.

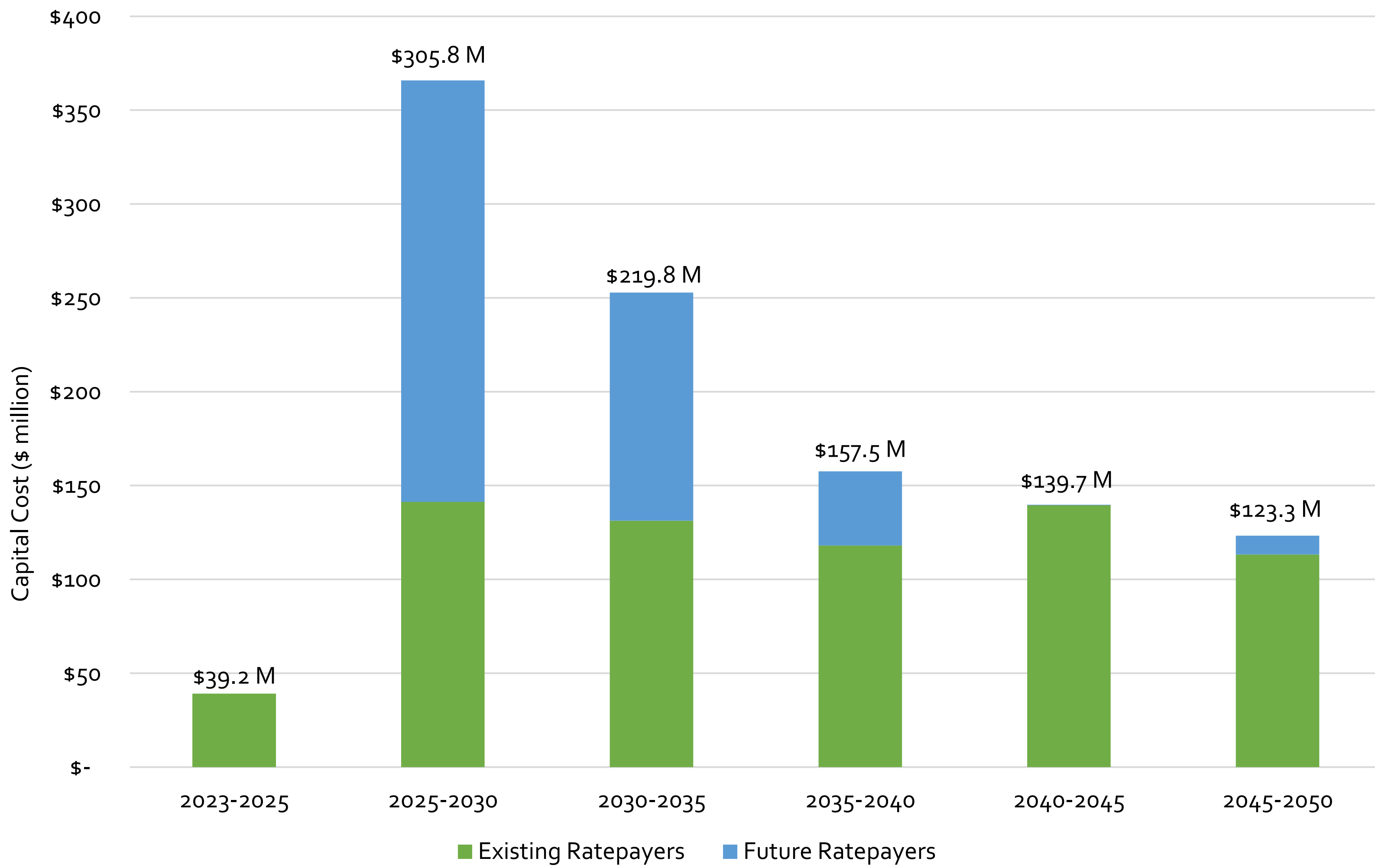

Figure 9.1 Capital Improvement Program Costs by Phase and Ratepayer Class

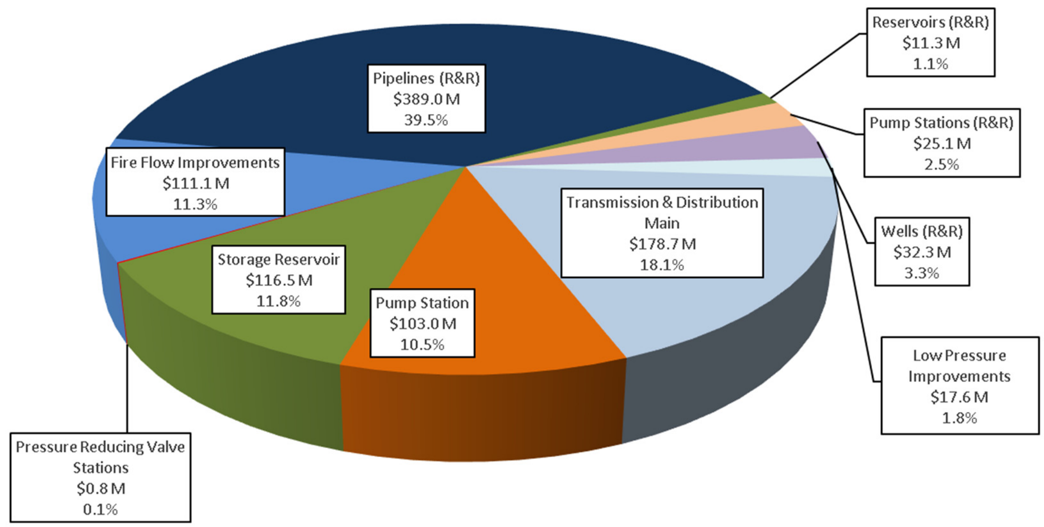

Figure 9.2 Capital Improvement Projects by Project Type

Table 9.9 CIP Costs by Project Type, and Ratepayer Class

Project Type	Existing Ratepayers ($Million)	Future Ratepayers ($Million)	Total ($Million)	Percent of Total
Low Pressure Improvements	$17.6	$0.0	$17.6	2%
Transmission and Distribution Main	$15.7	$163.0	$178.7	17%
PS	$2.6	$100.5	$103.0	10%
Storage Reservoir	$35.1	$81.4	$116.5	11%
Valves	$0.8	$0.0	$0.8	<0.1%
Fire Flow Improvements	$111.1	$0.0	$111.1	10%
Supply Improvements	$42.0	$51.0	$93.0	9%
Subtotal Capacity Improvements	**$224.9**	**$395.8**	**$620.7**	**58%**
Pipelines (R&R)	$389.0	$0.0	$389.0	36%
Reservoirs (R&R)	$11.3	$0.0	$11.3	1%
PSs (R&R)	$25.0	$0.0	$25.0	2%
Wells (R&R)	$32.3	$0.0	$32.3	3%
Subtotal R&R Projects	**$457.6**	**$0.0**	**$457.6**	**42%**
Total	**$682.5**	**$395.8**	**$1,078.4**	**100%**

As shown in Table 9.9, the pipeline R&R projects are estimated to cost $458 million, which represents 42 percent and thereby the highest percentage of the total CIP cost. The second largest cost is the transmission and distribution main projects which are estimated to cost $178.7 million or 17 percent. The third largest cost is the storage reservoir projects which are estimated to cost $116.5 million or 11 percent. Both the fire flow projects and PS projects are approximately 10 percent of the CIP. Supply projects account for approximately 9 percent of the CIP. The remaining projects account for 3 percent or less of the CIP. The top four largest projects costs are attributed to pipeline projects which is show on Table 9.9 and is demonstrated graphically in Figure 9.2. The facilities are organized by the following colors in Figure 9.2:

- Pipeline projects (shades of blue).
- PRV Station projects (red).
- Reservoir projects (shades of green).
- PS projects (shades of orange).
- Supply projects (purple).

As shown in Figure 9.2, the project type with the highest cost is pipelines R&R with $389 million. Adding the other pipeline categories such as capacity improvements for transmission mains, distributions pipelines, fire flow, and pipeline R&R, the total estimated cost for all pipeline improvements is $696.4 million or 65 percent of the total CIP. The total cost of reservoir projects, including capacity improvements and R&R is $127.8 million or 12 percent of the total CIP. Similarly, the total cost of PS projects, including capacity improvements and R&R is $128.1 million or 14 percent of the total CIP. The total cost of supply and well projects is $125.3 million or 12 percent of the total CIP. Lastly the total cost of PRV station projects is $0.8 million which is less than 0.1 percent of the CIP.

To depict the phasing of the capacity related CIP projects, the following maps are included for are for each planning period:

- Figure 9.3 Potable Water Capital Improvement Projects by Type.
- Figure 9.4 Capital Improvement Projects by Phase.
- Figure 9.5 2023-2025 Water System CIP Projects.
- Figure 9.6 2025-2030 Water System CIP Projects.
- Figure 9.7 2030-2035 Water System CIP Projects.
- Figure 9.8 2035-2040 Water System CIP Projects.
- Figure 9.9 2040-2045 Water System CIP Projects.
- Figure 9.10 2045-2050 Water System CIP Projects.

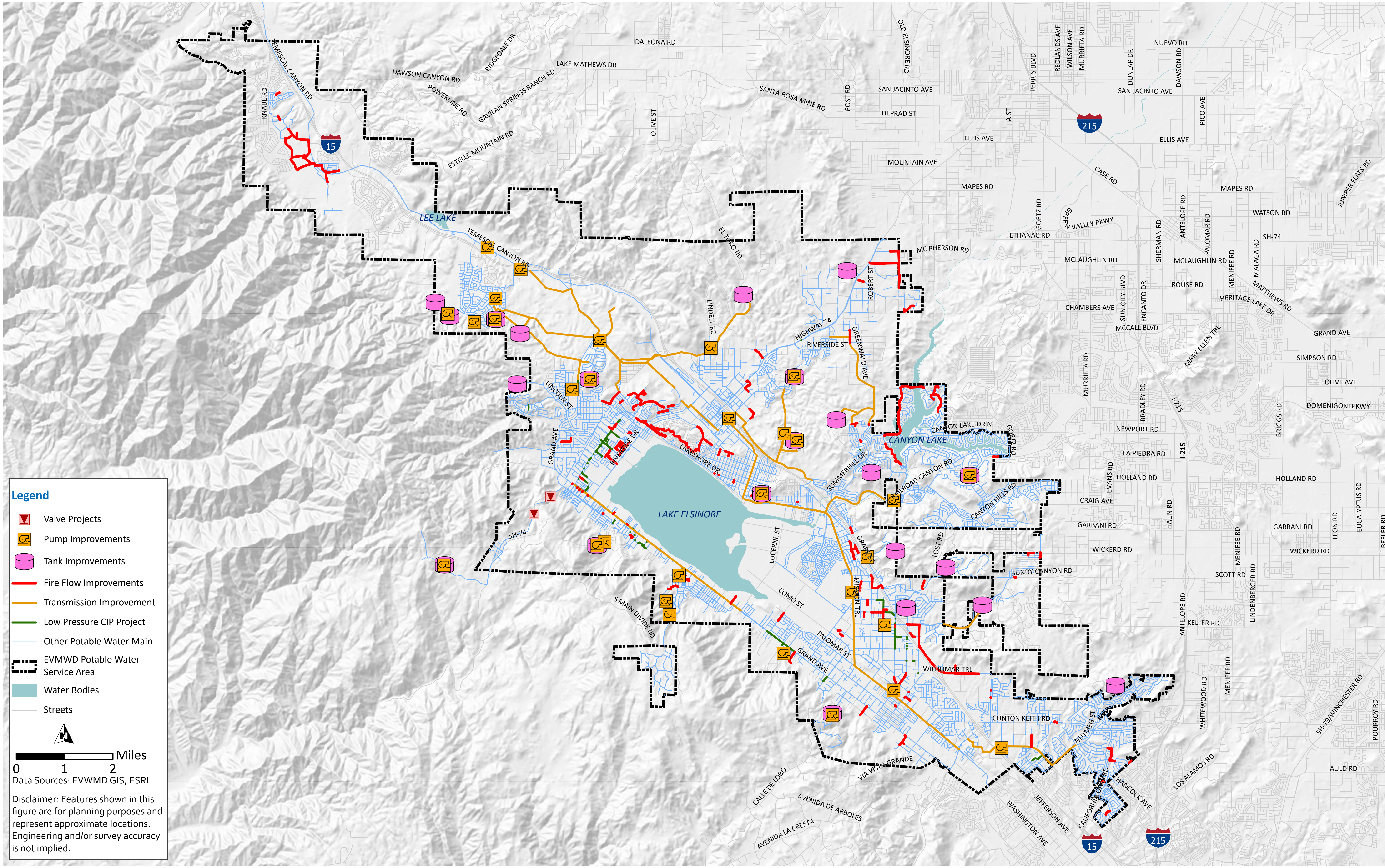

Figure 9.3 Potable Water Capital Improvement Projects by Type

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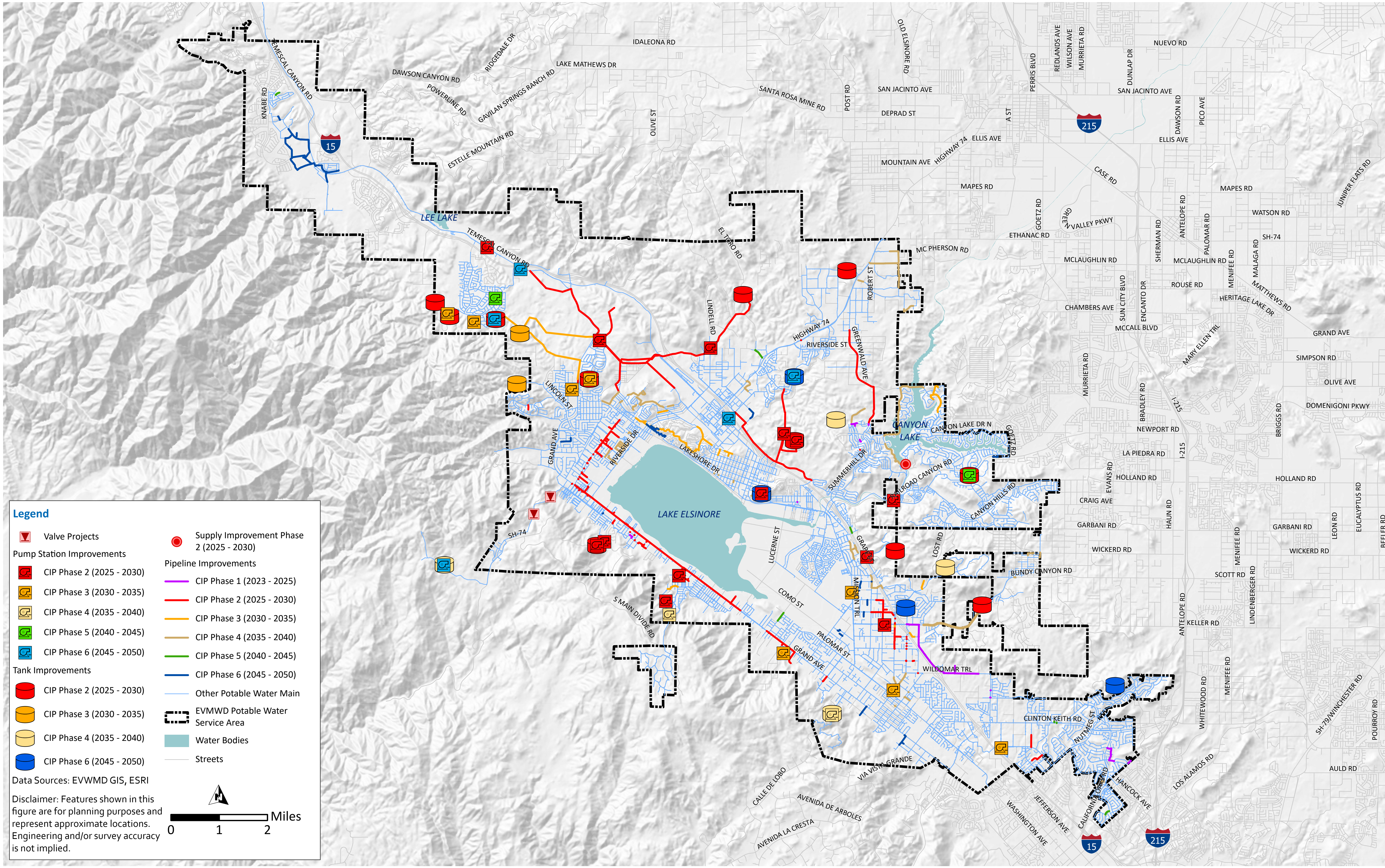

Figure 9.4 Capital Improvement Projects by Phase

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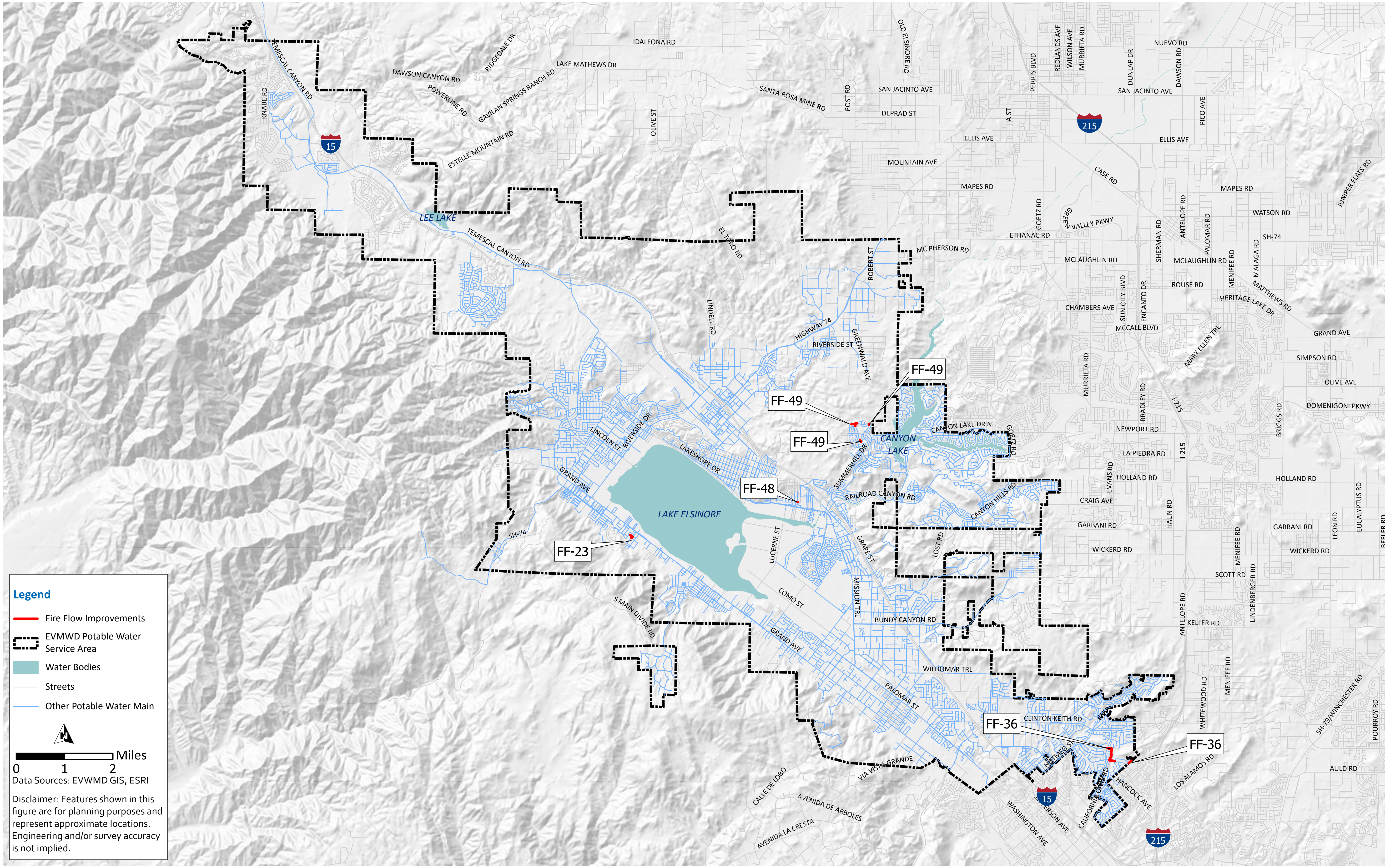

Figure 9.5 2023-2025 Water System CIP Projects

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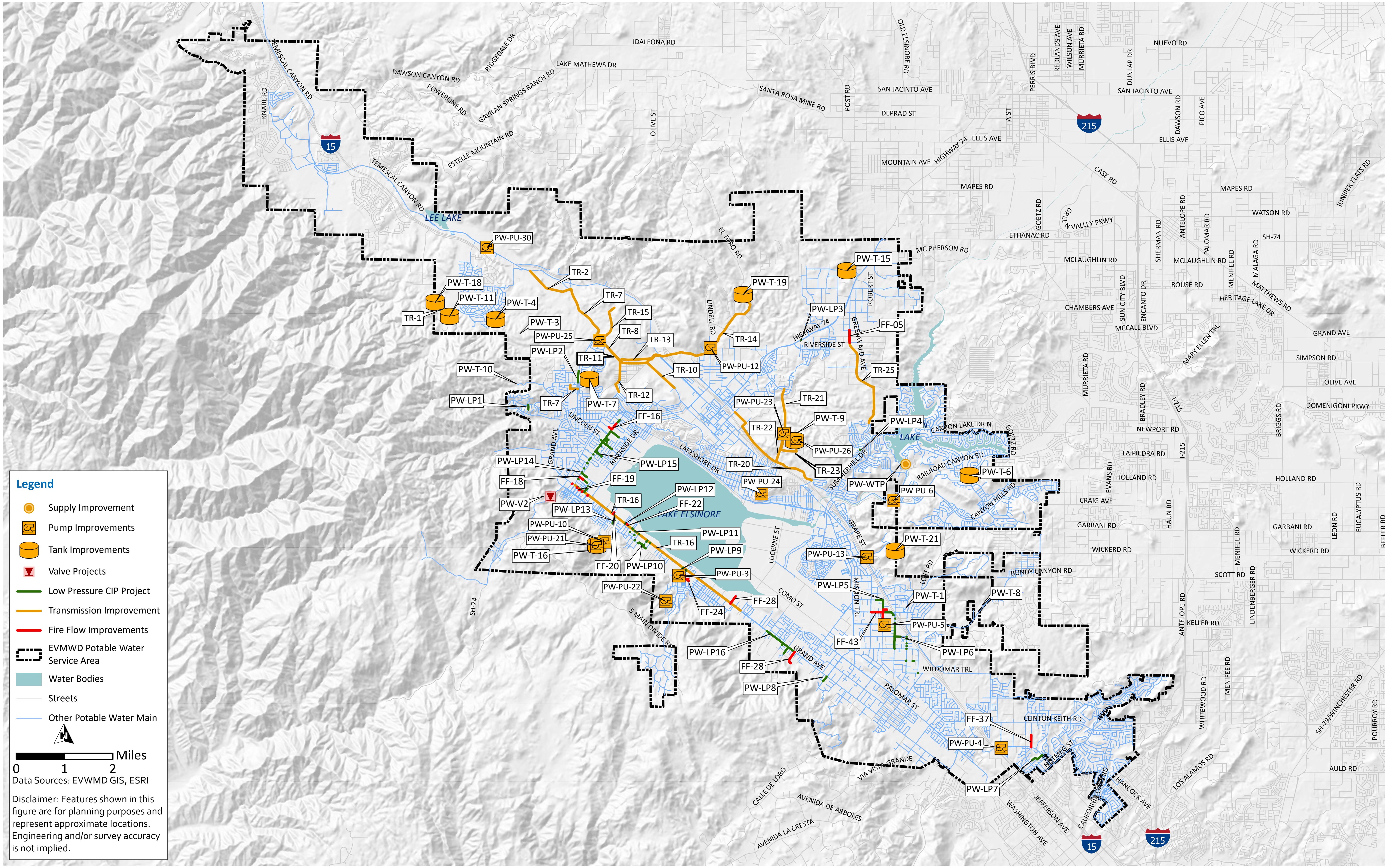

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Figure 9.6 2025-2030 Water System CIP Projects

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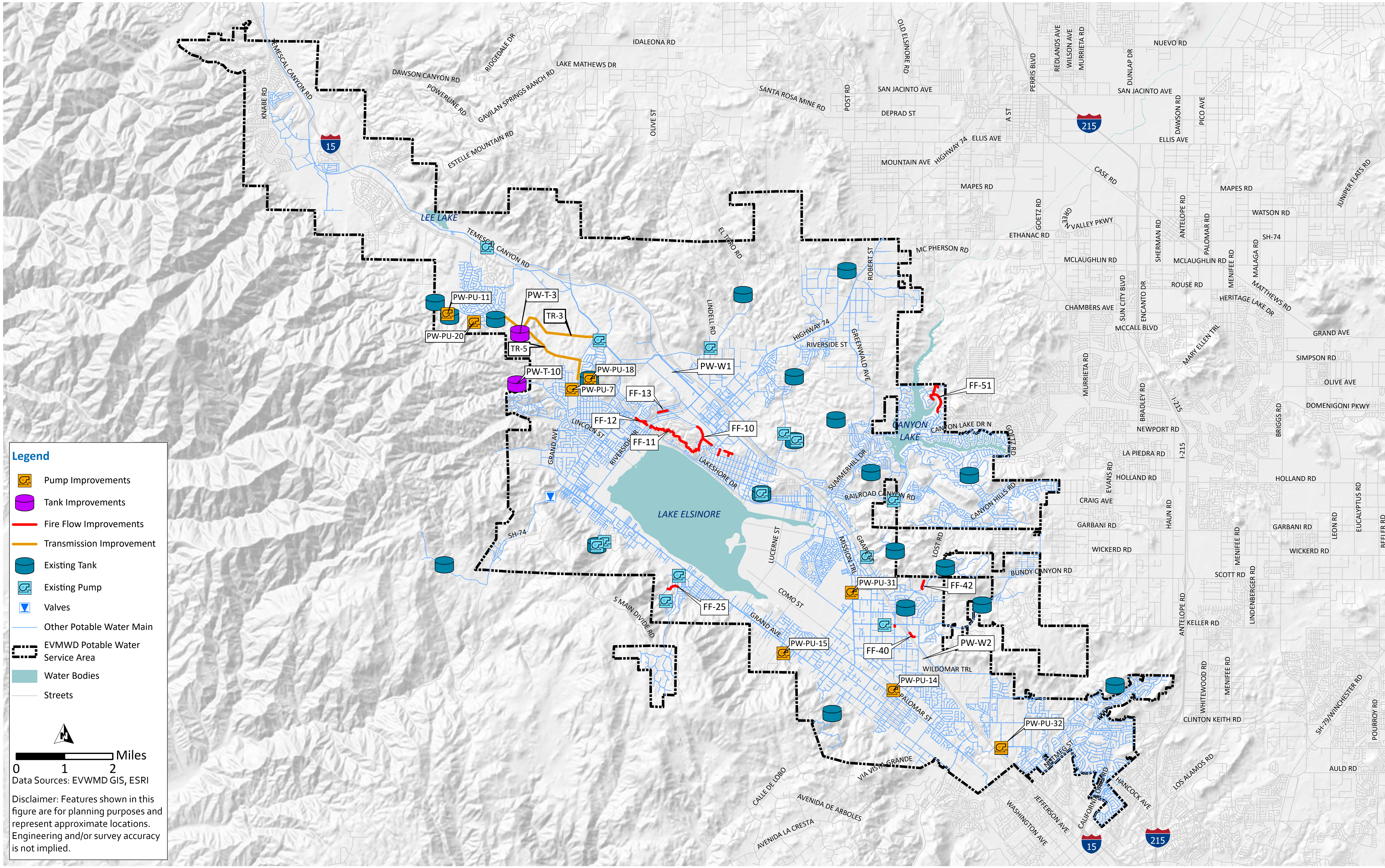
Legend
Pump Improvements
Tank Improvements
Fire Flow Improvements
Transmission Improvement
Existing Tank
Existing Pump
Valves
Other Potable Water Main
EVMWD Potable Water Service Area
Water Bodies
Streets
Miles
0
1
2
Data Sources: EVWMD GIS, ESRI
Disclaimer: Features shown in this figure are for planning purposes and represent approximate locations. Engineering and/or survey accuracy is not implied.
PW-PU-11
PW-PU-20
PW-T-3
TR-3
TR-5
PW-T-10
PW-PU-18
PW-PU-7
FF-13
FF-12
FF-11
FF-10
PW-W1
FF-51
FF-42
PW-PU-31
FF-25
PW-PU-15
FF-40
PW-W2
PW-PU-14
PW-PU-32
LEE LAKE
LAKE ELSINORE
CANYON LAKE
15
215

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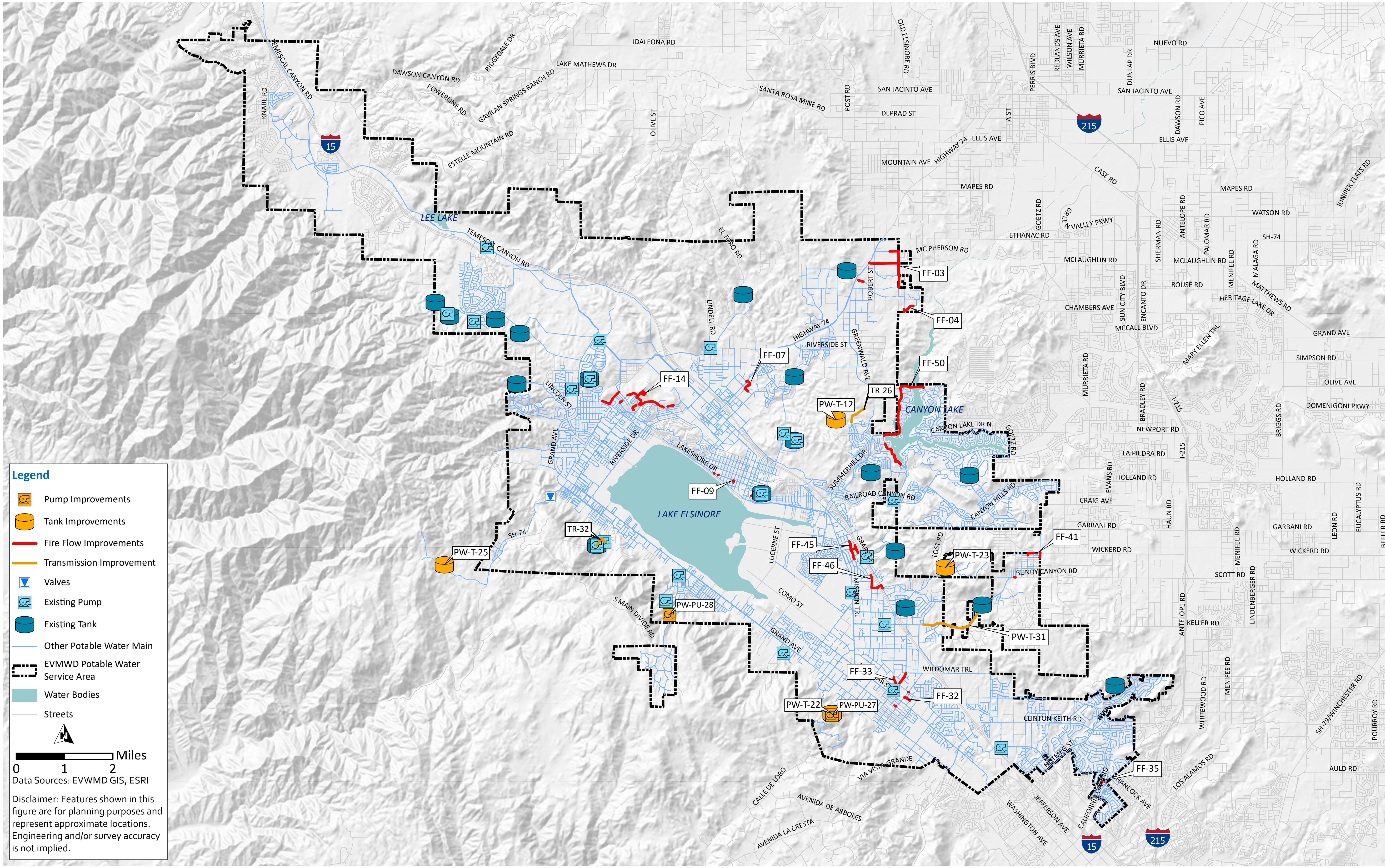

Figure 9.8 2035-2040 Water System CIP Projects

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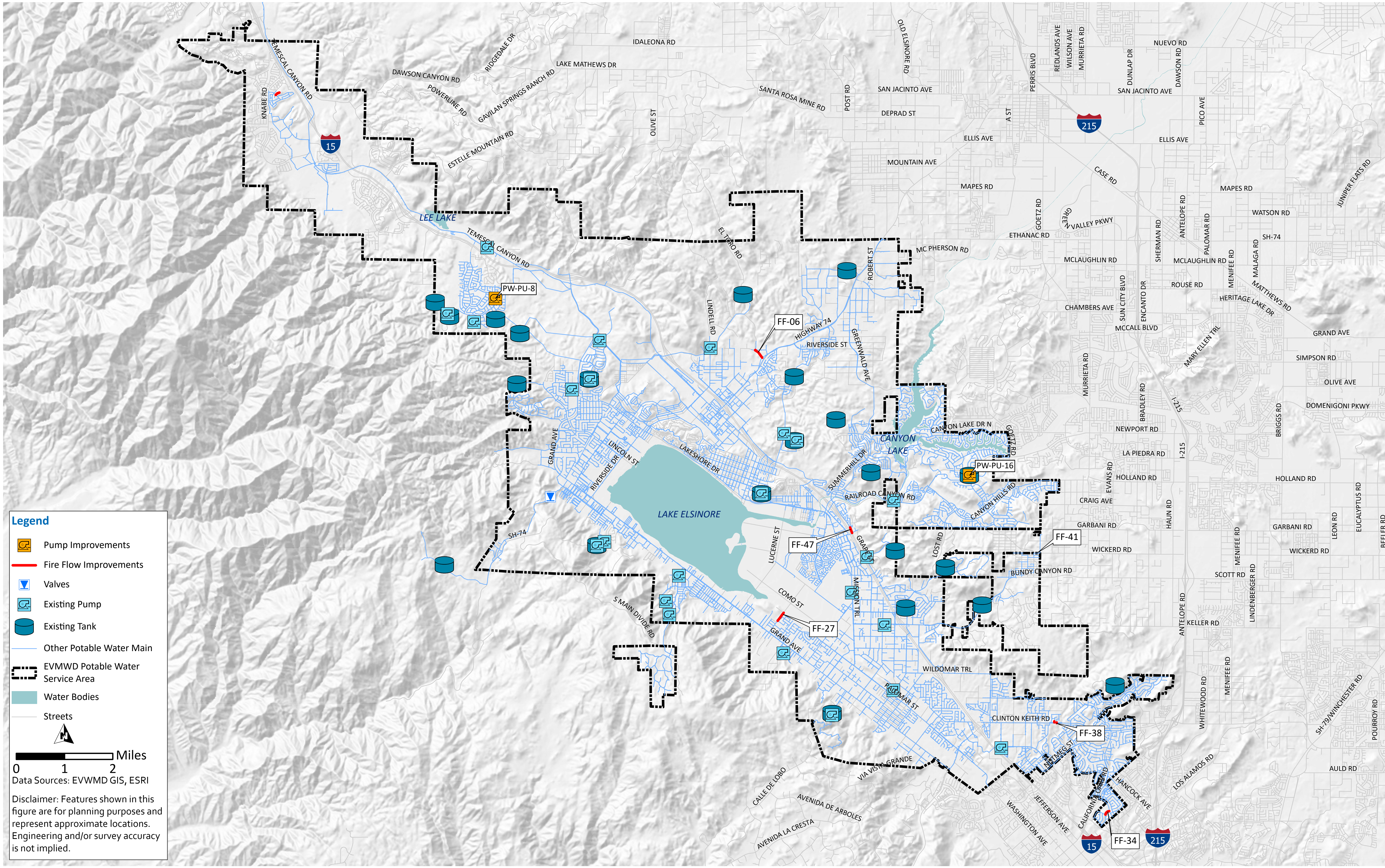

Figure 9.9 2040-2045 Water System CIP Projects

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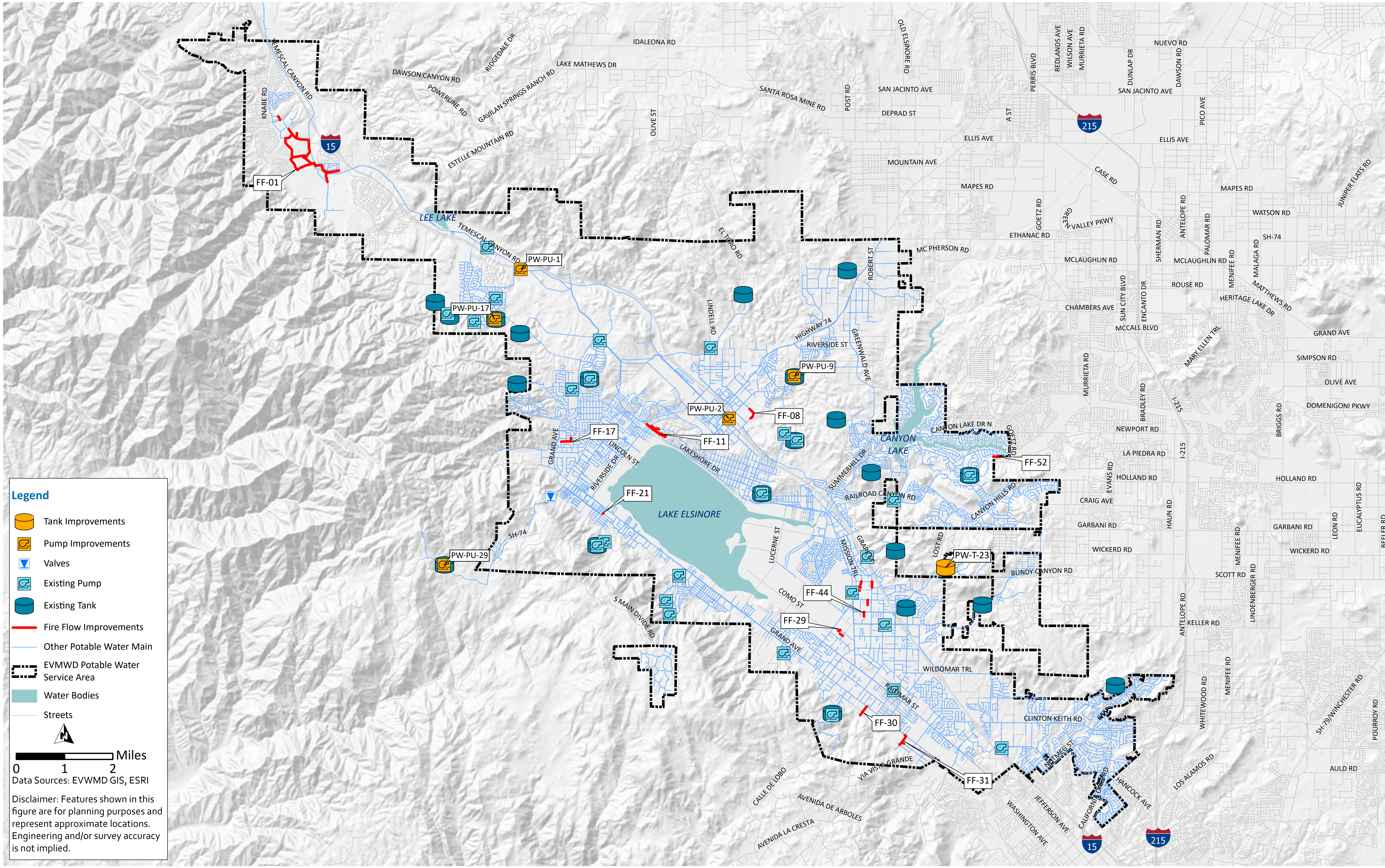

Figure 9.10 2045-2050 Water System CIP Projects

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Appendix A
REFERENCES

Appendix A

REFERENCES

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Appendix B
TRACKED PLANNED DEVELOPMENTS

Appendix B

PLANNED DEVELOPMENTS

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
1	Alberhill Ranch Master Plan Review	Lake Elsinore	N/A	Medium Density Residential	3,412	6,092
2	Alberhill Ranch	Lake Elsinore	Inspection	Low Medium Density Residential	46	82
5	Alberhill Ridge	Lake Elsinore	Planning	Low Medium Density Residential	591	1,056
6	Saddleback Estates	Riverside County	Plan Check	Low Medium Density Residential	146	261
8	JBJ Ranch	Riverside County	Planning	Low Density Residential	174	310
14	Murrieta Creek Estates - Trail 31896	Wildomar	Planning	Low Medium Density Residential	66	117
15	Wildomar Crossing at Clinton Keith and Stable Lane	Wildomar	Plan Check	Commercial	9	16
21	Highway 74 Car Wash and Retail Center	Riverside County	Inspection	Commercial	2	4
29	Northeast Corner Diamond Drive and Village Parkway	Lake Elsinore	Inspection	Medium Density Residential	30	54
30	Summerly Trail 31920-15	Lake Elsinore	Inspection	Medium Density Residential	36	65
36	Monte Vista Ranch	Wildomar	Inspection	Medium Density Residential	95	170
42	Colinas Del Oro	Riverside County	N/A	Low Medium Density Residential	273	488
49	Livable Communities	Lake Elsinore	Planning	Mixed Use	10	18

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
51	Rancho Fortunado II	Wildomar	Inspection	Low Medium Density Residential	31	55
53	Horizon Condos Trail 36672	Wildomar	Plan Check	High Density Residential	59	105
58	Villa Siena	Wildomar	Plan Check	High Density Residential	27	48
63	Orange Street Water and Sewer Improvements	Wildomar	Plan Check	Commercial	27	48
64	Diamond Professional Plaza	Lake Elsinore	Inspection	Mixed Use	1	2
65	Grove Park	Wildomar	Planning	Mixed Use	37	66
66	Baxter Village	Wildomar	Plan Check	Mixed Use	69	123
68	Tuscany Valley TTM 25475	Lake Elsinore	Plan Check	Medium Density Residential	95	169
69	Tuscany Crest TTM 33725	Lake Elsinore	Plan Check	Low Density Residential	65	116
73	Westpark	Wildomar	Planning	Mixed Use	54	97
75	South Shore II Tract 36567	Lake Elsinore	Planning	Low Medium Density Residential	161	287
76	Terracina Tract 36557	Lake Elsinore	Plan Check	Low Medium Density Residential	351	626
84	Canyon Hills Estates TTM 34249	Wildomar	Planning	Low Density Residential	169	302
86	Fisherman's Wharf	Lake Elsinore	N/A	Low Density Residential	28	50
87	33401 Orchard Street 3 Lot Subdivision	Wildomar	N/A	Medium Density Residential	2	3
89	Faith Bible Church	Wildomar	Inspection	Public/Institutional	36	64
92	Lake Elsinore Town Center	Lake Elsinore	Planning	Mixed Use	44	78
93	The Summit	Riverside County	N/A	Low Medium Density Residential	196	350
97	Hoist Industrial	Lake Elsinore	Planning	Industrial	85	152
99	Lakeside Pointe Apartments	Lake Elsinore	N/A	High Density Residential	84	150
100	Steven's Gardens No. 2	Riverside County	N/A	Commercial	3	5
109	Tract 33840	Wildomar	Planning	Low Medium Density Residential	8	15

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
110	Walmart Shopping Center, Inc.	Lake Elsinore	Inspection	Commercial	45	81
112	Tuscany Hills North	Lake Elsinore	N/A	Low Medium Density Residential	452	807
113	Circle K Riverside and Joy	Lake Elsinore	Inspection	Commercial	3	6
121	South Shore I Tract 31593	Lake Elsinore	Planning	Low Medium Density Residential	508	907
124	Kasiri Commercial Center	Wildomar	N/A	Commercial	3	6
128	Clinton Keith Mount San Jacinto College Campus	Wildomar	N/A	Public/Institutional	112	200
129	Tract 32026 Water and Sewer Improvements	Riverside County	Plan Check	Low Medium Density Residential	191	341
131	Bridlewood Trail 32206	Wildomar	Plan Check	Medium Density Residential	34	60
135	Palmilla Commercial Center	Murrieta	N/A	Commercial	9	16
139	Name Unknown	Wildomar	N/A	Medium High Density Residential	161	288
140	Name Unknown	Lake Elsinore	N/A	Hillside Residential	246	440
141	Tessera Project	Lake Elsinore	Inspection	Medium Density Residential	23	41
142	Name Unknown	Riverside County	N/A	Hillside Residential	194	347
150	Wildomar Meadows	Wildomar	Planning	Mixed Use	1,156	2,064
151	La Quinta Hotel on Dexter Avenue	Lake Elsinore	N/A	High Density Residential	35	63
152	94 Unit Apartments on Corydon and Sheets Lane	Wildomar	N/A	High Density Residential	53	94
155	Heald Street Apartment Complex - 8 Units - Sewer and Water	Lake Elsinore	N/A	High Density Residential	4	8
156	Darling-Bundy Canyon Apartment Project	Wildomar	Planning	Medium Density Residential	72	128
157	Airstream RV Dealership	Lake Elsinore	N/A	Commercial	15	27
159	North Main Street Hotel Water and Sewer	Lake Elsinore	N/A	High Density Residential	87	156
161	Camelia Townhomes	Wildomar	Planning	Medium High Density Residential	92	164

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
162	Name Unknown	Wildomar	N/A	Low Density Residential	3	5
163	Lakeshore Senior Apartments	Lake Elsinore	N/A	High Density Residential	68	121
164	Diamond Indoor Sports Center	Lake Elsinore	N/A	Industrial	23	41
165	Rome Hills Commercial	Riverside County	Planning	Mixed Use	71	126
167	Tract 32726 - 7 Lots	Wildomar	Plan Check	Low Density Residential	4	7
170	Riverside Drive Lake Front Hotel - Mixed-Use	Lake Elsinore	Planning	Mixed Use	57	101
171	Triangle ExpResidentials Car Wash	Wildomar	Planning	Commercial	3	5
172	Wildomar Shopping Mall	Wildomar	N/A	Commercial	2	3
174	Wasson Canyon Tract 37381	Lake Elsinore	Planning	Low Medium Density Residential	42	75
176	Smith Ranch Self Storage	Wildomar	Inspection	Industrial	7	13
178	Sunbelt Rentals	Wildomar	Planning	Industrial	2	4
179	The Cottages at Mission	Lake Elsinore	Inspection	Medium Density Residential	80	143
180	Railroad Canyon Mixed-Use	Lake Elsinore	N/A	Mixed Use	39	71
181	Artisan Alley	Lake Elsinore	N/A	Commercial	29	51
182	Lake Front Village Mixed-Use Project	Lake Elsinore	N/A	Mixed Use	258	460
183	Starlight Meadows	Wildomar	Inspection	Low Medium Density Residential	60	108
184	Tract 32035	Wildomar	Plan Check	Low Medium Density Residential	27	49
185	Lakeview Manor	Lake Elsinore	N/A	High Density Residential	58	104
187	Greenspring Hotel	Lake Elsinore	N/A	High Density Residential	49	87
188	RV Ready RV Sales	Lake Elsinore	N/A	Industrial	2	4
189	Running Deer	Lake Elsinore	Inspection	Low Medium Density Residential	54	96
192	La Laguna RV Residentialort	Lake Elsinore	Inspection	Open Space	184	328
194	Roadrunner Park Bathroom	Canyon Lake	Plan Check	Open Space	1	2
196	Lake Elsinore Assisted Living	Lake Elsinore	N/A	High Density Residential	37	66

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
197	Atshan Residentialidence	Lake Elsinore	N/A	Low Density Residential	0.2	0
198	Brent Industrial Building	Wildomar	N/A	Industrial	4	6
199	Lake and I-15 Gas Station	Lake Elsinore	N/A	Industrial	8	13
200	Markou Palomar Condo (12-15 Unit)	Wildomar	N/A	High Density Residential	8	15
201	Elm Street Container Home	Lake Elsinore	N/A	High Density Residential	3	5
202	Grand Avenue Subdivision - 11 Lots (City of Wildomar)	Wildomar	N/A	Low Density Residential	6	11
203	Silverleaf Motors	Lake Elsinore	N/A	Commercial	3	6
204	Lake Elsinore Travel Center	Lake Elsinore	Plan Check	Commercial	5	9
205	Circle K (Nichols Town Center)	Lake Elsinore	N/A	Commercial	15	28
206	Lake Elsinore Commercial	Lake Elsinore	Planning	Mixed Use	25	44
207	Sky Memorial Center	Lake Elsinore	N/A	Commercial	13	24
209	Wildomar Sites	Wildomar	N/A	Low Medium Density Residential	5	9
211	Commercial Mixed-Use - New Elsinore 43	Lake Elsinore	N/A	Mixed Use	83	148
212	Home Sweet Home M-HD Residential	Riverside County	Planning	Medium High Density Residential	33	59
213	Vantage Auctions	Lake Elsinore	Plan Check	Industrial	21	37
214	Canyon Hills Marketplace, Pad 8	Lake Elsinore	Inspection	Commercial	2	4
215	Collier Honda Dealership	Lake Elsinore	Plan Check	Commercial	19	33
216	Baxter and I-15 Mixed Use Project	Wildomar	Planning	Mixed Use	47	84
217	Bundy Canyon Subdivision	Wildomar	N/A	Low Medium Density Residential	35	63
218	Summerly Tract 31920-17	Lake Elsinore	Inspection	Medium Density Residential	36	65
219	Summerly Tract 31920-18	Lake Elsinore	Inspection	Medium Density Residential	32	57
220	Summerly Tract 31920-19	Lake Elsinore	Inspection	Medium Density Residential	30	53
221	Ortiz Apartments	Lake Elsinore	Planning	High Density Residential	3	5

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
222	Dollar General - Highway 74 and Richard Street	Riverside County	N/A	Commercial	7	12
223	Dollar General - Grand Avenue	Riverside County	N/A	Commercial	5	9
224	Kumar Convenience Center	Lake Elsinore	Plan Check	Commercial	2	4
226	Tract 36115-1 PA 32	Lake Elsinore	N/A	Low Medium Density Residential	44	78
228	Clinton Keith Village Grocery Outlet	Wildomar	Inspection	Commercial	14	25
230	Temescal Valley Project	Riverside County	N/A	Medium High Density Residential	80	142
231	Lake Elsinore Travel Center	Lake Elsinore	Inspection	High Density Residential	45	81
232	Monte Vista II	Wildomar	Plan Check	Mixed Use	72	128
233	Prielipp Apartments	Wildomar	Planning	Mixed Use	38	69
234	Kumar Commercial Center	Wildomar	N/A	Commercial	7	13
236	Imperial Stations	Lake Elsinore	N/A	Commercial	5	8
237	Wild Omar's Zoo	Wildomar	N/A	Mixed Use	22	39
238	Marriott Hotel	Lake Elsinore	N/A	High Density Residential	76	135
240	New Ventu Residential Apartments	Lake Elsinore	N/A	High Density Residential	3	6
241	Summerly Trail 31920-21 Water and Sewer	Lake Elsinore	Inspection	Medium Density Residential	32	57
242	Ortega Avenue and Grand Avenue Mixed-Use Project	Lake Elsinore	Planning	Mixed Use	24	43
244	Highway 74 Self Storage	Riverside County	Plan Check	Industrial	4	7
245	Summerly Trail 31920-22	Lake Elsinore	Inspection	Medium Density Residential	27	48
247	Hotel at Oak Creek Shopping Center	Wildomar	Planning	High Density Residential	57	102
249	Viscaya Trail 32008	Lake Elsinore	Planning	High Density Residential	4	8
250	Simple Simon, LLC	Lake Elsinore	Plan Check	Commercial	7	12
252	Harvest of Lake Elsinore	Lake Elsinore	Planning	Industrial	0.3	1

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs[(1)]
253	Summerly	Lake Elsinore	Inspection	Medium High Density Residential	57	101
254	NexxGen Project	Wildomar	Planning	Low Density Residential	4	8
255	Alberhill Elementary School	Lake Elsinore	Inspection	Public/Institutional	15	26
263	Vista Ortega Apartments	Lake Elsinore	Planning	Low Medium Density Residential	9	16
264	Oak Springs Ranch Phase 2	Wildomar	Planning	High Density Residential	37	65
265	Summerly	Lake Elsinore	Inspection	Medium High Density Residential	34	60
266	Central Street Plot Plan	Wildomar	Planning	Business Park	0.2	0
268	Summerly Tract 31920-23	Lake Elsinore	Inspection	Medium High Density Residential	43	77
269	Silverleaf Motors	Lake Elsinore	Planning	Commercial	1	1
270	Won Meditation/Retreat Center	Wildomar	Planning	Commercial	57	101
271	Jack in the Box El Toro	Lake Elsinore	Planning	Commercial	5	8
272	Central Avenue and Ardenwood Way Gas Station and Convenience Store	Riverside County	Planning	Commercial	4	7
273	Tru-Sports 17938 Collier Avenue	Lake Elsinore	Planning	Industrial	3	5
274	The Lakeview Plaza	Lake Elsinore	Planning	Commercial	11	19
275	Oak Creek Canyon	Lake Elsinore	Planning	Mixed Use	2	4
276	Highway 74 Business Park	Riverside County	Plan Check	Business Park	4	7
279	Westlake Offsite Water	Lake Elsinore	Inspection	Medium Density Residential	50	90
280	21-115 - SFR Waterline Extension	Riverside County	Planning	Low Density Residential	28	50
282	Corydon II	Lake Elsinore	Planning	Industrial	3	5
283	Hadley's Place	Lake Elsinore	Planning	Industrial	1	3
284	Jean Hayman Site Phase I	Wildomar	Planning	Medium Density Residential	28	50

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs[(1)]
286	Wildomar Shooting Range	Wildomar	Plan Check	Industrial	2	3
287	Ramiro Residentialidence	Lake Elsinore	Planning	Medium Density Residential	1	1
288	Mosqueda Residentialidence	Lake Elsinore	Planning	High Density Residential	0.5	1
289	Mountain and Lake Street	Lake Elsinore	Planning	Commercial	15	28
291	Leicester Waterline	Wildomar	Plan Check	Low Density Residential	0.3	1
292	DG- Lake Elsinore	Riverside County	Inspection	Commercial	3	6
293	Canyon Hills Phase 7 Landscape	Lake Elsinore	Inspection	Open Space	21	38
294	Nichols Ranch Tract 37305	Lake Elsinore	Inspection	Low Density Residential	97	173
295	Garner Road	Riverside County	Inspection	Medium Density Residential	0.3	1
299	Cordero Residence	Lake Elsinore	Planning	High Density Residential	1	1
300	Perris Senior Apartments	Lake Elsinore	Planning	High Density Residential	3	5
301	Summerly Storm Water Pump Station	Lake Elsinore	Inspection	Vacant	0	0
303	TPM 37773	Lake Elsinore	Planning	Industrial	7	12
304	Chevron Gas Station Remodel	Lake Elsinore	Planning	Commercial	2	3
305	Sycamore Creek Marketplace	Riverside County	Planning	Commercial	29	51
310	Gas Station, Convenience Store and Carwash	Lake Elsinore	Inspection	Commercial	3	5
311	Arturo and Nathan Luna	Wildomar	Planning	Low Density Residential	5	9
312	Wagners Run	Riverside County	Planning	Low Medium Density Residential	4	7
313	1589 Mill Street	Lake Elsinore	Planning	Medium Density Residential	10	19
314	Lake Elsinore Commerce Center	Lake Elsinore	Planning	Commercial	662	1,181
317	Golcheh Group Commercial Use	Lake Elsinore	Planning	Commercial	16	29
318	Wasson Canyon Tract 37382	Lake Elsinore	Planning	Low Medium Density Residential	123	220
319	East Lake Villas	Lake Elsinore	Planning	Mixed Use	21	37

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
320	Cannabis Property	Lake Elsinore	Planning	Commercial	2	3
322	Los Compadres	Lake Elsinore	Plan Check	Commercial	1	2
324	North Elsinore Industrial Park	Lake Elsinore	Planning	Industrial	5	9
325	187 Chestnut Avenue	Lake Elsinore	Inspection	Medium Density Residential	2	3
326	17393 Grand Avenue Cannabis Retail	Riverside County	Planning	Mixed Use	1	1
328	143 South Terra Cotta Road	Lake Elsinore	Inspection	Low Medium Density Residential	0.4	1
329	22200 Canyon Club Drive	Canyon Lake	Plan Check	Public/Institutional	12	22
330	Renaissance Ranch Commerce Center	Riverside County	Planning	Business Park	162	289
331	407 West Sumner Avenue	Lake Elsinore	Inspection	Low Medium Density Residential	0.4	1
332	Pacific Coral	Lake Elsinore	Planning	Low Medium Density Residential	98	174
333	Herbert Nursery	Riverside County	Planning	Commercial	13	23
334	Tommy's Car Wash	Lake Elsinore	Planning	Commercial	3	5
335	APN 374-101-003 Water Line Extension	Lake Elsinore	Planning	Low Medium Density Residential	1	1
336	APN 378-183-024 Single-Family Home	Lake Elsinore	Planning	Low Density Residential	0.3	1
338	Bahia Village	Riverside County	Planning	Low Medium Density Residential	21	38
339	Granite Street - Sewer Line Extension	Lake Elsinore	Planning	Medium Density Residential	1	1
340	APN 345-220-067 - Water Line Extension	Riverside County	Planning	Medium Density Residential	3	4
341	SEC Dexter and Allan	Lake Elsinore	Planning	Commercial	7	12
342	Palomar Road SFR	Wildomar	Inspection	Medium High Density Residential	3	5

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs[(1)]
343	APN 347-130-025 - Cannabis Facility	Riverside County	Planning	Commercial	3	5
344	Mi Familia Tattoo Shop	Lake Elsinore	Planning	Commercial	2	3
345	Trail 33140	Lake Elsinore	Planning	Low Medium Density Residential	163	292
346	PAR APN 370-080-024 Modular Offices	Lake Elsinore	Plan Check	Business Park	1	1
347	Starbucks	Lake Elsinore	Plan Check	Commercial	3	6
348	CAFH Order of Wildomar	Lake Elsinore	Planning	Low Density Residential	0.2	0
349	Pennington Industrial	Lake Elsinore	Inspection	Industrial	4	7
350	183 South Chestnut Street APN 373-152-016	Lake Elsinore	Inspection	Medium Density Residential	0.5	1
351	18565 Grand Avenue	Riverside County	Plan Check	Low Medium Density Residential	2	4
352	1515 West Sumner Avenue Sewer Extension	Lake Elsinore	Plan Check	Low Medium Density Residential	0.4	1
353	Store America Self Storage	Wildomar	Planning	Industrial	3	6
354	Sunny Lane SFR APN 387-060-004	Riverside County	Planning	Low Medium Density Residential	1	1
355	Westridge Condos	Lake Elsinore	Inspection	Medium Density Residential	34	60
356	Rivera Towing Flint Street Waterline Extension	Lake Elsinore	Inspection	High Density Residential	1	2
357	Temescal Canyon Mini Storage	Riverside County	Inspection	Industrial	6	10
358	Lakeside (TriPoint Homes)	Lake Elsinore	Planning	Medium High Density Residential	94	168
359	Lake Street RV Storage	Lake Elsinore	Plan Check	Industrial	15	27
360	Ortega Plaza	Lake Elsinore	Planning	Commercial	15	27
361	Echo Highland Tract 32585	Riverside County	Plan Check	Low Medium Density Residential	91	163
362	SFR Manufactured Homes	Wildomar	Plan Check	Low Density Residential	3	6
363	TTM 37916 SFR	Murrieta	Planning	Low Density Residential	3	5

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs[1]
364	Nichols Industrial Center	Lake Elsinore	Planning	Industrial	58	104
365	Pacific Hydrotech Corporation	Riverside County	Planning	Industrial	15	28
366	Spyglass Tract 35337	Lake Elsinore	Planning	Low Medium Density Residential	579	1,034
367	La Strata Tract 32077	Lake Elsinore	Planning	Low Medium Density Residential	72	128
368	ProWest Main	Wildomar	Planning	Commercial	7	13
369	Inland Valley Medical Center	Wildomar	Planning	Public/Institutional	28	51
370	Rancon Medical & Education Center	Wildomar	Planning	Commercial	76	136
371	The Grove (T36673)	Wildomar	Planning	High Density Residential	22	39
372	Cholico Residence	Riverside County	Planning	Low Density Residential	1	1
373	Cannabis Property	Lake Elsinore	Plan Check	Commercial	4	7
374	760 Park Avenue Waterline Extension	Lake Elsinore	Plan Check	Medium Density Residential	0.4	1
375	Alberhill Ranch Tract 28214-9 to 17	Lake Elsinore	Plan Check	Low Medium Density Residential	290	518
376	Sunny Express Carwash	Lake Elsinore	Planning	Commercial	6	11
377	Commercial Remodel 18570 Collier	Lake Elsinore	Plan Check	Commercial	2	3
378	Popeyes	Wildomar	Planning	Commercial	3	6
379	10 Single Family Homes	Wildomar	Planning	Medium Density Residential	6	10
380	Sage/Investco Mixed-Use	Wildomar	Planning	Mixed Use	19	34
381	Espinoza Residential	Lake Elsinore	Planning	Low Medium Density Residential	1	2
382	374-081-002 Line Extension	Lake Elsinore	N/A	Low Medium Density Residential	0.5	1
383	381-100-021 Parcel Subdivision	Riverside County	Planning	Low Medium Density Residential	10	17

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
384	Sierra Park North Development	Canyon Lake	Plan Check	Medium Density Residential	13	23
385	315 North Lewis Street Sewer Lateral	Lake Elsinore	Inspection	Low Medium Density Residential	0.5	1
386	Cannabis Cultivation Distribution Retail	Riverside County	N/A	Commercial	8	14
387	Riley Apartments	Lake Elsinore	Plan Check	High Density Residential	1	2
388	Flint Street 4 Plex	Lake Elsinore	N/A	High Density Residential	2	4
389	18492 Dexter Building Division	Lake Elsinore	N/A	Commercial	3	5
390	Brown Street New SFR	Lake Elsinore	N/A	Low Density Residential	0.2	0
391	Coffee and Bakery	Lake Elsinore	N/A	Commercial	5	8
392	Cannabis Cultivation and Retail Facility	Lake Elsinore	N/A	Commercial	1	2
393	Lakeland Village Senior Complex	Riverside County	Planning	Low Medium Density Residential	12	21
394	PAR - 21-0119 - TPM 36476 Proposal	Wildomar	Planning	Medium Density Residential	26	46
395	PAR - 21-0108 - Chiquito Battery Storage Facility	Wildomar	Planning	Industrial	1	3
396	SFR 379-202-001 31131 Illinois Street	Lake Elsinore	N/A	Medium Density Residential	0.3	0
397	Pottery Apartments	Lake Elsinore	N/A	Medium Density Residential	3	6
398	Commercial Retail Center	Riverside County	N/A	Commercial	6	11
400	Reyes Single Family Residence	Lake Elsinore	Planning	Low Medium Density Residential	1	1
401	Tres Lagos Apartments	Wildomar	N/A	High Density Residential	29	53
402	Central Grocery and Retail	Lake Elsinore	Planning	Commercial	23	41
403	Miguels Jr DCDA Service Removal	Lake Elsinore	N/A	Commercial	2	3
404	SFR APN 378-181-080	Lake Elsinore	N/A	Low Density Residential	0.2	0
405	SFR APN 383-020-001	Riverside County	N/A	Low Medium Density Residential	150	267

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
406	350-Home Single Family Development	Lake Elsinore	N/A	Hillside Residential	140	249
407	SFR 32657 Wildomar Trail 376-042-011	Wildomar	N/A	Medium Density Residential	1	1
408	SFR 365-270-053	Wildomar	Planning	Open Space	76	136
409	373-082-037 Townhomes	Lake Elsinore	N/A	Mixed Use	0.2	0
410	22261 Walnut Street Sewer Lateral	Wildomar	Inspection	Low Density Residential	1	2
411	Empire Design Group Backflow Upgrade	Lake Elsinore	N/A	Commercial	1	1
412	Graham Street Sewer Lateral Repair	Lake Elsinore	Inspection	Mixed Use	0.4	1
413	375-250-024 Line Extension	Lake Elsinore	Planning	Medium Density Residential	1	2
414	32985 Serena Way	Lake Elsinore	Inspection	Mixed Use	1	1
415	1505 West Sumner Avenue Sewer Lateral	Lake Elsinore	Inspection	Low Medium Density Residential	0.4	1
416	Trail 36952, Wildomar Ridge	Wildomar	Plan Check	Medium Density Residential	28	49
417	Manning Street Water Line Extension	Lake Elsinore	Planning	Hillside Residential	0.1	0
418	Sierra Park North Bathroom	Canyon Lake	Plan Check	Low Density Residential	0.2	0
419	Franklin and Miramar Single Family Residence	Lake Elsinore	Planning	Very Low Density Residential	0.4	1
420	16465 Joy Street 6-Inch Sewer Lateral Repair	Lake Elsinore	Inspection	Medium Density Residential	3	5
421	389-290-028 Water Line Extension	Lake Elsinore	Planning	Low Medium Density Residential	5	9
422	SFR - APN - 345-220-044	Riverside County	Planning	Low Density Residential	5	8
423	North Wildomar Retail Center	Wildomar	Planning	Commercial	4	7
424	Central Wildomar Retail Center	Wildomar	Planning	Commercial	2	4
427	Corydon 3	Lake Elsinore	Planning	Low Density Residential	4	8
428	SFR - 375-323-006	Lake Elsinore	Planning	Low Medium Density Residential	0.2	0

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs[(1)]
429	Saint Frances of Rome Recycled Water	Wildomar	Inspection	Outside	0	0
432	City of Wildomar 27 Acre Park	Wildomar	Planning	Medium Density Residential	67	120
433	317 North Lewis Street Sewer Lateral Connection	Lake Elsinore	Inspection	Low Medium Density Residential	0.5	1
445	Corydon and Grand Mixed Use - APN 370-171-015	Wildomar	Planning	Commercial	21	37
446	PA 2021-22 APN 377-190-002	Lake Elsinore	Planning	Commercial	2	4
447	Summer Sage Way PAR APN 367-130-036	Wildomar	Planning	Open Space	3	5
449	PAR - Ou Residence - APN - 374-112-019	Lake Elsinore	Planning	Low Medium Density Residential	0.4	1
450	PA 2021-29 Industrial Project APN 377-140-028	Lake Elsinore	Planning	Industrial	7	12
454	Catt Road Retail Center	Wildomar	Planning	Commercial	7	13
455	Highway 74 Contractor Yard	Riverside County	Planning	Commercial	40	71
456	Mission Trail Animal Shelter	Wildomar	Planning	Commercial	7	13
457	Horsethief Ridge Trail 37002	Riverside County	Plan Check	Medium Density Residential	128	229
458	Water and Sewer Extension APN 349-330-007	Riverside County	Planning	Hillside Residential	15	27
459	LE Costco Car Wash	Lake Elsinore	Planning	Commercial	7	12
460	Palmilla Bungalows Apartments	Murrieta	Planning	High Density Residential	30	54
461	34497 Cherry Street Sewer Lateral	Wildomar	Inspection	Low Density Residential	0.3	1
462	SFR APN 383-091-001	Riverside County	Planning	Low Medium Density Residential	0.3	0
463	Water Line Ext 366-130-041	Wildomar	Planning	Medium Density Residential	2	3
464	33016 Evergreen Street Sewer Lateral	Riverside County	Inspection	Medium Density Residential	0.3	1
465	America's Tire Lake Elsinore	Riverside County	Plan Check	Commercial	6	10

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
466	SFR APN 379-090-029 and 030	Lake Elsinore	Planning	Low Medium Density Residential	1	2
467	SFR Sewer Extension APN - 375-322-020	Lake Elsinore	Planning	Low Medium Density Residential	0.2	0
468	28603 Highway 74 Contractor Yard	Riverside County	Planning	Business Park	4	7
469	Dutch Brothers Coffee	Riverside County	Plan Check	Business Park	1	1
470	Rosetta View Estates	Lake Elsinore	Plan Check	Low Medium Density Residential	22	40
471	Fire Hydrant Relocation 29280 Central Avenue	Lake Elsinore	Inspection	Public/Institutional	1	3
472	Lakeshore Dock Installation	Lake Elsinore	Planning	Vacant	-	-
473	Aguinaga Green	Wildomar	Planning	Commercial	10	18
474	Trail 3720 Verizon Cell Tower - Cross Hill	Canyon Lake	Planning	Industrial	2	3
475	The Cove Apartments	Lake Elsinore	Planning	High Density Residential	255	456
476	Temescal Valley Commerce Center	Riverside County	Planning	Industrial	69	124
477	Grand Avenue 6	Wildomar	Planning	Low Density Residential	3	5
478	Rosetta Ridge	Lake Elsinore	Planning	Low Medium Density Residential	43	78
479	Lakeview Apartments	Lake Elsinore	Planning	High Density Residential	81	144
481	Horsethief 5G LSub6	Riverside County	Planning	Industrial	1	1
482	Lindsay Street	Lake Elsinore	Planning	Low Medium Density Residential	0.4	1
483	30433 Chaney Street	Lake Elsinore	Planning	Low Medium Density Residential	0.3	1
484	Mission Trail Tract 043001/1	Lake Elsinore	Planning	Medium Density Residential	76	136
485	Hidden Springs Mixed Use	Wildomar	Planning	Mixed Use	313	558
486	Rosetta Canyon Apartments	Lake Elsinore	Planning	High Density Residential	150	268

Ref No.	Project Name	City/Planning Entity	Project Status	Land Use	Estimated Demand (AFY)	EDUs(1)
487	De Palma Regional Lift Station	Riverside County	Planning	Low Medium Density Residential	7	12
488	Horsethief Zone 1601 Reservoir No. 2	Riverside County	Planning	Low Density Residential	1	1
489	Alberhill Ridge Zone 1601/1676 Pump Station	Lake Elsinore	Plan Check	Vacant	0	0
490	Tuscany Crest Temporary Sewer Lift Station	Lake Elsinore	Plan Check	Vacant	0	0
496	SFR - APN 363-273-025	Lake Elsinore	Planning	Low Medium Density Residential	1	1
497	420 North Langstaff Street Multi Family	Lake Elsinore	Planning	High Density Residential	2	4
498	Wildomar Crossings Commercial Mixed-Use	Wildomar	Planning	Commercial	12	21
499	Industrial Building APN 377-430-016	Lake Elsinore	Planning	Industrial	1	2
1275	Oak Creek Canyon	Lake Elsinore	Plan Check	Low Density Residential	154.02	275
1346	Rosetta Hills Trail 30698	Lake Elsinore	Inspection	Low Medium Density Residential	111	199
1348	SFR Olivas APN 378-156-038, 039	Lake Elsinore	Plan Check	Medium Density Residential	25	44
1350	Thomas Residence	Lake Elsinore	Inspection	Medium Density Residential	0.5	1
1351	Corydon Gateway Commercial	Riverside County	Plan Check	Commercial	15	26
1353	Wildomar Master Drainage Plan Lateral C, Stage 3 Sewer Relocation	Wildomar	Plan Check	Medium Density Residential	24	42
1469	Mermack Avenue Street Improvements	Riverside County	Planning	Commercial	24	42
Total					**17,899**	**31,959**

Notes:
Abbreviations: AFY - acre-feet per year; APN - accessors parcel number; EDU - equivalent dwelling unit; gpd - gallons per day; N/A - not applicable; PAR - parcel; SFR - single-family residential; TPM - tentative parcel map; TTM - tentative tract map.
(1) EDU = Equivalent Dwelling Unit. This represents the demand equal to one dwelling unit, even if the planned development does not include dwelling units. EDU demand is assumed to be 500 gpd/EDU.

Appendix C

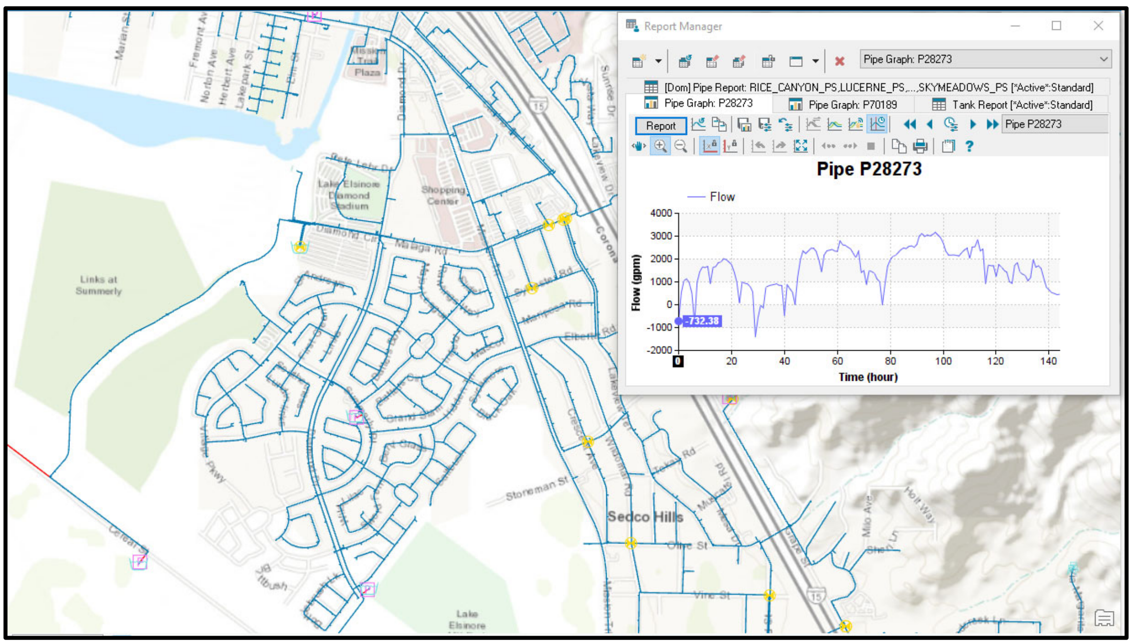
POTABLE WATER HYDRAULIC MODEL REFERENCE MANUAL

Elsinore Valley Municipal Water District

Potable Water Hydraulic Model Reference Manual

SEPTEMBER 2021

ELSINORE VALLEY MUNICIPAL WATER DISTRICT



ELSINORE VALLEY MUNICIPAL WATER DISTRICT

Potable Water Hydraulic Model Reference Manual

SEPTEMBER 2021

WORK ORDER NO. C2109

Prepared by Water Systems Consulting, Inc.

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Appendix A – Model Elements

Appendix B – System Schematic

Appendix C - EPS Calibration Graphs

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Figures

1. Introduction

Water Systems Consulting, Inc. (WSC) was retained by Elsinore Valley Municipal Water District (EVMWD, or the District) to develop an updated hydraulic model of the District's potable water distribution system. The District's service area measures approximately 63,000 acres and includes the City of Lake Elsinore, portions of the Cities of Canyon Lake, Wildomar, and Murrieta, as well as unincorporated areas of Riverside County.

The model was developed using the InfoWater hydraulic modeling software package marketed by Innovyze. The District has a license for InfoWater and maintains a working model of the distribution system that is used to evaluate the system, determine deficiencies, and perform fire flow analyses for new development projects. The updated model will be a valuable tool for effective operation and management of the system and planning for future improvements.

This document has been divided into several sections to describe the major components of the process to develop an updated hydraulic model. These sections include:

- **Infrastructure**. WSC built a new InfoWater model and loaded it with the District's physical infrastructure and control strategies.
- **Demands.** Using historic consumption data and anticipated future demands, alternative demand sets were added to the model.
- **Calibration.** District staff performed fire flow testing at hydrants and provided data from the District's Supervisory Control and Data Acquisition (SCADA) system for calibration. These data sets were used to adjust model parameters so that the model could more accurately simulate conditions in the system.

These sections were developed and reviewed with District staff. After discussion and review with District staff, information was compiled into this model reference manual that can be used by District staff to maintain and use the model.

WSC began the project by creating a new InfoWater model in the same coordinate system as the District's Geographic Information System (GIS) database (NAD_1983_Stateplane _California_VI_FIPS_0406 in US feet). The auto-calculate length feature was turned on to allow InfoWater to calculate lengths for each pipeline based on geographic distance. The current InfoWater model was used as a reference source and provided a great deal of valuable data.

2. Infrastructure

The District maintains a potable water distribution system that serves water to customers throughout the service area. District staff provided data sets on the various elements of the system to support the model update process. The major areas of infrastructure that are included in the model include:

- Sources of Supply
- Pressure Zones
- Pipe Network
- Hydrants
- Storage Tanks
- Pump Stations and Pumps
- Valves (Control and Isolation)
- Facility Controls

A summary of the infrastructure in the District's water system is shown in Table 1.

Table 1. Summary of Water Distribution System Components

Facility Type	Number
Water treatment plants	2
Groundwater wells (active)	14
Storage tanks (active)	72
Booster pump stations (including pressure sustaining stations)	55
Pipeline (miles)	750
Valves	20,500
Fire hydrants	8,200
Interconnections	2
Emergency interconnections	4

A map of the water system is shown in Figure 1.

For each category of infrastructure, detailed tables of model attributes are included in Appendix A. A hydraulic schematic of the system is included in Appendix B.

The categories of infrastructure are addressed in the following sections.

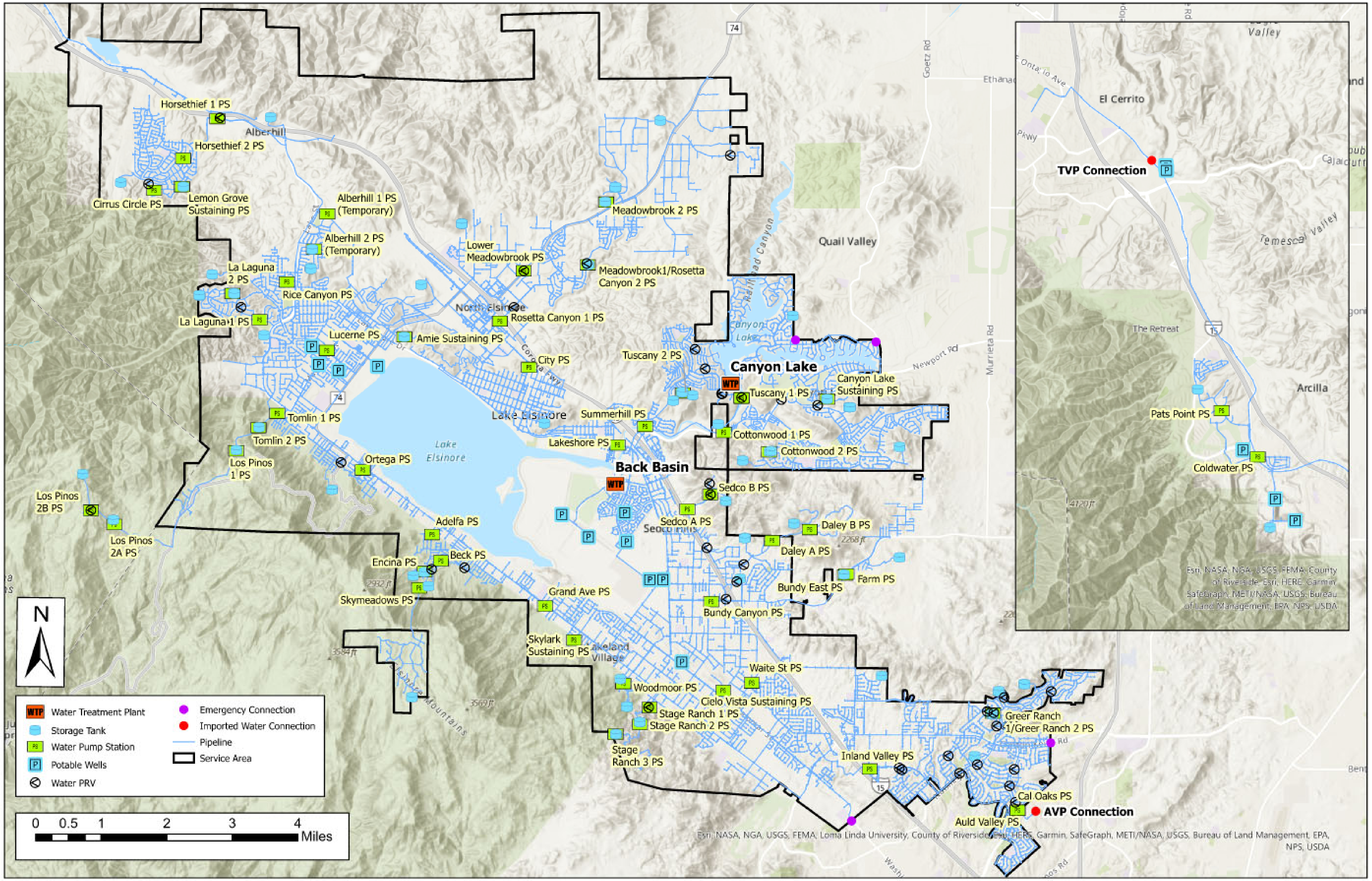

Figure 1. Potable Water System

2.1 Sources of Supply

The District has three primary sources of potable water supply:

- Groundwater wells. Some wells pump directly into the distribution system, while other wells direct their production to a treatment facility or blending line to meet water quality objectives before the water enters the distribution system.
- Potable water supply connections to neighboring agencies, Eastern Municipal Water District (EMWD) and Western Municipal Water District (WMWD).
- The Canyon Lake Water Treatment Plant (WTP). The plant draws raw water from Canyon Lake and pumps treated water into the District's distribution system.

2.1.1 Groundwater Wells

The District's GIS database includes 14 active groundwater wells. All well water is chloraminated for disinfection before discharge to the distribution system. Output from the Lincoln Street, Joy Street, and Machado wells is blended together to meet the maximum contaminant level (MCL) for arsenic. Output from the Cereal 3 and Cereal 4 wells is directed to the Back Basin Groundwater Water Treatment Plant (BBGWTP) for arsenic removal. Treated water from the BBGWTP can be blended with output from the Diamond, Summerly, Cereal 1, and Corydon Street wells in a dedicated blending line referred to as the Corydon Blend Line.

The groundwater wells are modeled with two related elements in the updated InfoWater model:

- A constant-level reservoir to represent the groundwater elevation at each well
- A pump to represent the well pump that draws water from the aquifer and directs it into the distribution system (or into the relevant treatment or blending facility)

2.1.2 Imported Water Connections

The District purchases treated water from WMWD. In order to leverage existing infrastructure, some of the water purchased from WMWD is delivered to the District through a connection with EMWD. Both of these agencies deliver water that was treated by the Metropolitan Water District (MWD) of Southern California. The water from EMWD is treated at the MWD Skinner Filtration Plant and pumped through the Auld Valley Pipeline (AVP) to MWD Connection EM-17. This connection provides the suction supply for two District pump stations, the Auld Valley Pump Station and the California Oaks Pump Station. These stations are adjacent to one another but pump into different pressure zones; the Auld Valley Pump Station feeds the District's 1434 zone, and the California Oaks Pump Station feeds the District's 1650 zone. The District's total delivery from EM-17 is limited to 37.5 cubic feet per second (cfs) by the District's purchase rights. The actual amount that can be delivered is further limited by hydraulic constraints in the Auld Valley Pipeline.

The District's connection to the WMWD system provides water treated at the MWD Mills Filtration Plant and conveyed through the Mills Gravity Pipeline. The connection point is located in Corona at the intersection of Temescal Canyon Road and La Gloria Street. The Temescal Valley Pipeline (TVP) conveys the water southeast to the District's service area.

The connections to neighboring agencies are modeled with two related elements in the updated InfoWater model:

- A constant-level reservoir to represent the Hydraulic Grade Line (HGL) elevation in the system that is providing supply to the District
- A control valve to constrain the flow into the District's system. Depending on actual operating conditions, this valve may function to limit flow to a certain capacity in gallons per minute (gpm), or it may seek to maintain a set pressure in pounds per square inch (psi) on the upstream or downstream side.

2.1.3 Canyon Lake Water Treatment Plant

Canyon Lake was constructed in 1928 by the Temescal Water Company. It impounds water from the San Jacinto River, Salt Creek, and local surface runoff. Raw imported water can also be purchased from WMWD and discharged into the San Jacinto River to fill Canyon Lake. The Canyon Lake Water Treatment Plant (CLWTP) provides conventional treatment to surface water from the lake. The CLWTP is currently off-line due to concerns about source water quality, but it is expected to be re-activated in the future.

The CLWTP is included in the model and is represented with two related elements:

- A constant-level reservoir to represent the HGL elevation in the clearwell
- A control valve to constrain the flow into the District's system.

In order to build the updated model, WSC obtained information about these sources of supply from resources and data sets provided by the District. References included:

- The District's Geographic Information System (GIS) database
- The current InfoWater model
- The 2016 Water System Master Plan

The model attributes of these sources of supply are shown in model element tables in Appendix A.

For future conditions, the District's supply is expected to include the same three sources, as well as indirect potable reuse (IPR) at the Regional Water Reclamation Facility. The District's expected future supply portfolio is shown in Table 2. Table 2 includes an estimate of the future supply from each source in acre-feet per year (AFY).

Table 2. Planned Future Water Supply Portfolio (AFY)

Year	Elsinore Basin Groundwater	Coldwater Basin Groundwater	Canyon Lake WTP	Pump Lee Lake Basin Groundwater	Flagler Wells	Palomar Well Replacement	IPR at Regional WRF	Temecula-Pauba Groundwater	Mills WTP via TVP	Skinner WTP via AVP
2020	5,500	1,200	-	-	1,300	-	-	-	10,030	16,256
2021	5,500	1,200	-	-	1,300	-	-	-	10,030	16,256
2022	5,500	1,200	-	-	1,300	-	-	-	10,030	16,256
2023	5,500	1,200	-	-	1,300	450	-	-	10,030	16,256
2024	5,500	1,200	-	875	1,300	450	-	-	10,030	16,256
2025	5,500	1,200	2,500	875	1,300	450	-	-	10,030	16,256
2026	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2027	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2028	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2029	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2030	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2031	5,500	1,200	6,200	875	1,300	450	-	-	10,030	16,256
2032	5,500	1,200	6,200	875	1,300	450	-	750	10,030	16,256
2033	5,500	1,200	6,200	875	1,300	450	-	750	10,030	16,256
2034	5,500	1,200	6,200	875	1,300	450	2,520	750	10,030	16,256
2035	5,500	1,200	6,200	875	1,300	450	3,023	750	10,030	16,256
2036	5,500	1,200	6,200	875	1,300	450	3,375	750	10,030	16,256
2037	5,500	1,200	6,200	875	1,300	450	3,375	750	10,030	16,256
2038	5,500	1,200	6,200	875	1,300	450	3,375	750	10,030	16,256
2039	5,500	1,200	6,200	875	1,300	450	3,375	750	10,030	16,256
2040	5,500	1,200	6,200	875	1,300	450	5,382	750	10,030	16,256
2041	5,500	1,200	6,200	875	1,300	450	5,724	750	10,030	16,256
2042	5,500	1,200	6,200	875	1,300	450	6,067	750	10,030	16,256
2043	5,500	1,200	6,200	875	1,300	450	6,410	750	10,030	16,256
2044	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2045	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2046	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2047	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2048	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2049	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256
2050	5,500	1,200	6,200	875	1,300	450	6,750	750	10,030	16,256

2.2 Pressure Zones

The District's customers are spread out across an area where the ground elevation varies by more than 2,000 vertical feet. In order to provide service to customers at acceptable pressures across a range of elevations, the District's distribution system is divided into pressure zones. These zones are shown in Table 3. The appropriate pressure zone was assigned as an attribute to pipes and junctions in the updated InfoWater model. The length of pipe in each zone is shown as an indication of the relative size of each zone. The nominal HGL elevation in each zone is shown in feet above mean sea level (msl).

Table 3. Pressure Zones in Updated InfoWater Model

Pressure Zone	Nominal Hydraulic Grade Line Elevation (feet above msl)	Length of Pipe (ft)	Percent of Total System Length
1258.4_Clay_Canyon	1258	17,814	0.5%
1358.7_Mayhew	1358	46,000	1.2%
1434	1434	1,160,049	29.3%
1464_Amie	1464	24,563	0.6%
1467_Waite	1467	196,380	5.0%
1550_Cielo_Vista	1550	1,738	0.0%
1561_Orange_Bundy	1561	2,424	0.1%
1571_City	1571	184,835	4.7%
1581_Churchill	1581	42,957	1.1%
1601_El_Toro_Rosetta_Canyon_1	1601	114,954	2.9%
1601_Horsethief_1	1601	68,336	1.7%
1601_Lucerne_Alberhill_1	1601	196,293	5.0%
1601_Ortega	1601	141,749	3.6%
1601_Summerhill	1601	74,042	1.9%
1601_Woodmoor	1601	9,665	0.2%
1622_Canyon_Lake	1622	178,144	4.5%
1640_Canyon_Lake_West	1640	44,136	1.1%
1650_Adelfa	1650	22,401	0.6%
1650_Amie_Hydro	1650	3,768	0.1%
1650_Cal_Oaks	1650	151,783	3.8%
1650_Inland_Valley	1650	116,271	2.9%
1701_Meadowbrook_1	1701	49,077	1.2%

Pressure Zone	Nominal Hydraulic Grade Line Elevation (feet above msl)	Length of Pipe (ft)	Percent of Total System Length
1746_Bundy_Gafford	1746	153,802	3.9%
1750_Cottonwood_1	1750	190,251	4.8%
1800_Rice_Canyon_Alberhill_2	1800	94,765	2.4%
1800_Tuscany_1	1800	66,238	1.7%
1801_Horsethief_2	1801	57,783	1.5%
1801_Rosetta_Canyon_2	1801	44,778	1.1%
1842_Beck	1842	8,497	0.2%
1850_Canyon_Lake_Hydro	1850	6,444	0.2%
1850_Greer_Ranch_1	1850	33,553	0.8%
1850_Lemon_Grove	1850	8,837	0.2%
1871_Tomlin_1	1871	2,078	0.1%
1882_Stage_Ranch_1	1882	7,590	0.2%
1896_Meadowbrook_2	1896	129,827	3.3%
1900_Farm	1900	8,281	0.2%
1913_Bundy_Canyon_East	1913	32,794	0.8%
1916.5_Encina	1916	5,128	0.1%
1928_Gateway_Solstice	1928	5,564	0.1%
1934_Cottonwood_2	1934	38,345	1.0%
1940_Cirrus_Circle	1940	915	0.0%
1940_Tuscany_2	1940	28,274	0.7%
2040_La_Laguna_1	2040	11,832	0.3%
2050_Greer_Ranch_2	2050	53,022	1.3%
2196_Sedco	2196	7,861	0.2%
2217_Stage_Ranch_2	2217	11,634	0.3%
2240_La_Laguna_2	2240	19,591	0.5%
2309_Daley	2309	17,840	0.5%
2313_Tomlin_2	2313	3,469	0.1%
2748_Los_Pinos_1	2748	23,579	0.6%
3300_Skymeadows	3300	31,033	0.8%
3544_Los_Pinos_2	3544	6,167	0.2%

2.3 Import of GIS Data to Model

The District's Geographic Information System (GIS) database was the primary source for pipeline information. The GIS Gateway in InfoWater was used to import information from the GIS database into the updated model. The network connectivity tools within InfoWater were then used to add model junctions where needed at pipe endpoints or points where two pipes connected.

The first step in model development was to build the model structure, confirm the pipe and facility connectivity, and populate basic physical facility information. The model structure was built using the District's GIS database which contains a map of the distribution system's assets and information on the system's water mains, reservoirs, pump stations, wells, and valves. The GIS data was carefully reviewed for pertinent information that would affect the system hydraulics and was prepared for transfer to the hydraulic model. Once GIS attributes to be included in the model were identified, additional fields, if needed, were added within InfoWater using the Database (DB) Editor. Fields for each system asset planned to be imported into the model were discussed in a workshop with District staff.

The Database (DB) Editor, found within the InfoWater toolbar, was used to add additional fields for each system asset. To create a new field, the user can open the DB Editor and select which feature type to add additional fields to. For this project, fields were added to an element's (pipe, tank, etc.) informational data. Once a table is opened within the DB Editor, a tool to add or edit field alias is available and can be used to add additional fields and specify the data type (character, numerical, etc.). A preview of the DB Editor is shown in Figure 2.

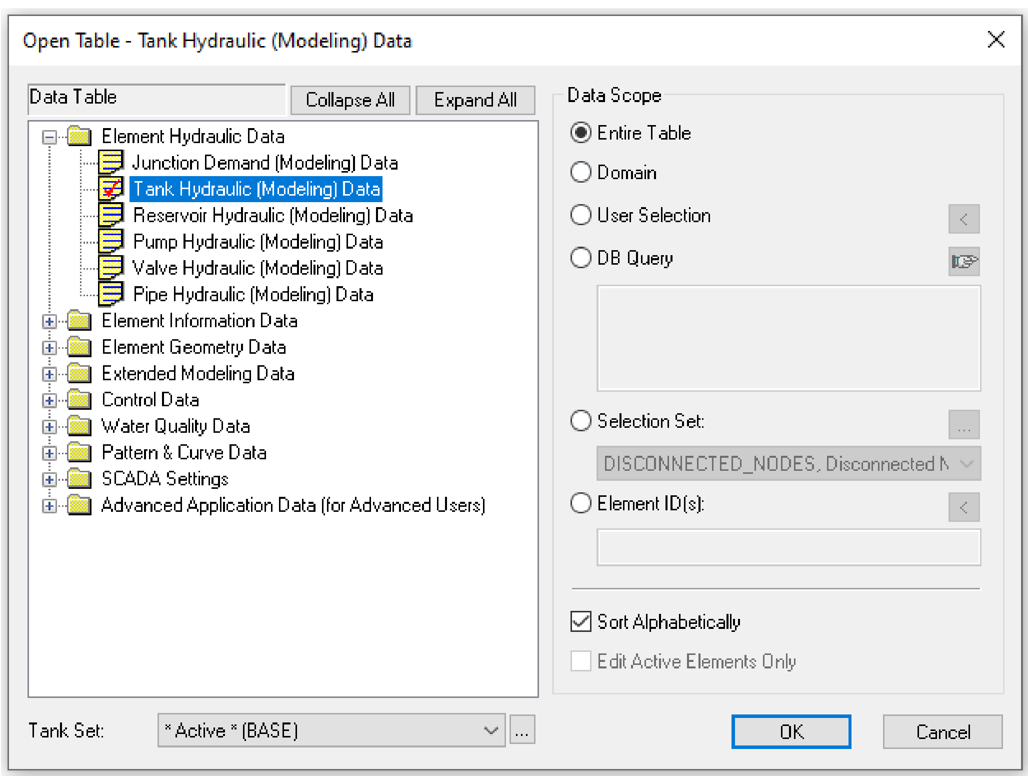

Figure 2. DB Editor Window

Once all fields were added for each system asset, the infrastructure was imported using the GIS Gateway Tool. The GIS Gateway Tool in InfoWater is used to easily transfer GIS data and attributes into the hydraulic model. The unique Model ID links elements to the GIS database for future model updates. Names for the reservoirs, wells, and Pressure Reducing Valves (PRVs) were used as asset ID's and formatted to be acceptable for InfoWater. Spaces were replaced in asset IDs with an underscore (ex. Tuscany_2). Table 4 lists the water distribution system facilities and assets transferred into the hydraulic model from the GIS database as well as the relevant properties transferred for each asset.

Once the GIS Gateway Tool was executed and the structure built, the system's connectivity was updated. InfoWater Network Review/Fix and Connectivity tools can use queries such as "nodes in close proximity", "pipe-split candidates", "orphaned nodes", "merge nodes", and more to review the connectivity and troubleshoot issues.

Disconnected nodes were added to the domain using the Facility and Domain manager to query selection sets. The disconnected nodes were manually analyzed to determine which pipelines the nodes should be connected to. The Merge Nodes Tool was manually applied to combine some disconnected nodes with an existing node on a pipeline. The tool asks the user to identify which node to be dissolved and which node to classify as the destination to automatically adjust the pipeline alignment and fix connectivity, as shown in Figure 3. In general, the merge nodes process yielded accurate pipe connections and improved many of the connectivity issues when the model was first built. The model was then manually reviewed for other connectivity issues, focusing on zone boundaries and tank and pump station connections.

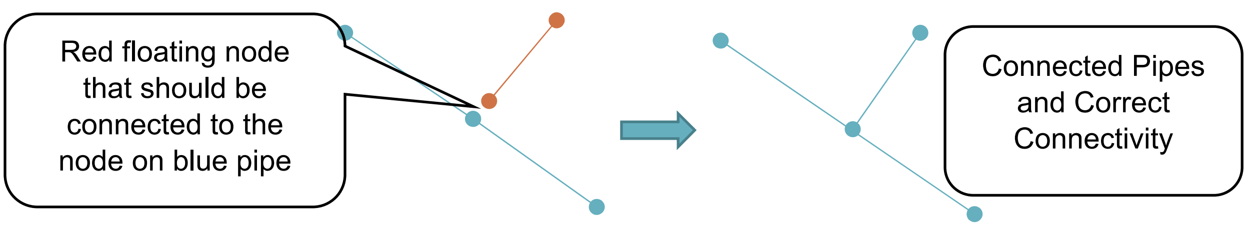

Figure 3. Merge Nodes Tool

Parallel pipes were inspected and updated accordingly. All parallel pipes within the model were added to the domain using the Locate Parallel Pipes tool. Each pipe within the domain was manually inspected and corrected. Many parallel pipes identified were extensions of other segments with lengths less than one foot. As a result, these were removed from the model. Other parallel pipes identified were duplicates with one pipeline drawn on top of the other with identical attribute data. In this case, one pipe was removed.

Table 4. Attributes Imported from GIS to Hydraulic Model

Pipes		Pumps		Reservoirs (Sources)		Storage Tanks		Valves		Pressure Reducing Valves		Hydrants	
Attributes	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**
Diameter	Pipeline diameter provided in the GIS attribute table.	Name	The pump station name was used as the pump ID. Additional pumps were manually added as needed to each pump station. Wells were imported as pumps and reservoirs added to simulate the head.	Reservoir ID	Reservoirs represent sources of supply: either the groundwater level at a well, or the HGL in a system that is supplying water. The well name or interconnection name was used as the Reservoir ID. Groundwater wells were originally added to the model as pumps and the reservoirs were manually added and connected to each corresponding well pump.	Tank ID	The District's GIS database stored tank information in a file labeled reservoir. In the model, storage tanks represent tanks that fill and drain, while reservoirs represent fixed sources of water (either groundwater or imported water). The name field was used as the Tank ID.	Valve ID	The MaximoID was used as the Valve ID.	Valve ID	The MP2CODE was used as the Valve ID.	Junction ID	The MaximoID was used as the Junction ID.
Pressure Zone	Pressure zone the pipeline is located in.	Pressure Zone	The pressure zone the pump (or well) is located in.	Pressure Zone	Pressure Zone the source is located in.	Description	Address or description of location where the tank is located.	Pressure Zone	Pressure zone valve is located in.	Pressure Zone	Pressure zone the PRV is located in.	Pressure Zone	The pressure zone the fire hydrant is located in.
Installation Date	Pipeline installation date, if available.	Year of Installation	Year the pump was installed.	Year of Installation	Year the well was installed or the source was activated.	Installation Year	Year the tank was installed.	Diameter	The diameter of the valve, in inches.	Year of Installation	Year PRV was installed.	Installation Year	The year the fire hydrant was installed.
Material	Pipeline material.	Status	Status of the pump.	Type	The type of reservoir (fixed head or variable head).	Diameter	Tank diameter in feet.	Installation Date	Date of installation.	Description	Address or the description of the location where the PRV is located.	Description	The address or general location of the fire hydrant.

Pipes		Pumps		Reservoirs (Sources)		Storage Tanks		Valves		Pressure Reducing Valves		Hydrants	
Attributes	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**	**Attributes**	**Notes**
Status	There was about 314,038 feet of water mains in the GIS database with an abandoned status that were removed from the water model.	Pumping Capacity	Capacity of the pump in gpm.	Head	The head of the reservoir. For well pumps, the groundwater head was populated using data from recent Southern California Edison tests. If two tests were conducted, the average head was used to populate the head field.	Maximum Level	The height of the tank was used to populate the maximum level of the tank in InfoWater.	Status Code	Status of valve (active)	Status	Status of valve (active).	Status	The status of the fire hydrant (active).
Type Sub	This attribute was copied from the GIS in case it is helpful for future analysis. It appears that mainlines have a value of 1 or 2, and laterals have values of 3 or higher.	Horsepower	Power of the pump.			Elevation	The bottom elevation of the tank.	Normal Position	Typical position of valve (open, closed).	High Zone	Upper zone valve pulls from.	Hydrant Diameter	The diameter of the fire hydrant.
Pipe Class	This attribute shows the pipe class (e.g., CL 350) for some pipelines.	Well Depth	For well pumps, the depth of the well. In the GIS data this attribute is stored with the well pump, and therefore this attribute has been maintained in the pump table.			Status	Status of tank (active).	System	System that the valve is located in (Elsinore, Temescal).	High Pressure	Pressure of the upper zone that valve pulls from.	System	The system the fire hydrant is located in (Elsinore, Temescal).
System	The System attribute classified the pipelines as part of the Elsinore or Temescal systems.	Well Pump Type	For groundwater well pumps, the type of use the well is for (domestic or irrigation).			Capacity	The capacity in million gallons of each tank.			Low Zone	Lower zone valve conveys water to.		
						Overflow Elevation	The overflow elevation of the tank.			Low Pressure	Pressure of the lower zone the valve regulates.		
										Quantity	Number of valves located at the PRV station.		
										Sizes	Size of the valves located at the PRV station.		

The last step in building the model structure was populating basic physical and operating information for the model and facilities. This information includes elevation data at the junctions and facilities, tank operating elevations, pump and well operating points or pump curves, and PRV settings. The District's 2016 Water System Master Plan and the previous system model were the basis for populating information in the updated model as well as input from the District.

Ground elevations were assigned to each model junction. At key facilities, such as tanks, the elevations were obtained from the current InfoWater model or from the District's hydraulic profile schematic. For other model junctions, a digital elevation model from the United States Geological Survey (USGS) was used to assign a ground elevation.

To load elevations into the model junctions, data from the USGS was added to the model as raster data sets. Using project and transformation GIS tools, the raster data sets were projected to the proper coordinate system used within the model and the elevation extractor tool was used to load elevations. Once elevations had been extracted, the DB Editor was used to convert the units from meters into feet.

Table 5 lists the sources used to populate facilities.

Table 5. Source of Manually Added Physical and Operating Data.

Hydraulic Model Elements	Source
Pipe Connectivity	GIS database and input from the District
Pump Definitions	Pump station setpoints and Southern California Edison tests
Tank Elevations and Dimensions	GIS database and 2016 Water System Master Plan
Elevation	USGS one-meter resolution digital elevation model files. These were downloaded as raster files and projected to the correct coordinate system in the model. Elevation data was extracted and converted to feet.
PRV Location and Direction	GIS database
Zone Separator Valves	GIS database – majority of these valves had an initial status set to closed. Used to isolate pressure zones.

2.4 Hydrants

Hydrants were added to the model as junctions to allow the calculation of available fire flow. The Maximo ID of the hydrant (FH-XXXX) was included in the Description field for the junction at the point where the hydrant lateral met the main. Approximately 8,000 model junctions include a FH-XXXX description and represent a point that can be used for fire flow calculations.

2.5 Storage Tanks

The District's distribution system includes a number of storage tanks. The purpose of these tanks is to provide storage volume that can be filled during periods of low demand and drawn down to help meet demands during peak demand periods. The tanks included in the updated model and their capacity in million gallons (MG) are shown in Table 6.

Table 6. InfoWater Model Storage Tanks

ID (Char)	Elevation (ft)	Maximum Level (ft)	Diameter (ft)	Year of Installation	Capacity (MG)
ADELFA	1,621.69	32.00	67.00	2011	0.80
ALBERHILL_1A	1,572.16	33.00	95.12	2006	1.50
ALBERHILL_1B	1,572.14	33.00	95.12	2006	1.50
ALBERHILL_2A	1,774.34	28.00	67.14	2006	0.63
ALBERHILL_2B	1,773.79	28.00	67.14	2006	0.63
AMIE	1,441.38	24.00	48.00	1984	0.30
AULD_VALLEY	1,418.56	32.00	155.00	1989	4.50
BAKER_ST	1,396.92	32.00	148.70	1986	5.00
BECK	1,847.16	24.00	30.00	1999	0.13
BRYANT_ST	1,396.66	32.00	148.70	1987	5.00
BUNDY_CANYON	1,714.75	32.00	110.00	1988	2.00
CAL_OAKS_A	1,612.00	40.00	122.00	1988	3.50
CAL_OAKS_B	1,612.17	40.00	122.00	1990	3.50
CANYON_LAKE_N	1,589.08	40.00	70.00	1979	1.00
CANYON_LAKE_S	1,588.22	32.00	73.00	1970	1.00
CITY	1,549.93	32.00	96.00	1995	1.73
CLAY_CANYON	1,230.87	32.00	26.00	1982	0.12
CLEARWELL	1,407.42	29.00	80.00	2006	1.00
COTTONWOOD_1A	1,720.26	32.00	82.00	2002	1.20
COTTONWOOD_1B	1,719.93	32.00	76.50	2002	1.10
COTTONWOOD_2	1,917.27	32.00	53.00	2003	0.50
COTTONWOOD_2_EAST	1,903.89	32.00	56.00	2015	0.55
COTTONWOOD_EAST_A	1,721.20	32.00	78.00	2006	1.10
COTTONWOOD_EAST_B	1,721.16	32.00	78.00	2006	1.10
DALEY	2,289.36	22.00	25.00	1998	0.88
EL_TORO_1	1,579.96	24.00	67.70	1988	0.25
EL_TORO_2	1,581.99	25.00	53.00	1996	0.40
ENCINA	1,874.20	46.00	47.50	1992	0.50

ID (Char)	Elevation (ft)	Maximum Level (ft)	Diameter (ft)	Year of Installation	Capacity (MG)
FARM	1,869.10	16.00	67.65	1975	0.43
GAFFORD_ST_A	1,710.43	30.00	30.00	1984	0.10
GAFFORD_ST_B	1,711.25	30.00	66.05	1973	0.61
GREER_RANCH_1A	1,833.74	19.00	61.50	2004	0.50
GREER_RANCH_1B	1,834.21	19.00	61.50	2004	0.50
GREER_RANCH_2A	2,023.56	33.00	58.90	2004	0.65
GREER_RANCH_2B	2,021.17	33.00	58.90	2004	0.65
HORSETHIEF_1	1,571.14	32.00	80.00	1994	1.20
HORSETHIEF_2	1,771.24	32.00	98.00	1986	1.80
INLAND_VALLEY_RESERVOIR	1,619.88	32.00	112.00	2007	2.40
LA_LAGUNA_1A	2,018.59	23.00	61.62	2005	0.47
LA_LAGUNA_1B	2,018.42	23.00	61.62	2005	0.47
LA_LAGUNA_2A	2,190.50	26.00	49.00	2006	0.54
LA_LAGUNA_2B	2,211.85	26.00	49.00	2006	0.54
LAKE_ST	1,403.98	32.00	200.00	1999	8.00
LOS_PINOS_1	2,750.38	24.00	27.00	1967	0.10
LOS_PINOS_2	3,479.90	24.00	27.00	1967	0.10
LUCERNE	1,570.94	32.00	118.00	1991	2.50
MAYHEW	1,345.19	30.00	32.00	1982	0.20
MEADOWBROOK_1	1,670.83	32.00	103.17	1989	2.00
MEADOWBROOK_2	1,861.48	27.00	85.00	1998	1.00
ORTEGA	1,571.42	32.00	110.00	1990	2.20
RAILROAD_CANYON	1,402.23	33.00	200.00	1995	8.00
RICE_CANYON	1,778.01	24.00	106.88	1992	1.61
ROSETTA_CANYON_1	1,570.69	31.00	117.00	2006	2.50
ROSETTA_CANYON_2A	1,772.43	33.00	64.35	2006	0.70
ROSETTA_CANYON_2B	1,772.27	33.00	64.35	2006	0.70
SEDCO	2,161.99	22.00	25.00	1998	0.88
SKYMEADOWS	3,289.64	24.00	27.00	1969	0.10
STAGE_RANCH_1A	1,835.72	16.00	29.18	1977	0.05

ID (Char)	Elevation (ft)	Maximum Level (ft)	Diameter (ft)	Year of Installation	Capacity (MG)
STAGE_RANCH_1B	1,835.72	16.00	29.18	1977	0.05
STAGE_RANCH_2A	2,180.02	16.00	32.63	1977	0.05
STAGE_RANCH_2B	2,176.04	16.00	32.63	1977	0.05
SUMMERHILL	1,571.06	32.00	114.00	1992	2.35
TOMLIN_1	1,789.26	23.00	19.58	2003	0.05
TOMLIN_2	2,292.06	23.00	19.58	2003	0.05
TUSCANY_1A	1,770.16	34.00	84.00	1990	1.30
TUSCANY_1B	1,770.01	34.00	84.00	1990	1.30
TUSCANY_2	1,917.93	24.00	85.00	1990	1.00
WAITE	1,445.06	24.00	17.35	1968	0.50
WOODMOOR_A	1,567.51	34.00	42.00	2007	0.25
WOODMOOR_B	1,567.51	34.00	42.00	2007	0.25

2.6 Pump Stations and Booster Pumps

The District's system includes a number of booster pump stations to move water from lower-elevation pressure zones to higher ones. At each station, the individual pumps were added to the updated InfoWater model. The pump stations are shown in Table 7.

The hydraulic characteristics of a pump can be defined by assigning a design flow and head within the pump attribute table. InfoWater will use these values to estimate a performance curve showing flow and head. Alternatively, InfoWater allows a flow-head curve to be defined for an individual pump, based on information from the manufacturer or from pump test results. These curves are assigned a name, and the name of the curve is included as an attribute for the pump. The pump curves in the updated model are included in Appendix A.

Table 7. Booster Pump Stations in Updated InfoWater Model

Station	Location	Suction Zone	Discharge Zone
Adelfa	Adelfa & Akley	1434	1650_Adelfa
Auld Valley	24281 Hancock Avenue	AVP	1434
Beck	33420 Mitchell Dr	1581_Churchill	1842_Beck
Bundy Canyon	21785 Bundy Canyon Road	1434	1746_Bundy_Gafford
Cal Oaks	24281 Hancock Avenue	AVP	1650_Cal_Oaks
Canyon Lake	202 Via De La Valle	1434	1622_Canyon_Lake
Cielo Vista	35197 Orange Street	1434	1550_Cielo_Vista
City	521 N. Langstaff Street	1434	1571_City
Coldwater Booster	24636 Temescal Canyon Rd	1358.7_Mayhew	1434
Cottonwood 1	21980 Railroad Canyon Rd	1434	1750_Cottonwood_1
Cottonwood 2	113 Cedar Lane	1750_Cottonwood_1	1934_Cottonwood_2
Daley A	23245 Crab Hollow Circle	1746_Bundy_Gafford	2216_Daley
Daley B	22749 Lost Road	2216_Daley	2309_Daley
Encina	Adelfa & Encina	1650_Adelfa	1916.5_Encina
Farm	23810 Bundy Canyon	1746_Bundy_Gafford	1900_Farm
Grand Avenue	18861 Grand Avenue	1434	1434
Greer Ranch 1	Nutmeg & Evandel	1650_Cal_Oaks	1850_Greer_Ranch_1
Horsethief 1	13630 Mountain Rd	1434	1601_Horsethief_1
Horsethief 2	27260 Horsethief	1601_Horsethief_1	1801_Horsethief_2
Inland Valley	Prielipp & Inland Valley	1434	1650_Inland_Valley
La Laguna 1	McVicker Canyon Park Rd	1800_Rice_Canyon	2040_La_Laguna_1
La Laguna 2	Gateway Dr	2040_La_Laguna_1	2240_La_Laguna_2
Lakeshore	2087 Lakeshore	1434	1434
Lemon Grove	27697 Kachina Ct	1801_Horsethief_2	1850_Lemon_Grove
Los Pinos 1	77 Grand-Ortega B3	2313_Tomlin_2	2748_Los_Pinos_1
Los Pinos 2A	39251 Gen Pinchot	2748_Los_Pinos_1	3544_Los_Pinos_2

Station	Location	Suction Zone	Discharge Zone
Lower Meadowbrook	Conard & Hwy 74	1601_El_Toro_Rosetta_Canyon_1	1701_Meadowbrook_1
Lucerne	15070 Lincoln	1434	1601_Lucerne_Alberhill_1
Meadowbrook 1 / Rosetta Canyon 2	222 Crimson Pillar Lane	1601_El_Toro_Rosetta_Canyon_1	1701_Meadowbrook_1
Meadowbrook 2	77 El Toro - 74	1701_Meadowbrook_1	1896_Meadowbrook_2
Ortega	15171 Anchor Way	1434	1601_Ortega
Rice Canyon	16482 Orange Grove Way	1601_Lucerne_Alberhill_1	1800_Rice_Canyon
Sedco A	32550 Highway - 71	1746_Bundy_Gafford	2100_Sedco
Sedco B	32660 Highway - 71	2100_Sedco	2196_Sedco
Skylark	19613 Grand Avenue	1434	Skylark_Sustaining
Skymeadows	33850 Encina Drive	1916.5_Encina	3300_Skymeadows
Stage Ranch 1	33440 Hixon Street	1434	1882_Stage_Ranch_1
Stage Ranch 2	34250 Enderlein Street	1882_Stage_Ranch_1	2217_Stage_Ranch_2
Summerhill	31636 Canyon Estates	1434	1601_Summerhill
Tomlin 1	15049 Grand Avenue	1601_Ortega	1871_Tomlin_1
Tomlin 2	77 Grand-Ortega B2	1871_Tomlin_1	2313_Tomlin_2
Tuscany Hills 1	200 Via De La Valle	1434	1800_Tuscany_1
Tuscany Hills 2	21 Bel Lucia	1800_Tuscany_1	1940_Tuscany_2
Waite	31820 Central	1434	1467_Waite
Woodmoor PS	33295 Sweet Nectar Rd	1434	1601_Woodmoor

2.7 Valves (Control and Isolation)

Valves in the updated InfoWater model are assigned a valve type based on their function.

- Pressure Reducing Valves (PRVs) allow flow from a higher-elevation pressure zone to a lower-elevation pressure zone while maintaining a maximum allowable pressure on the downstream side.
- Flow Control Valves (FCVs) allow flow into the system while restricting flow to a maximum allowable flow.

- Zone isolation valves are normally kept closed to prevent flow from a higher-elevation pressure zone to a lower-elevation pressure zone. These valves can be modeled as General-Purpose Valves or Throttle Control Valves, but their status is maintained as closed during typical simulations.

The valves with an active status are summarized in Table 8.

Table 8. Summary of Active Valves in Water System

Diameter (inches)	Count of Valves	Percent of Valves
1	5	0%
2	191	1%
2.5	3	0%
3	19	0%
4	1,703	9%
6	7,888	40%
8	5,271	27%
10	245	1%
12	3,495	18%
13	1	0%
14	50	0%
16	406	2%
18	34	0%
20	173	1%
21	22	0%
24	162	1%
27	6	0%
30	94	0%
33	2	0%
36	54	0%
42	4	0%
Total	19,828	100%

At many of the District's PRV stations, there are two or three valves in parallel. Typically, there is a smaller-diameter valve that opens first to allow low flow through, and then one or two larger-diameter valves that can open as needed to allow additional flow into the lower-elevation zone. Each of the individual PRVs were added to the updated model.

During November of 2020, District staff performed a series of fire flow tests to gather data for model calibration. During this process, the setpoints of many PRVs were field verified, and this information was used to verify the settings in the updated InfoWater model. The PRV settings gathered in the field are shown in Table 9.

Table 9. PRV Stations in Updated InfoWater Model

PRV Station	Description	Model Setting (psi)	Upstream Pressure (psi)	Downstream Pressure (psi)
PRV-3	Temescal Canyon/Hostetler Rd	86	98	89
PRV-5	River Rd	30	147	29
PRV-8	Lower Meadowbrook PS	107	120	113-114
PRV-12	Villa Roma/Villa Milano	50	135	49-50
PRV-16	Vía De La Valle/Vía De Lago	56	126	69
PRV-17	Vía Del Lago/Vía De La Valle	132	123	120
PRV-18	Lower Tuscany Hills PS	30		
PRV-20	Elsinore Heights Rd	84	193	88-89
PRV-21	Upper Los Pinos PS	62	172	44
PRV-22	Sedco	97	193	84
PRV-24	Lemon St	84	94	86
PRV-26	Waite St Reservoir	106	118	111
PRV-27	Orange/Bundy Canyon Rd	75	162	89
PRV-28	Stage Ranch Lower PS	65	56	51-52
PRV-33	Golden Pheasant/Nutmeg	76	118	78-79
PRV-35	Morning Dove/Cal Oaks Rd	92	142	90
PRV-38	Manresa/Cal Oaks Rd	45	96-98	57
PRV-41	Saradella/Cal Oaks Rd	95	160-162	112
PRV-43	Laguna Ave & Trabuco Dr	100	120	28
PRV-47	Orchid Tree Ave & Pumpkin St	105	141	109
PRV-48	Horsetail St & Iceplant Ln	90	130	88
PRV-50	Greer Rd & Darcy St	100	115	101
PRV-51	Darcy Pl & Nutmeg St	78	118	81
PRV-52	Skylink Dr	145	145	111
PRV-53	Greer Ranch 2050/1850 PS	90	188	102
PRV-54	Nutmeg & Jameson	108	150	110
PRV-56	Crimson Pillar Ln	60	100	65-66
PRV-58	Hillside Dr & Big Tree	30	93	58
PRV-59	Gateway Dr & Solstice Ct	70	74.5	52

PRV Station	Description	Model Setting (psi)	Upstream Pressure (psi)	Downstream Pressure (psi)
PRV-60	Della Cava Ln	60	117	70
PRV-62	Brand/Cross	74	100	75
PRV-63	Spinning Wheel Dr/Silkwood Ct	78	110	80
PRV-1265	Third St	70	120	69.5
PRV-1266	Grape St – next to Mountain View Church	92	120-121	94
PRV-1267	Silver Stirrup Dr	75	104	78
PRV-1667	Hayes Ave/Churchill St	69	144	94
N/A	Malaga Rd/Lakeview Terrace	48	92-95	48
N/A	Grape St/Victorian Ln	56	146	55
N/A	Riverside St	42	89	42

While performing fire flow testing, the team verified settings at PRVs. Several PRVs were not included within the model structure and added prior to performing calibration. Additions or changes included:

- Modified valve VA-13439 to PRV_LAKEVIEW_TER. Valve VA-13439 was originally stored in GIS as a general throttle control valve. Its physical location matched the PRV measured in the field, and as a result, was updated as a PRV.
- Added PRV_VICTORIAN_LN. This PRV was not included in the existing GIS database provided and was identified in the field. This PRV is located in pressure zone 1746.
- Added PRV_RIVERSIDE_ST. This PRV was not included in the existing GIS database provided. Based on conversations with District staff, this valve was installed as a 12-inch valve on a 12-inch pipeline in 2019. In December of 2020, the PRV was downsized to an 8-inch. An 8-inch PRV and a connecting 12-inch pipeline between the existing 1701 12-inch and existing 1801 12-inch pipelines within Riverside Street were added to the model.

2.8 Facility Controls

Controls for pumps were added to the model based on setpoints provided by the District. Pump controls are based on tank levels or pressures.

The pump controls are summarized in Table 10. The control value_1 represents the lower boundary while the control value_2 represents the upper boundary. Pumps turn on when the level in the tank is below the control value_1 and turn off when the level in the tank is above control value_2. For pumps at pressure sustaining stations, the pump analyzes pressure at the closest junction on the discharge side of the pump station. The pumps turn on when pressures fall below the control value_1 and turn off once pressures reach control value_2.

Table 10. Summary of ADD Pump Controls

Pump ID	Control ID	Control Value_1	Control Value_2
ADELFA_1	Adelfa	5	18
ADELFA_2	Adelfa	4	6
BECK_1	Beck	3.5	12
BECK_2	Beck	3	7
BUNDY_CANYON_1	Bundy_Canyon	5	8
BUNDY_CANYON_2	Bundy_Canyon	5	8
BUNDY_CANYON_3	Bundy_Canyon	5	8
BUNDY_CANYON_3	Bundy_Canyon	4.5	4
BUNDY_CANYON_EAST	J83910	112	80
CAL_OAKS_1	Cal_Oaks_A	8	32
CAL_OAKS_2	Cal_Oaks_A	8	32
CAL_OAKS_3	Cal_Oaks_A	8	32.5
CAL_OAKS_4	Cal_Oaks_A	8	33
CIELO_VISTA_1	J89146	105	88
CIELO_VISTA_2	J89146	95	80
CIRRUS_CIR_1	J89744	87	80
CIRRUS_CIR_2	J89744	84	80
CIRRUS_CIR_3	J89744	75	87
CITY_1	City	5	20
CITY_2	City	5	20
CITY_3	City	3.5	20
COTTONWOOD1_1	Cottonwood_1A	6	28
COTTONWOOD1_2	Cottonwood_1A	6	28
COTTONWOOD2_1	Cottonwood_2	4	24
COTTONWOOD2_2	Cottonwood_2	4	24
COTTONWOOD2_3	Cottonwood_2	3	5
CANYON_LAKE_1	Canyon_Lake_N	9	32
CANYON_LAKE_2	Canyon_Lake_N	9	32
CANYON_LAKE_3	Canyon_Lake_N	9	32
CANYON_LAKE_4	Canyon_Lake_N	9	32
CANYON_LAKE_HYDRO_1	J65100	95	80

Pump ID	Control ID	Control Value_1	Control Value_2
CANYON_LAKE_HYDRO_2	J65100	92	80
DALEYA_1	Daley	4	10
DALEYA_2	Daley	2.5	6
ENCINA_1	Encina	5	10
ENCINA_2	Encina	3.5	9
FARM_1	Farm	6	17
FARM_2	Farm	4	8
GREER_RANCH1_1	Greer_Ranch_1A	5	15
GREER_RANCH1_2	Greer Ranch_1A	5	15
GREER_RANCH1_3	Greer Ranch_1A	3	15
GREER_RANCH2_1	Greer Ranch_2A	5	15
GREER_RANCH2_2	Greer Ranch_2A	5	15
GREER_RANCH2_3	Greer Ranch_2A	3	15
HORSETHIEF1_1	Horsethief_1	11	26
HORSETHIEF1_2	Horsethief_1	11	26
HORSETHIEF1_3	Horsethief_1	10	26
HORSETHIEF2_1	Horsethief_2	5	28
HORSETHIEF2_2	Horsethief_2	5	28
HORSETHIEF2_3	Horsethief_2	4	28
INLAND_VALLEY_1	Inland_Valley_RESERVOIR	5	7
INLAND_VALLEY_2	Inland_Valley_RESERVOIR	4	21
INLAND_VALLEY_3	Inland_Valley_RESERVOIR	3.5	15
INLAND_VALLEY_4	Inland_Valley_RESERVOIR	3	15
LAKESHORE_1	Lake	12	34
LAKESHORE_2	Lake	9	18
LAKESHORE_3	Lake	12	34
LAKESHORE_4	Lake	9	18
LA_LAGUNA1_1	La_Laguna_1A	4.5	14
LA_LAGUNA1_2	La_Laguna_1A	4.5	14
LA_LAGUNA1_3	La_Laguna_1A	3	4
LA_LAGUNA2_1	La_Laguna_2A	3.5	12
LA_LAGUNA2_2	La_Laguna_2A	3.5	5

Pump ID	Control ID	Control Value_1	Control Value_2
LA_LAGUNA2_3	La_Laguna_2A	3	4
LOS_PINOS1_1	Los_Pinos_1	5	15
LOS_PINOS1_2	Los_Pinos_1	4.5	12
LOS_PINOS_2A_1	Los Pinos 2A	3.5	7
LOS_PINOS_2A_2	Los Pinos 2A	2.6	3
LUCERNE_1	Lucerne	5	7
LUCERNE_2	Lucerne	5	7
LUCERNE_3	Lucerne	5	7
LUCERNE_4	Lucerne	5	7
MEADOWBROOK2_1	Meadowbrook_2	5	15
MEADOWBROOK2_2	Meadowbrook_2	3	15
MEADOWBROOK2_3	Meadowbrook_2	3	15
ORTEGA_1	Ortega	5	20
ORTEGA_2	Ortega	5	20
ORTEGA_3	Ortega	5	20
RICE_CYN_1	Rice_Canyon	7	14
RICE_CYN_2	Rice_Canyon	7	14
RICE_CYN_3	Rice_Canyon	7	14
RICE_CYN_4	Rice_Canyon	7	14
ROSETTA_CYN1_1	Rosetta_Canyon_1	6	24
ROSETTA_CYN1_2	Rosetta_Canyon_1	5.5	18
ROSETTA_CYN1_3	Rosetta_Canyon_1	3	5
ROSETTA_CYN2_1	Rosetta_Canyon_2A	3.5	5
ROSETTA_CYN2_2	Rosetta_Canyon_2B	3	3.5
SEDCO_A	Sedco	3.5	4.5
SKYLARK_1	J89150	79	80
SKYLARK_2	J89150	77	80
SKYLARK_3	J89150	70	80
SKYMEADOWS_1	Skymeadows	6	20
SKYMEADOWS_2	Skymeadows	3	10
STAGE_RANCH1_1	Stage_Ranch_1A	5	13.5
STAGE_RANCH1_2	Stage_Ranch_1A	5	13

Pump ID	Control ID	Control Value_1	Control Value_2
STAGE_RANCH2_1	Stage_Ranch_2A	5	13.5
STAGE_RANCH2_2	Stage_Ranch_2A	3.5	8
SUMMERHILL_1	Summerhill	4	8
SUMMERHILL_2	Summerhill	4	8
SUMMERHILL_3	Summerhill	3	5
TOMLIN1_1	Tomlin_1	5	21
TOMLIN1_2	Tomlin_1	3	10
TOMLIN2_1	Tomlin_2	5	21
TOMLIN2_2	Tomlin_2	3.5	16
TUSCANY1_1	Tuscany_1A	6	24
TUSCANY1_2	Tuscany_1A	6	24
TUSCANY1_3	Tuscany_1A	6	24
TUSCANY1_4	Tuscany_1A	6	24
TUSCANY2_1	Tuscany_2	4	6
TUSCANY2_2	Tuscany_2	3	4
WAITE_1	Waite	5	20
WAITE_2	Waite	5	20
WAITE_3	Waite	5	20
WAITE_4	Waite	5	20
WOODMOOR_1	Woodmoor_A	4	24
WOODMOOR_2	Woodmoor_A	4	24
WOODMOOR_3	Woodmoor_B	3	24
WOODMOOR_4	Woodmoor_B	3	24

The updated model includes several control sets. Each set includes initial settings for pumps and valves and facility controls for turning facilities on or off based on observed conditions. Basic control sets were created for Average Day Demand (ADD) and Maximum Day Demand (MDD) to use during typical system evaluations. A separate control set was created for the Extended Period Simulation (EPS) calibration period in November 2019 (this control set is identified as CTRL_NOV_2019). The CTRL_NOV_2019 control set includes the set points that were in place during the EPS calibration period, which may not have been typical for normal operations. Additional control sets can be created as needed to represent a set of operating rules to be used for a particular simulation.

3. Demands

The updated InfoWater model was loaded with demands to be used during simulations of the system. Different demand datasets can be loaded into the model to represent different conditions (average day, maximum day, or peak hour) as well as different timeframes (existing development and future development).

3.1 Existing Demands

The District provided water production data for calendar year 2019. The daily production values (for total potable water entering the system) are shown in Figure 4. The average daily production for calendar year 2019 was 19.1 million gallons per day (mgd). Figure 4 also shows the rolling two-week average production. WSC selected a timeframe where the two-week average production was as close as possible to the annual average. The selected period was May 6th through May 19th, 2019; that period is identified on Figure 4.

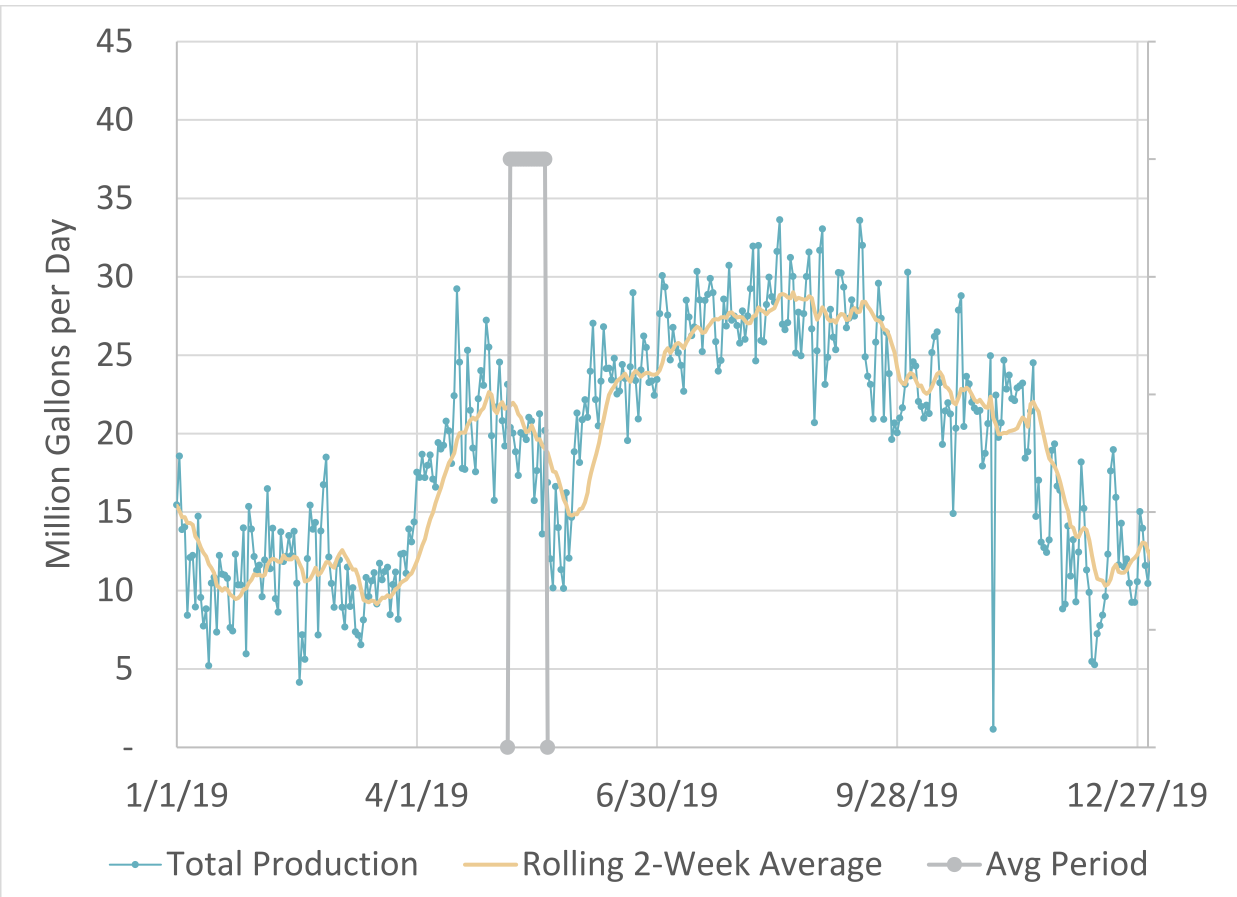

Figure 4. 2019 Production Data

The District provided metered consumption data for each customer for the selected two-week period in May 2019. WSC compiled the data and calculated an average consumption for each parcel during that period. These demands were considered to represent Average Day Demands (ADD).

The maximum day production in 2019 was 33.6 mgd. The calculated peaking factor of Maximum Day Demand (MDD) to ADD for 2019 was 1.76. This value is essentially identical to the peaking factor of 1.75 used in the 2016 Water System Master Plan. For this project, 1.75 was considered to be an accurate estimate of the MDD:ADD peaking factor.

The sum of the measured consumption for the two-week in period in May 2019 was approximately 5 percent less than the observed production data for that period. This difference is likely due to a combination of factors, including apparent losses (such as meter inaccuracies) and real losses (such as leakage). The District performs water loss audits on an annual basis to evaluate water loss and potential opportunities to reduce it. For this project, the 5-percent difference was assumed to apply uniformly across the system. The measured consumption at each parcel was scaled up by 5 percent to represent the total water demand, including system losses. After this adjustment, the assigned demands in the model matched the total water production.

The May 2019 demand data included the Assessor's Parcel Numbers (APN) for each customer and were associated with GIS parcel data to determine each customer's location. To load average demands into the model, a new demand set called May_2019 was created and loaded using the Demand Allocation Manager. The Demand Allocation Manager allows the model builder to select an allocation method, specify the demand field, and log which pipe demands are loaded to. The closest pipe method was used to allocate demands. For this method, point shapefiles can act like meters, and the Demand Allocation Manager will spatially load the demand to pipes within the model, using the target demand set specified within the options. The Demand Allocation Manager window is shown in Figure 5. A summary of the demands loaded by pressure zone is provided in Table 11.

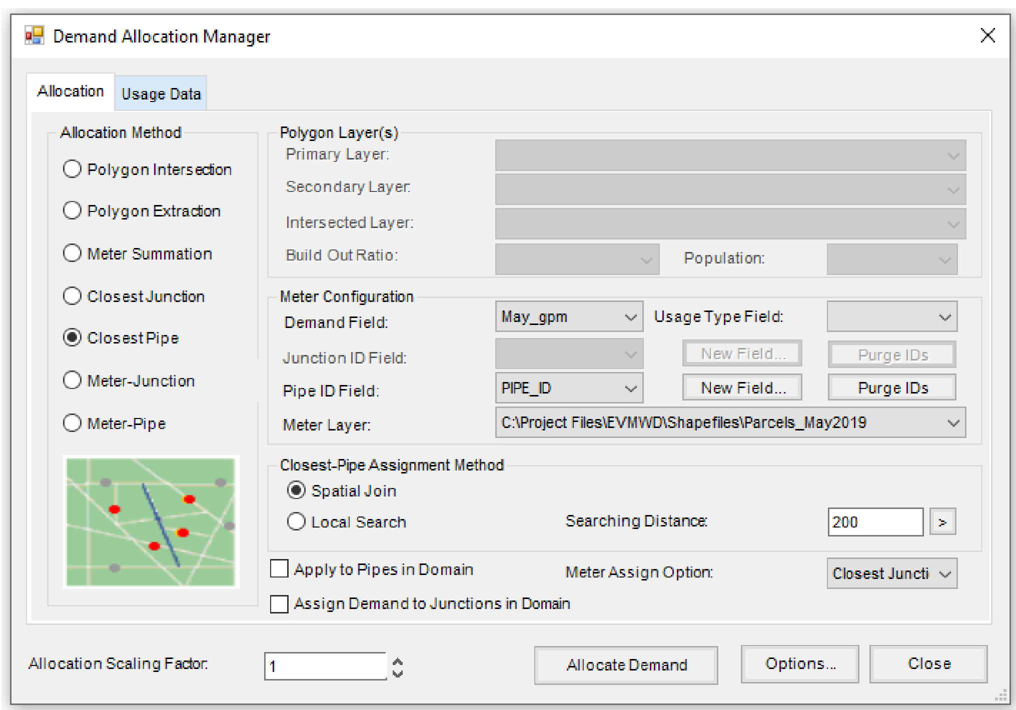

Figure 5. Demand Allocation Manager

Table 11. Average Day Demands Assigned to Junctions in each Pressure Zone

Pressure Zone	ADD (gpm) based on May 2019
1258.4_Clay_Canyon	81.8
1358.7_Mayhew	112.9
1434	3,416.3
1464_Amie	124.0
1467_Waite	522.1
1550_Cielo_Vista	7.7
1561_Orange_Bundy	4.8
1571_City	500.5
1581_Churchill	103.7
1601_El_Toro_Rosetta_Canyon_1	406.2
1601_Horsethief_1	387.3
1601_Lucerne_Alberhill_1	701.0
1601_Ortega	362.2
1601_Summerhill	267.0
1601_Woodmoor	48.4
1622_Canyon_Lake	834.0
1640_Canyon_Lake_West	229.7
1650_Adelfa	43.2
1650_Amie_Hydro	0.1
1650_Cal_Oaks	718.2
1650_Inland_Valley	499.1
1701_Meadowbrook_1	80.3
1746_Bundy_Gafford	418.7
1750_Cottonwood_1	937.6
1800_Rice_Canyon_Alberhill_2	435.4
1800_Tuscany_1	348.2
1801_Horsethief_2	435.1
1801_Rosetta_Canyon_2	190.3
1842_Beck	12.3
1850_Canyon_Lake_Hydro	11.3
1850_Greer_Ranch_1	155.7

Pressure Zone	ADD (gpm) based on May 2019
1850_Lemon_Grove	37.8
1871_Tomlin_1	1.0
1882_Stage_Ranch_1	15.1
1896_Meadowbrook_2	178.4
1900_Farm	-
1913_Bundy_Canyon_East	30.3
1916.5_Encina	3.7
1928_Gateway_Solstice	23.8
1934_Cottonwood_2	196.1
1940_Cirrus_Circle	3.1
1940_Tuscany_2	99.1
2040_La_Laguna_1	31.4
2050_Greer_Ranch_2	376.3
2196_Sedco	6.3
2217_Stage_Ranch_2	22.0
2240_La_Laguna_2	175.7
2309_Daley	8.7
2313_Tomlin_2	0.4
2748_Los_Pinos_1	11.7
3300_Skymeadows	0.0
3544_Los_Pinos_2	-
Total	13,616

The pipe network and locations of demand points are shown in Figure 6. Demand points were determined as the parcel centroid. A zoomed-in view of demand points and parcels is provided in Figure 7.

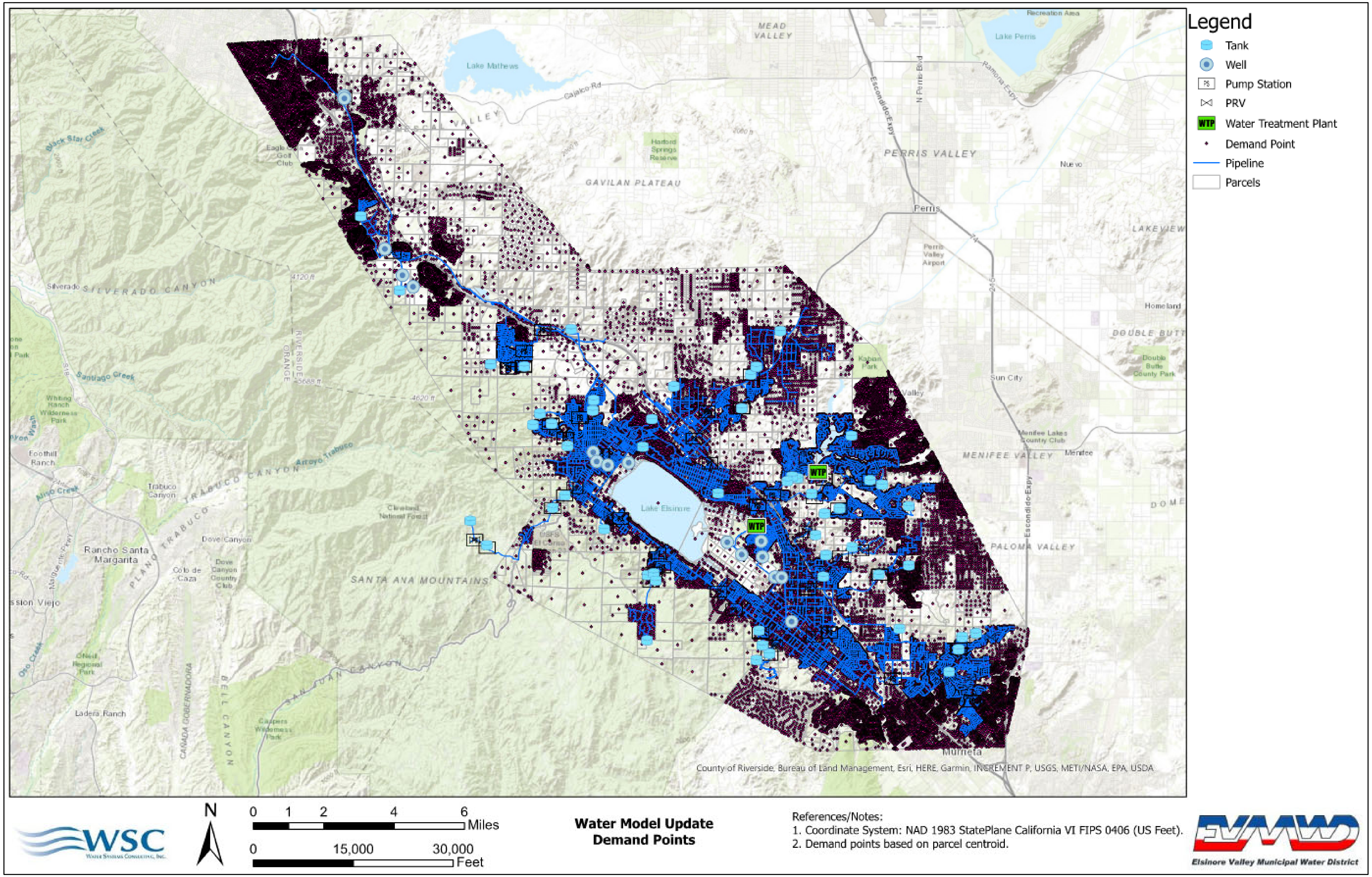

Figure 6. May 2019 Demand Points and Location within the Model.

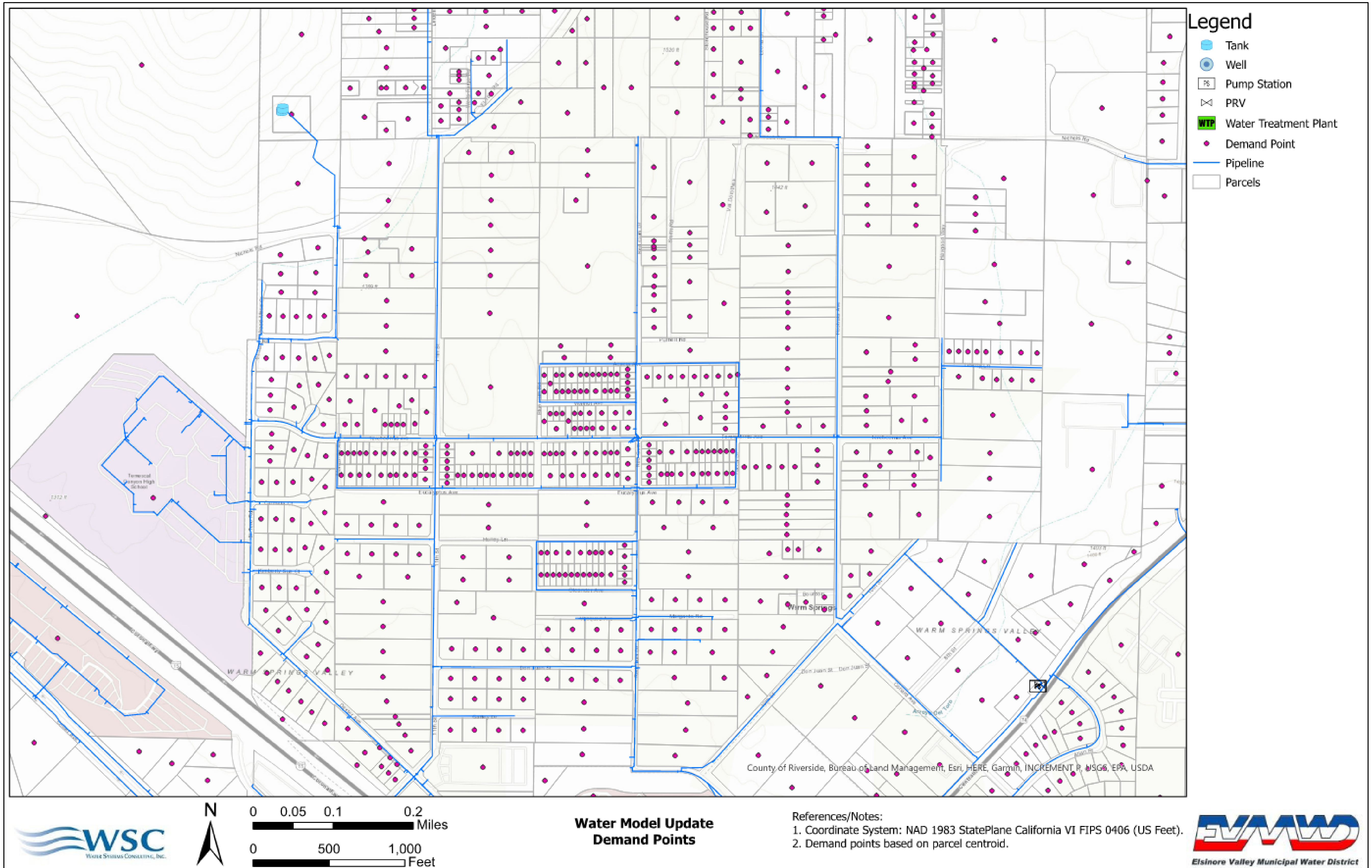

Figure 7. Detailed View of May 2019 Demand Points.

3.2 Diurnal Patterns

WSC used the consumption data to develop diurnal patterns to represent the typical variation in demand over a 24-hour period. Patterns were developed for individual pressure zones to reflect their mix of land uses and customer types. Curves for the different pressure zones are shown in Figure 8. Pressures zones with very small demands (less than 100 gallons per minute) are not shown in Figure 8 because a small number of customers can have a disproportionate effect on the demands. The demands follow a typical diurnal pattern with the highest demand in the morning as residents and businesses start their day. A second, smaller peak occurs around 8:00 pm.

The highest multiplier on each diurnal pattern represents the ratio of the peak hourly demand to the average demand on that day. If the diurnal pattern is applied during the maximum day demand condition, then the highest multiplier on the pattern represents the peaking factor from MDD to Peak Hour Demands (PHD). These peaking factors are shown in Table 12.

Table 12. PHD:MDD Peaking Factors

Pressure Zone	Highest Diurnal Multiplier (PHD:MDD Factor)
1258.4	1.84
1358.7	1.64
1434	1.83
1464	1.96
1467	1.88
1571	1.51
1581	1.63
1589	1.68
1601	1.97
1622	2.61
1640	2.61
1650	2.35
1701	1.83
1746	1.86
1750	2.40
1800	2.49
1801	2.53
1842	1.83
1850	2.98

Pressure Zone	Highest Diurnal Multiplier (PHD:MDD Factor)
1882	2.53
1896	1.61
1916.5	2.68
1934	2.67
1940	3.31
1980	2.08
2050	2.90
2217	2.78
2240	2.72
2778	2.30
System Average / Default for Smaller Zones with Limited Data	2.24

Each of the diurnal demand patterns were added to the InfoWater model. WSC also created a diurnal pattern called CONSTANT with a consistent 1.0 multiplier for all 24 hours. The CONSTANT diurnal pattern is used for all demands during steady-state conditions.

The data for the diurnal patterns is shown in Appendix A.

3.3 Projections of Future Demand

WSC developed projections of estimated future demand through 2045. The projections were based on growth projections prepared by the Southern California Association of Governments (SCAG) as part of their regional transportation plan. SCAG's most recent transportation plan is referred to as Connect SoCal; more detailed information is available at https://scag.ca.gov/connect-socal. SCAG gathered and coordinated input from cities and counties throughout Southern California about expected growth and development for the next 25 years. An overview of the demographic and growth forecast is available at https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal_demographics-and-growth-forecast.pdf?1606001579.

In general, Southern California has experienced slower growth than was projected in previous forecasts. For most jurisdictions, the expected growth is slower in the Connect SoCal plan than in SCAG's previous forecasts. As one example, the City of Lake Elsinore was previously projected to have a population of over 128,000 by the year 2040. In the updated projection, the City's population is expected to reach 111,600 by the year 2045.

The SCAG analysis includes estimates of population, households, and employment in each Traffic Analysis Zone (TAZ) in their study area. The boundaries of the TAZ are shown in relation to the District's service area in Figure 9.

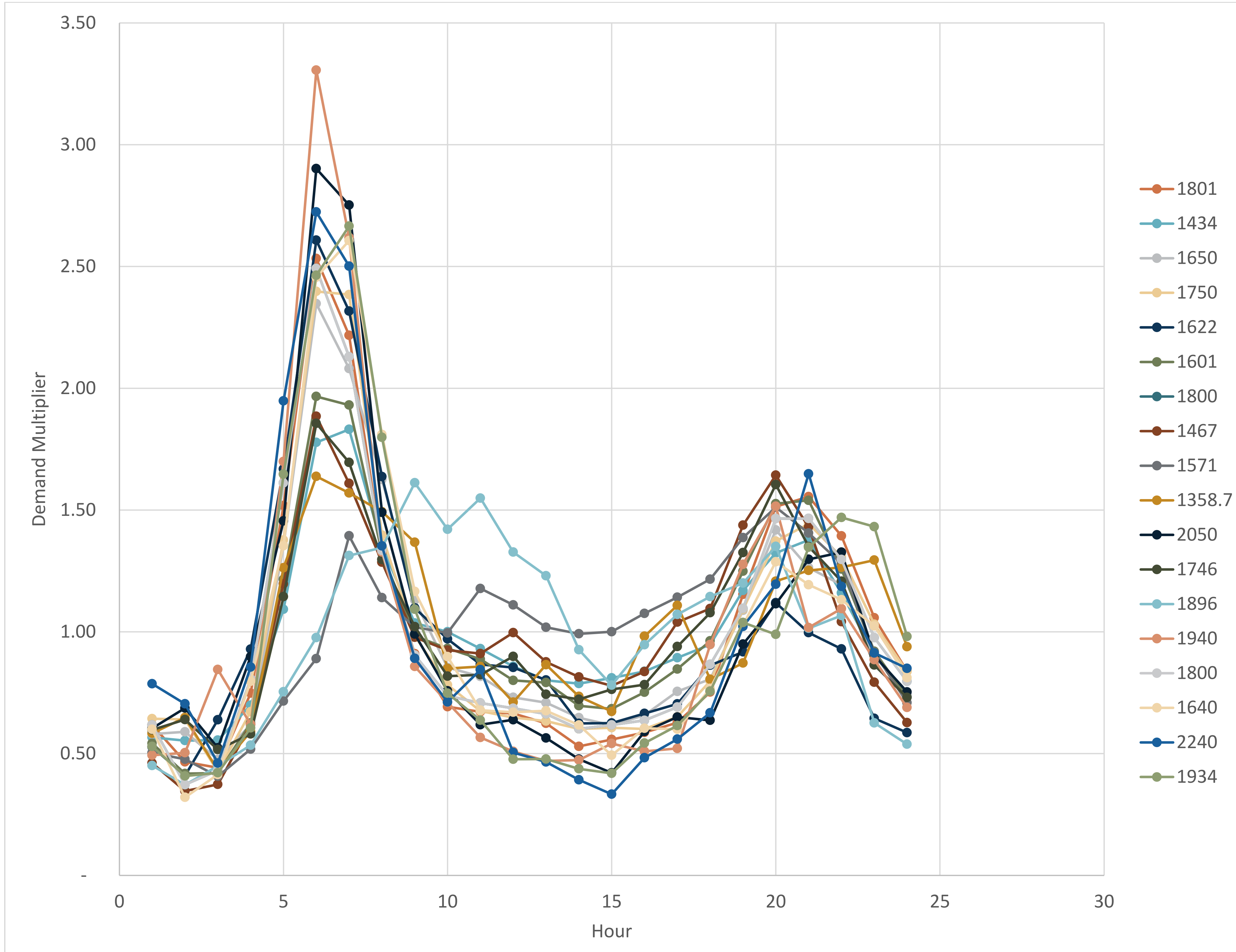

Figure 8. Diurnal Demands for Pressure Zones

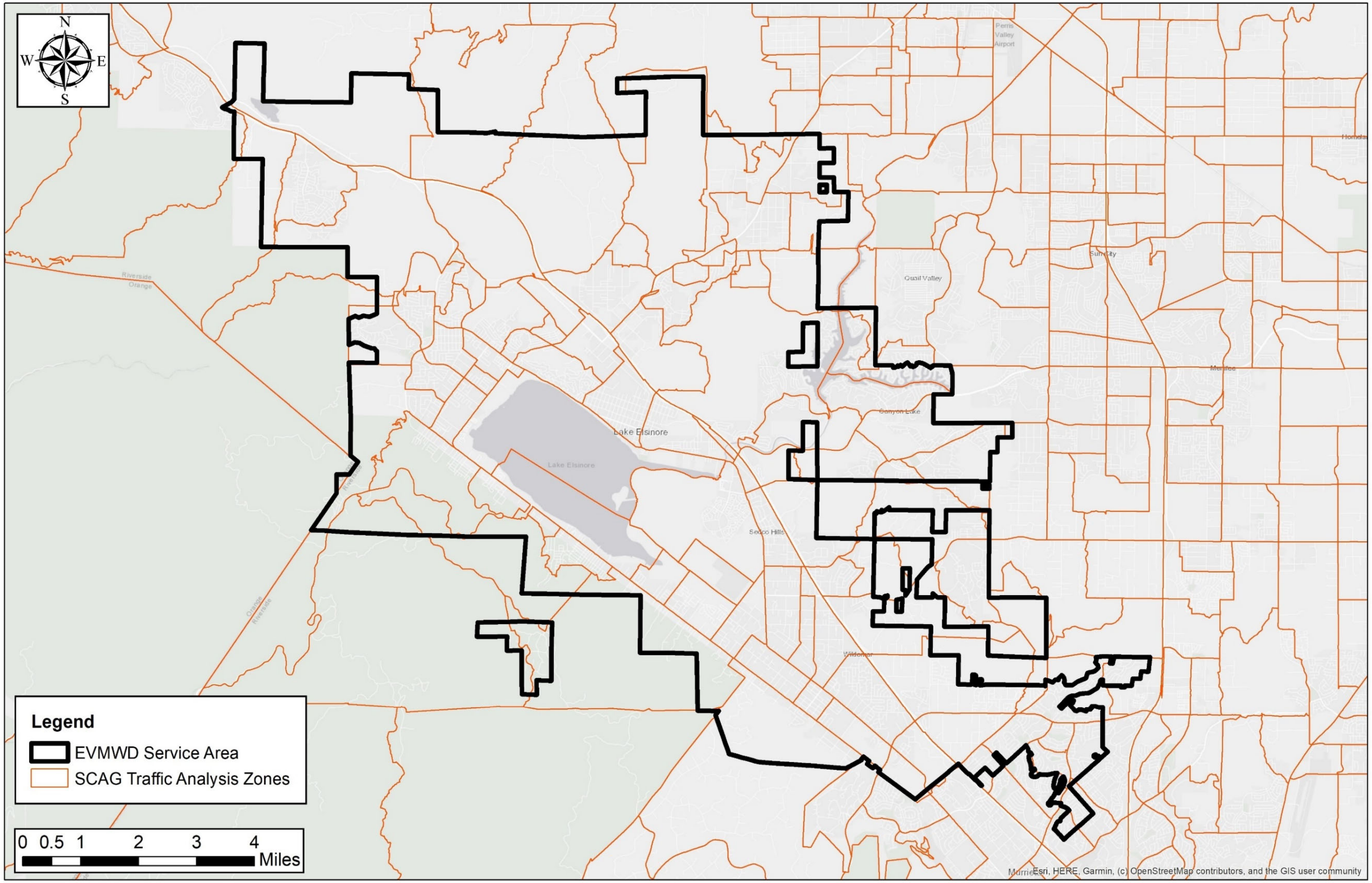

Figure 9. Traffic Analysis Zones used by Southern California Association of Governments

WSC used GIS software to intersect the TAZ data with the District's service area boundary and estimate the population, households, and employment within the District.

> *Note: This modeling analysis was performed by Water Systems Consulting, Inc. based upon modeling information originally developed by the Southern California Association of Governments (SCAG). SCAG is not responsible for how the Model is applied or for any changes to the model scripts, model parameters, or model input data. The resulting modeling data does not necessarily reflect the official views or policies of SCAG. SCAG shall not be held responsible for the modeling results and the content of the documentation.*

For calendar year 2020, the SCAG estimate of population within the District's service area was lower than the estimates of service area population that the District has been making using its number of connections and an assumed population per connection. In its 2020 Urban Water Management Plan (UWMP), the District was required to demonstrate compliance with SB X7-7 using its data for calendar year 2020. The District has been using the Population Tool developed by the California Department of Water Resources (DWR) to estimate service area population for compliance with SB X7-7. The DWR Population Tool uses U.S. Census data to estimate 2010 population for the District's service area, and then it estimates a 2020 population using the change in number of connections. Based on the DWR Population Tool, the 2020 UWMP reported a 2020 service area population of 163,984. Future service area population was estimated using the number of residential connections and an average value of 3.78 persons per connection.

The calculated population, households, and employees within the District's service area are shown in Table 13.

The population projections for the EVMWD service area are shown by jurisdiction in Table 14.

Table 13. Projections of Future Population, Households, and Employment

Parameter	2020	2025	2030	2035	2040	2045	Notes
SCAG Projection							
Service Area Population	163,984	171,583	182,653	193,722	205,372	217,021	Connections & Pop. Per Connection for 2020; SCAG for 2025 - 2045
Calculated annual growth rate		1.3%	1.3%	1.2%	1.2%	1.1%	
Service Area Households	47,417	53,318	59,219	65,120	69,608	74,096	SCAG
Calculated annual growth rate		2.4%	2.1%	1.9%	1.3%	1.3%	
Service Area Employment	29,126	32,114	35,103	38,091	39,500	40,909	SCAG
Calculated annual growth rate		2.0%	1.8%	1.6%	0.7%	0.7%	
Growth at 1.5% per Year							
Total Residential Connections	43,382	46,735	50,347	54,238	58,429	62,945	Assumed to grow at rate of 1.5 percent per year
Population per Connection	3.78	3.78	3.78	3.78	3.78	3.78	2020 UWMP
Population Based on Connections	163,984	176,657	190,310	205,018	220,863	237,932	Residential connections times pop. per connection
Growth at SCAG Population Growth							
Total Residential Connections	43,382	46,374	49,366	52,357	55,506	58,654	Assumed to grow at growth rate for SCAG population
Population per Connection	3.78	3.78	3.78	3.78	3.78	3.78	2020 UWMP
Population Based on Connections	163,984	175,294	186,603	197,909	209,813	221,712	Residential connections times pop. per connection

Table 14. SCAG Population Projections by Jurisdiction

	Estimated Population					
Jurisdiction	**2020**	**2025**	**2030**	**2035**	**2040**	**2045**
Lake Elsinore	72,385	79,857	87,329	94,801	102,941	111,082
Canyon Lake	9,892	9,785	9,677	9,570	9,685	9,800
Wildomar	37,081	39,234	41,388	43,541	46,293	49,045
Murrieta	17,842	17,527	17,212	16,897	16,915	16,933
Unincorporated	23,314	25,180	27,046	28,913	29,537	30,161
District Service Area	160,513	171,583	182,653	193,722	205,372	217,021

The most recent year for which complete water use data were available was 2020. The District provided historic water production and consumption for calendar years 2016 through 2020, and the data are shown in Table 15. Since 2020 is the most recent year available, it was compared to the previous years to evaluate whether it was a reasonable starting point for the projections. Total consumption in 2020 was the second-highest year in the five-year period of 2016 through 2020, and consumption by category was generally within the ranges seen in previous years. Therefore, the 2020 data were considered a reasonable starting point for the projections.

Table 15. Water Consumption, 2016 - 2020

Parameter	2016	2017	2018	2019	2020
Consumption (AFY)					
Commercial	4,570	4,889	5,103	4,364	4,409
EVMWD	68	98	2,361	49	51
Hydrant	205	174	181	236	168
Institutional	108	116	121	117	82
Residential	15,360	16,116	16,964	15,769	17,162
Farm Mutual Water Company	282	294	319	305	332
County Water Company	64	15	-	-	-
Total Consumption	20,657	21,701	25,048	20,840	22,204
Non-Revenue Water (AFY)	1,710	1,196	(1,586)	1,557	1,449
Percent of consumption	8.3%	5.5%	-6.3%	7.5%	6.5%
Production (AFY)	22,367	22,898	23,462	22,397	23,653

Water use in 2020 was affected by the COVID-19 pandemic, government-mandated closures of schools and businesses, and extended stay-at-home orders. Total residential water consumption in 2020 was the highest in the five-year period of 2016 through 2020. As schools and business re-open and people spend less time at home, residential water use may decline, and commercial and institutional use may increase. However, this impact is not expected to be large enough to merit adjusting the starting point for the projections from the observed 2020 data.

Projections of future demand were prepared using two alternative forecasts for future growth:

1. The District has recently used an annual growth rate of 1.5 percent and has seen good correlation with actual results. One alternative forecast was a constant increase in new connections of 1.5 percent per year.
2. The second alternative forecast was based on using the expected growth rate in population from the SCAG projection to calculate the annual increase in new connections.

Projections were prepared using two different methods for comparison. These methods were defined by the District based on available data and previously used approaches.

1. In Method 1, the District's gross water use in gallons per capita per day (gpcd) was assumed to remain constant at 137 gpcd. This value of 137 gpcd is the highest annual average observed during the past four years and is considered a reasonable conservative estimate for future projections. Production for future years was calculated by multiplying the expected population by 137 gpcd.
2. In Method 2, the consumption by different customer classes was calculated separately. The production for future years was calculated by summing the expected consumption within each customer class and adding an allowance for non-revenue water.

Table 16 shows the calculated production values for Method 1 with the two growth forecasts.

Table 16. Projections of Future Demand (Method 1)

Parameter	Value	2025	2030	2035	2040	2045
Annual Production with Growth at 1.5% per Year	137 gpcd	27,114	29,209	31,467	33,898	36,518
Annual Production with Growth at SCAG Population Growth	137 gpcd	26,690	28,211	29,733	31,521	33,309

For Method 2, water consumption by customer type was estimated for years 2025, 2030, 2035, 2040, and 2045. The calculations were tailored for each customer type.

- Future consumption by residential customers was estimated separately for existing and future residences. Based on 2020 data, the average consumption per residential connection was 0.40 acre-feet per year (AFY). This value of consumption per connection was assumed to remain constant for future years for existing customers. It was assumed that new construction would be more water-efficient than existing residential customers, because of water-saving fixtures and changing landscape preferences. These factors were assumed to reduce water use per connection by 5 percent. Therefore, new residential connections were assigned an annual consumption of 0.38 AFY.

- Future consumption by commercial and institutional customers was assumed to increase from 2020 at the same rate that total employment in the District's service area is projected to increase.
- Future consumption by EVMWD and Hydrant accounts was assumed to increase from 2020 at the same rate that total population in the District's service area is projected to increase.
- Water use by current customers of Farm Mutual Water Company (FMWC) was assumed to remain roughly constant at 333 AFY. FMWC provided information about two planned development projects in their service area and their anticipated demands:
    - Wildomar Meadows, with an estimated demand of 961 AFY
    - Oak Creek Canyon, with an estimated demand of 170 AFY
- Non-revenue water, or the difference between production and metered consumption, was assumed to be 7 percent of metered consumption in future years. This value is close to the average observed value for 2016 through 2020.
- A 10-percent buffer was added to the calculated production for future years to account for planning uncertainties.

The estimated consumption by customer class is shown in Table 17.

The reporting requirements for SB X7-7 will conclude with the 2020 UWMP. For reference, the consumption in gpcd that results from the Method 2 calculations is estimated to remain relatively constant around 135 gpcd, well below the District's 2020 target of 189 gpcd.

New state guidelines are being developed for water use efficiency, including an estimate of residential indoor use in gpcd. These standards are expected to gradually reduce allowable residential indoor water use to 50 gpcd, with additional allowances for outdoor use and commercial and institutional customers. These standards are still being finalized, and they may be further modified by proposed legislation. For the purposes of this projection, it was assumed that use per customer would not increase, and that new residential customers would use less water than existing residential customers.

Table 17. Projections of Future Demand (Method 2)

Parameter	Value	2025	2030	2035	2040	2045	Notes
Consumption per Connection (AFY)							
Residential - Single Family (existing in 2020)		0.40	0.40	0.40	0.40	0.40	
Residential - Single Family (new)	95%	0.38	0.38	0.38	0.38	0.38	Allows for new construction to be more water-efficient
Consumption (AFY)							
Commercial		4,862	5,314	5,766	5,980	6,193	Assumed to grow at same rate as employment
EVMWD		55	60	64	69	75	Assumed to grow at same rate as population
Hydrant		181	195	210	226	244	Assumed to grow at same rate as population
Institutional		90	98	107	111	115	Assumed to grow at same rate as employment
Residential		18,624	19,996	21,474	23,067	24,785	Uses consumption per connection (existing and new)
Farm Mutual Water Company		333	333	333	333	333	Assumed to remain constant
FMWC – Planned Developments		1,131	1,131	1,131	1,131	1,131	Oak Creek Canyon and Wildomar Meadows
County Water Company							
Total Consumption		25,275	27,126	29,085	30,916	32,875	
Non-Revenue Water (AFY)		1,769	1,899	2,036	2,164	2,301	Difference between production and consumption
Percent of consumption		7.0%	7.0%	7.0%	7.0%	7.0%	Assumed percent of consumption going forward
Production (AFY)		27,044	29,025	31,121	33,080	35,176	Sum of consumption and non-revenue water

3.3.1 Planned Development Projects and Available Land

The District provided information about currently planned development projects being tracked by the District. The database included 215 planned projects that are at various stages of planning or review. The information included the acreage and the land use category, and for some projects the number of equivalent dwelling units (EDUs) was estimated.

WSC developed an estimated water demand for each of these planned development projects. If the development's record in the database included an estimated number of EDUs, the average demand was estimated using 500 gallons per day (gpd) per EDU. If the number of EDUs was not available, the average demand was estimated using values of gpd per acre that were obtained from the 2016 Water System Master Plan. The demand factors are summarized in Table 18.

Table 18. Demand Factors for Planned Development Projects

Planned Development Type	Estimated Demand (gpd per acre)
Residential	2,000
Mixed Use	2,300
Commercial	2,500
Project with an equivalent number of EDUs defined in District database	500 gpd per EDU

The planned development projects are shown in Figure 10.

The total estimated demand for planned developments was determined as approximately 12,800 AFY. This value is approximately equal to the projected growth in demand through 2045 based on the forecast (including the planning buffer). For each of these planned development projects, it is not known exactly when they will be completed, or if they will exert the full demand currently estimated. At the same time, new development projects could be proposed for currently vacant parcels.

WSC added additional attributes to the District's shapefile of parcels, as shown in Figure 11. Parcels that had measured consumption in 2019 were considered to be currently developed, although they may be redeveloped at a higher density in the future. Parcels that intersect the planned development projects were identified using the shapefile of development projects provided by the District. As shown in Figure 11, there are still significant areas (approximately 30,000 acres) with no current consumption data and no planned development projects. Some of these areas have steep slopes, environmentally sensitive areas, or other factors affecting potential development. However, some of these areas could be developed in the future and contribute additional water demand beyond the amount identified for currently planned development projects.

In summary, the projected growth in demand through 2045 is not expected to exceed the available area for new development within the District's service area.

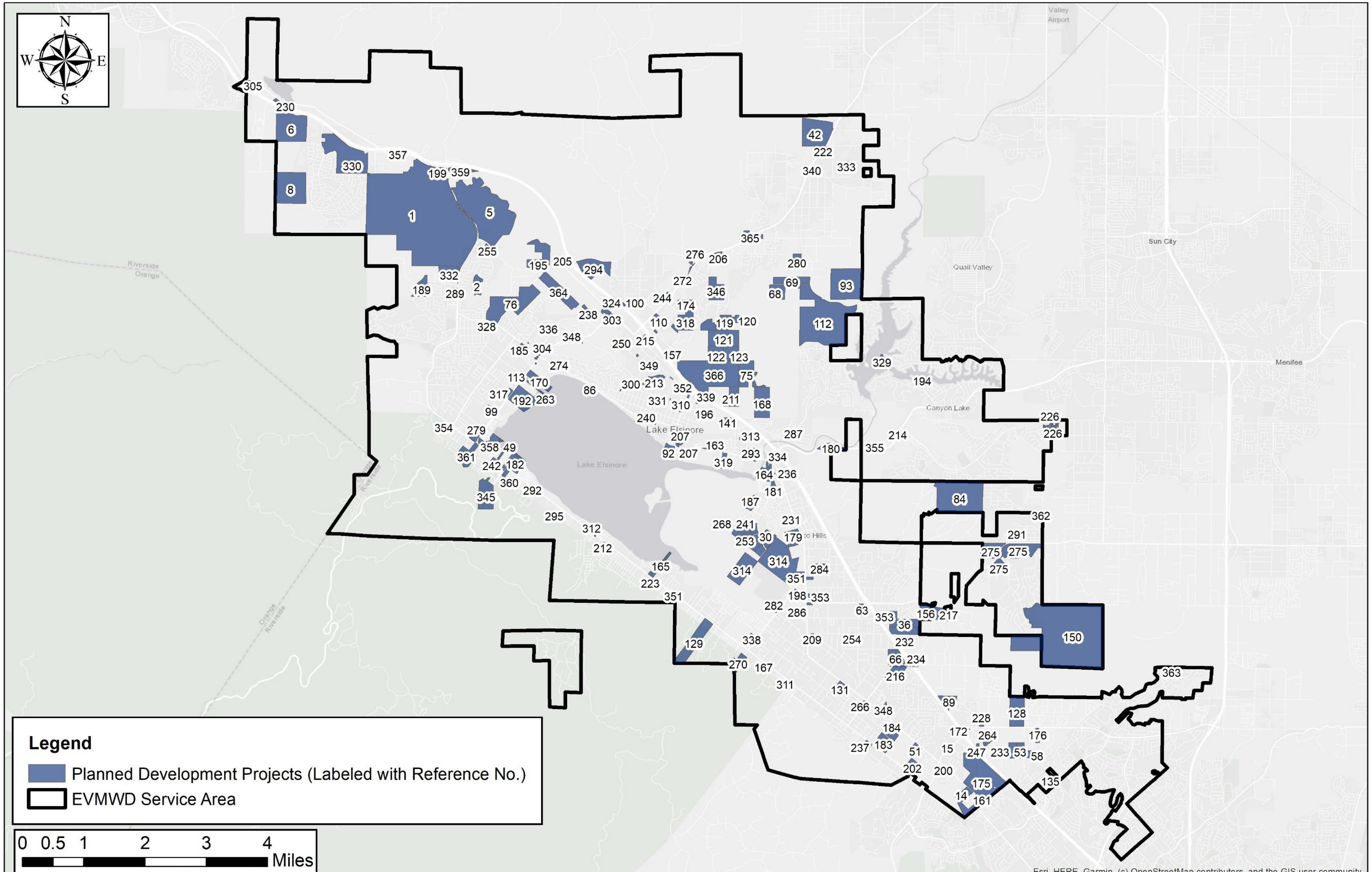

Figure 10. Planned Development Projects

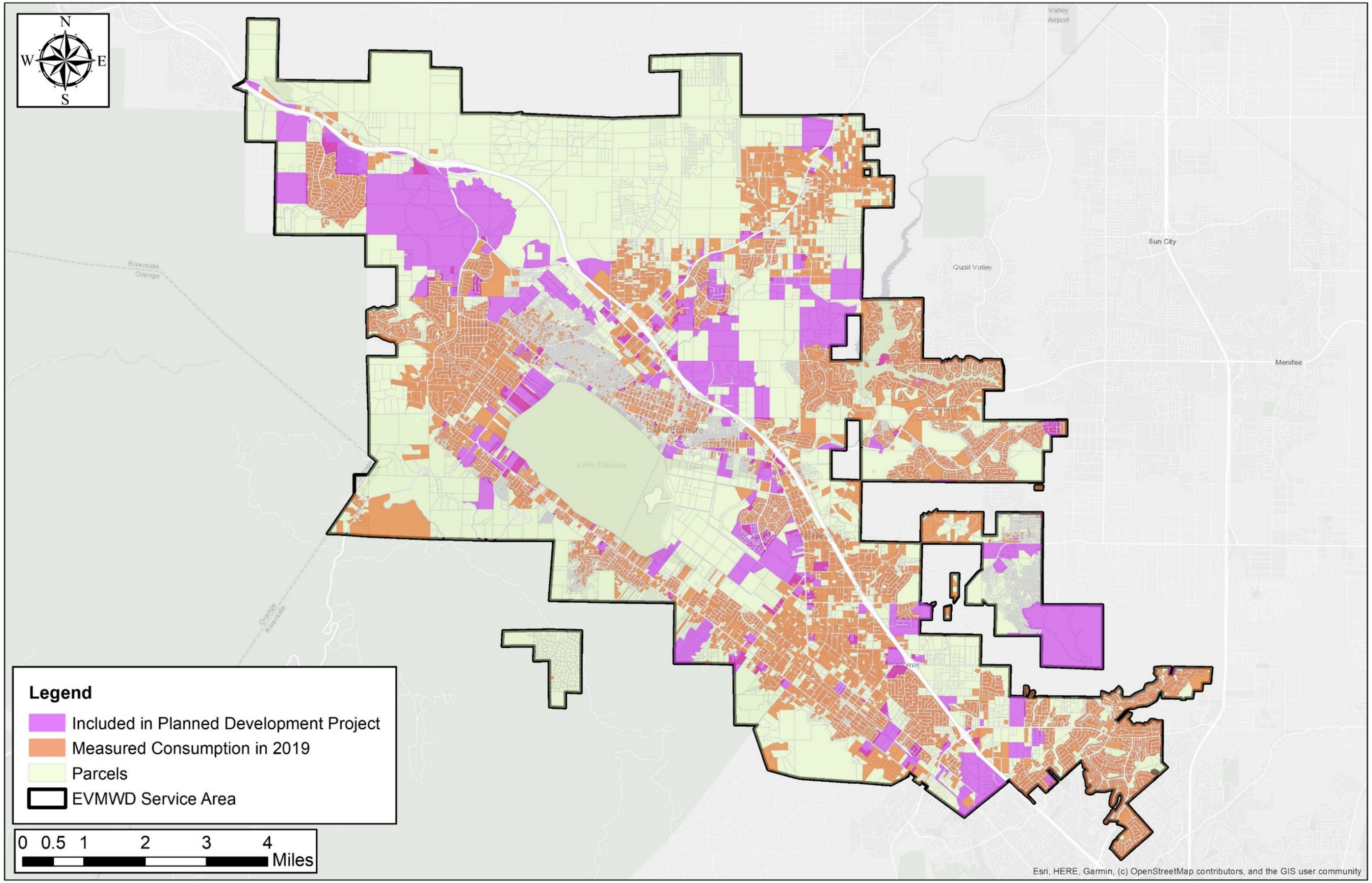

Figure 11. Parcels in EVMWD Service Area

3.3.2 Buildout Demand

An estimated buildout demand was developed by analyzing the parcels within the District's service area. Each parcel was assigned to one of three categories:

- Currently developed
- Part of a planned development project
- Vacant

For the vacant parcels, the water demand was estimated using water duty factors in gpd per acre from the 2016 Water Master Plan Update. A compilation of the estimated demands for vacant parcels is shown in Table 19.

Table 19. Estimated Demand for Vacant Parcels Not in a Planned Development Project

SCAG Zone	Acres	Factor (gpd/acre)	gpd	AFY
Mixed Residential	145	2300	332,541	373
Single Family Residential	3,853	2000	7,706,972	8,634
Multi-Family Residential	181	3500	633,954	710
Mobile Homes and Trailer Parks	575	2300	1,323,238	1,482
Rural Residential	9,631	400	3,852,302	4,316
Commercial and Services	828	2500	2,071,246	2,320
General Office	54	2500	135,382	152
Facilities	300	1700	510,456	572
Industrial	550	900	495,030	555
Mixed Commercial and Industrial	88	2500	220,176	247
Mixed Residential and Commercial	267	2300	613,685	688
Open Space and Recreation	4,612	1150	5,303,343	5,941
Specific Plan	7,630	2000	15,260,606	17,097
Total	28,715			43,086

If all these parcels were developed, the additional water demand is estimated to be approximately 43,000 AFY. This demand is in addition to the demand from currently developed parcels and from planned development projects. The total buildout demand estimate is shown in Table 20.

Table 20. Total Estimated Demand at Buildout

Category	Demand AFY	Demand gpm
Production for existing customers in 2020	24,000	14,900
Planned developments	12,800	7,900
Vacant parcels not included in a planned development project	43,086	26,700
Total at buildout	79,886	49,500

3.3.3 Summary of Demand Projections

Demand projections were prepared using two methods:

- Method 1 used a constant value of 137 gallons per capita per day, in combination with projected population, to estimate future demand.
- Method 2 used a breakdown of water use by customer class and applied growth assumptions to each type of customer.

Each of these methods was applied with two growth assumptions:

- Population would grow at the rate projected by SCAG, or
- Population would grow at a constant rate of 1.5 percent per year.

In addition, a buildout demand was estimated by assuming that all parcels that are not either (1) already developed, or (2) part of a planned development, would eventually be developed to the general plan land use. The total estimated demand at buildout is approximately 80,000 AFY.

The results are shown in Figure 12 and in Table 21.

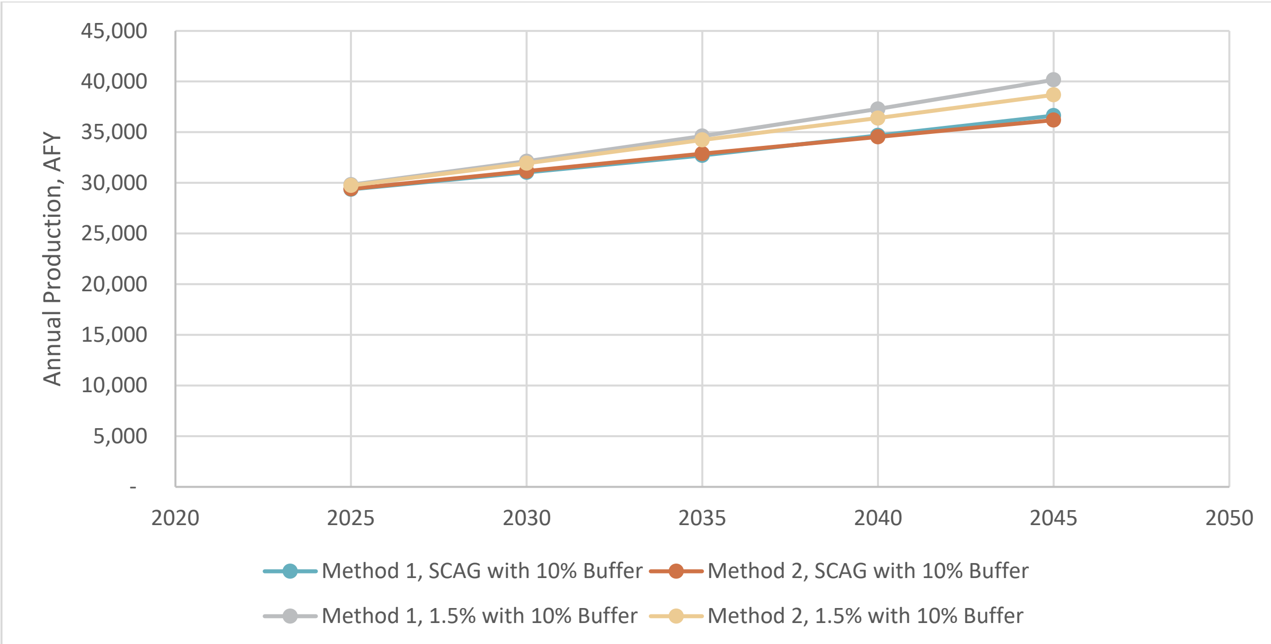

Figure 12. Projections of Water Production through 2045

Table 21. Projected Production Values through 2045

	Method 1		Method 2		Method 1		Method 2	
	Growth at SCAG Pop.	SCAG with 10% Buffer	Growth at SCAG Pop.	SCAG with 10% Buffer	Growth at 1.5 Percent	1.5% with 10% Buffer	Growth at 1.5 Percent	1.5% with 10% Buffer
2025	26,690	29,359	26,743	29,418	27,114	29,825	27,044	29,749
2030	28,211	31,033	28,317	31,148	29,209	32,130	29,025	31,928
2035	29,733	32,706	29,890	32,879	31,467	34,613	31,121	34,233
2040	31,521	34,673	31,392	34,531	33,898	37,288	33,080	36,388
2045	33,309	36,640	32,897	36,187	36,518	40,170	35,176	38,694

The timeframe for all the vacant parcels to be developed is unclear. Some vacant parcels may never be developed because of economic conditions, environmental constraints, or owner decisions. Based on continuation of the trend lines in Figure 12, the buildout demand could be reached between 2100 and 2150. The trends are shown with the buildout estimate in Figure 13.

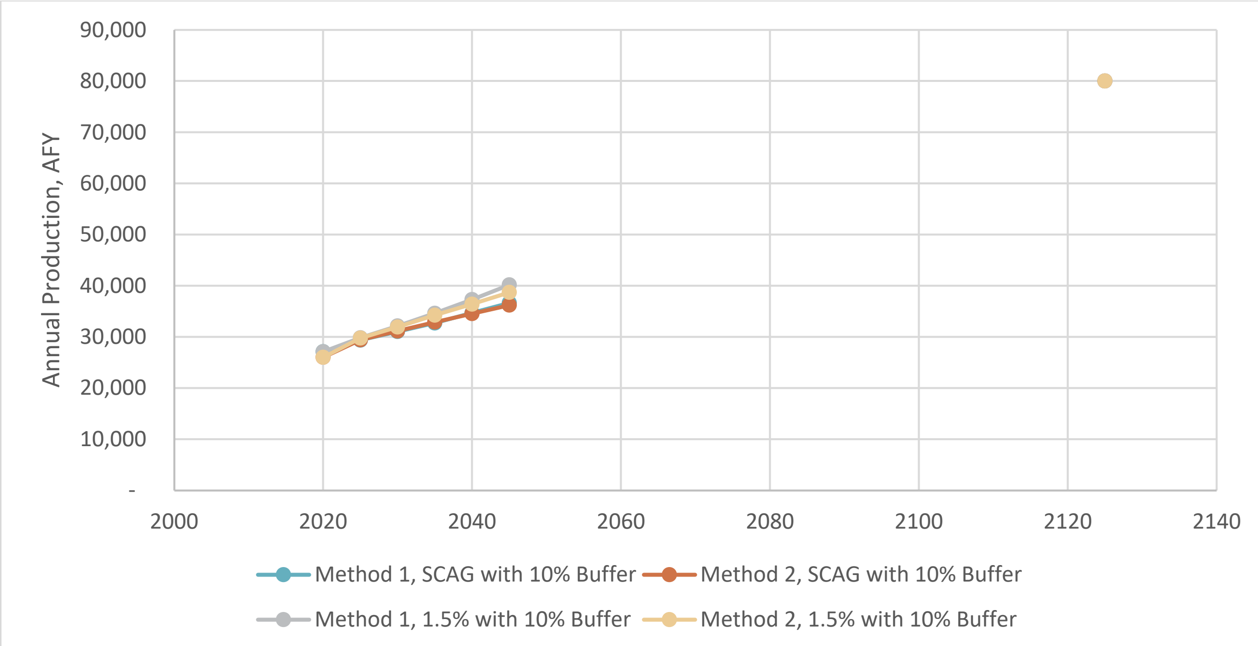

Figure 13. Projections of Water Production with 10-Percent Planning Buffer and Buildout Estimate

The projected demands in 2045 for the four projections are summarized in Table 22.

Table 22. Summary of Demand Projection Results

Growth Scenario	Method	Estimated Production in 2045 (AFY)
SCAG Population Growth	1 – Constant gpcd	33,309
	2 – Consumption by Customer Class	32,897
Constant Growth of 1.5 Percent per Year	1 – Constant gpcd	36,518
	2 – Consumption by Customer Class	35,176
Highest Estimate	Method 1, Constant Growth of 1.5 Percent	36,518
Projected Production with Planning Buffer of 10 Percent		40,170

The differences between the four approaches are not that large; all four projections for 2045 are within 10 percent of each other. Method 2, the consumption by customer class, allows for flexibility in making different assumptions for different types of customers. However, for these projections it was assumed that future use by customers would be similar to historic use. The State is currently developing water use standards for different types of customers, based on population for residential use and landscape area for outdoor use. As these standards are finalized, the District may wish to modify assumptions about future customer demands.

The highest expected production in 2045 was obtained using Method 1 (Constant gpcd) with a constant growth rate in connections and population of 1.5 percent per year. The District uses a 10-percent buffer on the projected demands to provide a level of conservative forecasting. This buffer accounts for uncertainty in future actions by customers and future growth rates. The District's estimated total production in 2045 is approximately 36,518 AFY, or 40,170 AFY with the 10-percent planning buffer. This value is lower than projections that have been prepared for previous reports. The difference is due largely to reduced water use by District customers and continued conservation regulations that could constrain growth in future demands.

3.3.4 InfoWater Alternative Datasets for Future Demands

WSC created InfoWater demand sets to represent future conditions. WSC created future demand points for the known developments at the centroid of the development and estimated their ADD based on the land use duty factors. For the remaining future demand, WSC allocated future demand to currently vacant parcels within close proximity to existing distribution system to represent infill development.

The potential demand for all parcels within the District's service area was determined by the land use and corresponding demand factor. Additional fields were added to identify 2019 ADD for each parcel, based on APN. Parcels that did not contain any demand in 2019 were assumed to be currently undeveloped.

A 2045 demand set for average day demands (ADD) was created in the model to incorporate existing (2019) demands and the demand from known developments. The future demands were spatially loaded into the model based on APN and parcel centroid. Once loaded into the model, demand from the points at parcel centroids was spatially allocated to the closest pipe using tools within InfoWater. The future demands were assigned to the "Demand 2" field in InfoWater, to differentiate them from the "Demand 1" values that were based on existing conditions.

3.3.5 InfoWater Nodes for Known Development Projects

WSC also imported the 215 known planned developments as model nodes, so that their individual impact could be evaluated. Each of the 215 planned developments was imported as a node with an ID that included the word "DEVELOP" and the District's reference number for the development.

A custom field called "TIME_FRAME" was added to the junction information table. For each planned development node, a year was assigned in the attribute table (either 2025, 2030, 2035, or 2040). WSC also added a model pipe to connect each development node to the closest existing junction. WSC added a custom field called "TIME_FRAME" to the pipe information table and populated these connecting pipes with the same year value as the corresponding development node.

WSC created database queries to select developments that were expected to be online by 2025, 2030, 2035, and 2040. For each timeframe, queries were created to capture the development nodes and the corresponding connecting pipes that would be online for that simulation. WSC then created query sets for each timeframe to capture the nodes and pipes that would be active during that year.

The updated model has scenarios defined for 2025_ADD, 2030_ADD, 2035_ADD, and 2040_ADD. For each of these scenarios, the active facilities are defined by a database query set that includes the entire existing system, plus the development nodes and connecting pipes that should be active in that timeframe. When the model is run, the demand exerted by the new development nodes will be drawn through the new connecting pipe from the junction in the existing system.

As developers change the scope or timing of their plans, the District may need to update the development nodes. The demand at each node can be re-calculated to reflect changes in the expected amount of development. The “TIME_FRAME” values for the development node and connecting pipe can also be changed as needed to show the demand becoming active in earlier or later timeframes.

A demand set for 2045 MDD was developed by applying a peaking factor of 1.75 to ADD demands. The updated InfoWater model also has a set of simulation options called MAX_DAY_DEMANDS that includes a global demand multiplier of 1.75. This simulation option can be used to create a maximum day scenario without the need to create a new demand set.

4. Model Calibration

Two types of calibration were performed. In steady-state calibration, WSC created model scenarios to reflect conditions during a fire flow test. These simulations produce results for one point in time. The second type of calibration involved Extended Period Simulation (EPS) runs to simulate system operations over a period of time, ranging from one day to six days long.

4.1 Steady-State

Steady-state calibration was performed using fire flow tests. WSC and District staff worked together to perform thirty-six fire hydrant flow tests throughout the water distribution system. The testing locations were selected based on pressure zone, pipe size, and number of available hydrants in the area. The testing locations are shown in Figure 14.

WSC and District staff performed the selected hydrant flow tests during the period from November 16 through November 19, 2020. The fire hydrant flow tests were performed by using at least two hydrants. One hydrant is open and the flowrate is measured with a pitot gage, and the pressure drop from a nearby hydrant, known as the witness hydrant, is measured with a pressure gage. The pressure taken when the hydrant is closed is known as the static pressure, and the pressure taken when the hydrant is open is the residual pressure. Two flow hydrants may also be used if the difference between the static and residual pressure is less than 10 psi. In addition to the static and residual pressure at the flow and witness hydrant, four data loggers were also placed on nearby hydrants to monitor system pressure during the fire hydrant flow test and provide additional calibration points. The static and residual pressure recorded at all hydrants were used to calibrate the model.

To accurately calibrate the model with the hydrant flow testing data, the system conditions during testing are also required. These conditions, usually referred to as boundary conditions, include tank levels, pump and well status, and PRV settings. The District provided data from the SCADA system for the period from November 15 through November 21, 2020 for this purpose.

Through the calibration process, WSC selected pipe roughness values that provided the best level of agreement with the observed results. These selected roughness values are shown in Table 23.

Table 23. Hazen Williams Coefficients Selected During Calibration

Pipe Material	Selected Hazen-Williams C Value
PVC	140
ACP	140
All other materials	130

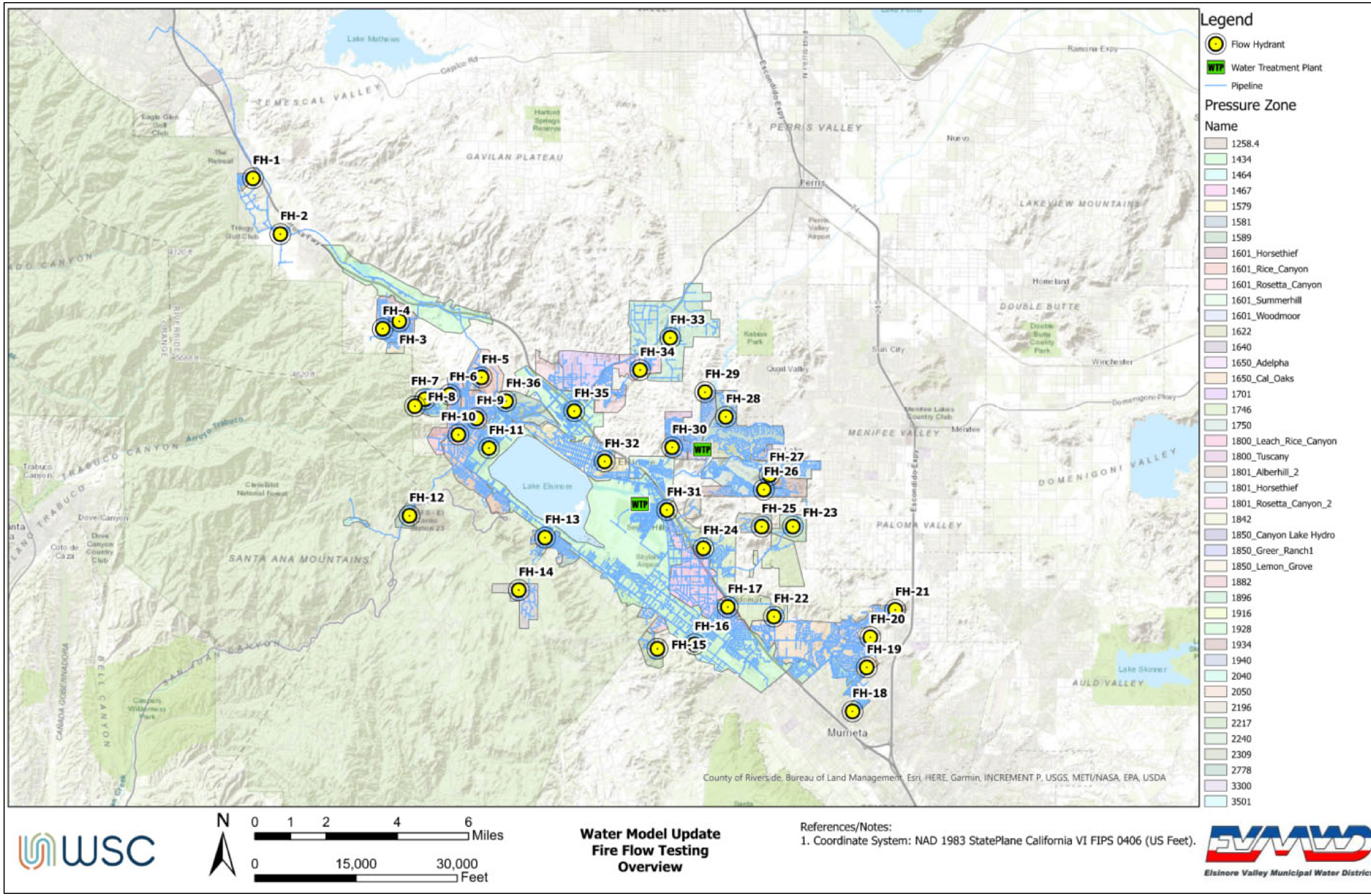

Figure 14. Locations of Hydrant Flow Tests.

A comparison of the model results with observed conditions during the fire flow tests is shown in Table 24. Cells colored in gray represent data points that were not collected nor modeled. At these testing locations, only static pressures were measured (typically because of non-standard fire hydrants or other conditions preventing an accurate flow test).

The model results generally agreed well with the observed results. During each fire flow test, there may be errors in field data collection or gauge accuracy. Therefore, WSC did not attempt to "force-fit" the model by manipulating roughness factors and minor head losses until the model results matched the observed results exactly. Instead, WSC sought to identify widely applicable roughness factors that could be used to simulate conditions around the entire system. The factors shown in Table 23 allowed the model to simulate conditions with a degree of accuracy that could support system analysis. Table 24 includes a column to discuss the agreement at each test location.

4.2 Extended Period Simulation

WSC created an extended period simulation (EPS) scenario in the updated InfoWater model with a duration of 6 days (144 hours). The model results were compared to data from the District's SCADA system for the period from November 15 through November 21, 2020. WSC made adjustments to pump controls to make the model results more closely match the observed conditions. WSC and the District held several workshops to review the calibration and consider potential reasons for discrepancies between model results and observed data. In some areas, District staff were able to identify recent system improvements or zone reconfigurations that could be added to the model to improve the calibration. District staff also researched the history in the SCADA system for manual changes that may have been made to the operations during the period being used for model calibration. These adjustments are summarized in Table 25.

Table 24. Observed Conditions and Modeled Results for Fire Flow Tests

Location	Elevation	Observed Static Pressure (psi)	Observed Static HGL (ft)	Modeled Static Pressure (psi)	Modeled Static HGL (ft)	Hydrant Flow (gpm)		Observed Residual Pressure (psi)	Observed Pressure Drop (psi)		Modeled Residual Pressure (psi)	Modeled Pressure Drop (psi)	Notes
WH-1	1,080	79	1,262	77	1,258	1,350		70	9		67	10	Good agreement
WH-2	1,106	105	1,349	109	1,358	1,190		85	20		89	20	Good agreement
WH-3	1,436	72	1,602	70	1,598	1,926		55	17		61	9	Higher head loss in field; potential partially closed valve
WH-4	1,547	113	1,808	105	1,790								Flow test not performed
WH-5	1,582	90	1,790	90	1,790	2,665		84	6		80	10	Good agreement
WH-6	1,545	111	1,801	108	1,794	2,915		101	10		90	18	Higher head loss in model; possible overestimation of flow in the field
WH-7	2,062	68	2,219	69	2,221	2,540		62	6		58	11	Good agreement
WH-8	2,064	69	2,223	68	2,221	1,160		68	1		65	3	Good agreement
WH-9	1,355	102	1,591	96	1,577	2,910		96	6		92	4	Good agreement
WH-10	1,431	72	1,597	63	1,577	1,100		60	12		60	3	Higher head loss in field; potential partially closed valve
WH-11	1,273	62	1,416	60	1,412	1,060		55	7		57	3	Good agreement
WH-12	2,535	112	2,794	115	2,800	700		35	77		34	81	Good agreement
WH-13	1,360	120	1,637	118	1,633								Flow test not performed
WH-14	3,041	118	3,314	115	3,307	700		84	34		86	29	Good agreement
WH-15	1,990	127	2,283	87	2,191								Flow test not performed
WH-16	1,265	70	1,427	67	1,420	2,085		62	8		62	5	Good agreement
WH-17	1,362	68	1,519	50	1,478	1,206		59	9		43	7	Good agreement
WH-18	1,221	96	1,443	92	1,434	2,267		75	21		56	36	Higher head loss in model; potential change in head from Auld Valley
WH-19	1,377	63	1,523	116	1,645	1,060		52	11		96	20	Field static pressure extremely low; potential gauge issue
WH-20	1,552	134	1,862	129	1,850	1,590		118	16		99	30	Higher head loss in model; possible overestimation of flow in the field
WH-21	1,808	106	2,053	100	2,039	1,238		90	16		67	33	Higher head loss in model; possible overestimation of flow in the field
WH-22	1,483	109	1,735	102	1,719	1,026		65	44		75	27	Higher head loss in field; potential partially closed valve
WH-23	1,689	111	1,945	114	1,953	1,121		82	29		64	50	Affected by VFD activation at Bundy East PS
WH-24	1,479	90	1,687	97	1,703	1,163		68	22		65	32	Good agreement
WH-25	1,980	134	2,290	137	2,296	914		82	52		97	40	Good agreement
WH-26	1,538	88	1,741	83	1,730	2,535		82	6		73	10	Good agreement
WH-27	1,548	84	1,742	78	1,728	2,413		79	5		71	7	Good agreement
WH-28	1,417	87	1,618	82	1,606								Flow test not performed
WH-29	1,433	79	1,615	92	1,646								Flow test not performed
WH-30	1,742	77	1,920	81	1,929	2,042		65	12		68	13	Good agreement
WH-31	1,356	112	1,615	154	1,712	974		50	62		92	62	Field static pressure extremely low; potential gauge issue
WH-32	1,335	97	1,559	98	1,561	1,435		90	7		93	5	Good agreement
WH-33	1,662	92	1,875	96	1,884	1,201		75	17		55	41	Higher head loss in model; possible overestimation of flow in the field
WH-34	1,598	91	1,808	78	1,778	3,000		80	11		57	21	Good agreement
WH-35	1,286	54	1,411	50	1,402	2,044		44	10		32	18	Good agreement
WH-36	1,508	29	1,575	27	1,570	530		10	19		21	6	Higher head loss in field; potential partially closed valve

Note: Cells colored in gray represent data points that were not collected nor modeled. At these testing locations, only static pressures were measured

Table 25. SCADA Audit Trails Compiled by District Staff for November 2020

Pump Station	Manual Changes Made in SCADA
Bundy Canyon Pump Station	11/15/20, 11/16/20, 11/19/20, 11/20/20, 11/21/20
Cal Oaks	11/15/20, 11/16/20, 11/17/20, 11/18/20, 11/19/20, 11/20/20
Cottonwood 1	11/15/20, 11/16/20, 11/17/20, 11/18/20, 11/20/20, 11/21/20
Lucerne	11/16/20, 11/17/20, 11/18/20, 11/19/20, 11/20/20, 11/21/20
Ortega	11/19/20, 11/20/20
Summerhill	11/16/20, 11/18/20
Tuscany 2	11/19/20, 11/20/20
Waite St	11/15/20, 11/16/20, 11/18/20, 11/19/20, 11/20/20, 11/21/20
Woodmoor	11/16/20, 11/18/20, 11/19/20, 11/20/20

Graphs showing comparisons between observed and modeled conditions are included in Appendix C. There is generally good agreement between the observed conditions and the model results. At some locations, the SCADA data appear to include one constant value for the calibration period; this may be an indication of a sensor being off-line.

Comparisons between observed and modeled conditions were generally made by visual comparison. In some cases, a slight offset in the timing of a pump turning on or off can lead to a large discrepancy between observed and modeled results for the affected timesteps. Therefore, WSC did not use any automated methods to minimize the sum of the errors between observed and modeled results.

The first set of graphs in Appendix C shows the sources of supply during the calibration period. WSC used time-based controls to adjust the flow control through the imported water connections and the wells for the calibration period.

The remaining graphs in Appendix C are organized by pressure zone. The booster pump stations were controlled by levels in tanks, based on the normal operating rules defined during model development. WSC made some adjustments to tank levels where booster stations would turn on and off to better match observed conditions. Notes about the EPS calibration results in each zone are shown in Table 26.

Table 26. EPS Calibration Notes

Pressure Zone(s)	Notes on EPS Calibration
1434	The SCADA data showed the Railroad Canyon Reservoir stayed at a relatively low level during the entire period. The tank may have been drawn down for operational considerations. The other tanks in the zone showed good agreement between observed data and model results.
Adelfa PS and higher	Model results were very close to observed conditions at the Adelfa, Encina, Beck, and Skymeadows tanks.
Lucerne PS and higher	Model results agreed well with observed levels in the Lucerne, Alberhill Ranch 1, Rice Canyon, Alberhill Ranch 2, La Laguna 1, and La Laguna 2 tanks. A short-term rise in the levels in the Lucerne and Alberhill Ranch 1 tanks was noted in the SCADA data on November 18th, 2020. This increase may have been caused by short-term operational changes.
Ortega PS and higher	The model results show a relatively steady level at the Ortega tank, while the SCADA data shows the tank level falling and rising. In the model the Terra Cotta well is pumping into the 1601_Ortega zone and helping to maintain the relatively constant levels. It may be that the well was operationally configured to pump into the 1601_Lucerne_Alberhill_1 zone during the calibration period. The SCADA data showed a constant flow of 800 gpm at the Tomlin 1 PS, which is likely due to a sensor malfunction. The model results generally agreed well with the observed levels at the Tomlin 1, Tomlin 2, and Los Pinos tanks.
Cottonwood PS and Summerhill PS and higher	Model results agreed well with observed levels at the Cottonwood 1, Cottonwood 2, and Summerhill tanks. There was a short-term increase in the levels in Cottonwood 1 and Summerhill on November 17th, 2020. This increase may have been caused by short-term operational changes.
Canyon Lake PS and Tuscany PS and higher	Model results agreed well with observed levels at the Canyon Lake North, Canyon Lake South, Tuscany 1, and Tuscany 2 tanks. The SCADA data showed zero flow at the Canyon Lake PS, which may have been due to a sensor malfunction. The SCADA data showed a constant flow of 1,682 gpm at the Tuscany 1 PS, which may have been due to a sensor malfunction.
Horsethief PS and Temescal Valley	Model results agreed well with observed levels at the Horsethief 1, Horsethief 2, and Mayhew tanks. The SCADA data showed zero flow at the Horsethief 2 PS, which may have been due to a sensor malfunction.
Bundy Canyon PS and Waite St. PS	Model results agreed well with observed levels at the Bundy Canyon and Gafford Street tanks. At the Waite St. tank, the model results showed levels fluctuating more rapidly between the high and low set points than shown in the SCADA data. It may be that actual demands

Pressure Zone(s)	Notes on EPS Calibration
	in this zone are higher than the model demands assigned through the meter consumption data.
Stage Ranch PS and Woodmoor PS	The model results show the range of tank levels agreeing well with observed levels for the Stage Ranch 1, Stage Ranch 2, and Woodmoor tanks. At locations with two tanks, the model calculates some oscillation as flow moves back and forth between the adjacent tanks to find a common HGL. This oscillation only affects flows at the tank site and does not impact the system-wide analysis.
Rosetta Canyon PS and Meadowlark PS	Model results agreed well with observed levels at the El Toro, Rosetta Canyon 1, Rosetta Canyon 2, and Meadowbrook 2 tanks.
Cal Oaks PS and Greer Ranch PS and Inland Valley PS	Model results agreed well with observed levels at the Cal Oaks, Inland Valley, Greer Ranch 1, and Green Ranch 2 tanks. The SCADA data showed that the level in the Cal Oaks and Inland Valley tanks rose above the normal operating range on November 20, 2020, which may have been due to a short-term operational change.
City PS and Sedco PS and Daley PS	Model results agreed well with observed levels at the City, Sedco, and Daley tanks.

5. Model Applications

The updated hydraulic model has been calibrated to data gathered during 2019 and 2020. The model is considered to be ready for use in system analysis. Some potential next steps for the hydraulic model include:

- Running EPS simulations to calculate water age and identify areas with potential for higher water age.
- Running steady-state simulations to evaluate the system's ability to deliver required fire flow, either with or without the additional demand from proposed development projects.
- Analyzing potential operating strategies to be used during planned or emergency shutdowns of key assets. WSC prepared a technical memorandum to describe a potential re-configuration of the Lakeshore Booster Pump Station to provide water to the Canyon Lake area if a break occurred on the 33-inch transmission main that crosses underneath Interstate 15.
- Analyzing current operations to evaluate potential changes to pump controls. WSC prepared a technical memorandum to describe modeling work of the Corydon Blend Line, which receives water from several groundwater wells and blends the sources to achieve water quality objectives. If multiple wells are pumping at the same time, the head in the Corydon Blend Line can increase and lead to reduced groundwater production as the pumps move back on their curve.
- Evaluate the extent of water movement from different sources in the distribution system. WSC prepared a technical memorandum to describe the District's response to a release of anthracite into the distribution system during a backwash malfunction at the Back Basin Groundwater Water Treatment Plant. The hydraulic model was used to estimate the long-term average flow in key pipes, and the results were used to target areas for investigation of potential anthracite accumulation.
- Calculating minimum and maximum pressures in each zone under ADD for water loss reporting.
- Considering alternative combinations of future supplies (imported water, CLWTP, and groundwater wells) and evaluating potential constraints in the distribution system's capability to meet demands while maintaining adequate pressures.

The network infrastructure in the model was imported from the District's GIS database in 2019. During the model calibration process, WSC made further updates to the infrastructure based on input from District staff, including information about recently completed improvement projects. The model is considered to be representative of the existing system and suitable for system analysis. For future model maintenance, it is recommended that the District periodically use the GIS database to update the network infrastructure in the hydraulic model. The GIS Gateway tool in InfoWater allows this process to be set up in a consistent and repeatable approach.

5.1 Water Age

Water age is calculated as the time that water spends in the distribution system, from the time it enters from one of the supply sources (modeled as reservoirs) to the time it leaves the system as demand at a node. Extended water age can lead to water quality concerns, such as reduced disinfectant residual or taste and odor concerns.

Water age is specific to each system. Water age can be estimated through various methods, such as tracer studies, hydraulic modeling, or from hydraulic and/or water quality data. The US Environmental Protection Agency (EPA) published a paper discussing the effects of water age on water quality. As part of this effort, the Water Industry Database (AWWA and AwwaRF 1992 (now known as the Water Research Foundation (WRF)) was analyzed. It was concluded that an average distribution system retention time varied from 1.3 days to 3 days, although many utilities operate with water age greater than 3 days. Based on the data analyzed, water age greatly varied from system to system. It was estimated that larger systems that served between 750,000 to 800,000 people experienced water ages less than 1 day up to 7 or more days, while smaller systems that serve 24,000 to 87,900 people experienced water ages from 12 to more than 16 days.

WSC performed several water age simulations of the EVMWD system, using different demand conditions (average day demands, minimum winter demands, and maximum summer demands). WSC reviewed the findings with District staff in a training session, and the model can be used for additional simulations to aid in District efforts to maintain water quality.

5.2 Source Tracing

The District's system can receive water supply from imported water connections, the CLWTP, or groundwater wells. There may be situations where it is helpful to understand how water from each of these sources moves through the system. InfoWater provides the capability to trace water from each source and calculate the supply mix that is reaching each demand node.

The simplest source tracing application is to identify a single source (modeled as a reservoir). For every time step and every node, InfoWater will calculate the percentage of water that came from the selected source. This application could allow the District to evaluate how far into the system water from a particular source (such as a groundwater well) is likely to extend.

A more complex simulation can be performed to track water from all the sources. In the "Quality" tab on the simulation options, the user can select "Multi-Trace" and select "All Reservoirs." InfoWater will keep track of the percent of water from each source at each node throughout the simulation. This report can be accessed through the Report Manager; after a Multi-Trace run is complete, a new option will appear for "Multi-Trace Report." This report contains a large amount of data; for each timestep, it records the percentage from each source at each junction. This report can be exported to a CSV file and then opened in Excel for graphing.

6. References

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Appendix A – Model Elements

Sources of Supply

Table A - 1. InfoWater Model Reservoirs

ID (Char)	Type (Int)	Head (ft)	Year of Installation (Int)	Zone (Char)
RES_BBGWTP	0: Fixed Head	1,275.00		
RES_CEREAL_1	0: Fixed Head	692.90	1987	1434
RES_CEREAL_3	0: Fixed Head	748.00	1993	1434
RES_CEREAL_4	0: Fixed Head	775.90	1993	1434
RES_CLINTONKEITH_CONNECTION	0: Fixed Head	1,483.00		
RES_CLWTP	0: Fixed Head	1,600.00		
RES_CORYDON	0: Fixed Head	651.00	1983	1434
RES_CROSSHILL_CONNECTION	0: Fixed Head	1,426.00		
RES_DIAMOND	0: Fixed Head	675.40	2008	1434
RES_FLAGGER_2A	0: Fixed Head	816.61		
RES_FLAGGER_3A	0: Fixed Head	815.92		
RES_JOY	0: Fixed Head	718.00	2003	1434
RES_LASBRISAS	0: Fixed Head	1,295.00		
RES_LINCOLN	0: Fixed Head	611.10		1434
RES_MACHADO	0: Fixed Head	1,002.00	2001	1434
RES_MAYHEWWELL	0: Fixed Head	545.30	1982	1358.7
RES_PALOMAR	0: Fixed Head	1,311.00		
RES_PALOMARWASHINGTON_CONNECTION	0: Fixed Head	1,190.00		
RES_SKIPJACKWINWARD_CONNECTION	0: Fixed Head	1,430.00		
RES_STATION71WELL	0: Fixed Head	1,161.00	1982	1358.7
RES_SUMMERLY	0: Fixed Head	750.00	2008	1434
RES_TERRACOTTA	0: Fixed Head	550.00	2014	1601
RES_TRILOGY	0: Fixed Head	1,002.00		
RES_TVP_CONNECTION	0: Fixed Head	1,532.00		

Table A - 2. InfoWater Model Well Pumps

ID	Type	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve	Description	Year of Installation	Zone	GIS Pumping Capacity
WELL_CEREAL_1	3: Multiple Point Curve	1,267.68	12.00	0.00	0.00	0.00	BPCEREAL_1	33520 Cereal St	1987	1434	1150
WELL_CEREAL_3	3: Multiple Point Curve	1,258.86	12.00	0.00	0.00	0.00	BPCEREAL_3	18801 Cereal St	1993	1434	2500
WELL_CEREAL_4	1: Design Point Curve	1,258.79	12.00		686.00	1,270.00		18301 Cereal St	1993	1434	2500
WELL_CORYDON_ST	3: Multiple Point Curve	1,277.52	12.00	0.00	0.00	0.00	BPCORYDON	31642 Corydon St	1983 estimated	1434	1000
WELL_DIAMOND	3: Multiple Point Curve	1,269.65	12.00	0.00	1,472.00	150.00	DIAMONDWELL	32000 Diamond Dr	2008	1434	1400
WELL_FLAGGER_2A	0: Constant Power Input	794.37	10.00	40.00	0.00	0.00		20292 Temescal Canyon Rd, Corona	Drilled 2005, equipped 2011		
WELL_FLAGGER_3A	0: Constant Power Input	794.60	10.00	40.00	0.00	0.00		20296 Temescal Canyon Rd, Corona	Drilled 2005, equipped 2011		
WELL_JOY_AVE	3: Multiple Point Curve	1,267.37	12.00	0.00	0.00	0.00	BPJOY	16751 Joy Ave	2003	1434	1000
WELL_LINCOLN_ST	3: Multiple Point Curve	1,291.67	12.00	0.00	0.00	0.00	BPLINCOLN	15157 Lincoln St	1984 estimated	1434	750
WELL_MACHADO_ST	3: Multiple Point Curve	1,314.60	12.00	0.00	0.00	0.00	BPMACHADO	32227 Machado St	2001	1434	1200 GPM
WELL_MAYHEW	1: Design Point Curve	1,246.91	12.00		120.00	300.00		25050 Maitri Rd		1358.7	250
WELL_PALOMAR_ST	0: Constant Power Input	1,299.92	10.00	40.00	0.00	0.00					
WELL_STATION_71	1: Design Point Curve	1,169.86	12.00		576.20	269.00		25150 Maitri Rd	1982	1358.7	200
WELL_SUMMERLY	3: Multiple Point Curve	1,270.65	12.00	0.00	1,472.00	150.00	SUMMERLYWELL	29337 Summerly Pl	2008	1434	1400
WELL_TERRACOTTA	3: Multiple Point Curve	1,356.39	12.00	0.00	0.00	0.00	BPMACHADO	32196 Terra Cotta St	2014	1601	1200
WELL_TRILOGY	0: Constant Power Input	1,104.23	10.00	40.00	0.00	0.00		Trilogy Pkwy/Temescal Canyon	Proposed		500

Table A - 3. GIS Attributes of Potable Wells

GIS	GIS	GIS	GIS	GIS	GIS	GIS	SCADA	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	SCE	District Water Level Spreadsheet	District Water Level Spreadsheet	District Water Level Spreadsheet
NAME	**STATUSCODE**	**PRESSUREZO**	**INSTALLDAT**	**PUMPING_CA**	**HORSEPOWER**	**WELL_DEPTH**	**SCADA Tag for Calibration**	**Capacity (gpm)**	**Total Head (ft)**	**Standing Water Level (bgs)**	**Discharge Pressure (psi)**	**Year of Installation**	**Service Area**	**SCE Test Date**	**Recent Water Level**	**Water Level Date**	**Water Level Type**
Cereal 1 Well	ACT	1434	1987	1150	350	-1408	CEREAL1_WL_PUMP_CNST_FLOW	1400	774	436	82	1987		11/14/14	452.75	8/27/19	Static
Cereal 3 Well	ACT	1434	1993	2500	400	-1936	CEREAL3_WL_PUMP_CNST_FLOW	1400	683	448	92	1993			426.4	4/8/20	Static
Cereal 4 Well	ACT	1434	1993	2500	400	-1685	CEREAL4_WL_PUMP_CNST_FLOW	1450	775	466	101	1993		8/18/15	442.85	4/8/20	Static
Corydon St Well	ACT	1434		1000	300	-1280	CORYDON_WL_PUMP_CNST_FLOW	900	712	512	71	1983			473.3	4/9/20	Static
Diamond Well	ACT	1434	2008	1400	350	-960	DIAMOND_WL_PUMP_CNST_FLOW	1600	616	401	79	2008		8/1/17	319	4/16/20	Static
Flagler 2A	ACT					-105						2011		9/26/14	20.92	4/8/20	Static
Flagler 3A	ACT					-100						2011		9/26/14	19.83	4/8/20	Static
Joy St Well	ACT	1434	2003	1000	250	-1000	JOY_WL_PUMP_CNST_FLOW	600	696	489	74	2003		11/14/14	379.5	4/14/20	Static
Lincoln St Well	ACT	1434		750	150	-945	LINCOLN_WL_PUMP_CNST_FLOW	600	525	113	86			11/14/14	232	4/8/20	Static
Machado St Well	ACT	1434	2001	1200 GPM	200	-1010	MACHADO_WL_PUMP_CNST_FLOW	1200	413	171	66	2001			267.08	4/14/20	Static
Mayhew Well	ACT	1358.7		250	100	-738	MAYHEW_WL_PUMP_CNST_FLOW	600	489	351	55	1982	TDSA	8/1/17	368.4	4/9/20	Static
Palomar St Well	PRO																
Station 71 Well	ACT	1358.7	1982	200	100	-583	WELL71_WL_PUMP_CNST_FLOW	250	567	318	85	1982	TDSA		271.2	4/9/20	Static
Summerly Well	ACT	1434	2008	1400		-980	SUMMERLY_WL_PUMP_CNST_FLOW	1700	613	392	82	2008			331.75	12/3/19	Static
Terra Cotta Well	ACT	1601	2014	1200	250	-1000	TCOTA_WL_PUMP_CNST_FLOW	1200	550	353	85	2014			374.83	4/8/20	Static
Trilogy (Proposed) Well	PRO			500													

Table A - 4. GIS Attributes of EMWD and WMWD Connections

Source	GIS Location	SCADA Tag for Calibration	InfoWater Description	InfoWater Reservoir Elevation	InfoWater Flow Control Setting (gpm)	EVMWD Notes on Imported Emergency Water Connections.pdf
EMWD	Skipjack Dr & Windward Dr		Emergency only			Meter 2”, Pipe 2”; EMWD to EVMWD; EVMWD to abandon
EMWD	Cross Hill Dr, Canyon Lake		Emergency only			Meter 6”, Pipe 6”, EMWD to EVMWD
EMWD	Las Brisas Rd, Murrieta	AULD_VA_BS_FLOW_H	TAVP, Auld Valley Pipeline	1370	16,806	Meter 24”, Pipe 42”; Active Supply EMWD to EVWMD
EMWD	Clinton Keith Rd, Murrieta		Emergency only			Meter 12”, Pipe 12”; EMWD to EVMWD
WMWD	TVP Connection	TVP_SRC_FLOW_H	TTVP, Temescal Valley Pipeline	1532	9,000	TVP WR-24D, Pipe 42”, Meter ?, Active Supply WMWD to EVMWD
WMWD	Palomar/ Washington St Connection		Emergency only			Meter 12”, Pipe 12”, EVMWD to WMWD

Table A - 5. GIS Attributes of Water Treatment Plants

GIS NAME	GIS LOCATION	GIS MaximoID	InfoWater Description	InfoWater Reservoir Elevation	InfoWater Flow Control Setting (gpm)
Canyon Lake WTP	81 Via De La Valle	CL WTP	TCYNLAKEWTP	1600	3,500
BBGWTP	601 Malaga Rd	BB WTP	WTP-ARS, Arsenic Treatment Plant	1434	2,500

Storage Tanks

Table A - 6. InfoWater Model Storage Tanks

ID (Char)	Type (Int)	Elevation (ft)	Minimum Level (ft)	Maximum Level (ft)	Initial Level (ft)	Diameter (ft)	Location	Year of Installation	Zone	Capacity (MG)
ADELFA	0: Cylindrical	1,621.69	3.00	32.00	14.17	67.00	17255 Encina Dr	2011	1650	0.80
ALBERHILL_1A	0: Cylindrical	1,572.16	3.50	33.00	4.59	95.12	6019 Alberhill Ranch Rd	2006	1601	1.50
ALBERHILL_1B	0: Cylindrical	1,572.14	3.00	33.00	4.90	95.12	6019 Alberhill Ranch Rd	2006	1601	1.50
ALBERHILL_2A	0: Cylindrical	1,774.34	6.00	28.00	14.23	67.14	6021 Alberhill Ranch Rd	2006	1801	0.63
ALBERHILL_2B	0: Cylindrical	1,773.79	7.00	28.00	14.36	67.14	6021 Alberhill Ranch Rd	2006	1801	0.63
AMIE	0: Cylindrical	1,441.38	3.00	24.00	16.38	48.00	18332 Sunnyslope Ave	1984	1464	0.30
AULD_VALLEY	0: Cylindrical	1,418.56	4.00	32.00	7.35	155.00	39986 Lafayette Dr	1989	1434	4.50
BAKER_ST	0: Cylindrical	1,396.92	3.00	32.00	4.51	148.70	Baker St	1986	1434	5.00
BECK	0: Cylindrical	1,847.16	3.00	24.00	6.85	30.00	33420 Mitchell Dr	1999	1842	0.13
BRYANT_ST	0: Cylindrical	1,396.66	3.00	32.00	4.86	148.70	20235 Soaring Falcon Ct	1987	1434	5.00
BUNDY_CANYON	0: Cylindrical	1,714.75	3.00	32.00	12.91	110.00	23810 Bundy Canyon Rd	1988	1746	2.00
CAL_OAKS_A	0: Cylindrical	1,612.00	3.00	40.00	15.88	122.00	35915 Evandel Rd	1988	1650	3.50
CAL_OAKS_B	0: Cylindrical	1,612.17	3.00	40.00	15.72	122.00	35915 Evandel Rd	1990	1650	3.50
CANYON_LAKE_N	0: Cylindrical	1,589.08	3.00	40.00	17.23	70.00	22911 Gold Rush Pl	1979	1622	1.00
CANYON_LAKE_S	0: Cylindrical	1,588.22	3.00	32.00	15.24	73.00	30849 Blackhorse Dr	1970	1618.5	1.00
CIELO_VISTA_TANK	0: Cylindrical	1,280.60	0.00	200.00	190.00	1.00				
CIRRUS_TANK	0: Cylindrical	1,750.00	0.00	200.00	190.00	1.00				
CITY	0: Cylindrical	1,549.93	3.00	32.00	12.97	96.00	263 Hampton Cir	1995	1579	1.73
CLAY_CANYON	0: Cylindrical	1,230.87	3.00	32.00	15.07	26.00	Hunt Rd	1982	1258.4	0.12
CLEARWELL	0: Cylindrical	1,407.42	0.00	29.00	1.73	80.00	22600 Railroad Canyon Rd	2006	1434	1.00
COTTONWOOD_1A	0: Cylindrical	1,720.26	3.00	32.00	11.68	82.00	113 Cedar Ln	2002	1750	1.20
COTTONWOOD_1B	0: Cylindrical	1,719.93	3.00	32.00	14.82	76.50	113 Cedar Ln	2002	1750	1.10
COTTONWOOD_2	0: Cylindrical	1,917.27	3.00	32.00	8.97	53.00	318631/2 Willow Wood Ct	2003	1934	0.50
COTTONWOOD_2_EAST	0: Cylindrical	1,903.89	3.00	32.00	9.92	56.00	33950 Corktree Ln	2015	1934	0.55
COTTONWOOD_EAST_A	0: Cylindrical	1,721.20	3.00	32.00	30.00	78.00	35542 Desert Rose Way	2006	1750	1.10
COTTONWOOD_EAST_B	0: Cylindrical	1,721.16	3.00	32.00	30.00	78.00	35542 Desert Rose Way	2006	1750	1.10
DALEY	0: Cylindrical	2,289.36	3.00	22.00	4.92	25.00	Crooked Arrow Dr	1998	2309	0.88

ID (Char)	Type (Int)	Elevation (ft)	Minimum Level (ft)	Maximum Level (ft)	Initial Level (ft)	Diameter (ft)	Location	Year of Installation	Zone	Capacity (MG)
EL_TORO_1	0: Cylindrical	1,579.96	3.00	24.00	9.41	67.70	El Toro Rd	1988	1601	0.25
EL_TORO_2	0: Cylindrical	1,581.99	3.00	25.00	9.41	53.00	El Toro Rd	1996	1601	0.40
ENCINA	0: Cylindrical	1,874.20	3.00	46.00	5.59	47.50	Encina Dr	1992	1916.5	0.50
FARM	0: Cylindrical	1,869.10	3.00	16.00	12.87	67.65	Mill Pond Dr	1975	1900	0.43
GAFFORD_ST_A	0: Cylindrical	1,710.43	3.00	30.00	24.32	30.00	Gafford St	1984	1746	0.10
GAFFORD_ST_B	0: Cylindrical	1,711.25	3.00	30.00	18.03	66.05	Gafford St	1973	1746	0.61
GREER_RANCH_1A	0: Cylindrical	1,833.74	3.00	19.00	5.85	61.50	35843 Ice Plant Way, Murrieta	2004	1850	0.50
GREER_RANCH_1B	0: Cylindrical	1,834.21	3.00	19.00	6.43	61.50	35843 Ice Plant Way, Murrieta	2004	1850	0.50
GREER_RANCH_2A	0: Cylindrical	2,023.56	3.00	33.00	11.81	58.90	26760 Golden Cup Ct	2004	2050	0.65
GREER_RANCH_2B	0: Cylindrical	2,021.17	3.00	33.00	12.36	58.90	26760 Golden Cup Ct	2004	2050	0.65
HORSETHIEF_1	0: Cylindrical	1,571.14	3.00	32.00	17.70	80.00	27697 Kachina Ct, Corona CA 92883	1994	1601	1.20
HORSETHIEF_2	0: Cylindrical	1,771.24	3.00	32.00	15.51	98.00	Mountain Rd/Hidden Creek Dr	1986	1801	1.80
INLAND_VALLEY_RESERVOIR	0: Cylindrical	1,619.88	3.00	32.00	16.24	112.00	24364 Verona Ct	2007	1650	2.40
LA_LAGUNA_1A	0: Cylindrical	2,018.59	3.00	23.00	10.89	61.62	29300 Gateway Dr	2005	2040	0.47
LA_LAGUNA_1B	0: Cylindrical	2,018.42	3.00	23.00	10.91	61.62	29300 Gateway Dr	2005	2040	0.47
LA_LAGUNA_2A	0: Cylindrical	2,190.50	3.00	26.00	7.86	49.00	29265 Spectra Dr	2006	2240	0.54
LA_LAGUNA_2B	0: Cylindrical	2,211.85	3.00	26.00	7.84	49.00	29265 Spectra Dr	2006	2240	0.54
LAKE_ST	0: Cylindrical	1,403.98	3.00	32.00	11.16	200.00	31010 Lake St	1999	1434	8.00
LOS_PINOS_1	0: Cylindrical	2,750.38	3.00	24.00	9.15	27.00	39251 General Pinchot Lower	1967	2778	0.10
LOS_PINOS_2	0: Cylindrical	3,479.90	3.00	24.00	7.53	27.00	39251 General Pinchot Upper	1967	3501	0.10
LOS_PINOS_BUFFER	0: Cylindrical	2,660.00	1.00	10.00	5.00	5.00				
LUCERNE	0: Cylindrical	1,570.94	3.00	32.00	6.65	118.00	6000 Patrick Ct	1991	1601	2.50
MAYHEW	0: Cylindrical	1,345.19	3.00	30.00	21.37	32.00	Maitri Rd	1982	1358.7	0.20
MEADOWBROOK_1	0: Cylindrical	1,670.83	3.00	32.00	5.00	103.17	77 El Toro	1989	1701	2.00
MEADOWBROOK_2	0: Cylindrical	1,861.48	3.00	27.00	6.23	85.00	Mountain Ave / Peach St	1998	1896	1.00
ORTEGA	0: Cylindrical	1,571.42	3.00	32.00	11.74	110.00	Ortega Hwy	1990	1601	2.20
RAILROAD_CANYON	0: Cylindrical	1,402.23	3.00	33.00	3.45	200.00	21982 Railroad Canyon Rd	1995	1434	8.00
RICE_CANYON	0: Cylindrical	1,778.01	3.00	24.00	9.84	106.88	29620 Dale Ct	1992	1800	1.61
ROSETTA_CANYON_1	0: Cylindrical	1,570.69	3.00	31.00	13.50	117.00	222 Crimson Pillar Ln	2006	1601	2.50
ROSETTA_CANYON_2A	0: Cylindrical	1,772.43	3.00	33.00	19.27	64.35	20111 Walnut St	2006	1801	0.70
ROSETTA_CANYON_2B	0: Cylindrical	1,772.27	3.00	33.00	19.34	64.35	20111 Walnut St	2006	1801	0.70

ID (Char)	Type (Int)	Elevation (ft)	Minimum Level (ft)	Maximum Level (ft)	Initial Level (ft)	Diameter (ft)	Location	Year of Installation	Zone	Capacity (MG)
SEDCO	0: Cylindrical	2,161.99	3.00	22.00	5.78	25.00	32395 Elsinore Heights Dr	1998	2196	0.88
SKYLARK_PS_TANK	0: Cylindrical	1,353.00	0.00	1,545.00	1,537.00	1.00				
SKYMEADOWS	0: Cylindrical	3,289.64	3.00	24.00	20.95	27.00	Los Aliso Rd	1969	3300	0.10
STAGE_RANCH_1A	0: Cylindrical	1,835.72	3.00	16.00	12.04	29.18	34250 Enderlein	1977	1882	0.05
STAGE_RANCH_1B	0: Cylindrical	1,835.72	3.00	16.00	12.50	29.18	34250 Enderlein	1977	1882	0.05
STAGE_RANCH_2A	0: Cylindrical	2,180.02	3.00	16.00	13.26	32.63	35200 Enderlein	1977	2217	0.05
STAGE_RANCH_2B	0: Cylindrical	2,176.04	3.00	16.00	14.19	32.63	35200 Enderlein	1977	2217	0.05
SUMMERHILL	0: Cylindrical	1,571.06	3.00	32.00	13.38	114.00	31900 Summerhill Dr	1992	1601	2.35
TOMLIN_1	0: Cylindrical	1,789.26	3.00	23.00	19.71	19.58	77 Grand-Ortega B2	2003	1871	0.05
TOMLIN_2	0: Cylindrical	2,292.06	3.00	23.00	20.12	19.58	77 Grand-Ortega B3	2003	2313	0.05
TUSCANY_1A	0: Cylindrical	1,770.16	3.00	34.00	9.95	84.00	21 Bella Lucia	1990	1800	1.30
TUSCANY_1B	0: Cylindrical	1,770.01	3.00	34.00	9.40	84.00	21 Bella Lucia	1990	1800	1.30
TUSCANY_2	0: Cylindrical	1,917.93	3.00	24.00	11.42	85.00	21 Bella Lucia	1990	1940	1.00
WAITE	0: Cylindrical	1,445.06	3.00	24.00	6.11	17.35	77 Cherry -Waite St	1968	1467	0.50
WOODMOOR_A	0: Cylindrical	1,567.51	3.00	34.00	19.77	42.00	20648 Red Dawn Ct	2007	1601	0.25
WOODMOOR_B	0: Cylindrical	1,567.51	3.00	34.00	30.00	42.00	20648 Red Dawn Ct	2007	1601	0.25

Table A - 7. GIS Attributes of Water Storage Tanks

GIS NAME	GIS LOCATION	GIS STATUSCODE	GIS PRESSUREZO	GIS INSTALLDAT	GIS CAPACITY	GIS DIAMETER	GIS HEIGHT	GIS BOTTOMELEV	GIS OVERFLOWEL	SCADA SCADA Tag for Calibration
Adelfa	17255 Encina Dr	ACT	1650	2011	0.8	67	32	1620.34	1650	ENCINA_LV_BS_ADELFA_TK_LEVEL
Alberhill 1A	6019 Alberhill Ranch Rd	ACT	1601	2006	1.5	95.12	33	1570	1601	ABH_RCH1_TK_A_LEVEL
Alberhill 1B	6019 Alberhill Ranch Rd	ACT	1601	2006	1.5	95.12	33	1570	1601	ABH_RCH1_TK_B_LEVEL
Alberhill 2A	6021 Alberhill Ranch Rd	ACT	1801	2006	0.625	67.14	28	1772.6	1801	ABH_RCH2_TK_A_LEVEL
Alberhill 2B	6021 Alberhill Ranch Rd	ACT	1801	2006	0.625	67.14	28	1772.6	1801	ABH_RCH2_TK_B_LEVEL
Amie	18332 Sunnyslope Ave	ACT	1464	1984	0.3	48	24	1441	1464	JUNKLE_BS_AMIE_TK_LEVEL
Auld Valley	39986 Lafayette Dr	ACT	1434	1989	4.5	155	32	1402	1434	AULD_VA_TK_LEVEL
Baker St	Baker St	ACT	1434	1986	5	0	32	1395.5	1434	BAKER_ST_TK_LEVEL
Beck	33420 Mitchell Dr	ACT	1842	1999	0.13	30	24	1820	1842	BECK_TK_LEVEL
Bryant St	20235 Soaring Falcon Ct	ACT	1434	1987	5	0	32	1395.5	1434	BRYANT_TK_LEVEL
Bundy Canyon	23810 Bundy Canyon Rd	ACT	1746	1988	2	110	32	1714.5	1746	FARM_BS_BUNDY_CYN_TK_LEVEL

GIS NAME	GIS LOCATION	GIS STATUSCODE	GIS PRESSUREZO	GIS INSTALLDAT	GIS CAPACITY	GIS DIAMETER	GIS HEIGHT	GIS BOTTOMELEV	GIS OVERFLOWEL	SCADA SCADA Tag for Calibration
Cal Oaks A	35915 Evandel Rd	ACT	1650	1988	3.5	122	40	1610	1650	GREER_RCH1_BS_CAL_OK_TK_A_LEVEL
Cal Oaks B	35915 Evandel Rd	ACT	1650	1990	3.5	122	40	1610	1650	GREER_RCH1_BS_CAL_OK_TK_B_LEVEL
Canyon Lake N	22911 Gold Rush Pl	ACT	1622	1979	1	70	40	1581	1622	CYN_LK_TK_LEVEL
Canyon Lake S	30849 Blackhorse Dr	ACT	1618.5	1970	1	73	32	1586.5	1618.5	CYN_LK_S_BS_CYN_LK_S_TK_LEVEL
Chlorine Contact Tank	22600 Railroad Canyon Rd	ACT	1434	2006	0.25	50	21	1413	1434	
City	263 Hampton Cir	ACT	1579	1995	1.73	0	32	1547	1579	CITY_TK_LEVEL
Clay Canyon	Hunt Rd	ACT	1258.4	1982	0.12	26	32	1228.8	1258.3	
Clearwell	22600 Railroad Canyon Rd	ACT	1434	2006	1	80	29	1405	1434	
Cottonwood 1A	113 Cedar Ln	ACT	1750	2002	1.2	82	32	1718	1750	CW2_BS_CW1_TK_A_LEVEL
Cottonwood 1B	113 Cedar Ln	ACT	1750	2002	1.1	76.5	32	1718	1750	CW2_BS_CW1_TK_B_LEVEL
Cottonwood 2	318631/2 Willow Wood Ct	ACT	1934	2003	0.5	53	32	0	1934	CW2_TK_LEVEL
Cottonwood 2 East	33950 Corktree Ln	ACT	1934	2015	0.55	56	32	1902	1934	CW2_E_TK_LEVEL
Cottonwood East A	35542 Desert Rose Way	ACT	1750	2006	1.1	78	32	1718	1750	CW1_E_TK_A_LEVEL
Cottonwood East B	35542 Desert Rose Way	ACT	1750	2006	1.1	78	32	1718	1750	CW1_E_TK_B_LEVEL
Daley	Crooked Arrow Dr	ACT	2309	1998	0.88	25	22	2287	2309	DALEY_TK_LEVEL
El Toro 1	El Toro Rd	ACT	1601	1988	0.25	0	24	1577	1601	EL_TORO_TK_A_LEVEL
El Toro 2	El Toro Rd	ACT	1601	1996	0.4	53	25	1576	1601	EL_TORO_TK_B_LEVEL
Encina	Encina Dr	ACT	1916.5	1992	0.5	47.5	46	1877	1916.5	ENCINA_TK_LEVEL
Farm	Mill Pond Dr	ACT	1900	1975	0.43	0	16	1884	1900	FARM_TK_LEVEL
Gafford St A	Gafford St	ACT	1746	1984	0.1	30	30	1716	1746	GAFFORD_TK_A_LEVEL
Gafford St B	Gafford St	ACT	1746	1973	0.61	0	30	1716	1746	GAFFORD_TK_B_LEVEL
Greer Ranch 1A	35843 Ice Plant Way, Murrieta	ACT	1850	2004	0.5	61.5	19	1831.75	1850	GREER_RCH1_TK_A_LEVEL
Greer Ranch 1B	35843 Ice Plant Way, Murrieta	ACT	1850	2004	0.5	61.5	19	1831.75	1850	GREER_RCH1_TK_B_LEVEL
Greer Ranch 2A	26760 Golden Cup Ct	ACT	2050	2004	0.647	58.9	33	2019	2050	GREER_RCH2_TK_A_LEVEL
Greer Ranch 2B	26760 Golden Cup Ct	ACT	2050	2004	0.647	58.9	33	2019	2050	GREER_RCH2_TK_B_LEVEL
Horsethief 1	27697 Kachina Ct, Corona CA 92883	ACT	1601	1994	1.2	80	32	1569	1601	LEMON_GROVE_BS_HSTF1_TK_LEVEL
Horsethief 2	Mountain Rd/Hidden Creek Dr	ACT	1801	1986	1.8	98	32	1769	1801	HSTF2_TK_LEVEL
Inland Valley Reservoir	24364 Verona Ct	ACT	1650	2007	2.4	112	32	1617.5	1650	INLAND_VA_TK_LEVEL
Junkle	17701 Sunnyslope Ave	ABN	1575	2006	0.33	42	32	1545	1575	
La Laguna 1A	29300 Gateway Dr	ACT	2040	2005	0.465	61.62	23	2017.17	2040	LA_LGNA2_BS_LGNA1_TK_A_LEVEL
La Laguna 1B	29300 Gateway Dr	ACT	2040	2005	0.465	61.62	23	2017.17	2040	LA_LGNA2_BS_LGNA1_TK_B_LEVEL
La Laguna 2A	29265 Spectra Dr	ACT	2240	2006	0.535	49	26	2213.57	2240	LA_LGNA2_TK_A_LEVEL
La Laguna 2B	29265 Spectra Dr	ACT	2240	2006	0.535	49	26	2212.24	2240	LA_LGNA2_TK_B_LEVEL
Lake St	31010 Lake St	ACT	1434	1999	8	200	32	1402	1434	LAKE_ST_TK_LEVEL
Leach Canyon	Amorose St	ACT	1800	1984	0.11	0	16	1784	1800	LEACH_CYN_TK_LEVEL

GIS NAME	GIS LOCATION	GIS STATUSCODE	GIS PRESSUREZO	GIS INSTALLDAT	GIS CAPACITY	GIS DIAMETER	GIS HEIGHT	GIS BOTTOMELEV	GIS OVERFLOWEL	SCADA SCADA Tag for Calibration
Los Pinos 1	39251 General Pinchot Lower	ACT	2778	1967	0.1	27	24	2754.1	2778	LOS_PINOS1_TK_LEVEL
Los Pinos 2	39251 General Pinchot Upper	ACT	3501	1967	0.1	27	24	3477	3501	LOS_PINOS2_TK_LEVEL
Lucerne	6000 Patrick Ct	ACT	1601	1991	2.5	118	32	1569.65	1601	LUCERNE_TK_LEVEL
Mayhew	Maitri Rd	ACT	1358.7	1982	0.2	32	30	1330.5	1358.7	0
Meadowbrook 1	77 El Toro	ACT	1701	1989	2	0	32	1669	1701	MB1_TK_LEVEL
Meadowbrook 2	Mountain Ave / Peach St	ACT	1896	1998	1	85	27	1872	1896	MB2_TK_LEVEL
Ortega	Ortega Hwy	ACT	1601	1990	2.2	110	32	1570.67	1601	ORTEGA_TK_LEVEL
Railroad Canyon	21982 Railroad Canyon Rd	ACT	1434	1995	8	200	33	1402.52	1434	RAILROAD_CYN_TK_LEVEL
Rice Canyon	29620 Dale Ct	ACT	1800	1992	1.61	0	24	1776	1800	RICE_CYN_TK_LEVEL
Rosetta Canyon 1	222 Crimson Pillar Ln	ACT	1601	2006	2.5	117	31	1572	1601	0
Rosetta Canyon 2A	20111 Walnut St	ACT	1801	2006	0.7	64.35	33	1770.5	1801	RST_CYN2_TK_A_LEVEL
Rosetta Canyon 2B	20111 Walnut St	ACT	1801	2006	0.7	64.35	33	1770.5	1801	RST_CYN2_TK_B_LEVEL
Sedco	32395 Elsinore Heights Dr	ACT	2196	1998	0.88	25	22	2174	2196	SEDCO_TK_LEVEL
Skymeadows	Los Aliso Rd	ACT	3300	1969	0.1	27	24	3276	3300	SKYMEADOWS_TK_LEVEL
Stage Ranch 1A	34250 Enderlein	ACT	1882	1977	0.05	0	16	1862	1882	STAGE_RCH2_BS_SR1_TK_A_LEVEL
Stage Ranch 1B	34250 Enderlein	ACT	1882	1977	0.05	0	16	1862	1882	STAGE_RCH2_BS_SR1_TK_B_LEVEL
Stage Ranch 2A	35200 Enderlein	ACT	2217	1977	0.05	0	16	2201	2217	STAGE_RCH2_TK_A_LEVEL
Stage Ranch 2B	35200 Enderlein	ACT	2217	1977	0.05	0	16	2201	2217	STAGE_RCH2_TK_B_LEVEL
Summerhill	31900 Summerhill Dr	ACT	1601	1992	2.35	114	32	1570	1601	SUMMERHILL_TK_LEVEL
Tomlin 1	77 Grand-Ortega B2	ACT	1871	2003	0.051	19.58	23	0	2313	TOMLIN2_BS_TOMLIN1_TK_LEVEL
Tomlin 2	77 Grand-Ortega B3	ACT	2313	2003	0.051	19.58	23	1855	1871	LOS_PINOS1_BS_TOMLIN2_TK_LEVEL
Tuscany 1A	21 Bella Lucia	ACT	1800	1990	1.3	84	34	1768	1800	TUSCY2_BS_TUSCY1_TK_A_LEVEL
Tuscany 1B	21 Bella Lucia	ACT	1800	1990	1.3	84	34	1768	1800	TUSCY2_BS_TUSCY1_TK_B_LEVEL
Tuscany 2	21 Bella Lucia	ACT	1940	1990	1	85	24	1916	1940	TUSCY2_TK_LEVEL
Waite	77 Cherry -Waite St	ACT	1467	1968	0.5	0	24	1423	1467	WAITE_TK_LEVEL
Woodmoor A	20648 Red Dawn Ct	ACT	1601	2007	0.25	42	34	1574.07	1601	WOODMOOR_TK_A_LEVEL
Woodmoor B	20648 Red Dawn Ct	ACT	1601	2007	0.25	42	34	1574.07	1601	WOODMOOR_TK_B_LEVEL

Pump Stations and Pumps

Table A - 8. InfoWater Model Pumps

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve Identifier
ADELFA_1	1: Design Point Curve	1,341.81	12.00	0.00	199.80	322.00	
ADELFA_2	1: Design Point Curve	1,341.81	12.00	0.00	199.80	322.00	
AULD_VALLEY_5	3: Multiple Point Curve	1,321.05	12.00	0.00	0.00	0.00	BPAULDVALLEY_6CAL
AULD_VALLEY_6	3: Multiple Point Curve	1,321.99	12.00	0.00	0.00	0.00	BPAULDVALLEY_6CAL
AULD_VALLEY_7	3: Multiple Point Curve	1,321.99	12.00	0.00	0.00	0.00	BPAULDVALLEY_7
AULD_VALLEY_8	3: Multiple Point Curve	1,321.99	12.00	0.00	0.00	0.00	BPAULDVALLEY_8
BECK_1	1: Design Point Curve	1,499.58	12.00	0.00	400.00	140.00	
BECK_2	1: Design Point Curve	1,500.83	12.00	0.00	400.00	140.00	
BUNDY_CANYON_1	3: Multiple Point Curve	1,345.99	12.00	0.00	0.00	0.00	BPBUNDYCYN_1
BUNDY_CANYON_2	3: Multiple Point Curve	1,346.04	12.00	0.00	0.00	0.00	BPBUNDYCYN_2
BUNDY_CANYON_3	3: Multiple Point Curve	1,346.07	12.00	0.00	0.00	0.00	BPBUNDYCYN_3
BUNDY_CANYON_EAST	1: Design Point Curve	1,698.40	8.00	0.00	270.70	992.00	
CAL_OAKS_1	3: Multiple Point Curve	1,322.14	12.00	0.00	0.00	0.00	BPCALOAKS_1
CAL_OAKS_2	3: Multiple Point Curve	1,322.14	12.00	0.00	0.00	0.00	BPCALOAKS_2
CAL_OAKS_3	3: Multiple Point Curve	1,322.14	12.00	0.00	0.00	0.00	BPCALOAKS_3
CAL_OAKS_4	3: Multiple Point Curve	1,322.14	12.00	0.00	0.00	0.00	BPCALOAKS_4
CANYON_LAKE_1	3: Multiple Point Curve	1,329.56	12.00	0.00	0.00	0.00	BPCYNLAKE_1
CANYON_LAKE_2	3: Multiple Point Curve	1,329.56	12.00	0.00	0.00	0.00	BPCYNLAKE_2
CANYON_LAKE_3	3: Multiple Point Curve	1,329.56	12.00	0.00	0.00	0.00	BPCYNLAKE_3
CANYON_LAKE_4	3: Multiple Point Curve	1,329.56	12.00	0.00	0.00	0.00	BPCYNLAKE_4
CANYON_LAKE_HYDRO_1	1: Design Point Curve	1,588.28	10.00	0.00	47.20	1,028.00	
CANYON_LAKE_HYDRO_2	1: Design Point Curve	1,588.28	10.00	0.00	47.20	1,028.00	
CIELO_VISTA_1	1: Design Point Curve	1,280.55	12.00	0.00	191.30	214.00	
CIELO_VISTA_2	1: Design Point Curve	1,280.55	12.00	0.00	192.70	226.00	
CIRRUS_CIR_1	1: Design Point Curve	1,752.02	12.00	0.00	540.00	70.00	
CIRRUS_CIR_2	1: Design Point Curve	1,752.11	12.00	0.00	540.00	70.00	
CIRRUS_CIR_3	1: Design Point Curve	1,752.05	12.00	0.00	540.00	70.00	

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve Identifier
CITY_1	1: Design Point Curve	1,270.29	12.00	0.00	194.50	809.00	
CITY_2	1: Design Point Curve	1,270.29	12.00	0.00	174.90	916.00	
CITY_3	1: Design Point Curve	1,270.07	12.00	0.00	194.70	882.00	
COLDWATER_1	1: Design Point Curve	1,099.40	12.00	0.00	150.00	300.00	
COLDWATER_2	1: Design Point Curve	1,099.45	12.00	0.00	199.80	322.00	
COTTONWOOD1_1	1: Design Point Curve	1,312.84	12.00	0.00	320.00	1,371.00	
COTTONWOOD1_2	1: Design Point Curve	1,312.82	12.00	0.00	320.00	1,371.00	
COTTONWOOD2_1	3: Multiple Point Curve	1,720.22	12.00	0.00	173.10	569.90	BPCOTTONWOOD2_1
COTTONWOOD2_2	3: Multiple Point Curve	1,720.26	12.00	0.00	173.10	569.00	BPCOTTONWOOD2_2
COTTONWOOD2_3	3: Multiple Point Curve	1,720.21	12.00	0.00	173.00	569.00	BPCOTTONWOOD2_3
DALEYA_1	1: Design Point Curve	1,682.62	12.00	0.00	257.00	80.00	
DALEYA_2	3: Multiple Point Curve	1,682.62	12.00	0.00	0.00	0.00	BPDALEYA_2
DALEYB_1	3: Multiple Point Curve	1,952.46	12.00	0.00	0.00	0.00	BPDALEYB_1
DALEYB_2	3: Multiple Point Curve	1,952.94	12.00	0.00	323.40	103.00	BPDALEYB_2
ENCINA_1	3: Multiple Point Curve	1,622.98	12.00	0.00	0.00	0.00	BPENCINA_1
ENCINA_2	3: Multiple Point Curve	1,623.08	12.00	0.00	0.00	0.00	BPENCINA_1
ENCINA_3	3: Multiple Point Curve	1,623.05	12.00	0.00	0.00	0.00	BPENCINA_1
FARM_1	3: Multiple Point Curve	1,704.07	12.00	0.00	270.70	992.00	BPFARMB_1
FARM_2	3: Multiple Point Curve	1,704.07	12.00	0.00	268.70	957.00	BPFARMB_2
FARM_3	1: Design Point Curve	1,708.60	12.00	0.00	270.00	1,410.00	
GRAND_1	1: Design Point Curve	1,317.50	12.00	0.00	106.00	1,770.00	
GRAND_2	1: Design Point Curve	1,317.50	12.00	0.00	79.50	2,885.00	
GRAND_3	1: Design Point Curve	1,317.53	12.00	0.00	30.00	1,000.00	
GREER_RANCH1_1	1: Design Point Curve	1,597.83	12.00	0.00	423.60	580.00	
GREER_RANCH1_2	1: Design Point Curve	1,597.83	12.00	0.00	428.80	602.00	
GREER_RANCH1_3	1: Design Point Curve	1,597.83	12.00	0.00	425.70	591.00	
GREER_RANCH2_1	1: Design Point Curve	1,597.83	12.00	0.00	234.40	500.00	
GREER_RANCH2_2	1: Design Point Curve	1,597.83	12.00	0.00	229.40	500.00	
GREER_RANCH2_3	1: Design Point Curve	1,597.83	12.00	0.00	228.40	500.00	
HORSETHIEF1_1	3: Multiple Point Curve	1,195.98	12.00	0.00	0.00	0.00	BPHORSETHIEF1_1
HORSETHIEF1_2	3: Multiple Point Curve	1,195.98	12.00	0.00	0.00	0.00	BPHORSETHIEF1_2
HORSETHIEF1_3	3: Multiple Point Curve	1,195.99	12.00	0.00	0.00	0.00	BPHORSETHIEF1_3

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve Identifier
HORSETHIEF1_4	3: Multiple Point Curve	1,195.99	12.00	0.00	0.00	0.00	BPHORSETHIEF1_3
HORSETHIEF2_1	3: Multiple Point Curve	1,466.21	12.00	0.00	0.00	0.00	BPHORSETHIEF2_1
HORSETHIEF2_2	3: Multiple Point Curve	1,466.22	12.00	0.00	0.00	0.00	BPHORSETHIEF2_2
HORSETHIEF2_3	3: Multiple Point Curve	1,466.22	12.00	0.00	0.00	0.00	BPHORSETHIEF2_3
INLAND_VALLEY_1	1: Design Point Curve	1,329.19	12.00	0.00	253.00	1,400.00	
INLAND_VALLEY_2	1: Design Point Curve	1,329.19	12.00	0.00	253.00	1,400.00	
INLAND_VALLEY_3	3: Multiple Point Curve	1,329.19	12.00	0.00	0.00	0.00	BPWILDOMAR_2
INLAND_VALLEY_4	3: Multiple Point Curve	1,329.19	12.00	0.00	0.00	0.00	BPWILDOMAR_2
LA_LAGUNA1_1	1: Design Point Curve	1,616.95	12.00	0.00	245.30	639.00	
LA_LAGUNA1_2	1: Design Point Curve	1,616.95	12.00	0.00	256.90	639.00	
LA_LAGUNA1_3	1: Design Point Curve	1,616.95	12.00	0.00	261.00	639.00	
LA_LAGUNA2_1	1: Design Point Curve	2,018.03	12.00	0.00	208.50	256.00	
LA_LAGUNA2_2	1: Design Point Curve	2,018.03	12.00	0.00	208.50	256.00	
LA_LAGUNA2_3	1: Design Point Curve	2,018.03	12.00	0.00	208.50	256.00	
LAKESHORE_1	1: Design Point Curve	1,272.24	12.00	0.00	46.20	1,000.00	
LAKESHORE_2	1: Design Point Curve	1,272.22	12.00	0.00	42.70	1,000.00	
LAKESHORE_3	1: Design Point Curve	1,272.26	12.00	0.00	46.00	1,000.00	
LAKESHORE_4	1: Design Point Curve	1,272.26	12.00	0.00	48.10	1,000.00	
LEMON_GROVE_1	1: Design Point Curve	1,573.26	12.00	0.00	500.00	70.00	
LEMON_GROVE_2	1: Design Point Curve	1,573.26	12.00	0.00	540.00	70.00	
LEMON_GROVE_3	1: Design Point Curve	1,573.26	12.00	0.00	500.00	70.00	
LEMON_GROVE_4	1: Design Point Curve	1,573.23	12.00	0.00	500.00	70.00	
LEMON_GROVE_5	1: Design Point Curve	1,573.23	12.00	0.00	500.00	70.00	
LOS_PINOS_2A_1	1: Design Point Curve	2,663.77	12.00	0.00	750.00	101.00	
LOS_PINOS_2A_2	1: Design Point Curve	2,663.77	12.00	0.00	750.00	93.00	
LOS_PINOS_2B_1	3: Multiple Point Curve	3,104.32	12.00	0.00	0.00	0.00	BPLOSPINOS2B_1
LOS_PINOS_2B_2	3: Multiple Point Curve	3,104.43	12.00	0.00	0.00	0.00	BPLOSPINOS2B_2
LOS_PINOS1_1	3: Multiple Point Curve	2,294.71	12.00	0.00	0.00	0.00	BPLOSPINOS1_1
LOS_PINOS1_2	3: Multiple Point Curve	2,294.51	12.00	0.00	0.00	0.00	BPLOSPINOS1_2
LOWER_MEADOWBROOK_1	3: Multiple Point Curve	1,348.35	12.00	0.00	144.40	1,141.00	BPLOMEADOWBROOK_1
LOWER_MEADOWBROOK_2	3: Multiple Point Curve	1,348.35	12.00	0.00	144.50	1,151.00	BPLOMEADOWBROOK_2
LOWER_MEADOWBROOK_3	3: Multiple Point Curve	1,348.35	12.00	0.00	144.10	1,141.00	BPLOMEADOWBROOK_3

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve Identifier
LUCERNE_1	3: Multiple Point Curve	1,324.81	12.00	0.00	0.00	0.00	BPLUCERNE_1
LUCERNE_2	3: Multiple Point Curve	1,324.86	12.00	0.00	0.00	0.00	BPLUCERNE_2
LUCERNE_3	3: Multiple Point Curve	1,324.70	12.00	0.00	0.00	0.00	BPLUCERNE_3
LUCERNE_4	3: Multiple Point Curve	1,324.23	12.00	0.00	0.00	0.00	BPLUCERNE_4
MEADOWBROOK2_1	3: Multiple Point Curve	1,668.57	12.00	0.00	0.00	0.00	BPUPMEADOW_1
MEADOWBROOK2_2	3: Multiple Point Curve	1,668.57	12.00	0.00	0.00	0.00	BPUPMEADOW_2
MEADOWBROOK2_3	3: Multiple Point Curve	1,668.40	12.00	0.00	0.00	0.00	BPUPMEADOW_3
ORTEGA_1	3: Multiple Point Curve	1,314.00	12.00	0.00	199.60	974.00	ORTEGA_B1
ORTEGA_2	3: Multiple Point Curve	1,313.98	12.00	0.00	199.40	991.00	ORTEGA_B2
ORTEGA_3	1: Design Point Curve	1,313.92	12.00	0.00	199.80	1,008.00	
ORTEGA_4	1: Design Point Curve	1,313.91	12.00	0.00	180.50	1,092.00	
RICE_CYN_1	3: Multiple Point Curve	1,476.22	12.00	0.00	0.00	0.00	BPRICECYN_1
RICE_CYN_2	3: Multiple Point Curve	1,476.29	12.00	0.00	0.00	0.00	BPRICECYN_2
RICE_CYN_3	3: Multiple Point Curve	1,476.29	12.00	0.00	0.00	0.00	BPRICECYN_3
RICE_CYN_4	3: Multiple Point Curve	1,476.33	12.00	0.00	0.00	0.00	BPRICECYN_4
ROSETTA_CYN1_1	3: Multiple Point Curve	1,275.94	12.00	0.00	0.00	0.00	BPROSETTACYN_1
ROSETTA_CYN1_2	3: Multiple Point Curve	1,275.94	12.00	0.00	0.00	0.00	BPROSETTACYN_2
ROSETTA_CYN1_3	3: Multiple Point Curve	1,275.94	12.00	0.00	0.00	0.00	BPROSETTACYN_3
ROSETTA_CYN2_1	1: Design Point Curve	1,567.00	12.00	0.00	236.00	1,000.00	
ROSETTA_CYN2_2	1: Design Point Curve	1,567.00	12.00	0.00	236.00	1,000.00	
ROSETTA_CYN2_3	1: Design Point Curve	1,567.00	12.00	0.00	236.00	1,000.00	
ROSETTA_CYN2_4	1: Design Point Curve	1,567.00	12.00	0.00	236.00	1,000.00	
SEDCO_A	3: Multiple Point Curve	1,464.77	12.00	0.00	0.00	0.00	BPSEDCO_A
SEDCO_B	3: Multiple Point Curve	1,790.94	12.00	0.00	0.00	0.00	BPSEDCO_B
SKYLARK_1	0: Constant Power Input	1,352.01	10.00	40.00	0.00	0.00	
SKYLARK_2	0: Constant Power Input	1,352.14	10.00	40.00	0.00	0.00	
SKYLARK_3	0: Constant Power Input	1,352.37	10.00	40.00	0.00	0.00	
SKYMEADOWS_1	1: Design Point Curve	1,805.99	12.00	0.00	1,490.00	179.00	
SKYMEADOWS_2	1: Design Point Curve	1,805.63	12.00	0.00	1,472.00	150.00	
STAGE_RANCH1_1	1: Design Point Curve	1,404.01	12.00	0.00	459.20	442.00	
STAGE_RANCH1_2	1: Design Point Curve	1,404.01	12.00	0.00	433.60	462.00	
STAGE_RANCH2_1	1: Design Point Curve	1,820.64	12.00	0.00	462.40	598.00	

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Constant Power (hp)	Design Head (ft)	Design Flow (gpm)	Curve Identifier
STAGE_RANCH2_2	1: Design Point Curve	1,820.64	12.00	0.00	441.70	558.00	
SUMMERHILL_1	3: Multiple Point Curve	1,286.83	12.00	0.00	0.00	0.00	BPSUMMERHILL_1
SUMMERHILL_2	3: Multiple Point Curve	1,286.83	12.00	0.00	0.00	0.00	BPSUMMERHILL_2
SUMMERHILL_3	3: Multiple Point Curve	1,286.83	12.00	0.00	0.00	0.00	BPSUMMERHILL_3
TOMLIN1_1	3: Multiple Point Curve	1,439.78	12.00	0.00	0.00	0.00	BPTOMLIN1_1
TOMLIN1_2	3: Multiple Point Curve	1,440.02	12.00	0.00	0.00	0.00	BPTOMLIN1_2
TOMLIN2_1	3: Multiple Point Curve	1,802.38	12.00	0.00	0.00	0.00	BPTOMLIN2_1
TOMLIN2_2	1: Design Point Curve	1,799.53	12.00	0.00	502.70	215.00	
TUSCANY1_1	1: Design Point Curve	1,331.34	12.00	0.00	391.50	900.00	
TUSCANY1_2	1: Design Point Curve	1,331.34	12.00	0.00	387.40	900.00	
TUSCANY1_3	1: Design Point Curve	1,331.34	12.00	0.00	390.60	900.00	
TUSCANY1_4	1: Design Point Curve	1,331.34	12.00	0.00	381.60	917.00	
TUSCANY2_1	3: Multiple Point Curve	1,769.44	12.00	0.00	0.00	0.00	BPTUSCANY2_1
TUSCANY2_2	3: Multiple Point Curve	1,769.73	12.00	0.00	0.00	0.00	BPTUSCANY2_2
WAITE_1	1: Design Point Curve	1,299.69	12.00	0.00	78.30	1,465.00	
WAITE_2	1: Design Point Curve	1,299.69	12.00	0.00	78.30	1,465.00	
WAITE_3	1: Design Point Curve	1,299.69	12.00	0.00	55.60	1,184.00	
WAITE_4	1: Design Point Curve	1,299.69	12.00	0.00	47.20	1,028.00	
WOODMOOR_1	1: Design Point Curve	1,370.63	12.00	0.00	200.00	600.00	
WOODMOOR_2	1: Design Point Curve	1,370.70	12.00	0.00	200.00	600.00	
WOODMOOR_3	1: Design Point Curve	1,370.67	12.00	0.00	200.00	600.00	
WOODMOOR_4	1: Design Point Curve	1,370.80	12.00	0.00	200.00	600.00	

Table A - 9. GIS Attributes of Pump Stations and Pumps

GIS NAME	GIS LOCATION	GIS STATUSCODE	GIS PRESSUREZO	GIS INSTALLDAT	GIS NOPUMPS	GIS PUMPING_CA	GIS HORSEPOWER
Adelfa PS	17309 Akley St.	ACT	1650	2014	2	800 GPM	75
Alberhill 1 Booster (Temporary)	3712 Nichols Rd	ACT			0		
Alberhill 2 Booster (Temporary)	6019 Alberhill Ranch Rd	ACT			0		
Amie Sustaining	17211 Sunnyslope	ACT			2		
Auld Valley PS	24281 Hancock Ave	ACT	1434	1989	4	4400/4400/4400/4400	250/250/250/250
Beck	33420 Mitchell Dr	ACT	1820		2	30/30	30/30
Bundy Canyon PS	21785 Bundy Canyon Dr	ACT	1434	1994	3	400/800/900	125/100/100
Bundy East	21785 Bundy Canyon Rd	ACT			0		

GIS NAME	GIS LOCATION	GIS STATUSCODE	GIS PRESSUREZO	GIS INSTALLDAT	GIS NOPUMPS	GIS PUMPING_CA	GIS HORSEPOWER
Cal Oaks PS	24281 Hancock Ave	ACT	1650	1989	4	1100/1100/1100/1100	100/100/100/100
Canyon Lake PS	202 Via De La Valle	ACT	1800		4	1300/1300/1300/1300	100/100/100/100
Canyon Lake Sustaining	30849 Blackhorse Dr	ACT	1618.5	1970	2	300/500	30/30/40
Cielo Vista Sustaining	35197 Orange St	ACT	1434		2	150/150	20/20
Cirrus Circle PS	27809 Cirrus Circle	ACT			0		
City Booster	521 N Langstaff St	ACT	1434		3	850/850/850	50/50/50
Coldwater Booster	24636 Temescal Canyon Rd	ACT	1434	2012	2	500/500	25/25
Cottonwood 1 Booster	21980 Railroad Canyon Rd	ACT	1750	2003	2	1667/1667	200
Cottonwood 2 Booster	113 Cedar Lane	ACT	1934	2003	3	50/50/50	60/60/60
Daley A PS	22749 Lost Rd	ACT	2309		2	0/15	15/15
Daley B PS	23245 Crab Hollow	ACT	2309		2	120/120	15/15
Encina PS	17255 Encina Dr	ACT	1916.5	2011	3	750/750/750	75/75/75
Farm PS	23810 Bundy Canyon Rd	ACT	1900	1989	2	1100/1100	100/100
Grand Ave PS	18861 Grand Ave	ACT	1434	1989	3	1000/1500/2500	60/100/125
Greer Ranch 1/Greer Ranch 2 PS	35915 Evandel Rd	ACT	20501850	2004	3	50/100	
Horsethief 1 PS	26665 Hostettler Rd	ACT	1601		4	125/125/125	
Horsethief 2 PS	13630 Mountain Rd	ACT	1601	1991	3	900/900/900	75/75/75
Inland Valley Booster	24225 Prielipp Rd	ACT	1434	2007	4	1500 1500 1500 1500	150 150 150 150
La Laguna 1 PS	15425 McVicker Canyon Park Rd	ACT	2040	2005	3	600/600/600	60/60/60
La Laguna 2 PS	29300 Gateway Dr	ACT	2240	2006	3	256 256 256	25 25 25
Lakeshore Booster	2087 Lakeshore Dr	ACT	1434	1991	4	4000/4000/4000/4000	85/85/85/85
Lemon Grove Sustaining	27697 Kachina Ct	ACT	1801	2002	5	35/35/150/150/1000	7.5/7.5/25/25/150
Los Pinos 1 PS	77 Grand-Ortega B3	ACT	2778		2	270/270	50/50
Los Pinos 2A PS	39251 General Pinchot Lower	ACT	2778		2	90/90	15/15
Los Pinos 2B PS	39251 General Pinchot Upper	ACT	3501		2	90/90	15/15
Lower Meadowbrook PS	77 Conard	ACT	1701	2003	2	500/500/820	50/50/100
Lucerne PS	15070 Lincoln Ave	ACT	1601	1989	4	1030/1030/1030/1030	75/75/75/75
Meadowbrook 1 /Rosetta Canyon 2 PS	222 Crimson Pillar Ln	ACT	17011801	2006	4	800/800/1333/1333	50/50/150/150
Meadowbrook 2 PS	77 El Toro	ACT	1701	2004	3	500/500/500	40/40/40
Ortega PS	15171 Anchor Way	ACT	1601	1990	3	1000/1000/1000	75/75/75
Pats Point Booster	23870 Lawson Rd	ACT	1358.7	1984	0		
Rice Canyon PS	16482 Orange Grove Way	ACT	1800	1988	3	850/850/850	75/75/75
Rosetta Canyon 1 PS	761 Third St	ACT	1601	2005	3	2400/2400/2400	250/250/250
Sedco A PS	32660 Grape St	ACT	2196		1	160	20
Sedco B PS	32395 Elsinore Heights Dr	ACT	2196		1	160	20
Skylark Sustaining	19613 Grand Ave	ACT	1434		2	100/100	10/10/2025
Skymeadows PS	33850 Encina Dr	ACT	3300		2	175/175	100/100
Stage Ranch 1 PS	33440 Hixon St	ACT	1434	1977	2	500/500	75/75
Stage Ranch 2 PS	34250 Enderlein St	ACT	2217	1977	2	500/500	100/100
Stage Ranch 3 PS	35200 Enderlein St	ACT	2217	1977	2		75/75
Summerhill PS	31636 Canyon Estates	ACT	1434	1990	3	900/900/900	100/100/100
Tomlin 1 PS	15049 Grand Ave	ACT	1601		2	436/497	50/60
Tomlin 2 PS	77 Grand-Ortega B2	ACT	2313		2	300/300	50/60
Tuscany 1 PS	200 Via De La Valle	ACT	1800	1989	4	950/950/950/950	125/125/125/125
Tuscany 2 PS	21 Bella Lucia	ACT	1800	1990	2	400/400	25/25
Waite St PS	31820 Central Ave	ACT	1434	1988	4	1000/1000/1000	50/50/50/10
Woodmoor PS	33295 Sweet Nectar Rd	ACT	1601	2007	4	940/940/940/940	75/75/75/75

Table A - 10. GIS Attributes of Pumps

GIS NAME	GIS LOCATION	2016 WSMP Pump Unit Number	2016 WSMP Location	2016 WSMP Suction Zone	2016 WSMP Discharge Zone	2016 WSMP Horsepower	2016 WSMP Year Installed	2016 WSMP TDH (ft)	2016 WSMP Flow Capacity (gpm)	InfoWater Curve	SCE Test Date
Adelfa PS	17309 Akley St.	1	Adelfa & Akley	1428	1650	30	2014	198	327		8/15/14
		2	Adelfa & Akley	1428	1650	30	2014	202	266		8/18/15
Alberhill 1 Booster (Temporary)	3712 Nichols Rd										
Alberhill 2 Booster (Temporary)	6019 Alberhill Ranch Rd										
Amie Sustaining	17211 Sunnyslope										
Auld Valley PS	24281 Hancock Ave	5	24281 Hancock Ave	AVP	1434	250	1989	58	5250	BPAULDVALLEY_6CAL	9/5/14
		6	24281 Hancock Ave	AVP	1434	250	1989	62	5510	BPAULDVALLEY_6CAL	9/5/14
		7	24281 Hancock Ave	AVP	1434	250	1989	53	4870	BPAULDVALLEY_7	9/5/14
		8	24281 Hancock Ave	AVP	1434	250	1989	78	5251	BPAULDVALLEY_8	9/28/12
Beck	33420 Mitchell Dr	1	33420 Mitchell Dr	1581	1842	30			30		
		2	33420 Mitchell Dr	1581	1842	30			30		
Bundy Canyon PS	21785 Bundy Canyon Dr	1	21785 Bundy Canyon Dr	1434	1746	125	1994	342	400	BPBUNDYCYN_1	4/3/15
		2	21785 Bundy Canyon Dr	1434	1746	100	1994	327	800	BPBUNDYCYN_2	4/3/15
		3	21785 Bundy Canyon Dr	1434	1746	100	1994	338	900	BPBUNDYCYN_3	4/3/15
Bundy East	21785 Bundy Canyon Rd	1									
		2									
Cal Oaks PS	24281 Hancock Ave	1	24281 Hancock Ave	1380	1650	100	1989	313	940	BPCALOAKS_1	9/5/14
		2	24281 Hancock Ave	1380	1650	100	1989	289	1110	BPCALOAKS_2	9/5/14
		3	24281 Hancock Ave	1380	1650	100	1989	312	1060	BPCALOAKS_3	9/5/14
		4	24281 Hancock Ave	1380	1650	100	1989	316	1000	BPCALOAKS_4	9/5/14
Canyon Lake PS	202 Via De La Valle	1	202 Via De La Valle	1434	1622	100		215	1240	BPCYNLAKE_1	9/12/14
		2	202 Via De La Valle	1434	1622	100		214	1190	BPCYNLAKE_2	9/12/14
		3	202 Via De La Valle	1434	1622	100		213	1250	BPCYNLAKE_3	9/12/14
		4	202 Via De La Valle	1434	1622	100		213	1320	BPCYNLAKE_4	9/12/14
Canyon Lake Sustaining	30849 Blackhorse Dr	1	30849 Blackhorse Dr	1622	1850	30	1970		300		
		2	30849 Blackhorse Dr	1622	1850	40	1970		500		
Cielo Vista Sustaining	35197 Orange St	1	35197 Orange St	1434	1550	20		191	226		
		2	35197 Orange St	1434	1550	20		193	196		
Cirrus Circle PS	27809 Cirrus Circle										
City Booster	521 N Langstaff St	1	521 N Langstaff St	1434	1579	50		180	810		9/23/16
		2	521 N Langstaff St	1434	1579	50		181	700		9/23/16
		3	521 N Langstaff St	1434	1579	50		181	790		9/23/16
Coldwater Booster	24636 Temescal Canyon Rd	1	24636 Temescal Canyon Rd		1434	25	2012	141	490		4/18/14
		2	24636 Temescal Canyon Rd		1434	25	2012	120	490	COLD_WBASINB2	4/18/14
Cottonwood 1 Booster	21980 Railroad Canyon Rd	1	21980 Railroad Canyon Rd	1434	1746	200	2003	326	940		5/16/14
		2	21980 Railroad Canyon Rd	1434	1746	200	2003	328	1600		5/16/14
Cottonwood 2 Booster	113 Cedar Lane	1	113 Cedar Lane	1750	1934	60	2003	212	540	BPCOTTONWOOD2_1	9/20/13

GIS	GIS	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	InfoWater	SCE
NAME	LOCATION	Pump Unit Number	Location	Suction Zone	Discharge Zone	Horsepower	Year Installed	TDH (ft)	Flow Capacity (gpm)	Curve	Test Date
		2	113 Cedar Lane	1750	1934	60	2003	217	540	BPCOTTONWOOD2_2	9/20/13
		3	113 Cedar Lane	1750	1934			217	560	BPCOTTONWOOD2_3	9/20/13
Daley A PS	22749 Lost Rd	1	23245 Crab Hollow Cir	1746	2216	15		257	80		8/18/15
		2	23245 Crab Hollow Cir	1746	2216	15		270	80	BPDALEYA_2	8/18/15
Daley B PS	23245 Crab Hollow	1	22749 Lost Rd	2216	2216	15		336	80	BPDALEYB_1	8/18/15
		2	22749 Lost Rd	2216	2216	15		329	80	BPDALEYB_2	8/18/15
Encina PS	17255 Encina Dr	1	Adelfa & Encina	1620	1916	75	2011	272	630	BPENCINA_1	7/22/15
		2	Adelfa & Encina	1620	1916	75	2011	277	232	BPENCINA_1	
		3	Adelfa & Encina	1620	1916	75	2011	278	570	BPENCINA_1	7/22/15
Farm PS	23810 Bundy Canyon Rd	1	23810 Bundy Canyon	1746	1900	100	1989	286	920	BPFARMB_1	9/26/14
		2	23810 Bundy Canyon	1746	1900	100	1989	280	960	BPFARMB_2	9/26/14
		3	23810 Bundy Canyon	1746	1900	125	1989				
Grand Ave PS	18861 Grand Ave	1	18861 Grand Ave	1434	1434	125	1989	159	1840	BPGRAND_1	4/10/15
		2	18861 Grand Ave	1434	1434	100	1989	137	1690		4/10/15
		3	18861 Grand Ave	1434	1434	60	1989	71	1060	BPGRAND_3	5/16/14
Greer Ranch 1/Greer Ranch 2 PS	35915 Evandel Rd	1-1	Nutmeg & Evandel	1650	1850		2004	234	551		3/20/15
		1-2	Nutmeg & Evandel	1650	1850		2004	229	557		3/20/15
		1-3	Nutmeg & Evandel	1650	1850			228	554		3/20/15
		2-1	Nutmeg & Evandel	1650	2050			424	580		3/20/15
		2-2	Nutmeg & Evandel	1650	2050			429	602		3/20/15
		2-3	Nutmeg & Evandel	1650	2050			426	591		3/20/15
Horsethief 1 PS	26665 Hostettler Rd	1	13630 Mountain Rd	1434	1601	125	2000	176	1795	BPHORSETHIEF1_1	4/3/15
		2	13630 Mountain Rd	1434	1601	125	2000	174	1767	BPHORSETHIEF1_2	4/3/15
		3	13630 Mountain Rd	1434	1601	125	2000	179	1905	BPHORSETHIEF1_3	4/3/15
		4	13630 Mountain Rd	1434	1601	125	2000				
Horsethief 2 PS	13630 Mountain Rd	1	27260 Horsethief	1601	1801	75	1991	225	900	BPHORSETHIEF2_1	4/3/15
		2	27260 Horsethief	1601	1801	75	1991	225	900	BPHORSETHIEF2_2	4/3/15
		3	27260 Horsethief	1601	1801	75	1991	226	900	BPHORSETHIEF2_3	4/3/15
Inland Valley Booster	24225 Prielipp Rd	1	Prielipp & Inland Valley	1434	1650	150	2007	205	756		
		2	Prielipp & Inland Valley	1434	1650	150	2007	205	756		9/23/16
		3	Prielipp & Inland Valley	1434	1650	150	2007	205	756	BPWILDOMAR_2	9/23/16
		4	Prielipp & Inland Valley	1434	1650	150	2007	205	756	BPWILDOMAR_2	9/23/16
La Laguna 1 PS	15425 McVicker Canyon Park Rd	1	McVicker Canyon Park Rd	1801	2040	60	2005	245	639		8/31/16
		2	McVicker Canyon Park Rd	1801	2040	60	2005	257	693		8/31/16
		3	McVicker Canyon Park Rd	1801	2040	60	2005	261	693		8/31/16
La Laguna 2 PS	29300 Gateway Dr	1	Gateway Dr	2040	2240	25	2006	209	269		
		2	Gateway Dr	2040	2240	25	2006	209	269		
		3	Gateway Dr	2040	2240	25	2006	235	100		
Lakeshore Booster	2087 Lakeshore Dr	1	2087 Lakeshore	1434	1434	85	1991	53	4433		
		2	2087 Lakeshore	1434	1434	85	1991	69	3112		
		3	2087 Lakeshore	1434	1434	85	1991	70	2710		5/20/14
		4	2087 Lakeshore	1434	1434	85	1991	76	2710		5/20/14
Lemon Grove Sustaining	27697 Kachina Ct	1	27697 Kachina Ct	1801	1900	7.5	2002		35		
		2	27697 Kachina Ct	1801	1900	7.5	2002		35		

GIS	GIS	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	InfoWater	SCE
NAME	LOCATION	Pump Unit Number	Location	Suction Zone	Discharge Zone	Horsepower	Year Installed	TDH (ft)	Flow Capacity (gpm)	Curve	Test Date
		3	27697 Kachina Ct	1801	1900	25	2002		150		
		4	27697 Kachina Ct	1801	1900	25	2002		150		
		5	27697 Kachina Ct	1801	1900	150	2002		1000		
Los Pinos 1 PS	77 Grand-Ortega B3	1	77 Grand-Ortega B3	2246	2748	50		559	200	BPLOSPINOS1_1	8/22/14
		2	77 Grand-Ortega B3	2246	2748	50		582	220	BPLOSPINOS1_2	8/22/14
Los Pinos 2A PS	39251 General Pinchot Lower	1	39251 Gen Pinchot	2778	3501	15		365	100		4/23/13
		2	39251 Gen Pinchot	2778	3501	15		414	80		4/23/13
Los Pinos 2B PS	39251 General Pinchot Upper	1	39251 Gen Pinchot	2778	3501	15		385	100	BPLOSPINOS2B_1	4/23/13
		2	39251 Gen Pinchot	2778	3501	15		327	80	BPLOSPINOS2B_2	4/23/13
Lower Meadowbrook PS	77 Conard	1	Conrad & Hwy 74	1601	1701	50	2003		500		
		2	Conrad & Hwy 74	1601	1701	50	2003		500		
		3	Conrad & Hwy 74	1601	1701	100	2003		820		
Lucerne PS	15070 Lincoln Ave	1	15070 Lincoln	1434	1601	75	1989	212	830	BPLUCERNE_1	8/15/14
		2	15070 Lincoln	1434	1601	75	1989	207	840	BPLUCERNE_2	8/15/14
		3	15070 Lincoln	1434	1601	75	1989	209	860	BPLUCERNE_3	8/15/14
		4	15070 Lincoln	1434	1601	75	1989	186	940	BPLUCERNE_4	8/15/14
Meadowbrook 1 /Rosetta Canyon 2 PS	222 Crimson Pillar Ln	1	77 Conrad - 74	1434	1701	100	1962	145	950	BPLOMEADOWBROOK_1	8/31/16
		2	77 Conrad - 74	1434	1701	100	1962	147	950	BPLOMEADOWBROOK_2	8/31/16
		3	77 Conrad - 74	1434	1701	100	1962	225	1970	BPLOMEADOWBROOK_3	5/20/14
		4	77 Conrad - 74	1434	1701	100	1962	231	1970		8/31/16
Meadowbrook 2 PS	77 El Toro	1	77 El Toro - 74	1701	1896	40	2004	223	540	BPUPMEADOW_1	5/20/14
		2	77 El Toro - 74	1701	1896	40	2004	222	560	BPUPMEADOW_2	5/20/14
		3	77 El Toro - 74	1701	1896	40	2004	226	550	BPUPMEADOWB3	5/20/14
Ortega PS	15171 Anchor Way	1	15171 Anchor Way	1434	1601	75	1990	184	860	ORTEGA_B1	5/16/14
		2	15171 Anchor Way	1434	1601	75	1990	202	970	ORTEGA_B2	5/16/14
		3	15171 Anchor Way	1434	1601	75	1990	200	1008		8/18/15
		4	15171 Anchor Way	1434	1601	75	1990				
Pats Point Booster	23870 Lawson Rd									BPPATSPOINT	
Rice Canyon PS	16482 Orange Grove Way	1	16482 Orange Grove Way	1601	1800	75	1988	214	960	BPRICECYN_1	8/31/16
		2	16482 Orange Grove Way	1601	1800	75	1988	214	1017	BPRICECYN_2	8/31/16
		3	16482 Orange Grove Way	1601	1800	75	1988	215	979	BPRICECYN_3	8/31/16
		4	16482 Orange Grove Way	1601	1800					BPRICECYN_4	8/31/16
Rosetta Canyon 1 PS	761 Third St	1	3rd & Collier	1434	1601		2006	178	3445	BPRAMSGATE1601_1	
		2	3rd & Collier	1434	1601		2006	237	2990	BPRAMSGATE1601_2	8/31/16
		3	3rd & Collier	1434	1601		2006	234	2910	BPRAMSGATE1601_3	8/31/16
Sedco A PS	32660 Grape St	1	32550 HWY 71	1746	2201	20		335	209	BPSEDCOA	3/20/15
Sedco B PS	32395 Elsinore Heights Dr	1	32660 HWY 71	2201	2201	20		325	160	BPSEDCOB	3/20/15
Skylark Sustaining	19613 Grand Ave	1									
		2									
Skymeadows PS	33850 Encina Dr	1	33850 Encina Dr	1916.5	3300	100		1446	150		
		2	33850 Encina Dr	1916.5	3300			971	260		4/23/13

GIS	GIS	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	2016 WSMP	InfoWater	SCE
NAME	LOCATION	Pump Unit Number	Location	Suction Zone	Discharge Zone	Horsepower	Year Installed	TDH (ft)	Flow Capacity (gpm)	Curve	Test Date
Stage Ranch 1 PS	33440 Hixon St	1	33440 Hixon St	1434	1882	75	1977	459	410		8/15/14
		2	33440 Hixon St	1434	1882	75	1977	446	430		8/15/14
Stage Ranch 2 PS	34250 Enderlein St	1	34250 Enderlein St	1882	2217	100	1977	449	580		8/15/14
		2	34250 Enderlein St	1882	2217	100	1977	443	530		8/15/14
Stage Ranch 3 PS	35200 Enderlein St										
Summerhill PS	31636 Canyon Estates	1	31636 Canyon Estates	1434	1601	100	1990	188	1176	BPSUMMERHILL_1	
		2	31636 Canyon Estates	1434	1601	100	1990	188	1230	BPSUMMERHILL_2	
		3	31636 Canyon Estates	1434	1601	100	1990	190	1213	BPSUMMERHILL_3	
Tomlin 1 PS	15049 Grand Ave	1	15049 Grand Ave	1601	1871	50		378	450	BPTOMLIN1_1	8/22/14
		2	15049 Grand Ave	1601	1871	60		366	390	BPTOMLIN1_2	8/22/14
Tomlin 2 PS	77 Grand-Ortega B2	1	77 Grand-Ortega B2	1871	2246	50		505	270	BPTOMLIN2_1	10/3/14
		2	77 Grand-Ortega B2	1871	2246	60		499	230		10/3/14
Tuscany 1 PS	200 Via De La Valle	1	200 Via De La Valle	1434	1800	125	1989	387	880		5/16/14
		2	200 Via De La Valle	1434	1800	125	1989	387	880		5/16/14
		3	200 Via De La Valle	1434	1800	125	1989	387	920		9/23/16
		4	200 Via De La Valle	1434	1800	125	1989	383	890		9/23/16
Tuscany 2 PS	21 Bella Lucia	1	21 Bel Lucia	1800	1940	25	1990	190	1228	BPTUSCANY2_1	
		2	21 Bel Lucia	1800	1940	25	1990	193	1193	BPTUSCANY2_2	
Waite St PS	31820 Central Ave	1	31820 Central	1434	1467	50	1988				
		2	31820 Central	1434	1467	50	1988	93	1150		9/23/16
		3	31820 Central	1434	1467	50	1988	82	970		9/23/16
		4	31820 Central	1434	1467	50	1988	77	1020		9/23/16
Woodmoor PS	33295 Sweet Nectar Rd	1	33295 Sweet Nectar Rd	1434	1601	75	2007		940		9/23/16
		2	33295 Sweet Nectar Rd	1434	1601	75	2007		940		9/23/16
		3	33295 Sweet Nectar Rd	1434	1601	75	2007		940		9/23/16
		4	33295 Sweet Nectar Rd	1434	1601	75	2007		940		9/23/16

Pump Curves

The pump curves in the updated InfoWater model are shown in the graphs below. The curves are identified by the name assigned in the updated InfoWater model. At some stations pumps may have similar or identical curves, so they may be plotted on top of each other.

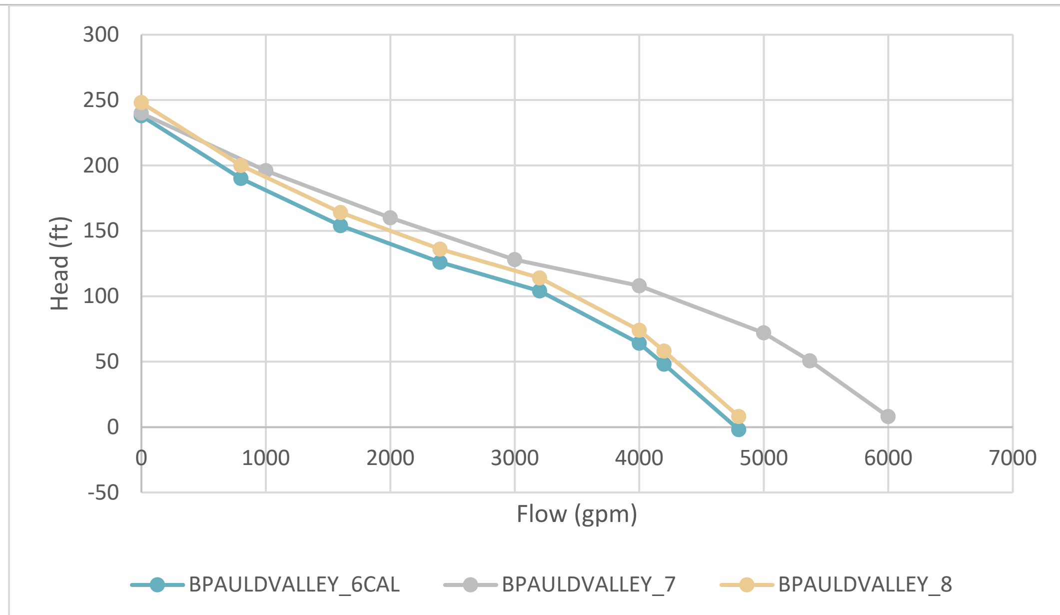


Figure A-1. Auld Valley Pump Curves

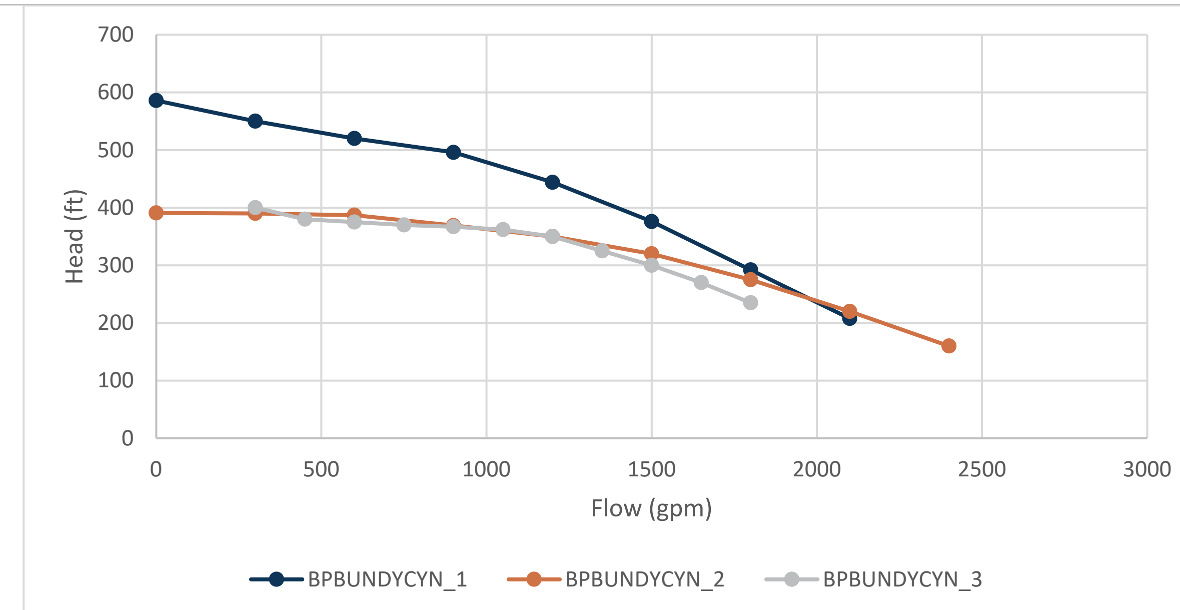


Figure A-2. Bundy Canyon Pump Curves

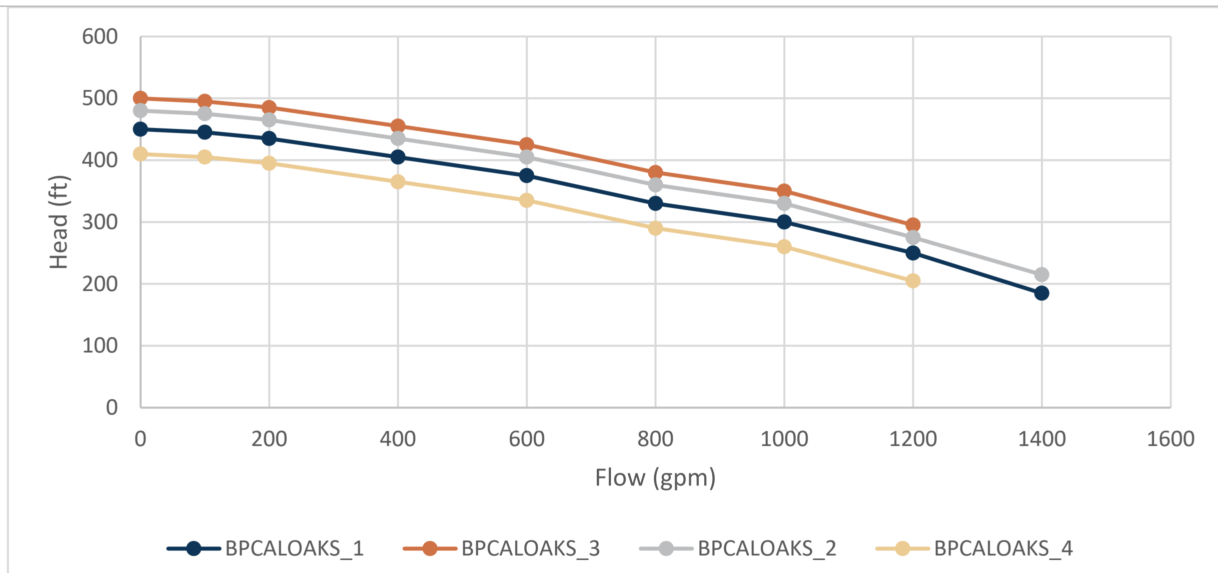


Figure A-3. Cal Oaks Pump Curves

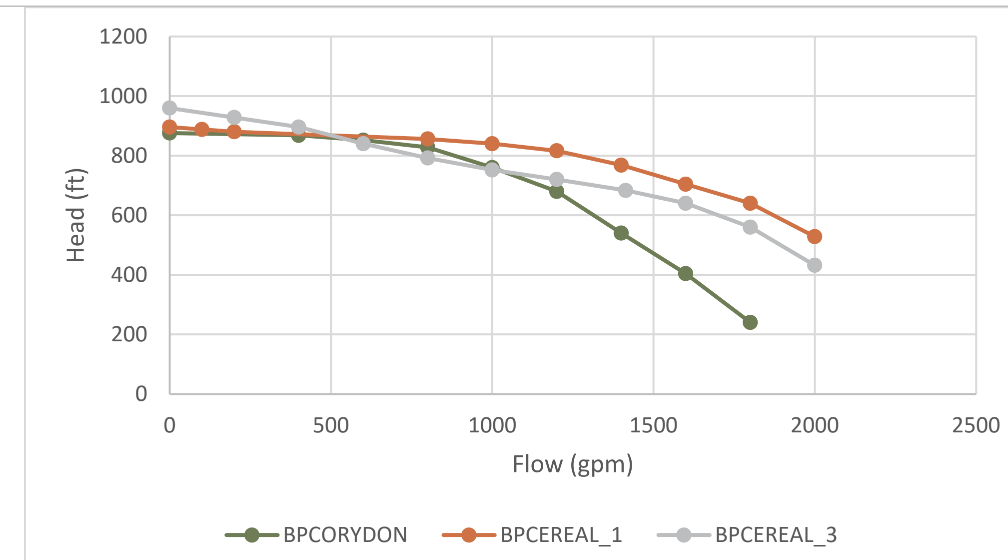


Figure A-4. Cereal 1, Cereal 3, and Corydon Pump Curves

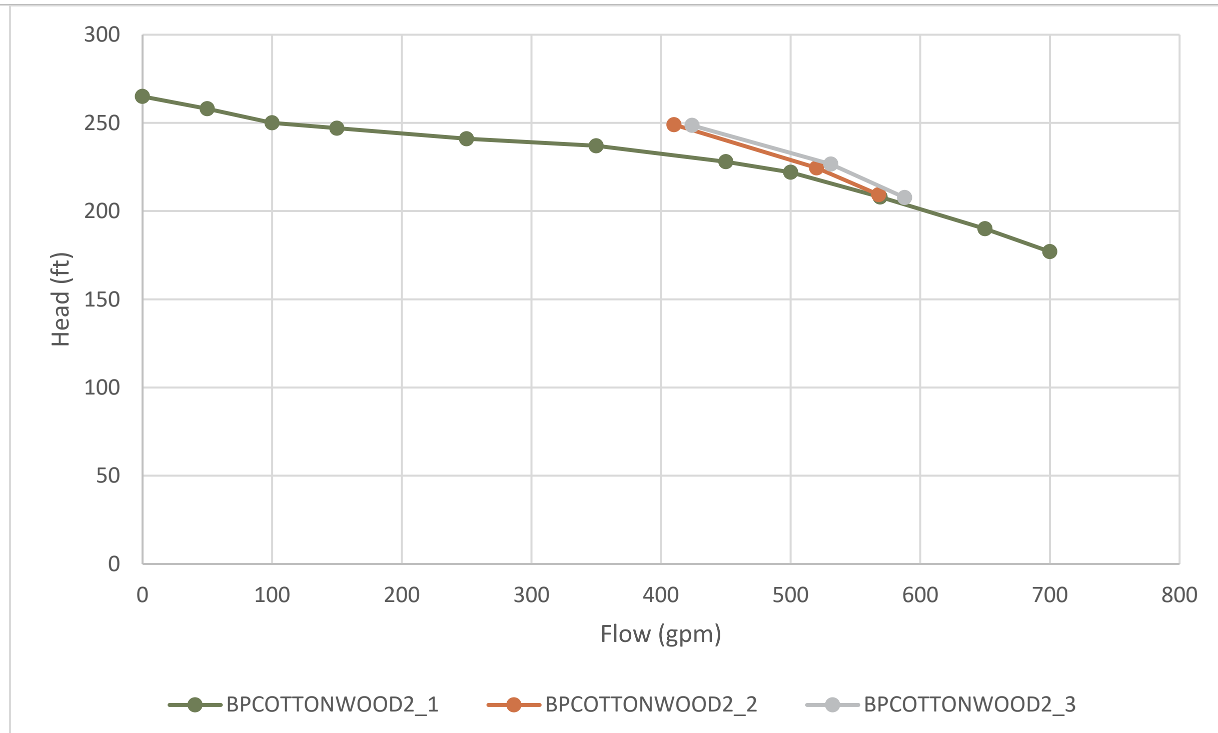


Figure A-5. Cottonwood 2 Pump Curves

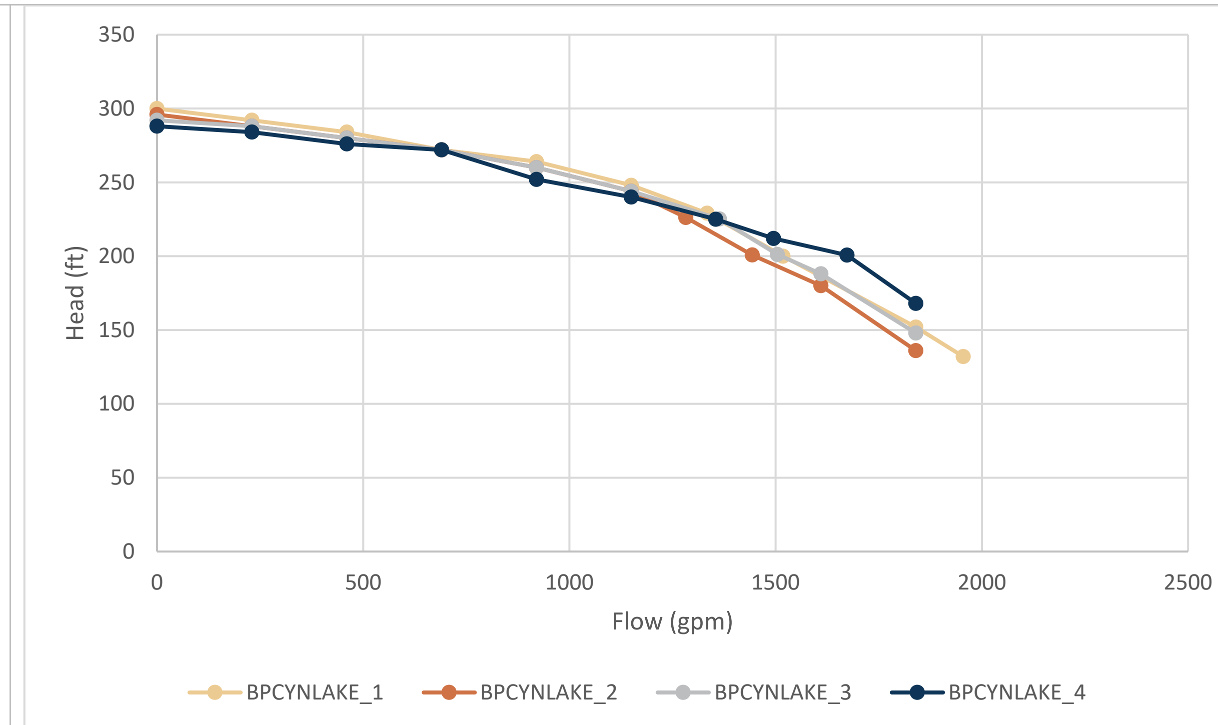


Figure A-6. Canyon Lake Pump Curves

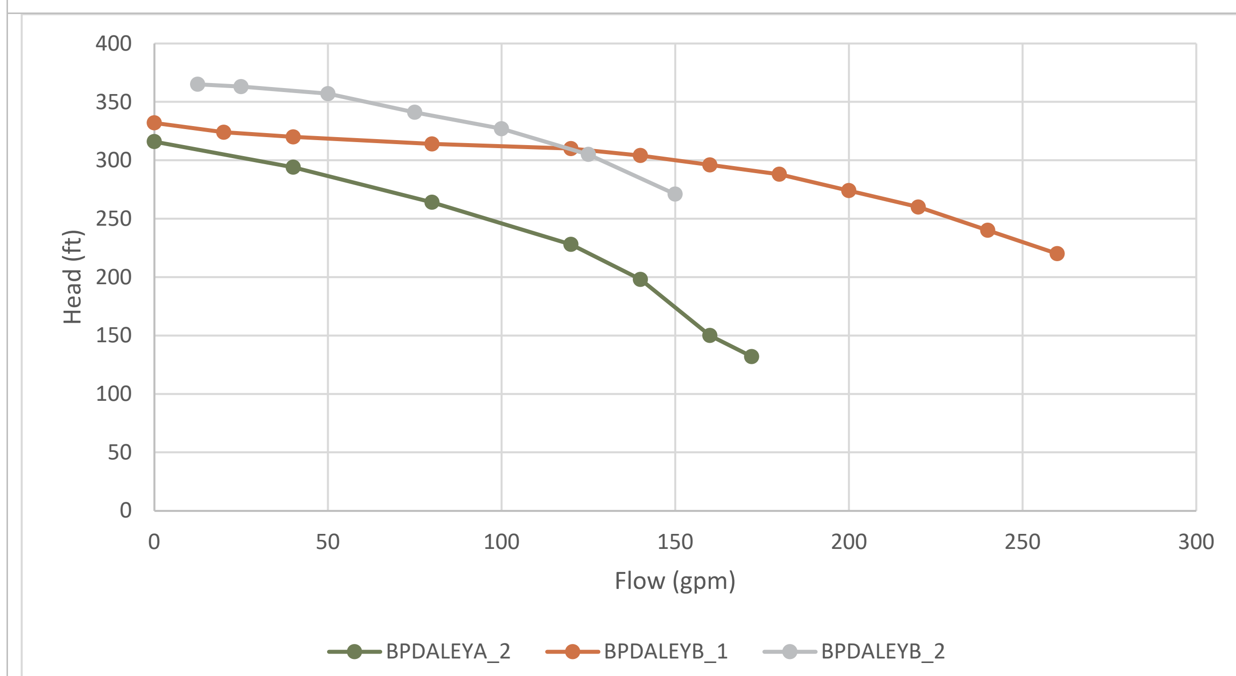


Figure A-7. Daley A and B Pump Curves

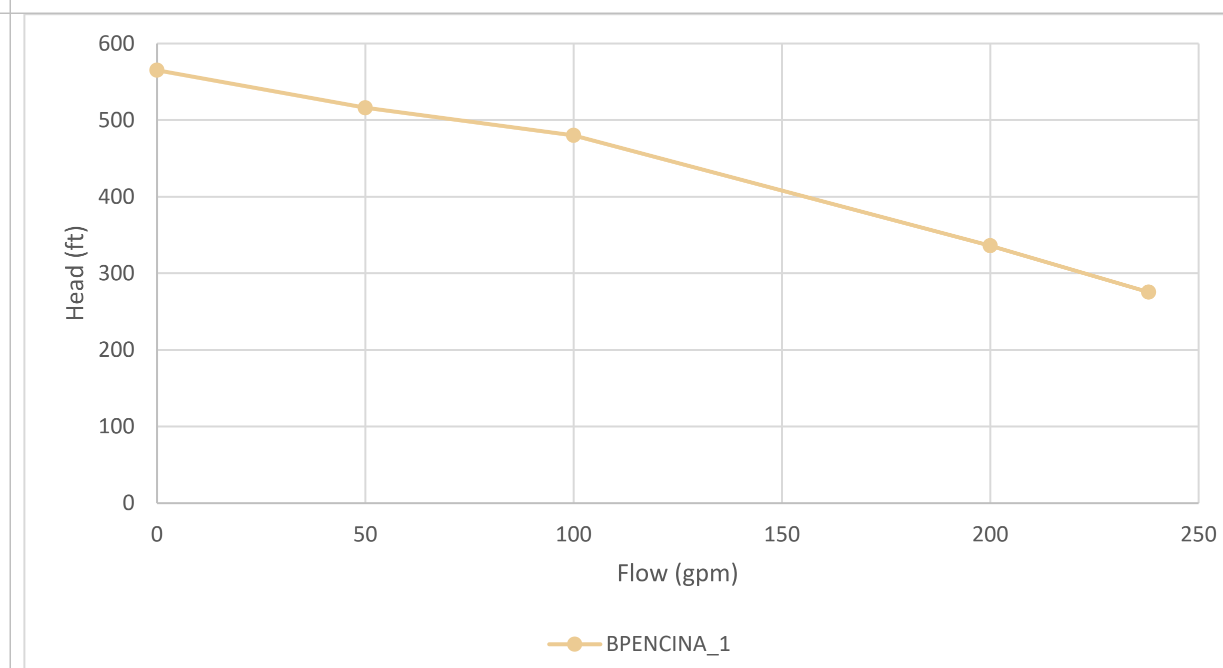


Figure A-8. Encina Pump Curves

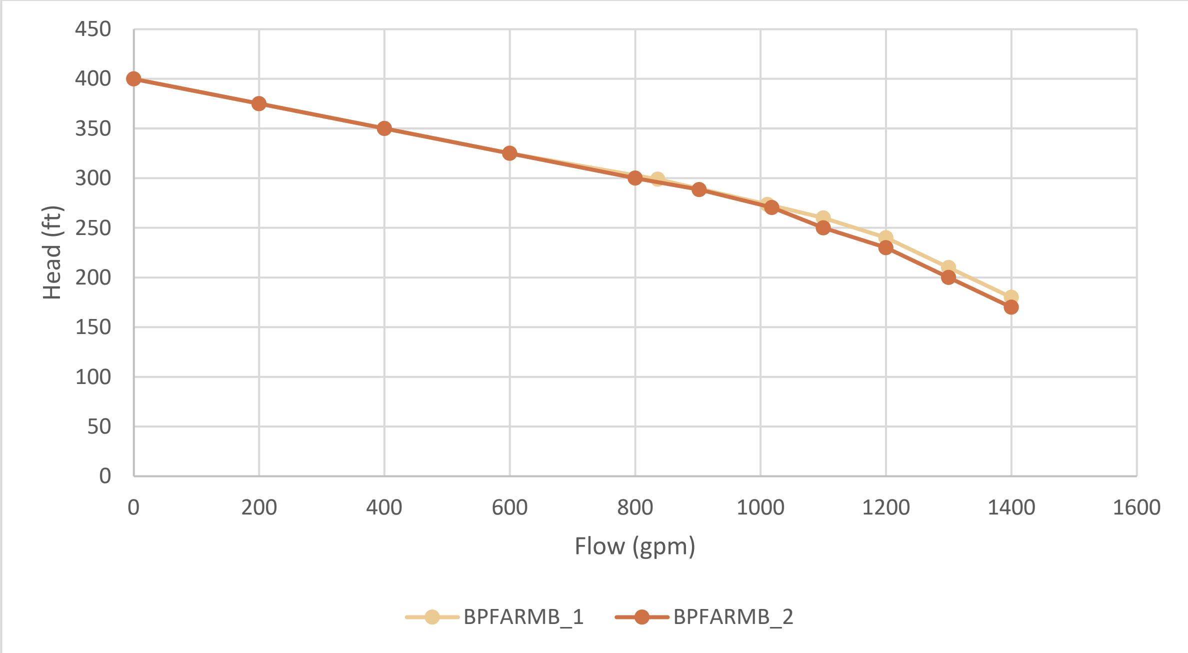


Figure A-9. Farm Pump Curves

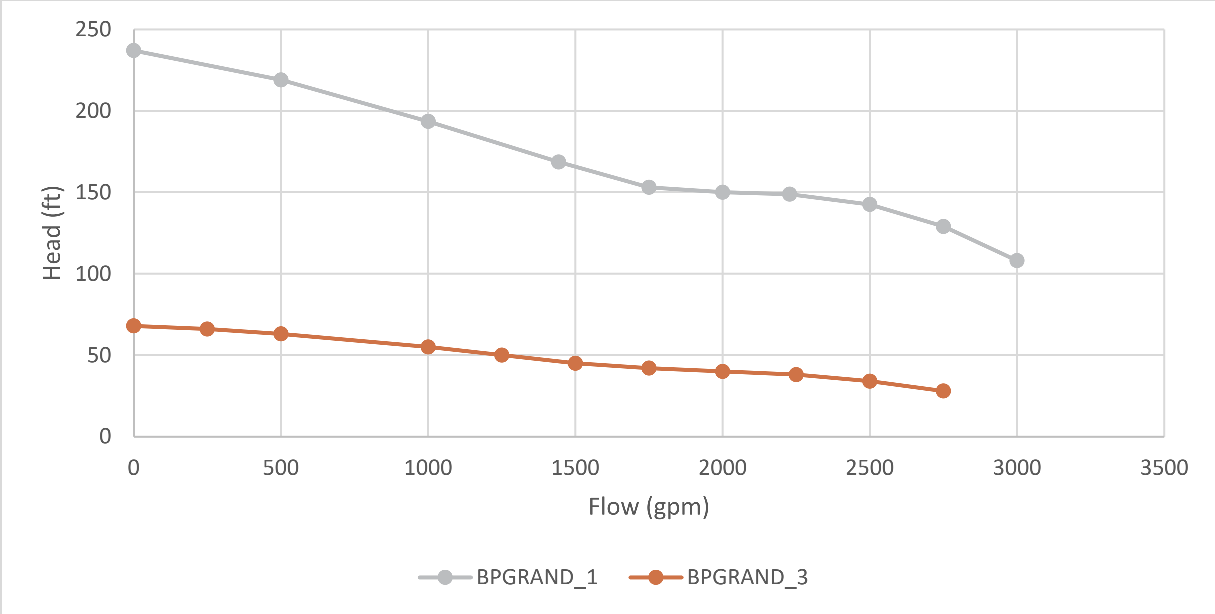


Figure A-10. Grand Pump Curves

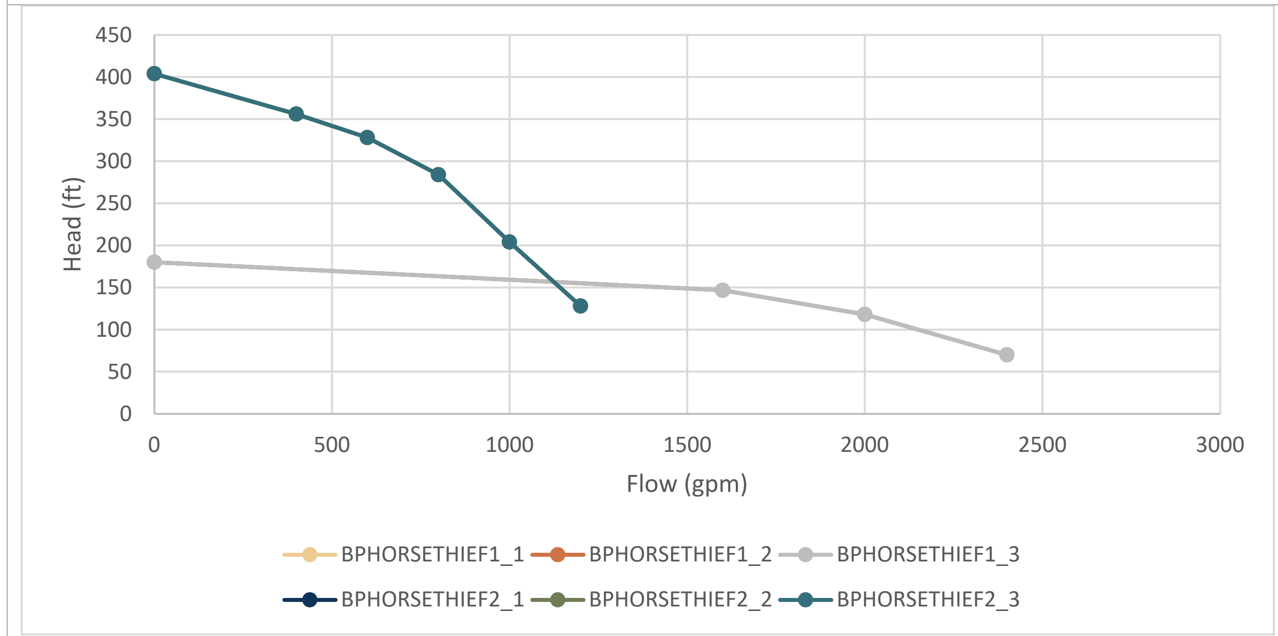


Figure A-11. Horsethief 1 and 2 Pump Curves

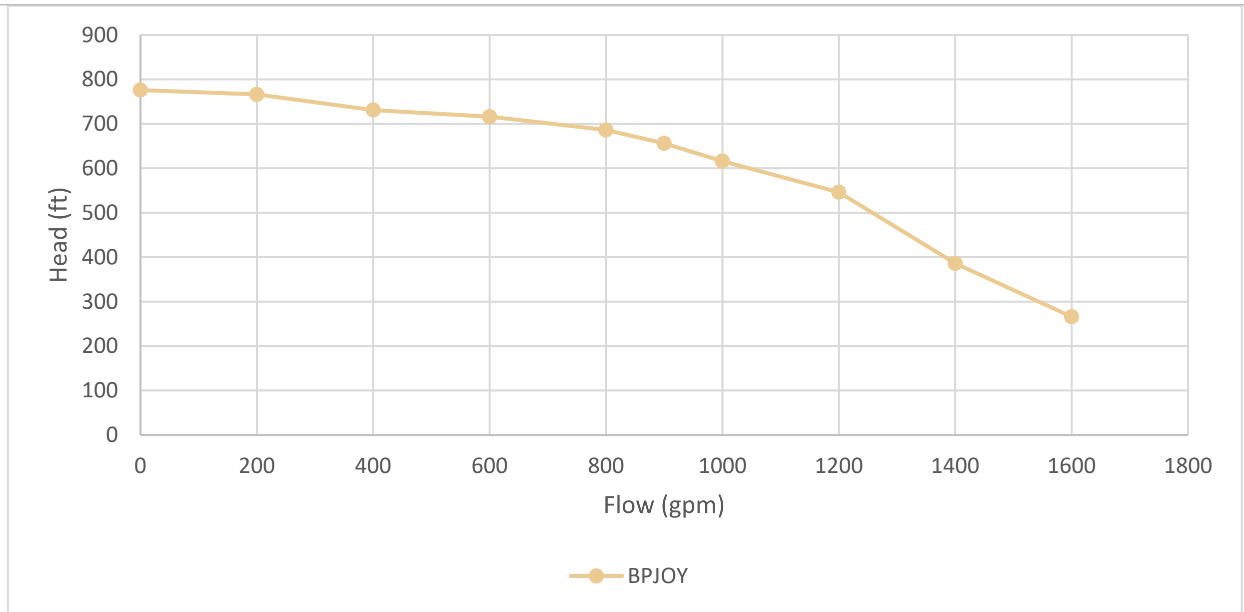


Figure A-12. Joy St. Pump Curves

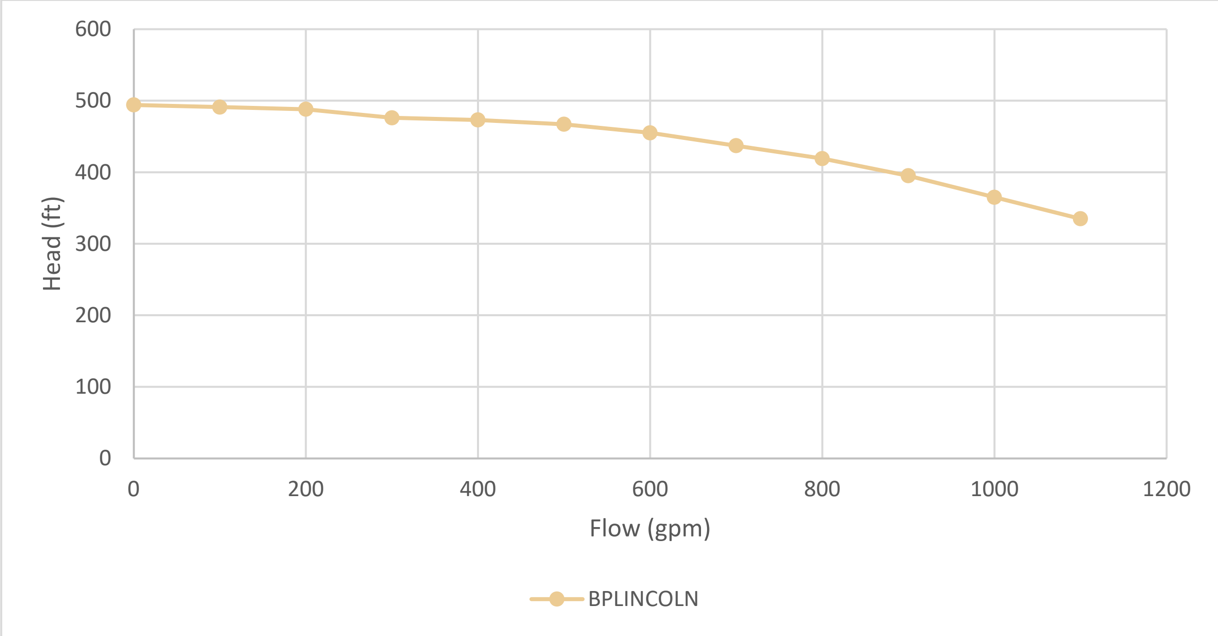


Figure A-13. Lincoln Pump Curve

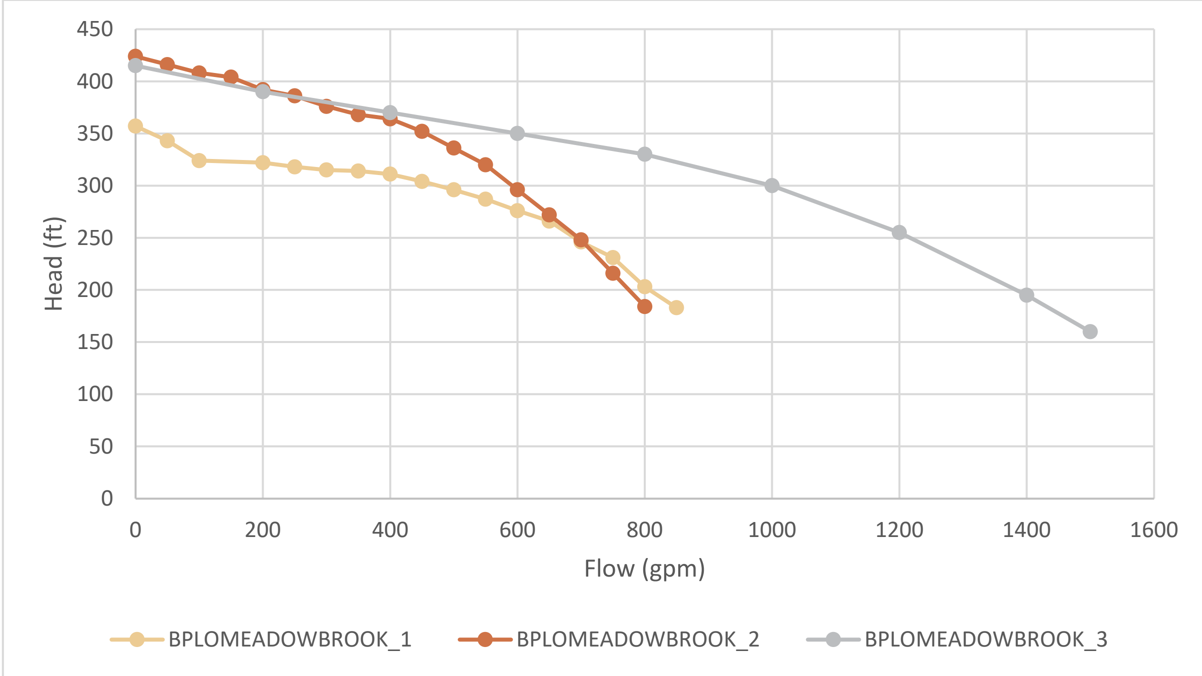


Figure A-14. Lower Meadowbrook Pump Curves

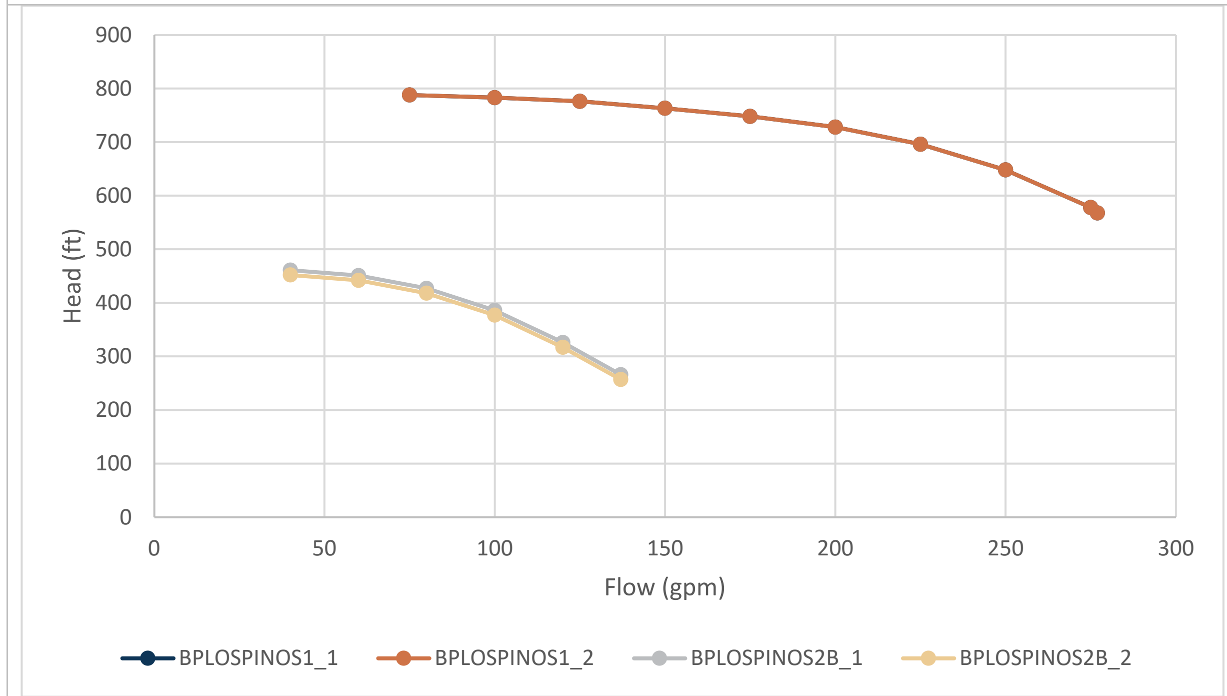


Figure A-15. Los Pinos 1 and 2 Pump Curves

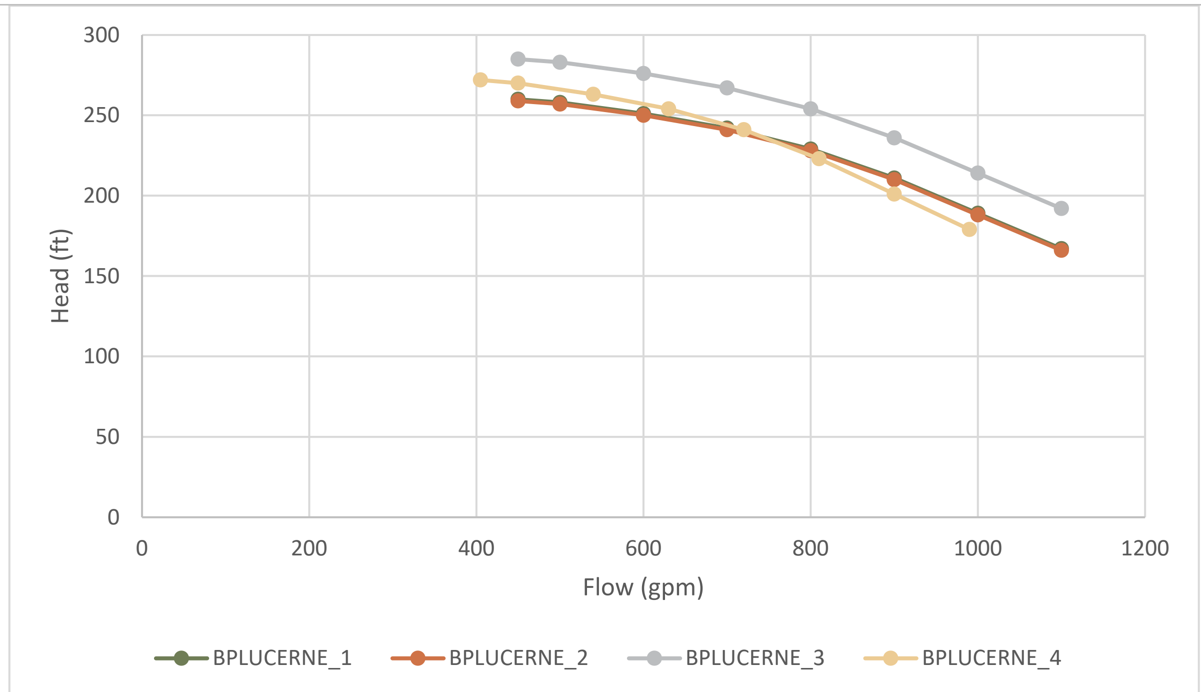


Figure A-16. Lucerne Pump Curves

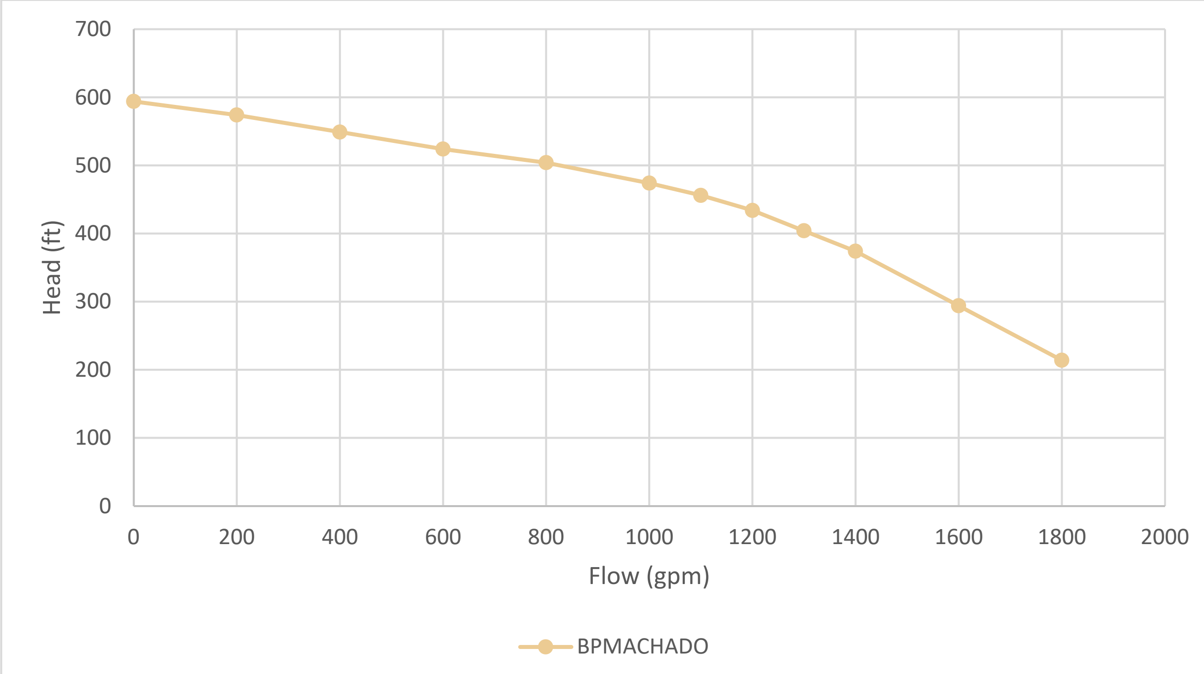


Figure A-17. Machado Pump Curve

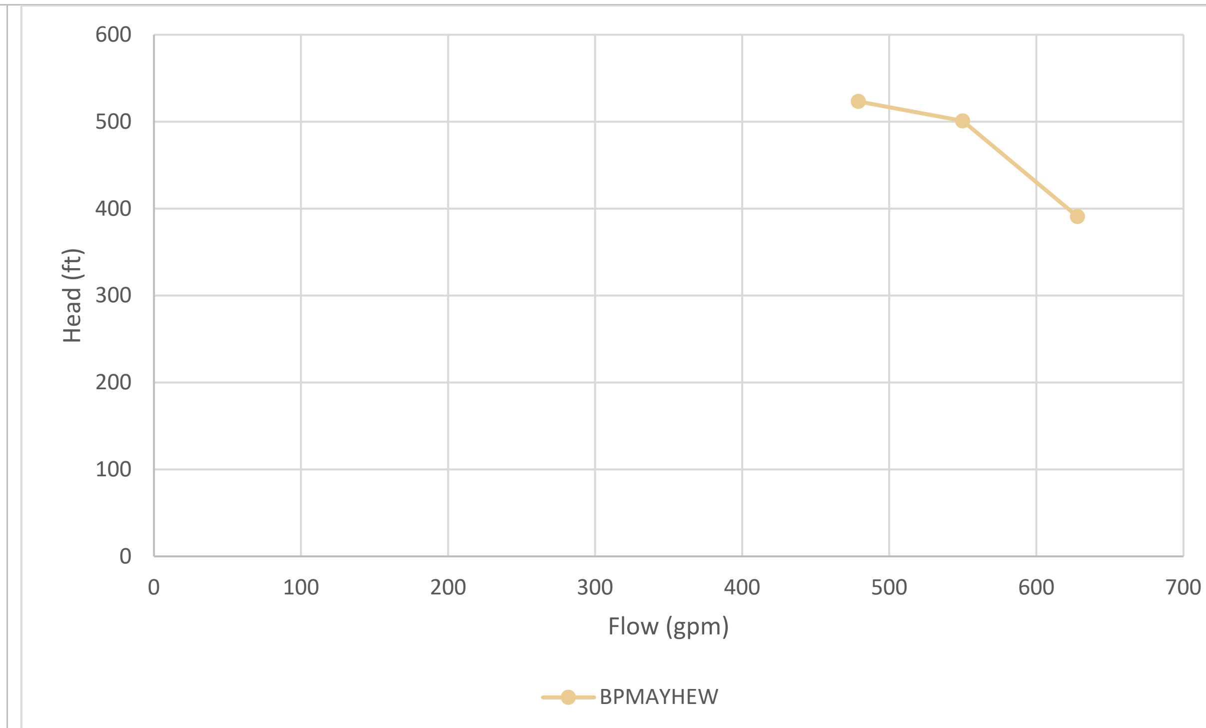


Figure A-18. Mayhew Pump Curve

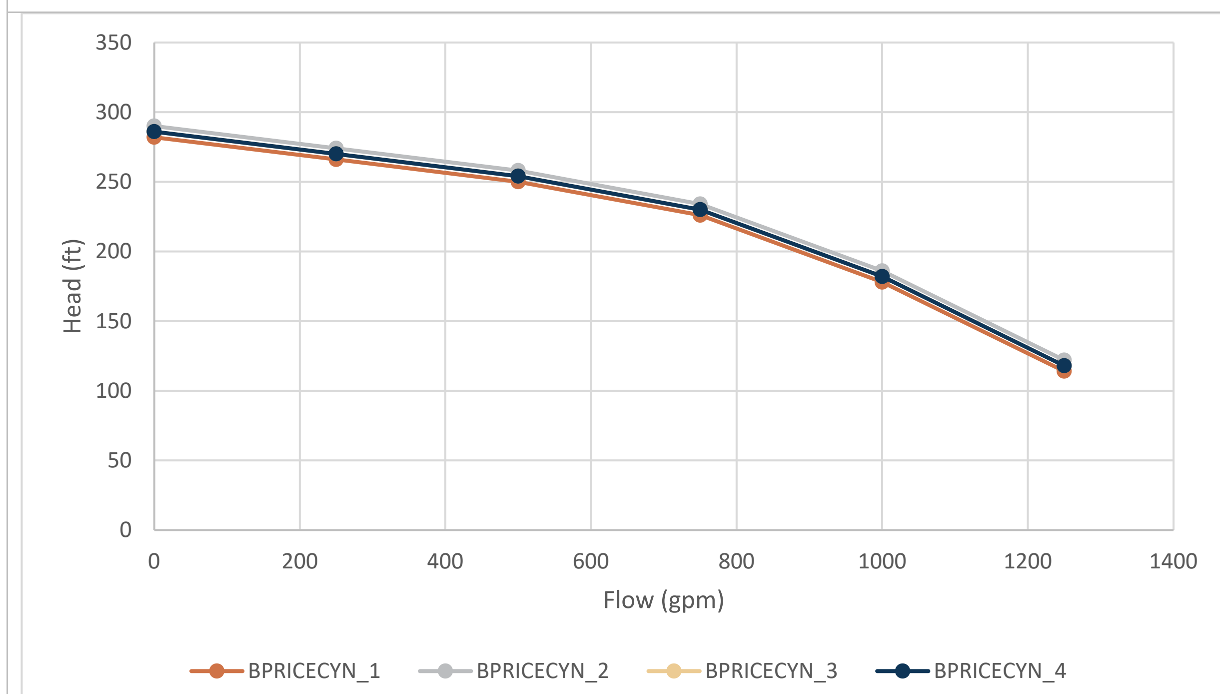


Figure A-19. Price Canyon Pump Curves

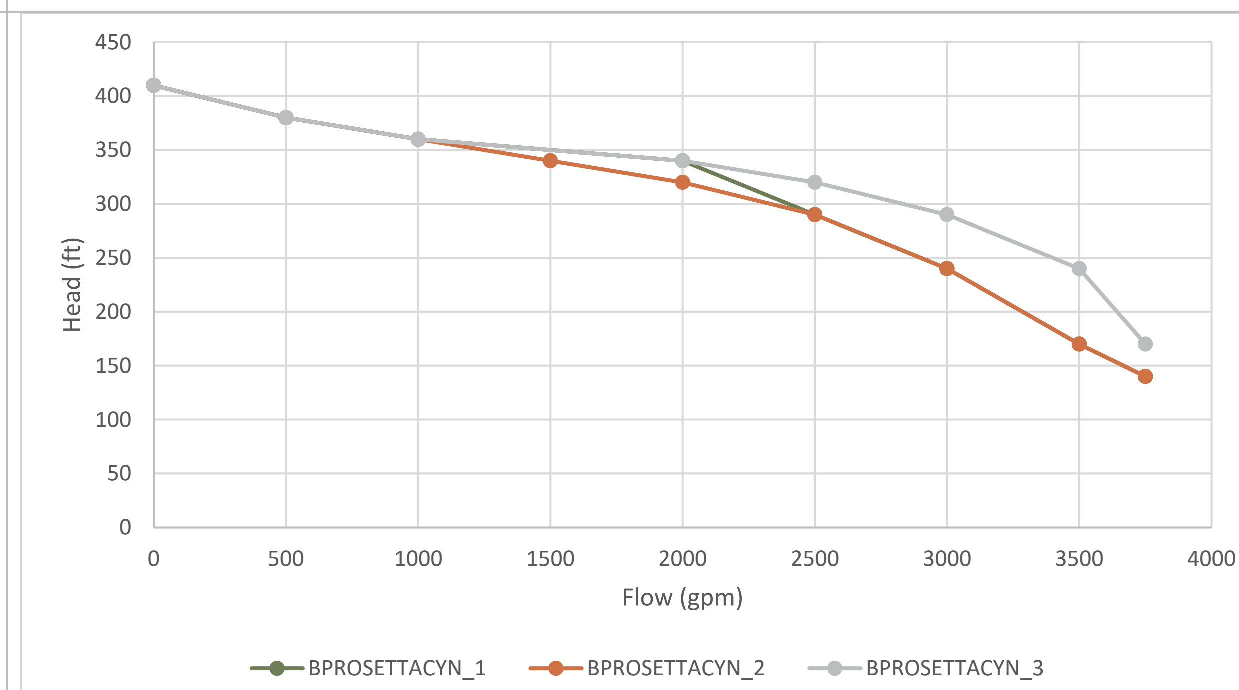


Figure A-20. Rosetta Canyon Pump Curves

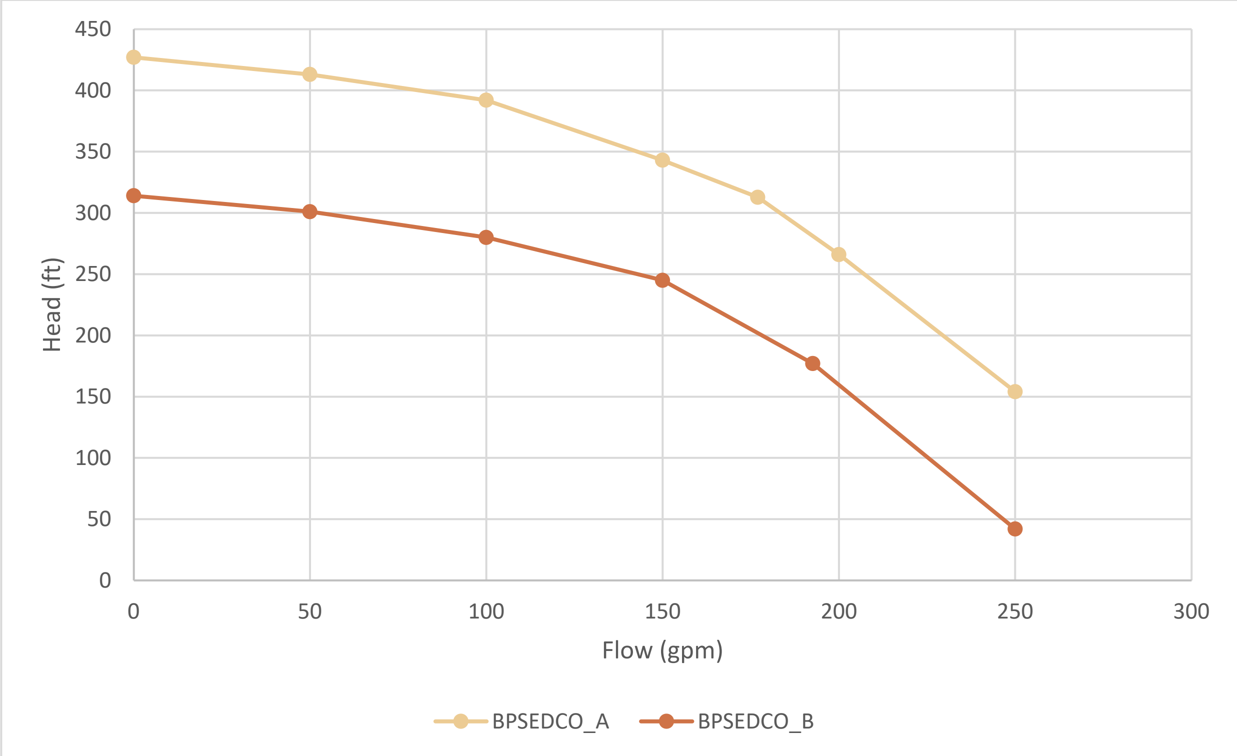


Figure A-21. Sedco Pump Curves

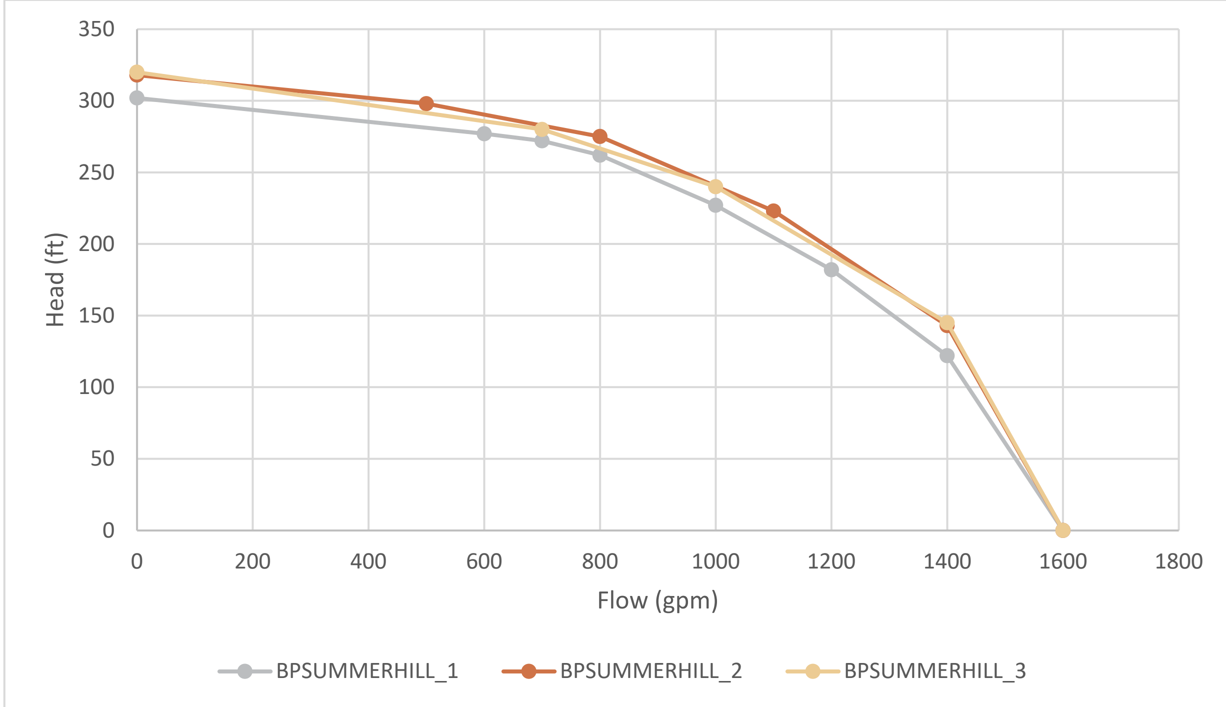


Figure A-22. Summerhill Pump Curves

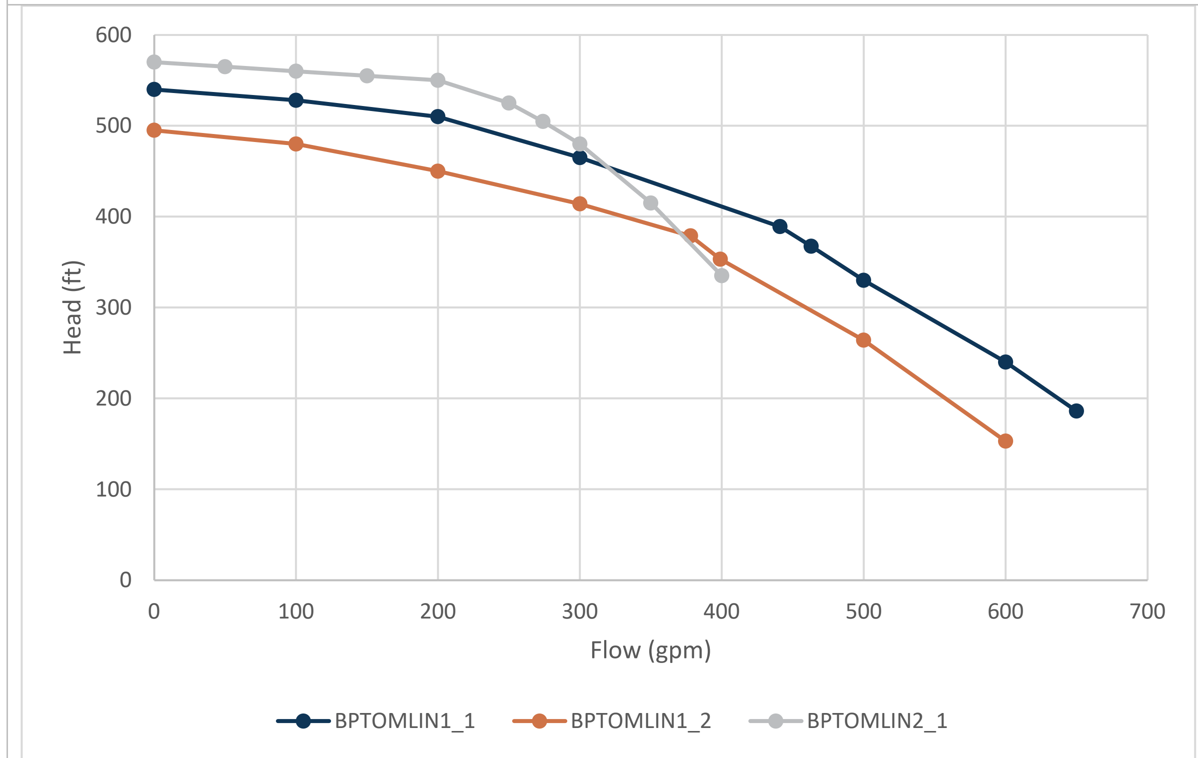


Figure A-23. Tomlin 1 and 2 Pump Curves

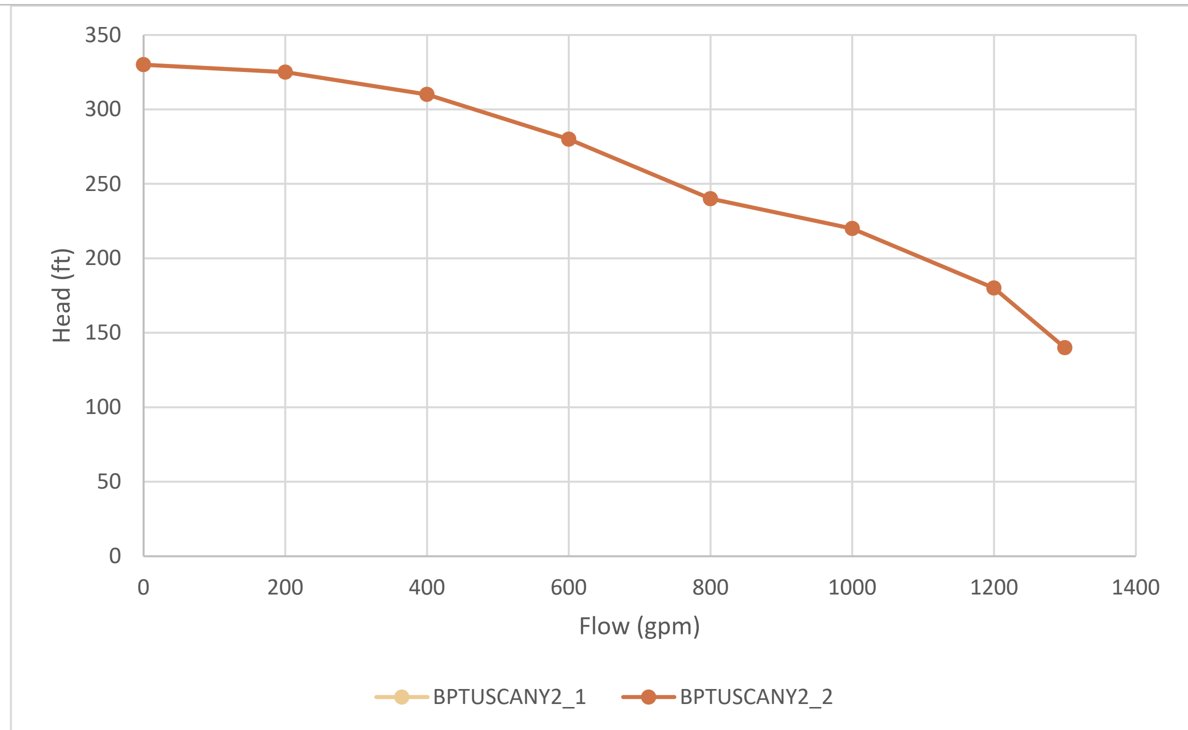


Figure A-24. Tuscany 2 Pump Curves

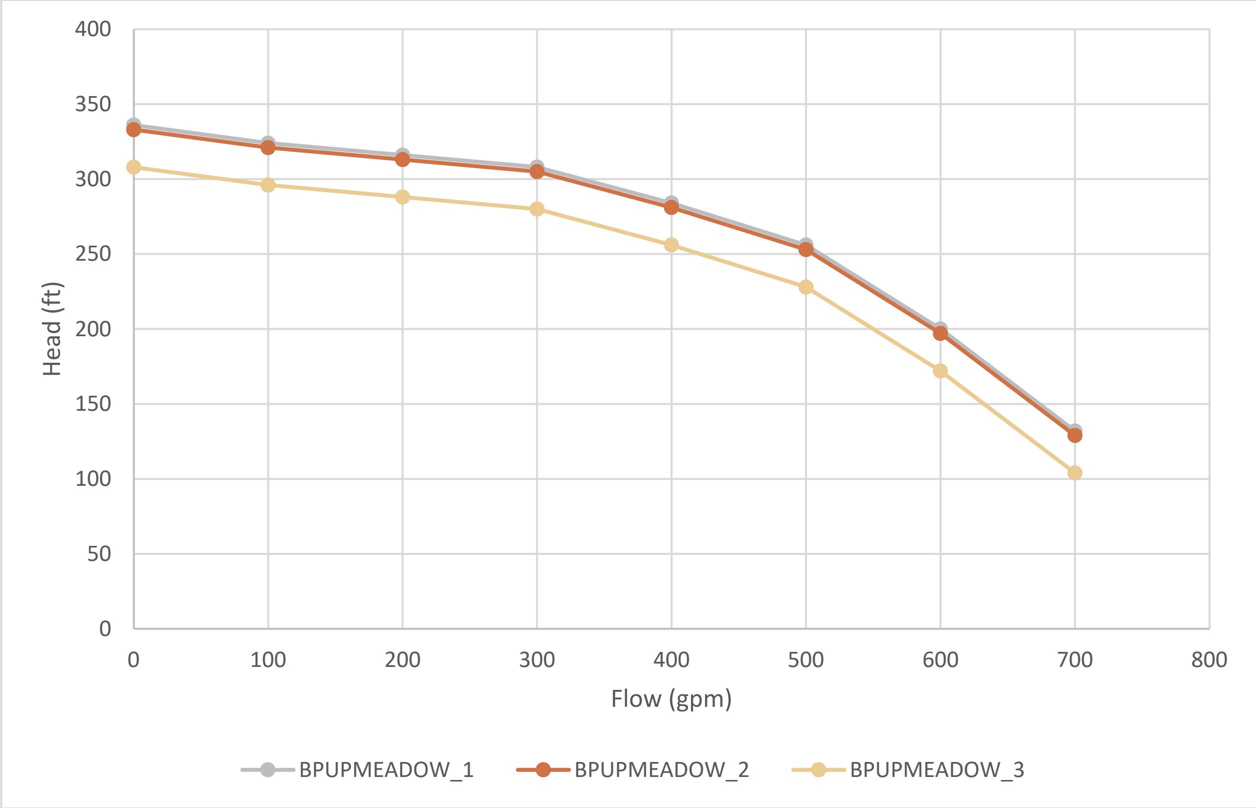


Figure A-25. Upper Meadowbrook Pump Curves

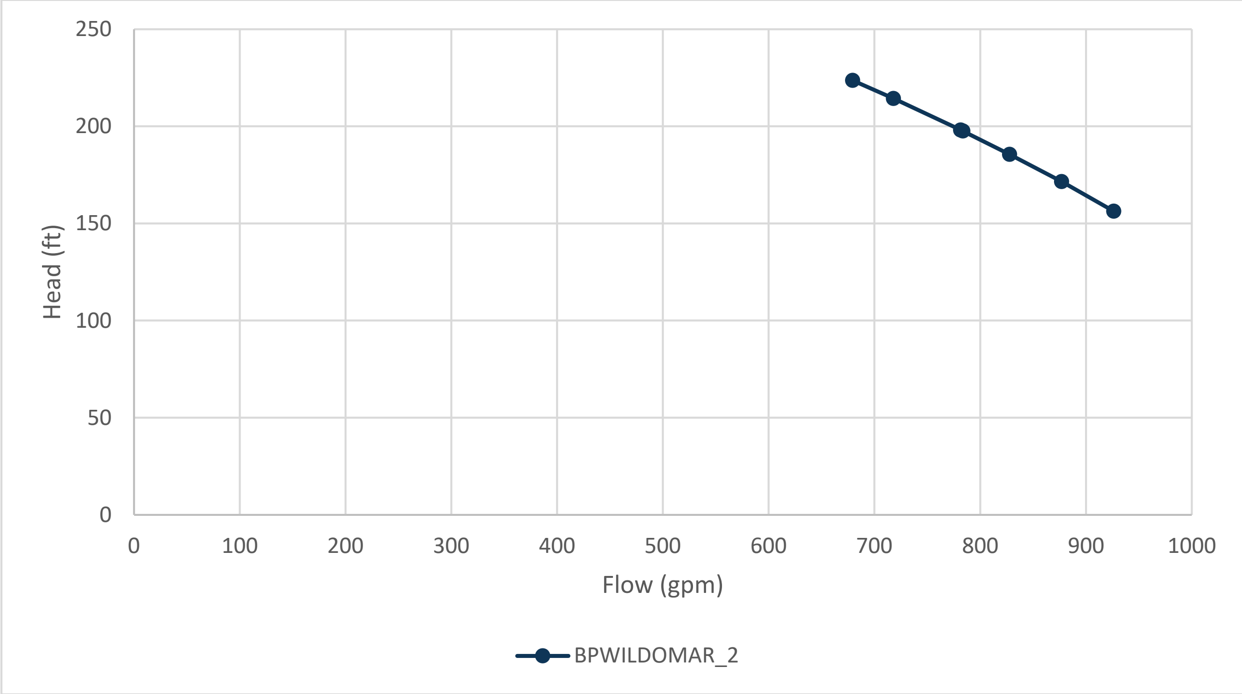


Figure A-26. Wildomar Pump Curve

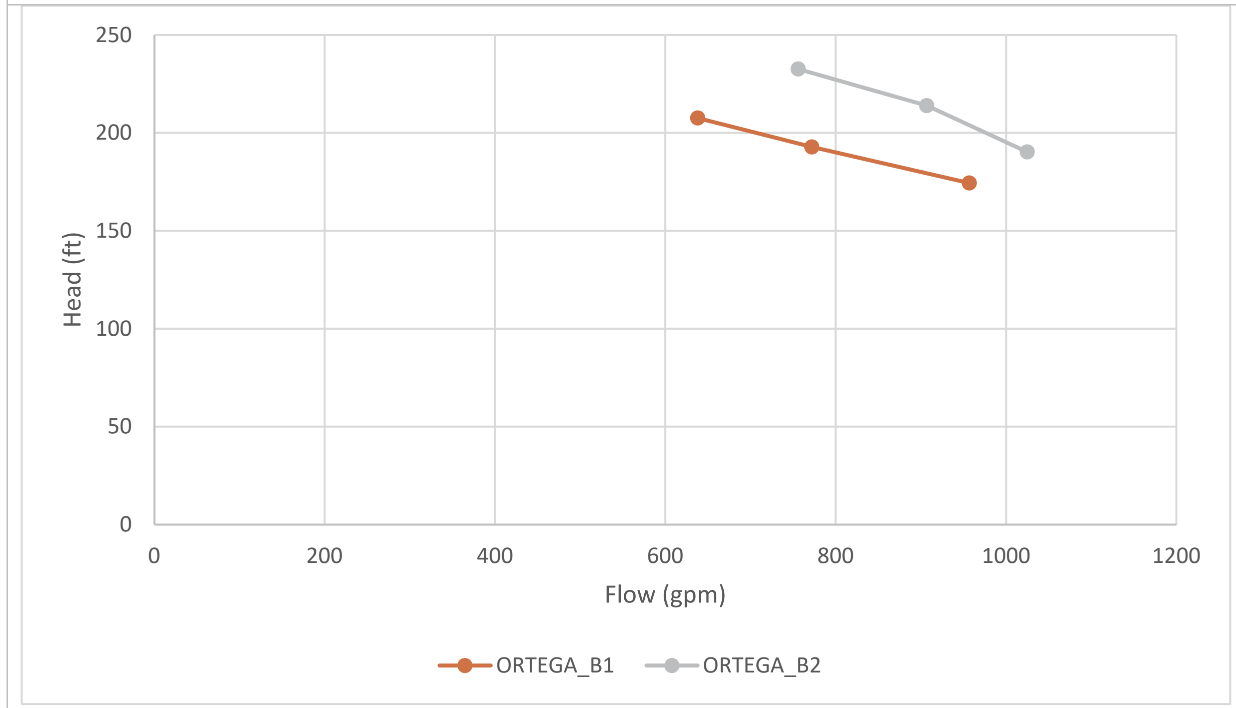


Figure A-27. Ortega Pump Curves

Valves

Table A - 11. InfoWater Model Valves (Control and Isolation)

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
PRV_LAKEVIEW_TER	0: Pressure Reducing Valve	1,356.50	8.00	48.00	0.00	GENERAL_VALVE	VA-13439	2002	1746
PRV_RIVERSIDE_ST	0: Pressure Reducing Valve	1,587.00	8.00	42.00	0.00				
PRV_VICTORIAN_LN	0: Pressure Reducing Valve	1,436.00	8.00	55.00	0.00				1746
PRV-12	0: Pressure Reducing Valve	1,540.60	3.00	45.00	0.00		Villa Roma\Villa Milano		1675
PRV-1265	0: Pressure Reducing Valve	1,293.98	8.00	70.00	0.00		Third St		1511
PRV-1265B	0: Pressure Reducing Valve	1,293.79	4.00	70.00	0.00		Third St_4inch		1511
PRV-1265C	0: Pressure Reducing Valve	1,294.02	2.00	70.00	0.00		Third St_2inch		1511
PRV-1266	0: Pressure Reducing Valve	1,429.87	4.00	92.00	0.00		Grape St	2015	1619
PRV-1266B	0: Pressure Reducing Valve	1,430.71	8.00	92.00	0.00		Grape St_8inch	2015	1619
PRV-1267	0: Pressure Reducing Valve	1,711.01	6.00	75.00	0.00		SILVER STIRRUP DR	2015	1741
PRV-12B	0: Pressure Reducing Valve	1,540.92	6.00	50.00	0.00		Villa Roma/Villa Milano		1675
PRV-16	0: Pressure Reducing Valve	1,494.70	8.00	56.00	0.00		Vía De La Valle\ Vía Del Lago	1989	1615
PRV-1667	0: Pressure Reducing Valve	1,328.30	8.00	69.00	0.00		Churchill St & Hayes	2017	1477
PRV-16B	0: Pressure Reducing Valve	1,494.76	6.00	56.00	0.00		Vía De La Valle/Vía DeLago_6inch	1989	1615
PRV-16C	0: Pressure Reducing Valve	1,495.00	4.00	56.00	0.00		Vía De La Valle/Vía DeLago_4inch	1989	1615
PRV-17	0: Pressure Reducing Valve	1,499.83	6.00	132.00	0.00		Vía Del Lago\Vía de La Valle	1988	1733
PRV-17B	0: Pressure Reducing Valve	1,500.29	2.00	132.00	0.00			1988	1733
PRV-18	0: Pressure Reducing Valve	1,330.69	6.00	30.00	0.00		Lower Tuscany Hills Pump Station		1410
PRV-20	0: Pressure Reducing Valve	1,749.09	6.00	84.00	0.00		Elsinore Heights Rd		2109
PRV-20B	0: Pressure Reducing Valve	1,749.85	2.00	84.00	0.00		Elsinore Heights Rd_2inch		2109
PRV-21	0: Pressure Reducing Valve	3,104.35	2.00	62.00	0.00		Upper Los Pinos Pump Station	2001	3446
PRV-21B	0: Pressure Reducing Valve	3,104.35	3.00	62.00	0.00		Upper Los Pinos Pump Station	2001	3446
PRV-22	0: Pressure Reducing Valve	1,784.39	6.00	97.00	0.00		SEDCO		1982
PRV-22B	0: Pressure Reducing Valve	1,784.39	2.00	97.00	0.00		Sedco_2inch		1982
PRV-24	0: Pressure Reducing Valve	1,505.84	12.00	84.00	0.00		Lemon St	2002	1746
PRV-24B	0: Pressure Reducing Valve	1,506.07	4.00	84.00	0.00			2002	1746
PRV-26	0: Pressure Reducing Valve	1,437.12	2.00	106.00	0.00		Waite St Reservoir	1988	1488

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
PRV-26B	0: Pressure Reducing Valve	1,438.71	4.00	106.00	0.00		Waite St Reservoir_4inch	1988	1488
PRV-27	0: Pressure Reducing Valve	1,372.09	8.00	75.00	0.00		Orange\Bundy Canyon Rd	1990	1568
PRV-27B	0: Pressure Reducing Valve	1,372.14	6.00	75.00	0.00		Orange/Bundy Canyon Rd_6inch	1990	1568
PRV-27C	0: Pressure Reducing Valve	1,372.12	4.00	75.00	0.00		Orange/Bundy Canyon Rd_4inch	1990	1568
PRV-28	0: Pressure Reducing Valve	1,392.71	6.00	65.00	0.00		Stage Ranch lower Pump Station	1977	1605
PRV-28B	0: Pressure Reducing Valve	1,392.71	2.00	65.00	0.00		Stage Ranch Lower Pump Station_2inch	1977	1605
PRV-3	0: Pressure Reducing Valve	1,201.66	4.00	86.00	0.00		Temescal Canyon\Hostetler Rd		1413
PRV-33	0: Pressure Reducing Valve	1,390.63	12.00	76.00	0.00		Golden Pheasant\Nutmeg	2011	1548
PRV-33B	0: Pressure Reducing Valve	1,390.63	2.00	76.00	0.00		Golden Pheasant/Nutmeg_2inch	2011	1548
PRV-35	0: Pressure Reducing Valve	1,363.23	12.00	92.00	0.00		Morning Dove\Cal Oaks Rd	2011	1571
PRV-35B	0: Pressure Reducing Valve	1,363.23	2.00	92.00	0.00		Morning Dove/Cal Oaks Rd_2inch	2011	1571
PRV-38	0: Pressure Reducing Valve	1,414.64	8.00	45.00	0.00		Manresa\Cal Oaks Rd	2011	1546
PRV-38B	0: Pressure Reducing Valve	1,414.64	2.00	45.00	0.00		Manresa/Cal Oaks Rd_2inch	2011	1546
PRV-3B	0: Pressure Reducing Valve	1,201.66	8.00	86.00	0.00		Temescal Canyon/Hostetler Rd		1413
PRV-41	0: Pressure Reducing Valve	1,260.46	8.00	95.00	0.00		Saradella\Cal Oaks Rd	2011	1507
PRV-41B	0: Pressure Reducing Valve	1,260.46	2.00	95.00	0.00		Saradella/Cal Oaks Rd_2inch	2011	1507
PRV-43	0: Pressure Reducing Valve	1,334.58	4.00	100.00	0.00		Laguna Ave & Trabuco Dr	2001	1430
PRV-43B	0: Pressure Reducing Valve	1,334.29	8.00	100.00	0.00			2001	1430
PRV-47	0: Pressure Reducing Valve	1,721.18	6.00	105.00	0.00		Orchid Tree Ave & Pumpkin St	2002	1971
PRV-47B	0: Pressure Reducing Valve	1,721.18	4.00	105.00	0.00		Orchid Tree Ave/Pumpkin St_4inch	2002	1971
PRV-47C	0: Pressure Reducing Valve	1,721.18	2.00	105.00	0.00		Orchid Tree Ave/Pumpkin St_2inch	2002	1971
PRV-48	0: Pressure Reducing Valve	1,737.22	6.00	90.00	0.00		Horsetail St & Iceplant Ln	2003	1969
PRV-48B	0: Pressure Reducing Valve	1,737.22	4.00	90.00	0.00		Horsetail St/Iceplant Ln_4inch	2003	1969
PRV-48C	0: Pressure Reducing Valve	1,737.42	2.00	90.00	0.00		Horsetail St/Iceplant Ln_2inch	2003	1969
PRV-5	0: Pressure Reducing Valve	1,551.32	6.00	30.00	0.00		River Rd		1642
PRV-50	0: Pressure Reducing Valve	1,527.07	6.00	100.00	0.00		Greer Rd & Darcy St	2004	1758
PRV-50B	0: Pressure Reducing Valve	1,527.07	4.00	100.00	0.00		Greer Rd/Darcy St_4inch	2004	1758
PRV-50C	0: Pressure Reducing Valve	1,527.07	2.00	100.00	0.00		Greer Rd/Darcy St_2inch	2004	1758
PRV-51	0: Pressure Reducing Valve	1,562.26	6.00	78.00	0.00		Darcy Pl & Nutmeg St	2004	1760
PRV-51B	0: Pressure Reducing Valve	1,562.26	4.00	78.00	0.00		Darcy Pl/Nutmeg St_4inch	2004	1760
PRV-51C	0: Pressure Reducing Valve	1,562.26	2.00	78.00	0.00		Darcy Pl/Nutmeg St_2inch	2004	1760
PRV-52	0: Pressure Reducing Valve	1,400.82	8.00	145.00	0.00		Skylink Dr		1671

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
PRV-52B	0: Pressure Reducing Valve	1,402.25	2.50	145.00	0.00		Skylink Dr_2.5inch		1671
PRV-53	0: Pressure Reducing Valve	1,599.77	6.00	90.00	0.00		Greer Ranch 2050/1850 Pump Station	2004	1856
PRV-53B	0: Pressure Reducing Valve	1,599.77	4.00	90.00	0.00		Greer Ranch 2050/1850 PS_4inch	2004	1856
PRV-53C	0: Pressure Reducing Valve	1,599.77	2.00	90.00	0.00		Greer Ranch 2050/1850 PS_2inch	2004	1856
PRV-54	0: Pressure Reducing Valve	1,310.31	8.00	108.00	0.00		Nutmeg & Jameson	2003	1548
PRV-54B	0: Pressure Reducing Valve	1,310.31	2.00	108.00	0.00		Nutmeg & Jameson_2inch	2003	1548
PRV-56	0: Pressure Reducing Valve	1,564.20	2.00	60.00	0.00		Crimson Pillar Ln	2005	1709
PRV-56B	0: Pressure Reducing Valve	1,564.34	4.00	60.00	0.00		Crimson Pillar Ln	2005	1709
PRV-56C	0: Pressure Reducing Valve	1,564.49	8.00	60.00	0.00		Crimson Pillar Ln	2005	1709
PRV-58	0: Pressure Reducing Valve	1,517.04	8.00	30.00	0.00		Hillside Dr & Big Tee	2006	1683
PRV-58B	0: Pressure Reducing Valve	1,517.09	4.00	30.00	0.00		Hillside Dr & Big Tree_4inch	2006	1683
PRV-58C	0: Pressure Reducing Valve	1,517.56	2.00	30.00	0.00		Hillside Dr & Big Tree_2inch	2006	1683
PRV-59	0: Pressure Reducing Valve	1,861.13	2.00	70.00	0.00		Gateway Dr & Solstice Ct	2005	2017
PRV-59B	0: Pressure Reducing Valve	1,861.13	4.00	70.00	0.00			2005	2017
PRV-59C	0: Pressure Reducing Valve	1,860.96	6.00	70.00	0.00			2005	2017
PRV-60	0: Pressure Reducing Valve	1,516.42	6.00	60.00	0.00		Della Cana Ln	2006	1664
PRV-60B	0: Pressure Reducing Valve	1,523.54	3.00	50.00	0.00		Della Cana Ln_3inch	2006	1664
PRV-60C	0: Pressure Reducing Valve	1,531.45	12.00	60.00	0.00		Della Cana Ln_12inch	2006	1664
PRV-62	0: Pressure Reducing Valve	1,577.94	8.00	74.00	0.00		Brand /Cross		1842
PRV-62B	0: Pressure Reducing Valve	1,577.62	2.00	74.00	0.00		Brand/Cross		1842
PRV-63	0: Pressure Reducing Valve	1,383.82	6.00	78.00	0.00		Spinning Wheel Dr/ Silkwood Ct		1583
PRV-63B	0: Pressure Reducing Valve	1,385.57	4.00	78.00	0.00		Spinning Wheel Dr/Silkwood Ct_4inch		1583
PRV-63C	0: Pressure Reducing Valve	1,385.57	2.00	78.00	0.00		Spinning Wheel Dr/Silkwood Ct_2inch		1583
PRV-8	0: Pressure Reducing Valve	1,348.41	8.00	107.00	0.00		Lower Meadowbrook Pump Station	2003	1815
PRV-8B	0: Pressure Reducing Valve	1,348.27	4.00	107.00	0.00		Lower Meadowbrook PS_4inch	2003	1815
PRV-8C	0: Pressure Reducing Valve	1,348.27	2.00	107.00	0.00		Lower Meadowbrook PS_2inch	2003	1815
V__BBGWTP	3: Flow Control Valve	1,270.55	12.00	2,500.00	0.00				
V__CLWTP	3: Flow Control Valve	1,407.19	12.00	3,500.00	0.00				
V__LASBRISAS	3: Flow Control Valve	1,306.11	12.00	16,806.00	0.00				
V__SKIPJACKWINWARD	3: Flow Control Valve	1,416.84	12.00						
V__TVP	3: Flow Control Valve	833.57	12.00	9,000.00	0.00				
V_CLINTON_KEITH	3: Flow Control Valve	1,480.24	12.00	0.00	0.00				

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
V_CROSSHILL_CONNECTION	3: Flow Control Valve	1,415.13	12.00						
V_PALOMAR_WASHINGTON	3: Flow Control Valve	1,182.82	12.00	0.00	0.00				
VA-1023	4: Throttle Control Valve	1,357.70	24.00	0.00	0.00	GENERAL_VALVE		1999	1601
VA-10353	4: Throttle Control Valve	1,518.95	12.00	0.00	0.00	GENERAL_VALVE		1990	1650
VA-10581	4: Throttle Control Valve	1,402.31	8.00	0.00	0.00	GENERAL_VALVE		2000	1650
VA-10946	4: Throttle Control Valve	1,295.52	12.00	0.00	0.00	GENERAL_VALVE			1467
VA-1096	4: Throttle Control Valve	1,443.96	8.00	0.00	0.00	GENERAL_VALVE		1984	1800
VA-11805	4: Throttle Control Valve	1,462.88	12.00			GENERAL_VALVE		2001	1746
VA-11815	4: Throttle Control Valve	1,523.82	8.00			GENERAL_VALVE		2001	1650
VA-11828	4: Throttle Control Valve	1,461.18	8.00			GENERAL_VALVE		2001	1650
VA-11935	4: Throttle Control Valve	1,279.60	12.00			GENERAL_VALVE		2001	1434
VA-11947	4: Throttle Control Valve	1,313.37	12.00			GENERAL_VALVE		2001	1434
VA-12967	4: Throttle Control Valve	1,496.69	12.00			GENERAL_VALVE		2002	1746
VA-13326	4: Throttle Control Valve	1,601.38	12.00			GENERAL_VALVE		2002	1934
VA-1366	4: Throttle Control Valve	1,472.22	12.00			GENERAL_VALVE		1991	1601
VA-13984	4: Throttle Control Valve	1,279.43	4.00			GENERAL_VALVE		2003	1467
VA-14224	4: Throttle Control Valve	1,724.75	8.00			GENERAL_VALVE		2002	2050
VA-14389	4: Throttle Control Valve	1,373.88	12.00			GENERAL_VALVE		2003	1650
VA-1450	4: Throttle Control Valve	1,476.85	8.00			GENERAL_VALVE		1990	1800
VA-15498	4: Throttle Control Valve	1,346.15	12.00			GENERAL_VALVE		2003	1434
VA-15526	4: Throttle Control Valve	1,636.19	12.00			GENERAL_VALVE		2003	1896
VA-15547	4: Throttle Control Valve	1,292.43	12.00			GENERAL_VALVE		2004	1571
VA-15640	4: Throttle Control Valve	1,489.78	20.00			GENERAL_VALVE		2004	1601
VA-1610	4: Throttle Control Valve	1,477.21	8.00			GENERAL_VALVE		1990	1800
VA-16410	4: Throttle Control Valve	1,310.58	12.00			GENERAL_VALVE		2003	1650
VA-16820	4: Throttle Control Valve	1,297.36	12.00			GENERAL_VALVE		2004	1650
VA-1806	4: Throttle Control Valve	1,476.24	12.00			GENERAL_VALVE		1988	1800
VA-18401	4: Throttle Control Valve	1,559.66	20.00			GENERAL_VALVE		2005	1801
VA-18412	4: Throttle Control Valve	1,425.98	12.00			GENERAL_VALVE		2005	1746
VA-188	4: Throttle Control Valve	1,710.45	8.00			GENERAL_VALVE		2000	1801
VA-22773	4: Throttle Control Valve	1,494.47	8.00			GENERAL_VALVE		2006	1601
VA-23081	4: Throttle Control Valve	1,306.20	8.00			GENERAL_VALVE		2007	1467

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
VA-23118	4: Throttle Control Valve	1,275.11	8.00			GENERAL_VALVE		2007	1467
VA-23123	4: Throttle Control Valve	1,276.23	8.00			GENERAL_VALVE		2007	1467
VA-23135	4: Throttle Control Valve	1,350.66	8.00			GENERAL_VALVE		2007	1746
VA-23233	4: Throttle Control Valve	1,471.12	12.00			GENERAL_VALVE		2006	1601
VA-23339	4: Throttle Control Valve	1,307.84	12.00			GENERAL_VALVE			1601
VA-23469	4: Throttle Control Valve	1,346.41	12.00			GENERAL_VALVE		2007	1434
VA-23523	4: Throttle Control Valve	1,283.78	4.00			GENERAL_VALVE		2007	1467
VA-2370	4: Throttle Control Valve	1,601.99	12.00			GENERAL_VALVE		1989	1800
VA-23903	4: Throttle Control Valve	1,958.00	8.00			GENERAL_VALVE		2008	2240
VA-25103	4: Throttle Control Valve	1,352.83	8.00			GENERAL_VALVE			1467
VA-25114	4: Throttle Control Valve	1,335.04	4.00			GENERAL_VALVE		2010	1467
VA-256	4: Throttle Control Valve	1,475.60	8.00			GENERAL_VALVE		1987	1601
VA-25657	4: Throttle Control Valve	1,283.06	6.00			GENERAL_VALVE			
VA-2638	4: Throttle Control Valve	1,298.96	12.00			GENERAL_VALVE		1992	1434
VA-2912	4: Throttle Control Valve	1,338.04	8.00			GENERAL_VALVE			1701
VA-29481	4: Throttle Control Valve	1,459.77	4.00			GENERAL_VALVE			1464
VA-3004	4: Throttle Control Valve	1,325.59	6.00			GENERAL_VALVE		1985	1434
VA-3287	4: Throttle Control Valve	1,340.76	8.00			GENERAL_VALVE		1995	1571
VA-3439	4: Throttle Control Valve	1,383.37	8.00			GENERAL_VALVE		1992	1601
VA-3515	4: Throttle Control Valve	1,329.73	6.00			GENERAL_VALVE			1434
VA-3664	4: Throttle Control Valve	1,373.62	8.00			GENERAL_VALVE		1995	1571
VA-3720	4: Throttle Control Valve	1,448.75	8.00			GENERAL_VALVE		1991	1601
VA-3801	4: Throttle Control Valve	1,315.80	8.00			GENERAL_VALVE		1986	1601
VA-4338	4: Throttle Control Valve	1,443.95	8.00			GENERAL_VALVE		1986	1800
VA-4372	4: Throttle Control Valve	1,291.06	8.00			GENERAL_VALVE			1434
VA-44037	4: Throttle Control Valve	1,477.68	8.00			GENERAL_VALVE		2014	1601
VA-45653	4: Throttle Control Valve	1,297.27	8.00			GENERAL_VALVE			1434
VA-4800	4: Throttle Control Valve	1,270.50	8.00			GENERAL_VALVE		1995	1571
VA-48815	4: Throttle Control Valve	1,687.40	8.00			GENERAL_VALVE		2015	1801
VA-5292	4: Throttle Control Valve	1,498.23	8.00			GENERAL_VALVE		1989	1800
VA-5442	4: Throttle Control Valve	1,309.70	8.00			GENERAL_VALVE		1990	1601
VA-5491	4: Throttle Control Valve	1,322.35	8.00			GENERAL_VALVE		1990	1601

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
VA-5574	4: Throttle Control Valve	1,449.36	10.00			GENERAL_VALVE		1971	1618.5
VA-5654	4: Throttle Control Valve	1,485.05	12.00			GENERAL_VALVE		1971	1750
VA-5763	4: Throttle Control Valve	1,317.54	6.00			GENERAL_VALVE			1601
VA-5769	4: Throttle Control Valve	1,327.88	12.00			GENERAL_VALVE		1995	1571
VA-5866	4: Throttle Control Valve	1,335.30	8.00			GENERAL_VALVE		1989	1601
VA-6083	4: Throttle Control Valve	1,297.41	8.00			GENERAL_VALVE		1999	1467
VA-6127	4: Throttle Control Valve	1,299.19	8.00			GENERAL_VALVE		1985	1601
VA-619	4: Throttle Control Valve	1,665.88	8.00			GENERAL_VALVE			1896
VA-64199	4: Throttle Control Valve	1,954.87	6.00			GENERAL_VALVE		2020	2240
VA-6551	4: Throttle Control Valve	1,385.43	6.00			GENERAL_VALVE		1990	1561
VA-6644	4: Throttle Control Valve	1,401.98	12.00			GENERAL_VALVE		1997	1746
VA-6664	4: Throttle Control Valve	1,330.55	12.00			GENERAL_VALVE		1993	1467
VA-6761	4: Throttle Control Valve	1,437.44	4.00			GENERAL_VALVE		1996	1746
VA-7017	4: Throttle Control Valve	1,290.70	12.00			GENERAL_VALVE		1993	1467
VA-7165	4: Throttle Control Valve	1,300.79	16.00			GENERAL_VALVE		1988	1434
VA-7443	4: Throttle Control Valve	1,285.23	12.00			GENERAL_VALVE		1995	1571
VA-7502	4: Throttle Control Valve	1,349.22	8.00	0.00	0.00	GENERAL_VALVE		1990	1467
VA-7711	4: Throttle Control Valve	1,298.60	24.00			GENERAL_VALVE		1993	1434
VA-8117	4: Throttle Control Valve	1,327.47	12.00			GENERAL_VALVE		1991	1467
VA-8162	4: Throttle Control Valve	1,304.51	12.00			GENERAL_VALVE		1993	1467
VA-8488	4: Throttle Control Valve	1,284.47	12.00			GENERAL_VALVE		2000	1434
VA-8695	4: Throttle Control Valve	1,478.46	12.00			GENERAL_VALVE		1990	1850
VA-8757	4: Throttle Control Valve	1,438.57	12.00			GENERAL_VALVE		1998	1650
VA-8877	4: Throttle Control Valve	1,408.86	8.00			GENERAL_VALVE		1990	1650
VA-8900	4: Throttle Control Valve	1,330.56	16.00			GENERAL_VALVE		1986	1434
VA-9273	4: Throttle Control Valve	1,343.90	8.00			GENERAL_VALVE		1988	1650
VA-9284	4: Throttle Control Valve	1,412.94	12.00			GENERAL_VALVE		1990	1650
VA-9320	4: Throttle Control Valve	1,304.93	6.00			GENERAL_VALVE			1434
VA-966	4: Throttle Control Valve	1,375.93	6.00			GENERAL_VALVE			1701
VA-9749	4: Throttle Control Valve	1,427.31	12.00			GENERAL_VALVE		1989	1650
VA-9840	4: Throttle Control Valve	1,274.91	8.00			GENERAL_VALVE		1987	1434
VA-987	4: Throttle Control Valve	1,403.63	10.00			GENERAL_VALVE		1970	1640

ID (Char)	Type (Int)	Elevation (ft)	Diameter (in)	Setting	Minor Loss	Curve	Description	Year of Installation	Zone
VA-9981	4: Throttle Control Valve	1,410.09	8.00			GENERAL_VALVE		1989	1650
VA-9989	4: Throttle Control Valve	1,368.10	12.00			GENERAL_VALVE			1434

Table A - 12. GIS Attributes of Valves

GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	Summer 2019	Summer 2019 PZ Document		
MP2CODE	LOCATION	STATUSCODE	INSTALLDAT	HIGHZONE	HIGHPRESSU	LOWZONE	LOWPRESSUR	QUANTITY	SIZES	Name	Inlet Pressure	Discharge Pressure	Inlet Zone
PRV-3	Temescal Canyon\Hostetler Rd	ACT		1434	109	1416	100	2	4 8	HOSTETTLER/TEMESCAL CANYON RD	112/96	86	1434
PRV-5	River Rd	ACT		1896	140	1896	30	2	2 6	RIVER RD	143	30	1896
PRV-8	Lower Meadowbrook Pump Station	ACT	2003	1896	140	1896	105	3	2 4 8	LOWER MEADOWBROOK NORTH	150	127	1701
										LOWER MEADOWBROOK SOUTH	150	107	1701
PRV-12	Villa Roma\Villa Milano	ACT		1800	110	1640	55	2	3 6	VILLA ROMA	132	50	1800
PRV-17	Vía Del Lago\Vía de La Valle	ACT	1988	1800	125	1800	95	2	2 6	VILLA DEL LAGO	136	132	1800
PRV-16	Vía De La Valle\Vía Del Lego	ACT	1989	1800	130	1800	50	3	4 6 8	VILLA DE LA VALLE	136	56	1800
PRV-18	Lower Tuscany Hills Pump Station	ACT		1800	200	1800	30	1	6				
PRV-20	Elsinore Heights Rd	ACT		2201	130	2201	90	2	2 6	ELSINORE HEIGHTS	172	84	2196
PRV-21	Upper Los Pinos Pump Station	ACT	2001	3501	164	3501	140	2	3,2	LOS PINOS 2B	164	62	3501
PRV-22	SEDCO	ACT		2201	176	2201	80	2	2 6	SEDCO	180	97	2196
PRV-26	Waite St Reservoir	ACT	1988	1576	125	1576	86	2	2 4	WAITE ST/GAFFORD	124	106	1746
PRV-27	Orange\Bundy Canyon Rd	ACT	1990	1750	160	1750	80	3	4 6 8	ORANGE/BUNDY CANYON	156	75	1746
PRV-28	Stage Ranch lower Pump Station	ACT	1977	1882	210	1550	90	2	2 6	STAGE RANCH	202	65	1882
PRV-33	Golden Pheasant\Nutmeg	ACT	2011	1650	120	1650	75	2	2 12	NUTMEG/GOLDEN PHEASANT	120	76	1650
PRV-35	Morning Dove\Cal Oaks Rd	ACT	2011	1650	125	1650	90	2	2 12	MORNING DOVE/CAL OAKS	135	92	1650
PRV-38	Manresa\Cal Oaks Rd	ACT	2011	1650	95	1650	50	2	2 8	MANRESA/CAL OAKS	103	45	1650
PRV-41	Saradella\Cal Oaks Rd	ACT	2011	1650	165	1650	102	2	2 8	SARADELLA/CAL OAKS	163	95	1650

GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	GIS	Summer 2019	Summer 2019 PZ Document		
MP2CODE	**LOCATION**	**STATUSCODE**	**INSTALLDAT**	**HIGHZONE**	**HIGHPRESSU**	**LOWZONE**	**LOWPRESSUR**	**QUANTITY**	**SIZES**	**Name**	**Inlet Pressure**	**Discharge Pressure**	**Inlet Zone**
PRV-43	Laguna Ave & Trabuco Dr	ACT	2001	1601	110	1601	35	2	8 4	LAGUNA/TRABUCO	107	100	1601
PRV-24	Lemon St	ACT	2002	1746	100	1746	100	2	12 4	LEMON ST	93	84	1746
PRV-47	Orchid Tree Ave & Pumpkin St	ACT	2002	2050	145	2050	110	3	6,4,2	ORCHID TREE/PUMPKIN	148	105	2050
PRV-48	Horsetail St & Iceplant Ln	ACT	2003	2050	130	2050	95	3	2,4,6	HORSETAIL/ICEPLANT	130	90	2050
PRV-50	Greer Rd & Darcy St	ACT	2004	1850	140	1850	100	3	2 4 6	GREER RANCH/DARCY	145	100	1850
PRV-51	Darcy Pl & Nutmeg St	ACT	2004	1850	120	1850	80	3	2 4 6	DARCY/NUTMEG	119	78	1850
PRV-52	Skylink Dr	ACT		1750	150	1750	115	2	8, 2.5	SKYLINK	150	145	1750
PRV-53	Greer Ranch 2050/1850 Pump Station	ACT	2004	2050	185	1850	100	3	6,4,2	GREER RANCH 2050/1850 P.RED-P.SUS	178	90	2050
PRV-54	Nutmeg & Jameson	ACT	2003	1650	165	1650	120	2	8,2	NUTMEG/JAMESON	144	108	1650
PRV-56	Crimson Pillar Ln	ACT	2005	1801	100	1701	60	3	2 4 8	CRIMSON PILLAR	100	70	1801
PRV-59	Gateway Dr & Solstice Ct	ACT	2005	2040	72	1928	62	2	4 6	GATEWAY/SOLSTICE	70	70	2040
PRV-58	Hillside Dr & Big Tee	ACT	2006	1750	95	1750	65	3	8 4 2				
PRV-60	Della Cana Ln	ACT	2006	1800	120	1640	60	3	12 6 3	DELL CAVA	119	60	1640
PRV-62	Brand /Cross	ACT		1842	120	1842	75	0		BRAND/CROSS ST	122	74	1842
PRV-63	Spinning Wheel Dr/ Silkwood Ct	ACT		1650	115	1650	85	3	6 4 2	SILKWOOD/SPINNING WHEEL	107	78	1650
PRV-1267	SILVER STIRRUP DR	ACT	2015	1801	100	1801	73	0	6	SILVER STIRRUP	105	75	1801
PRV-1265	Third St	ACT		1601	120	1434	80	3	8 4 2	THIRD ST	122	70	1601
PRV-1266	Grape St	ACT	2015	1746	130	1746	75	2	8 4	GRAPE ST	124	92	1746
PRV-CHURCHILL_HAYES	Churchill St & Hayes	ACT	2017	1581	145	1581	100	2	8 4	HAYES/CHURCHILL	137	93	1650
PRV_PRIELLUP_SUMMER	Prielipp Rd & Summer Dain Ln	ACT	2017	1650	121	1650	88	3	8 4 2	PRIELIPP/SUMMER DAIN	124	82	1650
PRV_ELIZABETH_PRIELLUP	Elizabeth Ln & Prielipp Rd	ACT	2017	1650	118	1650	80	3	8 4 2	ELIZABETH/PRIELIPP	118	78	1650
										DESERT ROSE	85	86	1750

Controls

Table A - 13 InfoWater Model Facility Controls

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
ADELFA_1	No	1	0: Closed	0	1: By Node Level	0	ADELFA	0: Above	18
ADELFA_1	No	0	1: Open	0	1: By Node Level	0	ADELFA	1: Below	5
ADELFA_2	No	1	0: Closed	0	1: By Node Level	0	ADELPHA	0: Above	6
ADELFA_2	No	0	1: Open	0	1: By Node Level	0	ADELPHA	1: Below	4
BECK_1	No	1	0: Closed	0	1: By Node Level	0	BECK	0: Above	12
BECK_1	No	0	1: Open	0	1: By Node Level	0	BECK	1: Below	3.5
BECK_2	No	1	0: Closed	0	1: By Node Level	0	BECK	0: Above	7
BECK_2	No	0	1: Open	0	1: By Node Level	0	BECK	1: Below	3
BUNDY_CANYON_1	No	0	1: Open	0	1: By Node Level	0	BUNDY_CANYON	1: Below	5
BUNDY_CANYON_1	No	1	0: Closed	0	1: By Node Level	0	BUNDY_CANYON	0: Above	8
BUNDY_CANYON_2	No	1	0: Closed	0	1: By Node Level	0	BUNDY_CANYON	0: Above	8
BUNDY_CANYON_2	No	0	1: Open	0	1: By Node Level	0	BUNDY_CANYON	1: Below	5
BUNDY_CANYON_3	No	2	0: Closed	0	1: By Node Level	0	GAFFORD_ST_A	0: Above	16
BUNDY_CANYON_3	No	1	1: Open	0	1: By Node Level	0	GAFFORD_ST_A	1: Below	4
BUNDY_CANYON_3	No	0	1: Open	0	1: By Node Level	0	BUNDY_CANYON	1: Below	5
BUNDY_CANYON_3	No	3	0: Closed	0	1: By Node Level	0	BUNDY_CANYON	0: Above	8
BUNDY_CANYON_EAST	No	1	0: Closed	0	1: By Node Level	0	J83910	0: Above	112
BUNDY_CANYON_EAST	No	0	1: Open	0	1: By Node Level	0	J83910	1: Below	80
CAL_OAKS_1	No	0	1: Open	0	1: By Node Level	0	CAL_OAKS_A	1: Below	8
CAL_OAKS_1	No	1	0: Closed	0	1: By Node Level	0	CAL_OAKS_A	0: Above	32
CAL_OAKS_2	No	1	0: Closed	0	1: By Node Level	0	CAL_OAKS_A	0: Above	32
CAL_OAKS_2	No	0	1: Open	0	1: By Node Level	0	CAL_OAKS_A	1: Below	8
CAL_OAKS_3	No	0	1: Open	0	1: By Node Level	0	CAL_OAKS_A	1: Below	8
CAL_OAKS_3	No	1	0: Closed	0	1: By Node Level	0	CAL_OAKS_A	0: Above	32.5
CAL_OAKS_4	No	0	1: Open	0	1: By Node Level	0	CAL_OAKS_A	1: Below	8
CAL_OAKS_4	No	1	0: Closed	0	1: By Node Level	0	CAL_OAKS_A	0: Above	33
CANYON_LAKE_1	No	1	0: Closed	0	1: By Node Level	0	CANYON_LAKE_N	0: Above	32
CANYON_LAKE_1	No	0	1: Open	0	1: By Node Level	0	CANYON_LAKE_N	1: Below	9

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
CANYON_LAKE_2	No	1	0: Closed	0	1: By Node Level	0	CANYON_LAKE_N	0: Above	32
CANYON_LAKE_2	No	0	1: Open	0	1: By Node Level	0	CANYON_LAKE_N	1: Below	9
CANYON_LAKE_3	No	0	1: Open	0	1: By Node Level	0	CANYON_LAKE_N	1: Below	9
CANYON_LAKE_3	No	1	0: Closed	0	1: By Node Level	0	CANYON_LAKE_N	0: Above	32
CANYON_LAKE_4	No	0	1: Open	0	1: By Node Level	0	CANYON_LAKE_N	1: Below	9
CANYON_LAKE_4	No	1	0: Closed	0	1: By Node Level	0	CANYON_LAKE_N	0: Above	32
CANYON_LAKE_HYDRO_1	No	1	0: Closed	0	1: By Node Level	0	J65100	0: Above	95
CANYON_LAKE_HYDRO_1	No	0	1: Open	0	1: By Node Level	0	J65100	1: Below	80
CANYON_LAKE_HYDRO_2	No	1	0: Closed	0	1: By Node Level	0	J65100	0: Above	92
CANYON_LAKE_HYDRO_2	No	0	1: Open	0	1: By Node Level	0	J65100	1: Below	80
CIELO_VISTA_1	No	0	1: Open	0	1: By Node Level	0	J89146	1: Below	88
CIELO_VISTA_1	No	1	0: Closed	0	1: By Node Level	0	J89146	0: Above	105
CIELO_VISTA_2	No	0	1: Open	0	1: By Node Level	0	J89146	1: Below	80
CIELO_VISTA_2	No	1	0: Closed	0	1: By Node Level	0	J89146	0: Above	95
CIRRUS_CIR_1	No	0	1: Open	0	1: By Node Level	0	J89744	1: Below	80
CIRRUS_CIR_1	No	1	0: Closed	0	1: By Node Level	0	J89744	0: Above	87
CIRRUS_CIR_2	No	1	0: Closed	0	1: By Node Level	0	J89744	0: Above	84
CIRRUS_CIR_2	Yes	0	1: Open	0	1: By Node Level	0	J89744	1: Below	80
CIRRUS_CIR_3	No	1	0: Closed	0	1: By Node Level	0	J89744	0: Above	87
CIRRUS_CIR_3	Yes	0	0: Closed	0	1: By Node Level	0	J89744	1: Below	75
CITY_1	No	1	0: Closed	0	1: By Node Level	0	CITY	0: Above	20
CITY_1	No	0	1: Open	0	1: By Node Level	0	CITY	1: Below	5
CITY_2	No	0	1: Open	0	1: By Node Level	0	CITY	1: Below	5
CITY_2	No	1	0: Closed	0	1: By Node Level	0	CITY	0: Above	20
CITY_3	No	0	1: Open	0	1: By Node Level	0	CITY	1: Below	3.5
CITY_3	No	1	0: Closed	0	1: By Node Level	0	CITY	0: Above	20
COTTONWOOD1_1	No	0	1: Open	0	1: By Node Level	0	COTTONWOOD_1A	1: Below	6
COTTONWOOD1_1	No	1	0: Closed	0	1: By Node Level	0	COTTONWOOD_1A	0: Above	28
COTTONWOOD1_2	No	1	0: Closed	0	1: By Node Level	0	COTTONWOOD_1A	0: Above	28
COTTONWOOD1_2	No	0	1: Open	0	1: By Node Level	0	COTTONWOOD_1A	1: Below	6
COTTONWOOD2_1	No	1	0: Closed	0	1: By Node Level	0	COTTONWOOD_2	0: Above	24
COTTONWOOD2_1	No	0	1: Open	0	1: By Node Level	0	COTTONWOOD_2	1: Below	4

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
COTTONWOOD2_2	No	1	0: Closed	0	1: By Node Level	0	COTTONWOOD_2	0: Above	24
COTTONWOOD2_2	No	0	1: Open	0	1: By Node Level	0	COTTONWOOD_2	1: Below	4
COTTONWOOD2_3	No	0	1: Open	0	1: By Node Level	0	COTTONWOOD_2	1: Below	3
COTTONWOOD2_3	No	1	0: Closed	0	1: By Node Level	0	COTTONWOOD_2	0: Above	5
DALEYA_1	Yes	0	1: Open	0	1: By Node Level	0	DALEY	1: Below	4
DALEYA_1	Yes	1	0: Closed	0	1: By Node Level	0	DALEY	0: Above	10
DALEYA_2	Yes	1	1: Open	0	1: By Node Level	0	DALEY	1: Below	2.5
DALEYA_2	Yes	0	0: Closed	0	1: By Node Level	0	DALEY	0: Above	6
ENCINA_1	No	0	1: Open	0	1: By Node Level	0	ENCINA	1: Below	5
ENCINA_1	No	1	0: Closed	0	1: By Node Level	0	ENCINA	0: Above	10
ENCINA_2	No	1	0: Closed	0	1: By Node Level	0	ENCINA	0: Above	9
ENCINA_2	No	0	1: Open	0	1: By Node Level	0	ENCINA	1: Below	3.5
FARM_1	No	1	0: Closed	0	1: By Node Level	0	FARM	0: Above	17
FARM_1	No	0	1: Open	0	1: By Node Level	0	FARM	1: Below	6
FARM_2	No	0	1: Open	0	1: By Node Level	0	FARM	1: Below	4
FARM_2	No	1	0: Closed	0	1: By Node Level	0	FARM	0: Above	8
GREER_RANCH1_1	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_1A	0: Above	15
GREER_RANCH1_1	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_1A	1: Below	5
GREER_RANCH1_2	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_1A	1: Below	5
GREER_RANCH1_2	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_1A	0: Above	15
GREER_RANCH1_3	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_1A	1: Below	3
GREER_RANCH1_3	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_1A	0: Above	15
GREER_RANCH2_1	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_2A	1: Below	5
GREER_RANCH2_1	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_2A	0: Above	15
GREER_RANCH2_2	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_2A	1: Below	5
GREER_RANCH2_2	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_2A	0: Above	15
GREER_RANCH2_3	No	0	1: Open	0	1: By Node Level	0	GREER_RANCH_2A	1: Below	3
GREER_RANCH2_3	No	1	0: Closed	0	1: By Node Level	0	GREER_RANCH_2A	0: Above	15
HORSETHIEF1_1	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_1	1: Below	11
HORSETHIEF1_1	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_1	0: Above	26
HORSETHIEF1_2	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_1	1: Below	11
HORSETHIEF1_2	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_1	0: Above	26

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
HORSETHIEF1_3	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_1	1: Below	10
HORSETHIEF1_3	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_1	0: Above	26
HORSETHIEF2_1	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_2	0: Above	28
HORSETHIEF2_1	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_2	1: Below	5
HORSETHIEF2_2	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_2	1: Below	5
HORSETHIEF2_2	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_2	0: Above	28
HORSETHIEF2_3	No	0	1: Open	0	1: By Node Level	0	HORSETHIEF_2	1: Below	4
HORSETHIEF2_3	No	1	0: Closed	0	1: By Node Level	0	HORSETHIEF_2	0: Above	28
INLAND_VALLEY_1	No	0	1: Open	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	1: Below	5
INLAND_VALLEY_1	No	1	0: Closed	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	0: Above	7
INLAND_VALLEY_2	No	1	0: Closed	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	0: Above	21
INLAND_VALLEY_2	No	0	1: Open	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	1: Below	4
INLAND_VALLEY_3	No	0	1: Open	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	1: Below	3.5
INLAND_VALLEY_3	No	1	0: Closed	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	0: Above	15
INLAND_VALLEY_4	No	1	0: Closed	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	0: Above	15
INLAND_VALLEY_4	No	0	1: Open	0	1: By Node Level	0	INLAND_VALLEY_RESERVOIR	1: Below	3
LA_LAGUNA1_1	No	0	1: Open	0	1: By Node Level	0	LA_LAGUNA_1A	1: Below	4.5
LA_LAGUNA1_1	No	1	0: Closed	0	1: By Node Level	0	LA_LAGUNA_1A	0: Above	14
LA_LAGUNA1_2	No	0	1: Open	0	1: By Node Level	0	LA_LAGUNA_1A	1: Below	4.5
LA_LAGUNA1_2	No	1	0: Closed	0	1: By Node Level	0	LA_LAGUNA_1A	0: Above	14
LA_LAGUNA1_3	No	0	0: Closed	0	1: By Node Level	0	LA_LAGUNA_1A	0: Above	4
LA_LAGUNA1_3	No	1	1: Open	0	1: By Node Level	0	LA_LAGUNA_1A	1: Below	3
LA_LAGUNA2_1	No	1	0: Closed	0	1: By Node Level	0	LA_LAGUNA_2A	0: Above	12
LA_LAGUNA2_1	No	0	1: Open	0	1: By Node Level	0	LA_LAGUNA_2A	1: Below	3.5
LA_LAGUNA2_2	No	0	1: Open	0	1: By Node Level	0	LA_LAGUNA_2A	1: Below	3.5
LA_LAGUNA2_2	No	1	0: Closed	0	1: By Node Level	0	LA_LAGUNA_2A	0: Above	5
LA_LAGUNA2_3	No	1	0: Closed	0	1: By Node Level	0	LA_LAGUNA_2A	0: Above	4
LA_LAGUNA2_3	No	0	1: Open	0	1: By Node Level	0	LA_LAGUNA_2A	1: Below	3
LAKESHORE_1	No	1	0: Closed	0	1: By Node Level	0	LAKE_ST	0: Above	34
LAKESHORE_1	No	0	1: Open	0	1: By Node Level	0	LAKE_ST	1: Below	12
LAKESHORE_2	No	1	0: Closed	0	1: By Node Level	0	LAKE_ST	0: Above	18
LAKESHORE_2	No	0	1: Open	0	1: By Node Level	0	LAKE_ST	1: Below	9

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
LAKESHORE_3	No	1	0: Closed	0	1: By Node Level	0	LAKE_ST	0: Above	34
LAKESHORE_3	No	0	1: Open	0	1: By Node Level	0	LAKE_ST	1: Below	12
LAKESHORE_4	No	0	1: Open	0	1: By Node Level	0	LAKE_ST	1: Below	9
LAKESHORE_4	No	1	0: Closed	0	1: By Node Level	0	LAKE_ST	0: Above	18
LOS_PINOS_2A_1	Yes	1	0: Closed	0	1: By Node Level	0	LOS_PINOS_2A	0: Above	7
LOS_PINOS_2A_1	Yes	0	1: Open	0	1: By Node Level	0	LOS_PINOS_2A	1: Below	3.5
LOS_PINOS_2A_2	Yes	1	0: Closed	0	1: By Node Level	0	LOS_PINOS_2A	0: Above	3
LOS_PINOS_2A_2	Yes	0	1: Open	0	1: By Node Level	0	LOS_PINOS_2A	1: Below	2.6
LOS_PINOS1_1	Yes	1	0: Closed	0	1: By Node Level	0	LOS_PINOS_1	0: Above	15
LOS_PINOS1_1	Yes	0	1: Open	0	1: By Node Level	0	LOS_PINOS_1	1: Below	5
LOS_PINOS1_2	Yes	0	1: Open	0	1: By Node Level	0	LOS_PINOS_1	1: Below	4.5
LOS_PINOS1_2	Yes	1	0: Closed	0	1: By Node Level	0	LOS_PINOS_1	0: Above	12
LUCERNE_1	No	1	0: Closed	0	1: By Node Level	0	LUCERNE	0: Above	7
LUCERNE_1	No	0	1: Open	0	1: By Node Level	0	LUCERNE	1: Below	5
LUCERNE_2	No	0	1: Open	0	1: By Node Level	0	LUCERNE	1: Below	5
LUCERNE_2	No	1	0: Closed	0	1: By Node Level	0	LUCERNE	0: Above	7
LUCERNE_3	No	0	1: Open	0	1: By Node Level	0	LUCERNE	1: Below	5
LUCERNE_3	No	1	0: Closed	0	1: By Node Level	0	LUCERNE	0: Above	7
LUCERNE_4	No	0	1: Open	0	1: By Node Level	0	LUCERNE	1: Below	5
LUCERNE_4	No	1	0: Closed	0	1: By Node Level	0	LUCERNE	0: Above	7
MEADOWBROOK2_1	No	1	0: Closed	0	1: By Node Level	0	MEADOWBROOK_2	0: Above	15
MEADOWBROOK2_1	No	0	1: Open	0	1: By Node Level	0	MEADOWBROOK_2	1: Below	5
MEADOWBROOK2_2	No	0	1: Open	0	1: By Node Level	0	MEADOWBROOK_2	1: Below	3
MEADOWBROOK2_2	No	1	0: Closed	0	1: By Node Level	0	MEADOWBROOK_2	0: Above	15
MEADOWBROOK2_3	No	1	0: Closed	0	1: By Node Level	0	MEADOWBROOK_2	0: Above	15
MEADOWBROOK2_3	No	0	1: Open	0	1: By Node Level	0	MEADOWBROOK_2	1: Below	3
ORTEGA_1	No	0	1: Open	0	1: By Node Level	0	ORTEGA	1: Below	5
ORTEGA_1	No	1	0: Closed	0	1: By Node Level	0	ORTEGA	0: Above	20
ORTEGA_2	No	1	0: Closed	0	1: By Node Level	0	ORTEGA	0: Above	20
ORTEGA_2	No	0	1: Open	0	1: By Node Level	0	ORTEGA	1: Below	5
ORTEGA_3	No	0	1: Open	0	1: By Node Level	0	ORTEGA	1: Below	5
ORTEGA_3	No	1	0: Closed	0	1: By Node Level	0	ORTEGA	0: Above	20

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
RICE_CYN_1	No	1	0: Closed	0	1: By Node Level	0	RICE_CANYON	0: Above	14
RICE_CYN_1	No	0	1: Open	0	1: By Node Level	0	RICE_CANYON	1: Below	7
RICE_CYN_2	No	0	1: Open	0	1: By Node Level	0	RICE_CANYON	1: Below	7
RICE_CYN_2	No	1	0: Closed	0	1: By Node Level	0	RICE_CANYON	0: Above	14
RICE_CYN_3	No	0	1: Open	0	1: By Node Level	0	RICE_CANYON	1: Below	7
RICE_CYN_3	No	1	0: Closed	0	1: By Node Level	0	RICE_CANYON	0: Above	14
RICE_CYN_4	No	0	1: Open	0	1: By Node Level	0	RICE_CANYON	1: Below	7
RICE_CYN_4	No	1	0: Closed	0	1: By Node Level	0	RICE_CANYON	0: Above	14
ROSETTA_CYN1_1	No	1	0: Closed	0	1: By Node Level	0	ROSETTA_CANYON_1	0: Above	24
ROSETTA_CYN1_1	No	0	1: Open	0	1: By Node Level	0	ROSETTA_CANYON_1	1: Below	6
ROSETTA_CYN1_2	No	0	1: Open	0	1: By Node Level	0	ROSETTA_CANYON_1	1: Below	5.5
ROSETTA_CYN1_2	No	1	0: Closed	0	1: By Node Level	0	ROSETTA_CANYON_1	0: Above	18
ROSETTA_CYN1_3	No	0	1: Open	0	1: By Node Level	0	ROSETTA_CANYON_1	1: Below	3
ROSETTA_CYN1_3	No	1	0: Closed	0	1: By Node Level	0	ROSETTA_CANYON_1	0: Above	5
ROSETTA_CYN2_1	No	1	0: Closed	0	1: By Node Level	0	ROSETTA_CANYON_2A	0: Above	5
ROSETTA_CYN2_1	No	0	1: Open	0	1: By Node Level	0	ROSETTA_CANYON_2A	1: Below	3.5
ROSETTA_CYN2_2	No	0	1: Open	0	1: By Node Level	0	ROSETTA_CANYON_2A	1: Below	3
ROSETTA_CYN2_2	No	1	0: Closed	0	1: By Node Level	0	ROSETTA_CANYON_2A	0: Above	3.5
SEDCO_A	Yes	0	1: Open	0	1: By Node Level	0	SEDCO	1: Below	3.5
SEDCO_A	Yes	1	0: Closed	0	1: By Node Level	0	SEDCO	0: Above	4.5
SKYLARK_1	No	1	0: Closed	0	1: By Node Level	0	J89150	0: Above	80
SKYLARK_1	No	0	1: Open	0	1: By Node Level	0	J89150	1: Below	79
SKYLARK_2	No	0	1: Open	0	1: By Node Level	0	J89150	1: Below	77
SKYLARK_2	No	1	0: Closed	0	1: By Node Level	0	J89150	0: Above	80
SKYLARK_3	No	0	1: Open	0	1: By Node Level	0	J89150	1: Below	70
SKYLARK_3	No	1	0: Closed	0	1: By Node Level	0	J89150	0: Above	80
SKYMEADOWS_1	No	0	1: Open	0	1: By Node Level	0	SKYMEADOWS	1: Below	6
SKYMEADOWS_1	No	1	0: Closed	0	1: By Node Level	0	SKYMEADOWS	0: Above	20
SKYMEADOWS_2	No	0	1: Open	0	1: By Node Level	0	SKYMEADOWS	1: Below	3
SKYMEADOWS_2	No	1	0: Closed	0	1: By Node Level	0	SKYMEADOWS	0: Above	10
STAGE_RANCH1_1	No	1	0: Closed	0	1: By Node Level	0	STAGE_RANCH_1A	0: Above	13.5
STAGE_RANCH1_1	No	0	1: Open	0	1: By Node Level	0	STAGE_RANCH_1A	1: Below	5

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
STAGE_RANCH1_2	No	0	1: Open	0	1: By Node Level	0	STAGE_RANCH_1A	1: Below	5
STAGE_RANCH1_2	No	1	0: Closed	0	1: By Node Level	0	STAGE_RANCH_1A	0: Above	13
STAGE_RANCH2_1	No	0	1: Open	0	1: By Node Level	0	STAGE_RANCH_2A	1: Below	5
STAGE_RANCH2_1	No	1	0: Closed	0	1: By Node Level	0	STAGE_RANCH_2A	0: Above	13.5
STAGE_RANCH2_2	No	1	0: Closed	0	1: By Node Level	0	STAGE_RANCH_2A	0: Above	8
STAGE_RANCH2_2	No	0	1: Open	0	1: By Node Level	0	STAGE_RANCH_2A	1: Below	3.5
SUMMERHILL_1	No	0	1: Open	0	1: By Node Level	0	SUMMERHILL	1: Below	4
SUMMERHILL_1	No	1	0: Closed	0	1: By Node Level	0	SUMMERHILL	0: Above	8
SUMMERHILL_2	No	0	1: Open	0	1: By Node Level	0	SUMMERHILL	1: Below	4
SUMMERHILL_2	No	1	0: Closed	0	1: By Node Level	0	SUMMERHILL	0: Above	8
SUMMERHILL_3	No	1	0: Closed	0	1: By Node Level	0	SUMMERHILL	0: Above	5
SUMMERHILL_3	No	0	1: Open	0	1: By Node Level	0	SUMMERHILL	1: Below	3
TOMLIN1_1	No	0	1: Open	0	1: By Node Level	0	TOMLIN_1	1: Below	5
TOMLIN1_1	No	1	0: Closed	0	1: By Node Level	0	TOMLIN_1	0: Above	21
TOMLIN1_2	No	0	1: Open	0	1: By Node Level	0	TOMLIN_1	1: Below	3
TOMLIN1_2	No	1	0: Closed	0	1: By Node Level	0	TOMLIN_1	0: Above	10
TOMLIN2_1	No	0	1: Open	0	1: By Node Level	0	TOMLIN_2	1: Below	5
TOMLIN2_1	No	1	0: Closed	0	1: By Node Level	0	TOMLIN_2	0: Above	21
TOMLIN2_2	No	1	0: Closed	0	1: By Node Level	0	TOMLIN_2	0: Above	16
TOMLIN2_2	No	0	1: Open	0	1: By Node Level	0	TOMLIN_2	1: Below	3.5
TUSCANY1_1	No	0	1: Open	0	1: By Node Level	0	TUSCANY_1A	1: Below	6
TUSCANY1_1	No	1	0: Closed	0	1: By Node Level	0	TUSCANY_1A	0: Above	24
TUSCANY1_2	No	1	0: Closed	0	1: By Node Level	0	TUSCANY_1A	0: Above	24
TUSCANY1_2	No	0	1: Open	0	1: By Node Level	0	TUSCANY_1A	1: Below	6
TUSCANY1_3	No	1	0: Closed	0	1: By Node Level	0	TUSCANY_1A	0: Above	24
TUSCANY1_3	No	0	1: Open	0	1: By Node Level	0	TUSCANY_1A	1: Below	6
TUSCANY1_4	No	0	1: Open	0	1: By Node Level	0	TUSCANY_1A	1: Below	6
TUSCANY1_4	No	1	0: Closed	0	1: By Node Level	0	TUSCANY_1A	0: Above	24
TUSCANY2_1	No	1	0: Closed	0	1: By Node Level	0	TUSCANY_2	0: Above	6
TUSCANY2_1	No	0	1: Open	0	1: By Node Level	0	TUSCANY_2	1: Below	4
TUSCANY2_2	No	1	0: Closed	0	1: By Node Level	0	TUSCANY2_2	0: Above	4
TUSCANY2_2	No	0	1: Open	0	1: By Node Level	0	TUSCANY2_2	1: Below	3

ID (Char)	Disabled (Boolean)	Sequence (Long)	Status (Int)	Setting (Double)	Control Method (Int)	Control Time (hour)	Control ID (Char)	Control Context (Int)	Control Value (Double)
WAITE_1	No	0	1: Open	0	1: By Node Level	0	WAITE	1: Below	5
WAITE_1	No	1	0: Closed	0	1: By Node Level	0	WAITE	0: Above	20
WAITE_2	No	1	0: Closed	0	1: By Node Level	0	WAITE	0: Above	20
WAITE_2	No	0	1: Open	0	1: By Node Level	0	WAITE	1: Below	5
WAITE_3	No	1	0: Closed	0	1: By Node Level	0	WAITE	0: Above	20
WAITE_3	No	0	1: Open	0	1: By Node Level	0	WAITE	1: Below	5
WAITE_4	No	1	0: Closed	0	1: By Node Level	0	WAITE	0: Above	20
WAITE_4	No	0	1: Open	0	1: By Node Level	0	WAITE	1: Below	5
WOODMOOR_1	No	1	0: Closed	0	1: By Node Level	0	WOODMOOR_A	0: Above	24
WOODMOOR_1	No	0	1: Open	0	1: By Node Level	0	WOODMOOR_A	1: Below	4
WOODMOOR_2	No	1	0: Closed	0	1: By Node Level	0	WOODMOOR_A	0: Above	24
WOODMOOR_2	No	0	1: Open	0	1: By Node Level	0	WOODMOOR_A	1: Below	4
WOODMOOR_3	No	1	0: Closed	0	1: By Node Level	0	WOODMOOR_B	0: Above	24
WOODMOOR_3	No	0	1: Open	0	1: By Node Level	0	WOODMOOR_B	1: Below	3
WOODMOOR_4	No	0	1: Open	0	1: By Node Level	0	WOODMOOR_B	1: Below	3
WOODMOOR_4	No	1	0: Closed	0	1: By Node Level	0	WOODMOOR_B	0: Above	24

Diurnal Patterns

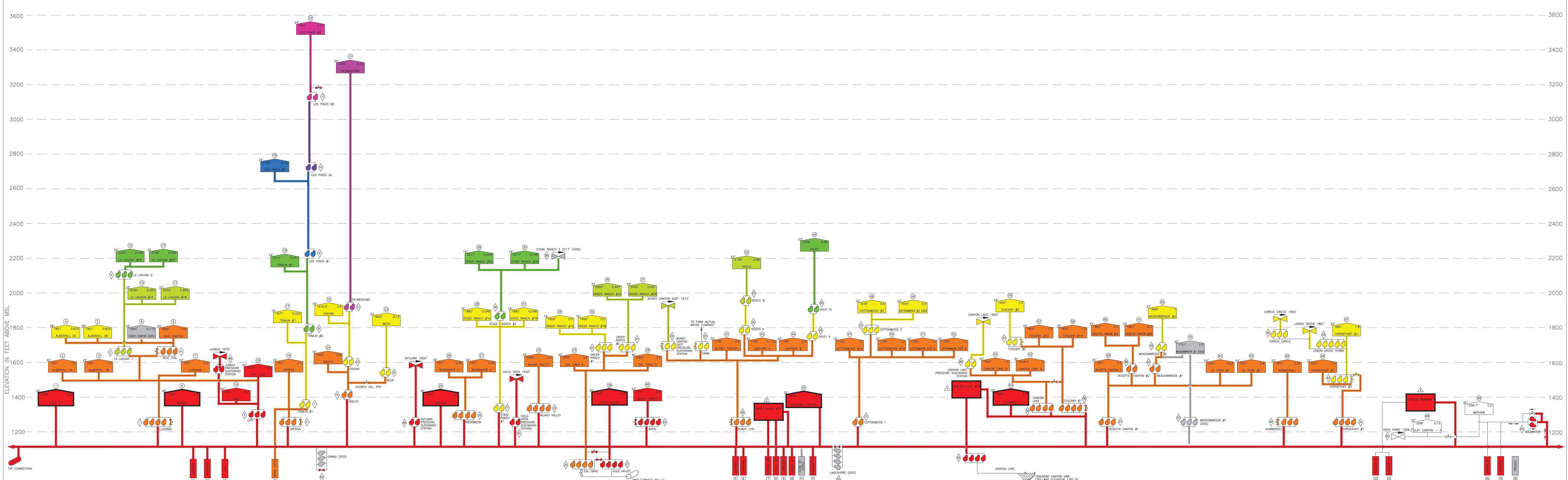
Table A - 14. Diurnal Demand Patterns

Zone	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1801	0.62	0.47	0.44	0.75	1.52	2.53	2.22	1.33	0.91	0.69	0.67	0.67	0.62	0.53	0.56	0.59	0.63	0.75	1.15	1.51	1.55	1.39	1.06	0.84
1882	0.32	0.54	0.23	0.25	0.35	0.46	1.32	0.79	0.98	1.28	0.77	1.10	1.40	2.53	2.14	1.17	0.92	1.59	2.36	1.27	0.60	0.87	0.39	0.36
1434	0.57	0.55	0.56	0.70	1.09	1.78	1.83	1.35	1.04	1.00	0.93	0.86	0.80	0.79	0.81	0.84	0.89	0.95	1.17	1.32	1.38	1.16	0.90	0.74
1650	0.58	0.59	0.48	0.62	1.35	2.35	2.08	1.62	1.13	0.85	0.82	0.73	0.71	0.65	0.62	0.66	0.76	0.81	1.09	1.42	1.26	1.19	0.90	0.74
1258.4	0.40	0.49	0.49	0.62	1.14	1.84	1.34	1.27	1.00	0.81	0.73	0.74	0.97	0.72	0.69	1.14	0.80	0.88	1.19	1.36	1.35	1.81	1.34	0.87
1358.7	0.58	0.65	0.43	0.59	1.26	1.64	1.57	1.49	1.37	0.85	0.86	0.71	0.86	0.73	0.67	0.98	1.11	0.80	0.87	1.21	1.25	1.26	1.29	0.94
1746	0.60	0.64	0.52	0.58	1.14	1.86	1.70	1.30	1.02	0.82	0.82	0.90	0.74	0.72	0.76	0.78	0.94	1.08	1.33	1.60	1.35	1.21	0.86	0.73
1601	0.54	0.42	0.42	0.63	1.21	1.97	1.93	1.32	0.98	0.93	0.89	0.80	0.79	0.70	0.68	0.75	0.85	0.96	1.25	1.53	1.54	1.26	0.92	0.73
1701	0.85	0.51	0.48	0.79	1.22	1.37	1.83	1.25	1.27	1.09	0.85	0.83	0.70	0.71	0.70	0.72	0.70	1.01	1.24	1.60	1.50	0.93	0.94	0.90
1467	0.46	0.35	0.37	0.62	1.20	1.88	1.61	1.29	0.98	0.92	0.91	1.00	0.88	0.81	0.78	0.84	1.04	1.10	1.44	1.64	1.43	1.04	0.79	0.63
1750	0.64	0.64	0.43	0.67	1.38	2.40	2.38	1.40	0.98	0.78	0.67	0.65	0.63	0.60	0.61	0.60	0.65	0.80	1.09	1.37	1.44	1.31	1.03	0.84
1571	0.50	0.48	0.41	0.52	0.72	0.89	1.39	1.14	1.02	1.00	1.18	1.11	1.02	0.99	1.00	1.08	1.14	1.22	1.39	1.51	1.41	1.28	0.92	0.71
2050	0.60	0.69	0.52	0.90	1.46	2.90	2.75	1.49	0.99	0.76	0.62	0.64	0.56	0.48	0.42	0.59	0.65	0.64	0.95	1.11	1.30	1.33	0.90	0.75
1850	0.66	0.67	0.64	0.85	1.36	2.98	2.50	1.45	1.35	0.93	0.73	0.48	0.48	0.65	0.43	0.60	0.55	0.89	0.85	1.07	1.22	1.08	0.83	0.75
2778	0.64	0.72	0.58	0.28	1.03	0.70	1.12	0.93	2.30	1.70	1.28	1.41	0.79	1.32	1.35	0.85	1.14	1.12	1.17	1.23	0.79	0.52	0.47	0.56
1581	0.37	0.39	0.42	0.47	0.64	0.84	1.17	0.95	1.12	1.15	1.24	1.15	1.12	1.06	0.98	1.00	1.16	1.30	1.56	1.63	1.52	1.20	0.92	0.65
2217	0.93	0.89	1.11	0.90	0.99	0.89	0.89	0.79	0.90	0.90	0.92	1.01	0.80	0.94	0.79	0.91	1.05	2.78	0.86	0.95	1.00	1.00	0.89	0.91
1464	0.17	0.19	0.18	0.62	0.44	1.20	1.11	0.92	1.96	1.11	1.56	0.91	0.67	0.81	0.75	0.96	1.63	1.26	1.49	1.79	1.36	1.07	1.17	0.67
1842	0.40	0.40	0.45	0.79	1.29	1.77	1.83	1.12	1.65	1.11	0.88	0.87	0.89	0.90	0.75	0.64	0.85	0.92	0.92	1.28	1.25	1.29	1.05	0.72
1916.5	0.49	0.75	0.99	0.76	0.58	0.73	1.93	1.30	0.52	0.60	0.88	1.85	2.68	1.26	1.15	1.85	0.51	0.63	0.87	1.03	1.31	0.29	0.53	0.51
1896	0.45	0.37	0.45	0.53	0.75	0.98	1.31	1.35	1.61	1.42	1.55	1.33	1.23	0.93	0.78	0.95	1.07	1.14	1.20	1.35	1.01	1.07	0.63	0.54
1622	0.53	0.41	0.64	0.93	1.67	2.61	2.32	1.64	1.10	0.97	0.87	0.85	0.80	0.62	0.63	0.66	0.70	0.86	0.92	1.12	1.00	0.93	0.64	0.59
1589	0.40	0.57	0.56	0.48	0.80	1.08	1.38	0.93	1.01	1.68	1.44	1.02	1.17	1.19	1.21	1.17	1.10	0.87	1.10	1.27	1.17	0.84	0.93	0.66
1940	0.49	0.50	0.85	0.62	1.70	3.31	2.62	1.33	0.86	0.71	0.57	0.51	0.47	0.47	0.54	0.51	0.52	0.95	1.28	1.52	1.02	1.10	0.89	0.69
1980	0.40	0.22	0.14	0.18	0.75	0.84	0.77	0.99	1.06	1.82	0.97	0.93	0.86	0.99	1.15	1.52	1.47	1.17	2.08	1.41	1.46	1.73	0.59	0.50
1800	0.62	0.37	0.43	0.81	1.61	2.49	2.13	1.33	0.90	0.74	0.71	0.69	0.66	0.60	0.62	0.64	0.69	0.87	1.10	1.47	1.47	1.30	0.98	0.80
1640	0.60	0.32	0.41	0.80	1.35	2.46	2.61	1.81	1.17	0.90	0.68	0.67	0.68	0.62	0.49	0.60	0.60	0.77	1.03	1.29	1.19	1.13	1.02	0.81
1871	0.17	0.18	1.56	0.29	0.19	0.15	0.23	2.27	5.64	1.77	0.95	0.78	0.86	0.89	0.88	1.71	1.95	1.80	0.56	0.39	0.29	0.19	0.15	0.16

Zone	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
2240	0.79	0.70	0.46	0.86	1.95	2.72	2.50	1.35	0.89	0.71	0.84	0.50	0.47	0.39	0.33	0.48	0.56	0.67	1.02	1.20	1.65	1.19	0.91	0.85
1575	0.68	0.94	0.67	0.73	0.67	0.68	1.00	1.61	0.66	1.87	0.64	0.65	0.64	0.68	0.63	0.68	0.71	0.73	0.73	4.36	2.06	0.66	0.68	0.68
1461	0.39	1.69	0.17	0.29	0.92	1.50	0.80	1.78	0.67	0.67	1.03	1.25	1.73	1.35	0.72	0.58	1.20	1.53	1.29	1.03	1.39	0.97	0.57	0.48
2309	0.15	1.72	3.43	0.73	1.03	1.87	2.13	1.56	1.09	0.55	1.24	0.64	1.12	0.55	0.31	0.51	0.78	0.62	1.71	0.69	0.58	0.42	0.34	0.24
1561	0.09	0.12	0.20	0.70	2.33	3.11	0.21	0.41	0.54	0.70	0.51	0.71	0.42	2.44	3.81	2.60	0.30	0.46	0.80	0.64	1.09	1.34	0.29	0.19
1934	0.53	0.41	0.42	0.61	1.65	2.46	2.67	1.80	1.09	0.75	0.64	0.48	0.48	0.44	0.42	0.54	0.61	0.76	1.04	0.99	1.35	1.47	1.43	0.98
1471	0.10	0.14	0.01	0.10	0.32	0.26	0.16	1.21	1.35	0.34	1.24	1.47	1.14	0.38	0.52	3.84	2.14	0.49	2.19	0.62	3.44	0.70	1.20	0.65
2196	2.57	3.92	4.08	0.78	0.39	0.73	0.96	1.35	1.36	0.34	0.49	0.28	0.57	0.46	0.96	0.33	0.38	0.38	0.47	0.71	0.38	0.46	0.24	1.40
1928	1.46	0.94	0.94	0.84	1.52	1.61	2.29	2.00	0.67	0.36	0.68	0.49	0.41	0.89	0.50	0.46	0.71	0.32	1.16	1.04	1.02	1.55	0.95	1.21
2040	0.33	0.31	0.12	0.72	0.78	1.90	1.78	1.59	1.19	1.13	0.63	0.71	0.68	0.53	0.69	1.44	0.87	1.02	1.39	1.34	1.88	1.45	0.89	0.61
2170	0.49	0.38	0.20	1.28	1.58	2.76	3.19	1.80	0.97	0.57	0.70	0.40	0.40	0.37	0.48	0.64	0.68	0.78	0.77	0.84	1.50	1.59	0.93	0.71

Appendix B – System Schematic

HYDRAULIC SCHEMATIC OF WATER SUPPLY SYSTEM



LAST UPDATED: January 3, 2019

LEGEND

- ON DEMAND
- PRESSURE RELIEF/RED. VALVE
- SHUT-OFF VALVE
- WATER TREATMENT PLANT
- NOT IN USE
- OUT OF SERVICE
- OUT OF SERVICE (xxxx (OOS))
- RESERVOIR (HEIGHT 24'; OVERFLOW ELEVATION 1450'; RESERVOIR CAPACITY (MG) 0.5; NAME)
- WELL
- BOOSTER PUMPS
- WATER TREATMENT PLANT (XXXX)
- RESERVOIR NUMBER
- PUMP STATION NUMBER
- WELL NUMBER
- WTP NUMBER
- 1200 – 1400 PZ
- 1401 – 1600 PZ
- 1601 – 1800 PZ
- 1801 – 2000 PZ
- 2001 – 2200 PZ
- 2201 – 2400 PZ
- 2401 – 2600 PZ
- 2601 – 2800 PZ
- 2801 – 3000 PZ
- 3001 – 3200 PZ
- 3201 – 3400 PZ
- 3401 – 3600 PZ

RESERVOIRS	70
RESERVOIRS (OUT OF SERVICE)	2
WELLS	17
WELLS (OUT OF SERVICE)	2
BOOSTER PUMP STATIONS	55
BOOSTER PUMP STATIONS (OUT OF SERVICE)	3
WATER TREATMENT PLANTS	3
PRESSURE SUSTAINING STATIONS	9
PRESSURE SUSTAINING STATIONS (OUT OF SERVICE)	–

BOOSTER STATIONS

NAME	# OF PUMPS	HORSE POWER
ADELFA	2	75
AULD VALLEY	4	250
BECK	–	30
BUNDY CANYON	3	#1: 125 / #2: 100 / #3: 100
BUNDY CANYON EAST	–	–
CAL OAKS	4	100
CANYON LAKE	4	100
CANYON LAKE HYDRO	3	#1: 30 / #2: 30 / #3: 40
CIELO VISTA	2	20
CITY	2	50
CIRRUS CIRCLE	–	–
COLDWATER	2	25
COTTONWOOD 1	2	200
COTTONWOOD 2	3	50
DALEY A	2	15
DALEY B	2	15
ENCINA	2	100
FARM	3	100
GRAND AVENUE	3	#1: 125 / #2: 100 / #3: 60
GREER RANCH 1	3	50
GREER RANCH 2	3	100
HORSE THIEF 1	4	125
HORSE THIEF 2	3	75
JUNKLE / AMIE	2	–
LA LAGUNA 1	3	60
LA LAGUNA 2	3	25
LAKESHORE	4	85
LEMON GROVE	5	#1:7.5/#2:7.5/#3:25/#4:25/#5:150
LOS PINOS 1	2	50
LOS PINOS 2A	2	15
LOS PINOS 2B	2	15
LUCERN	4	75
MEADOWBROOK 1	2	50
MEADOWBROOK 2	3	40
ORTEGA	3	75
PATS POINT	0	0
RICE CANYON	4	75
ROSETTA CANYON #1	3	250
ROSETTA CANYON #2	2	150
SEDCO A	1	20
SEDCO B	1	20
SKYLARK	3	#1: 10 / #2: 10 / #3: 25
SKYMEADOWS	2	100
STAGE RANCH 1	2	75
STAGE RANCH 2	2	100
STAGE RANCH 3	2	75
SUMMERHILL	3	100
TOMLIN 1	2	60
TOMLIN 2	2	50
CANYON LAKE WTP INFLUENT	4	95
TUSCANY 1	4	125
TUSCANY 2	2	75
WAITE	3	50
WOODMOOR	4	75

WELLS

NAME	NUMBER OF PUMPS	HORSE POWER
CEREAL 1	1	400
CEREAL 3	1	400
CORYDON	1	300
LINCOLN	1	150
OLIVE	1	–
DIAMOND	1	350
SUMMERLY	1	–
PALOMAR	1	–
CEREAL 4	1	400
FLAGLER 2A	1	–
FLAGLER 3A	1	–
TERRA COTTA	1	250
JOY	1	250
MACHADO	1	200
STATION 71	1	100
MAYHEW	1	100

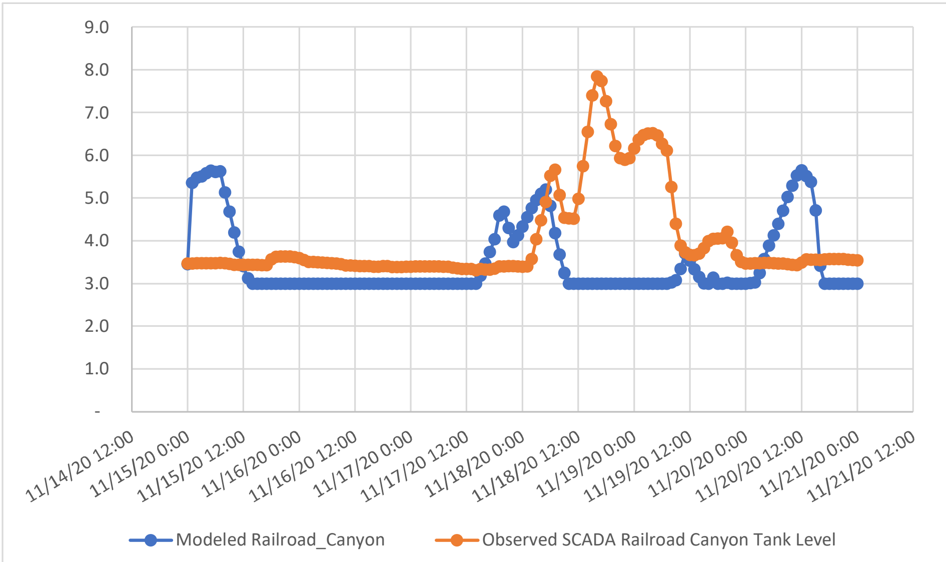
Elsinore Valley Municipal Water District

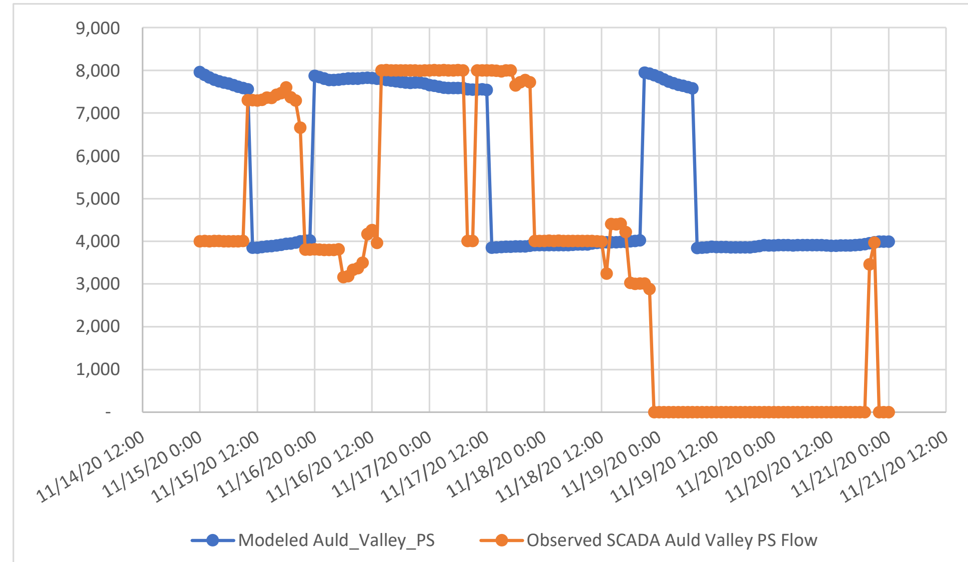
V:\Exhibits\System Schematic\System Schematic.dwg 01/09/19 11:07am

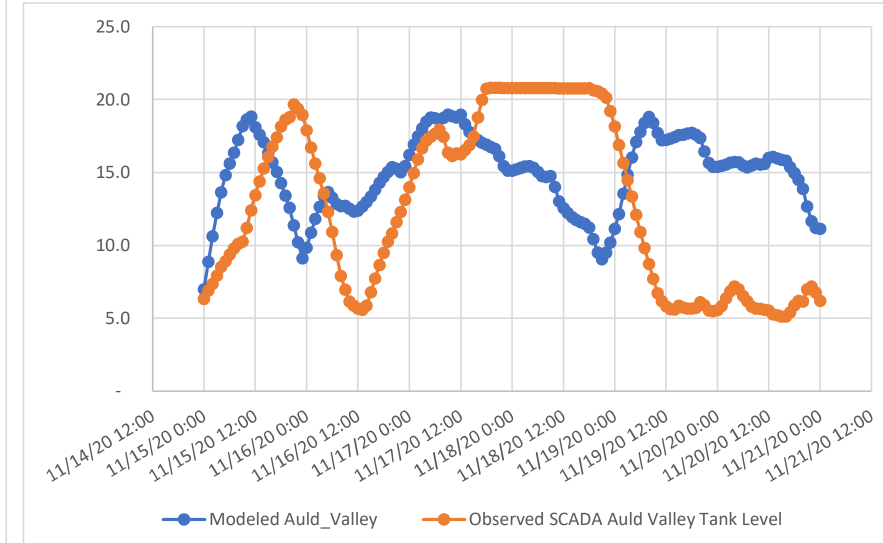
Appendix C – EPS Calibration Graphs

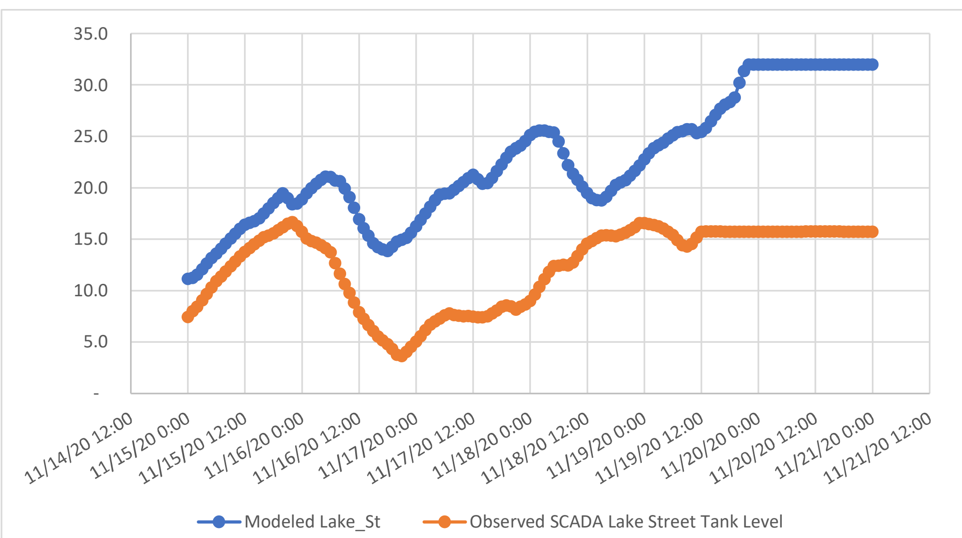
Figure C-1. Sources of Supply

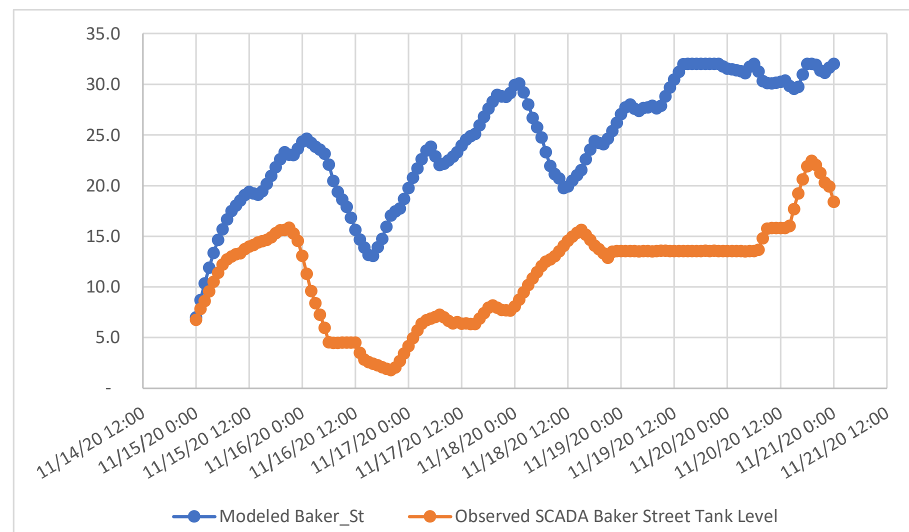
Figure C-2. 1434 Zone

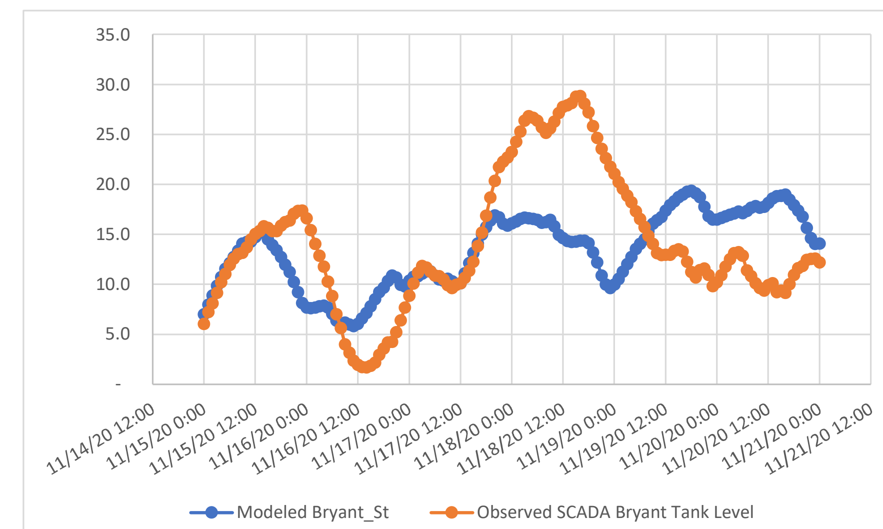


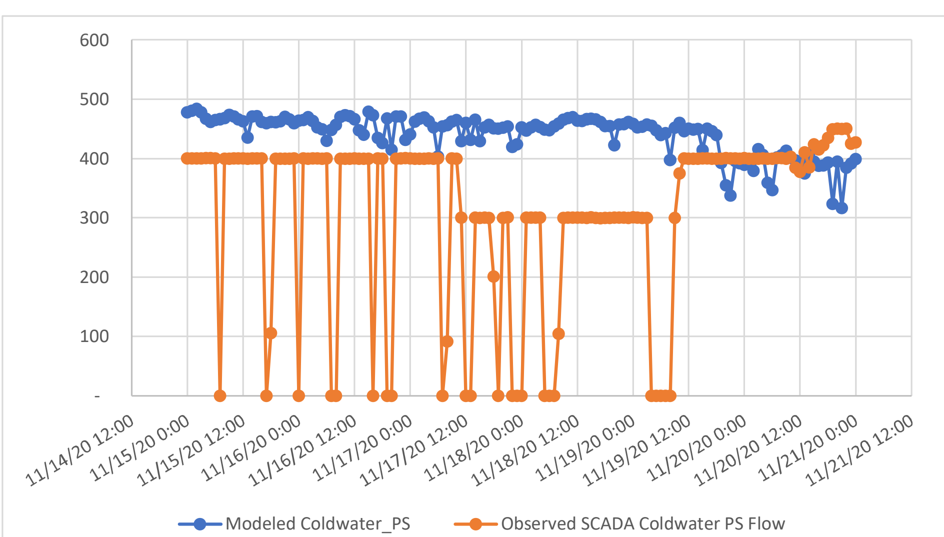












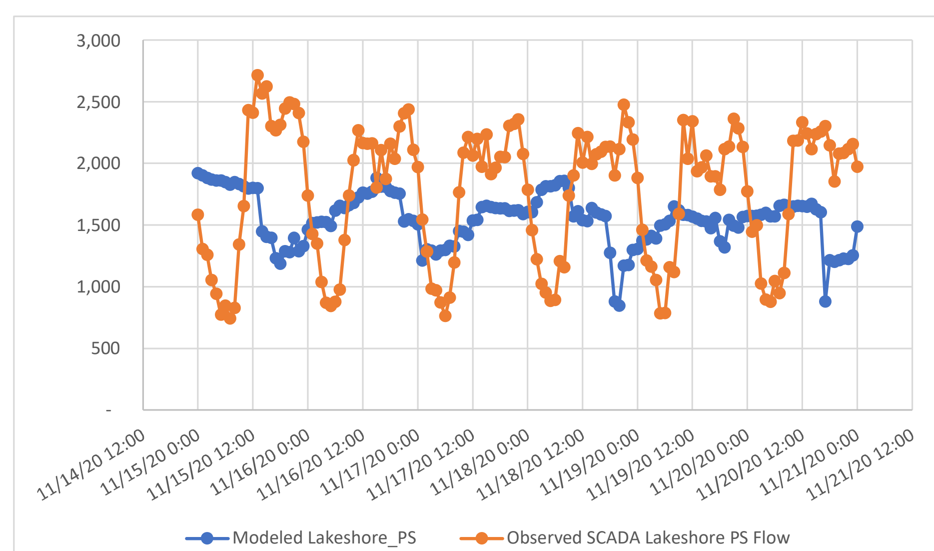
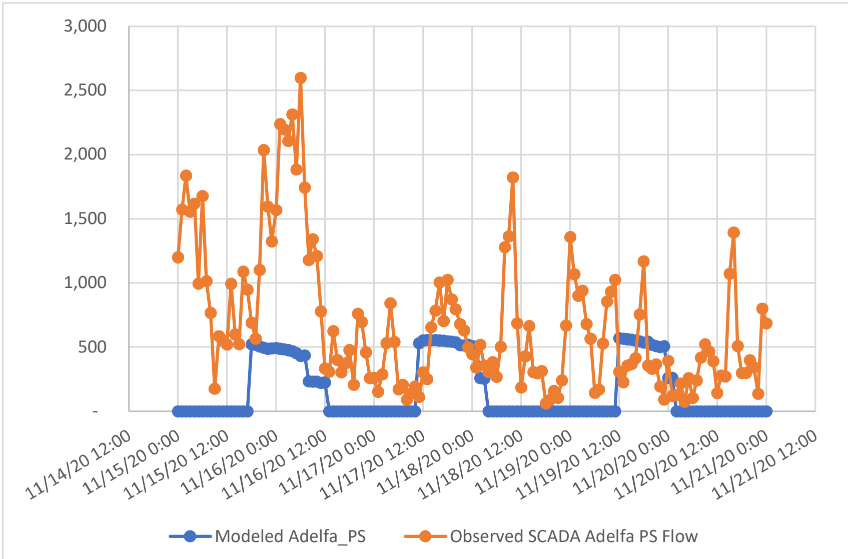
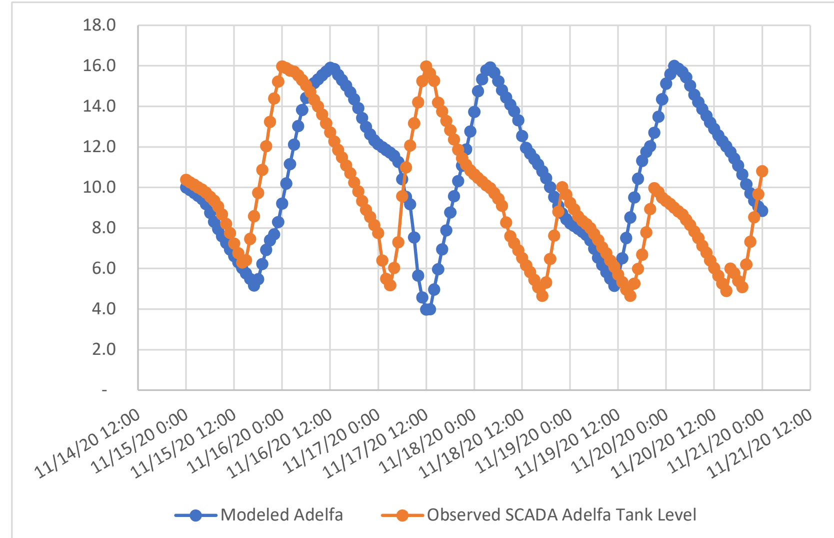
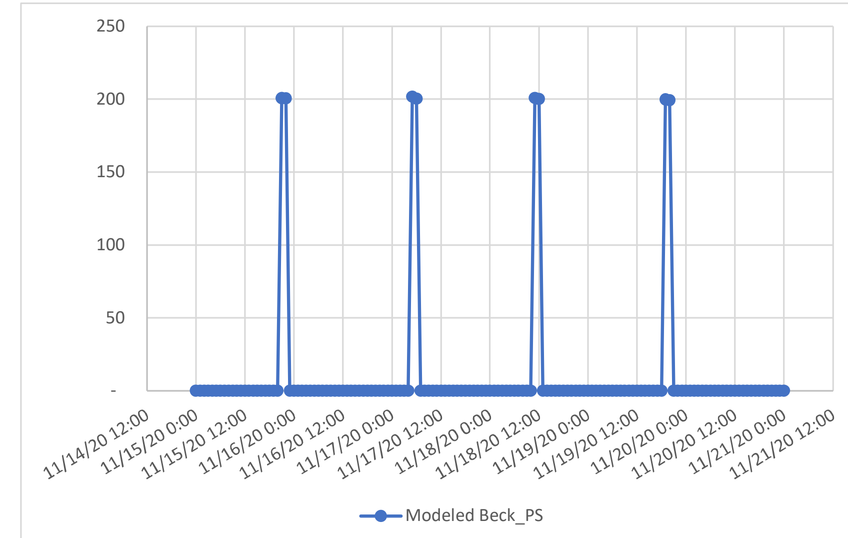
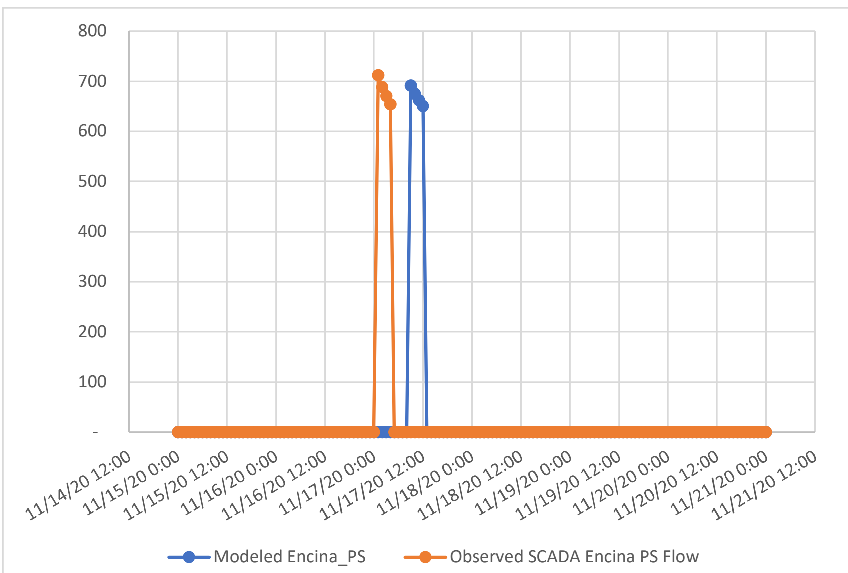


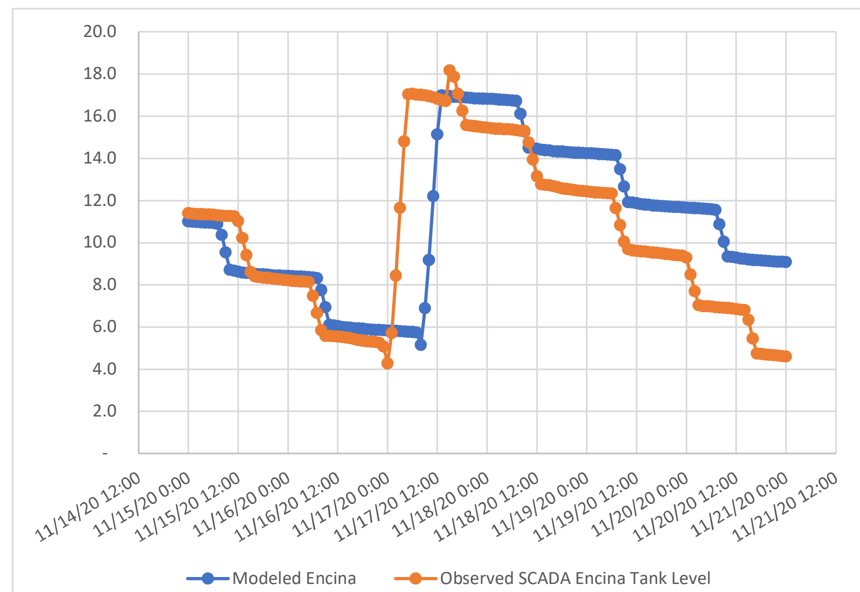
Figure C-3. Adelfa PS

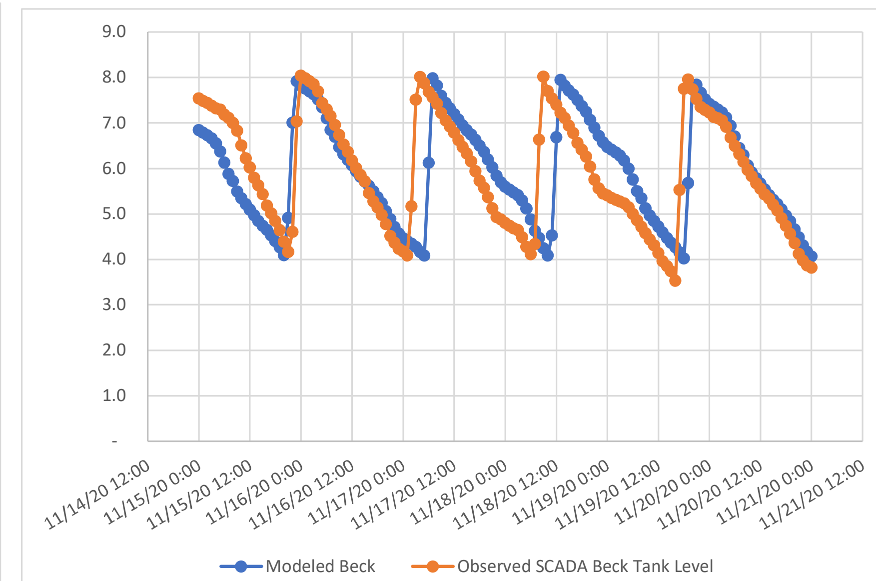


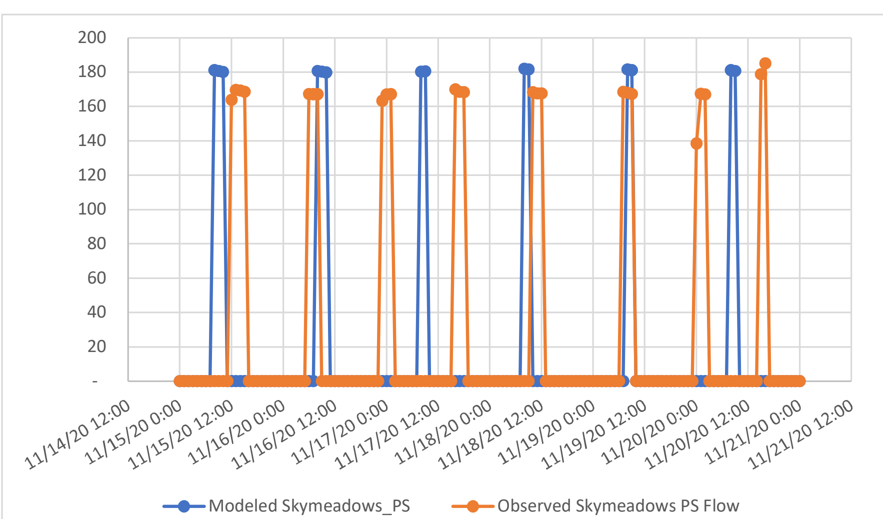












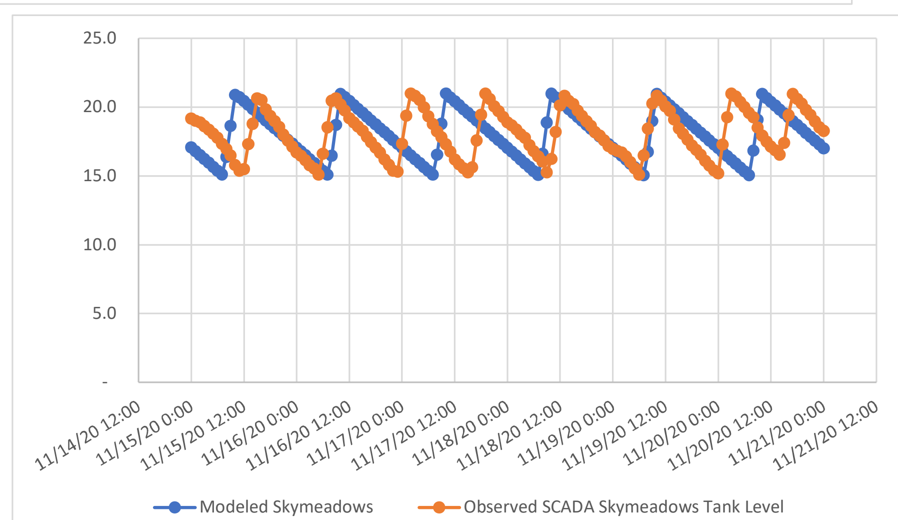
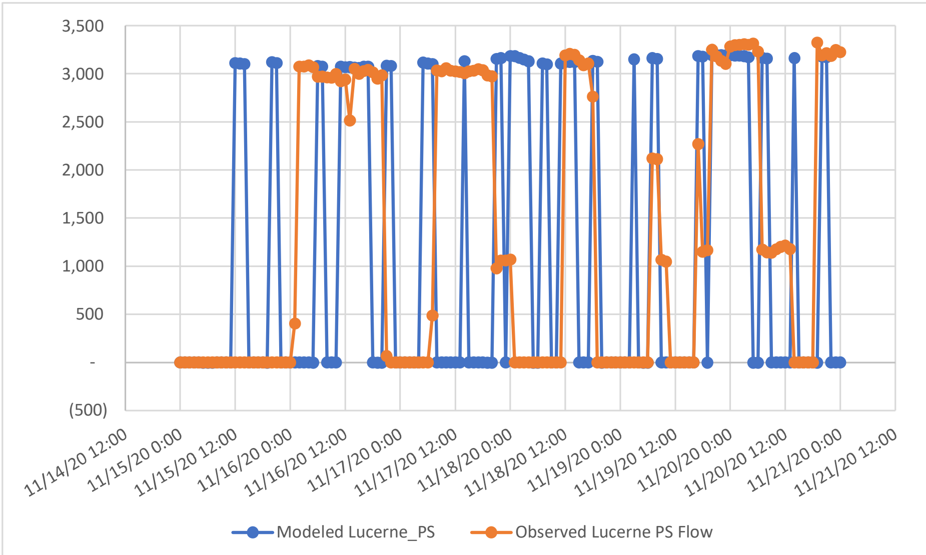
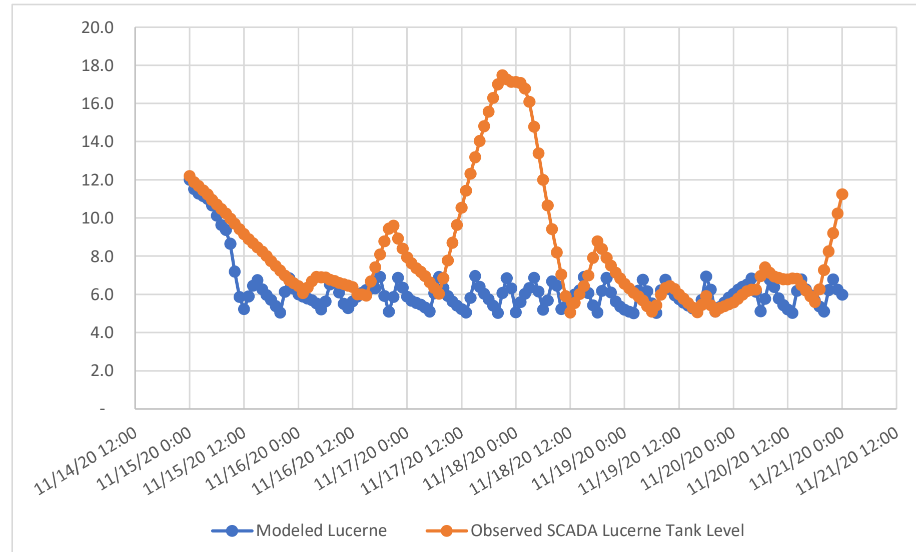
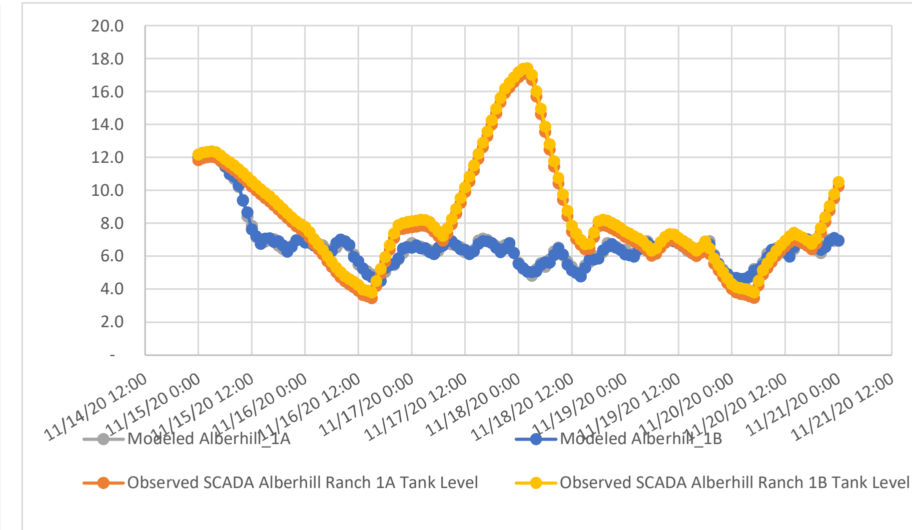
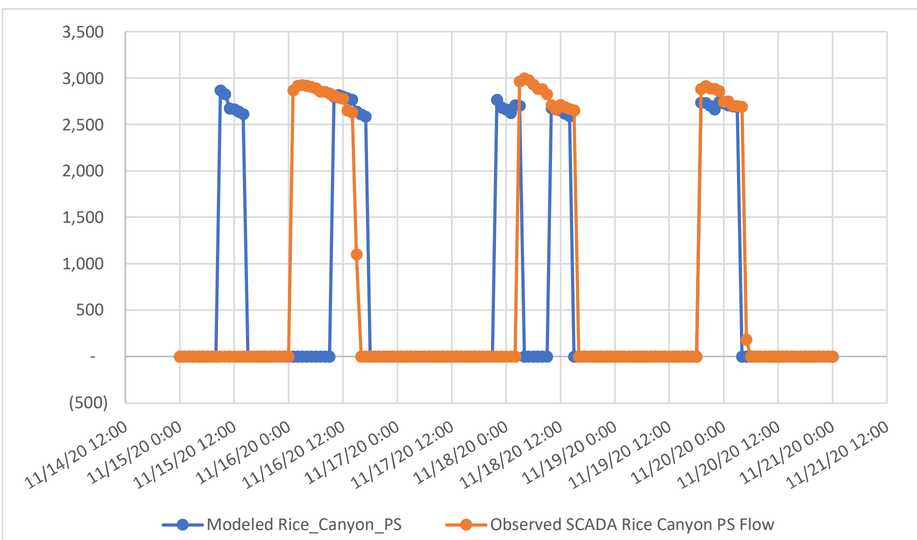


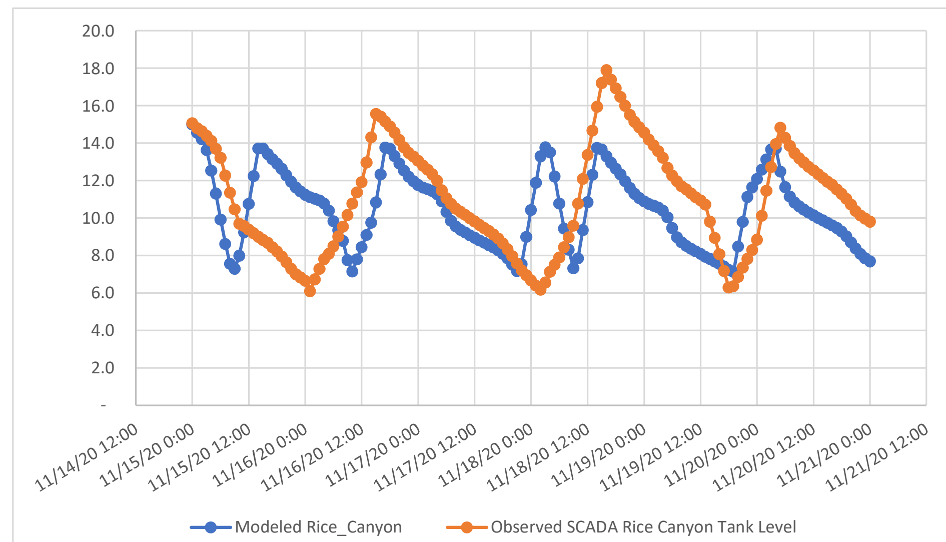
Figure C-4. Lucerne PS

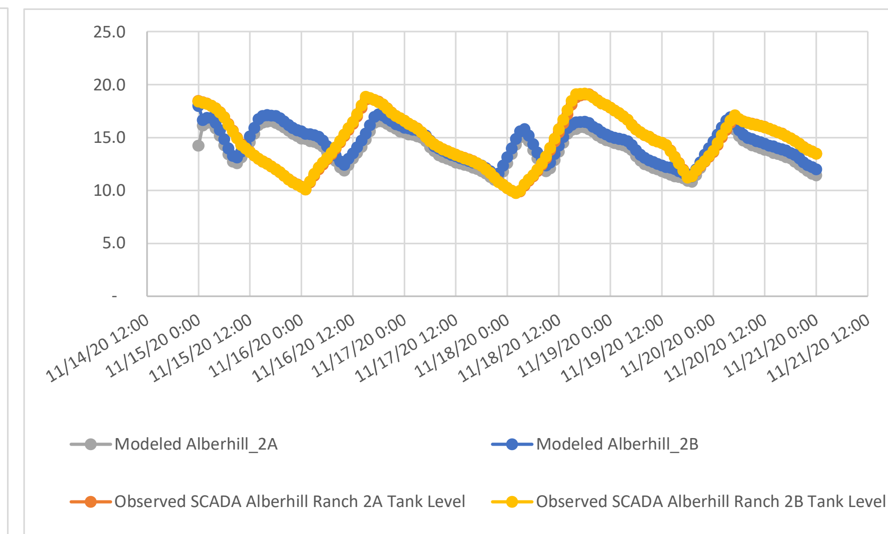


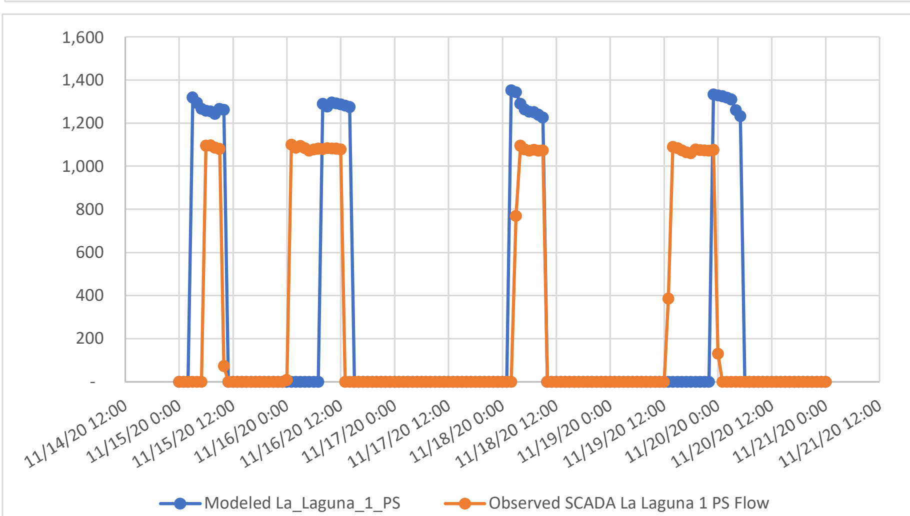


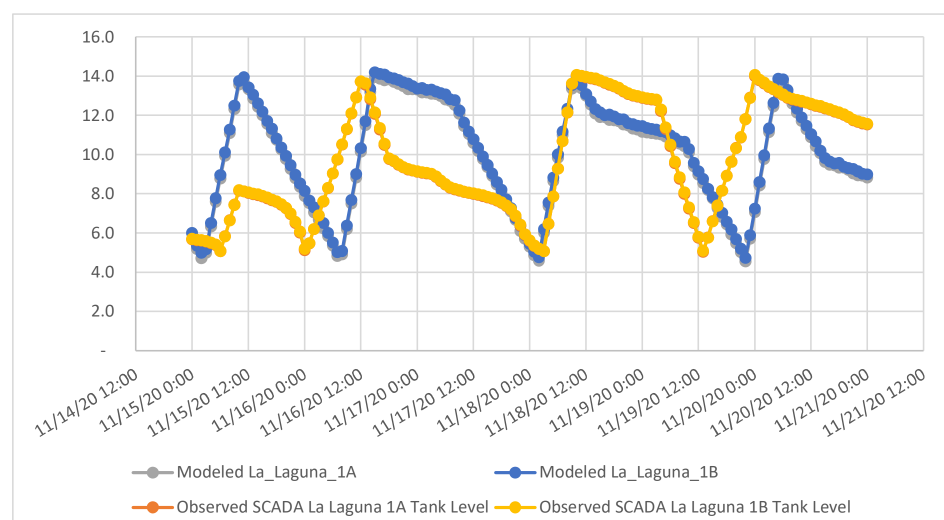












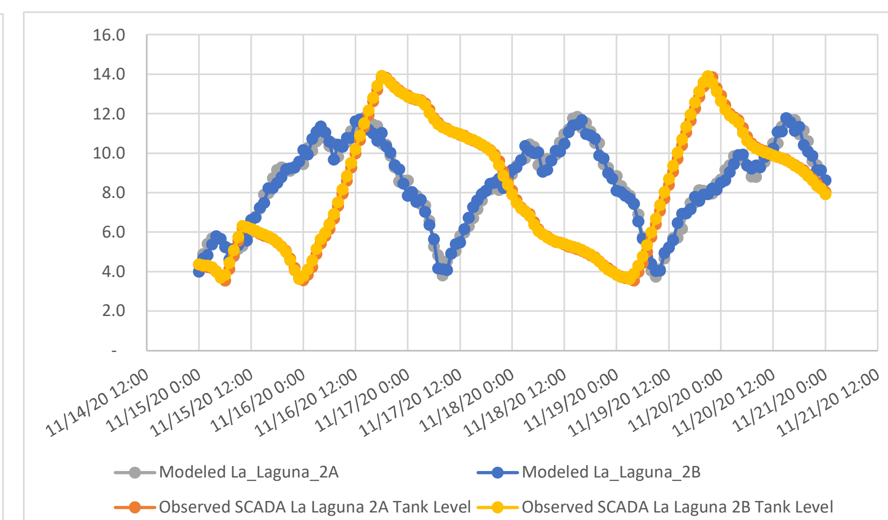


Figure C-5. Ortega PS

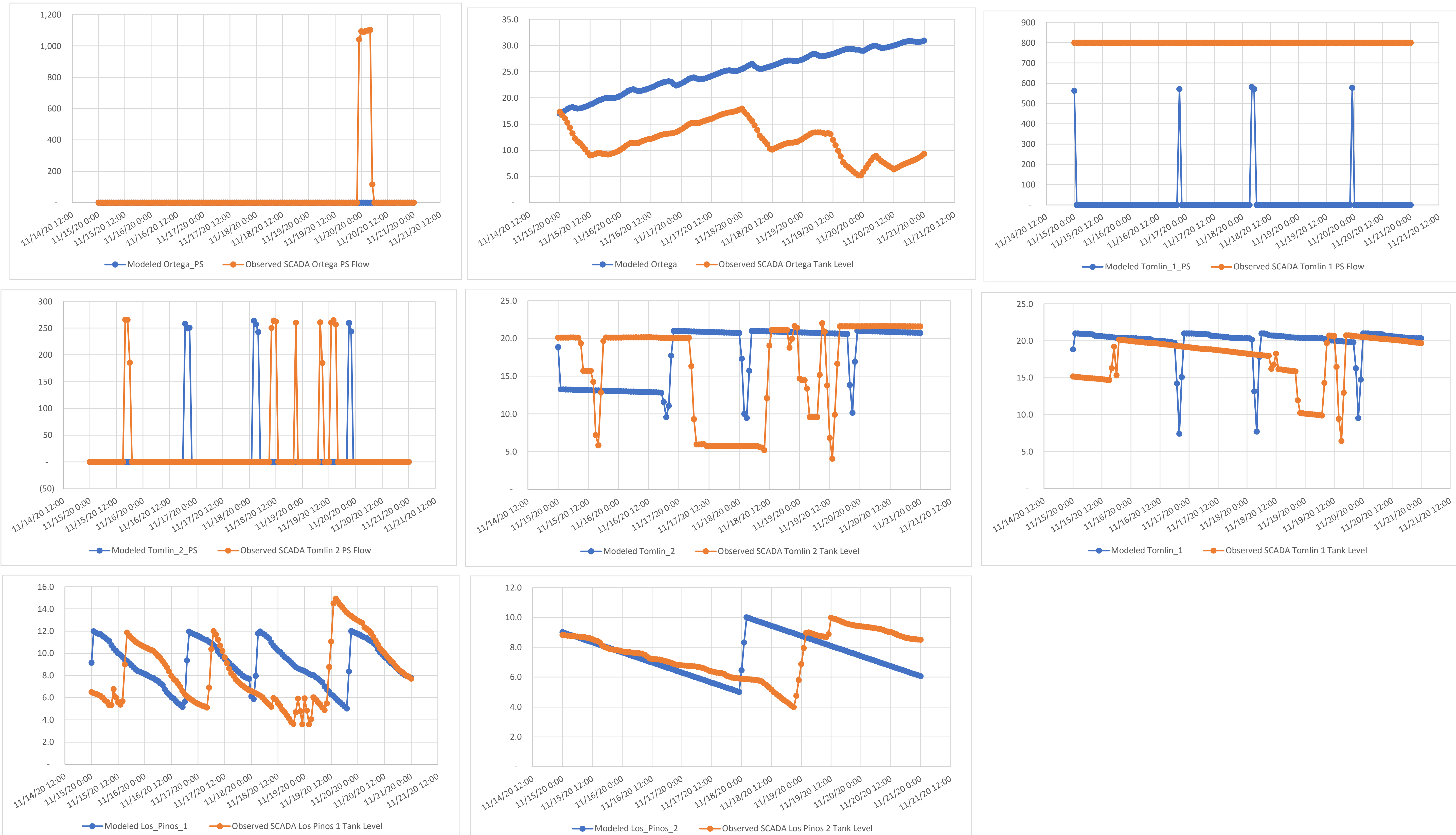
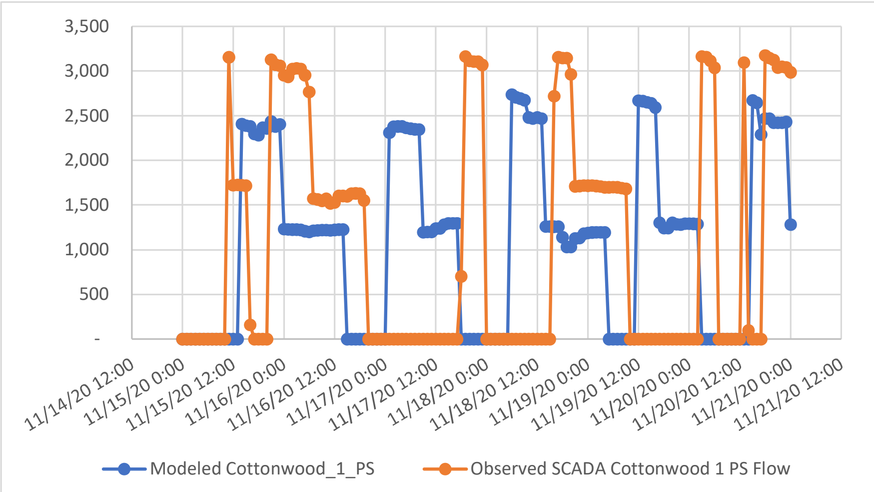
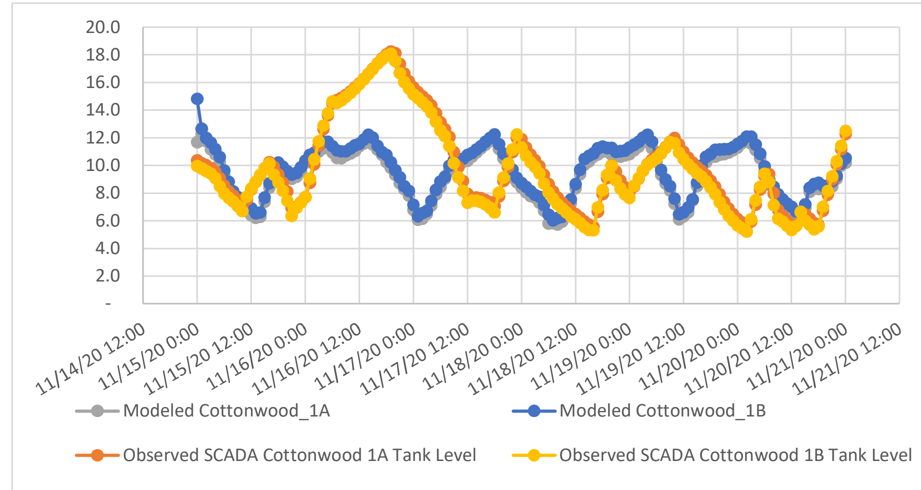
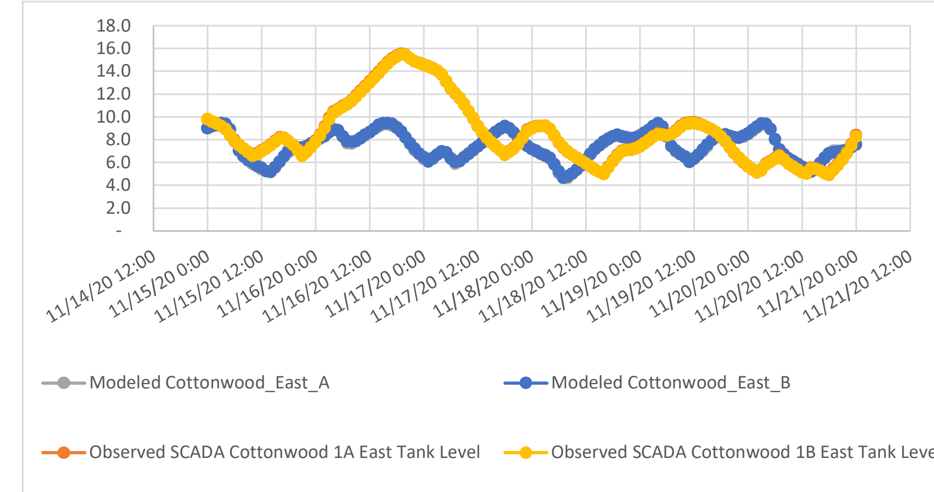
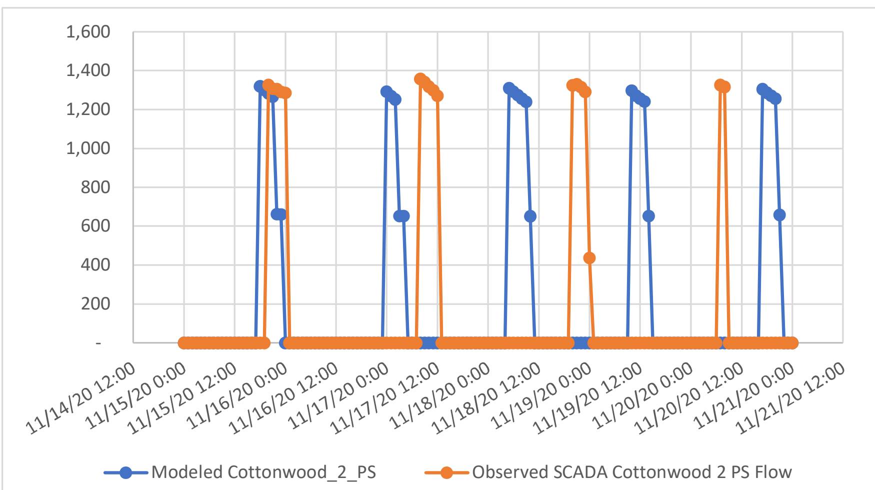


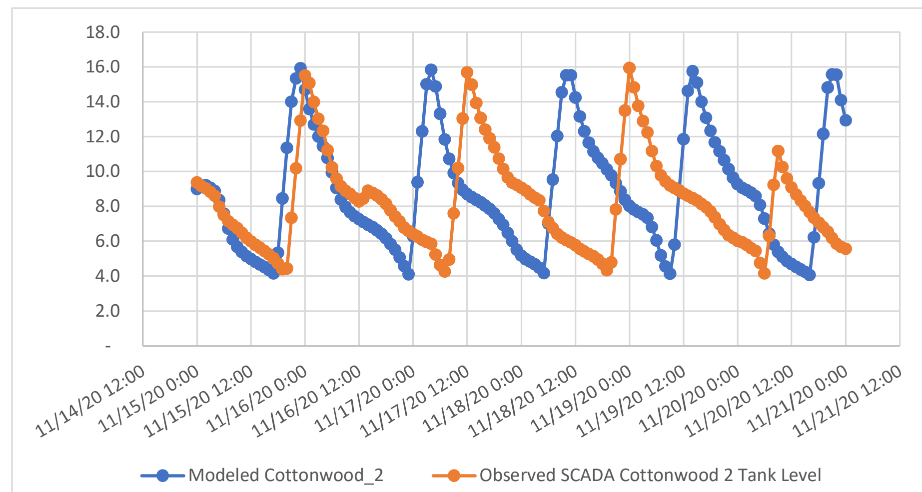
Figure C-6. Cottonwood PS & Summerhill PS

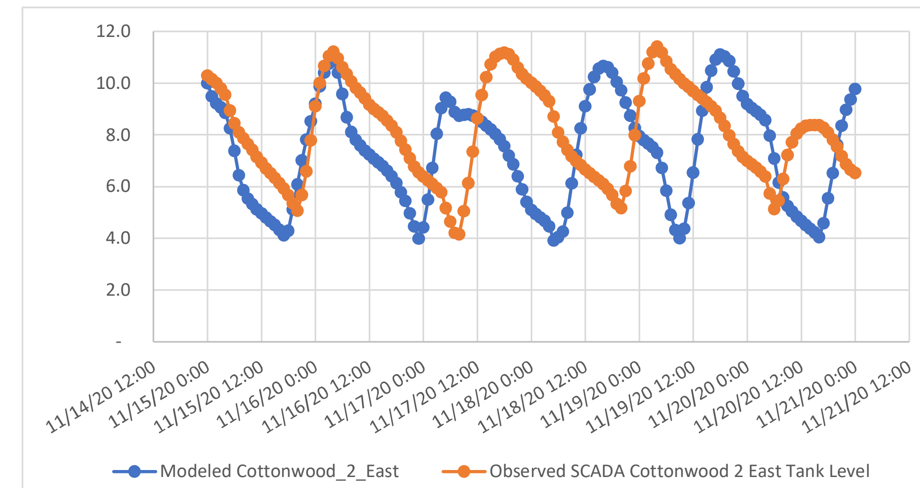


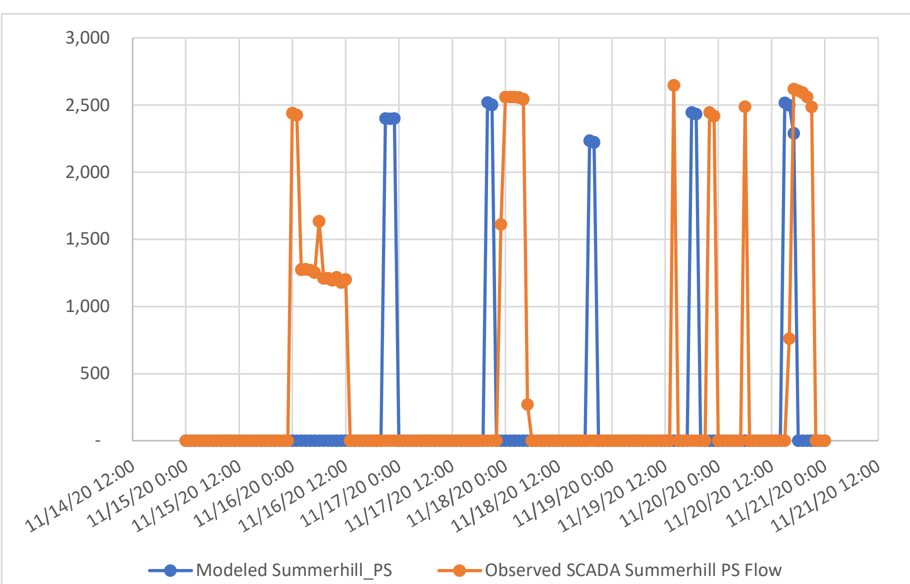












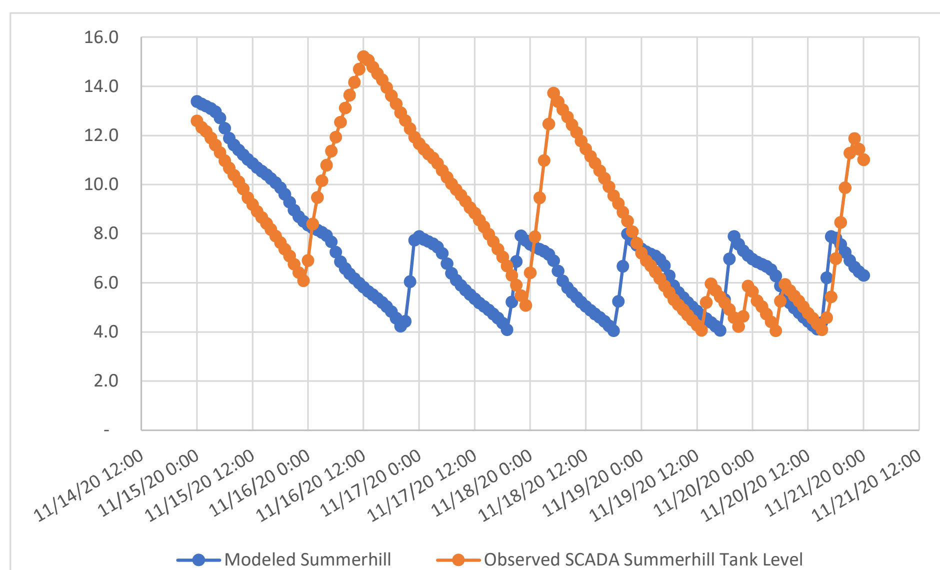
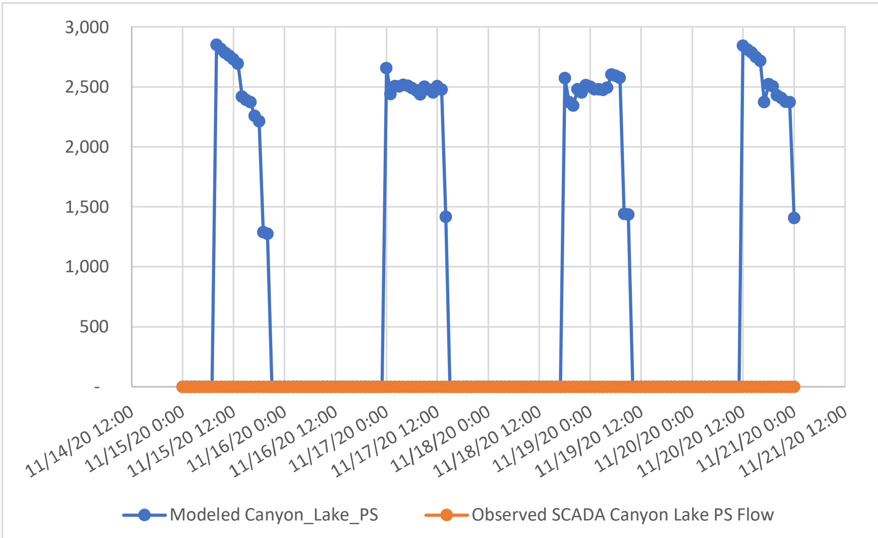
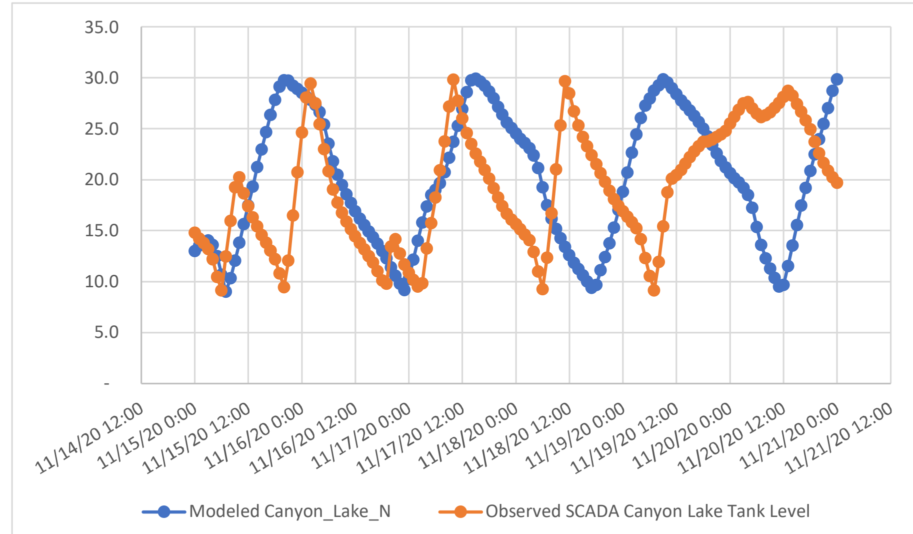
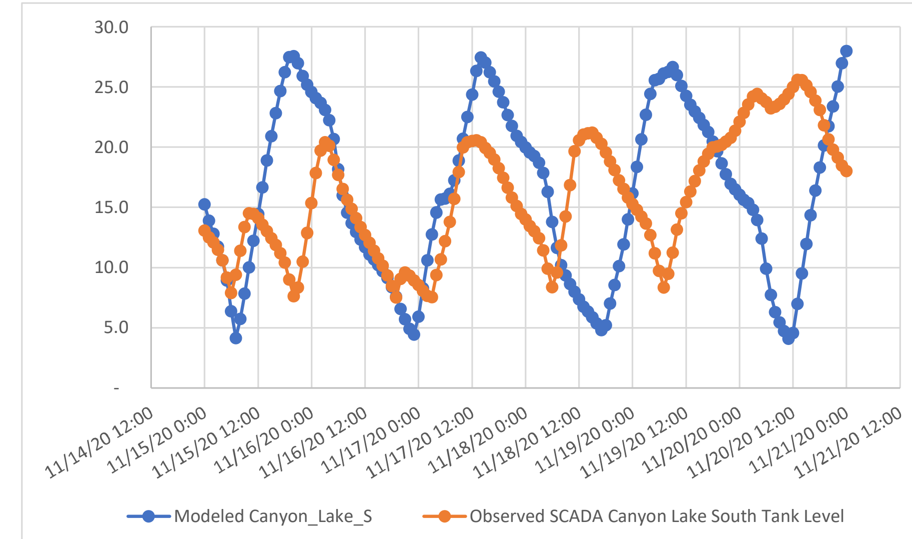
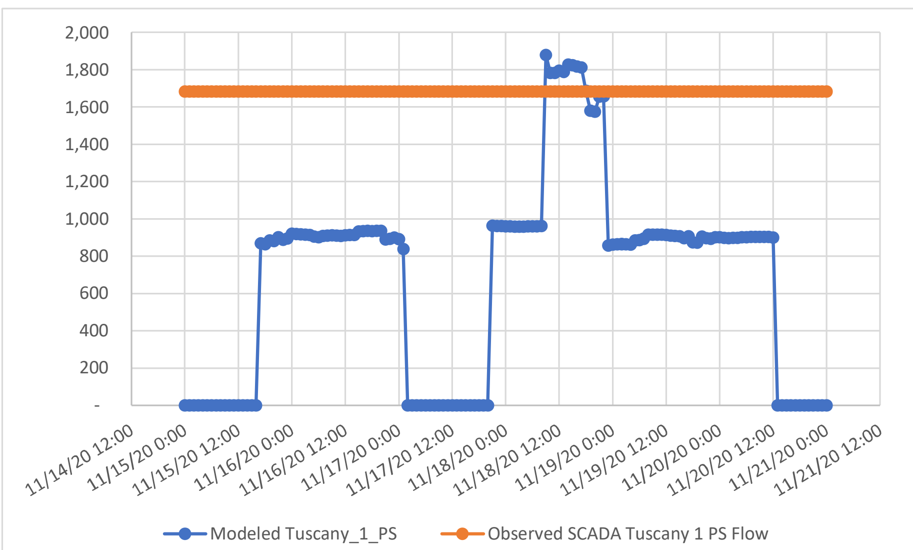


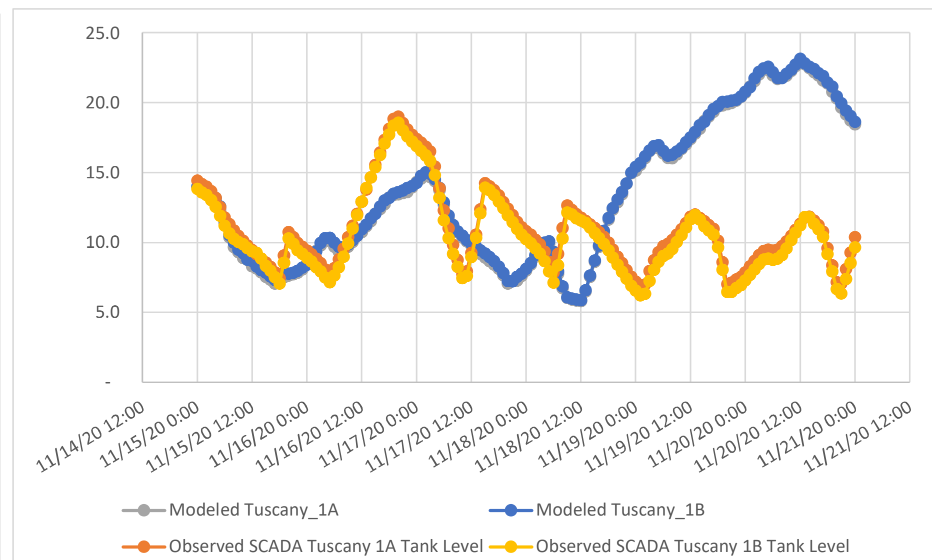
Figure C-7. Canyon Lake PS & Tuscany PS











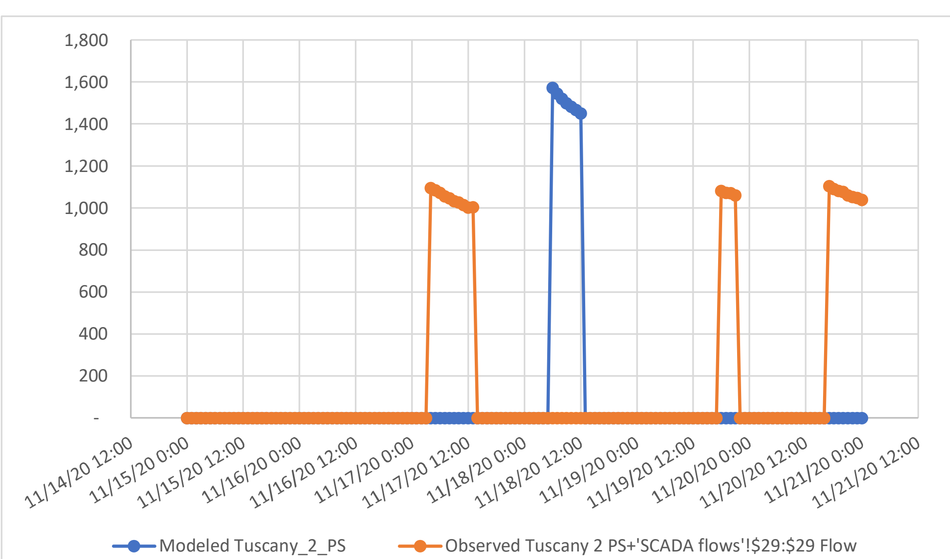
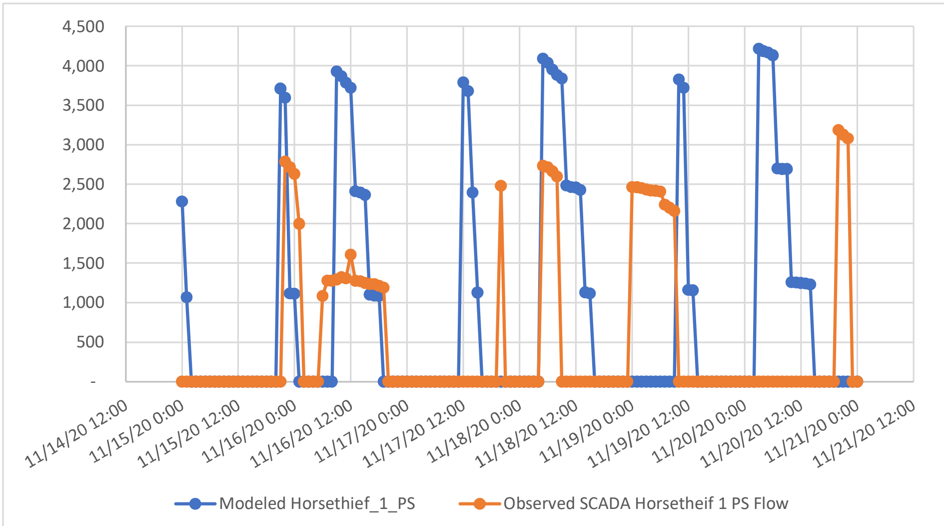
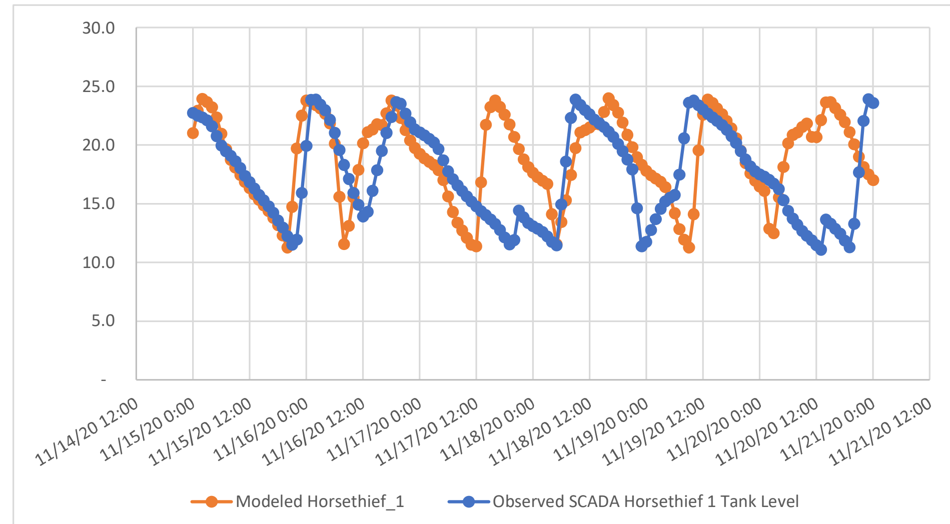
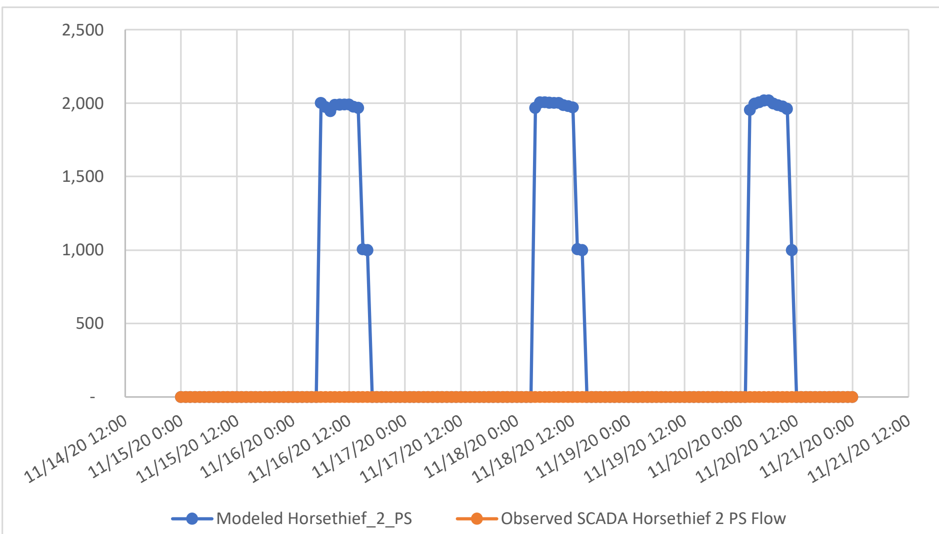
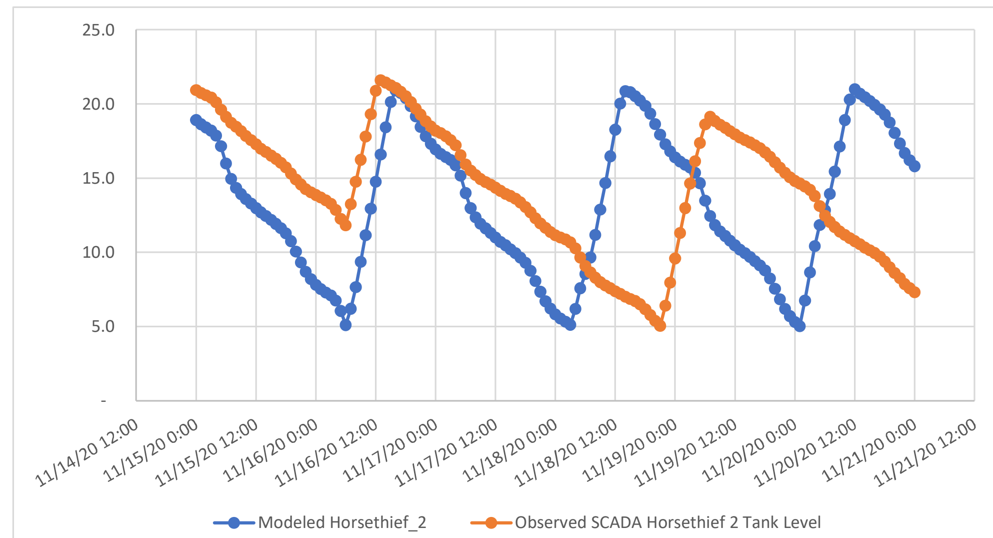


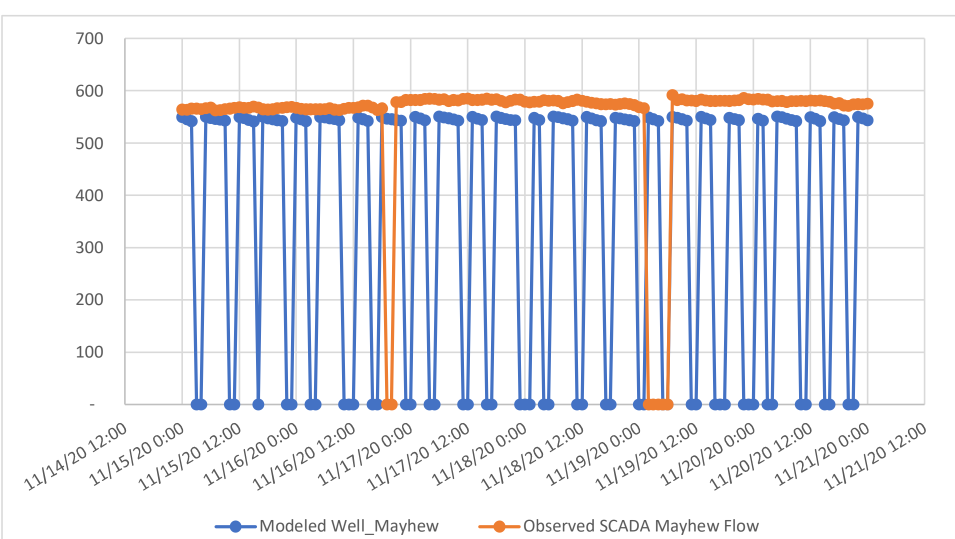
Figure C-8. Horsethief PS & Temescal Valley

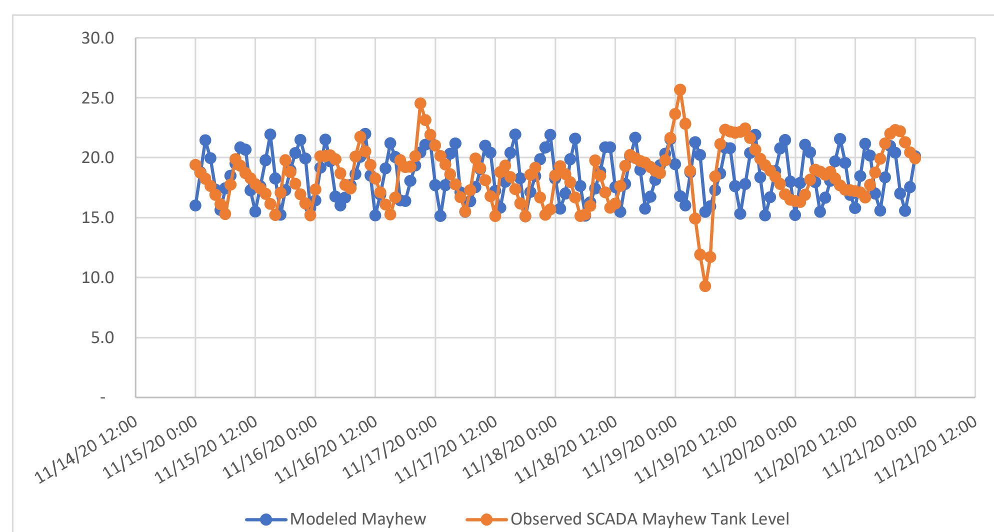












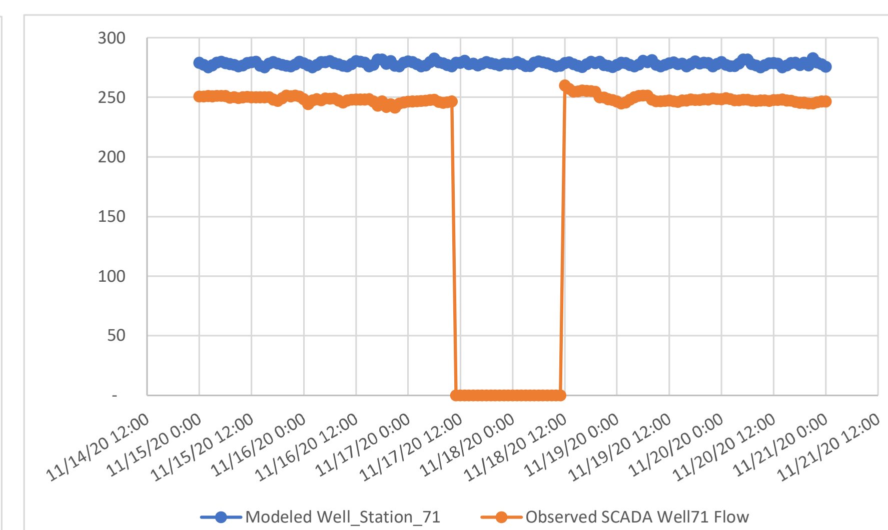
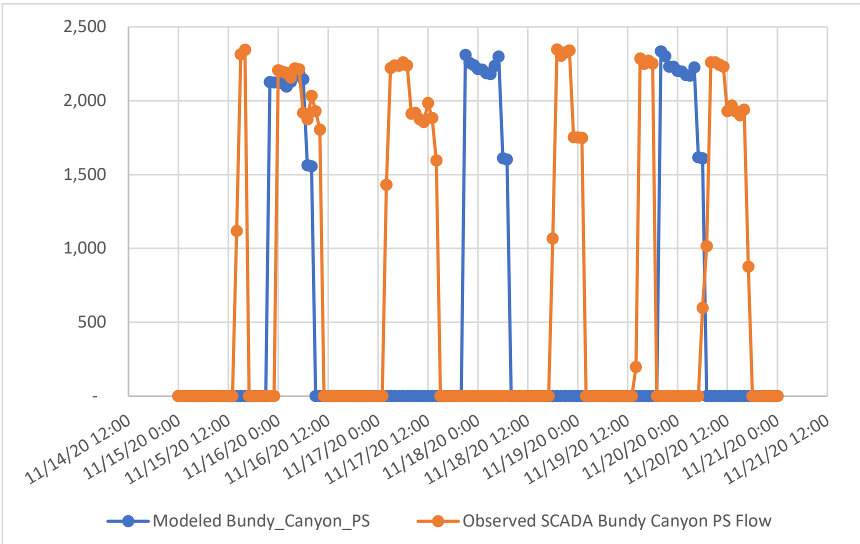
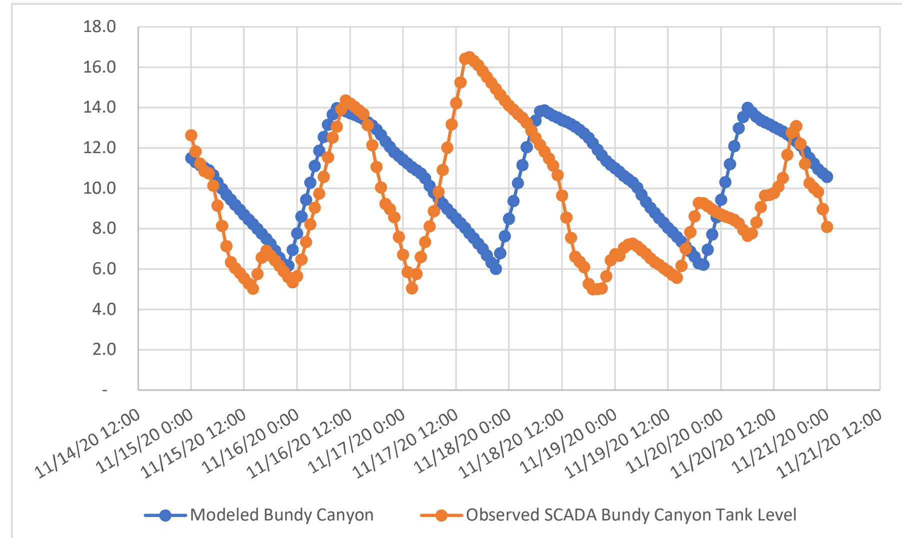
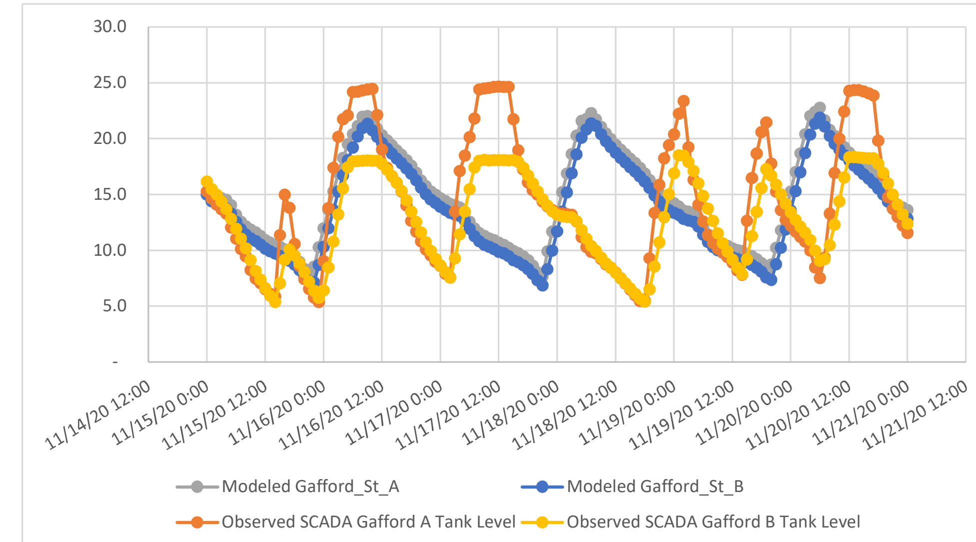
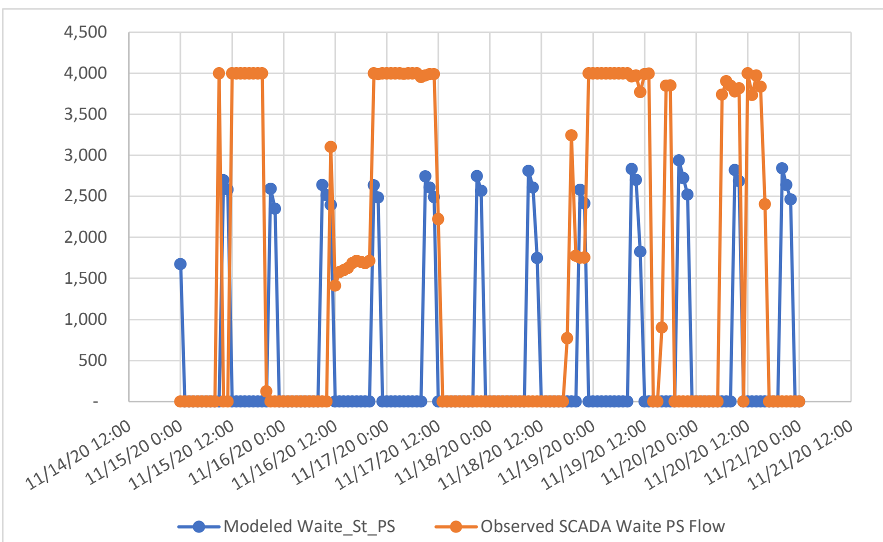


Figure C-9. Bundy Canyon PS & Waite St PS









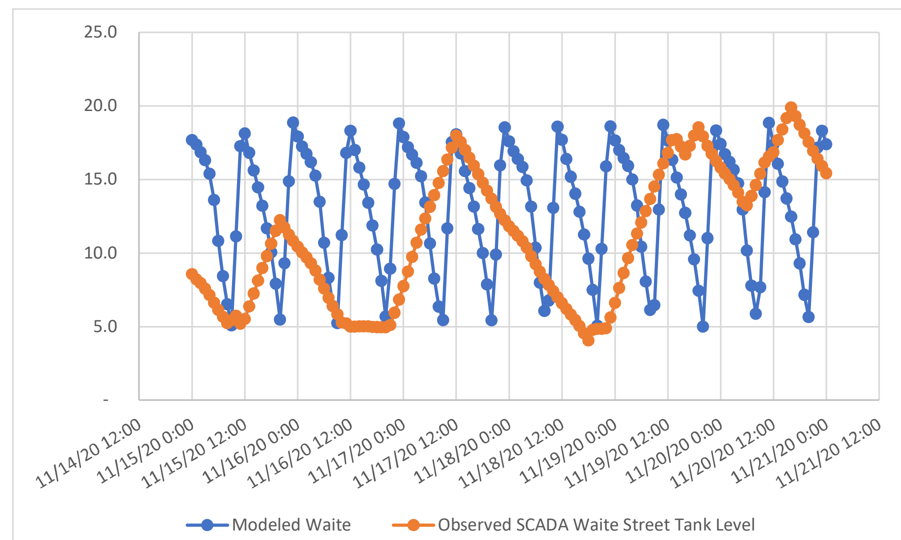
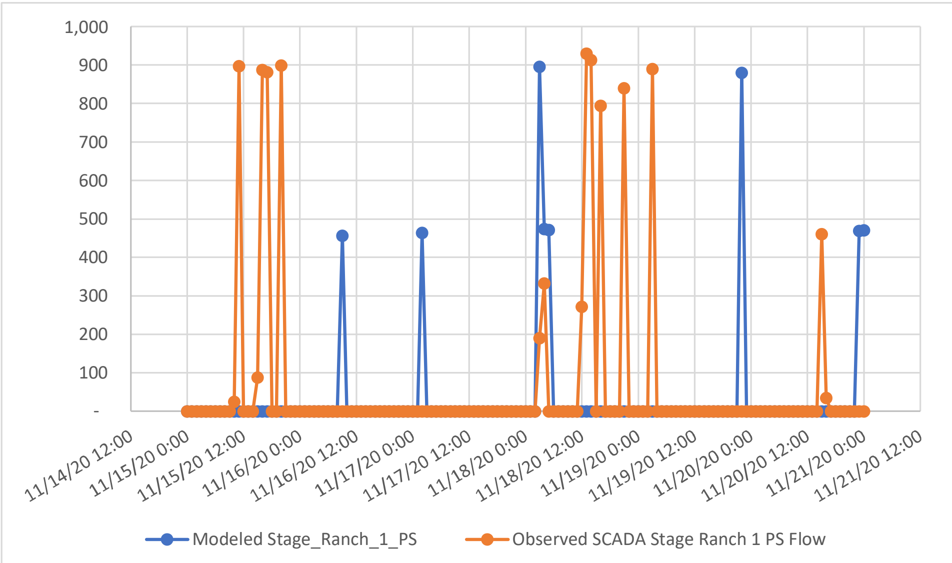
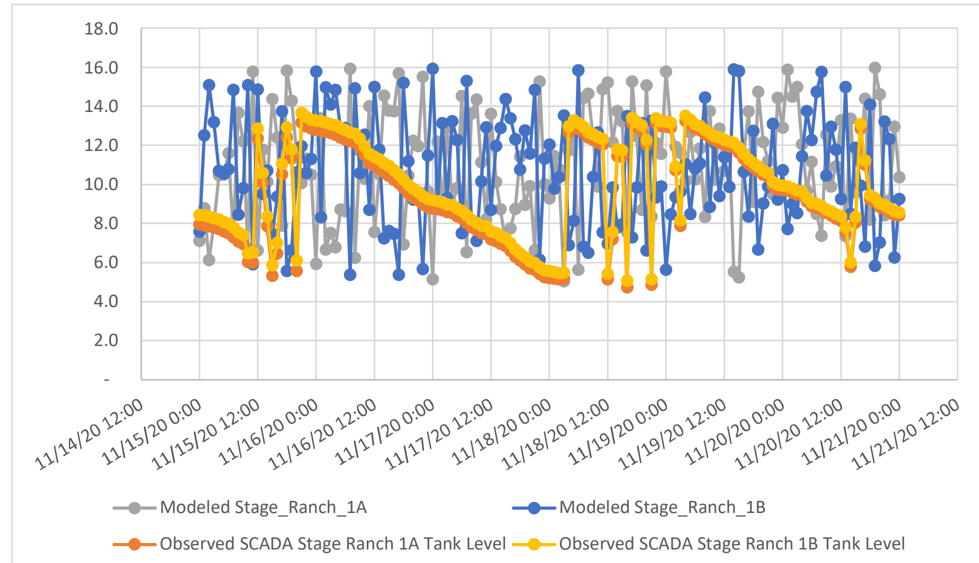
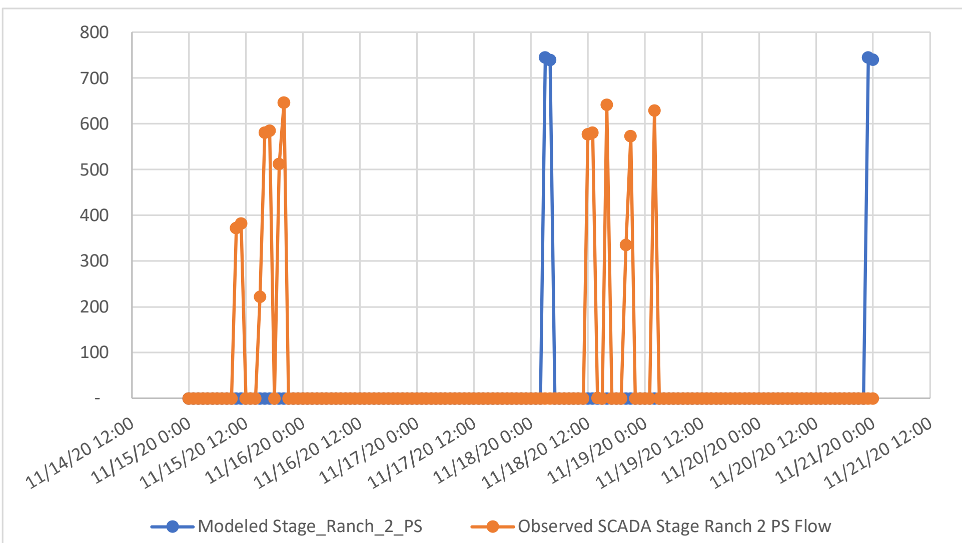
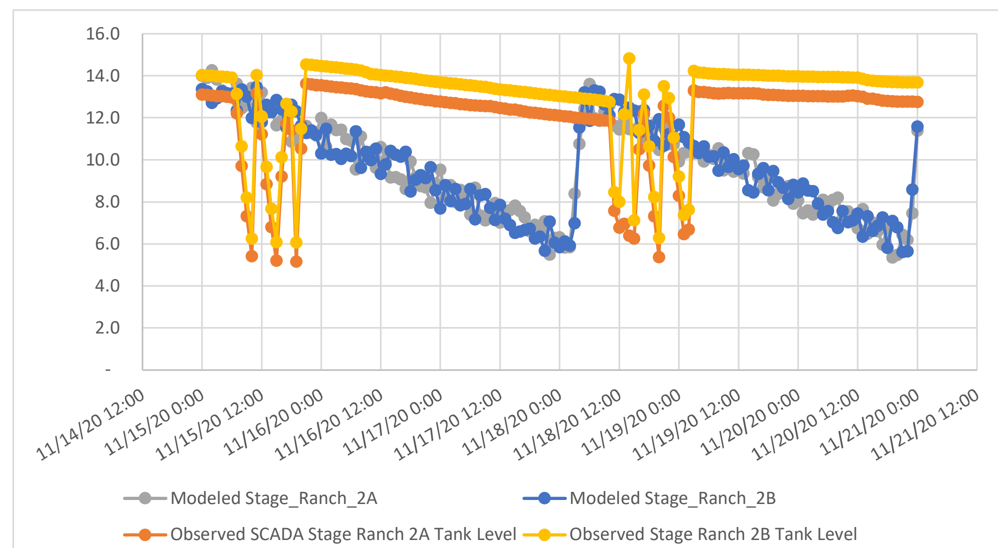


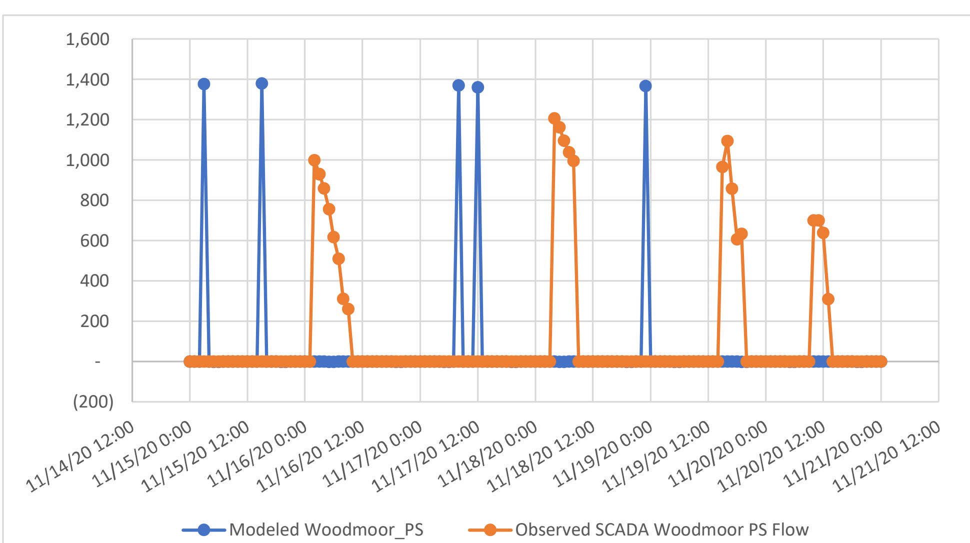
Figure C-10. Stage Ranch PS & Woodmoor PS











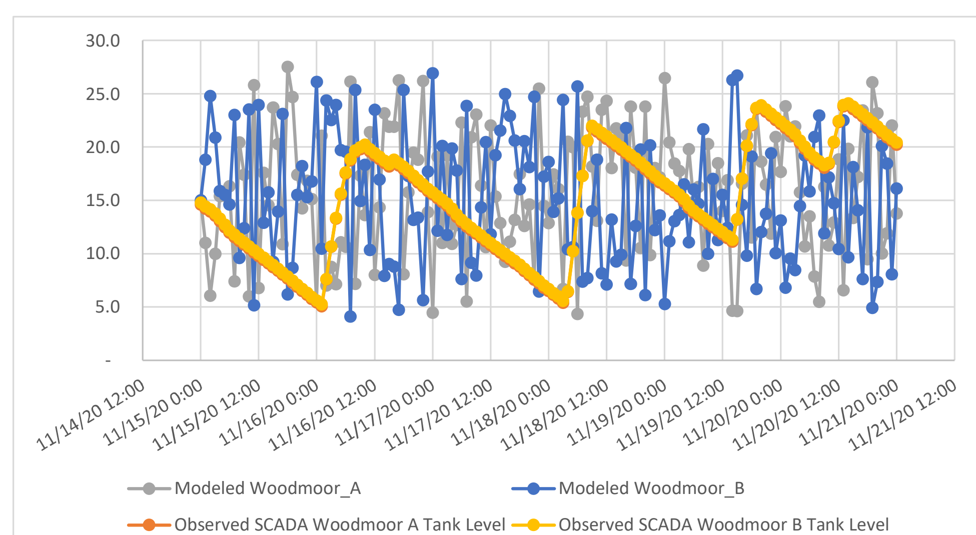
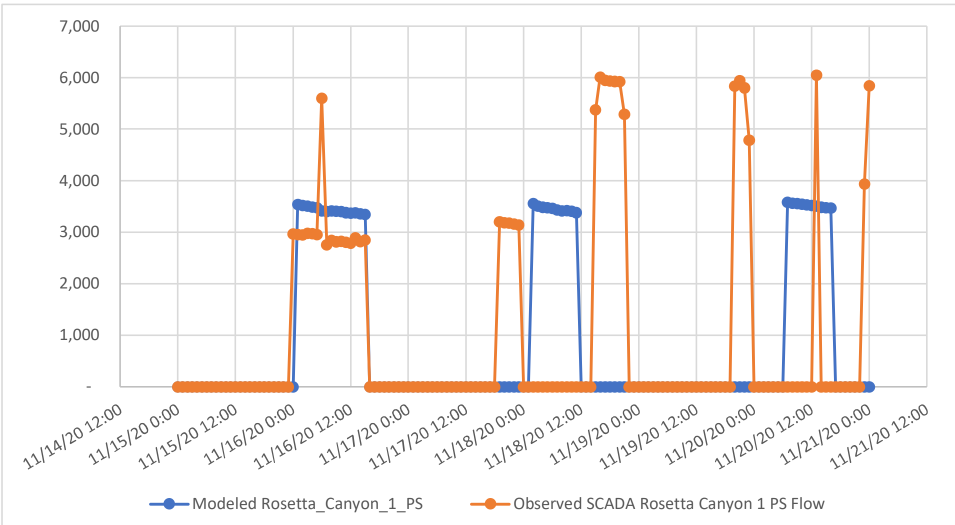
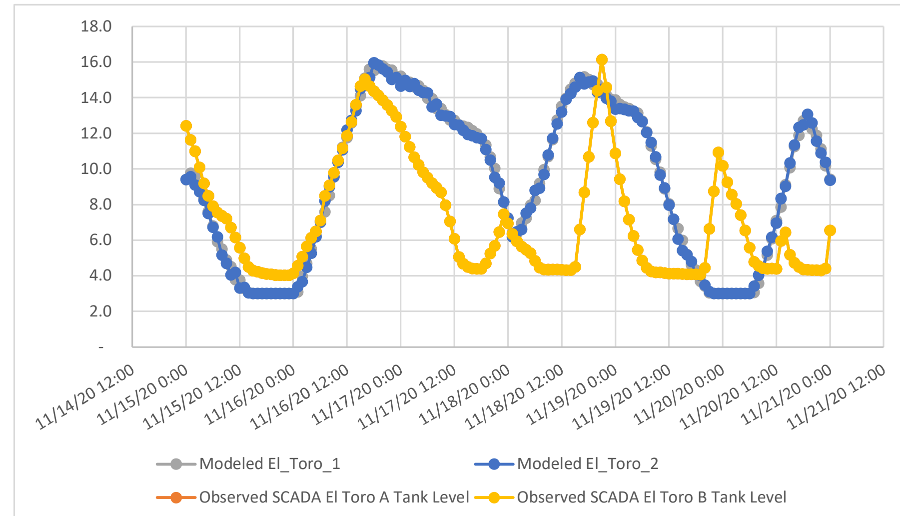
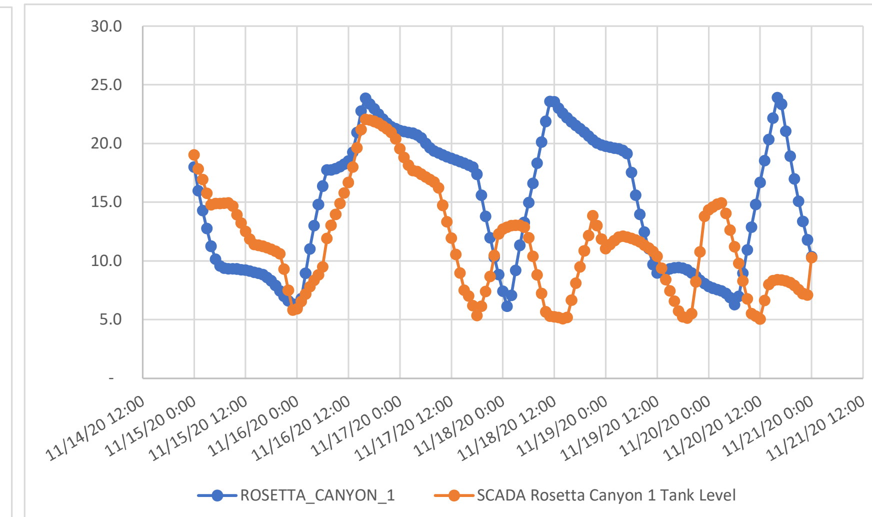
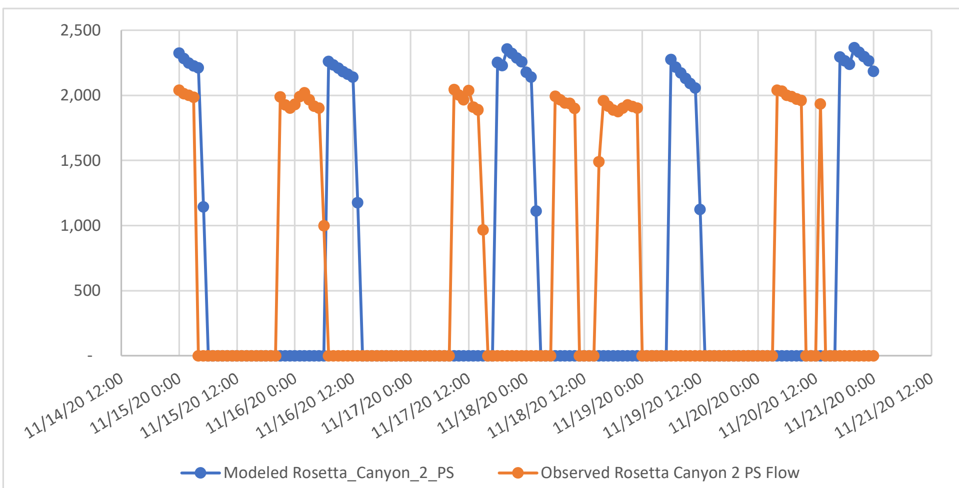


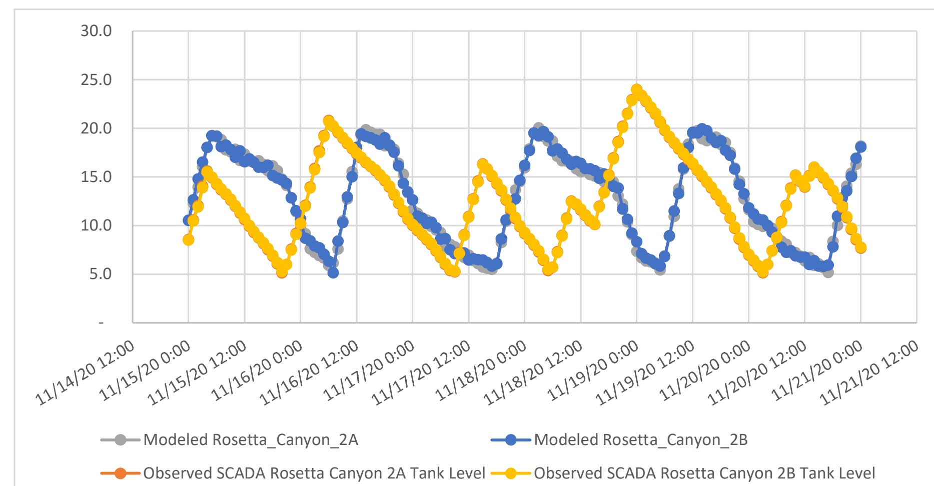
Figure C-11. Rosetta Canyon PS & Meadowbook PS

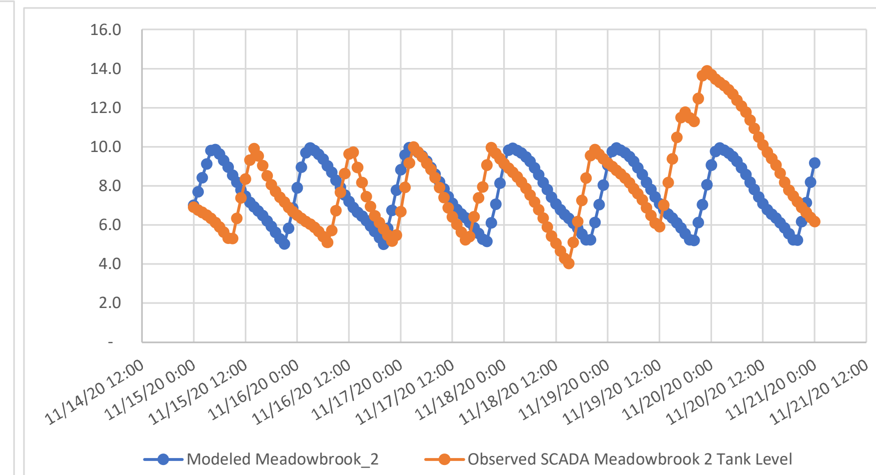












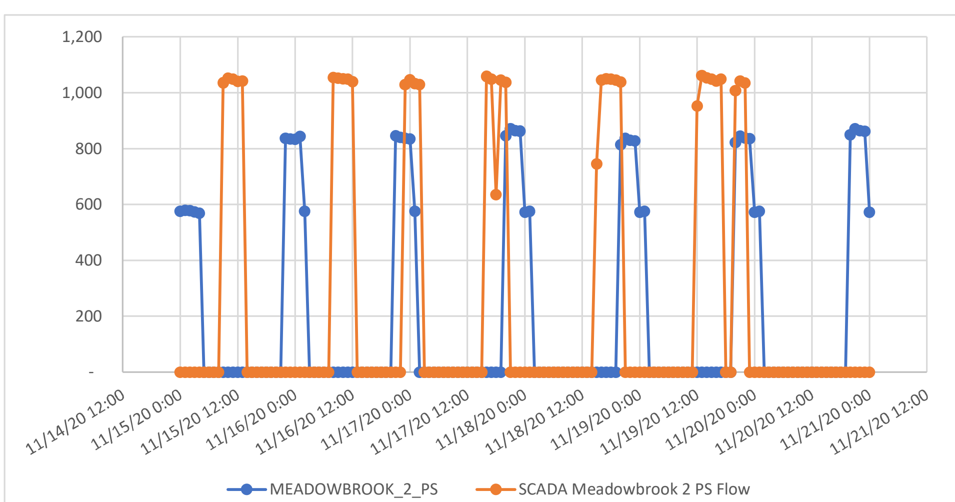
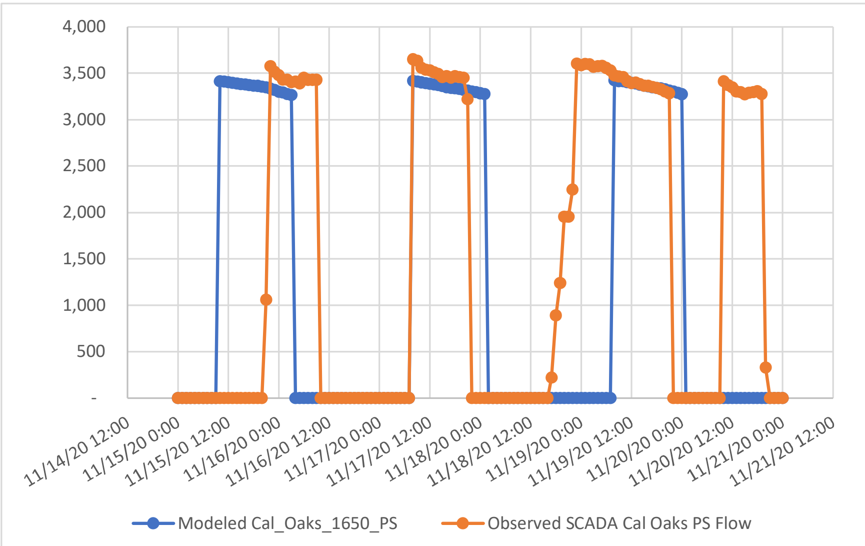
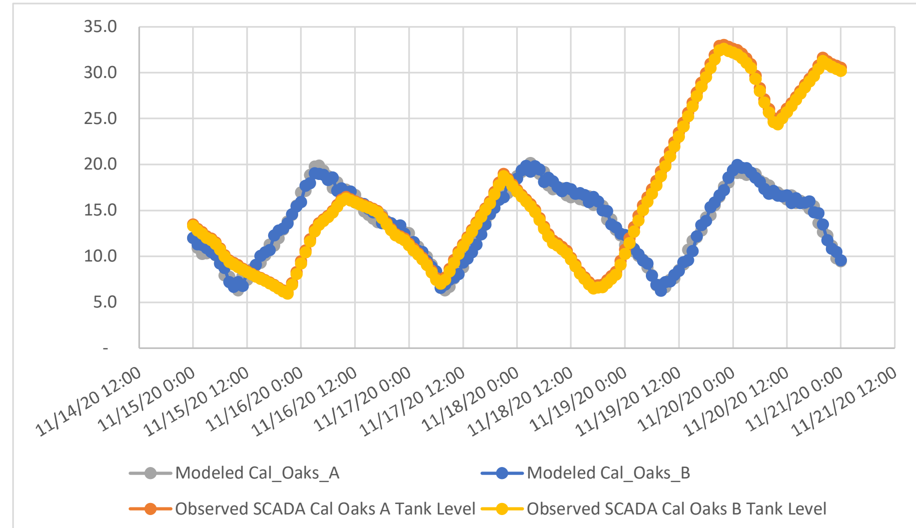
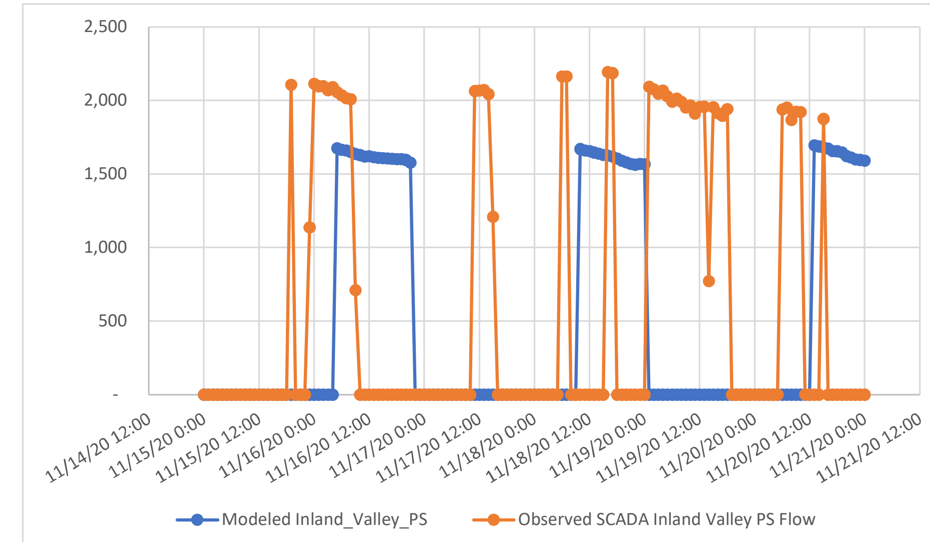
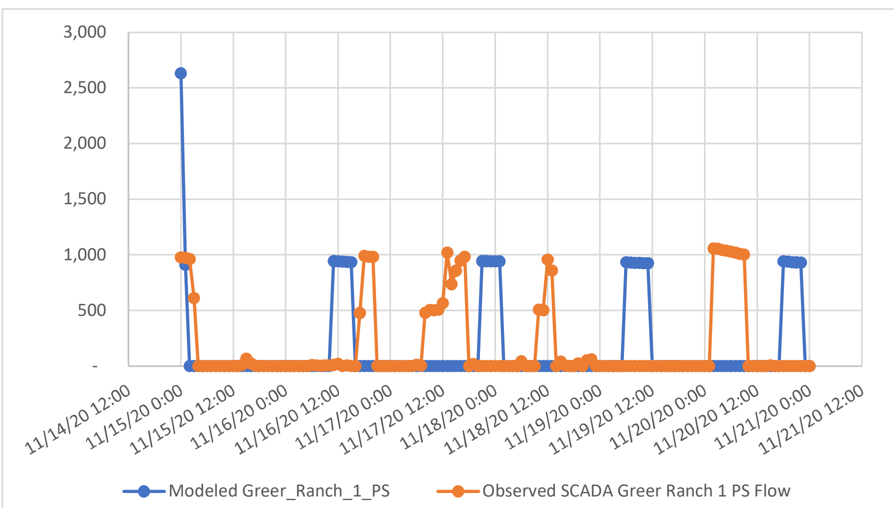


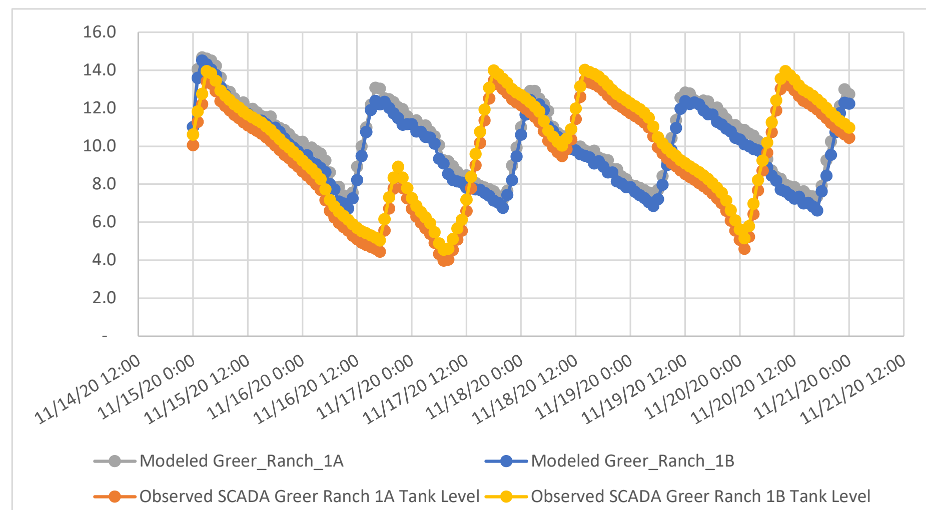
Figure C-12. Cal Oaks PS & Greer Ranch PS & Inland Valley PS

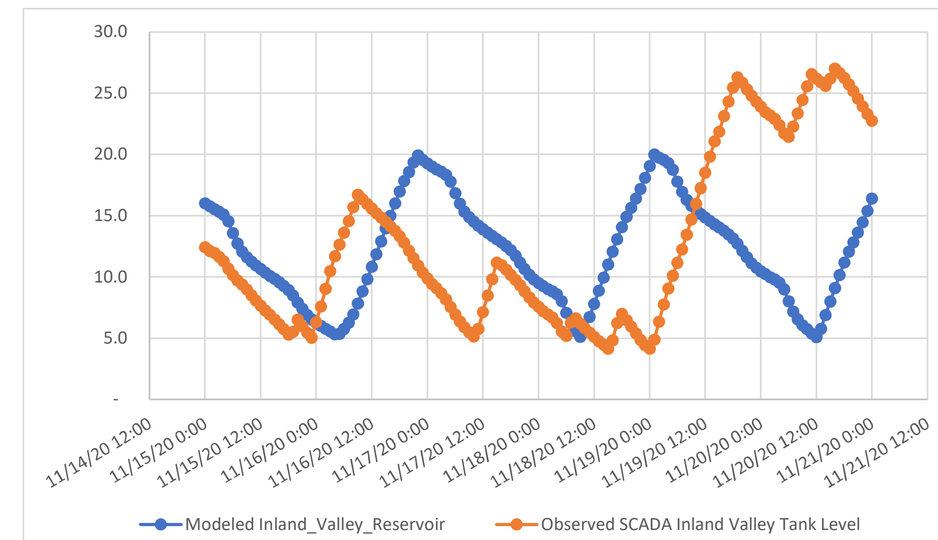


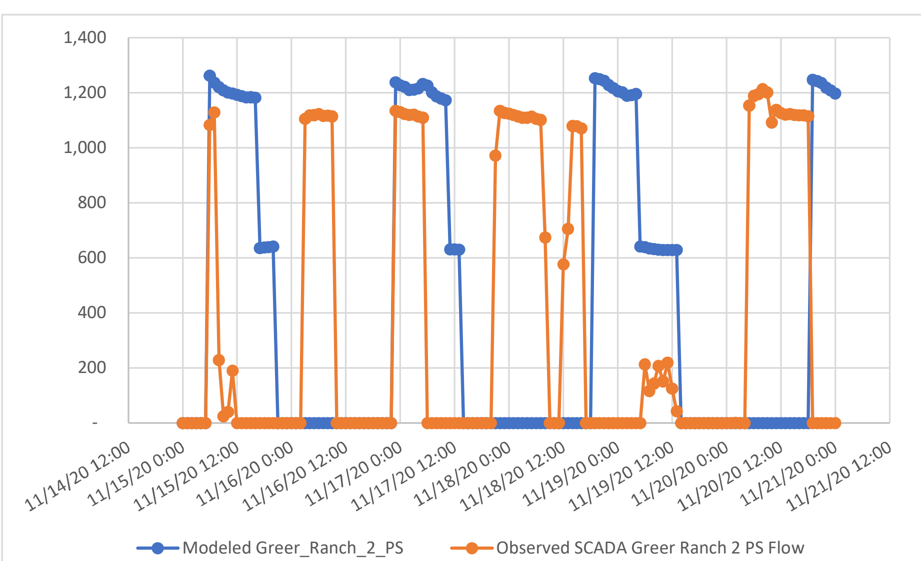












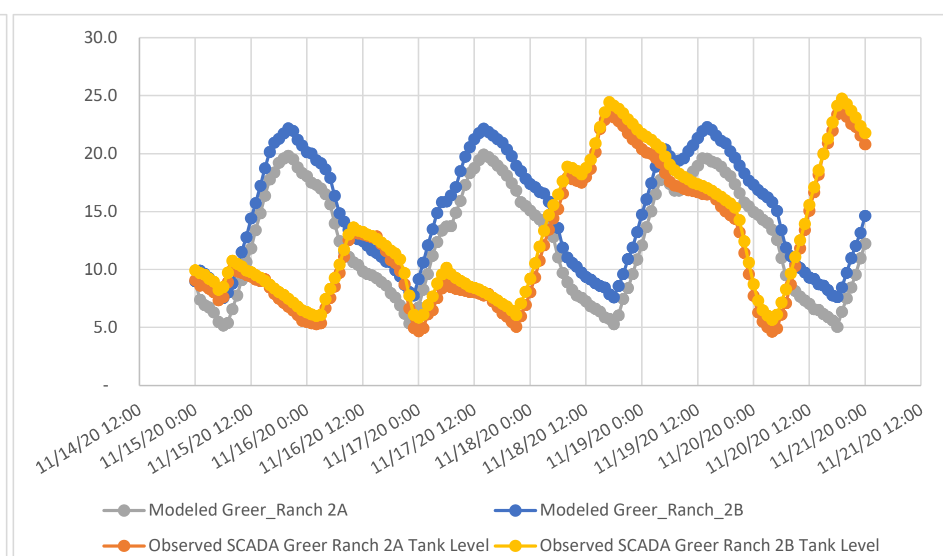
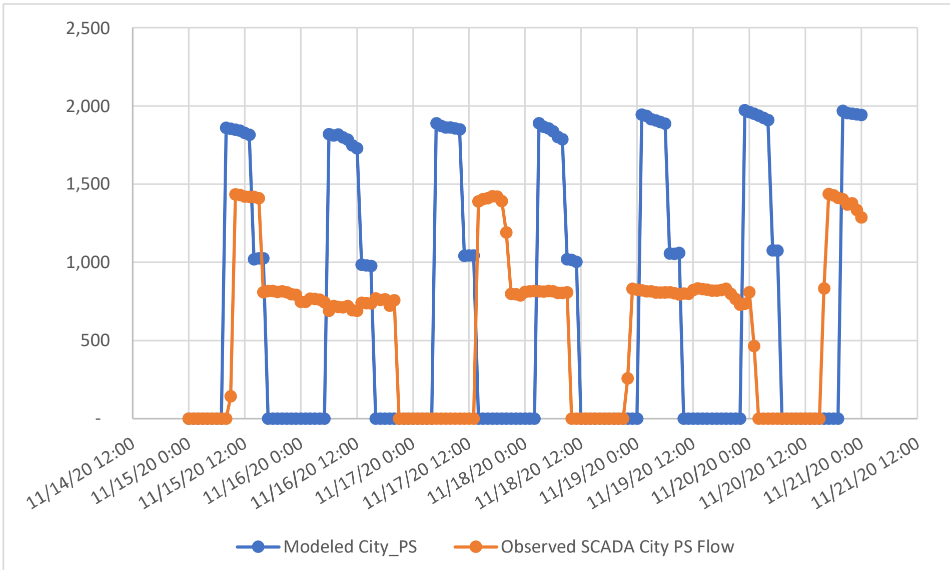
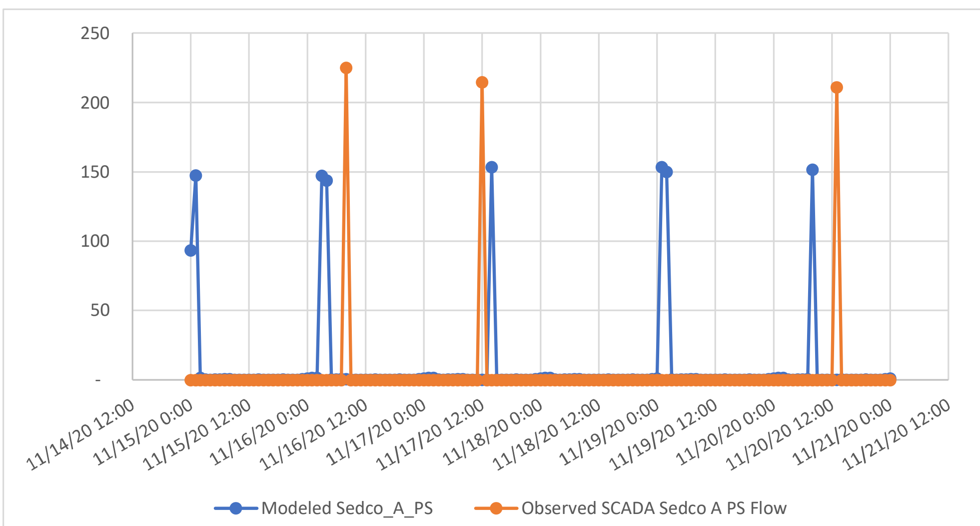
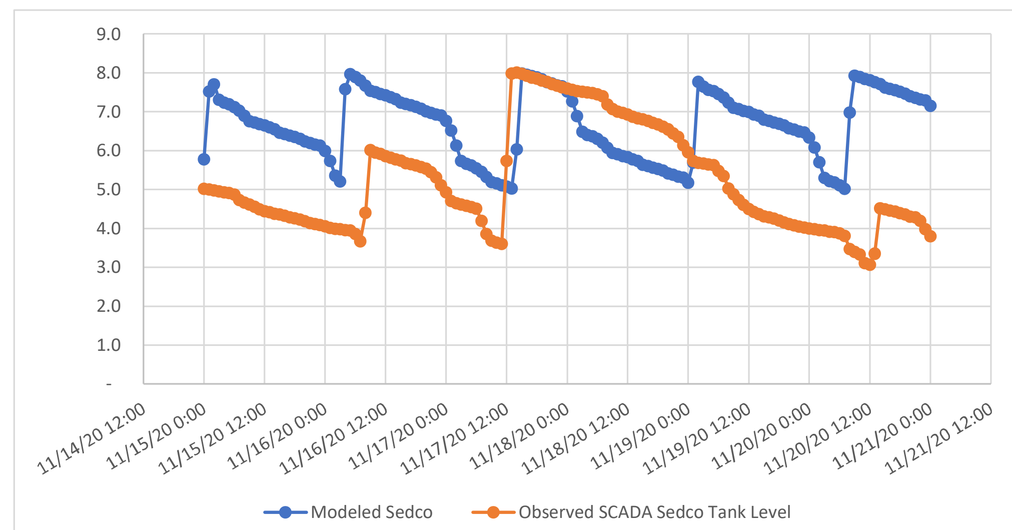
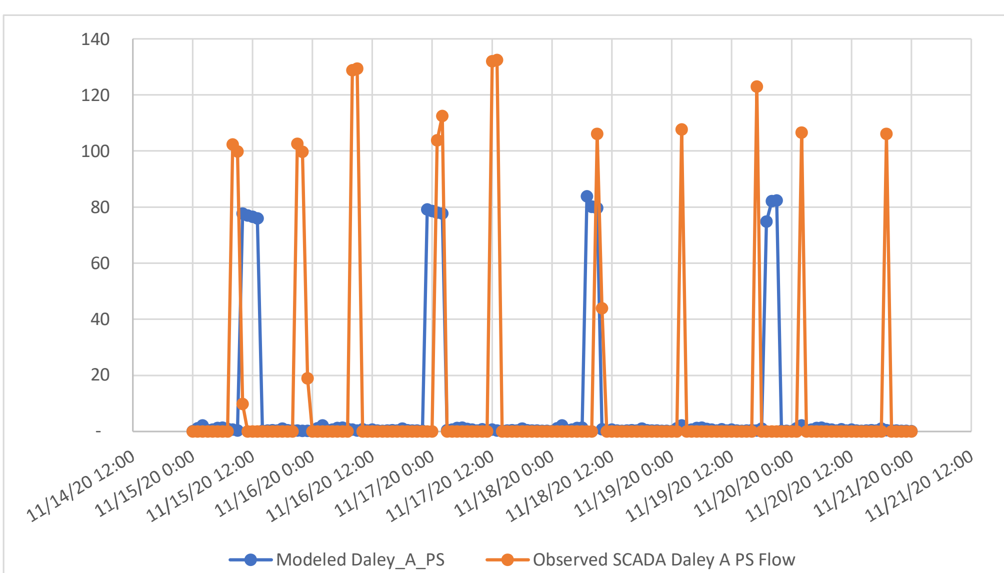


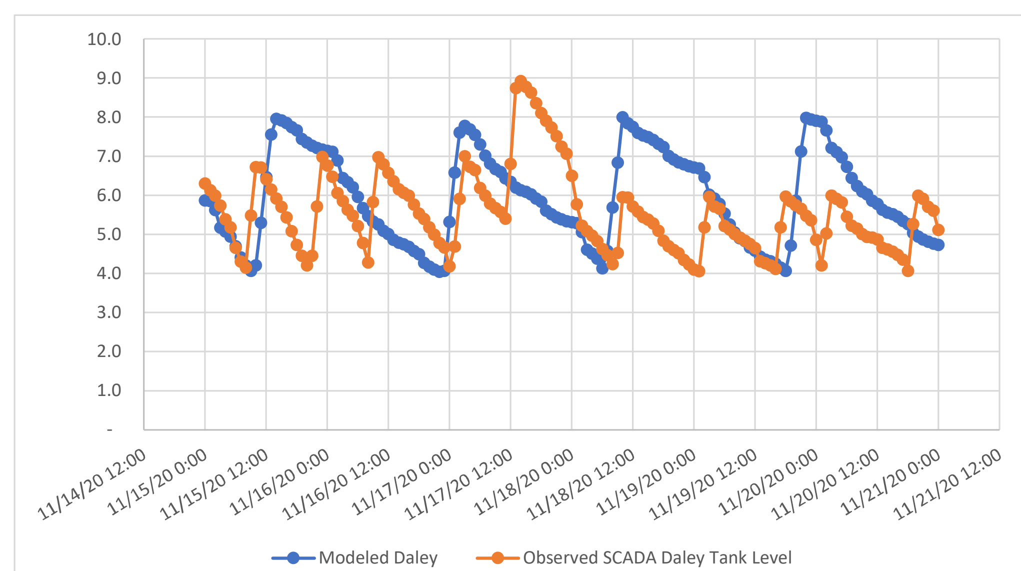
Figure C-13. City PS & Sedco PS & Daley PS









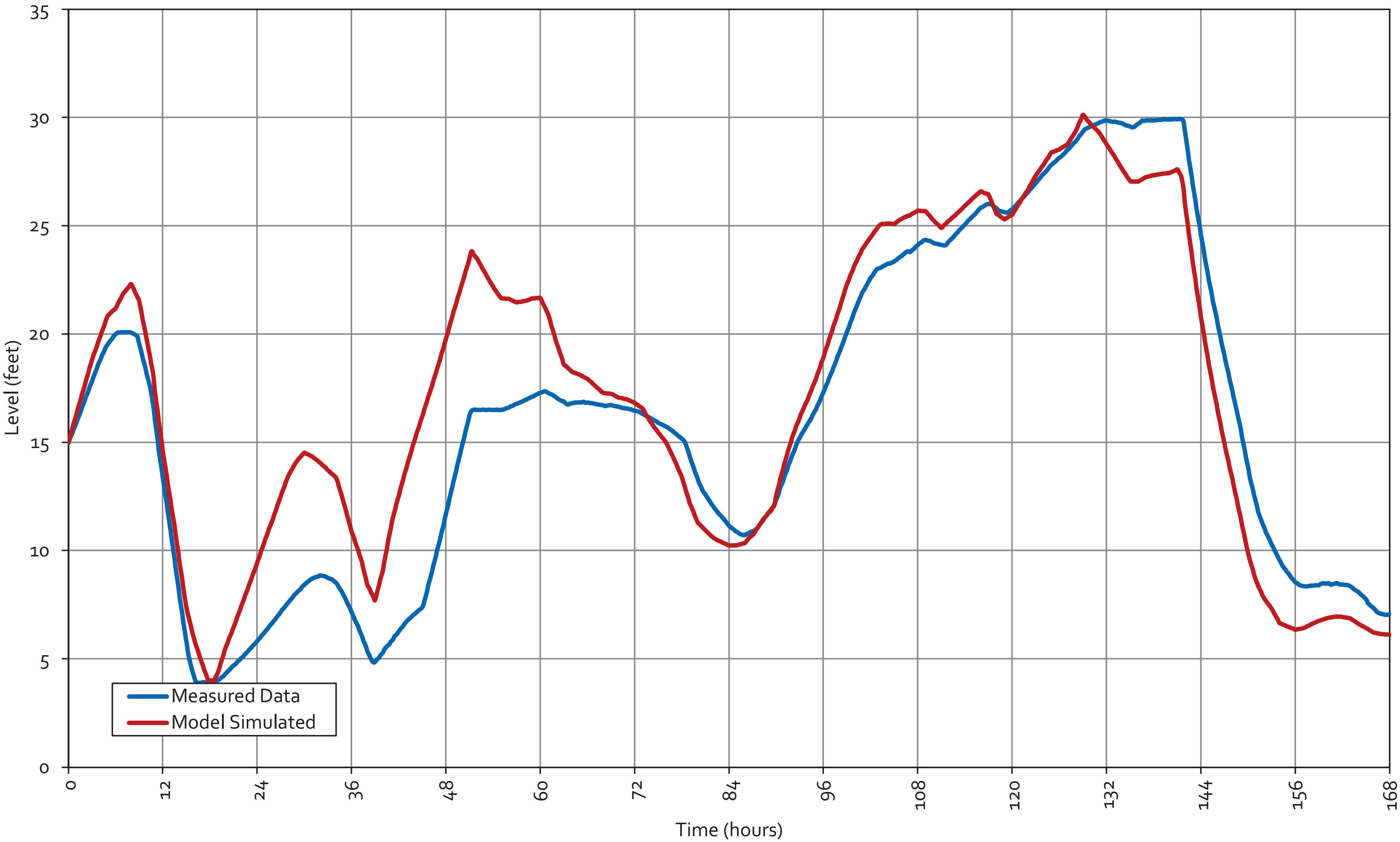


Appendix D

POTABLE WATER MODEL VALIDATION RESULTS

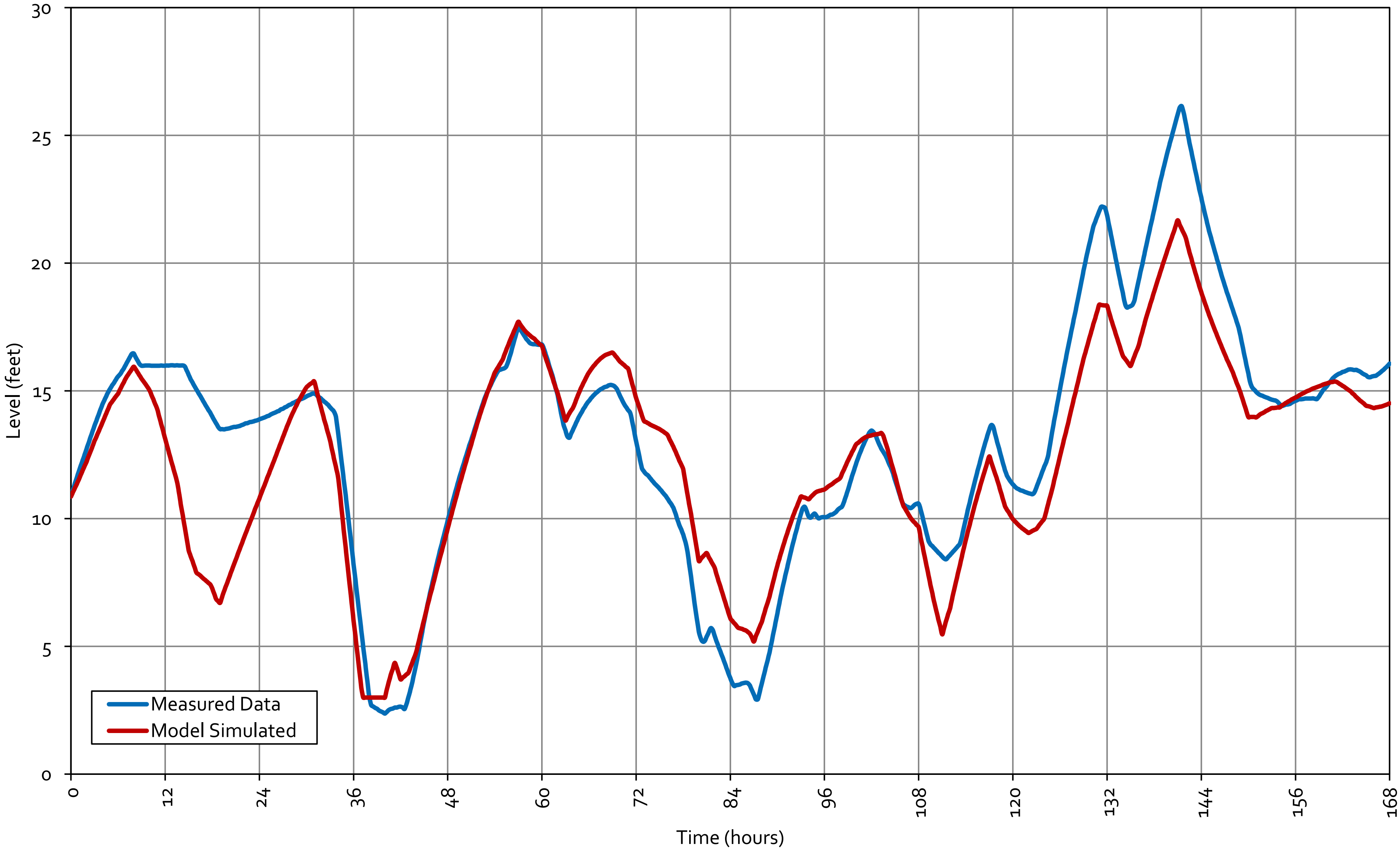
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - AULD VALLEY TANK



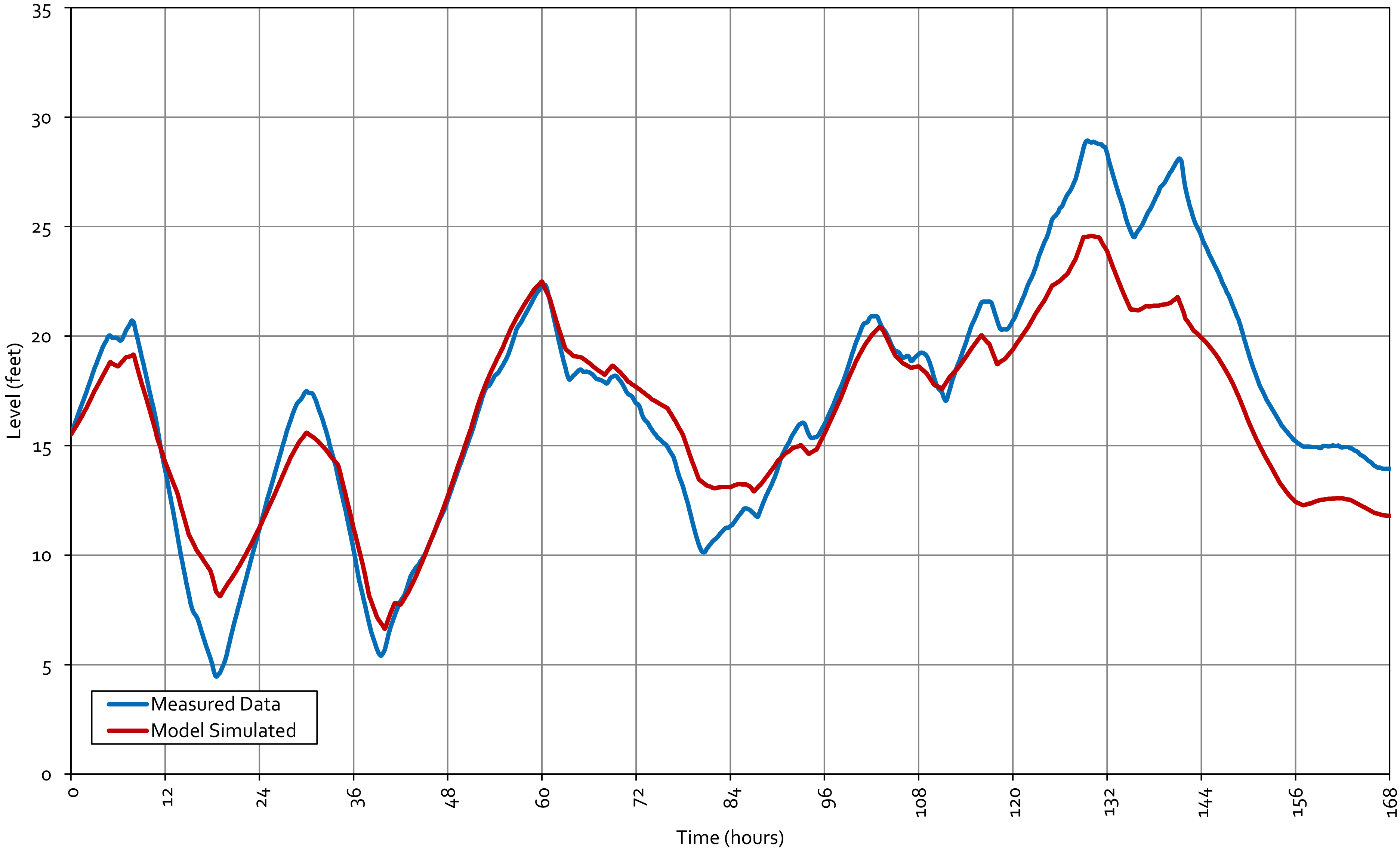
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - BAKER ST TANK



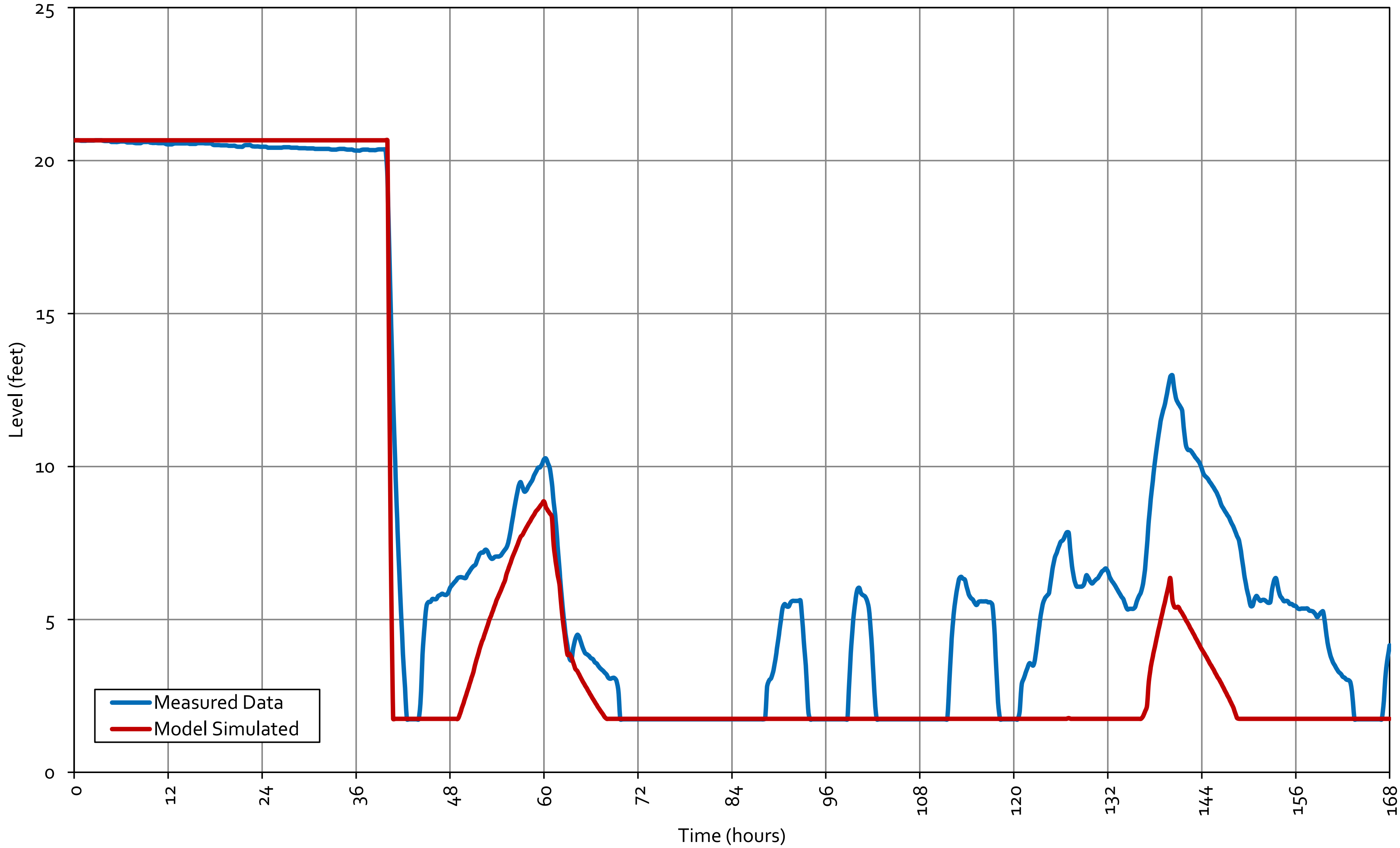
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - BRYANT TANK



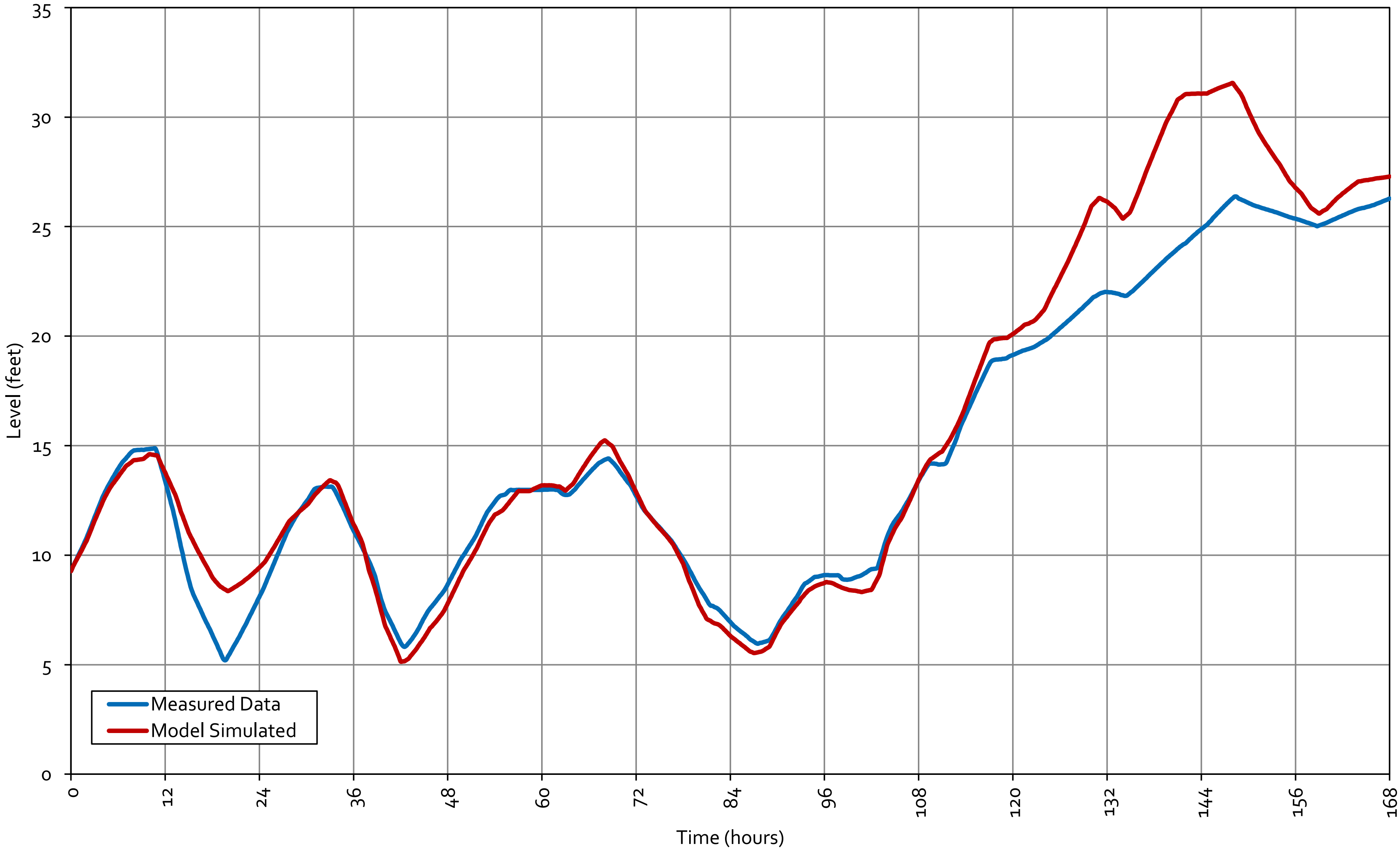
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CLEARWELL TANK



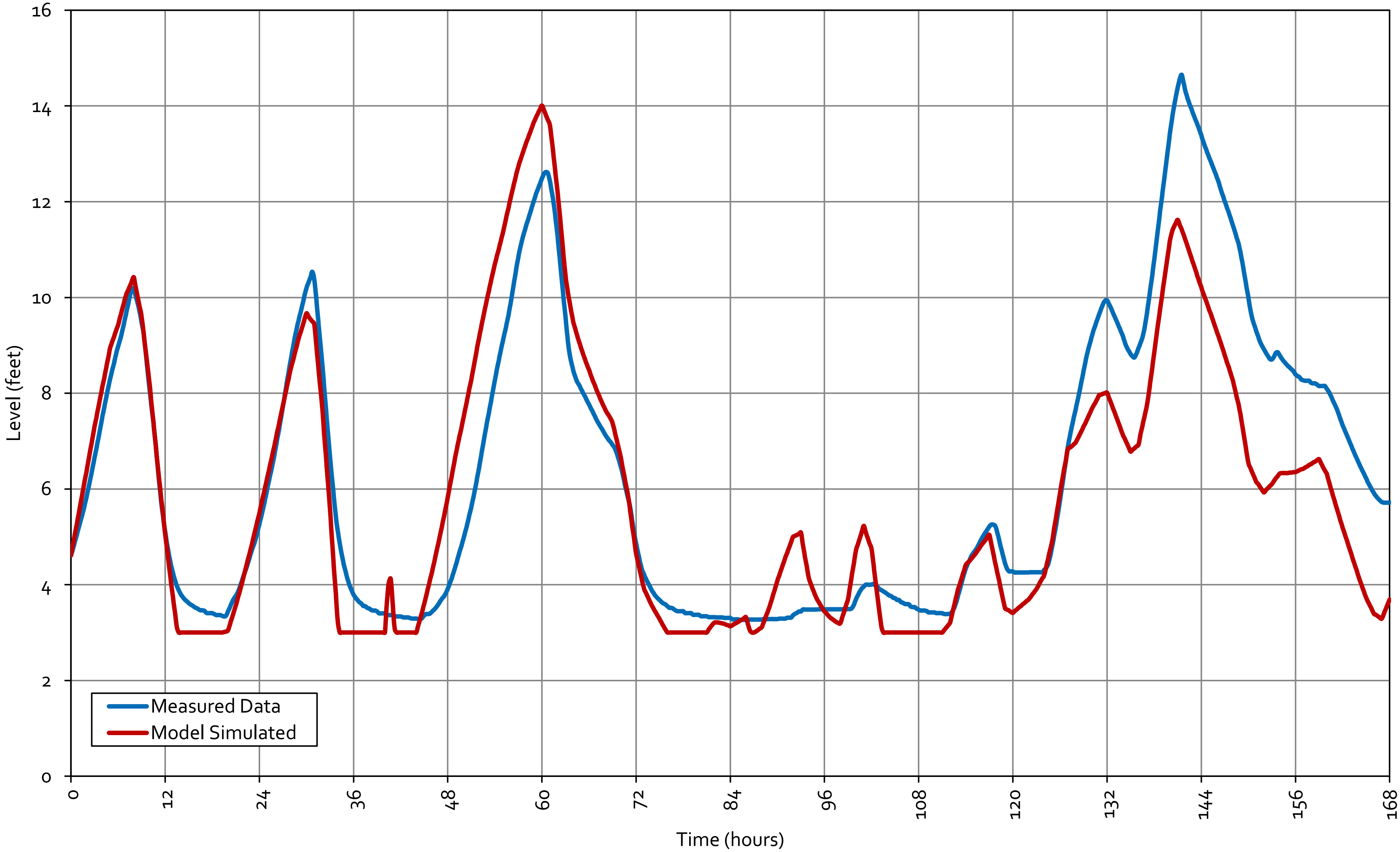
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LAKE TANK



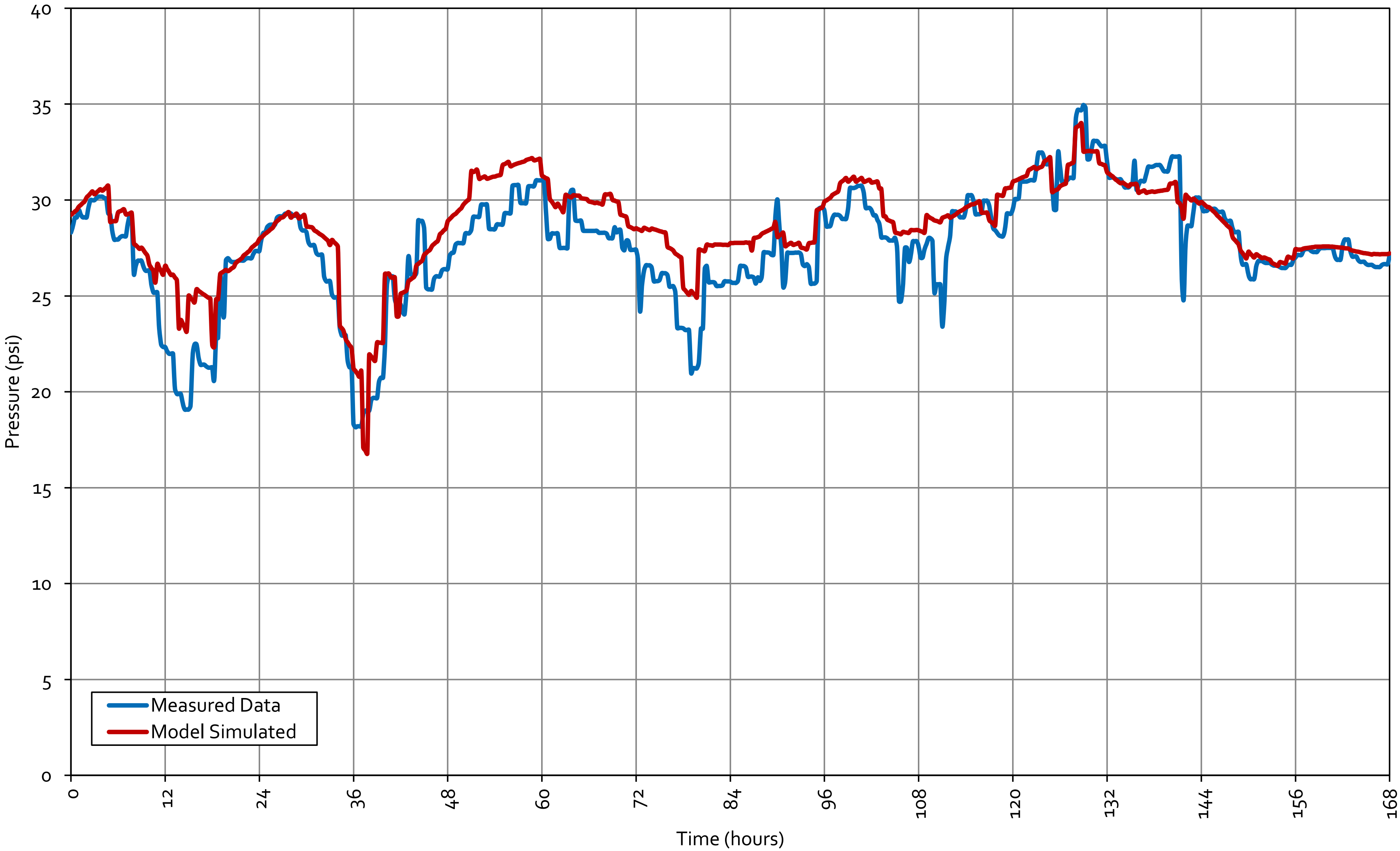
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - RAILROAD CANYON TANK



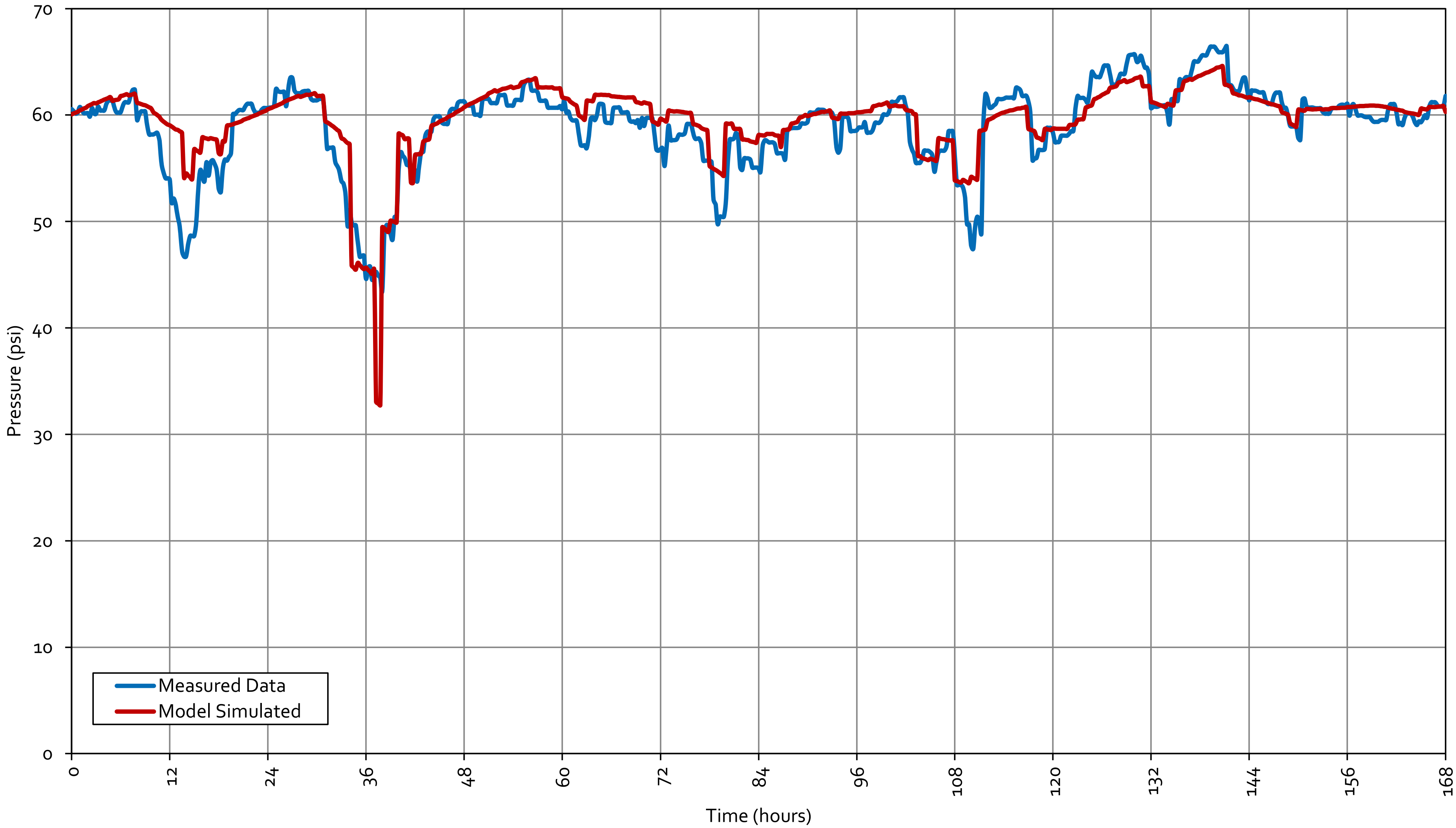
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - BUNDY CANYON SUCTION BOOSTER



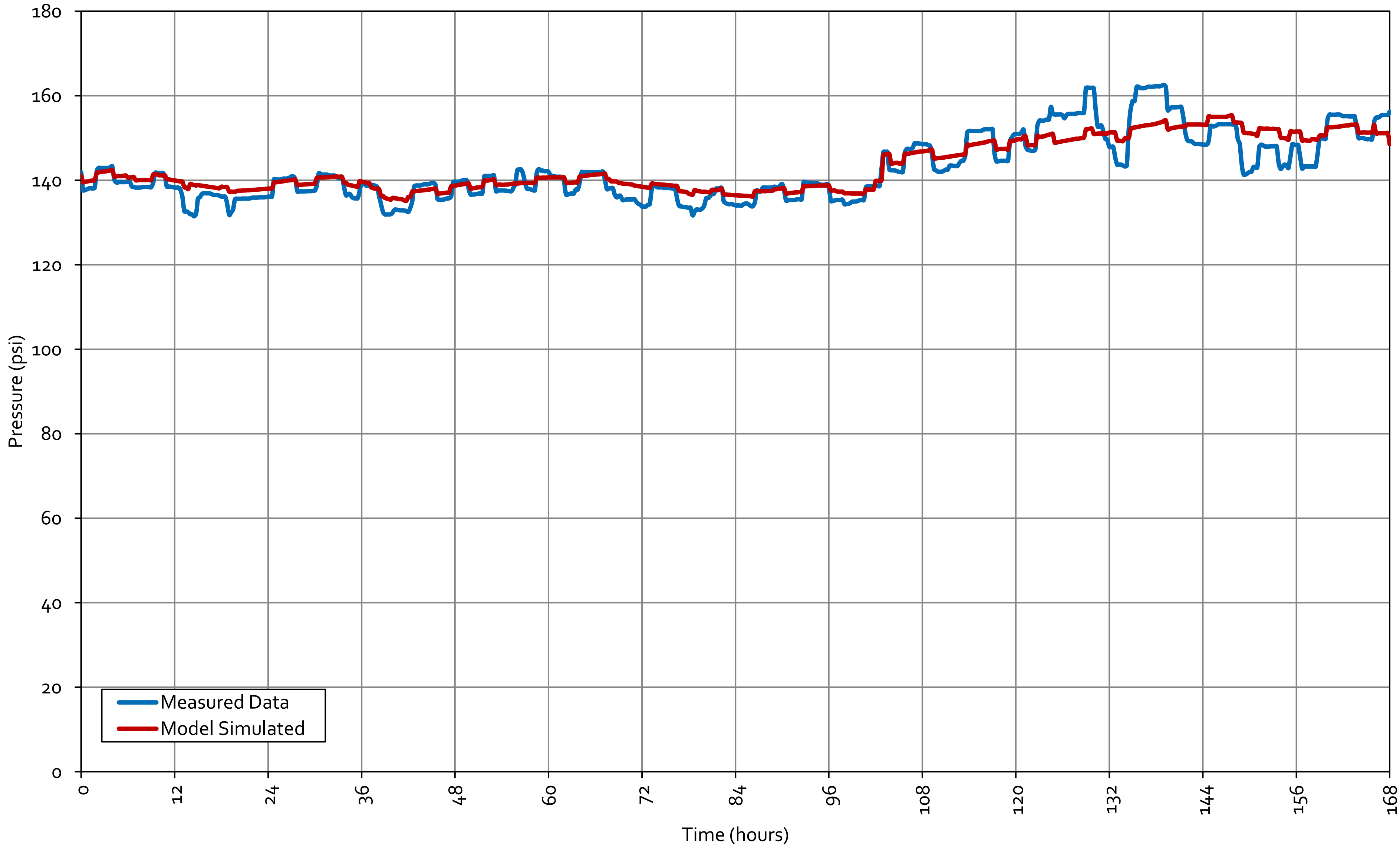
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CITY SUCTION BOOSTER



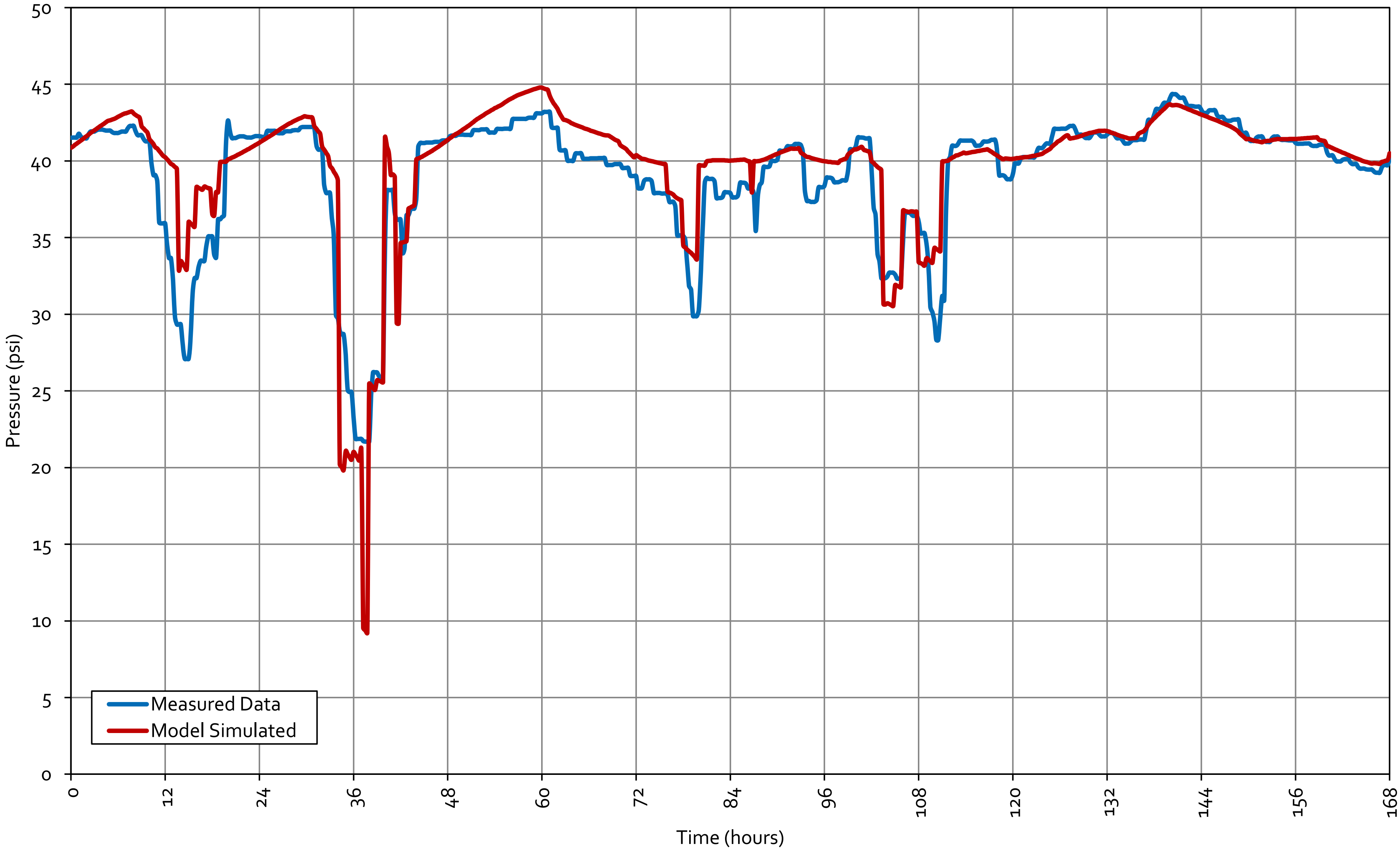
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - COLD DISCHARGE BOOSTER



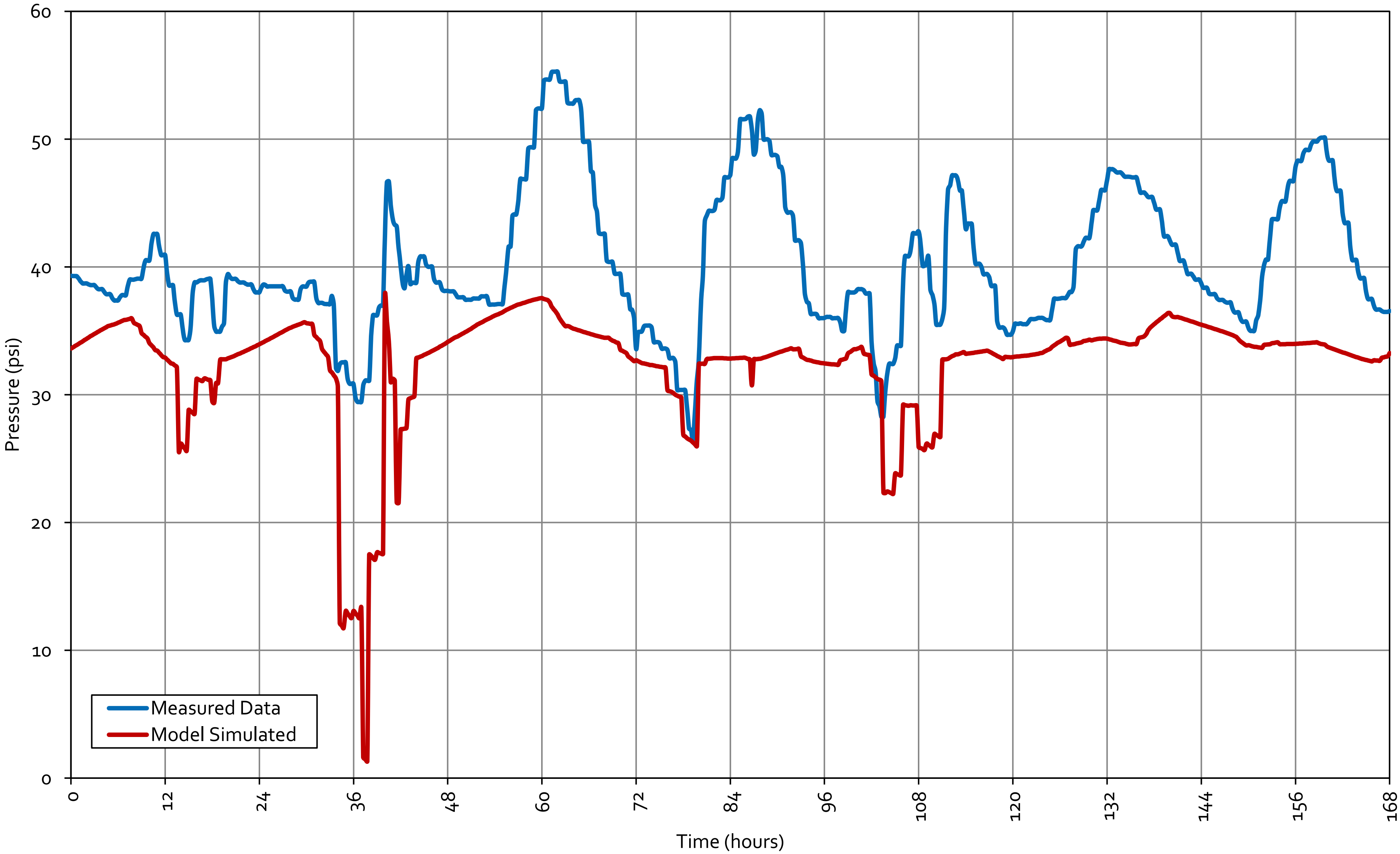
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - COTTONWOOD SUCTION BOOSTER 1



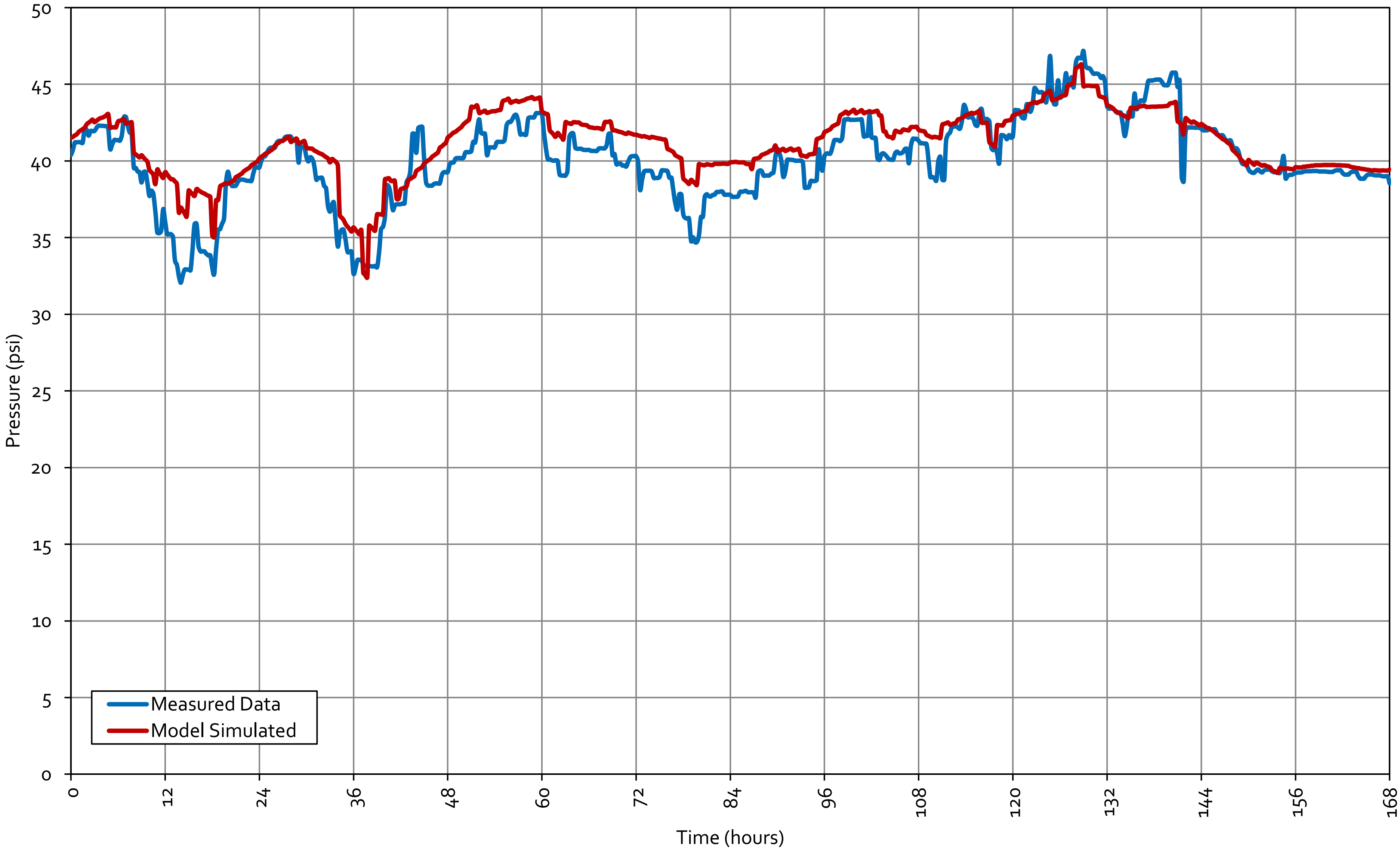
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CANYON LAKE SUCTION BOOSTER



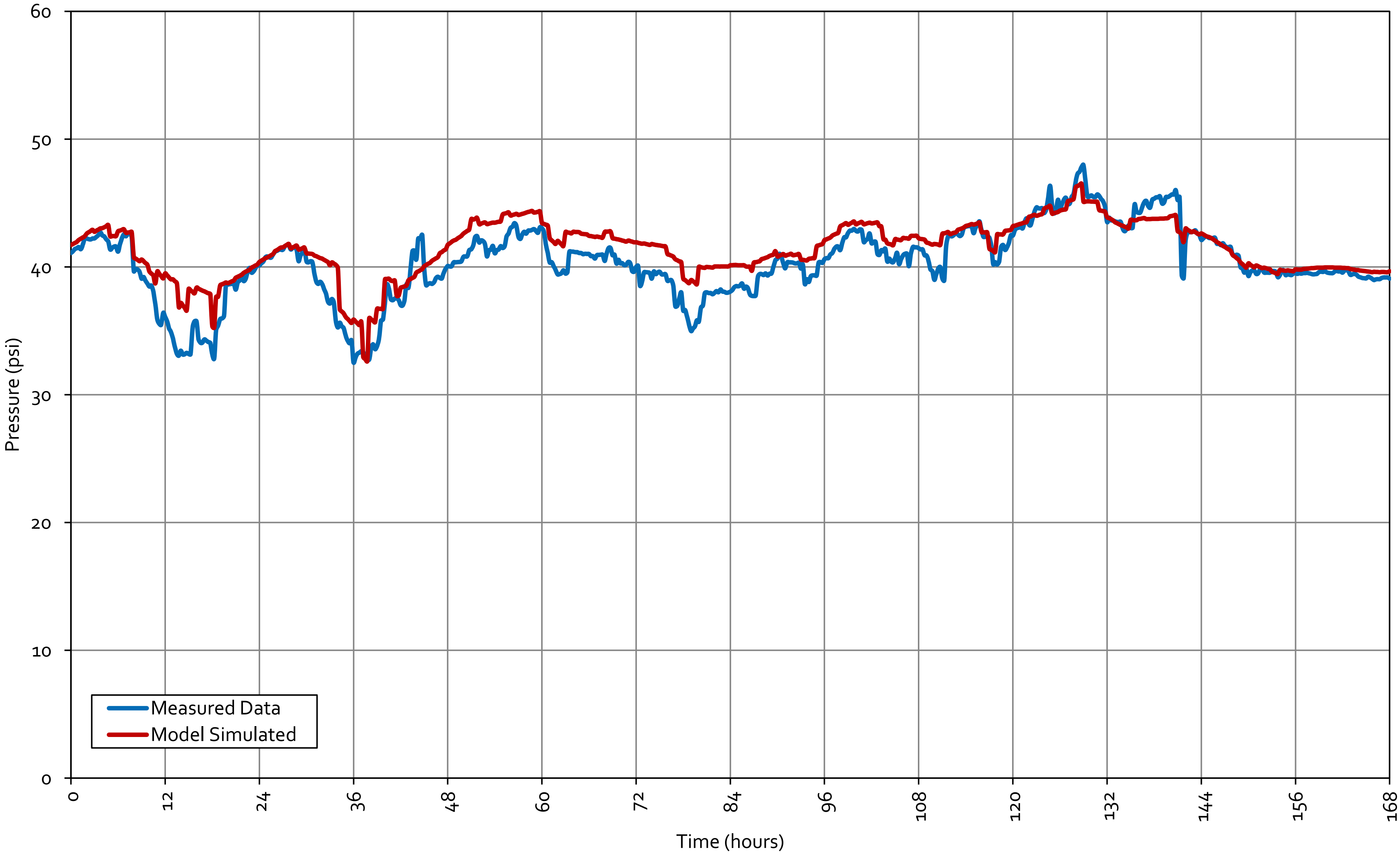
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - GRAND DISCHARGE BOOSTER



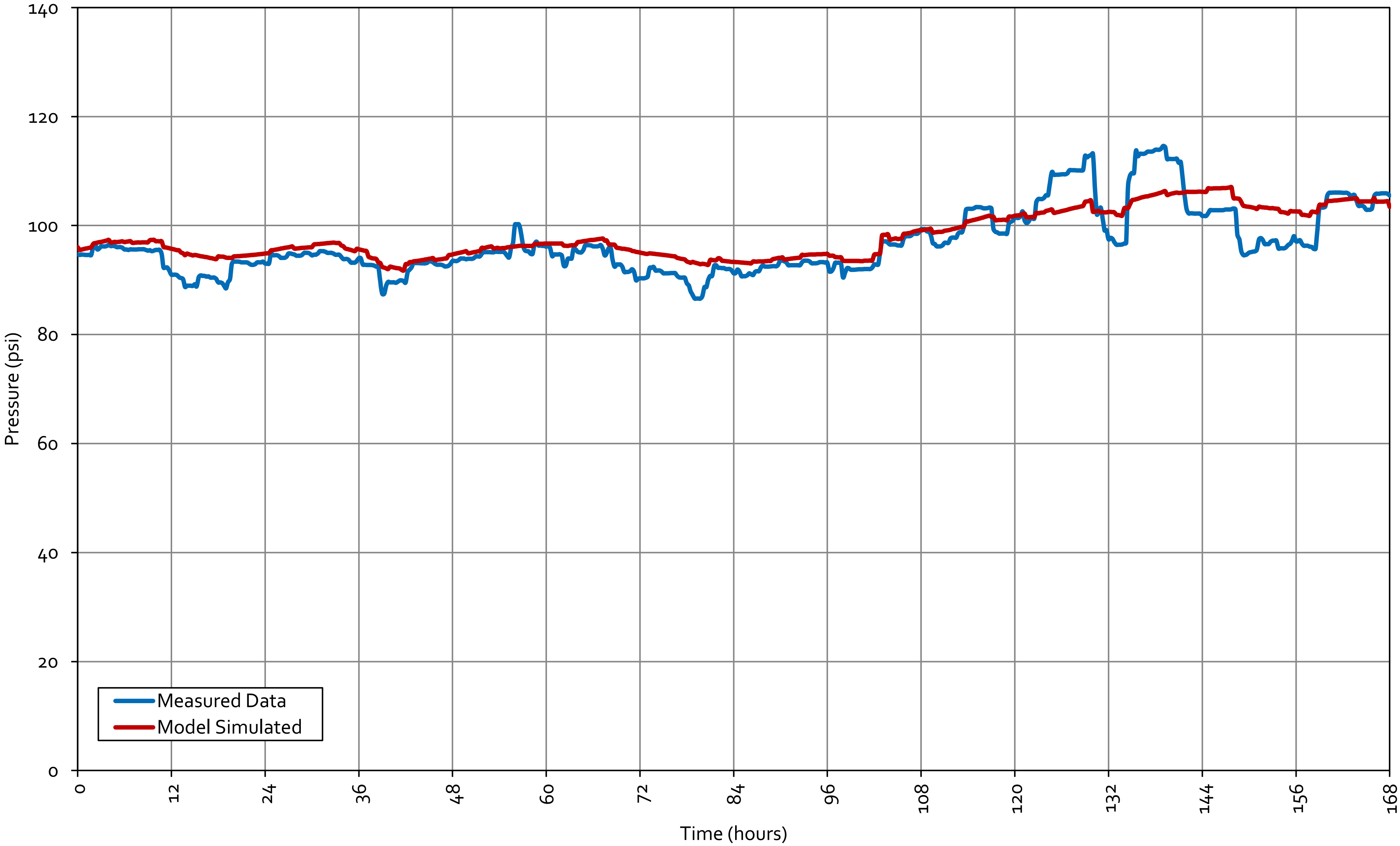
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - GRAND SUCTION BOOSTER



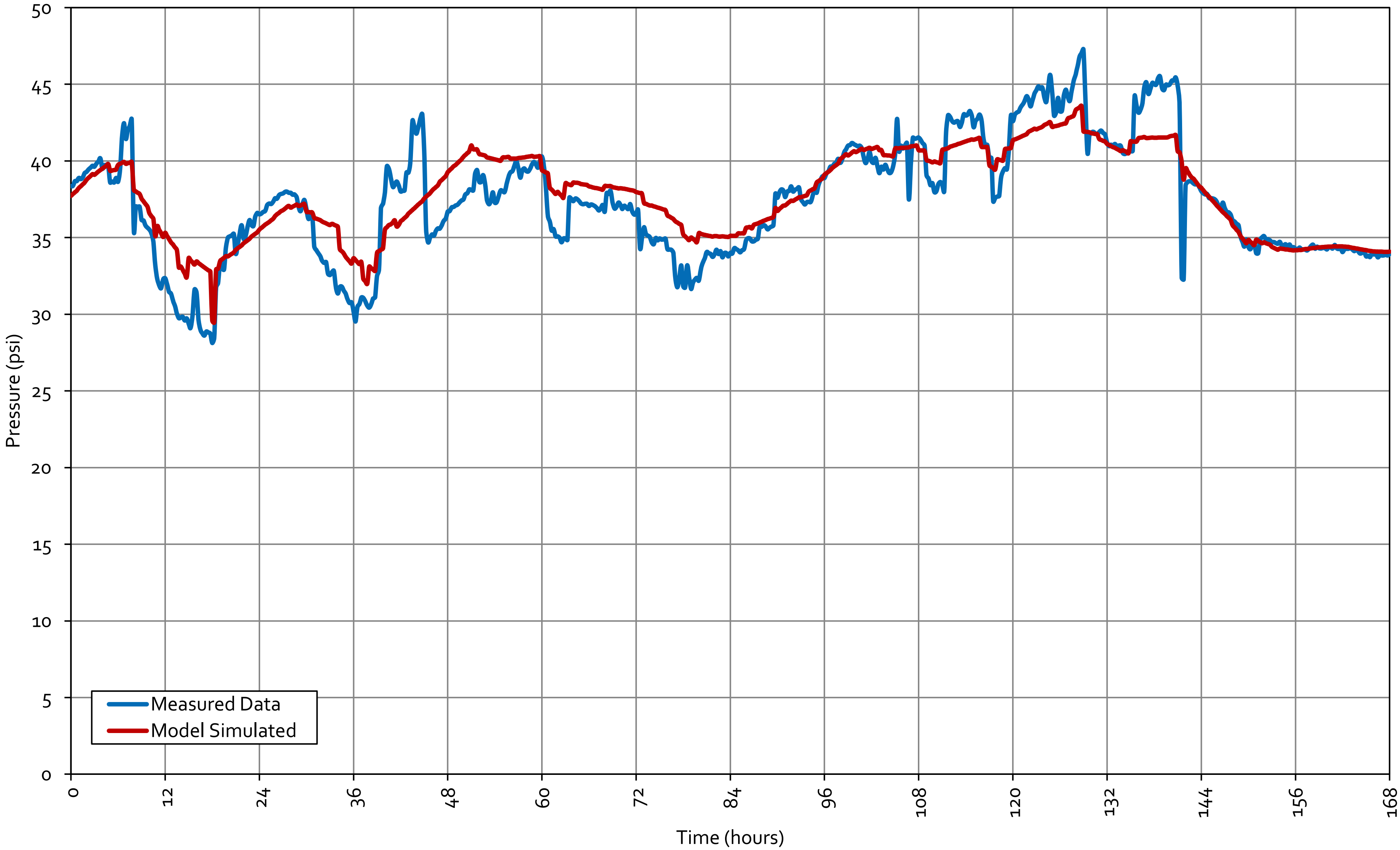
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - HORSETHIEF SUCTION BOOSTER 1



Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - INLAND VALLEY SUCTION BOOSTER



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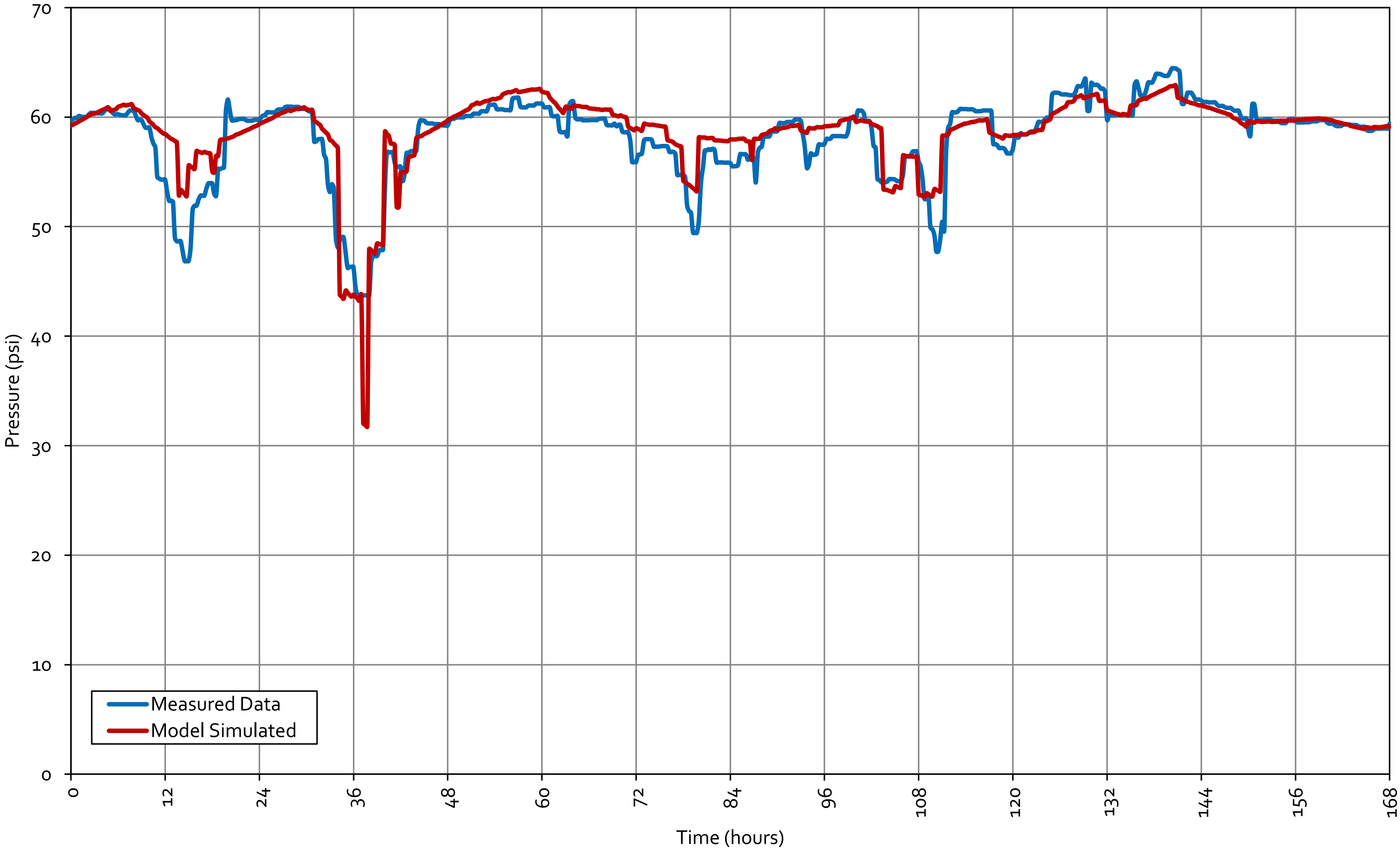
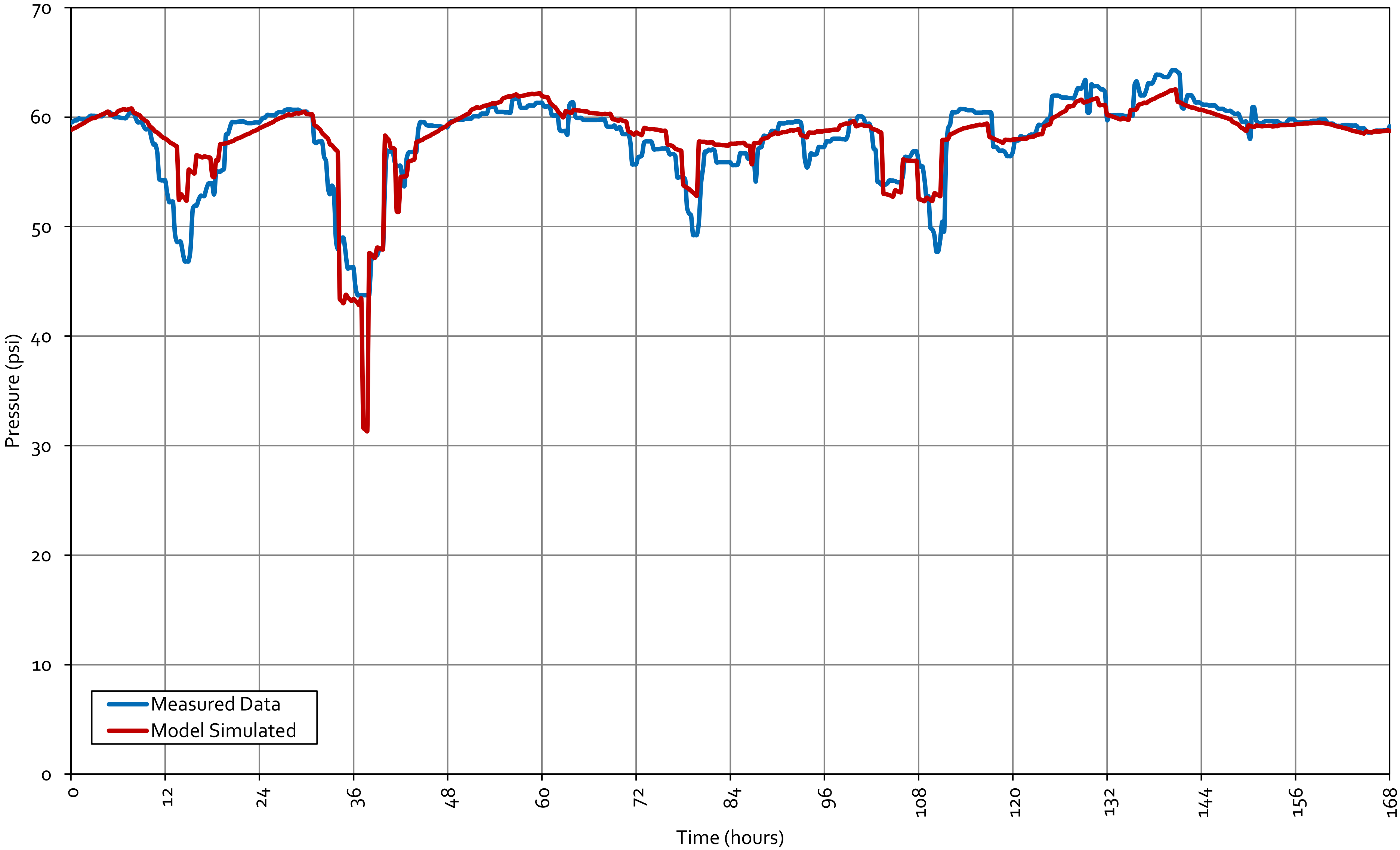
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LAKESHORE DISCHARGE BOOSTER



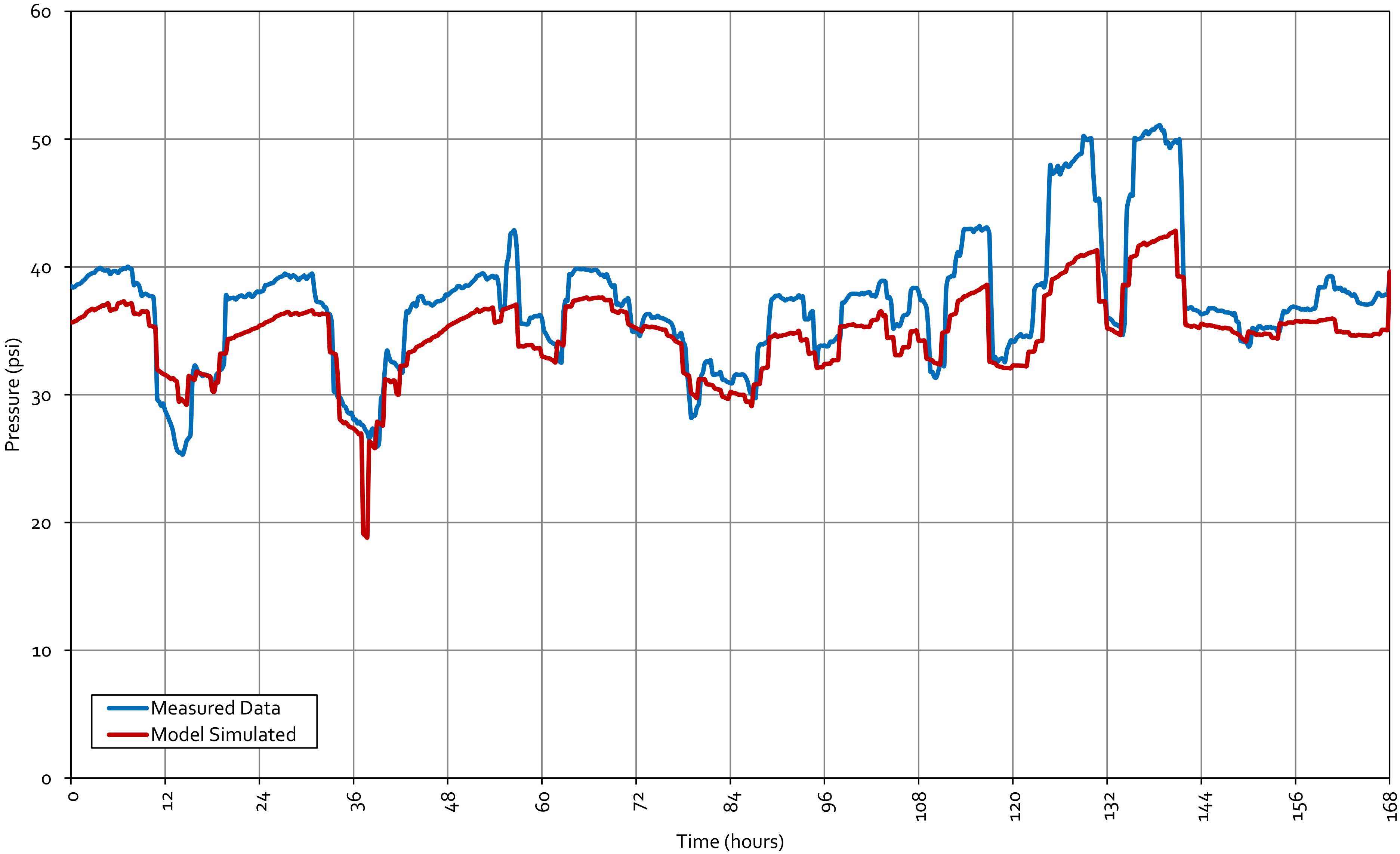
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LAKESHORE SUCTION BOOSTER



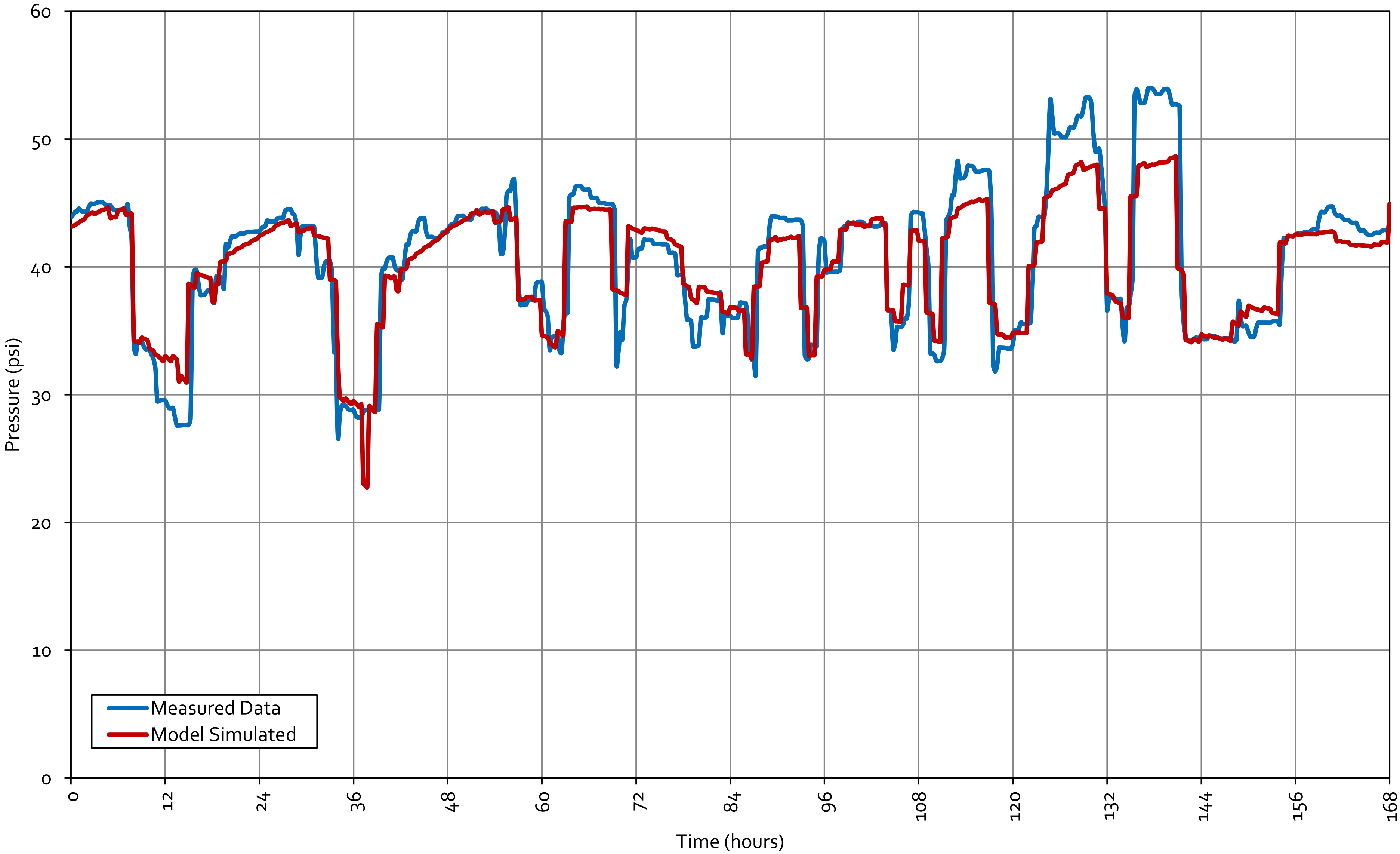
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LUCERNE SUCTION BOOSTER



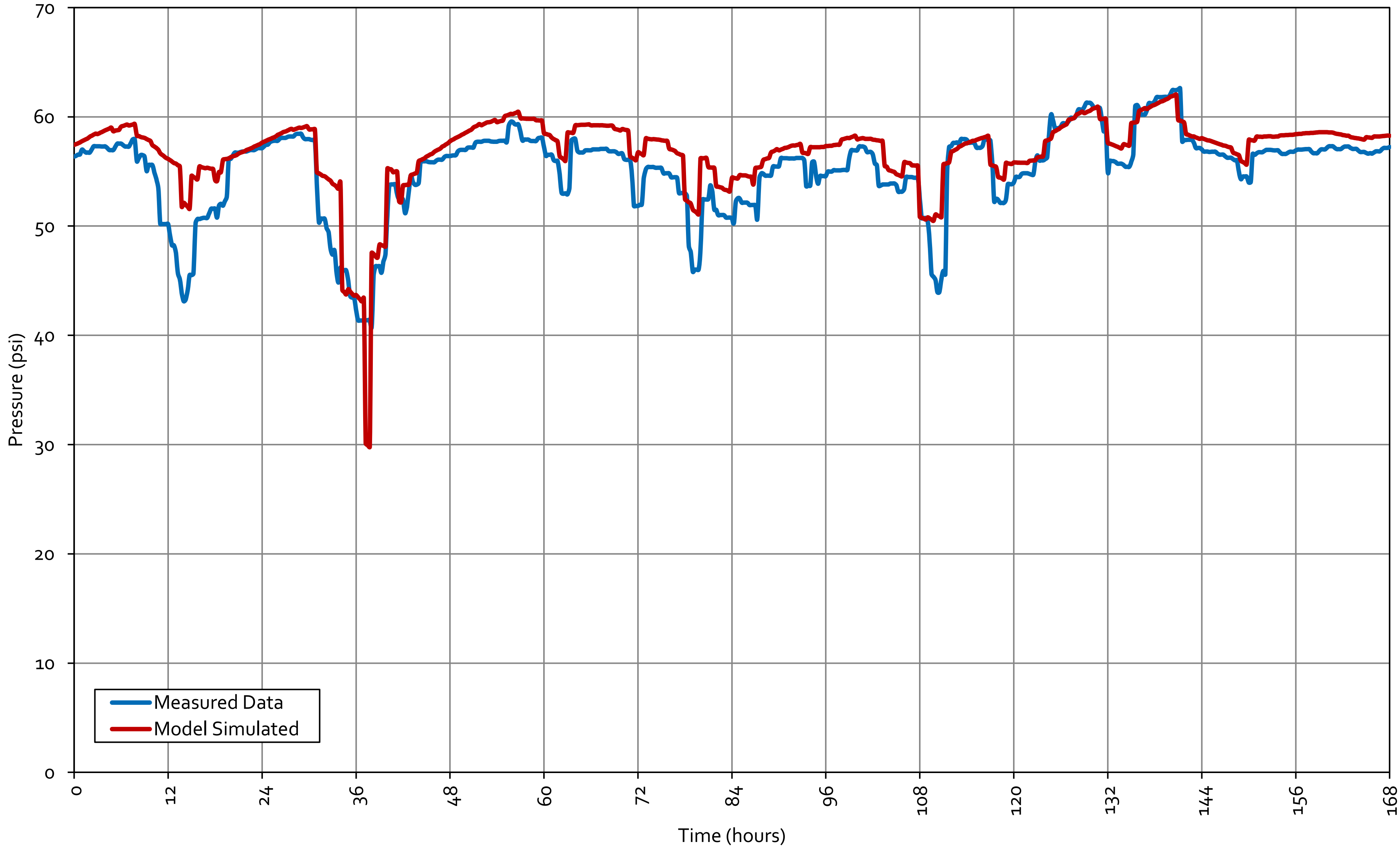
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - ORTEGA SUCTION BOOSTER



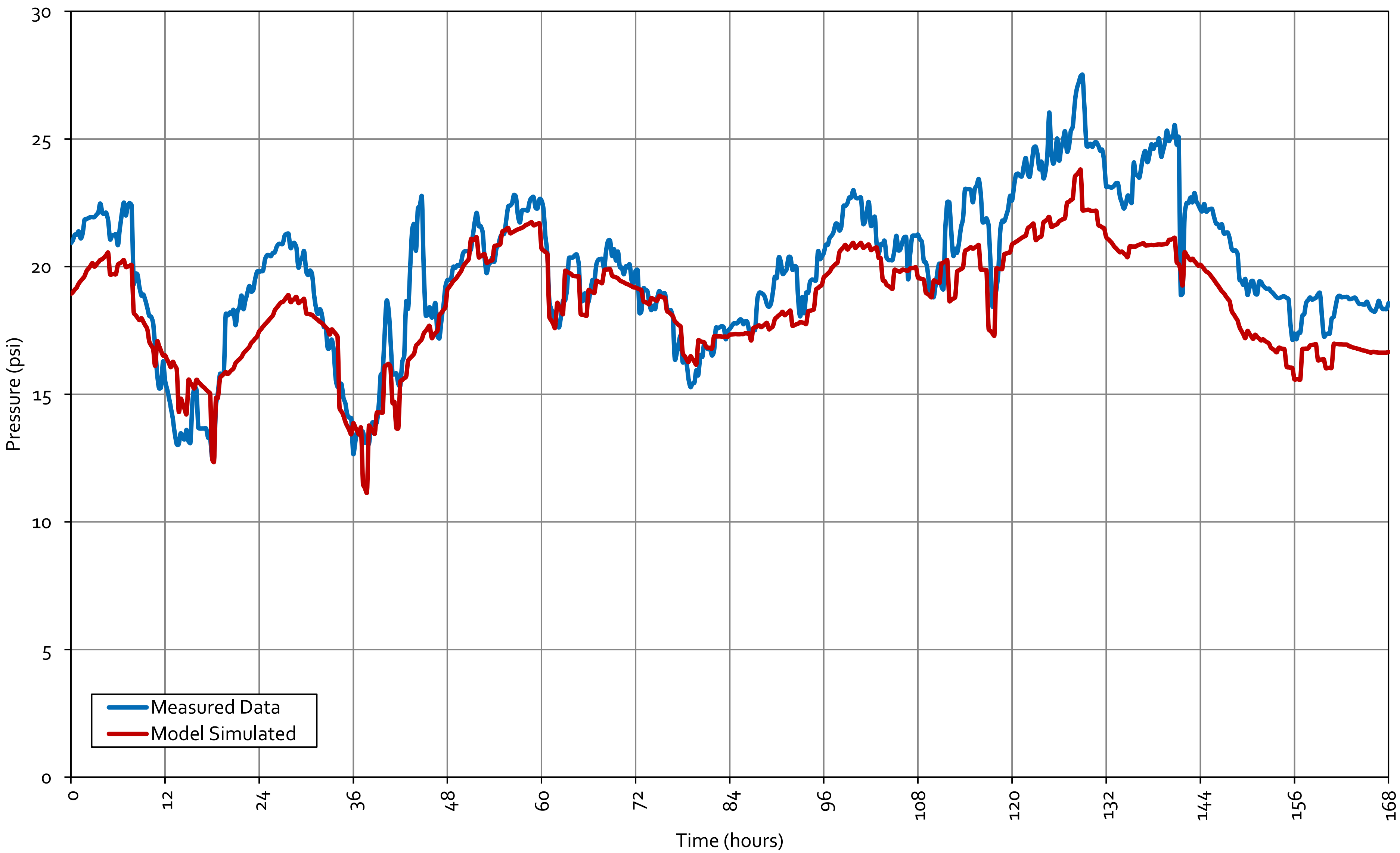
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - ROSETTA CANYON SUCTION BOOSTER 1



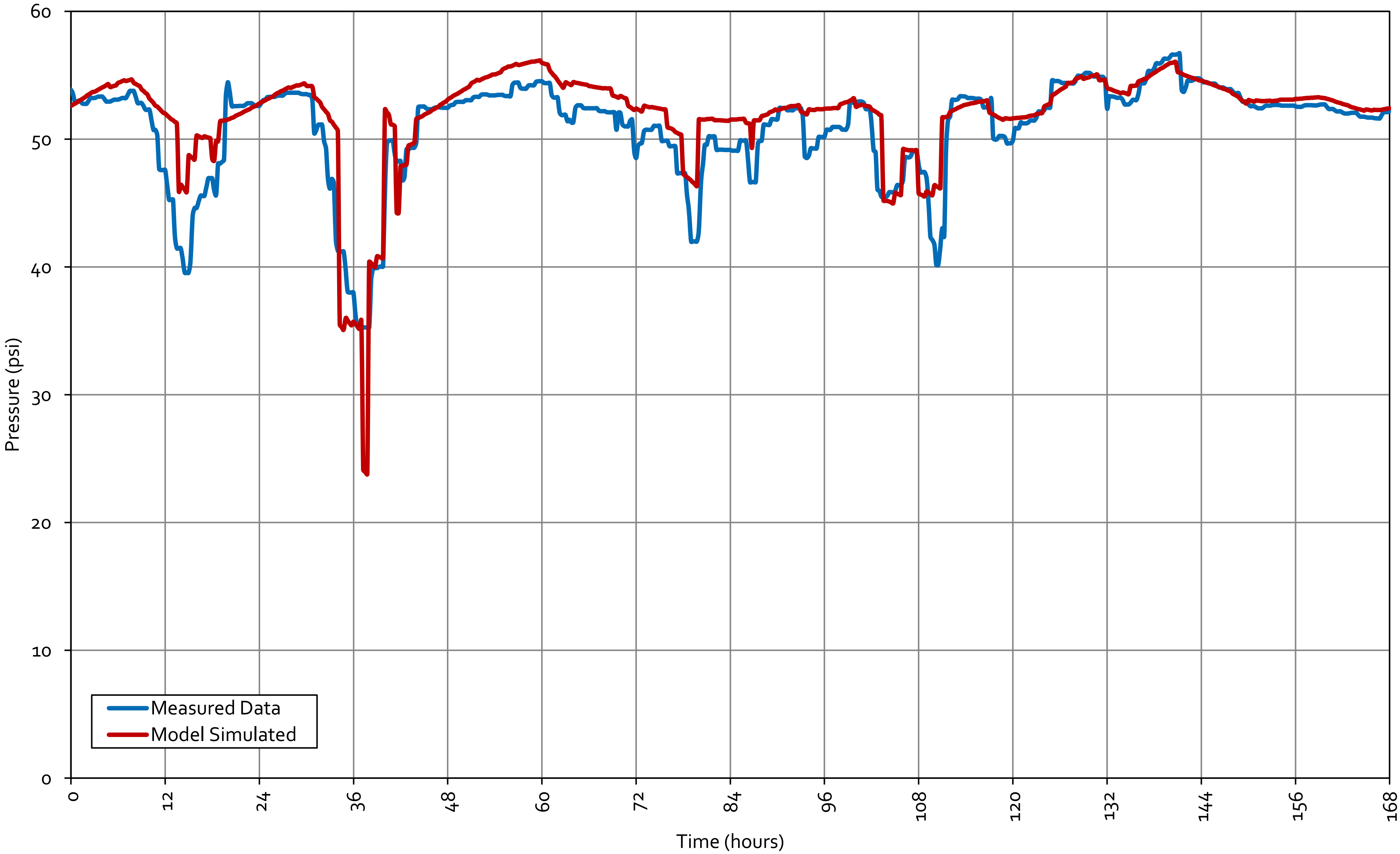
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - STAGE RANCH SUCTION BOOSTER 1



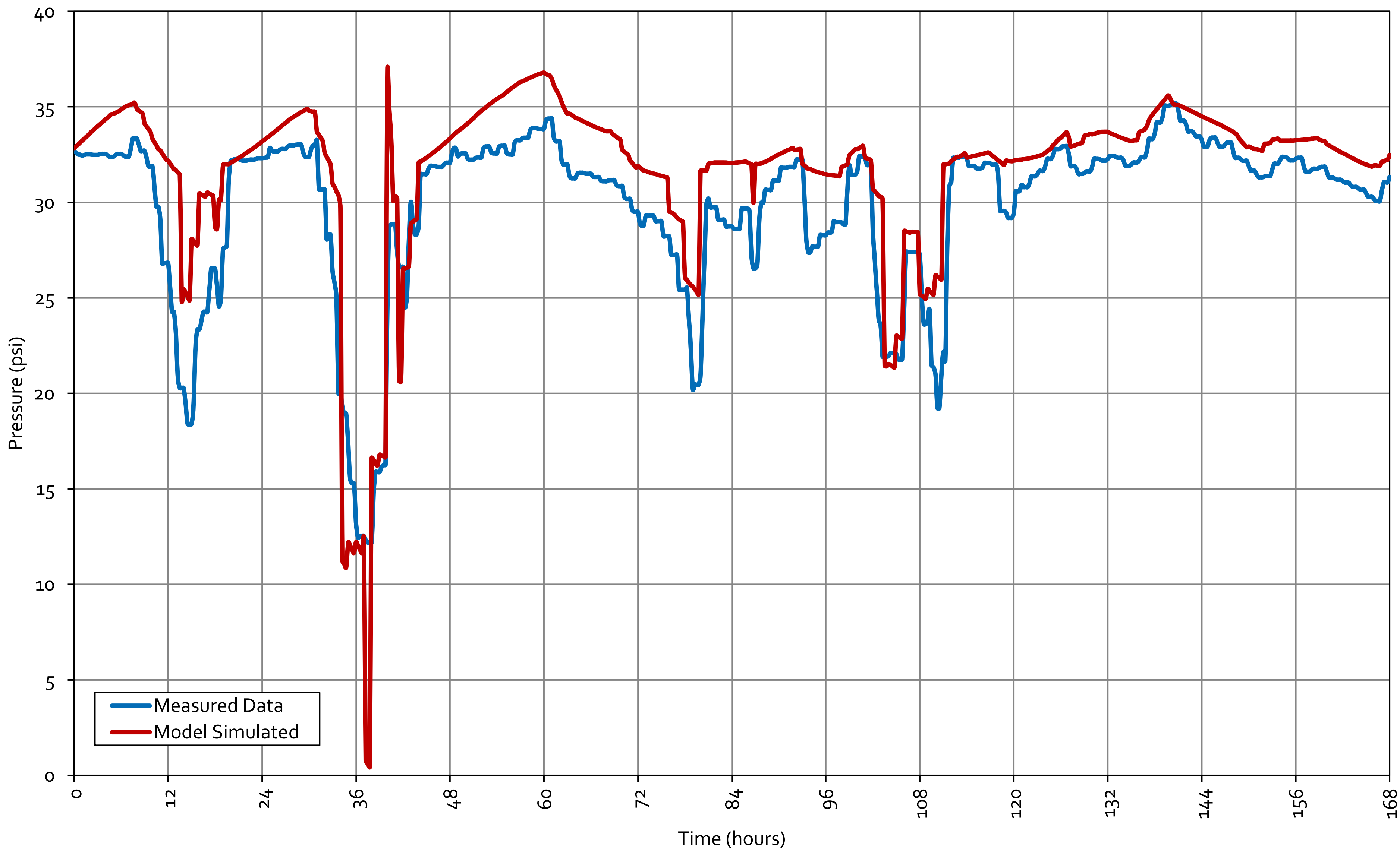
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - SUMMERHILL SUCTION BOOSTER



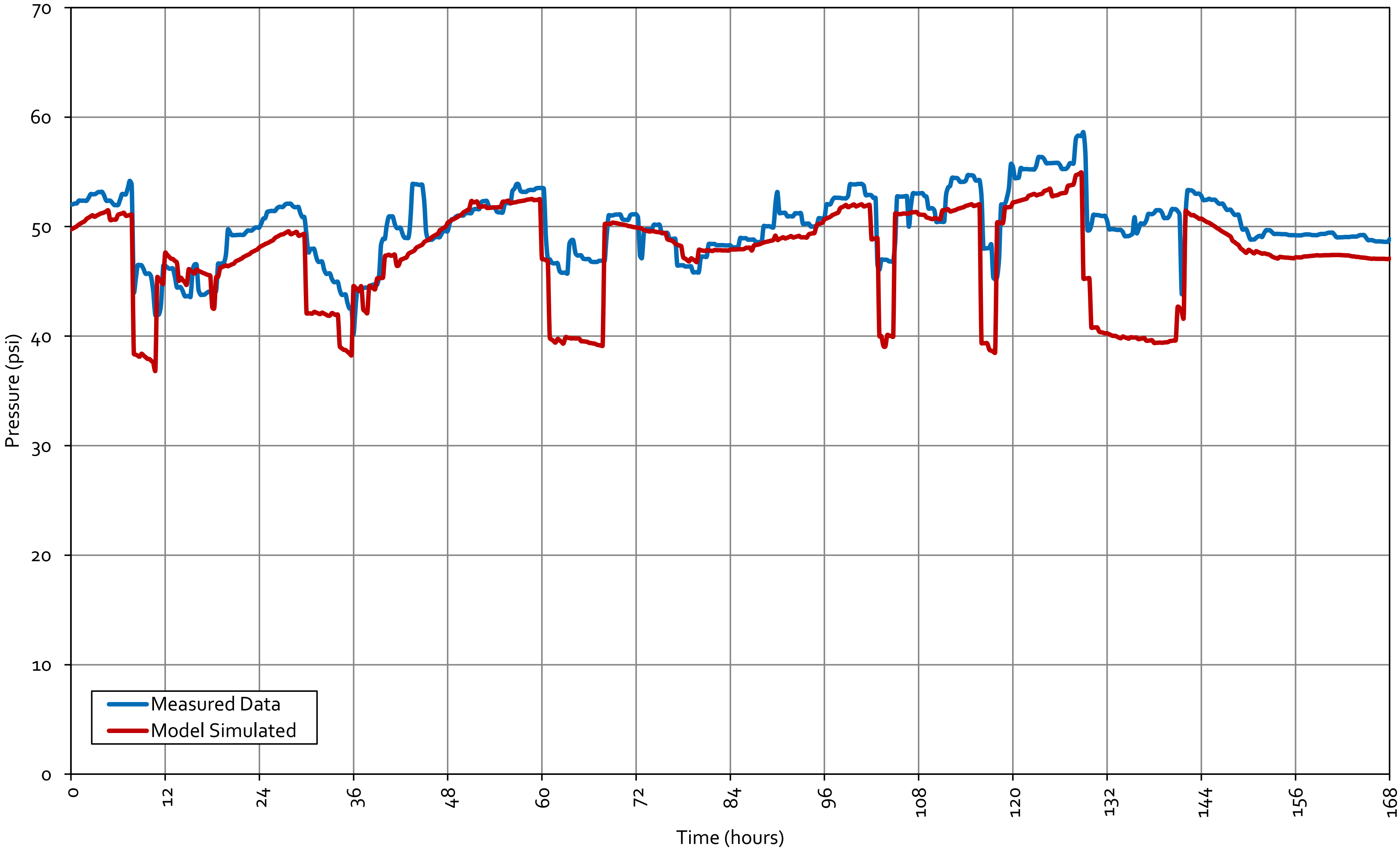
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - TUSCANY SUCTION BOOSTER 1



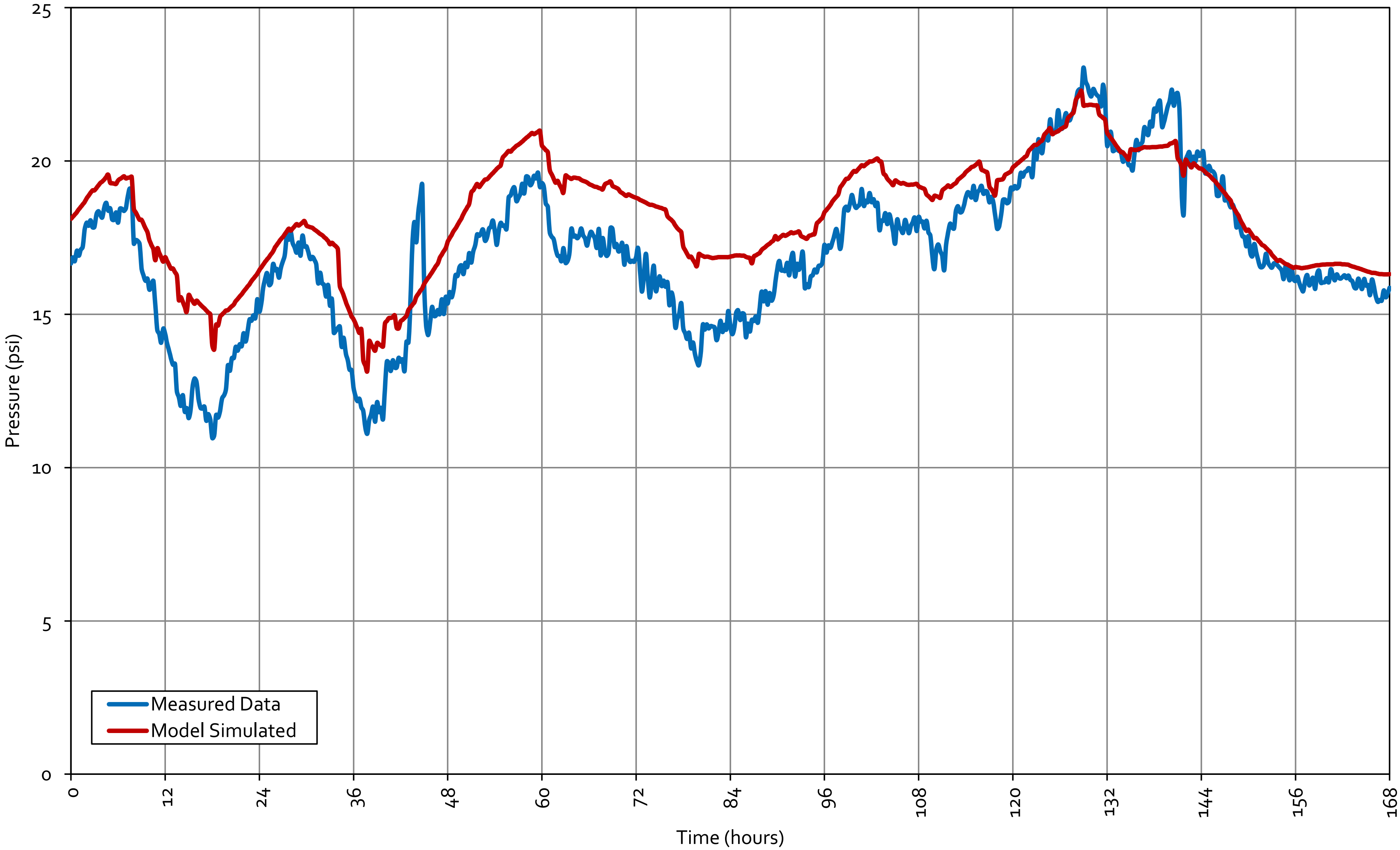
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - WAITE SUCTION BOOSTER



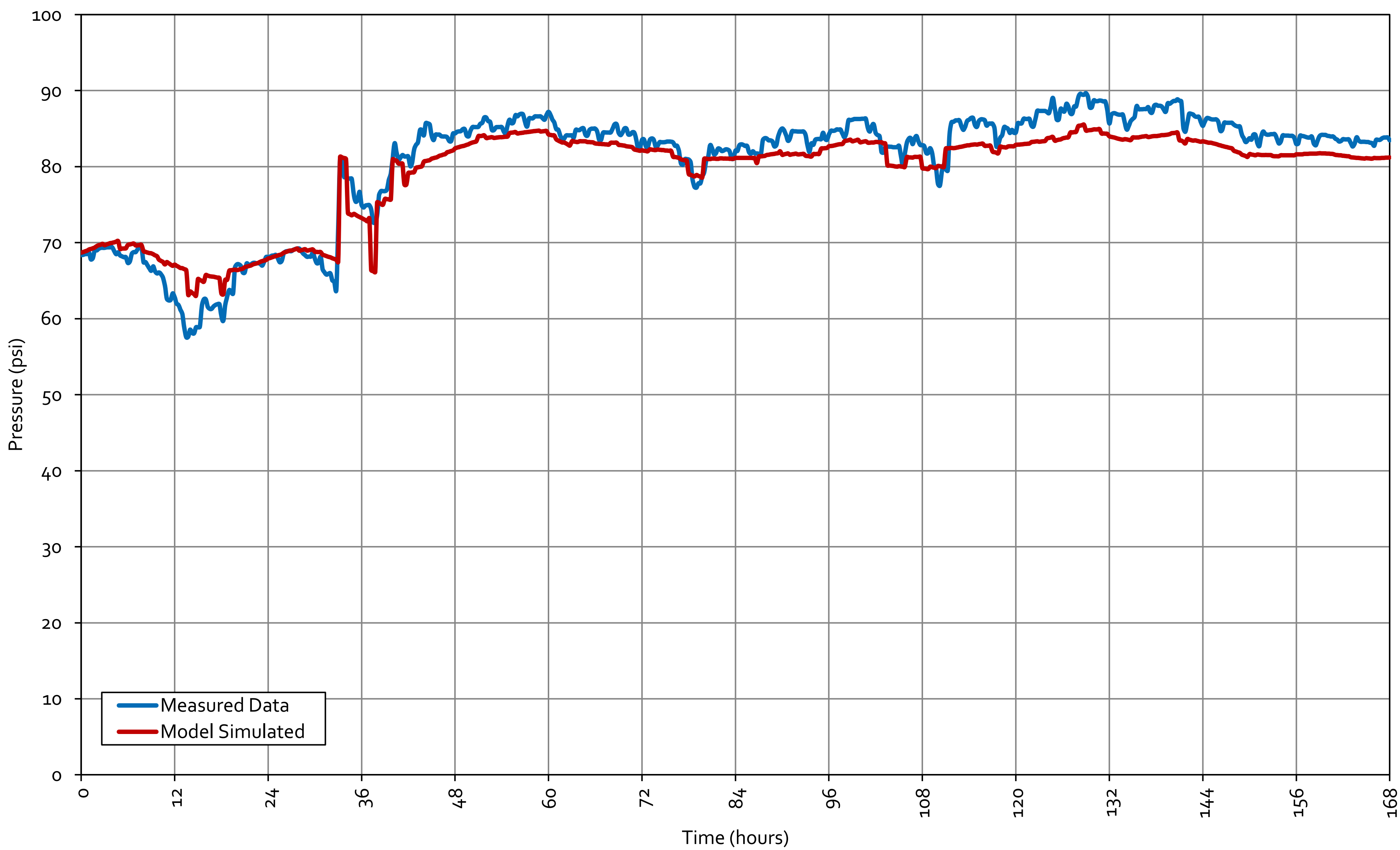
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - WOODMOOR SUCTION BOOSTER



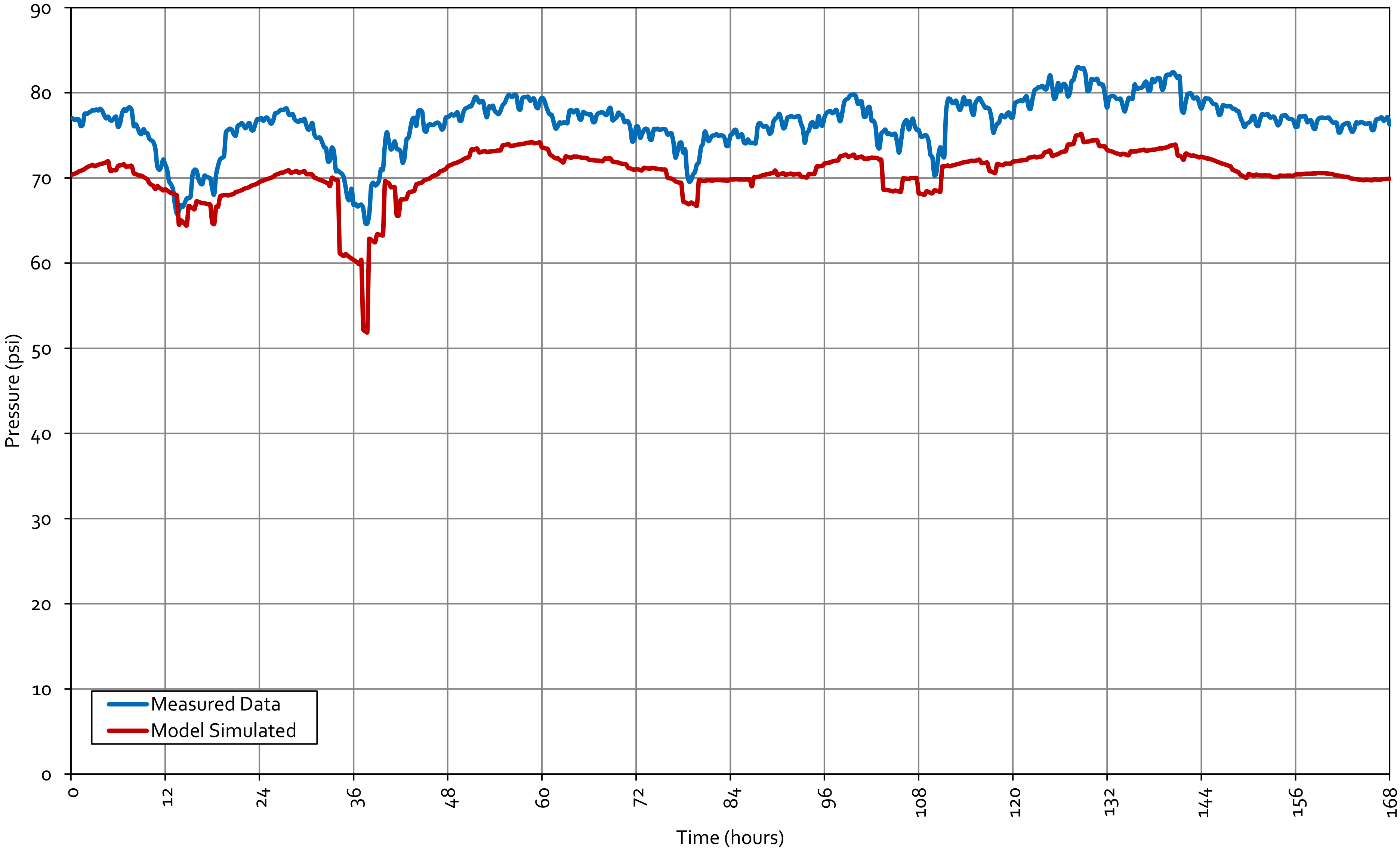
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL DISCHARGE 1



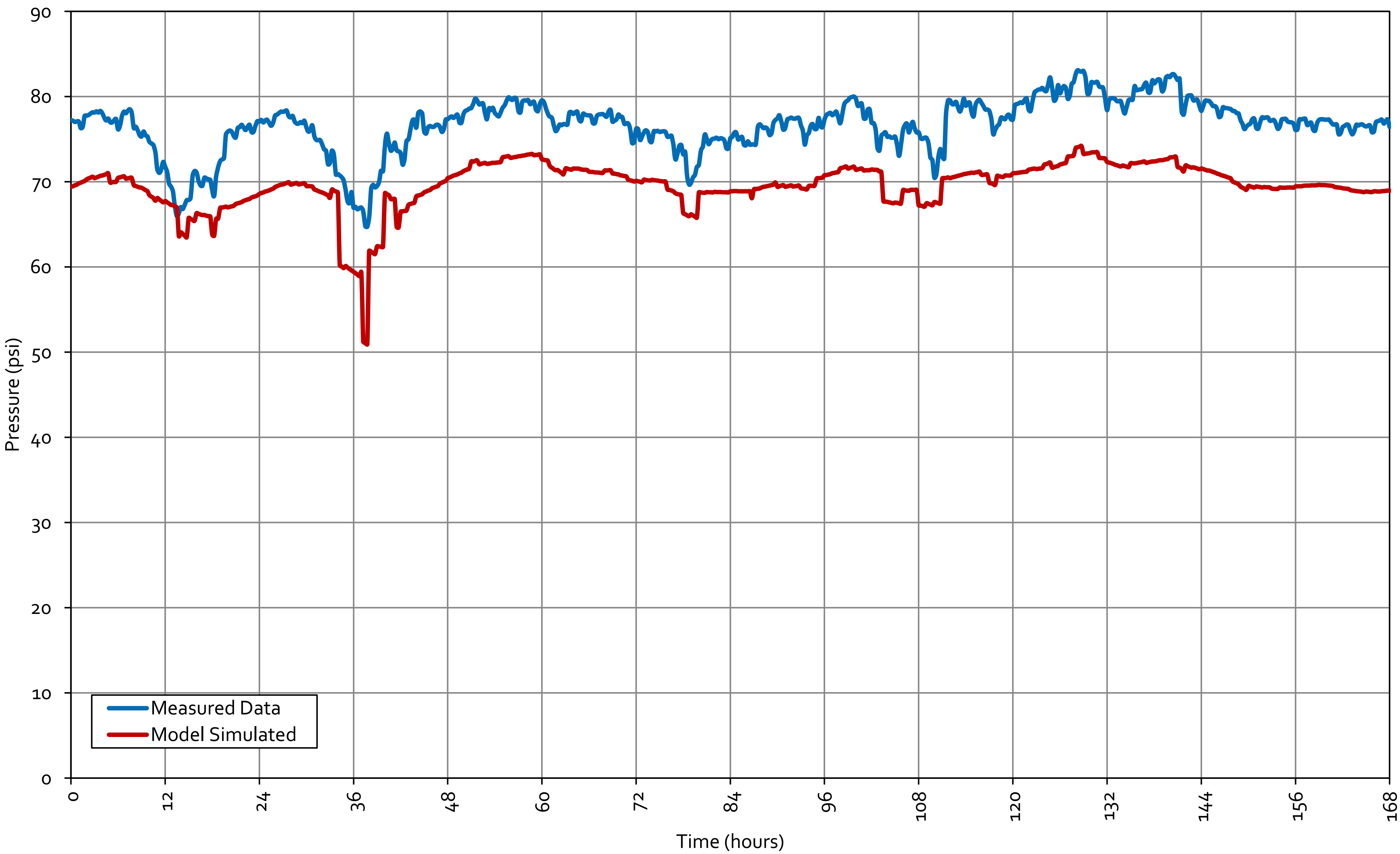
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL DISCHARGE 3



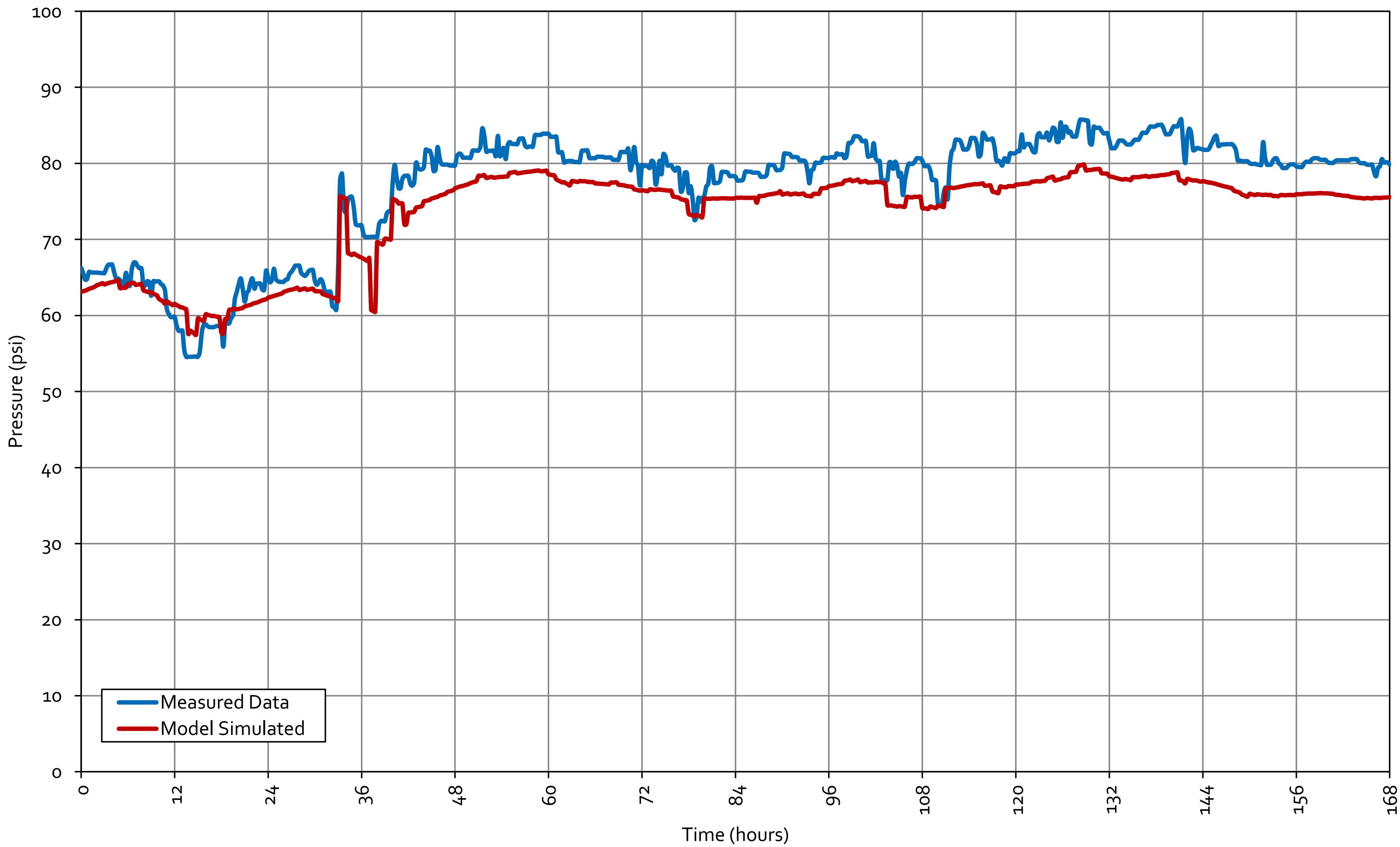
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL DISCHARGE 4



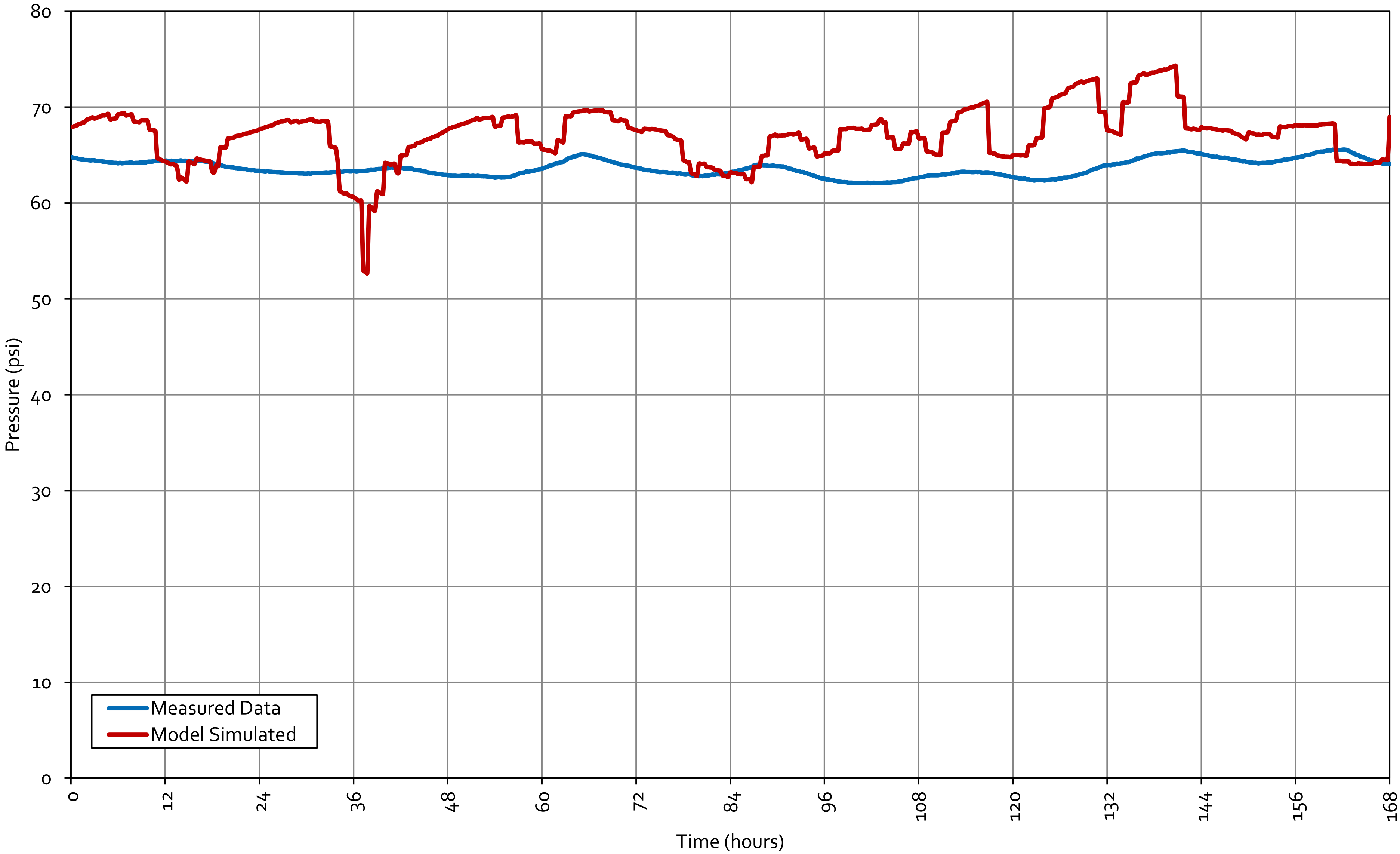
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CORYDON WELL DISCHARGE



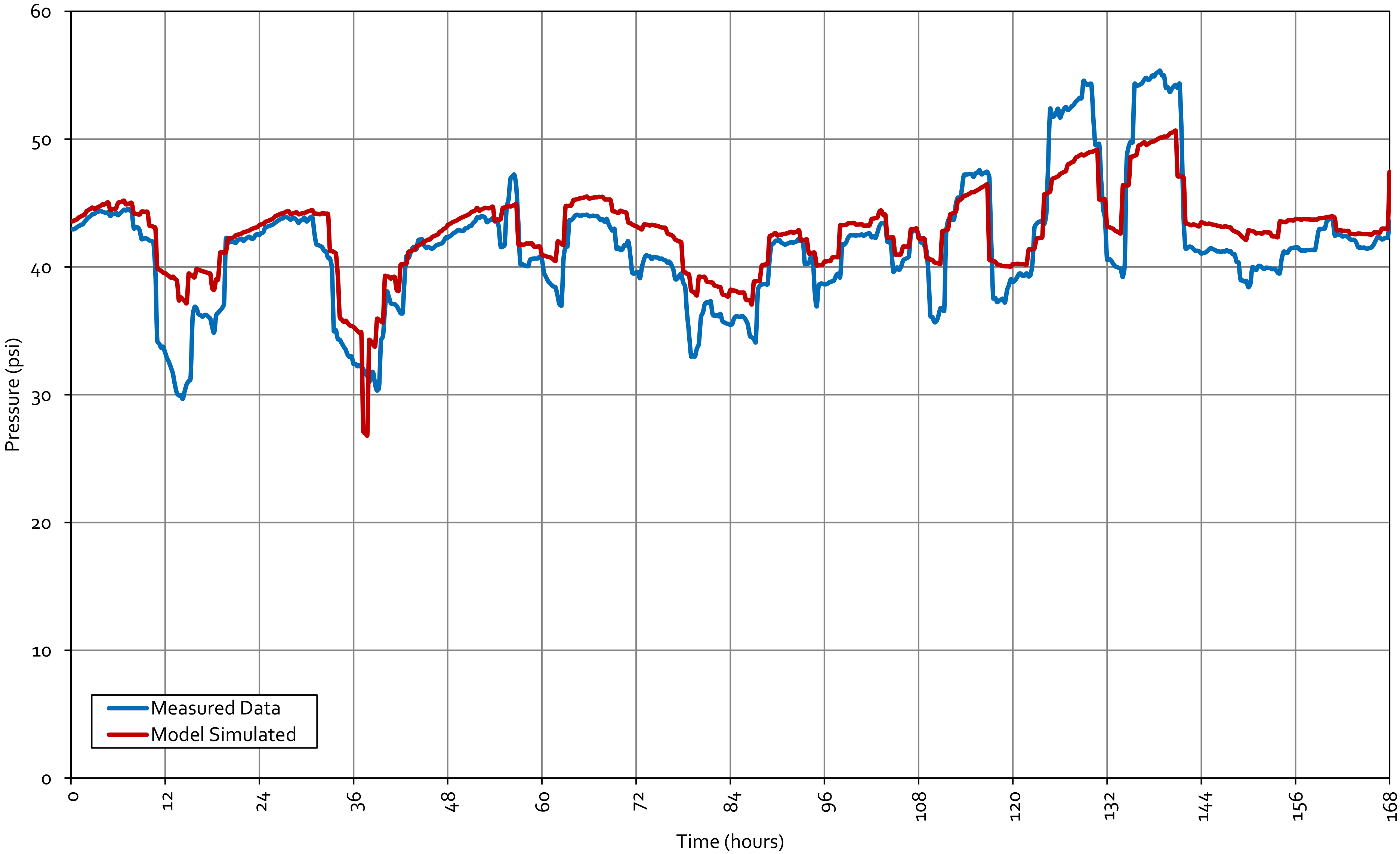
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - JOY WELL DISCHARGE



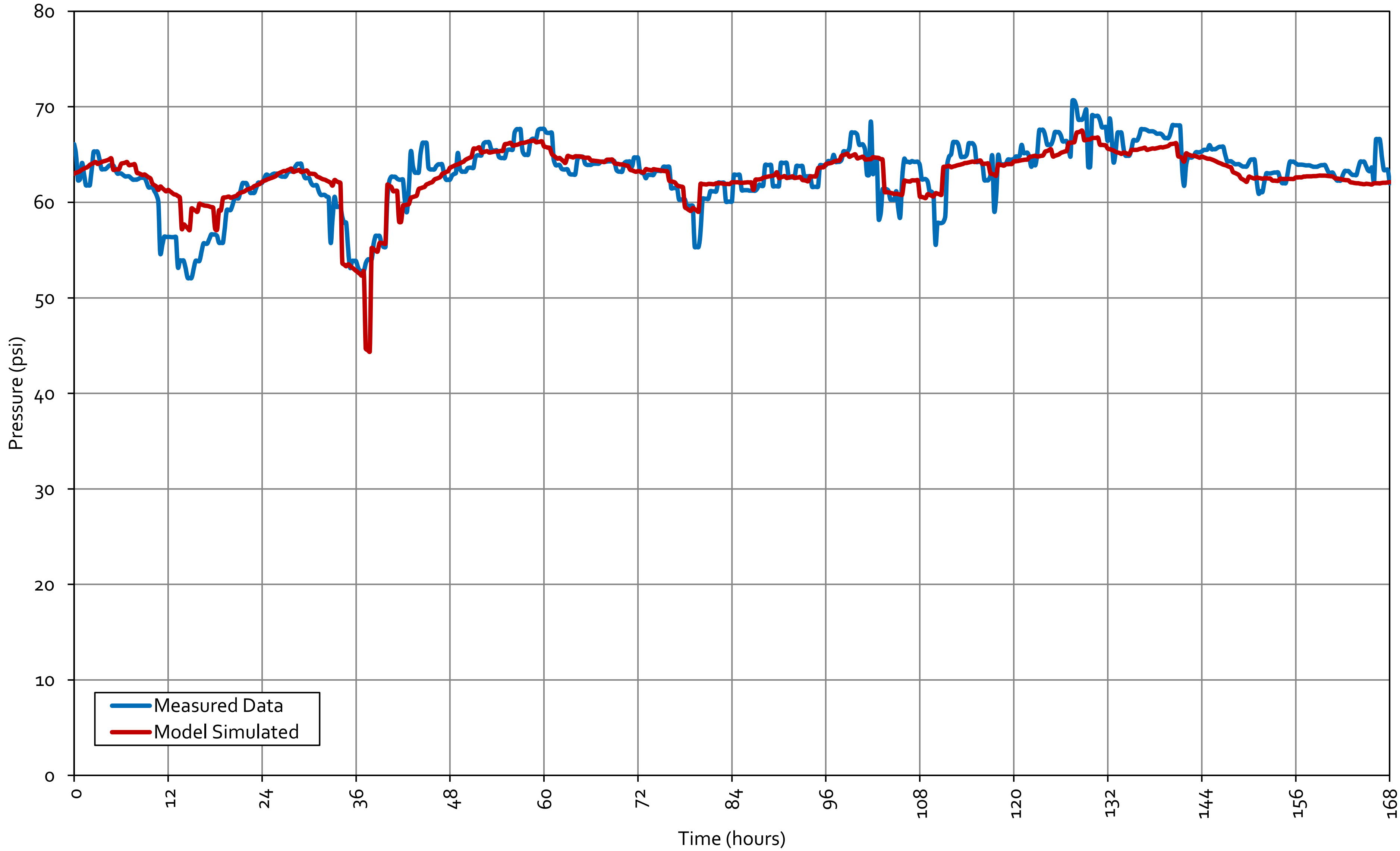
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - MACHADO WELL DISCHARGE



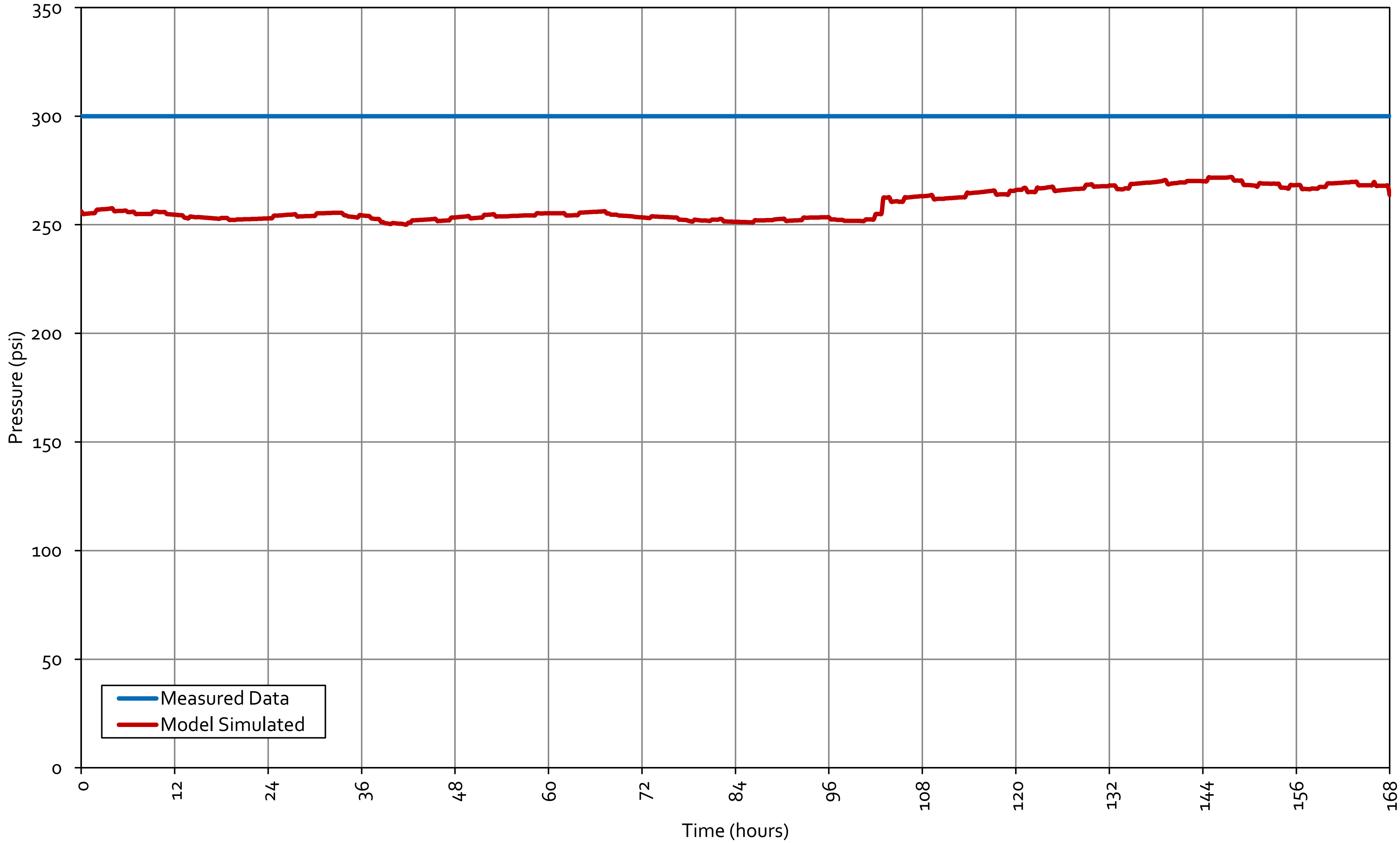
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - SUMMERLY WELL DISCHARGE



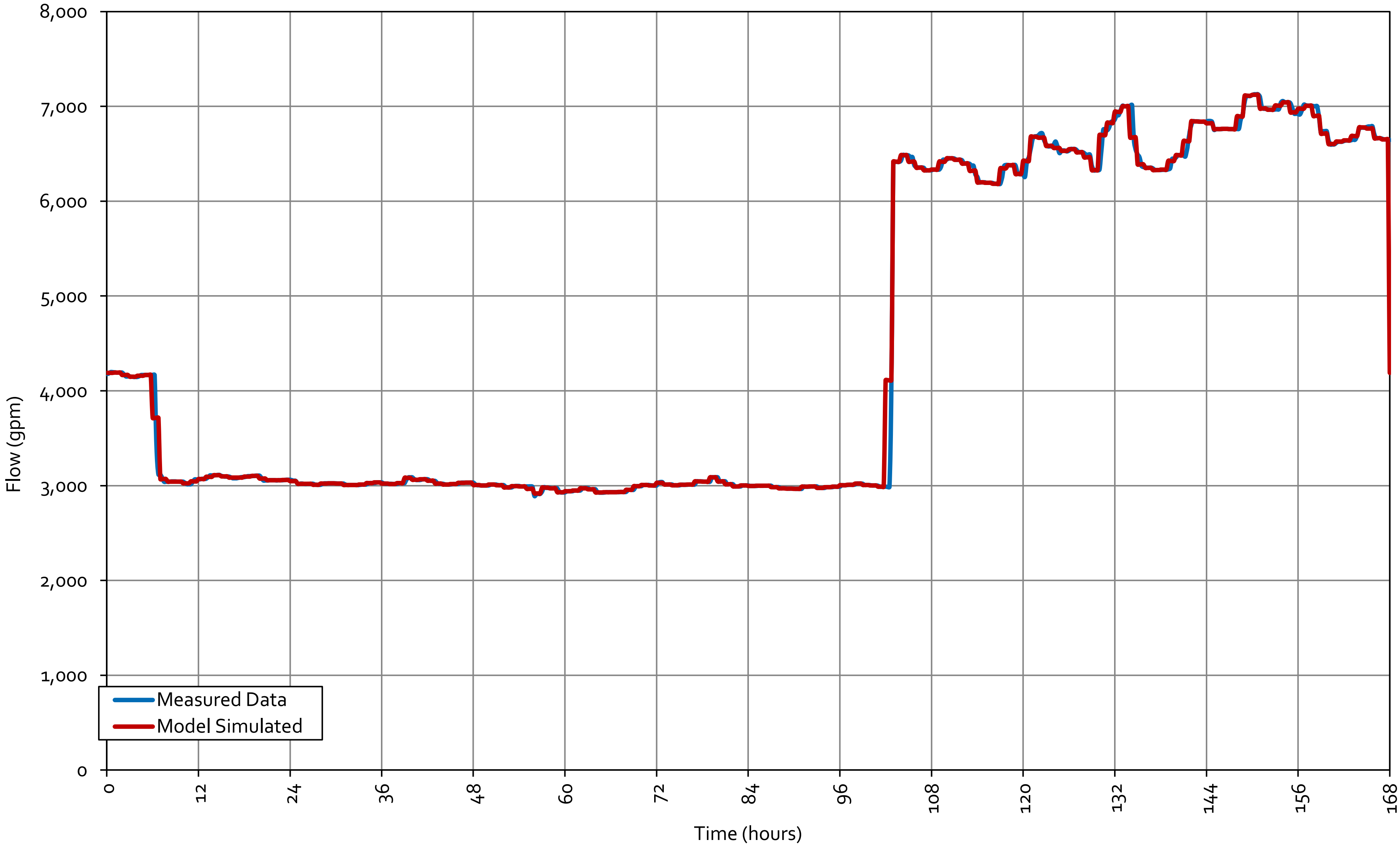
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - TVP CONNECTION DISCHARGE



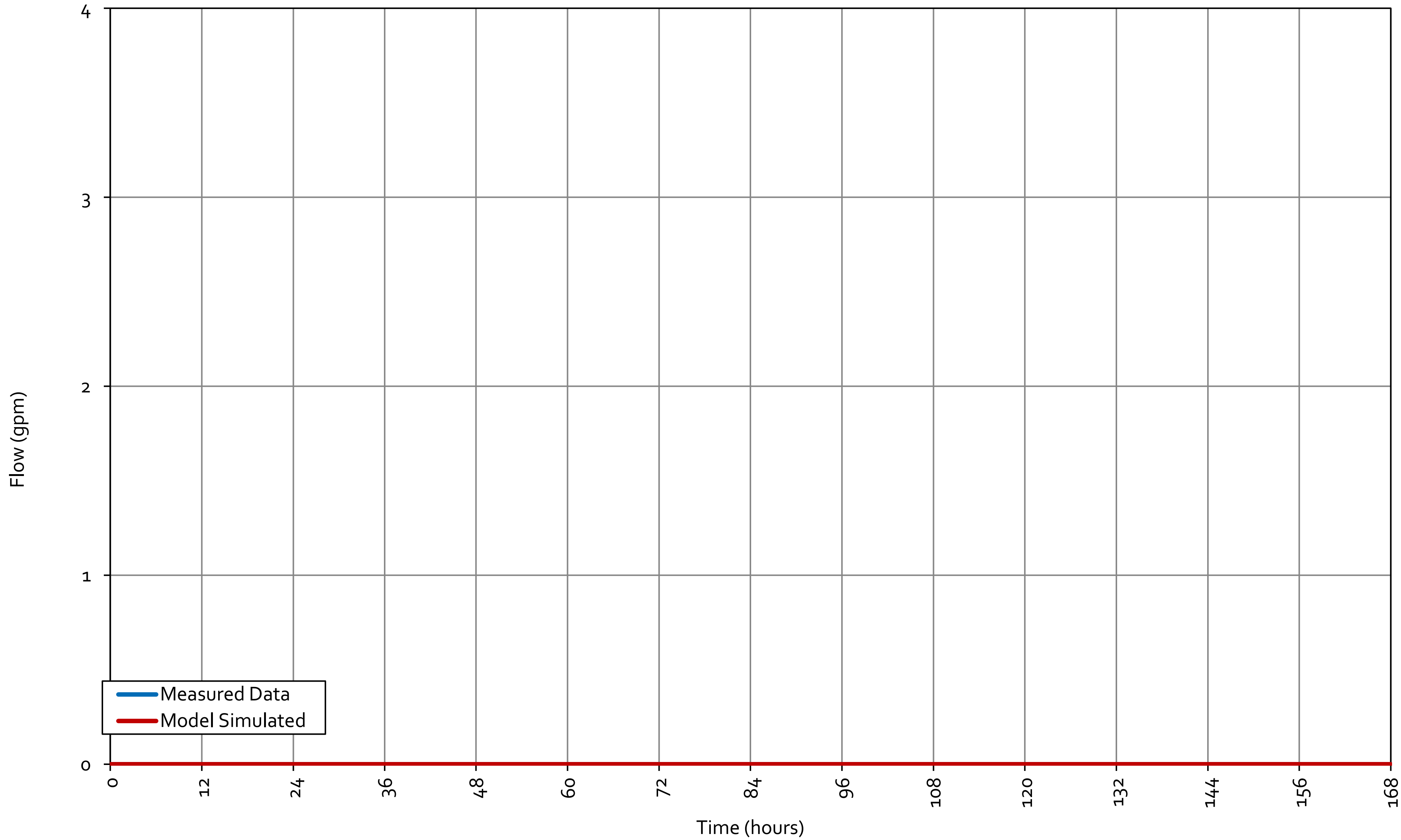
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - TVP CONNECTION



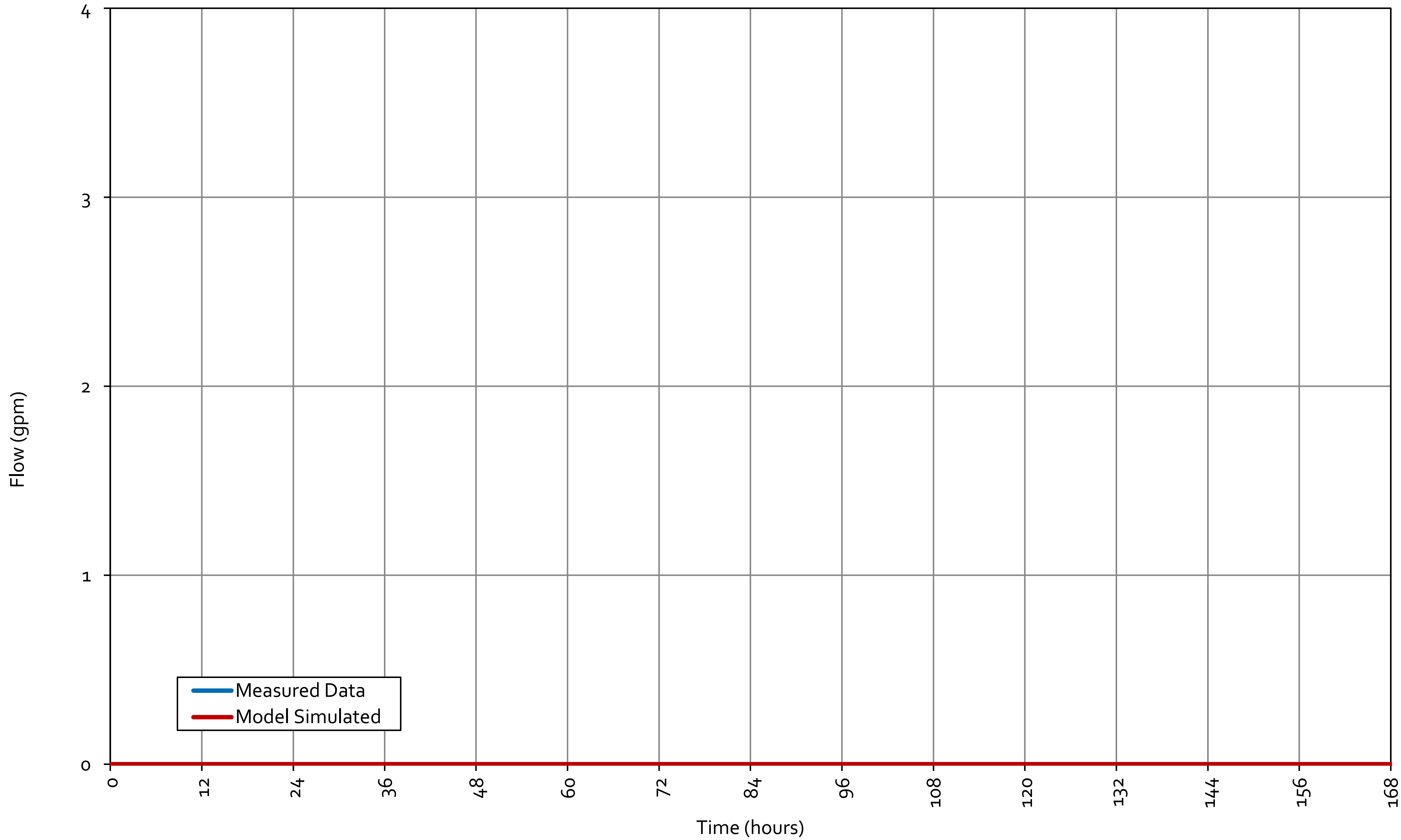
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - FLAGGER WELL 2A



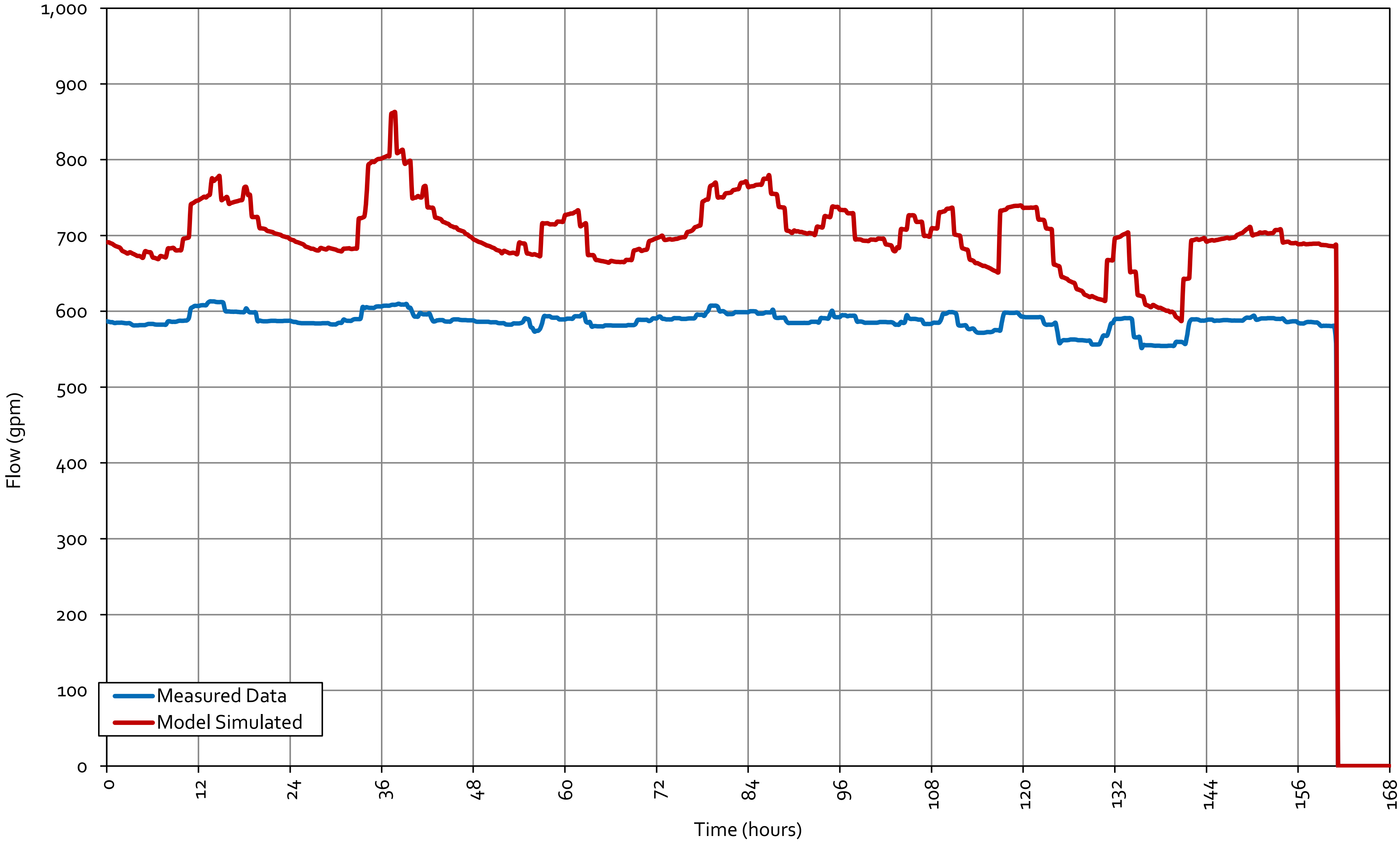
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - FLAGGER WELL 3A



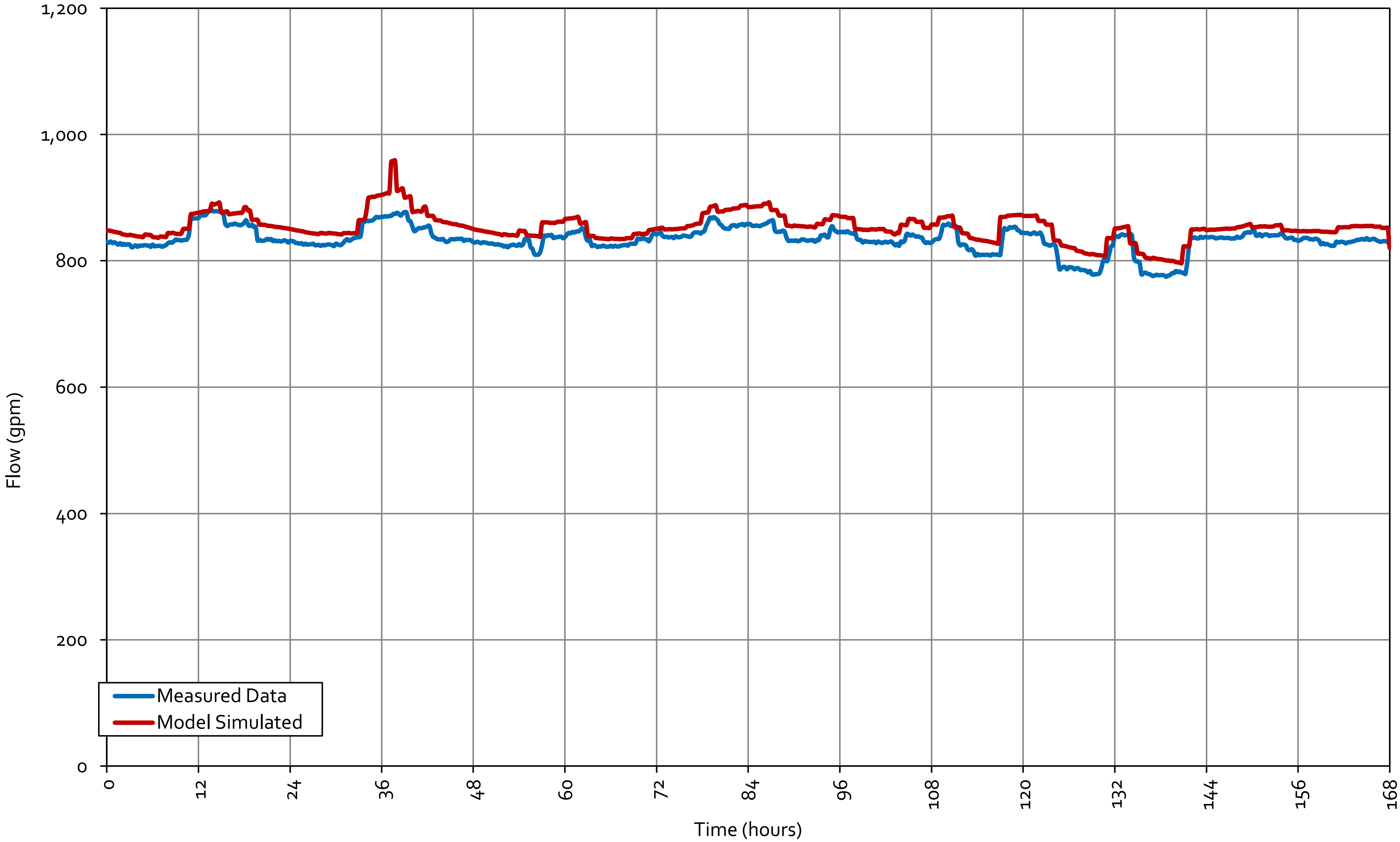
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - JOY WELL



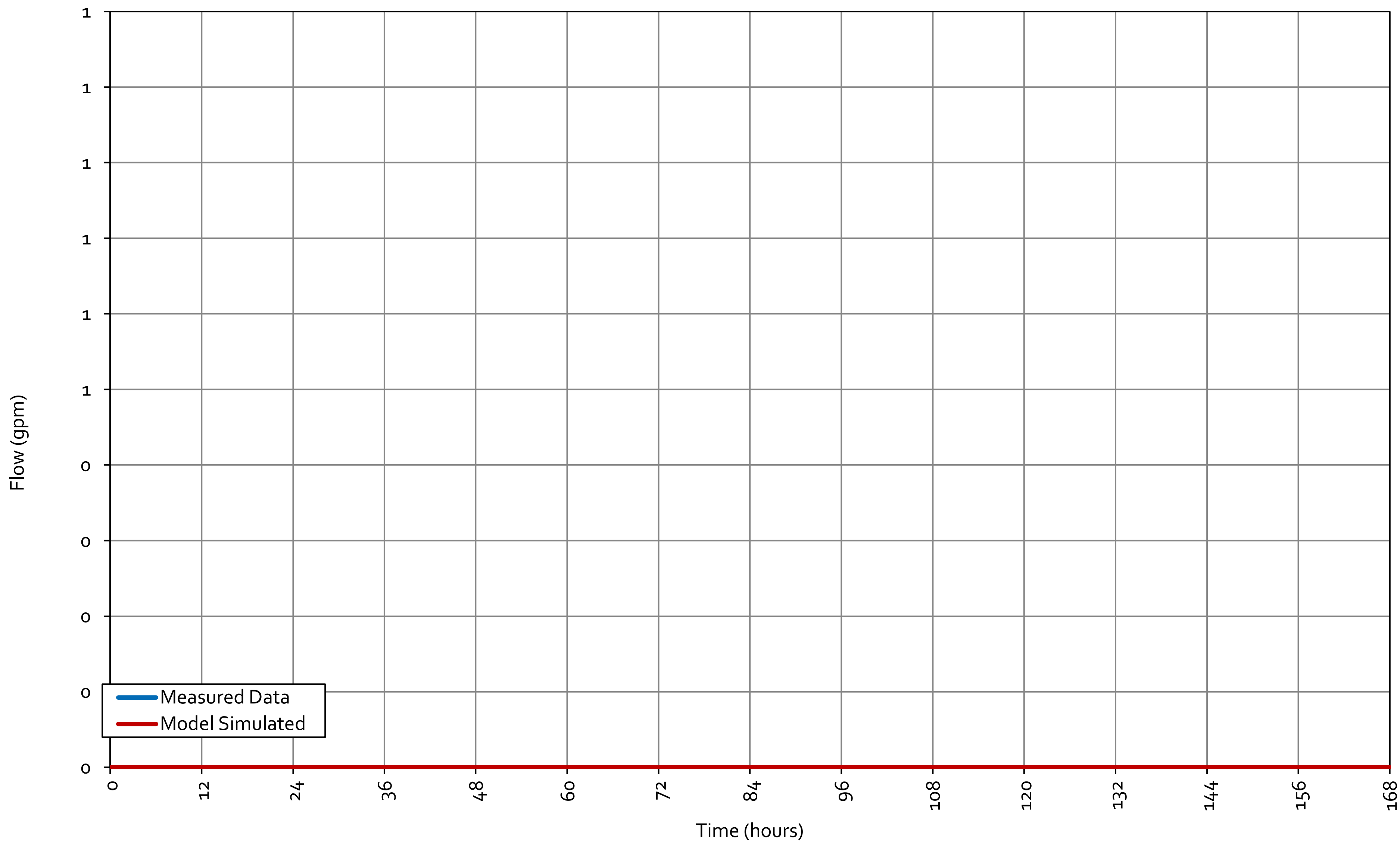
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - MACHADO WELL



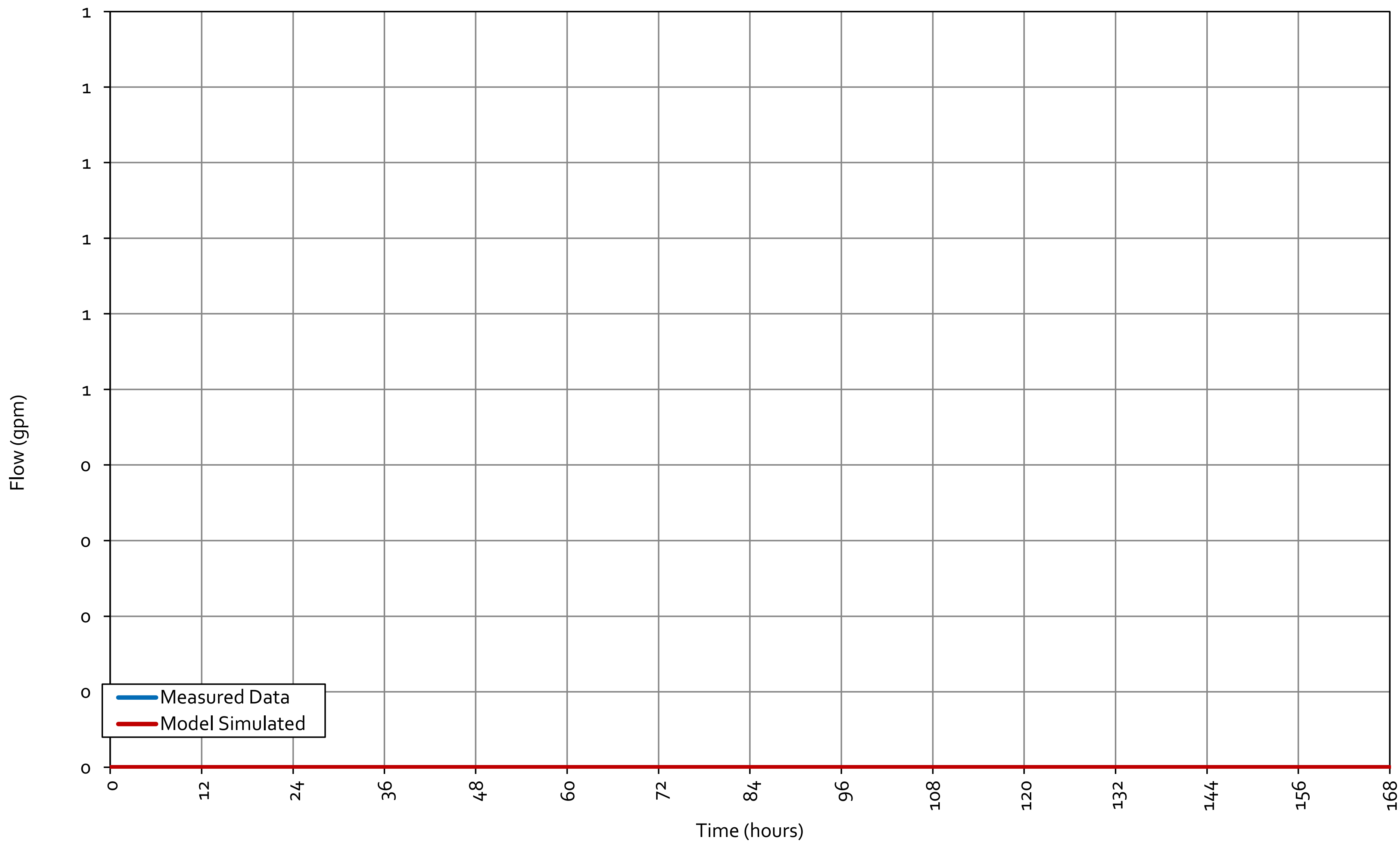
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - SUMMERLY WELL



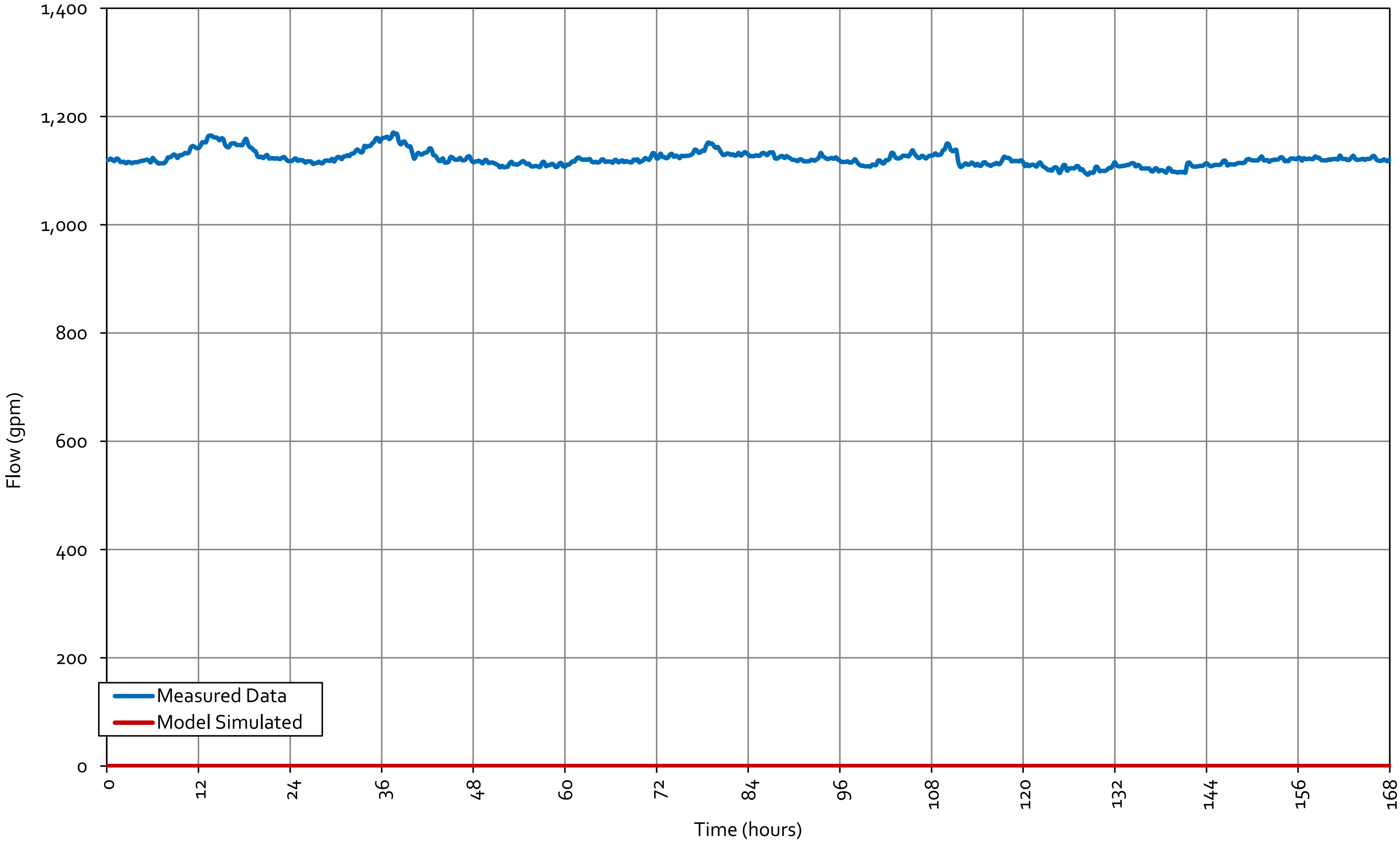
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - DIAMOND WELL



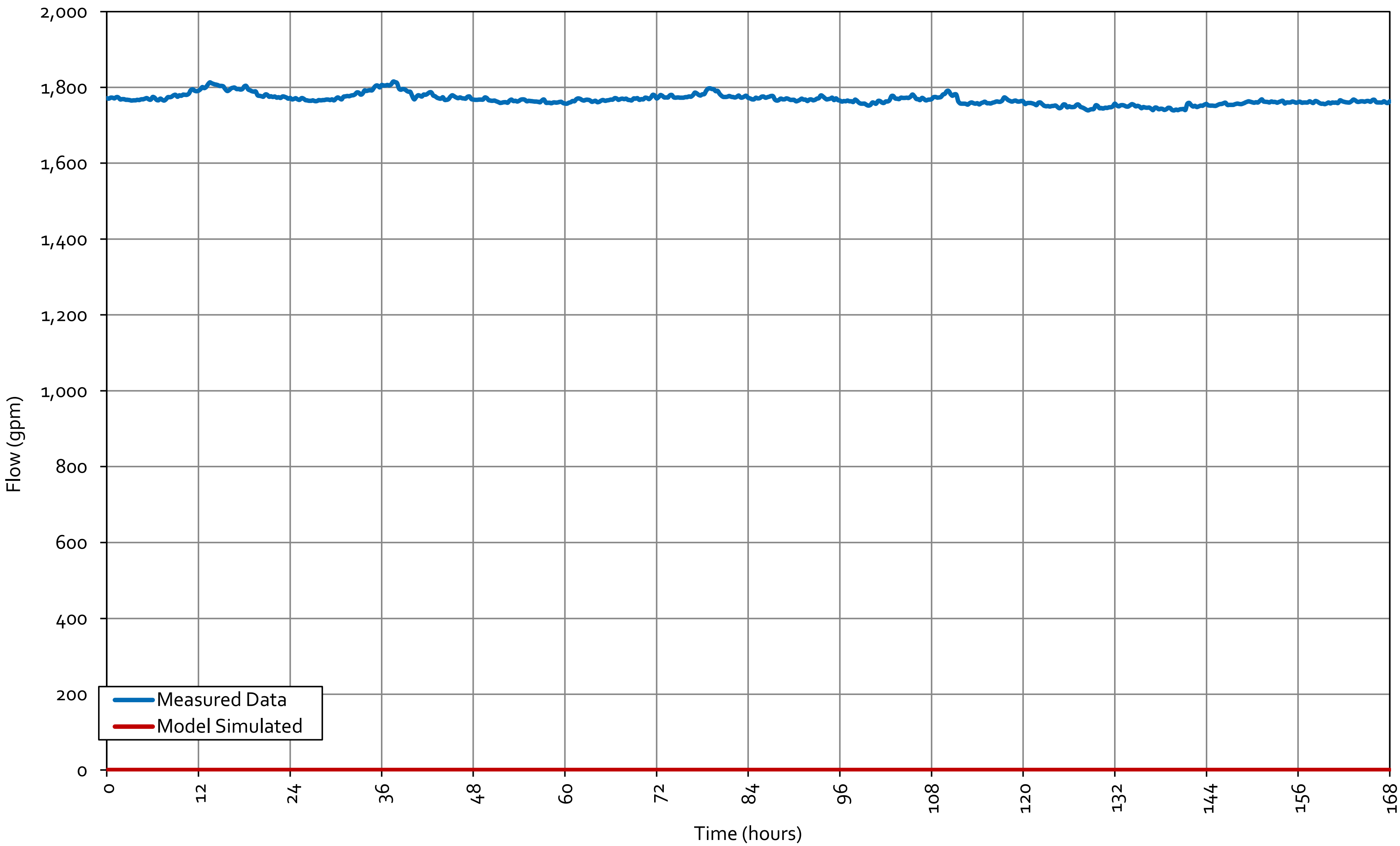
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL 3



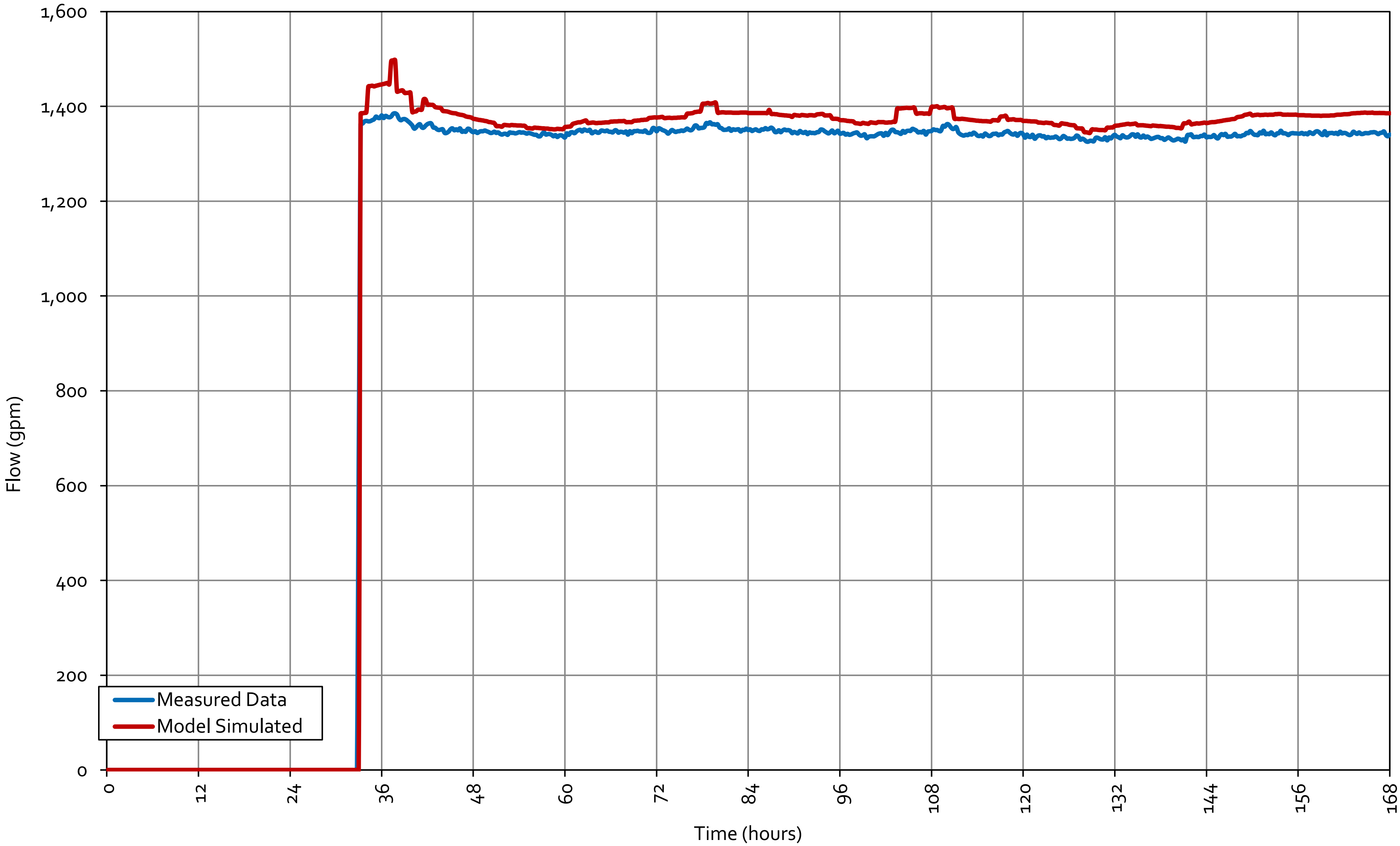
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL 4



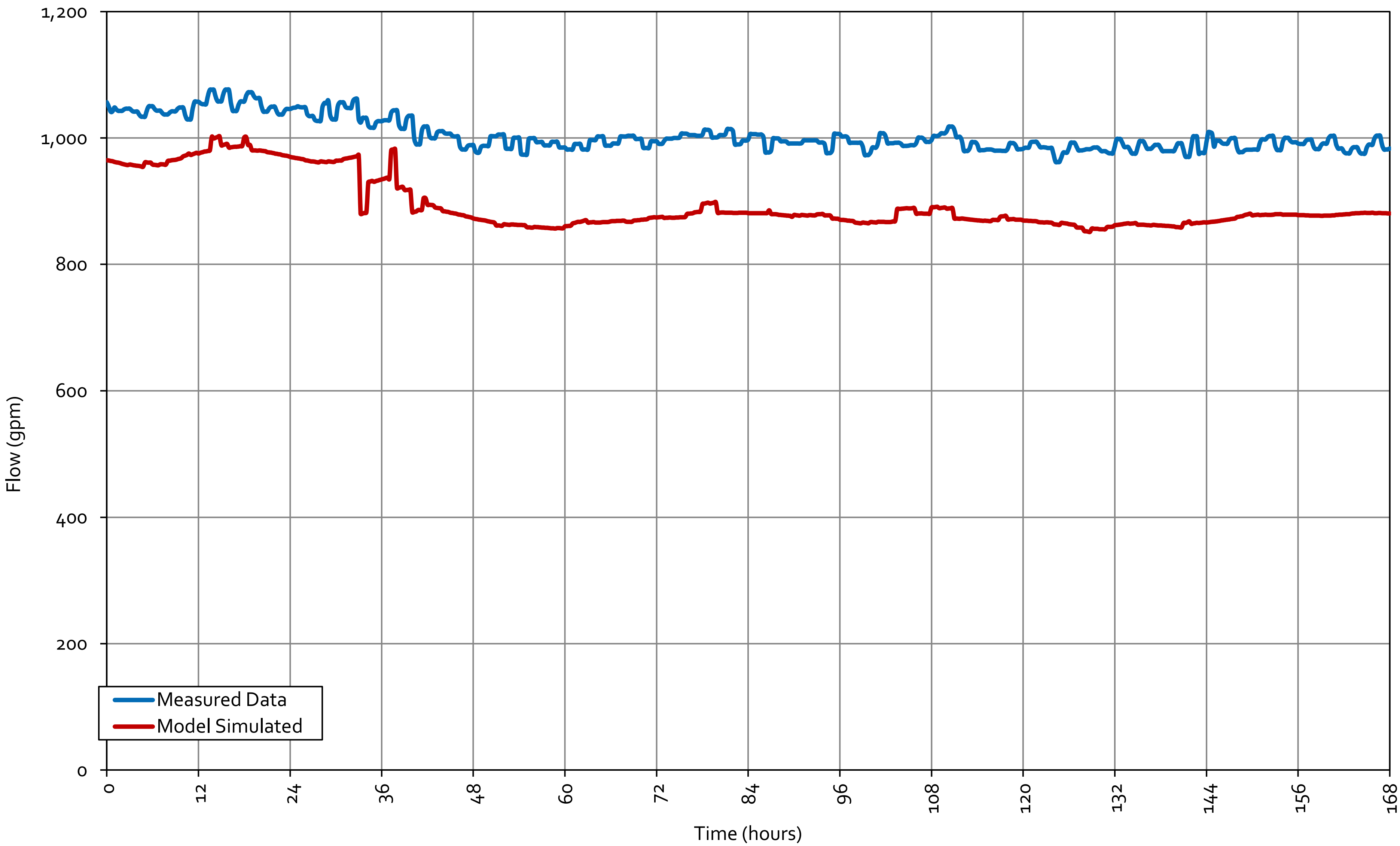
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CEREAL WELL 1



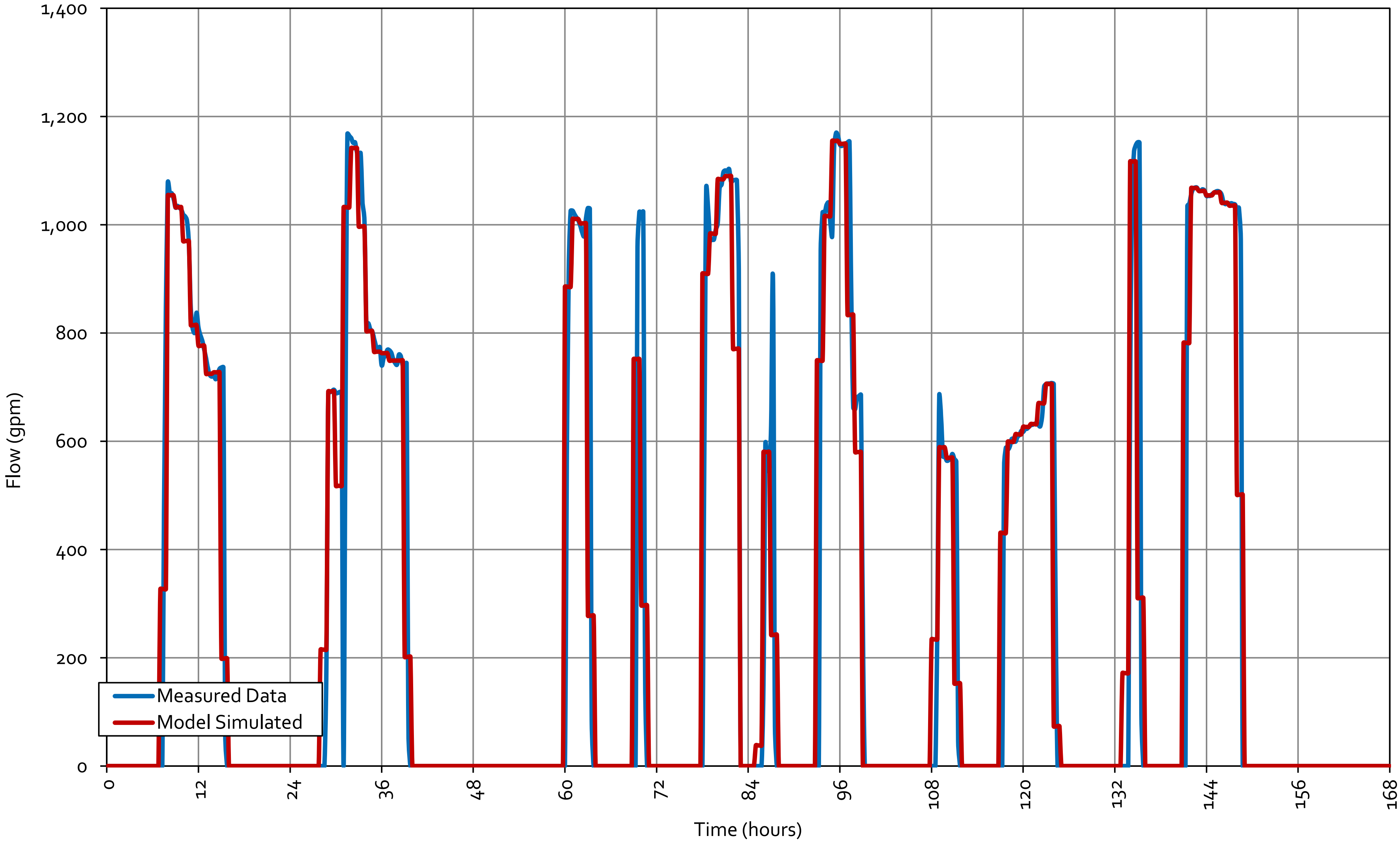
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CORYDON WELL



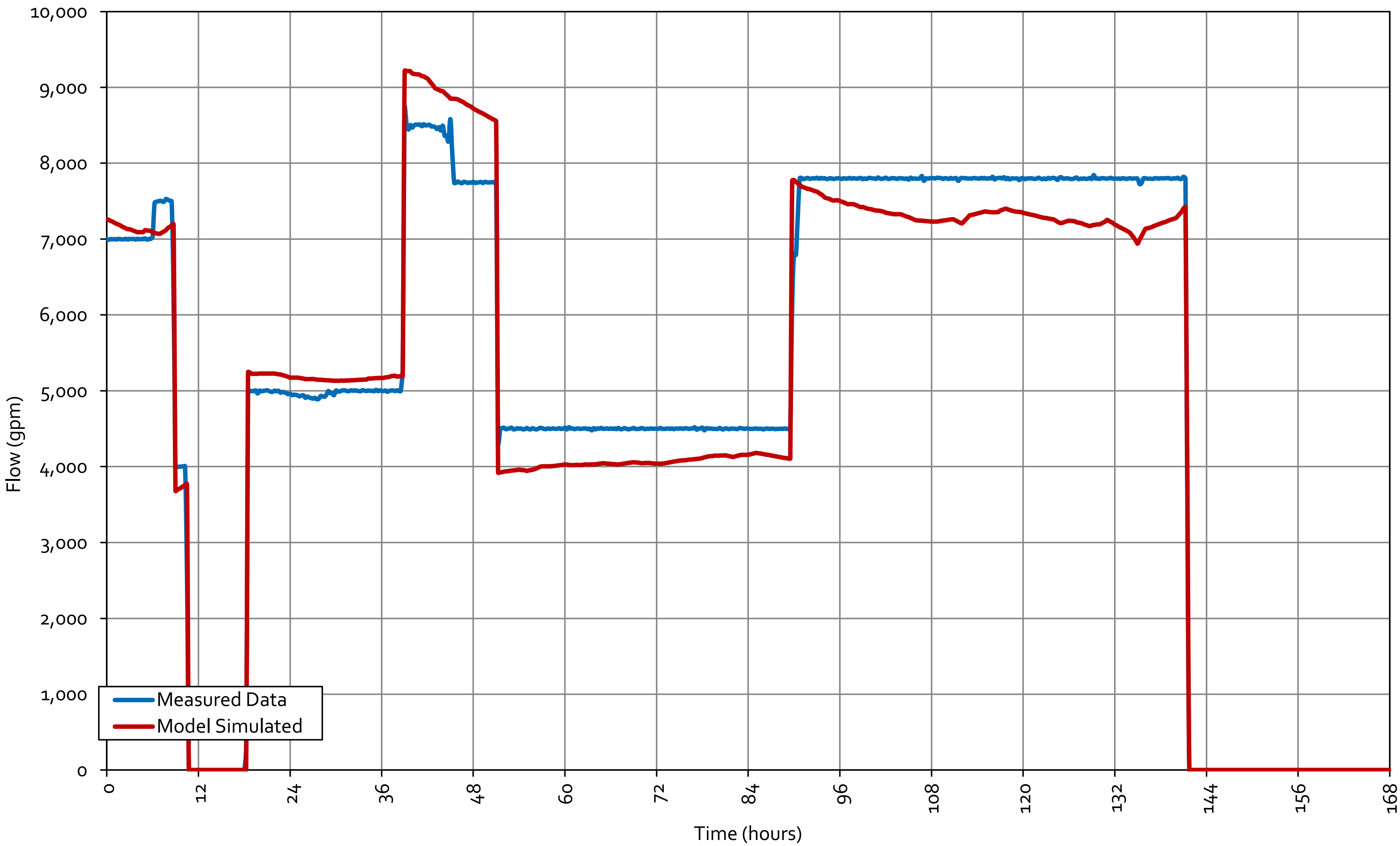
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - ADELFA BOOSTER



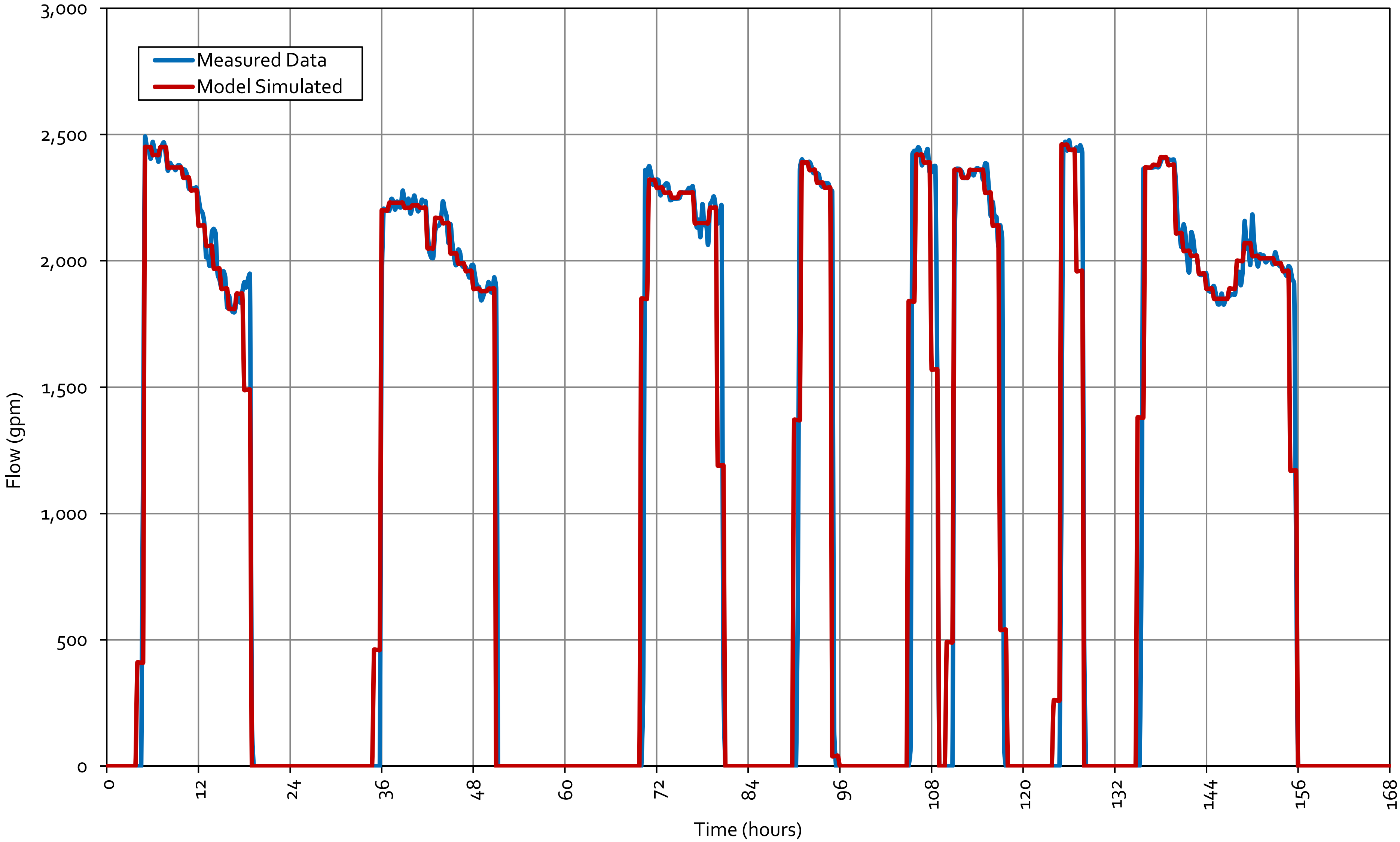
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - AULD VALLEY BOOSTER



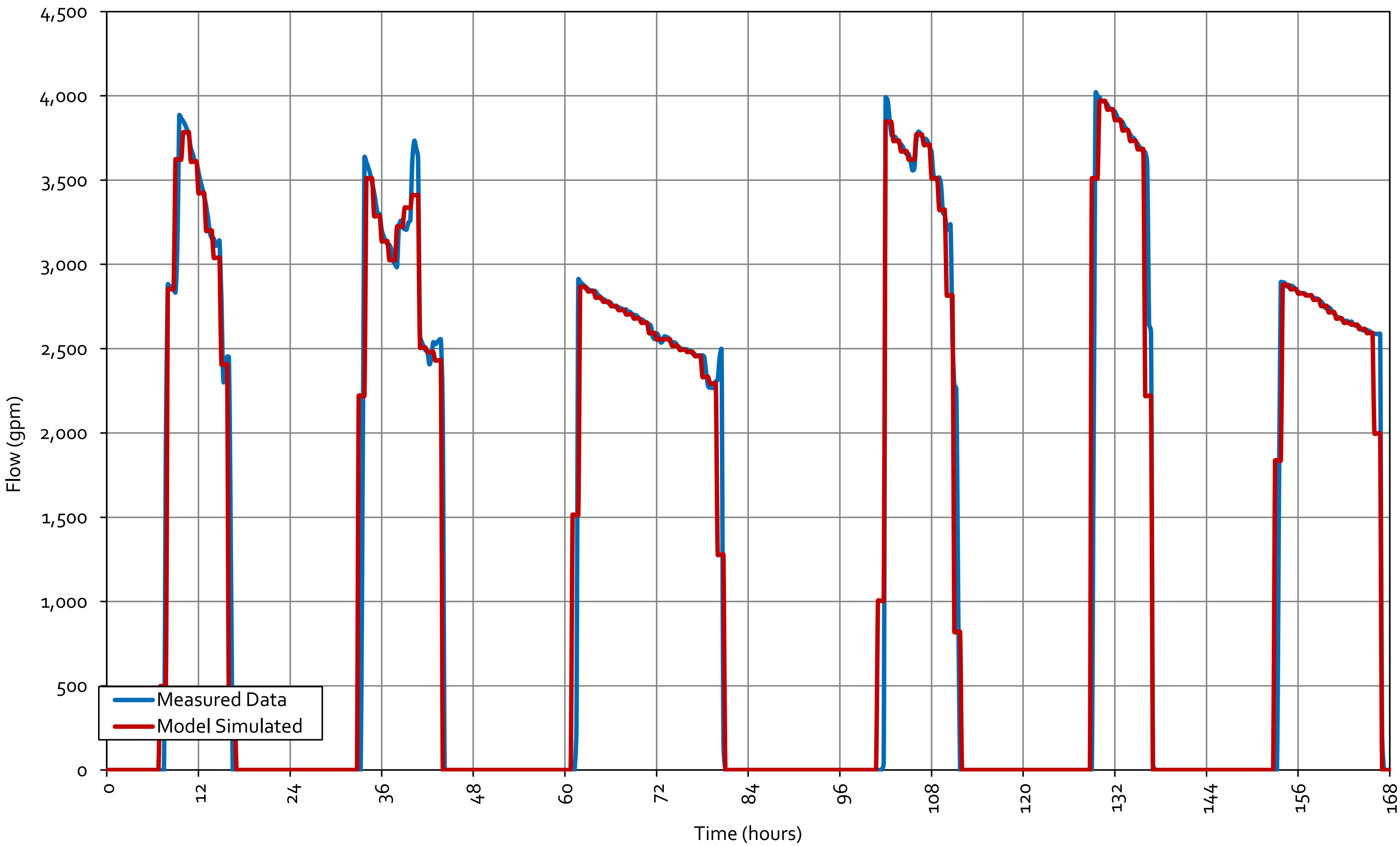
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - BUNDY CANYON BOOSTER



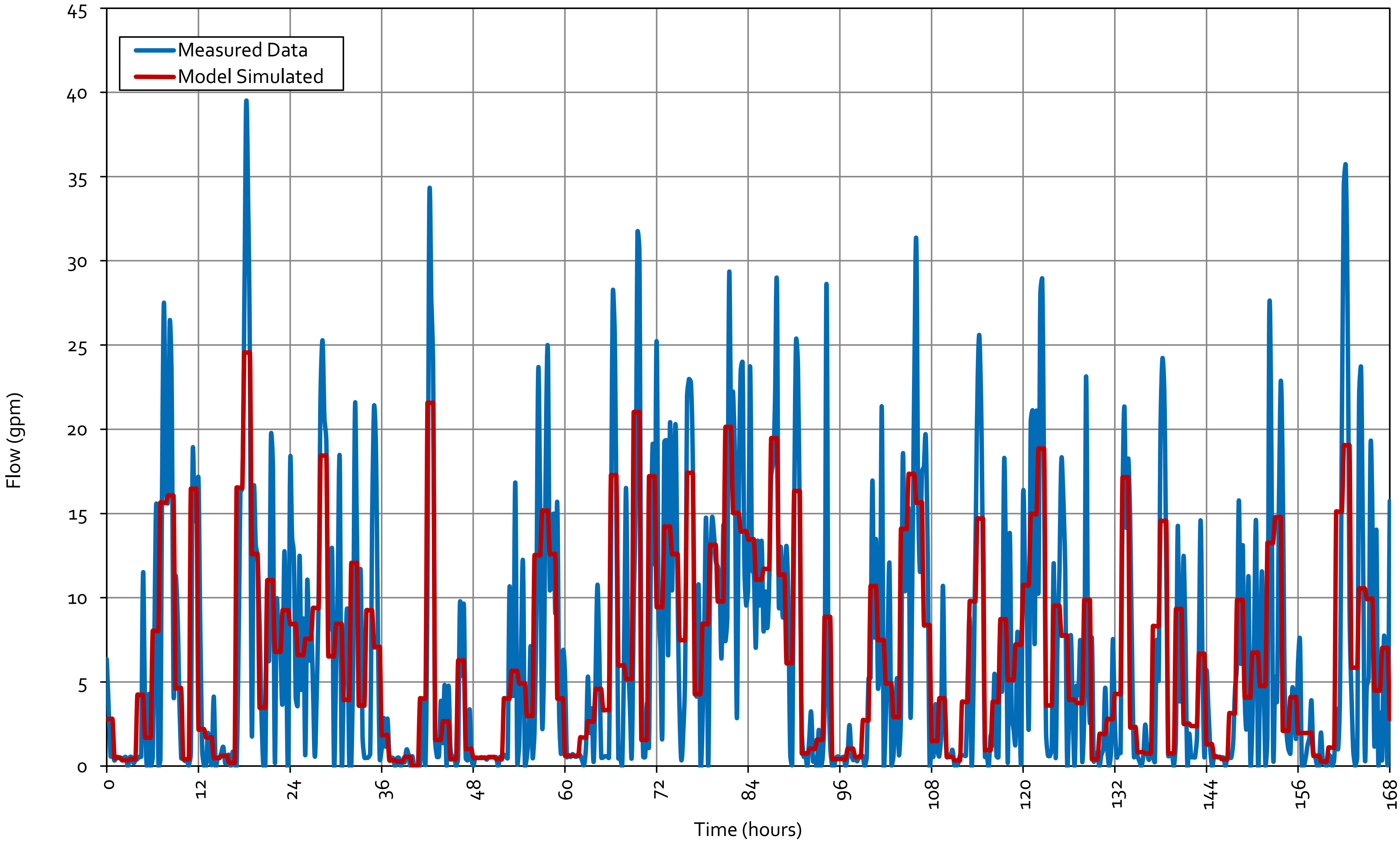
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CANYON LAKE BOOSTER



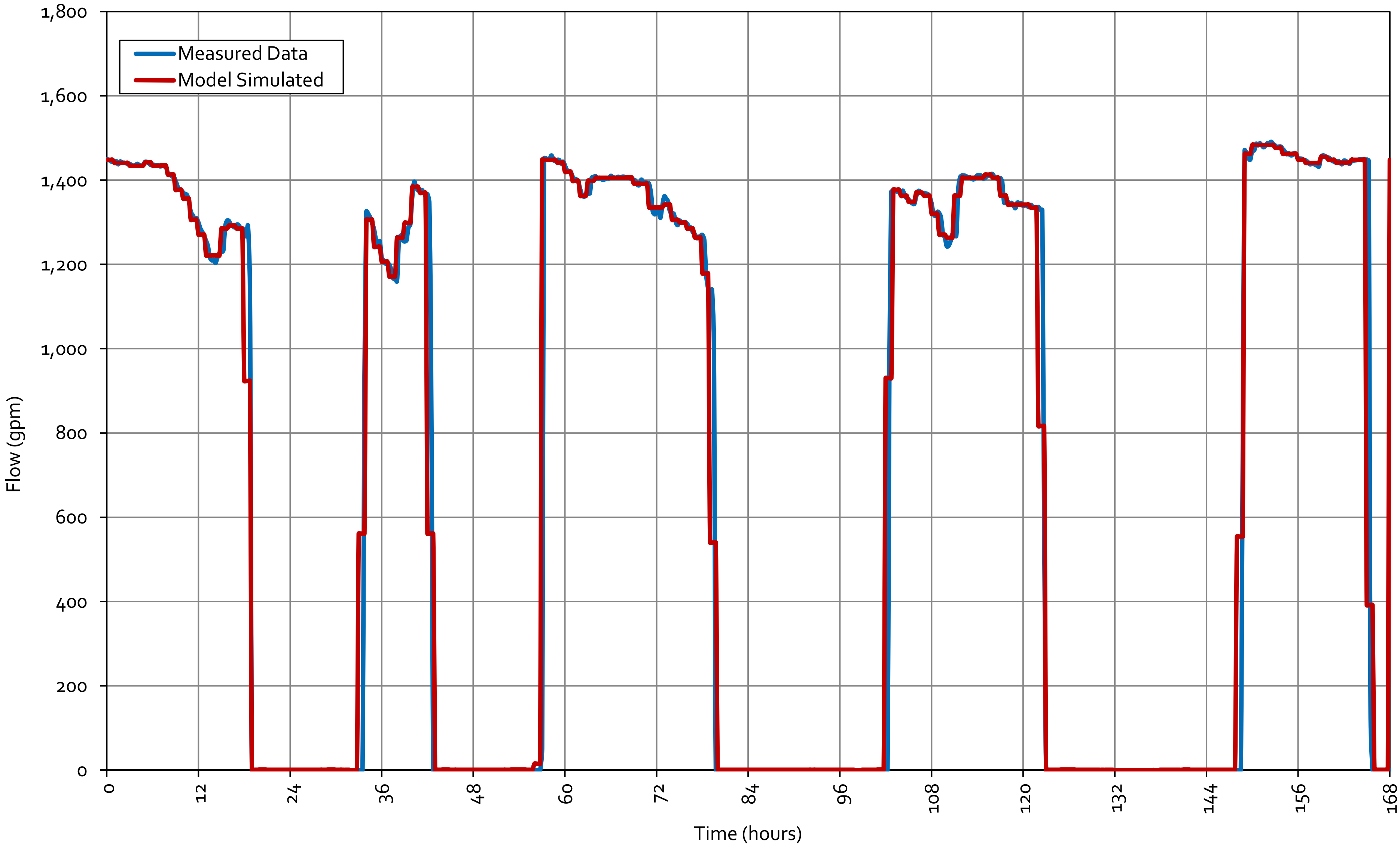
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CIELO VISTA BOOSTER



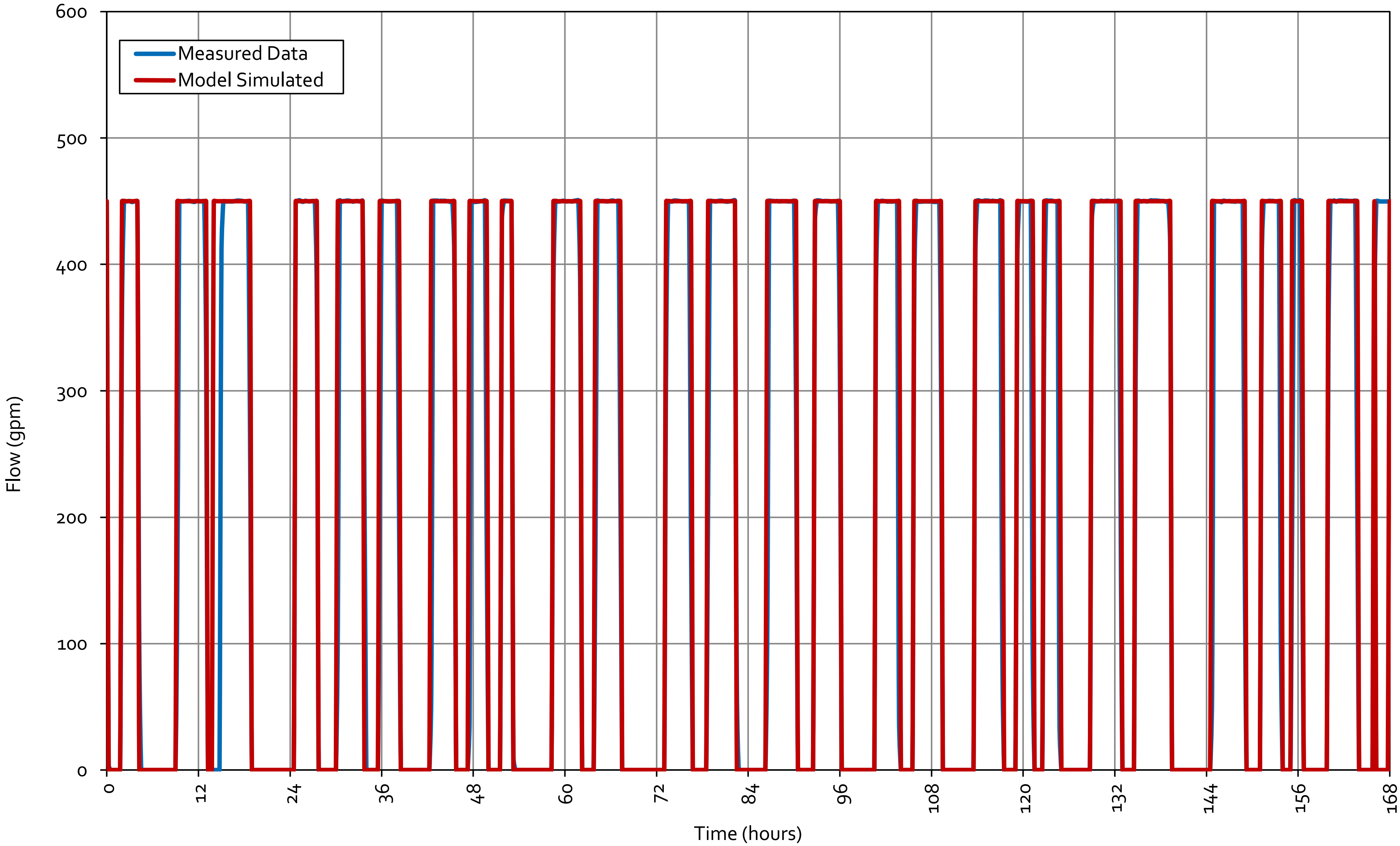
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CITY BOOSTER



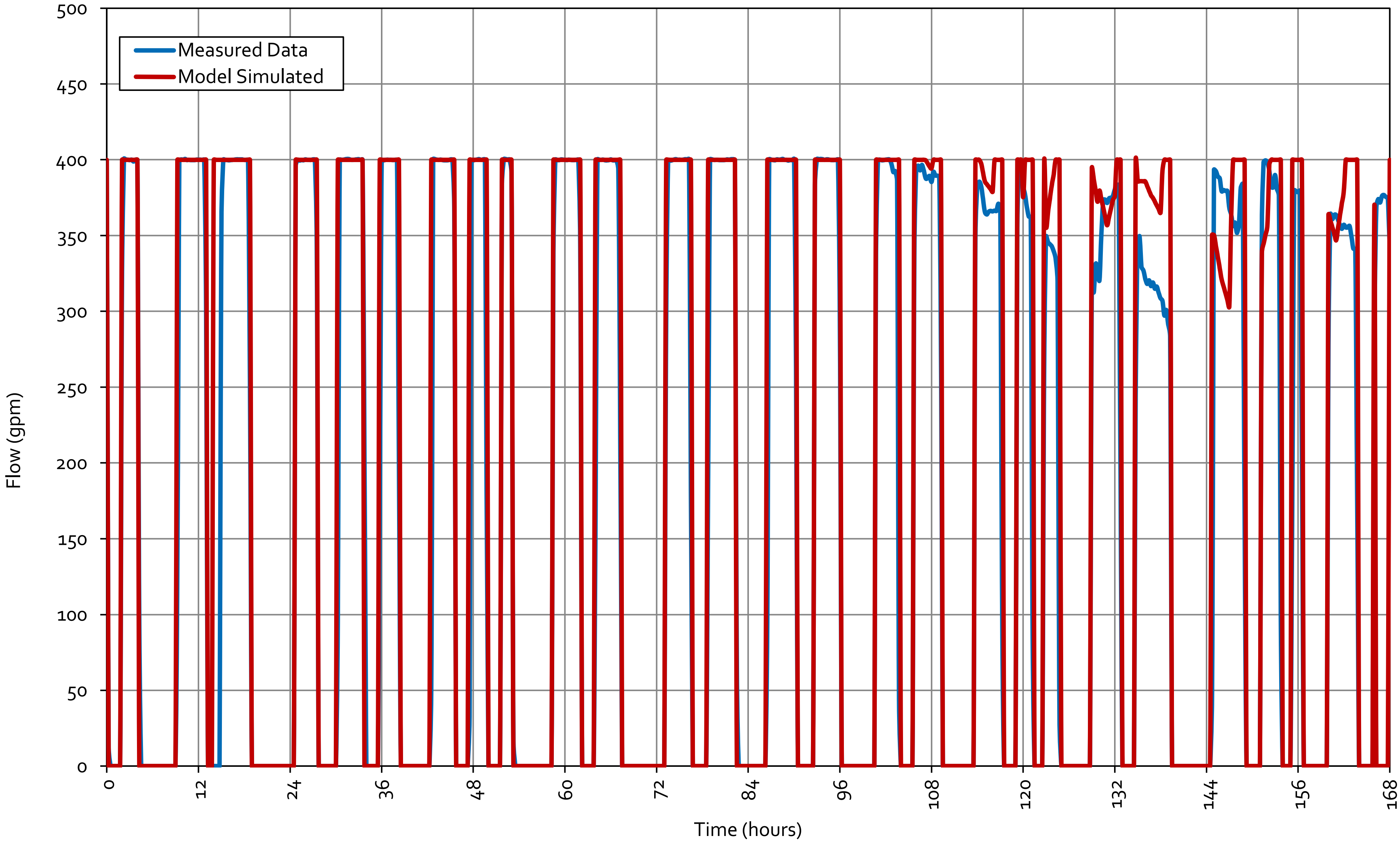
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - COLDWATER BOOSTER 1



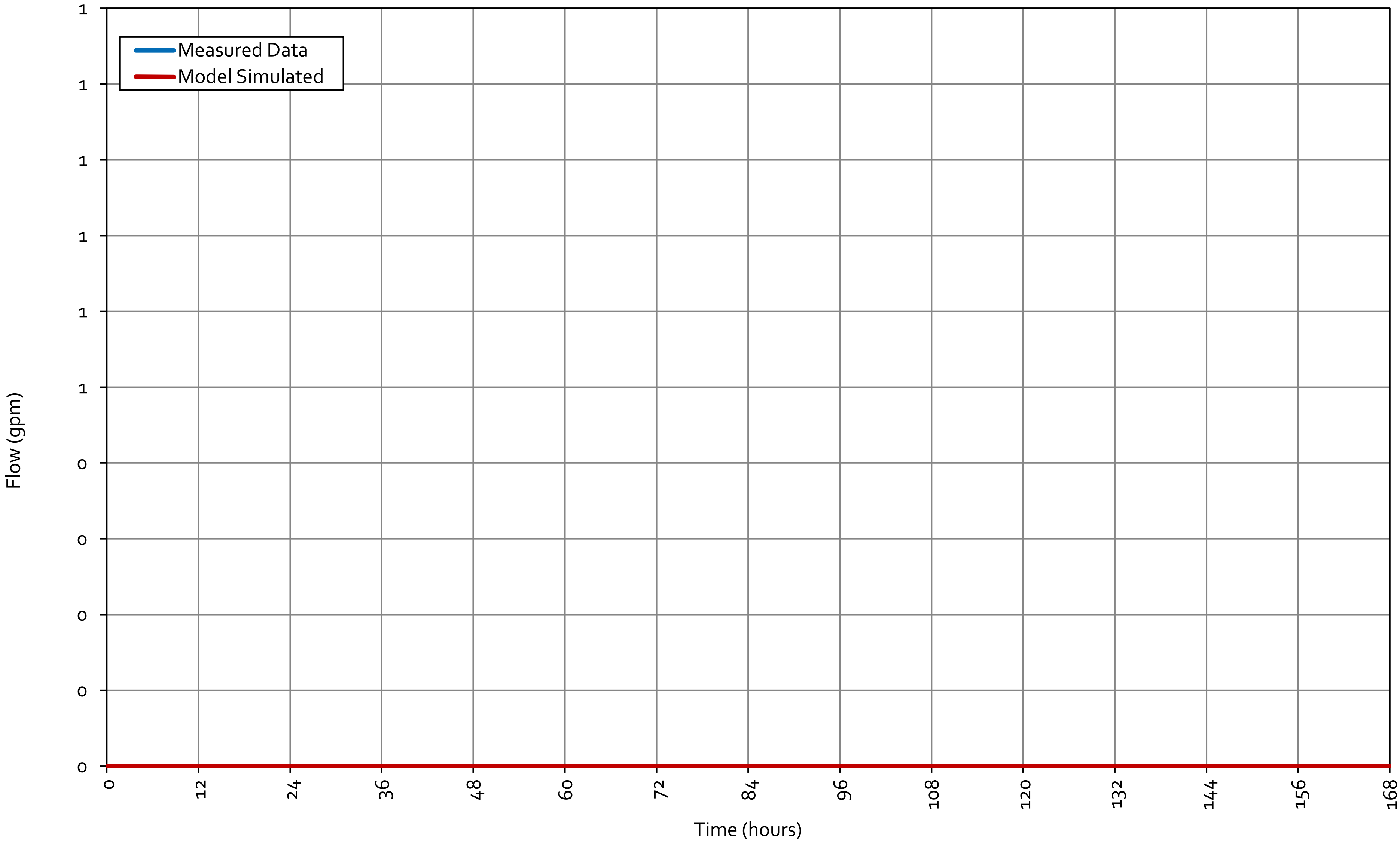
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - COLDWATER BOOSTER 2



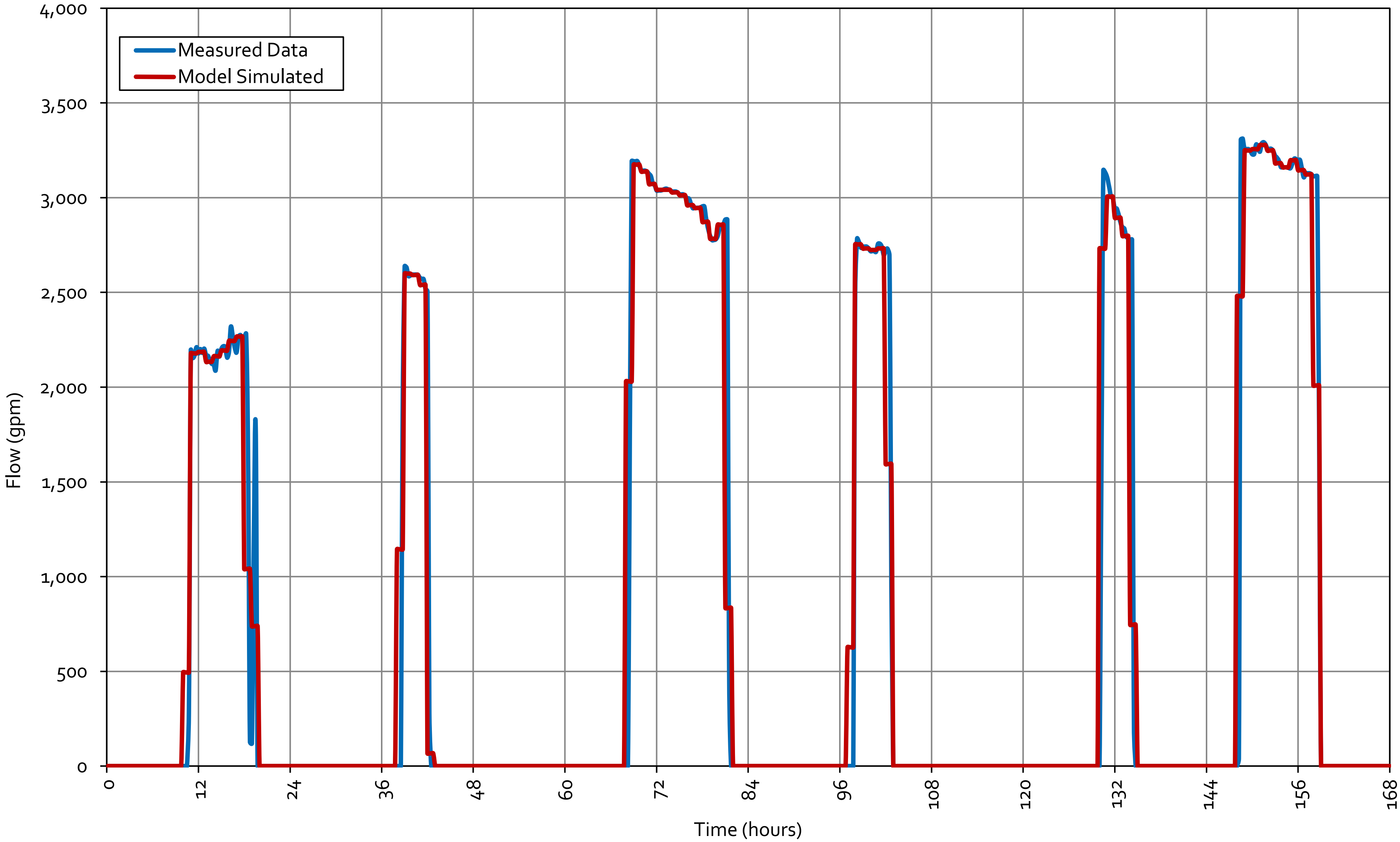
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - GRAND AVENUE BOOSTER



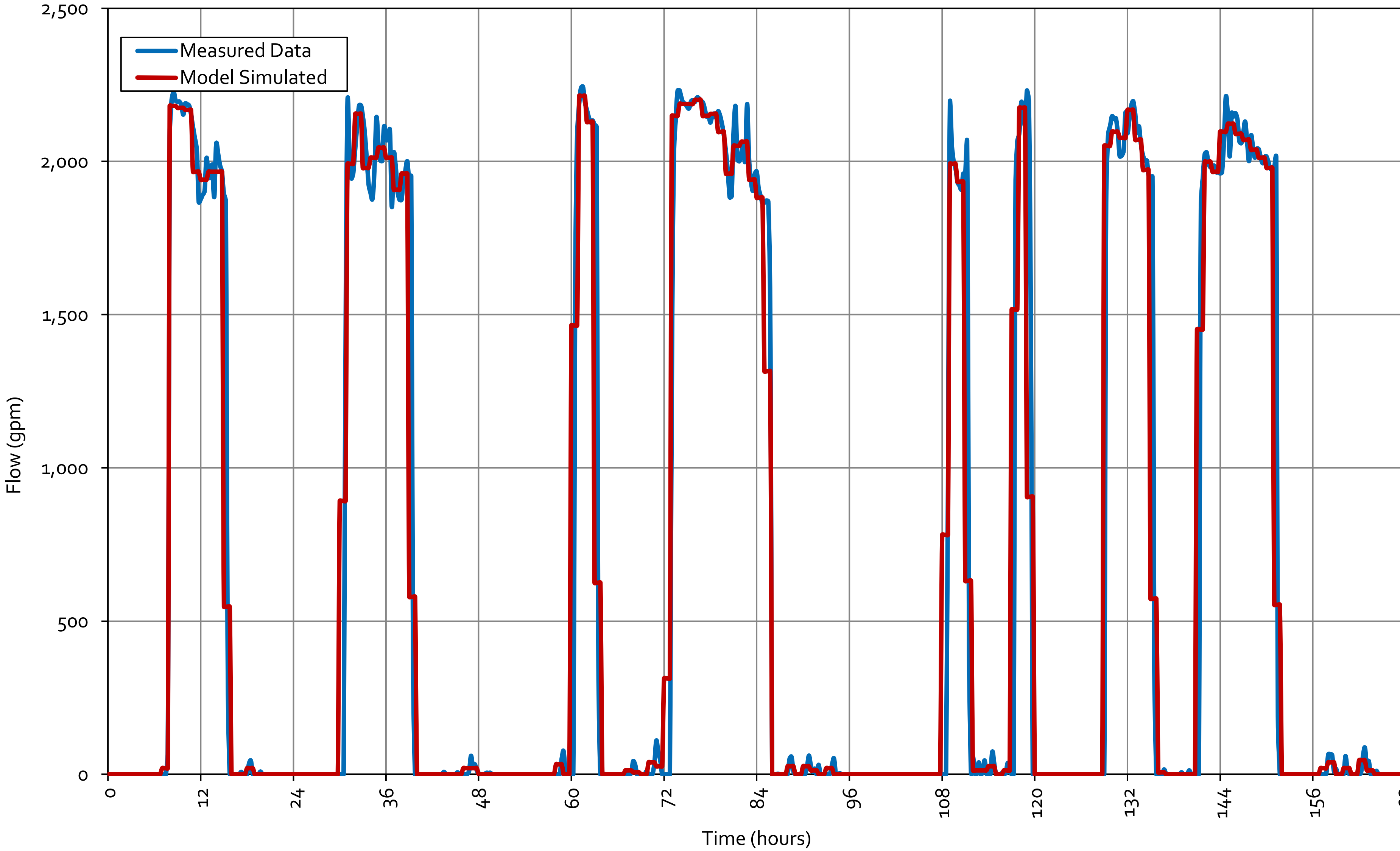
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - HORSETHIEF BOOSTER 1



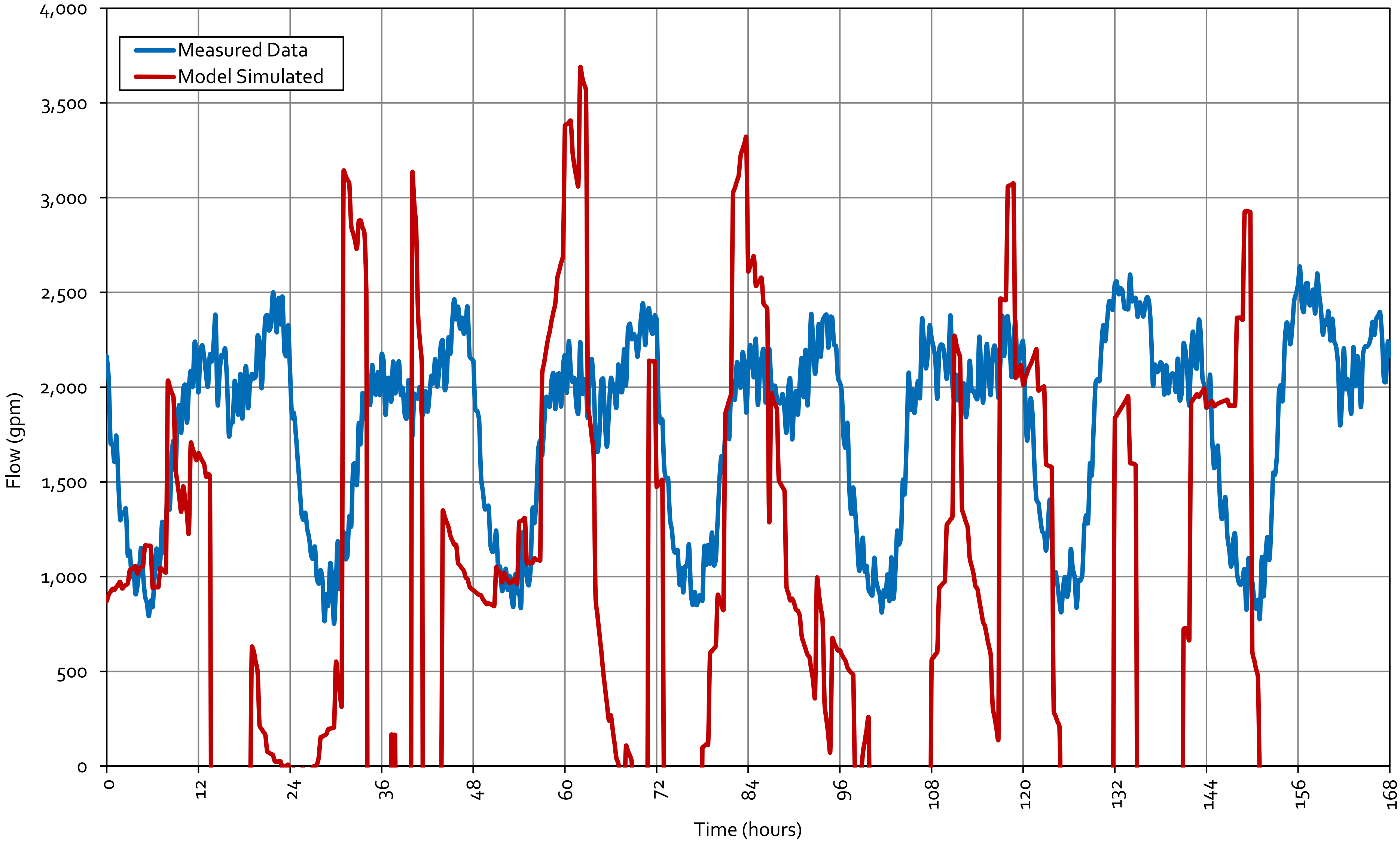
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - INLAND VALLEY BOOSTER



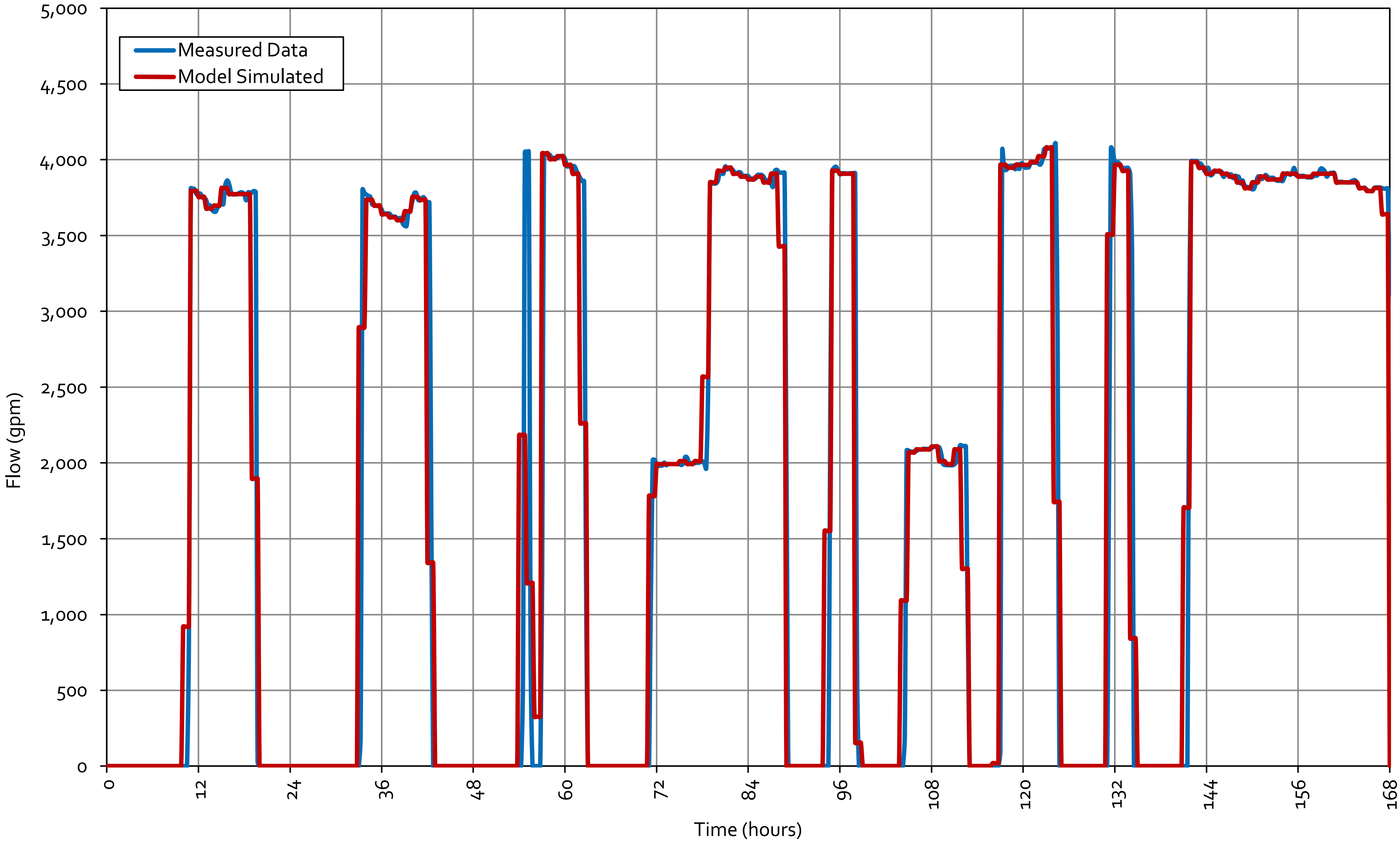
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LAKESHORE BOOSTER 1



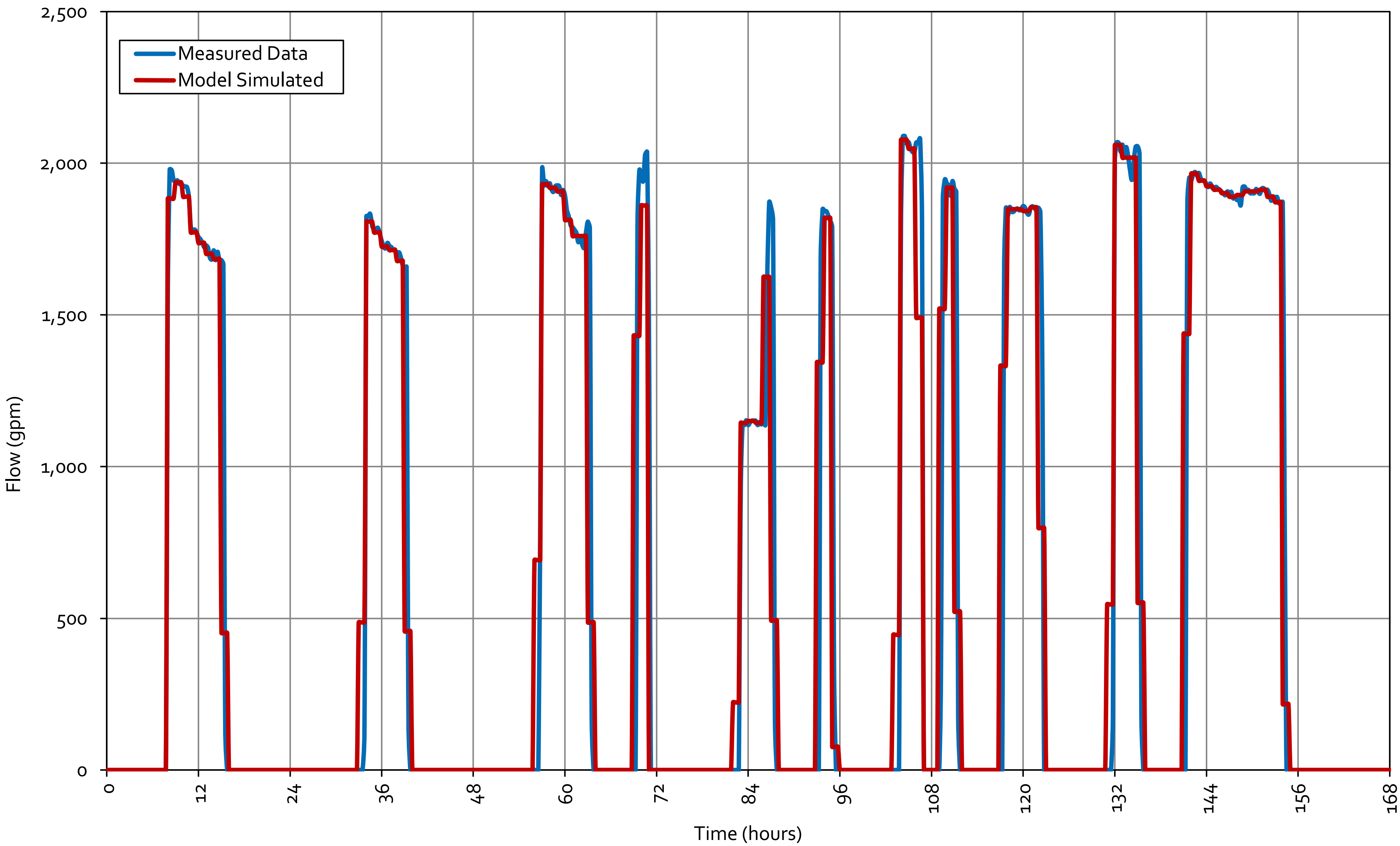
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - LUCERNE BOOSTER



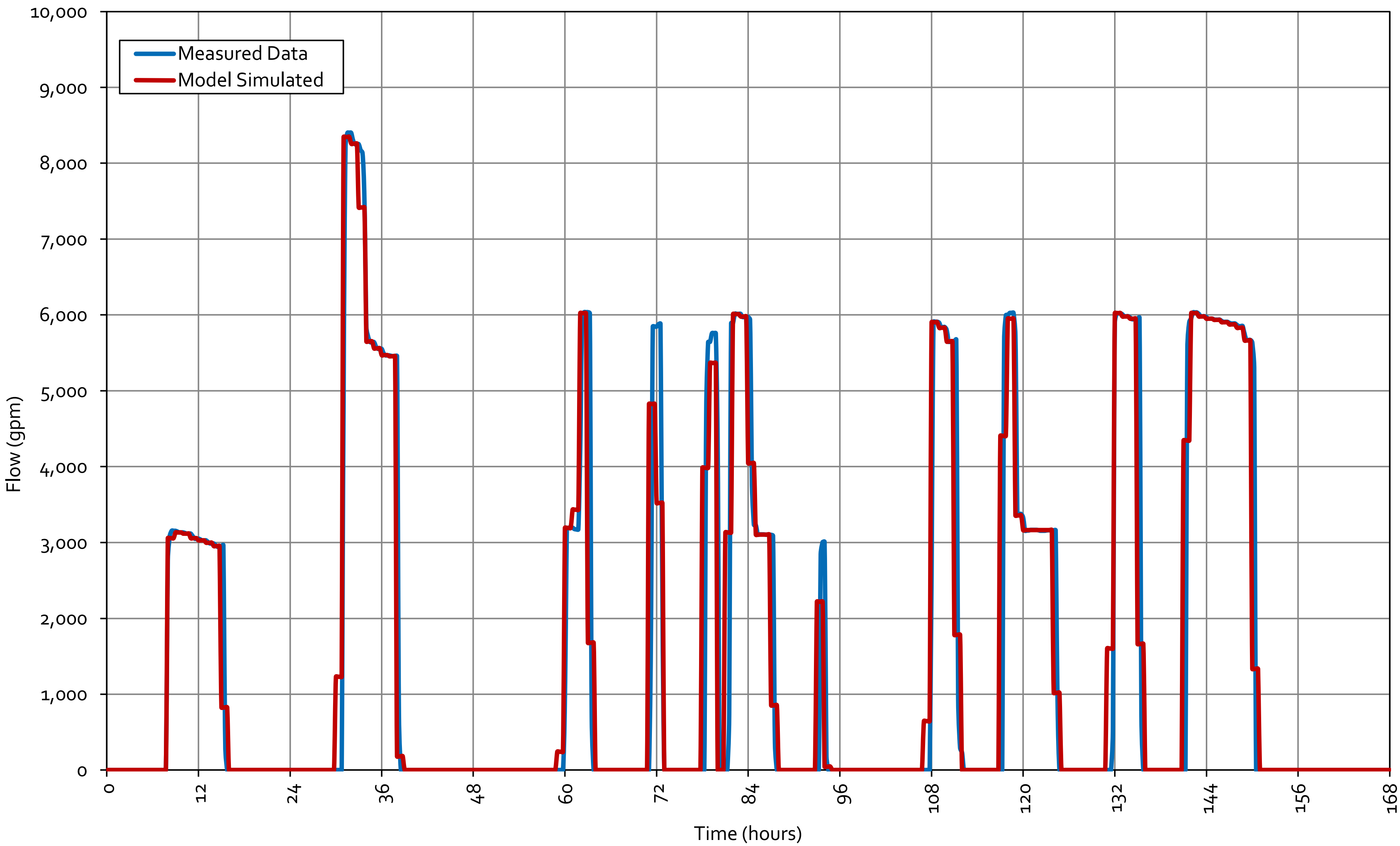
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - ORTEGA BOOSTER



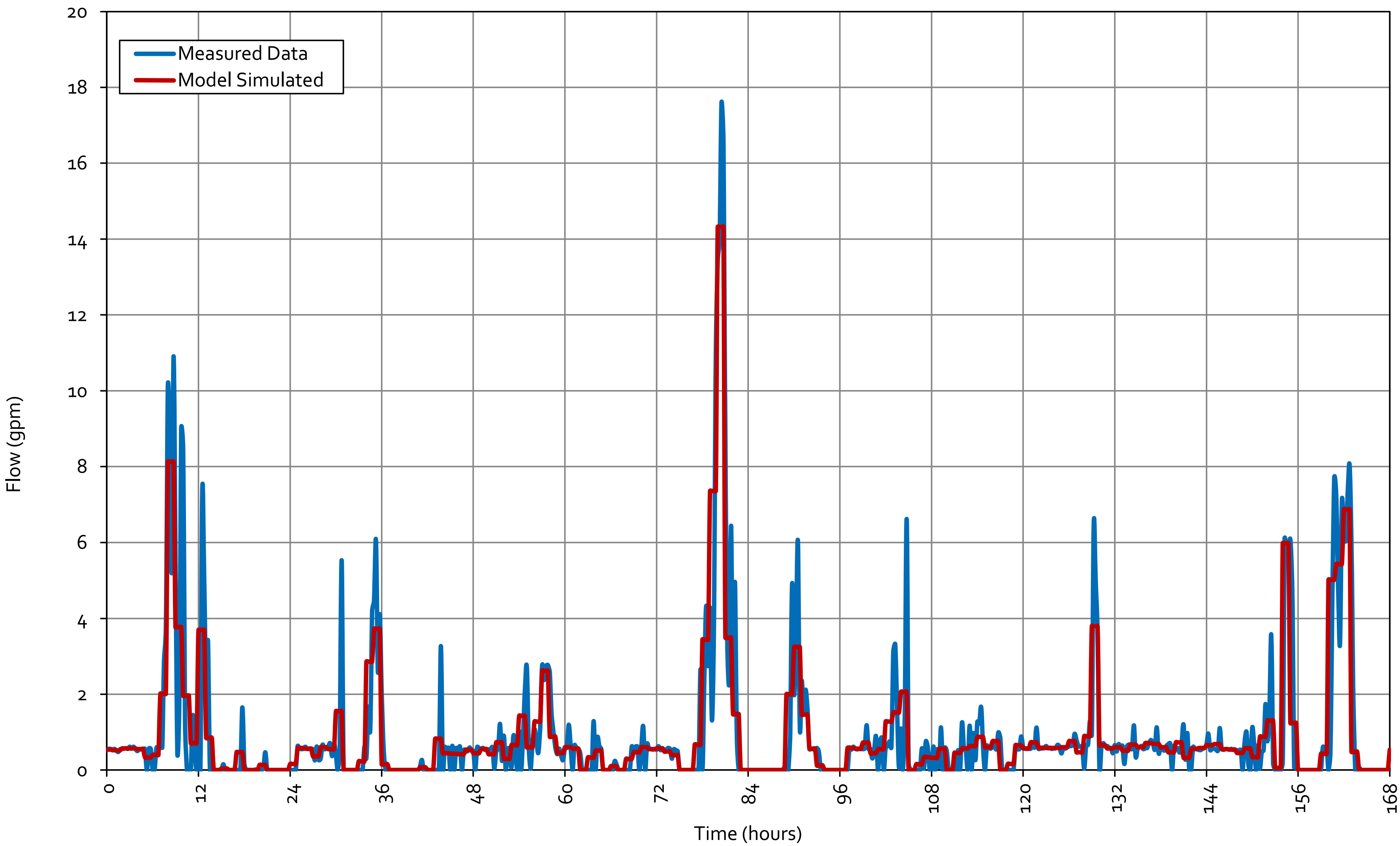
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - ROSETTA CANYON BOOSTER 1



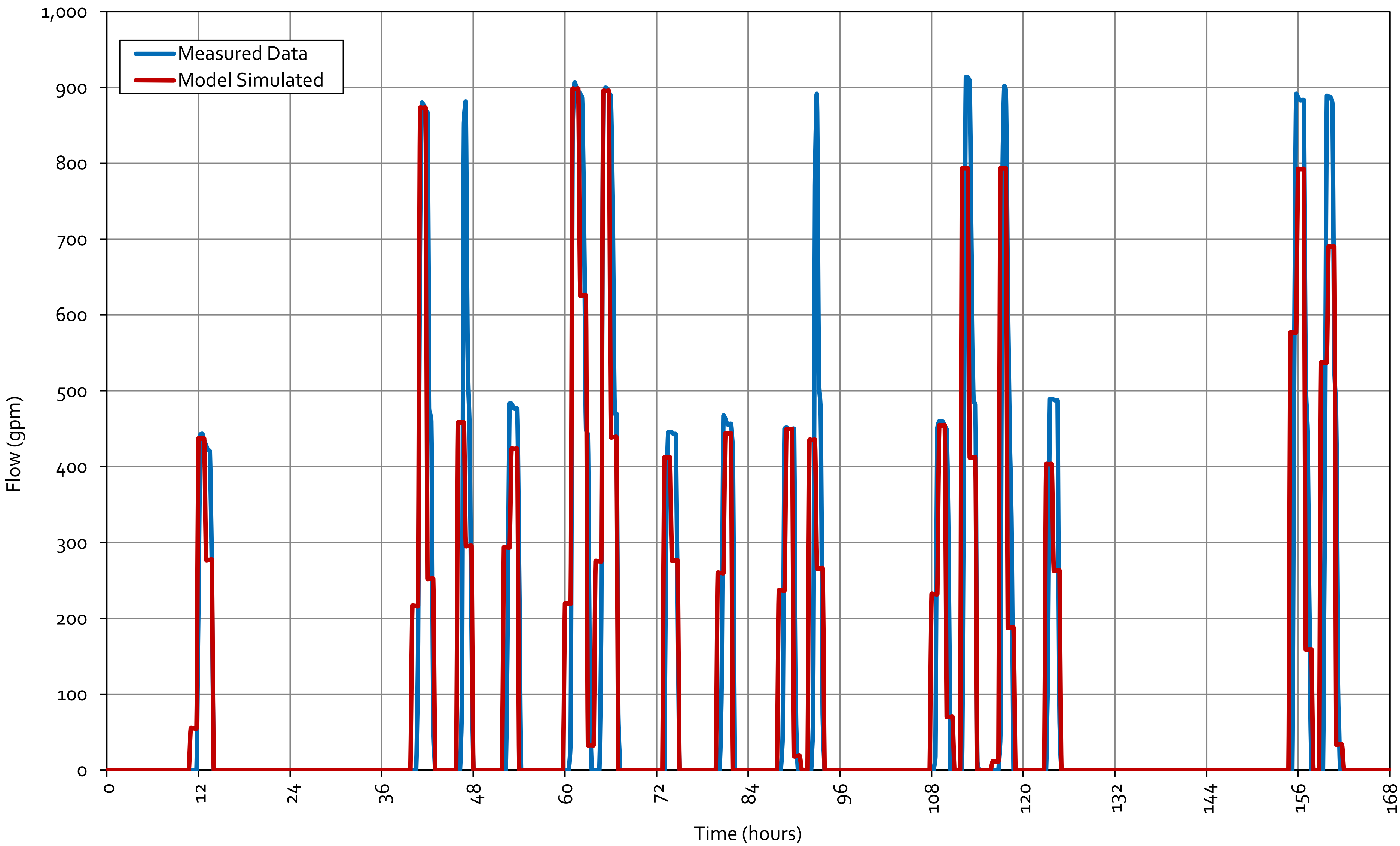
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - SKYLARK BOOSTER



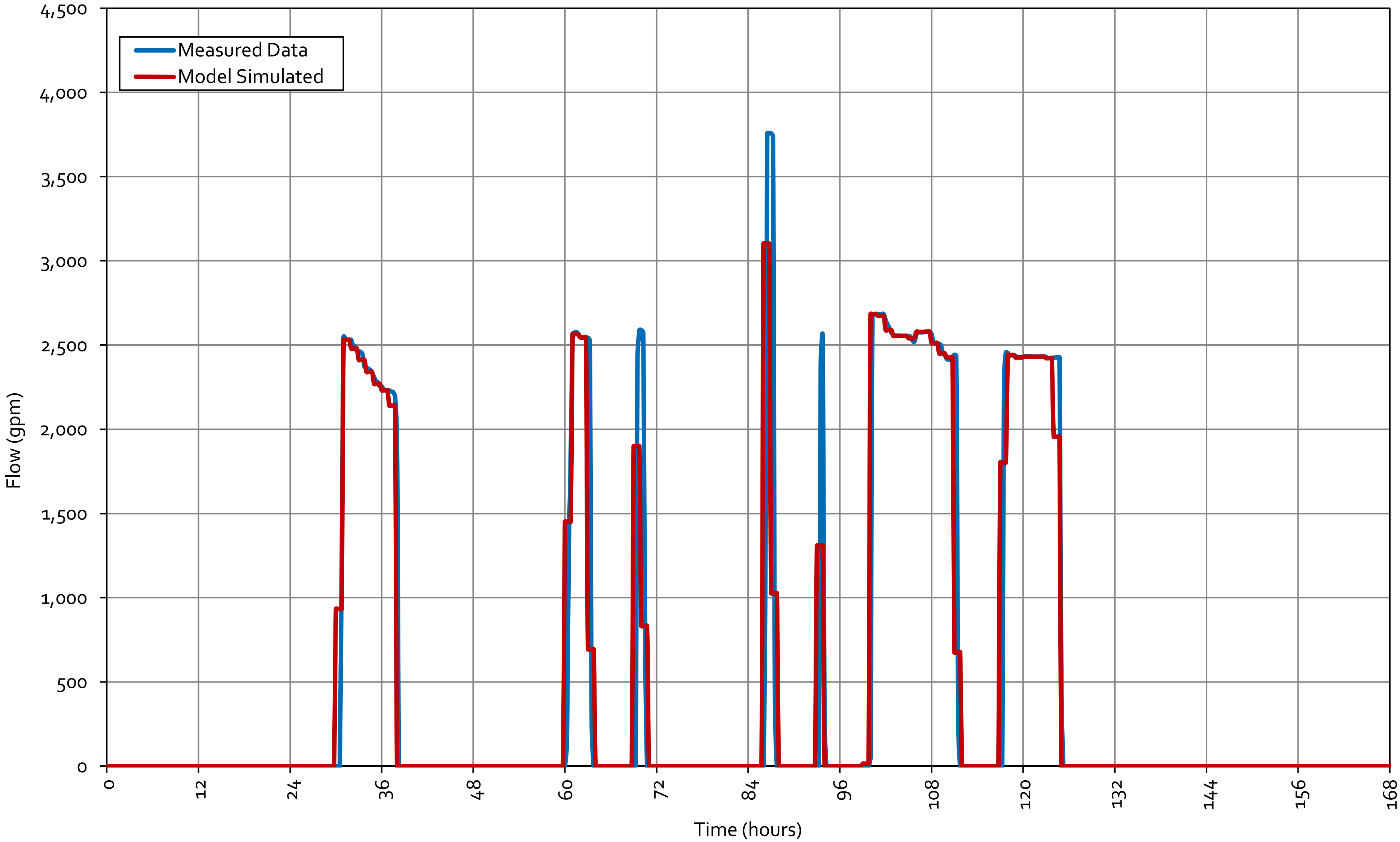
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - STAGE RANCH BOOSTER 1



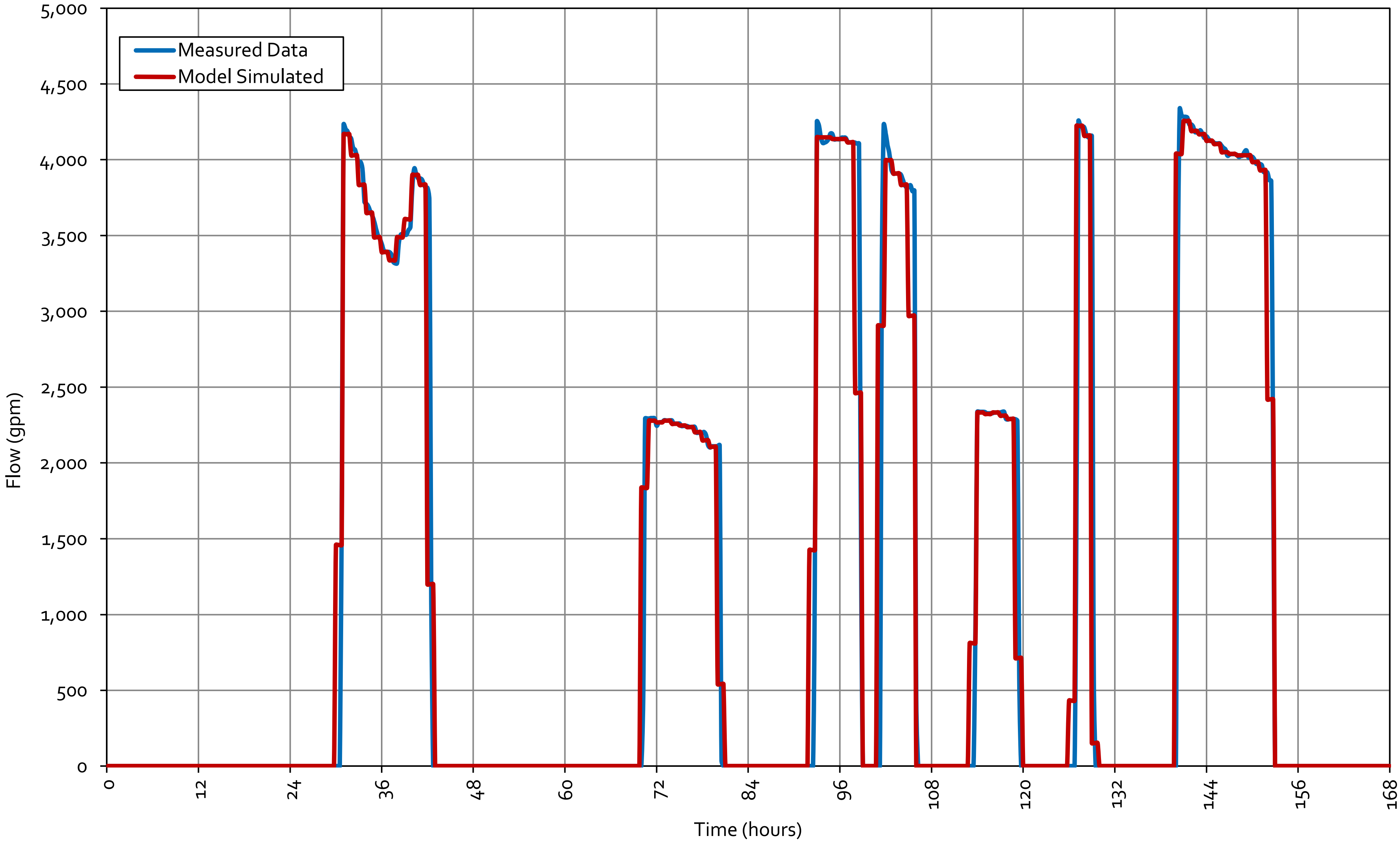
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - SUMMERHILL BOOSTER



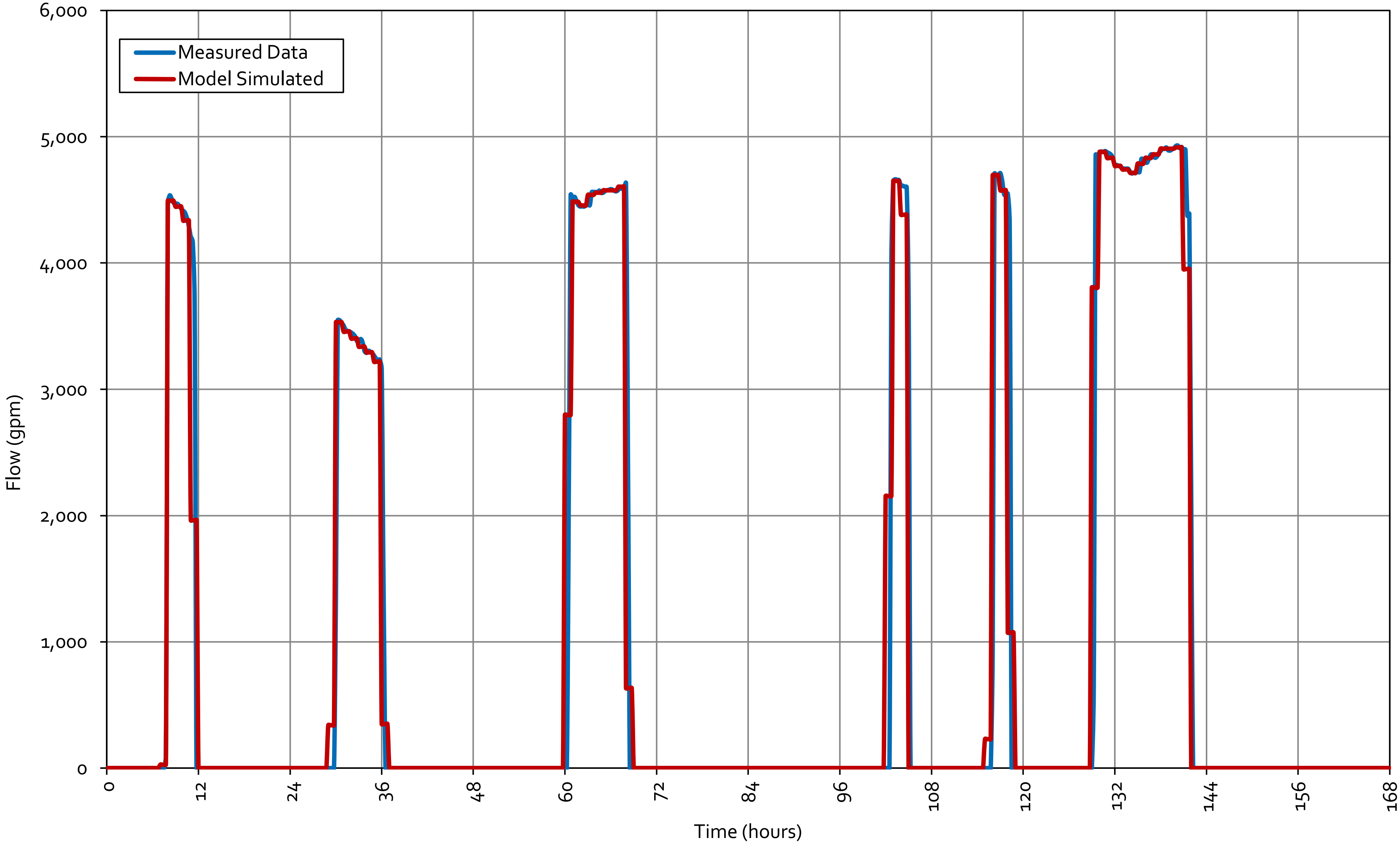
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - TUSCANY BOOSTER 1



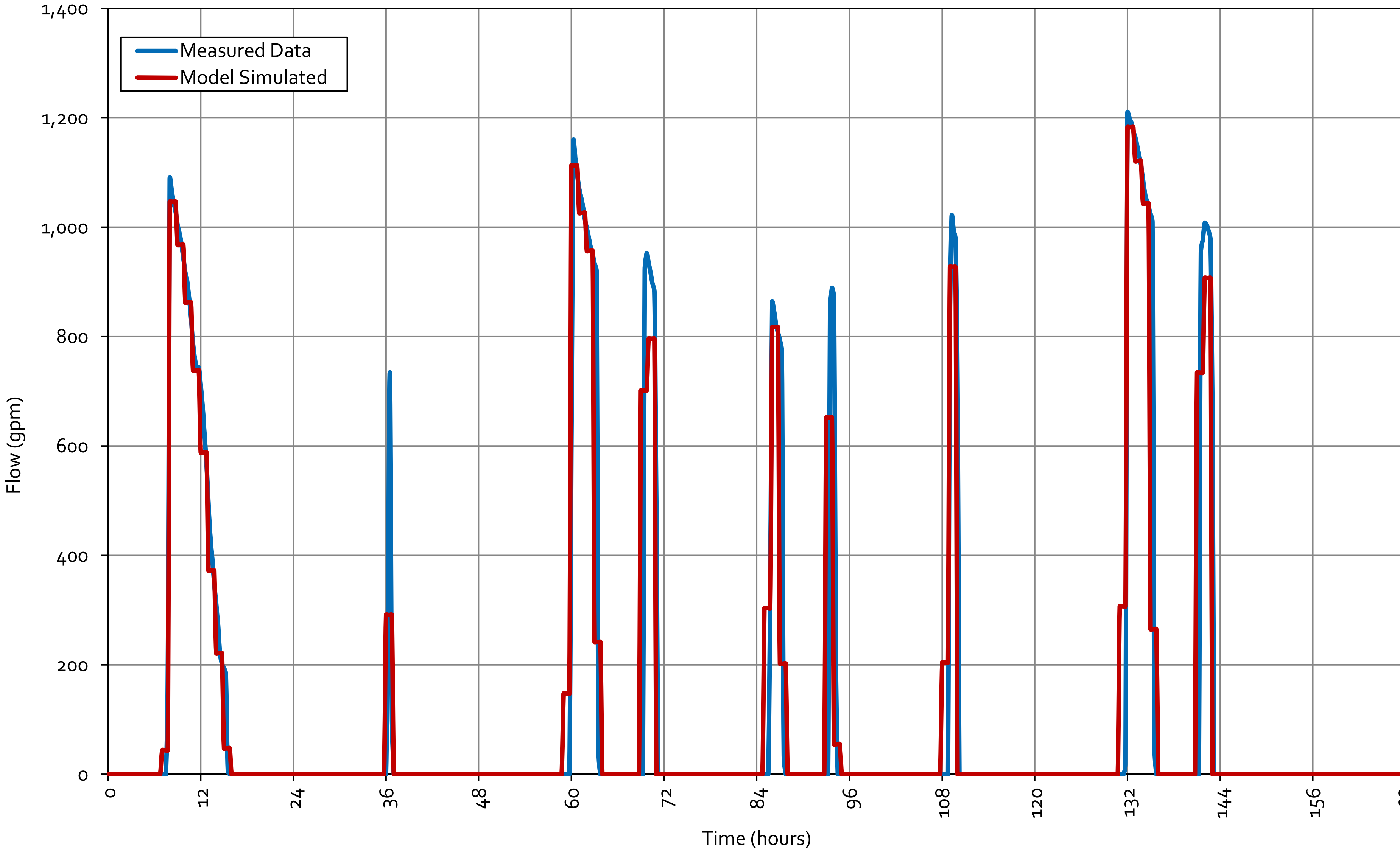
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - WAITE BOOSTER



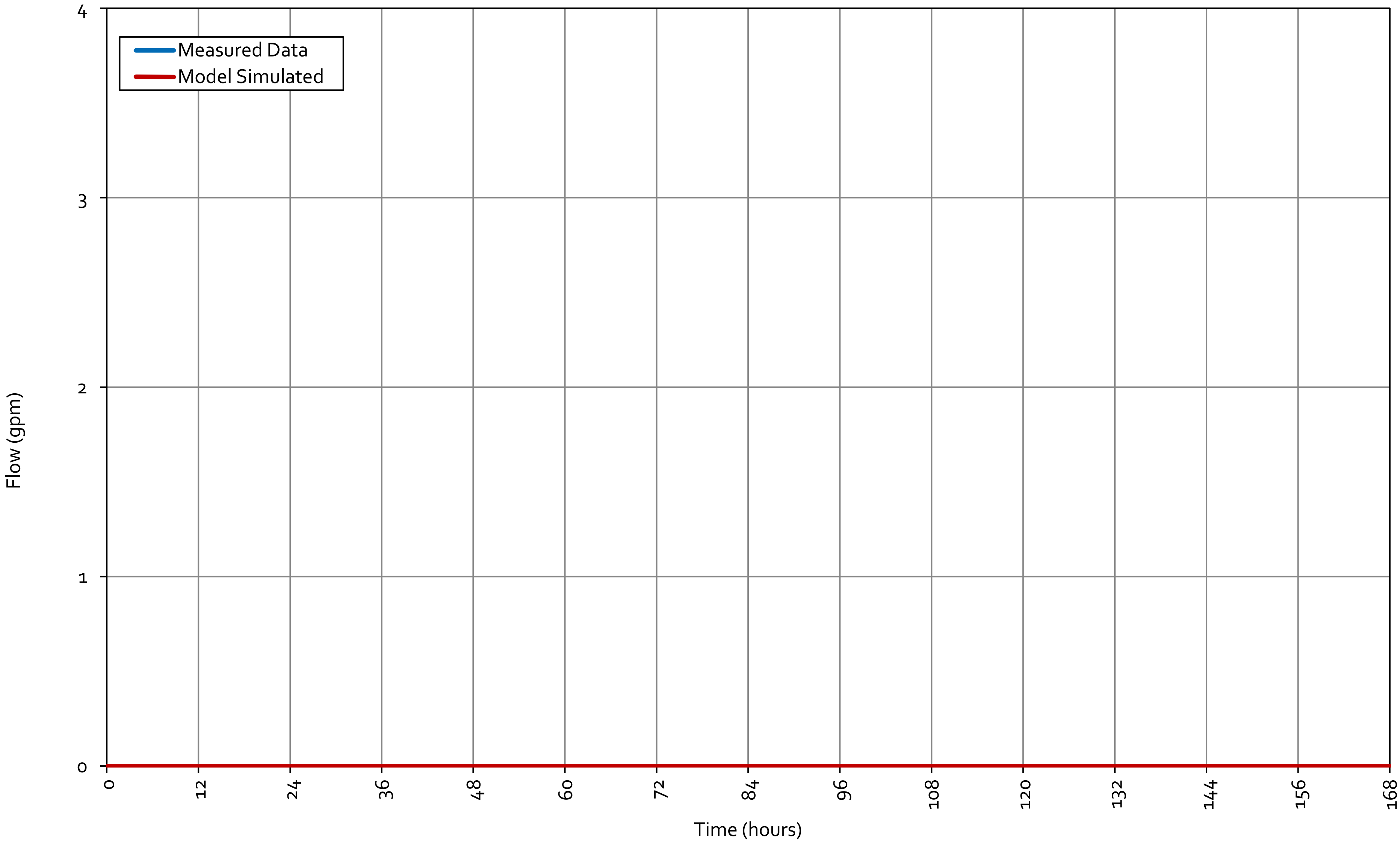
Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - WOODMOOR BOOSTER



Water Distribution System Hydraulic Model Conversion and Calibration

EPS CALIBRATION - CANYON LAKE WATER TREATMENT PLANT



Appendix E

DETAILED PROJECT SHEETS

Project Number: PW-WTP
Project Name: Canyon Lake Water Treament Plant Upgrades
System Type: Potable Water

Project Description:
Canyon Lake Water Treament Plan Upgrades.

60000000
50000000
357142857.1

Project Details:

Project Element		Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
WTP Upgrade		1	New	1	$ 35,714,400	$ 35,714,000	$ 42,857,000	$ 60,000,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	70%	$ 42,000,000
Future Users	30%	$ 18,000,000
Total	100%	$ 60,000,000

Project Map:

Notes on Cost Estimation:
This project is primarily an existing improvement and therefore 70% of cost are assigned to existing users. A portion (30%) is assigned to future users.

Project Number: PW-W1
Project Name: Warm Springs groundwater wells
System Type: Potable Water

Project Description:
Drill and Equip new Warm Springs groundwater wells.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[1] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Well and Pump		1	New	1	#####	$ 7,738,000	$ 9,286,000	$ 13,000,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 13,000,000
Total	100%	$ 13,000,000

Notes on Cost Estimation:
This project provides new water supplies for future users and therefore 100% of the cost is assigned to future users.

Project Map:

Project Number:	PW-W2
Project Name:	Temecula-Pauba groundwater wells
System Type:	Potable Water

Project Description:

Drill and Equip new Temecula-Pauba groundwater wells.

20000000
14285714.29
11904761.9

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[1] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Well and Pump		1	New	1	$ 11,904,760	$ 11,905,000	$ 14,286,000	$ 20,000,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 20,000,000
Total	100%	$ 20,000,000

Notes on Cost Estimation:

This project provides new water supplies for future users and therefore 100% of the cost is assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-LP1
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Build parallel pipeline to La_Laguna_2 Zone on Falling Leaf Drive. Connect Moon View Ct. to the La_Laguna_Zone with 40 feet of pipe.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	400	$ 390	$ 156,000	$ 187,000	$ 262,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 262,000
Future Users	0%	$ -
Total	100%	$ 262,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-LP2
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Build parallel pipeline from 1800_Rice_Canyon_Alberhill_2 Zone.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	1,000	$ 390	$ 390,000	$ 468,000	$ 655,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 655,000
Future Users	0%	$ -
Total	100%	$ 655,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-LP3
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Connect to 1896_Meadowbrook_2

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	12	Replace	40	$ 390	$ 16,000	$ 19,000	$ 27,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 10,000	$ 12,000	$ 17,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 44,000
Future Users	0%	$ -
Total	100%	$ 44,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-LP4
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Connect to 1940_Tuscany_2

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	40	$ 390	$ 16,000	$ 19,000	$ 27,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

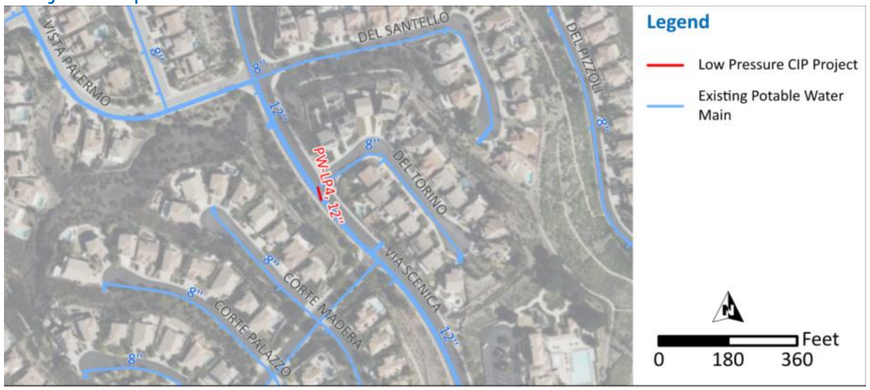
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 61,000
Future Users	0%	$ -
Total	100%	$ 61,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number:	PW-LP5
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Build parallel pipe from 1561_Orange_Bundy

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	1,800	$ 325	$ 585,000	$ 702,000	$ 983,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 983,000
Future Users	0%	$ -
Total	100%	$ 983,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-LP6
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Build parallel pipe from 1561_Orange_Bundy

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	8	8	Replace	5,700	$ 325	$ 1,853,000	$ 2,224,000	$ 3,114,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

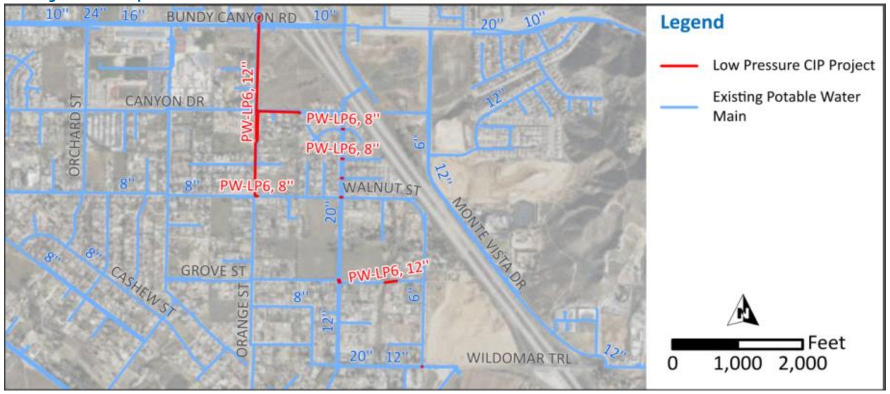
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 3,114,000
Future Users	0%	$ -
Total	100%	$ 3,114,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-LP7
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Build parallel pipe from 1601_Inland_Valley

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	12	Replace	3,800	$ 390	$ 1,482,000	$ 1,778,000	$ 2,489,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

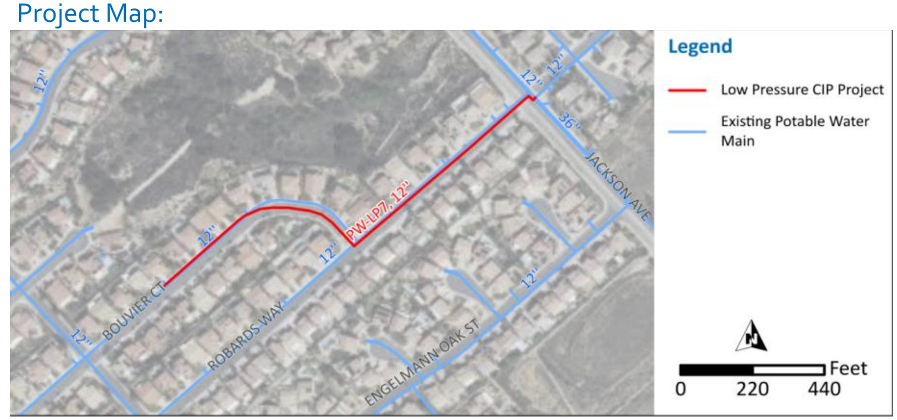
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,489,000
Future Users	0%	$ -
Total	100%	$ 2,489,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-LP8

Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.

System Type: Potable Water

Project Description:

Build parallel pipe from 1601_Woodmoor

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	8	8	Replace	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 109,000
Future Users	0%	$ -
Total	100%	$ 109,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-LP9
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Build parallel pipe from 1650_Adelfa

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	3,000	$ 390	$ 1,170,000	$ 1,404,000	$ 1,966,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

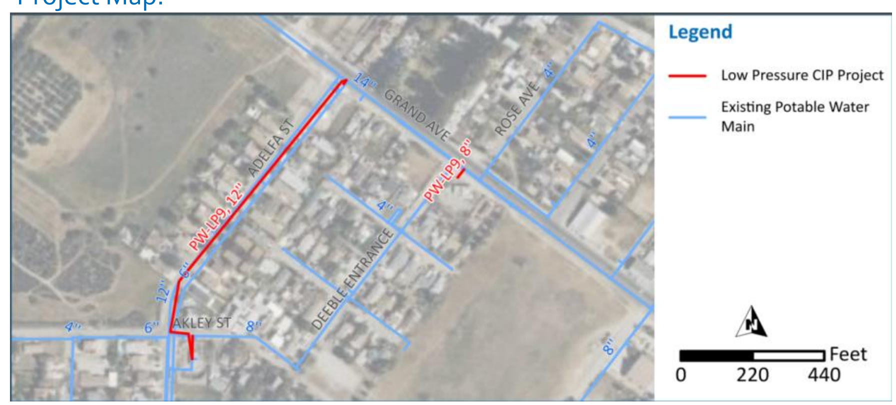
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,966,000
Future Users	0%	$ -
Total	100%	$ 1,966,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-LP10
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Connect to 1601 Ortega. Install individual pressure regulators on 40 services.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	8	8	Replace	1,300	$ 325	$ 423,000	$ 508,000	$ 711,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

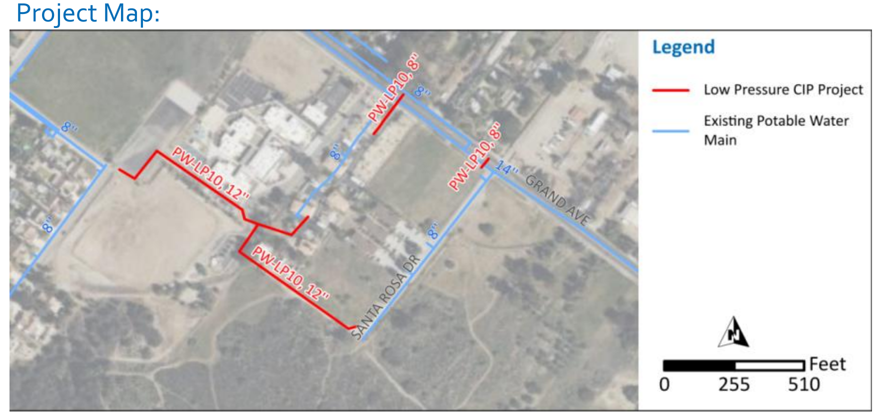
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 745,000
Future Users	0%	$ -
Total	100%	$ 745,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-LP11
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Connect to 1601 Ortega. Move VA-6127 and adjust zone breaks. Install individual pressure reglulators on 40 services.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	-	8	New	40	$ 325	$ 13,000	$ 16,000	$ 22,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 56,000
Future Users	0%	$ -
Total	100%	$ 56,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-LP12
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Build parallel pipe from 1601 Ortega and add PRV to make 1501 zone

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[(1)] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pipe	8	16	Replace	600	$ 470	$ 282,000	$ 338,000	$ 473,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

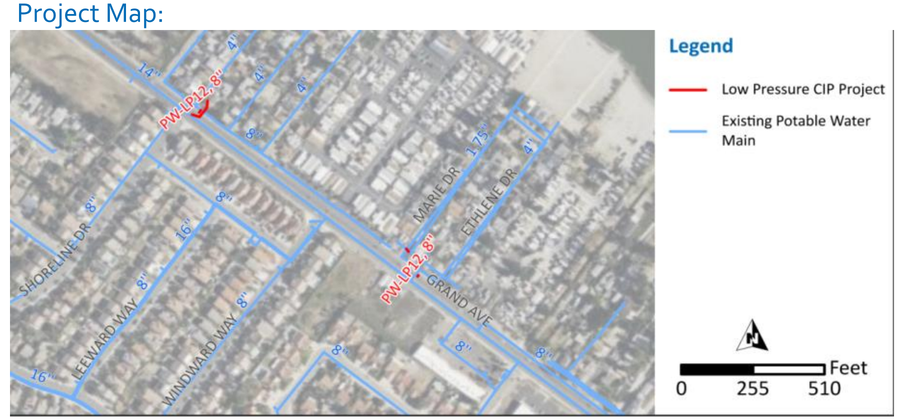
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 473,000
Future Users	0%	$ -
Total	100%	$ 473,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number:	PW-LP13
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Connect to 1601 Ortega. Adjust zone breaks. Build some short pipeline connections

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 90,000
Future Users	0%	$ -
Total	100%	$ 90,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-LP14
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Connect to 1601 Ortega. Adjust zone breaks. Build some short pipeline connections. Build parallel 1434 Zone transmission.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	1,500	$ 325	$ 488,000	$ 586,000	$ 820,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 854,000
Future Users	0%	$ -
Total	100%	$ 854,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-LP15
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Connect to 1601_Lucerne_Alberhill_1. Build parallel 1434 Zone transmission.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	16	16	Replace	5,500	$ 470	$ 2,585,000	$ 3,102,000	$ 4,343,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 4,377,000
Future Users	0%	$ -
Total	100%	$ 4,377,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-LP16-1
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Connect to Future 1620_Adelfa

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	40	$ 390	$ 16,000	$ 19,000	$ 27,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 61,000
Future Users	0%	$ -
Total	100%	$ 61,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-LP16-2
Project Name: Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type: Potable Water

Project Description:

Connect to 1601 Ortega. If there are pressure complaints beforehand, recommend individual user to install private pump.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	12	Replace	1,800	$ 390	$ 702,000	$ 842,000	$ 1,179,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,213,000
Future Users	0%	$ -
Total	100%	$ 1,213,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-LP17
Project Name:	Pressure Zone Adjustment near Adelfa St. and McGrew Dr.
System Type:	Potable Water

Project Description:

Connect to 1916.5_Encina for the low pressure residences near the intersection of Adelfa Street and McGrew Drive. Test

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[(1)] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pipe	8	8	Replace	40	$ 325	$ 13,000	$ 16,000	$ 22,000	2025-2030
Rezoning	-	-	-	-	$ 10,000	$ 20,000	$ 24,000	$ 34,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 56,000
Future Users	0%	$ -
Total	100%	$ 56,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PW-PU-1
Project Name:	Pressure Zone 1601 (Horsethief 1) Pump Station Upgrade
System Type:	Potable Water

Project Description:

Build new pump.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	125	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 538,000
Total	100%	$ 538,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-PU-2
Project Name: Pressure Zone 1601 (Rosetta Canyon 1) Pump Station Upgrade
System Type: Potable Water

Project Description:

Expand pump station by adding a new pump.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	250	New	3	$ 100,000	$ 300,000	$ 360,000	$ 504,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 504,000
Total	100%	$ 504,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number:	PW-PU-3
Project Name:	Pressure Zone 1650 (Adelfa) Pump Station Upgrade
System Type:	Potable Water

Project Description:

Expand existing pump station by adding a 650 gpm pump.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	75	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	48%	$ 96,000
Future Users	53%	$ 106,000
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-4
Project Name: Pressure Zone 1650 (Inland Valley) Pump Station Upgrade
System Type: Potable Water

Project Description:

Expand existing pump station by adding a pump.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	150	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	3%	$ 14,000
Future Users	97%	$ 524,000
Total	100%	$ 538,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Elsinore Valley Municipal Water District

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Project Number: PW-PU-5
Project Name: Pressure Zone 1746 (Bundy Canyon) Pump Station Upgrade
System Type: Potable Water

Project Description:

Expand pump station by adding pump. Will also need a larger discharge transmission pipeline.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	125	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2025-2030
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 336,000
Total	100%	$ 336,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number:	PW-PU-6
Project Name:	Pressure Zone 1750 (Cottonwood) Pump Station Upgrade
System Type:	Potable Water

Project Description:

Expand pump station by adding pump(s).

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	200	New	3	$ 80,000	$ 240,000	$ 288,000	$ 403,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	57%	$ 230,000
Future Users	43%	$ 173,000
Total	100%	$ 403,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-7
Project Name: Pressure Zone 1800 (Rice Canyon) Pump Station Upgrade
System Type: Potable Water

Project Description:
Expand pump station by adding pump(s).

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 403,000
Total	100%	$ 403,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-PU-8
Project Name: Pressure Zone 1801 (Horsethief 2) Pump Station Upgrade
System Type: Potable Water

Project Description:
Expand pump station by adding pump(s).

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	75	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 302,000
Total	100%	$ 302,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-9
Project Name: Pressure Zone 1801 (Rosetta Canyon 2) Pump Station Upgrade
System Type: Potable Water

Project Description:

Expand pump station by adding pump(s).

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	150	New	2	$ 80,000	$ 160,000	$ 192,000	$ 269,000	2045-2050
Boost Pump	0	50	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 403,000
Total	100%	$ 403,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-10
Project Name: Pressure Zone 1901 (Ortega) New Pump Station
System Type: Potable Water

Project Description:

Build new pump station from 1601_Ortega with capacity of 250 gpm at tank.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[1] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pump	0.00	250	New	250	$ 1,500,000	$ 1,500,000	$ 1,800,000	$ 2,520,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,520,000
Total	100%	$ 2,520,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-11
Project Name: Pressure Zone 2001 (Horsethief 3) New Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 550 gpm at 1801_Horsethief 2 Tank.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[1] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pump	0.00	550	New	550	$ 2,500,000	$ 2,500,000	$ 3,000,000	$ 4,200,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

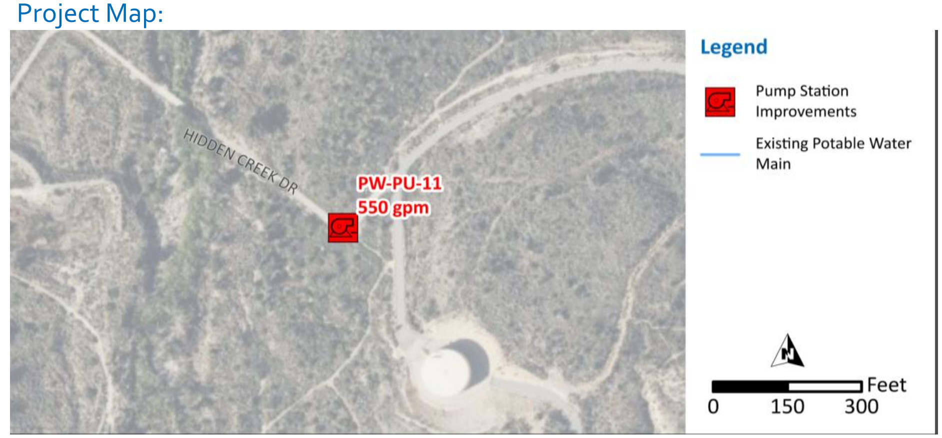
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 4,200,000
Total	100%	$ 4,200,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-12
Project Name: Pressure Zone 2001 (North Peak) New Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 450 gpm from 1601 El Toro Rosetta Canyon zone; location probably near El Toro Tanks, see previous master plan.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[1] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pump	0.00	450	New	450	$ 1,500,000	$ 1,500,000	$ 1,800,000	$ 2,520,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,520,000
Total	100%	$ 2,520,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-13
Project Name: Pressure Zone 2196 (Sedco) Pump Station Replacement
System Type: Potable Water

Project Description:

Suggest eliminating Sedco A and B and constructing single new pump station with 250 gpm firm capacity.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	250	New	250	#####	$ 1,500,000	$ 1,800,000	$ 2,520,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	17%	$ 428,000
Future Users	83%	$ 2,092,000
Total	100%	$ 2,520,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-14
Project Name: Pressure Zone 1550 (Cielo Vista) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add fire pump(s) to address a capacity deficiency of delivering fire flows of less than 25% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	20	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

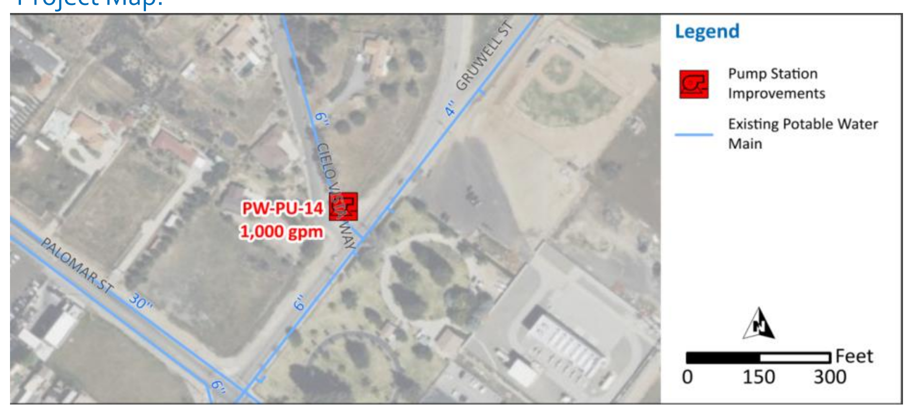
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 134,000
Future Users	0%	$ -
Total	100%	$ 134,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-PU-15
Project Name: Pressure Zone 1600 (Skylark) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add fire pump(s) to address a capacity deficiency of delivering fire flows of less than 25% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	10	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 202,000
Future Users	0%	$ -
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-16
Project Name: Pressure Zone 1850 (Canyon Lake Sustaining) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add fire pump(s) to address a capacity deficiency of delivering fire flows of between 50% and 75% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	30	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045
Boost Pump	0	40	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 134,000
Future Users	0%	$ -
Total	100%	$ 134,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-17
Project Name: Pressure Zone 1850 (Lemon Grove) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add fire pump(s) to address a capacity deficiency of delivering fire flows of between 75% and 100% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	150	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2045-2050
Boost Pump	0	8	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2045-2050
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 402,000
Future Users	0%	$ -
Total	100%	$ 402,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-18
Project Name: Pressure Zone 1900 (Elderberry) New Pump Station
System Type: Potable Water

Project Description:
Build new pump station with capacity of 100 gpm at Alberhill 2 tanks.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[(1)] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pump	0.00	100	New	100	$ 1,500,000	$ 1,500,000	$ 1,800,000	$ 2,520,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

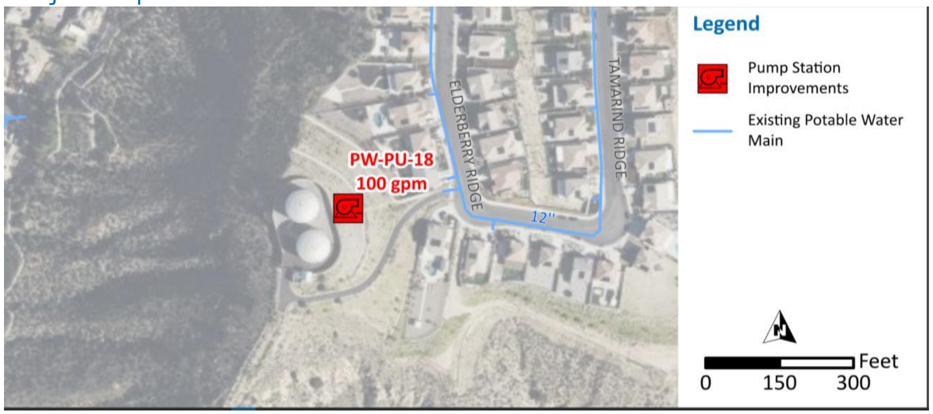
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,520,000
Total	100%	$ 2,520,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-19
Project Name: Pressure Zone 1901 (Borchard) New Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 1,800 gpm from 1434 zone.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	1800	New	1,800	$ 3,500,000	$ 3,500,000	$ 4,200,000	$ 5,880,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,880,000
Total	100%	$ 5,880,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-20
Project Name: Pressure Zone 1940 (Cirrus Circle) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add fire pump(s) to address a capacity deficiency of delivering fire flows of less than 25% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	15	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

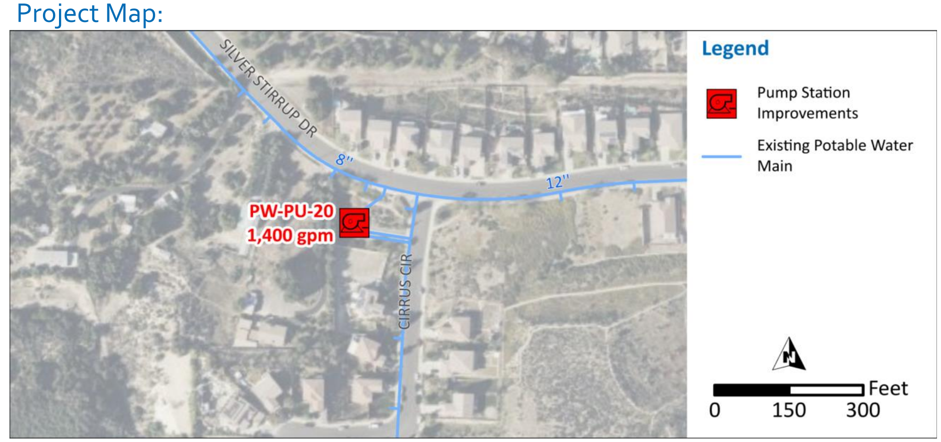
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 202,000
Future Users	0%	$ -
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-PU-21
Project Name: Pressure Zone 2201 (Ortega) New Pump Station
System Type: Potable Water

Project Description:
Build new pump station with capacity of 1,700 gpm at new Ortega 1901 tank.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[1] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pump	0.00	1700	New	1,700	$ 3,500,000	$ 3,500,000	$ 4,200,000	$ 5,880,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

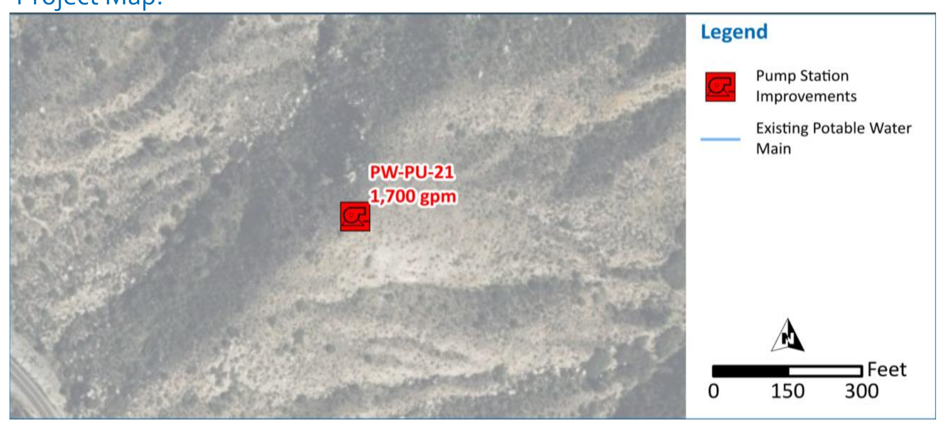
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,880,000
Total	100%	$ 5,880,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-22
Project Name: Pressure Zone 2320 (Adelfa) New Pump Station
System Type: Potable Water

Project Description:
Build new pump station with capacity of 1,400 gpm at 1916.5 Encina tank.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	1400	New	1,400	$ 3,500,000	$ 3,500,000	$ 4,200,000	$ 5,880,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

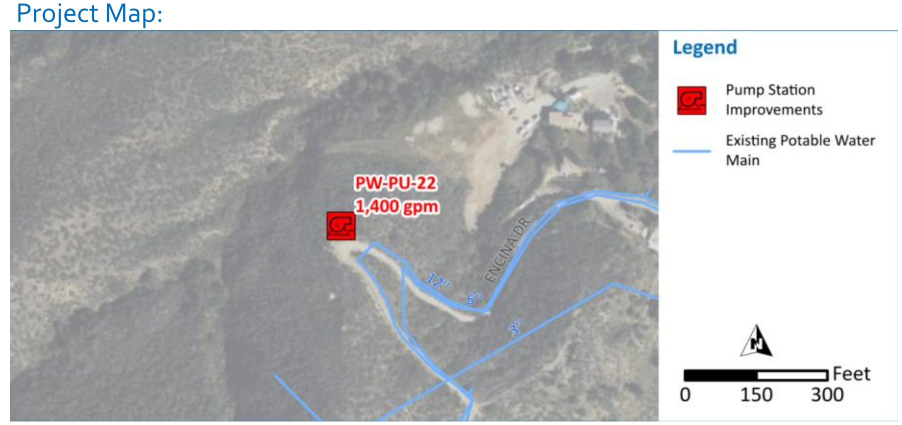
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,880,000
Total	100%	$ 5,880,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-23
Project Name: Pressure Zone 1800 (Spyglass) New Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 1,650 gpm; feeding from 1601_Rosetta_Canyon_1. See previous master plan for approximate location.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	1650	New	1,650	$ 3,500,000	$ 3,500,000	$ 4,200,000	$ 5,880,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

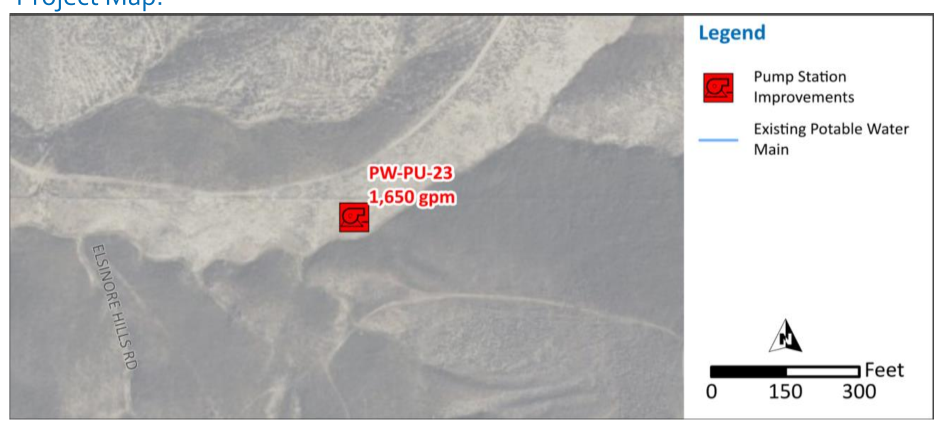
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,880,000
Total	100%	$ 5,880,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number:	PW-PU-24
Project Name:	Pressure Zone 1571 (City) Pump Station Upgrade
System Type:	Potable Water

Project Description:

Expand pump station by adding pump(s).

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	50	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	24%	$ 48,000
Future Users	76%	$ 154,000
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-PU-25
Project Name: Pressure Zone 1601 (Alberhill 1) Pump Station Upgrade
System Type: Potable Water

Project Description:

Construct new pumps at the exiting Alberhill 1 Pump Station to increase existing capacity of 6,000 gpm by 3,000 gpm to a total capacity of 9,000 gpm. There is no room to expand in current PS therefore cost estimate reflects the cost of a new pump station rather than an expansion.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	3000	New	3,000	$ 5,000,000	$ 5,000,000	$ 6,000,000	$ 8,400,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

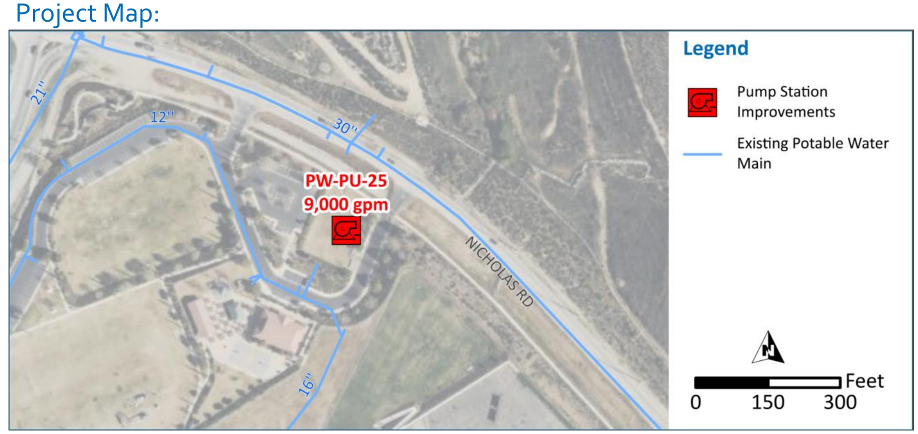
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 8,400,000
Total	100%	$ 8,400,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-26
Project Name: Pressure Zone 1925 (Spyglass) Pump Station Upgrade
System Type: Potable Water

Project Description:
Add fire pump(s).

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	1800	New	1,800	$ 3,500,000	$ 3,500,000	$ 4,200,000	$ 5,880,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,880,000
Total	100%	$ 5,880,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-PU-27
Project Name: Pressure Zone 2217 (Stage Ranch 2) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add 1,000 gpm fire pump(s) to address a capacity deficiency of delivering fire flows of between 25% and 50% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

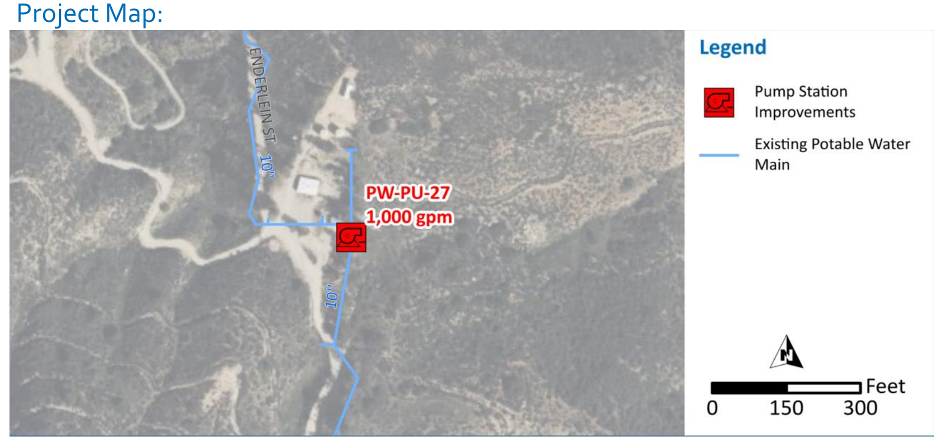
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 202,000
Future Users	0%	$ -
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-PU-28
Project Name: Pressure Zone 3300 (Skymeadows) Pump Station Upgrade
System Type: Potable Water

Project Description:

Add a 1,250 fire pump(s) to address a capacity deficiency of delivering fire flows of between 25% and 50% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 202,000
Future Users	0%	$ -
Total	100%	$ 202,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number:	PW-PU-29
Project Name:	Pressure Zone 3544 (Los Pinos 2) Pump Station Upgrade
System Type:	Potable Water

Project Description:

Add 1,000 gpm fire pump(s) to address a capacity deficiency of delivering fire flows of between 75% and 100% of the required fire flow in the discharge pressure zone.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	15	New	4	$ 40,000	$ 160,000	$ 192,000	$ 269,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

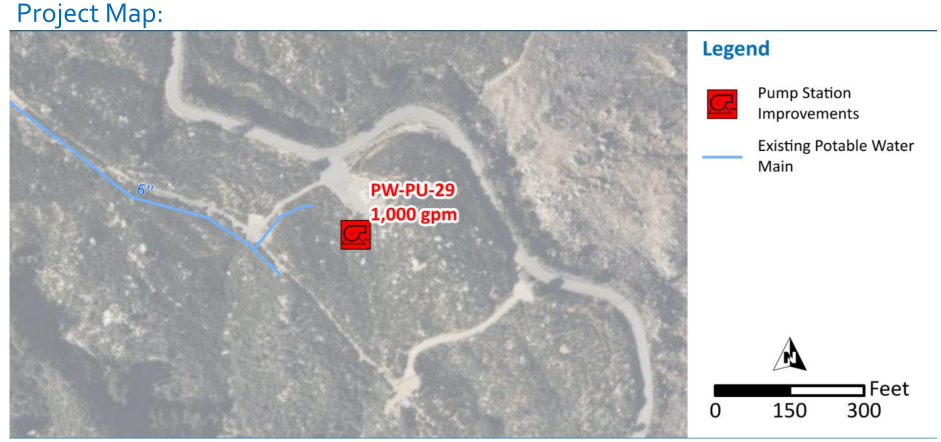
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 269,000
Future Users	0%	$ -
Total	100%	$ 269,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-PU-30
Project Name: Temescal Valley Pipeline Pump Station
System Type: Potable Water

Project Description:
Build new pump station with capacity of 20,200 gpm.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	20200	New	20,200	$ 9,000,000	$ 9,000,000	$ 10,800,000	$ 15,120,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

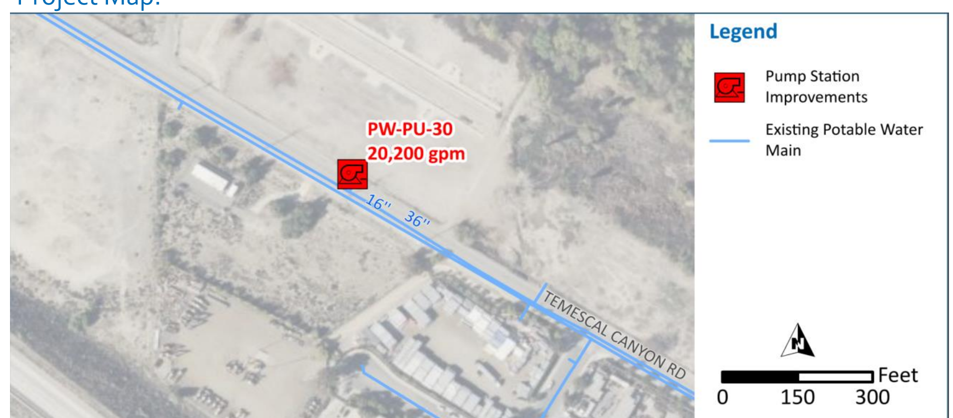
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 15,120,000
Total	100%	$ 15,120,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-PU-31
Project Name: Mission Trails Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 8,000 gpm and a TDH of 70 feet to move water from the AVP to the north.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost(1) ($)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pump	0.00	8000	New	8,000	$ 9,000,000	$ 9,000,000	$ 10,800,000	$ 15,120,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 15,120,000
Total	100%	$ 15,120,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-PU-32
Project Name: Inland Valley Pump Station
System Type: Potable Water

Project Description:

Build new pump station with capacity of 15,000 gpm and a TDH of 70 feet to move water from the AVP to the north.

Project Details:

Project Element	Existing Firm Capacity (gpm)	Proposed Firm Capacity (gpm)	Replace/ New	Total Capacity (gpm)	Unit Cost[1] ($)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pump	0.00	15000	New	15,000	$ 9,000,000	$ 9,000,000	$ 10,800,000	$ 15,120,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 15,120,000
Total	100%	$ 15,120,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-T-1
Project Name: 1467 Waite Street Zone Additional Tank
System Type: Potable Water

Project Description:

Build a new 0.6-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	0.6	New	600,000	$ 2.70	$ 1,620,000	$ 1,944,000	$ 2,722,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	62%	$ 1,679,000
Future Users	38%	$ 1,043,000
Total	100%	$ 2,722,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-T-2
Project Name: 1571 City Tank Replacement
System Type: Potable Water

Project Description:
Build a new 4.2-MG storage tank with HWL of 1600 ft. Existing tank to be abandoned.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	1.73	4.2	Replace	4,200,000	$ 1.70	$ 7,140,000	$ 8,568,000	$ 11,995,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

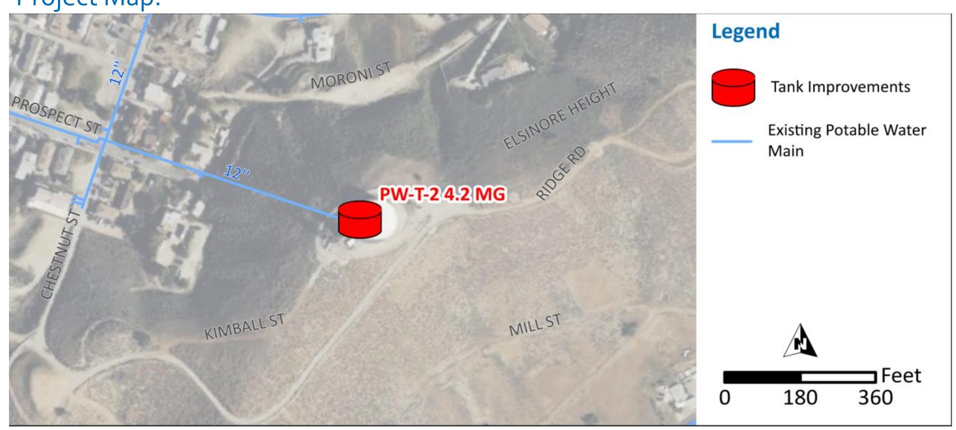
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	65%	$ 7,797,000
Future Users	35%	$ 4,198,000
Total	100%	$ 11,995,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-3
Project Name: 1601 Alberhill Village Tank
System Type: Potable Water

Project Description:
Build a new 6.0-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	6.0	New	6,000,000	$ 1.70	$ 10,200,000	$ 12,240,000	$ 17,136,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

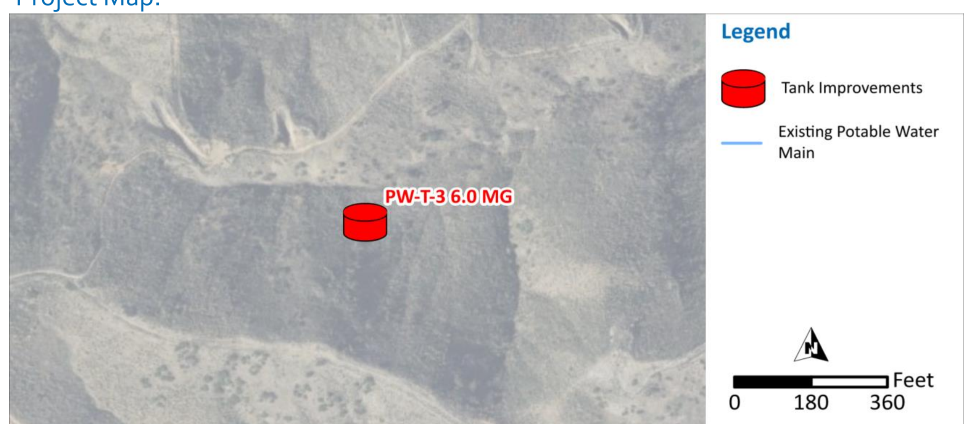
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 17,136,000
Total	100%	$ 17,136,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-T-4
Project Name: 1601 Horsethief 1 Additional Tank
System Type: Potable Water

Project Description:

Build a new 1.5-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	1.5	New	1,500,000	$ 2.40	$ 3,600,000	$ 4,320,000	$ 6,048,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	60%	$ 3,629,000
Future Users	40%	$ 2,419,000
Total	100%	$ 6,048,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PW-T-5
Project Name: 1601 Rosetta Canyon 1 Additional Tank
System Type: Potable Water

Project Description:
Build a new 0.7-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	0.7	New	700,000	$ 2.70	$ 1,890,000	$ 2,268,000	$ 3,175,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 3,175,000
Total	100%	$ 3,175,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-T-6
Project Name: 1622 Canyon Lake Additional Tank
System Type: Potable Water

Project Description:

Build a new 2.0-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	2.0	New	2,000,000	$ 2.40	$ 4,800,000	$ 5,760,000	$ 8,064,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

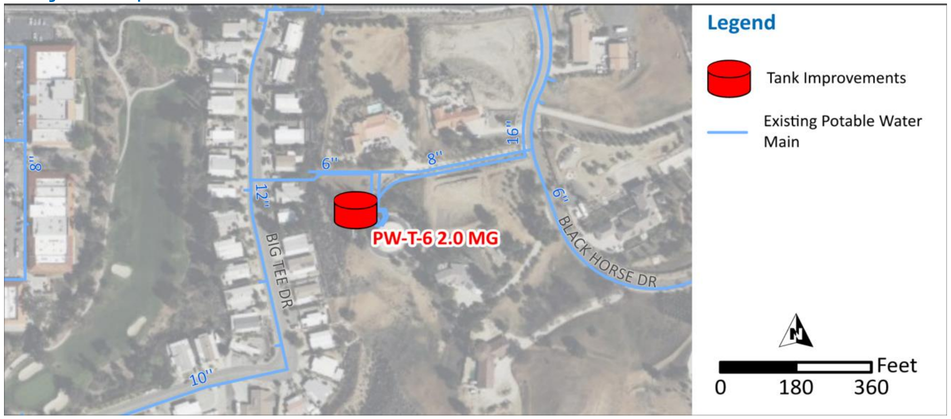
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	90%	$ 7,258,000
Future Users	10%	$ 806,000
Total	100%	$ 8,064,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-7
Project Name: 1676 Alberhill Zone New Tank
System Type: Potable Water

Project Description:

Build a new 1.0-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	1.0	New	1,000,000	$ 2.70	$ 2,700,000	$ 3,240,000	$ 4,536,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 4,536,000
Total	100%	$ 4,536,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:

Project Number: PW-T-8
Project Name: 1746 Bundy Canyon Zone Additional Tank
System Type: Potable Water

Project Description:

Build a new 1.5-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	1.5	New	1,500,000	$ 2.40	$ 3,600,000	$ 4,320,000	$ 6,048,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

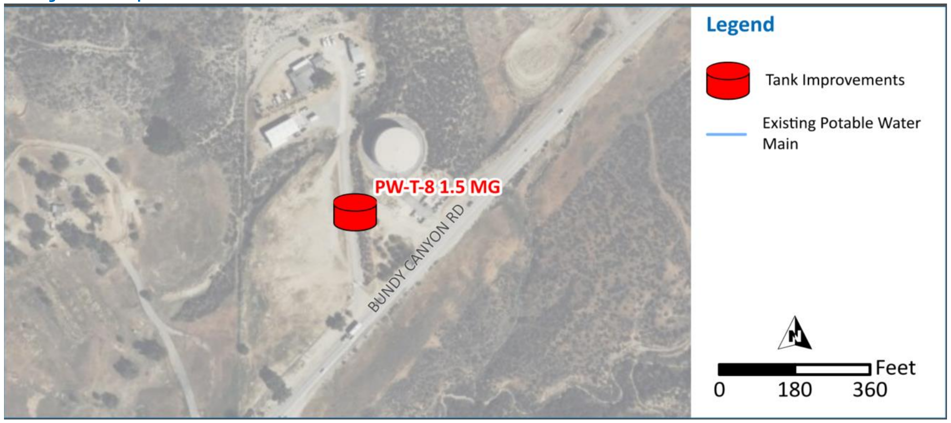
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	4%	$ 242,000
Future Users	96%	$ 5,806,000
Total	100%	$ 6,048,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Elsinore Valley Municipal Water District

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Project Number: PW-T-9
Project Name: 1800 Spyglass Zone New Tank
System Type: Potable Water

Project Description:

Build a new 2.3-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	2.3	New	2,300,000	$ 2.10	$ 4,830,000	$ 5,796,000	$ 8,114,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

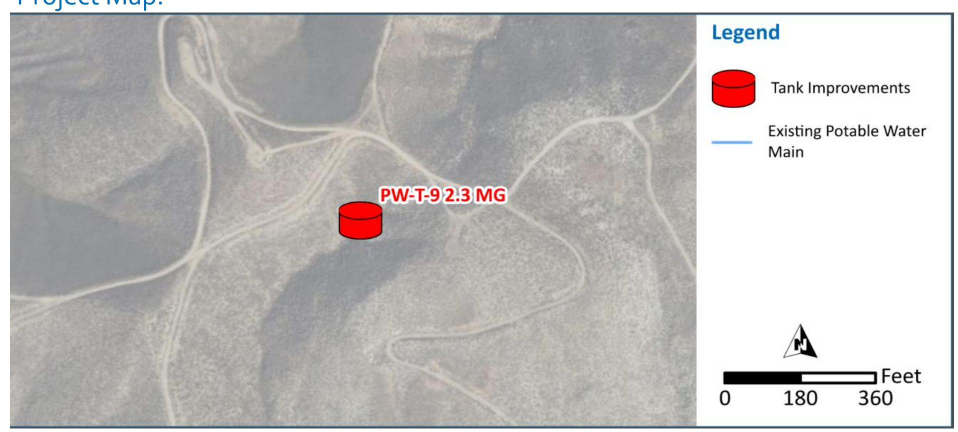
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 8,114,000
Total	100%	$ 8,114,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number: PW-T-10
Project Name: 1800 Rice Canyon/Alberhill 2 Zone New Tank
System Type: Potable Water

Project Description:
Build a new 1.7-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	1.7	New	1,700,000	$ 2.40	$ 4,080,000	$ 4,896,000	$ 6,854,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

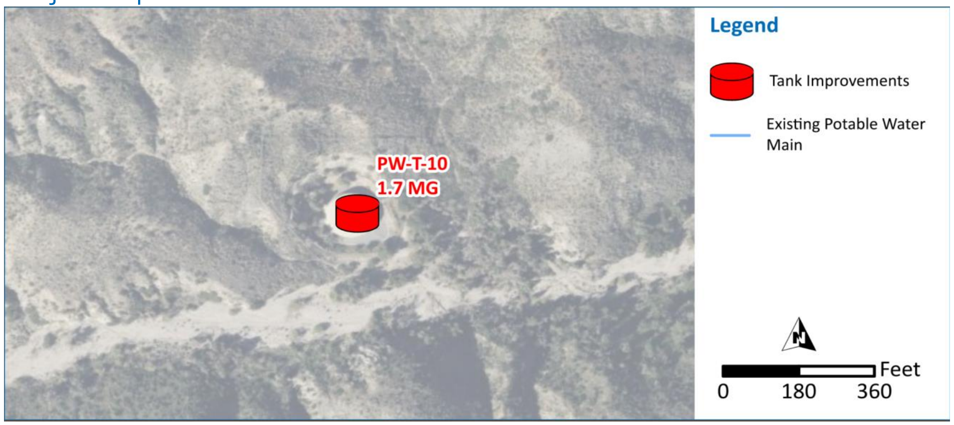
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 6,854,000
Total	100%	$ 6,854,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-T-11
Project Name: 1801 Horsethief 2 Zone Additional Tank
System Type: Potable Water

Project Description:
Build a new 1.6-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	1.6	Replace	1,600,000	$ 2.40	$ 3,840,000	$ 4,608,000	$ 6,451,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

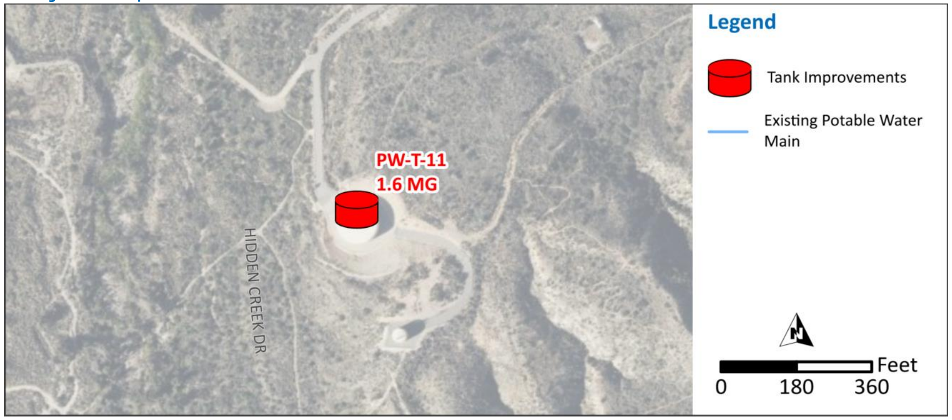
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	33%	$ 2,129,000
Future Users	67%	$ 4,322,000
Total	100%	$ 6,451,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-12
Project Name: 1801 North Tuscany Hills New Tank
System Type: Potable Water

Project Description:

Build a new 2.6-MG storage tank at North Tuscany Hills to cover Rosetta Canyon and Tuscany Hills deficiency.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	2.6	New	2,600,000	$ 2.10	$ 5,460,000	$ 6,552,000	$ 9,173,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

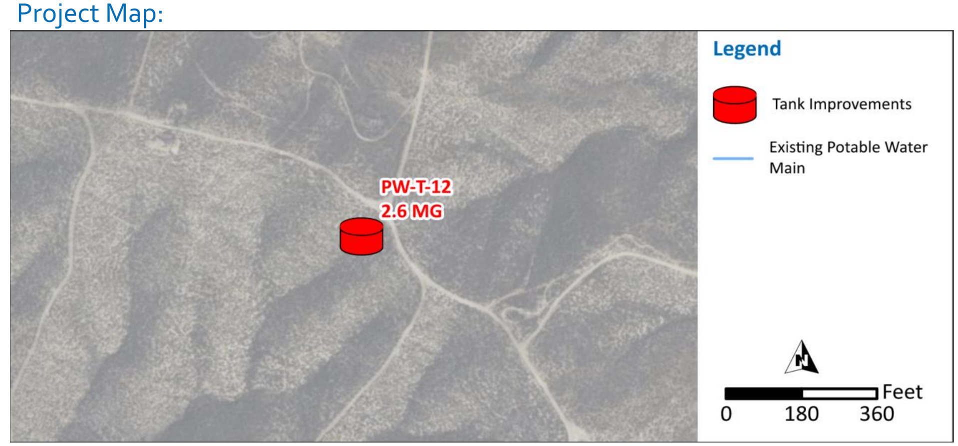
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 9,173,000
Total	100%	$ 9,173,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number: PW-T-15
Project Name: 1896 Meadowbrook 2 Additional Tank
System Type: Potable Water

Project Description:
Build a new 1.3-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	1.3	New	1,300,000	$ 2.40	$ 3,120,000	$ 3,744,000	$ 5,242,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

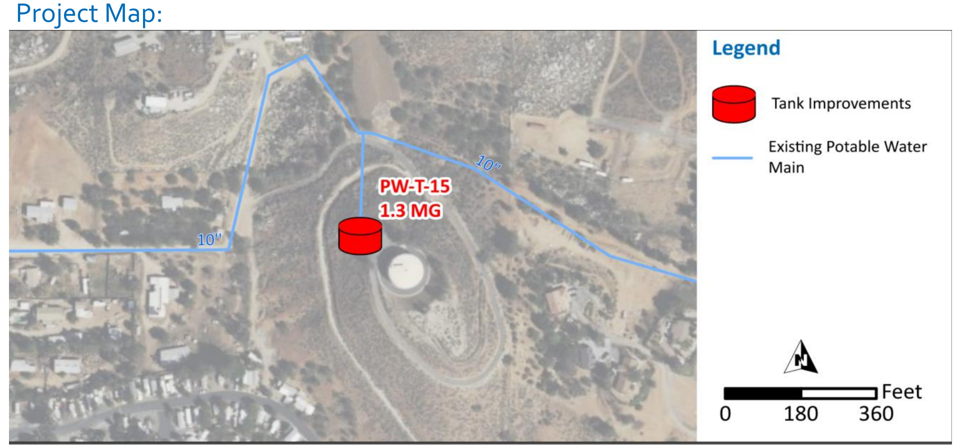
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	49%	$ 2,578,000
Future Users	51%	$ 2,664,000
Total	100%	$ 5,242,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-16
Project Name: 1901 Ortega Zone New Tank
System Type: Potable Water

Project Description:
Build a new 0.5-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	0.5	New	500,000	$ 3.00	$ 1,500,000	$ 1,800,000	$ 2,520,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

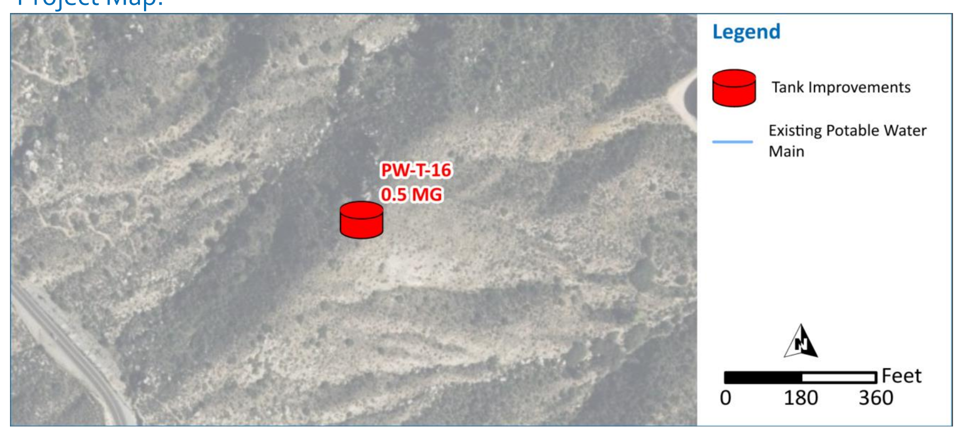
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,520,000
Total	100%	$ 2,520,000

Notes on Cost Estimation:
This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-T-18
Project Name: 2001 Horsethief 3 New Tank
System Type: Potable Water

Project Description:

Build a new 0.8-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	0.8	New	800,000	$ 2.70	$ 2,160,000	$ 2,592,000	$ 3,629,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

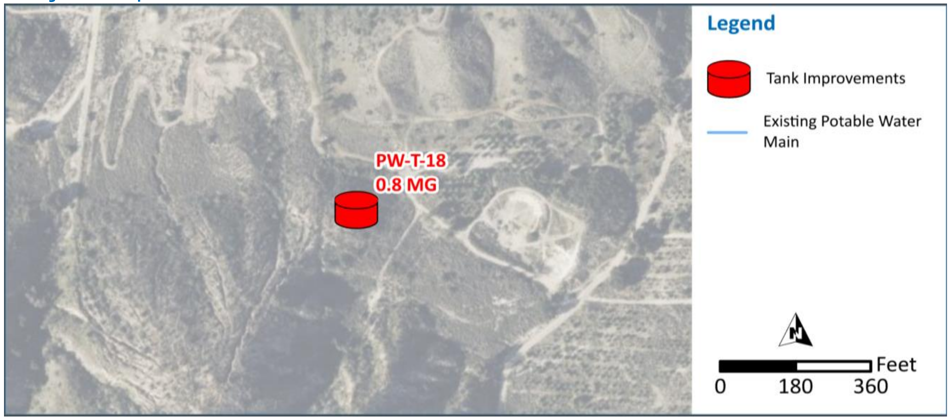
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 3,629,000
Total	100%	$ 3,629,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-T-19
Project Name: 2001 North Peak Zone New Tank
System Type: Potable Water

Project Description:

Build a new 0.7-MG storage tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	0.7	New	700,000	$ 2.70	$ 1,890,000	$ 2,268,000	$ 3,175,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

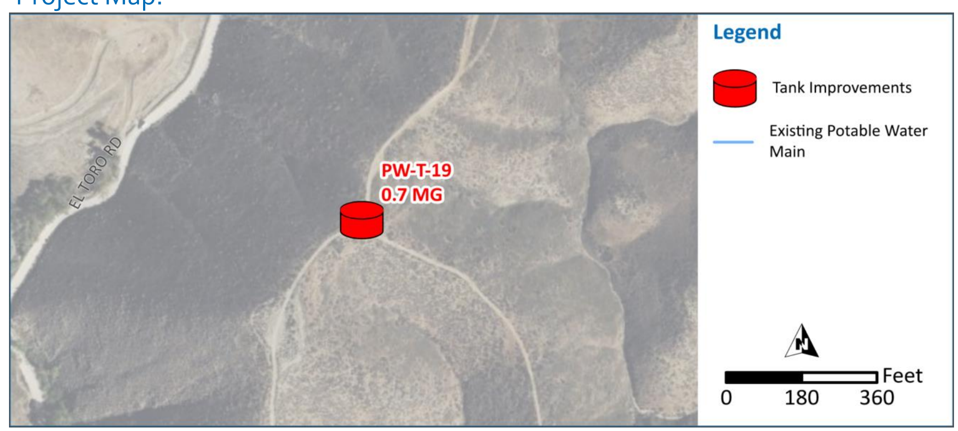
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 3,175,000
Total	100%	$ 3,175,000

Notes on Cost Estimation:

This project is for growth only, therefore, 100% of the cost have been assigned to future users.

Project Map:



Project Number: PW-T-20
Project Name: 2050 Greer Ranch 2 Zone Additional Tank
System Type: Potable Water

Project Description:

Build a new 1.0-MG storage tank at Greer Ranch 2; slightly extra storage to cover Greer Ranch 1 deficiency.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.00	1.0	New	1,000,000	$ 2.70	$ 2,700,000	$ 3,240,000	$ 4,536,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

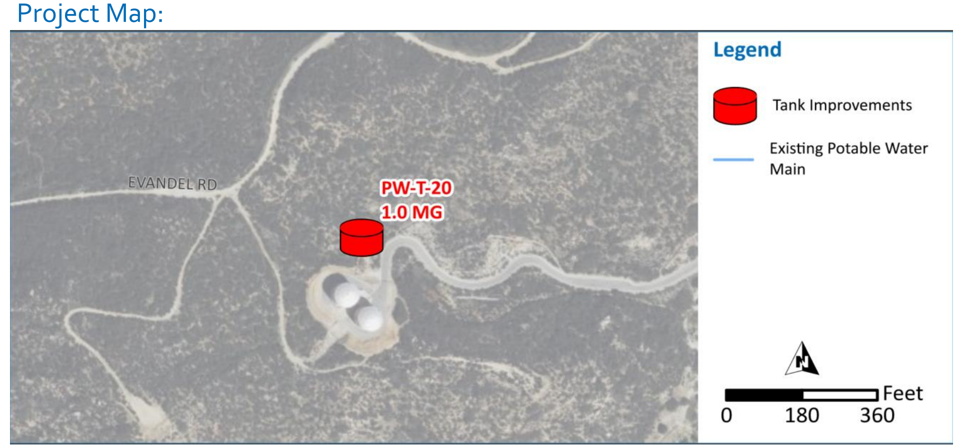
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	97%	$ 4,400,000
Future Users	3%	$ 136,000
Total	100%	$ 4,536,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-21
Project Name: 2196 Sedco Zone Tank Replacement
System Type: Potable Water

Project Description:

Build a new 0.4-MG storage tank

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.00	0.4	New	400,000	$ 3.00	$ 1,200,000	$ 1,440,000	$ 2,016,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

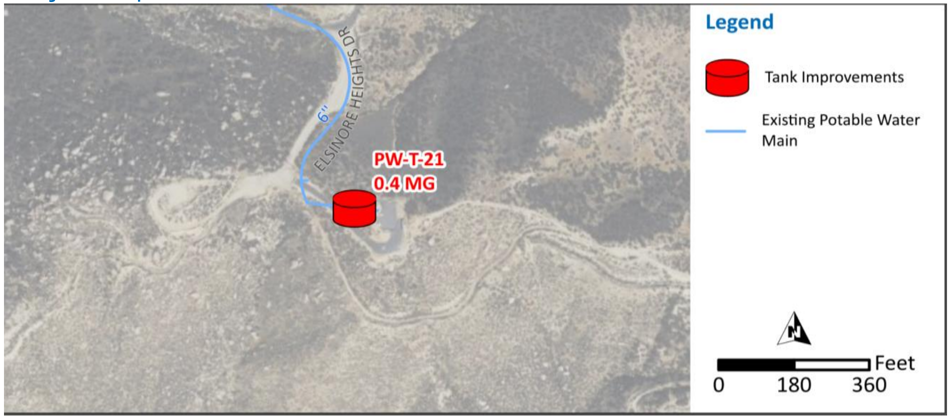
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	17%	$ 343,000
Future Users	83%	$ 1,673,000
Total	100%	$ 2,016,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Elsinore Valley Municipal Water District

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Project Number: PW-T-22
Project Name: 1882 Stage Ranch 1 Zone Additional Tank
System Type: Potable Water

Project Description:
Add fire pump at Stage Ranch 2 PS (1000 gpm) in lieu of storage.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[(1)] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Storage Tank	0.00	0.1	New	100,000	$ 8.00	$ 800,000	$ 960,000	$ 1,344,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

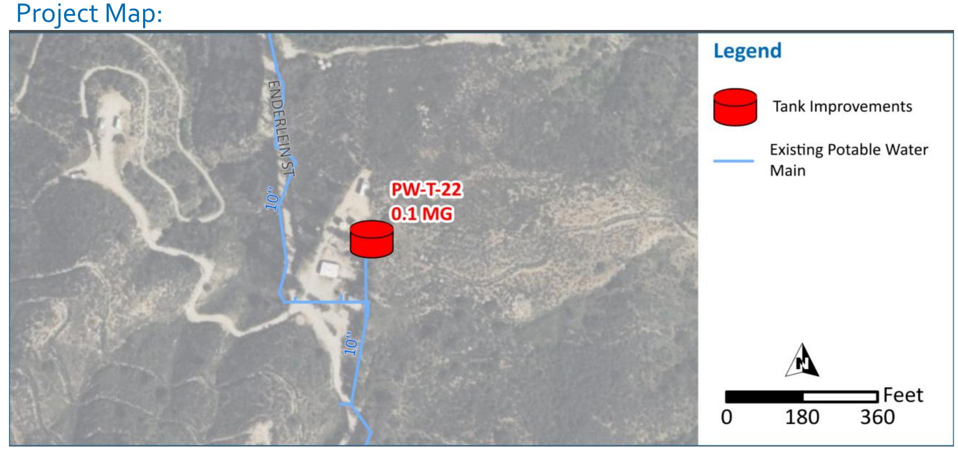
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-23
Project Name: 2309 Daley Zone Tank Replacement
System Type: Potable Water

Project Description:
Build 0.2-MG new tank to replace 0.088-MG existing tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.09	0.2	Replace	200,000	$ 6.00	$ 1,200,000	$ 1,440,000	$ 2,016,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

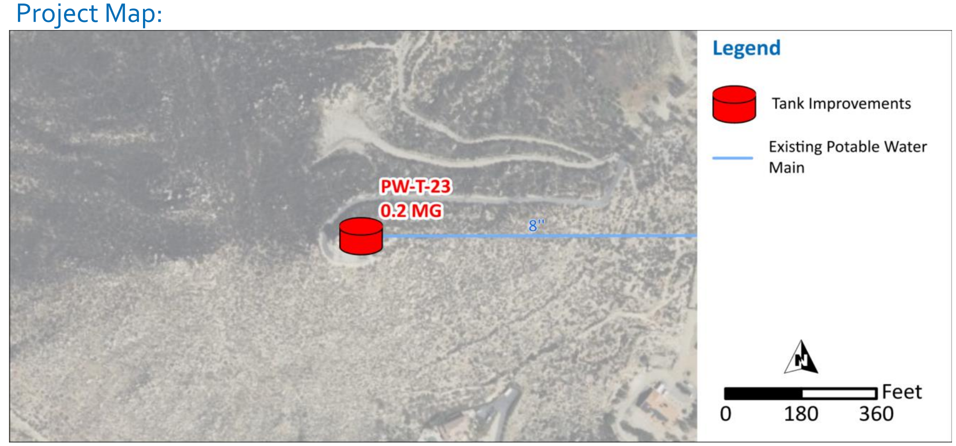
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,016,000
Future Users	0%	$ -
Total	100%	$ 2,016,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PW-T-25
Project Name: 2748 Los Pinos 1 Additional Tank
System Type: Potable Water

Project Description:

Build 0.25-MG new tank to replace 0.1-MG existing tank.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[(1)] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Storage Tank	0.10	0.25	Replace	250,000	$ 4.00	$ 1,000,000	$ 1,200,000	$ 1,680,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

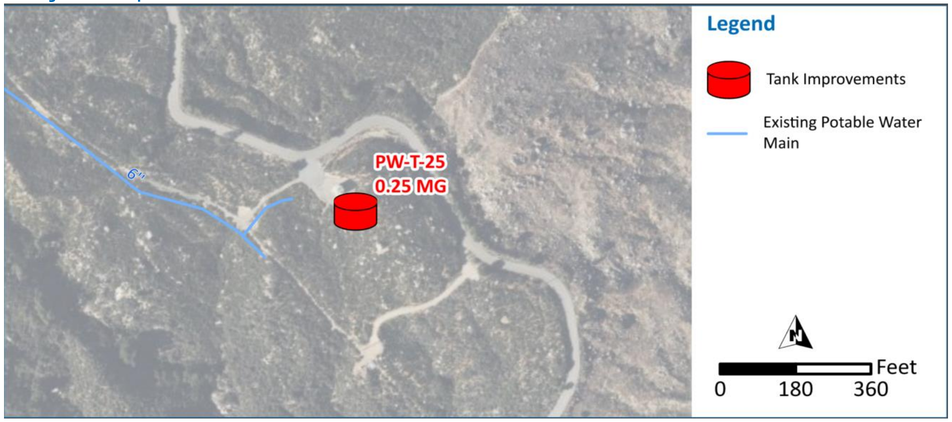
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,680,000
Future Users	0%	$ -
Total	100%	$ 1,680,000

Notes on Cost Estimation:

This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number: PW-V1
Project Name: Pressure Zone Tomlin 2 PS Pressure Reducing Valve Upgrade
System Type: Potable Water

Project Description:
Build a 8-inch-diameter pressure reducing valve at PZ Tomlin 2 PS.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	No.	Unit Cost[(1)] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pressure Reducing Valve	0	8	New	1	$ 250,000	$ 250,000	$ 300,000	$ 420,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 420,000
Future Users	0%	$ -
Total	100%	$ 420,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-V2
Project Name: Pressure Zone Los Pinos 1 PS Pressure Reducing Valve Upgrade
System Type: Potable Water

Project Description:
Build a 8-inch-diameter pressure reducing valve at PZ Los Pinos 1 PS.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	No.	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pressure Reducing Valve	0	8	New	1	$ 250,000	$ 250,000	$ 300,000	$ 420,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 420,000
Future Users	0%	$ -
Total	100%	$ 420,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:


Project Number: PWRR-P-2030
Project Name: Pipeline R&R Program
System Type: Potable Water

Project Description:

Replace any existing pipelines between 1951 and 1955 with different diameters into new pipelines with corresponding diameters shown in the table below by 2030.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	43,316	$ 325	$ 14,078,000	$16,894,000	$ 23,652,000	2025-2030
Pipe	10	10	Replace	1,173	$ 390	$ 458,000	$ 550,000	$ 770,000	2025-2030
Pipe	12	12	Replace	2,694	$ 390	$ 1,051,000	$ 1,261,000	$ 1,765,000	2025-2030
Pipe	14	14	Replace	745	$ 470	$ 350,000	$ 420,000	$ 588,000	2025-2030
Pipe	16	16	Replace	0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	18	18	Replace	0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	20 - 25.25	24	Replace	103	$ 630	$ 65,000	$ 78,000	$ 109,000	2025-2030
Pipe	27 - 36	36	Replace	66	$ 850	$ 56,000	$ 67,000	$ 94,000	2025-2030
Pipe	42	42	Replace	0	$ 1,000	$ -	$ -	$ -	2025-2030
Pipe	**Varies**	**Varies**	**Replace**	**48,097**	**Varies**	**$16,058,000**	**#######**	**$ 26,978,000**	**2025-2030**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

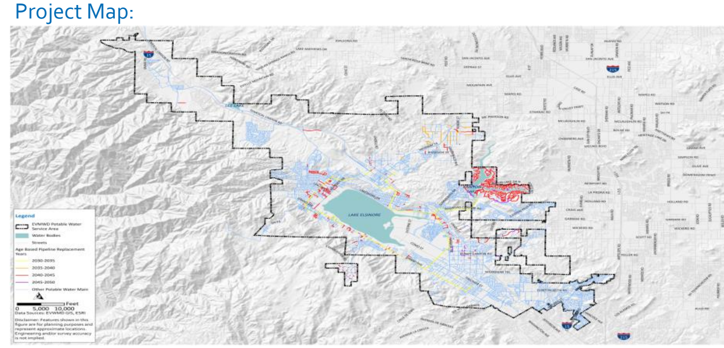
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 26,978,000
Future Users	0%	$ -
Total	100%	$ 26,978,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-P-2035
Project Name: Pipeline R&R Program
System Type: Potable Water

Project Description:

Replace any existing pipelines between 1956 and 1960 with different diameters into new pipelines with corresponding diameters shown in the table below by 2035.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	9,169	$ 325	$ 2,980,000	$ 3,576,000	$ 5,006,000	2030-2035
Pipe	10	10	Replace	3,695	$ 390	$ 1,441,000	$ 1,729,000	$ 2,421,000	2030-2035
Pipe	12	12	Replace	35	$ 390	$ 14,000	$ 17,000	$ 24,000	2030-2035
Pipe	14	14	Replace	17,311	$ 470	$ 8,136,000	$ 9,763,000	$ 13,668,000	2030-2035
Pipe	16	16	Replace	14,864	$ 470	$ 6,986,000	$ 8,383,000	$ 11,736,000	2030-2035
Pipe	18	18	Replace	0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	20 - 25.25	24	Replace	30,472	$ 630	$ 19,198,000	$ 23,038,000	$ 32,253,000	2030-2035
Pipe	27 - 36	36	Replace	32,357	$ 850	$ 27,504,000	$ 33,005,000	$ 46,207,000	2030-2035
Pipe	42	42	Replace	0	$ 1,000	$ -	$ -	$ -	2030-2035
Pipe	**Varies**	**Varies**	**Replace**	**107,903**	**Varies**	**$ 66,259,000**	**$ 79,511,000**	**$ 111,315,000**	**2030-2035**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

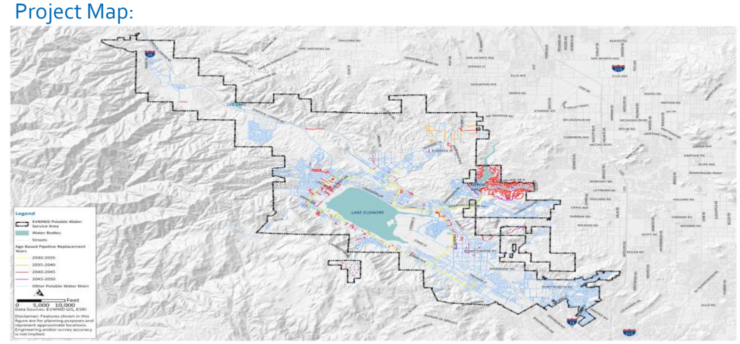
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 111,315,000
Future Users	0%	$ -
Total	100%	$ 111,315,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number:	PWRR-P-2040
Project Name:	Pipeline R&R Program
System Type:	Potable Water

Project Description:

Replace any existing pipelines between 1961 and 1965 with different diameters into new pipelines with corresponding diameters shown in the table below by 2040.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	28,863	$ 325	$ 9,380,000	$ 11,256,000	$ 15,758,000	2035-2040
Pipe	10	10	Replace	2,442	$ 390	$ 952,000	$ 1,142,000	$ 1,599,000	2035-2040
Pipe	12	12	Replace	0	$ 390	$ -	$ -	$ -	2035-2040
Pipe	14	14	Replace	0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	16	16	Replace	0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	18	18	Replace	0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	20 - 25.25	24	Replace	0	$ 630	$ -	$ -	$ -	2035-2040
Pipe	27 - 36	36	Replace	0	$ 850	$ -	$ -	$ -	2035-2040
Pipe	42	42	Replace	0	$ 1,000	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**Replace**	**31,305**	**Varies**	**$10,332,000**	**$ 12,398,000**	**$ 17,357,000**	**2035-2040**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

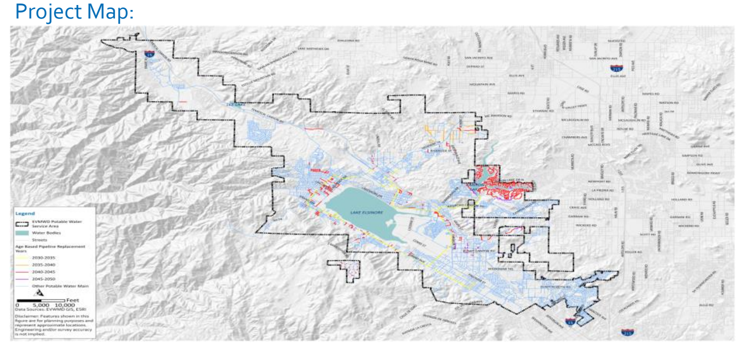
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 17,357,000
Future Users	0%	$ -
Total	100%	$ 17,357,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number:	PWRR-P-2045
Project Name:	Pipeline R&R Program
System Type:	Potable Water

Project Description:

Replace any existing pipelines between 1966 and 1970 with different diameters into new pipelines with corresponding diameters shown in the table below by 2045.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	≤8	8	Replace	204,371	$ 325	$ 66,421,000	$ 79,705,000	$ 111,587,000	2040-2045
Pipe	10	10	Replace	35,537	$ 390	$ 13,859,000	$ 16,631,000	$ 23,283,000	2040-2045
Pipe	12	12	Replace	12,826	$ 390	$ 5,002,000	$ 6,002,000	$ 8,403,000	2040-2045
Pipe	14	14	Replace	0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	16	16	Replace	0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	18	18	Replace	0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	20 - 25.25	24	Replace	0	$ 630	$ -	$ -	$ -	2040-2045
Pipe	27 - 36	36	Replace	0	$ 850	$ -	$ -	$ -	2040-2045
Pipe	42	42	Replace	0	$ 1,000	$ -	$ -	$ -	2040-2045
Pipe	**Varies**	**Varies**	**Replace**	**252,734**	**Varies**	**$85,282,000**	**#######**	**########**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

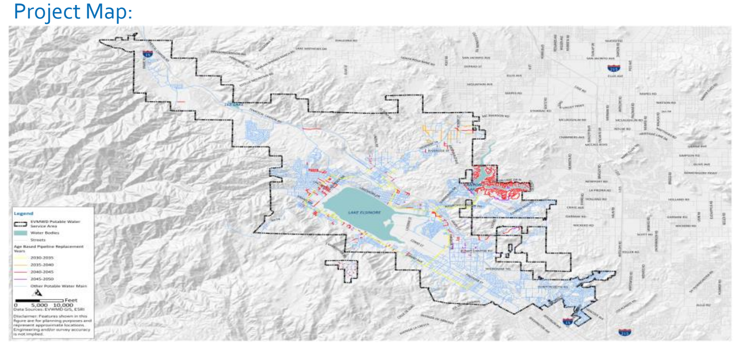
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 143,273,000
Future Users	0%	$ -
Total	100%	$ 143,273,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PWRR-P-2050
Project Name: Pipeline R&R Program
System Type: Potable Water

Project Description:
Replace any existing pipelines between 1971 and 1975 with different diameters into new pipelines with corresponding diameters shown in the table below by 2050.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	12,834	$ 325	$ 4,171,000	$ 5,005,000	$ 7,007,000	2045-2050
Pipe	10	10	Replace	5,968	$ 390	$ 2,328,000	$ 2,794,000	$ 3,912,000	2045-2050
Pipe	12	12	Replace	1,129	$ 390	$ 440,000	$ 528,000	$ 739,000	2045-2050
Pipe	14	14	Replace	0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	16	16	Replace	136	$ 470	$ 64,000	$ 77,000	$ 108,000	2045-2050
Pipe	18	18	Replace	0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	20 - 25.25	24	Replace	0	$ 630	$ -	$ -	$ -	2045-2050
Pipe	27 - 36	36	Replace	0	$ 850	$ -	$ -	$ -	2045-2050
Pipe	42	42	Replace	0	$ 1,000	$ -	$ -	$ -	2045-2050
Pipe	**Varies**	**Varies**	**Replace**	**20,067**	**Varies**	**$ 7,003,000**	**$ 8,404,000**	**$ 11,766,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

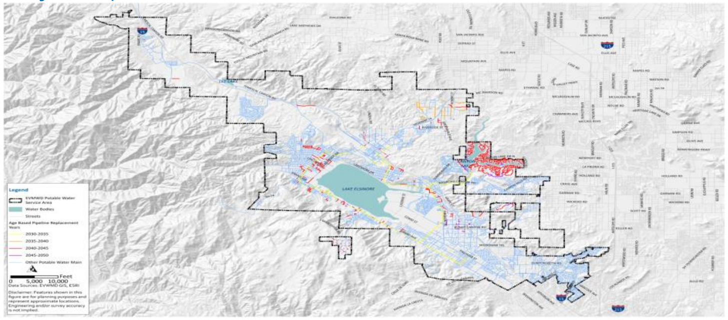
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$11,766,000
Future Users	0%	$ -
Total	100%	$ 11,766,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

Project Number: PWRR-W1
Project Name: Cereal No. 1 Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-W2
Project Name: Cereal No. 3 Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-W3
Project Name: Cereal No. 4 Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[1] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

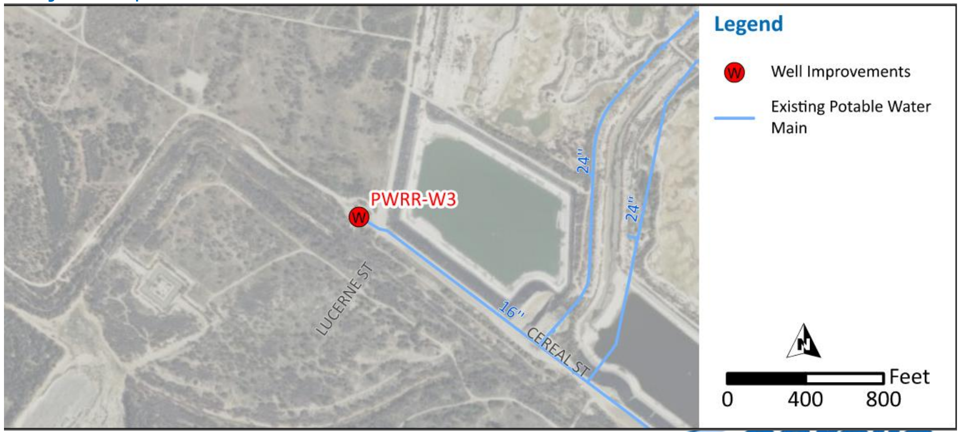
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PWRR-W4
Project Name: Corydon St Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-W5
Project Name: Diamond Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2028 and 2030 and again between 2045 and 2050.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2025-2030
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

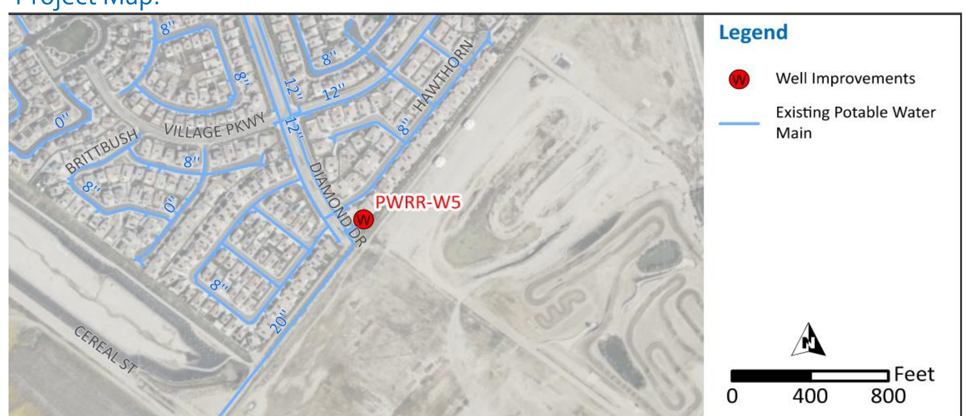
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number:	PWRR-W6
Project Name:	Joy St Well
System Type:	Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	PWRR-W7
Project Name:	Lincoln St Well
System Type:	Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-W8
Project Name: Lee Lake Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump		1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-W9
Project Name: Machado St Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-W10
Project Name: Mayhew Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[1] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-W11
Project Name: Station 71 Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2023 and 2025 and again between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[1] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2023-2025
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-W12
Project Name: Summerly Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2028 and 2030 and again between 2045 and 2050.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost(1) ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2025-2030
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

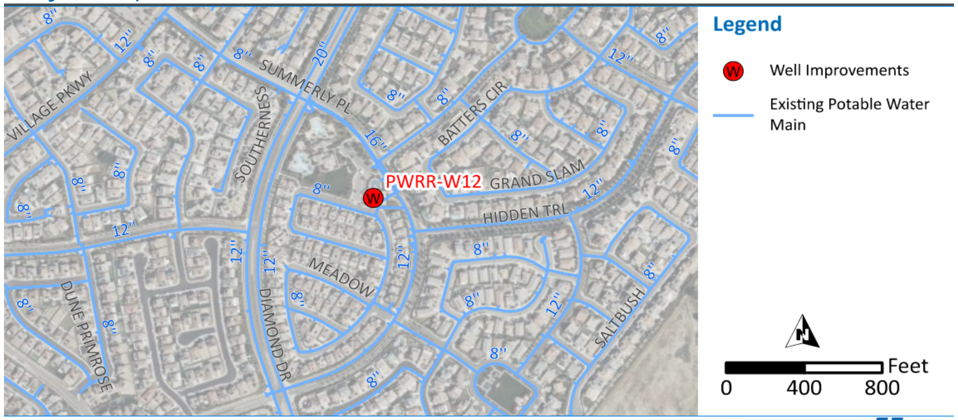
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,688,000
Future Users	0%	$ -
Total	100%	$ 2,688,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PWRR-W13
Project Name: Terra Cotta Well
System Type: Potable Water

Project Description:

Replace existing well pump with new pump between 2040 and 2045.

Project Details:

Project Element	Existing Well	Proposed Well	Replace/ New	No.	Unit Cost[(1)] ($/EA)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Well Pump	1	1	Replace	1	$ 800,000	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: SDR-2030
Project Name: Pipeline Small Diameter Replacement Program
System Type: Potable Water

Project Description:

Replace all the existing pipelines build between 1951 and 1955 with diameters equal or smaller than 8 inches into 8-inch new pipelines and replace 10-inch existing pipeline into 10-inch new pipeline by 2030.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	18,071	$ 325	$ 5,873,000	$ 7,048,000	$ 9,867,000	2025-2030
Pipe	10	10	Replace	404	$ 390	$ 158,000	$ 190,000	$ 266,000	2025-2030
Pipe	**≤8 / 10**	**8 / 10**	**Replace**	**18,475**	**Varies**	**$ 6,031,000**	**$ 7,238,000**	**$ 10,133,000**	**2025-2030**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

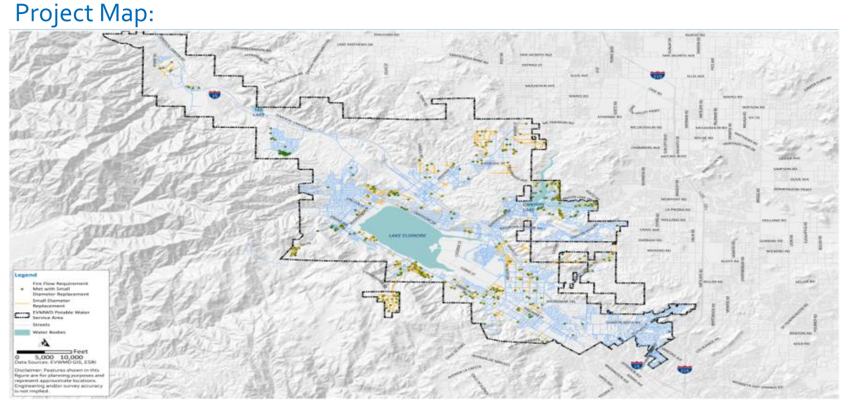
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$10,133,000
Future Users	0%	$ -
Total	100%	$ 10,133,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: SDR-2035
Project Name: Pipeline Small Diameter Replacement Program
System Type: Potable Water

Project Description:

Replace all the existing pipelines between 1956 and 1960 with diameters equal or smaller than 8 inches into 8-inch new pipelines by 2035.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	≤8	8	Replace	5,861	$ 325	$ 1,905,000	$ 2,286,000	$ 3,200,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

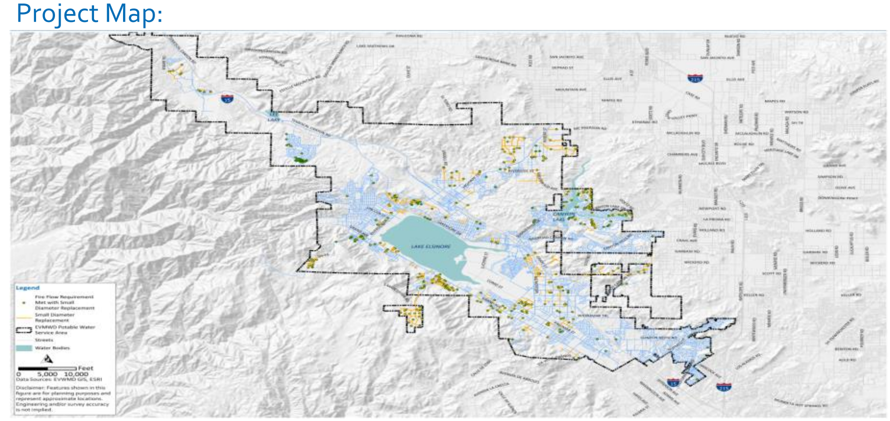
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 3,200,000
Future Users	0%	$ -
Total	100%	$ 3,200,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

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Project Number:	SDR-2040
Project Name:	Pipeline Small Diameter Replacement Program
System Type:	Potable Water

Project Description:

Replace all the existing pipelines between 1961 and 1965 with diameters equal or smaller than 8 inches into 8-inch new pipelines by 2040.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	25,375	$ 325	$ 8,247,000	$ 9,896,000	$ 13,854,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

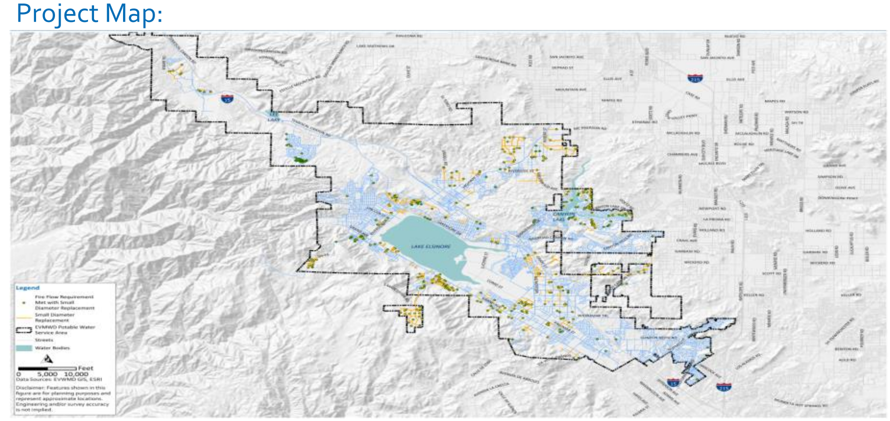
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$13,854,000
Future Users	0%	$ -
Total	100%	$13,854,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

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Project Number: SDR-2045
Project Name: Pipeline Small Diameter Replacement Program
System Type: Potable Water

Project Description:

Replace all the existing pipelines between 1966 and 1970 with diameters equal or smaller than 8 inches into 8-inch new pipelines by 2045.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	89,834	$ 325	$29,196,000	$ 35,035,000	$ 49,049,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

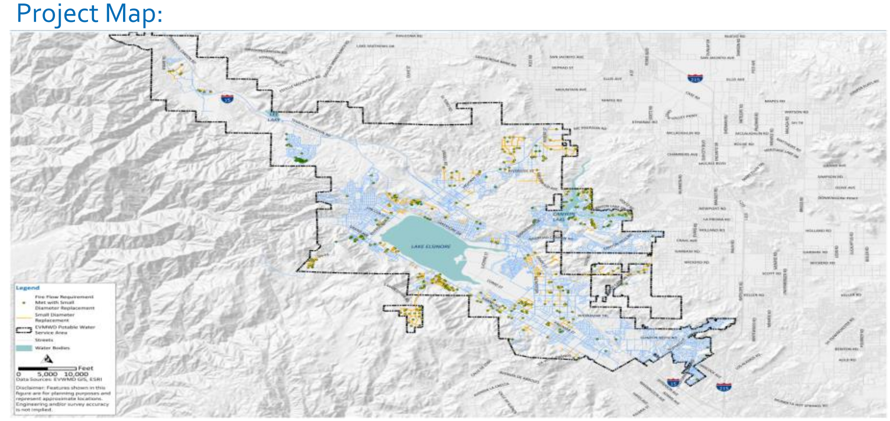
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	#######
Future Users	0%	$ -
Total	100%	#######

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: SDR-2050
Project Name: Pipeline Small Diameter Replacement Program
System Type: Potable Water

Project Description:

Replace all the existing pipelines between 1971 and 1975 with diameters equal or smaller than 8 inches into 8-inch new pipelines by 2050.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	≤8	8	Replace	3,752	$ 325	$ 1,219,000	$ 1,463,000	$ 2,048,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

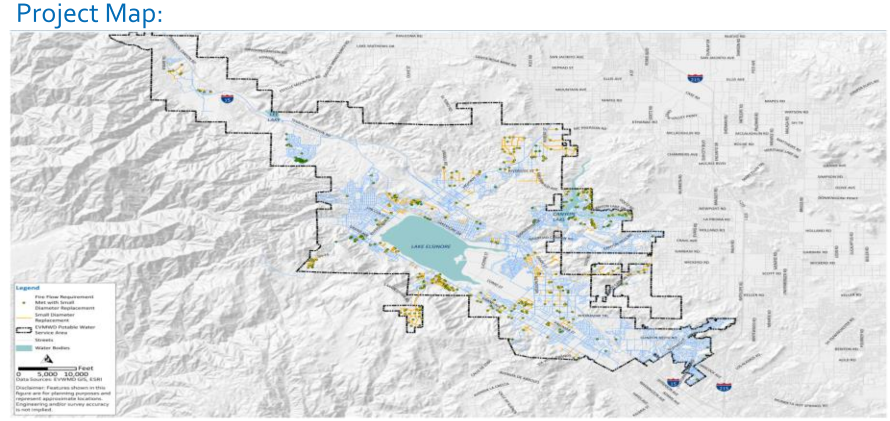
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,048,000
Future Users	0%	$ -
Total	100%	$ 2,048,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number:	FF-01
Project Name:	Fire Flow Pipeline Improvement Project - Warm Springs Dr
System Type:	Potable Water

Project Description:

Replace existing pipelines and build new pipelines in total of 20,600 ft near Warm Springs Drive and Temescal Canyon Road.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	6	8	Replace	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2045-2050
Pipe	4 to 8	12	Replace	3,400	$ 390	$ 1,326,000	$ 1,591,000	$ 2,227,000	2045-2050
Pipe	4 to 12	16	Replace	15,400	$ 470	$ 7,238,000	$ 8,686,000	$ 12,160,000	2045-2050
Pipe	N/A	20	New	1,700	$ 570	$ 969,000	$ 1,163,000	$ 1,628,000	2045-2050
Pipe	**6**	**Varies**	**eplace/Ne**	**20,600**	**Varies**	**$ 9,566,000**	**$ 11,480,000**	**$ 16,072,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 16,071,000
Future Users	0%	$ -
Total	100%	$ 16,071,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-02
Project Name: Fire Flow Pipeline Improvement Project - Canyon Hills Dr
System Type: Potable Water

Project Description:
Replace existing 500-ft pipelines near Canyon Hills Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2040-2045
Pipe	6	12	Replace	500	$ 390	$ 195,000	$ 234,000	$ 328,000	2040-2045
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**6**	**12**	**Replace**	**500**	**$ 390**	**$ 195,000**	**$ 234,000**	**$ 328,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 328,000
Future Users	0%	$ -
Total	100%	$ 328,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-03
Project Name: Fire Flow Pipeline Improvement Project - Richard St
System Type: Potable Water

Project Description:

Replace existing 3,200-ft pipelines and build 5,900-ft new pipelines near Richard Street and Theda Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8	New	600	$ 325	$ 195,000	$ 234,000	$ 328,000	2035-2040
Pipe	N/A	12	New	5,300	$ 390	$ 2,067,000	$ 2,480,000	$ 3,472,000	2035-2040
Pipe	4	12	Replace	100	$ 390	$ 39,000	$ 47,000	$ 66,000	2035-2040
Pipe	4 to 8	16	Replace	3,100	$ 470	$ 1,457,000	$ 1,748,000	$ 2,447,000	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**ew/Repla**	**9,100**	**Varies**	**$ 3,758,000**	**$ 4,509,000**	**$ 6,313,000**	**2035-2040**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 6,313,000
Future Users	0%	$ -
Total	100%	$ 6,313,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-04
Project Name: Fire Flow Pipeline Improvement Project - Riverview Dr
System Type: Potable Water

Project Description:

Build 1,600-ft new pipeline near Riverview Drive

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	1,600	$ 325	$ 520,000	$ 624,000	$ 874,000	2035-2040
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**N/A**	**8**	**New**	**1,600**	**$ 325**	**$ 520,000**	**$ 624,000**	**$ 874,000**	**2035-2040**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 874,000
Future Users	0%	$ -
Total	100%	$ 874,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-05
Project Name: Fire Flow Pipeline Improvement Project - Greenwald Ave
System Type: Potable Water

Project Description:

Replace 1,400-ft existing pipeline near Greenwald Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2025-2030
Pipe	6	12	Replace	1,400	$ 390	$ 546,000	$ 655,000	$ 917,000	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**6**	**12**	**Replace**	**1,400**	**$ 390**	**$ 546,000**	**$ 655,000**	**$ 917,000**	**2025-2030**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 917,000
Future Users	0%	$ -
Total	100%	$ 917,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-06
Project Name:	Fire Flow Pipeline Improvement Project - El Toro Cut Off Rd
System Type:	Potable Water

Project Description:

Build 1,200-ft new pipeline near El Toro Cut Off Road.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2040-2045
Pipe	N/A	12	New	1,200	$ 390	$ 468,000	$ 562,000	$ 787,000	2040-2045
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**N/A**	**12**	**New**	**1,200**	**$ 390**	**$ 468,000**	**$ 562,000**	**$ 787,000**	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 787,000
Future Users	0%	$ -
Total	100%	$ 787,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

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Project Number:	FF-07
Project Name:	Fire Flow Pipeline Improvement Project - Allan St
System Type:	Potable Water

Project Description:

Replace 1,900-ft existing pipeline near Allan Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2035-2040
Pipe	6 & 8	12	Replace	1,900	$ 390	$ 741,000	$ 889,000	$ 1,245,000	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**6 & 8**	**12**	**Replace**	**1,900**	**$ 390**	**$ 741,000**	**$ 889,000**	**$ 1,245,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,245,000
Future Users	0%	$ -
Total	100%	$ 1,245,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-08
Project Name:	Fire Flow Pipeline Improvement Project - 2nd St
System Type:	Potable Water

Project Description:

Build 1,400-ft new pipeline near 2nd Street and Cambern Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	N/A	12	New	1,400	$ 390	$ 546,000	$ 655,000	$ 917,000	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**N/A**	**12**	**New**	**1,400**	**$ 390**	**$ 546,000**	**$ 655,000**	**$ 917,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 917,000
Future Users	0%	$ -
Total	100%	$ 917,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-09
Project Name: Fire Flow Pipeline Improvement Project - W Graham Ave
System Type: Potable Water

Project Description:
Build 1,300-ft new pipeline near W Graham Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	1,300	$ 325	$ 423,000	$ 508,000	$ 711,000	2035-2040
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**N/A**	**8**	**New**	**1,300**	**$ 325**	**$ 423,000**	**$ 508,000**	**$ 711,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 711,000
Future Users	0%	$ -
Total	100%	$ 711,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-10
Project Name:	Fire Flow Pipeline Improvement Project - Sunnyslope Ave
System Type:	Potable Water

Project Description:

Replace 10,700-ft existing pipeline and build 2,000-ft new pipeline near Sunnyslope Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	400	$ 325	$ 130,000	$ 156,000	$ 218,000	2030-2035
Pipe	N/A	8	New	2,000	$ 325	$ 650,000	$ 780,000	$ 1,092,000	2030-2035
Pipe	6 & 8	12	Replace	10,300	$ 390	$ 4,017,000	$ 4,820,000	$ 6,748,000	2030-2035
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**Varies**	**Varies**	**eplace/Ne**	**12,700**	**Varies**	**$ 4,797,000**	**$ 5,756,000**	**$ 8,058,000**	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 8,058,000
Future Users	0%	$ -
Total	100%	$ 8,058,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-11
Project Name:	Fire Flow Pipeline Improvement Project - Lakeview Ave
System Type:	Potable Water

Project Description:

Build 4,300-ft new pipeline near Lakeview Avenue and Skyline Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	N/A	12	New	4,300	$ 390	$ 1,677,000	$ 2,012,000	$ 2,817,000	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**N/A**	**12**	**New**	**4,300**	**$ 390**	**$ 1,677,000**	**$ 2,012,000**	**$ 2,817,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,817,000
Future Users	0%	$ -
Total	100%	$ 2,817,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-12
Project Name: Fire Flow Pipeline Improvement Project - Lash St
System Type: Potable Water

Project Description:
Replace 3,300-ft existing pipeline and build 200-ft new pipeline near Skyline Drive and Lash Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	5 & 8	8	Replace	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2030-2035
Pipe	N/A	8	New	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2030-2035
Pipe	5 to 8	12	Replace	2,800	$ 390	$ 1,092,000	$ 1,310,000	$ 1,834,000	2030-2035
Pipe	8	16	Replace	400	$ 470	$ 188,000	$ 226,000	$ 316,000	2030-2035
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**Varies**	**Varies**	**eplace/Ne**	**3,500**	**Varies**	**$ 1,378,000**	**$ 1,654,000**	**$ 2,316,000**	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,315,000
Future Users	0%	$ -
Total	100%	$ 2,315,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-13
Project Name: Fire Flow Pipeline Improvement Project - De Brask Ave
System Type: Potable Water

Project Description:

Replace 600-ft existing pipeline and build 500-ft new pipeline near De Brask Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	2 & 4	8	Replace	600	$ 325	$ 195,000	$ 234,000	$ 328,000	2030-2035
Pipe	N/A	8	New	500	$ 325	$ 163,000	$ 196,000	$ 274,000	2030-2035
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2030-2035
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**2 & 4**	**Varies**	**eplace/Ne**	**1,100**	**Varies**	**$ 358,000**	**$ 430,000**	**$ 602,000**	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 602,000
Future Users	0%	$ -
Total	100%	$ 602,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-14
Project Name:	Fire Flow Pipeline Improvement Project - Dryden St
System Type:	Potable Water

Project Description:

Replace 10,000-ft existing pipeline and build 3,600-ft new pipeline near Dryden Street and Gunnerson Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8	New	2,100	$ 325	$ 683,000	$ 820,000	$ 1,148,000	2035-2040
Pipe	2 to 8	12	Replace	10,000	$ 390	$ 3,900,000	$ 4,680,000	$ 6,552,000	2035-2040
Pipe	N/A	12	New	1,500	$ 390	$ 585,000	$ 702,000	$ 983,000	2035-2040
Pipe	N/A	16		0	470			0	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	2 to 8	Varies	eplace/Ne	13,600	Varies	$ 5,168,000	$ 6,202,000	$ 8,683,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

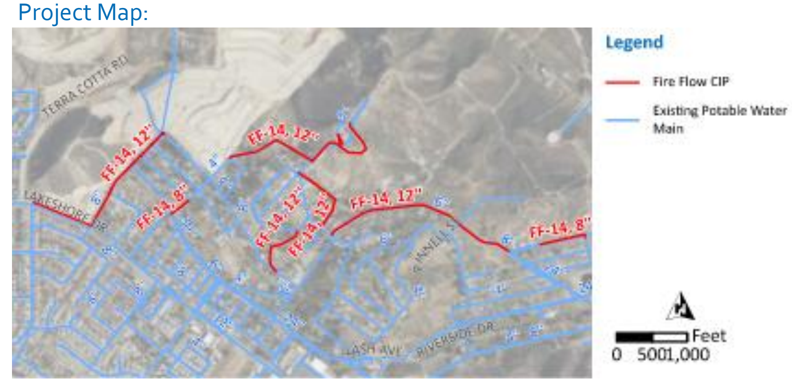
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 8,683,000
Future Users	0%	$ -
Total	100%	$ 8,683,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-15
Project Name: Fire Flow Pipeline Improvement Project - Raven Dr
System Type: Potable Water

Project Description:

Replace 7,700-ft existing pipeline and build 500-ft new pipeline near Raven Drive and Amber Lane.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[(1)] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pipe	N/A	8	New	500	$ 325	$ 163,000	$ 196,000	$ 274,000	2035-2040
Pipe	6 & 8	12	Replace	7,700	$ 390	$ 3,003,000	$ 3,604,000	$ 5,046,000	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**6 & 8**	**Varies**	**eplace/Ne**	**8,200**	**Varies**	**$ 3,166,000**	**$ 3,800,000**	**$ 5,320,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 5,320,000
Future Users	0%	$ -
Total	100%	$ 5,320,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-16
Project Name: Fire Flow Pipeline Improvement Project - Zieglinde Dr
System Type: Potable Water

Project Description:
Build 1,300-ft new pipeline near Machado Street and Zieglinde Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	1,300	$ 325	$ 423,000	$ 508,000	$ 711,000	2025-2030
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**N/A**	**8**	**New**	**1,300**	**$ 325**	**$ 423,000**	**$ 508,000**	**$ 711,000**	2025-2030

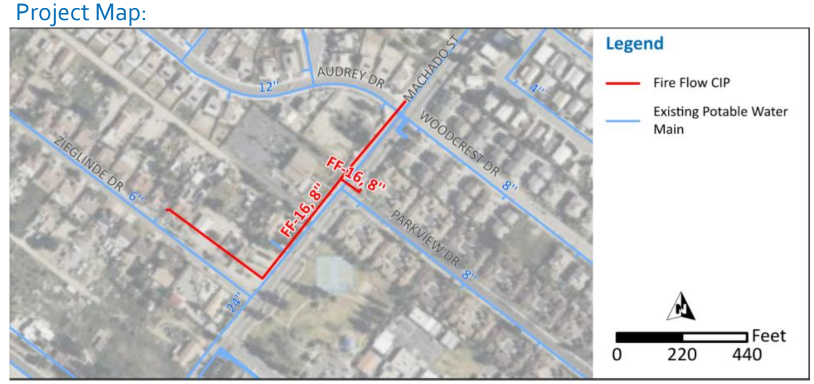
Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 711,000
Future Users	0%	$ -
Total	100%	$ 711,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-17
Project Name: Fire Flow Pipeline Improvement Project - Ficus St
System Type: Potable Water

Project Description:
Replace 1,500-ft existing pipeline near Ficus Street and Lake Trail Circle.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2045-2050
Pipe	8	12	Replace	1,400	$ 390	$ 546,000	$ 655,000	$ 917,000	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**Varies**	**Varies**	**Replace**	**1,500**	**Varies**	**$ 579,000**	**$ 695,000**	**$ 973,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 973,000
Future Users	0%	$ -
Total	100%	$ 973,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-18
Project Name: Fire Flow Pipeline Improvement Project - Ulla Ln
System Type: Potable Water

Project Description:

Replace 600-ft existing pipeline near Ulla Lane.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2025-2030
Pipe	6	12	Replace	600	$ 390	$ 234,000	$ 281,000	$ 393,000	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**6**	**12**	**Replace**	**600**	**$ 390**	**$ 234,000**	**$ 281,000**	**$ 393,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 393,000
Future Users	0%	$ -
Total	100%	$ 393,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-19
Project Name:	Fire Flow Pipeline Improvement Project - Oregon St
System Type:	Potable Water

Project Description:

Build 400-ft new pipeline near Grand Avenue and Oregon Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8	New	400	$ 325	$ 130,000	$ 156,000	$ 218,000	2025-2030
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**N/A**	**8**	**New**	**400**	**$ 325**	**$ 130,000**	**$ 156,000**	**$ 218,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 218,000
Future Users	0%	$ -
Total	100%	$ 218,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

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Project Number: FF-20
Project Name: Fire Flow Pipeline Improvement Project - Kevin Pl
System Type: Potable Water

Project Description:
Build 300-ft new pipeline near Kevin Place.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	300	$ 325	$ 98,000	$ 118,000	$ 165,000	2025-2030
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**N/A**	**8**	**New**	**300**	**$ 325**	**$ 98,000**	**$ 118,000**	**$ 165,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

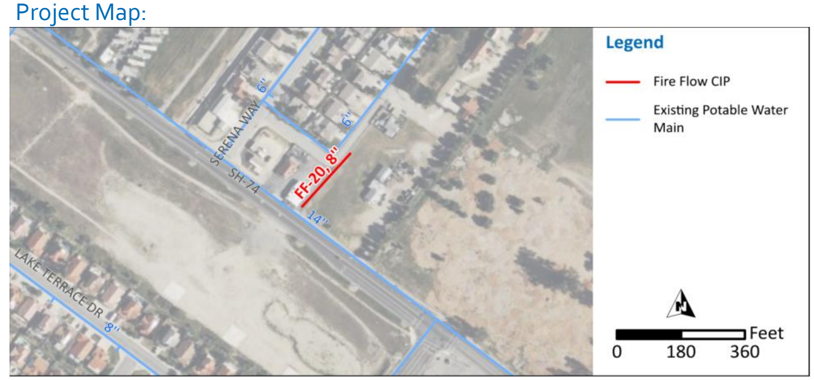
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 165,000
Future Users	0%	$ -
Total	100%	$ 165,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-21
Project Name: Fire Flow Pipeline Improvement Project - Macy St
System Type: Potable Water

Project Description:
Build 100-ft new pipeline near Macy Street and Lake Terrace Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2045-2050
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**N/A**	**8**	**New**	**100**	**$ 325**	**$ 33,000**	**$ 40,000**	**$ 56,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 56,000
Future Users	0%	$ -
Total	100%	$ 56,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-22
Project Name: Fire Flow Pipeline Improvement Project - Cedar Dr
System Type: Potable Water

Project Description:
Replace 200-ft existing pipeline near Grand Avenue and Cedar Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2025-2030
Pipe	N/A	12		0	$ 390	$ -	$ -	$ -	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**8**	**8**	**Replace**	**200**	**$ 325**	**$ 65,000**	**$ 78,000**	**$ 109,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

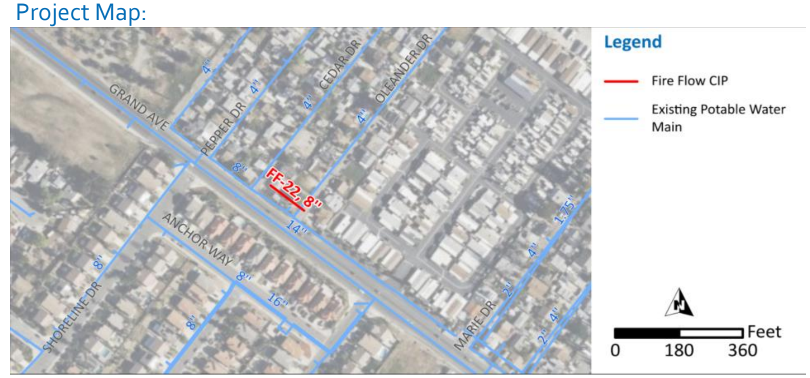
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 109,000
Future Users	0%	$ -
Total	100%	$ 109,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



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Project Number: FF-23
Project Name: Fire Flow Pipeline Improvement Project - Sangston Dr
System Type: Potable Water

Project Description:

Replace 500-ft existing pipeline near Via Sola and Sangston Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2023-2025
Pipe	6 & 8	12	Replace	500	$ 390	$ 195,000	$ 234,000	$ 328,000	2023-2025
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2023-2025
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2023-2025
Pipe	**6 & 8**	**12**	**Replace**	**500**	**$ 390**	**$ 195,000**	**$ 234,000**	**$ 328,000**	2023-2025

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

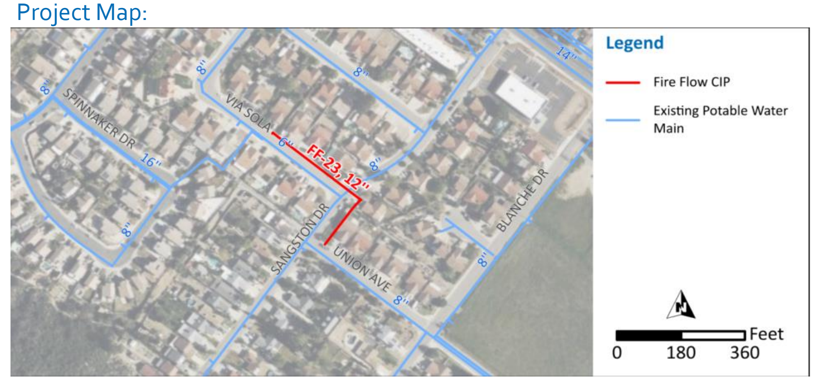
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 328,000
Future Users	0%	$ -
Total	100%	$ 328,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-24
Project Name: Fire Flow Pipeline Improvement Project - Curtis Ave
System Type: Potable Water

Project Description:
Replace existing pipeline and build new pipeline near Maiden Lane and Curtis Avenue

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[(1)] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Pipe	N/A	8	New	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2025-2030
Pipe	N/A	12	New	0	$ 390	$ -	$ -	$ -	2025-2030
Pipe	N/A	16	New	0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20	New	0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**N/A**	**8**	**New**	**100**	**$ 325**	**$ 33,000**	**$ 40,000**	**$ 56,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 56,000
Future Users	0%	$ -
Total	100%	$ 56,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-25
Project Name: Fire Flow Pipeline Improvement Project - Coleman Ave
System Type: Potable Water

Project Description:
Replace 1,400-ft existing pipeline near Alta Vista Street and Coleman Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2030-2035
Pipe	4 & 8	12	Replace	1,400	$ 390	$ 546,000	$ 655,000	$ 917,000	2030-2035
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**4 & 8**	**12**	**Replace**	**1,400**	**$ 390**	**$ 546,000**	**$ 655,000**	**$ 917,000**	2030-2035

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 917,000
Future Users	0%	$ -
Total	100%	$ 917,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-26
Project Name: Fire Flow Pipeline Improvement Project - Grand Ave
System Type: Potable Water

Project Description:
Replace 1,000-ft existing pipeline near Grand Avenue.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2025-2030
Pipe	4	12	Replace	1,000	$ 390	$ 390,000	$ 468,000	$ 655,000	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**4**	**12**	**Replace**	**1,000**	**$ 390**	**$ 390,000**	**$ 468,000**	**$ 655,000**	2025-2030

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 655,000
Future Users	0%	$ -
Total	100%	$ 655,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-27
Project Name: Fire Flow Pipeline Improvement Project - Stoneman St
System Type: Potable Water

Project Description:
Replace 1,100-ft existing pipeline near Stoneman Street.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2040-2045
Pipe	6 & 8	12	Replace	1,100	$ 390	$ 429,000	$ 515,000	$ 721,000	2040-2045
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**6 & 8**	**12**	**Replace**	**1,100**	**$ 390**	**$ 429,000**	**$ 515,000**	**$ 721,000**	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 721,000
Future Users	0%	$ -
Total	100%	$ 721,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-28
Project Name: Fire Flow Pipeline Improvement Project - Arbolado Ln
System Type: Potable Water

Project Description:
Replace 1,600-ft existing pipeline near Arbolado Lane.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	6	8	Replace	1,500	$ 325	$ 488,000	$ 586,000	$ 820,000	2025-2030
Pipe	4	12	Replace	100	$ 390	$ 39,000	$ 47,000	$ 66,000	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**Varies**	**Varies**	**Replace**	**1,600**	**Varies**	**$ 527,000**	**$ 633,000**	**$ 886,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

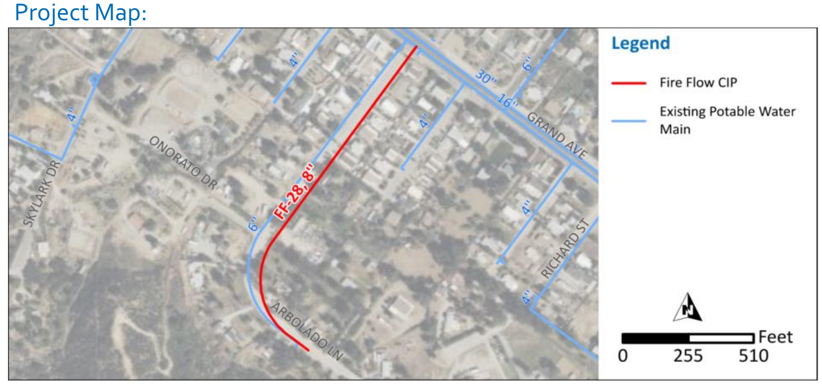
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 886,000
Future Users	0%	$ -
Total	100%	$ 886,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-29
Project Name: Fire Flow Pipeline Improvement Project - Melinda Ln
System Type: Potable Water

Project Description:
Replace 500-ft existing pipeline and build 400-ft new pipeline near Melinda Lane and Beecher Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	400	$ 325	$ 130,000	$ 156,000	$ 218,000	2045-2050
Pipe	4	12	Replace	500	$ 390	$ 195,000	$ 234,000	$ 328,000	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**Varies**	**Varies**	**eplace/Ne**	**900**	**Varies**	**$ 325,000**	**$ 390,000**	**$ 546,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 546,000
Future Users	0%	$ -
Total	100%	$ 546,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-30
Project Name: Fire Flow Pipeline Improvement Project - Wilson St
System Type: Potable Water

Project Description:
Replace 1,200-ft existing pipeline near Wilson Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	8	12	Replace	1,200	$ 390	$ 468,000	$ 562,000	$ 787,000	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**8**	**12**	**Replace**	**1,200**	**$ 390**	**$ 468,000**	**$ 562,000**	**$ 787,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 787,000
Future Users	0%	$ -
Total	100%	$ 787,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-31
Project Name: Fire Flow Pipeline Improvement Project - Leslie St
System Type: Potable Water

Project Description:
Build 1,700-ft new pipeline near Leslie Street and Alameda Del Monte

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	1,700	$ 325	$ 553,000	$ 664,000	$ 930,000	2045-2050
Pipe	N/A	12			$ 390	$ -	$ -	$ -	2045-2050
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**N/A**	**8**	**New**	**1,700**	**$ 325**	**$ 553,000**	**$ 664,000**	**$ 930,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 930,000
Future Users	0%	$ -
Total	100%	$ 930,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-32
Project Name: Fire Flow Pipeline Improvement Project - Illinois St
System Type: Potable Water

Project Description:
Build 1,000-ft new pipeline near Cedar Street and Illinois Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2035-2040
Pipe	N/A	12	New	800	$ 390	$ 312,000	$ 374,000	$ 524,000	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**New**	**1,000**	**Varies**	**$ 377,000**	**$ 452,000**	**$ 633,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 633,000
Future Users	0%	$ -
Total	100%	$ 633,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-33
Project Name: Fire Flow Pipeline Improvement Project - Gruwell St
System Type: Potable Water

Project Description:

Replace 1,600-ft existing pipeline and build 1,300-ft new pipeline near Gruwell Street and Orange Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2035-2040
Pipe	4 to 8	12	Replace	1,600	$ 390	$ 624,000	$ 749,000	$ 1,049,000	2035-2040
Pipe	N/A	12	New	1,300	$ 390	$ 507,000	$ 608,000	$ 851,000	2035-2040
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**4 to 8**	**Varies**	**place/Ne**	**2,900**	**Varies**	**$ 1,131,000**	**$ 1,357,000**	**$ 1,900,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,900,000
Future Users	0%	$ -
Total	100%	$ 1,900,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-34
Project Name:	Fire Flow Pipeline Improvement Project - Symphony Park Ln
System Type:	Potable Water

Project Description:

Replace 700-ft existing pipeline near Symphony Park Lane

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2040-2045
Pipe	8	12	Replace	700	$ 390	$ 273,000	$ 328,000	$ 459,000	2040-2045
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**8**	**12**	**Replace**	**700**	**$ 390**	**$ 273,000**	**$ 328,000**	**$ 459,000**	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 459,000
Future Users	0%	$ -
Total	100%	$ 459,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-35
Project Name: Fire Flow Pipeline Improvement Project - Colony Dr
System Type: Potable Water

Project Description:
Replace 500-ft existing pipeline near Colony Drive and Calle Toga

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2035-2040
Pipe	8 & 12	12	Replace	200	$ 390	$ 78,000	$ 94,000	$ 132,000	2035-2040
Pipe	12	16	Replace	300	$ 470	$ 141,000	$ 169,000	$ 237,000	2035-2040
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**Replace**	**500**	**Varies**	**$ 219,000**	**$ 263,000**	**$ 368,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 369,000
Future Users	0%	$ -
Total	100%	$ 369,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-36
Project Name: Fire Flow Pipeline Improvement Project - Pantera Ct
System Type: Potable Water

Project Description:
Replace 2,800-ft existing pipeline near Medina Court and Pantera Court

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2023-2025
Pipe	8	12	Replace	2,800	$ 390	$ 1,092,000	$ 1,310,000	$ 1,834,000	2023-2025
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2023-2025
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2023-2025
Pipe	**8**	**12**	**Replace**	**2,800**	**$ 390**	**$ 1,092,000**	**$ 1,310,000**	**$ 1,834,000**	2023-2025

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

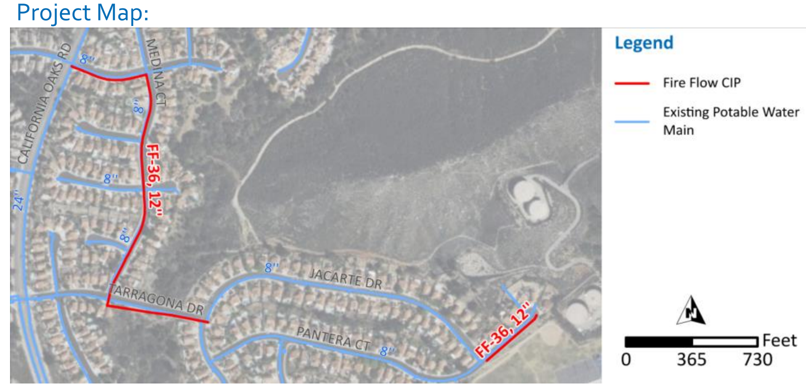
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,834,000
Future Users	0%	$ -
Total	100%	$ 1,834,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-37
Project Name: Fire Flow Pipeline Improvement Project - Jena Ln
System Type: Potable Water

Project Description:
Build 1,400-ft new pipeline near Jena Lane

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8		0	$ 325	$ -	$ -	$ -	2025-2030
Pipe	N/A	12	New	1,400	$ 390	$ 546,000	$ 655,000	$ 917,000	2025-2030
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**N/A**	**12**	**New**	**1,400**	**$ 390**	**$ 546,000**	**$ 655,000**	**$ 917,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 917,000
Future Users	0%	$ -
Total	100%	$ 917,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-38
Project Name: Fire Flow Pipeline Improvement Project Camelot Cir
System Type: Potable Water

Project Description:
Build 300-ft new pipeline near Camelot Circle and Carrington Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8	New	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2040-2045
Pipe	N/A	12	New	100	$ 390	$ 39,000	$ 47,000	$ 66,000	2040-2045
Pipe	N/A	16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe	N/A	20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**Varies**	**Varies**	**New**	**300**	**Varies**	**$ 104,000**	**$ 125,000**	**$ 175,000**	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 175,000
Future Users	0%	$ -
Total	100%	$ 175,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-39
Project Name: Fire Flow Pipeline Improvement Project - Wildomar Tr
System Type: Potable Water

Project Description:
Replace 12,600-ft existing pipeline and build 200-ft new pipeline near Monte Vista Drive and Wildomar Trail

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2023-2025
Pipe	8	12	Replace	900	$ 390	$ 351,000	$ 421,000	$ 589,000	2023-2025
Pipe	10 & 12	12	New	100	$ 390	$ 39,000	$ 47,000	$ 66,000	2023-2025
Pipe	11,700	16	Replace	11,700	$ 470	$ 5,499,000	$ 6,599,000	$ 9,239,000	2023-2025
Pipe	N/A	16	New	100	$ 470	$ 47,000	$ 56,000	$ 78,000	2023-2025
Pipe		20		0	$ 570	$ -	$ -	$ -	2023-2025
Pipe	**Varies**	**Varies**	**Replace/ New**	**12,800**	**Varies**	**$ 5,936,000**	**$ 7,123,000**	**$ 9,972,000**	2023-2025

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 9,972,000
Future Users	0%	$ -
Total	100%	$ 9,972,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-40
Project Name: Fire Flow Pipeline Improvement Project - Canyon Dr
System Type: Potable Water

Project Description:
Build 200-ft new pipeline near Canyon Drive and Orange Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	200	$ 325	$ 65,000	$ 78,000	$ 109,000	2030-2035
Pipe		12		0	$ 390	$ -	$ -	$ -	2030-2035
Pipe		16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe		20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**N/A**	**8**	**New**	**200**	**$ 325**	**$ 65,000**	**$ 78,000**	**$ 109,000**	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 109,000
Future Users	0%	$ -
Total	100%	$ 109,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-41
Project Name: Fire Flow Pipeline Improvement Project - Sunset Ave
System Type: Potable Water

Project Description:
Build 1,800-ft new pipeline near Sunset Avenue and Orange Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	1,600	$ 325	$ 520,000	$ 624,000	$ 874,000	2035-2040
Pipe	N/A	12	New	200	$ 390	$ 78,000	$ 94,000	$ 132,000	2035-2040
Pipe		16		0	$ 470	$ -	$ -	$ -	2035-2040
Pipe		20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**New**	**1,800**	**Varies**	**$ 598,000**	**$ 718,000**	**$ 1,005,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,006,000
Future Users	0%	$ -
Total	100%	$ 1,006,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-42
Project Name: Fire Flow Pipeline Improvement Project - Dial Rd
System Type: Potable Water

Project Description:
Replace 1,000-ft existing pipeline near Dial Road

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2030-2035
Pipe	6	12	Replace	1,000	$ 390	$ 390,000	$ 468,000	$ 655,000	2030-2035
Pipe		16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe		20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**6**	**12**	**Replace**	**1,000**	**$ 390**	**$ 390,000**	**$ 468,000**	**$ 655,000**	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 655,000
Future Users	0%	$ -
Total	100%	$ 655,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-43
Project Name: Fire Flow Pipeline Improvement Project - Almond St
System Type: Potable Water

Project Description:
Replace 2,600-ft existing pipeline near Almond Street and Waite Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	500	$ 325	$ 163,000	$ 196,000	$ 274,000	2025-2030
Pipe	6 to 12	12	Replace	2,100	$ 390	$ 819,000	$ 983,000	$ 1,376,000	2025-2030
Pipe		16		0	$ 470	$ -	$ -	$ -	2025-2030
Pipe		20		0	$ 570	$ -	$ -	$ -	2025-2030
Pipe	**8**	**Varies**	**Replace**	**2,600**	**Varies**	**$ 982,000**	**$ 1,179,000**	**$ 1,651,000**	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,650,000
Future Users	0%	$ -
Total	100%	$ 1,650,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-44
Project Name: Fire Flow Pipeline Improvement Project - Valencia St
System Type: Potable Water

Project Description:
Replace 1,600-ft existing pipeline near Jo Ann Court and Valencia Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	6 & 8	12	Replace	1,600	$ 390	$ 624,000	$ 749,000	$ 1,049,000	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**6 & 8**	**12**	**Replace**	**1,600**	**$ 390**	**$ 624,000**	**$ 749,000**	**$ 1,049,000**	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,049,000
Future Users	0%	$ -
Total	100%	$ 1,049,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-45
Project Name:	Fire Flow Pipeline Improvement Project - Orchard St
System Type:	Potable Water

Project Description:

Replace 6,700-ft existing pipeline near Orchard Street and Lakeview Terrace

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2035-2040
Pipe	6 & 8	12	Replace	3,700	$ 390	$ 1,443,000	$ 1,732,000	$ 2,425,000	2035-2040
Pipe	6 & 12	16	Replace	3,000	$ 470	$ 1,410,000	$ 1,692,000	$ 2,369,000	2035-2040
Pipe		20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**Replace**	**6,700**	**Varies**	**$ 2,853,000**	**$ 3,424,000**	**$ 4,794,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

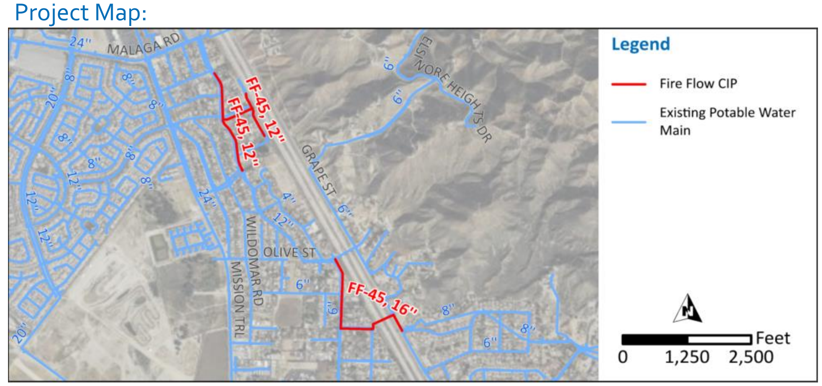
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 4,794,000
Future Users	0%	$ -
Total	100%	$ 4,794,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-46
Project Name: Fire Flow Pipeline Improvement Project - Lewis St
System Type: Potable Water

Project Description:

Replace 1,500-ft existing pipeline and build 800-ft new pipeline near Lewis Street and Orchard Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	800	$ 325	$ 260,000	$ 312,000	$ 437,000	2045-2050
Pipe	4 to 8	12	Replace	1,500	$ 390	$ 585,000	$ 702,000	$ 983,000	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**4 to 8**	**Varies**	**eplace/Ne**	**2,300**	**Varies**	**$ 845,000**	**$ 1,014,000**	**$ 1,420,000**	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,420,000
Future Users	0%	$ -
Total	100%	$ 1,420,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-47
Project Name: Fire Flow Pipeline Improvement Project - Grape St
System Type: Potable Water

Project Description:
Build 700-ft new pipeline near Grape Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	700	$ 325	$ 228,000	$ 274,000	$ 384,000	2040-2045
Pipe		12		0	$ 390	$ -	$ -	$ -	2040-2045
Pipe		16		0	$ 470	$ -	$ -	$ -	2040-2045
Pipe		20		0	$ 570	$ -	$ -	$ -	2040-2045
Pipe	**N/A**	**8**	**New**	**700**	**$ 325**	**$ 228,000**	**$ 274,000**	**$ 384,000**	2040-2045

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 384,000
Future Users	0%	$ -
Total	100%	$ 384,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:


Project Number:	FF-48
Project Name:	Fire Flow Pipeline Improvement Project - Park Way
System Type:	Potable Water

Project Description:

Build 100-ft new pipeline near Park Way and Avenue 6

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	8	New	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2023-2025
Pipe		12		0	$ 390	$ -	$ -	$ -	2023-2025
Pipe		16		0	$ 470	$ -	$ -	$ -	2023-2025
Pipe		20		0	$ 570	$ -	$ -	$ -	2023-2025
Pipe	**N/A**	**8**	**New**	**100**	**$ 325**	**$ 33,000**	**$ 40,000**	**$ 56,000**	2023-2025

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 56,000
Future Users	0%	$ -
Total	100%	$ 56,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-49
Project Name: Fire Flow Pipeline Improvement Project - Ponte Russo
System Type: Potable Water

Project Description:
Replace 1,200-ft existing pipeline and build 200-ft new pipeline near Ponte Russo and Del Copparo

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe		8	New	0	$ 325	$ -	$ -	$ -	2023-2025
Pipe	4 to 8	12	Replace	1,200	$ 390	$ 468,000	$ 562,000	$ 787,000	2023-2025
Pipe	N/A	16	New	200	$ 470	$ 94,000	$ 113,000	$ 158,000	2023-2025
Pipe		20	New	0	$ 570	$ -	$ -	$ -	2023-2025
Pipe	**4 to 8**	**Varies**	**eplace/Ne**	**1,400**	**Varies**	**$ 562,000**	**$ 675,000**	**$ 945,000**	2023-2025

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 945,000
Future Users	0%	$ -
Total	100%	$ 945,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-50
Project Name:	Fire Flow Pipeline Improvement Project - Longhorn Dr
System Type:	Potable Water

Project Description:

Replace 13,100-ft existing pipeline near Vacation Drive and Longhorn Drive

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	8	8	Replace	100	$ 325	$ 33,000	$ 40,000	$ 56,000	2035-2040
Pipe	8 & 10	12	Replace	6,100	$ 390	$ 2,379,000	$ 2,855,000	$ 3,997,000	2035-2040
Pipe	12	16	Replace	6,900	$ 470	$ 3,243,000	$ 3,892,000	$ 5,449,000	2035-2040
Pipe		20		0	$ 570	$ -	$ -	$ -	2035-2040
Pipe	**Varies**	**Varies**	**Replace**	**13,100**	**Varies**	**$ 5,655,000**	**$ 6,787,000**	**$ 9,502,000**	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

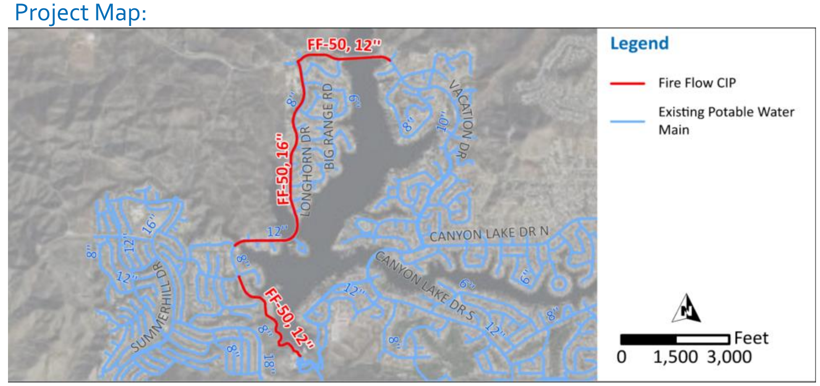
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 9,502,000
Future Users	0%	$ -
Total	100%	$ 9,502,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-51
Project Name: Fire Flow Pipeline Improvement Project - Yosemite Pl
System Type: Potable Water

Project Description:
Replace 4,800-ft existing pipeline near Yosemite Place and Vacation Drive

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2030-2035
Pipe	6 to 10	12	Replace	4,800	$ 390	$ 1,872,000	$ 2,246,000	$ 3,144,000	2030-2035
Pipe		16		0	$ 470	$ -	$ -	$ -	2030-2035
Pipe		20		0	$ 570	$ -	$ -	$ -	2030-2035
Pipe	**6 to 10**	**12**	**Replace**	**4,800**	**$ 390**	**$ 1,872,000**	**$ 2,246,000**	**$ 3,144,000**	2030-2035

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 3,144,000
Future Users	0%	$ -
Total	100%	$ 3,144,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: FF-52
Project Name: Fire Flow Pipeline Improvement Project - Railroad Canyon Rd
System Type: Potable Water

Project Description:
Replace 700-ft existing pipeline near Railroad Canyon Road

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	8	12	Replace	700	$ 390	$ 273,000	$ 328,000	$ 459,000	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**8**	**12**	**Replace**	**700**	**$ 390**	**$ 273,000**	**$ 328,000**	**$ 459,000**	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 459,000
Future Users	0%	$ -
Total	100%	$ 459,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-53
Project Name:	Fire Flow Hydrant Zone Adjustment - Temescal Canyon Rd
System Type:	Potable Water

Project Description:

Move eight hydrants from 6-inch diameter pipe on Temescal Canyon Road to 30-inch diameter pipe. Assumed these 8 hydrants will be double the cost of the other hydrant projects.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 50,000	$ 60,000	$ 84,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 84,000
Future Users	0%	$ -
Total	100%	$ 84,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-54
Project Name: Fire Flow Hydrant Zone Adjustment - Horsethief 1 Tank
System Type: Potable Water

Project Description:

Move one hydrant near the Horsethief 1 Tank from 1601 Horsethief 1 PZ to 1801 Horsethief 2 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-55
Project Name:	Fire Flow Hydrant Zone Adjustment - Alberhill 1 PS
System Type:	Potable Water

Project Description:

Move one hydrant near the Alberhill 1 PS from 1434 PZ to 1601 Lucerne Alberhill 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

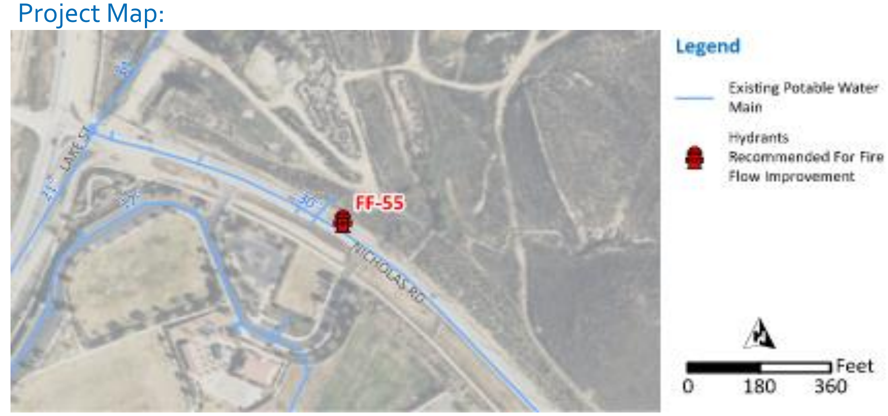
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: FF-56
Project Name: Fire Flow Hydrant Zone Adjustment - Alberhill 1A Tank
System Type: Potable Water

Project Description:

Move one hydrant near the Alberhill 1A and 1B Tanks from 1601 Lucerne Alberhill 1 PZ to 1800 Rice Canyon Alberhill 2 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-57
Project Name: Fire Flow Hydrant Zone Adjustment - Dryden St
System Type: Potable Water

Project Description:

Move three hydrants on Dryden Street between Lash Street and Arnold Avenue from 1434 PZ to 1601 Lucerne Alberhill 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

Project Number: FF-58
Project Name: Fire Flow Hydrant Zone Adjustment - Grand Ave
System Type: Potable Water

Project Description:

Move two hydrants on Grand Avenue between Morro Way and Bonnie Lea Drive from 1434 PZ to 1601 Ortega PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-59
Project Name: Fire Flow Hydrant Zone Adjustment - Crab Hollow Cir
System Type: Potable Water

Project Description:

Add PRV at Daley B 2 PS to serve hydrant on Crab Hollow Circle in 2309 Daley PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-60
Project Name: Fire Flow Hydrant Zone Adjustment - Country Club Dr
System Type: Potable Water

Project Description:

Move one hydrant on Country Club Drive from 1622 Canyon Lake to 1750 Cottonwood 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-61
Project Name: Fire Flow Hydrant Zone Adjustment - Sunnyslope Ave
System Type: Potable Water

Project Description:
Move two hydrants on Sunnyslope Avenue from 1650 Amie Hydro PZ to 1571 City PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-62
Project Name: Fire Flow Hydrant Zone Adjustment - 3rd St
System Type: Potable Water

Project Description:

Move one hydrant at 3rd Street and Conard Avenue from 1434 PZ to 1701 Meadowbrook 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-63
Project Name: Fire Flow Hydrant Zone Adjustment
System Type: Potable Water

Project Description:

Move one hydrant on State Highway 74 near the Meadowbrook 2 PS from 1701 Meadowbrook 1 PZ to 1896 Meadowbrook 2 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number:	FF-64
Project Name:	Fire Flow Hydrant Zone Adjustment - Rosetta Canyon 2A Tank
System Type:	Potable Water

Project Description:

Move two hydrants near the Rosetta Canyon 2A and 2B Tanks from 1801 Rosetta Canyon 2 PZ to 1896 Meadowbrook 2 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-65
Project Name: Fire Flow Hydrant Zone Adjustment - El Cariso Truck Tr
System Type: Potable Water

Project Description:
Move one hydrant on El Cariso Truck Trail from 2313 Tomlin 2 PZ to 2748 Los Pinos 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 25,000	$ 30,000	$ 42,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 42,000
Future Users	0%	$ -
Total	100%	$ 42,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-66
Project Name: Fire Flow Pipeline Improvement Project (Future Deficiency) - Longhorn Dr
System Type: Potable Water

Project Description:
Replace 13,100-ft existing pipeline near Vacation Drive and Longhorn Drive

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	6	8	Replace	1,000	$ 325	$ 325,000	$ 390,000	$ 546,000	2045-2050
Pipe		12		0	$ 390	$ -	$ -	$ -	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**6**	**8**	**Replace**	**1,000**	**$ 325**	**$ 325,000**	**$ 390,000**	**$ 546,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

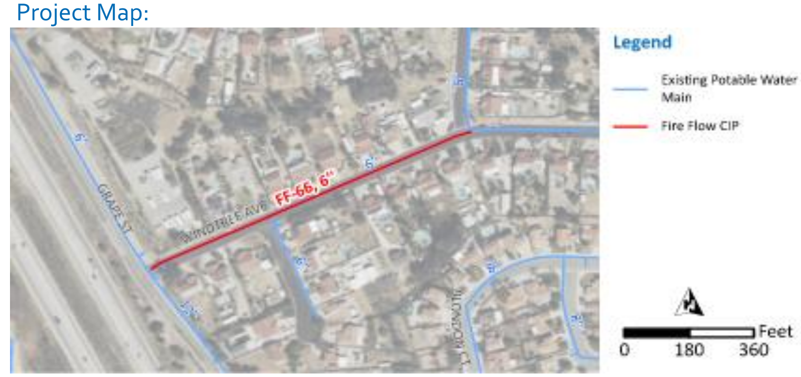
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 546,000
Future Users	0%	$ -
Total	100%	$ 546,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



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Project Number: FF-67
Project Name: Fire Flow Pipeline Improvement Project (Future Deficiency) - White St
System Type: Potable Water

Project Description:
Replace 1,000-ft existing pipeline on White Street between Chetlee Lane and Grove Street

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	6	8	Replace	1,000	$ 325	$ 325,000	$ 390,000	$ 546,000	2045-2050
Pipe		12		0	$ 390	$ -	$ -	$ -	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**6**	**8**	**Replace**	**1,000**	**$ 325**	**$ 325,000**	**$ 390,000**	**$ 546,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 546,000
Future Users	0%	$ -
Total	100%	$ 546,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: FF-68
Project Name: Fire Flow Pipeline Improvement Project (Future Deficiency) - Skylark Dr
System Type: Potable Water

Project Description:
Replace 500-ft existing pipeline on Skylark Drive.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe		8		0	$ 325	$ -	$ -	$ -	2045-2050
Pipe	8	12	Replace	500	$ 390	$ 195,000	$ 234,000	$ 328,000	2045-2050
Pipe		16		0	$ 470	$ -	$ -	$ -	2045-2050
Pipe		20		0	$ 570	$ -	$ -	$ -	2045-2050
Pipe	**8**	**12**	**Replace**	**500**	**$ 390**	**$ 195,000**	**$ 234,000**	**$ 328,000**	**2045-2050**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 328,000
Future Users	0%	$ -
Total	100%	$ 328,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

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Project Number: FF-69
Project Name: Fire Flow Hydrant Zone Adjustment (Future Deficiency) - 1434 PZ
System Type: Potable Water

Project Description:

Move one hydrant from 1434 PZ to 1601 El Toro Rosetta Canyon 1 PZ

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Hydrant	N/A	N/A	Replace	N/A	$ 25,000	$ 50,000	$ 60,000	$ 84,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

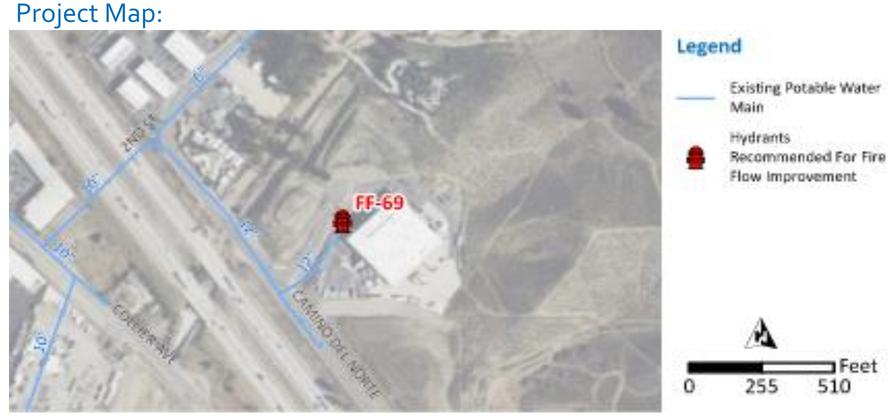
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 84,000
Future Users	0%	$ -
Total	100%	$ 84,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PWRR-PS-1
Project Name: Auld Valley PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	250	New	4	$ 100,000	$ 400,000	$ 480,000	$ 672,000	2023-2025
Boost Pump	0	250	New	4	$ 100,000	$ 400,000	$ 480,000	$ 672,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-2
Project Name: Beck Pumps
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	30	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2023-2025
Boost Pump	0	30	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 134,000
Future Users	0%	$ -
Total	100%	$ 134,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-3
Project Name: Bundy Canyon PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	125	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	100	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2023-2025
Boost Pump	0	125	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2040-2045
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045
Boost Pump	0	100	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2040-2045
Boost Pump	**0**	**100 / 125 / -**	**New**	**8**		**$ 520,000**	**$ 624,000**	**$ 874,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 874,000
Future Users	0%	$ -
Total	100%	$ 874,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-4
Project Name: Cal Oaks PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	100	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	100	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-5
Project Name: Canyon Lake Hydro
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	30	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2023-2025
Boost Pump	0	40	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045
Boost Pump	0	30	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2023-2025
Boost Pump	0	40	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045
Boost Pump	**0**	**30 / 40**	**New**	**4**		**$ 160,000**	**$ 192,000**	**$ 269,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-6
Project Name: Farm PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	100	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2023-2025
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045
Boost Pump	0	100	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2040-2045
Boost Pump	**0**	**100 / -**	**New**	**6**		**$ 360,000**	**$ 432,000**	**$ 605,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 606,000
Future Users	0%	$ -
Total	100%	$ 606,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-8
Project Name: Horsethief 2 PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	75	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2023-2025
Boost Pump	0	75	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 604,000
Future Users	0%	$ -
Total	100%	$ 604,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-9
Project Name: Lakeshore Booster
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	85	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	85	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-10
Project Name: Lucerne PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-11
Project Name: Ortega PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-12
Project Name: Rice Canyon PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-13

Project Name: Stage Ranch 1 PS

System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	75	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	75	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-PS-14
Project Name: Stage Ranch 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

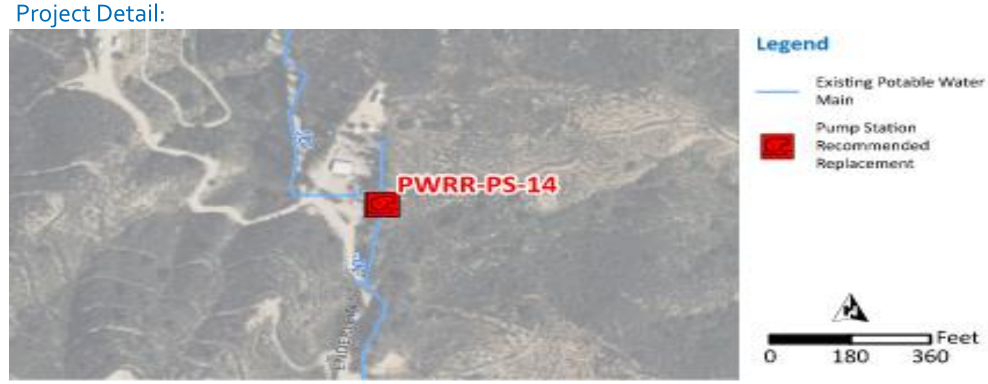
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:



Project Number: PWRR-PS-15
Project Name: Summerhill PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	100	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2023-2025
Boost Pump	0	100	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 604,000
Future Users	0%	$ -
Total	100%	$ 604,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-16
Project Name: Tuscany 1 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	125	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2023-2025
Boost Pump	0	125	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,076,000
Future Users	0%	$ -
Total	100%	$ 1,076,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-17
Project Name: Tuscany 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-18
Project Name: Waite St PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	50	New	4	$ 40,000	$ 160,000	$ 192,000	$ 269,000	2023-2025
Boost Pump	0	50	New	4	$ 40,000	$ 160,000	$ 192,000	$ 269,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 538,000
Future Users	0%	$ -
Total	100%	$ 538,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-19
Project Name: Canyon Lake PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	100	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	100	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-20
Project Name: Cielo Vista Hydro
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	20	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	20	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-21
Project Name: City Booster
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	50	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	50	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-22
Project Name: Cottonwood 1 Booster
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	200	New	3	$ 80,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	200	New	3	$ 80,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-23
Project Name: Cottonwood 2 Booster
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	60	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2023-2025
Boost Pump	0	60	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2040-2045
Boost Pump	**0**	**60 / -**	**New**	**6**		**$ 360,000**	**$ 432,000**	**$ 605,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 606,000
Future Users	0%	$ -
Total	100%	$ 606,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-24
Project Name: Daley A PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-25
Project Name: Daley B PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

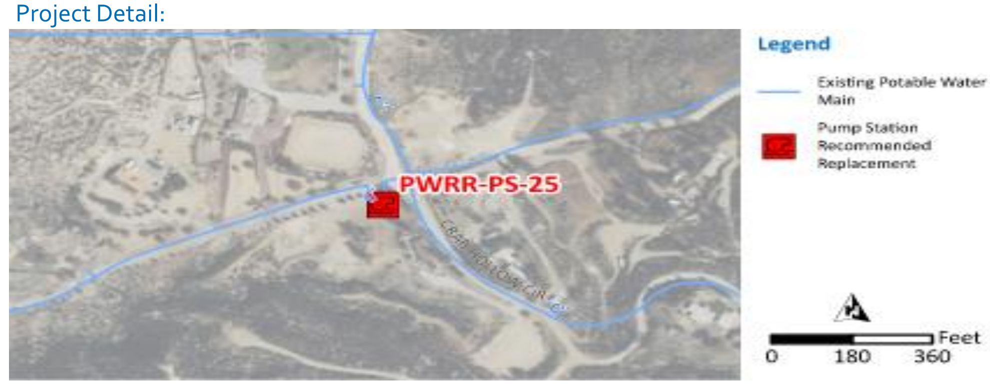
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:



Project Number: PWRR-PS-26
Project Name: Greer Ranch 1/Greer Ranch 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	50	New	6	$ 40,000	$ 240,000	$ 288,000	$ 403,000	2023-2025
Boost Pump	0	50	New	6	$ 40,000	$ 240,000	$ 288,000	$ 403,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-27
Project Name: Horsethief 1 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	125	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2023-2025
Boost Pump	0	125	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,076,000
Future Users	0%	$ -
Total	100%	$ 1,076,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-28
Project Name: La Laguna 1 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	60	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2023-2025
Boost Pump	0	60	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

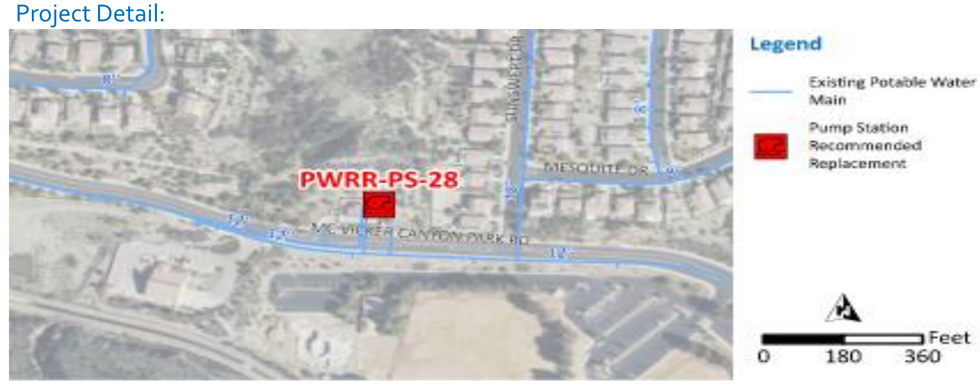
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 604,000
Future Users	0%	$ -
Total	100%	$ 604,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:



Project Number: PWRR-PS-29
Project Name: Lemon Grove Hydro
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	7.5	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	150	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	7.5	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045
Boost Pump	0	150	New	1	$ 80,000	$ 80,000	$ 96,000	$ 134,000	2040-2045
Boost Pump	**0**	**7.5 / 25 / 150**	**New**	**5**		**$ 480,000**	**$ 576,000**	**$ 806,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 804,000
Future Users	0%	$ -
Total	100%	$ 804,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number:	PWRR-PS-30
Project Name:	Los Pinos 1 PS
System Type:	Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	50	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	50	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-PS-31
Project Name: Los Pinos 2A PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-32
Project Name: Los Pinos 2B PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2023-2025
Boost Pump	0	15	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 268,000
Future Users	0%	$ -
Total	100%	$ 268,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-33
Project Name: Meadowbrook 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	40	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	40	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:
(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.
(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-34
Project Name: Rosetta Canyon 1 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	250	New	3	$ 100,000	$ 300,000	$ 360,000	$ 504,000	2023-2025
Boost Pump	0	250	New	3	$ 100,000	$ 300,000	$ 360,000	$ 504,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,008,000
Future Users	0%	$ -
Total	100%	$ 1,008,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-37
Project Name: Skylark Hydro
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	10	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	10	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-38
Project Name: Skymeadows PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2023-2025
Boost Pump	0	100	New	2	$ 60,000	$ 120,000	$ 144,000	$ 202,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-39
Project Name: Tomlin 1 PS
System Type: Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	50	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2023-2025
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2023-2025
Boost Pump	0	50	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2040-2045
Boost Pump	**0**	**50 / 60**	**New**	**4**		**$ 200,000**	**$ 240,000**	**$ 336,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 336,000
Future Users	0%	$ -
Total	100%	$ 336,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-40
Project Name: Tomlin 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[(1)] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[(2)] ($)	Capital Improvement Cost[(3)] ($)	Project Schedule
Boost Pump	0	50	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2023-2025
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2023-2025
Boost Pump	0	50	New	1	$ 40,000	$ 40,000	$ 48,000	$ 67,000	2040-2045
Boost Pump	0	60	New	1	$ 60,000	$ 60,000	$ 72,000	$ 101,000	2040-2045
Boost Pump	**0**	**50 / 60**	**New**	**4**		**$ 200,000**	**$ 240,000**	**$ 336,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 336,000
Future Users	0%	$ -
Total	100%	$ 336,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-41
Project Name: Inland Valley Booster
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	150	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2025-2030
Boost Pump	0	150	New	4	$ 80,000	$ 320,000	$ 384,000	$ 538,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,076,000
Future Users	0%	$ -
Total	100%	$ 1,076,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-42
Project Name: La Laguna 2 PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	25	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2025-2030
Boost Pump	0	25	New	3	$ 40,000	$ 120,000	$ 144,000	$ 202,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 404,000
Future Users	0%	$ -
Total	100%	$ 404,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number:	PWRR-PS-43
Project Name:	Rosetta Canyon 2 PS
System Type:	Potable Water

Project Description:

Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	50	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2025-2030
Boost Pump	0	150	New	2	$ 80,000	$ 160,000	$ 192,000	$ 269,000	2025-2030
Boost Pump	0	50	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2045-2050
Boost Pump	0	150	New	2	$ 80,000	$ 160,000	$ 192,000	$ 269,000	2045-2050
Boost Pump	**0**	**50 / 60**	**New**	**8**		**$ 480,000**	**$ 576,000**	**$ 806,000**	**2040-2045**

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-44
Project Name: Woodmoor PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2025-2030
Boost Pump	0	75	New	4	$ 60,000	$ 240,000	$ 288,000	$ 403,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 806,000
Future Users	0%	$ -
Total	100%	$ 806,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-45
Project Name: Coldwater Booster
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost(1) ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Boost Pump	0	25	New	2	$ 40,000	$ 80,000	$ 96,000	$ 134,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 134,000
Future Users	0%	$ -
Total	100%	$ 134,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PWRR-PS-46
Project Name: Encina PS
System Type: Potable Water

Project Description:
Pump replacement for aging pumps.

Project Details:

Project Element	Existing Pump (hp)	Proposed Horsepower (hp)	Replace/ New	No.	Unit Cost[1] ($/hp)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Boost Pump	0	75	New	3	$ 60,000	$ 180,000	$ 216,000	$ 302,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 302,000
Future Users	0%	$ -
Total	100%	$ 302,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Detail:

Project Number: PW-TR1
Project Name: 2001 Horsethief 3 Zone Transmission
System Type: Potable Water

Project Description:

The 2001 Horsethief 3 Zone is expected to be needed by 2025 to supply new development in the Horsethief area above 1,660 feet elevation. A new PS with 550 gpm firm booster pump capacity (PW-PU-11) will be needed, along with 2,100 feet of 16-inch transmission main (PW-TR1), and a new 0.8 MG reservoir (PW T 18) with a high water elevation of 1,901 feet. Additionally, EVMWD could consider connecting the 1850 Lemon Grove and 1940 Cirrus Circle Zones into the 2001 Horsethief 3 Zone rather than constructing fire pumps for those two zones.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	2,050	$ 470	$ 964,000	$ 1,157,000	$ 1,620,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 1,620,000
Total	100%	$ 1,620,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR2
Project Name: 1434 Zone Transmission in Alberhill Villages
System Type: Potable Water

Project Description:
Add approximately 1 mile of pipe for the 1434 Zone Transmission in Alberhill Villages connecting from Lake street to Temescal Canyon Road.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	24	New	5,400	$ 630	$ 3,402,000	$ 4,082,000	$ 5,715,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,715,000
Total	100%	$ 5,715,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR3
Project Name: 1601 Zone Transmission in Alberhill Villages
System Type: Potable Water

Project Description:

Construct a 30-inch diameter transmission main to connect the new Alberhill Village tank to the future development and tie into the existing 1601 Lucerne Alberhill 1 Zone Pump Station.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	4,482	$ 470	$ 2,107,000	$ 2,528,000	$ 3,539,000	2030-2035
Pipe	N/A	30	New	10,562	$ 750	$ 7,921,000	$ 9,505,000	$ 13,307,000	2030-2035
Pipe	N/A	16/30	New	0	varies	$10,028,000	$ 12,033,000	$ 16,846,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 16,846,000
Total	100%	$ 16,846,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR5
Project Name: 1801 Zone Transmission in Alberhill Villages
System Type: Potable Water

Project Description:

Construct a northern pipeline in the Alberhill Hill Villages to connect the 1801 Zone in the northwest to the southeast.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	13,041	$ 470	$ 6,129,000	$ 7,355,000	$ 10,297,000	2030-2035

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 10,297,000
Total	100%	$ 10,297,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR7A
Project Name: Lucerne PS Suction/Discharge Pipeline
System Type: Potable Water

Project Description:

New large suction and discharge pipeline for Lucerne Pump Station.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	12	16	Replace	1,085	$ 470	$ 510,000	$ 612,000	$ 857,000	2025-2030
Pipe	12	24	Replace	204	$ 630	$ 128,000	$ 154,000	$ 216,000	2025-2030
Pipe	N/A	16/24	Replace	1,289	varies	$ 638,000	$ 766,000	$ 1,073,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

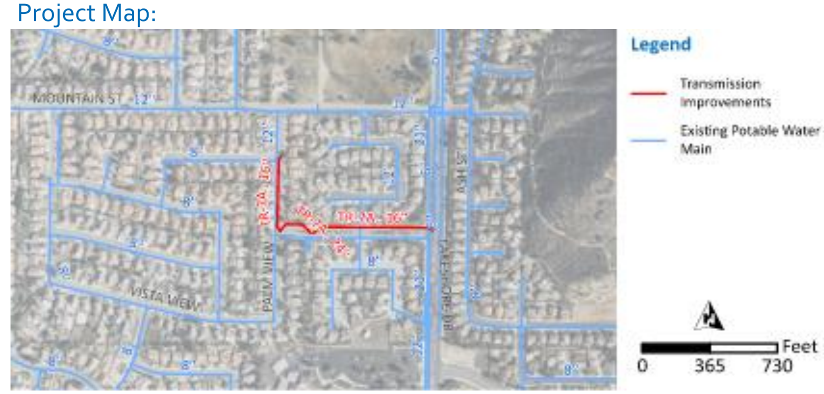
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,073,000
Future Users	0%	$ -
Total	100%	$ 1,073,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-TR7B
Project Name: 1434 Transmission from Temescal Canyon Road to Alberhill PS
System Type: Potable Water

Project Description:

New large diameter pipeline from Alberhill Pump Station up Lake St. to Temescal Canyon Road.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	36	New	7,220	850	6,137,000	7,364,000	10,310,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	25%	$ 2,578,000
Future Users	75%	$ 7,733,000
Total	100%	$ 10,311,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-TR8
Project Name: 1434 Transmission from Alberhill PS to Baker/Nichols
System Type: Potable Water

Project Description:

The recommended transmission pipelines are a 36-inch diameter pipeline from the intersection of Temescal Canyon Road and Lake Street to the suction of the Alberhill PS (PW-TR-7), a 36-inch diameter pipeline from the suction of Alberhill PS to the intersection of Nichols and Baker Street (PW-TR8), a 24-inch diameter pipeline in Nichols Road from Baker Street to the existing 24-inch pipeline in Collier Avenue (PW-TR-9), and a 24-inch diameter pipeline in Baker Street from Nichols Road to the Baker Street Tank (PW-TR-10). These pipelines are recommended to be constructed prior to 2030, with PW-TR-7 as the highest priority section of this pipeline.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	36	New	6,257	$ 850	$ 5,318,000	$ 6,382,000	$ 8,935,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 8,935,000
Total	100%	$ 8,935,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR9
Project Name: 1434 Transmission from Baker/Nichols to Nichols/Collier
System Type: Potable Water

Project Description:

The recommended transmission pipelines are a 36-inch diameter pipeline from the intersection of Temescal Canyon Road and Lake Street to the suction of the Alberhill PS (PW-TR-7), a 36-inch diameter pipeline from the suction of Alberhill PS to the intersection of Nichols and Baker Street (PW-TR8), a 24-inch diameter pipeline in Nichols Road from Baker Street to the existing 24-inch pipeline in Collier Avenue (PW-TR-9), and a 24-inch diameter pipeline in Baker Street from Nichols Road to the Baker Street Tank (PW-TR-10). These pipelines are recommended to be constructed prior to 2030, with PW-TR-7 as the highest priority section of this pipeline.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	24	New	1,714	$ 630	$ 1,080,000	$ 1,296,000	$ 1,814,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

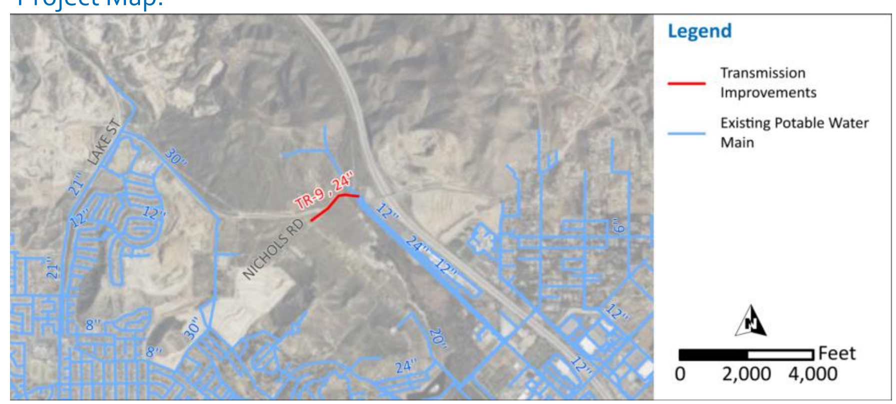
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 1,814,000
Total	100%	$ 1,814,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-TR10
Project Name: 1434 Transmission from Baker/Nichols to Baker Tank
System Type: Potable Water

Project Description:

The recommended transmission pipelines are a 36-inch diameter pipeline from the intersection of Temescal Canyon Road and Lake Street to the suction of the Alberhill PS (PW-TR-7), a 36-inch diameter pipeline from the suction of Alberhill PS to the intersection of Nichols and Baker Street (PW-TR8), a 24-inch diameter pipeline in Nichols Road from Baker Street to the existing 24-inch pipeline in Collier Avenue (PW-TR-9), and a 24-inch diameter pipeline in Baker Street from Nichols Road to the Baker Street Tank (PW-TR-10). These pipelines are recommended to be constructed prior to 2030, with PW-TR-7 as the highest priority section of this pipeline.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	24	New	4,154	$ 630	$ 2,617,000	$ 3,140,000	$ 4,396,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 4,396,000
Total	100%	$ 4,396,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR11
Project Name: 1601 Transmission from Alberhill PS to Nichols/Terra Cotta
System Type: Potable Water

Project Description:

An additional 3,200 feet of 16-inch diameter 1601 Lucerne Alberhill 1 Zone transmission will need to be constructed by 2030 to accommodate the growth in the zone. New developments are planned to the east and the pressure zone will need to expand. This transmission main will connect the 1601 Lucerne Alberhill 1 Zone pump station to the intersection of Nichols Rd and Terra Cotta Road.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	3,200	$ 470	$ 1,504,000	$ 1,805,000	$ 2,527,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,527,000
Total	100%	$ 2,527,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR12
Project Name: 1601 Transmission in Terra Cotta Road
System Type: Potable Water

Project Description:

From the intersection of Nichols Rd and Terra Cotta Road 3,600 feet of 16-inch diameter transmission pipe (PW-TR12) will need to be installed to the south to connect to the existing 1601 Lucerne Alberhill 1 Zone pipe at the intersection of Dryden St. and Arnold Ave.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	16	New	2,664	$ 470	$ 1,252,000	$ 1,502,000	$ 2,103,000	2025-2030
Pipe	N/A	16	New	909	$ 470	$ 427,000	$ 512,000	717,000	2025-2030
Pipe	N/A	16	New	3,573	940	1,679,000	2,014,000	2,820,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation: 0%

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,640,000
Total	100%	$ 5,640,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR13
Project Name: 1601 Transmission from Nichols/Terra Cotta to Nichols/Baker
System Type: Potable Water

Project Description:

3,500 feet of 16-inch diameter transmission pipe (PW-TR13) will need to connect the 1601 Lucerne Alberhill 1 transmission pipe from the intersection of Nichols Rd and Terra Cotta Road to the existing 1601 Lucerne Alberhill 1 Zone pipe at the intersection of Nichols Road and Collier Ave.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	3,450	$ 470	$ 1,622,000	$ 1,946,000	$ 2,724,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,724,000
Total	100%	$ 2,724,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PW-TR14
Project Name: North Peak PS Suction/Discharge Pipeline
System Type: Potable Water

Project Description:

15,600 feet of 16-inch diameter transmission pipe will be needed to connect to the planned 1601 Lucerne Alberhill 1 Zone pipe at the intersection of Nichols Road and Collier Ave to the existing 1601 El Toro Rosetta Canyon 1 Pressure Zone at the intersection of Nichols Road and El Toro Road. For there this transmission main will continue to the proposed North Peak pump station at the intersection of El Toro Road and 11th Street. This transmission main should connect the pump station to the future North Peak 2001 Zone Tank.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	15,533	$ 470	$ 7,301,000	$ 8,761,000	$ 12,265,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

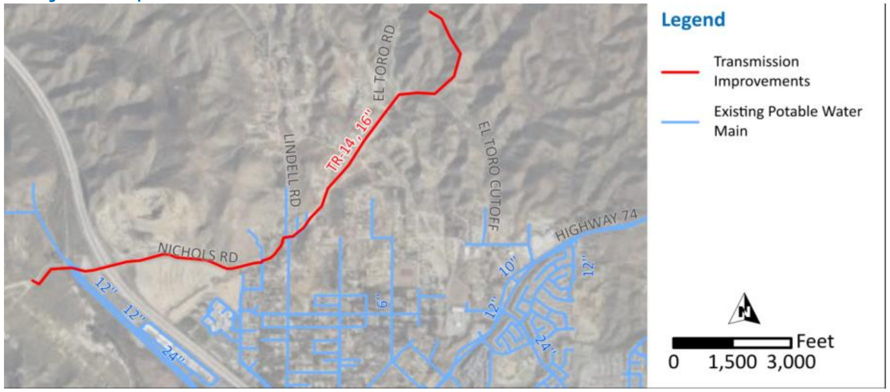
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$12,265,000
Total	100%	$12,265,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Elsinore Valley Municipal Water District

carollo

Project Number: PW-TR15
Project Name: 1676 Transmission in Alberhill Ranch
System Type: Potable Water

Project Description:
The 1676 Alberhill Ridge Zone is a new zone. It will be fed from the 1676 Alberhill 2 PS (currently under construction). The zone will require approximately 4,400 feet of a 12-inch diameter transmission main (PW-TR15) and a new 1 MG reservoir (PW T 7), with timing expected prior to 2030 but depend on growth in the Alberhill Ranch area.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	4,332	$ 470	$ 2,036,000	$ 2,443,000	$ 3,420,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 3,420,000
Total	100%	$ 3,420,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:


Project Number: PW-TR16
Project Name: 1434 Transmission in Grand Avenue
System Type: Potable Water

Project Description:

Upsize the transmission pipe in grand avenue with a 24-inch diameter pipe between 2025 and 2030.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	24	New	22,767	$ 630	$ 14,343,000	$ 17,212,000	$ 24,097,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	50%	$12,049,000
Future Users	50%	$12,049,000
Total	100%	#######

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR20
Project Name: 1601 Spyglass Transmission from Dexter/3rd to Summerhill Area
System Type: Potable Water

Project Description:

The biggest changes for the 1601 Rosetta Canyon zone are the transmission pipes that will serve the area south of the current zone in the Spyglass area. About 12,400 feet of new 30-inch diameter transmission line (PW-TR20) will need to be installed between 2025 and 2030 from the discharge of the 1601 Rosetta Canyon PS, along Dexter and Camino del Norte, to the 1601 Summerhill Zone. Additionally, about 8,200 feet of new 16-inch diameter transmission line (PW-TR21) will need to be installed to provide service between Rosetta Canyon Road and Camino del Norte, tying into the Spyglass development.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	30	New	12,397	$ 750	$ 9,298,000	$ 11,158,000	$ 15,621,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$15,621,000
Total	100%	$15,621,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR21
Project Name: 1601 Spyglass Transmission from Camino del Norte to Rosetta Canyon Road
System Type: Potable Water

Project Description:

The biggest changes for the 1601 Rosetta Canyon zone are the transmission pipes that will serve the area south of the current zone in the Spyglass area. About 12,400 feet of new 30-inch diameter transmission line (PW-TR20) will need to be installed between 2025 and 2030 from the discharge of the 1601 Rosetta Canyon PS, along Dexter and Camino del Norte, to the 1601 Summerhill Zone. Additionally, about 8,200 feet of new 16-inch diameter transmission line (PW-TR21) will need to be installed to provide service between Rosetta Canyon Road and Camino del Norte, tying into the Spyglass development.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	8,177	$ 470	$ 3,843,000	$ 4,612,000	$ 6,457,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 6,457,000
Total	100%	$ 6,457,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR22
Project Name: 1801 Spyglass Transmission
System Type: Potable Water

Project Description:

3,500 feet of 16-inch diameter transmission pipe (PW-TR22) is planned to connect the 1800 Spyglass pump station to the future developments to the east in the future 1800 Spyglass Zone

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	3,470	$ 470	$ 1,631,000	$ 1,957,000	$ 2,740,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 2,740,000
Total	100%	$ 2,740,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR23
Project Name: 1801 Spyglass Transmission
System Type: Potable Water

Project Description:

1,500 feet of 16-inch diameter transmission pipe (PW-TR23) is planned to connect the future developments and the PW-TR22 pipe to the proposed 1800 Spyglass Tank.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	16	New	1,425	$ 470	$ 670,000	$ 804,000	$ 1,126,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 1,126,000
Total	100%	$ 1,126,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR25
Project Name: 1801 Transmission in Greenwald Avenue
System Type: Potable Water

Project Description:

The following transmission pipe will be needed to expand the 1801 Tuscany 1 PZ to accommodate the growth in the zone as well as new developments, which are planned to the north and to interconnect to the 1801 Rosetta Canyon 2 Zone to the north:

- 2,100 feet of 20-inch diameter pipeline in Mauricio Street from Steele Valley Road to Greenwald Avenue (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 11,000 feet of 16-inch diameter pipeline from Greenwald Avenue and Mauricio Street to the existing 16-inch diameter pipeline in Summerhill Drive in Tuscany Hills (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 6,400 feet of 16-inch diameter pipeline within the North Tuscany Hills area and to the proposed 2.6 MG reservoir (PW-TR26), needed between 2035 and 2040, with dates depending on date of development.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	20	New	2,143	$ 570	$ 1,222,000	$ 1,466,000	$ 2,052,000	2025-2030
Pipe	N/A	16	New	10,975	$ 470	$ 5,158,000	$ 6,190,000	$ 8,666,000	2025-2030
Pipe	N/A	16/20	New	13,118	varies	$ 6,380,000	$ 7,656,000	$ 10,718,000	2025-2030

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

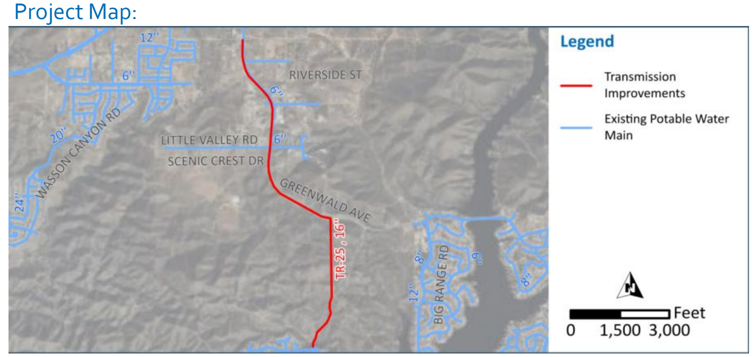
Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 10,718,000
Total	100%	$ 10,718,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:



Project Number: PW-TR26
Project Name: 1801 Transmission in North Tuscany Hills
System Type: Potable Water

Project Description:
The following transmission pipe will be needed to expand the 1801 Tuscany 1 PZ to accommodate the growth in the zone as well as new developments, which are planned to the north and to interconnect to the 1801 Rosetta Canyon 2 Zone to the north:
- 2,100 feet of 20-inch diameter pipeline in Mauricio Street from Steele Valley Road to Greenwald Avenue (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 1,000 feet of 16-inch diameter pipeline from Greenwald Avenue and Mauricio Street to the existing 16-inch diameter pipeline in Summerhill Drive in Tuscany Hills (PW-TR25), needed between 2025 and 2030, with dates depending on date of development.
- 6,400 feet of 16-inch diameter pipeline within the North Tuscany Hills area and to the proposed 2.6 MG reservoir (PW-TR26), needed between 2035 and 2040, with dates depending on date of development.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	16	New	6,422	$ 470	$ 3,018,000	$ 3,622,000	$ 5,071,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 5,071,000
Total	100%	$ 5,071,000

Notes on Cost Estimation:
This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Elsinore Valley Municipal Water District

Project Number: PW-TR31
Project Name: 1746 Bundy Gafford Zone Transmission
System Type: Potable Water

Project Description:

To address the future storage deficit in the 1746 Bundy Canyon Zone, a new 1.5 MG reservoir (PW-T-8) is recommended at the existing 1746 Bundy Canyon tank site before 2025. Also, by 2025 an additional 2,600 gpm firm booster pump capacity (PW-PU-5) is recommended at the existing 1746 Bundy Canyon PS to meet the increased demands in the Zone. Along with the booster PS, 5,800 feet of 20-inch diameter pipeline (PW-TR31) is needed to replace the existing 10 inch diameter transmission pipeline in Bundy Canyon Road, from the existing 20 inch diameter pipeline east of Oak Canyon Drive to the Bundy Canyon Tank. This pipeline should be constructed prior to 2025.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost(1) ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Pipe	N/A	20	New	5,850	$ 570	$ 3,335,000	$ 4,002,000	$ 5,603,000	2035-2040
Pipe	N/A	30	New	14,750	$ 750	$ 11,063,000	$ 13,276,000	$ 18,586,000	2035-2040
Pipe	N/A	20/30	New	20,600	varies	$ 14,398,000	$ 17,278,000	$ 24,189,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation: 0%

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 24,189,000
Total	100%	$ 24,189,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PW-TR32
Project Name: 1901 Ortega Transmission
System Type: Potable Water

Project Description:

The 1901 Ortega Zone is expected to be needed by 2040 to supply new development around the existing 1601 Zone Ortega Tank. A new PS with 250 gpm firm booster pump capacity (PW-PU-10) will be needed, along with 1,700 feet of 16-inch transmission main (PW-TR32), and a new 0.5 MG reservoir (PW-T-16) with a high water elevation of 1,901 feet. This zone and storage tank would further supply the 2201 Ortega Zone at even higher elevations.

Project Details:

Project Element	Existing Diameter (in)	Proposed Diameter (in)	Replace/ New	Length (ft)	Unit Cost[1] ($/ft)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Pipe	N/A	8	New	897	$ 325	$ 291,000	$ 349,000	$ 489,000	2035-2040
Pipe	N/A	16	New	776	$ 470	$ 365,000	$ 438,000	$ 613,000	2035-2040
Pipe	N/A	8 / 16	New	1,673	795	656,000	787,000	1,102,000	2035-2040

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation: 0%

Reimbursement Category	Percent	Cost ($)
Existing Users	0%	$ -
Future Users	100%	$ 1,102,000
Total	100%	$ 1,102,000

Notes on Cost Estimation:

This project is an existing improvement therefore 100% of cost are assigned to existing users.

Project Map:

Project Number: PWRR-T-1
Project Name: Canyon Lake South Tank Replacement
System Type: Potable Water

Project Description:
Replace tank due to end of useful life.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	1.00	1.0	New	1,000,000	$ 2.70	$ 2,700,000	$ 3,240,000	$ 4,536,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 4,536,000
Future Users	0%	$ -
Total	100%	$ 4,536,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Elsinore Valley Municipal Water District

carollo

Project Number: PWRR-T-2
Project Name: Gafford Street B Tank Replacement
System Type: Potable Water

Project Description:
Replace tank due to end of useful life.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.60	0.6	New	600,000	$ 2.70	$ 1,620,000	$ 1,944,000	$ 2,722,000	2045-2050

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

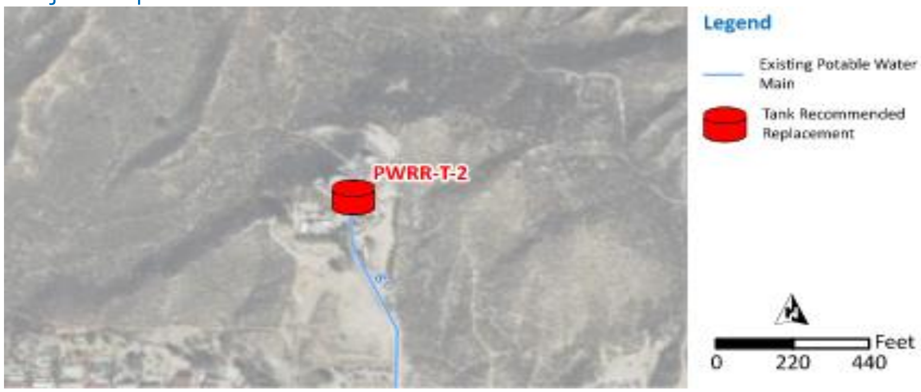
(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 2,722,000
Future Users	0%	$ -
Total	100%	$ 2,722,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:



Project Number: PWRR-T-3
Project Name: Los Pinos 1 Tank Replacement
System Type: Potable Water

Project Description:
Replace tank due to end of useful life.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.10	0.1	New	100,000	$ 8.00	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PWRR-T-4
Project Name: Los Pinos 2 Tank Replacement
System Type: Potable Water

Project Description:
Replace tank due to end of useful life.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost[1] ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost[2] ($)	Capital Improvement Cost[3] ($)	Project Schedule
Storage Tank	0.10	0.1	New	100,000	$ 8.00	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map:

Project Number: PWRR-T-5
Project Name: Skymeadows Tank Replacement
System Type: Potable Water

Project Description:
Replace tank due to end of useful life.

Project Details:

Project Element	Existing Capacity (MG)	Proposed Capacity (MG)	Replace/ New	Proposed Capacity (gal)	Unit Cost(1) ($/gal)	Baseline Construction Cost ($)	Estimated Construction Cost(2) ($)	Capital Improvement Cost(3) ($)	Project Schedule
Storage Tank	0.10	0.1	New	100,000	$ 8.00	$ 800,000	$ 960,000	$ 1,344,000	2040-2045

Notes:

(1) ENR 20 City Average Construction Cost Index for February 2023 is 14,033.

(2) Estimated Construction Cost includes a 20% contingency of the baseline construction cost.

(3) Total project costs includes a 40% markup for engineering, construction management and environmental & legal and a 8% markup for project administration of the estimated construction cost.

Project Cost Allocation:

Reimbursement Category	Percent	Cost ($)
Existing Users	100%	$ 1,344,000
Future Users	0%	$ -
Total	100%	$ 1,344,000

Notes on Cost Estimation:
This project is an existing improvement. A cost percentage has been assigned to future users as a combination of existing and future users contribute to the deficiency.

Project Map: