La Cumbre Mutual Water Company

Final Draft Water System Master Plan

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FIGURES

LIST OF ABBREVIATIONS

ACP	Asbestos Cement Pipe
AF	Acre-Foot
AFY	Acre-Foot per Year
asl	Above Sea Level
gpd	Gallons per Day
GPM	Gallons Per Minute
hp	Horsepower
MDC	Maximum Daily Consumption
MDD	Maximum Daily Demand
mgd	Million Gallons per Day
MMD	Maximum Monthly Demand
NFF	Needed Fire Flow
PHD	Peak Hour Demand
PC	Production Capacity
psi	Pounds per Square Inch
PVC	Polyvinylchloride
PRV	Pressure Reducing Valve
rpm	Revolutions per Minute
SCADA	Supervisory Control and Data Acquisition
S.F.	Square Feet
SSR	Storage Supply Required
SWP	State Water Project
TDH	Total Dynamic Head

Section 1. Executive Summary

1.1. System Summary

The La Cumbre Mutual Water Company (La Cumbre) serves water to shareholders in Hope Ranch and the Hope Ranch Annex totaling approximately 2,000 acres in Santa Barbra County and serves approximately 1,472 connections. Water is supplied to La Cumbre from a combination of local ground water and State Water that originates in Northern California is supplied through Lake Cachuma by the Central Coast Water Authority and distributed through the Goleta Water District (GWD).

The Current La Cumbre Water System Includes:

- Six active groundwater wells
- Seven interconnections with GWD and the City of Santa Barbara
- One iron and manganese water treatment plant
- Five booster pump stations
- Ten pressure zones
- Three potable water storage reservoirs
- Distribution system infrastructure including
  - Distribution piping (approximately 40.90 miles)
  - Fire hydrants (286)
  - Control valves
  - System valves (817)
  - Blow-offs
  - Air release valves

Water Company records and system maintenance records indicate that much of the distribution system piping is nearing 100 years old, surpassing the typical service life of these assets. Approximately 20% of the distribution piping is less than 6-inches in diameter, constricting available fire flow rates. A comprehensive program to replace aging, undersized and deteriorating piping is recommended to improve the condition, capacity, and reliability of the distribution system. Development of a computerized hydraulic model of the system is recommended to identify and prioritize water main replacements, and appropriately size replacement piping.

1.2. Demand Analysis

Water demands were analyzed for the period August 2020 through August 2022. Based on the data analyzed, existing and future minimum month daily demand (MMDD), average daily demand (ADD), maximum daily demand (MDD), and peak hour demand (PHD) were estimated, and summarized in Table 1-1. Average annual water use over this period was 1303 Acre-Feet per year (AFY) with a voluntary water conservation program in place.

Table 1-1. Summary of Existing and Future System Water Use

Criteria	Existing Demand (MGD)	Existing Demand (GPM)	Future Demand (MGD)	Future Demand (GPM)
MMDD	0.50	345	0.53	362
ADD	1.16	808	1.22	848
MDD	2.57	1,785	2.70	1,874
PHD	3.86	2,678	4.05	2,812

1.3. Supply Analysis

La Cumbre obtains the majority of their water through a combination of groundwater and State Water Project (SWP) sources. Well production capacities of La Cumbre's wells are shown in Table 1-2. La Cumbre is permitted to draw 300 acre-feet/year from the foothill basin on a 5-year running average and 1,000 acre-feet/year from the Goleta Central Basin on a 10-year running average.

Table 1-2. Well Production Capacities

Well	Well Capacity (GPMGPM)	Groundwater Basin
Well No. 10A	450	Goleta Central
Well No. 16	170	Foothill
Well No. 17	400	Goleta Central
Well No. 18	450	Goleta Central
Well No. 19	1,100	Goleta Central
Well No. 21	450	Goleta Central

La Cumbre also obtains imported surface water via a Water Supply Agreement with the Central Coast Water Authority (CCWA). This contract allows La Cumbre up to 1,100 acre-feet (AF) of SWP water including 1,000 acre-feet (AF) of Table A water and 100 AF of Drought Buffer. Depending on the current supplies in the SWP system, La Cumbre may or may not be permitted to receive its entire allocation. GWD provides 20% of the GWD's allocation of spill water from lake Cachuma to La Cumbre, which is water, if not utilized, would be lost downstream of the reservoir.

With the Goleta Central Basin levels in decline compared to historical records, securing additional long-term reliable sources of supply is critical to maintain future water supply reliability. Groundwater levels in the Foothill Basin have been relatively stable.

1.4. Storage Analysis

La Cumbre owns three reservoirs to store potable water for use in the distribution system. The reservoirs are deteriorated and in need of replacement. La Cumbre should strongly consider a comprehensive operational storage upgrade. Existing and recommended sizing for replacement reservoirs are shown in Table 1-3.

Table 1-3. Summary of Reservoir Sizing

Reservoir	Existing Reservoir Volume (MG)	Recommended Replacement Volume (MG)
Reservoir No. 1	0.75	1.1
Reservoir No. 2	1.5	2.5
Reservoir No. 3	0.5	0.7

Total	**2.75**	**4.7**

1.5. Condition Assessment

Field inspections of existing water infrastructure were completed by Nick Panofsky, PE of MNS Engineers, and existing electrical infrastructure by Jill Johnson, PE, and Jack Ivers, PE, of IRJ Engineers, Inc. Identified condition deficiencies are documented in Section 6.

1.6. Staffing Analysis

A staffing analysis was completed to estimate appropriate staffing levels for operations and administration staff for La Cumbre. Based on this analysis, seven full-time operators are recommended. Operator staffing does not include La Cumbre's general manager or administrative manager. Hiring an internal or contract capital program manager should be considered to advance the capital project recommendations of this Report.

Implementation of a computerized maintenance and management system (CMMS) would also assist in transitioning operations activities from reactionary to proactive, to more efficiently make use of operations staff.

1.7. Capital Improvement Projects

Capital improvement projects were developed based on the results of the condition assessment and other evaluations performed in preparation of this Report. A preliminary estimate of project costs for each of the identified capital projects was developed. As a basis for developing an implementation plan, the recommended projects were assigned a priority number between one and ten based on project necessity; with a priority number of one being the highest priority. Assigned priorities and budgetary project costs are summarized in Table 1-4.

Table 1-4. Capital Project Cost Estimates

Capital Project	Project Priority	Budgetary Implementation Cost Estimate
Project G-1: Water System Hydraulic Model	1	$60,000
Project G-2: New Maintenance Building	3	$3,200,000
Project G-3: New Administration Building	6	$3,320,000
Project G-4: CMMS Program	7	$65,000
Project G-5: SCADA Platform Upgrade	7	$120,000
Project G-6: Security Improvements Project	8	$192,000
Project S-1: Modoc Ring Meter and Pressure Relief Valve Site	2	$536,000
Project S-2: Modoc 6" Meter Piping Upgrade	2	$64,000
Project S-3: Hope Ranch Subbasin Well	6	$1,920,000
Project S-4: Well #16 Replacement – With New Well No. 22.	1	$2,160,000
Project S-5: Well #18 Short Term Improvements	1	$64,000
Project S-6: Well #18 Rehabilitation and Transmission Main	2	$1,430,000
Project S-7: Well #10A, #19, and #21 Rehabilitation	5	$556,000
Project T-1: Nogal Water Treatment Plant	2	$1,061,600
Project T-2: Well #17 Water Treatment Plant	3	$2,320,000
Project ST-1: Reservoir 1 Replacement	4	$6,000,000
Project ST-2: Reservoir 2 Replacement	5	$6,640,000
Project ST-3: Reservoir 3 Replacement	6	$4,640,000
Project P-1: Cuervo Pump Station Rehabilitation	7	$128,000
Project P-2: Via Hierba Pump Station Rehabilitation	4	$121,600

Capital Project	Project Priority	Budgetary Implementation Cost Estimate
Project P-3: Via Alegre Pump Station Rehabilitation	5	$156,800
Project P-4: Cresta Pump Station Rehabilitation	5	$1,344,000
Project P-5: Tranquila Pump Station Rehabilitation	6	$76,000
Project D-1: Contract Hydrant and Valve Flushing and Condition	3	$48,000
Project D-2: Valve and Hydrant Replacement Project	4	$400,000
Project D-3: Marina Drive Water Main Replacement	2	$2,320,000
Project D-4: Cuervo Pump Station Pipeline Replacements	1	$980,000
Project D-5: Well #16 Discharge Lining	7	$280,000
Project D-6: Zone 9 Secondary Supply	6	$880,000
Project D-7: Zone 2 to Zone 3 Interconnect	7	$960,000
Project D-8: Water Main Replacement Year 4	8	$4,000,000
Project D-9: Water Main Replacement Year 5	9	$4,000,000
Project D-10: Water Main Replacement Year 6	10	$4,000,000
Total		**$54,043,000**

All costs are in 2023 dollars. Budgets for projects in future years should be escalated based on an assumed inflation estimate of 3-6% annually.

Section 2. System Description

This Section provides an overview of the existing water production, storage, and distribution facilities in the La Cumbre Mutual Water Company (La Cumbre) potable water system (System). Figure 2-1 shows the locations of water wells, system interconnections, treatment facility, reservoirs, pump stations, and other elements of the system.

2.1. Setting

La Cumbre's service area is located on the Pacific Ocean coastline, adjacent to and west of the City of Santa Barbara in unincorporated Santa Barbara County, approximately 330 miles south of San Francisco and 100 miles northwest of Los Angeles, in Santa Barbara County, California. The area has varied topography with ground surface elevations ranging from sea level to 610 feet above sea level (asl).

2.2. Water System Overview

The La Cumbre System provides potable water service to 1,472 customers within the service area, approximately 2,000 acres in size (California Division of Drinking Water System CA4210024). In addition, La Cumbre provides recycled water to the La Cumbre Country Club via a pipeline supplied by the City of Santa Barbara (City). The service area includes the area known as Hope Ranch and the area between Hollister Avenue and Hope Ranch known as the Hope Ranch Annex. Customer meters include single-family residential, multi-family residential, commercial, educational, and golf course meters.

The system component locations are shown in Figure 2-1. A hydraulic profile of the system is provided as Figure 2-2.

6" MODOC RING GWD METER
4" MOTEL GWD METER
WELL 16
WELL 18
6" CLARA VISTA CT (OFF) GWD METER
6" MODOC GWD METER
4" PUENTE METER
WELL 10A
(2) 2" WEST & EAST GWD METER
WELL 21
NOGAL WTP
WELL 19
10" GOLF COURSE GWD METER
WELL 17
HIERBA BOOSTER PUMP STATION
RESERVOIR #1
TRANQILLA BOOSTER PUMP STATION
3" LAGUNA BLANCA METER-EMERGENCY INTERTIE
ALEGRE BOOSTER PUMP STATION
RESERVOIR #2
CRESTA BOOSTER PUMP STATION
CUERVO BOOSTER PUMP STATION
RESERVOIR #3
PACIFIC OCEAN

LEGEND

- PRESSURE ZONE BOUNDARY
- GROUNDWATER WELL
- BOOSTER PUMP STATION
- WATER RESERVOIR
- WATER TREATMENT PLANT
- STATE WATER CONNECTION

1000' 0' 1000'
1"=1000'

MNS

LA CUMBRE MUTUAL WATER COMPANY
WATER MASTER PLAN
FIGURE 2-1 ASSET MAP

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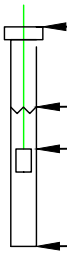
LEGEND

NOT TO SCALE

WELL

WELL NAME
DESIGN CAPACITY (GPM)



115' SURFACE ELEVATION

-138' PUMPING WATER LEVEL

-168' PUMP DEPTH

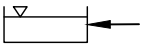
-400' WELL DEPTH

TANK

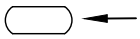
TANK NAME
CAPACITY (GALLONS)

627' OVERFLOW ELEVATION

BASE ELEVATION

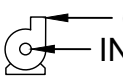


BALANCING TANK



HYDRO TANK

PUMP



OUTLET
INLET

PLANT NAME
CAPACITY (GPM)
ELEVATION

PRESSURE FILTER

PRESSURE SHUTOFF VALVE

CONTROL VALVE

VALVE, NORMALLY CLOSED

CHECK VALVE

ELEVATION

HYDRAULIC GRADE

PRESSURE ZONES

ZONE 1 - ANNEX

ZONE 2 - LAS PALMAS/BENDITA

ZONE 3 - MARINA

ZONE 4 - ALEGRE

ZONE 5 - HIERBA

ZONE 6 - CAYENTE/MONTE

ZONE 7 - CUERVO

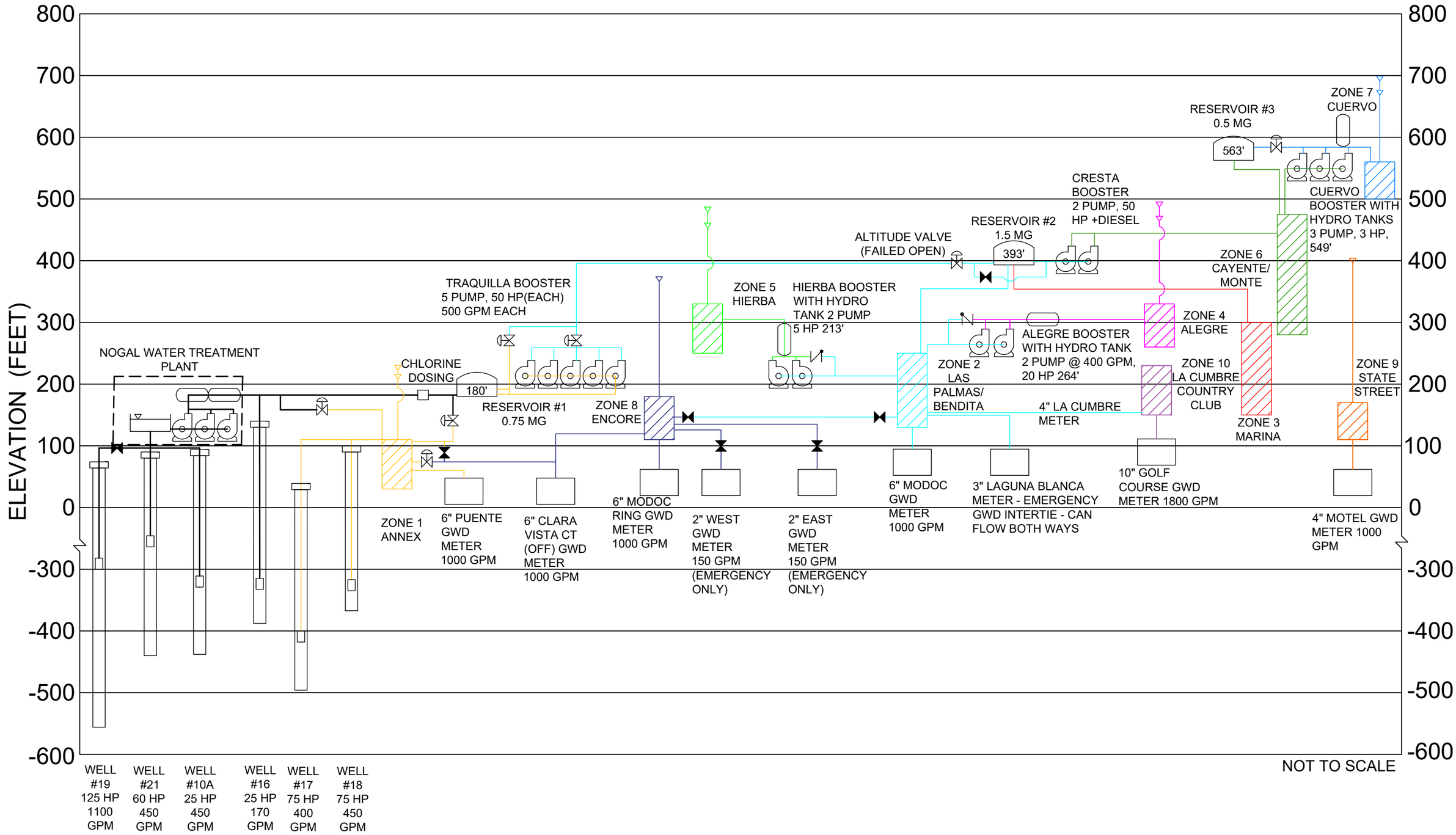
ZONE 8 - ENCORE

ZONE 9 - STATE STREET

ZONE 10 - LA CUMBRE COUNTRY CLUB

MNS

LA CUMBRE MUTUAL WATER DISTRICT
HYDRAULIC PROFILE LEGEND



SYSTEM SCHEMATIC DIAGRAM

LA CUMBRE MUTUAL WATER DISTRICT

JANUARY 2023

2.3. Water Sources

La Cumbre obtains water through a combination of local groundwater, recycled and imported surface water sources.

Groundwater

La Cumbre owns and operates six active wells which provide groundwater to the system. Three wells (Wells No. 10A, 19 and 21) feed water to the Nogal Water Treatment Plant to address elevated levels of iron and manganese. The remaining three active wells (Wells No. 16, 17 and 18) supply water directly to the distribution system. Chlorine is dosed to water prior to entering Reservoir No. 1. Well 18 is currently off-line due to elevated levels of iron and manganese above the secondary maximum contaminant level (MCL).

Wells that supply the treatment plant and directly to the system are located within pressure Zone 1 - Annex. Controls for the wells supplying the treatment plant are based on the operating levels in Reservoir 1. The groundwater supply well locations are shown on Figure 2-1, and summarized in Table 2-1.

Table 2-1. Well Production Capacities and Locations

Well	Well Capacity (GPM)	Well Address
Well No. 10A	450	4289 Modoc Rd.
Well No. 16	170	4101 State St.
Well No. 17	400	4698 Puente Plaza
Well No. 18	450	4500 Hollister Ave.
Well No. 19	1,100	4491 Nueces Dr.
Well No. 21	450	429 Nogal

State Water Project

La Cumbre is party to Water Supply Agreement with the CCWA for the delivery of water from the SWP. This contract allows La Cumbre up to1,100 acre-feet (AF) of SWP water including 1,000 acre-feet (AF) of Table A water and 100 AF of Drought Buffer. The actual amount of water available for delivery varies from year to year. SWP is wheeled through Lake Cachuma via connecting infrastructure by the Central Coast Water Authority and the Goleta Water District System. There are five active connections, one inactive connection, and three emergency connections to the Goleta Water District System for State Water. The names, sizes, and capacities of these connections are documented in Table 2-2.

The SWP connections also enable La Cumbre to purchase water on the open market from other agencies, and wheel water through the SWP system, when excess conveyance capacity is available.

Table 2-2. State Water Project Connections

Supplying Agency	Connection Name	Connection Size (in)	Connection Capacity* (GPM)	Zone Serviced	Notes
GWD	Puente Meter	4	1,000	1	
GWD	Modoc	6	1,000	2	
GWD	Laguna Blanca	3	N/A	2	Intertie
GWD	Clara Vista Ct.	6	1,000	8	Not in Use
GWD	Modoc Ring	6	1,000	8	
GWD	West	2	150	8	Emergency Only
GWD	East	2	150	8	Emergency Only
GWD	Motel	4	1,000	9	
GWD	Golf Course	6	1,800	10	

*Connection capacities are estimates and could be verified during development of hydraulic model.

2.4. Water Treatment

La Cumbre owns and operates one groundwater treatment plant, the Nogal Water Treatment Plant (Plant). Water is supplied to the plant from Wells 10A, 19, and 21. La Cumbre plans to direct flow from Well 18 to the Plant in the future. The Plant treats Iron and Manganese using a proprietary catalytic ion exchange media by Pure Flow Technologies. Water flows into the Plant from the three wells into a balancing tank. Due to hydrogen sulfide in the feed water supply, the balancing tank has exhibited corrosion, and has been rehabilitated. A blower was added to the balancing tank to continuously circulate air in the tank headspace to reduce future H2S induced corrosion. Three 50 horsepower, 800 GPMGPM each, canned vertical turbine pumps draw water from the balancing tank and convey it through the treatment process and into the System. The system uses an on-site sodium hypochlorite generator to produce 0.8% sodium hypochlorite disinfectant solution. If all three wells are operating, the sodium hypochlorite generator does not generate sufficient disinfectant solution, and La Cumbre uses a back-up chlorine tablet system to supplement. La Cumbre is in the process of replacing the on-site sodium hypochlorite generation system with a larger unit and will remove the supplemental tablet chlorination system. Filter backwash uses system water from Reservoir 1 to backwash filters. Backwash waste discharges to the backwash reclaim tank. Solids from the backwash tank are metered into the sanitary sewer system. Backwash tank supernatant is returned to the balancing tank.

2.5. Water Storage

La Cumbre owns three reservoirs to store treated water for use in the distribution system. The level of water in the reservoirs controls the system operating pressure in the pressure zone(s) served directly by each reservoir. All three reservoirs are below grade concrete structures. A summary of the existing reservoirs is provided in Table 2-3. The three reservoirs combined provide a total of 2,750,000 gallons of storage capacity.

Table 2-3. Storage Reservoirs

Reservoir	Capacity (gallons)	Zone Serviced Directly / Indirectly	Location
1	750,000	8	695 Via Tranquila
2	1,500,000	2, 3 / 4, 5	4228 Cresta Ave
3	500,000	6 / 7	Cuervo Ave
Total	**2,750,000**		

Reservoir 1

Reservoir No. 1 is supplied water from the Nogal Water Treatment Plant and from Well No. 16. Both Wells No. 17 and No. 18 can also discharge to Reservoir No. 1 through the distribution system. Reservoir No. 1 has a capacity of 750,000 gallons and includes a chlorine dosing facility just upstream of the reservoir to chlorinate water prior to entering the reservoir. The reservoir roof is a wood framed structure, covered with corrugated metal panels. Water from Reservoir No. 1 feeds the Tranquila Booster Pump Station that feeds Reservoir No. 2. Reservoir No. 1 is located at the La Cumbre office at 695 Via Tranquila and has a base elevation of 169 feet asl, and high-water level of 180 feet asl. Figure 2-3 shows the reservoir.

Figure 2-3. Reservoir No. 1

Reservoir 2

Reservoir No. 2 is supplied water from the Tranquila Booster Pump Station and has a capacity of 1,500,000 gallons. The reservoir roof is a wood framed structure, covered with a raised seam metal roof. The reservoir supplies water and operating head to pressurize Zones 2 and 3. The reservoir also supplies Zones 4 and 5 indirectly via the Alegre and Hierba booster pump stations respectively. Water from the reservoir also supplies the Cresta booster pump station that feeds Reservoir No. 3. Reservoir No. 2 is located off Cresta Avenue and has a base elevation of 381 feet asl, and high water level of 393 feet asl. Figure 2-4 shows the reservoir.

Figure 2-4. Reservoir No. 2

Reservoir 3

Reservoir No. 3 is supplied by the Cresta Booster Pump Station and has a capacity of 500,000 gallons. The reservoir roof is a wood framed and steel framed structure, covered with a raised seam metal roof. The reservoir supplies water and operating head directly to pressure Zone 6. Water from the reservoir supplies the Cuervo booster pump station that feeds Zone 7. Reservoir No. 3 is located at the terminus of Cuervo Avenue and has a base elevation of 549 feet asl, and high water levels of 563 feet asl. Figure 2-5 shows the reservoir.

Figure 2-5. Reservoir No. 3

2.6. Water Distribution System

The water distribution system is composed of a network of pipes, pump stations, valves, and appurtenances which are used to convey water from the treatment facility and reservoirs to customers throughout the service area. These facilities are summarized in the following subsections.

Pressure Zones

The distribution system is divided into ten pressure zones. There are various locations within the distribution system where pressure zones are connected. At these locations, pressure-reducing valves (PRVs) maintain the pressure differential between the zones, or closed isolation valves isolate the zones. The locations of the pressure zones are shown on Figure 2-6. A summary of the pressure zones is provided in Table 2-4.

ZONE 9 - STATE STREET

ZONE 8 - ENCORE

ZONE 1 - ANNEX

ZONE 5 - HIERBA

ZONE 10 - LA CUMBRE COUNTRY CLUB

ZONE 2 - LAS PALMAS/BENDITA

ZONE 4 - ALEGRE

ZONE 6 - CAYENTE/MONTE

ZONE 7 - CUERVO

ZONE 3 - MARINA

PACIFIC OCEAN

PRESSURE ZONES

- ZONE 1 - ANNEX
- ZONE 2 - LAS PALMAS/BENDITA
- ZONE 3 - MARINA
- ZONE 4 - ALEGRE
- ZONE 5 - HIERBA
- ZONE 6 - CAYENTE/MONTE
- ZONE 7 - CUERVO
- ZONE 8 - ENCORE
- ZONE 9 - STATE STREET
- ZONE 10 - LA CUMBRE COUNTRY CLUB

1000' 0' 1000'

1"=1000'

MNS

LA CUMBRE MUTUAL WATER COMPANY
WATER MASTER PLAN
FIGURE 3-1 PRESSURE MAP

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Table 2-4. Service Area Pressure Zones

Zone No.	Zone Name	Zone Ground Elevation Range (feet asl)	Zone Pressure Operating Range (psi)	Hydraulic Grade Line Range (Feet)	Pressure Maintained By
1	Annex	33-125	38-82	190-245	Nogal Plant, Wells 16 & 17, and SWP Connections
2	Las Palmas/Bendita	130-250	62-138	381-393	Reservoir 2 and Tranquila Booster
3	Marina	150-300	40-105	381-393	Reservoir 2 and Tranquila Booster
4	Alegre	260-330	62-102	472-465	Alegre Booster
5	Hierba	250-330	53-99	453-479	Hierba Booster
6	Cayente/Monte	280-475	38-122	549-563	Reservoir 3 and Cresta Booster
7	Cuervo	500-560	50-86	676-699	Cuervo Booster
8	Encore	110-180	100-140	411-433	SWP/GWD Connections
9	State Street	110-170	105-140	412-433	SWP/GWD Connections
10	La Cumbre Country Club	150-230	71-105	381-393	Reservoir 2 and SWP/GWD Connections

Booster Pump Stations

The system has five booster pump stations to transfer water between pressure zones. Table 2-5 includes information for each pump station. The booster stations are controlled by pressure sensors located on the discharge sides of each pump station.

Table 2-5. Booster Pump Stations

Name	Number of Pumps / Pump HP	Pump Capacity (GPM) @ Feet TDH	Pump Model	Supply Zone / Discharge Zone
Tranquila	5 / 50	550 @ 236’	Goulds 92SVBCOK2A Vertical Turbine	1 / 2 & 3
Cresta	2 / 50	550 @ 236’	Goulds 92SVBCOK2A Vertical Turbine	2 / 6
Cuervo	3 / 3	50 @ 185’	Goulds E-SV 5SV7WF60 Vertical Turbine	6 / 7
Hierba	2 / 3	25 @ 240’ – 266’	Webtrol NV25B9 Vertical Turbine	2 / 5
Alegre	2 / 20	400 @ 254’	Goulds E-SV 66SV21GL4F60 Vertical Turbine	2 / 4

A photo of each pump station is provided as follows.

Figure 2-7. Tranquila Booster Pump Station

Figure 2-8. Cresta Booster Pump Station

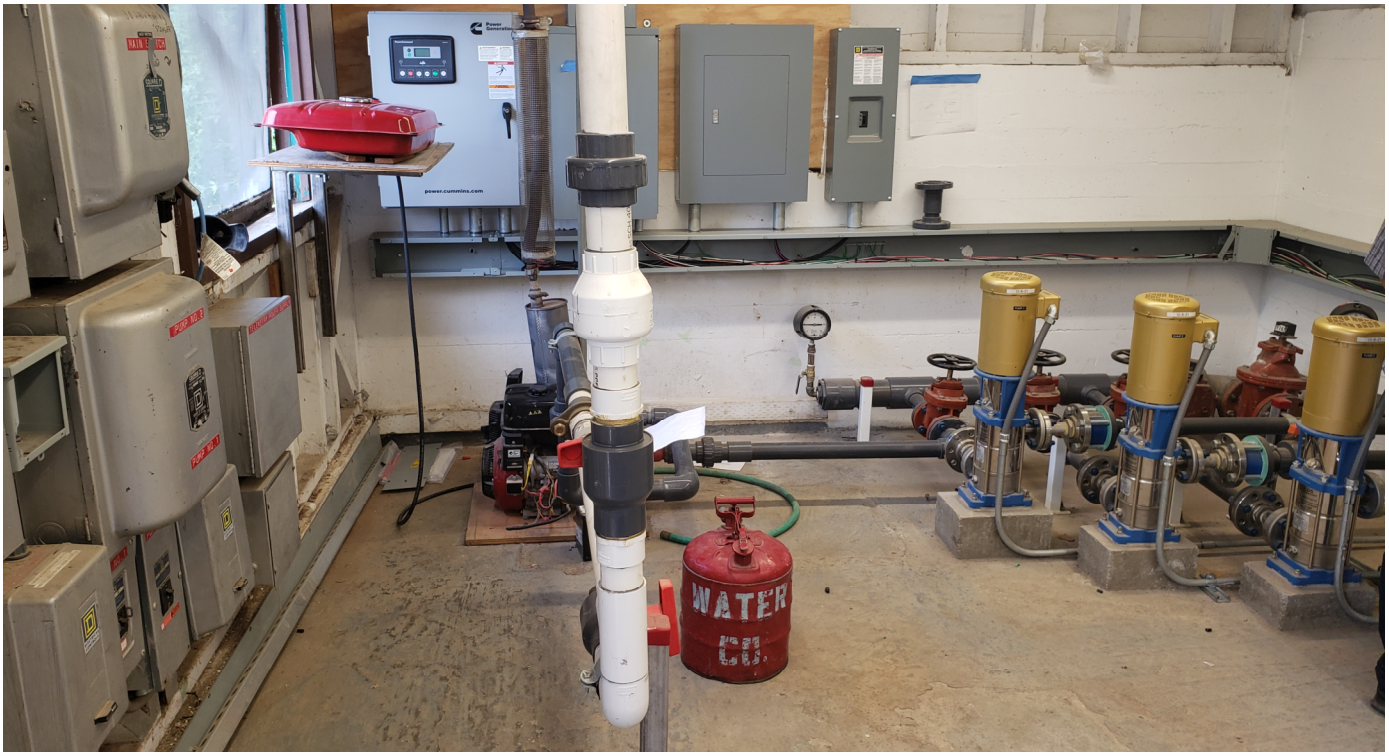

Figure 2-9. Cuervo Booster Pump Station

Figure 2-10. Hierba Pump Station

Figure 2-11. Alegre Booster Pump Station

Distribution System Piping

The System Includes distribution infrastructure including:

- Distribution piping
- Fire hydrants
- Control valves
- System valves
- Blow-offs
- Air release valves

The distribution network includes approximately 40.90 miles of distribution piping, as summarized in Table 2-6. Ages of piping materials were not available for preparation of this Report, but much of the distribution system piping is believed to date to the 1920s.

Table 2-6. Pipe Lengths and Materials of Construction in Distribution System

	Pipe Length (feet) By Diameter (inch)								
Pipe Material	**2”**	**3”**	**4”**	**6”**	**8”**	**10”**	**12”**	**14”**	**Total Material Length (feet)**
Asbestos Cement	667	4,434	33,556	57,122	24,611	7,177	503	-	**128,070**
PVC	418	301	594	13,453	35,722	-	159	772	**51,369**
HDPE	-	-	-	-	862	-	-	-	**862**
Steel	217	-	139	4,538	3,143	1,947	6,933	6,651	**23,568**
Ductile Iron	-	-	29	592	144	379	-	-	**1,144**
Total (feet)	**1,302**	**4,735**	**34,318**	**75,705**	**64,482**	**9,503**	**7,595**	**7,423**	**205,063**

Valves and Hydrants

Based on La Cumbre provided GIS data, the distribution network includes 817 valves and 286 fire hydrants. A summary of the size and type of valves in the system are provided in Table 2-7. Control valves are not included in this summary.

Table 2-7. Valve Count by Type and Size

	Valve Size (inches)										
Valve Type	Unknown	1.5	2	3	4	6	8	10	12	14	16
Butterfly	1		2		4	31	10	2			
Gate	1	3	23	13	84	378	145	92	15	11	2
Total	**2**	**3**	**25**	**13**	**88**	**409**	**155**	**94**	**15**	**11**	**2**

2.7. Distribution System Analysis Summary and Recommendations

An analysis of the distribution system was completed based on the information documented in this section. A summary of the findings and recommendations are provided as follows.

- Portions of Zone 1 may have lower operating pressures than normally desired when the Nogal Treatment Plant is not operating. La Cumbre should consider adjusting the service pressure from GWD to more closely match service pressure when the treatment plant is operating.
- Zone 2 and Zone 3 are actually one zone served directly by Reservoir No. 2 but have limited interconnectivity. Adding an additional connection at the zone boundary on the west side of the system would improve flow between Zone 2 and Zone 3 and allow them to be managed as a single zone, and improve fire flow availability.
- La Cumbre could consider combining Zone 6 and Zone 4. This would allow abandonment of the Alegre booster station and improve water supply reliability for Zone 4. Pressure reducing valves on each service would be required to avoid over pressurizing residential piping. If this change is implemented, the recommended sizing for Reservoir Nos. 2 and 3 would be adjusted to shift demand from Reservoir No. 2 to Reservoir No. 3.
- Zone 9 is serviced only by SWP/GWD supplies. A loss of service from GWD would result in a water outage. A connection between Zone 9 and Zone 2 would provide additional supply reliability to Zone 9.

- La Cumbre does not currently have any means to transfer water from Reservoir No. 3 to Reservoir No. 2. During an emergency situation, making additional water supplies available would benefit system operability.

While the existing distribution system is functional, there are a variety of operational, condition, and capacity concerns. Reservoir storage capacities are discussed in detail in Section 5. Reservoir conditions are discussed in Section 6.

Capacities of pump stations are believed to be adequate to meet existing and future demands, however, development of a computerized hydraulic model of the system is recommended to verify pump station sizing under various operational scenarios. Pump station condition issues are discussed in Section 6.

Limited information is available regarding the exact age and condition of existing distribution system piping, valves, and fire hydrants, except documented system leaks discussed in Section 6. Much of the distribution system piping is believed to be nearing 100 years old, surpassing the typical service life of these assets. Approximately 20% of distribution piping is less than 6-inches in diameter, constricting available fire flow rates. A program to replace aging, undersized and deteriorating piping is recommended to improve the condition, capacity, and reliability of the distribution system. Development of a computerized hydraulic model of the system is recommended to identify and prioritize water main replacements, and appropriately size replacement piping.

Section 3. Water Demand

This Section discusses the average and peak demands in the La Cumbre water system.

3.1. Study Area

The study area for this report encompasses all residences, businesses, and water system customers within the La Cumbre's service area limits. All customers within the service area are equipped with water meters. The service area limits encompass approximately 2,000 acres and is shown in Figure 2-6.

3.2. Land Use and Population

The majority of the land within the La Cumbre service area limits is developed with a mix of residential, commercial, municipal/public, and open space. The La Cumbre County Club Golf Course is on the northeast portion of the service area. Interstate Highway 101 runs along the northern boundary of the service area. The service area is bound on the south by the Pacific Ocean. La Cumbre currently provides service to 1,472 customer meters including 65 commercial services and 1,507 residential services. Per the California Division of Drinking Water, the population served by La Cumbre is 4,861.

3.3. Existing Water Production and Demand

Historical water production was calculated based on well production records, and water supply data received from SWP connection meters. For the analysis in this section, production is assumed to equal demand. California has experienced a severe drought in recent years. As a result of conservation efforts, recent water production and consumption has declined compared to years past. For the purposes of this study, demands by existing customers are not anticipated to increase to pre-drought consumption levels. Water production data was analyzed over a two-year period, August 2020 through August 2022. Average annual water use over this period was 1,303 Acre-Feet per year (AFY).

Peak water system demands were estimated based on peak month production. Minimum water system demands are based on the minimum average monthly water use. The maximum daily demand (MDD) was determined by multiplying the calculated average daily usage by a peaking factor of 1.5. Peak hour demand (PHD) was determined by finding the average hourly flow during MDD, dividing MDD by 24, and multiplying this value by a peaking factor of 1.5.

Annual average demand (ADD) was calculated to be 1.16 million gallons per day (MGD). During the analyzed period, the highest monthly production occurred in August 2020. This data was used to calculate a MDD for the System of 2.57 MGD, and a PHD of 0.16 MG per hour, equivalent to 3.86 MGD. During the analyzed period, the minimum water production occurred in January 2022, yielding a minimum month daily demand (MMDD) of 0.50 MGD. These data points are summarized in Table 3-1.

Table 3-1. Summary of Existing System Water Use

Criteria	Demand (MGD)	Demand (GPM)
MMDD	0.50	345
ADD	1.16	808
MDD	2.57	1,785
PHD	3.86	2,678

Average water use was calculated to be 816 gallons per connection per day.

Sufficient data was not available to allocate water system demand to each pressure zone. Based on meter and pump station flow data, water supplies were allocated to each reservoir for use in evaluating reservoir capacity. A summary of per reservoir demand, based on maximum month demand for each reservoir is provided in Table 3-2. Maximum flow to Reservoirs 1 and 2 did not occur in the same month as system peak month production.

Table 3-2. Existing Water Use by Reservoir

Reservoir	Average Annual Demand (MG)	Average Daily Demand (Gal)	Max Monthly Demand (MG) (Month)	Max Daily Demand (MG)	Peak Hourly Demand (GPM)	Minimum Daily Demand (MGD)
Reservoir No. 1	98.3	269,401	17.5 July-2022	0.85	882	54,632
Reservoir No. 2	261.0	715,068	38.1 July-2021	1.84	1,920	246,375
Reservoir No. 3	65.1	178,382	7.6 August-2020	0.37	381	66,842

3.4. Future Development and Demands

La Cumbre is substantially built out. No significant development projects are planned which will increase System demand. Due to recent changes in regulation, construction of accessory dwelling units (ADUs) is anticipated which could increase System demand. For the basis of planning, an 8% increase in water use from current conditions is assumed. An estimate of the anticipated future water use is described in Table 3-3.

Table 3-3. Summary of Future System Water Use

Criteria	Demand (MGD)	Demand (GPM)
MMDD	0.54	373
ADD	1.25	873
MDD	2.78	1,928
PHD	4.17	2,892

It is estimated that future water demand will increase to 1,400 AFY. Table 3-4 provides a summary of estimated future system demands by reservoir.

Table 3-4. Future Water Use by Reservoir

Reservoir	Average Annual Demand (MG)	Average Daily Demand (Gal)	Max Monthly Demand (MG)	Max Daily Demand (MG)	Peak Hourly Demand (GPM)	Minimum Daily Demand (MGD)
Reservoir No. 1	106.2	290953	18.9	0.9	953	0.059
Reservoir No. 2	281.9	772273	41.1	2.0	2,074	0.266
Reservoir No. 3	70.2	192653	8.2	0.4	411	0.72

Section 4. Water Supply Analysis

This section discusses La Cumbre's existing water supplies, their long-term reliability, and potential future sources of supply.

4.1. Water Supply Sources Overview

La Cumbre's existing water supplies consist of a combination of local groundwater, imported surface water (SWP), and recycled water sources.

La Cumbre is actively seeking additional supplies which will provide both short- and long-term water supply reliability. Potential future water supplies include purchasing water from the City of Santa Barbara through participation in the expansion of the City's ocean desalination plant, desalination of ocean water at an offshore buoy, further development of groundwater supplies, and purchasing of water on the open market. These sources are described in the following sections.

4.2. Groundwater

La Cumbre owns and operates six wells which provide groundwater to the system as described in Section 2.3. Controls for the wells feeding the treatment plants are based on the operating level of the supply reservoir to the treatment plant. Well information and capacity information for La Cumbre's wells are shown in Table 4-1.

Table 4-1. Well Production Capacities

Well	Year of Construction	Casing Depth (Feet) /Material /Diameter (Inches)	Well Capacity (GPM)	Notes
Well No. 10A	1966*	530 / PVC & Stainless / 8	450	
Well No. 16	1978	380/ Stainless / 3	170	
Well No. 17	1980	535 / PVC / 10	400	Not used since 2011
Well No. 18	1983		450	Offline due to high Fe and Mn
Well No. 19	1989	630 / PVC / 10	1,100	
Well No. 21	2000	530 / PVC / 10	450	

*PVC blank and stainless steel casing liner installed in 2018

Well production has declined over the past 10 years from a peak production in 2012 of 2,407 acre-feet to less than 800 acre-feet in 2019 and 2020.

La Cumbre contracted with Pueblo Water Resources to perform an assessment of the production capacity of the four existing active wells, considering ongoing drought conditions. This assessment is included as **Appendix A**. This assessment reinforces the need to identify alternative sources of supply to reduce reliance on the Goleta Groundwater Basin.

Well 18 is currently offline due to elevated concentrations of iron and manganese over the secondary MCL. La Cumbre desires to reactivate the well and convey the water to the Nogal Water Treatment Plant for treatment.

Photos of Wells Nos. 10A, 16, 17, 18, 19, and 21. are shown in Figure 4-1 through Figure 4-6.

Figure 4-1. Well No. 10A

Figure 4-2. Well No. 16

Figure 4-3. Well No. 17

Figure 4-4. Well No. 18

Figure 4-5. Well No. 19

Figure 4-6. Well No. 21

Three groundwater basins, the Goleta Groundwater Basin, the Foothill Basin, and the Hope Ranch subbasins of the Santa Barbara Groundwater Basin underlie the System boundary. The existing wells draw water from the central portion of the Goleta Groundwater Basin and the Foothill Basin. The Goleta Groundwater Basin is bounded to the west by the topographic divide east of Ellwood Canyon, and on the southeast by the Modoc Fault. The Foothill Basin is bounded on the north and northeast by Tertiary sedimentary rocks of the Santa Ynez Mountains, on the northwest by the Goleta fault, on the southwest by the Modoc and Mesa faults, on the south by the More Ranch fault, and on the southeast by the Mission Ridge fault. The Hope Ranch subbasin of the Santa Barbara Groundwater Basin is bounded to the northwest by the Modoc Fault.

Due to ongoing drought and continued draw, the groundwater levels in the Goleta Groundwater Basin are declining. Decreasing reliance on this basin as a source of supply is recommended to the extent feasible and cost effective.

Construction of a well or wells within the Hope Ranch subbasin could be a potentially productive new source of supply for the system. A hydrogeologic report titled Groundwater Availability and Quality, More Mesa Development, Hope Ranch Subbasin, in 1977 documented the sustainable yield of the Hope Ranch Groundwater Basin to be at least 150 AFY. It is believed these supplies are not currently being fully utilized. Additional work to estimate the sustainable yield of the groundwater basin is recommended. This document assumes up to 50 AFY of water are available to La Cumbre. Treatment of water from this basin is anticipated to be required for elevated levels of iron, manganese, sulfate, and total dissolved solids (TDS).

4.3. State Water

La Cumbre is party to Water Supply Agreement with the CCWA for the delivery of water from the SWP. This contract allows La Cumbre up to 1,100 AF of SWP water. Access to this water is provided through Lake Cachuma, via the Central Coast Water Authority, utilizing the South Coast Conduit Pipeline, and wheeling water through the Goleta Water District distribution system. SWP water allocations have been historically variable. Deliveries for 2022 were just 5% of Table A allocations. Over the past 10 years, SWP allocations have ranged from 0-85%. In addition, GWD provides 20% of the GWD's allocation of spill water from lake Cachuma to La Cumbre, which is water, if not utilized, would be lost downstream of the reservoir. When available, this spill water could be utilized to serve La Cumbre customers or be used for aquifer supply and recharge (ASR).

La Cumbre has five active connections, one inactive connection, and three emergency connections to the Goleta Water District System for State Water. A summary of the connections and their capacities are listed in Table 4-2.

Table 4-2. Summary of GWD Interconnection Meters

Connection	Meter Size (in)	Connection Capacity (GPM)	Notes
Puente Meter	4"	1000	
Clara Vista Ct.	6"	1000	Not used
West GWD Meter	2"	150	Emergency Use Only
West GWD Meter	2"	150	Emergency Use Only
Modoc Meter	6"	1000	
Laguna Blanca	3"		Intertie – Can Flow Both Ways
Golf Course GWD	6"	1800	
Motel GWD Meter	4"	1000	

* Connection capacities are estimates, and could be verified during development of hydraulic model.

Regardless of the meter capacities, La Cumbre can only draw water from these meters at a rate and quantity in accordance with current the agreements. Existing meter connections have sufficient capacity to serve existing and future demands.

4.4. Open Market

La Cumbre has a physical connection to the SWP system. This connection allows La Cumbre to purchase water on the open market, which would be wheeled through the SWP system. Depending on current market conditions, this can be an expensive approach to generating water supplies. Since each purchase provides a one-time supply, open market purchases do not provide long term sustainable supplies but can provide a buffer to address drought conditions or a back-up source of supply. Purchased water can also be stored in other agencies facilities or groundwater banks for future use.

4.5. City of Santa Barbara Desalination

La Cumbre is in active negotiations with the City of Santa Barbara to purchase capacity in an expansion of the City's desalination plant. If the negotiations are successful, this will provide a long-term drought protected source of supply for the System. Conceptual agreements have been drafted for short term and long term supplies.. If successful, purchased water would be wheeled through the GWD system, and received at the GWD Clara Vista Court and Modoc meters. This connection would provide a substantial improvement in supply reliability for La Cumbre.

4.6. Sea Well Project

La Cumbre is collaborating with a private firm to advance a project, known as the Sea Well Project, which would provide a new local source of supply. The project would consist of a desalination buoy, located approximately 1 mile offshore in the Pacific Ocean. The buoy would provide up to 1,000 AFY of desalinated water through a pipeline installed along the sea floor to the shore,

where a pipeline would be installed using horizontal directional drilling to extend the pipeline onto land. A pipeline would then continue along existing roadways to a new remineralization plant on La Cumbre property, conceptually located south of the intersection of Paloma Drive and Las Palmas Drive. The treated water would then be conveyed into the System.

If the Sea Well Project moves forward, it will provide a new long-term drought protected source of supply for the System. A more thorough analysis would be needed to determine how the new source of supply would be integrated into the existing potable water system However, the likelihood of this moving forward is believed to be low. As a result, a capital project to facilitate advancement of this project is not designated.

4.7. Water Supply Long-Term Reliability

La Cumbre maintains multiple water supplies, including connections to State Water via the Goleta Water Systems, and groundwater wells. In a multiple dry-year drought scenario, all of these sources may not be relied upon. In the most recent drought cycle, La Cumbre did not receive its SWP allocation and was forced to throttle back production on shallow groundwater wells to prevent well cavitation. In this scenario, the La Cumbre relied more heavily on the deeper Wells No. 19 and No. 17 as the most reliable sources of water.

It is imperative the La Cumbre maintain operability of Well No. 19 and move forward with installing an additional well in the Hope Ranch groundwater Basin to improve long-term supply reliability.

Section 5. Water Storage Analysis

This section discusses the analysis and associated recommendations regarding potable water storage volumes in La Cumbre's water distribution system for meeting potable service requirements as well as fire demands.

5.1. Existing Water Storage Facilities

As discussed in Section 2, La Cumbre has three reservoirs to store treated water for use in the distribution system. In total, La Cumbre currently has 2,750,000 gallons of potable water storage volume. La Cumbre doesn't currently have facilities to transfer water from Reservoir No. 3 to Reservoir No. 2. However, La Cumbre does have the capability to transfer water between Reservoir No.2 and Reservoir No. 1.

5.2. Fire/Storage Analysis

The quantity of water which needs to be provided in the event of a fire is determined by the 2022 California Fire Code, Appendix B. To ensure sufficient storage is available in the system, an analysis was conducted to determine the recommended fire demand.

Based on input from the County of Santa Barbara fire department, the recommended fire flow for the system is 3,000 GPM for a period of 3 hours based on the size and type of construction for the homes in the La Cumbre service area. A flow rate of 3,000 GPM for 3 hours yields a fire storage requirement of 540,000 gallons. This fire demand is used for recommended sizing of Reservoir Nos. 2 and 3. Since Reservoir No. 1 does have sufficient pressure to directly serve Zone 1 – Annex, fire protection is provided by GWD through existing connections.

5.3. Storage Analysis

Determining the recommended volume of water storage is a balance between multiple factors. Industry standards and fire protection requirements provide multiple methods for estimating the minimum water storage volume required for a potable water system. For La Cumbre, a conservative estimate of storage requirements was used to provide operational flexibility and system reliability. Recommended reservoir volume was calculated as described below, then rounded up to the nearest 100,000 gallons.

Sizing of Reservoir No. 1 includes future storage requirements per reservoir MDD as discussed in Section 3. No fire storage is included.

Sizing of Reservoir No. 2 includes the sum of the recommended fire storage of 540,000 gallons, plus the future storage requirements per reservoir MDD as discussed in Section 3.

Sizing of Reservoir No. 3 includes the sum of the recommended fire storage of 540,000 gallons, plus the future storage requirements per reservoir MDD, as discussed in Section 3, less the planned future pumping capacity of the Cresta Pump Station, which is 1,500 GPM, for a period of three hours. The calculations for reservoir sizing are summarized in Table 5-1.

Table 5-1. Summary of Reservoir Sizing

Reservoir	Reservoir Future MDD (MG)	Fire Storage Requirement (gallons)	Pump Capacity Considered (Gallons)	Recommended Reservoir Sizing (Rounded)
Reservoir No. 1	0.92	0	-	920,000 (1.0 MG)
Reservoir No. 2	2.0	540,000	-	2,540,000 (2.6 MG)
Reservoir No. 3	0.4	540,000	270,000 (1,500 for 3 hours)	670,000 (0.7 MG)

An analysis was also conducted to determine the days of system demand stored in each reservoir for MDD and MMDD. The calculations for reservoir residence time are summarized in Table 5-2.

Table 5-2. Summary of Reservoir Days Storage

Reservoir	Recommended Reservoir Sizing	Reservoir Future MDD (MG)	Future MDD Days Storage	Reservoir MMDD (MG)	MMDD Days Storage
Reservoir No. 1	1.0 MG	0.92	1.1	0.058	28.4
Reservoir No. 2	2.6 MG	2.00	1.3	0.258	10
Reservoir No. 3	0.7 MG	0.40	1.75	0.07	10.0

Due to the large differential between MDD and MMDD, during low demand periods, there is a risk of chlorine residual loss due to extended residence time. Typically, greater than 3 days' storage can result in a loss of chlorine residual.

The system is configured such that water in Reservoir No. 1 is moved into Reservoir No. 2 and water in Reservoir No. 2 is moved into Reservoir No. 3. As a result, the extended storage time during low flow periods for Reservoir No. 1 is not anticipated to be a concern.

The residence times in Reservoir No. 2 and No. 3 are greater than recommended. Increased chlorine dosing, installation of a disinfectant maintenance system, and/or reduced operating levels in these reservoirs should be considered during low flow periods to reduce the risk of chlorine residual loss.

Section 6. Condition and Infrastructure Assessment

This section discusses the results of a condition assessment of La Cumbre's water supply, treatment, and distribution system. La Cumbre works proactively to maintain existing facilities, however, aging infrastructure is challenging to keep in operable condition, and larger scale projects are essential to maintain a municipal level of operation and maintenance standards.

A field inspection of above-grade water facilities was completed on July 26, 2022, by Nick Panofsky, PE from MNS, as well as Jill Johnson, PE and Jack Ivers, PE, both with IRJ Engineers, Inc. An additional site visit to some facilities was completed on September 28, 2022, by Nick Panofsky, PE. MNS Instrumentation and Controls Engineer, Albert Wong, PE, reviewed the existing controls system with La Cumbre's system integrator to understand the condition and needs of the system. The deficiencies identified during this inspection are documented in this section.

The findings of the condition assessment are divided into water production facilities, storage facilities, pumping facilities, pipelines and appurtenances, and Supervisory Control and Data Acquisition (SCADA).

6.1. Water Production Facilities

6.1.1. Well No. 10A

Well No. 10A was recently reactivated after a period of inactivity due to sanding. La Cumbre staff have been working to install appropriate pipes and appurtenances for reliable operation. Recommended improvements at this site include:

- Coat above grade piping.
- Anchor existing pipe supports.
- Install a security system to provide lighting and remote monitoring and alarms to prevent unauthorized access.
- Remove existing pump to waste discharge piping to avoid a dead end in the system.
- Install a new pump-to-waste infiltration pit or discharge point for future maintenance activities at the site.

The site is challenging to access during wet weather, however, if an issue occurs during wet weather, the site can be remotely shut down, and accessed when conditions improve.

Another well was noted on the same property, known as Well No. 20. Based on data provided by La Cumbre, the well has a depth of 569 feet. This well is not equipped with facilities to operate. It could be used as a monitoring well, reactivated, or demolished. Additional investigations are recommended for this existing well to plan for future use or destruction.

The existing site is large, and could facilitate installation of a new well, solar panels, storage facilities, or other improvements.

The electrical distribution system is rated 480Y/277V, three-phase, 4-wire with a 200A main circuit breaker and, includes a meter enclosure, manual transfer switch, well pump control panel enclosure, and 120/240V mini-power center rated 5kVA. All of the equipment except the free-standing well pump control panel is surface mounted on a wood back plane. The equipment appears to be in good condition.

The lighting for the site is provided by an LED floodlight that is mounted above the equipment backplane and supported by the branch-circuit conduit that feeds the luminaire. The luminaire is controlled by a time switch with the on-time selectable between 10 and 60 minutes.

The equipment at this site is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.1.2. Well No. 16

Well No. 16 is located within a commercial storage facility. The property is leased to a contract operator of the facility. Well No. 16 is currently on reduced output to reduce sand production and is planned for destruction. A new well will be constructed within the storage facility parking lot as a replacement. La Cumbre has received a grant to cover the costs of installation of a new well including drilling and equipping.

6.1.3. Well No. 17

The Well No. 17 site includes two wells, well No. 17 and Well No. 2A. Well No. 2A is not used for production but is used as a monitoring well by the United States Geologic Survey (USGS). Well No. 17 has elevated concentrations of iron and manganese. La Cumbre is currently dosing a polymer to water produced from this well to avoid aesthetic issues and complaints. A new iron and manganese treatment plant is proposed for this site. La Cumbre has initiated improvements at the site to accommodate future construction including parking and fencing.

A comprehensive project to construct the new treatment facility and improve the site is recommended.

The electrical distribution system is rated 200A at 480Y/277V, three-phase, four-wire and, includes a meter enclosure, well pump control panel, and 120/240V mini-power center rated 5kVA. The equipment is surface mounted to a wood back plane. The equipment appears to be in acceptable condition. The design of a replacement facility should consider the electrical load requirements and phasing of the demolition and new installation to determine if any of the equipment can be reused.

The well pump motor is rated 75-horsepower.

The equipment at this site is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.1.4. Well No. 18

Well No. 18 is currently not operated due to elevated concentrations of iron and manganese. The well is permitted for emergency use only.

Well No. 18 is sited on a property leased from the County of Santa Barbara. The lease for this property expires in 2023. La Cumbre is in the process of renewing the lease for the property. La Cumbre will be required to improve site aesthetics as part of the lease renewal process including fencing replacement, and construction of a permanent access road.

The existing well is in acceptable condition. Above grade facilities are in poor condition. It is recommended all above grade piping and appurtenances, discharge piping, electrical, and communications facilities be replaced as part of well reactivation. A security system should be included in the rehabilitation efforts to provide lighting and remote monitoring and alarms to prevent unauthorized access.

To provide iron and manganese treatment for water produced from the well, a transmission pipeline will be constructed from the well site to tie into an existing raw water pipeline at the intersection of N. Arboleda Road and Nueces drive. Water will discharge to the Nogal Water Treatment Plant. Existing piping from the well to the distribution system will be abandoned.

The electrical distribution system is rated 200A at 480Y/277V, three-phase, four-wire and, includes a meter enclosure and a well pump control panel. The meter enclosure shows rust damage and signs of age. The well pump control panel appears to be relatively new and in good condition. The existing conduit between the well pump control panel enclosure and the well head is not installed in a code compliant conduit body.

The well pump motor is rated 75-horsepower.

No permanent lighting for maintenance or security was observed. A convenience receptacle was observed beneath the well pump control panel enclosure, but it did not appear to be operational.

The equipment at this site is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.1.5. Well No. 19

Well No. 19 is in generally good condition. The well is set up for aquifer storage and recovery (ASR), but an existing check valve on the pump intake would need to be removed for ASR to function. The existing fence at the back of the site is deteriorating and needs replacement. A security system should be installed to provide lighting and remote monitoring and alarms to prevent unauthorized access. Miscellaneous improvements at the site would improve operability, including demolition of an abandoned pump-to-waste stub up, and adding a meter for site water use.

The electrical distribution system is rated 480Y/277V, three-phase, four-wire with a 400A main circuit breaker and, included a 225kVA pad-mounted utility company transformer, service-entrance main switchboard with manual transfer switch and portable generator receptacle, portable generator, a 120/240V mini-power center rated 5kVA, and a well pump control panel. The mini-power center is surface mounted to a wood back plane. The well pump control panel is located in a pad-mounted enclosure.

The well pump motor is rated 125 horsepower.

The 120V shore power for the generator is provided from a receptacle mounted adjacent to the mini-power center on the wood back plane. An extension cord spans the distance between the wood back plane and the perimeter fence, where the cord is then supported along the fence to a point adjacent to the portable generator. This does not provide a reliable source for the shore power and should be replaced with permanent wiring methods.

The junction boxes at the well head and adjacent to the piping tree do not have code required supports. In addition, these boxes have unused openings and mounting holes that are not properly sealed against water intrusion.

The equipment at this site is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.1.6. Well No. 21

Well No. 21 site is located near the Nogal Water Treatment Plant and is in generally serviceable condition. The well and appurtenances are located within a small wooden enclosure on a larger parcel. A second unused well exists just behind Well No. 21.

The Well No. 21 well pump was recently replaced with a new 450 GPM, 60 horsepower pump. Recent electrical upgrades were completed. The existing meter is oversized and should be replaced with a 4-inch magnetic flow meter to improve accuracy. All above grade piping should be coated to prevent corrosion.

Well No. 11 is not currently used due to sanding but has a stainless casing. It could be used as a monitoring well, reactivated with provisions to address sanding, or destroyed. Additional investigations are recommended for this existing well to plan for future use or destruction.

Electrical power is provided to the Well No. 21 site main disconnect switch from a 200A circuit breaker in the main switchboard for the Nogal Treatment Plant located directly across Nogal Drive. The electrical distribution system is rated 480V, three-phase, three-wire and, also includes a well pump control panel, 480V-120/240V, 5kVA transformer, and branch-circuit panelboard.

The main disconnect switch is surface mounted on a wood back plane that also supports some abandoned electrical equipment. The conduits entering and exiting the switch transition to PVC at grade, where they are subject to damage. These conduits are not supported from the wood back plane or independent means.

The transformer and branch-circuit panelboard are surface mounted to a second wood back plane across the site from the main disconnect switch location. Several of the circuit breakers are in the 'on' position but no loads are identified in the schedule. The well pump control panel is free-standing and located adjacent to the back plane for the transformer and panelboard.

The electrical equipment is in good condition except as noted.

The well pump motor is rated 60 horsepower.

The junction boxes at the well head are in poor condition, with one of the boxes semi-buried.

The abandoned electrical equipment should be demolished.

The equipment at this location is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.1.7. Modoc Meter and Pressure Relief Valve

The Modoc Meter and Pressure Relief Valve is located on a large parcel (approximately 22 acres) owned by La Cumbre, as shown in Figure 6-1. The existing meter is owned by GWD. La Cumbre plans to use a portion of the site for a new administration and maintenance building. The existing meter vault and associated piping is substantially deteriorated. Existing conditions are very poor, with abandoned piping, safety, and security concerns. La Cumbre does not currently have the ability to remotely monitor and control the site. Various concrete, an unused/abandoned well, and other miscellaneous unused facilities exist at the site.

Figure 6-1. Modoc Pressure Relief Valve

6.1.8. Modoc 6" Meter

The Modoc 6" Meter is in good condition. A proposed bike path along Modoc Road has the potential to conflict with piping on the downstream side of the vault, as well as downstream piping for an adjacent GWD meter. Piping modifications are likely needed to relocate and protect the existing piping in coordination with the planned bike path.

6.2. Nogal Water Treatment Plant

The Plant was primarily constructed by La Cumbre staff in 2010 and is in generally good condition. Minor modifications to the site to maintain the site in good condition and expand capacity are recommended.

Due to hydrogen sulfide in the feed water supply, the balancing tank has exhibited corrosion, and has been rehabilitated, however, to reduce future degradation, replacement of the tank with a glass lined bolted steel tank is recommended.

The on-site chlorine generator is undersized; a tablet system is used to provide additional free chlorine for disinfection during peak months. La Cumbre is in the process of replacing the existing chlorine generator with a larger unit. The existing water softener feed system is believed to be adequate for the larger chlorine generator. The existing chlorine generator will be relocated to the Well No. 17 site.

In the future, the Plant will also receive flow from Well No. 18. The Plant was constructed with a foundation for a third treatment vessel. Installation of a third treatment vessel would provide additional operational redundancy and allow the Plant to operate at high peak capacities and with reduced head loss through the filtration process.

Additional recommendations for the site include:

- Upgraded lighting and security improvements such as cameras and razor wire on top of the walls.
- Installation of a tarp system to cover stored PVC pipe to reduce damage from UV.
- Recoating of piping, to protect from corrosion.

The electrical distribution system is rated 400A at 480Y/277V, three-phase, four-wire and, includes a service-entrance main switchboard and motor control center. A 480V-208Y/120V transformer rated 25kVA and a branch-circuit panelboard are located inside the motor control center. The main switchboard includes key-interlocked circuit breakers that act as a manual transfer switch for connection to a portable generator. Both the main switchboard and the motor control center have space available to add future loads. This equipment is located within the electrical building and is in good condition. Arc-flash warning labels that identify the incident energy and PPE levels have been provided on this equipment.

Load capacity verification will be required to confirm the electrical system is adequate to serve the proposed chlorine generator. Any new electrical loads associated with the future third treatment vessel will also need to be considered.

Site lighting is provided by building mounted luminaires at the electrical building and the chemical building. The 25kVA transformer and the branch-circuit panelboard likely have capacity for the load added by site lighting, but this will need to be verified.

6.3. Storage Facilities

Condition of the three reservoirs in the System are discussed in this section. The reservoirs are periodically drained, cleaned, and visually inspected. Formal inspection reports of the reservoirs are not available.

6.3.1. Reservoir No. 1

Reservoir No. 1 is of the shotcrete on grade style, with a wood framed and corrugated metal roof. The reservoir is in fair condition. La Cumbre has worked to maintain the reservoir, with reoccurring issues associated with steel roof

substructure corrosion, and wood framing deterioration. Reservoir 1 inlet piping has degraded and has been repaired multiple times.

The chlorine dosing facility for Zone 1 overflow and wells which discharge to Reservoir 1 at the Reservoir 1 site are in good working order.

A branch-circuit panelboard located within the chemical dosing facility for the reservoir is served by a feeder from the Tranquila Pump Station. The panelboard is good condition. It is not marked with an arc-flash warning label that identify the incident energy and PPE levels.

6.3.2. Reservoir No. 2

Reservoir No. 2 is of the shotcrete on grade style, with a wood framed and raised seam metal roof. The reservoir is in fair condition. La Cumbre has worked to maintain the reservoir, with reoccurring issues associated with steel roof substructure corrosion, and wood framing deterioration. The Reservoir 2 site is shared with the Cresta Booster Pump Station.

Existing site piping and controls associated with Reservoir 2 and the Cresta Booster Pump Station are antiquated and have reached the end of their useful life and require replacement. The access road is in poor condition and should be paved to provide reliable access.

6.3.3. Reservoir No. 3

Reservoir No. 3 is of the shotcrete on grade style, with a wood framed and raised seam metal roof. The reservoir is in poor condition. La Cumbre has worked to maintain the reservoir, with reoccurring issues associated with steel roof substructure corrosion, and wood framing deterioration. Visual observations of the reservoir show cracking shotcrete and deteriorating wood.

6.4. Pumping Facilities

6.4.1. Via Hierba Pump Station

The Via Hierba Pump Station is sited within a small wood and concrete building just to the northwest of the Via Hierba roadway. The back wall of the pump station building acts as a retaining wall. The back wall of the building is cracking. Temporary patches were installed, but the cause of the issue has not been addressed, and the wall can be observed to be leaning slightly inward.

A check valve in the street maintains reduced pressure service when pump station is out of service or opens if demand exceeds the capacity of the pump station. The pump station cannot provide fire flow at pressure, and limited fire flow availability is expected in Zone 5. Piping from the street to the pump station and back to the system needs replacement. Housekeeping pedestals should be provided for the existing pumps.

The pumps were observed to cycle frequently. The addition of a second hydropneumatic tank on the discharge side of the pumps is anticipated to resolve the issue. Alternatively, additional controls could be added to assist in reducing cycle volumes.

If Reservoir No. 2 elevation can be raised, this pump station could potentially be eliminated from the system, or a fire pump could be added to address fire flow concerns. Hydraulic modeling should be completed to confirm proposed modifications.

The electrical distribution system includes a meter enclosure, main circuit breaker, transformer, and branch-circuit panelboard. The utility service is fed from an open-delta, 240V, three-phase, three-wire system. The transformer is used to provide a 208Y/120V, three-phase, four-wire system within the pump station. The equipment is in good condition.

The equipment at this location is not marked with arc-flash warning labels that identify the incident energy and PPE levels.

6.4.2. Via Alegre Pump Station

The Via Alegre Pump Station is sited within a concrete building just to the south of the Via Alegre roadway. A check valve in the street maintains reduced pressure service when the pump station is out of service.

New pumps were recently retrofit into the existing pump station; however, the pumps may be oversized for the application. A hydraulic evaluation of the pump station, including a review of hydropneumatic tank sizing, should be conducted. A third pump could be added for low demand periods.

The hydropneumatic tank needs recoating and inspection. A level sensor integrated into SCADA would be a benefit to avoid low air volumes in the hydropneumatic tank.

The pumps are not installed with ideal piping configurations and should be simplified. Supply and discharge piping to the station should be replaced along with pump pedestals. Replacing suction and discharge piping with headers incorporating a single inlet and discharge point to the hydropneumatic tank would simplify the piping layout.

Piping from the street to the pump station and back needs replacement. An isolation valve on the pump station supply piping was noted to be installed at a 45-degree angle.

The electrical distribution system consists of a service-entrance enclosure, meter, service-entrance panelboard with a 200A main circuit breaker, transformer, and branch-circuit panelboard. The utility service voltage is 240V, three-phase, three-wire. The booster pump motors are connected at 240V, three-phase using VFD control. The 7.5kVA transformer provides 120/240V power to serve the branch-circuit panelboard. The electrical equipment is in good condition but is not marked with arc-flash warning labels that identify the incident energy and PPE levels. The equipment is located in close proximity to the booster pumps and their associated piping, which could result in damage in the case of a piping leak. The ventilation openings in the VFD enclosures make this equipment especially subject to water damage.

6.4.3. Cresta Pump Station

The existing Cresta Pump Station pumps water from Reservoir No. 2 to Reservoir No. 3 through a dedicated transmission main and is sited at Reservoir No. 2. The facility is aged and requires replacement. The new Cresta Pump Station could be constructed just uphill of the existing station or in the existing footprint of Reservoir 2 following demolition of the reservoir for reconstruction as recommended in Section 5.3. Existing pumps and electrical equipment could potentially be salvaged and reused, if hydraulically appropriate. A high flow operating condition should be included in the design to convey a flow of up to 1,500 GPM based on planned Reservoir No. 3 sizing discussed in Section 5.3.

The site is served by a 200A, 480Y/277V, three-phase, four-wire utility meter pedestal located at the top of the hill adjacent to the pump station access road. The electrical distribution system in the pump station includes a main circuit breaker, and 480V-120/240V mini-power center rated 10kVA. The equipment is in good condition. None of the equipment is marked with arc-flash warning labels that identify the incident energy and PPE levels.

The equipment can be considered for reuse in the proposed replacement pump station if it is suitable based on an increase in load required to address a high flow operating condition. The phasing of the construction will also affect whether the existing equipment can be relocated.

6.4.4. Cuervo Pump Station

The Cuervo Pump Station is sited within a small wood and concrete building along a private driveway north of Cresta Avenue. The back wall of the pump station building acts as a retaining wall.

La Cumbre is in the process of installing a back-up generator at the site and demolishing a gas-powered back-up pump. Existing unused electrical equipment should be demolished and removed.

The pump station discharges to a 2" AC distribution line within easements on private property, which does not have hydraulic capacity to provide fire flow. The distribution pipe should be replaced in the street, and services rerouted.

The pump station capacity is insufficient to provide fire flows. The addition of a fire pump would provide additional fire protection to fire hydrants served by the pump station.

The electrical distribution system receives its service from a pole-mounted meter enclosure and pole-mounted main circuit breaker located behind the pump station building. The utility service voltage is 240V, three-phase, three-wire. The electrical system within the pump station includes a main circuit breaker, automatic transfer switch, branch-circuit panelboard, and 240V-120/240V mini-power center rated 5kVA. The branch-circuit panelboard serves the pump motor VFDs at 240V three-phase. The mini-power center serves the 120V loads such as lighting, SCADA, and instrument loads. The equipment is in good condition. None of the equipment is marked with arc-flash warning labels that identify the incident energy and PPE levels.

There is abandoned electrical equipment in the pump station that should be demolished.

The capacity of the existing distribution system to accommodate the added load of the proposed fire pump will need to be verified.

6.4.5. Tranquila Pump Station

The Tranquila Pump Station is located adjacent to Reservoir No. 1. The station pumps water from Reservoir No. 1 to Reservoir No. 2 and directly serves Zone 2. The supply pipeline from Reservoir No. 1 was recently replaced. The station includes 5 pumps, 3 duty and 2 standby, with a single suction and discharge header. In the future, when Well No. 18 is returned to service, a 4th duty pump may be required to convey the increased flow.

Condition issues which should be addressed include replacement of the pump station roof, demolition and removal of a large unused pump, and replacement of the control valve on the pump station discharge with an anti-surge check valve.

The electrical distribution system is rated 400A at 480Y/277V, three-phase, four-wire, and includes an outdoor utility service-entrance switchboard and outdoor switchboard with a manual transfer switch for connection to a portable generator. The system inside the pump station includes a motor control center. The 120V loads in the pump station are served by a transformer and panelboard located within the motor control center. The equipment is in good condition. None of the equipment is marked with arc-flash warning labels that identify the incident energy and PPE levels.

The shore power for the portable generator is provided by an extension cord routed between the generator location behind the pump station to a remote location that was not observed. This does not provide a reliable source for the generator shore power and should be replaced with permanent wiring means.

6.5. Pipelines and Appurtenances

6.5.1. Pipelines

La Cumbre provided documentation of historic leak locations within the system over a period of 10 years. A review of the locations of the identified leaks was completed to identify areas with consistent or reoccurring leak issues. No such pattern was identified. Leaks and main breaks have been spread relatively evenly across the system, and across multiple pipe materials. This is evidence of a generally aging and deteriorating distribution system. A pipeline replacement plan to replace aging and deteriorated distribution mains is recommended.

Two cathodic protection systems on existing steel pipelines are regularly maintained, and steel piping is believed to be in good condition.

6.5.2. Valves and Hydrants

The existing condition of system valves and fire hydrants is generally unknown. Some valves are shown on existing atlas maps as inoperable, and it is highly likely there are other inoperable valves in the system. It is recommended that La Cumbre perform, or contract to perform, a comprehensive system audit of these facilities to determine existing condition and operability to provide a basis for repairs and replacements.

6.6. SCADA

La Cumbre utilizes a SCADA system, which consists of Programmable Logic Controllers (PLC) and Human Machine Interfaces (HMI), to allow operators to remotely monitor operation of approximately 75% of the system. This SCADA system allows operators to remotely observe and control the status of various equipment including water levels in the reservoirs, pump controls, and other real-time operational information for the treatment plant, and majority of the pump stations and wells.

La Cumbre's communication system equipment was not included in the condition assessment, as it has been adequately maintained. However, it was noted most of the current PLCs, including Schneider SCADA Pack P350, Modicon Momentum, and Modicon model 171, are no longer supported and should be upgraded. Support to repair these Modicon/Schneider models will be discontinued after June 1, 2023.

Additional information on the various SCADA components is provided in the following sections.

6.6.1. Programmable Logic Controller Assessment

The Cuervo Pump Station and the Via Hierba Pump Station currently utilize Koyo C2 PLCs which are currently available from the manufacturer and supported.

Well Nos. 10A, 19, 21, the Alegre Pump Station, and Cresta Pump Station utilize Modicon model 171 PLCs which are obsolete. Repair for these units and associated I/O cards will not be available from the manufacturer after May 31, 2023. These PLCs should be replaced with Schneider Electric PLCs with new control panel drawings.

Both the Tranquila Pump Station and Nogal Treatment Plant utilize Modicon Momentum PLCs which are obsolete. Repair for these units and associated I/O cards will not be available from the manufacturer after May 31, 2023.

Well No. 16 utilizes a Schneider/CMS P350 PLC which is also obsolete. Repair of these units will not be available from the manufacturer after May 31, 2023.

Obsolete PLCs should be replaced with Schneider Electric PLCs with new control panel drawings. The Cuervo Pump Station and the Via Hierba Pump Station PLCs could also be replaced if desired to maintain consistency of PLCs across the system.

A PLC is not currently installed at the Modoc Meter Site but is recommended for remote control and monitoring of the site.

6.6.2. Human Machine Interface Assessment

La Cumbre utilizes Inductive Automation HMI at the central location. This software package is currently available. La Cumbre prefers to continue with this HMI software platform.

Section 7. Staffing Analysis

7.1. Staffing Analysis Goal and Methodology

La Cumbre has reported challenges sufficiently staffing operations to complete required operational activities, while proactively maintaining the system. Based on the condition of the existing system, additional operators and more effective management of operational activities would benefit the system. Currently much of system operation is reactionary, rather than being proactive.

This section discusses the findings of a staffing analysis to estimate appropriate staffing levels for operations and administration staff for La Cumbre and makes recommendations on improvements to the current operational management approach. An outreach effort was conducted to similarly sized water purveyors to survey current staffing levels and sufficiency. Based on these responses, comparative calculations were completed to estimate the appropriate number of operation and administration staff to effectively operate a water agency.

7.2. Existing La Cumbre Staff

La Cumbre currently has five operators, not including the general manager, administrative manager, and system maintenance staff. La Cumbre also has 2 administrative staff. Existing staffing is summarized in Table 7-1.

Table 7-1. Summary of Existing La Cumbre Staffing

Employee Title	Distribution Certification	Treatment Certification
General Manager	D5	T4
Administrative Manager	D4	T2
Distribution Foreman	D2	T2
Distribution Supervisor	D3	T2
System Operator	D2	T2
System Operator	D2	
System Operator	D2	
System Maintenance		
Office Administrator/Secretary		

7.3. Staff Level Comparisons

Five water agencies were contacted to document existing staffing levels. The agencies include the City of Solvang, the City of Buellton, Crestview Mutual Water Company, Montecito Water District, and Sunnyslope County Water District. A summary of the results of the survey are shown in Table 7-2.

Table 7-2. Summary of Water Agency Staffing Survey

Agency	Number of Service Connection	Current Operators	Current Administrative Staff	Notes
Sunnyslope	7200	Grade D1/T1: 2 Grade D2/T2: 6 Grade D3/T3: 4 Grade D4: 3	10	Adequately staffed
Montecito Water District	4638	Grade D1: 2 Grade D2/T2: 3/1 Grade D3/T3: 3/2 Grade D4/T4: 2/3	12	Understaffed, currently recruiting for one additional operator
City of Solvang	2700	OIT: 1 Grade D2: 2 Grade D4: 1	2	Understaffed, currently recruiting for one additional operator
City of Buellton Water	1822	OIT: 1 Grade D2/T2: 2	0	Severely understaffed, currently recruiting for four additional operators and need two administrators
Crestview Water Company	630	Grade TD1/T1: 1 Grade D3/T3:1	1	Understaffed, need one additional operator and half-time administrator

Comparative calculations to estimate appropriate staffing for La Cumbre are shown in Table 7-3. For agencies indicating they are understaffed, for comparative analysis, additional operators needed to fill open positions are included.

Table 7-3. Average Staffing Calculation

Agency	Number of Service Connection	Total Operators	Connections per Operator	Total Administrative Staff	Connections per Administrative Staff
Sunnyslope	7200	15	480	10	720
Montecito Water	4638	17	273	12	387
City of Solvang	2700	5	540	2	1350
City of Buellton	1822	6	304	2	911
Crestview Water Company	630	3	210	1.5	420
Average			**361**		**758**

7.4. Staffing Recommendations

Using La Cumbre's 1,472 connections and the average number of connections per operator and administrative staff calculated in Table 7-2, comparable staffing levels were calculated. The calculation indicates five full-time operators, and two full-time administrative staff are recommended to provide a similar level of service as the comparison agencies for a similarly complex

system. Several factors about the La Cumbre system justify additional operational requirements. La Cumbre prides itself on providing a very high level of service to meet the needs of the membership; to continue to provide this level of service, additional operators are needed. Due to the relative complexity and age of the La Cumbre system, additional operational efforts are required to operate and maintain the system. In addition to normal water system operations, implementation of the recommendations of this Report will require additional operational support to maintain normal procedures, and support implementation of capital projects.

Based on this assessment, seven full-time operators are recommended. Operator staffing does not include La Cumbre's general manager or administrative manager. Operators should be a mix of grades, and ideally, cross certified as distribution and treatment operators.

In addition to maintaining normal operations, effective and timely implementation of a capital improvement program is a time intensive endeavor. Current La Cumbre staff do not have the expertise or availability to effectively manage the planning, design, and implementation of the capital projects recommended in this Report. Hiring an internal or contract capital program manager should be considered to advance the recommendations of this Report. It is assumed planning, design, and construction management/inspection of most projects will also be required.

As mentioned, due to the age and current condition of the system, operations staff is encumbered with reactionary maintenance of existing facilities and equipment. In addition to implementing the recommended capital projects to reduce operation issues requiring immediate attention, a more robust system to coordinate and manage the work of operations staff would benefit La Cumbre, with the goal of moving away from reactive management and to a proactive management approach. Implementation of a computerized maintenance and management system (CMMS) to assist in this transition would assist in this evolution of management approach.

Section 8. Capital Improvement Recommendations

This section discusses the recommended capital improvement projects for the La Cumbre water system.

Recommended Capital Improvement Projects

Capital improvement projects were developed based on the results of the condition assessment and other evaluations performed in preparation of this Report. The projects were divided into several categories including:

General (G-X):	General projects include planning projects, and other projects which do not fit into the other categories.
Supply (S-X):	Supply projects include work associated with development and maintenance associated with wells and other sources of supply to the System.
Treatment (T-X):	Treatment projects include upgrades to the Nogal Water Treatment Plant.
Storage (ST-X):	Storage projects include modifications to System storage facilities.
Pumping (P-X):	Pumping projects include work associated with upgrades to existing pump stations.
Distribution (D-X):	Distribution projects include work to improve the potable water distribution system, not including pump stations.

Each project is described in the following subsections.

8.1. General Projects

8.1.1. Project G-1 – Water System Hydraulic Model

This project includes preparation of a water system hydraulic model using computerized modeling software. The model will be developed and calibrated using water system data and hydrant fire flow testing. The model will be used to evaluate current and future performance of the water system, verify operation of pumping, verify recommend pipe sizes for water main replacements, and to estimate fire flow availability and operating pressures throughout the system.

8.1.2. Project G-2 – New Maintenance Building

This project consists of construction of a new maintenance building for La Cumbre located at the Modoc Ring Meter and Pressure Relief Valve site. The building will incorporate back-up power in the form of roof mounted solar panels with battery back-up. Prior to construction of the new building, Project S-1 should be implemented to prepare the site for construction. The new facility would incorporate Planning for both project G-2 and S-1 should be initiated concurrently.

During construction of Project G-3, the new maintenance building is anticipated to serve as a temporary administration building while the existing administration building is demolished and reconstructed.

8.1.3. Project G-3 – New Administration Building

This project consists of construction of a new administration building for La Cumbre located at the existing administration building site. The existing building will be demolished for construction of the proposed replacement Reservoir No.1 in the existing building footprint. Following construction of reservoir No. 1, the new administration building will be installed within

the footprint of existing Reservoir No. 1. This will result in a hold period between demolition and construction of the building.

The building will incorporate back-up power in the form of roof mounted solar panels with battery back-up. During construction, administration facilities will be relocated to the planned maintenance building included in Project G-2.

8.1.4. Project G-4 – CMMS Program

La Cumbre does not currently have a computerized maintenance and management system (CMMS). Implementation of a CMMS will assist in streamlining operation and maintenance activities, resulting in increased system reliability. The goal would be to assist La Cumbre in being proactive, rather than reactive in maintaining existing facilities.

8.1.1. Project G-5 – SCADA Platform Upgrade

The La Cumbre SCADA software platform is antiquated and is no longer supported. Implementation of a new SCADA platform is included in this project.

8.1.2. Project G-6 – Security Improvements Project

This project includes implementation of security improvements at the various well, reservoir, and treatment plant sites. Typical improvements include security cameras, intrusion alarms, and fencing improvements.

8.2. Supply Projects

8.2.1. Project S-1 – Modoc Ring Meter and Pressure Relief Valve Site Rehabilitation

This project consists of rehabilitation of the Modoc Ring Meter and Pressure Relief Valve Site including clean up of the existing facility site, demolition of existing concrete structures, demolition of existing abandoned well elements to below grade, demolition of existing wharf hydrant, relocation of existing water mains to accommodate footprint of new administration building, addition of new flow meter, addition of SCADA connection via radio to Annex Zone 1 that can monitor the flow meter and cla-val status, and addition of separate vault access hatch for the Goleta Water District meter.

8.2.2. Project S-2 – Modoc 6” Meter Piping Upgrade

This project includes modifications and reinforcement to discharge piping from the Modoc meter, as well as the adjacent Goleta Water District meter. The project includes replacement and reinforcement of piping, with scope to be confirmed based on detailed design of the proposed bike path. This project is anticipated to be externally funded.

8.2.3. Project S-3 – Hope Ranch Subbasin Well

This project consists of construction of a new ground water well located in the Hope Ranch subbasin. This well is anticipated to be constructed adjacent to Reservoir No. 1, and will use existing facilities for treatment and electrical equipment. Water produced from the well will discharge to Reservoir No. 1. This well should not be constructed until after existing Reservoir No. 1 has been demolished to avoid potentially damaging a well at this site.

8.2.4. Project S-4 – Well No. 16 Replacement – with New Well No. 22.

This project consists of replacing Well No. 16, including; demolition and removal of existing above grade facilities, destruction of the existing well, construction of a new well, and equipping of the new well. This project is being externally funded by a $1.2 million Small Community Drought Relief Grant through the California Department of Water Resources. The value of this grant has not been deducted from the anticipated capital cost of the project. Construction of the well is currently underway.

8.2.5. Project S-5 – Well No. 18 Short Term Improvements

As discussed in Section 6.1.4, La Cumbre is negotiating for the lease renewal of the Well No. 18 site. As part of the lease renewal, La Cumbre has committed to completing aesthetic upgrades to the site, including fencing and a new paved access road.

8.2.6. Project S-6 – Well No. 18 Rehabilitation and Transmission Main

This project consists of rehabilitation of the Well No. 18 site facility including rehabilitation of the well casing by chemical treatment, replacement of above-grade piping and appurtenances, well discharge piping, and electrical and communications equipment. In addition, a new raw water transmission main will be constructed from the well site, east on Hollister Avenue, then south on North Arboleda Road to the intersection of Nueces Drive, at which point it will tie into an existing raw water pipeline, discharging to the Nogal Water Treatment Plant. The pipeline, approximately 2,350 feet in length, is anticipated to be constructed of 6" PVC C-900.

8.2.7. Project S-7 – Well No. 10A, No. 19, and No. 21 Rehabilitation

The project consists of minor work at Well No. 10A, Well No. 19, and Well No. 21.

Work at Well No. 10A includes removal of unused electrical equipment, addition of a new site water service meter, and hose bib connection. Out of service Well No. 20, adjacent to the Well No. 10A site, will be destroyed.

Work at Well No. 19 includes removal of the existing check valve at the bottom of the well, demolition of the abandoned pump to waste stub-up, addition of site water service meter, hose bib for potable water supply, replacement of the deteriorating fence and gate at the back of the site, addition of a 110-v stub up, and power outlet to service the back-up generator battery trickle charger.

Work at Well No. 21 site includes coating and anchoring the existing pipe supports, demolition of the existing dead-end piping going to the distribution system, and a new discharge point for the pump to waste upon pump start-up.

8.3. Treatment Projects

8.3.1. Project T-1 – Nogal Water Treatment Plant

This project consists of expansion and minor rehabilitation of the existing Nogal Water Treatment Plant facility, including; replacement of the existing above ground 33,000 gallon influent storage tank with a new glass lined bolted steel tank, replacement of the existing sodium hypochlorite generator with a larger Microclor on-site hypochlorite generator, demolition of the existing disinfection tablet system, additional treatment vessel, soft starts for the facility feed pumps to reduce transient pressures in the distribution system when starting motors, tarp to cover onsite stored pipe material to reduce damage from UV, and minor recoating of site piping.

An additional treatment vessel and upsized sodium hypochlorite generator will be required with implementation of project S-6 to accommodate additional influent from Well No. 18.

8.3.2. Project T-2 – Well No. 17 Water Treatment Plant

This project includes construction of a new iron and manganese treatment plant at the Well No. 17 site, including miscellaneous improvements to develop a complete and operable municipal site. This project is currently in design by Pueblo Water Resources.

8.4. Storage Projects

Projects to replace existing water storage reservoirs are discussed in this section. These projects should be carefully coordinated with respect to temporary storage to minimize associated costs. The storage projects will incorporate power generation in the form of roof mounted solar panels on the reservoirs.

8.4.1. Project ST-1 – Reservoir 1 Replacement

This project consists of demolition and replacement of the existing Reservoir No. 1 with a new, pre-stressed concrete tank (AWWA D110), sized for 1.1 MG in accordance with Section 5.

During construction of the project, the existing reservoir will be operational while the new reservoir is in construction in the footprint of the existing La Cumbre administration building's footprint.. It is anticipated a new storage tank would be sited in the footprint of the existing La Cumbre administration building prior to construction of a new administration building as described in project G-3.

8.4.2. Project ST-2 – Reservoir 2 Replacement

This project consists of demolition and replacement of the existing Reservoir No. 2 with a new pre-stressed concrete tank (AWWA D110), sized for 2.5 MG in accordance with Section 5. The project includes replacement of all site piping and valve vaults, and re-pavement of the site access road. This project is recommended to be constructed simultaneously with Project P-3, for replacement of the Cresta Pump Station.

Several options exist to maintain service during demolition and reconstruction of Reservoir No. 2. Service could be maintained in one of the following methods:

- Construct a temporary storage tank and pump station, located at a lower elevation
- Construct a small balancing tank at the Reservoir No. 2 site and modify operation of the Tranquila Pump Station to operate continuously to maintain system pressure. Installation of a pressure reducing backpressure sustaining valve, bypassing the Cresta pump station, would provide some level of fire protection and system back-up.

8.4.3. Project ST-3 – Reservoir 3 Replacement

This project consists of demolition and replacement of the existing Reservoir No. 3 with a new pre-stressed concrete tank (AWWA D110), sized for 0.7 MG in accordance with Section 5.

During construction of the project, a small temporary storage tank will be required to maintain system operation in the open space to the south of the existing reservoir.

8.5. Pumping Projects

8.5.1. Project P-1 Cuervo Pump Station Rehabilitation

This project includes the addition of a high flow pump to serve fire hydrants in Zone 7, which will be installed as part of Project D-4. The addition of a high flow pump will likely require replacement of the pump station’s electrical service.

8.5.2. Project P-2 – Via Hierba Pump Station Rehabilitation

This project consists of rehabilitation of the Via Hierba Pump Station facility, including; replacement of the supply and discharge piping from the pump station to the street, addition of housekeeping pads for the pumps, evaluation and repair of a cracked building back wall that is damaged, and installation of an additional hydropneumatic tank.

If the Reservoir No. 2 elevation can be raised, this pump station could potentially be eliminated from the system. This needs to be evaluated through preparation and analysis of a hydraulic model.

8.5.3. Project P-3 – Via Alegre Pump Station Rehabilitation

This project consists of rehabilitation of the Via Alegre Pump Station facility, including; piping modifications, new pump pedestal, inspection and potentially recoating of hydropneumatic tank, addition of level alarm for the hydropneumatic tank, and replacement of the supply and discharge piping to the pump station.

8.5.4. Project P-4 – Cresta Pump Station Rehabilitation

This project consists of replacement of the existing Cresta Pump Station facility. The facility is aged and requires replacement. The new Cresta Pump Station will be constructed just uphill of the existing station or in the footprint of Reservoir No. 2. The design for the new pump station should consider salvaging existing pumps and electrical equipment. The new pump station may be a package pump station. The new station will include a VFD on at least one pump to allow for bypassing of Reservoir No. 2. This project is recommended to be constructed simultaneously with Project ST-2, for replacement of Reservoir No. 2.

8.5.5. Project P-5 – Tranquila Pump Station Rehabilitation

This project consists of rehabilitation of the Tranquila Pump Station facility, including; replacement of the pump station roof, demolition of the unused pump inside the pump room, and replacement of the existing discharge pump control valve with a new booster pump control valve.

8.6. Distribution System Projects

This section discusses capital projects associated with upgrades to water distribution pipelines and appurtenances.

8.6.1. Project D-1 – Contract Hydrant and Valve Flushing and Condition Assessment

This project consists of contracting with a firm to complete a field assessment of existing fire hydrants and hydrant valves within the distribution system. The firm will conduct testing for each hydrant and valve in the system to determine operability and document the equipment's performance as well as provide recommendations for repairs.

This project is the first phase of work to evaluate and upgrade system valves and hydrants prior to repairs completed as Project D-2.

8.6.2. Project D-2 – Valve and Hydrant Replacement Project

The project includes replacement and repairs of existing fire hydrants and valves based on the results of the work completed by Project D-1, Contract for Hydrant and Valve Flushing and Condition Assessment. Due to the unknown scope required, an arbitrary value has been assumed for the cost of repairs.

8.6.3. Project D-3 – Marina Drive Water Main Replacement

The project consists of replacing the existing 3" and 4" diameter AC water main along the entirety of Marina Drive from Robles Drive to the eastern terminus, past Cantera Avenue. The new pipeline, approximately 5,800 linear feet, is anticipated to be constructed of 8-inch PVC C-900.

8.6.4. Project D-4 – Cuervo Pump Station Pipeline Replacements

This project consists of replacement of the multiple segments of Cuervo Pump Station discharge. The new pipelines will be installed within Cuervo Avenue.

The project includes approximately 1,700 linear feet of new 6" diameter PVC C-900 water main downstream of the Cuervo Booster Pump Station to address capacity issues on existing small diameter piping. The existing discharge pipeline could be abandoned in place, or a portion of the existing pipeline maintained to provide a looped system. New fire hydrants will be installed on the new water main.

The project also includes replacement of approximately 750 linear feet of existing 3" AC pipe in Cuervo Avenue upstream of the Cuervo Booster Pump Station with new 6" diameter PVC C-900 water main. Approximately 500 linear feet of existing 6-inch steel water main just downslope of the Cuervo Booster Pump Station on a steep slope would be abandoned.

Hydraulic modeling should be completed to confirm pipeline sizing.

8.6.5. Project D-5 – Well No. 16, Discharge Lining

The project consists of installing a 6" diameter liner within the existing Well No. 16 discharge piping from the well to the distribution system.

The lining alignment begins near the eastern cul-de-sac of Encore Drive and extends under the Southern Pacific Railroad and terminates near the location of the proposed new Well No. 22. This work includes lining approximately 450-feet of 6" AC pipe and 500-feet of 10" steel pipe with a composite polymer liner such as manufactured by Primus Line or similar to allow lining through fittings in the existing pipe.

8.6.6. Project D-6 – Zone 9 Secondary Supply

The project includes construction of a new interconnection between pressure Zones 2 and Zone 9. This will provide a secondary source of supply in the event of a loss of service from GWD. The interconnection pipeline, assumed to be 8-inch diameter PVC C-900, will be constructed in Modoc Road and Hollister Avenue, crossing the Union Pacific Railroad tracks. The pipeline has a total length of approximately 2,200 linear feet. Pipeline sizing and connection locations should be confirmed by hydraulic modeling.

8.6.7. Project D-7 – Zone 2 to Zone 3 Interconnect

The project includes construction of a new interconnection between pressure Zone 2 and Zone 3. This will consolidate the two zones and allow management as a single zone, as the two zones operate at the same hydraulic grade line, controlled by the operating level of Reservoir No. 2. The interconnection pipeline, assumed to be 8-inch diameter PVC C-900, will be constructed in Las Palmas Drive and Roble Drive. The pipeline has a total length of approximately 2,400 linear feet. Pipeline sizing and connection locations should be confirmed by hydraulic modeling.

8.6.8. Project D-8, D-9, D-10 – Water Main Replacements Year 4, 5, & 6

Projects D-6, D-7 and D-8 include replacements of existing undersized and aging water mains with new 6" or 8" PVC C-900 water mains. The exact locations of these main replacement projects will be determined in the future based on hydraulic modeling results. These projects are anticipated to be completed as one-project-per-year over a three-year period. To provide a basis for budgeting, it is assumed each project will include 10,000 linear feet of pipeline replacement, for a total of 30,000 linear feet of pipeline replacements.

8.7. Capital Improvements Cost

A preliminary estimate of project costs for each of the identified capital projects was developed. Detailed breakdowns of the costs of each project are included in Appendix B. A summary of project costs is provided in Table 8-1.

A 30 percent construction contingency factor was applied to the total construction cost of each construction project, as well as an additional 30 percent of construction costs to cover project engineering, construction management, permitting, and administration.

All costs are in 2023 dollars. Budgets for projects in future years should be escalated based on an assumed inflation estimate of 3-6% annually.

Table 8-1. Capital Project Cost Estimates

Capital Project	Budgetary Implementation Cost Estimate
Project G-1: Water System Hydraulic Model	$60,000
Project G-2: New Maintenance Building	$3,200,000
Project G-3: New Administration Building	$3,320,000
Project G-4: CMMS Program	$65,000
Project G-5: SCADA Platform Upgrade	$120,000
Project G-6: Security Improvements Project	$192,000
Project S-1: Modoc Ring Meter and Pressure Relief Valve Site	$536,000
Project S-2: Modoc 6” Meter Piping Upgrade	$64,000
Project S-3: Hope Ranch Subbasin Well	$1,920,000
Project S-4: Well #16 Replacement – With New Well No. 22.	$2,160,000
Project S-5: Well #18 Short Term Improvements	$64,000
Project S-6: Well #18 Rehabilitation and Transmission Main	$1,430,000
Project S-7: Well #10A, #19, and #21 Rehabilitation	$556,000
Project T-1: Nogal Water Treatment Plant	$1,061,600
Project T-2: Well #17 Water Treatment Plant	$2,320,000
Project ST-1: Reservoir 1 Replacement	$6,000,000
Project ST-2: Reservoir 2 Replacement	$6,640,000
Project ST-3: Reservoir 3 Replacement	$4,640,000
Project P-1: Cuervo Pump Station Rehabilitation	$128,000
Project P-2: Via Hierba Pump Station Rehabilitation	$121,600
Project P-3: Via Alegre Pump Station Rehabilitation	$156,800
Project P-4: Cresta Pump Station Rehabilitation	$1,344,000
Project P-5: Tranquila Pump Station Rehabilitation	$76,000
Project D-1: Contract Hydrant and Valve Flushing and Condition	$48,000
Project D-2: Valve and Hydrant Replacement Project	$400,000
Project D-3: Marina Drive Water Main Replacement	$2,320,000
Project D-4: Cuervo Pump Station Pipeline Replacements	$980,000
Project D-5: Well #16 Discharge Lining	$280,000
Project D-6: Zone 9 Secondary Supply	$880,000
Project D-7: Zone 2 to Zone 3 Interconnect	$960,000
Project D-8: Water Main Replacement Year 4	$4,000,000
Project D-9: Water Main Replacement Year 5	$4,000,000
Project D-10: Water Main Replacement Year 6	$4,000,000
Total	**$54,043,000**

8.8. Capital Project Prioritization and Implementation Schedule

As a means to establish a schedule for capital project implementation and associated annual budgets, a priority was assigned to each capital project. Priorities were assigned with a score of 1-10 based on project sequencing, severity of need, and to spread projects over a reasonable implementation period. Table 8-2 shows the project prioritization and planned implementation schedule. 30% of the total project cost for each construction project was allocated to the prior year to cover design, permitting, and administrative costs.

Table 8-2. Capital Project Budget Implementation Schedule

Capital Project	Priority	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Project G-1	1	$60,000									
Project G-2	3		$960,000	$2,240,000							
Project G-3	6					$996,000	$2,324,000				
Project G-4	7						$19,500	$45,500			
Project G-5	7						$36,000	$84,000			
Project G-6	8							$57,600	$134,400		
Project S-1	2	$160,800	$375,200								
Project S-2	2	$19,200	$44,800								
Project S-3	6					$576,000	$1,344,000				
Project S-4	1	$2,160,000									
Project S-5	1	$64,000									
Project S-6	2	$429,000	$1,001,000								
Project S-7	5				$166,800	$389,200					
Project T-1	2	$318,480	$743,120								
Project T-2	3		$696,000	$1,624,000							
Project ST-1	4			$1,800,000	$4,200,000						
Project ST-2	5				$1,992,000	$4,648,000					
Project ST-3	6					$1,392,000	$3,248,000				
Project P-1	7						$38,400	$89,600			
Project P-2	4			$36,480	$85,120						
Project P-3	5				$47,040	$109,760					
Project P-4	5				$403,200	$940,800					
Project P-5	6					$22,800	$53,200				
Project D-1	3		$14,400	$33,600							
Project D-2	4			$120,000	$280,000						
Project D-3	2	$696,000	$1,624,000								
Project D-4	1	$980,000									
Project D-5	7						$84,000	$196,000			
Project D-6	6					$264,000	$616,000				
Project D-7	7						$288,000	$672,000			
Project D-8	8							$1,200,000	$2,800,000		
Project D-9	9								$1,200,000	$2,800,000	
Project D-10	10									$1,200,000	$2,800,000
Total		$4,887,480	$5,458,520	$5,854,080	$7,174,160	$9,338,560	$8,051,100	$2,344,700	$4,134,400	$4,000,000	$2,800,000

Appendix A: Pueblo Water Resources Central Basin Wellfield Production Capacity Assessment

TECHNICAL MEMORANDUM

Pueblo Water Resources, Inc.
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To: Mike Alvarado, General Manager
La Cumbre Mutual Water Company

Date: June 21, 2021,

From: Michael Burke, Principal Hydrogeologist
Pueblo Water Resources

Pueblo Project No: 20-0031

Subject: Central Basin Wellfield Production Capacity Assessment

This Technical Memorandum (TM) presents an assessment of the La Cumbre Mutual Water Company's (La Cumbre) four active Central Basin groundwater production wells (Well Nos. 10A, 17, 19, and 21) and an estimate of the production capacity, and the combined production capacity, of the four wells through calendar year 2021. The analysis was performed to gauge whether the wellfield can contribute to meeting La Cumbre's demand during continued dry conditions, particularly in light of a likely reduction in State Water Project and Cachuma Project deliveries, and to evaluate if the wellfield can extract the annual Central Basin Water Right (on a 10-year running average) of 1,000 acre-feet per year (afy), as established through the Wright Judgement.

Currently, three of the wells (10A, 19, and 21) are actively in production. La Cumbre is awaiting approval from the State of California Division of Drinking Water for an iron and manganese sequestration system for Well 17. It is anticipated that approval will be granted before June 2021. The locations of the wells are shown on **Figure 1**. **Table 1** provides the well construction details and pump settings for each of the wells.

Table 1. Summary of Well Construction Details
La Cumbre Central Basin Production Wells

Well Feature	Well 10A	Well 17	Well 19	Well 21
Date of Construction	1966/2018*	1980		2000
Casing Depth (ft)	530	535	630	530
Casing Material	PVC/Stainless	PVC	PVC	PVC
Casing Diameter (in)	8	10	10	10
Top of Screen (ft)	260	275	350	350
Pump Setting (ft)	405	440	345	310
Additional Info	*Liner: PVC Blank SS Screen			

Well operational data, including static water levels, pumping rates, pumping water levels, and specific capacities, have been collected by La Cumbre over time, and are plotted on hydrographs that are presented on **Figures 2 through 5**.

Static water levels for the four production wells from 2014 through March 2021 are plotted on **Figure 6**. The average decline in static levels from the start of 2014 continuing through 2017, a period of significant drought, averages approximately 12 feet per year. Declining static levels during a period of sustained pumping will result in diminished well yields, and must be accommodated for in estimating future production capacity.

Monitoring was recently performed to establish the current well performance characteristics at the three wells currently in operation. Water level transducers and data loggers were installed in the wells for periods of two to four weeks to measure and record static, pumping, and recovering water levels during the normal operation of the wells. The pumping rates of the three wells were measured and recorded periodically while the wells were in operation. Hydrographs showing the data collected are presented in **Figures 7, 8, and 9**. **Table 2** summarizes recent well performance characteristics of the four wells (data from Well 17 from 2019) and presents baseline well performance characteristics (from testing immediately following construction and development of the wells) for purposes of comparison. As illustrated in Table 2, the current specific capacities of each of the wells, with the exception of Well 21, are significantly lower than baseline specific capacities values.

Well Testing

Table 2. Well Performance Summary
La Cumbre Central Basin Production Wells

Well	Static Level ft	Pumping Rate gpm	Pumping Level ft	Specific Capacity gpm/ft	Test Date
	Baseline Well Performance				
10A	168	1360	251	15.3	--
17	76	500	205	3.6	--
19	249	450	279	15	--
21	158	600	269	5.4	--
	Recent Well Performance				
10A	228	408	265	11.0	4/2021
17	82	384	272	2.0	7/2019
19	206	720	300	6.9	3/2021
21	235	315	290	5.7	4/2021

Monthly well production totals for each of the four wells has been compiled and reviewed. The summary spreadsheet for monthly production is attached, and the data are presented graphically on **Figure 10**. In general, data indicated the following range of monthly production for the four wells: Well 10 A - 14 to 35 acre-feet per month (afm); Well 17 – 40 to 60 afm; Well 19 – 12 to 32 afm; and Well 21 – 10 to 32 afm. The combined production total from the four wells has generally been in the range of 15 to 80 afm.

The annual production totals from 2010 through 2020 are summarized in **Table 3**. The combined production from the four wells during this period has been in the range of 329 acre-feet per year (afy) to 1,204 afy.

Table 3. Annual Well Production Summary, 2010 - 2021
La Cumbre Central Basin Production Wells -

	Well 10A	Well 17	Well 19	Well 21	Combined
2010	0	594.81	4.73	3.54	603.08
2011	0	0.08	825.95	219.34	1045.37
2012	0	0	960.56	243.18	1203.74
2013	0	0	924.04	187.88	1111.92
2014	0	0	592.96	157.43	750.39
2015	0	0	637.92	55.96	693.88
2016	0	0	412.98	34.55	447.53
2017	0	0	465.82	0.25	466.07
2018	0	0	542.14	18.77	560.91
2019	0	0	300.28	28.4	328.68
2020	131.14	0	151.94	107.42	390.5
2021	49.47		2.92	44.12	96.51

The objective of this TM is to estimate how the wells will perform and what the combined production capacity of the wellfield will be with continued operation through the summer high demand period and through calendar year 2021, with the assumption that drought conditions will persist and groundwater levels in the basin will continue to decline. With continuous or near continuous operation of the wells, drawdown at each of the wells will continue to increase and specific capacities of each of the wells will accordingly decrease, as will the instantaneous pumping rates. To estimate projected drawdown and specific capacity characteristics, well performance and aquifer test data collected during testing of the wells in the past were analyzed. Drawdown and specific capacity characteristics of a given well are dependent on hydraulic conditions of the completed aquifer at each well, along with the hydraulic characteristics of the well. Drawdown characteristics will be unique for each well.

Aquifer test data collected in the past for each of the four wells are presented on **Figures 12, 13, 14, and 15.** As shown on each of the test hydrographs, drawdown is projected

for continuous pumping of durations of one month, three months, and six months. For each of these projections, drawdown for each well has been estimated on a monthly basis through calendar year 2021. A summary of these drawdown estimates is presented on a spreadsheet included in the Supporting Documentation section of this TM.

Figure 16 depicts graphically the relationship for each well between the static water level, the pump setting depth, the top of the well screen, and the recent pumping level. Operationally, it is desirable and standard practice if possible, to operate the well in a manner in which the pumping water level in the well remains above the top of the well screen. When the pumping level drops below the top of the screen, undesirable water quality results, such as air entrainment, may occur. As shown on Figure 16, the recent pumping level at Well 10A is just below the top of the screen of the inner liner casing, and at Well 17, the pumping level is immediately above the top of the well screen. At wells 19 and 21, there is considerable 'free-board' (separation of pumping level and top of screen). Whether or not water quality or other problematic issues (i.e. pumping of sand) will develop is dependent upon a variety of issues (well construction features, hydrogeologic conditions, native water quality, etc.) unique to each individual well.

The graphic on Figure 16 also shows the available drawdown (separation between the pumping level and the current pump depth. At wells 10A and 17, while the pumping water level is at or below the top of the well screen, there is considerable existing available drawdown (greater than 100 feet) at both wells. At Well 19 there is approximately 50 feet of available drawdown, and greater than 100 feet of available drawdown at Well 21.

Based on the estimates of sustained pumping drawdown, the recent well performance data presented on Figures 7, 8, and 9, and in Table 2, and estimates of specific capacity, instantaneous pumping rate, monthly production totals have been developed for each of the four wells through calendar year 2021. These estimates assume that current well operational practices continue, that is maintaining current pumping levels, which at Wells 10A and 17 maintain the pumping level at or above the top of the well screen.

Two scenarios have been assumed in estimating the monthly production totals. The first assumes a 50 percent operational schedule for the wells, and the second assumes a 75 percent operational schedule. These operational schedules bracket the range of expected operational schedules for the remainder of 2021, and are meant to accommodate down time of the wells due to demand and storage conditions, water level recovery, and well/pump servicing and repair. The spreadsheets summarizing these estimates are presented as supporting documentation. Monthly production total estimates for each well and for the combined wellfield are summarized in **Table 4** for the 50 percent operational schedule scenario, and in **Table 5** for the 75 percent operational schedule scenario. Totals for January through May 2021 are from actual documented meter values.

Table 4. Estimated Wellfield Production Capacity, 2021; 50% Operational Schedule
La Cumbre Central Basin Production Wells

	Well 10A	Well 17	Well 19	Well 21	Combined
January 2021	19.5		0.09	16.47	36.06
February 2021	18.24		0.01	3.72	21.97
March 2021	3.71		2.7	6.47	12.88
April 2021	41.32		12.88	33.75	87.95
May 2021	47.44		0.48	42.80	90.72
June 2021	24.41	22.96	40.69	15.73	103.78
July 2021	23.66	21.94	40.03	15.31	100.94
August 2021	23.00	21.51	39.08	14.72	98.32
September 2021	22.34	21.20	38.48	14.36	96.37
October 2021	21.80	20.80	37.89	14.01	94.50
November 2021	21.29	20.61	37.04	13.51	92.46
December 2021	20.72	20.42	36.63	13.28	91.05
Totals	**287.43**	**149.45**	**286.00**	**204.13**	**927.00**

Table 5. Estimated Wellfield Production Capacity, 2021; 75% Operational Schedule
La Cumbre Central Basin Production Wells

	Well 10A	Well 17	Well 19	Well 21	Combined
January 2021	19.5		0.09	16.47	36.06
February 2021	18.24		0.01	3.72	21.97
March 2021	3.71		2.7	6.47	12.88
April 2021	41.32		12.88	33.75	87.95
May 2021	47.44		0.48	42.80	90.72
June 2021	36.61	34.44	61.03	23.60	155.68
July 2021	35.49	32.91	60.04	22.97	151.40
August 2021	34.51	32.27	58.63	22.09	147.48
September 2021	33.51	31.80	57.72	21.53	144.56
October 2021	32.70	31.21	56.84	21.01	141.75
November 2021	31.94	30.92	55.56	20.27	138.68
December 2021	31.08	30.63	54.95	19.92	136.57
Totals	**366.03**	**224.17**	**420.92**	**254.59**	**1265.71**

As shown in Tables 4 and 5, the range of estimated combined production for 2021 is between 927.00 acre-feet (for the 50 percent operational schedule scenario) and 1265.71 acre-feet (for the 75 percent operational schedule scenario).

The estimates developed and presented for well production capacity and combined well production capacity assumes that the wells and the completed aquifers at each well will continue to support well pumping and production through the summer months and into the fall of 2021, particularly through this period of expected and continued drought. With respect to this assumption, we have the following recommendations regarding the monitoring of the wells and well production:

- Track monthly production from each of the wells and compare with the estimates provided in this TM.
- Instrument each of the wells with water level probes/loggers to continuously monitor water levels. Download and plot the data on a bi-weekly basis (at a minimum) and evaluate the data in order to identify any significant trends.
- Measure and record the pumping rates at each of the wells on a weekly (minimum) basis.
- Measure, record, and evaluate pump performance data to identify and significant deviations from normal pump operation.

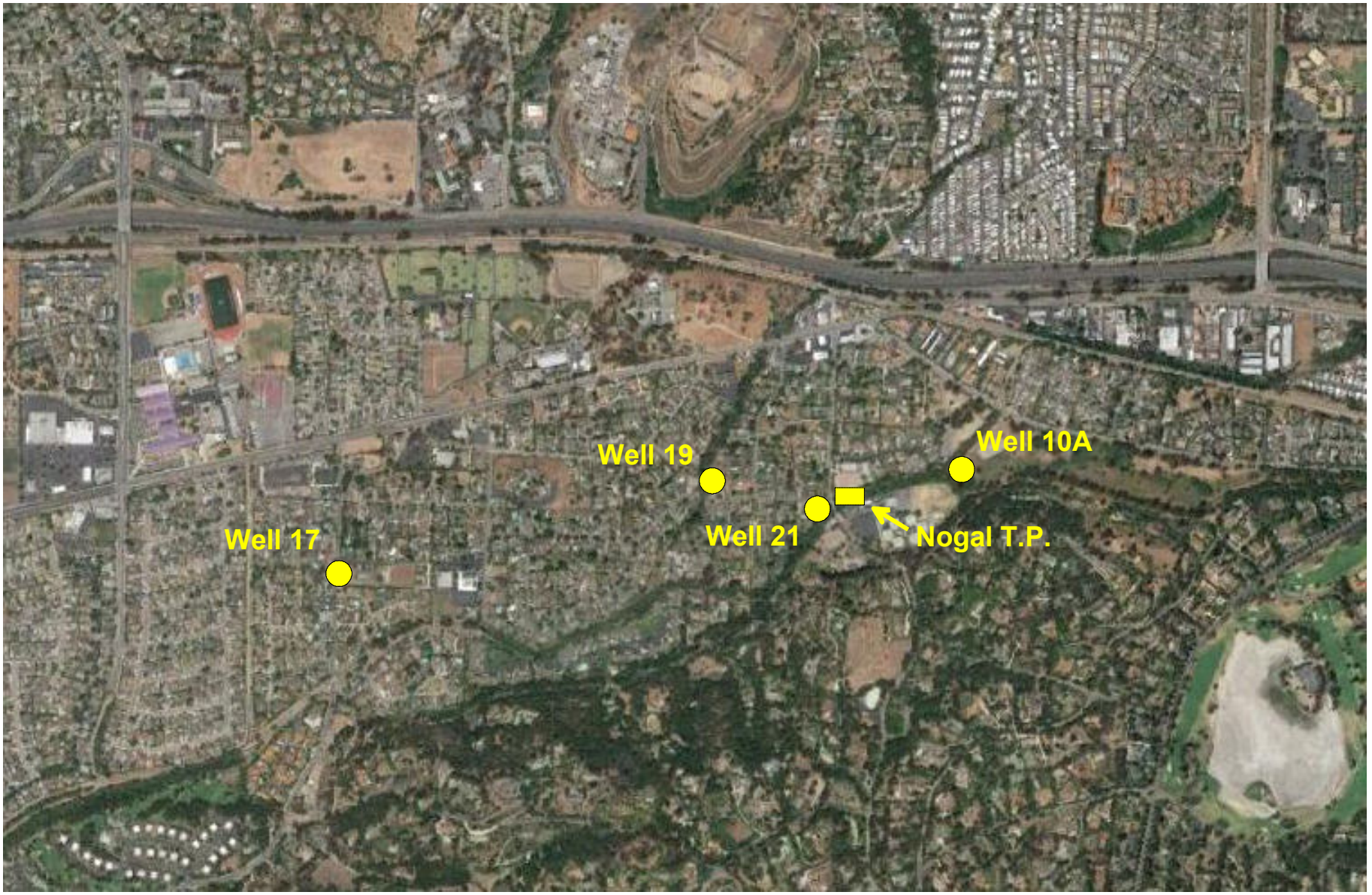
Should it become necessary to allow pumping levels to drop below the top of the well screen in order to maintain production goals, we recommend focused and diligent monitoring to

assess the existence of air entrainment, sand pumping, and/or other water quality related phenomena.

We also recommend that La Cumbre identify an appropriate time to perform full rehabilitation of one of the wells in order to maintain production capacity of each well. La Cumbre should establish a schedule and sequence for the rehabilitation of all of the wells. Based on review of the data presented in Table 2, we recommend the sequence of Well 19, Well 17, Well 21, and Well 10A.

Attachments: Figures 1 through 16
Supporting Documentation

FIGURES



PUEBLO water resources

0 2000

Scale, feet

N

FIGURE 1. WELL LOCATION MAP
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

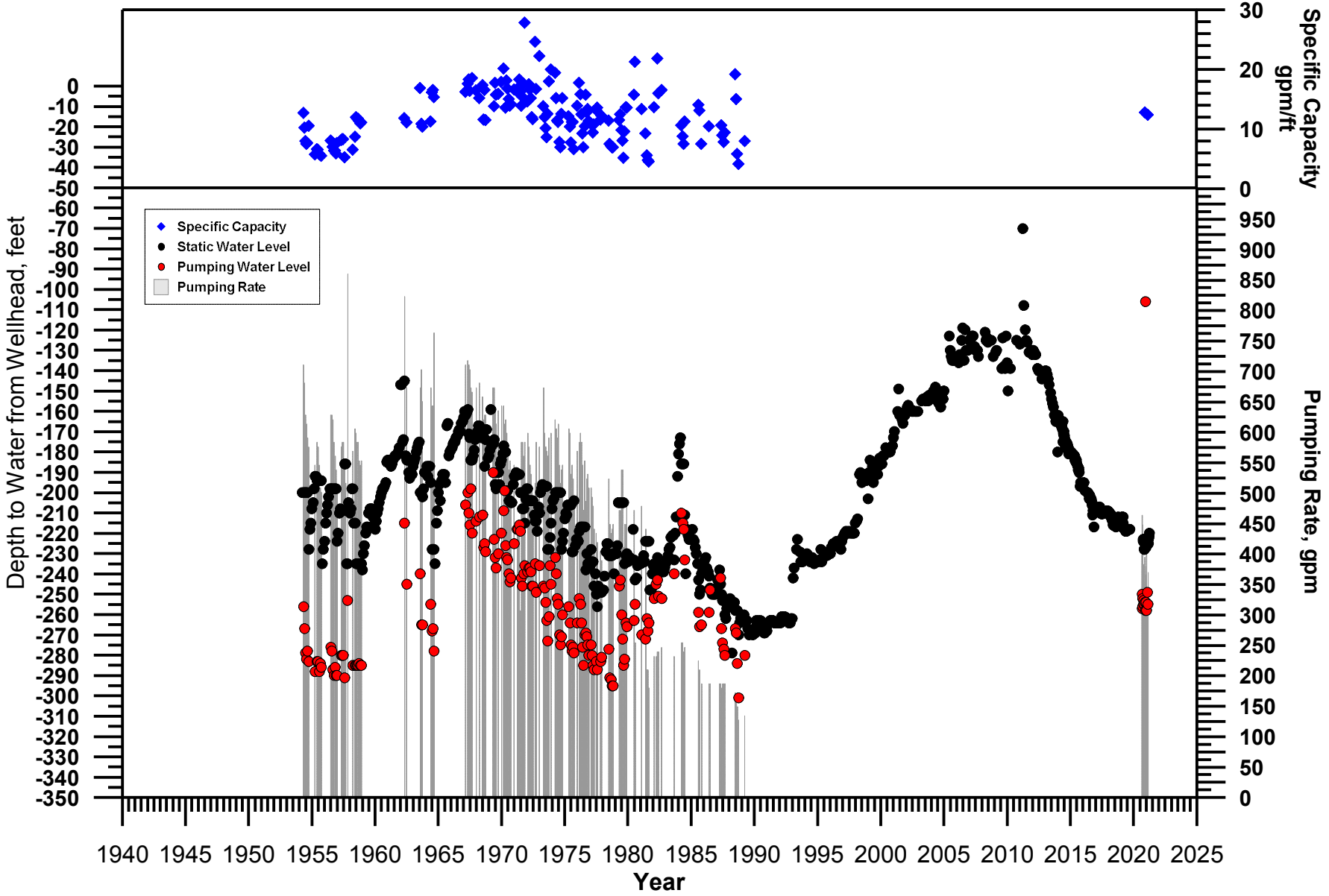


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FIGURE 2. WELL 10A PERFORMANCE HYDROGRAPH
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

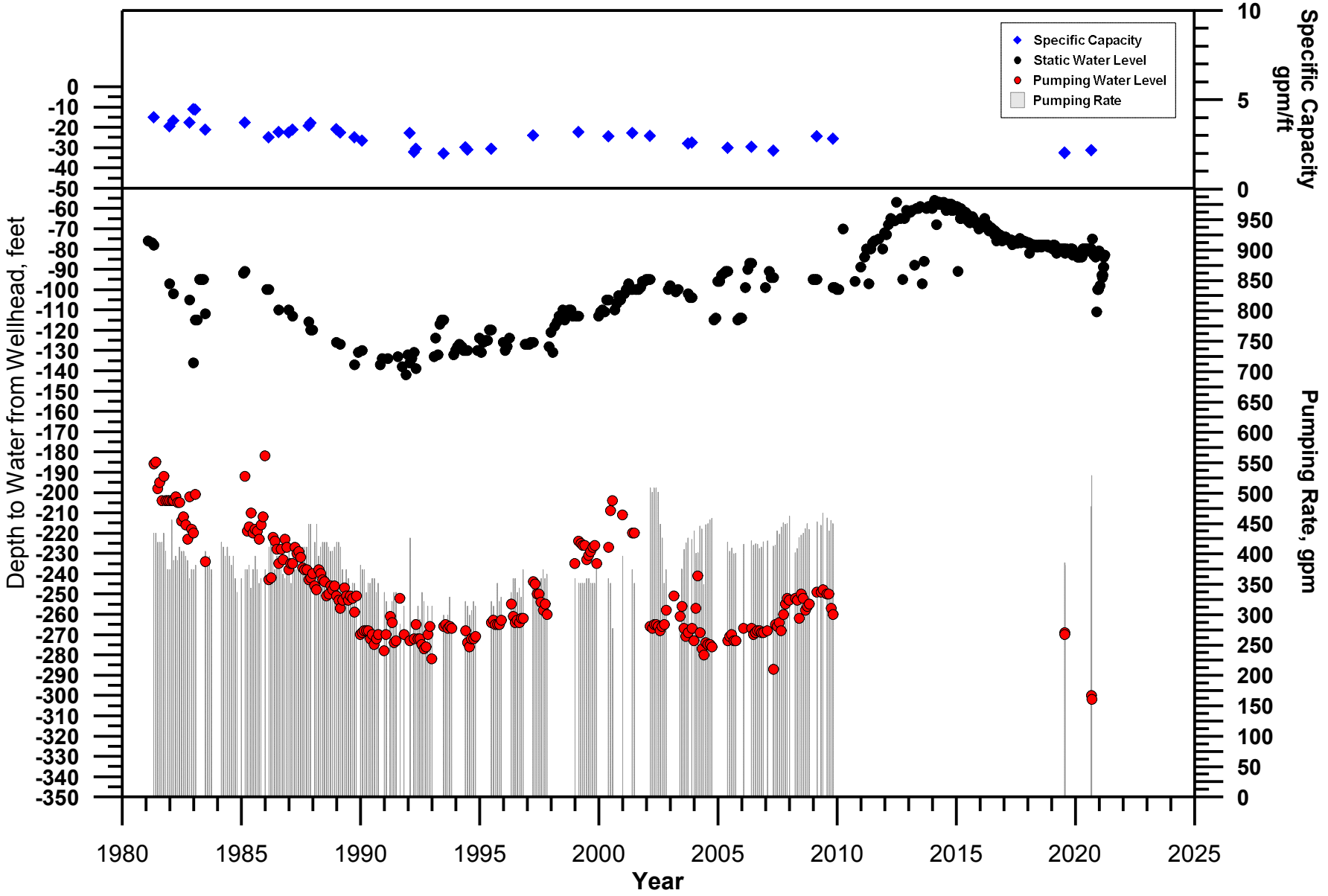

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FIGURE 3. WELL 17 PERFORMANCE HYDROGRAPH
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

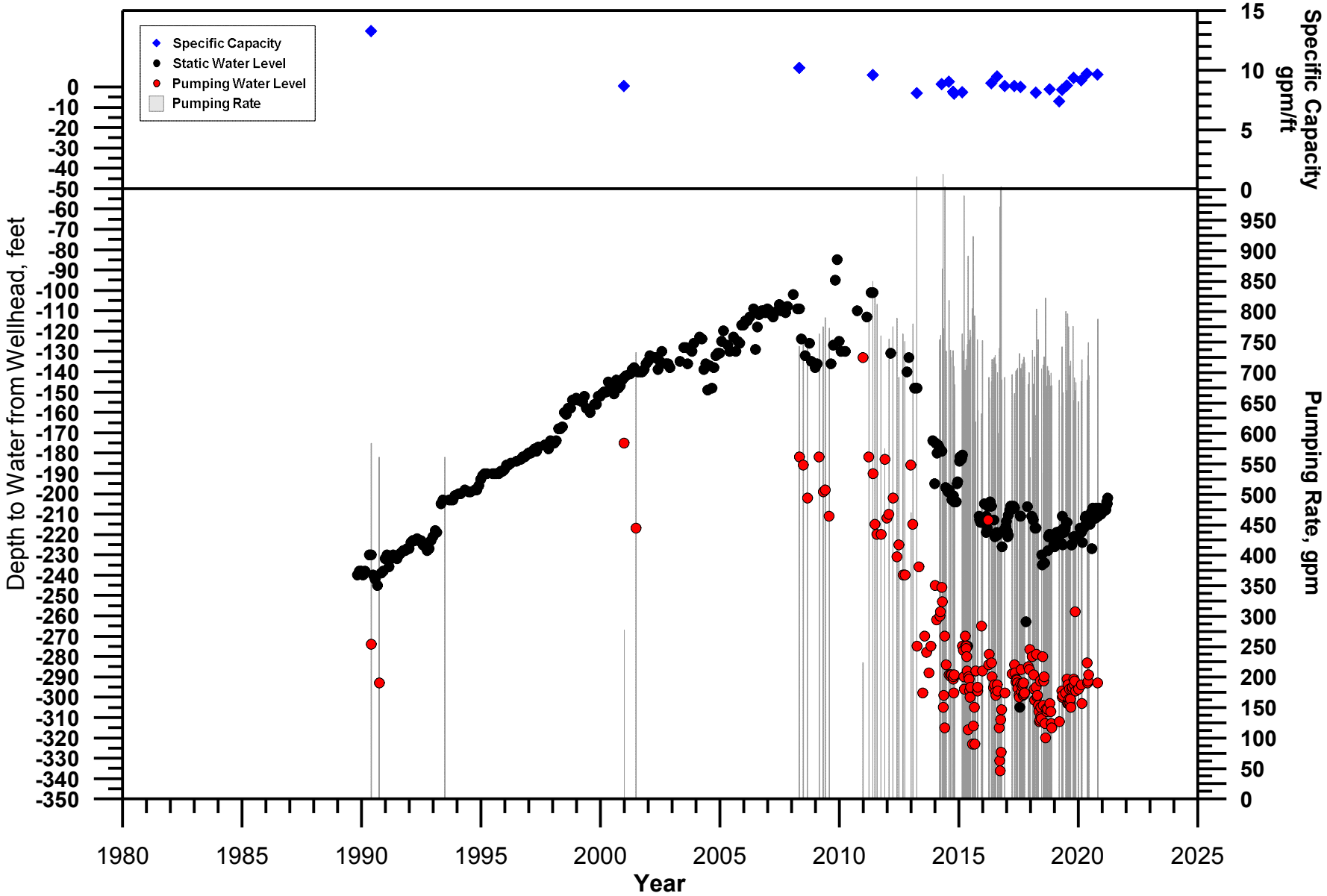

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FIGURE 4. WELL 19 PERFORMANCE HYDROGRAPH
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

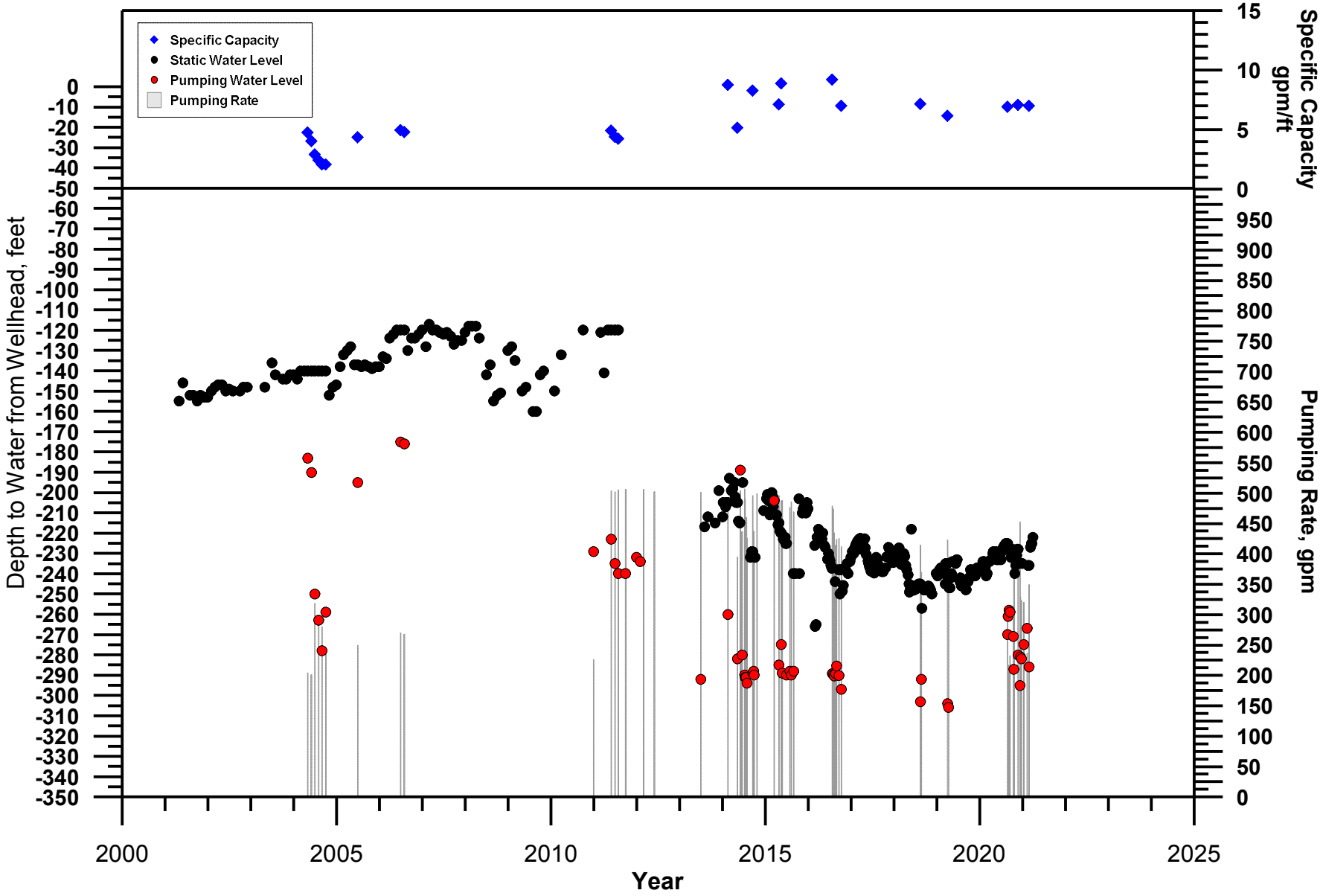

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FIGURE 5. WELL 21 PERFORMANCE HYDROGRAPH
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

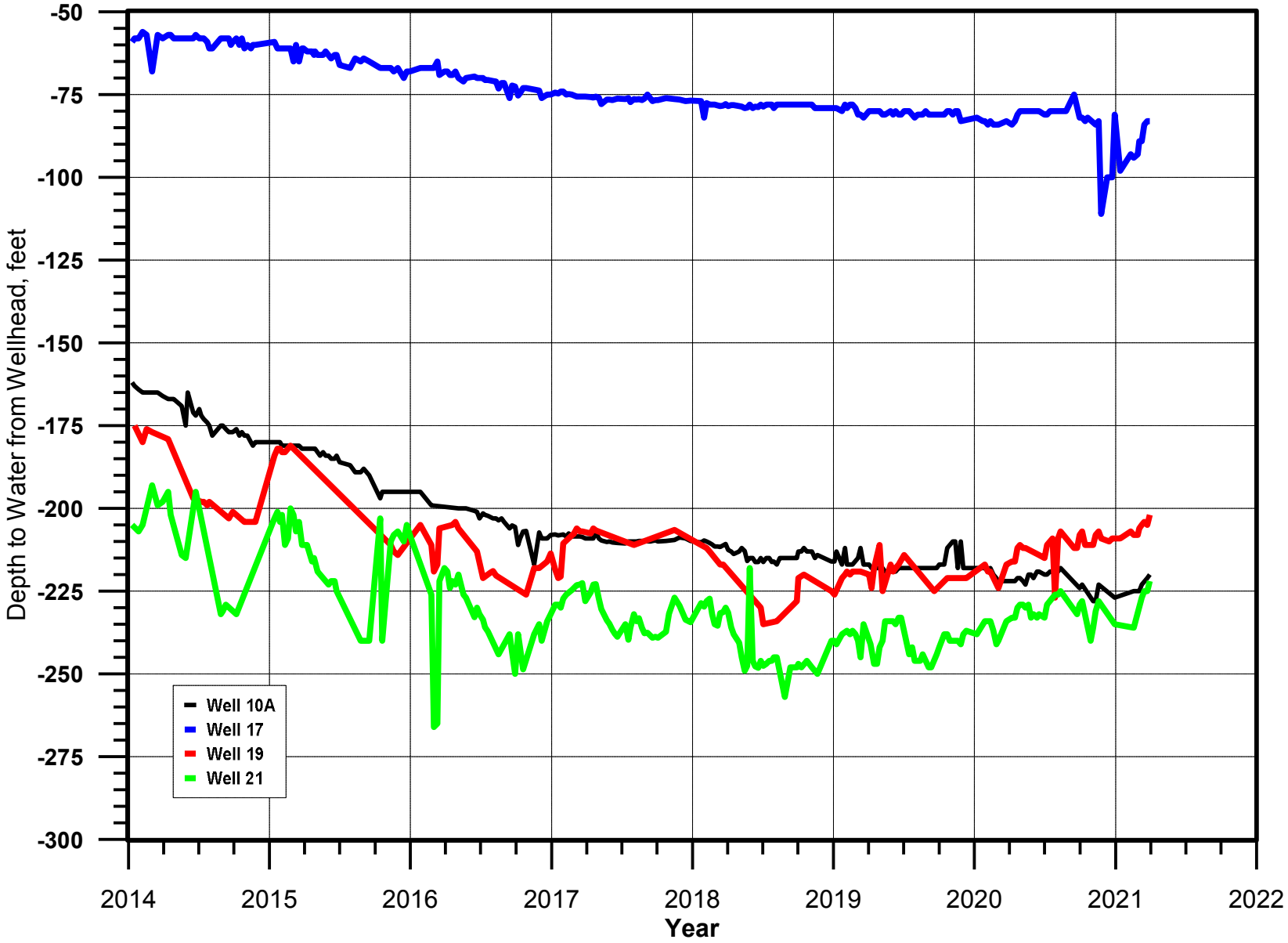

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FIGURE 6. LCMWC Production Wells Static Water Levels
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

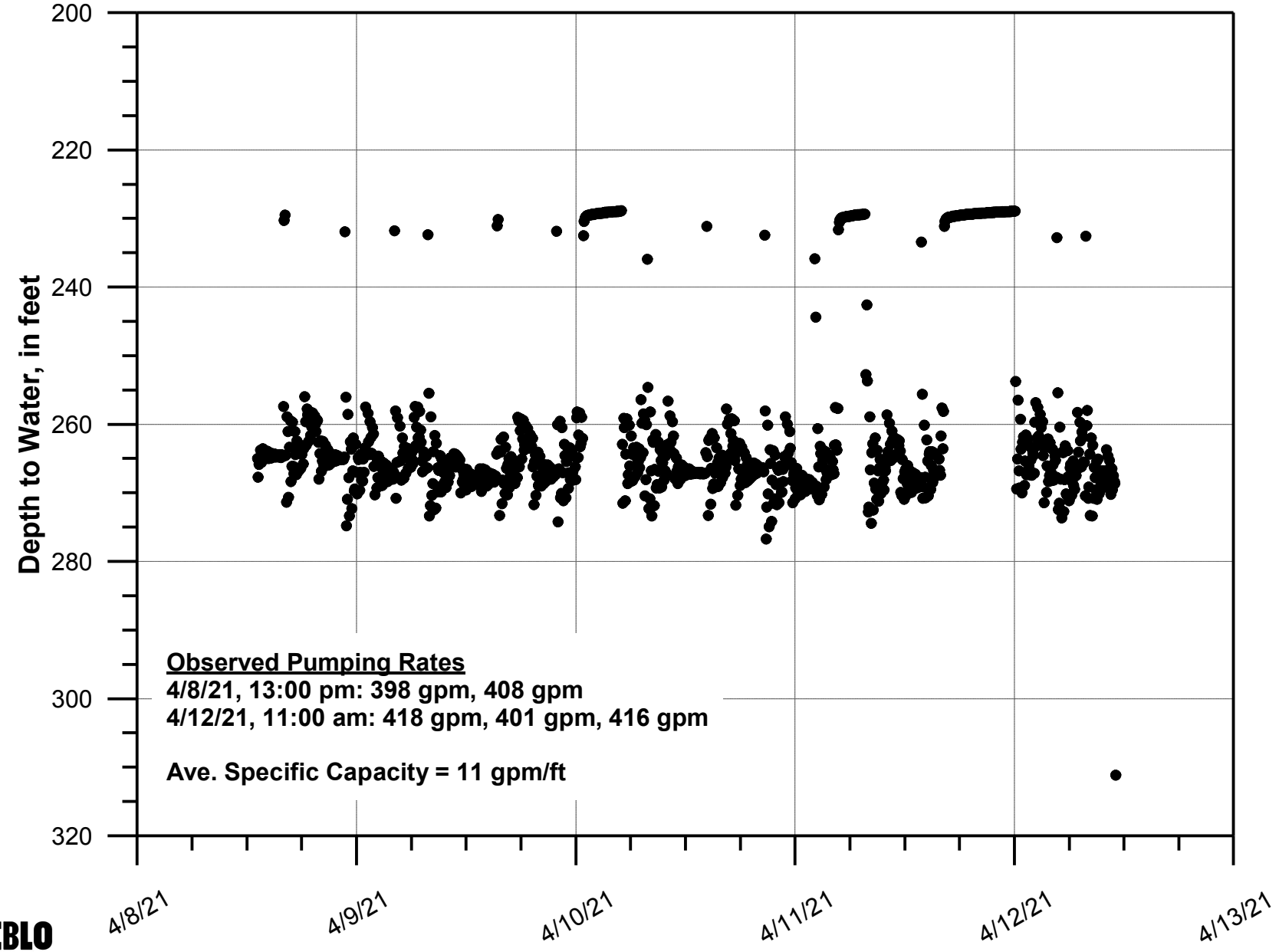

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FIGURE 7. WELL 10A OPERATIONAL DATA
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

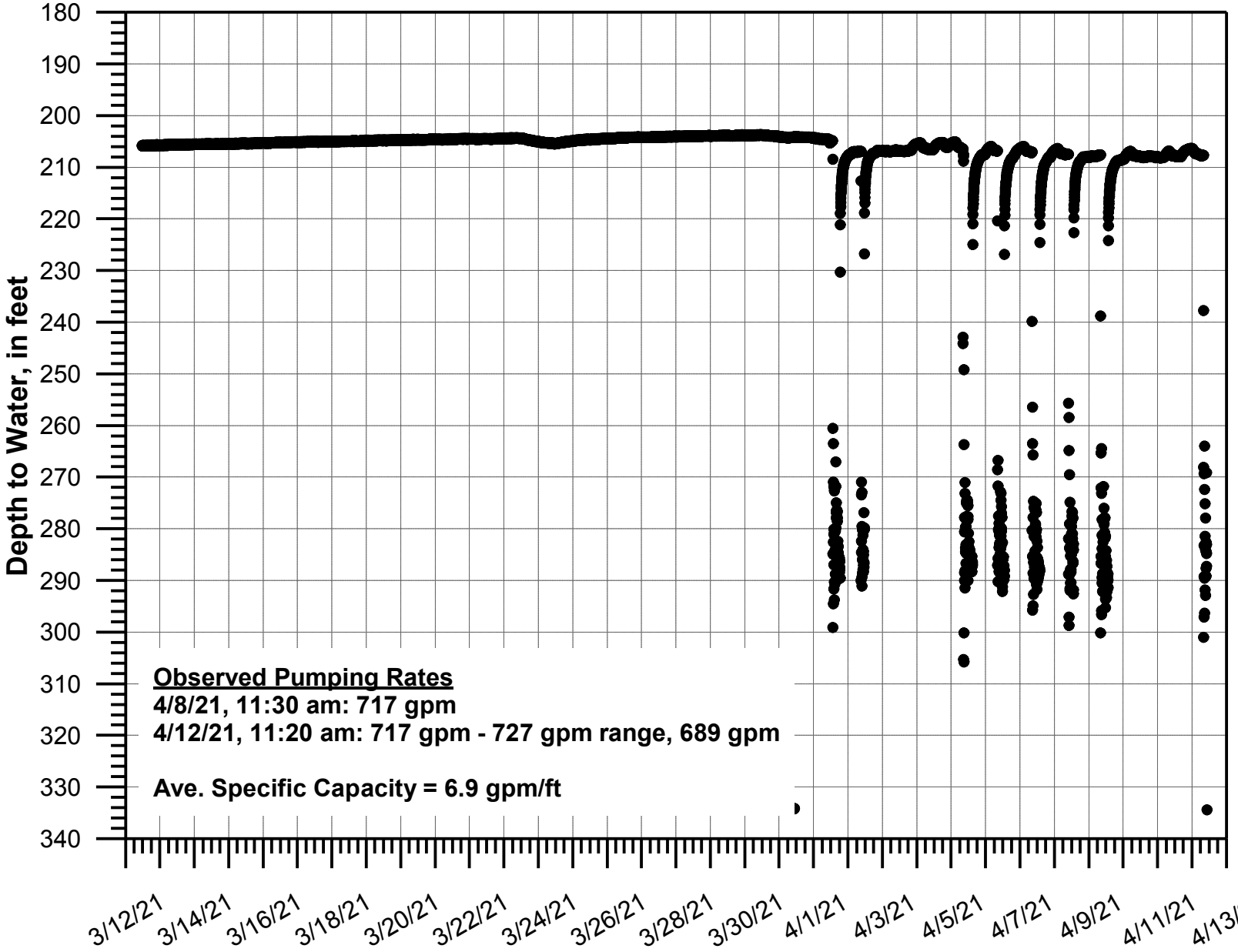

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FIGURE 8. WELL 19 OPERATIONAL DATA
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

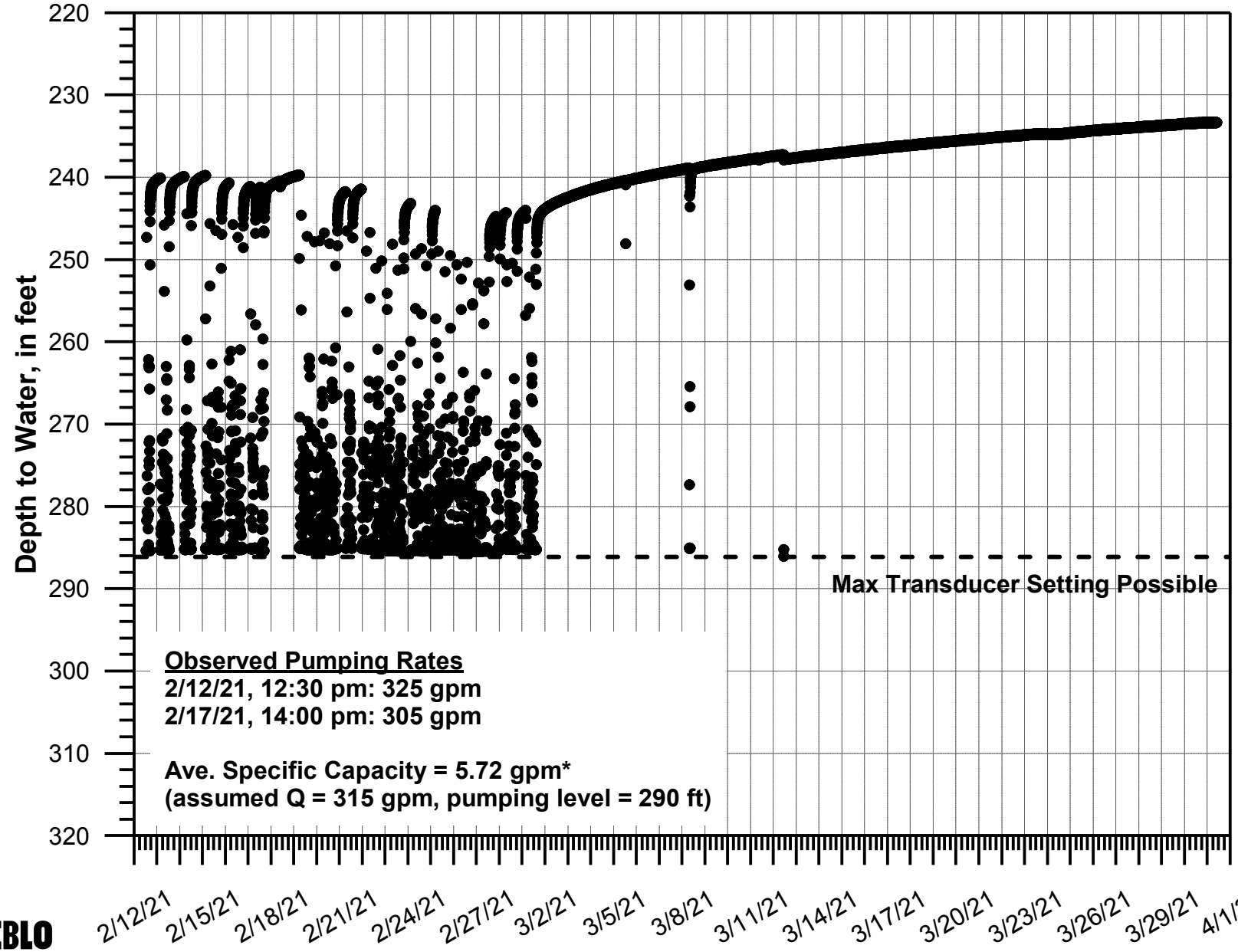

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FIGURE 9. WELL 21 OPERATIONAL DATA
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

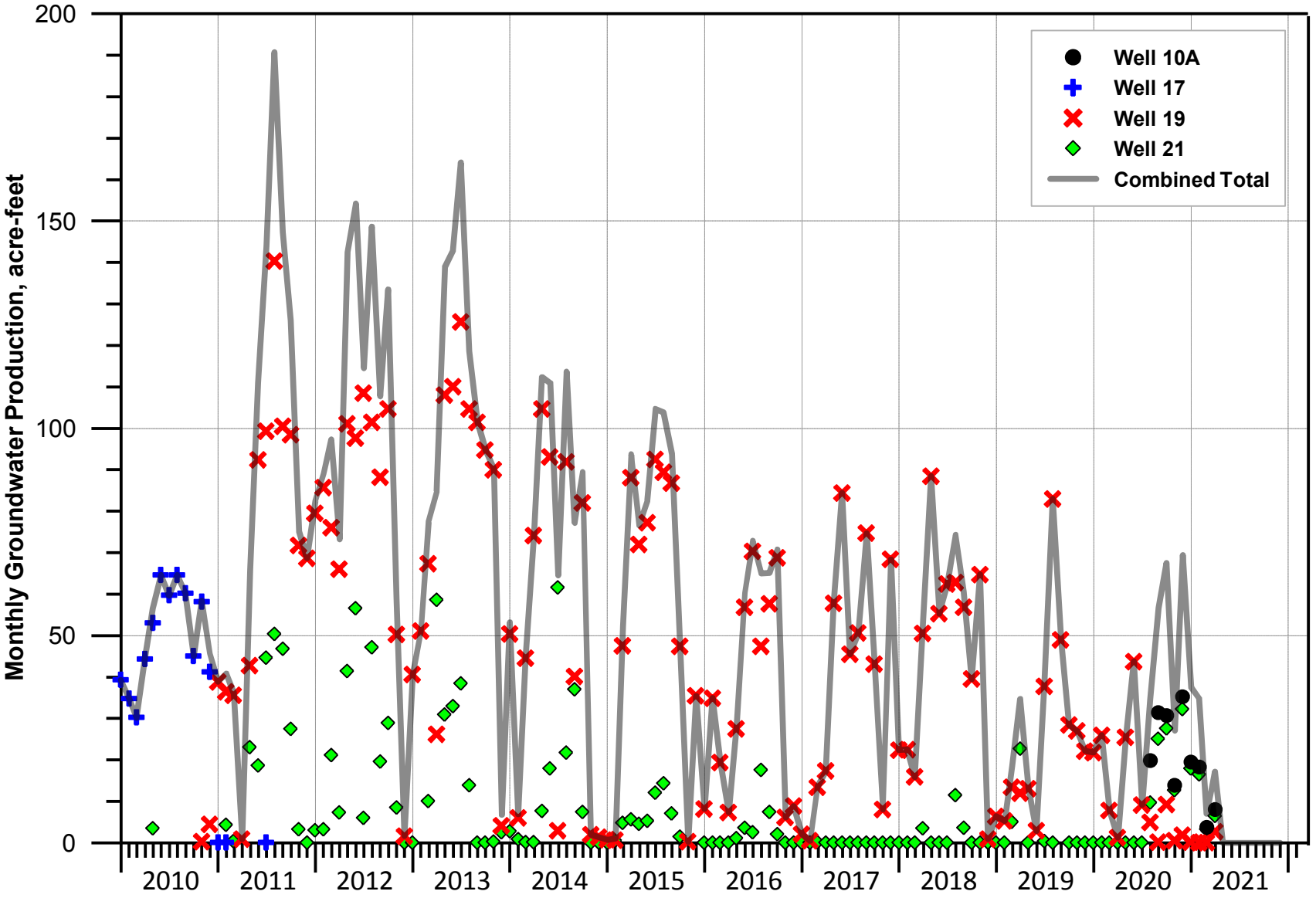

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FIGURE 10. Monthly Production Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

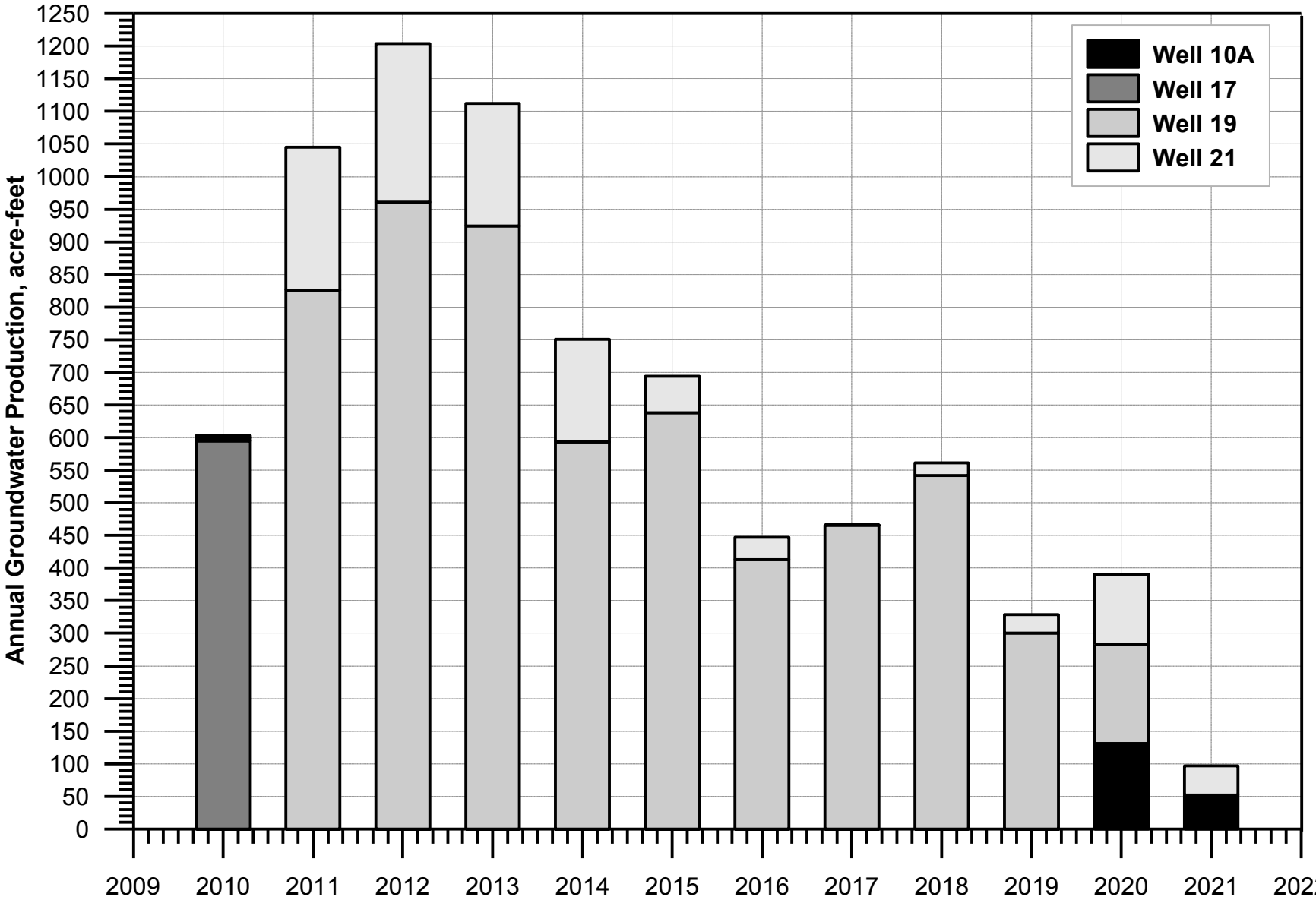

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FIGURE 11. Annual Production Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

June 2021
Well Production Capacity Analysis

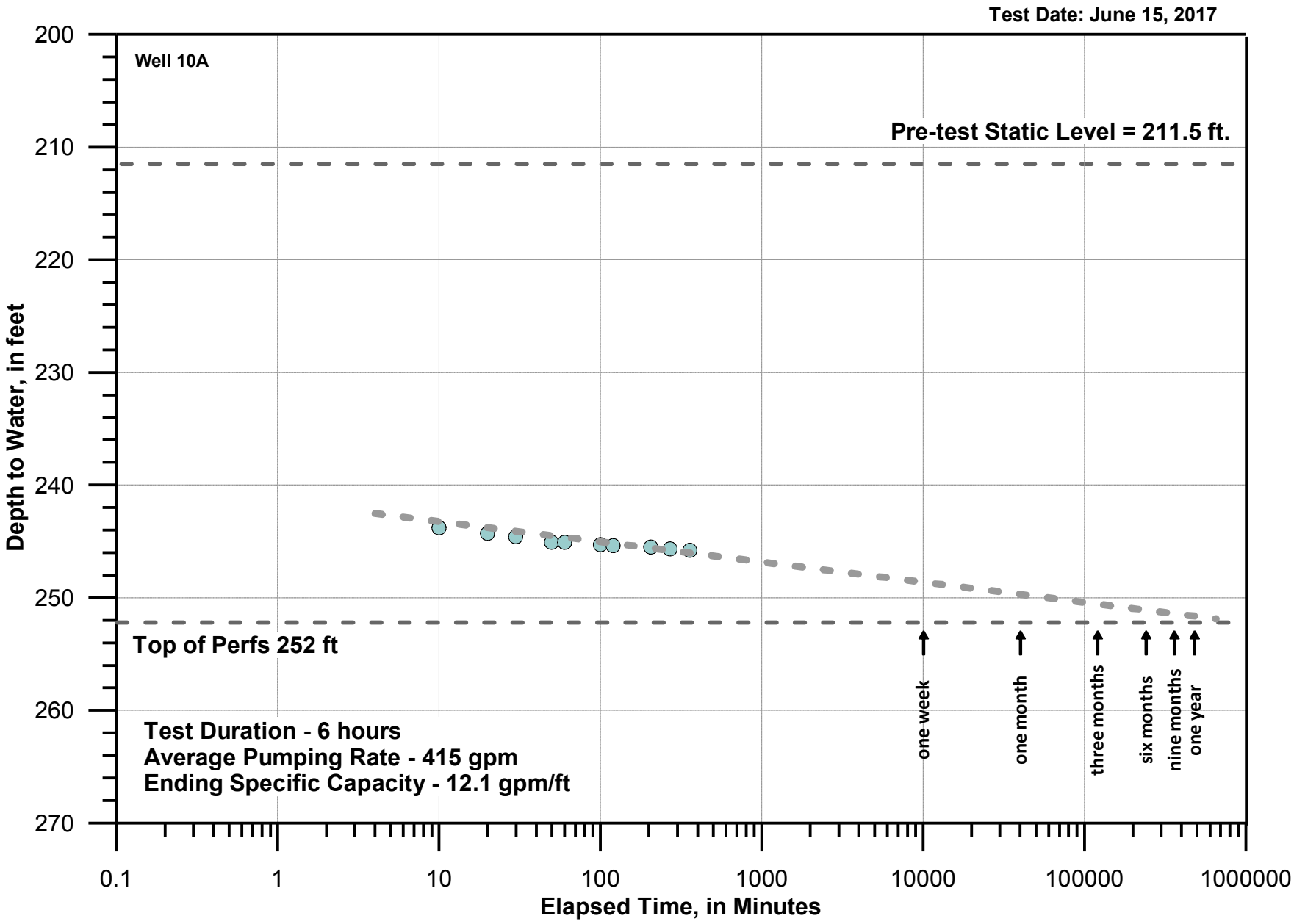

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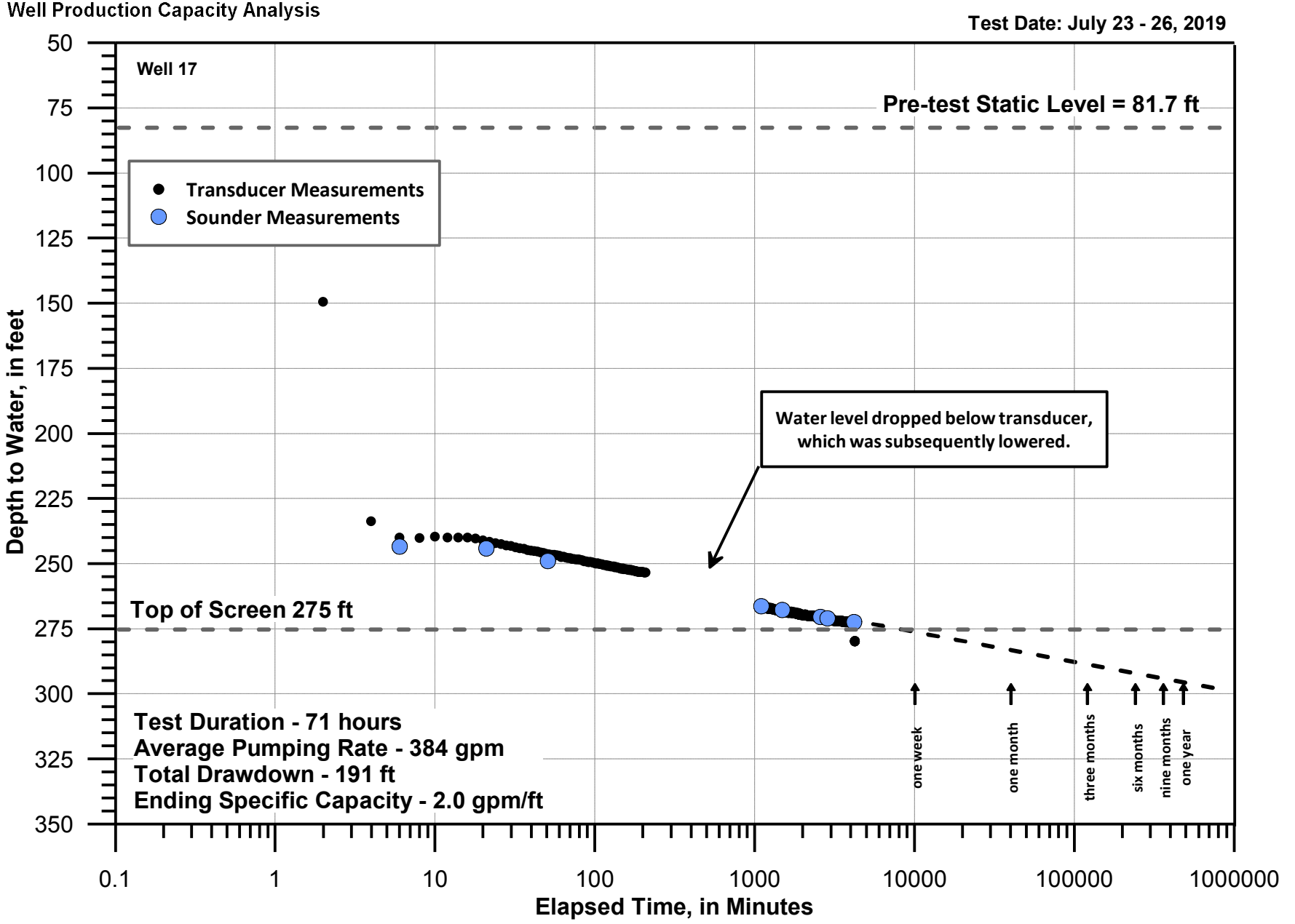
FIGURE 12. Well 10A Test Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

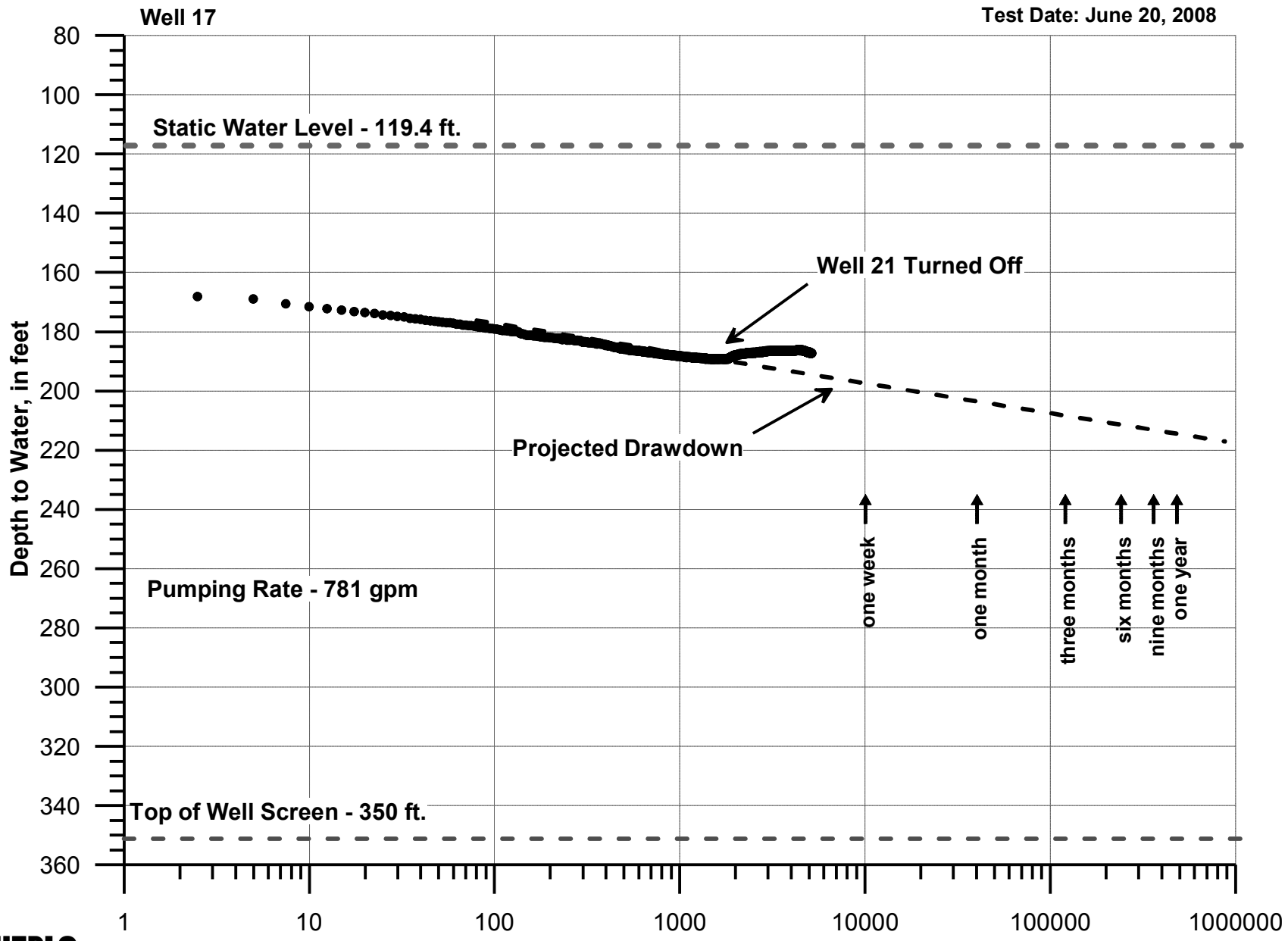
June 2021
Well Production Capacity Analysis



PUEBLO water resources

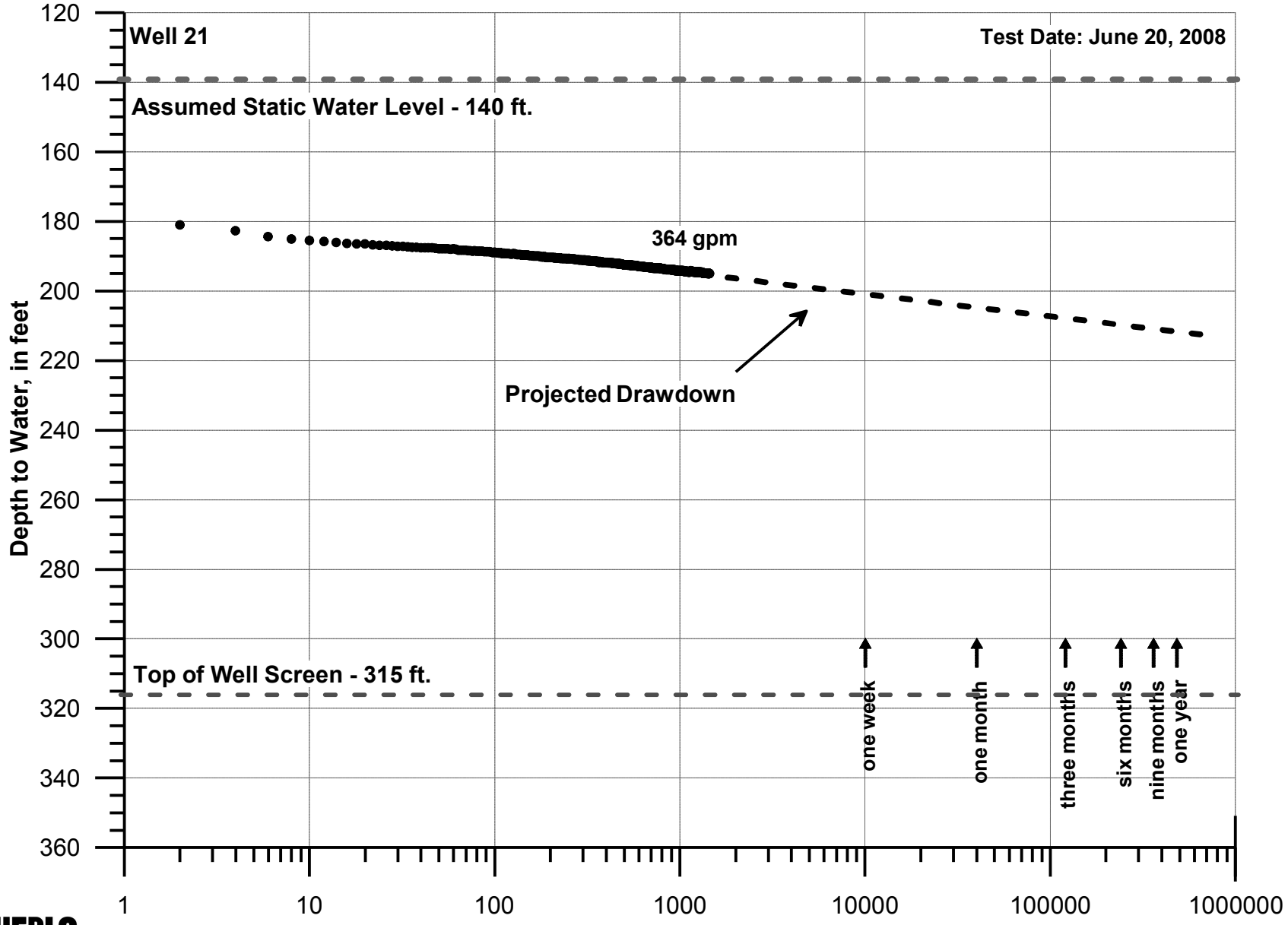
1980 Baseline Well Performance (24 hour test):
Q = 500 gpm; SWL = 76 ft; PWL = 205 ft; s = 129 ft;
Q/s = 3.88 gpm/ft

FIGURE 13. Well 17 Test Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company



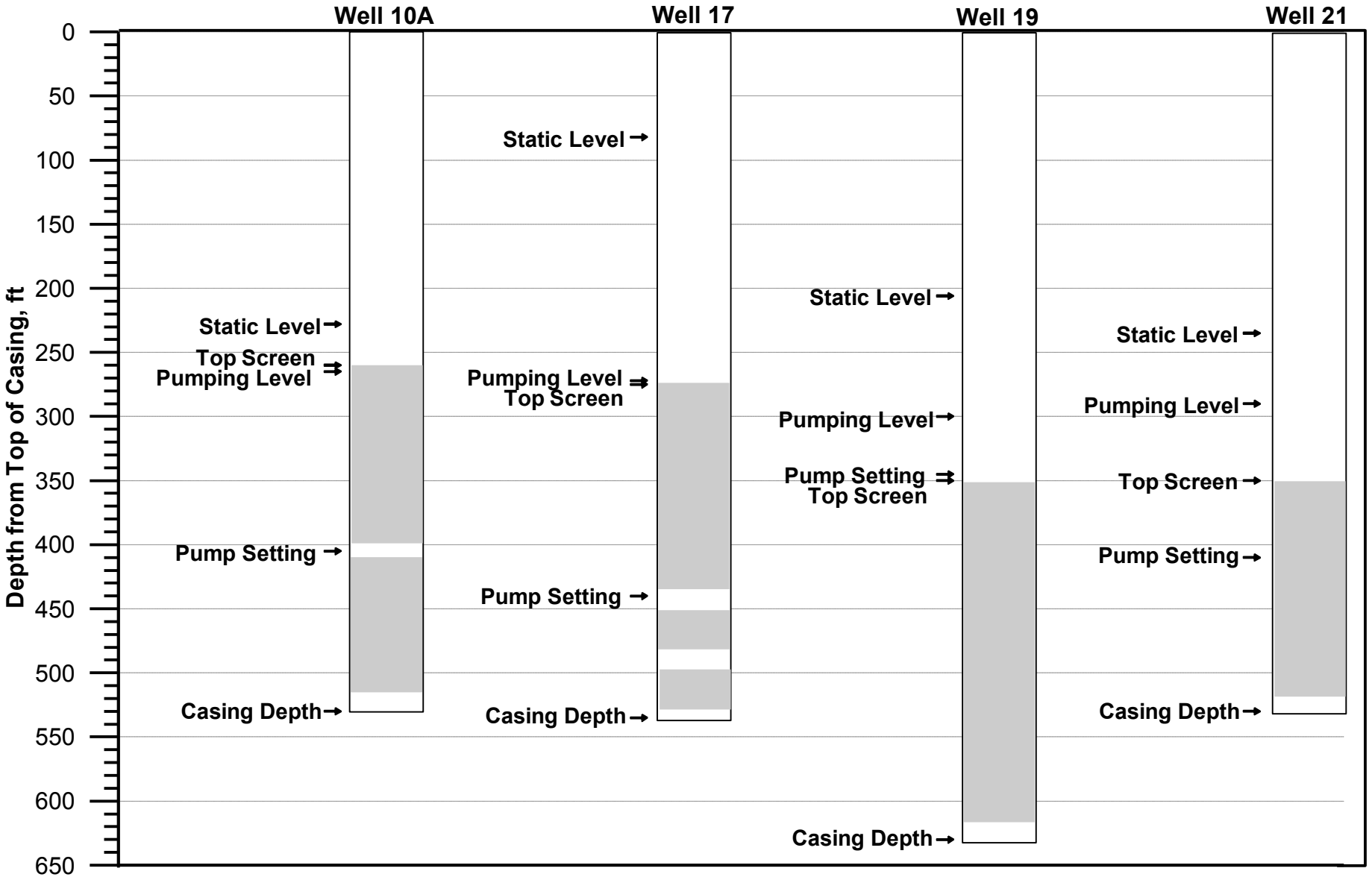
PUEBLO water resources

FIGURE 14. Well 19 Test Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company



PUEBLO water resources

FIGURE 15. Well 21 Test Data
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company



Pumping levels Spring 2021 for Wells 10A, 19, and 21; Summer 2020 for Well 17.
Shaded areas are well screens.

PUEBLO water resources

FIGURE 16. Pumping Conditions, Pump Settings, Well Constructions
Central Basin Well Production Capacity Analysis
La Cumbre Mutual Water Company

SUPPORTING DOCUMENTATION

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Monthly Production Acre-Feet				
	Well 10A	**Well 17**	**Well 19**	**Well 21**	**Total**
1/1/2010		39.24			39.24
2/1/2010		34.72			34.72
3/1/2010		30.18			30.18
4/1/2010		44.35			44.35
5/1/2010		53.01		3.54	56.55
6/1/2010		64.61			64.61
7/1/2010		59.64			59.64
8/1/2010		64.60			64.60
9/1/2010		60.11			60.11
10/1/2010		45.03			45.03
11/1/2010		58.09	0.29		58.38
12/1/2010		41.26	4.45		45.71
1/1/2011		0.05	38.81		38.85
2/1/2011		0.01	36.47	4.37	40.85
3/1/2011			35.62	0.44	36.06
4/1/2011			0.94		0.94
5/1/2011			42.74	23.10	65.85
6/1/2011			92.32	18.70	111.01
7/1/2011		0.02	99.32	44.69	144.03
8/1/2011			140.31	50.37	190.68
9/1/2011			100.45	46.84	147.29
10/1/2011			98.51	27.48	125.99
11/1/2011			71.79	3.31	75.09
12/1/2011			68.66	0.04	68.71
1/1/2012			79.46	3.03	82.49
2/1/2012			85.70	3.31	89.02
3/1/2012			76.07	21.22	97.29
4/1/2012			65.98	7.27	73.26
5/1/2012			101.05	41.47	142.52
6/1/2012			97.64	56.59	154.23
7/1/2012			108.46	6.05	114.51
8/1/2012			101.45	47.22	148.67
9/1/2012			88.18	19.58	107.75
10/1/2012			104.64	28.88	133.51
11/1/2012			50.28	8.53	58.81
12/1/2012			1.64	0.03	1.67
1/1/2013			40.65	0.05	40.70
2/1/2013			51.13		51.13
3/1/2013			67.37	10.10	77.47

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Monthly Production Acre-Feet				
	Well 10A	**Well 17**	**Well 19**	**Well 21**	**Total**
4/1/2013			26.13	58.63	84.76
5/1/2013			107.94	30.88	138.83
6/1/2013			110.03	32.93	142.96
7/1/2013			125.68	38.43	164.11
8/1/2013			104.70	13.91	118.61
9/1/2013			101.43	0.08	101.51
10/1/2013			94.82	0.00	94.82
11/1/2013			90.04	0.26	90.30
12/1/2013			4.13	2.60	6.73
1/1/2014			50.36	2.84	53.19
2/1/2014			6.04	0.84	6.88
3/1/2014			44.52	0.11	44.63
4/1/2014			74.10	0.14	74.24
5/1/2014			104.64	7.70	112.34
6/1/2014			93.07	17.89	110.96
7/1/2014			2.88	61.64	64.52
8/1/2014			91.86	21.79	113.65
9/1/2014			40.16	37.05	77.21
10/1/2014			82.00	7.40	89.40
11/1/2014			2.01	0.01	2.02
12/1/2014			1.33	0.03	1.36
1/1/2015			0.73	0.01	0.73
2/1/2015			0.62	0.48	1.10
3/1/2015			47.50	4.85	52.34
4/1/2015			88.11	5.61	93.71
5/1/2015			71.98	4.63	76.61
6/1/2015			77.25	5.27	82.52
7/1/2015			92.54	12.11	104.64
8/1/2015			89.37	14.41	103.78
9/1/2015			86.73	7.07	93.80
10/1/2015			47.42	1.53	48.95
11/1/2015			0.24		0.24
12/1/2015			35.44		35.44
1/1/2016			8.17	0.01	8.18
2/1/2016			34.89	0.06	34.94
3/1/2016			19.41	0.01	19.42
4/1/2016			7.28	0.09	7.37
5/1/2016			27.43	1.10	28.53
6/1/2016			56.78	3.57	60.35

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Monthly Production Acre-Feet				
	Well 10A	**Well 17**	**Well 19**	**Well 21**	**Total**
7/1/2016			70.25	2.60	72.85
8/1/2016			47.37	17.63	65.00
9/1/2016			57.64	7.45	65.09
10/1/2016			68.75	2.02	70.77
11/1/2016			6.17	0.00	6.17
12/1/2016			8.84	0.01	8.85
1/1/2017			2.07	0.00	2.07
2/1/2017			0.47	0.01	0.48
3/1/2017			13.40	0.17	13.57
4/1/2017			17.36	0.00	17.37
5/1/2017			57.80	0.00	57.80
6/1/2017			84.39	0.02	84.41
7/1/2017			45.51	0.00	45.51
8/1/2017			50.67	0.01	50.68
9/1/2017			74.66	0.01	74.67
10/1/2017			43.07	0.00	43.07
11/1/2017			8.05	0.00	8.05
12/1/2017			68.36	0.02	68.38
1/1/2018			22.35	0.01	22.36
2/1/2018			22.52	0.00	22.53
3/1/2018			15.89	0.02	15.90
4/1/2018			50.45	3.52	53.97
5/1/2018			88.45	0.01	88.46
6/1/2018			55.26	0.02	55.28
7/1/2018			62.47	0.01	62.47
8/1/2018			62.80	11.51	74.31
9/1/2018			56.83	3.65	60.48
10/1/2018			39.49	0.01	39.49
11/1/2018			64.70	0.01	64.71
12/1/2018			0.93	0.01	0.94
1/1/2019			6.41	0.01	6.42
2/1/2019			5.25	0.00	5.25
3/1/2019			13.44	5.10	18.54
4/1/2019			12.02	22.70	34.72
5/1/2019			13.09	0.08	13.17
6/1/2019			2.88		2.88
7/1/2019			37.79	0.42	38.21
8/1/2019			82.95	0.03	82.98
9/1/2019			48.95		48.95

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Monthly Production Acre-Feet				
	Well 10A	**Well 17**	**Well 19**	**Well 21**	**Total**
10/1/2019			28.38	0.01	28.39
11/1/2019			27.00	0.00	27.00
12/1/2019			22.12	0.05	22.17
1/1/2020			21.80	0.02	21.82
2/1/2020			25.98	0.01	25.99
3/1/2020			7.80	0.02	7.82
4/1/2020			1.28	0.00	1.28
5/1/2020			25.49	0.01	25.49
6/1/2020			43.73	0.01	43.75
7/1/2020			9.13	0.00	9.13
8/1/2020	19.82		4.92	9.76	34.49
9/1/2020	31.38		0.19	25.06	56.64
10/1/2020	30.73		9.21	27.56	67.50
11/1/2020	13.84		0.52	12.71	27.08
12/1/2020	35.26		1.88	32.26	69.40
1/1/2021	19.50		0.12	17.90	37.52
2/1/2021	18.24		0.09	16.47	34.80
3/1/2021	3.71		0.01	3.27	6.99
4/1/2021	8.01		2.70	6.47	17.19
5/1/2021					0
6/1/2021					0
7/1/2021					0
8/1/2021					0
9/1/2021					0
10/1/2021					0
11/1/2021					0
12/1/2021					0

Projected Drawdown Analysis Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

(from projections of well performance/aquifer test data)

Sustained Pumping Addl Dawdown, ft	Well 10A	Well 17	Well 19	Well 21
1 month	2	8	15	8
2 months	2.3	11	16	10
3 months	2.5	13	17	11
4 months	2.8	16	19	11.5
5 months	2.9	17	20	11.8
6 months	3	18	21	12
7 months	3.3	19	23	12.5
8 months	3.4	19.5	23.5	12.8
9 months	3.5	20	24	13

Production Capacity Estimate Summary

Well 10A

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	228					
Starting Pumping Rate, gpm	408					
Initial Pumping Level, ft	265					
Initial Drawdown	37					
Initial Specific Capacity, gpm/ft	11.03					
April 2021						
May 2021						
June 2021		2	2	9.95	368.2	24.41
July 2021		2.3	3	9.65	356.9	23.66
August 2021		2.5	4	9.38	347.0	23.00
September 2021		2.8	5	9.11	337.0	22.34
October 2021		2.9	6	8.89	328.9	21.80
November 2021		3	7	8.68	321.2	21.29
December 2021		3.3	8	8.45	312.5	20.72

Monthly Estimate Assumes 50% Operation

Production Capacity Estimate Summary

Well 10A

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	228					
Starting Pumping Rate, gpm	408					
Initial Pumping Level, ft	265					
Initial Drawdown	37					
Initial Specific Capacity, gpm/ft	11.03					
April 2021						
May 2021						
June 2021		2	2	9.95	368.2	36.61
July 2021		2.3	3	9.65	356.9	35.49
August 2021		2.5	4	9.38	347.0	34.51
September 2021		2.8	5	9.11	337.0	33.51
October 2021		2.9	6	8.89	328.9	32.70
November 2021		3	7	8.68	321.2	31.94
December 2021		3.3	8	8.45	312.5	31.08

Monthly Estimate Assumes 75% Operation

Production Capacity Estimate Summary

Well 17

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	82					
Starting Pumping Rate, gpm	350					
Initial Pumping Level, ft	273					
Initial Drawdown	191					
Initial Specific Capacity, gpm/ft	2					
April 2021						
May 2021						
June 2021		0	2	1.81	346.4	22.96
July 2021		8	3	1.73	330.9	21.94
August 2021		11	4	1.70	324.5	21.51
September 2021		13	5	1.67	319.9	21.20
October 2021		16	6	1.64	313.8	20.80
November 2021		17	7	1.63	310.9	20.61
December 2021		18	8	1.61	308.1	20.42

Monthly Estimate Assumes 50% Operation

Production Capacity Estimate Summary

Well 17

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	82					
Starting Pumping Rate, gpm	350					
Initial Pumping Level, ft	273					
Initial Drawdown	191					
Initial Specific Capacity, gpm/ft	2					
April 2021						
May 2021						
June 2021		0	2	1.81	346.4	34.44
July 2021		8	3	1.73	330.9	32.91
August 2021		11	4	1.70	324.5	32.27
September 2021		13	5	1.67	319.9	31.80
October 2021		16	6	1.64	313.8	31.21
November 2021		17	7	1.63	310.9	30.92
December 2021		18	8	1.61	308.1	30.63

Monthly Estimate Assumes 75% Operation

Production Capacity Estimate Summary

Well 19

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	206					
Starting Pumping Rate, gpm	720					
Initial Pumping Level, ft	300					
Initial Drawdown	104					
Initial Specific Capacity, gpm/ft	6.92					
April 2021						
May 2021						
June 2021		16	2	5.90	613.8	40.69
July 2021		17	3	5.81	603.9	40.03
August 2021		19	4	5.67	589.6	39.08
September 2021		20	5	5.58	580.5	38.48
October 2021		21	6	5.50	571.6	37.89
November 2021		23	7	5.37	558.8	37.04
December 2021		23.5	8	5.31	552.6	36.63

Monthly Estimate Assumes 50% Operation

Production Capacity Estimate Summary

Well 19

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	206					
Starting Pumping Rate, gpm	720					
Initial Pumping Level, ft	300					
Initial Drawdown	104					
Initial Specific Capacity, gpm/ft	6.92					
April 2021						
May 2021						
June 2021		16	2	5.90	613.8	61.03
July 2021		17	3	5.81	603.9	60.04
August 2021		19	4	5.67	589.6	58.63
September 2021		20	5	5.58	580.5	57.72
October 2021		21	6	5.50	571.6	56.84
November 2021		23	7	5.37	558.8	55.56
December 2021		23.5	8	5.31	552.6	54.95

Monthly Estimate Assumes 75% Operation

Production Capacity Estimate Summary

Well 21

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	235					
Starting Pumping Rate, gpm	315					
Initial Pumping Level, ft	290					
Initial Drawdown	55					
Initial Specific Capacity, gpm/ft	5.73					
April 2021						
May 2021						
June 2021		16	2	4.32	237.3	15.73
July 2021		17	3	4.20	231.0	15.31
August 2021		19	4	4.04	222.1	14.72
September 2021		20	5	3.94	216.6	14.36
October 2021		21	6	3.84	211.3	14.01
November 2021		23	7	3.71	203.8	13.51
December 2021		23.5	8	3.64	200.3	13.28

Monthly Estimate Assumes 50% Operation

Production Capacity Estimate Summary

Well 21

La Cumbre Mutual Water Company

		Sustained Pumping Drawdown ft	Static Water Level Decline ft	Projected Specific Capacity gpm/ft	Estimated Pumping Rate gpm	Monthly Groundwater Production Estimate af
Starting Static Level	235					
Starting Pumping Rate, gpm	315					
Initial Pumping Level, ft	290					
Initial Drawdown	55					
Initial Specific Capacity, gpm/ft	5.73					
April 2021						
May 2021						
June 2021		16	2	4.32	237.3	23.60
July 2021		17	3	4.20	231.0	22.97
August 2021		19	4	4.04	222.1	22.09
September 2021		20	5	3.94	216.6	21.53
October 2021		21	6	3.84	211.3	21.01
November 2021		23	7	3.71	203.8	20.27
December 2021		23.5	8	3.64	200.3	19.92

Monthly Estimate Assumes 75% Operation

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Well 10A	Well 17	Well 19	Well 21	Combined
January 2021	19.5		0.09	16.47	36.06
February 2021	18.24		0.01	3.72	21.97
March 2021	3.71		2.7	6.47	12.88
April 2021	41.32		12.88	33.75	87.95
May 2021	47.44		0.48	42.80	90.72
June 2021	24.41	22.96	40.69	15.73	103.78
July 2021	23.66	21.94	40.03	15.31	100.94
August 2021	23.00	21.51	39.08	14.72	98.32
September 2021	22.34	21.20	38.48	14.36	96.37
October 2021	21.80	20.80	37.89	14.01	94.50
November 2021	21.29	20.61	37.04	13.51	92.46
December 2021	20.72	20.42	36.63	13.28	91.05
Totals	**287.43**	**149.45**	**286.00**	**204.13**	**927.00**

Monthly Estimate Assumes 50% Operation

Janurary 2021 through May 2021 Actual Useage

Annual Production Capacity Estimate Summary

Central Basin Production Wells

La Cumbre Mutual Water Company

	Well 10A	Well 17	Well 19	Well 21	Combined
January 2021	19.5		0.09	16.47	36.06
February 2021	18.24		0.01	3.72	21.97
March 2021	3.71		2.7	6.47	12.88
April 2021	41.32		12.88	33.75	87.95
May 2021	47.44		0.48	42.80	90.72
June 2021	36.61	34.44	61.03	23.60	155.68
July 2021	35.49	32.91	60.04	22.97	151.40
August 2021	34.51	32.27	58.63	22.09	147.48
September 2021	33.51	31.80	57.72	21.53	144.56
October 2021	32.70	31.21	56.84	21.01	141.75
November 2021	31.94	30.92	55.56	20.27	138.68
December 2021	31.08	30.63	54.95	19.92	136.57
Totals	**366.03**	**224.17**	**420.92**	**254.59**	**1265.71**

Monthly Estimate Assumes 75% Operation

Janurary 2021 through May 2021 Actual Useage

Appendix B: Capital Project Cost Estimates

Table 7-1: Capital Improvement Project Summary		
Capital Project	Priority	Budgetary Cost
Project G-1: Water System Hydraulic Model	1	$ 60,000
Project G-2: New Maintenance Building	3	$ 3,200,000
Project G-3: New Administration Building	6	$ 3,320,000
Project G-4: CMMS Program	7	$ 65,000
Project G-5: SCADA Platform Upgrade	7	$ 120,000
Project G-6: Security Improvements Project	8	$ 192,000
Project S-1: Modoc Ring Meter and Pressure Relief Valve Site Rehabilitation	2	$ 536,000
Project S-2: Modoc 6” Meter Piping Upgrade	2	$ 64,000
Project S-3: Hope Ranch Subbasin Well	6	$ 1,920,000
Project S-4: Well #16 Replacement – With New Well No. 22.	1	$ 2,160,000
Project S-5: Well #18 Short Term Improvements	1	$ 64,000
Project S-6: Well #18 Rehabilitation and Transmission Main	2	$ 1,430,000
Project S-7: Well #10A, #19, and #21 Rehabilitation	5	$ 556,000
Project T-1: Nogal Water Treatment Plant	2	$ 1,061,600
Project T-2: Well #17 Water Treatment Plant	3	$ 2,320,000
Project ST-1: Reservoir 1 Replacement	4	$ 6,000,000
Project ST-2: Reservoir 2 Replacement	5	$ 6,640,000
Project ST-3: Reservoir 3 Replacement	6	$ 4,640,000
Project P-1: Cuervo Pump Station Rehabilitation	7	$ 128,000
Project P-2: Via Hierba Pump Station Rehabilitation	4	$ 121,600
Project P-3: Via Alegre Pump Station Rehabilitation	5	$ 156,800
Project P-4: Cresta Pump Station Rehabilitation	5	$ 1,344,000
Project P-5: Tranquila Pump Station Rehabilitation	6	$ 76,000
Project D-1: Contract Hydrant and Valve Flushing and Condition Assessment	3	$ 48,000
Project D-2: Valve and Hydrant Replacement Project	4	$ 400,000
Project D-3: Marina Drive Water Main Replacement	2	$ 2,320,000
Project D-4: Cuervo Pump Station Pipeline Replacements	1	$ 980,000
Project D-5: Well #16 Discharge Lining	7	$ 280,000
Project D-6: Zone 9 Secondary Supply	6	$ 880,000
Project D-7: Zone 2 to Zone 3 Interconnect	7	$ 960,000
Project D-8: Water Main Replacement Year 4	8	$ 4,000,000
Project D-9: Water Main Replacement Year 5	9	$ 4,000,000
Project D-10: Water Main Replacement Year 6	10	$ 4,000,000

Project G-1: Water System Hydraulic Model		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Water System Hydraulic Model	$60,000
	Total	**$60,000**

Project G-2: New Maintenance Building		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Maintenance building and Site Improvements	$2,000,000
	Subtotal	**$2,000,000**
	Construction Contingency (30%)	**$600,000**
	Engineering & Administration (30%)	**$600,000**
	Total	**$3,200,000**

Project G-3: New Administration Building		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Demolish Existing Administration Building	$75,000
2	Construct Administration Building	$2,000,000
	Subtotal	**$2,075,000**
	Construction Contingency (30%)	**$622,500**
	Engineering & Administration (30%)	**$622,500**
	Total	**$3,320,000**

Project G-4: CMMS Program		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	CMMS Software Purchase and Licensing	$25,000
2	CMMS program Implementation	$40,000
	Subtotal	**$65,000**
	Total	**$65,000**

Note annual licensing fee - $5000

Project G-5: SCADA platform upgrade		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Upgrade SCADA platform	$75,000
	Subtotal	**$75,000**
	Construction Contingency (30%)	**$22,500**
	Engineering & Administration (30%)	**$22,500**
	Total	**$120,000**

Project G-6: Security Improvements Project		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Site Security Improvements (10 sites @ $15,000 per site)	$120,000.0
	Subtotal	**$120,000**
	Construction Contingency (30%)	**$36,000**
	Engineering & Administration (30%)	**$36,000**
	Total	**$192,000**

Project S-1: Modoc Ring Meter and Pressure Relief Valve Site Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Well Destruction	$100,000
2	Misc. Concrete Demolition	$20,000
3	Misc. Site Clean-up	$10,000
4	Water Main Relocation (200' @ $300/ft)	$60,000
5	Vault and Piping Modifications	$120,000
6	SCADA Connection	$25,000
	Subtotal	**$335,000**
	Construction Contingency (30%)	**$100,500**
	Engineering & Administration (30%)	**$100,500**
	Total	**$536,000**

Project S-2: Modoc 6" Meter Piping Upgrade		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace / Reinforce Discharge Piping	$40,000.0
	Subtotal	**$40,000**
	Construction Contingency (30%)	**$12,000**
	Engineering & Administration (30%)	**$12,000**
	Total	**$64,000**

Project S-3: Hope Ranch Subbasin Well		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Well Construction	$150,000
2	Well Equipping Including Electrical	$150,000
3	Misc. Site Work and Site Piping	$50,000
4	RO, and Fe/Mn Treatment System	$850,000
	Subtotal	**$1,200,000**
	Construction Contingency (30%)	**$360,000**
	Engineering & Administration (30%)	**$360,000**
	Total	**$1,920,000**

Project S-4: Well #16 Replacement		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Demolish Existing Well Site, Destroy Well No. 16	$150,000
2	Construct & Equip Replacement Well	$1,200,000
	Subtotal	**$1,350,000**
	Construction Contingency (30%)	**$405,000**
	Engineering & Administration (30%)	**$405,000**
	Total	**$2,160,000**

Project S-5: Well #18 Short Term Improvements		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace Fencing	$20,000
2	Grade and Construction Access Road	$20,000
	Subtotal	**$40,000**
	Construction Contingency (30%)	**$12,000**
	Engineering & Administration (30%)	**$12,000**
	Total	**$64,000**

Project S-6: Well #18 Rehabilitation and Transmission Main		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Rehabilitate Well (Brush/Bail/Disinfect)	$150,000
2	Replace Sbove-Grade Piping and Appurtenances	$75,000
3	Misc. Site Improvements	$25,000
4	Replace Electrical & Communications Equipment	$50,000
5	Construct 8-Inch PVC Raw Water Transmission Main (2375 LF @ $250/LF)	$593,750
	Subtotal	**$893,750**
	Construction Contingency (30%)	**$268,125**
	Engineering & Administration (30%)	**$268,125**
	Total	**$1,430,000**

Project S-7: Well #10A, #19, and #21 Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Well #10A: Remove Unused Electrical Equipment	$5,000
2	Well #10A: Add new site water service meter and hose bib connection	$2,500
3	Well #10A: Recoat Above Grade Piping	$2,500
4	Well #10A: Destroy Well No. 20	$200,000
5	Well #19: Remove Check Valve at Well Pump	$40,000
6	Well #19: Demolish Abandoned Pump to Waste Stub-up	$2,500
7	Well #19: Add Water Service Meter and Hose Bib	$2,500
8	Well #19: Replace Back Gate & Fence	$6,000
9	Well #19: Add 110-v stub-up and power outlet	$4,000
10	Well #21: Coat and anchor existing pipe supports	$2,500
11	Well #21: Demolish existing dead-end piping	$40,000
12	Well #21: Add new start-up discharge point	$40,000
	Subtotal	**$347,500**
	Construction Contingency (30%)	**$104,250**
	Engineering & Administration (30%)	**$104,250**
	Total	**$556,000**

Project T-1: Nogal Water Treatment Plant		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace Influent Tank	$50,000
2	Replace Sodium Hypochlorite Generator	$300,000
3	Demolish Disinfection Tablet System	$1,000
4	Add Additional Treatment Vessel	$200,000
5	Add Soft Starts for Feed Pumps	$100,000
6	Onsite Pipe Storage Cover	$10,000
7	Recoat Site Piping	$2,500
	Subtotal	**$663,500**
	Construction Contingency (30%)	**$199,050**
	Engineering & Administration (30%)	**$199,050**
	Total	**$1,061,600**

Project T-2: Well #17 Water Treatment Plant		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Construct Iron & Manganese Treatment Plant	$1,400,000
2	Miscellaneous Site Improvements	$50,000
	Subtotal	**$1,450,000**
	Construction Contingency (30%)	**$435,000**
	Engineering & Administration (30%)	**$435,000**
	Total	**$2,320,000**

Project ST-1: Reservoir 1 Replacement		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Construct Temporary Storage Tank	$800,000
2	Demolish Existing Reservoir No. 1	$150,000
3	Excavation and Site Preparation	$300,000
4	Pre-Stressed Concrete 1.0 MG Reservoir	$2,200,000
5	Electrical, Communications, and Lighting	$50,000
6	Site Piping and Misc. Improvements	$250,000
	Subtotal	**$3,750,000**
	Construction Contingency (30%)	**$1,125,000**
	Engineering & Administration (30%)	**$1,125,000**
	Total	**$6,000,000**

Project ST-2: Reservoir 2 Replacement		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Construct Temporary Balancing Tank	$100,000
2	Demolish Existing Reservoir No. 2	$150,000
3	Excavation and Site Preparation	$300,000
4	Pre-Stressed Concrete 2.5 MG Reservoir	$3,100,000
5	Electrical, Communications, and Lighting	$50,000
6	Site Piping and Misc. Improvements	$400,000
7	Site Access Road Improvements	$50,000
	Subtotal	**$4,150,000**
	Construction Contingency (30%)	**$1,245,000**
	Engineering & Administration (30%)	**$1,245,000**
	Total	**$6,640,000**

Project ST-3: Reservoir 3 Replacement		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Construct Temporary Storage Tank	$400,000
2	Demolish Existing Reservoir No. 3	$100,000
3	Excavation and Site Preparation	$200,000
4	Pre-Stressed Concrete 0.7 MG Reservoir	$1,900,000
5	Electrical, Communications, and Lighting	$50,000
6	Site Piping and Misc. Improvements	$250,000
	Subtotal	**$2,900,000**
	Construction Contingency (30%)	**$870,000**
	Engineering & Administration (30%)	**$870,000**
	Total	**$4,640,000**

Project P-1: Cuervo Pump Station Rehabilitaiton		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Add High-Flow Pump	$80,000
	Subtotal	**$80,000**
	Construction Contingency (30%)	**$24,000**
	Engineering & Administration (30%)	**$24,000**
	Total	**$128,000**

Project P-2: Via Hierba Pump Station Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace Supply & Discharge Piping	$40,000
2	Add Pump Housekeeping Pads	$10,000
3	Evaluate / Repair Damaged Building Wall	$25,000
4	Install Additional Hydropneumatic Tank	$1,000
	Subtotal	**$76,000**
	Construction Contingency (30%)	**$22,800**
	Engineering & Administration (30%)	**$22,800**
	Total	**$121,600**

Project P-3: Via Allegra Pump Station Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Piping Modifications/Coating	$20,000
2	Add Pump Pedestal	$3,000
3	Inspect/Recoat Hydropneumatic Tank	$30,000
4	Add Level Sensor/Alarm for Hydropneumatic Tank	$5,000
5	Replace Pump Station Supply & Discharge Piping	$40,000
	Subtotal	**$98,000**
	Construction Contingency (30%)	**$29,400**
	Engineering & Administration (30%)	**$29,400**
	Total	**$156,800**

Project P-4: Cresta Pump Station Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Excavation and Site Prep	**$30,000.00**
2	Pump Station Foundation and Building	**$250,000.00**
3	Pumps and Piping Improvements	**$500,000.00**
4	Electrical, Communications, and Lighting	**$10,000.00**
5	Demolish Existing Pump Station	**$50,000.00**
	Subtotal	**$840,000**
	Construction Contingency (30%)	**$252,000**
	Engineering & Administration (30%)	**$252,000**
	Total	**$1,344,000**

Project P-5: Tranquilla Pump Station Rehabilitation		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace Pump Station Roof	$15,000
2	Demolish unused pump	$2,500
3	Replace existing discharge pump control valve with a new booster pump control valve	$30,000
	Subtotal	**$47,500**
	Construction Contingency (30%)	**$14,250**
	Engineering & Administration (30%)	**$14,250**
	Total	**$76,000**

Project D-1: Contract Hydrant and Valve Flushing and Condition Assessment		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Fire Hydrants and Valve Assessment	$30,000
	Subtotal	**$30,000**
	Construction Contingency (30%)	**$9,000**
	Engineering & Administration (30%)	**$9,000**
	Total	**$48,000**

Project D-2: Valve and Hydrant Replacement Project		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Repair / replace Failed/Broken Fire Hydrants Valves	$250,000
	Subtotal	**$250,000**
	Construction Contingency (30%)	**$75,000**
	Engineering & Administration (30%)	**$75,000**
	Total	**$400,000**

Project D-3: Marina Drive Water Main Replacement		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace Pipeline in Marina Drive with 8-inch PVC (5,800 linear feet @ $250/LF)	$1,450,000
	Subtotal	**$1,450,000**
	Construction Contingency (30%)	**$435,000**
	Engineering & Administration (30%)	**$435,000**
	Total	**$2,320,000**

Project D-4: Cuervo Pump Station Pipeline Replacements		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Install PVC water main (2,450 LF @ $250/LF)	$612,500
	Subtotal	**$612,500**
	Construction Contingency (30%)	**$183,750**
	Engineering & Administration (30%)	**$183,750**
	Total	**$980,000**

Project D-5: Well #16 Discharge Lining		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Install 6" Liner (Approx 970')	$175,000
	Subtotal	**$175,000**
	Construction Contingency (30%)	**$52,500**
	Engineering & Administration (30%)	**$52,500**
	Total	**$280,000**

Project D-6: Zone 9 Secondary Supply		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Install PVC water main (2,200 LF @ $250/LF)	$550,000
	Subtotal	**$550,000**
	Construction Contingency (30%)	**$165,000**
	Engineering & Administration (30%)	**$165,000**
	Total	**$880,000**

Project D-7: Zone 2 to Zone 3 Interconnect		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Install PVC water main (2,400 LF @ $250/LF)	$600,000
	Subtotal	**$600,000**
	Construction Contingency (30%)	**$180,000**
	Engineering & Administration (30%)	**$180,000**
	Total	**$960,000**

Project D-8: Water Main Replacement Year 4		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace 6" or 8" Water Main (10,000 LF @$250/LF)	$2,500,000
	Subtotal	**$2,500,000**
	Construction Contingency (30%)	**$750,000**
	Engineering & Administration (30%)	**$750,000**
	Total	**$4,000,000**

Project D-9: Water Main Replacement Year 5		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace 6" or 8" Water Main (10,000 LF @$250/LF)	$2,500,000
	Subtotal	**$2,500,000**
	Construction Contingency (30%)	**$750,000**
	Engineering & Administration (30%)	**$750,000**
	Total	**$4,000,000**

Project D-10: Water Main Replacement Year 6		
Item No.	**Item Description**	**Opinion of Cost ($)**
1	Replace 6" or 8" Water Main (10,000 LF @$250/LF)	$2,500,000
	Subtotal	**$2,500,000**
	Construction Contingency (30%)	**$750,000**
	Engineering & Administration (30%)	**$750,000**
	Total	**$4,000,000**