2022 Water Master Plan

June 2022

Prepared for
La Habra Heights County Water District
1271 Hacienda Road | La Habra Heights, CA 90631

Prepared By:

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

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Executive Summary

Background

The 2022 La Habra Heights County Water District (LHHCWD) Water Master Plan (WMP) was written to provide the Board of Directors, Management, and Staff with a thorough report of system operations as well as guidance for future improvements based upon adopted Design Criteria. This report has a six-year study period from fiscal year (FY) 2015-16 to FY 2020-21. The LHHCWD FY is from July of the previous year to June of the current year. For example, FY 2015-2016 is from July 2015 through June 2016. This report aims to achieve several goals:

- Evaluate the performance and reliability of LHHCWD's water production, storage, and delivery systems.
- Identify system deficiencies and recommend improvements necessary to eliminate deficiencies to ensure reliable performance of the system.
- Update the computer water model in Innovyze's InfoWater to reflect current conditions.
- Develop a Capital Improvement Plan (CIP).

Land Use, Population and Water Requirements

LHHCWD's service area consists of land within the City of La Habra Heights, the City of Whittier, and unincorporated Los Angeles County. Land to the west of the service boundary is utilized by LHHCWD for water production and transmission.

FY 2020 was chosen to be the representative demand year within the study period based upon analysis in Chapter 2. The average annual water consumption for the overall study period is 2,610 acre feet per year (AFY) as shown in the table below.

Table ES-1 – Consumption History During Study Period

Fiscal Year	Consumption (100 Acre Feet (AF))
2015-2016	24.10
2016-2017	24.77
2017-2018	28.87
2018-2019	25.31
2019-2020	25.11
2020-2021	28.42
Study Period Average	**26.10**

The average day demand (ADD) in terms of production during the study period was found to be 2,728 AFY. Demand fluctuation on an annual basis is best described by Peaking Factors (PF) that compare the various extreme demand conditions to the annual average. The table below shows the peaking factors and demands derived from the production data for the study period.

Table ES-2 – Peaking Factors

Demand Condition	Abbr.	MGD	gpm	AFY	PF
Average Day Demand	ADD	2.435	1,691	2,728	1.00
Maximum Day Demand	MDD	5.517	3,831		2.27
Minimum Day Demand	Min Day	0.357	248		0.15
Peak Hour Demand	PHD		5,747		3.40

Data from the 2020 United States Census reported that the City of La Habra Heights has a population of 5,682. At build-out (2036), the population is anticipated to decrease to 5,478 and the demand is expected to decrease to 2,707 AFY (1,678 gpm).

Land use within LHHCWD's service area consists of mostly residential with some open space and institutional. Water demand coefficients (water duty factors and unit factors) were developed to estimate the average water demand for each type of land use. These factors were split into the City of La Habra Heights, City of Whittier, and unincorporated Los Angeles County and each land use designation. See the table below for the water duty factors and unit factors calculated.

Table ES-3 – Water Duty and Unit Factors

Jurisdiction	Land Use Designation	Water Duty Factor (AFY/acre)	Unit Factor (AFY/unit)
City of La Habra Heights	RA – Residential Agricultural*	0.67	1.24
	I – Institutional	1.23	NA
	OS – Open Space	5.91	NA
City of Whittier	R-1-1	1.54	0.53
Los Angeles County	R-A-20000	2.22	1.04
	R-1-10000	2.60	0.70
	R-1-15000	1.50	0.67
	R-1-20000	2.64	1.48
* Used 2020 billing data to determine RA duty factor			

Sources of Supply

LHHCWD's supply is from groundwater and imported water. Groundwater is extracted from the Central Basin through the Judson Well Field and imported water is available from an interconnection with the Metropolitan Water District (MWD). LHHCWD can also obtain water from an emergency interconnection with the California Domestic Water Company (CDWC).

The Judson Well Field is located within unincorporated Los Angeles County adjacent to the San Gabriel River in the vicinity of West Whittier. During the study period (FY 2016 to FY 2021), there were four active wells (Well Nos. 8, 9, 10, and 11), however, as of March 2022, Well No.9 was placed out of service (on standby by definition). All proposed system analysis within the WMP was done by taking the three currently active wells into consideration.

A portion of the water at the Judson Well Field is distributed to Orchard Dale Water District (ODWD) through the La Mirada Reservoir by contractual agreement. The remaining production is used to serve water demands of LHHCWD's customers. LHHCWD currently has 2,666 AFY of Annual Pumping Allocation (APA) in the Central Basin from the Central Basin Judgment and purchased water rights as listed in Chapter 3 of the WMP. The average groundwater production for LHHCWD during the study period from FY 2016 to FY 2021 is 2,667 AF. The Third Amended Judgment was enacted in January 2014 and provides new procedures for the implementation of storage and water augmentation projects as well as other updated regulations.

Imported water is provided to LHHCWD through an MWD interconnection which has a maximum capacity of 10 cubic feet per second (cfs) (4,488 gallons per minute (gpm)) and connects to the Central Basin MWD Lower Feeder. LHHCWD can also obtain water from an emergency interconnection with CDWC.

Water Quality

LHHCWD is compliant with all adopted federal and state water quality requirements. Federal water quality requirements are set by the United States Environmental Protection Agency (EPA) through the Safe Drinking Water Act (SDWA). State requirements are set by the California Division of Drinking Water (DDW) of the California State Water Resources Control Board (SWRCB) through the Title 22 California Code of Regulations. The SDWA and the Title 22 California Code of Regulations contain both primary and secondary standards for drinking water quality. Primary standards include treatment requirements and performance requirements for drinking water know as Maximum Contaminate Levels (MCL)s. State MCLs are either the same or more stringent than Federal regulations. All regulations must be followed. It is important to be aware of new and pending Federal and State legislation related to drinking water quality for planning purposes.

Well water in LHHCWD is chlorinated using a sodium hypochlorite chlorinator located at the La Mirada Pump Station. Residual chlorine in the water leaving the Plant No. 1 is maintained at a minimum of 1.0 mg/L. La Mirada Plant is slightly higher, ranging from 1.3 mg/L to 1.5 mg/L of residual chlorine. The result of monitoring is shown in the Consumer Confidence Reports (CCRs) for the study period. LHHCWD meets all federal and state water quality regulations. Some contaminants to be aware of are Total Trihalomethanes (TTHMs), Specific Conductance, and Total Dissolved Solids (TDS).

Per- and poly-fluoroalkyl substances (PFAS) is the collective term for a group of chemicals that includes perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS). There is evidence that long-term exposure to these chemicals could cause harmful health effects. In May 2016, the EPA issued a non-enforceable lifetime health advisory level of 70 parts per trillion (ppt) for the sum of PFOA and PFOS in drinking water. Health advisories are non-regulatory and provide technical information to state agencies and other public health officials on health effects, analytical methodologies, and treatment technologies associated with drinking water contamination. Although there are no MCLs for PFAS, Assembly Bill 756 (codified as Health and Safety Code section 116378) authorizes the SWRCB to order a water system to test for PFAS, notify their customers if the concentration is over the notification level, and advises to take the water source out of service until water is treated if the concentration is over the response level. When notification levels (NLs) are exceeded, the drinking water system is required to notify the local governing body of the local agency in which the users of the drinking water reside. A response level (RL) is a concentration level of a contaminant in drinking water that warrants customer notification, further monitoring, and assessment. In February 2020, the State Water Resources Control Board set new RLs of 10 parts per trillion (ppt) for PFOA and 40 ppt for PFOS.

In data provided by LHHCWD it can be seen that water sample results received on March 2022 show PFOA levels of 17.75 ppt at Well No. 9, 13.5 ppt at Well No. 10, and 12 ppt at Well No. 11. These values are above the response level of 10 ppt. Per the Kear Groundwater study, recent water quality data has shown that Well No. 8 is above the NL for PFOA.

All four wells are also above the NL for PFOS and Well Nos. 10 and 11 are close to the response level.

The high concentration of PFAS in the Central Basin is a concern for LHHCWD and steps are being taken to lower this concentration. In a PFAS Cost Benefit Analysis completed by Civiltec Engineering, Inc. for LHHCWD and ODWD in 2022, the two candidates considered to reduce levels of PFAS were Granulated Activated Carbon (GAC) and Ion Exchange (IX) treatment.

LHHCWD is provided imported water through a connection with MWD. Water delivered to LHHCWD from MWD is treated at the Diemer Plant in Yorba Linda, California. Water quality is assessed periodically by MWD, and results are displayed annually in a MWD Drinking Water Quality Report. MWD water meets all state and federal water quality standards.

Existing Water System

In LHHCWD's system, groundwater is extracted and pumped from the Judson Well Field and conveyed approximately four and a half miles to the La Mirada Reservoir and Pumping Plant. A portion of the water stored in the La Mirada Reservoir is gravity fed to ODWD per contractual agreement through an interconnection. The remaining water in the reservoir is pumped approximately three miles to LHHCWD's service area where it is then distributed throughout the water system. When needed, water can also be pumped from Plant No. 2 through an interconnection with MWD.

The system generally operates as follows:

1. Water level in the La Mirada Reservoir controls operations at the Judson Well Field. Well Nos. 8, 9, 10, and 11 turn on in a pre-programmed sequence to refill the reservoir based upon the water level signal from LHHCWD's SCADA system. (It should be noted that as of March 2022, Well No. 9 has been placed on standby.)

2. From the La Mirada Plant, water is pumped to the 47,000-gallon forebay at Plant No. 1 and then boosted by Plant No. 1 pumps into the Lower Zone. Operation of pumps at Plant No. 1 is based on the water level in the forebay at the Plant.

3. Pumping Plant Nos. 5 and 6 boost waters from the Lower Zone to the Upper Zone reservoirs.

4. Water level in the Lyons Reservoir controls Booster Pumps 1, 2, and 3 at the La Mirada Plant. Any of the Lower Zone reservoirs can control La Mirada Plant if needed.

5. Water level at Reservoir No. 10A controls Booster Pumps 1 and 2 at Plant No. 5. Any of the Upper Zone reservoirs can control Plant No. 5 if needed.

6. Water level at Vigil Reservoir controls Booster Pumps 1 and 2 at Plant No. 6. Any of the Upper Zone reservoirs can control Plant No. 6 if needed.

7. As a precautionary measure, the high water level (HWL) in the forebay at Plant No. 1 turns off the boosters at the La Mirada Plant.

8. Plant No. 2 pumps MWD water (when needed) directly into the Lower Zone and is controlled by the level at the Lyons Reservoir. Plant No. 2 can be controlled by any of the Lower Zone reservoirs if needed.

LHHCWD has four emergency interconnections, two contractual interconnections, and one imported water supply interconnection. Non-interruptible service is provided to LHHCWD by MWD.

LHHCWD's system consists of two main water service pressure zones, four sub-zones, seven reservoirs, one forebay, five booster pump stations, four sub-zone pressure regulating stations, two pressure regulating stations for providing supplemental flow in case of a fire, and approximately 64.5 miles of pipeline ranging in diameter from 4 to 36-inches.

Design Criteria

Design and planning criteria have been established for all components of the water system as a basis for determining the adequacy and redundancy of LHHCWD's infrastructure. See the tables below for LHHCWD's design and planning criteria.

Table ES-4 - LHHCWD Water System Design Criteria

Element	Design Criteria
System Pressure	• Goal for normal system pressure range: 40 psi to 125 psi. • Goal for minimum pressure during fire: 20 psi. • Goal for maximum pressure during minimum hour: 200 psi or pipeline pressure class, whichever is less. • Daily pressure fluctuations: 20 psi maximum.
Supply	• Combined production capacity of MDD with largest single source out of service. • Combined production capacity sufficient to refill emergency and fire storage in two days with all sources operating.
Storage Capacity	• Operational: 30 percent of MDD. • Fire flow: 1,500 gpm - Duration 2 hours. • Emergency: 24 hours at MDD.
Booster Pumping Stations	• If gravity storage is available: capacity equals MDD with largest single pump out of service.

Element	Design Criteria
	• If gravity storage is not available: capacity equals MDD plus fire flow or PHD, whichever is great, with largest pump out.
Pressure Reducing Stations	• Capacity equals MDD plus fire flow or PHD within the continuous rating of valves. Maximum intermittent flow rating of valves is acceptable for fire flows. Allowance made for low flows.
Pipeline Sizes	• Standard pipe sizes to be used are 8-inch, 12-inch, and 16-inch for distribution. 6-inch pipes may be considered for cul-de-sacs and in areas where hydraulic system analysis supports the smaller pipe size.
Transmission Mains	• Sized to meet MDD for pumping plant discharge lines. Sized for MDD plus fire flow or PHD, whichever is greater. For transmission main and reservoir inlet-outlet, velocity range: 4 to 6 fps, and headloss range: 1.5 to 3 feet per 1,000 feet of pipe.
Distribution Mains	• Sized to meet MDD plus fire flow or PHD, whichever is greater. • Maximum velocity of 10 fps and maximum headloss of 10 feet per 1,000 feet of pipe, except under fire flow conditions.
Fire Hydrant Spacing	• A building must be within 400 feet of a hydrant. • For R-3 and U occupancies with sprinkler systems: within 600 feet. • Commercial/Industrial: per Fire Department requirements.
Fire Flow	• 750 gpm for grandfathered structures. • For new developments or existing structures that are to be altered, 1,000 gpm for structures between 1 and 3,600 SF and 1,500 gpm for structures greater than 3,600 SF.

Table ES-5 - Replacement Schedules and Indications

Component	Interval (yrs)	Indication
Pipeline (other than AC)	60	Frequent repair history, excessive energy losses
AC Pipelines	Over 100	Frequent repair history, excessive energy losses
Pump/ Motor Overhaul	15	Drop in efficiency below 65%
Pump/ Motor Replacement	30	Frequent repair history, drop in efficiency
Control Valve Overhaul	25	Leaks, poor response, frequent repairs
Reservoir Recoating	15	Evidence of corrosion
Reservoir Replacement	80	Frequency/ extent of repair history
Well Refurbishment/ Replacement	50	Decline in effective capacity
Production meter calibration	5	Drop in accuracy
Production meter replacement	20	Drop in accuracy and reliability

Existing System Analysis and Proposed Improvements

Recommended improvements for LHHCWD's water system were determined by using the calibrated computer water model to simulate existing and projected demand scenarios. The design criteria for the system, existing and projected demands for the study period, the capacities of LHHCWD's infrastructure, and operational parameters were all taken into consideration during this analysis.

LHHCWD is divided into the Lower Pressure Zone and Upper Pressure Zone. The La Mirada Plant and Plant No. 1 work in sequence to boost groundwater into the Lower Zone from the Judson Well Field. Plant No. 2 boosts imported water into the Lower Zone. The Upper Zone is dependent on its water supply from the Lower Zone.

The existing ADD for the study period for the Upper Zone is 747 gpm and for the Lower Zone is 944 gpm, for a system total of 1,691 gpm. The future demand was calculated based on the population at buildoout (2036) that was projected using existing population values from the United States Decennial Census and the California Department of Finance. At build-out (2036), the population is anticipated to decrease from 5,682 to 5,478. The anticipated future ADD for the Upper Zone is 741 gpm and for the Lower Zone is 937 gpm, for a system total of 1,678 gpm.

Storage Analysis

The results of the existing and projected storage analysis presented in indicate that both Upper and Lower Zones have sufficient storage during existing and projected demand conditions. LHHCWD meets MWD criteria to have sufficient storage for seven average days during existing and projected demands.

Table ES-6 - Existing Conditions - Storage Analysis

Pressure Zone Name	Volume (MG)	MDD (MGD)	Fire Storage (gpm)	Fire Storage (hrs)	Fire Storage (MG)	Operational (30% of MDD) (MG)	Emergency (24 hrs of MDD) (MG)	Total Required Storage (MG)	Surplus or (Deficit) (MG)	Equivalent in ADD Days (MG)
Upper	4.00	2.44	1,500	2	0.18	0.73	2.44	3.35	0.65	3.72
Lower	5.56	3.09				0.93	3.09	4.20	1.36	4.09
Total	**9.56**	**5.53**	**1,500**	**2**	**0.18**	**1.66**	**5.53**	**7.55**	**2.01**	**7.81**

Table ES-7 - Future Conditions - Storage Analysis

Pressure Zone Name	Volume (MG)	MDD (MGD)	Fire Storage (gpm)	Fire Storage (hrs)	Fire Storage (MG)	Operational (30% of MDD) (MG)	Emergency (24 hrs of MDD) (MG)	Total Required Storage (MG)	Surplus or (Deficit) (MG)	Equivalent in ADD Days (MG)
Upper	4.00	2.42	1,500	2	0.18	0.73	2.42	3.33	0.67	3.75
Lower	5.56	3.06				0.92	3.06	4.16	1.40	4.12
Total	**9.56**	**5.48**	**1,500**	**2**	**0.18**	**1.65**	**5.48**	**7.49**	**2.07**	**7.87**

Booster Analysis

There is an existing and projected booster pump deficiency in the overall system with the La Mirada Plant and Plant No.1. During the existing and projected analyses, it can be seen that the Upper Zone has a booster pumping capacity surplus.

Table ES-8 - Existing Conditions - Booster Pump Analysis

Zone	MDD (gpm)	Plant	Firm Pumping Capacity (gpm)	Surplus or (Deficit) (gpm)
Overall	3,938	La Mirada	2,872	**(967)**
		Plant No.1	3,085	**(754)**
Upper	1,696	Plant No.5 &6	2,218	522

Table ES-9 - Future Conditions - Booster Pump Analysis

Zone	MDD (gpm)	Plant	Firm Pumping Capacity (gpm)	Surplus or (Deficit) (gpm)
Overall	3,809	La Mirada	2,872	**(937)**
		Plant No.1	3,085	**(724)**
Upper	1,682	Plant No.5 &6	2,218	536

To solve this deficit, it is recommended to add pumping capacity at the La Mirada Plant and at Plant No. 1 to accommodate for the pumping deficiencies. It is also recommended to match pumps in the La Mirada Plant with pumps in Plant No. 1 by installing Variable Frequency Drives (VFD) for pumps in the La Mirada Plant. This will allow pumps at the La Mirada Plant to be controlled by the water level in the Plant No. 1 Forebay. It is recommended the pumps at Plant No. 1 be controlled by the Lower Zone Reservoirs.

Supply Analysis

It can be seen through this supply analysis that there is an existing and projected supply deficiency in LHHCWD's system.

Table ES-10 - Existing Conditions – Supply Analysis

Capacity (gpm)	MDD (gpm)	Surplus or (Deficit) (gpm)
2,105	3,839	**(1,734)**

Table ES-11 - Future Conditions – Supply Analysis

Capacity (gpm)	MDD (gpm)	Surplus or (Deficit) (gpm)
2,105	3,809	(1,704)

It is recommended for a new well to be installed and sized to satisfy current and future deficiencies. It is planned that Well No. 8 will be deactivated/put on standby which will add further deficiency into the water system under the supply analysis. Including ODWD's supply needs, the new well should have a minimum capacity of 3,100 gpm. LHHCWD has set a goal for the new well to achieve a capacity of 3,100 gpm to 3,500 gpm.

Under existing and future conditions, there is no emergency supply deficiency in the Lower or Upper Zone.

Table ES-12 - Existing Conditions – Emergency Supply Analysis

Zone	MDD (gpm)	Required Refill (gpm)	Capacity (gpm)	Surplus or (Deficit) (gpm)
Lower with Mirada Plant	2,143	1,135	3,693	414
Lower with Plant No.1			4,242	964
Upper	1,696	910	3,072	466

Table ES-13 - Future Conditions – Emergency Supply Analysis

Zone	MDD (gpm)	Required Refill (gpm)	Capacity (gpm)	Surplus or (Deficit) (gpm)
Lower with Mirada Plant	2,127	1,125	3,693	441
Lower with Plant No.1			4,242	990
Upper	1,682	903	3,072	487

Planning Criteria

Planning criteria deal with cyclical infrastructure replacement due to age, condition, and other non-hydraulic factors. Planning criteria provide guidance for approximate replacement times in order to prevent costs associated with inefficiency. Overall infrastructure condition as well as other considerations should be considered before conducting replacements simply due to age.

Table ES-14 - Replacement Schedules and Indications

Component	Interval (yrs)	Indication
Pipeline (other than AC)	60	Frequent repair history, excessive energy losses
AC Pipelines	Over 100	Frequent repair history, excessive energy losses
Pump/ Motor Overhaul	15	Drop in efficiency below 65%
Pump/ Motor Replacement	30	Frequent repair history, drop in efficiency
Control Valve Overhaul	25	Leaks, poor response, frequent repairs
Reservoir Recoating	15	Evidence of corrosion
Reservoir Replacement	80	Frequency/ extent of repair history
Well Rehabilitation/ Replacement	50	Decline in effective capacity
Production meter calibration	5	Drop in accuracy
Production meter replacement	20	Drop in accuracy and reliability

Pipelines are on a recommended 60-year replacement cycle. Approximately 43,903 feet of pipe or 13% of the pipelines in the water system are 60 or more years old (installed in the year 1962 or older) and should be candidates for replacement if they have a leak history, are hydraulically deficient, or if the current pipe diameter causes fire flow deficiency with future demand.

When a pump falls below 65% efficiency, an analysis should be performed to determine whether retrofit or replacement would be necessary to increase efficiency. There are ten pumps that have efficiencies below 65% within LHHCWD's water system and are candidates for rehabilitation or replacement.

Reservoirs should be recoated approximately every fifteen years or when there is evidence of corrosion. All LHHCWD reservoirs are due for recoating with the exception of the Lyons and Vigil Reservoirs. La Mirada, Snooks, and Reservoir No. 10A are top priority to be recoated. The condition of each of these reservoirs should be inspected prior to proceeding into the necessary work.

Reservoirs should be replaced approximately every eighty years, depending on the frequency and extent of repair. no reservoirs are currently in need of replacement per the recommended age criteria. The oldest reservoir is the Snooks Reservoir that would need replaced due to age around the year 2029, but should be inspected prior to proceeding.

Wells are candidates for rehabilitation or replacement if they are over fifty years of age or have a decline in effective capacity. Before being placed on standby, Well No. 9's pump efficiency was below 65% and over fifty years old so it was a candidate for rehabilitation or replacement. LHHCWD plans to put Well No. 8 out of service as it is over fifty years old and there has been a significant decline in effective capacity.

Fire Protection

Seven fire hydrants were found to be fire flow deficient. These hydrants are either hydraulically restricted by small pipe diameters which should be upsized or would benefit from reconfiguration into the Upper Pressure Zone. Improvements to these hydrants are recommended capital improvement projects.

System Pressure

Eighteen (18) areas were found to experience system pressure outside the recommended range of 40 psi to 125 psi. It is recommended that three of these areas, which experience excessively high pressures, have a pressure reducing station installed to create a pressure sub-zone in order to lower pressures within the recommended range.

Cross-Country Pipelines

LHHCWD has expressed interest in eliminating unnecessary cross-country pipelines. There are twenty-two (22) cross-country pipelines existing in LHHCWD's system which are difficult to access. Although they could prove to be less reliable due to their location, cross-country pipelines that form hydraulic loops tend to improve redundancy and capacity within a water system. Further study is needed to determine viability of abandonment of these cross-country pipelines in favor of more accessible alignments. This study is included as a recommended capital improvement project.

Recommendations

Twenty-three (23) improvements have been identified to address production reliability, fire flow, reduce high system pressure, maintenance, and operations. Costs for each recommended improvement were estimated and each project was assigned a priority depending on perceived urgency.

As described in Chapter 7, Section 7.7, each CIP would be ranked either *High, Medium,* or *Low*. The "high" priority projects would be implemented within the next 3 to 5 years, "medium" priority projects would be implemented within the next 5 to 10 years and the "low" priority projects would be implemented within the next 10 to 15 years. The total CIP schedule is estimated at $22,445,000 in 2022 dollars.

Chapter 1 - Introduction

1.1 General

In 1919, the La Habra Heights Mutual Water Company was established to provide water to customers residing on land in the south slope of the Puente Hills. With the approval of the Local Agency Formation Commission, a measure was placed on the 1976 ballot to form a County Water District. This was successful and the La Habra Heights Mutual Water Company became the La Habra Heights County Water District (LHHCWD). LHHCWD's boundaries encompass the same area as the original water company, along with additional land to the northwest and west, for a total service area of approximately 3,900 acres.

To provide a reliable supply of water to its customers, LHHCWD utilizes a system of pipes, pumping stations, wells, reservoirs, and other water system infrastructure. The previous water master plan (WMP) for LHHCWD was completed in 2015 to analyze this system and provide recommendations to further improve operations. The Management, Staff, and Board of Directors of LHHCWD recognize how vital it is that the water system continues to develop to meet the new needs of water users. As such, this 2022 WMP was written to observe trends, analyze possible future effects on the system, and maximize system effectiveness with a special focus on water quality.

1.2 Description of Study Area

LHHCWD's service area is comprised of land within the City of La Habra Heights, the City of Whittier, and unincorporated Los Angeles County. The study area also includes land to the west of LHHCWD's service boundary that is utilized for water production and transmission. The Judson Well Field, La Mirada Plant, and transmission mains are discussed further in Chapter 5. **Exhibit 1** shows LHHCWD's service area boundary.

The topography in the service area consists of rolling hills in the southerly region to steep terrain in the north. Elevations within LHHCWD's boundary varies from 340 feet above mean sea-level in the southwesterly corner to 1,150 feet in the north-central part of LHHCWD. The present predominant land use consists of residential zoning. The 2018 Southern California Association of Governments (SCAG) Profile of the City of La Habra Heights shows that the City has an approximately population of 5,454. From a geotechnical standpoint, the area is intersected by numerous ground fault traces and is prone to landslides and slope creep in parts of the northerly steep terrain.

1.3 Study Period and Purpose

The study period for the 2022 Water Master Plan is from fiscal year (FY) 2016 to 2021. A FY is from July of the previous year to June of the current year; therefore, the study period is from July 2015 through June 2021. FY 2020 was chosen as the representative year since the consumption data for this year was most representative of the average for the study period. As such, FY 2020 demands were programmed into the hydraulic model and were used for the analysis in this report.

Key objectives of the 2022 Water Master Plan are as follows:

- Evaluate the performance and reliability of LHHCWD's water production, storage, and delivery systems.

- Identify system strengths and weaknesses and recommend improvements necessary to eliminate deficiencies to ensure reliable performance of the system. Leverage strengths as much as possible.
- Update the computer water model in Innovyze's InfoWater to reflect current conditions. Expand the water model database to include age and material for all pipes. Calibrate the model based upon new field tests.
- Develop Capital Improvement Plans covering a 5-year and 10-year planning horizon.

1.4 Abbreviations

Table 1-1 displays a list of commonly used abbreviations that may be found in this WMP.

Table 1-1 - Abbreviations

Abbreviation	Description
ACP	Asbestos Cement Pipe
ADD	Average Day Demand
ADU	Accessory Dwelling Unit
AF	acre feet
AFY	Acre-Feet per Year
APA	Allowed Pumping Allocation
ASTM	American Society for Testing and Materials
ATCM	Airborne Toxic Control Measure
BACT	Best Available Control Technology
BIL	Bipartisan Infrastructure Law
CARB	California Air Resources Board
CBMWD	Central Basin Municipal Water District
CWS	Community Water System
CCRs	Consumer Confidence Reports
CDPH	California Department of Public Health
CDWC	California Domestic Water Company
cfs	Cubic Feet Per Second
CMP	Corrugated Metal Pipe
CONC BOX	Concrete Box
CWBWRD	Central and West Basin Water Replenishment District
cyanotoxins	cyanobacterial toxins
DDW	California Division of Drinking Water
DIP	Ductile Iron Pipe
DLR	Detection Limit for Purposes of Reporting
DPM	Diesel Particulate Matter
DWR	California Department of Water Resources
EPA	United States Environmental Protection Agency
FEMA	Federal Emergency Management Agency
fps	Feet per second
FY	Fiscal Year
g/bhp-hour	grams per brake horsepower hour
GAC	Granulated Activated Carbon

Abbreviation	Description
gpm	Gallons Per Minute
H&SC	Health and Safety Code
HDPE	High Density Polyethylene
HFHSZ	High Fire Hazard Severity Zone
HGL	Hydraulic Grade Line
hp	Rated Horsepower
HWL	High Water Level
IRP	Integrated Resource Planning
ISO	Insurance Services Office
IX	Ion Exchange
JADU	Junior Accessory Dwelling Unit
kW	kilowatt
L	Liter
LCR	Lead and Copper Rule
LCRI	Lead and Copper Rule Improvements
LCRR	Lead and Copper Rule Revisions
LHHCWD	La Habra Heights County Water District
LSL	Lead Service Line
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
mg	milligram
MG	Million Gallon
Min Day	Minimum Day Demand
MDD+FF	Maximum Day Demand plus Fire Flow
MWD	Metropolitan Water District
NL	Notification level
No.	Number
NPDWR	National Primary Drinking Water Regulations
NPV	Net Present Value
NTNCWS	Non-transient Non-community Water System
NTP	National Toxicology Program
NTU	nephelometric turbidity units
O&M	Operation and Maintenance
ODWD	Orchard Dale Water District
OEHHA	Office of Environmental Health Hazard Assessment
pCi	picocuries
PE	Polyethylene
PERP	Portable Equipment Registration Program
PFAS	Per- and Poly- Fluoroalkyl Substance
PFBS	Perfluorobutane sulfonic acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PHD	Peak Hour Demand
PHG	Public Health Goal
POE	Point-of-Entry
POU	Point-of-Use
ppm	Parts per Million
ppt	Parts per Trillion
psi	Pounds per Square Inch

Abbreviation	Description
PVC	Polyvinyl Chloride
PWS	Public Water System
RCP	Reinforced Concrete Pipe
RL	Response level
RLDWA	Reduction of Lead in Drinking Water Act
rTCR	Federal Revised Total Coliform Rule
RWD	Rowland Water District
SB 9	Senate Bill 9
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCE	Southern California Edison
SDWA	Safe Water Drinking Act
SEA	Significant Ecological Area
SF	Square feet
STL	Steel
Suburban	Suburban Water Systems
SWP	State Water Project
SWRCB	California State Water Resources Control Board
TDS	Total Dissolved Solids
Third Amended Judgment	Third Amendment to the Central Basin Judgment
TTHMs	Total Trihalomethanes
UCMR 5	Fifth Unregulated Contaminant Monitoring Rule
UWMP	Urban Water Management Plan
VHFHSZ	Very High Fire Hazard Severity Zone
WMP	Water Master Plan
WRD	Water Replenishment District of Southern California
µg	microgram
µS/cm	microsiemens per centimeter

1.5 Conversion Factors

Volumetric flow can be presented with a variety of different units. Volumetric flow is a unit of volume per unit of time. The following volumetric flow units are used in this report:

Gallons per Minute (gpm)

gpm is commonly used to describe the capacity of a pump, valve, fire hydrant, or other appurtenance. This unit was used to program the LHHCWD Water Model.

Cubic Foot per Second (CFS)

Metropolitan Water District (MWD) rates the capacity of its interconnections in terms of CFS. This unit is often used for scientific calculations.

Acre-feet per Year (AFY)

When discussing volumetric flow over a long period of time, AFY is often used. Examples of the use of AFY include recharge of an aquifer, seasonal demand associated with agricultural irrigation and the conversion of a snowpack into melt.

The table below provides conversions for the above volumetric flows:

	gpm	CFS	AFY
1 gpm equals	1	0.00223	1.61
1 CFS equals	448.9	1	724.0
1 AFY equals	0.62	0.00138	1

The table below provides conversions for key volumes:

	Gallons	Cubic feet	Acre-Feet
1 gallon equals	1	0.1337	3.069×10^{-6}
1 cubic foot equals	7.481	1	43,560
1 acre-foot equals	325,872	2.296×10^{-5}	1

1.6 Acknowledgments

We, at ***Civiltec***, would like to express our deep appreciation for the cooperation and valuable assistance of LHHCWD management and staff. In particular, the efforts of the following individuals have proved to be vital:

- Michael Gualtieri – General Manager
- Joe Matthews – Superintendent
- Tammy Wagstaff – Treasurer/Office Manager

Chapter 2 - Land Use, Population and Water Requirements

2.1 General

Planning for future water demands involves analyzing current land use, population growth, and any new laws pertaining to land use and zoning. Analyzing historical water production data and water use in terms of land use will also assist in estimating future water demands.

The City of La Habra Heights 2004 General Plan, Los Angeles Municipal Code Title 22 (Planning and Zoning), the 1993 Whittier General Plan, the 2018 SCAG Profile of the City of La Habra Heights, the United States Decennial Census values, and the LHHCWD 2015 Water Master Plan Update were consulted pertaining to land use, population, and zoning during this analysis.

2.2 Population

For many years, the City of La Habra Heights has been a near completely developed community with relatively minor amounts of accessible undeveloped land. Data from the 2020 United States Decennial Census reported that the City of La Habra Heights has an approximate population of 5,682. This is an increase of approximately 262 people (from 5,420) since the 2014 SCAG Profile (reported in the 2015 WMP).

A line graph of population values from 1981 to 2020 was made to project the population at build-out (2036). Population values for 1990, 2000, 2010, and 2020 are from the United States Decennial Census. The values for the other years are estimates by the California Department of Finance. These values can be found in **Table 2-1**. As can be seen in the chart in **Figure 2-1**, the line equation for the data is Y=-4.8423X+5744.8 where Y is the total population and X is the number of years since 1981. Using this equation, at build-out (2036), the population is anticipated to decrease to 5,478 and the demand is expected to decrease to 2,707 AFY (1,678 gpm).

Table 2-1 – Population of La Habra Heights

Year	Population
1981	4,900
1982	5,050
1983	5,225
1984	5,350
1985	5,500
1986	5,675
1987	5,850
1988	5,950
1989	6,125
1990	6,226
1991	6,103
1992	6,148
1993	6,141
1994	6,053
1995	5,909

Year	Population
1996	5,828
1997	5,767
1998	5,720
1999	5,693
2000	5,712
2001	5,733
2002	5,769
2003	5,812
2004	5,801
2005	5,730
2006	5,582
2007	5,508
2008	5,443
2009	5,398
2010	5,325
2011	5,354
2012	5,399
2013	5,444
2014	5,472
2015	5,472
2016	5,487
2017	5,504
2018	5,498
2019	5,483
2020	5,682

Figure 2-1- Population of La Habra Heights

Senate Bill 9 (SB 9) that was enacted in January 2022 could cause the population within LHHCWD's service area to increase. The allowance of single-family residential properties to split lots and build multiple dwellings on each lot per this bill is possible and may cause the population within the City of La Habra Heights to increase. This will be discussed later in this chapter.

2.3 Historical Water Demand

Water usage data was collected and analyzed from FY 2015-16 to FY 2020-21. A fiscal year is from July of the previous year to June of the current year. For example, FY 2015-2016 is from July 2015 through June 2016.

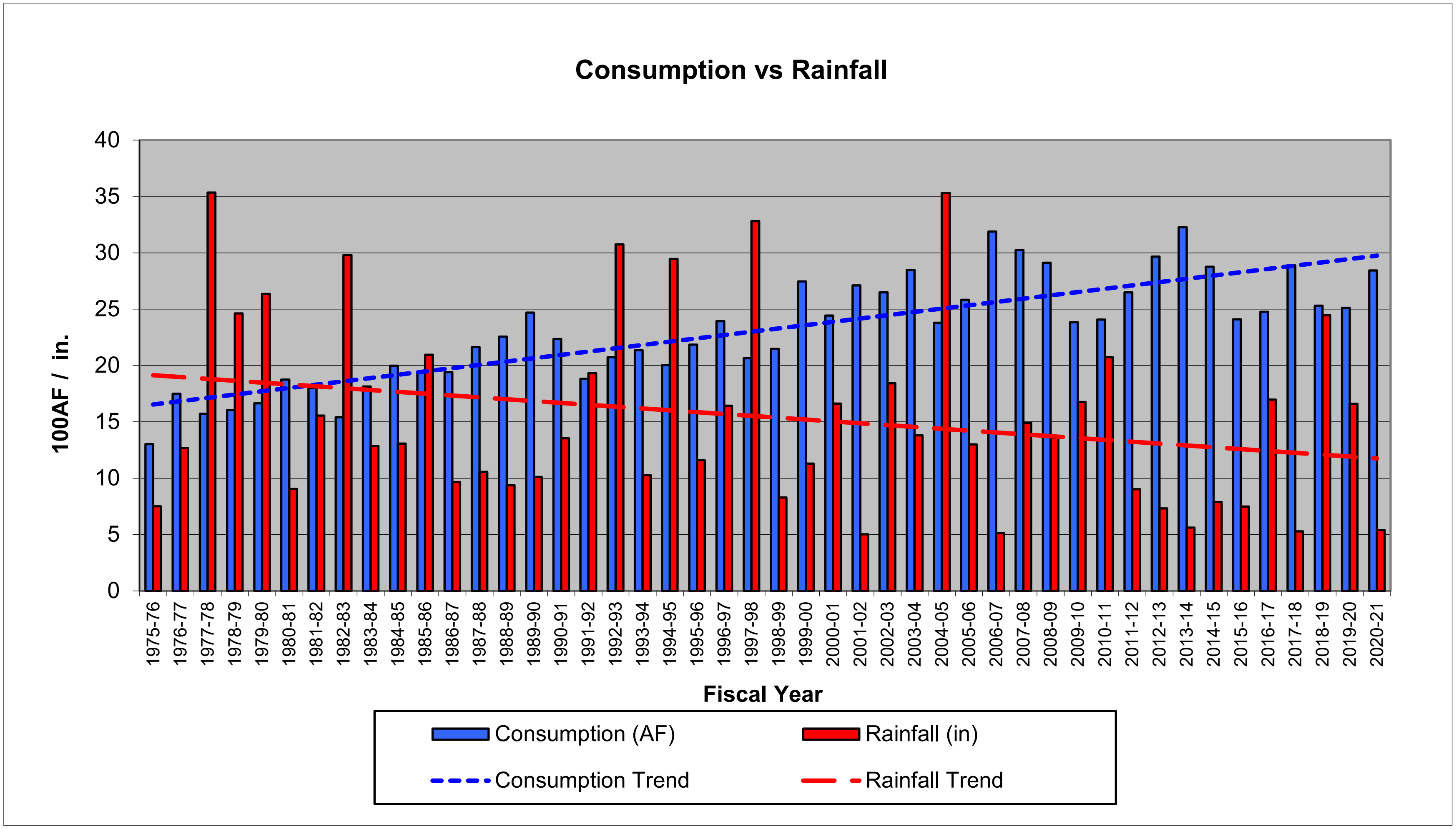
Annual precipitation data was provided by LHHCWD. LHHCWD maintains Rain Gage 1088B at the District Office for the Los Angeles County Department of Public Works. **Table 2-2** and **Figure 2-2** show the annual consumption of water by LHHCWD's customers and the annual rainfall in the area for each fiscal year.

Table 2-2 – Consumption and Rainfall History

Fiscal Year	Consumption (100 Acre Feet (AF))	Rainfall (in)
1975-1976	13.01	7.51
1976-1977	17.49	12.66
1977-1978	15.72	35.35
1978-1979	16.04	24.62

Fiscal Year	Consumption (100 Acre Feet (AF))	Rainfall (in)
1979-1980	16.65	26.34
1980-1981	18.74	9.05
1981-1982	17.99	15.56
1982-1983	15.41	29.81
1983-1984	18.13	12.86
1984-1985	19.97	13.07
1985-1986	19.39	20.94
1986-1987	19.41	9.66
1987-1988	21.63	10.57
1988-1989	22.55	9.37
1989-1990	24.68	10.12
1990-1991	22.34	13.54
1991-1992	18.83	19.31
1992-1993	20.73	30.75
1993-1994	21.35	10.27
1994-1995	20.03	29.45
1995-1996	21.85	11.59
1996-1997	23.94	16.43
1997-1998	20.64	32.82
1998-1999	21.48	8.29
1999-2000	27.45	11.29
2000-2001	24.44	16.63
2001-2002	27.10	5.03
2002-2003	26.49	18.41
2003-2004	28.48	13.80
2004-2005	23.79	35.31
2005-2006	25.82	13.00
2006-2007	31.88	5.14
2007-2008	30.25	14.91
2008-2009	29.11	13.59
2009-2010	23.84	16.76
2010-2011	24.08	20.73
2011-2012	26.50	9.03
2012-2013	29.65	7.32
2013-2014	32.27	5.61
2014-2015	28.74	7.88
2015-2016	24.10	7.48
2016-2017	24.77	16.97
2017-2018	28.87	5.27
2018-2019	25.31	24.45
2019-2020	25.11	16.59
2020-2021	28.42	5.41
25-year Average	**26.50**	**13.93**
Study Period Average	**26.10**	**12.70**

Figure 2-2 - Consumption Versus Rainfall



The 25-year average of consumption indicated above is 2,650 AFY. The average annual water consumption for the study period is 2,610 AFY. The previous five-year average is 2,825 AFY indicating that consumption is trending downward compared to the 2015 WMP study period.

2.4 Water Demand Coefficients and Requirements

Water demand coefficients are developed to estimate the average water demand for each type of land use. The two types of water demand coefficients are water duty factors and unit factors.

The water duty factor is the amount of water, excluding rainfall, applied annually to an acre of land in each land use category. The unit factor is the amount of water, excluding rainfall, applied annually to a typical parcel in each land use category. In this report, water duty factors are measured in acre-feet per year per acre (AFY/acre) and unit factors are measured in acre-feet per year per unit (AFY/unit).

2.4.1 Water Duty and Unit Factors

The water duty and unit factors in this report were determined by examining the various land use categories and correlating the metered records for those selected samples. Each parcel's land use category can be seen in **Exhibit 2**. **Table 2-3** summarizes the data used on the sample size and location of the sampled water users that were used to develop these factors. Any overlay zoning was added into its respective overall land use designation for the factors for the City of La Habra Heights. Furthermore, the factors within the OS – Open Space land use designation for the City of La Habra Heights include all categories within the OS land designation (OS-C, OS-R, etc.).

Table 2-3 – Development of Water Duty and Unit Factor Calculations

Jurisdiction	Land Use Designation	Parcel Numbers	Parcel Locations
City of La Habra Heights	RA – Residential Agricultural	1,792	West Rd., Las Cumbres, Monte Oro, Encanada Dr., Arbela Dr. Escarpado Dr., Cancho Dr., El Terraza Dr., Cloister Dr., La Riata Dr., Solejar Dr., Hacienda Rd., El Travesia Dr., East Rd. Ardsheal Dr., Chandos Ln., Avocado Crest, Churchill Rd., Deep Canyon Rd., Reposado Dr., Green View Rd., N. Nueva Vista Dr., E. Mira Verde Dr., Via Luna Dr., Sialic Place, Shawnan Ln., N. Walnut, Dorothea Rd., Pueblo Crest Ln., Lamat Rd., N. Cypress, N. Citrus St., Skycrest Rd., Ganter Rd., Via Miguel, Skyline Vista Dr., Kanola Dr., Picaacho Dr., Kashlan Rd., Tumin Rd., Sharpless Dr., Valle Dr., Ahuacate Rd., E. Leucadia Dr., Fullerton Rd., El Cajonita Dr., Flowerfield Ln., Mayapan Rd., Virazon Dr., Coban Rd.

Jurisdiction	Land Use Designation	Parcel Numbers	Parcel Locations
	I – Institutional	4	West Rd., Bella Vista Dr., Fullerton Rd.
	OS – Open Space	8	Hacienda Golf Course, Hacienda Park, Hacienda Rd., E Skyline Dr., West Rd., Encanada Dr, Skyline Dr.
City of Whittier	R-1-1	3	West Rd.
Los Angeles County	R-A-20000	18	Pine Edge Dr., Avocado Crest Rd., N. Citrus St., Vista Rd.
	R-1-10000	57	Villa Rita Dr., Eseverri Ln., Antoinette Dr., Villa Rita Dr.
	R-1-15000	3	Villa Rita Dr.
	R-1-20000	6	Avocado Crest Rd.

The average total consumption for the study period (FY 2016 to FY 2021) is the basis for the calculation of water duty and unit factors.

For hydraulic modeling purposes, we used the average consumption during the study period. We distributed the consumption by inputting the top users (as discussed in Section 2.4.2) accordingly by its associated address and then distributing the rest of the remaining consumption demand into the other nodes in the model. Once the demands were inputted into the model, the calculations were adjusted to account for water loss. All water duty and unit factors were scaled up by 4.26%, which represents the average water loss during the study period.

Table 2-4 – Water Duty and Unit Factors

Jurisdiction	Land Use Designation	Water Duty Factor (AFY/acre)	Unit Factor (AFY/unit)
City of La Habra Heights	RA – Residential Agricultural*	0.67	1.24
	I – Institutional	1.23	NA
	OS – Open Space	5.91	NA
City of Whittier	R-1-1	1.54	0.53
Los Angeles County	R-A-20000	2.22	1.04
	R-1-10000	2.60	0.70
	R-1-15000	1.50	0.67
	R-1-20000	2.64	1.48
* Used 2020 billing data to determine RA duty factor			

2.4.2 Top 25 Users

Based on the consumption data provided, calendar year 2020 has been selected as the most recent and representative of typical annual water consumption for this system. The top twenty-25 users of LHHCWD’s water supplies for the 2020 calendar year were identified by sorting the consumption data. They are ranked from greatest to least in terms of average annual water consumption. **Table 2-5** shows the details of each user.

Table 2-5 – Top 25 Water Users

Rank	Category	Pressure Zone	AFY	gpm	% of total demand
1	Open Space	Upper	151.1	93.7	3.57%
2	Open Space	Upper	89.0	55.2	2.11%
3	Residential	Upper	34.5	21.4	0.82%
4	Open Space	Lower	30.6	19.0	0.72%
5	Residential	Upper	25.4	15.8	0.60%
6	Residential	Lower	18.3	11.4	0.43%
7	Residential	Upper	16.9	10.5	0.40%
8	Residential	Lower	14.1	8.7	0.33%
9	Park	Lower	11.7	7.3	0.28%
10	Open Space	Upper	10.9	6.8	0.26%
11	Residential	Upper	10.8	6.7	0.25%
12	Residential	Lower	10.3	6.4	0.24%
13	Residential	Lower	10.1	6.3	0.24%
14	Residential	Lower	9.7	6.0	0.23%
15	Residential	Lower	9.0	5.6	0.21%
16	Residential	Lower	9.0	5.6	0.21%
17	Residential	Lower	8.4	5.2	0.20%
18	Residential	Lower	8.3	5.1	0.20%
19	Residential	Upper	8.2	5.1	0.19%
20	Residential	Upper	7.9	4.9	0.19%
21	Residential	Upper	7.5	4.7	0.18%
22	Residential	Upper	6.5	4.0	0.15%
23	Residential	Lower	5.7	3.5	0.14%
24	Residential	Lower	5.5	3.4	0.13%
25	Residential	Lower	5.5	3.4	0.13%

The demands associated with these users were programmed into the Water Model to represent variation in demand distribution. **Exhibit 3** shows the location of the top twenty-five-point demand water users.

2.4.3 Demand Fluctuations

Daily and hourly fluctuations in demand must be considered to determine the capacities of water supply facilities. Residential demands fluctuate more than any other land use categories due primarily to climatic conditions and varied user activities.

Data analyzed from production records and SCADA data from LHHCWD's system revealed the following current characteristics:

1. The six-year study period (FY 2015-16 to FY 2020-21) average day demand (ADD) is approximately 2,728 AFY or 1,691 gpm.

2. The maximum day demand (MDD) is approximately 3,831 gpm or 2.27 times the ADD.

3. MDD generally occurs during the months of June, July, or August.

4. The highest maximum production day, within the six-year study period, occurred during the month of July 2020 and was estimated at 5,517,179 gallons or 5.517 MG.

Demand fluctuation on an annual basis is best described by Peaking Factors (PF) that compare the various extreme demand conditions to the annual average. **Table 2-6** summarized an analysis of actual production data during the study period. Average Daily Demand (ADD) is the statistical average for the study period. Maximum Daily Demand MDD and Minimum Daily Demand (Min Day) were found by sorting the data set. Since there is no direct data describing fluctuation on an hourly basis, per the California Code of Regulations Title 22 Section 64554, Peak Hour Demand (PHD) is taken as 1.5 times the MDD.

Table 2-6 - Peaking Factors

Demand Condition	Abbr.	MGD	gpm	AFY	PF
Average Day Demand	ADD	2.435	1,691	2,728	1.00
Maximum Day Demand	MDD	5.517	3,831		2.27
Minimum Day Demand	Min Day	0.357	248		0.15
Peak Hour Demand	PHD		5,747		3.40

2.5 Fire Flow Requirements

LHHCWD's system must be capable for providing a reliable supply of water to meet demands for firefighting. The current 'grandfathered' fire flow requirement is 750 gpm. The City of La Habra Heights Municipal Code (passed December 6, 2021) "Chapter 4.4.60 Chapter 5 – Adoption and Amendments" states the updated fire flow requirements.

Per these new requirements, fire flow shall be a minimum of 1,000 gpm for structures between 1 and 3,600 square feet (SF) and 1,500 gpm for structures greater than 3,600 SF. The Water Model was updated to follow these new fire flow requirements so future analyses can be conducted for homeowners that are conditioned to meet the updated fire flows as part of home improvements and building permit requirements.

2.6 Senate Bill 9 (Urban Lot Splits)

SB 9 was enacted in January 2022 to encourage housing development in urban environments. This bill allows a property owner to subdivide their single-family residential lot in two parcels and build additional residential units on their property. Local agencies must ministerially approve urban lot splits and building new housing units without discretionary review if the property owner meets the requirements set forth in the bill. The results of this bill to California state law are summarized below:

- Single-family residential homeowners are, in most cases, eligible to build a second unit within an existing lot. Single-family dwellings, accessory dwelling units (ADUs), or junior accessory dwelling units (JADUs) may be built.

- Single-family residential homeowners are, in most cases, eligible to divide their existing lot into two lots.

- Once a lot is split, up to two residential units may be built on each lot. More may be allowed depending on local ordinances.

- Any property owner who splits their property must commit to occupying one of the lots as their primary residence for a minimum of three years.

Some restrictions to lot splitting and building new housing units per SB 9 are as follows:

- The property must be zoned as single-family residential and be within an urbanized area as designated by the United States Census Bureau to qualify.

- The proposed development or lot split cannot take place on a historic property or property located within a historic district.

- The proposed development or lot split cannot demolish more than 25% of the existing exterior structural walls unless allowed by a local ordinance.

- The proposed development or lot split cannot alter or demolish any rent-controlled or low, very low, or moderate income housing.

- The proposed development or lot split cannot alter or demolish any units that has been occupied by a rental tenant within the past three years.

2.6.1 La Habra Heights Municipal Code

Through SB 9, the City of La Habra Heights is required to ministerially approve urban lot splits and building new housing units without discretionary review if the property owner meets the requirements set forth in the bill. However, City codes must still be followed when subdividing property and building further dwelling units.

La Habra Heights Municipal Code “Chapter 7.22 SB 9 Two (2) Unit Projects” and “Chapter 9.14 SB 9 Urban Lot Splits” were developed in response to SB 9 and give details on the process required by the City for lot splitting and building housing units.

Per the La Habra Heights Municipal Code:

- Each lot split cannot have more than two units total. A unit is defined as any type of dwelling, including, but not limited to an ADU or JADU.

- Multifamily dwellings will not be allowed.

Property will not be eligible to be subdivided or be built upon further if it is located within:

- A very high fire hazard severity zone (VHFHSZ),

- Earthquake fault zone,

- Habitat for protected species,

- Or if there is any other specific, adverse impact that could be caused by the development.

Further details on the application process and other grounds for denial can be found in the La Habra Heights Municipal Code.

2.6.2 Los Angeles County Regulations

Los Angeles County regulations must be followed when splitting lots and building new housing units per SB 9. Although there are no specific municipal codes regarding this bill, the Los Angeles County Department of Regional Planning has provided an application for activities under SB 9 that gives details on grounds for denial.

Per the Los Angeles County Department of Regional Planning:

- On non-split lots, a site with two principal dwelling units may in total have one ADU converted from spaces within an existing residential building and two detached ADUs.
- On split lots, there will be a maximum of two units (including ADUs and JADUs) on each new parcel for a total of four units over the two lots.

Furthermore, a property will not be eligible to be subdivided or be built upon further per SB 9 if it is located within:

- A coastal zone,
- Prime farmland or farmland of statewide importance,
- Wetlands,
- High or very high fire hazard severity zone (HFHSZ or VHFHSZ),
- A hazardous waste site not cleared for residential use or residential mixed use,
- A delineated earthquake fault zone,
- Federal Emergency Management Agency (FEMA) 100-year flood zone,
- FEMA regulatory floodway,
- Or Significant Ecologic Area (SEA) or conversation land.

Further details on the application process and other grounds for denial can be found on the Los Angeles County Department of Regional Planning's website.

2.6.3 Whittier Municipal Code

The City of Whittier regulations must be followed when performing activities designated under SB 9. Per the City of Whittier Municipal Code "17.06.100 – Urban lot split-Approval process", "17.06.110 Urban lot split-Standards and requirements" and "17.06.120 – Urban lot split-Exceptions":

- No more than two units can be created on a parcel, including any ADUs or JADUs

Furthermore, the property cannot be subdivided or built upon further per SB 9 if it is located within any of the following areas:

- Prime farmland or farmland of statewide importance,
- Wetlands,
- VHFHSZ,
- A hazardous waste site not cleared for residential use or residential mixed use,
- FEMA 100-year flood zone,
- FEMA regulatory floodway,
- Land identified for conservation, habitats for protected species or lands under a conservation easement,
- Or if there is any other specific, adverse impact that could be caused by the development.

Further details on the application process and other grounds for denial can be found in the City of Whittier's Municipal Code.

2.6.4 Effect on Demand

SB 9 may increase water demand in LHHCWD's service area by allowing single-family residential homeowners the eligibility to build more housing.

LHHCWD's service boundary is comprised of mostly single-family residential properties located within the City of La Habra Heights. Through this bill and per municipal code, these properties can now be subdivided into two lots and house a maximum of four dwelling units on a property in which previously there was only one. A small portion of LHHCWD's service area is in the City of Whittier which also adopted the same maximum of four dwelling units per property in their municipal code.

The remaining properties in LHHCWD's service area is within Los Angeles County. On existing lots, single-residential properties will be eligible to house a maximum of five dwelling units in which previously there was only one. If an existing lot is subdivided into two lots, a maximum of four dwellings may exist over the two lots in which previously there was only one.

If more housing is built within the service area through SB 9, this could cause the population to increase resulting in a rise in water demand. An increase in housing density typically triggers a requirement for higher fire flow. LHHCWD should further investigate possible outcomes of lot splitting within the service area and prepare to meet this possible increase in demand.

2.7 Future Water Demands

Table 2-7 provides the estimated future demand by taking the projected population calculated in Section 2.2. **Table 2-8** provides a breakdown of the future demands per demand scenario. These demands were used to determine system analysis under the future condition in Chapter 7.

Table 2-7 –Future Water Demands

Year	Condition	Demand (AFY)	Demand (gpm)	Demand (MGD)	Population
FY 2016 – 2020	Existing	2,728	1,691	2.435	5,521 (Average)
2036	Future	2,707	1,678	2.416	5,478

Table 2-8 – Future Demands by Demand Scenario

Demand Scenario	Peaking Factor	Demand (gpm)	Demand (MGD)
ADD	1.00	1,678	2.42
MDD	2.27	3,809	5.48
PHD	3.40	5,704	

LHHCWD's service area is essentially built out and as such, the estimated water demand at build-out is 2,707 AFY which is lower than the six-year study period (FY 2015-16 to FY 2020-21) ADD of approximately 2,728 AFY by 21 AFY. This estimate is not including the possible effects due to urban lot splitting under SB 9.

Chapter 3 - Sources of Supply

3.1 General

The water supply sources for LHHCWD consist of groundwater and imported water. Groundwater is extracted from the Central Basin through the Judson Well Field. Water can be imported from the MWD.

The Judson Well Field is located adjacent to the San Gabriel River in the vicinity of West Whittier within the unincorporated Los Angeles County. It is composed of four wells (Well Nos. 8, 9, 10, and 11) that extract water from the Central Basin. During the study period (FY 2016 to FY 2021), Well No. 9 was active, however, as of March 2022, this well has been placed on standby. Due to a contractual agreement, the Judson Well Field also serves as the primary groundwater source for Orchard Dale Water District (ODWD). Per this agreement, maintenance, improvements, and operational costs for the Judson Well Field, transmission facilities between the Judson Well Field and the La Mirada Reservoir, and the La Mirada Reservoir itself are shared between LHHCWD and ODWD. The groundwater produced at the Judson Well Field is conveyed approximately four- and one-half miles by the "low pressure" La Mirada Conduit to the La Mirada Reservoir. From the La Mirada Reservoir, ODWD is provided water through a metered connection. Water pumped through the La Mirada Booster Station from the La Mirada Reservoir is solely for the purpose of supplying groundwater to LHHCWD.

Imported water is provided to LHHCWD through an interconnection with MWD. This connection has a maximum capacity of 10-cfs (4,488 gpm) and connects to the Central Basin MWD Lower Feeder. LHHCWD can also obtain water from one emergency interconnection with California Domestic Water Company (CDWC).

3.2 Central Basin Judgment

Groundwater is extracted by LHHCWD through the Central Basin. As the population grew in the area over time, the demand for groundwater exceeded the natural replenishment of the Central Basin and the adjoining West Coast Basin. This situation led to the formation of the Central Basin Water Association in 1950 and the creation of the West Basin Water Association. This led to a plan to:

1. Provide supplemental water to major producers,
2. Limit groundwater extractions from the Central Basin; and
3. Create an exchange water pool to provide groundwater-pumping rights for users lacking access to other supplemental water supplies.

The West Coast Basin and Central Basin Water Associations were largely responsible for the establishment of the Central and West Basin Water Replenishment District (CWBWRD) in 1959. CWBWRD was created to replenish and maintain the Central and West Coast Basin by purchasing imported water, recharging the basins, and halting seawater intrusion.

On January 2, 1962, CWBWRD filed Case No. 786,656 in the Superior Court, County of Los Angeles, naming more than 700 parties as defendants. Its goal was to obtain title to the right to use groundwater and regulate withdrawals from the Central Basin. The Central Basin Water Association drafted an interim agreement with water producers of the Central Basin to curtail extractions. By September 1962, the proposed agreement had been approved by a sufficient number of the water producers to guarantee control over groundwater pumping in the Central Basin. On September 28, 1962, the Court signed the "Order Pursuant to Stipulation and Interim Agreement and Petition for Order" and appointed the California Department of Water Resources (DWR) as Watermaster.

The case continued for months to hold meetings to work out a settlement, listen to testimonies on engineering, geology, and hydrology, and to discuss safe yield of the Central Basin and water right entitlement. The final Judgment was signed on October 11, 1965 and became effective on October 1, 1966. This Judgment is known as the Central Basin Judgment.

The Judgment was amended on March 21, 1980 to provide for a transition in the administrative year from a water year (October 1 to September 30) to a FY (July 1 to June 30). On July 9, 1985, the Judgment was amended once more to modify the annual budget ($20 minimum assessment) and exchange pool provisions. The Judgment was amended again on May 6, 1991 to modify the carryover and overproduction provisions (to 20 percent or 20 acre-feet from 10 percent or 10 acre-feet), defined drought carryover, and provided for exemptions for extractors of contaminated groundwater. The most recent Judgment enacted in January 2014 is called the Third Amendment to the Central Basin Judgment (Third Amended Judgment). In the Third Amended Judgment, DWR retired as Watermaster and a new Watermaster was established. The new Watermaster and regulations under the latest Judgment will be described further in this chapter.

The CWBWRD eventually changed its name to Water Replenishment District of Southern California (WRD). The organization maintains its responsibility for replenishing the groundwater supply to both the Central and West Coast Basins.

3.3 Regulations Under the Third Amendment to the Central Basin Judgment (Third Amended Judgment)

The Third Amendment enacted in January 2014 resulted in the DWR retiring as Watermaster. The current Watermaster is composed of three bodies: the Water Rights Panel (The Panel), the Administrative Body (WRD), and the Storage Panel (The Panel plus the WRD Board of Directors).

The Third Amended Judgment provides new procedures for the implementation of storage and water augmentation projects. These procedures were created to provide incentive to develop new water supplies in the Central Basin by:

1. Granting ownership of the new suppliers to their developer,
2. Granting rights to store excess supplies in long-term accounts; and
3. Waiving all assessment fees on the production of stored water.

Aside from these new procedures, other key regulations of the Judgment are discussed in this section. The Third Amended Judgment contains provisions for parties to obtain additional pumping rights, exceed entitled extractions, or make variations in annual pumping. These procedures are described below.

3.3.1 New Procedures for Storage and Augmentation Projects

Per the Third Amended Judgment, a storage project is defined as any activity that increases the volume of water stored in the Central Basin on an intermittent basis. An example of this would be a project that captures and treats rainwater to recharge the Basin.

A water augmentation project is defined as any activity that increases the volume of water stored in the Central Basin on a regular basis and adds to the annual yield. Desalinating seawater and recharging the basin on a regular basis is an example of such a project.

Any water generated by a storage or water augmentation project is owned by the project's owner. This stored water is a commodity which can be held, sold, or leased by its owner. Usually, groundwater rights are subject to a replenishment assessment, however storage and water augmentation projects are exempt from this fee.

Within certain limitations, a purveyor may implement a modest storage or water augmentation project independently for their sole benefit. However, a lead agency (the sponsor of a very large project) is obligated to offer an opportunity for other parties with interest in the Central Basin to participate in the project. This means that any party sharing the cost of implementation would share proportionally in the benefits of the project. The administrative body will determine the obligations of the lead agency.

Per the Third Amended Judgment, Adjudicated Storage Capacity is 220,000 AF of available dewatered space and of this space, WRD has a right to occupy up to 110,000 AF as the Basin Operating Reserve. This volume corresponds to the capture of storm runoff during wet years based on historical data. This right is not intended to allow WRD to sell or lease store water, storage, or water rights. The remaining 110,000 AF of dewatered space is subject to individual storage allocation by parties to the judgement.

3.3.2 Groundwater Extractions and Carryover

The Central Basin Judgment limits the amount of groundwater each party can extract from the Central Basin annually. This limit is referred to as the Allowed Pumping Allocation (APA). Recipients of Exchange Pool water may pump the amount released to them in addition to their APA.

The Judgment allows parties to carry over a portion of any unused water rights into the succeeding water year. The Third Amended Judgment modified the carryover provisions to incrementally increase it from the previous 20 percent of each party's APA to 60 percent over the span of four years. As of 2022, the APA has increased to its final value of 60 percent as set by the Third Amended Judgment.

3.3.3 Exchange Pool

Part 111, Subpart C of the Judgment allows an Exchange Pool to provide additional water rights for parties who meet the requirements. These requirements will be discussed further in this section.

Annually around July 1st the Watermaster forwards a form that is to be completed by each Party who wishes to participate in the Exchange Pool. The form provides for making:

1. Mandatory offers of water rights to the pool (referred to as "Required Subscription" in the Judgment),

2. Voluntary offers of water rights to the pool (referred to as "Voluntary Subscription" in the Judgment); and

3. Requests for water rights from the pool.

The Party completing the form must also provide estimates of their water needs and supply for the ensuing fiscal year.

Exchange Pool Requests

A Voluntary Subscription can be made as long as a Party's estimated needs exceed its total supply, including leases, and only the difference is offered. A Required Subscription can be made to the Exchange Pool if the member has a connection to supplementary water and can obtain imported water from MWD or the Central and West Basin Municipal Water District. The Required Subscription is limited to 60 percent of the member's APA as of 2022. However, the Required Subscription, plus the party's water needs for the year, cannot exceed the party's total supply.

A Category (a) Request is defined as a quantity requested by a member not in excess of 150 of their APA or 100 acre-feet, whichever is greater. Category (b) Requests are those, which exceed the 150 percent or 100 acre-feet limitation. Whenever there are insufficient Voluntary Subscriptions to meet all Category (a) Requests, Required Subscriptions may be used. All Category (a) Requests shall be filled first before any Category (b) Requests are filled. Category (b) Requests are filled first by any remaining Voluntary Subscriptions before the Required Subscriptions are used.

Experience has shown that Voluntary Subscriptions have always been sufficient to meet the entire Category (a) Requests. As a result, no Required Subscriptions have been used to fill Category (a) Requests.

Exchange Pool Costs

Part III, Subpart C, and Paragraph 10 of the Judgment fix the price charged for Exchange Pool water rights. This provision was amended by Court order on July 9, 1985. The price is based primarily on:

- The weighted daily normal price as of the beginning of the administrative year charged by the Central Basin Municipal Water District (CBMWD) for treated MWD water used by the exchangers during the preceding fiscal year (July 1 to July 30),

- The incremental cost of pumping water in the Central Basin at the beginning of the administrative year determined by Southern California Edison's (SCE) schedule PA-1 rate multiplied by 560 kilowatt-hours per acre-foot rounded to the nearest dollar; and

- The current replenishment assessment.

The cost of the Exchange Pool water varies among exchangers and from year to year based on the several elements that effect it.

Exchange Pool Carryover

Per the Judgment, parties who purchased exchange water may carryover the unpumped portion of their allowable extraction into the next succeeding administrative year. The charge is authorized by the Judgment and is based on the difference in the prices of Exchange Pool water between the year the water was purchased and the succeeding year.

3.3.4 Transfers of APAs

Transfers of APA through leases or sales between parties is also allowed under the Judgment. All leases should be entered into on the basis of APA and made on a fiscal year basis. Sales should specify both amount of Total Water Right and amount of APA.

When property on which water rights have been developed is sold, the Watermaster must be furnished a copy of the sale document. The sale document is required for the proper accounting of the water rights. The Watermaster assumes that the water rights pass to the new owner unless it is specifically reserved in the sale document.

3.3.5 Overextractions

Overextractions happen when a party to the Judgment extracts more groundwater from the Central Basin than they are entitled to by their groundwater rights. Each party to the Judgment is allowed to over extract 20 acre-feet or 20 percent of their APA, whichever is greater, as long as the overextraction will be eliminated during the following fiscal year.

3.4 WRD Operations

The WRD manages groundwater storage in the Central Basin. WRD is comprised of a Board of Directors and staff that actively engage in replenishment programs. Replenishment programs such as water spreading, barrier operation, and in-lieu replenishment and other WRD operations are summarized in a report published annually by WRD. Division 18 of the California Water Code describes the full duties and obligations of water replenishment districts. The details of the responsibilities and operations of WRD will be described further in this section.

3.4.1 Watermaster Service

Watermaster Service is administered by WRD in accordance with State Bill 1386 amended Water Code §71610 via Chapter 215 to parties of the judgment.

Once a month, every groundwater pumper reports its extractions to the Watermaster. This makes it possible to update the water right account (Watermaster Water Production Summary) by computing the amount pumped during the previous month, the amount pumped during the current fiscal year, and the amount that can legally be pumped during the remainder of the year. A copy of the Watermaster Water Production Summary is mailed to the pumper each month.

If electric meter readings are reported along with water meter readings, electric power consumption can be correlated with water production. Erratic or rapidly increasing electric power consumption vs. water production, for instance, may suggest an inefficient pump, system losses, or an inaccurate or malfunctioning water meter.

The Watermaster's field staff schedules tests to determine water meter accuracy on every active well at least once every two years. Accurate measurement of groundwater extractions is absolutely necessary for the success of the Basin's management plan. All available means including system efficiency tests, are used to confirm water meter test results. Results of each test are furnished to the well owner. If a meter is inaccurate beyond 5%, it must be repaired within 30 days. Follow-up tests on repaired meters and initial tests on new meters are scheduled whenever necessary. Parties may also request a meter test at any time.

3.4.2 Groundwater Recharge

Natural replenishment of the Central Basin's groundwater supply is largely from surface inflow (and some underflow) through Whittier Narrows from the San Gabriel Valley. Some of the water that percolates into the forebay areas of the Central Basin eventually crosses the barrier between the Central Basin and the West Coast Basin and flows into the West Coast Basin.

Generally, outflow and extractions of the Central Basin exceed natural replenishment. The availability and pricing of imported water has an effect on the amount of extraction from the Central Basin. To maintain the supply of water in the Central Basin, artificial and in-lieu replenishment is done

Artificial Replenishment

One method of artificial replenishment that is used is water spreading. Water is flooded on areas where it can percolate into the underground aquifers and supplement the natural recharge supply. Large quantities can be returned to the ground by spreading, but the process is limited by the space available for facilities for spreading and the ability of the recharge aquifers to percolate water back to the basin. Imported water purchased from MWD and recycled water from the Whittier Narrows and San Jose Creek Reclamation Plants are used for artificial recharge.

In-Lieu Replenishment

During the 1965-66 water year, WRD began the "in-lieu replenishment" program. This program enabled the WRD to be allowed to form a contract with any producer having access to supplemental water that can be used in-lieu of extracting groundwater from the Central Basin. Through this program, discounted imported water was offered by WRD seasonally depending on availability to reduce overall pumping impacts on the Central Basin.

This type of program is used to alter pumping patterns within a groundwater basin. It is effective in areas of low transmissivity where conventional recharge techniques are ineffective. This program also heightens the effect of injecting water to form a seawater barrier by reducing extraction in the vicinity. Through this program, the amount of replenishment water purchased by WRD and the annual extraction from the Central Basin has decreased.

LHHCWD has participated in the in-lieu program when the program has been offered and LHHCWD was eligible. LHHCWD's staff must perform a financial analysis each time participation in the in-lieu program is considered. Factors such as power costs, seasonal water prices, and WRD reimbursements for retiring the original water right must be analyzed. When LHHCWD was eligible to participate in the program, LHHCWD's customers were supplied with MWD water and groundwater production was suspended to accumulate in-lieu credits with the CBMWD. A pre-determined amount of groundwater production rights was then retired to the WRD for that fiscal year. WRD used those rights to help offset their annual replenishment obligations.

The WRD Board determines which producers can participate in the program, depending on local conditions. Due to water shortages and other reasons, MWD discontinued their discounted seasonal imported water in 2011 and as a result, WRD suspended its in-lieu program except under special circumstances. During the study period (FY 2016 to FY 2021), conditions in the Montebello Forebay (the area from which LHHCWD extracts) have not been conducive to in-lieu purchases.

3.5 Groundwater Rights

Through the 1965 Central Basin Judgement, LHHCWD was granted 2,498 AFY of water rights. LHHCWD has also purchased 168 AFY of water rights.

As of 2022, the total water rights of LHHCWD are 2,666 AFY. LHHCWD's water rights as of 2022 can be found in **Table 5-7**. LHHCWD has set a goal of ultimately having water rights equal to 3,000 AFY.

Table 3-1 – LHHCWD Water Rights as of 2022

Year	Source	AFY
1965	Central Basin Judgment	2,498
2007	John J. Hathaway	8
2009	Kal Kan Foods, Inc.	90
2014	Aqua Management	50
2020	Eco Gas, Inc.	20
	Total AFY	2,666

LHHCWD avoids dependence on imported water from MWD and prefers to supply demand solely through groundwater from their production wells. If the need arises, LHHCWD will participate in the lease market to obtain additional pumping rights for the year to minimize the need to buy imported water.

The groundwater produced by LHHCWD during the study period is from Well Nos. 8, 9, 10, and 11 at the Judson Well Field. As of March 2022, Well No. 9 has been placed on standby. By a contractual agreement from 1957, a portion of the Judson Well Field production is supplied to ODWD through the La Mirada Reservoir. The remaining production is utilized by LHHCWD to provide supply to its customers or is sold to the LHHCWD's contractual customers when needed.

During this WMP, water production data has been collected and analyzed from FY 2015-2016 to FY 2020-2021. A FY is from July of the previous year to June of the current year. For example, FY 2015-2016 is from July 2015 through June 2016. **Table 3-2** shows well production and the imported water production from MWD. The total production shown in the table below during the study period includes changes in storage. **Figure 2-2** shows further data.

The average groundwater production for LHHCWD during the 6 FY study period from FY 2016 to FY 2021 is 2,667 AF. The 15-year average groundwater production was 2,804 AF. Average groundwater production has decreased due to water conservation efforts by LHHCWD. During the study period, imported water purchased from MWD augmented LHHCWD's groundwater production by an average of 60 AF. This is a significant decrease in the 15-year average of 132 AF. This decrease is attributed to LHHCWD 's commitment to decrease its dependence on imported water from MWD.

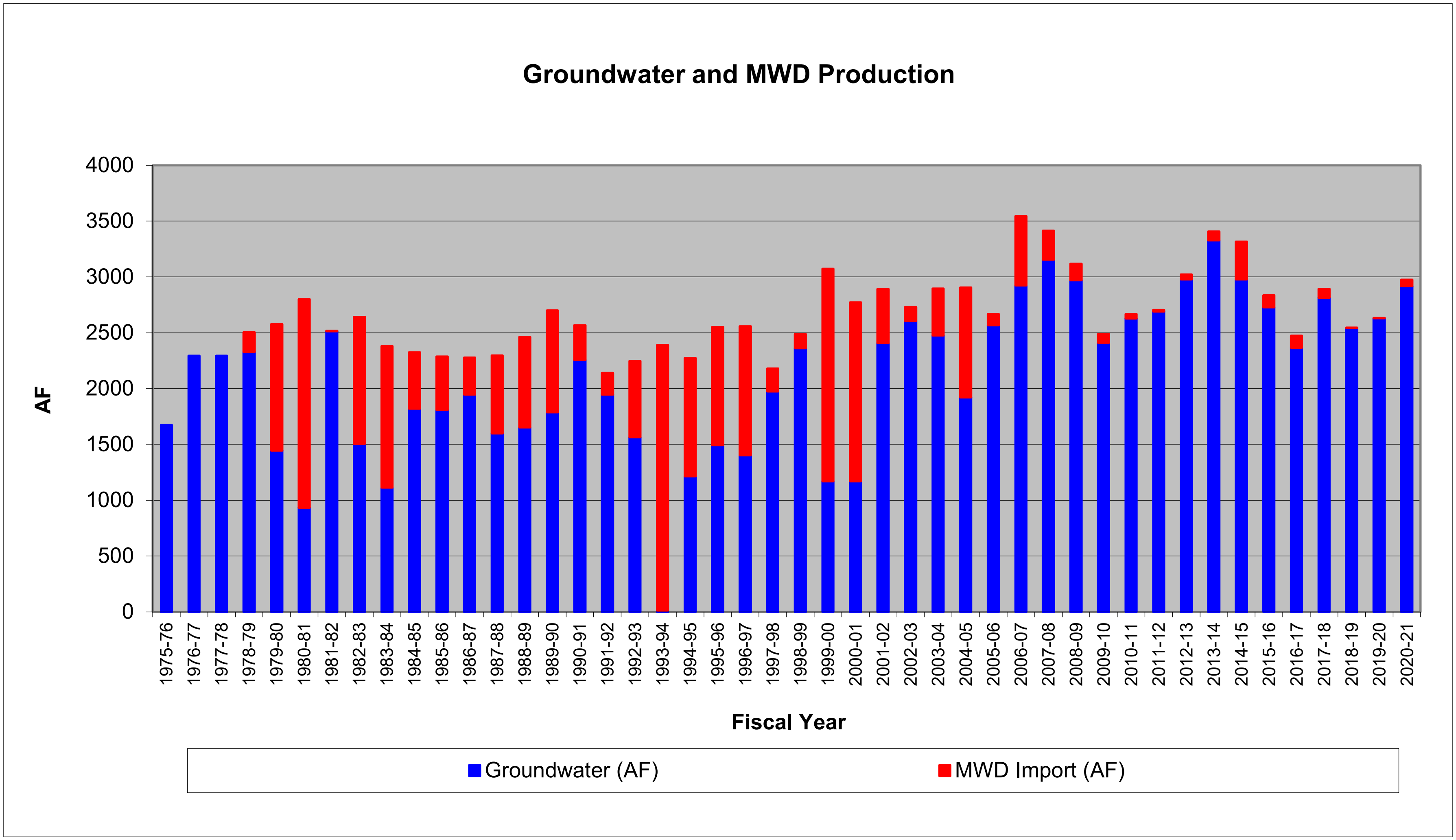
During the 1993-1994 FY, LHHCWD was participating in the "in-lieu replenishment" program by leasing out their groundwater rights and importing MWD water. As can be seen from the table and chart, almost all the supply for the 1993-1994 FY was imported MWD water. Around the 1999-2000 FY and 2000-2001 FY, the La Mirada Plant was being built and it can be seen that more than half of LHHCWD's supply at the time was MWD imported water.

Table 3-2 – Historical Groundwater and Imported Water Production

Fiscal Year	Well Production (AF)	MWD CENB-47 (AF)	Total (AF)
1975-1976	1673	0	1673
1976-1977	2295	0	2295
1977-1978	2294	0	2294
1978-1979	2329	176	2505
1979-1980	1444	1132	2576
1980-1981	934	1867	2801
1981-1982	2513	6	2519
1982-1983	1505	1138	2643
1983-1984	1114	1266	2380
1984-1985	1820	504	2324
1985-1986	1808	479	2287
1986-1987	1947	331	2278
1987-1988	1599	698	2297
1988-1989	1652	811	2463
1989-1990	1789	912	2701
1990-1991	2258	310	2568
1991-1992	1946	194	2140
1992-1993	1565	682	2247
1993-1994	12	2379	2391
1994-1995	1214	1059	2273
1995-1996	1494	1056	2550
1996-1997	1403	1156	2559
1997-1998	1975	204	2179
1998-1999	2363	124	2487
1999-2000	1169	1905	3074
2000-2001	1170	1603	2773
2001-2002	2408	484	2892
2002-2003	2608	122	2730

Fiscal Year	Well Production (AF)	MWD CENB-47 (AF)	Total (AF)
2003-2004	2477	418	2895
2004-2005	1921	986	2906
2005-2006	2567	101	2668
2006-2007	2,925	629	3,544
2007-2008	3,155	259	3,414
2008-2009	2,971	147	3,118
2009-2010	2,410	77	2,487
2010-2011	2,628	40	2,668
2011-2012	2,692	14	2,706
2012-2013	2,977	45	3,022
2013-2014	3,328	79	3,407
2014-2015	2,978	338	3,316
2015-2016	2,728	108	2,836
2016-2017	2,366	109	2,475
2017-2018	2,815	78	2,893
2018-2019	2,543	3	2,546
2019-2020	2,630	1	2,631
2020-2021	2,917	58	2,975
15-year Average	**2,804**	**132**	**2,936**
6-year Study Period Average	**2,668**	**61**	**2,728**

Figure 3-1- Groundwater and MWD Production



3.6 MWD

Although LHHCWD prefers to rely on groundwater production for their supply, imported water is available through an interconnection with the MWD. This connection has a maximum capacity of 10-cfs (4,488 gpm) and connects to the Central Basin MWD Lower Feeder.

MWD's supply is obtained from its Colorado River Aqueduct and the State Water Project (SWP). Water delivered to LHHCWD is treated by MWD at the Diemer Plant. All water imported from MWD meets federal and state water quality regulations.

3.6.1 Water Supply Reliability

MWD's supply is obtained from the Colorado River Aqueduct and the SWP. MWD is contractually entitled to water from the SWP and Colorado River in excess of 2.5-million-AF annually.

According to the DWR, the reliability of future SWP is impacted by (1) climate change and (2) possible restrictions on SWP and Central Valley Project pumping due to the harm caused to the delta smelt.

MWD Entitlements

MWD has entitlement to water from the SWP and Colorado River in excess of 2.5-million-AF annually.

The *1960 Contract between the State of California and the Metropolitan Water District of Southern California* for a Water Supply entitles MWD to SWP water. This contract requires the DWR to make reasonable efforts to secure water supplies for MWD. MWD is allowed to use up to 48 percent of the quantity of SWP water delivered annually. MWD will have the option to renew the contract when it expires in 2035.

MWD's entitlement to Colorado River water is based on a series of agreements and compacts which govern the distribution and management of the river. Annual allocation of Colorado River water is controlled by the U.S. Department of the Interior. This water is made available to MWD based on precipitation levels within the respective watersheds. MWD maintains multiple large reservoirs which serve to mitigate the impact of any disruption to SWP water or Colorado River water.

Climate Change

Due to the uncertainty of the impact of climate change on water supply availability, SWP deliveries are forecasted to decrease in the future. According to the 2020 MWD Urban Water Management Plan (UWMP), MWD is capable of meeting all customer demands during normal years, a single-dry year, and multiple dry years from 2025 to 2045.

Integrated Resource Planning (IRP)

MWD participates in IRP. The IRP is a report updated about every five years that is used to guide water supply investments, programs, and policies. The 2020 IRP update describes actions such as conservation, water recycling, groundwater recovery, Colorado River supplies and transfers, SWP supplies and transfers, in-region surface reservoir storage, in-region groundwater storage, out-of-region banking, treatment, conveyance, and infrastructure improvements. These actions are MWD's strategy for achieving regional water supply reliability.

SWP Delta Smelt Controversy

During the LHHCWD 2015 WMP Update, the possibility of short-term deficiencies in MWD supplies had increased due to factors that could affect the SWP. In 1982, upon activation of the Central Arizona Project, the water available to MWD from the Colorado River was curtailed. At that time, MWD began to receive a substantially increased proportion of SWP water. MWD still currently uses SWP water for their supply.

The Bay Delta Conservation Plan was a habitat conversation plan proposed by the DWR, U.S. Fish & Wildlife Service, National Marine Fisheries Service, and the U.S. Bureau of Reclamation, under the Endangered Species Act, that was to address water shortage issues by constructing new water delivery infrastructure and restoring aquatic habitat. In 2008, the Fish & Wildlife Service issued a biological opinion on the Long-Term Operational Criteria and Plan for coordination of the Central Valley Project and SWP. In this opinion, they stated that they believed the continued operation of these two water projects, as described in the plan, would jeopardize the existence of the delta smelt and their designated habitat. Large changes or a shutdown of the SWP would impact MWD's supply. For that reason, MWD had adapted its rate structure several times to account for variation in supply.

Since then, in 2015, the Bay-Delta Conservation was recast as California Water Fix with a focus on the construction and operation of proposed new water export intakes on the Sacramento River to divert water into a proposed 40-mile twin tunnel conveyance facility. The U.S. Fish & Wildlife Service worked with the U.S. Bureau of Reclamation to minimize and offset the impacts from the proposed operations of the Central Valley Project and SWP. In 2019, the Fish & Wildlife Service issued a new biological opinion stating that they believe the new proposed operations of these two water projects will no longer threaten the existence of the delta smelt and their designated habitat.

As the SWP will continue operation with the new adjustments that have been made, this issue will no longer be a cause of any deficiencies in MWD's supply.

Emergency Response

In the case of a power outage, MWD maintains dedicated backup power generators at its treatment facilities and mobile generators that can be quickly moved to key locations as needed.

If an emergency occurs in which MWD has a shortage of supplies, MWD will continue deliveries up to its capability on a priority basis. The highest priority users would be those with limited local water resources or alternative sources of supply. For LHHCWD, the priority would depend on the extent in which LHHCWD's production and transmission facilities are operable.

Chapter 4 - Water Quality

4.1 General Description

The water that LHHCWD supplies its customers must meet water quality standards set by the United States Environmental Protection Agency (EPA) and the California Division of Drinking Water (DDW) of the California State Water Resources Control Board (SWRCB). Standards that limit contaminant concentrations for drinking water are set by these agencies to protect the health of the public. The Safe Drinking Water Act (SDWA) are the federal water quality standards set by the EPA. The Title 22 California Code of Regulations are California's state water quality regulations.

LHHCWD chlorinates well water using a sodium hypochlorite chlorinator located at the La Mirada Pump Station. Residual chlorine in the water leaving the Plant No. 1 is maintained at a minimum of 1.0 mg/L. La Mirada Plant is slightly higher, ranging from 1.3 mg/L to 1.5 mg/L of residual chlorine. This facility is adequate to meet the existing water production of LHHCWD's service area and ensures that LHHCWD is compliant with water quality standards.

Monitoring has shown that LHHCWD's drinking water meets all state and federal water quality requirements for the study period.

4.2 Legislation Related to Water Quality

4.2.1 SDWA

Under the 1974 SDWA, the EPA has the authority to set standards for all drinking water delivered by public and private water suppliers in the United States. The SDWA contains both primary and secondary standards for drinking water quality. Primary standards include treatment requirements and performance requirements for drinking water called MCLs. The MCL is the highest level of a contaminant that is allowed in drinking water. Primary MCLs are in place to protect public health and so are an enforceable standard. Secondary drinking water standards list secondary MCLs that are established for chemicals or characteristics that relate to taste, odor, or appearance of drinking water. These secondary MCLs are not enforced; however, water systems must inform customers when contaminants exceed secondary MCLs per each contaminant's notification guidelines. The SDWA Primary and Secondary MCLs can be found in **Exhibit 4**.

4.2.2 SDWA Amendments

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

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

4.2.3 Title 22 California Code of Regulations

The DDW of the SWRCB regulates drinking water standards for the state. The potable water quality standards listed in the Title 22 California Code of Regulations include primary and secondary MCLs. Primary drinking water standards list primary MCLs that are established for specific contaminants to protect public health. The Title 22 California Code of Regulations also contains secondary drinking water regulations that establish MCLs for contaminants that may adversely affect odor or appearance of water. These State MCLs can be the same or in some cases can be more strict than Federal MCLs.

4.2.4 New and Pending Legislation Related to Water Quality

There are several new and pending Federal and State legislation related to drinking water quality. Federal legislation related to drinking water quality is managed by the EPA while State legislation for California is managed by the DDW of the SWRCB. **Table 4-1** summarizes the discussion below into legislation name/summary, whether the legislation is at the state or federal level, and the status of said legislation. All new and pending regulations should be taken into consideration by LHHCWD.

Table 4-1 - Summary of New and Pending Federal and State Legislation

Legislation Name/Summary	Government Level	Status
Point-of-Use (POU) and Point-of-Entry (POE) Treatment	State	Effective as of March 2019
New NL and Response Level (RL) for perfluorooctanoic acid (PFOA) and Perfluorooctanesulfonic acid (PFOS)	State	Effective as of February 2020
Use of Lead-Free Pipes, Fittings, Fixtures, Solder, and Flux	Federal	Effective as of October 2020
Notification and Response Level for Perfluorobutane Sulfonic Acid (PFBS)	State	Effective as of March 2021
Notification Level (NL) Recommendations for Four Cyanobacterial Toxins (Cyanotoxins)	State	Effective as of May 2021
17 Alt. Test Procedures for Analysis of Contaminants Under SDWA	Federal	Effective as of May 2021
Definition and Standard Testing Methodology for Microplastics	State	Effective as of July 2021
Revised Total Coliform Rule (rTCR)	State	Effective as of July 2021
Perchlorate Detection Limit for Purposes of Reporting (DLR)	State	Effective as of July 2021
Lead and Copper Rule Revisions (LCRR)	Federal	Effective as of December 2021
Fifth Unregulated Contaminant Monitoring Rule (UCMR 5)	Federal	Effective as of January 2022
Hexavalent Chromium MCL	State	Pending

Point-of-Use (POU) and Point-of-Entry (POE) Treatment

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

In March 2016, under the H&SC 116380, the SWRCB adopted emergency regulations pertaining to the use of POU and POE treatment that remained in effect until January 2018. In February 2018, the SWRCB adopted permanent regulations to fulfill statutory requirements. These regulations include requirements from section 116380 and 116552. Section 116380 limits the use of POU and POE treatment to water systems with less than two hundred service connections and section 116552 limits the use of POU and POE treatment to three years or until funding for centralized treatment becomes available. These new regulations were put into effect in March 2019.

New NL and RL for PFOA and PFOS

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

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

Since then, California has established its own regulations for PFAS. Assembly Bill 756 (codified as H&SC section 116378) authorizes the SWRCB to order a water system to test for PFAS, notify their customers if the concentration is over the NL, and advises to take the water source out of service until water is treated if the concentration is over the response level. When NLs are exceeded, the drinking water system is required to notify the local governing body of the local agency in which the users of the drinking water reside. A RL is a concentration level of a contaminant in drinking water that warrants customer notification, further monitoring, and assessment. In August 2019, the SWRCB reduced the NLs from 14 to 5.1 ppt for PFOA and from 13 to 6.5 ppt for PFOS. In February 2020, the SWRCB set new RLs of 10 ppt for PFOA and 40 ppt for PFOS. This new RL is a reduction of the previous level which used to be 70 ppt for the total concentration of PFOA and PFOS combined. The current NL and RL for PFOA and PFOS are shown in **Table 4-2**.

Table 4-2 - Current NL and RL for PFOA and PFOS

SWRCB	PFOA	PFOS
NL	5.1 ppt	6.5 ppt
RL	10 ppt	40 ppt

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

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

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

Notification and Response Level for Perfluorobutane Sulfonic Acid (PFBS)

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

Preparation will be made to implement the new NL and RL in LHHCWD's water supply. Customers will be notified if the concentration of PFBS is over the NL.

NL Recommendations for Four Cyanotoxins

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

Table 4-3 - Four Cyanotoxins Recommended Notification Levels

Cyanotoxins	Recommended NL
Anatoxin-a	4 μg/L
Saxitoxins	0.6 μg/L

Cyanotoxins	Recommended NL
Microcystins	0.03 µg/L
Cylindrospermopsin	0.3 µg/L

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

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

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

Table 4-4 - 17 Additional Testing Procedures for the Analysis of Contaminants Under the SDWA

Approved Method	Contaminant(s)
EPA Method 903.0, Revision 1.0 (USEPA 2021a)	Radium-226
EPA Method 903.1, Revision 1.0 (USEPA 2021b)	Radium-226
EPA Method 127	Total chlorine as monochloramine
D 6919-17 (ASTM 2017a)	Calcium, Magnesium, Sodium
D 4327-17 (ASTM 2017b)	Fluoride, Nitrate, Nitrite, Orthophosphate, Chloride, Sulfate
D 3697-17 (ASTM 2017c)	Antimony
D 3223-17 (ASTM 2017d)	Mercury
D 1688 A-17 (ASTM 2017e)	Copper
D 1688 C-17 (ASTM 2017e)	Copper
D 1293-18 (ASTM 2018a)	pH
D 3454-18 (ASTM 2018b)	Radium-226
Bio-Rad - RAPID'E. coli 2 (REC2)	Total coliforms, E. coli
Maine Health Environmental Testing Laboratory - ME 531, Version 1.0	Carbofuran, oxamyl
Palintest - ChloroSense, Rev. 1,1	Free and total chlorine
Palintest - Method 1001, Rev. 1.1	Total recoverable lead
Palintest – ChlorodioX Plus, Rev. 1.1	Chlorine dioxide, chlorite
Neogen-Modified Colitag, Version 2.0	Total coliforms, E. coli

Definition and Standard Testing Methodology for Microplastics

In September 2018, Senate Bill No. 1422 was filed, adding section 116376 to the H&SC.

This section stated that the SWRCB was required to adopt a definition for microplastics in drinking water by July 2020. The SWRCB was also required by July 2021 to adopt a standard testing methodology for microplastics, requirements for four years of testing and reporting, and rules for public disclosure and results. The final adopted resolution and definition of microplastics in drinking water was made publicly available in July 2020. LHHCWD should prepare to include the new definition and testing methodologies for microplastics in current drinking water testing and monitoring.

Revised Total Coliform Rule (rTCR)

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

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

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

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

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

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

The SWRCB announced that beginning July 1, 2021, the new rTCR will become effective. These revisions reflect the federal revisions and include a new E.coli MCL and the new Coliform Treatment Technique requirement replacing the Total Coliform MCL.

Perchlorate Detection Limit for Purposes of Reporting (DLR)

Perchlorate is produced by industrial processes such as making rockets, missiles, and fireworks. It can cause adverse health effects related to perchlorate preventing the thyroid gland from receiving enough iodine and preventing thyroid hormone production. Insufficient thyroid hormone levels can negatively affect human growth and development. Perchlorate is neither a primary nor secondary drinking water standard by EPA standards. However, it is a Title 22 California Code of Regulations primary drinking water standard with an MCL of 6 μg/L.

In February 2015, the OEHHA revised the Public Health Goal (PHG) for perchlorate from 0.006 mg/L to 0.001 mg/L. At a public hearing on July 5, 2017, the DDW presented to the SWRCB its findings and recommendations related to the perchlorate MCL. DDW's recommendations were to establish and lower the detection limit for purposes of reporting DLR to investigate and gather additional data on the feasibility of lowering the MCL for perchlorate. If the new data they found supported development of a new standard for perchlorate, they aimed to revise the MCL.

The previous DLR of 4 μg/L had limited DDW's ability to determine the concentration of perchlorate in wells at lower concentrations. Laboratories would typically only report results down to the DLR, so a lower DLR will allow DDW to fully evaluate how different treatment methods perform at removing perchlorate. By being allowed to monitor perchlorate at lower concentrations, it is expected that the DDW and SWRCB will be able to determine whether it is possible to reduce the MCL of perchlorate to a concentration closer to the PHG. On June 17, 2021, the new Perchlorate DLR was approved and the DLR was reduced from 0.004 to 0.002 mg/L. The rule took into effect July 1, 2021.

Lead and Copper Rule Revisions (LCRR)

On January 15, 2021, the EPA revised the original Lead and Copper Rule (LCR). These revisions are called the Lead and Copper Rule Revisions (LCRR). On June 16, 2021, the EPA stated that they are making further revisions to the LCRR and issued new effective and compliance dates of December 16, 2021 and October 16, 2024, respectively. These further revisions are called the Lead and Copper Rule Improvements (LCRI).

The EPA intends to propose new compliance deadlines for components of the rule that the agency will propose to significantly revise. The EPA intends to propose changes to the lead service line (LSL) replacement and tap sampling requirements in the LCRR. As such, the EPA expects to propose to delay the October 16, 2024 compliance deadline for submitting LSL replacement and tap sampling plans so that systems can incorporate any potential revisions made through the LCRI. At this time, the EPA does not expect to propose changes to the requirements for information to be submitted in the initial LSL inventory or its associated October 16, 2024 compliance date.

The LCR and LCRR were developed to protect public health by reducing lead and copper levels in drinking water. Data from the NTP shows that there are adverse health effects associated with lead exposure. The source of much of this lead and copper in drinking water is due to the corrosion of plumbing material such as service lines containing these substances. No safe blood lead level in children has been identified, so it is important to lower childhood blood lead levels as much as possible. The changes that will be proposed by the LCRI are intended to reduce lead levels in drinking water further.

Per the LCRR, water systems must keep an LSL inventory. This LSL inventory is anticipated to be a count and location of all lead service lines and their conditions within a water system's service area. By identifying locations of LSLs, the inventory will provide the EPA with locations of potentially high drinking water lead exposure and will allow for quicker action to reduce exposure of lead to the public. Preparing the initial LSL inventory will allow public water systems to assess the extent of LSLs within their system, better identify sampling locations, and begin planning for replacements (including applying for state and federal grants and loans). Information must be submitted in the initial LSL inventory by the October 16, 2024 compliance date. The EPA is currently still in the process of developing its LCRR inventory guidance, best practices, case studies, and templates.

In the current LCRR, if action levels for lead or copper are exceeded, installation or modifications to corrosion control treatment or line replacements may be required in order to lower concentrations. The EPA is established a new lead trigger level of 10 µg/L in addition to the 15 µg/L lead action level. At this trigger level, systems that currently treat for corrosion are required to start planning how to reoptimize their existing treatment. Systems that do not currently treat for corrosion will be required to conduct a corrosion control study. Sampling frequencies will depend on the concentration of the contaminant in the system. More frequent testing will be required for systems with concentrations higher than the trigger or action levels.

The current LCRR action level and trigger level for lead will be evaluated in the new LCRI revisions. The EPA is currently investigating whether to eliminate the trigger level and lower the action level to compel action by water systems sooner. The EPA is also anticipating making changes to the sampling plans in the current LCRR as well. It is anticipated that these changes will include a requirement of taking first and fifth liter samples in homes served by LSLs and using the samples with the highest levels of lead in 90^{th} percentile calculations.

The current LCRR is to be improved with regard to the replacement of LSLs. Under the current LCRR, water systems are only required to replace a small percentage of their LSLs after their customers are exposed to high lead levels. Water systems with 90th percentile lead concentrations above the trigger level of 10 µg/L are required to replace LSLs at a goal rate approved by the state (projected to likely be lower than 3 percent). Water systems serving more than 10,000 people with more than 10 percent of samples above the action level of 15 µg/L need to replace 3 percent of their LSLs per year. The EPA projected that only 339,000 to 555,000 LSLs (out of approximately 6.3 to 9.3 million LSLs) would be replaced over the 35 year period of analysis using the current LCRR. The current Administration believes that it is an urgent priority to eliminate all LSLs. The recently enacted Bipartisan Infrastructure Law (BIL) provides $15 billion in funding over the next five years for lead service line identification and replacement. The LCRI is anticipated to include changes that will increase the rate of LSL replacement.

In the proposed LCRI revisions to the LCRR, the EPA is planning to look into options to address concerns in order to reduce the health risks of lead in drinking water in more communities. LHHCWD should prepare to submit an initial LSL inventory by the compliance date and monitor the progress of the LCRI revisions.

Fifth Unregulated Contaminant Monitoring Rule (UCMR 5)

The EPA has revised the Unregulated Contaminant Monitoring Rule (effective as of January 26, 2022). These revisions are known as the Fifth Unregulated Contaminant Monitoring Rule (UCMR 5). Per these revisions, specified water systems are to collect national occurrence data for 29 PFAS and lithium. These contaminants are not currently subject to national primary drinking water regulations and collecting this data would provide the EPA with data that can be used to make regulatory decisions.

A public water system (PWS) is defined as a system that provides drinking water to at least 15 service connections or that regularly serves an average of at least 25 individuals daily at least 60 days out of the year. A community water system (CWS) is a PWS that has at least 15 service connections used by year-round residents or regularly serves at least 25 year-round residents. A non-transient non-community water system (NTNCWS) is a PWS that is not a CWS and that regularly serves at least 25 of the same people over 6 months per year.

Under the UCMR 5, all large CWSs and NTNCWSs serving more than 10,000 people are required to perform monitoring. In addition, small CWSs and NTNCWSs serving between 3,300 and 10,000 people may be required to monitor. PWSs included in a nationally representative sample of CWSs and NTNCWSs serving between 25 and 3,299 people may also be required to monitor. Every July 1st of the year prior to each year's sample collection, the EPA expects to determine whether it has received necessary appropriations to support its plan to monitor all systems serving between 3,300 and 10,000 people and the representative group of 800 smaller systems. As EPA finalizes its small system plan for each sample collection year, the agency will notify the small PWSs accordingly.

It is anticipated that by early 2022, EPA will notify all small CWSs and NTNCWSs serving between 3,300 and 10,000 people of their anticipated requirement to monitor. Per these revisions, LHHCWD may be required to expand drinking water monitoring and testing to these 29 PFAS and lithium if small CWSs and NTNCWSs serving between 3,300 and 10,000 people are required to monitor. LHHCWD should make preparations to monitor per UCMR 5 if notified by the EPA.

Hexavalent Chromium MCL

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

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

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

In response to the Judgment, on February 2020, the SWRCB published a White Paper Discussion on the economic feasibility of complying with the MCL for hexavalent chromium. On April 27, 2020, the SWRCB held a public workshop to discuss these paper and other topics concerning the MCL. The SWRCB evaluated the comments from said workshop regarding treatment technologies and cost estimating methodology. In March 2022, SWRCB released a Notice of Public Workshop and Opportunity for Public Comment on the Administrative Draft. Workshops were held in April and comments are still being considered. LHHCWD should monitor the progress of the rulemaking by the SWRCB concerning hexavalent chromium.

4.3 Water Quality

LHHCWD monitors their distribution's water quality and reports their findings in accordance with federal and state water quality regulations under the SDWA of the EPA and the Title 22 California Code of Regulations of the DDW. Monitoring has shown that LHHCWD's drinking water meets all state and federal water quality requirements for the study period.

Reported results found in the 2015 to 2020 CCRs for LHHCWD were analyzed to determine which constituents should be monitored closely. Results of well monitoring from the groundwater production wells at the Judson Well Field were also analyzed. LHHCWD meets all federal and state water quality regulations. Some contaminants to be aware of are Total Trihalomethanes (TTHMs), Specific Conductance, and Total Dissolved Solids (TDS

4.3.1 Consumer Confidence Report (CCR) Summary

Under the SDWA, every public water system or community water supplier must provide a consumer confidence report (CCR) every year. A CCR is an annual report that gives information on the quality of the drinking water and reports the concentrations of contaminants in the water. LHHCWD's CCRs for 2015 to 2020 can be found in **Exhibit 5**. A summary of these CCRs is provided in **Table 4-5**.

The data in the table below shows that LHHCWD meets all primary and secondary water quality standards for the study period. The average concentration of each contaminant is reported per year. Any data in which the constituent could not be detected at the testing limit (shown as ND or (a)) was considered as having no concentration in the drinking water. All MCLs or regulations are per the SDWA (Federal law) except for those marked with an asterisk which are per the Title 22 California Code of Regulations (State law). MCLs or regulations that are per State law are more stringent than Federal law. Some contaminants to be aware of are Total Trihalomethanes (TTHMs), Specific Conductance, and Total Dissolved Solids (TDS).

Table 4-5 - Summary of 2015-2020 CCR Data

	2015	2016	2017	2018	2019	2020	MCL or Regulation
Primary Standards – Monitored at Source							
Organic Chemicals	(a)	(a)	(a)	(a)	(a)	(a)	(a)
Inorganics							
Aluminum (mg/L)	-	-	-	ND	-	-	1
Arsenic (µg/L)	2.9	2.6	2.1	2.0	2.9	2.8	10
Barium (mg/L)	-	-	-	ND	ND	-	2
Fluoride (mg/L)	0.3	0.2	0.2	0.2	0.2	0.2	2*
Nitrate (mg/L as N)	3.0	3.1	3.2	3.7	3.4	3.8	10
Radiological							
Gross Alpha (pCi/L)	1.7	0.8	0.8	1.1	0.8	0.8	15
Gross Beta (pCi/L)	-	-	-	-	-	-	50
Radium 226 (pCi/L)	ND	0.02	0	0	0.3	ND	5
Radium 228 (pCi/L)	ND	0	0	0	0.1	ND	
Uranium (pCi/L)	2.2	1.9	0.9	0.9	2.1	2.1	20*
Primary Standards – Monitored in Distribution System							
Microbials							
Total Coliform Bacteria (count)	0	0	0	0	0	0	> 1 positive
Fecal Coliform and E. Coli Bacteria (count)	0	0	0	0	0	0	0
Disinfection By-Products and Disinfection Residuals							
TTHMs (µg/L)	14.8	39	44.5	8.2	69	8.7	80
Haloacetic Acids (HAA5) (µg/L)	2.8	4.2	4.3	0.6	ND	2.0	60
Total Chlorine Residual (mg/L)	1.2	1.3	1.3	1.3	1.4	1.4	4
Physical Constituents at the Tap							
Copper (mg/L)**	0.5	0.5	0.5	0.4	0.4	0.4	1.3
Lead (µg/L)**	ND	ND	ND	ND	ND	ND	15

	2015	2016	2017	2018	2019	2020	MCL or Regulation
Secondary Standards – Monitored at Source							
Aggressiveness Index (Corrosivity)	12.5	12.4	12.3	12.2	12.1	12.1	>10 (Non-corrosive)
Aluminum (µg/L)	-	-	-	ND	-	-	200*
Chloride (mg/L)	104.8	104.5	105	97.5	100.6	100.6	500
Manganese (µg/L)	4.9	4.9	4.9	ND	-	-	50
Odor (threshold odor number)	0.5	1	1	1	1	0.8	3
Specific Conductance (µS/cm)	902.5	950	947.5	952.5	970	980	1,600*
Sulfate (mg/L)	150	150	142.5	148.3	148.5	148	500
TDS (mg/L)	600	587.5	585	578.3	520	583.8	1,000*
Turbidity (NTU)	0.2	0.14	0.14	0.19	0.4	0.4	5*
Secondary Standards – Monitored in Distribution System							
Color (color units)	<3	2.8	<3	2	<3	<3	15*
Odor (threshold odor number)	1	1	1.1	1.1	1.1	1.1	3
Turbidity (NTU)	0.1	0.1	0.1	0.2	0.2	0.2	5*

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.
- Constituent was not analyzed.
ND Constituent was not detected at the testing limit.
NA Percentage cannot be determined using the data available.
* All constituents are per the SDWA (Federal law) except for those marked with an asterisk in the "MCL or Regulation" column which are per the Title 22 California Code of Regulations (State law).
** These contaminants are not reported as the average of sampling data. They are the 90th percentile from the sampling at selected customer taps.

TTHMs

Chlorine is added to drinking water for disinfection purposes to prevent growth of bacteria that can cause adverse health effects. TTHMs are a group of disinfection byproducts that are formed when the chlorine used to disinfect water reacts with other naturally occurring chemicals in the water. TTHMs can evaporate out of the water into the air and so can be inhaled as well as being drank. TTHMs has been shown to potentially cause cancer and be toxic to the liver, kidneys, central nervous and reproductive systems. TTHMs is a primary standard by EPA standards with an MCL of 80 µg/L.

It is common for water systems to experience temporary increases in TTHMs due to short-term increases in chlorine disinfection. This could be an explanation for why the concentration of TTHS varies per year reported. TTHMs should be monitored carefully so that the concentration does not rise above the MCL.

Specific Conductance

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

The latest sampling (2020) reported that the concentration was 980 µS/cm. The results of testing have shown that specific conductance is gradually increasing every year during the study period, aside from the 2017 which had a slight decrease. Specific conductance should be monitored carefully.

TDS

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

The latest sampling (2020) showed that the concentration was 583.8 mg/L. The results for the study period have decreased from 2015 to 2019 and then rose in 2020. Although there is no clear trend, TDS should be monitored closely to ensure that the concentration does not rise over the MCL.

4.3.2 PFAS in the Judson Well Field

The Judson Well Field supplies groundwater for LHHCWD from the Central Basin. The Central Basin has shown to have PFA constituents identified at varying levels at several testing locations per a study done by Kear Groundwater Inc. in 2020. There is a plume of contaminant west of the Judson Well Field that is anticipated to continue to expand in all directions. In data provided by LHHCWD it can be seen that, water sample results received on March 2022 show PFOA levels of 17.75 ppt at Well No. 9, 13.5 ppt at Well No. 10, and 12 ppt at Well No. 11. These values are above the response level of 10 ppt. Per the Kear Groundwater study, recent water quality data has shown that Well No. 8 is above the NL for PFOA. All four wells are also above the NL for PFOS and Well Nos. 10 and 11 are close to the response level. The high concentration of PFAS in the Central Basin is a concern for LHHCWD and steps are being taken to lower this concentration.

In a PFAS Cost Benefit Analysis done by Civiltec Engineering, Inc. for LHHCWD and ODWD in 2022, the anticipated capital and operation and maintenance (O&M) costs of potential PFAS well site treatment systems as well as other options to decrease the concentration of the contaminant were analyzed. The suggested new PFAS treatment systems consist of either Granulated Activated Carbon (GAC) or Ion Exchange (IX) treatment. A net present value (NPV) analysis was performed on the capital and O&M costs for each of the alternatives of the study. This value is a calculation of the anticipated total sum of money that would be needed to be set aside to cover all the expenses during the life of the treatment system.

GAC is a porous material with an extremely high internal surface area. When contaminated water passes through a bed of granular activated carbon, adsorption occurs and the contaminant is retained on the internal surface of the material, leaving the rest of the water to pass through. The granular activated carbon must be replaced or regenerated periodically when its capacity is exhausted for the treatment to continue efficiently. Per the Cost Benefit Analysis, the NPV of the average vendor costs for the GAC treatment system was determined to be $579/AF.

IX treatment works by passing the water to be treated through a bed of resin. As the water passes through this resin, negatively charged molecules (anions) or positively charged molecules (cations) are exchanged with more acceptable ions contained within the resin. The undesirable contaminants will then remain in the resin and therefore be removed from the water. An IX is used in PFAS applications. Per the Cost Benefit Analysis, the NPV of the average vendor costs for the IX treatment system was determined to be $639/AF.

Blending was not considered as an option in the Cost Benefit Analysis due to the fact that all four wells contain high levels of PFAS. Blending is the mixing of water with less concentration of a contaminant with contaminated water in a calculated ratio to meet or exceed regulations before delivery to customers. Per the study prepared by Kear Groundwater Inc. in 2020, LHHCWD would like to drill a new well or wells to replace Well Nos. 8 and 9. If the proposed well or wells have a better water quality than the existing wells, this water can be blended to dilute the concentration of PFAS and reduce their levels. Blending is likely to maintain the current O&M costs as a treatment system may not be needed. However, the water quality of the proposed new well is currently unknown and as such, the feasibility of blending with its water cannot be determined at this time.

It was determined through this study that although a GAC system will have a higher capital expense due to the additional treatment vessels needed for the process, the average annual O&M costs are lower with respect to the IX treatment option or purchasing imported water (The NPV of purchasing MWD water was $1,301/AF).

4.3.3 MWD Water Quality

LHHCWD is provided imported water through a connection with the MWD. MWD was formed in 1926 for the purpose of importing supplemental water to Southern California.

Water delivered to LHHCWD from MWD is treated at the Diemer Plant in Yorba Linda, California. The Diemer Plant treats a blend of water from the Colorado River, Lake Matthews Reservoir, and the SWP. Water quality is assessed periodically by MWD, and results are displayed annually in a MWD Drinking Water Quality Report. MWD water meets all state and federal water quality standards.

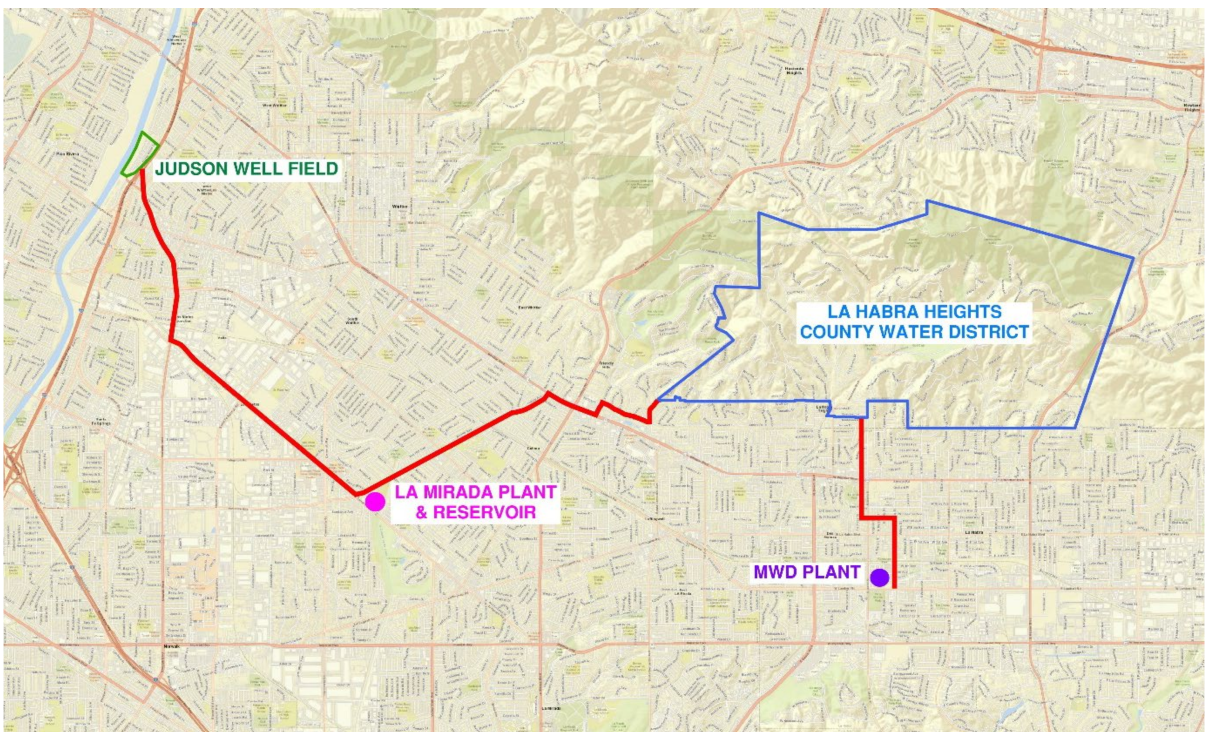
Chapter 5 - Existing Water System

5.1 General

A water system is composed of facilities and interdependent subsystems that work together to provide water service for customers. Pressure zones, booster pumping facilities, wells, pressure reducing stations, and water system interconnections all play a key role in LHHCWD's water system.

In LHHCWD's system, groundwater is extracted and pumped from the Judson Well Field and conveyed approximately four and a half miles to the La Mirada Reservoir and Pumping Plant. A portion of the water stored in the La Mirada Reservoir is gravity fed to ODWD per contractual agreement through an interconnection. The remaining water in the reservoir is pumped approximately three miles to LHHCWD's service area where it is then distributed throughout the water system. When needed, water can also be pumped from Plant No. 2 through an interconnection with the MWD. A diagram of the groundwater conveyance system can be seen in **Figure 5-1**. The red lines indicated in the figure are transmission pipelines from the source of supply to LHHCWD's boundary.

Figure 5-1 - Groundwater Conveyance System



Well No. 9 has been an integral part of the groundwater supply for LHHCWD for decades. Well No. 9 data is presented in this report since it remained in operation throughout the study period. Well No. 9 was removed from service in early 2022 which influences future planning discussed in Chapter 7.

The system generally operates as follows:

1. Water level in the La Mirada Reservoir controls operations at the Judson Well Field. Well Nos. 8, 9, 10, and 11 turn on in a pre-programmed sequence to refill the reservoir based upon the water level signal from LHHCWD's SCADA system. (It should be noted that as of March 2022, Well No. 9 has been placed on standby.)

2. From the La Mirada Plant, water is pumped to the 47,000-gallon forebay at Plant No. 1 and then boosted by Plant No. 1 pumps into the Lower Zone. Operation of pumps at Plant No. 1 is based on the water level in the forebay at the Plant.

3. Pumping Plant Nos. 5 and 6 boost waters from the Lower Zone to the Upper Zone reservoirs.

4. Water level in the Lyons Reservoir controls Booster Pumps 1, 2, and 3 at the La Mirada Plant. Any of the Lower Zone reservoirs can control La Mirada Plant if needed.

5. Water level at Reservoir No. 10A controls Booster Pumps 1 and 2 at Plant No. 5. Any of the Upper Zone reservoirs can control Plant No. 5 if needed.

6. Water level at Vigil Reservoir controls Booster Pumps 1 and 2 at Plant No. 6. Any of the Upper Zone reservoirs can control Plant No. 6 if needed.

7. As a precautionary measure, the high water level (HWL) in the forebay at Plant No. 1 turns off the boosters at the La Mirada Plant.

8. Plant No. 2 pumps MWD water (when needed) directly into the Lower Zone and is controlled by the level at the Lyons Reservoir. Plant No. 2 can be controlled by any of the Lower Zone reservoirs if needed.

Supervisory Control and Data Acquisition (SCADA) is a computer based system responsible for controlling critical functions of LHHCWD's water production system. SCADA is used to gather, monitor, and analyze real-time data from water production infrastructure throughout LHHCWD's system. Well and pump controls, reservoir levels, and other facility functions are controlled through SCADA.

5.2 Water System Pipelines

LHHCWD's system consists of two main water service pressure zones, four sub-zones, seven reservoirs, one forebay, five booster pump stations, four sub-zone pressure regulating stations, two pressure regulating stations for providing supplemental flow in case of a fire, and approximately 64.5 miles of pipeline ranging in diameter from 4 to 36-inches. A hydraulic schematic of the primary production facilities and data associated with them can be found in **Exhibit 6**.

There are a few encased pipelines in the system. The types of encasements are steel (STL) pipe, concrete box (CONC BOX), corrugated metal pipe (CMP), and reinforced concrete pipe (RCP). Most of the pipelines within encasements are polyethylene (PE) pipe. **Table 5-2** shows a summary of the encasements within LHHCWD's system.

Pipeline material in the water system consists of asbestos cement pipe (ACP), ductile iron pipe (DIP), high density polyethylene (HDPE), PE, polyvinyl chloride (PVC), RCP, and STL pipe. Most of the system is ACP as can be seen in **Table 5-1** which gives the length of pipe in the system based on diameter and material. Some of the DIP listed below may be cast iron.

Table 5-1 – Pipe Summary

Size (in)	ACP	DIP	HDPE	PE	PVC	RCP	STL	Total (feet)
4	11,495	1,218	-	-	-	-	3,524	16,237
6	60,301	18,660	-	-	-	-	3,595	82,556
8	106,533	7,331	-	-	518	-	979	115,361
10	18,010	-	-	-	-	-	3,132	21,142
12	21,253	3,039	-	-	-	-	3,170	27,462
14	2,213	-	-	-	-	-	656	2,869
16	3,378	1,253	-	-	-	-	691	5,322
18	14,237	-	-	202	-	-	3,104	17,543
20	9,518	14,127	-	-	-	-	7,714	31,359
22	-	-	-	-	-	-	98	98
24	-	74	417	11,463	-	-	77	12,032
28	-	-	-	2,695	-	-	-	2,695
30	-	-	-	-	-	1,932	370	2,302
33	-	-	-	-	-	1,925	730	2,655
36	886	-	-	-	-	-	-	886
Total	**247,825**	**45,702**	**417**	**14,360**	**518**	**3,857**	**27,840**	**340,519**

Table 5-2 – Pipe Encasement Summary

Dimensions (in)	CMP	CONC BOX	RCP	STL	Total (feet)
22	-	-	-	202	202
25	-	-	-	34	34
30	128	-	-	-	128
36	-	-	-	30	30
42	-	-	417	-	417
28x28	-	1,433	-	-	1,433
28x34	-	321	-	-	321
30x30	-	9,548	-	-	9,548
36x36	-	2,714	-	-	2,714
Total	**128**	**14,016**	**417**	**266**	**14,827**

5.3 Pressure Zones

LHHCWD is divided into two main pressure zones – the Lower Zone (833 Hydraulic Grade Line (HGL)) and the Upper Zone (1154 HGL). Besides these two main zones, there are four sub-zones that are served by pressure regulating stations. These sub-zones are the Escarpado, Greenview, Ganter, and Virazon Sub-Zones. The sub-zones serve parcels along the following roads:

- Escarpado serves a total of twelve parcels along Arbela Drive, West Road, and Escarpado Road.
- Greenview serves four parcels along Greenview Road.
- Ganter serves three parcels along Dorothea Road.
- Virazon serves three parcels along Subtropic Drive.

Exhibit 7 shows the boundaries of both the main pressure zones and sub-zones.

The hydraulic gradient for each main pressure zone is set by reservoirs. LHHCWD's reservoirs, their capacities, source of water, and the pressure zone or plant served is shown in **Table 5-3** and illustrated in the hydraulic profile in **Exhibit 6**.

A general description of each of the two main pressure zones is as follows:

Lower Zone:

- Most southerly zone in system. Operates at a static HGL of 833.
- The range of service elevations in the Lower Zone is from approximately 375 feet to 864 feet.
- The Lower Zone consists of approximately 2,313 acres.

Upper Zone:

- Most northerly zone in system. Operates at a static HGL of 1154.
- The range of service elevations in the Upper Zone is from approximately 605 feet to 1,122 feet.
- The Upper Zone consists of approximately 1,817 acres.

Table 5-3 – Reservoir Data

Reservoir	Material	Zone Served	Diameter (feet)	Height (feet)	Capacity (MG)
La Mirada	Steel	NA	156	32	4.29
No. 2	Steel	Lower Zone (833)	108	32	2.06
No. 5A	Steel	Lower Zone (833)	105	32	1.56
Lyons	Steel	Lower Zone (833)	94	32	1.94
Snooks	Steel	Upper Zone (1154)	60	24	0.47
Vigil	Steel	Upper Zone (1154)	125	24	1.97
No. 10A	Steel	Upper Zone (1154)	94	32	1.56
Total					**13.85**

5.4 Booster Pumping Facilities

There are five booster pump facilities within LHHCWD. These booster pump stations are the La Mirada Pumping Plant (Mills Avenue and Telegraph Road), Plant No. 1 (Whittier Boulevard and Santa Gertrudes Avenue), Plant No. 2 (Hacienda Road and East Road), Plant No. 5 (Reservoir No. 2 Site at Reposado Drive and Green View Road), and Plant No. 6 (Lyons Reservoir Site on Coban Road south of East Road). The characteristics of the booster pump stations can be found in **Table 5-4**.

Pumps are designed to operate most efficiently under an anticipated head range (typical suction pressure and discharge pressure) that depends on the pump characteristics. Typically pumps with an efficiency rating below 65% are considered candidates for improvements. SCE performed energy efficiency tests on all LHHCWD pumps in September 2021. **Table 5-4** displays the results of these efficiency tests. Any efficiencies below 65% are shown in red text in the table below.

It can be seen in the table that the following pumps are all below 65% and should be considered candidates for improvements:

- P1-B1 and P1-B3 from Plant No. 1
- P2-B2 through P2-B5 from Plant No. 2
- P6-B1 and P6-B2 from Plant No. 6

Table 5-4 – Booster Pump Station Data

Pump Station or Plant	Location	Pump No.	Rated Horsepower (hp)	Efficiency (%)*	Capacity (gpm)*	Suction	Discharge
La Mirada	Mills Ave and Telegraph Rd	LM-B1	75	68.1	1,612	La Mirada Reservoir	Plant No. 1
		LM-B2	75	69.8	1,622		
		LM-B3	75	68.0	1,629		
Plant No. 1	Whittier Blvd and Santa Gertrudes Ave	P1-B1	300	58.5	1,191	Plant No. 1 Forebay	Reservoir Nos. 5A, 2, and Lyons 833 Zone
		P1-B2	300	70.3	1,394		
		P1-B3	350	42.9	1,073		
Plant No. 2	Hacienda Blvd and East Rd	P2-B2	75	53.8	1,633	Interconnection with MWD (CEN-B – 47)	Reservoir Nos. 5A, 2, and Lyons 833 Zone
		P2-B3	75	61.9	1,753		
		P2-B4	75	59.5	1,743		
		P2-B5	50	57.6	792		
Plant No. 5	Reservoir No. 2 Site at	P5-B1	125	77.5	854	Reservoir No. 2	Snooks Reservoir, Reservoir

Pump Station or Plant	Location	Pump No.	Rated Horsepower (hp)	Efficiency (%)*	Capacity (gpm)*	Suction	Discharge
	Reposado Dr and Green View Rd	P5-B2	125	75.2	842		No. 10A, Vigil Reservoir 1154 Zone
Plant No. 6	Lyons Reservoir Site on Coban Rd south of East Rd	P6-B1	75	53.8	522	Lyons Reservoir	Vigil Reservoir 1154 Zone
		P6-B2	100	63.4	854		

*Capacity and efficiency are based upon SCE pump tests conducted in September 2021.

La Mirada Pumping Plant

The La Mirada Pumping Plant is located at the northeast corner of Mills Avenue and Telegraph Road. There are three booster pumps (B-1, B-2, and B-3) in parallel that take suction from the La Mirada Reservoir and discharge water into the Plant No. 1 forebay. The three pumps are identical (rated 75 hp each).

The La Mirada Reservoir water level effects the operations at the Judson Well Field. Well Nos. 8, 9, 10, and 11 turn on in a pre-programmed sequence to refill the reservoir based upon the water level signal. Water is pumped to the forebay at Pump Plant No. 1 from the La Mirada Plant. As a precautionary measure, the HWL in the forebay at Plant No. 1 turns off the boosters at the La Mirada Plant. Water level in the Lyons Reservoir is currently chosen to control Booster Pumps 1, 2, and 3 at the La Mirada Plant. Any Lower Zone reservoir can control the La Mirada Plant if needed.

Plant No. 1

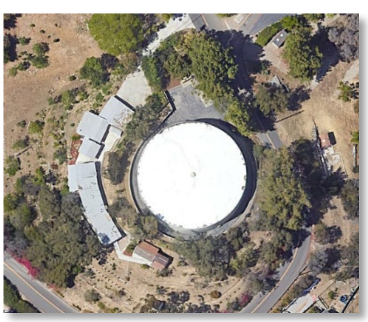
Plant No. 1 is located at the northeast corner of Whittier Boulevard and Santa Gertrudes Avenue. There are three booster pumps (P1-B1, P1-B2, and P1-B3) in parallel that take suction from the Plant No. 1 forebay and discharges into Reservoir No. 2, Reservoir No. 5A, Lyons Reservoir, and the Lower Zone. Two pumps are identical (rated 300 hp each) and one pump is larger (rated 350 hp).

The La Mirada Plant pumps water to the 47,000-gallon forebay at Plant No. 1. From there, the water is then boosted by Plant No. 1 into the Lower Zone. Operation of pumps at Plant No. 1 is based on the water level in the forebay of the plant.

Plant No. 2

Plant No. 2 is located at the southeast corner of Hacienda Boulevard and East Road. There are four booster pumps (P2-B2, P2-B3, P2-B4, and P2-B5) in parallel that take suction from an interconnection with MWD named CEN-B-47. The booster pumps then discharge water into Reservoir No 5A, Reservoir No. 2, Lyons Reservoir, and the Lower Zone. The P2-B2, P2-B3, and P2-B4 pumps are identical (rated 75 hp each) and P2-P5 is smaller (rated 50 hp).

The CEN-B-47 interconnection with MWD allows LHHCWD to import water from MWD when needed. The interconnection has a maximum capacity of 10-cfs (4,488 gpm) and imported water is controlled by MWD rules that are discussed further in later sections. The CEN-B-47 connection is located on Monte Vista Street, north of the intersection with Lambert Road. Plant No. 2 can pump MWD water directly into the Lower Zone and is controlled by the level at the Lyons Reservoir.



Plant No. 5

Plant No. 5 is located at the Reservoir 2 Site on Reposado Drive at the intersection with Green View Road. There are two booster pumps (P5-B1 and P5-B2) in parallel that take suction from Reservoir No. 2 and discharge into Snooks Reservoir, Reservoir No. 10A, Vigil Reservoir, and the Upper Zone. The two pumps are identical (rated 125 hp each).

Plant No. 5 boosts water from the Lower Zone to the Upper Zone reservoirs. The water level at Reservoir No. 10A controls booster pumps P5-B1 and P5-B2 at Plant No. 5.

Plant No. 6

Plant No. 6 is located at the Lyons Reservoir Site on Coban Road, south of East Road. There are two booster pumps (P6-B1 and P6-B2) in parallel that take suction from the Lyons Reservoir and discharge water into Snooks Reservoir, Reservoir No. 10A, Vigil Reservoir, and the Upper Zone. P6-B1 is smaller (rated 75 hp) and P6-B2 is larger (rated 100 hp).

Plants No. 6 boosts water from the Lower Zone to the Upper Zone reservoirs. Water level at Vigil Reservoir controls P6-B1 and P6-B2 at Plant No. 6.

5.5 Wells

There are three active wells within LHHCWD's system. During the study period (FY 2016 to FY 2021), Well No. 9 was active, however, as of March 2022, this well has been taken out of service. Data for Well No. 9 is still shown in the table below since it was active during the study period. As Well No. 9's pump efficiency is below 65%, it was a candidate for retrofit or replacement. Well No. 8 also has an efficiency below 65% and is also a candidate for retrofit or replacement. The efficiencies of these two wells are show in red text to signify that they are below 65%. All wells discharge to the La Mirada Reservoir. Groundwater from the La Mirada Reservoir is treated by means of chlorine injection prior to leaving the La Mirada site. Information on the active wells can be found in **Table 5-5**.

Table 5-5 – Well Facilities

Well	Year Drilled	Depth Below Grade (feet)	Motor Size (hp)	Efficiency (%)*	Approx. Length of Column (feet)	Design Flow (gpm)	Existing Rate of Flow (gpm)*
No. 8	1950	650	100	64.7	180	950	904
No. 9	1950	677	75	59.9	350	750	582
No. 10	1998	800	150	71.9	250	3,000	2,191
No. 11	2001	805	150	74.0	250	3,500	2,394

*Existing rate of flow (gpm) and efficiency are based upon SCE pump tests conducted in September 2021.

5.6 Pressure Reducing Stations

There are six active pressure reducing stations or valves operational in LHHCWD's water system. Four of these pressure reducing stations control pressure sub-zones and two are for providing supplemental flow in the case of a fire.

The Escarpado, Virazon, Ganter, and Greenview pressure reducing stations are set to maintain a constant downstream pressure, with associated hydraulic gradient. Each of the four pressure reducing stations serves a sub-zone. Pressures would be too great in these areas if served by the main pressure zones.

Ardsheal and Dorothea connect the Upper and Lower Pressure Zones at the zone boundaries. They provide fire flow protection in the Lower Zone. If a sudden drop in pressure occurs in the Lower Pressure Zones due to a fire flow event, the respective valve would open and provide additional flow to the area as needed. This flow will assist in meeting the fire flow requirement and help maintain minimum residual pressure.

See **Table 5-6** for data on the six pressure reducing stations in LHHCWD.

Table 5-6 – Pressure Reducing Station Data

Name	Size (inch)	Location	Set Pressure (psi)	Ground Elevation (feet)	Set Downstream HGL (feet)
Escarpado	2	At the intersection of Escarpado Drive and West Rd	82	378	567
	4		75		551
	1		90		Atmosphere
Virazon	2	2059 Virazon Drive, 1,030 feet south of Encanada Dr	52	764	885
	4		20		810
	0.5		30		Atmosphere
Ganter	1.5	1938 Ganter Road, 420 feet south of Cypress Dr	49	770	884
	6		40		862
	0.5		45		Atmosphere
Greenview	2.5	505 Greenview Road	15	820	855
	6		10		843
	2.5		65		Atmosphere
Ardsheal	6	2323 Ardsheal Drive	14	800	833
Dorothea	6	Dorothea Rd and Cypress St	49	720	833

Note: The valves that discharge to atmosphere are the pressure relief valves of the pressure reducing station.

5.7 Water System Interconnections

LHHCWD has connections with Suburban Water Systems (Suburban), CDWC, ODWD, Rowland Water District (RWD), and MWD. The summary of these interconnections can be found in **Table 5-7**.

Table 5-7 – Interconnection Data

From	To	Type	Location
LHHCWD	Suburban	Emergency	Plant No. 1
LHHCWD	Suburban	Emergency	Solejar Drive and Vista Del Llano Drive
MWD	LHHCWD	Imported Water Supply	Plant No. 2
LHHCWD	CDWC	Emergency	1099 N. Idaho Street at Rebecca Drive, La Habra

From	To	Type	Location
LHHCWD	ODWD	Contractual (Per 1957 agreement)	La Mirada Plant
CDWC	LHHCWD	Emergency	CDWC HQ
LHHCWD	RWD	Contractual	RWD HQ

5.7.1 Suburban Water Systems (Suburban)

There are two emergency interconnections from LHHCWD to Suburban. One is located at Plant No. 1 and the other is located just east of the intersection of Solejar Drive and Vista Del Llano Drive.

5.7.2 California Domestic Water Company (CDWC)

LHHCWD has two emergency interconnections with CDWC. One is a two-way emergency interconnection located at CDWC's main office that connects to a 20-inch LHHCWD supply pipeline. The other emergency interconnection is located at 1099 N. Idaho Street at Rebecca Drive in La Habra.

5.7.3 Orchard Dale Water District (ODWD)

In 1957, through a mutually agreed upon court action and legal agreement, ODWD became a limited partner in, what is called today, the Judson Well Field. Through this Joint Facilities Agreement, the ownership of facilities and the conditions of their use, operation, maintenance, and repair were established. This Agreement allows LHHCWD and ODWD to avoid purchasing costly imported water from the MWD.

Per this Agreement, LHHCWD owns and operates the Judson Well Field and La Mirada Reservoir. ODWD pays a proportionate share of O&M costs for the wells, transmission pipeline facilities, and La Mirada Reservoir in exchange for groundwater produced by the Judson Well Field.

During normal operations, all production from the Judson Well Field is pumped directly into the La Mirada Reservoir. ODWD is entitled to store water in this reservoir for use in their system per the Joint Facilities Agreement. From there, a 16-inch metered connection is used to gravity feed the well water to ODWD. The remaining storage in La Mirada Reservoir is pumped by the La Mirada Plant for use by LHHCWD's customers.

5.7.4 Rowland Water District (RWD)

An agreement dated May 16, 2012 and amended June 8, 2021 was put into place for delivery of water from LHHCWD to RWD. This agreement describes the operating conditions that LHHCWD's system must have for capacity be available to RWD. A new interconnection was built at RWD headquarters to take the water deliveries. A new 12-inch pipeline was also constructed from LHHCWD's Upper Pressure Zone to the RWD headquarters along Fullerton Road.

5.7.5 Metropolitan Water District (MWD)

LHHCWD can import water to Plant No. 2 from an interconnection with MWD. The water MWD supplies to LHHCWD flows through the R.B. Diemer Filtration Plant. This plant receives water from the SWP and the Colorado River Aqueduct. The 96-inch Lower Feeder leaving the plant has a design capacity of 500 cfs. The Lower Feeder traverses the area in a westerly direction from the plant to its termination point on the Orange County Feeder and Coyote Creek.

The interconnection from LHHCWD to the Lower Feeder of MWD was constructed in 1978. It is designated as CEN-B-47 and has a maximum capacity of 10 cfs (4,488 gpm). The CEN-B-47 connection is located on Monte Vista Street, north of the intersection with Lambert Road. The pipeline stationing of the connection on the Lower Feeder is 1733+55.

MWD imposes restrictions of rates of flow through each connection to its system. These include the following:

1. Within any 24-hour period, changes in rate of flow shall not vary more than 10 percent above or below the average of the previous 24 hours.

2. Average flow during any one month shall not exceed 132 percent of annual average flow.

3. When flow through a connection is reduced below 10 percent of the requested flow or 10 percent of the design capacity of the meter, whichever is less, LHHCWD will be charged for flow at 10 percent of the capacity of the meter.

Chapter 6 - Design Criteria

6.1 Design Criteria

Design criteria are used as benchmarks that reflects customer expectations, the regulatory environment, sustainable design, redundancy/reliability, functionality, emergency preparedness, and efficiency. They are used to evaluate the hydraulic capacity of an existing water distribution system.

6.1.1 Peaking Factors

Water data from the six-year study period (FY 2015-16 to FY 2020-21) was used to determine the ratios for MDD and PHD from ADD. These ratios are called Peaking Factors (PF) which compare the various extreme demand conditions to the annual average.

Per the production data, the ADD for the study period is 2,728 AFY or 1,691 gpm. As ADD is the average for the study period, its peaking factor is 1.00.

MDD was determined by analyzing the data and finding the day with the highest demand during the study period. MDD for the study period was found to be 3,831 gpm or 2.27 times the ADD. Therefore, the peaking factor for MDD is 2.27.

Since there is no direct data describing fluctuation on an hourly basis for LHHCWD, per the California Code of Regulations Title 22 Section 64554, Peak Hour Demand (PHD) is taken as 1.5 times the MDD. Therefore, PHD is 3.40 times the ADD and its peaking factor is 3.40.

A summary of the peaking factors and the demand for the study period for each demand scenario is shown in **Table 6-1**.

Table 6-1 - Peaking Factors

Demand Condition	Abbr.	gpm	PF
Average Day Demand	ADD	1,691	1.00
Maximum Day Demand	MDD	3,831	2.27
Peak Hour Demand	PHD	5,747	3.40

6.1.2 System Pressure

Goal for normal system pressure range: 40 psi to 125 psi.

A water system should aim to operate under a pressure range in order to provide consistent level of service. Water industry design criteria typically has the ultimate goal of 40 to 80 psi for system pressures in distribution mains under normal operating conditions. As the terrain changes rapidly within LHHCWD's service area, this goal may not be always achievable, but under no circumstances should the pressure in the system exceed the pressure class rating of the pipe.

As recommended in Section 1007 (b) of the current Uniform Plumbing Code, individual pressure regulators should be installed on all services that could have pressures greater than 80 psi at the meter. It is typically the customer's responsibility to install and maintain these pressure regulators at their own expense.

Daily pressure fluctuation: 20 psi maximum.

Minimizing pressure fluctuation during the day will result in more consistent delivery. Stable water pressure is desirable at service connections for consistency of service delivery. Establishment of a range for daily pressure fluctuation is driven by customer expectations.

Goal for minimum pressure during fire: 20 psi

Residual pressures should not fall below 20 psi when delivering the required fire flow rate. Fire hydrants that are located so close to reservoirs as to not achieve the requirement (draft hydrants) are exempt from this requirement. This minimum residual pressure requirement is established by the SWRCB, DDW and the Uniform Fire Code. A minimum pressure requirement provides a buffer against the possibility of negative pressure in the distribution system which could result in contamination ingress.

Goal for maximum pressure during minimum hour: 200 psi or pipeline pressure class, whichever is less.

During the normal operation of facilities within a water distribution system, when a pump is turned on or off or when a control valve is opened or closed, a surge of energy may be created. This energy surge causes a pressure wave that could potentially damage sensitive machinery or vulnerable pipelines already under high pressure. Due to this, during minimum hour demands when booster pumps are operating to refill reservoirs, pressures should not exceed 200 psi as an ultimate goal, or the pressure rating of the pipe, whichever is lower. Maximum pressures within a system typically occur (1) at production and transmission facilities such as wells, booster pumping stations and control valves or (2) at low elevations. Under no circumstances should the pressure in the distribution system exceed the pressure class rating of the pipe.

6.1.3 Supply

Combined production capacity of MDD with largest single source out of service.

The total groundwater well production capacity of LHHCWD must be capable of meeting MDD with the largest single groundwater source out of service. This standby capacity will provide system reliability regardless of a temporary loss of a single groundwater well due to unforeseen emergency or maintenance.

Combined production capacity sufficient to refill emergency and fire storage in two days (48 hours) under MDD with all sources operating.

The total groundwater well production capacity must be able to meet MDD within 48 hours. When an emergency or fire event occurs, the temporary depletion of storage creates vulnerability to further events of the same nature. A rapid replenishment of storage will minimize this vulnerability.

6.1.4 Storage Capacity

Sum of Operational, Fire and Emergency Storage in each pressure zone.

- Operational Storage: 30 percent of MDD
- Fire Storage: 1,500 gpm for a duration of 2 hours
- Emergency Storage: 24 hours at MDD

The main functions of storage are:

- To equalize fluctuations in hourly demand so that extreme and rapid variations in demand are not imposed on the source of supply;
- To provide water for firefighting; and
- To meet demand during an emergency such a disruption of the major source of supply, a power outage, a pipe break or other unforeseen emergency or maintenance issue.

Operational Storage

Operational storage is determined by fluctuations in hourly demand during peak summer demand periods. It is the volume needed to equalize the difference between supply and demand over the course of a day. The volume of operational storage, as an industry standard, averages between 20 and 30 percent of MDD. The operational storage for LHHCWD should be equal to 30 percent of MDD for all pressure zones with storage.

Fire Storage

The water system must be capable of meeting MDD and firefighting requirements simultaneously. LHHCWD's fire storage criterion is developed based on the recommendations of the Insurance Services Office (ISO), the County of Los Angeles Fire Department and the La Habra Heights Volunteer Fire Department.

The historical, 'grandfathered' fire flow requirement is 750 gpm for a duration of two hours. Any new developments or existing structures that are to be altered must follow updated fire flow requirements: 1,000 gpm for structures between 1 and 3,600 SF and 1,500 gpm for structures greater than 3,600 SF. As 1,500 gpm is the highest fire flow within LHHCWD's service area, fire storage will be 1,500 gpm for 2 hours to be most conservative.

Emergency Storage

Emergency storage is required to meet demands during times of planned and unplanned equipment outages such as pump breakdown, power failure, pipeline rupture, etc. Emergency storage is estimated based on the water supply to a pressure zone being out of service for a period of 24 hours under MDD conditions. This storage will allow LHHCWD 24 hours to repair the emergency or secure alternative storage.

MWD Suggested Storage Criteria

For water retailers that are dependent on MWD supplies, MWD staff highly recommends that systems should be designed to withstand a shutdown of MWD's facilities for a seven-day period. This seven day period is the projected maximum time required for a planned shutdown of MWD's system when repair, inspection, or maintenance is needed. To minimize impact, planned shutdowns should only occur during low to average water demand periods.

Should LHHCWD become 100% dependent on MWD year-round due to the loss of all groundwater supply, it is recommended that LHHCWD water system contain, as a minimum, storage equal to seven days of average water use, with the MWD connection shut down while maintaining other sources of supply such as emergency connections with adjacent water purveyors.

6.1.5 Booster Pumping Capacity

If gravity storage is available, capacity should equal MDD with largest pump out of service.

In the future, any pressure zones without storage (sub-zone systems) must have pumps capable of supplying maximum day demand plus fire flow (MDD+FF) or PHD, whichever is greater.

Flow and pressure are maintained in each pressure zone by a combination of booster pumps, reservoir storage and/or pressure reducing valves. In pressurized systems, the hydraulic gradient is established artificially by a balance between pumps which add pressure and relief valves which reduce pressure. Pumps may also be equipped to regulate the amount of energy they impart to the water with variable frequency drives.

Due to this, it is important to be able to have enough booster pump capacity at a station to operate under MDD so that the system can continue functioning when a booster pump is out of service.

Maintain alternative power source to operate critical pump stations

To protect against a power failure, alternative sources of power should be maintained in order to operate critical pumps and provide adequate supply on a temporary basis until the grid is restored.

Additional Booster Pumping Criteria

Station Sizing

Booster pumping stations should have a minimum of two pumping units of equal capacity, each sized to provide MDDs. Pumping stations which consist of more than two units should have adequate capacity to meet MDDs with the largest unit out of service.

When booster pumping stations can provide redundant amounts of capacity to meet MDDs, service will remain uninterrupted if a pump is not operational.

Pump Efficiency

All pumps should be tested periodically for efficiency on a two-or three-year basis. Any time a booster pump falls below 65% efficiency, it becomes a candidate for maintenance or replacement.

Maintaining high overall pumping plant efficiency is essential for minimizing energy costs. The importance and typical operation of a booster pump will also play a critical role in recommended improvements based on efficiency. Pumps used often or continuously have a higher priority than pumps that are rarely used or not needed for normal operations.

6.1.6 Pressure Reducing Stations

The primary capacity equals PHD or MDD+FF within the continuous rating of valves, whichever is greater. Maximum intermittent flow rating of valves is acceptable for fire flows. Allowance made for low flows.

In general, pressure reducing stations should be provided when needed to supplement deliveries to lower pressure zones or pressure sub-zones. For LHHCWD, this would be sub-zones between Zones or below the Lower Zone. Pressure reducing stations should also be considered when distribution piping is operated at or above the maximum pressure rating of the pipe. Pressure reducing stations shall be sized to meet PHD or MDD+FF, whichever is greater, within the continuous flow rating of the valves.

It is recommended that three valves be installed within each pressure reducing station that is intended to feed a small sub-zone. Two smaller valves should be installed that, combined, can provide MDD. One larger valve should be installed that can provide all flow required in the zone.

6.1.7 Pipelines Sizes

Standard pipe sizes to be used are 8-inch, 12-inch, and 16-inch for distribution. 6-inch pipes may only be considered for cul-de-sacs and in areas where hydraulic system analysis supports the smaller pipe size.

6.1.8 Transmission Mains

Velocity range under normal operating conditions for transmission main and reservoir inlet-outlet: 4 to 6 feet per second. Maximum energy loss under normal operating conditions: 1.5 to 3 feet of head loss per 1000 feet of pipe.

Transmission mains carry water at a high flow rate between facilities (i.e. production, treatment, booster stations and storage). Energy losses can be managed or reduced by controlling pipe velocity. The primary methods for controlling pipe velocity are (1) increasing pipe diameter, (2) providing multiple flow pathways and (3) reducing flow rate. Velocity and energy loss (i.e. feet of head loss per 1000 feet of pipe) are indirectly related measurements of transmission efficiency and should both be examined independently.

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

6.1.9 Distribution Mains

Sized to satisfy two conditions:

(1) MDD plus fire flow with residual pressure of 20 psi

(2) PHD with system pressure between 40 psi and 125 psi

Maximum pipe velocity: 10 fps (except under fire flow conditions)

Maximum headloss: 10 feet per 1,000 feet of pipe (except under fire flow conditions)

Distribution mains carry water to service connections and fire hydrants. Fire flow is typically the governing factor in sizing distribution mains, although normal operations under peak demand conditions should also be examined for efficiency.

6.1.10 Fire Flow and Fire Hydrant Spacing Requirements

Fire flow information for LHHCWD is referenced from Chapter 4.4 Fire Code of the La Habra Heights Municipal Code, which constitutes an amended version of the California Fire Code, 2019 Edition (Part 9 of Title 24 of the California Code of Regulations).

All portions of a facility or building must be within 400 feet of a hydrant as measured by an approved route. For Residential Group R-3 and Group U occupancies equipped with an approved automatic sprinkler system, the distance requirement is within 600 feet.

The following fire flow requirements are applied within LHHCWD's service area:

- 750 gpm for 2 hours: For current 'grandfathered' structures

For new structures or if alterations are to be done to existing structures:

- 1,000 gpm for 2 hours: Structures between 1 to 3,600 SF
- 1,500 gpm for 2 hours: Structures greater than 3,600 SF

If a hydrant cannot meet the fire flow requirements set above, the capacity of the hydrant should be brought up to current requirements prior to (1) land subdivision, (2) construction or (3) the installation/alteration of the water system.

If none of these three conditions exists, it is assumed that the hydrant was subject to a lower standard at the time of installation and this lower standard has been "grandfathered in" (aka allowable nonconformity). The fire flow requirement for current, 'grandfathered' structures is 750 gpm for two hours.

Table 6-2 - LHHCWD Water System Design Criteria

Element	Design Criteria
System Pressure	• Goal for normal system pressure range: 40 psi to 125 psi. • Goal for minimum pressure during fire: 20 psi. • Goal for maximum pressure during minimum hour: 200 psi or pipeline pressure class, whichever is less. • Daily pressure fluctuations: 20 psi maximum.
Supply	• Combined production capacity of MDD with largest single source out of service. • Combined production capacity sufficient to refill emergency and fire storage in two days with all sources operating.
Storage Capacity	• Operational: 30 percent of MDD. • Fire flow: 1,500 gpm – Duration 2 hours. • Emergency: 24 hours at MDD.
Booster Pumping Stations	• If gravity storage is available: capacity equals MDD with largest single pump out of service.

Element	Design Criteria
	• If gravity storage is not available: capacity equals +FF or PHD, whichever is great, with largest pump out.
Pressure Reducing Stations	• Capacity equals MDD+FF or PHD within the continuous rating of valves. Maximum intermittent flow rating of valves is acceptable for fire flows. Allowance made for low flows.
Pipeline Sizes	• Standard pipe sizes to be used are 8-inch, 12-inch, and 16-inch for distribution. 6-inch pipes may be considered for cul-de-sacs and in areas where hydraulic system analysis supports the smaller pipe size.
Transmission Mains	• Sized to meet MDD for pumping plant discharge lines. Sized for MDD plus fire flow or PHD, whichever is greater. For transmission main and reservoir inlet-outlet, velocity range: 4 to 6 fps, and headloss range: 1.5 to 3 feet per 1,000 feet of pipe.
Distribution Mains	• Sized to meet MDD+FF or PHD, whichever is greater. • Maximum velocity of 10 fps and maximum headloss of 10 feet per 1,000 feet of pipe, except under fire flow conditions.
Fire Hydrant Spacing	• A building must be within 400 feet of a hydrant. • For R-3 and U occupancies with sprinkler systems: within 600 feet. • Commercial/Industrial: per Fire Department requirements.
Fire Flow	• 750 gpm for current 'grandfathered' structures. • For new developments or existing structures that are to be altered, 1,000 gpm for structures between 1 and 3,600 SF and 1,500 gpm for structures greater than 3,600 SF.

6.2 Planning Criteria

Planning criteria deal with cyclical infrastructure replacement due to age, condition and other non-hydraulic factors. Note that it is possible for a pipeline or other of piece of equipment to meet the hydraulic requirement established by design criteria, while at the same time exhibit costly repairs or downtime due to fatigue, corrosion, normal wear, poor workmanship, incompatibility or other issues associated with deterioration. Planning criteria provide a secondary methodology for identifying and mitigating vulnerabilities in the system by a combination of qualitative and quantitative analyses

Planning criteria are not meant to be rigid set of rules that narrowly define service life; rather, they provide guidance for determining those portions of the distribution system that would benefit most from replacement in advance of higher and unsustainable costs associated with maintenance and inefficiency.

Well designed and maintained water systems will provide many years of superior performance, but at some point, replacement of individual components is necessary for sustainability. Components that exceed both the time interval and performance indictor should be considered as high priority replacement projects.

Table 6-3 provides general parameters for determining when a particular component should be replaced. A combination of time interval and indication of performance provides solid justification for replacement. Components that exceed both the time interval and performance indicator should be considered as high priority replacement projects.

Table 6-3 - Replacement Schedules and Indications

Component	Interval (years)	Indication
Pipeline (other than AC)	60	Frequent repair history, excessive energy losses
AC Pipelines	Over 100	Frequent repair history, excessive energy losses
Pump/ Motor Overhaul	15	Drop in efficiency below 65%
Pump/ Motor Replacement	30	Frequent repair history, drop in efficiency
Control Valve Overhaul	25	Leaks, poor response, frequent repairs
Reservoir Recoating	15	Evidence of corrosion
Reservoir Replacement	80	Frequency/ extent of repair history
Well Rehabilitation/ Replacement	50	Decline in effective capacity
Production meter calibration	5	Drop in accuracy
Production meter replacement	20	Drop in accuracy and reliability

Chapter 7 - Existing System Analysis and Proposed Improvements

7.1 General

In order to determine recommended improvements to LHHCWD's water system, the system was analyzed in accordance with LHHCWD's design criteria discussed in Chapter 6. The calibrated water model was used to assess the ability of the system to meet the existing and projected demands for the study period. The capacities of LHHCWD's infrastructure have been taken into consideration during these analyses.

LHHCWD is divided into two main pressure zones, Lower Zone and Upper Zone. Each zone includes a series of reservoirs working collectively to provide fire, operational, and emergency storage by gravity. The La Mirada Plant and Plant No. 1 work in sequence to boost groundwater into the Lower Zone from the Judson Well Field. Plant No. 2 boosts imported water into the Lower Zone. The Upper Zone is dependent on its water supply from the Lower Zone. The way the two main pressure zones function and their demands were taken into account during this analysis.

The existing average day demand (ADD) for the study period for the Upper Zone is 747 gpm and for the Lower Zone is 944 gpm, for a system total of 1,691 gpm. The future demand was calculated based on the population at buildoout (2036) that was projected using existing population values from the United States Decennial Census and the California Department of Finance. See Chapter 2 for a more detailed explanation on the process of projecting the population for 2036. At build-out (2036), the population is anticipated to decrease from 5,682 to 5,478. The anticipated future ADD for the Upper Zone is 741 gpm and for the Lower Zone is 937 gpm, for a system total of 1,678 gpm.

7.2 Storage Analysis

LHHCWD has seven existing reservoirs in its system. Of these, six reservoirs establish the hydraulic gradient of the two main pressure zones (Lower and Upper Zones). Reservoir No. 2, No. 5A and Lyons provide water storage for the Lower Zone. Snooks, Vigil and Reservoir No. 10A provide water storage for the Upper Zone. **Table 5-3** shows these reservoirs, the zone they serve, and their corresponding capacities. Including the La Mirada Reservoir, LHHCWD has a total storage capacity of 13.85 MG.

Although the La Mirada Reservoir is used to store water that is pumped into the Lower Zone and serves as a groundwater storage facility, its capacity is not taken into consideration under existing and proposed conditions for storage analysis. The capacities of the remaining six reservoirs listed in **Table 7-1**, 9.56 MG, will be used for storage analysis discussed in this section.

Table 7-1 – Reservoir Data

Reservoir	Zone Served	Capacity (MG)
La Mirada	NA	4.29
No. 2	Lower Zone	2.06
No. 5A	Lower Zone	1.56
Lyons	Lower Zone	1.94
Snooks	Upper Zone	0.47
Vigil	Upper Zone	1.97
No. 10A	Upper Zone	1.56
Total Water Storage Capacity (MG)		**13.85**
Total Capacity for Storage Analysis (MG)		**9.56**

This storage analysis is based on LHHCWD's adopted criteria and MWD's suggested criteria. LHHCWD's criteria states that the system must provide the operational storage, fire storage, and emergency storage required in each main pressure zone. The storage criteria from LHHCWD as written in Chapter 6 is as follows:

> **Operational Storage:** The volume of water required to provide storage for fluctuations in demand during the day. This volume has been determined to be equivalent to 30 percent of one day of MDD.
>
> **Fire Storage:** The volume of water required to meet the short-duration high demand of a fire event. The maximum fire flow requirement within LHHCWD's service area is 1,500 gpm for a duration of 2 hours.
>
> **Emergency Storage:** The volume of water required to provide for planned and unplanned equipment outage such as pump breakdown, pipeline failure, electric power outage or natural disaster. This volume has been determined to be equivalent to 24 hours of MDD.

The MWD criteria represents the required volume to maintain service during a planned shutdown of imported water deliveries when routine maintenance is done. This value is typically seven days of ADD.

The following tables provide an analysis of existing and future conditions for the storage design criteria discussed in Chapter 6. The "*Surplus or Deficit*" column of the tables evaluates the existing storage capacity in each zone against the required storage per the design criteria. The "*Equivalent in ADD Days*" column indicates how LHHCWD's capacity compares to MWD's suggested criteria for storage.

Table 7-2 - Existing Conditions - Storage Analysis

Pressure Zone Name	Volume (MG)	MDD (MGD)	Fire Storage			Operational (30% of MDD) (MG)	Emergency (24 hrs of MDD) (MG)	Total Required Storage (MG)	Surplus or (Deficit) (MG)	Equivalent in ADD Days (MG)
			(gpm)	(hrs)	(MG)					
Upper	4.00	2.44	1,500	2	0.18	0.73	2.44	3.35	0.65	3.72
Lower	5.56	3.09				0.93	3.09	4.20	1.36	4.09
Total	**9.56**	**5.53**	**1,500**	**2**	**0.18**	**1.66**	**5.53**	**7.55**	**2.01**	**7.81**

The results of the existing storage analysis presented in **Table 7-2** indicates that both Upper and Lower Zones have sufficient storage during existing demand conditions. The table also displays LHHCWD meets MWD criteria to have sufficient storage for seven average days.

Table 7-3 - Future Conditions - Storage Analysis

Pressure Zone Name	Volume (MG)	MDD (MGD)	Fire Storage			Operational (30% of MDD) (MG)	Emergency (24 hrs of MDD) (MG)	Total Required Storage (MG)	Surplus or (Deficit) (MG)	Equivalent in ADD Days (MG)
			(gpm)	(hrs)	(MG)					
Upper	4.00	2.42	1,500	2	0.18	0.73	2.42	3.33	0.67	3.75
Lower	5.56	3.06				0.92	3.06	4.16	1.40	4.12
Total	**9.56**	**5.48**	**1,500**	**2**	**0.18**	**1.65**	**5.48**	**7.49**	**2.07**	**7.87**

The future storage conditions in **Table 7-3** indicates that both Upper and Lower Zones have sufficient storage under future demand conditions. It also displays LHHCWD would still meet MWD criteria to have sufficient storage for seven days.

7.3 Booster Analysis

7.3.1 Booster Capacity Analysis

LHHCWD has five pumping plants within its system. The La Mirada and Plant No.1 work together in series where groundwater from the Judson Well Field feeds the La Mirada Reservoir and the La Mirada Plant which then pumps water to the 47,000-gallon forebay and Plant No. 1 that supplies the Lower Zone. The Lower Zone then provides water into the Upper Zone with the use of Plant No. 5 and No. 6. Plant No. 2 is supplied by the MWD lower feeder. The booster pumps, their individual capacities, and the zones they serve for each plant are given in **Table 7-4.** The available capacities shown in the table for Plant No.2, No.5 and No.6 were obtained from the SCE tests in September 2021, however the flow capacities for the La Mirada Plant and Plant No.1 were provided by field test done by LHHCWD staff in May 2022. The total capacity of the plant displayed in the table below is the capacity of the plant when all pumps are running and is not the sum of the individual pump capacities.

Along with each pump capacity shown in the table below, the firm pump capacity is displayed. As mentioned before, the La Mirada Plant and Plant No. 1 work in series hence the firm pumping capacity for La Mirada Plant is the total capacity of the plant with its largest pump out of service and the same applies to Plant No. 1. With Plant No. 2 being supplied by the MWD Lower Feeder and not the Judson Well Field, its capacities are not applied to influence the booster capacity analysis for the Lower Zone.

Table 7-4 – Plant Capacities

Plant	Booster Pump Name	Booster Pump Available Capacity (gpm)	Zone Served	Total Capacity of Plant (gpm)	Largest Pump per Station (gpm)	Firm Pumping Capacity (gpm)
La Mirada Plant	LM-B1	1,604	NA	3,693	1,618	2,872
	LM-B2	1,597	NA			
	LM-B3	1,618	NA			
Plant No. 1	P1-B1	1,592	Lower	4,242	1,881	3,085
	P1-B2	1,633	Lower			
	P1-B3	1,881	Lower			
Plant No. 2*	***P2-B2***	***1,633***	***Lower***	***5,921***	***1,753***	***4,168***
	P2-B3	***1,753***	***Lower***			
	P2-B4	***1,743***	***Lower***			
	P2-B5	***792***	***Lower***			
Plant No. 5	P5-B1	854	Upper	NA	854	2,218 (For Upper Zone)
	P5-B2	842	Upper			
Plant No. 6	P6-B1	522	Upper	NA		
	P6-B2	854	Upper			

****Plant No.2*** is supplied by MWD connection and not by the well fields. It could be used as a backup. This plant was not used for Booster Capacity Analysis

Per the design criteria, since gravity storage is available in both of the Lower and Upper Zones, the system's primary booster pumping capacity must equal maximum day demand with the largest pump out of service per zone.

Since the Upper Zone is dependent for its supply on the Lower Zone, booster pumps in the Lower Zone must be capable of providing MDD for the entire service area. The water system is dependent on the booster pumps serving the Lower Zone from Plant No. 1 or La Mirada. This analysis of the entire system is shown in the row labeled "*Overall*".

The Upper Zone must be able to serve the MDD capacity using the booster pumps at Plant No. 5 and Plant No. 6. The pumps that were used in the total firm pumping capacity for this portion of the analysis were P5-B2 from Plant No. 5 and P6-B1 and P6-B2 from Plant No. 6. This analysis is shown in **Table 7-5**.

Future conditions for the overall system and Upper Zone booster pumping analyses are shown in **Table 7-6.**

Table 7-5 – Existing Conditions - Booster Pump Analysis

Zone	MDD (gpm)	Plant	Firm Pumping Capacity (gpm)	Surplus or (Deficit) (gpm)
Overall	3,938	La Mirada	2,872	**(967)**
		Plant No.1	3,085	**(754)**
Upper	1,696	Plant No.5 &6	2,218	522

As shown in **Table 7-5,** there is an existing booster pump deficiency in the existing overall system with the La Mirada Plant and Plant No.1. It can be seen that the Upper Zone has a booster pumping capacity surplus.

Table 7-6 – Future Conditions - Booster Pump Analysis

Zone	MDD (gpm)	Plant	Firm Pumping Capacity (gpm)	Surplus or (Deficit) (gpm)
Overall	3,809	La Mirada	2,872	**(937)**
		Plant No.1	3,085	**(724)**
Upper	1,682	Plant No.5 &6	2,218	536

Even with the decrease in MDD, there is still booster pumping deficiencies in the overall system when the largest pump is out of service in the La Mirada Plant as well as when the largest pump is out of service in Plant No. 1. With those plants being in series, since the La Mirada Plant cannot meet the MDD requirement, Plant No. 1 will also not meet the criteria. The Upper Zone will remain to have booster pumping capacity surplus.

It is recommended to add new pump capacity at the La Mirada Plant and at Plant No. 1 to accommodate for the pumping deficiencies. It is also recommended to match pumps in the La Mirada Plant with pumps in Plant No. 1 using Variable Frequency Drives (VFD) for pumps in the La Mirada Plant. This will allow pumps at the La Mirada Plant to be controlled by the water level in the Plant No. 1 Forebay. It is recommended the pumps at Plant No. 1 be controlled by the Lower Zone Reservoirs. These projects will be described in detail within the capital improvement projects Section 7.7.

7.4 Supply Analysis

7.4.1 Supply Analysis

LHHCWD has groundwater supply through its wells at the Judson Well Field. LHHCWD had a total of four active groundwater wells during the study period. However, as of March 2022, Well No. 9 was placed out of service (put on standby) and as such, this supply analysis was done with only the three currently active wells. These active wells are Well No. 8, Well No. 10, and Well No. 11. These wells and their existing rate of flow are provided in **Table 7-7.**

Out of the total supply capacity, ODWD has a contractual agreement with LHHCWD that entitles ODWD to have access to 31.99% (approximately 1,756 gpm) of the groundwater supply out of the wells from the Judson Well Fields. Taking the ODWD supply needs into consideration, the total supply capacity for LHHCWD is 3,733 gpm

Table 7-7 – Well Capacities

Well	Existing Rate of Flow (gpm)	Pumping Capacity out of Judson Well Fields (gpm)	Pumping Capacity - for LHHCWD (gpm)
No. 8	904	904	615
No. 10	2,191	2,191	1,490
No. 11	2,394	2,394	1,628
Total supply capacity from Judson Well Fields (gpm)		**5,489**	**3,733**
Total supply capacity with largest source of supply out (gpm)		**3,095**	**2,105**

Per the design criteria, the primary supply criteria states that the combined production capacity must equal maximum day demand with the largest single source out of service. This standby capacity will provide system reliability regardless of a temporary loss of a single groundwater well due to unforeseen emergency or maintenance.

Table 7-8 – Existing Conditions – Supply Analysis

Capacity (gpm)	MDD (gpm)	Surplus or (Deficit) (gpm)
2,105	3,839	**(1,734)**

Table 7-8 shows that there is a supply deficiency of 1,734 gpm during existing conditions which assumes Well No. 11 is not operational.

Table 7-9 – Future Conditions – Supply Analysis

Capacity (gpm)	MDD (gpm)	Surplus or (Deficit) (gpm)
2,105	3,809	**(1,704)**

With the decrease in demands, **Table 7-9** shows that there will be a supply deficiency of 1,704 gpm during future conditions.

A new well should be sized large enough to satisfy current and future deficiencies which will include deactivation/standby of Well Nos. 8 and 9. With the current deficit being 1,734 gpm and the current existing rate of flow of Well No. 8 as 904 gpm from the well fields (approximately 615 gpm as LHHCWD's portion), the minimum size for the proposed well would be 2,349 gpm solely for LHHCWD's portion. Including the ODWD supply needs, the new well should have a capacity of 3,100 gpm minimum. LHHCWD has set a goal for the new well to achieve a capacity of 3,100 gpm to 3,500 gpm. This CIP is discussed in further detail under Section 7.7.

7.4.2 Emergency Supply Analysis

Per the design criteria, under the secondary supply criteria, the water system must have combined production capacity sufficient to refill emergency and fire storage in two days (48 hours) under MDD with all sources operating.

The Upper Zone's supply capacity consists of all booster pumps at Plant No. 5 and Plant No. 6 active. The Lower Zone's supply capacity consists of the La Mirada Plant and Plant No. 1 pumping in series.

Table 7-10 – Existing Conditions – Emergency Supply Analysis

Zone	MDD (gpm)	Required Refill (gpm)	Capacity (gpm)	Surplus or (Deficit) (gpm)
Lower with Mirada Plant	2,143	1,135	3,693	414
Lower with Plant No.1			4,242	964
Upper	1,696	910	3,072	466

Table 7-11 – Future Conditions – Emergency Supply Analysis

Zone	MDD (gpm)	Required Refill (gpm)	Capacity (gpm)	Surplus or (Deficit) (gpm)
Lower with Mirada Plant	2,127	1,125	3,693	441
Lower with Plant No.1			4,242	990
Upper	1,682	903	3,072	487

Under existing and future conditions per **Table 7-10** and **Table 7-11**, there is no emergency supply deficiency under any of the Lower Zone configurations or in the Upper Zone.

Emergency Power

Emergency power is a key part of providing emergency pumping capacity. To maintain adequate emergency operations, all motor control centers, and electrical panels should be upgraded or retrofitted to accept power supplied from a backup generator. LHHCWD maintains four portable backup generators and has retrofitted all plants, except for Plant No. 6, with manual transfer switches to run off those generators. All four portable generators are diesel fueled engines manufactured by Caterpillar (model 3306B). There is one 400 kW generator used for Plant No. 1 and three 230 kW generators used for all other locations.

In order to operate these portable generators in California without having to obtain individual permits from local air districts, these units have been registered under the California Air Resources Control Board (CARB) Statewide Portable Equipment Registration Program (PERP). The PERP Final Regulation Order (effective as of

November 30, 2018) instituted an airborne toxic control measure (ATCM) to reduce diesel particulate matter (DPM) emissions from all portable diesel-fueled engines with a rated brake horsepower of 50 and greater. Per this Regulation Order, emission regulations have been set for new diesel engines and restrictions have been put in place for existing ones. All LHHCWD's four portable backup power generators have an Engine DPM Emission Factor of 0.14 grams per brake horsepower hour (g/bhp-hr) which is over the limit of 0.01 g/bhp-hr. Retrofitting these engines with emission control systems, such as diesel particulate filters, has been a considered option, however it has been found that the best available control technology (BACT) to clean the emissions can't reduce these engines to the requirement.

As such, under the PERP Final Regulation Order, all four of the portable backup power generators in LHHCWD's possession are now designated as "low use". "Low use" engines are only allowed to run for a maximum of 200 hours per year unless an emergency is declared. An emergency is defined as unforeseen interruptions of power from the serving utility, maintenance and repair operations to a building, facility, stationary source, or stationary equipment, and electrical upgrade operations that do not exceed 90 calendar days. In any other events in which there is a loss of power, these portable generators cannot be used.

Replacement of all four generators to meet current regulations is recommended in order to ensure that they are a reliable source of power in the case of any emergency. Backup power improvements should include the addition of generator connections at Plant No. 6.

7.5 Planning Criteria

Planning criteria deal with cyclical infrastructure replacement due to age, condition and other non-hydraulic factors. Planning criteria are not meant to be rigid set of rules that narrowly define service life; rather, they provide guidance for determining those portions of the distribution system that would benefit most from replacement in advance of higher and unsustainable costs associated with maintenance and inefficiency. **Table 6-3** and **Table 7-12** provides planning criteria used by LHHCWD. See Chapter 6 for further discussion on planning criteria.

Table 7-12 - Replacement Schedules and Indications

Component	Interval (yrs)	Indication
Pipeline (other than AC)	60	Frequent repair history, excessive energy losses
AC Pipelines	Over 100	Frequent repair history, excessive energy losses
Pump/ Motor Overhaul	15	Drop in efficiency below 65%
Pump/ Motor Replacement	30	Frequent repair history, drop in efficiency
Control Valve Overhaul	25	Leaks, poor response, frequent repairs
Reservoir Recoating	15	Evidence of corrosion
Reservoir Replacement	80	Frequency/ extent of repair history
Well Rehabilitation/ Replacement	50	Decline in effective capacity
Production meter calibration	5	Drop in accuracy
Production meter replacement	20	Drop in accuracy and reliability

7.5.1 Pipeline Replacement Based on Age

Pipelines are on a recommended 60-year replacement cycle. Approximately 43,903 feet of pipe or 13% of the pipelines in the water system are 60 or more years old (installed in the year 1962 or older) and should be candidates for replacement if they have a leak history, are hydraulically deficient, or if the current pipe diameter causes fire flow deficiency with future demand. The pipelines that are 60 or more years old within the system can be seen within **Exhibit 8**. Specific pipelines that are deemed to be replaced due to hydraulic deficits such as fire flow requirement or head loss deficiencies will be discussed in detailed under Section 7.6.3.

7.5.2 Booster and Well Pump Efficiency

Pumps are designed to operate most efficiently under an anticipated head range (typical suction pressure and discharge pressure) that depends on the pump characteristics. When a pump falls below 65% efficiency, an analysis should be performed to determine whether retrofit or replacement would be necessary to increase efficiency.

The most recent energy efficiency tests for the booster and well pumps in the system were completed by Southern California Edison (SCE) in September 2021. These tests indicate each pump's capacity and efficiency. **Table 7-13** shows candidates for retrofit or replacement strictly based on efficiency ratings. The lowest efficiency pumps have the highest priority for improvements.

Table 7-13 – Pump Efficiencies Below 65%

Name of Facility	Pump No.	Efficiency (%)	Capacity (gpm)
La Mirada Plant	LM-B1	68.1	1,612
	LM-B2	69.8	1,622
	LM-B3	68.0	1,629
Plant No. 1(1)	P1-B1	58.5	NA
	P1-B2	70.3	NA
	P1-B3	42.9	NA
Plant No. 2	P2-B2	53.8	1,633
	P2-B3	61.9	1,753
	P2-B4	59.5	1,743
	P2-B5	57.6	792
Plant No. 5	P5-B1	77.5	854
	P5-B2	75.2	842
Plant No. 6	P6-B1	53.8	522
	P6-B2	63.4	854
Well No. 8	NA	64.7	904
Well No. 9	***NA***	***59.9***	***582***
Well No. 10	NA	71.9	2,191
Well No. 11	NA	74.0	2,394

NOTE:
- Well No.9 is on Stand-by but still listed
- Red values represent efficiencies below 65%

(1) The September 2021 SCE tests for Plant 1 contain errors and are not useable in this analysis. The August 2013 SCE Tests indicate all three pumps have efficiencies between 64.7% and 67.8%.

7.5.3 Reservoir Recoating

Reservoir recoating should be done on a cyclical basis to maintain good condition. Reservoirs should be recoated approximately every fifteen years or when there is evidence of corrosion.

There are seven existing reservoirs in LHHCWD's system. **Table 7-14** shows the year that these reservoirs were last recoated and the remaining life of the recoating as of 2022. All LHHCWD reservoirs are due for recoating with the exception of the Lyons and Vigil Reservoirs. La Mirada, Snooks, and Reservoir No. 10A are top priority to be recoated. The condition of each of these reservoirs should be inspected prior to proceeding into the necessary work. It is likely that all reservoirs will require various upgrades for OSHA codes and for seismic compliance.

Table 7-14 – Reservoir Recoating Data

Reservoir	Year of Last Recoating*	Remaining Life of Recoating (years)
La Mirada	**1999***	0
No. 2	2002	0
No. 5A	2002	0
Lyons	2013	6
Snooks	**NA**	NA
Vigil	**2010***	3
No. 10A	**1981***	0

*Reservoirs have never been recoated. Therefore, the year of last recoating is the installation date.
NA = Coating status and remaining life of recoating is unknown.

7.5.1 Reservoir Replacement

Reservoirs should be replaced approximately every eighty years, depending on the frequency and extent of repair. **Table 7-15** shows the year that each reservoir in LHHCWD's system was constructed, the age of the reservoir as of year 2022, and its remaining life. As shown in **Table 7-15**, no reservoirs are currently in need of replacement per the recommended age criteria. The oldest reservoir is the Snooks Reservoir that would need replaced due to age around the year 2029, pending inspection.

Table 7-15 – Reservoir Replacement Data

Reservoir	Year of Installation	Age (years)	Remaining Life (years)
La Mirada Plant	1999	23	57
No. 2	1983	39	41
No. 5A	1982	40	40
Lyons	1992	30	50
Snooks	1949	73	7
Vigil	2010	12	68
No. 10A	1981	41	39

7.5.2 Well Rehabilitation/Replacement

Wells are candidates for rehabilitation or replacement if they are over fifty years of age or have a decline in effective capacity. **Table 7-16** shows the efficiency of each well pump that was active during the study period, the age of the well as of 2022, and the remaining life of the well. The well pump efficiencies were obtained by the SCE efficiency tests conducted in September 2021.

There are three active wells within LHHCWD's system. During the study period (FY 2016 to FY 2021), Well No. 9 was active, however, as of March 2022, this well has been placed on standby.

Before being placed on standby, Well No. 9's pump efficiency was below 65% and over fifty years old so it was a candidate for rehabilitation or replacement. LHHCWD plans to put Well No. 8 out of service as it is over fifty years old and there has been a significant decline in effective capacity.

Per a study prepared by Kear Groundwater Inc. in 2020, LHHCWD plans to drill a new well or wells to replace Well Nos. 8 and 9. This new well will have the capacity to replace the combined capacity of Well Nos. 8 and 9 and meet existing and future deficits.

Table 7-16 – Well Data

Well	Year Drilled	Age (years)	Remaining Life (years)	Efficiency (%)
No. 8	1950	72	0	64.7
No. 9	1950	72	0	59.9
No. 10	1998	24	26	71.9
No. 11	2001	21	29	74.0

7.6 System Analysis and Proposed Improvements

7.6.1 Computer Modeling Program

The computer modeling program used to model LHHCWD's water system is the InfoWater software by Innovyze. InfoWater is a sophisticated and powerful software package that uses GIS as a visual interface. It operates under a Windows environment to perform steady state analyses of water distribution systems including pipes, pumps, reservoirs, tanks and control valves.

Each element (pipe) is a fluid conductor of known properties connecting two nodes such that, for a given value of flow through the element, a unique value of head change will occur. There are five types of nodes utilized in the program:

- Reservoir – A reservoir represents a fixed head source with an infinite volume such as an aquifer or imported water connection.
- Tank – A tank represents a variable head source with a finite volume that may fill or empty.
- Pump – A pump adds head to the system in a predetermined direction according to a performance curve of head vs. flow.
- Valve – A valve subtracts head from the system in a predetermined direction. There multiple types of valves including pressure reducing, pressure sustaining and flow control. Furthermore, a valve may be programmed to represent a known point loss in the system such as a treatment facility or dynamic mixer.

- Demand Node – System demands are estimated for an area and allocated to the nearest demand node as a fixed flow.

InfoWater generates and maintains an interactive database containing static and variable data. The static data represent physical elements of the water system that remain constant over time, such as pipes, reservoirs, pumps, valves, hydrants and other appurtenances. The variable data represent the dynamic aspects of the water system that tend to change over time, such as demand, reservoir levels, and pump and valve operations. A scenario is a predetermined combination of static and variable elements that represents a set of boundary conditions of interest. Through an iterative process, InfoWater applies a hydraulic gradient algorithm to the boundary conditions provided in the scenario to predict the hydraulic performance of the system.

InfoWater has the option of using one of three equations for head loss: the Hazen-Williams Equation, Manning's Equation and the Darcy-Weisbach Equation. The Hazen-Williams equation, which is an empirical formula applicable to turbulent flow, is the most frequently used for analyzing water systems and therefore, was used in LHHCWD Water Model.

7.6.2 Updating the Model

LHHCWD's functioning hydraulic model was updated as part of the Water Master Plan planning efforts. The model was updated by incorporating new improvements that were constructed since 2015 and as recent as the Vista Del Llano pipeline project, completed in March 2022. Along with incorporating pipe age and material into the hydraulic model, calibration efforts were accomplished by cross checking elevations using Google Earth and utilizing field fire flow tests and pressure station reads that were conducted by LHHCWD staff.

Fire Flow Tests

Ten locations were tested throughout LHHCWD's water system, five in the Upper Zone and five in the Lower Zone. Each location used two hydrants, one for pressure reads and one to determine flow. LHHCWD provided outlet diameters, static pressure, residual pressure, and pitot pressures at each test location to calculate input values that were used to calibrate the hydraulic model along with SCADA data containing reservoir levels and status of pumps during the time of each fire flow test. LHHCWD purposefully turned all pumps off during the tests.

This information was critical for the calibration of the model to determine flow during the test as well as the flow available at the desired residual pressure of 20 psi. LHHCWD staff provided us with cut sheets that are used in the field to compute for those corresponding flows. One cut sheet was used to determine the flow during the test by utilizing the pitot gauge pressure and outlet diameter. The other cut sheet contained values to use the pressure drops to calculate the flow available at the desired residual pressure of 20 psi by using the calculated flow during the test and the static and residual pressures during each individual test.

Once the flows were obtained, the model was programmed with the corresponding SCADA data to simulate similar conditions that were on the field during the flow tests to obtain simulated flows to compare the actual flows that occurred in the field. We calibrated the model to simulate flows within +/- 10 percent of the actual flow and pressures to be within +/- 3 psi in pressure drop difference.

Pressure Station Reads

Similar to the fire flow tests, LHHCWD conducted pressure reads at each of the corresponding pressure stations in its water system and provided us with SCADA data containing reservoir levels and status of pumps during the time of testing. These flows were then used to calibrate the PRV settings to simulate similar flows as read in the field. After adjusting the PRV settings, the pressures in the model were within +/- 3 psi in difference.

7.6.3 Distribution System Analysis

Four scenarios have been created within the water model. These four scenarios are:

- ADD – intended to simulate normal operations.
    - Average Day Demands
    - Tanks at 90 percent capacity
    - Booster Pumps on, with standby pump off
- MDD - intended to simulate worst case scenario without a fire flow event.
    - Maximum Day Demands
    - Tanks at 80 percent capacity
    - All Booster Pumps off
- Maximum Day Demand plus Fire Flow (MDD+FF) – intended to simulate worst case scenario while maintaining a minimum residual pressure of 20 psi throughout the system.
    - Maximum Day Demands and Fire Flow Demands
    - Tanks at 50 percent capacity
    - All Booster Pumps off
- Peak Hour Demand (PHD) – intended to simulate worst case normal operations in the system.
    - Peak Hour Demands
    - Tanks at 80 percent capacity
    - Booster Pumps on, with standby pump off

Fire Flow Deficiencies

To locate possible fire flow deficiencies within LHHCWD's water system, the MDD+FF scenario was simulated. Based upon the simulation results, seven deficient hydrants were identified under existing demand conditions as shown in **Table 7-17**. Recommended improvements for these fire flow deficiencies are shown in **Table 7-18**.

Table 7-17 – Existing Fire Flow Deficiencies

FH ID	Model Pipe ID	Location	MDD Static Pressure (psi)	Available Flow @ 20 psi (gpm)	Reason for Deficit(s)
5-2	P-575, P-580, P-585, P-590, P227, P969, and P975	Along Dorothea Rd from before Zone Boundary until Hydrant 5-2 and Hydrant 5-7	64	420	Pipe diameter is too small to allow sufficient flow and pipe is not hydraulically looped.
12-5	Parallel to P-875, P163 and P165	Avocado Crest Rd between Zone Boundary and Hydrant 11-47	38	435	Pipe diameter is too small to allow sufficient flow and pipe is not hydraulically looped.
11-47			32	250	
31-19	P-1265, P377, P373, P-1275, P-1280	Along Leucadia Rd from Skyline Dr to Hydrant 31-19	33	491	Pipe diameter is too small to allow sufficient flow and pipe is not hydraulically looped.
105	P171, P175, P173	On W. Skyline Drive and private road north of the intersection of W Skyline Drive and Casalero Dr	103	494	Pipe diameter is too small to allow sufficient flow and pipe is not hydraulically looped.
83			85	588	
21-5	P935, P-640, P933, Parallel to P931 and P-635	Along E. Skyline Dr from Oak Ranch Rd east to Hydrant 21-5	77	743	Pipe diameter is too small to allow sufficient flow and pipe is not hydraulically looped.

Table 7-18 – Recommended Pipeline Improvements for Fire Flow Deficiencies

FH ID	Model Pipe ID	Location	No. of Affected Parcels	Length (ft)	Existing Diameter (in)	Proposed Recommended Diameter (in)
5-2	P-575, P-580, P-585, P-590, P227, P969, and P975	Along Dorothea Rd from before Zone Boundary until Hydrant 5-2 and Hydrant 5-7	20	2,500	6-in and 8-in along Dorothea Rd	12
12-5	Parallel to P-875, P163 and P165	Avocado Crest Rd between Zone Boundary and FH 11-47	10	1,205	No existing pipe present	8
11-47						
31-19	P-1265, P377, P373, P-1275, P-1280	Along Leucadia Rd from Skyline Dr to Hydrant 31-19	26	810 of 6-in and 1,180 of 8-inch	6-in from Skyline Dr to Panchoy Pl and 8-in from Panchoy Pl to dead end of the street	12
105	P171, P175, P173	On W. Skyline Drive and private road north of the intersection of W Skyline Drive and Casalero Dr	10	1,450	4	6
83						
21-5	P935, P-640, P933, Parallel to P931 and P-635	Along E. Skyline Dr from Oak Ranch Rd east to Hydrant 21-5	7	2,080	6	8

Hydrant 5-2 Recommendation:

Hydrant 5-2 located on Dorothea Road has a fireflow deficiency. If the recommended pipeline improvement for Hydrant 5-2 as described in the table above is implemented to improve fireflow, this area will experience pressures higher than 125 psi. By doing so, all residences with services greater than 80 psi should be equipped with individual pressure regulators, per the Uniform Plumbing Code.

Hydrant 12-5 and 11-47 Recommendation:

Hydrant 12-5 and 11-47 on Avocado Crest Road and the private road off of Avocado Crest Road are experiencing a fire flow deficiency. It is recommended to install an 8-inch pipe parallel to the existing 8-inch from the Upper Zone side of the Zone Boundary to Hydrant 11-47.

The purpose of this pipe would be to serve the parcels in this area off the Upper Zone instead of the Lower Zone in order to meet the fireflow requirement. This area currently has a low pressure deficiency as discussed in the Low Pressure section of this chapter. By shifting these parcels to be fed off the Upper Zone, the Avocado Crest Area will no longer have a low pressure deficiency.

However, it was forecasted that these parcels would experience an average of approximately 175 psi (high pressures). With that said, per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

High Pressure

When running the ADD scenario, there were multiple occurrences of high pressure within the water system. Per LHHCWD's design criteria, the goal for normal system pressure range is 40 psi to 125 psi and these areas are higher than 125 psi. Those areas have been grouped into 11 individual areas. A brief description of each corresponding area is described within this section and **Table 7-19** provides a breakdown of the affected areas. **Exhibit 9** shows the location of each of these high system pressure areas.

Table 7-19 – Areas of High System Pressure Deficiencies

Area No.	Area Name	Streets within Area	No. of Affected Parcels	Average Pressure (psi)	Maximum Pressure (psi)
1	West Road	West Rd, Cancho Dr, Calle Juca Dr, El Terraza Dr, Le Flore Dr, Cloister Dr, La Riata Dr, Bonnie Jean Rd, Angola Ave	147	151	207
2	Picaacho	Picaacho Dr, Le Flore Dr, El Cajonita Rd, Las Palomas Dr, El Empino Dr, Subtropic Dr, Virazon Dr, Encanada Dr	217	176	235
3	Subtropic	Subtropic Dr, El Travesia Dr, West Rd, Shawnan Dr, Hacienda Blvd, Avocado Crest Rd, Villa Rita Dr, Antoinette Dr, Eseverri Lane, Marianita Dr, Madelena Dr, Las Palomas Dr, Avocado Crest Rd, Recado Rd, Hidden Canyon Rd, Vista Del Llano Dr, Solejar Dr	212	146	172
4	Deep Canyon	Papaya Dr, Deep Canyon Rd	2	138	149
5	Canada Sombre	Canada Sombre Rd, Hacienda Blvd, Citron Rd, Reposado Dr, Greenview Rd, Ahuacate Rd	50	144	176
6	Dorothea	East Rd, Deep Canyon Rd, Papaya Rd, Valle Dr, Tumin Rd, Dorothea Rd, Avocado Crest Rd, Cypress St, Milmac Dr, Nabal Rd, Fullerton Rd	266	157	193
7	El Paseo	El Paseo, Via Miguel, Via Patricio	12	138	153
8	Cypress	Cypress St, Nabal Rd, Popenoe Rd, Kashlan Rd	21	137	151
9	Flowerfield	Flowerfield Lane	9	136	137
10	Peppertree	Peppertree Dr, Oleander Rd, Bonita Dr, Tangelo Ln, Encinitas Dr, Harbor Blvd, Rincon Dr	46	138	151
11	Vista	Pine Edge Dr, Vista Rd, Whitehill Dr, Choral Dr	32	134	148

Below are descriptions and recommendations for each of the high-pressure areas are mentioned in **Table 7-19.**

Area No.1: West Road

The West Road Area is located in the southwest corner of the service area and contains multiple roads that branch off of West Road in the Lower Pressure Zone. This high pressure area affects approximately 147 parcels with pressures ranging from 126 psi to 207 psi. The average pressure in this area is approximately 151 psi.

As West Road is a primary transmission pipeline from Plant No. 1 into the Lower Zone, it is not recommended to make any hydraulic changes to this area that may affect transmission to the rest of the service area. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.2: Picaacho

The Picaacho Area is located in the western part of the service area in the Lower Pressure Zone. This high pressure area affects approximately 217 parcels with pressures ranging from 140 psi to 235 psi. The average pressure in this area is approximately 176 psi.

It is recommended to install a pressure reducing station on the 12-inch on Lupin Hill Road, north of Las Palomas Drive, and convert the Picaacho Area into a sub-pressure zone. All portions of this high pressure area are fed from this 12-inch main.

Area No.3: Subtropic

The Subtropic Area lies within the southwestern portion of the Lower Pressure Zone and effects approximately 212 parcels. This high pressure area has pressures ranging from 127 psi to 172 psi, with an average of approximately 146 psi.

The Subtropic Area provides hydraulic looping in a portion of the Lower Zone. Leaving such loops intact offers system redundancy even at the cost of excess pressure. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.4: Deep Canyon

The Deep Canyon Area is located in the Upper Pressure zone at the intersection of Papaya Drive and Deep Canyon Road. This high pressure area affects approximately two parcels with pressures ranging from 127 psi to 149 psi. The average pressure in this area is approximately 138 psi.

The number of affected residences in the Deep Canyon Area is small. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.5: Canada Sombre

The Canada Sombre Area affects several streets in the Upper Pressure Zone. This high pressure area affects approximately 50 parcels with pressures ranging from 126 psi to 176 psi. The average pressure in the area is approximately 144 psi.

The Canada Sombre Area provides hydraulic looping in a large portion of the Upper Zone. Leaving such loops intact offers system redundancy even at the cost of excess pressure.

Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.6: Dorothea

The Dorothea Area is located within the southeastern portion of the Upper Pressure Zone and affects approximately 266 parcels. The average pressure in the area is approximately 157 psi, with pressures ranging from 126 psi to 193 psi.

The Dorothea Area provides hydraulic looping in a large portion of the Upper Zone. Leaving such loops intact offers system redundancy even at the cost of excess pressure. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.7: El Paseo

The El Paseo Area is located in the southern portion of the Lower Pressure Zone and spans over El Paseo, Via Miguel, and Via Patricio. This high pressure area affects approximately 12 parcels with an area pressure of approximately 138 psi. Pressures range from 129 psi to 153 psi.

It is recommended to install a pressure reducing station on the 6-inch on Via Miguel, west of the intersection with Walnut Street, and convert the El Paseo Area into a sub-pressure zone. In order to form this pressure zone, the 6-inch cross country pipe between El Paseo and Dorothea Road must be abandoned. All portions of this area will be fed from the 6-inch main on Via Miguel.

Area No.8: Cypress

The Cypress Area is located in the southern portion of the Lower Pressure Zone and affects several streets branching off of Cypress Street. This high pressure area affects approximately 21 parcels with an average pressure of approximately 137 psi. Pressures range from 127 psi to 151 psi.

The Cypress Area provides hydraulic looping in a large portion of the Upper Zone. Leaving such loops intact offers system redundancy even at the cost of excess pressure. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.9: Flowerfield

The Flowerfield Area is located in the southern portion of the Lower Pressure Zone and is comprised on the southern portion of Flowerfield Lane. This high pressure area affects approximately 9 parcels with pressures ranging from 134 psi to 137 psi. The average pressure in this area is approximately 136 psi.

The number of affected residences in the Flowerfield Area is small. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.10: Peppertree

The Peppertree Area is located in the southern portion of the Lower Pressure Zone and affects several streets branching off of Peppertree Drive for an approximate total of 46 parcels affected. The average pressure is approximately 138 psi, with pressures ranging from 126 psi to 151 psi.

The Peppertree Area provides hydraulic looping in a portion of the Lower Zone. Leaving such loops intact offers system redundancy even at the cost of excess pressure. Per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.11: Vista

The Vista Area is located in the southeast corner of the Lower Pressure Zone and affects approximately 32 parcels. The average pressure in the area is approximately 134 psi, with pressures ranging from 126 psi to 148 psi.

It is recommended to install a pressure reducing station on the 8-inch on Vista Road, north of the intersection with Meadowland Drive, and convert the Vista Area into a sub-pressure zone. All portions of this high pressure area are fed from this 8-inch main.

Low Pressure

When running the PHD scenario, there were a few occurrences of low pressure within the water system. Per LHHCWD's design criteria, the goal for normal system pressure range is 40 psi to 125 psi and these areas are lower than 40 psi. Those areas have been grouped into 7 individual areas. A brief description of each corresponding area is described within this section and **Table 7-20** provides a breakdown of the affected areas. **Exhibit 9** shows the location of each of these low system pressure areas.

Table 7-20 – Areas of Low System Pressure Deficiencies

Area No.	Area Name	Streets within Area	No. of Affected Parcels	Average Pressure (psi)	Lowest Pressure (psi)
12	Le Flore	Le Flore Drive	3	39	39
13	Leucadia	Leucadia Road	6	36	36
14	Reposado	Reposado Drive	14	31	25
15	Avocado Crest	Avocado Crest Road	5	32	23
16	Private Avocado Crest	Private Road off Avocado Crest Road	5	29	23
17	Suncrest	Suncrest Court, Skyline Drive	6	23	19
18	Skyline Vista	Skyline Vista Drive	11	29	29

Below are descriptions and recommendations for each of the low-pressure areas are mentioned in **Table 7-20**.

Area No.12: Le Flore

The Le Flore Area is located in the western portion of the Lower Pressure Zone along Le Flore Drive. This low-pressure area affects approximately 3 parcels, with the lowest pressure being 39 psi and the average pressure being approximately 39 psi.

The Le Flore Area is borderline compliant with the low-pressure criterion. No CIP has been developed for this area due to the small number of impacted residents and the near compliant pressure.

Area No.13: Leucadia

The Leucadia Area is located in the northern portion of the Upper Pressure Zone and affects approximately 6 parcels along Leucadia Road. The lowest pressure in this area is 36 psi and the average pressure is approximately 36 psi.

The Leucadia Area is at a high elevation with no opportunity for looping. The recommended solution for this deficiency is for individual customers to install their own individual pumps to provide additional pressure where needed. Some residences in the Leucadia Area are already equipped with individual pressure pumps to overcome the low system pressure. If a pressure zone above the Upper Zone is established to accommodate further development at this elevation, this area would be a good candidate for inclusion in that new zone.

Area No.14: Reposado

The Reposado Area is located in the northern portion of the Upper Pressure Zone and affects approximately 14 parcels along Reposado Drive. The lowest pressure in this area is 25 psi and the average pressure is approximately 31 psi.

The Reposado Area is fed by a 12-inch transmission main and has no opportunity for looping. The recommended solution for this deficiency is for individual customers to install their own individual pumps to provide additional pressure where needed. Some residences in the Reposado Area are already equipped with individual pressure pumps to overcome the low system pressure. If a pressure zone above the Upper Zone is established to accommodate further development at this elevation, this area would be a good candidate for inclusion in that new zone.

Area No.15: Avocado Crest

The Avocado Crest Area is located in the Lower Pressure Zone and affects approximately 5 parcels along Avocado Crest Road. The lowest pressure in this area is 23 psi and the average pressure is approximately 32 psi. Some residences in the Avocado Crest area are equipped with individual pressure pumps to overcome the low system pressure.

The Avocado Crest Area has a fireflow deficiency at Hydrant 12-5. The recommended improvement as shown in the Fire Flow Deficiency section of this chapter is to install an 8-inch pipe parallel to the existing 8-inch from the Upper Zone side of the Zone Boundary to Hydrant 11-47. The purpose of this pipe is to serve the parcels in this area from the Upper Zone instead of the Lower Zone in order to meet the fireflow requirement. If this improvement is done, the Avocado Crest Area will no longer have a low pressure deficiency and instead will have a high pressure deficiency at an average of approximately 175 psi in the area. If this is the case, per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.16: Private Avocado Crest

The Private Avocado Crest Area is located in the Lower Pressure Zone and affects approximately 5 parcels along a private road off of Avocado Crest Road. This private road begins at approximately 205 feet northwest of the intersection of Avocado Crest Road and Lamat Road. The lowest pressure in this area is 23 psi and the average pressure is approximately 29 psi. Some residences in the Private Avocado Crest area are equipped with individual pressure pumps to overcome the low system pressure.

The Private Avocado Crest Area has a fireflow deficiency at Hydrant 11-47. The recommended improvement as shown in the Fire Flow Deficiency section of this chapter is to install an 8-inch pipe parallel to the existing 8-inch from the Upper Zone side of the Zone Boundary to Hydrant 11-47. The purpose of this pipe is to serve the parcels in this area from the Upper Zone instead of the Lower Zone in order to meet the fireflow requirement. If this improvement is done, the Private Avocado Crest Area will no longer have a low pressure deficiency and instead will have a high pressure deficiency at an average of approximately 175 psi in the area. If this is the case, per the Uniform Plumbing Code, all residences with services greater than 80 psi should be equipped with individual pressure regulators.

Area No.17: Suncrest

The Suncrest Area is located in the northern portion of the Upper Pressure Zone and affects approximately 6 parcels along Suncrest Court and Skyline Drive. The lowest pressure in this area is 19 psi and the average pressure is approximately 23 psi.

The residences in the Suncrest Area are at elevations too high to be effectively serviced by the Upper Zone. The recommended solution for this deficiency is for individual customers to install their own individual pumps to provide additional pressure where needed. Most residences in the Suncrest Area are equipped with individual pressure pumps to overcome the low system pressure. If a pressure zone above the Upper Zone is established to accommodate further development at this elevation, this area would be a good candidate for inclusion in that new zone.

Area No.18: Skyline Vista

The Skyline Vista Area is located in the northern portion of the Upper Pressure Zone and affects approximately 11 parcels along Skyline Vista Drive. The lowest pressure in this area is 29 psi and the average pressure is approximately 29 psi.

The Skyline Vista Area is at a high elevation and existing looping is insufficient to provide adequate pressure The recommended solution for this deficiency is for individual customers to install their own individual pumps to provide additional pressure where needed. Most residences in the Skyline Vista Area are equipped with individual pressure pumps to overcome the low system pressure. If a pressure zone above the Upper Zone is established to accommodate further development at this elevation, this area would be a good candidate for inclusion in that new zone.

Headloss Deficiencies

Per the design criteria, distribution mains may have a maximum headloss of 10 feet per 1,000 feet of pipe except under fire flow conditions. When running the ADD, MDD, and PHD scenarios, there was one occurrence of headloss over the maximum allowance within the water system. A brief description the corresponding area is described within this section and shown in **Table 7-21**.

Table 7-21 – Pipelines with Headloss Deficiencies

Model Pipe ID	Location	Max Headloss (ft/1000 ft)	Length (ft)	Existing Diameter (in)	Proposed Recommended Diameter (in)
P-800, P-409	Along Papaya Rd beginning from the intersection with Pinto Dr to the 6-inch golf course meter	14	790	6	8

Pipeline replacement for pipelines with high headlosses is a very low priority for a CIP. The pipeline is performing to meet demand under all scenarios except this one. If this pipeline is deficient in the future for other criteria, it would then be considered for replacement.

Cross-Country Pipelines

LHHCWD has expressed an interest in eliminating cross-country pipelines. In general, cross-country pipelines are difficult to access which tends to make them difficult to maintain and may be ultimately less reliable. However, cross-country pipelines that form hydraulic loops tend to improve redundancy and capacity.

The analysis has identified 22 cross-country pipelines as listed in **Table 7-22** and shown in **Exhibit 10**. It is recommended to perform additional hydraulic analysis on these pipelines to determine the feasibility of abandoning their alignments in favor of more accessible alignments.

Table 7-22 – Summary of Cross-County Pipelines

No.	Zone	From	To	Pipe Size (in)	Additional Comments
1	Upper	El Cajonita	Le Flore	8	Only supply to Le Flore and Picaacho
2	Upper	Las Palomas	El Cajonita	6	Only supply to Le Flore and Picaacho
3	Upper	Lupin Hill	Las Palomas	12	Only supply to western end of Upper Zone
4	Upper	Casolero	Lupin Hill	12	Only supply to western end of Upper Zone
5	Upper	Hacienda	Ardsheal	6	Forms minor loop
6	Upper	Reposado	Greenview	12	Primary link between Plant 5 and Snooks Reservoir

No.	Zone	From	To	Pipe Size (in)	Additional Comments
7	Upper	Canada Sombre	Reposado	6	Forms minor loop
8	Upper	Reposado	Papaya	10	Provides equalization between Snooks Reservoir and Reservoir 9
9	Upper	Pinto	Valle	10	Provides equalization between Snooks Reservoir and Reservoir 9
10	Lower	Dorothea	Coban	12	Primary outlet for Lyons Reservoir
11	Lower	East (Oil Company Rd)	Dorothea	18	Primary link from Plants 1 & 2 to Lyons Reservoir
12	Lower	Dorothea	Caminita	18	Primary link from Plants 1 & 2 to Lyons Reservoir
13	Lower	Choral	Pipe Edge Drive	8	Forms minor loop
14	Lower	Popenoe	Bonita	6	Forms minor loop
15	Lower	El Paseo	Dorothea	6	Forms minor loop
16	Lower	Avocado Crest	Villa Rita	8	Forms minor loop, recommended for abandonment per CIP #8
17	Lower	Villa Rita	Antoinette	8	Forms minor loop
18	Lower	Encanada Drive	Nueva Vista Drive	10	Primary link between Plant 2 and Reservoir 2
19	Lower	Nueva Vista Drive	Chandos	16	Primary link between Plant 2 and Reservoir 2
20	Lower	Hidden Canyon	Amante	6	Forms minor loop
21	Lower	West	Hidden Canyon	8	Forms minor loop
22	Lower	Nabal	1661,1675 & 1707	3	Service line to homes

7.7 CIP Schedule

The improvements described herein include certain operational and maintenance items as well as new requirements identified in this investigation. Costs for each proposed improvement were estimated, and each project was assigned a schedule for construction as high, medium and low priority, depending on the perceived urgency.

Total cost for pipeline replacements was estimated at $40.00 per inch diameter per linear foot to include pipeline construction, trenching, and asphalt reconstruction costs. These estimates do not include fire hydrant assemblies, valves, mobilization/demobilization, permits fees, possible conflict resolution with existing substructures, grade difficulties, traffic controls, tie-ins to existing pipes, new services and/or service reconnection costs. Cost escalations can be accomplished by using the Engineering News Record (ENR) Construction Cost Index (CCI) for LA County is 13,671 for May 2022. The costs presented in this WMP are based upon midyear 2022 costs.

The total cost has been estimated at 50 percent above construction cost as follows:

- 30% Engineering Design and Construction Management Cost
- 10% LHHCWD Administration
- 10% Contingencies

The Capital Improvement Project Locations are shown on **Exhibit 11** and Schedules are provided in **Table 7-23** through **Table 7-24.**

With these tables, LHHCWD Staff and Management can prioritize expenditures, based on the availability of funding. **Table 7-23** and **Table 7-24** provide descriptions of the projects. Market conditions, detailed design, and the extent to which designs are performed by consultants will determine actual cost. The numbering system in the CIP list does not reflect a priority.

LHHCWD's financial planning and budgeting should allow the time-phased expenditures to implement the Capital Improvement Plans based on priority ranking. Each CIP would be ranked either *High, Medium,* or *Low*. The "high" priority projects would be implemented within the next 3 to 5 years, "medium" priority projects would be implemented within the next 5 to 10 years and the "low" priority projects would be implemented with the next 10 to 15 years. The total CIP schedule is estimated at $22,445,000 in 2022 dollars.

Table 7-23 – Capital Improvement Program (Cost Presented x $1000)

No.	Priority	Description	Justification	Construction Cost	Engineering and Construction Management (30%)	District Administration (10%)	Contingency (10%)	2022 Estimate Cost	2027 Estimate Cost
1	High	Construction of New Well No. 12	Increase Production Reliability	$2,750	$825	$275	$275	$4,125	$5,363
2	High	Install additional pump capacity at La Mirada Plant and Plant No. 1. Add VFDs at La Mirada Plant	Booster Pumping Redundancy	$750	$225	$75	$75	$1,125	$1,463
3	High	Recoat La Mirada Reservoir	Maintenance	$1,073	$322	$107	$107	$1,609	$2,091
4	High	Recoat Snooks Reservoir	Maintenance	$165	$49	$16	$16	$247	$321
5	High	Recoat Reservoir No. 10A	Maintenance	$565	$170	$57	$57	$848	$1,102
			Total for High Priority CIPs:	**$5,302**	**$1,591**	**$530**	**$530**	**$7,953**	**$10,339**
6	Med	Recoat Reservoir No. 2	Maintenance	$570	$171	$57	$57	$855	$1,112
7	Med	Recoat Reservoir No. 5A	Maintenance	$468	$140	$47	$47	$702	$913
8	Med	Install 2,500 feet of 12-inch pipe in Dorothea Road from before Zone Boundary until Hydrant 5-2 and Hydrant 5-7	Improve Fire Flow	$1,200	$360	$120	$120	$1,800	$2,340
9	Med	Install 1,205 feet of parallel 8-inch pipe in Avocado Crest Road	Improve Fire Flow	$386	$116	$39	$39	$578	$752

No.	Priority	Description	Justification	Construction Cost	Engineering and Construction Management (30%)	District Administration (10%)	Contingency (10%)	2022 Estimate Cost	2027 Estimate Cost
10	Med	Replace 1,990 feet with 12-inch pipe in Leucadia Road	Improve Fire Flow	$955	$287	$96	$96	$1,433	$1,863
11	Med	Replace 1,450 feet with 8-inch on West Skyline Drive and private road north of the intersection of West Skyline Drive and Casalero Drive	Improve Fire Flow	$464	$139	$46	$46	$696	$905
12	Med	Install 2,080 feet of 8-inch pipe between Skyline Drive and Oak Ranch Road	Improve Fire Flow	$666	$200	$67	$67	$998	$1,298
13	Med	Greenview PRV and Pipeline	Improve System Pressure	$407	$122	$41	$41	$611	$794
14	Med	Generators for Wells, La Mirada Plant and Plant No. 1	Maintenance	$300	$90	$30	$30	$450	$585
			Total for Medium Priority CIPs:	**$5,416**	**$1,625**	**$542**	**$542**	**$8,124**	**$10,561**
15	Low	Cross-Country Pipeline Study	Operations and Maintenance	$40	$12	$4	$4	$60	$78
16	Low	Replace 790 feet of 8-inch pipe in Papaya Road	Improve Head Loss	$253	$76	$25	$25	$379	$493
17	Low	Install PRV in Via Miguel	Improve System Pressure	$75	$23	$8	$8	$113	$146

No.	Priority	Description	Justification	Construction Cost	Engineering and Construction Management (30%)	District Administration (10%)	Contingency (10%)	2022 Estimate Cost	2027 Estimate Cost
18	Low	Install PRV in Vista Road	Improve System Pressure	$75	$23	$8	$8	$113	$146
19	Low	Recoat Vigil Reservoir	Maintenance	$493	$148	$49	$49	$739	$960
20	Low	Recoat Lyons Reservoir	Maintenance	$485	$146	$49	$49	$728	$946
21	Low	Install PRV in Lupin Hill Road	Improve System Pressure	$75	$23	$8	$8	$113	$146
22	Low	Generators for Plant No. 5 and Plant No. 6	Maintenance	$250	$75	$25	$25	$375	$488
23	Low	Construction of additional well	Increase Production Reliability	$2,500	$750	$250	$250	$3,750	$4,875
			Total for Low Priority CIPs:	**$4,245**	**$1,274**	**$425**	**$425**	**$6,368**	**$8,278**
			Total Cost ($1000)	**$14,963**	**$4,489**	**$1,496**	**$1,496**	**$22,445**	**$29,178**

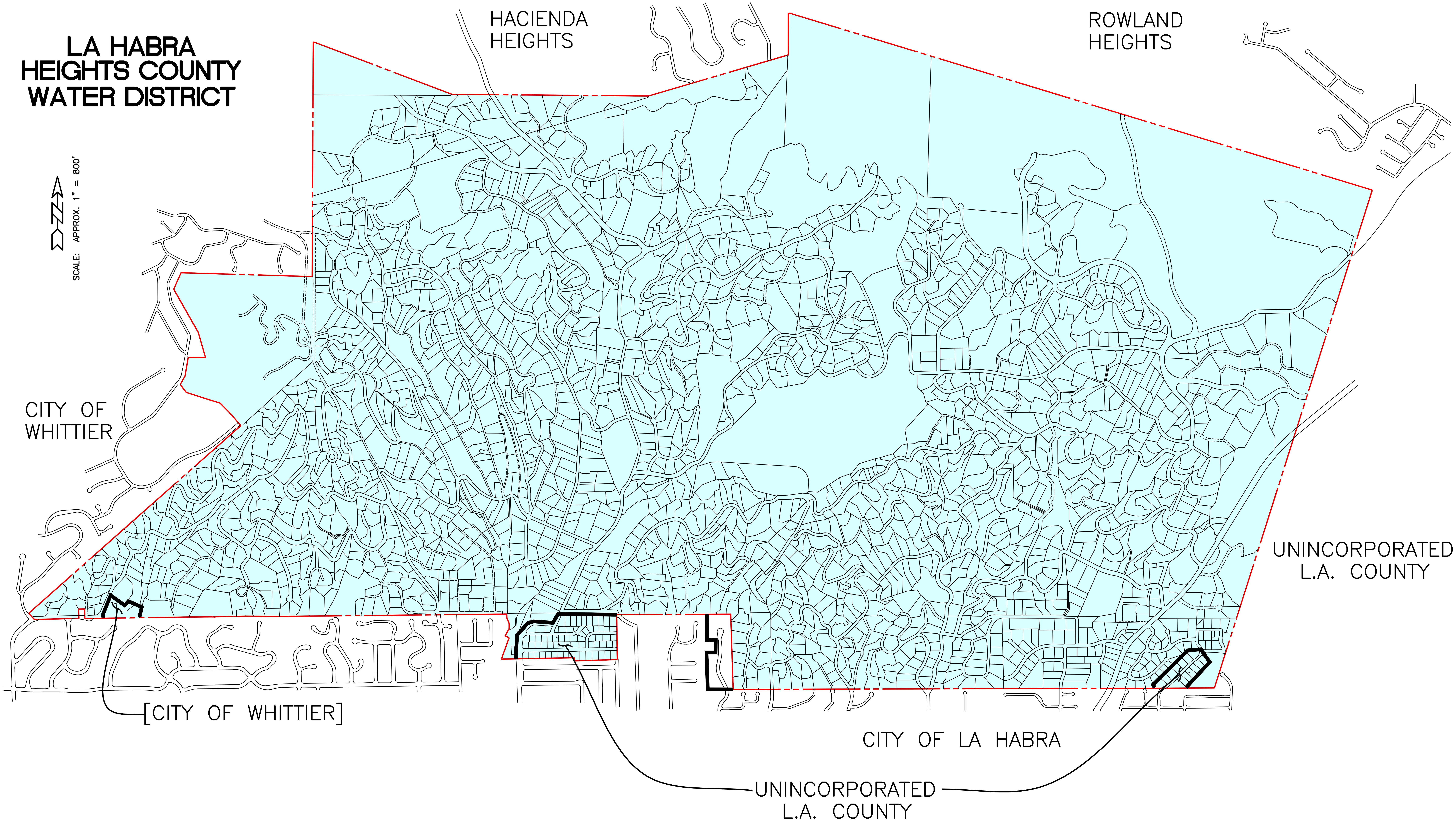
Table 7-24 – Capital Improvement Program Descriptions

No.	Priority	Description	Justification
1	High	Construction of New Well No. 12	Construct a new Well No. 12 to provide additional supply capacity to the system and increase production reliability. Goal is to add between 3,100 and 3,500 gpm capacity. Estimate includes destruction of Well Nos. 8 and 9.
2	High	Install additional pump capacity at La Mirada Plant and Plant No. 1. Add VFDs at La Mirada Plant	The capacity at the La Mirada Plant and Plant No.1 does not satisfy existing Design Criteria. Install an additional 970 gpm of pump capacity at the La Mirada Plant and Plant No. 1 and install VFDs at the La Mirada Plant. Upgrade SCADA Controls to operate as pump matching.
3	High	Recoat La Mirada Reservoir	The La Mirada Reservoir is due for a recoating per planning criteria. Includes upgrades to code and seismic
4	High	Recoat Snooks Reservoir	The Snooks Reservoir is due for a recoating per planning criteria. Includes upgrades to code and seismic
5	High	Recoat Reservoir No. 10A	Reservoir No. 10A is due for a recoating per planning criteria. Includes upgrades to code and seismic
6	Med	Recoat Reservoir No. 2	Reservoir No. 2 is due for a recoating per planning criteria. Includes upgrades to code and seismic
7	Med	Recoat Reservoir No. 5A	Reservoir No. 5A is due for a recoating per planning criteria. Includes upgrades to code and seismic
8	Med	Install 2,500 feet of 12-inch pipe in Dorothea Road from before Zone Boundary until Hydrant 5-2 and Hydrant 5-7	Hydrant 5-2 has poor fire flow capacity due to an undersized main. The existing 6-inch and 8-inch along Dorothea Road from between the Zone Boundary and Hydrant 5-7 should be upsized to a 12-inch. Install 12-inch pipe along Dorothea Road to Hydrant 5-2. The existing 6-inch pipe from Dorothea Road to Walnut Street and the existing 6-inch cross-country pipe from El Paseo to Dorothea Road should both be abandoned in order to make this area part of the Upper Pressure Zone.
9	Med	Install 1,205 feet of parallel 8-inch pipe in Avocado Crest Road	Hydrants 12-5 and 11-47 cannot maintain adequate residual pressure under the current configuration. Install 1,205 feet of parallel 8-inch pipe in Avocado Crest Road from the Upper Zone between the zone boundary and Hydrant 11-47. Hydrants 12-5 and 11-47 will be reconfigured into the Upper Zone.
10	Med	Replace 1,990 feet with 12-inch pipe in Leucadia Road	Hydrant 31-9 has poor fire flow capacity due to an undersized main. Existing 6-inch from Skyline Drive to Panchoy Place and existing 8-inch from Panchoy Place to Hydrant 31-19 should be abandoned and 1,990 feet of 12-inch pipe should be installed.
11	Med	Replace 1,450 feet with 8-inch on West Skyline Drive and private road north of the intersection of West Skyline Drive and Casalero Drive	Residences north of the intersection of West Skyline Drive and Casolero Drive experience poor fire flow capacity due to undersized mains. Replace existing 4-inch mains in W. Skyline Drive and the private road north of the intersection with 1,450 feet of 8-inch pipe.

No.	Priority	Description	Justification
12	Med	Install 2,080 feet of 8-inch pipe between Skyline Drive and Oak Ranch Road	Hydrant 21-5 cannot provide adequate fire flow due to poor connectivity and distance from the nearest reservoir. Install 2,080 feet of 8-inch pipe along East Skyline Drive from Oak Ranch Road to Hydrant 21-5.
13	Med	Greenview PRV and Pipeline	The existing Greenview Pressure Reducing Station is currently unstable in its current location due to slope creep in the area. The station is proposed to be rebuilt on the north side of Greenview. A new 6-inch pipeline is also proposed to close a hydraulic loop.
14	Med	Generators for Wells, La Mirada Plant and Plant No.1	The 400 kw generator for Plant No. 1 and the 230 kw generator for the wells and the La Mirada Plant do not meet the current PERP Final Regulation Order. Both generators will need to be replaced. The existing generators have a salvage value outside the SCAQMD boundary.
15	Low	Cross-Country Pipeline Study	Perform a hydraulic analysis to determine the feasibility of eliminating cross-country pipelines from the distribution system. Recommend any upgrades or reconfigurations that would accomplish this goal.
16	Low	Replace 790 feet of 8-inch pipe in Papaya Road	The existing 6-inch pipe along Papaya Road beginning from the intersection with Pinto Drive to the 6-inch golf course meter does not meet maximum headloss design criteria. Upsize 790 feet of existing 6-inch pipe to new 8-inch pipe.
17	Low	Install PRV in Via Miguel	Approximately 12 parcels along El Paseo and Via Miguel, west of Walnut Street within the Lower Zone are reaching pressures between 129 psi and 153 psi. Installing a pressure reducing station off of the existing 6-inch main, near the intersection of Via Miguel and Walnut Street and adding an isolation zone valve at the end of the El Paseo cul-de-sac would create an isolated sub-pressure zone.
18	Low	Install PRV in Vista Road	A portion at the lower right section of the Lower Zone, covering approximately 32 parcels, are reaching pressures as high as 148 psi. Installing a pressure reducing station off of the existing 8-inch main along Vista Road, approximately +/- 465 feet south of North Harbor Blvd near the address 2165 Vista Road would convert that area into a sub-pressure zone.
19	Low	Recoat Vigil Reservoir	The Vigil Reservoir is due for a recoating per planning criteria
20	Low	Recoat Lyons Reservoir	The Lyons Reservoir is due for a recoating per the planning criteria.
21	Low	Install PRV in Lupin Hill Road	A large, isolated portion of the southern Upper Zone experiences system pressures as high as 235 psi. Install a pressure reducing station on the 12-inch on Lupin Hill Road, north of Las Palomas Drive, and convert this area into a sub-pressure zone.
22	Low	Generators for Plant No. 5 and Plant No. 6	The two 230 kw generators for Plant No. 5 and No. 6 do not meet the current PERP Final Regulation Order. Both generators will need to be replaced. The existing generators have a salvage value outside the SCAQMD boundary.
23	Low	Construction of additional well	An additional well should be constructed after new Well No. 12 in order to meet design criteria and provide emergency production supply in case Well No. 12 is temporarily out of service.

Exhibit 1 – District Boundary Map

LA HABRA HEIGHTS COUNTY WATER DISTRICT



= LA HABRA HEIGHTS COUNTY WATER DISTRICT

= LA HABRA HEIGHTS COUNTY WATER DISTRICT SERVICE BOUNDARY

= LA HABRA HEIGHTS CITY BOUNDARY (SHOWN WHERE BOUNDARIES DIFFER)

CIVILTEC engineering inc.
Civil, Water, Wastewater, Drainage, and Transportation Engineering
Construction Management • Surveying
California • Arizona
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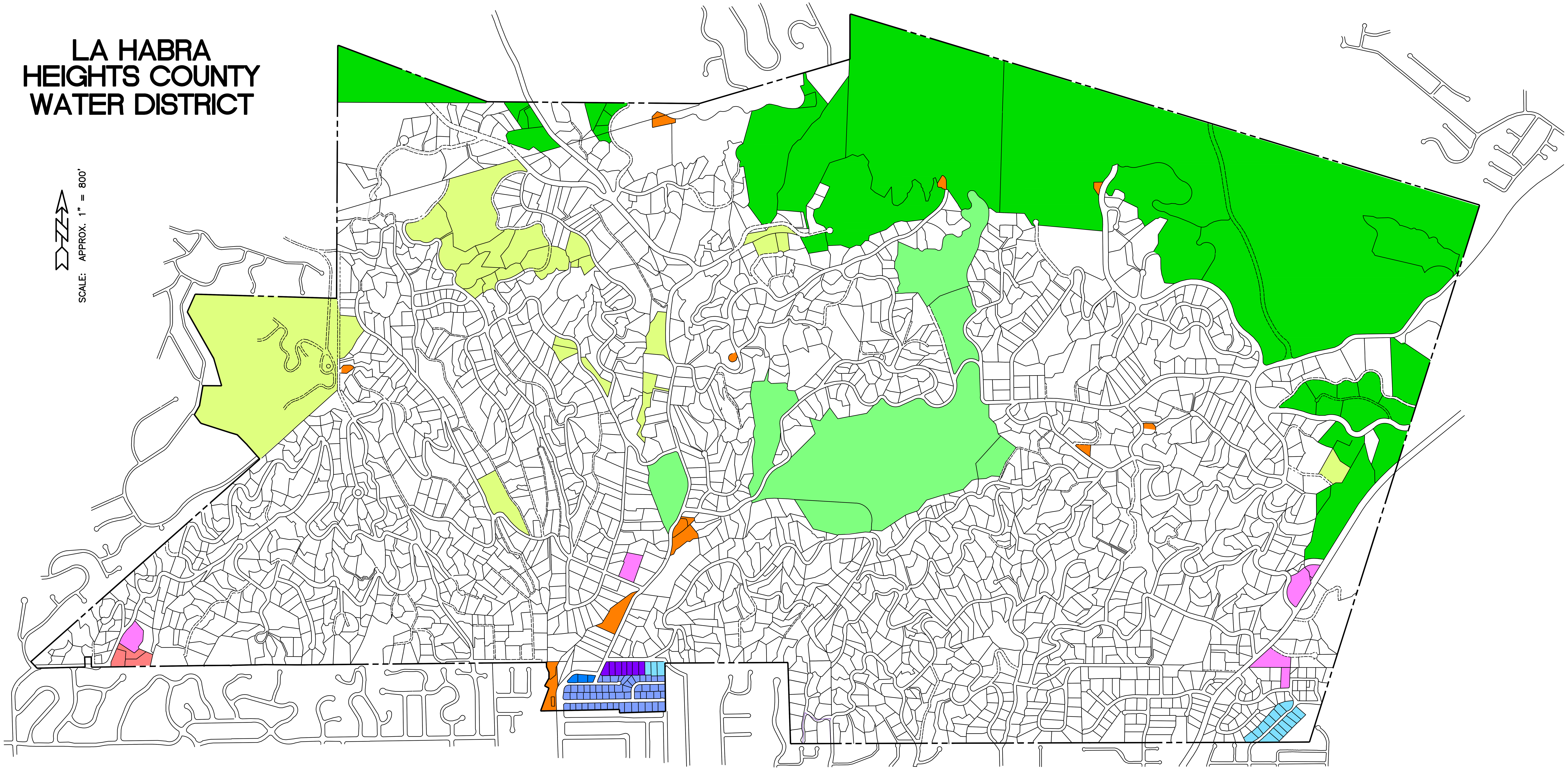
LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

DISTRICT BOUNDARY MAP

EXHIBIT 1

Exhibit 2 – Existing Land Use and Zoning Map

LA HABRA HEIGHTS COUNTY WATER DISTRICT



LAND USE DESIGNATION

CITY OF LA HABRA HEIGHTS

- RA – RESIDENTIAL AGRICULTURAL
- I – INSTITUTIONAL
- PF – PUBLIC FACILITIES
- O-RP – RESOURCE PRODUCTION
- O-R – RECREATION
- OS-C – CONSERVATION

UNINCORPORATED LOS ANGELES COUNTY

- R-A-20000 – 1DU/20000 SF
- R-I-10000 – 1DU/10000 SF
- R-I-15000 – 1DU/15000 SF
- R-I-20000 – 1DU/20000 SF

CITY OF WHITTIER

- R-1-1

WATER DISTRICT BOUNDARY

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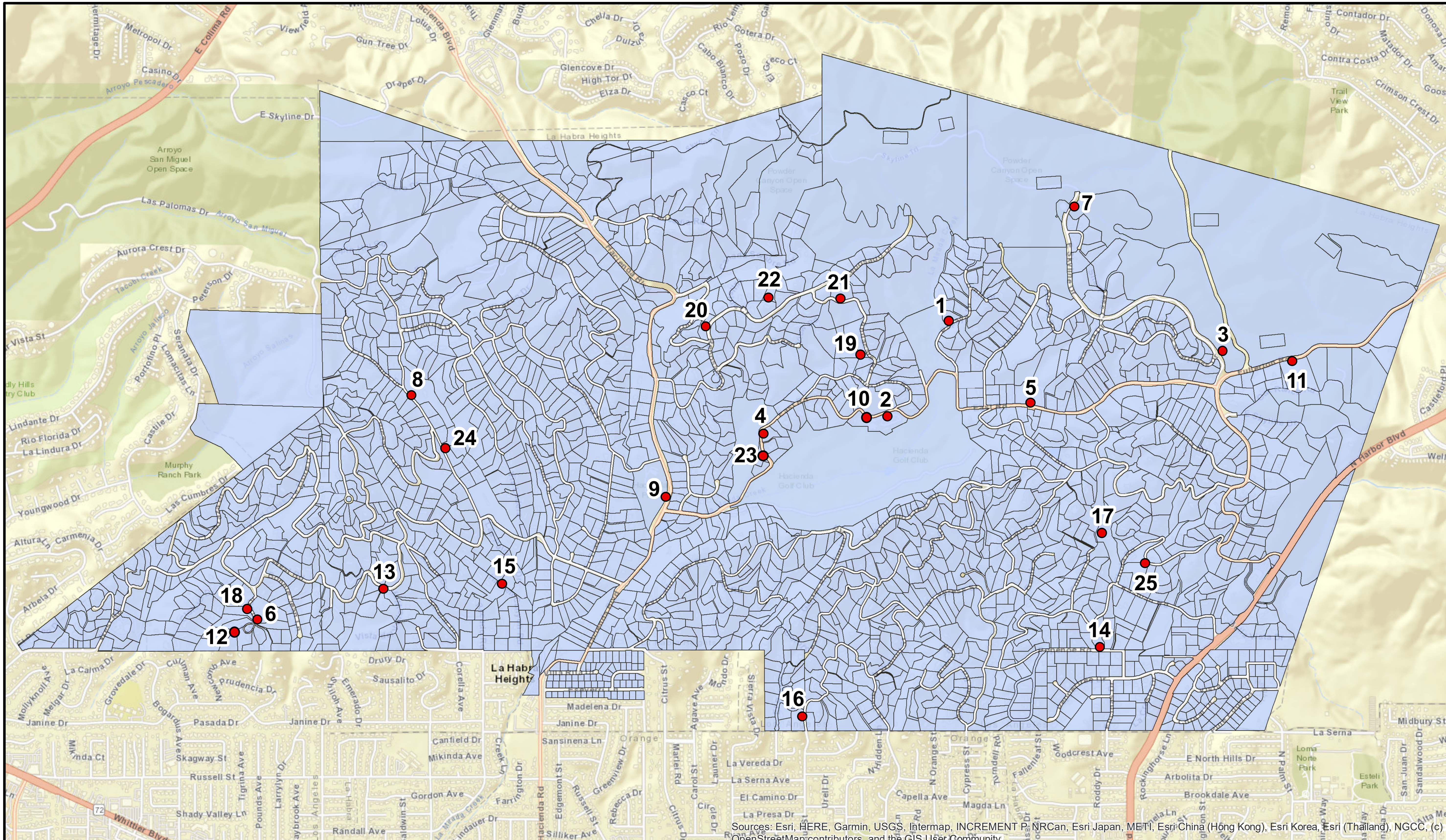
LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

EXISTING LAND USE AND ZONING MAP

EXHIBIT 2

Exhibit 3 – Top 25 Point Demand Users



0 0.15 0.3 0.6 Miles

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LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

TOP 25 POINT DEMAND USERS

EXHIBIT 3

P:\X\2021\21170.00-LHHCWD-2022 WMP\GIS\ArcGIS\Base\Exhibit 8.mxd D: 3/24/2022

Exhibit 4 – SDWA Primary and Secondary MCLs

National Primary Drinking Water Regulations

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
Acrylamide	TT[4]	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/ wastewater treatment	**zero**
Alachlor	0.002	Eye, liver, kidney, or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	**zero**
Alpha/photon emitters	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	**zero**
Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	**0.006**
Arsenic	0.010	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards; runoff from glass & electronics production wastes	**0**
Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	**7 MFL**
Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	**0.003**
Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	**2**
Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	**zero**
Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	**zero**
Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	**0.004**
Beta photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	**zero**
Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	**zero**
Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	**0.005**
Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	**0.04**

LEGEND

DISINFECTANT | DISINFECTION BYPRODUCT | INORGANIC CHEMICAL | MICROORGANISM | ORGANIC CHEMICAL | RADIONUCLIDES

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	**zero**
Chloramines (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort; anemia	Water additive used to control microbes	**MRDLG=4[1]**
Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	**zero**
Chlorine (as Cl_2)	MRDL=4.0[1]	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	**MRDLG=4[1]**
Chlorine dioxide (as ClO_2)	MRDL=0.8[1]	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Water additive used to control microbes	**MRDLG=0.8[1]**
Chlorite	1.0	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Byproduct of drinking water disinfection	**0.8**
Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	**0.1**
Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	**0.1**
Copper	TT[5]; Action Level=1.3	Short-term exposure: Gastrointestinal distress. Long-term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	**1.3**
Cryptosporidium	TT[7]	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	**zero**
Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	**0.2**
2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	**0.07**
Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	**0.2**
1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	**zero**
o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	**0.6**
p-Dichlorobenzene	0.075	Anemia; liver, kidney, or spleen damage; changes in blood	Discharge from industrial chemical factories	**0.075**
1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	**zero**

LEGEND

DISINFECTANT · DISINFECTION BYPRODUCT · INORGANIC CHEMICAL · MICROORGANISM · ORGANIC CHEMICAL · RADIONUCLIDES

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	**0.007**
cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	**0.07**
trans-1,2, Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	**0.1**
Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from industrial chemical factories	**zero**
1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	**zero**
Di(2-ethylhexyl) adipate	0.4	Weight loss, liver problems, or possible reproductive difficulties	Discharge from chemical factories	**0.4**
Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	**zero**
Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	**0.007**
Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	**zero**
Diquat	0.02	Cataracts	Runoff from herbicide use	**0.02**
Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	**0.1**
Endrin	0.002	Liver problems	Residue of banned insecticide	**0.002**
Epichlorohydrin	TT[4]	Increased cancer risk; stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	**zero**
Ethylbenzene	0.7	Liver or kidney problems	Discharge from petroleum refineries	**0.7**
Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	**zero**
Fecal coliform and *E. coli*	MCL[6]	Fecal coliforms and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.	Human and animal fecal waste	**zero[6]**

LEGEND DISINFECTANT | DISINFECTION BYPRODUCT | INORGANIC CHEMICAL | MICROORGANISM | ORGANIC CHEMICAL | RADIONUCLIDES

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
Fluoride	4.0	Bone disease (pain and tenderness of the bones); children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	**4.0**
Giardia lamblia	TT[7]	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	**zero**
Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	**0.7**
Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	**n/a[9]**
Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	**zero**
Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	**zero**
Heterotrophic plate count (HPC)	TT[7]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	**n/a**
Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	**zero**
Hexachloro-cyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	**0.05**
Lead	TT[5]; Action Level=0.015	Infants and children: Delays in physical or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	**zero**
Legionella	TT[7]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	**zero**
Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, and gardens	**0.0002**
Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	**0.002**
Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, and livestock	**0.04**
Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	**10**

LEGEND

DISINFECTANT | DISINFECTION BYPRODUCT | INORGANIC CHEMICAL | MICROORGANISM | ORGANIC CHEMICAL | RADIONUCLIDES

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	**1**
Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	**0.2**
Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood-preserving factories	**zero**
Picloram	0.5	Liver problems	Herbicide runoff	**0.5**
Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	**zero**
Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	**zero**
Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines	**0.05**
Simazine	0.004	Problems with blood	Herbicide runoff	**0.004**
Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	**0.1**
Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	**zero**
Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	**0.0005**
Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	**1**
Total Coliforms	5.0 percent[8]	Coliforms are bacteria that indicate that other, potentially harmful bacteria may be present. See fecal coliforms and *E. coli*	Naturally present in the environment	**zero**
Total Trihalomethanes (TTHMs)	0.080	Liver, kidney, or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	**n/a[9]**
Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	**zero**
2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	**0.05**
1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	**0.07**

LEGEND DISINFECTANT · DISINFECTION BYPRODUCT · INORGANIC CHEMICAL · MICROORGANISM · ORGANIC CHEMICAL · RADIONUCLIDES

Contaminant	MCL or TT[1] (mg/L)[2]	Potential health effects from long-term[3] exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L)[2]
1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	**0.2**
1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	**0.003**
Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	**zero**
Turbidity	TT[7]	Turbidity is a measure of the cloudiness of water. It is used to indicate water quality and filtration effectiveness (e.g., whether disease-causing organisms are present). Higher turbidity levels are often associated with higher levels of disease-causing microorganisms such as viruses, parasites, and some bacteria. These organisms can cause short term symptoms such as nausea, cramps, diarrhea, and associated headaches.	Soil runoff	**n/a**
Uranium	30μg/L	Increased risk of cancer, kidney toxicity	Erosion of natural deposits	**zero**
Vinyl chloride	0.002	Increased risk of cancer	Leaching from PVC pipes; discharge from plastic factories	**zero**
Viruses (enteric)	TT[7]	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	**zero**
Xylenes (total)	10	Nervous system damage	Discharge from petroleum factories; discharge from chemical factories	**10**

LEGEND

DISINFECTANT | DISINFECTION BYPRODUCT | INORGANIC CHEMICAL | MICROORGANISM | ORGANIC CHEMICAL | RADIONUCLIDES

NOTES

1 Definitions

- **Maximum Contaminant Level Goal (MCLG):** The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- **Maximum Contaminant Level (MCL):** The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- **Maximum Residual Disinfectant Level Goal (MRDLG):** The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- **Maximum Residual Disinfectant Level (MRDL):** The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
- **Treatment Technique (TT):** A required process intended to reduce the level of a contaminant in drinking water.

2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).

3 Health effects are from long-term exposure unless specified as short-term exposure.

4 Each water system must certify annually, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05 percent dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01 percent dosed at 20 mg/L (or equivalent).

5 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10 percent of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.

6 A routine sample that is fecal coliform-positive or E. coli-positive triggers repeat samples--if any repeat sample is total coliform-positive, the system has an acute MCL violation. A routine sample that is total coliform-positive and fecal coliform-negative or E. coli-negative triggers repeat samples--if any repeat sample is fecal coliform-positive or E. coli-positive, the system has an acute MCL violation. See also Total Coliforms.

7 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- ***Cryptosporidium*:** 99 percent removal for systems that filter. Unfiltered systems are required to include Cryptosporidium in their existing watershed control provisions.
- **Giardia lamblia:** 99.9 percent removal/inactivation
- **Viruses:** 99.9 percent removal/inactivation
- ***Legionella*:** No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, according to the treatment techniques in the surface water treatment rule, *Legionella* will also be controlled.
- **Turbidity:** For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelometric turbidity unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.
- **HPC:** No more than 500 bacterial colonies per milliliter
- **Long Term 1 Enhanced Surface Water Treatment:** Surface water systems or ground water systems under the direct influence of surface water serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- **Long Term 2 Enhanced Surface Water Treatment:** This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storages facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts. (Monitoring start dates are staggered by system size. The largest systems (serving at least 100,000 people) will begin monitoring in October 2006 and the smallest systems (serving fewer than 10,000 people) will not begin monitoring until October 2008. After completing monitoring and determining their treatment bin, systems generally have three years to comply with any additional treatment requirements.)
- **Filter Backwash Recycling:** The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

8 No more than 5.0 percent samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or E. coli. If two consecutive TC-positive samples, and one is also positive for E. coli or fecal coliforms, system has an acute MCL violation.

9 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:

- **Haloacetic acids:** dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
- **Trihalomethanes:** bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

NATIONAL SECONDARY DRINKING WATER REGULATION

National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, some states may choose to adopt them as enforceable standards.

Contaminant	Secondary Maximum Contaminant Level
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	Noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

FOR MORE INFORMATION ON EPA'S SAFE DRINKING WATER:

visit: **epa.gov/safewater**

call: **(800) 426-4791**

ADDITIONAL INFORMATION:

To order additional posters or other ground water and drinking water publications, please contact the National Service Center for Environmental Publications at: **(800) 490-9198**, or email: **nscep@bps-lmit.com**.

Exhibit 5 – LHHCWD CCRs 2015-2020

- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791). You can also get more information on tap water by logging on to these helpful web sites:

- **http://water.epa.gov/drink/standards/hascience.cfm** (Federal EPA's web site)
- **www.waterboards.ca.gov/drinking_water/programs/index.shtml** (State Board web site)

If present, elevated levels of lead can cause serious health problem, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with services lines and home plumbing. La Habra Heights County Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at **http://www.epa.gov/safewater/lead**.

Should I Take Additional Precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection of *Cryptosporidium* and other microbial contaminants are available from the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

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The La Habra Heights County Water District conducted an assessment of its groundwater supplies in 2003. Groundwater supplies are considered most vulnerable to surface water recreational areas, chemical/petroleum pipelines, and other animal operations. A copy of the approved assessment may be obtained by contacting Michael Gualtieri at (562) 697-6769.

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- Save between 15 and 50 gallons each time by only washing full loads of laundry
- Adjust your sprinklers so that water lands on your lawn/garden, not the sidewalk/driveway – save 500 gallons per month
- Use organic mulch around plants to reduce evaporation – save hundreds of gallons a year
- Never let the water run while brushing your teeth or shaving. – save 35 gallons a week per person

Visit us at: WWW.LHHCWD.COM

LA HABRA HEIGHTS COUNTY WATER DISTRICT 2015 CONSUMER CONFIDENCE REPORT

Results are from the most recent testing performed in accordance with state and federal drinking water regulations

PRIMARY STANDARDS MONITORED AT THE SOURCE-MANDATED FOR PUBLIC HEALTH

ORGANIC CHEMICALS (µg/l)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	PRIMARY MCL	MCLG or PHG	MAJOR SOURCES IN DRINKING WATER
	(a)	(a)	(a)	(a)	
INORGANICS Sampled from 2013 to 2015 (b)					
Arsenic (µg/l)	2.9	2.5 - 3.7	10	0.004 (c)	Erosion of natural deposits; glass/electronics production wastes; runoff
Fluoride (mg/l)	0.3	0.2 - 0.3	2.0	1 (c)	Erosion of natural deposits, water additive that promotes strong teeth
Nitrate (mg/l as N)	3.0	2.2 - 3.8	10	10 (c)	Runoff and leaching from fertilizer use / septic tanks / sewage, natural erosion
RADIOLOGICAL - (pCi/l) (Sampled from 2013 to 2015) (b)					
Gross Alpha	1.7	ND - 4.1	15	0	Erosion of natural deposits
Radium 226	ND	ND	5 (h)	0.05	Erosion of natural deposits
Radium 228	ND	ND		0.019	Erosion of natural deposits
Uranium	2.2	1.3 - 3.4	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0 - 2	> 1 positive	0	Naturally present in the environment
Fecal Coliform and *E.Coli* Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes-TTHMS (µg/l)	14.8	6.9 - 22.7	80	-	By-product of drinking water chlorination
Haloacetic Acids (µg/l)	2.8	1.3 - 4.2	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.2	0.9 - 1.7	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2015	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.5 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing, erosion of natural deposits
Lead (µg/l)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing, industrial manufacturer discharges.

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2013-2015 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	SECONDARY MCL	MCLG or PHG	
Aggressiveness Index (corrosivity)	12.5	12.0 - 13.0	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Chloride (mg/l)	104.8	91 - 120	500	-	Runoff/leaching from natural deposits, seawater influence
Manganese (µg/l)	4.9	ND - 34	50	-	Leaching from natural deposits
Odor (threshold odor number)	0.5	ND - 1	3	-	Naturally-occurring organic materials.
Specific Conductance (uS/cm)	902.5	880 - 920	1,600	-	Substances that form ions when in water, seawater influence
Sulfate (mg/l)	150	150	500	-	Runoff/leaching from natural deposits, industrial wastes
Total Dissolved Solids (mg/l)	600	540 - 660	1,000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.2	ND - 0.7	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	<3.0	< 3.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.0	1	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.1	<0.1 - 0.3	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2013-2015 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE
Alkalinity (mg/l)	182.5	160 - 210
Calcium (mg/l)	92.3	79 - 100
1,4-Dioxane (ug/l)	1.0	ND - 1.5
Magnesium (mg/l)	18.0	17 - 19
pH (standard unit)	7.7	7.4 - 8.1
Potassium (mg/l)	4.3	4.0 - 4.5
Sodium (mg/l) (MCL=None)	67.0	59 - 77
Total Hardness (mg/l) (MCL=None)	305.0	260 - 340
Total Organic Carbon (mg/l)	0.6	0.6

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.

(b) Indicates dates sampled for groundwater sources only.

(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)

(d) Running annual average used to calculate average, range, and MCL compliance.

(e) Maximum Residual Disinfectant Level (MRDL)

(f) Maximum Residual Disinfectant Level Goal (MRDLG)

(g) 90th percentile from the most recent sampling at selected customer taps.

(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L.

ABBREVIATIONS

< = less than
mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NA = constituent not analyzed
ND = constituent not detected at the testing limit
NTU = nephelometric turbidity units
pCi/l = picoCuries per liter (a measure of radiation)
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
SI = saturation index
uS/cm = microSiemens per centimeter
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. MRDLGs are set by the U.S. Environmental Protection Agency.

Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Secondary Drinking Water Standard (SDWS): MCLs and MRDLs for contaminants that affect the aesthetic qualities (taste, odor, or appearance) of drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

Variances & Exemptions: Department permission to exceed an MCL or not comply with a treatment technique under certain conditions.

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo entienda bien. Para obtener una copia en Español, llame a (562) 697-6769

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

此份有关你的食水报告,内有重要资料和讯息,请找他人为你翻译及解释清楚。

この情報は重要です。翻訳を依頼してください。

Chi tiết này thật quan trọng. Xin nhờ người dịch cho quý vị.

이 안내는 매우 중요합니다. 본인을 위해 번역인을 사용하십시요.

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2015 CONSUMER CONFIDENCE REPORT

LA HABRA HEIGHTS COUNTY WATER DISTRICT
1271 NORTH HACIENDA ROAD
LA HABRA HEIGHTS, CA 90631

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LA HABRA HEIGHTS COUNTY WATER DISTRICT
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Since 1991, California water utilities have been providing information on water served to its consumers. This report is a snapshot of the tap water quality that we provided last year. Included are details about where your water comes from, how it is tested, what is in it, and how it compares with state and federal limits. We strive to keep you informed about the quality of your water, and to provide a reliable and economic supply that meets all regulatory requirements.

Where Does My Tap Water Come From?

Your tap water comes from local, deep groundwater wells that supply our service area shown on the adjacent map. The quality of groundwater delivered to your home is presented in this report.

How is My Drinking Water Tested?

Your drinking water is tested regularly for unsafe levels of chemicals, radioactivity and bacteria at the source and in the distribution system. We test weekly, monthly, quarterly, annually or less often depending on the substance. State and federal laws allow us to test some substances less than once per year because their levels do not change frequently. All water quality tests are conducted by specially trained technicians in state-certified laboratories.

What Are Drinking Water Standards?

The U.S Environmental Protection Agency (USEPA) limits the amount of certain substances allowed in tap water. In California, the State Water Resources Control Board (State Board) regulates tap water quality by enforcing limits that are at least as stringent as the Federal EPA's. Historically, California limits are more stringent than the Federal ones.

There are two types of these limits, known as standards. Primary standards protect you from substances that could potentially affect your health. Secondary standards regulate substances that affect the aesthetic qualities of water. Regulations set a Maximum Contaminant Level (MCL) for each of the primary and secondary standards. The MCL is the highest level of a substance that is allowed in your drinking water.

Public Health Goals (PHGs) are set by the California Environmental Protection Agency. PHGs provide more information on the quality of drinking water to customers, and are similar to their federal counterparts, Maximum Contaminant Level Goals (MCLGs). PHGs and MCLGs are advisory levels that are nonenforceable. Both PHGs and MCLGs are concentrations of a substance below which there are no known or expected health risks.

How Do I Read the Water Quality Table?

Although we test for over 100 substances, regulations require us to report only those found in your water. The first column of the water quality table lists substances detected in your water. The next columns list the average concentration and range of concentrations found in your drinking water. Following are columns that list the MCL and PHG or MCLG, if appropriate. The last column describes the likely sources of these substances in drinking water.

To review the quality of your drinking water, compare the highest concentration and the MCL. Check for substances greater than the MCL. Exceedence of a primary MCL does not usually constitute an immediate health threat. Rather, it requires testing the source water more frequently for a short duration. If test results show that the water continues to exceed the MCL, the water must be treated to remove the substance, or the source must be removed from service.

Why Do I See So Much Coverage in the News About the Quality Of Tap Water?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

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MWD completed an assessment of its Colorado River and State Water Project supplies in 2002. Colorado River supplies are considered most vulnerable to recreation, urban/storm water runoff, increasing urbanization in the watershed, and wastewater. State Water Project supplies are considered most vulnerable to urban/storm water runoff, wildlife, agriculture, recreation and wastewater. A copy of the assessment can be obtained by contacting MWD at (213) 217-6850.

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PRIMARY STANDARDS MONITORED AT THE SOURCE-MANDATED FOR PUBLIC HEALTH

ORGANIC CHEMICALS (µg/l)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE	PRIMARY MCL	MCLG or PHG	MAJOR SOURCES IN DRINKING WATER
	(a)		(a)		(a)	(a)	
INORGANICS Sampled from 2014 to 2016 (b)							
Arsenic (µg/l)	2.6	ND - 3.8	1.6	ND - 3.1	10	0.004 (c)	Erosion of natural deposits; glass/electronics production wastes; runoff
Barium (mg/l)	NA	NA	0.07	ND - 0.14	1	2	Oil drilling waste and metal refinery discharge; erosion of natural deposits
Fluoride (mg/l)	0.2	0.1 - 0.3	0.70	0.6 - 1.0	2.0	1 (c)	Erosion of natural deposits, water additive that promotes strong teeth
Nitrate (mg/l as N)	3.1	2.4 - 4.3	0.4	ND - 0.9	10	10 (c)	Runoff and leaching from fertilizer use / septic tanks / sewage, natural erosion
RADIOLOGICAL - (pCi/l) (Sampled from 2014 to 2016) (b)							
Gross Alpha	0.8	ND - 3.1	1.5	ND - 5.0	15	0	Erosion of natural deposits
Gross Beta	NA	NA	2.5	ND - 6.0	50	0	Decay of natural and man-made deposits
Radium 226	0.02	ND - 0.05	ND	ND	5 (h)	0.05	Erosion of natural deposits
Radium 228	0.0	ND - 0.16	ND	ND		0.019	Erosion of natural deposits
Uranium	1.9	1.3 - 3.4	2.5	2.0 - 3.0	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0.0	> 1 positive	0	Naturally present in the environment
Fecal Coliform and *E.Coli* Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes-TTHMS (µg/l)	39	8.8 - 39.0	80	-	By-product of drinking water chlorination
Haloacetic Acids (µg/l)	4.2	ND - 2.8	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.3	0.42 - 1.77	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2015	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.5 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing, erosion of natural deposits
Lead (µg/l)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing, industrial manufacturer discharges.

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2014-2016 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE	SECONDARY MCL	MCLG or PHG	
Aggressiveness Index (corrosivity)	12.4	12.4	12.4	12.2 - 12.5	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Chloride (mg/l)	104.5	98 - 120	259	ND - 220	500	-	Runoff/leaching from natural deposits, seawater influence
Manganese (µg/l)	4.9	ND - 34	ND	ND	50	-	Leaching from natural deposits
Odor (threshold odor number)	1	1	2.5	2.0 - 3.0	3	-	Naturally-occurring organic materials.
Specific Conductance (uS/cm)	950	900 - 1000	861	652 - 1050	1,600	-	Substances that form ions when in water, seawater influence
Sulfate (mg/l)	150	150	176.5	86 - 259	500	-	Runoff/leaching from natural deposits, industrial wastes
Total Dissolved Solids (mg/l)	587.5	540 - 620	527.5	377 - 659	1,000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.14	ND - 0.7	ND	ND	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	2.8	1.0 - 3.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.0	1	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.1	0.1 - 0.2	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2014-2016 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE
Alkalinity (mg/l)	185.0	160 - 210	106	92 - 124
Boron (µg/l)	NA	NA	210	150 - 270
Calcium (mg/l)	92.3	79 - 100	55.0	30 - 79
1,4-Dioxane (ug/l)	1.3	1.2 - 1.4	NA	NA
Magnesium (mg/l)	18.3	17 - 20	19	12 - 27
N-Nitrosodimethylamine (ug/l)	NA	NA	ND	ND - 0.005
pH (standard unit)	7.7	7.4 - 7.8	8.2	8.1 - 8.3
Potassium (mg/l)	4.5	4.2 - 4.9	4.1	2.9 - 5.1
Sodium (mg/l) (MCL=None)	68.8	60 - 77	97	84 - 106
Total Hardness (mg/l) (MCL=None)	307.5	260 - 340	214.5	126 - 306
Total Organic Carbon (mg/l)	0.6	0.6	2.4	1.7 - 2.8

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.

(b) Indicates dates sampled for groundwater sources only.

(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)

(d) Running annual average used to calculate average, range, and MCL compliance.

(e) Maximum Residual Disinfectant Level (MRDL)

(f) Maximum Residual Disinfectant Level Goal (MRDLG)

(g) 90th percentile from the most recent sampling at selected customer taps.

(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L.

ABBREVIATIONS

< = less than
mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NTU = nephelometric turbidity units
SI = saturation index
NA = constituent not analyzed
pCi/l = picoCuries per liter (a measure of radiation)
uS/cm = microSiemens per centimeter
ND = constituent not detected at the testing limit
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. MRDLGs are set by the U.S. Environmental Protection Agency

Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.

Public Health Goal (PHG) The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow

Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements

Secondary Drinking Water Standard (SDWS): MCLs and MRDLs for contaminants that affect the aesthetic qualities (taste, odor, or appearance) of drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

Variances & Exemptions: Department permission to exceed an MCL or not comply with a treatment technique under certain conditions.

LA HABRA HEIGHTS COUNTY WATER DISTRICT
1271 NORTH HACIENDA ROAD
LA HABRA HEIGHTS, CA 90631

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2016 CONSUMER CONFIDENCE REPORT

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo enteinda bien. Para obtener una copia en Español, llame a (562) 697-6769

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

此份有关你的食水报告,内有重要资料和讯息,请找
他人为你翻译及解释清楚。

この情報は重要です。
翻訳を依頼してください。

Chi tiết này thật quan trọng.
Xin nhờ người dịch cho quý vị.

이 안내는 매우 중요합니다.
본인을 위해 번역인을 사용하십시요.

LA HABRA HEIGHTS COUNTY WATER DISTRICT 2016 CONSUMER CONFIDENCE REPORT

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2016 CONSUMER CONFIDENCE REPORT

Since 1991, California water utilities have been providing information on water served to its consumers. This report is a snapshot of the tap water quality that we provided last year. Included are details about where your water comes from, how it is tested, what is in it, and how it compares with state and federal limits. We strive to keep you informed about the quality of your water, and to provide a reliable and economic supply that meets all regulatory requirements.

Where Does My Tap Water Come From?

Your tap water comes from 2 sources: groundwater and surface water. We pump groundwater from local, deep wells. We also use Metropolitan Water District of Southern California's (MWD) surface water from both the Colorado River and the State Water Project in northern California. These water sources, located on the adjacent map, supply our service area. The quality of our groundwater and MWD's surface water supplies is presented in this report.

How is My Drinking Water Tested?

Your drinking water is tested regularly for unsafe levels of chemicals, radioactivity and bacteria at the source and in the distribution system. We test weekly, monthly, quarterly, annually or less often depending on the substance. State and federal laws allow us to test some substances less than once per year because their levels do not change frequently. All water quality tests are conducted by specially trained technicians in state-certified laboratories.

What Are Drinking Water Standards?

The U.S Environmental Protection Agency (USEPA) limits the amount of certain substances allowed in tap water. In California, the State Water Resources Control Board (State Board) regulates tap water quality by enforcing limits that are at least as stringent as the Federal EPA's. Historically, California limits are more stringent than the Federal ones.

There are two types of these limits, known as standards. Primary standards protect you from substances that could potentially affect your health. Secondary standards regulate substances that affect the aesthetic qualities of water. Regulations set a Maximum Contaminant Level (MCL) for each of the primary and secondary standards. The MCL is the highest level of a substance that is allowed in your drinking water.

Public Health Goals (PHGs) are set by the California Environmental Protection Agency. PHGs provide more information on the quality of drinking water to customers, and are similar to their federal counterparts, Maximum Contaminant Level Goals (MCLGs). PHGs and MCLGs are advisory levels that are nonenforceable. Both PHGs and MCLGs are concentrations of a substance below which there are no known or expected health risks.

How Do I Read the Water Quality Table?

Although we test for over 100 substances, regulations require us to report only those found in your water. The first column of the water quality table lists substances detected in your water. The next columns list the average concentration and range of concentrations found in your drinking water. Following are columns that list the MCL and PHG or MCLG, if appropriate. The last column describes the likely sources of these substances in drinking water.

To review the quality of your drinking water, compare the highest concentration and the MCL. Check for substances greater than the MCL. Exceedence of a primary MCL does not usually constitute an immediate health threat. Rather, it requires testing the source water more frequently for a short duration. If test results show that the water continues to exceed the MCL, the water must be treated to remove the substance, or the source must be removed from service.

Why Do I See So Much Coverage in the News About the Quality Of Tap Water?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791). You can also get more information on tap water by logging on to these helpful web sites:

- **https://www.epa.gov/dwstandardsregulations** (USEPA's web site)
- **https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html** (State Board web site)

If present, elevated levels of lead can cause serious health problem, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with services lines and home plumbing. La Habra Heights County Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Should I Take Additional Precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection of *Cryptosporidium* and other microbial contaminants are available from the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Source Water Assessment

The La Habra Heights County Water District conducted an assessment of its groundwater supplies in 2003. Groundwater supplies are considered most vulnerable to surface water recreational areas, chemical/petroleum pipelines, and other animal operations. A copy of the approved assessment may be obtained by contacting Michael Gualtieri at (562) 697-6769.

MWD completed an assessment of its Colorado River and State Water Project supplies in 2002. Colorado River supplies are considered most vulnerable to recreation, urban/storm water runoff, increasing urbanization in the watershed, and wastewater. State Water Project supplies are considered most vulnerable to urban/storm water runoff, wildlife, agriculture, recreation and wastewater. A copy of the assessment can be obtained by contacting MWD at (213) 217-6850.

How Can I Participate in Decisions On Water Issues That Affect Me?

The public is welcome to attend Board of Directors meetings on the fourth Tuesday of each month at 4:00 p.m. at the District Office, 1271 North Hacienda Road, La Habra Heights, CA 90631.

How Do I Contact My Water Agency If I Have Any Questions About Water Quality?

If you have specific questions about your water quality, please contact Michael Gualtieri at (562) 697-6769.

Some Helpful Water Conservation Tips

- Fix leaky faucets in your home – save up to 20 gallons every day for every leak stopped
- Save between 15 and 50 gallons each time by only washing full loads of laundry
- Adjust your sprinklers so that water lands on your lawn/garden, not the sidewalk/driveway – save 500 gallons per month
- Use organic mulch around plants to reduce evaporation – save hundreds of gallons a year
- Never let the water run while brushing your teeth or shaving. – save 35 gallons a week per person

Visit us at: WWW.LHHCWD.COM

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2017 CONSUMER CONFIDENCE REPORT

Results are from the most recent testing performed in accordance with state and federal drinking water regulations

PRIMARY STANDARDS MONITORED AT THE SOURCE-MANDATED FOR PUBLIC HEALTH

ORGANIC CHEMICALS (µg/l)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE	PRIMARY MCL	MCLG or PHG	MAJOR SOURCES IN DRINKING WATER
	(a)		(a)		(a)	(a)	
INORGANICS Sampled from 2015 to 2017 (b)							
Arsenic (µg/l)	2.1	ND - 3.6	ND	ND - 2.4	10	0.004 (c)	Erosion of natural deposits; glass/electronics production wastes; runoff
Barium (mg/l)	NA	NA	ND	ND	1	2	Oil drilling waste and metal refinery discharge; erosion of natural deposits
Fluoride (mg/l)	0.2	0.15 - 0.33	0.70	0.5 - 0.9	2.0	1 (c)	Erosion of natural deposits, water additive that promotes strong teeth
Nitrate (mg/l as N)	3.2	2.0 - 5.1	0.30	ND - 0.6	10	10 (c)	Runoff and leaching from fertilizer use / septic tanks / sewage, natural erosion
RADIOLOGICAL - (pCi/l) (Sampled from 2014 to 2017) (b)							
Gross Alpha	0.8	ND - 3.1	ND	ND - 4.0	15	0	Erosion of natural deposits
Gross Beta	NA	NA	ND	ND - 5.0	50	0	Decay of natural and man-made deposits
Radium 226	0.0	ND - 0.05	ND	ND	5 (h)	0.05	Erosion of natural deposits
Radium 228	0.0	ND - 0.16	ND	ND		0.019	Erosion of natural deposits
Uranium	0.9	0.87 - 3.4	ND	ND - 3.0	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0.0	> 1 positive	0	Naturally present in the environment
Fecal Coliform and *E.Coli* Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes-TTHMS (µg/l)	44.5	6.1 - 44.5	80	-	By-product of drinking water chlorination
Haloacetic Acids (µg/l)	4.3	ND - 4.3	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.3	0.69 - 1.99	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2015	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.5 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing, erosion of natural deposits
Lead (µg/l)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing, industrial manufacturer discharges.

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2015-2017 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE	SECONDARY MCL	MCLG or PHG	
Aggressiveness Index (corrosivity)	12.3	12.2 - 12.4	12	11.9 - 12.1	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Chloride (mg/l)	105	100 - 120	66	29 - 94	500	-	Runoff/leaching from natural deposits, seawater influence
Manganese (µg/l)	4.9	ND - 34	ND	ND	50	-	Leaching from natural deposits
Odor (threshold odor number)	1	1	2.5	2.0 - 3.0	3	-	Naturally-occurring organic materials.
Specific Conductance (uS/cm)	947.5	900 - 1000	526	299 - 626	1,600	-	Substances that form ions when in water, seawater influence
Sulfate (mg/l)	142.5	120 - 150	77	48 - 123	500	-	Runoff/leaching from natural deposits, industrial wastes
Total Dissolved Solids (mg/l)	585	540 - 620	308	179 - 373	1,000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.14	ND - 0.7	ND	ND	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	<3.0	<3.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.1	1.0 - 2.0	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.1	<0.1 - 0.3	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2015-2017 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE
Alkalinity (mg/l)	182.5	160 - 210	106.0	92 - 124
Boron (µg/l)	NA	NA	150.0	110 - 190
Calcium (mg/l)	91.0	79 - 100	25.5	14 - 27
1,4-Dioxane (ug/l) (i)	1.0	ND - 1.6	NA	NA
Magnesium (mg/l)	18.8	17 - 20	12.0	6.2 - 16
N-Nitrosodimethylamine (ug/l)	NA	NA	ND	ND - 3.2
pH (standard unit)	7.6	7.4 - 7.7	8.4	8.2 - 8.7
Potassium (mg/l)	4.6	4.3 - 4.9	3.0	2.2 - 3.2
Sodium (mg/l) (MCL=None)	69.3	60 - 77	59.5	35 - 80
Total Hardness (mg/l) (MCL=None)	305.0	260 - 340	112.0	58 - 152
Total Organic Carbon (mg/l)	0.6	0.6	2.5	2.0 - 3.1

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.

(b) Indicates dates sampled for groundwater sources only.

(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)

(d) Running annual average used to calculate average, range, and MCL compliance.

(e) Maximum Residual Disinfectant Level (MRDL)

(f) Maximum Residual Disinfectant Level Goal (MRDLG)

(g) 90th percentile from the most recent sampling at selected customer taps.

(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L.

(i) The Notification Level of 1 ug/l for 1,4-Dioxane was exceeded in two wells in 2017. Some people who use water containing 1,4-dioxane in excess of the Notification Level over many years may experience liver or kidney problems and may have an increased risk of getting cancer, based on studies in laboratory animals.

ABBREVIATIONS

<= less than
mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NA = constituent not analyzed
ND = constituent not detected at the testing limit
NTU = nephelometric turbidity units
pCi/l = picoCuries per liter (a measure of radiation)
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
SI = saturation index
uS/cm = microSiemens per centimeter
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

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Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.

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LA HABRA HEIGHTS COUNTY WATER DISTRICT
2017 CONSUMER CONFIDENCE REPORT

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Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

此份有关你的食水报告,内有重要资料和讯息,请找他人为你翻译及解释清楚。

この情報は重要です。
翻訳を依頼してください。

Chi tiết này thật quan trọng.
Xin nhờ người dịch cho quý vị.

이 안내는 매우 중요합니다.
본인을 위해 번역인을 사용하십시요.

LA HABRA HEIGHTS COUNTY WATER DISTRICT
1271 NORTH HACIENDA ROAD
LA HABRA HEIGHTS, CA 90631

LA HABRA HEIGHTS COUNTY WATER DISTRICT 2017 CONSUMER CONFIDENCE REPORT

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2017 CONSUMER CONFIDENCE REPORT

Since 1991, California water utilities have been providing information on water served to its consumers. This report is a snapshot of the tap water quality that we provided last year. Included are details about where your water comes from, how it is tested, what is in it, and how it compares with state and federal limits. We strive to keep you informed about the quality of your water, and to provide a reliable and economic supply that meets all regulatory requirements.

Where Does My Tap Water Come From?

Your tap water comes from 2 sources: groundwater and surface water. We pump groundwater from local, deep wells. We also use Metropolitan Water District of Southern California's (MWD) surface water from both the Colorado River and the State Water Project in northern California. These water sources, located on the adjacent map, supply our service area. The quality of our groundwater and MWD's surface water supplies is presented in this report.

How is My Drinking Water Tested?

Your drinking water is tested regularly for unsafe levels of chemicals, radioactivity and bacteria at the source and in the distribution system. We test weekly, monthly, quarterly, annually or less often depending on the substance. State and federal laws allow us to test some substances less than once per year because their levels do not change frequently. All water quality tests are conducted by specially trained technicians in state-certified laboratories.

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The U.S Environmental Protection Agency (USEPA) limits the amount of certain substances allowed in tap water. In California, the State Water Resources Control Board (State Board) regulates tap water quality by enforcing limits that are at least as stringent as the Federal EPA's. Historically, California limits are more stringent than the Federal ones.

There are two types of these limits, known as standards. Primary standards protect you from substances that could potentially affect your health. Secondary standards regulate substances that affect the aesthetic qualities of water. Regulations set a Maximum Contaminant Level (MCL) for each of the primary and secondary standards. The MCL is the highest level of a substance that is allowed in your drinking water.

Public Health Goals (PHGs) are set by the California Environmental Protection Agency. PHGs provide more information on the quality of drinking water to customers, and are similar to their federal counterparts, Maximum Contaminant Level Goals (MCLGs). PHGs and MCLGs are advisory levels that are nonenforceable. Both PHGs and MCLGs are concentrations of a substance below which there are no known or expected health risks.

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Although we test for over 100 substances, regulations require us to report only those found in your water. The first column of the water quality table lists substances detected in your water. The next columns list the average concentration and range of concentrations found in your drinking water. Following are columns that list the MCL and PHG or MCLG, if appropriate. The last column describes the likely sources of these substances in drinking water.

To review the quality of your drinking water, compare the highest concentration and the MCL. Check for substances greater than the MCL. Exceedence of a primary MCL does not usually constitute an immediate health threat. Rather, it requires testing the source water more frequently for a short duration. If test results show that the water continues to exceed the MCL, the water must be treated to remove the substance, or the source must be removed from service.

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Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;

- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;
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In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Board regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

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MWD completed an assessment of its Colorado River and State Water Project supplies in 2002. Colorado River supplies are considered most vulnerable to recreation, urban/storm water runoff, increasing urbanization in the watershed, and wastewater. State Water Project supplies are considered most vulnerable to urban/storm water runoff, wildlife, agriculture, recreation and wastewater. A copy of the assessment can be obtained by contacting MWD at (213) 217-6850.

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LA HABRA HEIGHTS COUNTY WATER DISTRICT 2018 CONSUMER CONFIDENCE REPORT

Results are from the most recent testing performed in accordance with state and federal drinking water regulations

PRIMARY STANDARDS MONITORED AT THE SOURCE-MANDATED FOR PUBLIC HEALTH

ORGANIC CHEMICALS (µg/l)	GROUNDWATER		MWD'S SURFACE WATER		PRIMARY MCL	MCLG or PHG	MAJOR SOURCES IN DRINKING WATER
	AVERAGE	RANGE	AVERAGE	RANGE			
	(a)		(a)		(a)	(a)	
INORGANICS Sampled from 2016 to 2018 (b)							
Aluminum (mg/l)	ND	ND	0.06	ND - 0.11	1000	600 (j)	Erosion of natural deposits; residue from surface water treatment processes
Arsenic (µg/l)	2.0	ND - 3.5	ND	ND	10	0.004 (c)	Erosion of natural deposits; glass/electronics production wastes; runoff
Barium (mg/l)	ND	ND	0.06	ND - 0.12	1	2	Oil drilling waste and metal refinery discharge; erosion of natural deposits
Fluoride (mg/l)	0.2	0.15 - 0.33	0.70	0.4 - 0.9	2.0	1 (c)	Erosion of natural deposits, water additive that promotes strong teeth
Nitrate (mg/l as N)	3.7	2.5 - 5.2	0.25	ND - 0.5	10	10 (c)	Runoff and leaching from fertilizer use / septic tanks / sewage, natural erosion
RADIOLOGICAL - (pCi/l) (Sampled from 2015 to 2018) (b)							
Gross Alpha	1.1	ND - 3.1	ND	ND - 3.0	15	0	Erosion of natural deposits
Gross Beta	NA	NA	ND	ND	50	0	Decay of natural and man-made deposits
Radium 226	0.0	ND - 0.05	ND	ND - 1.0	5 (h)	0.05	Erosion of natural deposits
Radium 228	0.0	ND - 0.16	ND	ND		0.019	Erosion of natural deposits
Uranium	0.9	0.87 - 2.10	ND	ND - 1.0	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0.0 - 1.0	> 1 positive	0	Naturally present in the environment
Fecal Coliform and E Coli Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes-TTHMS (µg/l)	8.2	7.8 - 8.6	80	-	By-product of drinking water chlorination
Haloacetic Acids (µg/l)	0.6	ND - 1.2	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.3	1.0 - 1.8	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2018	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.4 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing, erosion of natural deposits
Lead (µg/l)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing, industrial manufacturer discharges.

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2016-2018 (b)	GROUNDWATER		MWD'S SURFACE WATER		SECONDARY MCL	MCLG or PHG	
	AVERAGE	RANGE	AVERAGE	RANGE			
Aggressiveness Index (corrosivity)	12.2	11.7 - 12.4	12.2	12.0 - 12.5	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Aluminum (µg/l) (j)	ND	ND	53	ND - 220	200	600 (j)	Erosion of natural deposits, surface water treatment process residue
Chloride (mg/l)	97.5	77 - 110	76	54 - 97	500	-	Runoff/leaching from natural deposits, seawater influence
Manganese (µg/l)	ND	ND	ND	ND	50	-	Leaching from natural deposits
Odor (threshold odor number)	1	1	2.5	1.0 - 4.0	3	-	Naturally-occurring organic materials.
Specific Conductance (uS/cm)	952.5	900 - 1000	695	428 - 1010	1,600	-	Substances that form ions when in water, seawater influence
Sulfate (mg/l)	146.3	84 - 190	128.5	43 - 236	500	-	Runoff/leaching from natural deposits, industrial wastes
Total Dissolved Solids (mg/l)	578.3	540 - 620	419	239 - 639	1 000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.19	ND - 1.0	ND	ND	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	2.0	ND - <3.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.1	1.0 - 2.0	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.2	<0.1 - 0.6	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2016-2018 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	MWD'S SURFACE WATER AVERAGE	MWD'S SURFACE WATER RANGE
Alkalinity (mg/l)	180.0	150 - 210	92	68 - 117
Boron (µg/l)	250	240 - 260	135	130 - 140
Calcium (mg/l)	91.0	79 - 100	41.5	19 - 69
Chlorate (ug/l)	NA	NA	49.5	26 - 60
1,4-Dioxane (ug/l) (i)	1.4	ND - 1.8	NA	NA
Magnesium (mg/l)	18.5	16 - 20	16.9	9.5 - 26
N-Nitrosodimethylamine (ug/l)	NA	NA	1.1	ND - 0.003
pH (standard unit)	7.6	7.2 - 7.7	8.3	8.1 - 8.5
Potassium (mg/l)	4.7	4.3 - 5.1	3.4	2.4 - 5.0
Sodium (mg/l) (MCL=None)	69.8	60 - 79	72	45 - 103
Total Hardness (mg/l) (MCL=None)	305.0	260 - 340	171.5	84 - 274
Total Organic Carbon (mg/l)	NA	NA	2.5	2.0 - 2.8
Vandium (ug/l)	NA	NA	3.7	ND - 7.4

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.

(b) Indicates dates sampled for groundwater sources only.

(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)

(d) Running annual average used to calculate average, range, and MCL compliance.

(e) Maximum Residual Disinfectant Level (MRDL)

(f) Maximum Residual Disinfectant Level Goal (MRDLG)

(g) 90th percentile from the most recent sampling at selected customer taps.

(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L.

(i) The Notification Level of 1 ug/l for 1,4-Dioxane was exceeded in two wells in 2018. Some people who use water containing 1,4-dioxane in excess of the Notification Level over many years may experience liver or kidney problems and may have an increased risk of getting cancer, based on studies in laboratory animals.

(j) Aluminum has primary and secondary standards.

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER

Availability of Monitoring Data for Unregulated Contaminants for LaHabra Heights County Water District Our System has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a standard. As our customer, you have a right to know that these data are available. If you are interested in examining the results, please contact Michael Gualtieri at 562-697-6769 or 1271 North Hacienda Road, LaHabra Heights, CA 90631. This notice is being sent to you by LaHabra Heights County Water District. State System ID# 1910210.

ABBREVIATIONS

< = less than

mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NA = constituent not analyzed
ND = constituent not detected at the testing limit
NTU = nephelometric turbidity units
pCi/l = picoCuries per liter (a measure of radiation)
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
SI = saturation index
uS/cm = microSiemens per centimeter
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. MRDLGs are set by the U.S. Environmental Protection Agency.

Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Secondary Drinking Water Standard (SDWS): MCLs and MRDLs for contaminants that affect the aesthetic qualities (taste, odor, or appearance) of drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

Variances & Exemptions: Department permission to exceed an MCL or not comply with a treatment technique under certain conditions.

LA HABRA HEIGHTS COUNTY WATER DISTRICT

2018 CONSUMER CONFIDENCE REPORT

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo entienda bien. Para obtener una copia en Español, llame a (562) 697-6769

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

此份有关你的食水报告,内有重要资料和讯息,请找他人为你翻译及解释清楚。

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Uranium	2.1	1.3 - 3.14	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0.0	> 1 positive	0	Naturally present in the environment
Fecal Coliform and *E.Coli* Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes TTHMS (µg/l)	69	8.8 - 69	80	-	By product of drinking water chlorination
Haloacetic Acids (µg/l)	ND	ND	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.4	0.7 - 2.1	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2018	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.4 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing; erosion of natural deposits
Lead (µg/l) (k)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing; industrial manufacturer discharges

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2017-2019 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	SECONDARY MCL	MCLG or PHG	
Aggressiveness Index (corrosivity)	12.1	11.7 - 12.3	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Chloride (mg/l)	100.6	77 - 110	500	-	Runoff/leaching from natural deposits; seawater influence
Odor (threshold odor number)	1	1	3	-	Naturally-occurring organic materials
Specific Conductance (uS/cm)	970	900 - 1100	1,600	-	Substances that form ions when in water; seawater influence
Sulfate (mg/l)	148.5	84 - 190	500	-	Runoff/leaching from natural deposits; industrial wastes
Total Dissolved Solids (mg/l)	598	560 - 620	1,000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.4	ND - 1.6	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	<3.0	<3.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.1	1.0 - 2.0	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.2	<0.1 - 1.5	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2017-2019 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE
Alkalinity (mg/l)	177.5	150 - 210
Boron (µg/l)	250	240 - 260
Calcium (mg/l)	92.0	79 - 110
1,4-Dioxane (ug/l) (i)	1.1	ND - 1.5
Magnesium (mg/l)	18.8	16 - 22
pH (standard unit)	7.5	7.2 - 7.6
Potassium (mg/l)	5.0	4.5 - 5.3
Sodium (mg/l) (MCL=None)	73.3	69 - 79
Total Hardness (mg/l) (MCL=None)	310.0	260 - 380

PERFLUOROBUTANESULFONIC ACID (PFBS) (ng/l)	7.2	ND - 13
PERFLUORODECANOIC ACID (PFDA) (ng/l)	0.4	ND - 1.9
PERFLUOROHEPTANOIC ACID (PFHpA) (ng/l)	1.3	ND - 3.9
PERFLUOROHEXANE SULFONIC ACID (PFHxS) (ng/l)	5.3	ND - 8.6
PERFLUOROHEXANOIC ACID (PFHxA) (ng/l)	4.7	ND - 12
PERFLUORONONANOIC ACID (PFNA) (ng/l)	2.4	ND - 3.6
PERFLUOROOCTANE SULFONIC ACID (PFOS) (ng/l)	34.8	26 - 52
PERFLUOROOCTANOIC ACID (PFOA) (ng/l)	12.7	7.8 - 17

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.
(b) Indicates dates sampled for groundwater sources only.
(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)
(d) Running annual average used to calculate average, range, and MCL compliance.
(e) Maximum Residual Disinfectant Level (MRDL)
(f) Maximum Residual Disinfectant Level Goal (MRDLG)
(g) 90th percentile from the most recent sampling at selected customer taps.
(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L
(i) The Notification Level of 1 ug/l for 1,4-Dioxane was exceeded in two wells in 2019. Some people who use water containing 1,4 dioxane in excess of the Notification Level over many years may experience liver or kidney problems and may have an increased risk of getting cancer, based on studies in laboratory animals.
(k) Lead Sampling in Schools: Recent events in the United States have shown that lead in drinking water remains an on-going public health concern, particularly for children. Lead rarely occurs naturally in California's drinking water sources, but may become present when water passes through older plumbing fixtures or solder containing lead that connects plumbing. In 2019, no lead sampling was requested from any school in the service area.

Notification of PFOA/PFOS: PFOA and PFOS are manmade fluorinated organic chemicals that are part of a larger group of chemicals referred to as per- and poly-fluoroalkyl substances (PFASs). These substances have been synthesized for water and lipid resistance and have been used extensively in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, and other materials (e.g., cookware) designed to be waterproof, stain-resistant or non-stick. In addition, they have been used in fire-retarding foam and various industrial processes.
In May 2016, the United States Environmental Protection Agency (U.S. EPA) issued a lifetime health advisory for PFOS and PFOA for drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 parts per trillion (PPT) or nanograms per liter (NG/L) in community water supplies. The recommended interim notification levels (NLs) OEHHA provided to SWRCB in July 2018 was 13 ug/l for PFOS and 14 ug/l for PFOA. In August 2019, State Water Resources Control Board, Division of Drinking Water (DDW), revised the notification levels to 6.5 ppt for PFOS and 5.1 ppt for PFOA. The single health advisory response level (for the combined values of PFOS and PFOA) remained at 70 ppt.
Exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes)."

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER - Availability of Monitoring Data for Unregulated Contaminants for LaHabra Heights County Water District. Our System has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a standard. As our customer, you have a right to know that these data are available. If you are interested in examining the results, please contact Michael Gualtieri at 562-697-6769 or 1271 North Hacienda Road, LaHabra Heights, CA 90631. This notice is being sent to you by LaHabra Heights County Water District. State System ID# 1910210

ABBREVIATIONS

< = less than
mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NA = constituent not analyzed
ND = constituent not detected at the testing limit
NTU = nephelometric turbidity units
pCi/l = picoCuries per liter (a measure of radiation)
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
SI = saturation index
uS/cm = microSiemens per centimeter
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.
Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency
Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. MRDLGs are set by the U.S. Environmental Protection Agency.
Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.
Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency
Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.
Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow
Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.
Secondary Drinking Water Standard (SDWS): MCLs and MRDLs for contaminants that affect the aesthetic qualities (taste, odor, or appearance) of drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2019 CONSUMER CONFIDENCE REPORT

Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo enteinda bien. Para obtener una copia en Español, llame a (562) 697-6769

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

此份有关你的食水报告,内有重要资料和讯息,请找他人为你翻译及解释清楚。

この情報は重要です。
翻訳を依頼してください。

Chi tiết này thật quan trọng.
Xin nhờ người dịch cho quý vị.

이 안내는 매우 중요합니다.
본인을 위해 번역인을 사용하십시오.

LA HABRA HEIGHTS COUNTY WATER DISTRICT
1271 NORTH HACIENDA ROAD
LA HABRA HEIGHTS, CA 90631

LA HABRA HEIGHTS COUNTY WATER DISTRICT 2019 CONSUMER CONFIDENCE REPORT

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2019 CONSUMER CONFIDENCE REPORT

Since 1991, California water utilities have been providing information on water served to its consumers. This report is a snapshot of the tap water quality that we provided last year. Included are details about where your water comes from, how it is tested, what is in it, and how it compares with state and federal limits. We strive to keep you informed about the quality of your water, and to provide a reliable and economic supply that meets all regulatory requirements.

Where Does My Tap Water Come From?

Your tap water comes from groundwater sources. We pump groundwater from local, deep wells. These water sources supply our service area shown on the adjacent map. The quality of our groundwater supplies is presented in this report.

How is My Drinking Water Tested?

Your drinking water is tested regularly for unsafe levels of chemicals, radioactivity and bacteria at the source and in the distribution system. We test weekly, monthly, quarterly, annually or less often depending on the substance. State and federal laws allow us to test some substances less than once per year because their levels do not change frequently. All water quality tests are conducted by specially trained technicians in state-certified laboratories.

What Are Drinking Water Standards?

The U.S Environmental Protection Agency (USEPA) limits the amount of certain substances allowed in tap water. In California, the State Water Resources Control Board (State Water Board) regulates tap water quality by enforcing limits that are at least as stringent as the Federal EPA's. Historically, California limits are more stringent than the Federal ones.

There are two types of these limits, known as standards. Primary standards protect you from substances that could potentially affect your health. Secondary standards regulate substances that affect the aesthetic qualities of water. Regulations set a Maximum Contaminant Level (MCL) for each of the primary and secondary standards. The MCL is the highest level of a substance that is allowed in your drinking water.

Public Health Goals (PHGs) are set by the California Environmental Protection Agency. PHGs provide more information on the quality of drinking water to customers, and are similar to their federal counterparts, Maximum Contaminant Level Goals (MCLGs). PHGs and MCLGs are advisory levels that are nonenforceable. Both PHGs and MCLGs are concentrations of a substance below which there are no known or expected health risks.

How Do I Read the Water Quality Table?

Although we test for over 100 substances, regulations require us to report only those found in your water. The first column of the water quality table lists substances detected in your water. The next columns list the average concentration and range of concentrations found in your drinking water. Following are columns that list the MCL and PHG or MCLG, if appropriate. The last column describes the likely sources of these substances in drinking water.

To review the quality of your drinking water, compare the highest concentration and the MCL. Check for substances greater than the MCL. Exceedence of a primary MCL does not usually constitute an immediate health threat. Rather, it requires testing the source water more frequently for a short duration. If test results show that the water continues to exceed the MCL, the water must be treated to remove the substance, or the source must be removed from service.

Why Do I See So Much Coverage in the News About the Quality Of Tap Water?

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;
- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2020 CONSUMER CONFIDENCE REPORT

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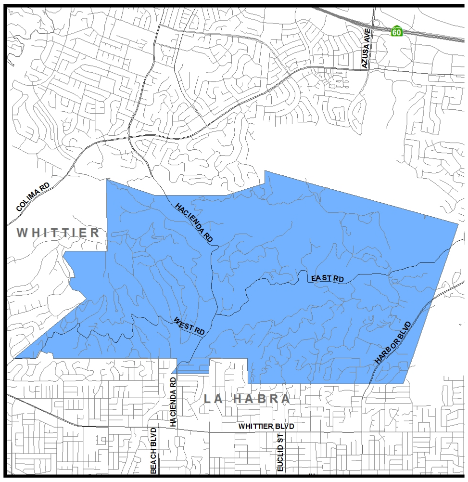

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Contaminants that may be present in source water include:

- Microbial contaminants, including viruses and bacteria, that may come from sewage treatment plants, septic systems, agricultural livestock operations, and wildlife;
- Inorganic contaminants, such as salts and metals, that can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming;
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses;
- Organic chemical contaminants, including synthetic and volatile organic chemicals, that are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, agricultural application, and septic systems;

- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, the U. S. Environmental Protection Agency (USEPA) and the State Water Resources Control Board (State Water Board) prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. The State Water Board regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA's Safe Drinking Water Hotline (1-800-426-4791). You can also get more information on tap water by logging on to these helpful web sites:

- **http://www.epa.gov/dwstandardsregulations/2018-drinking-water-standards-and-advisory-tables** (USEPA's web site)

- **https://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/Chemicalcontaminants.html** (State Board web site)

If present, elevated levels of lead can cause serious health problem, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with services lines and home plumbing. La Habra Heights County Water is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at **http://www.epa.gov/safewater/lead**.

Should I Take Additional Precautions?

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The USEPA/Centers for Disease Control guidelines on appropriate means to lessen the risk of infection of *Cryptosporidium* and other microbial contaminants are available from the USEPA's Safe Drinking Water Hotline (1-800-426-4791).

Source Water Assessment

The La Habra Heights County Water District conducted an assessment of its groundwater supplies in 2003. Groundwater supplies are considered most vulnerable to surface water recreational areas, chemical/petroleum pipelines, and other animal operations. A copy of the approved assessment may be obtained by contacting Michael Gualtieri at (562) 697-6769.

How Can I Participate in Decisions On Water Issues That Affect Me?

The public is welcome to attend Board of Directors meetings on the fourth Tuesday of each month at 4:00 p.m. at the District Office, 1271 North Hacienda Road, La Habra Heights, CA 90631.

How Do I Contact My Water Agency If I Have Any Questions About Water Quality?

If you have specific questions about your water quality, please contact Michael Gualtieri at (562) 697-6769.

Some Helpful Water Conservation Tips

- Fix leaky faucets in your home – save up to 20 gallons every day for every leak stopped

- Save between 15 and 50 gallons each time by only washing full loads of laundry

- Adjust your sprinklers so that water lands on your lawn/garden, not the sidewalk/driveway – save 500 gallons per month

- Use organic mulch around plants to reduce evaporation – save hundreds of gallons a year

- Never let the water run while brushing your teeth or shaving. – save 35 gallons a week per person

- Visit http://www.epa.gov/watersense for more information.

Visit us at: WWW.LHHCWD.COM

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2020 CONSUMER CONFIDENCE REPORT

Results are from the most recent testing performed in accordance with state and federal drinking water regulations

PRIMARY STANDARDS MONITORED AT THE SOURCE-MANDATED FOR PUBLIC HEALTH

ORGANIC CHEMICALS (µg/l)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	PRIMARY MCL	MCLG or PHG	MAJOR SOURCES IN DRINKING WATER
	(a)	(a)	(a)	(a)	
INORGANICS Sampled from 2018 to 2020 (b)					
Arsenic (µg/l)	2.8	2.4 - 4.1	10	0.004 (c)	Erosion of natural deposits; glass/electronics production wastes; runoff
Fluoride (mg/l)	0.2	0.2 - 0.3	2.0	1 (c)	Erosion of natural deposits, water additive that promotes strong teeth
Nitrate (mg/l as N)	3.8	2.7 - 4.8	10	10 (c)	Runoff and leaching from fertilizer use / septic tanks / sewage, natural erosion
RADIOLOGICAL - (pCi/l) (Sampled from 2015 to 2020) (b)					
Gross Alpha	0.8	ND - 3.1	15	0	Erosion of natural deposits
Radium 226	ND	ND - 0.05	5 (h)	0.05	Erosion of natural deposits
Radium 228	ND	ND - 0.16		0.019	Erosion of natural deposits
Uranium	2.1	1.3 - 3.4	20	0.5 (c)	Erosion of natural deposits

PRIMARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM - MANDATED FOR PUBLIC HEALTH

MICROBIALS	DISTRIBUTION SYSTEM AVERAGE # POSITIVE	DISTRIBUTION SYSTEM RANGE OF # POSITIVE	PRIMARY MCL	MCLG or PHG	
Total Coliform Bacteria	0	0.0	> 1 positive	0	Naturally present in the environment
Fecal Coliform and *E.Coli* Bacteria	0.0	0.0	0	0	Human and animal fecal waste
No. of Acute Violations	0.0	0.0	-	-	

DISINFECTION BY-PRODUCTS (d) AND DISINFECTION RESIDUALS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	PRIMARY MCL	MCLG or PHG	
Trihalomethanes-TTHMS (µg/l)	8.7	8.7 - 18.0	80	-	By-product of drinking water chlorination
Haloacetic Acids (µg/l)	2.0	0.0 - 2.0	60	-	By-product of drinking water disinfection
Total Chlorine Residual (mg/l)	1.4	0.9 - 2.0	4.0 (e)	4.0 (f)	Drinking water disinfectant added for treatment

AT THE TAP PHYSICAL CONSTITUENTS 20 sites sampled in 2018	DISTRIBUTION SYSTEM 90%ile	DISTRIBUTION SYSTEM # OF SITES ABOVE THE AL	PRIMARY MCL	MCLG or PHG	
Copper (mg/l)	0.4 (g)	0	1.3 AL	0.3 (c)	Internal corrosion of household plumbing, erosion of natural deposits
Lead (µg/l) (j)	ND (g)	0	15 AL	0.2 (c)	Internal corrosion of household plumbing, industrial manufacturer discharges.

SECONDARY STANDARDS MONITORED AT THE SOURCE-FOR AESTHETIC PURPOSES

Sampled in 2018-2020 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE	SECONDARY MCL	MCLG or PHG	
Aggressiveness Index (corrosivity)	12.1	11.7 - 12.3	Non-corrosive	-	Natural/industrially-influenced balance of hydrogen/carbon/oxygen in water
Chloride (mg/l)	100.6	77 - 110	500	-	Runoff/leaching from natural deposits, seawater influence
Odor (threshold odor number)	0.8	ND - 1.0	3	-	Naturally-occurring organic materials.
Specific Conductance (uS/cm)	980	920 - 1100	1,600	-	Substances that form ions when in water, seawater influence
Sulfate (mg/l)	148	84 - 190	500	-	Runoff/leaching from natural deposits, industrial wastes
Total Dissolved Solids (mg/l)	583.8	540 - 620	1,000	-	Runoff/leaching from natural deposits
Turbidity (NTU)	0.4	ND - 1.6	5	-	Soil runoff

SECONDARY STANDARDS MONITORED IN THE DISTRIBUTION SYSTEM-FOR AESTHETIC PURPOSES

GENERAL PHYSICAL CONSTITUENTS	DISTRIBUTION SYSTEM AVERAGE	DISTRIBUTION SYSTEM RANGE	SECONDARY MCL	MCLG or PHG	
Color (color units)	<3.0	<3.0 - 5.0	15	-	Naturally-occurring organic materials
Odor (threshold odor number)	1.1	1.0 - 2.0	3	-	Naturally-occurring organic materials
Turbidity (NTU)	0.2	<0.1 - 0.5	5	-	Soil runoff

ADDITIONAL CHEMICALS OF INTEREST

Sampled in 2018-2020 (b)	GROUNDWATER AVERAGE	GROUNDWATER RANGE
Alkalinity (mg/l)	180.0	150 - 210
Boron (µg/l)	250	240 - 260
Calcium (mg/l)	95.5	79 - 110
1,4-Dioxane (ug/l) (i)	0.8	ND - **1.3**
Magnesium (mg/l)	19.0	16 - 22
pH (standard unit)	7.4	7.2 - 7.5
Potassium (mg/l)	5.1	4.9 - 5.3
Sodium (mg/l) (MCL=None)	72.5	66 - 79
Total Hardness (mg/l) (MCL=None)	320.0	260 - 380

PERFLUOROBUTANESULFONIC ACID (PFBS) (ng/l)	7.52	6.2 - 10
PERFLUOROHEPTANOIC ACID (PFHpA) (ng/l)	1.93	ND - 3.2
PERFLUOROHEXANE SULFONIC ACID (PFHxS) (ng/l)	6.97	5.1 - 8.2
PERFLUOROHEXANOIC ACID (PFHxA) (ng/l)	6.28	3.1 - 13
PERFLUORONONANOIC ACID (PFNA) (ng/l)	2.91	2.7 - 3.1
PERFLUOROOCTANE SULFONIC ACID (PFOS) (ng/l)	31.83	23 - 41
PERFLUOROOCTANOIC ACID (PFOA) (ng/l)	13.32	9.9 - 16

FOOTNOTES

(a) Over 50 regulated and unregulated organic chemicals were analyzed. None were detected at or above the reporting limit in the groundwater sources.

(b) Indicates dates sampled for groundwater sources only.

(c) California Public Health Goal (PHG). Other advisory levels listed in this column are Federal Maximum Contaminant Level Goals (MCLGs)

(d) Running annual average used to calculate average, range, and MCL compliance.

(e) Maximum Residual Disinfectant Level (MRDL)

(f) Maximum Residual Disinfectant Level Goal (MRDLG)

(g) 90th percentile from the most recent sampling at selected customer taps.

(h) Combined Radium 226 + Radium 228 has a Maximum Contaminant Level (MCL) of 5 pCi/L.

(i) The Notification Level of 1 ug/l for 1,4-Dioxane was exceeded in two wells in 2020. Some people who use water containing 1,4-dioxane in excess of the Notification Level over many years may experience liver or kidney problems and may have an increased risk of getting cancer, based on studies in laboratory animals.

(j) Lead Sampling in Schools: Recent events in the United States have shown that lead in drinking water remains an on-going public health concern, particularly for children. Lead rarely occurs naturally in California's drinking water sources, but may become present when water passes through older plumbing fixtures or solder containing lead that connects plumbing. In 2020, there we no schools in the service area that requested lead sampling at their school.

Notification of PFOA/PFOS: PFOA and PFOS are manmade fluorinated organic chemicals that are part of a larger group of chemicals referred to as per- and poly-fluoroalkyl substances (PFASs). These substances have been synthesized for water and lipid resistance and have been used extensively in consumer products such as carpets, clothing, fabrics for furniture, paper packaging for food, and other materials (e.g., cookware) designed to be waterproof, stain-resistant or non-stick. In addition, they have been used in fire-retarding foam and various industrial processes.

In May 2016, the United States Environmental Protection Agency (U.S. EPA) issued a lifetime health advisory for PFOS and PFOA for drinking water, advising municipalities that they should notify their customers of the presence of levels over 70 parts per trillion (PPT) or nanograms per liter (NG/L) in community water supplies. The recommended interim notification levels (NLs) OEHHA provided to SWRCB in July 2018 was 13 ug/l for PFOS and 14 ug/l for PFOA. In August 2019, State Water Resources Control Board, Division of Drinking Water (DDW), revised the notification levels to 6.5 ppt for PFOS and 5.1 ppt for PFOA. The single health advisory response level (for the combined values of PFOS and PFOA) remained at 70 ppt.

Exposure to PFOA and PFOS over certain levels may result in adverse health effects, including developmental effects to fetuses during pregnancy or to breastfed infants (e.g., low birth weight, accelerated puberty, skeletal variations), cancer (e.g., testicular, kidney), liver effects (e.g., tissue damage), immune effects (e.g., antibody production and immunity), thyroid effects and other effects (e.g., cholesterol changes)."

IMPORTANT INFORMATION ABOUT YOUR DRINKING WATER - Availability of Monitoring Data for Unregulated Contaminants for LaHabra Heights County Water District Our System has sampled for a series of unregulated contaminants. Unregulated contaminants are those that don't yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a standard. As our customer, you have a right to know that these data are available. If you are interested in examining the results, please contact Michael Gualtieri at 562-697-6769 or 1271 North Hacienda Road, LaHabra Heights, CA 90631. This notice is being sent to you by LaHabra Heights County Water District. State System ID# 1910210.

ABBREVIATIONS

< = less than
mg/l = milligrams per liter or parts per million (equivalent to 1 drop in 42 gallons)
NA = constituent not analyzed
ND = constituent not detected at the testing limit
NTU = nephelometric turbidity units
pCi/l = picoCuries per liter (a measure of radiation)
ng/l = nanograms per liter or parts per trillion (equivalent to 1 drop in 42,000,000 gallons)
SI = saturation index
uS/cm = microSiemens per centimeter
µg/l = micrograms per liter or parts per billion (equivalent to 1 drop in 42,000 gallons)

DEFINITIONS

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants. MRDLGs are set by the U.S. Environmental Protection Agency.

Notification Level: The level at which notification of the public water system governing body is required. A health-based advisory level for an unregulated contaminant.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Treatment Technique (TT): A required process intended to reduce the level of a contaminant in drinking water.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements that a water system must follow.

Primary Drinking Water Standard (PDWS): MCLs and MRDLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

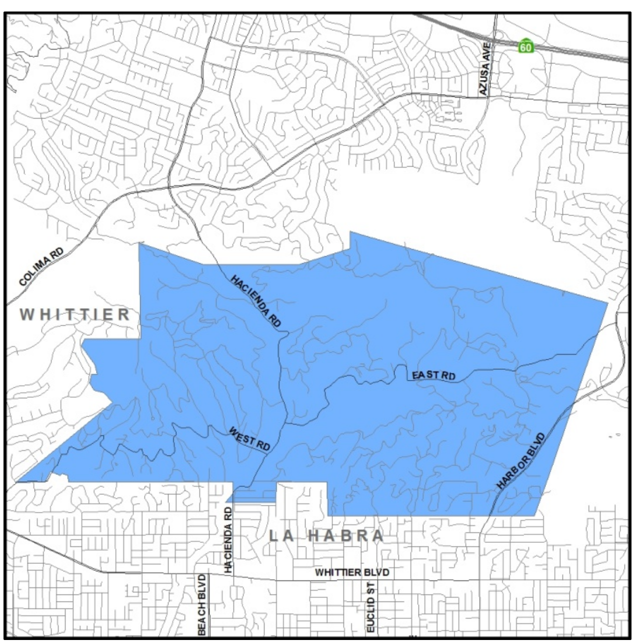
Secondary Drinking Water Standard (SDWS): MCLs and MRDLs for contaminants that affect the aesthetic qualities (taste, odor, or appearance) of drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

Variances & Exemptions: Department permission to exceed an MCL or not comply with a treatment technique under certain conditions.

LA HABRA HEIGHTS COUNTY WATER DISTRICT 2020 CONSUMER CONFIDENCE REPORT

LA HABRA HEIGHTS COUNTY WATER DISTRICT
1271 NORTH HACIENDA ROAD
LA HABRA HEIGHTS, CA 90631

LA HABRA HEIGHTS COUNTY WATER DISTRICT
2020 CONSUMER CONFIDENCE REPORT



Este informe contiene información muy importante sobre su agua potable. Tradúzcalo ó hable con alguien que lo enteinda bien. Para obtener una copia en Español, llame a (562) 697-6769

Daimntawv tshaj tawm no muaj lus tseemceeb txog koj cov dej haus. Tshab txhais nws, los yog tham nrog tej tug neeg uas totaub txog nws.

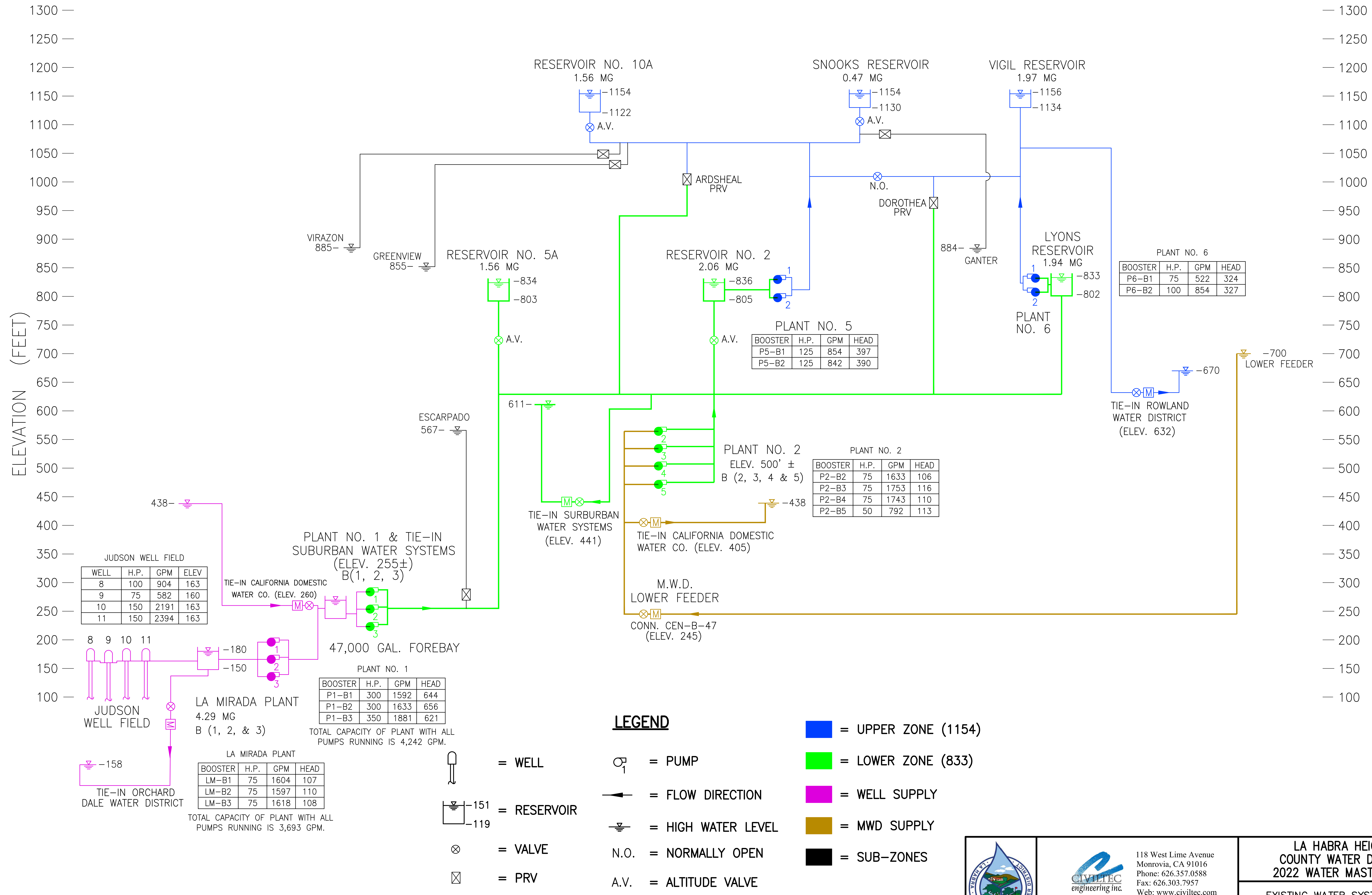
此份有关你的食水报告,内有重要资料和讯息,请找
他人为你翻译及解释清楚。

この情報は重要です。
翻訳を依頼してください。

Chi tiết này thật quan trọng.
Xin nhờ người dịch cho quý vị.

이 안내는 매우 중요합니다.
본인을 위해 번역인을 사용하십시요.

Exhibit 6 – Existing Water System Hydraulic Profile



PLANT NO. 6

BOOSTER	H.P.	GPM	HEAD
P6-B1	75	522	324
P6-B2	100	854	327

PLANT NO. 5

BOOSTER	H.P.	GPM	HEAD
P5-B1	125	854	397
P5-B2	125	842	390

PLANT NO. 2

BOOSTER	H.P.	GPM	HEAD
P2-B2	75	1633	106
P2-B3	75	1753	116
P2-B4	75	1743	110
P2-B5	50	792	113

JUDSON WELL FIELD

WELL	H.P.	GPM	ELEV
8	100	904	163
9	75	582	160
10	150	2191	163
11	150	2394	163

PLANT NO. 1

BOOSTER	H.P.	GPM	HEAD
P1-B1	300	1592	644
P1-B2	300	1633	656
P1-B3	350	1881	621

LA MIRADA PLANT

BOOSTER	H.P.	GPM	HEAD
LM-B1	75	1604	107
LM-B2	75	1597	110
LM-B3	75	1618	108

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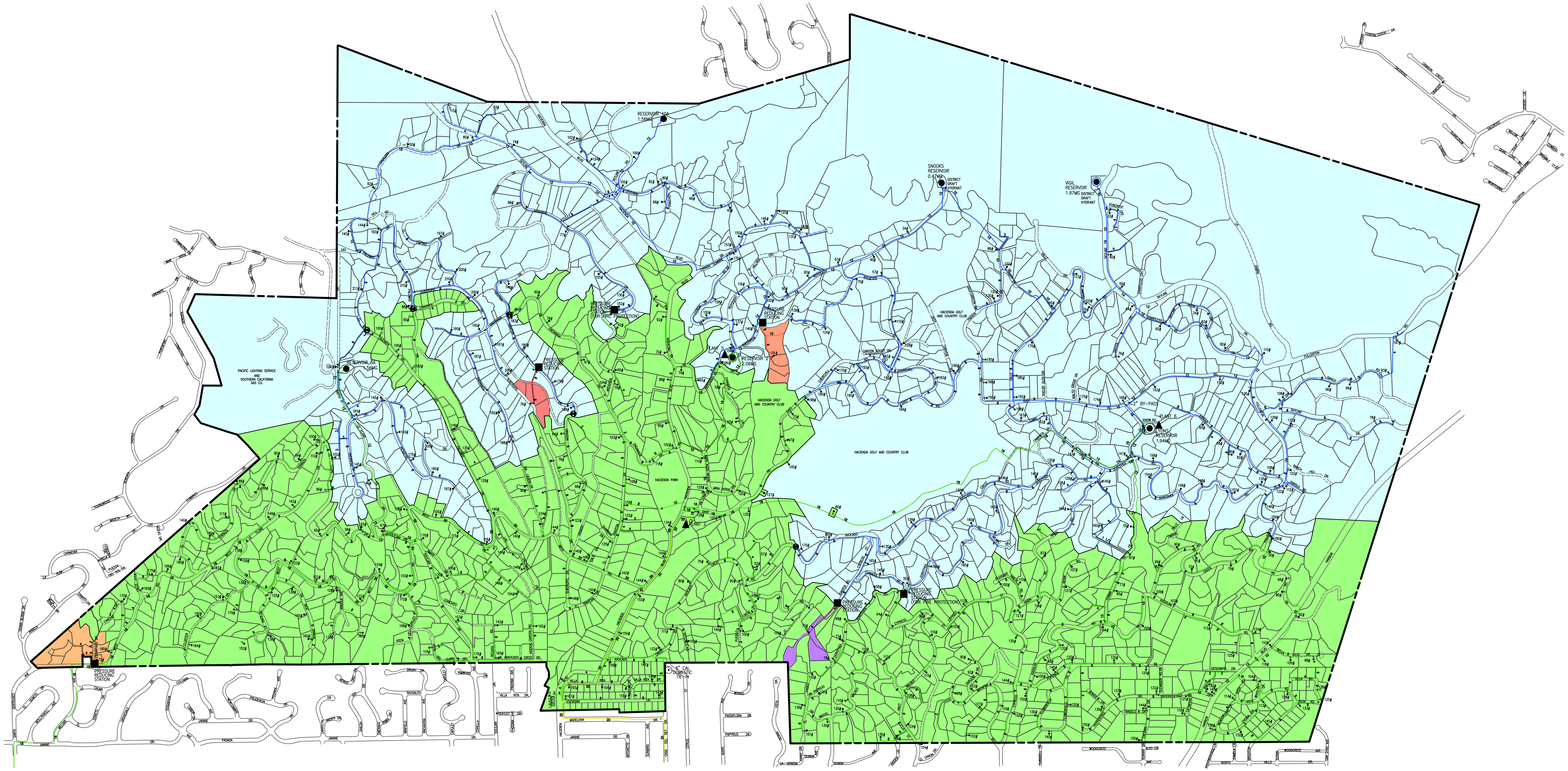
LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

EXISTING WATER SYSTEM HYDRAULIC PROFILE

EXHIBIT 6

Exhibit 7 – Existing Water System Pressure Zones & Facilities



LEGEND

140#	PRESSURE AT HYDRANT (PSI)
	6" FIRE HYDRANT
	4" FIRE HYDRANT
	4" FIRE HYDRANT WITH 6" BARREL
	LESS THAN 4" FIRE HYDRANT
	REDUCER
	MAINS DO NOT CONNECT
	WATER DISTRICT BOUNDARY
	UPPER ZONE (1154)
	UPPER ZONE PIPELINE
	LOWER ZONE (833)
	LOWER ZONE PIPELINE
	ESCARPADO SUB-ZONE
	GREENVIEW SUB-ZONE
	GANTER/LAMAT SUB-ZONE
	VIRAZON/SUBTROPIC SUB-ZONE
	MWD TRANSMISSION PIPELINE
	RESERVOIR
	BOOSTER PUMP STATION
	PRESSURE REGULATING STATION
	WATER SYSTEM INTERCONNECT
	CLOSED ZONE VALVE (ZB = ZONE BREAK)

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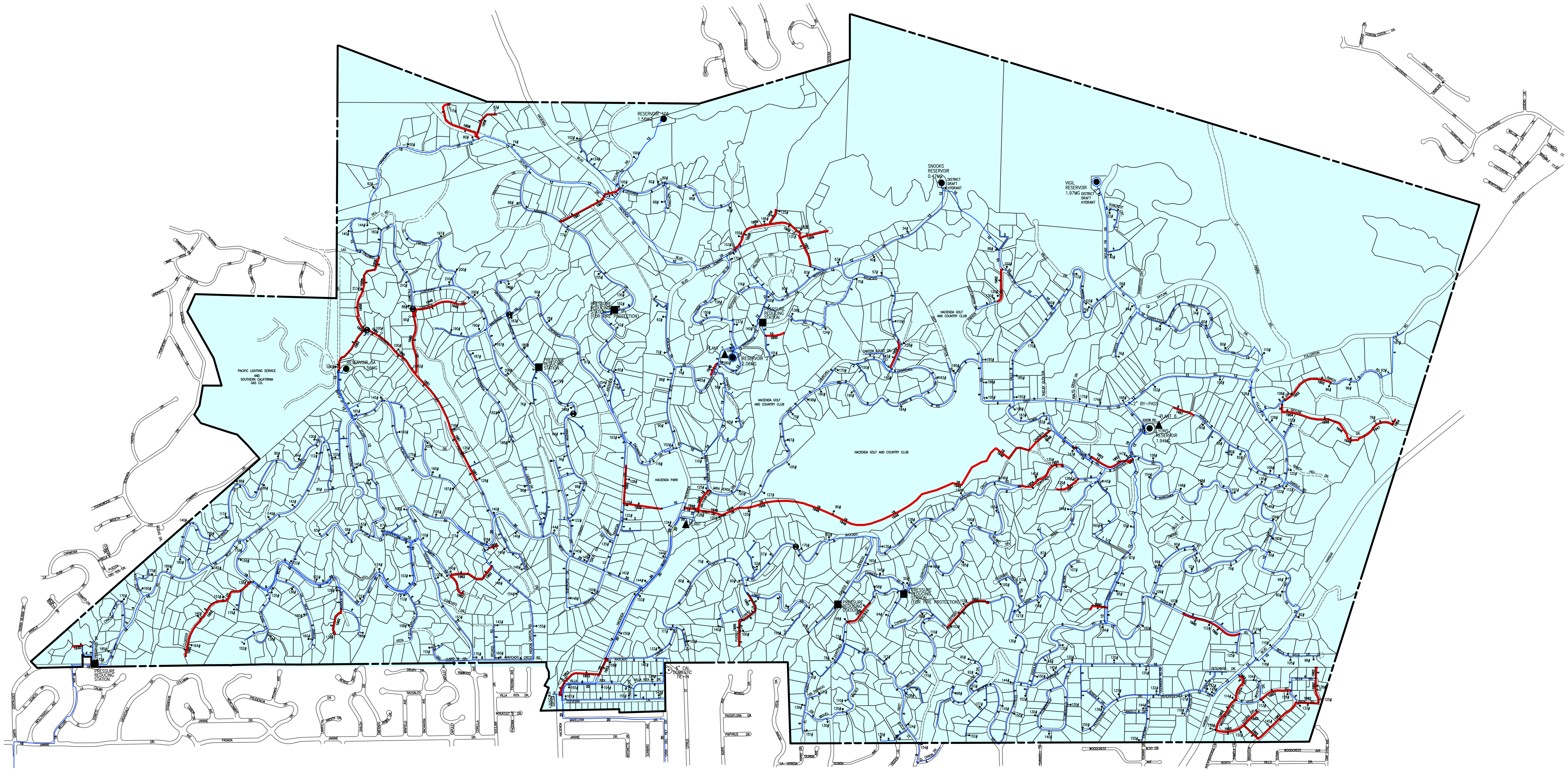
LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

EXISTING WATER SYSTEM PRESSURE ZONES & FACILITIES

EXHIBIT 7

Exhibit 8 – Pipes Sixty or More Years Old



LEGEND

140#	PRESSURE AT HYDRANT (PSI)
	6" FIRE HYDRANT
	4" FIRE HYDRANT
	4" FIRE HYDRANT WITH 6" BARREL
	LESS THAN 4" FIRE HYDRANT
	REDUCER
	MAINS DO NOT CONNECT
	WATER DISTRICT BOUNDARY
	LA HABRA HEIGHTS COUNTY WATER DISTRICT
	PIPES
	PIPES 60 OR MORE YEARS OLD
	RESERVOIR
	BOOSTER PUMP STATION
	PRESSURE REGULATING STATION
	WATER SYSTEM INTERCONNECT
	CLOSED ZONE VALVE (ZB = ZONE BREAK)

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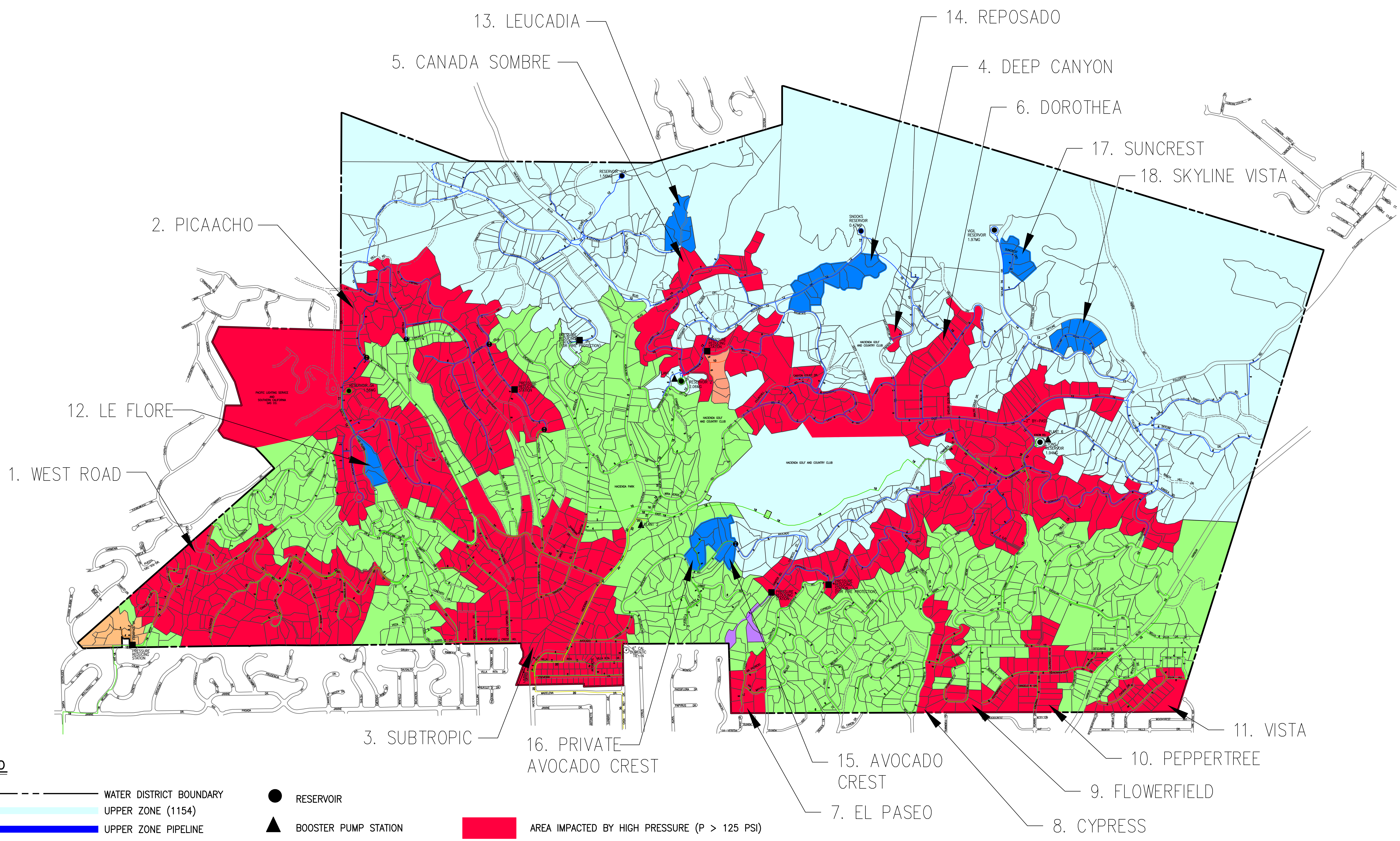
PIPES SIXTY OR MORE YEARS OLD

EXHIBIT 8

Exhibit 9 – Existing Water System Pressure Deficiencies



LEGEND

- WATER DISTRICT BOUNDARY
- UPPER ZONE (1154)
- UPPER ZONE PIPELINE
- LOWER ZONE (833)
- LOWER ZONE PIPELINE
- ESCARPADO SUB-ZONE
- GREENVIEW SUB-ZONE
- GANTER/LAMAT SUB-ZONE
- VIRAZON/SUBTROPIC SUB-ZONE
- MWD TRANSMISSION PIPELINE
- RESERVOIR
- BOOSTER PUMP STATION
- PRESSURE REGULATING STATION
- WATER SYSTEM INTERCONNECT
- CLOSED ZONE VALVE (ZB = ZONE BREAK)
- AREA IMPACTED BY HIGH PRESSURE (P > 125 PSI)
- AREA IMPACTED BY LOW PRESSURE (P < 40 PSI)

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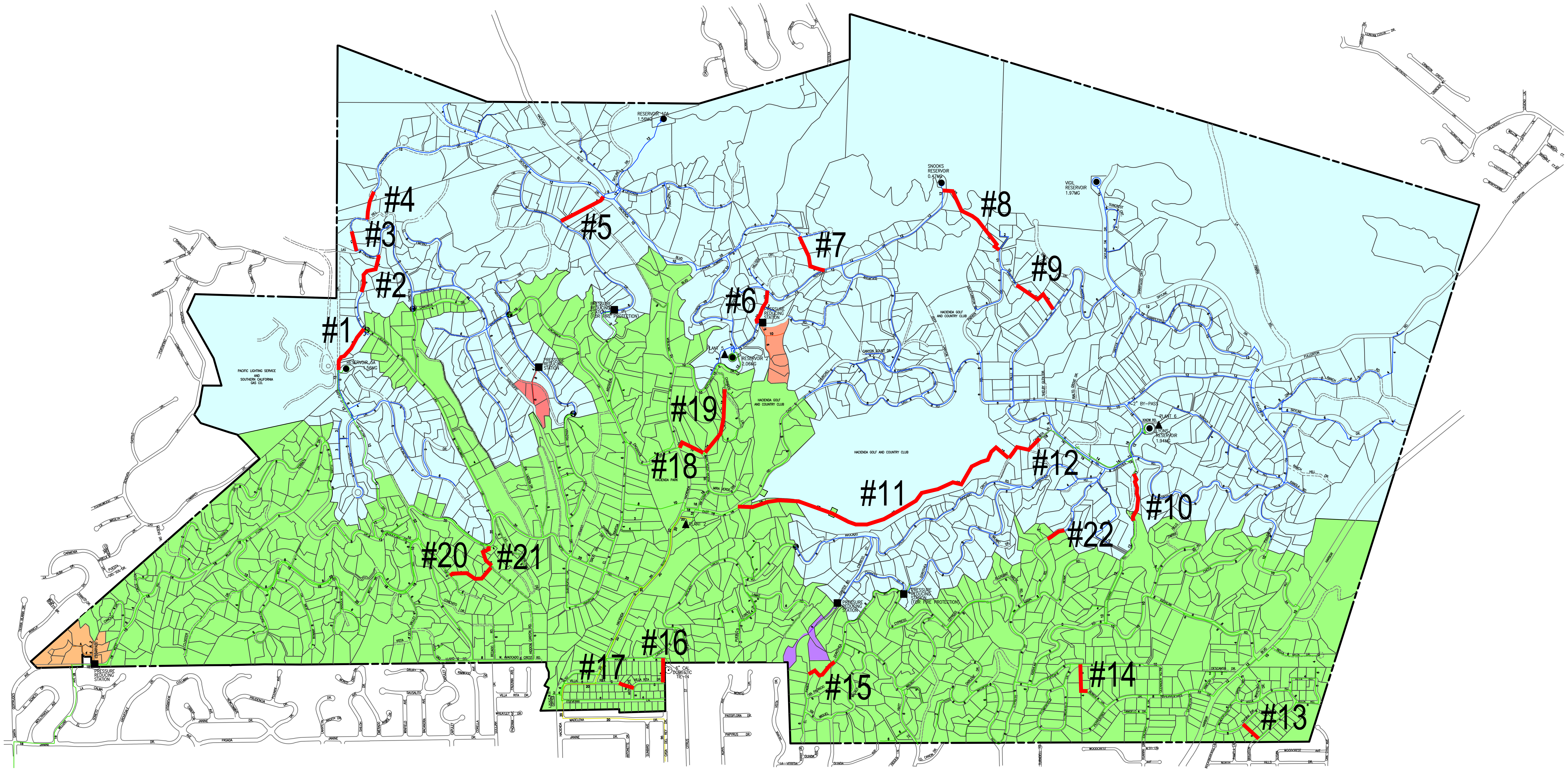
LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

EXISTING WATER SYSTEM PRESSURE DEFICIENCIES

EXHIBIT 9

Exhibit 10 – Existing Cross-Country Pipelines



LEGEND

WATER DISTRICT BOUNDARY	CROSS-COUNTRY PIPELINE
UPPER ZONE (1154)	RESERVOIR
UPPER ZONE PIPELINE	BOOSTER PUMP STATION
LOWER ZONE (833)	PRESSURE REGULATING STATION
LOWER ZONE PIPELINE	WATER SYSTEM INTERCONNECT
ESCARPADO SUB-ZONE	CLOSED ZONE VALVE (ZB = ZONE BREAK)
GREENVIEW SUB-ZONE	
GANTER/LAMAT SUB-ZONE	
VIRAZON/SUBTROPIC SUB-ZONE	
MWD TRANSMISSION PIPELINE	

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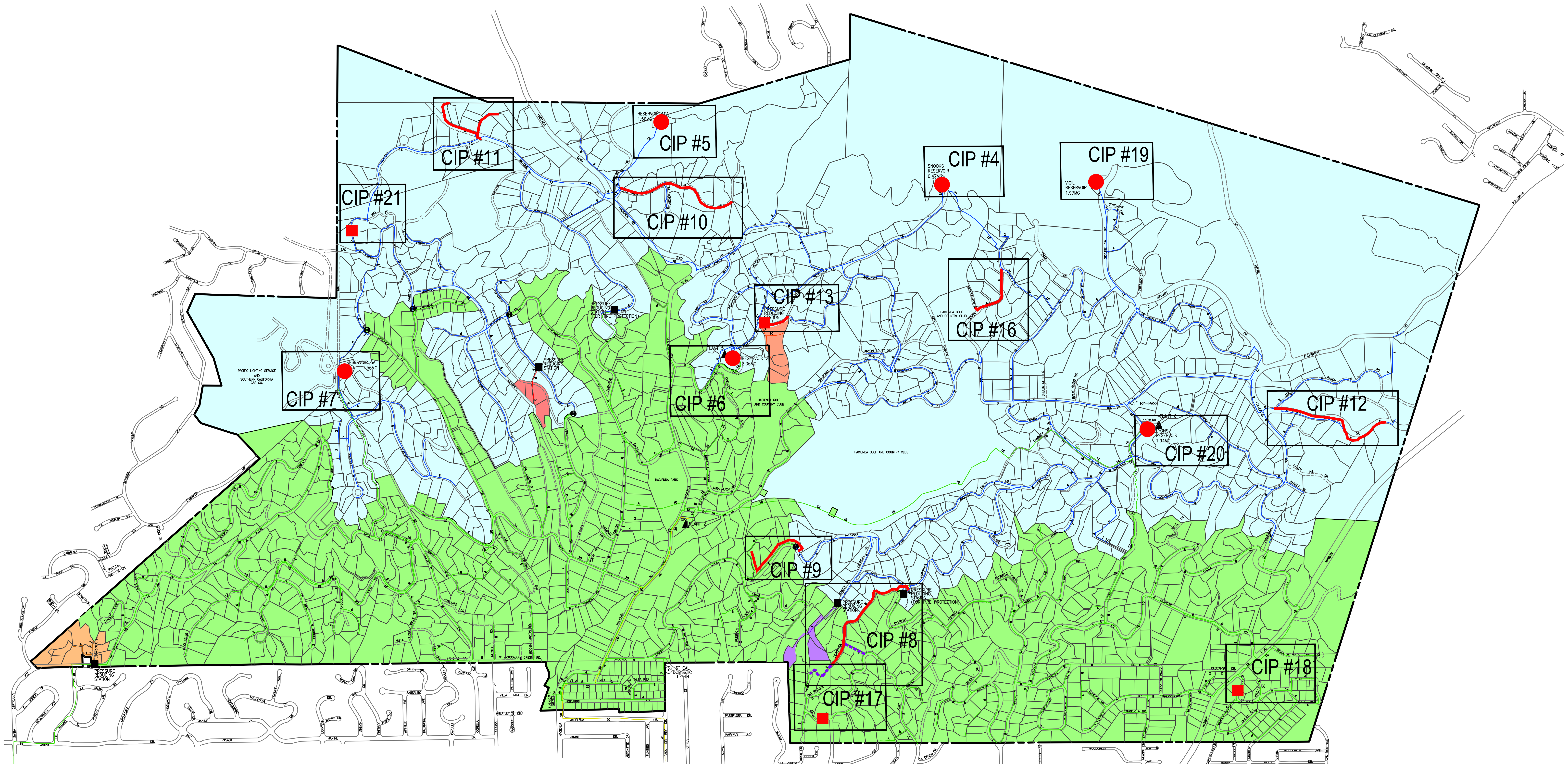
LA HABRA HEIGHTS COUNTY WATER DISTRICT 2022 WATER MASTER PLAN

EXISTING CROSS-COUNTRY PIPELINES

EXHIBIT 10

Exhibit 11 – Recommended Capital Improvements



LEGEND

- WATER DISTRICT BOUNDARY
- UPPER ZONE (1154)
- UPPER ZONE PIPELINE
- LOWER ZONE (833)
- LOWER ZONE PIPELINE
- ESCARPADO SUB-ZONE
- GREENVIEW SUB-ZONE
- GANTER/LAMAT SUB-ZONE
- VIRAZON/SUBTROPIC SUB-ZONE
- MWD TRANSMISSION PIPELINE
- RESERVOIR
- BOOSTER PUMP STATION
- PRESSURE REGULATING STATION
- WATER SYSTEM INTERCONNECT
- CLOSED ZONE VALVE (ZB = ZONE BREAK)
- RECOAT RESERVOIR PER CIP
- INSTALL PRESSURE REGULATING STATION PER CIP
- INSTALL PIPE PER CIP
- ABANDON PIPE PER CIP

OFF-SITE CIPS

CIP #1 – CONSTRUCTION OF NEW WELL NO. 12

CIP #2 – INSTALL ADDITIONAL PUMP CAPACITY AT LA MIRADA PLANT AND PLANT NO. 1. ADD VFDs AT LA MIRADA PLANT

CIP #3 – RECOAT LA MIRADA RESERVOIR

CIP #14 – GENERATORS FOR WELLS, LA MIRADA PLANT AND PLANT NO. 1

CIP #15 – CROSS-COUNTRY PIPELINE STUDY

CIP #22 – GENERATORS FOR PLANT NO. 5 AND PLANT NO. 6

CIP #23 – CONSTRUCTION OF ADDITIONAL WELL

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LA HABRA HEIGHTS COUNTY WATER DISTRICT
2022 WATER MASTER PLAN

RECOMMENDED CAPITAL IMPROVEMENTS

EXHIBIT 11

LA HABRA HEIGHTS COUNTY WATER DISTRICT

Prepared By

CIVILTEC
engineering inc.

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