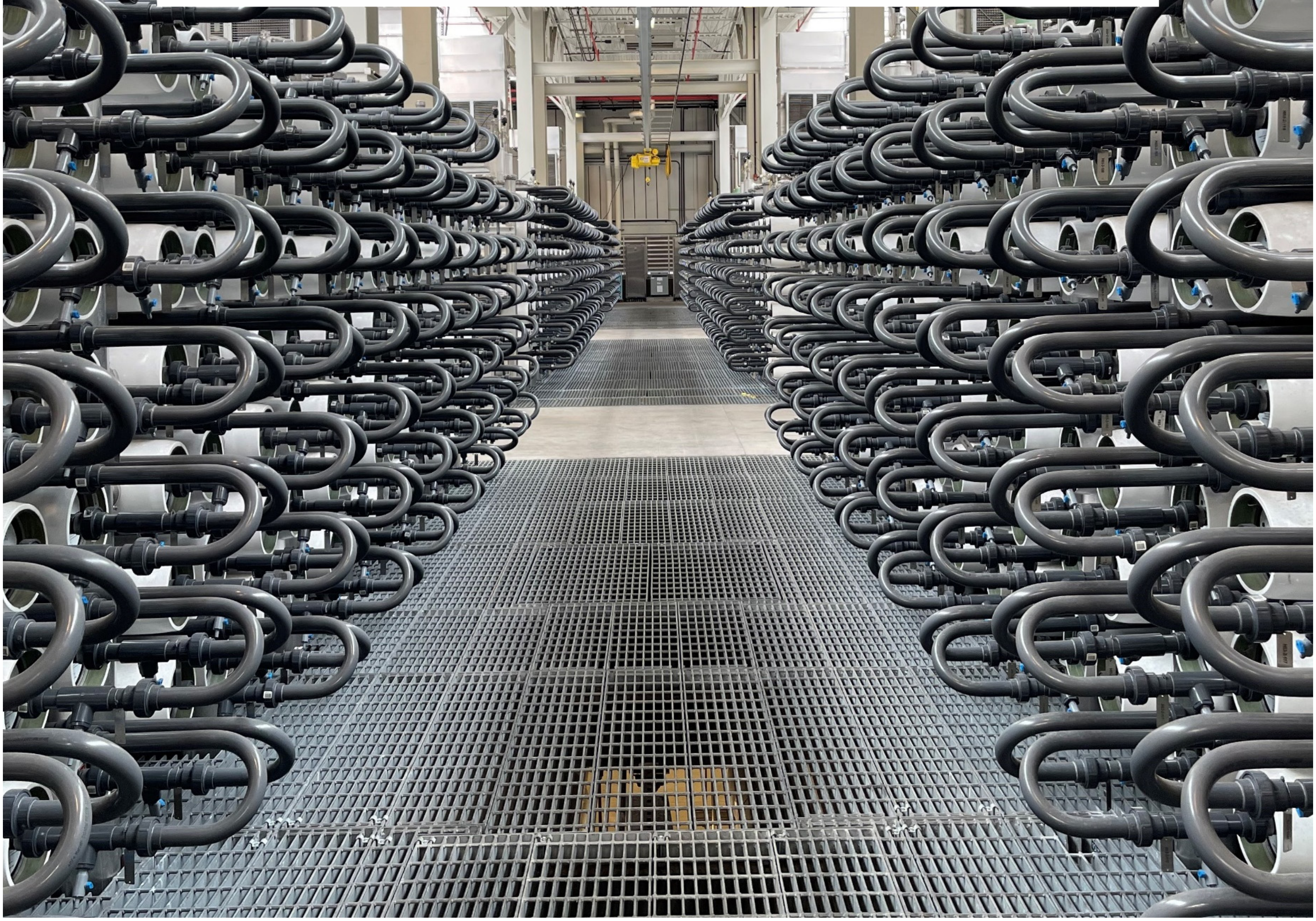
GWRS

GROUNDWATER REPLENISHMENT SYSTEM



ORANGE COUNTY WATER DISTRICT

SINCE 1933

2023

ANNUAL REPORT

ORANGE COUNTY WATER DISTRICT

SINCE 1933

Groundwater Replenishment System
2023 Annual Report

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EXECUTIVE SUMMARY

The Groundwater Replenishment System (GWRS) is a water supply project jointly sponsored by Orange County Water District (OCWD) and Orange County Sanitation District (OC San) that supplements existing water supplies by providing a reliable, high-quality source of water to replenish the Orange County Groundwater Basin (the Basin), to protect it from degradation due to seawater intrusion, and for limited non-potable uses.

This Annual Report examines the GWRS operation and performance for calendar year 2023. This Annual Report fulfills the GWRS permit requirements set forth by the California Regional Water Quality Control Board, Santa Ana Region (RWQCB) in Order No. R8-2022-0050 (RWQCB 2022a). This Annual Report also describes requirements for emergency discharges from the GWRS to the Santa Ana River (SAR) per RWQCB Order No. R8-2022-0002 (RWQCB, 2022b). The GWRS had no emergency discharges to the SAR in 2023.

Introduction

The GWRS, which is operated by OCWD, consists of five major components:

- **Advanced Water Purification Facility (AWPF)**, featuring treatment processes and pump stations to produce up to 130 million gallons per day (MGD) of purified recycled water;
- **Talbert Seawater Intrusion Barrier (Talbert Barrier)**, comprised of 36 injection well sites supported by an extensive network of groundwater monitoring wells;
- **Kraemer-Miller-Miraloma-La Palma Basins (K-M-M-L Basins)**, four permitted spreading basins supported by maintenance dewatering pumps and numerous groundwater monitoring wells;
- **Mid-Basin Injection (MBI) Project**, consisting of five injection wells equipped with maintenance backwash pumps and supported by downgradient monitoring wells; and
- **Three non-potable end users**: Anaheim Canyon Power Plant (Anaheim CPP), Anaheim Regional Transportation Intermodal Center (ARTIC), and Anaheim Adventure Park (AAP).

Figure ES-1 shows the location of the GWRS in central Orange County, California. The AWPF receives secondary-treated wastewater from OC San facilities and treats it to better than drinking water standards using full advanced treatment: membrane filtration (MF), reverse osmosis (RO), advanced oxidation/disinfection consisting of hydrogen peroxide addition and ultraviolet light exposure (UV/AOP), followed by partial decarbonation and lime stabilization. Pumping stations and pipelines convey purified recycled water from the AWPF to the Talbert Barrier, K-M-M-L Basins, MBI Project, and/or non-potable water users.

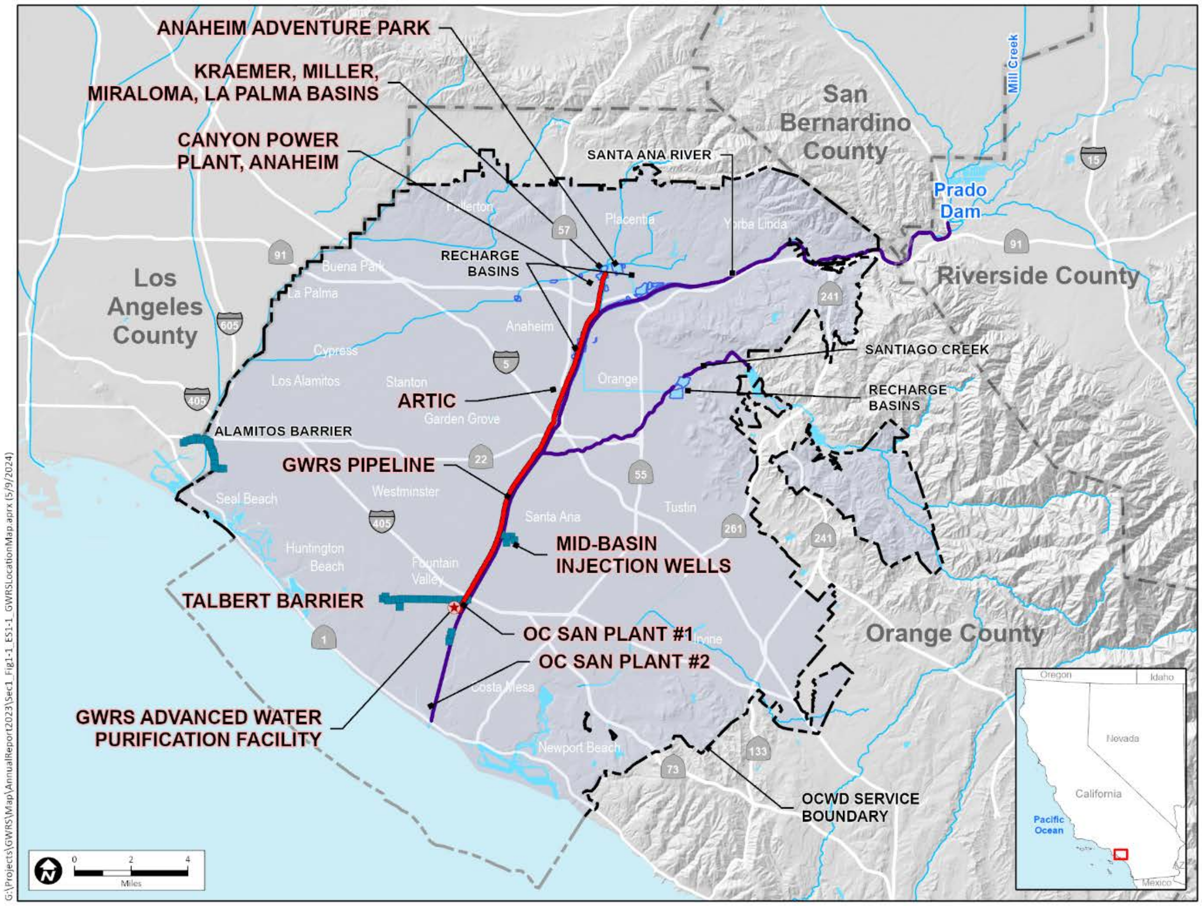


Figure ES-1. Groundwater Replenishment System Location Map

The original AWPF began operation in January 2008 and was designed to produce 70 MGD, or approximately 72,000 acre-feet per year (AFY) (243,000 cubic meters per day [m^3/day]), of purified recycled water based on a minimum on-line factor of 90%. The GWRS Initial Expansion (GWRSIE) began operation in May 2015, increasing the AWPF design production capacity up to 100 MGD, or approximately 103,000 AFY (348,000 m^3/day), of purified recycled water based on a minimum on-line factor of 90%. The GWRS Final Expansion (GWRSFE) began operation in December 2022, increasing the AWPF design production capacity up to 130 MGD, or approximately 134,000 AFY (452,000 m^3/day) based on a minimum on-line factor of 90%.

During 2023, most of the purified recycled water produced by the AWPF was injected at the Talbert Barrier or percolated at K-M-M-L Basins; a lesser volume was injected at the MBI Project and supplied to non-potable water customers.

The Talbert Barrier consists of a series of 36 injection well sites, I1 through I36, that are supplied by pipelines from the AWPF Barrier Pump Station. OCWD constructed the injection barrier to form an underground hydraulic mound, or pressure ridge, which helps prevent seawater intrusion near the coast in the Talbert Gap area. Without the Talbert Barrier, seawater would migrate inland and contaminate the fresh groundwater supply of the Basin. In addition to providing seawater intrusion control, the Talbert Barrier also injects purified recycled water into the deeper Main aquifer with the primary purpose of replenishing the Basin. Potable drinking water may also be injected at the barrier as needed, although blending of the recycled water injection is not required.

In the Anaheim Forebay area, GWRS purified recycled water and other waters are percolated at K-M-M-L Basins. Other waters may include SAR water and/or purchased untreated imported water. Purified recycled water is conveyed from the AWPF to these four spreading basins by the 13-mile GWRS Pipeline installed along the west levee of the SAR channel. GWRS recharge at Kraemer and Miller Basins began in January 2008 along with start-up of the rest of the original GWRS components. Miraloma Basin began spreading purified recycled water in July 2012. La Palma Basin began spreading purified recycled water in November 2016. While recharging with purified recycled water is restricted to K-M-M-L Basins, other waters (i.e., SAR and/or imported) may be recharged at those four basins. Blending of purified recycled water recharge with other waters is not required.

Turnouts from the GWRS Pipeline supply purified recycled water to the MBI Project, Anaheim CPP and ARTIC. The first component of the MBI Project (DMBI Project) began operation in April 2015 at one injection well (MBI-1) near the SAR in Fountain Valley. The second element of the MBI Project (MBI Centennial Park Project) in Santa Ana began injecting purified recycled water at four injection wells (MBI-2 through MBI-5) in March 2020.

Purified recycled water deliveries to Anaheim CPP and to ARTIC for non-potable uses began in July 2011 and November 2014, respectively. A third non-potable water user, AAP, began operation at Miraloma Basin in July 2021.

Advanced Water Purification Facility Performance

During 2023 the AWPF produced a total of approximately 36,508 million gallons (MG), or 112,038 acre-feet (AF) (138,198,000 cubic meters [m^3]), of purified recycled water to prevent seawater intrusion, replenish the Basin, and supply non-potable users. A breakdown of the 2023 purified recycled water production and discharge by location is presented in Table ES-1 and illustrated on Figure ES-2.

In terms of average daily flows, the AWPF produced approximately 100.0 MGD (379,000 m^3/day) of purified recycled water in 2023. Figure ES-3 illustrates the average daily AWPF production by month with the reuse location.

Table ES-1. 2023 Summary of Purified Recycled Water Flows and Discharge Points

Purified Recycled Water Discharge Point	Annual Average Daily Flow Rate (Avg. MGD)	Annual Volume		Percent (rounded)
		Million Gallons (MG)	Acre-Feet (AF)	
Talbert Barrier	16.0	5,853	17,963	16.0%
Kraemer Basin	6.5	2,368	7,267	6.5%
Miller Basin	9.3	3,405	10,450	9.3%
Miraloma Basin[1]	19.0	6,939	21,294	19.0%
La Palma Basin	42.5	15,531	47,662	42.5%
MBI Project	6.6	2,395	7,351	6.6%
Anaheim CPP	<0.1	14	43	<0.1%
ARTIC	<0.1	3	8	<0.1%
Total	**100.0**	**36,508**	**112,038**	**100%**

[1] Flows and volumes include use by AAP, which is located at Miraloma Basin.

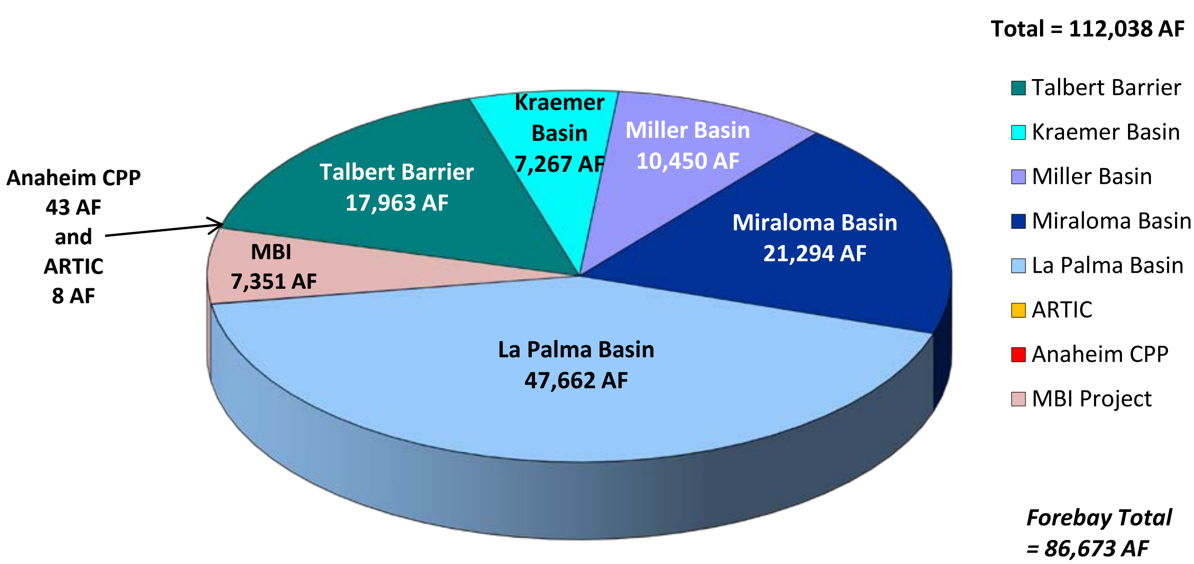


Figure ES-2. 2023 Purified Recycled Water Volume

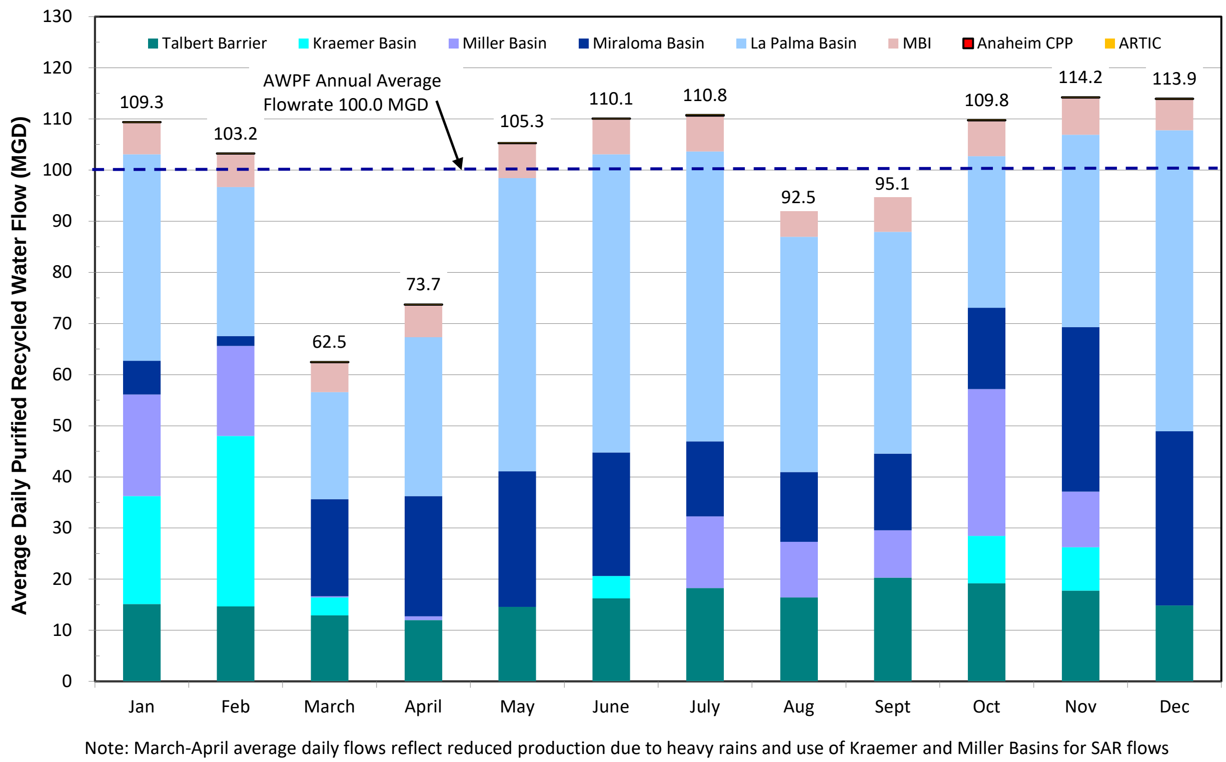


Figure ES-3. 2023 Average Daily Purified Recycled Water Flow By Month

As illustrated on Figure ES-4, the 2023 GWRS total purified recycled water production (36,508 MG, 112,038 AF, or 138,198,000 m^3) was greater than any of the previous years due to completion of the GWRSFE in late 2022. Overall, the AWPF was on-line approximately 361 days in 2023 (98.9% of the year). Planned and unplanned AWPF shutdowns or production restrictions were challenges in 2023.

The AWPF treatment processes operated well during the year, producing high quality purified recycled water in compliance with all permit requirements. Table ES-2 summarizes the average purified recycled water, or finished product water (FPW), quality for selected parameters.

Concentrations of inorganic constituents in the purified recycled water, such as aluminum and chromium, were either non-detect or if detected, far below the permit limits. Concentrations of organic contaminants, such as volatile organic compounds, pesticides, and other synthetic organic compounds, were also non-detect or far below the permit limits. Analyses of purified recycled water for unregulated compounds and chemicals of emerging concern (CECs), such as endocrine disrupting chemicals and pharmaceuticals, were either non-detect or if detected, found at levels below public health risk thresholds. During 2023 the GWRS complied with pathogenic microorganism reduction requirements using the MF, RO, and UV/AOP processes at the AWPF, plus underground retention time as an environmental buffer. Table ES-3 summarizes the daily total pathogen log reduction values achieved in 2023 in comparison to the requirements.

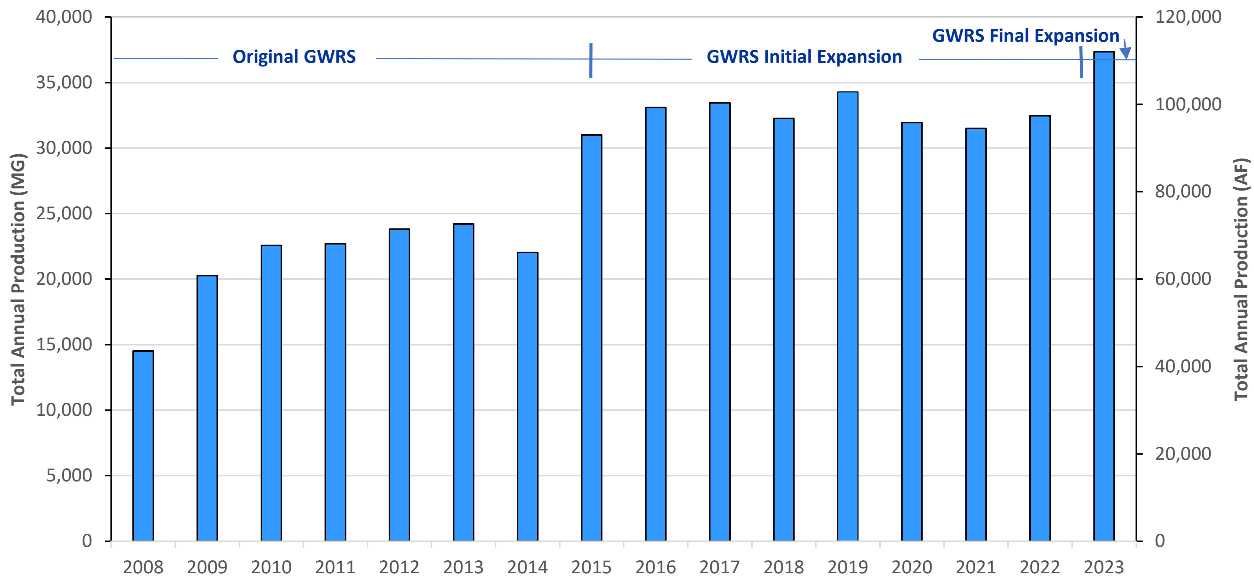


Figure ES-4. Historical GWRS Purified Recycled Water Production Since 2008

Table ES-2. 2023 Average Purified Recycled Water Quality

Parameter Name	Units [1]	FPW [2,3]	Permit Limit
Electrical Conductivity	µS/cm	115 [4]	900 [5]
Total Dissolved Solids	mg/L	57	500 [5]
pH	units	8.3 [4]	6 – 9
Chloride	mg/L	8.7	55
Total Nitrogen	mg/L	1.1	10
Arsenic	µg/L	<1 [6]	10
1,2,3-Trichloropropane (1,2,3-TCP)	µg/L	<0.005 [6]	0.005
N-nitrosodimethylamine (NDMA)	ng/L	0.7	N/A [7]
1,4-Dioxane	µg/L	<0.5 [6]	N/A
Perfluorooctanoic Acid (PFOA)	ng/L	<2 [6]	N/A
Perfluorooctane Sulfonic Acid (PFOS)	ng/L	<2 [6]	N/A
Perfluorobutane Sulfonic Acid (PFBS)	ng/L	<2 [6]	N/A
Perfluorohexane Sulfonic Acid (PFHxS)	ng/L	<2 [6]	N/A
Total Organic Carbon (unfiltered)	mg/L	0.07	0.5 [8]
Total Coliform	MPN/100 mL	<1 [6]	2.2 [9]

[1] See Acronyms list for units' abbreviations.

[2] FPW is GWRS Finished Product Water (Purified Recycled Water).

[3] Arithmetic average of all available data in 2023. For purposes of calculating annual averages, 10% of the Reportable Detection Limit (RDL) was used for all non-detect (ND) values. Number of significant digits shown matches those in raw data.

[4] On-line average.

[5] See Appendix A for more information.

[6] If all data for the period were ND, then the average is shown as "<RDL."

[7] Not applicable is abbreviated as N/A.

[8] Compliance based on 20-week running average and 4-sample running average; see Section 2.2.2.2 and Appendix A for more information.

[9] 7-day median limit; see Appendix A for more information.

Table ES-3. Summary of GWRS Pathogen Log Reduction Credits Achieved in 2023

Pathogen	Minimum Log Reduction Requirements[1]	Daily Pathogen Log Reduction Value (LRV) Achieved in 2023					
		Secondary Treat-ment[2]	MF and Cl_2	RO[3]	UV/AOP	Underground Retention Time[4]	Total
Giardia cysts	10	0	4.0	2.0	6.0	0	12.0
Cryptosporidium oocysts	10	0	4.0	2.0	6.0	0	12.0
Viruses	12	0	0	2.0	6.0	4 (5)	12.0

[1] Per Title 22 Water Recycling Criteria (CCR, 2018) and GWRS permit (RWQCB, 2022a).

[2] No pathogen reduction credits claimed for secondary treatment at OC San.

[3] Daily LRV credits for RO were equal to or greater than 2.00-log, with five exceptions: 1.97-log on 5/15/2023, 1.77-log on 8/30/2023, and 1.99-log on 10/27/2023, 10/31/2023, and 11/8/2023. See Section 2.2.3.3 and Figure 2-16.

[4] Daily virus LRV credit of 4-log for underground retention time, with two exceptions: 5/15/2023 and 8/30/2023 when 5-log virus LRV credits were taken. See Figure 2-11.

In accordance with the GWRS permit (RWQCB, 2022a) requirements, this annual report includes a one-time report describing optimization of the RO and AOP processes following completion of the initial 12-months of operation of the GWRSFE (Section 2.4).

Talbert Barrier Operations

The Talbert Barrier injection supply in 2023 was predominantly purified recycled water produced by the AWPF, as shown in Table ES-4. Negligible volumes of potable water from the Metropolitan Water District of Southern California (MWD) OC-44 turnout and City of Fountain Valley (FV) potable water were also injected at the barrier. Of the total annual volume of 5,858 MG (17,978 AF; 22,175,000 m^3) of injection water, the vast majority (99.91%), 5,853 MG (17,963 AF; 22,157,000 m^3), was GWRS purified recycled water. Only about 4.8 MG (14.9 AF; 18,300 m^3) of potable water was injected at the barrier during 2023. The potable water supply was used when the AWPF was temporarily off-line due to brief shutdowns to keep the barrier pipeline pressurized and maintain a minimal injection flow until purified recycled water production resumed. The total average daily flow rate injected at the Talbert Barrier in 2023 was 16.0 MGD.

Blending of purified recycled water with potable water is no longer required at the Talbert Barrier. While the maximum allowable recycled water contribution (RWC) at the Talbert Barrier is 100%, potable water may still be injected at the barrier.

Annual barrier injection in 2023 was the lowest since the GWRS came on-line in 2008 due to relatively high groundwater elevations throughout the Basin, as well as in the Talbert Gap area where groundwater levels were effectively maintained at or above protective elevations seaward of the barrier. Barrier injection in 2023 was nearly 21% less than in 2022, primarily due to higher groundwater levels resulting from unusually wet years during 2022 and 2023 as well as reduced Basin pumping due to wells off-line due to per- and polyfluoroalkyl substances (PFAS) contamination.

Table ES-4. 2023 GWRS Injection at the Talbert Barrier

Water Source	Flow Rate (Avg. MGD)	Volume (rounded) (MG)	(AF)	(m^3)	Description
Purified recycled water	16.0	5,853	17,963	22,157,000	GWRS finished product water (FPW)
OC-44 Potable water	<0.1	0.1	0.4	400	Imported water from MWD OC-44 turnout
FV Potable water	<0.1	4.7	14.5	17,900	Blend of imported water and groundwater from City of Fountain Valley
Total	**16.0**	**5,858**	**17,978**	**22,175,000**	

Operation of the Talbert Barrier was consistent and stable throughout 2023 due to a relatively constant purified recycled water supply. Injection was intermittently maintained at relatively high rates at the operating injection wells during 2023; many injection wells in the shallow and intermediate depth zones were off-line on stand-by for much of the year because they were not needed to maintain protective elevations for seawater intrusion control. Due to the reduced injection into the shallow and intermediate zones of the barrier during 2023, deep zone injection wells were on-line throughout 2023 for replenishing the Basin, when not undergoing maintenance or being taken off-line for construction activities requiring localized dewatering. On an annual basis, larger volumes of GWRS water were injected on the west end of the barrier as compared to the east end of the barrier for both seawater intrusion control and Basin replenishment, as is characteristic every year.

Groundwater Monitoring at the Talbert Barrier

The GWRS permit requires quarterly groundwater monitoring near the Talbert Barrier at five OCWD multi-point monitoring well sites: M10, M11, M45, M46, and M47 (RWQCB 2022a). Groundwater level (piezometric elevation) measurements as well as groundwater quality monitoring for an extensive list of parameters were conducted during 2023 at these monitoring well sites near the barrier. Seasonal fluctuations in groundwater levels indicate that the potable aquifers in the Talbert Barrier area are largely controlled by groundwater production, which varies considerably from winter to summer water demands, and to a lesser degree by barrier injection.

Barrier compliance monitoring wells were tested for an extensive list of inorganic and organic parameters including parameters with secondary maximum contaminant levels (MCLs), 1,4-dioxane, and NDMA. Dissolved chloride concentrations continued to be used as an intrinsic tracer to track the subsurface movement of injection water in 2023. Chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer, making it a relatively good, conservative tracer, especially since the chloride concentration of GWRS purified recycled water is much lower than both native groundwater and pre-GWRS injection water.

During 2023, groundwater quality at all the Talbert Barrier compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods.

Groundwater quality testing at the compliance monitoring wells during 2023 revealed some results above the Federal and State Secondary Drinking Water Standards for apparent color, similar to those in past years and unrelated to the injection of GWRS purified recycled water. The elevated color levels are likely due to the presence of naturally occurring organic matter in this very old groundwater commonly found within the Main and Lower Main aquifers in the coastal area.

Testing continued in 2023 for NDMA and voluntary testing for 1,4-dioxane at monitoring wells near the Talbert Barrier. During 2023, all NDMA groundwater monitoring results were below the DDW Notification Level (NL) of 10 ng/L, but 1,4-dioxane concentrations were detected above the NL of 1 µg/L at four compliance monitoring well zones, but significantly below the DDW Response Level (RL) of 35 µg/L for drinking water systems. Historically from 2002-2008, higher 1,4-dioxane levels were detected at the five compliance monitoring wells due to WF-21 injection but historically remained below the RL. Since 2008, 1,4-dioxane concentrations at the compliance wells have generally been decreasing, except during intermittent periods of high Basin conditions when the groundwater gradient often reverses or shifts, temporarily bringing some proportion of older pre-GWRS (WF-21) injection water back to these wells.

Kraemer-Miller-Miraloma-La Palma Basins Operations

Water from three sources is typically percolated at K-M-M-L Basins: (1) GWRS purified recycled water; (2) SAR base flow and captured storm flow; and (3) untreated imported water. During 2023, only GWRS and SAR water were percolated at K-M-M-L Basins. Due to relatively high Basin conditions and reduced Basin pumping due to PFAS, no imported replenishment water was purchased during 2023.

Table ES-5 summarizes the volumes of various waters recharged at K-M-M-L Basins during 2023. A total volume of approximately 41,117 MG (126,182 AF; 155,600,000 m^3) of purified recycled water and other water (only SAR water in 2023) was recharged at these four basins.

Table ES-5. 2023 GWRS Spreading at Kraemer-Miller-Miraloma-La Palma Basins

Water Source	Flow Rate (Avg. MGD)	Volume (rounded) (MG)	(AF)	(m^3)	Description
Purified recycled water[1]	77.4	28,242	86,673	106,909,000	GWRS finished product water (FPW) delivered
Other water[2]	15.7	5,741	17,618	21,730,000	SAR water and/or imported water percolated
Spreading basin storage[3]		50	152	187,500	Water in recharge basin storage at the end of calendar year
Total	**93.1**	**33,934**	**104,138**	**128,453,000**	

[1] Volume shown is based on AWPF production records.

[2] Other water volume is estimated based on total percolation and change in basin storage records from Forebay Operations. No imported water was spread in 2023.

[3] Storage is the estimated volume of water either retained in the spreading basins that has not yet percolated or drained from prior volumes in the spreading basins by the end of said calendar year based on percolation records from Forebay Operations.

During 2023, the GWRS purified recycled water discharge was divided between the four spreading basins as follows:

- Kraemer Basin: 2,368 MG (7,267 AF; 8,963,000 m^3), or 6.5 MGD on average;
- Miller Basin: 3,405 MG (10,450 AF; 12,890,000 m^3), or 9.3 MGD on average;
- Miraloma Basin: 6,939 MG (21,294 AF; 26,266,000 m^3), or 19.0 MGD on average; and
- La Palma Basin: 15,531 MG (47,662 AF; 58,790,000 m^3), or 42.5 MGD on average.

In 2023, La Palma and Miraloma Basins received only GWRS purified recycled water. Historically, La Palma and Miraloma Basins have been dedicated almost exclusively to GWRS purified recycled water to minimize clogging and to maintain their exceptionally high percolation rates. Kraemer and Miller Basins typically receive both GWRS purified recycled water and other water.

Blending of purified recycled water with other water is no longer required for the Anaheim Forebay recharge operations and determination of the RWC is no longer required.

Groundwater Monitoring Near Kraemer-Miller-Miraloma-La Palma Basins

Groundwater monitoring near K-M-M-L Basins is required by the GWRS permit (RWQCB, 2022a) at four OCWD monitoring well sites: single-point monitoring wells AM-7, AM-8, and AM-10 plus nested monitoring well AMD-12. Prior to December 2022, nested monitoring well site AMD-10 was a compliance monitoring location; beginning in 2023, monitoring well site AMD-10 is a voluntary groundwater monitoring site. OCWD continues to voluntarily sample single-point monitoring well OCWD-KB1 because of its proximity to Kraemer Basin and long historical record. Groundwater level measurements as well as groundwater quality monitoring for an extensive list of parameters were conducted during 2023 at these monitoring well sites near K-M-M-L Basins.

Anaheim Forebay compliance monitoring wells were tested for: an extensive list of inorganic and organic parameters including parameters with secondary MCLs, 1,4-dioxane, and NDMA. During 2023, groundwater quality at all the Forebay compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods. No detections of 1,4-dioxane or NDMA were found in groundwater at any of the Forebay compliance monitoring wells in 2023.

Groundwater quality testing during 2023 at two compliance monitoring well sites, AM-7 and AM-8, revealed constituents above the Federal Secondary Drinking Water Standards for iron. Corrosion of the mild steel well casings at these two monitoring well sites was likely the contributing factor causing the Secondary MCL exceedances for total iron. These Secondary MCL exceedances at AM-7 and AM-8 during 2023 were consistent with historical data collected since 2008 and were not associated with the presence of GWRS purified recycled water.

During 2023, OCWD continued additional non-compliance (voluntary) monitoring for dissolved arsenic; increases in arsenic concentrations correlate to contemporaneous chloride concentration decreases with the sustained arrival of large percentages of GWRS water, and subsequent decreases in arsenic correlate to contemporaneous increases in chloride with arrival of non-GWRS other water. Although GWRS purified recycled water arrival is the cause of the increased arsenic concentrations, it is not an arsenic source. Historically, SAR water recharged with elevated arsenic concentrations adsorbed onto mineral surfaces in the aquifer; the higher initial pH or lower ionic strength of GWRS water relative to surrounding groundwater causes the arsenic to desorb. Due to mass removal of arsenic during each sustained near-100% GWRS water arrival event, each successive GWRS water arrival event has generally led to reduced arsenic peaks, eventually declining below ambient concentrations until arrival of other water brings new arsenic mass for adsorption once again. To limit arsenic mobilization in the aquifer, operation of the AWPF post-treatment processes were modified beginning in 2015 to more closely control the FPW pH, targeting pH 8.5.

MBI Project Operation

The MBI Project was implemented in two phases: DMBI Project and MBI Centennial Park Project. The DMBI Project began injection of purified recycled water that was delivered via the GWRS Pipeline to the MBI-1 site in April 2015. The MBI Centennial Park Project began operation in March 2020 and consists of four injection wells: MBI-2, MBI-3, MBI-4, and MBI-5, which are also supplied purified recycled water by the GWRS Pipeline. The primary objective of the five-well MBI Project is to replenish a heavily pumped region of the Principal aquifer more locally and directly. Over 90% of groundwater production in the Basin occurs from the Principal aquifer system.

During 2023 approximately 2,395 MG (7,351 AF; 9,068,000 m^3) of purified recycled water was injected at the five MBI Project wells. Blending of purified recycled water with potable water is not required at the MBI Project, and no other water was injected in 2023. Periodic backwash pumping of the five MBI wells totaled approximately 18.1 MG (55.6 AF; 68,600 m^3) during 2023, representing 0.8% of the total injection. All water produced during backwash pumping of the MBI wells is discharged to adjacent channels near the SAR under RWQCB and County of Orange Flood Control permits.

The total monthly injection volume at the MBI Project was distributed somewhat evenly among the five MBI Project wells, with MBI-5 consistently receiving more injection than the other wells and MBI-3 receiving less. The average daily injection rates by well during 2023 (average for all days, including on- and off-line) were:

- MBI-1 1.54 MGD
- MBI-2 1.36 MGD
- MBI-3 0.80 MGD
- MBI-4 1.19 MGD
- MBI-5 1.68 MGD

The total average daily injection rate was 6.56 MGD at the MBI Project during 2023, which was 5% less than in 2022. The average injection yield (defined as the injection flowrate in gpm per foot of groundwater level rise from static conditions within the injection well) of the five MBI wells declined approximately 8% from 2022 to 2023 primarily due to a reduction in backwash frequency from biweekly to monthly at MBI-3 and MBI-5 in April 2023 at the conclusion of an operational test that began in July 2022; when accounting for this difference in backwashing, the average injection yield was relatively steady throughout 2023, indicating a continued stabilization in well performance that began in 2022.

Groundwater Monitoring at the MBI Project

Groundwater monitoring near the MBI Project is required by the GWRS permit (RWQCB, 2022a) at two monitoring wells: SAR-12 and SAR-13. Groundwater monitoring for the MBI Project began in 2012 and continued through 2023. As part of the DMBI Project, two monitoring wells, SAR-10 and SAR-11, were installed immediately downgradient of MBI-1. However, monitoring at SAR-10 and SAR-11 is no longer required as SAR-12 and SAR-13, installed in late-2017 along a flow path from the MBI wells toward the closest downgradient drinking water production wells IRWD-12 and IRWD-17, now serve as the required permit compliance wells for the MBI Project.

Commencement of the MBI Project in March 2020 with all five MBI wells on-line represented the start of the GWRS intrinsic tracer test to determine the underground travel time of injected purified recycled water to the downgradient compliance wells SAR-12 and SAR-13. The tracer test was completed in late 2023, and the MBI Tracer Test Report (OCWD, 2024) showing proposed 4-month primary and 5-month secondary boundary areas (aka control zones) where drinking water wells are restricted is under review by DDW.

The 2023 Principal aquifer inferred groundwater flow direction in the MBI Project area was to the south towards IRWD's Dyer Road Wellfield (DRWF). The hydraulic gradient is variable, depending on the MBI Project injection and timing and amounts pumped from nearby drinking water wells, especially the IRWD DRWF. During 2023, groundwater elevation trends in the MBI Project area followed the typical seasonal pattern: (1) rising and/or remaining high during winter and early spring months, (2) declining in late spring and summer months, and (3) recovering considerably in the late fall months to the end of the year.

Groundwater quality monitoring for the MBI Project was similar to the Talbert Barrier and Anaheim Forebay and included an extensive list of inorganic and organic parameters including parameters with secondary MCLs, 1,4-dioxane, and NDMA. During 2023, groundwater quality at the two compliance monitoring wells SAR-12 and SAR-13 complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods.

Two Secondary MCL exceedances occurred in 2023 at monitoring well SAR-12/2 for aluminum and iron. The SAR-12/2 aluminum concentration of 218 µg/L was observed in August (greater than the secondary MCL of 200 µg/L). The elevated aluminum concentration coincided with decreasing chloride concentrations (below background) indicating the initial arrival of some proportion of GWRS water. The elevated aluminum level was attributed to aluminum desorbed from the aquifer mineral surfaces and transported along the leading edge of the GWRS water to this well, as aluminum concentrations in GWRS water have remained at or below 5 µg/L since 2015. The subsequent trailing arrival of GWRS water was then devoid of detectable aluminum due to mass removal, as evidenced by the immediate decrease in aluminum concentrations in October 2023 to below the new (2023) RDL of 5 µg/L and lower than pre-GWRS ambient concentrations at this well. The SAR-12/2 iron concentration of 612 µg/L was observed in August 2023 (greater than the secondary MCL of 300 µg/L), contemporaneous with the one-time aluminum exceedance. Similar to aluminum, the one-time elevated total iron concentration at SAR-12/2 was likely related to the initial arrival of some proportion of GWRS water at SAR-12/2.

The iron was likely released by oxidation of pyrite and other iron sulfide minerals in the Principal aquifer. As with aluminum, GWRS water is not a source of iron; GWRS iron concentrations have remained below 5 µg/L since 2015 except for a small one-time increase of 9.6 µg/L in October 2021, far below the Secondary MCL. The SAR-12/2 iron concentrations declined during the fourth quarter of 2023, along with chloride concentrations declining down to a historical low of 10 mg/L, indicating sustained arrival of an increasing proportion of GWRS water.

Groundwater at the compliance monitoring well sites SAR-12 and SAR-13 was sampled and analyzed for 1,4-dioxane and NDMA during 2023. All zones at these two MBI Project compliance monitoring wells continued to be non-detect for 1,4-dioxane in 2023. NDMA concentrations at all zones of monitoring wells SAR-12 and SAR-13 during 2023 were within GWRS levels and ranged from non-detect to 5.2 ng/L, well below the DDW NL of 10 ng/L.

One of the main constituents monitored along the injection flow path is arsenic since mobilization of aquifer sediment-bound arsenic has been shown to occur at some locations in association with the recharge and injection of GWRS purified recycled water. The primary MCL for total arsenic is 10 µg/L. Total arsenic and other total metals were sampled at least quarterly at SAR-12 and SAR-13 from 2018 through 2023. During 2023, arsenic concentrations in all zones have remained below 4 µg/L, well below the primary MCL. A slightly increasing arsenic trend in some zones has coincided with arrival of GWRS water, including initial arrival at SAR-12/1 and SAR-12/2 finally in 2023.

Conclusions

The GWRS operated in compliance with its permit throughout 2023, producing a total of 36,508 MG, or 112,038 AF (138,198,000 m^3) of purified recycled water for injection at the Talbert Barrier, spreading at K-M-M-L Basins, injection at the MBI Project, and delivery to Anaheim CPP, ARTIC, and AAP for non-potable use. Of the purified recycled water produced, approximately 16% was injected at the barrier and over 77% was recharged at the spreading basins, including 55% of the Forebay spreading volume at La Palma Basin alone. Nearly 7% was injected at the MBI Project, and a negligible volume (less than 0.1%) was used for non-potable water purposes. On an annual average basis, the AWPF produced 100.0 MGD (379,000 m^3/day) of purified recycled water and was on-line 98.9% of the time in 2023. Daily purified recycled water production was periodically reduced to coordinate with Anaheim Forebay operations during wet weather events, OC San construction at Plant 2 that restricted its reclaimable effluent as AWPF source water, and other short-term planned and unplanned events.

In conclusion, the GWRS operated well throughout 2023, complying with its permit and producing up to its design capacity of 130 MGD (145,600 AFY; 179,630,000 m^3/year) of high quality purified recycled water to continue to supply the Talbert Barrier, replenish the Basin at the Anaheim Forebay and MBI Project, as well as non-potable purposes at the Anaheim CPP, ARTIC, and AAP. OCWD is planning to recharge GWRS purified recycled water at other sites in the future.

1. INTRODUCTION

The Groundwater Replenishment System (GWRS) is a water supply project jointly sponsored by Orange County Water District (OCWD) and Orange County Sanitation District (OC San). The GWRS supplements existing water supplies by providing a reliable high-quality source of water to replenish the Orange County Groundwater Basin (the Basin), to protect the Basin from degradation due to seawater intrusion, and to also provide a water source for non-potable uses.

This introductory section of the 2023 Annual Report for the GWRS presents the:

- Purpose of the Annual Report;
- Description of the GWRS and Advanced Water Purification Facility (AWPF);
- History of OCWD Water Recycling Facilities; and
- Overview of the Operation Optimization Plan (OOP).

1.1 Purpose of the Annual Report

OCWD is the lead agency for the GWRS and responsible for permit compliance. The GWRS permit sets forth requirements for production and use of purified recycled water for: (1) injection at the Talbert Barrier; (2) spreading at Kraemer-Miller-Miraloma-La Palma (K-M-M-L) Basins; (3) injection at the Mid-Basin Injection (MBI) Project; and (4) non-potable water uses. (RWQCB, 2022a).

This Annual Report for 2023 is prepared in fulfillment of the requirements specified in the GWRS permit issued by the California Regional Water Quality Control Board, Santa Ana Region (RWQCB). On December 2, 2022, the RWQCB replaced both the prior amended permit for groundwater replenishment and the master recycling permit for non-potable uses with the current permit, *"Order No. R8-2022-0050, Waste Discharge Requirements and Master Recycling Permit for the Orange County Water District Groundwater Replenishment System"* (RWQCB, 2022a). The current permit covers both groundwater replenishment and non-potable uses; monitoring and reporting requirements under the current permit became effective on January 1, 2023.

This Annual Report serves two overall purposes by providing: (1) an in-depth review and evaluation of the operation of the entire GWRS during 2023 in fulfillment of the permit requirements; and (2) a continuing historical record of the operations of the OCWD water reuse and groundwater recharge facilities.

Information for this report was based on: (1) review of laboratory and on-line water quality data; (2) review of operations reports and groundwater monitoring records compiled by OCWD; and (3) on-site and virtual observations by the authors.

A complete detailed list of water quality permit requirements and purified recycled water quality results from 2023 can be found in Appendix A. Appendices B and C contain laboratory analysis methods used for water quality monitoring. All water quality analyses are performed by state-certified laboratories that operate in accordance with quality assurance plans.

1.2 Groundwater Replenishment System

The GWRS produces a reliable, high-quality source of purified recycled water, replenishes the Basin, and protects it from further degradation due to seawater intrusion.

The GWRS consisted of the following major components during 2023:

- AWPF, which includes treatment processes and pumping stations (further described in Section 2);
- Talbert Barrier, featuring injection wells and pipelines (further described in Section 3);
- K-M-M-L Basins, which are surface percolation basins supplied by the GWRS Pipeline (further described in Section 5);
- MBI Project, consisting of injection wells supplied by the GWRS Pipeline (further described in Section 7); and
- Three non-potable end users: Anaheim Canyon Power Plant (Anaheim CPP) and Anaheim Regional Transportation Intermodal Center (ARTIC), both of which are supplied by turnouts from the GWRS Pipeline, and Anaheim Adventure Park (AAP), which operates at Miraloma Basin.

GWRS purified recycled water production by the AWPF began in 2008, featuring injection at the Talbert Barrier and spreading at Kraemer-Miller Basins. Spreading at Miraloma Basin began in July 2012. GWRS purified recycled water injection at the DMBI injection well (MBI-1) began in April 2015, and four additional MBI injection wells were placed on-line in March 2020. Spreading at La Palma Basin began in November 2016. Purified recycled water service for non-potable purposes began at Anaheim CPP in July 2011 and at ARTIC in November 2014. The third non-potable water user, AAP, began operation in July 2021.

The existing AWPF purified recycled water production design capacity is 130 million gallons per day (MGD). The GWRS Final Expansion (GWRSFE) began operation in December 2022, increasing the AWPF purified recycled water production design capacity from 100 to 130 MGD; related work included headworks improvements, flow equalization, and pumping facilities at OC San Plant 2 to convey reclaimable secondary-treated wastewater to the AWPF.

Figure 1-1 schematically shows the location of the GWRS facilities in central Orange County, California. Secondary-treated wastewater is conveyed from OC San facilities to the GWRS AWPF, where it is treated to better than drinking water standards using membrane filtration (MF),

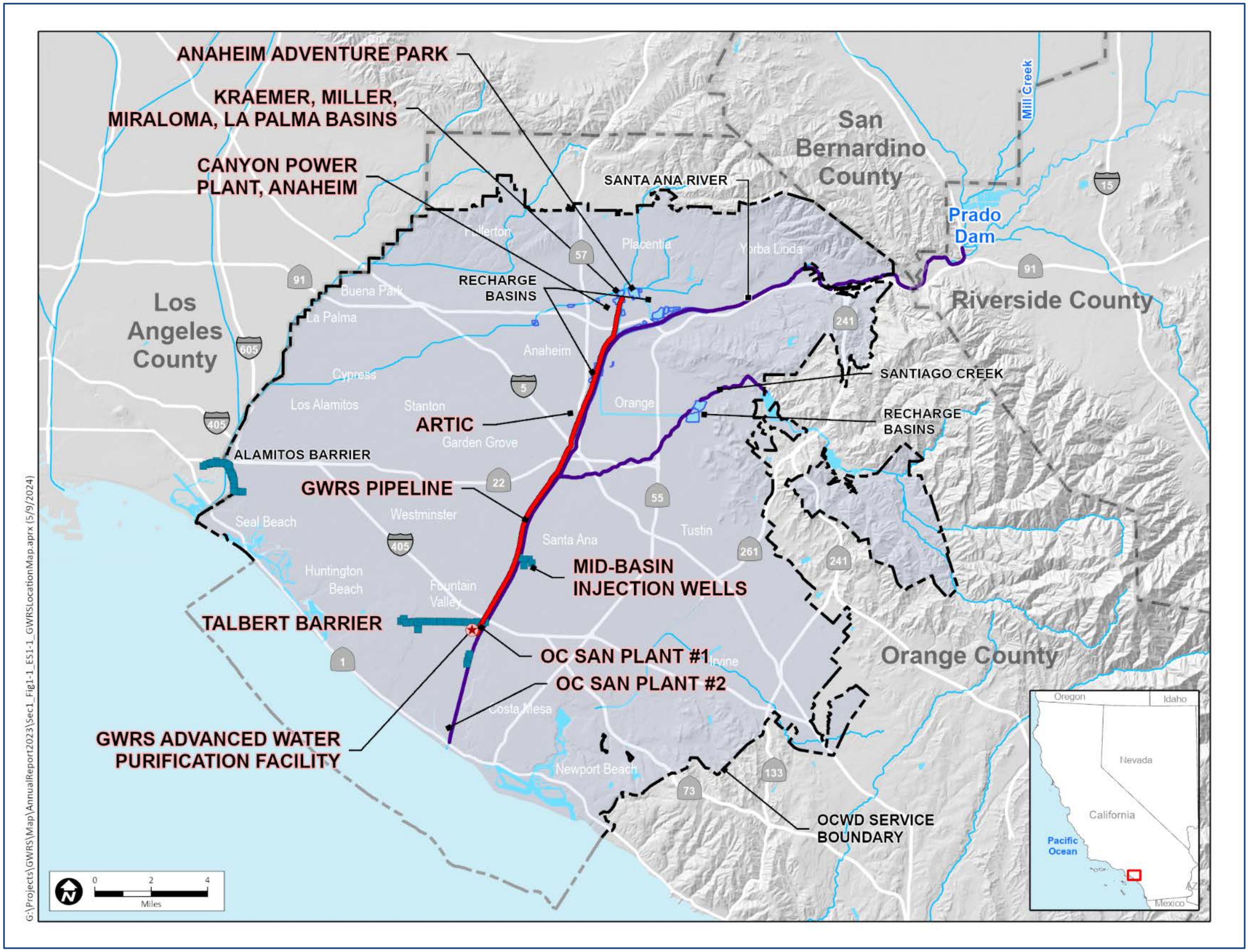


Figure 1-1. Groundwater Replenishment System Location Map

reverse osmosis (RO), an ultraviolet light/advanced oxidation process (UV/AOP), decarbonation, and lime stabilization. Following advanced treatment, two pumping stations at the AWPF in Fountain Valley deliver the purified recycled water to: (1) the Talbert Barrier in Fountain Valley and Huntington Beach, (2) K-M-M-L Basins in Anaheim, with service connections to Anaheim CPP and ARTIC also in Anaheim, and (3) the MBI Project in Fountain Valley and Santa Ana.

Besides water supply, another purpose of the GWRS is to provide peak flow relief for OC San during emergency, high wet weather flow conditions. During peak wastewater flow events, the AWPF can provide hydraulic relief for the OC San ocean outfall by discharging up to 100 MGD of membrane filtered, ultraviolet (UV)-disinfected, dechlorinated recycled water to the Santa Ana River (SAR) under RWQCB Order No. R8-2022-0002/NPDES CA8000408R8 (RWQCB, 2022b). Alternatively, the AWPF can provide similar hydraulic relief for the OC San ocean outfall by continuing normal operation and production of up to 130 MGD of purified recycled water for recharge.

1.2.1 Source Water

Source water for the GWRS is secondary-treated wastewater, or secondary effluent, from OC San Plants 1 and 2. Prior to December 2022, the GWRS source water supply was entirely from OC San Reclamation Plant No. 1 (Plant 1 or P1). Beginning on December 12, 2022, reclaimable secondary effluent from OC San Treatment Plant No. 2 (Plant 2 or P2) was added to the GWRS source water supply for normal purified recycled water production. To produce 130 MGD of purified recycled water, the AWPF needs approximately 170-173 MGD of secondary effluent based on design recovery rates. In addition to the variable blend of secondary effluent from OC San Plants 1 and 2, the AWPF source water may be supplemented with disinfected tertiary effluent from the Irvine Ranch Water District (IRWD) Michelson Water Recycling Plant (MWRP). While a small volume of MWRP effluent was sent to the GWRS influent screening facility in 2023, all MWRP effluent flowed over the influent weir to the OC San outfall and no MWRP effluent was used by the GWRS.

Plant 1, which is located adjacent to the OCWD AWPF in Fountain Valley, has a rated secondary treatment capacity of 182 MGD (annual average dry weather). In addition to the GWRS source water, Plant 1 provides secondary effluent for the Green Acres Project (GAP), which is a 7.5-MGD capacity tertiary treatment plant operated by OCWD that produces recycled water for non-potable irrigation and industrial uses.

Plant 2, which is located in Huntington Beach near the coast, has a rated secondary treatment capacity of 150 MGD (annual average dry weather). Plant 2 secondary effluent was not an approved source for the GWRS until December 2022 (RWQCB, 2022a). Headworks and treatment process modifications and flow equalization and pumping facilities were completed in 2022 at Plant 2 to segregate reclaimable secondary effluent to supplement the GWRS source water supply and support the GWRSFE. Non-reclaimable secondary effluent is discharged via an existing outfall to the Pacific Ocean.

OC San maintains an industrial pretreatment and source control program to manage contaminants entering the wastewater tributary to both Plants 1 and 2 which may be harmful to the treatment facilities, environment, or to human health and drinking water supplies. The comprehensive OC San enhanced source control program fulfills the GWRS permit requirements and Title 22 Water Recycling Criteria requirements for groundwater replenishment with recycled water (CCR, 2018), ultimately helping to protect GWRS purified recycled water quality.

1.2.1.1 OC San Plant 1 Secondary Treatment

Raw wastewater influent to Plant 1 passes through the metering and diversion structure, mechanical bar screens, and grit chambers, which comprise preliminary treatment. Following screening and grit removal, the wastewater receives advanced primary treatment using ferric chloride and anionic polymer addition and primary sedimentation. Primary effluent is then conveyed to the activated sludge (AS) plants or to trickling filters (TF) for secondary treatment. The existing TF and associated secondary clarifiers were upgraded and began operation in October 2006 with a design treatment capacity of 30 MGD. The older AS plant (OC San Project No. P1-82 or AS1), which consists of aeration basins and secondary clarifiers, was upgraded in August 2007 to include anoxic and oxic zones and has a design treatment capacity of 80 MGD. Historically, OC San operated the P1 AS1 plant in the carbonaceous biochemical oxygen demand (CBOD) mode. Since late 2009, the P1 AS1 plant has operated in the biological nitrification/partial denitrification (NdN) mode. The newer AS plant at Plant 1 (OC San Project No. P1-102 or AS2) was completed in July 2012 with a design capacity of 60 MGD and has operated in the NdN mode achieving partial denitrification. Both P1 AS1 and P1 AS2 effluents are blended and used as source water for the GWRS, along with TF secondary effluent.

Solids handling at Plant 1 consists of thickening centrifuges, anaerobic digestion, holding tanks, dewatering centrifuges, and truck loading facilities to haul stabilized solids to disposal. Support facilities include chemical addition, plant and city water systems, odor control, digester gas handling, and on-site power generation. Major upgrades to the biosolids thickening and dewatering facilities (OC San Project No. P1-101) were completed in 2019.

Since mid-2009, OC San has operated the Steve Anderson Lift Station (SALS) that conveys up to 50 MGD of additional raw wastewater to Plant 1 to increase the amount of secondary effluent available for the GWRS.

Nearly all secondary effluent from Plant 1 is recycled by OCWD at GWRS and GAP. Secondary effluent flows by gravity to the GWRS AWPF, first passing through fine screens which are located at the Plant 1 site. Secondary effluent flow equalization is used to deliver a consistent Plant 1 effluent flow to the AWPF screening facilities. While the ratio is variable, typically at least three times as much AS effluent (P1 AS1 plus P1 AS2) as TF effluent (P1 TF) is delivered from Plant 1 to the AWPF as feedwater.

1.2.1.2 OC San Plant 2 Secondary Treatment

Plant 2 features two separate wastewater treatment trains: reclaimable and non-reclaimable. The headworks was modified in 2022 by installing gates and stop plates to separate reclaimable wastewater from non-reclaimable wastewater as the various trunk sewer lines enter the plant (OC San Project No. P2-122). Modifications to the influent pump station were made to maintain the flow segregation, conveying wastewater to separate treatment process trains at Plant 2.

Reclaimable wastewater is screened, pumped to grit basins, metered and conveyed to primary sedimentation. Ferric chloride and polymer are added upstream of the primary clarifiers for advanced primary treatment. Primary effluent is pumped to trickling filter/solids contact (TF/SC) facilities. Clarified secondary effluent from the TF/SC facilities (P2 TF/SC effluent) is disinfected using sodium hypochlorite, stored in flow equalization tanks, and pumped to the GWRS AWPF screening facility. Up to 60 MGD of reclaimable secondary effluent can be delivered from Plant 2 to the AWPF as feedwater, although typically flows from Plant 1 are maximized as these flows are more easily treated by the GWRS, while also considering OC San's flow balancing and other operational needs. Any excess flow at Plant 2 is discharged to the ocean.

Non-reclaimable wastewater at Plant 2 is treated by a separate train featuring screens, grit removal, metering, and primary sedimentation. Ferric chloride and polymer can be added upstream of the primary clarifiers for advanced primary treatment. Primary effluent is pumped to the pure oxygen activated sludge (POAS) aeration basins followed by secondary clarifiers. Non-reclaimable secondary effluent is disinfected using sodium hypochlorite, dechlorinated using sodium bisulfite, and pumped to the ocean outfall.

Primary solids at Plant 2 are stabilized by anaerobic digesters. Waste secondary sludge is thickened by dissolved air flotation units and treated by the anaerobic digesters. Stabilized biosolids are dewatered using centrifuges, and the resulting cake is transferred to storage hoppers and trucked to biosolids recycling compost sites. Support facilities at Plant 2 include chemical addition, plant and city water systems, odor control, digester gas handling, and on-site power generation.

1.2.2 Advanced Water Purification Facility

The AWPF features MF, RO, and UV/AOP advanced water treatment processes applied to 100% of the influent flow stream, followed by decarbonation and lime stabilization post-treatment processes, with large pumping stations to convey the purified recycled water to the Talbert Barrier, K-M-M-L Basins, MBI Project, and three non-potable water customers. Figure 1-2 shows the entrance to the AWPF. The AWPF process flow diagram is shown on Figure 1-3, and Figure 1-4 shows the site layout.

Figure 1-2. Groundwater Replenishment System

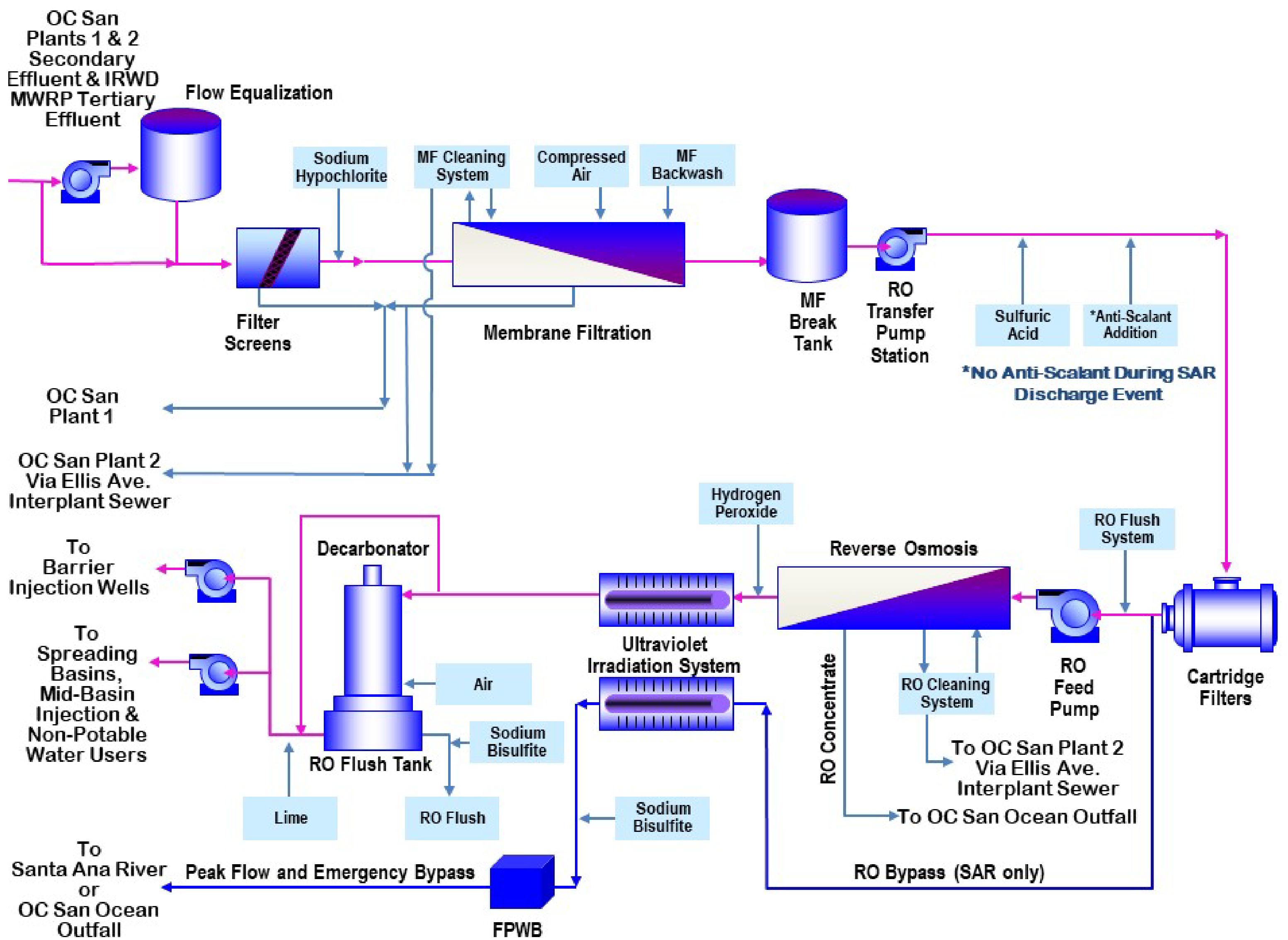


Figure 1-3. GWRS AWPF Process Flow Diagram

Figure 1-4. AWPF Site Layout with GWRSFE

1.3 History of OCWD Water Recycling Facilities

OCWD has a long history of water recycling for potable reuse, comprised of three recycled water groundwater recharge "eras", which can generally be identified by the water reclamation facilities in service at the time:

- Water Factory 21 (WF-21) — October 1976 to January 2004
- Interim Water Factory 21 (IWF-21) — June 2004 to August 2006
- GWRS AWPF — January 2008 to present

These OCWD water recycling facilities have produced highly treated recycled water for groundwater recharge at the Talbert Barrier. During two transitional periods, roughly from February to May 2004, and again from September 2006 until January 2008, OCWD had no operational facilities producing recycled water for groundwater recharge due to construction at the site.

Presently, the GWRS AWPF produces purified recycled water for injection and recharge at the Talbert Barrier and MBI Project and for recharge at K-M-M-L Basins to replenish the Orange County Groundwater Basin, plus limited non-potable uses.

1.3.1 Water Factory 21

OCWD operated WF-21 from October 1976 until January 2004 to produce recycled water for injection at the Talbert Barrier to help prevent the inflow of seawater into the Basin. Shown on Figure 1-5, WF-21 was originally designed as a 15-MGD capacity advanced water treatment (AWT) facility to reclaim secondary treated wastewater from OC San Plant 1.

Over this initial era of recycled water recharge, which spanned nearly three decades, the WF-21 facilities and operations were periodically modified and adjusted. The original WF-21 AWT system consisted of lime clarification, ammonia stripping, recarbonation, filtration, granular activated carbon (GAC), chlorination, blending reservoir, and pumping station. In September 1977, a 5-MGD capacity RO system with cellulose acetate membranes was added to demineralize part of the recycled water flow stream. Initially, GAC was used ahead of the RO system, but was switched to a parallel process after mid-1981 because the fine carbon particles in the GAC clogged the RO membranes and RO demonstrated good organics removal. Later, when it was found that ammonia was removed by nitrification at the OC San plant and by the RO process, the ammonia stripping towers were taken out of service in 1987 and demolished in 1998. Lastly, a UV/AOP unit consisting of UV light exposure with hydrogen peroxide addition was added in 2001 to remove low molecular weight organic contaminants (e.g., NDMA and 1,4-dioxane).

Figure 1-5. Water Factory 21 in 1976

Two types of recycled water produced by WF-21, AWT water (GAC treated) and RO product water, were blended with deep well water and pumped to the Talbert Barrier injection wells until 2000. After that, only RO product was recharged, blending with groundwater from deep wells and potable water from the City of Fountain Valley and the OC-44 turnout (treated potable water from MWD).

Operation of WF-21 ceased on January 15, 2004, for construction of IWF-21 and the GWRS. Portions of WF-21, specifically the RO and UV/AOP processes as well as the blending reservoir and barrier pump station, were maintained for use in IWF-21. Other WF-21 facilities were demolished.

1.3.2 Interim Water Factory 21

Operation of IWF-21 began on June 21, 2004, and ceased on August 8, 2006, for relocation of portions of its equipment to the GWRS AWPF. Although this second era of water recycling for groundwater recharge was relatively brief, the purpose of IWF-21 was twofold: (1) produce up to 5 MGD of recycled water for the Talbert Barrier to help prevent seawater intrusion; and (2) serve as a training facility to allow operations and maintenance staff to gain experience with the same treatment train as that planned for the larger GWRS AWPF. Figure 1-6 shows the IWF-21 facilities.

Figure 1-6. Interim Water Factory 21 in 2006

Utilizing new treatment processes along with modified WF-21 facilities, IWF-21 featured MF, RO, decarbonation, and UV/AOP to treat secondary effluent from OC San's Plant 1. Recycled water was blended with diluent water, chlorinated, and pumped to the Talbert Barrier injection wells.

The RO system removed minerals, organics, viruses, and other contaminants. The original WF-21 RO system was retrofitted with new thin-film composite polyamide membranes in 2004, which offered improved mineral and contaminant rejection rates and operated at lower pressure, thereby conserving energy. The IWF-21 RO process followed MF and consisted of three steps: chemical pretreatment and cartridge filtration, RO membrane treatment, and post-treatment. Following RO, treatment included decarbonation for product water degasification and removal of carbon dioxide. The nominal rated permeate capacity of the IWF-21 RO system was 5 MGD. Concentrate from the RO process was discharged via a brine pipeline to the OC San ocean outfall for disposal.

The IWF-21 UV/AOP facilities provided photolysis, advanced oxidation, and disinfection using hydrogen peroxide and UV exposure. Hydrogen peroxide was added to the decarbonated RO permeate upstream of the UV light treatment. UV exposure was used for disinfection and destruction of UV-sensitive contaminants (e.g., NDMA). Hydrogen peroxide exposed to UV light produces hydroxyl radicals that result in advanced oxidation to destroy UV-resistant contaminants (e.g., 1,4-dioxane). The UV/AOP featured a closed, in-vessel type UV system with low-pressure high-output lamps. The UV unit's nominal rated capacity of 8.75 MGD was oversized for IWF-21 because it was designed to be relocated to the GWRS AWPF.

IWF-21 utilized the original WF-21 chlorination system to help prevent biofouling of the injection wells. The blending reservoir combined water from three sources (purified recycled water, potable water from the City of Fountain Valley, and deep well water) for injection and in-plant use. The barrier pump station conveyed water from the blending reservoir to the Talbert Barrier.

After IWF-21 was taken out of service in August 2006 until construction of the full-scale GWRS was completed in January 2008, only potable water from MWD via the OC-44 turnout and from the City of Fountain Valley was available for injection at the Talbert Barrier.

1.3.3 Groundwater Replenishment System

The third and most recent era of OCWD water reclamation for groundwater recharge is the GWRS. Described in detail in subsequent sections of this report, the GWRS is a significant achievement and sets OCWD apart as a world leader in water recycling and groundwater management. The GWRS is the largest potable reuse facility in the world.

The original purified recycled water design production capacity of the GWRS was 70 MGD. Injection of purified recycled water produced by the AWPF at the Talbert Barrier began on January 10, 2008. Recharge of purified recycled water produced by the AWPF at Miller Basin began on January 17, 2008. Purified recycled water recharge at Kraemer Basin began on February 19, 2008.

The GWRSIE, increasing the AWPF purified recycled water design production capacity up to 100 MGD, began operation on May 21, 2015. By adding flow equalization facilities and 30 MGD of production capacity, the GWRSIE significantly enhanced the local water supply reliability within the Basin.

The GWRSFE construction began in 2019 and operation began on December 12, 2022. The GWRSFE added 30 MGD of capacity, increasing the AWPF purified recycled water design production capacity to 130 MGD.

Table 1-1 and Figure 1-7 summarize the history of the GWRS purified recycled water production since 2008, presenting the annual volumes recharged/used by site.

Table 1-1. GWRS Purified Recycled Water Production and Use by Site Since 2008

Year	Talbert Barrier (AFY)	Anaheim Forebay				MBI Project (AFY)	Non-Potable Uses					Total (AFY)
		Kraemer Basin (AFY)	Miller Basin (AFY)	Miraloma Basin (AFY) [1]	La Palma Basin (AFY)		Anaheim CPP (AFY)	ARTIC (AFY)	OC San Construction (AFY)	Carbon Canyon Diversion Channel (AFY)	Total Non-Potable Use (AFY)	
2008	22,248	9,064	12,243	-	-	-	-	-	-	-	-	43,537
2009	33,795	4,453	22,570	-	-	-	-	-	-	-	-	60,818
2010	38,257	5,340	24,133	-	-	-	-	-	-	-	-	67,730
2011	25,734	31,896	10,387	-	-	-	22	-	79	-	101	68,118
2012	24,486	22,813	11,610	12,442	-	-	57	-	17	17	91	71,442
2013	30,091	3,534	10,274	28,670	-	-	59	-	-	-	59	72,628
2014	32,942	60	3,955	29,076	-	-	52	1	-	-	53	66,086
2015	36,275	12,766	9,602	33,104	-	1,156	57	12	-	-	69	92,972
2016	34,664	28,878	2,571	28,298	3,301	1,523	67	16	-	-	83	99,298
2017	26,254	198	118	17,079	55,063	1,553	75	23	-	-	98	100,363
2018	24,848	666	-	16,805	52,836	1,521	75	18	-	-	93	96,769
2019	26,432	1,978	-	15,144	57,269	1,970	64	15	-	-	79	102,872
2020	24,138	396	3,342	3,220	56,140	8,536	75	11	-	-	86	95,858
2021	25,700	825	5,414	20,748	32,897	8,867	37	12	-	-	49	94,500
2022	22,696	93	2,913	13,801	50,045	7,769	64	12	-	-	76	97,393
2023	17,963	7,267	10,450	21,294	47,662	7,351	43	8	-	-	51	112,038

[1] Spreading at Miraloma Basin includes Anaheim Adventure Park NPR use beginning in 2022

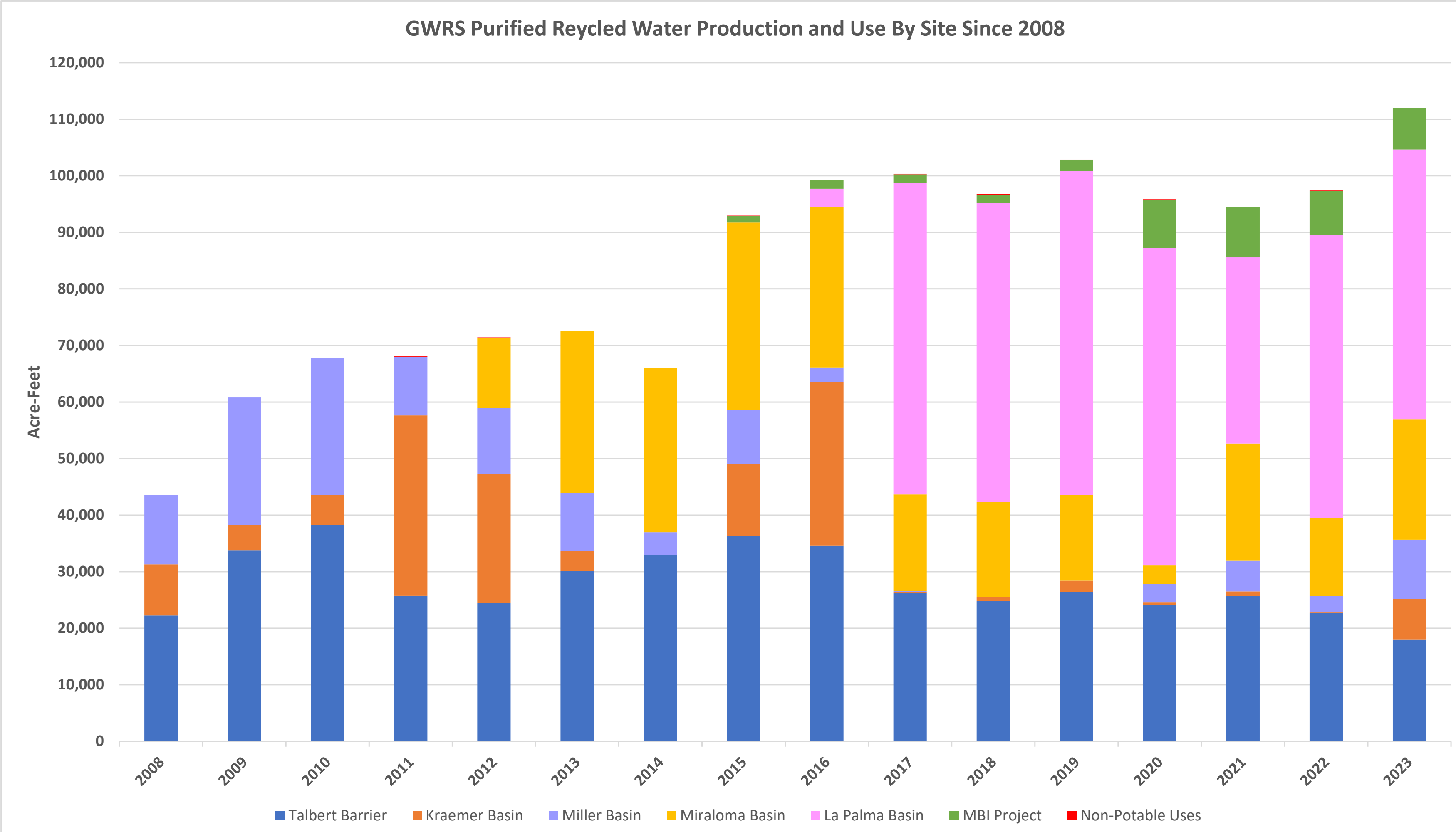


Figure 1-7. GWRS Purified Recycled Water Production and Use by Site Since 2008

1.4 Operation Optimization Plan Overview

The GWRS OOP describes the operating parameters, critical control points, maintenance schedules, and troubleshooting guides for the AWPF, injection barrier, MBI project, and spreading basins. The GWRS is operated in accordance with current permit (RWQCB, 2022a) and the OOP (OCWD and DDB Engineering, Inc., 2022) with minor updates to reflect the GWRSFE UV/AOP challenge test results that were conducted in late December 2022.

2. ADVANCED WATER PURIFICATION FACILITY PERFORMANCE

The GWRS AWPF continued to optimize performance and increase production during its sixteenth year of operation. The GWRS AWPF water quality met all compliance requirements in 2023. This section summarizes the performance of the AWPF during 2023:

- Purified recycled water production volume and flows;
- Purified recycled water quality and compliance record;
- Performance and operational record;
- One-time RO and AOP optimization report;
- Santa Ana River discharges;
- Non-potable water quality; and
- Anticipated changes.

2.1 Purified Recycled Water Volume and Flows

During 2023, the AWPF produced a total of approximately 36,508 MG, or 112,038 AF, of purified recycled water to help prevent seawater intrusion and replenish the Basin. The AWPF purified recycled water production volume is based on Product Water Pump Station and Barrier Pump Station discharge flow records and therefore, excludes internal plant water uses and MF effluent (MFE) and UV product (UVP) water supplied to GAP. On an annual average basis, the AWPF produced approximately 100.0 MGD of purified recycled water for injection, recharge, and non-potable uses in 2023 (average includes periods of facility non-operation). As shown on Figure 2-1, more than 77% of the GWRS purified recycled water was delivered to the Anaheim Forebay with the majority recharged at Miraloma and La Palma Basins.

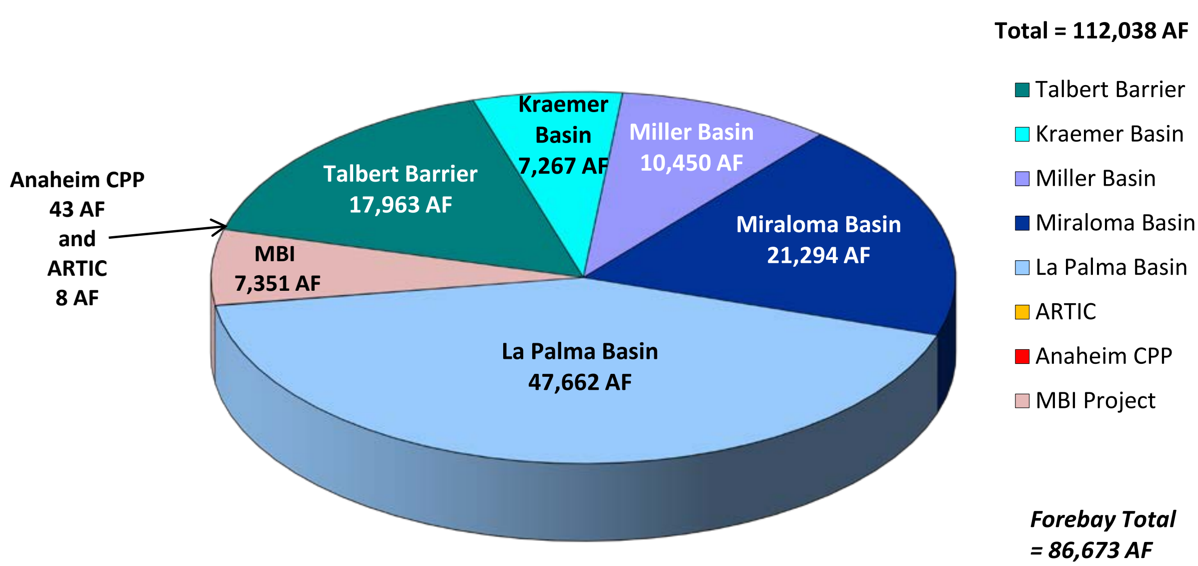
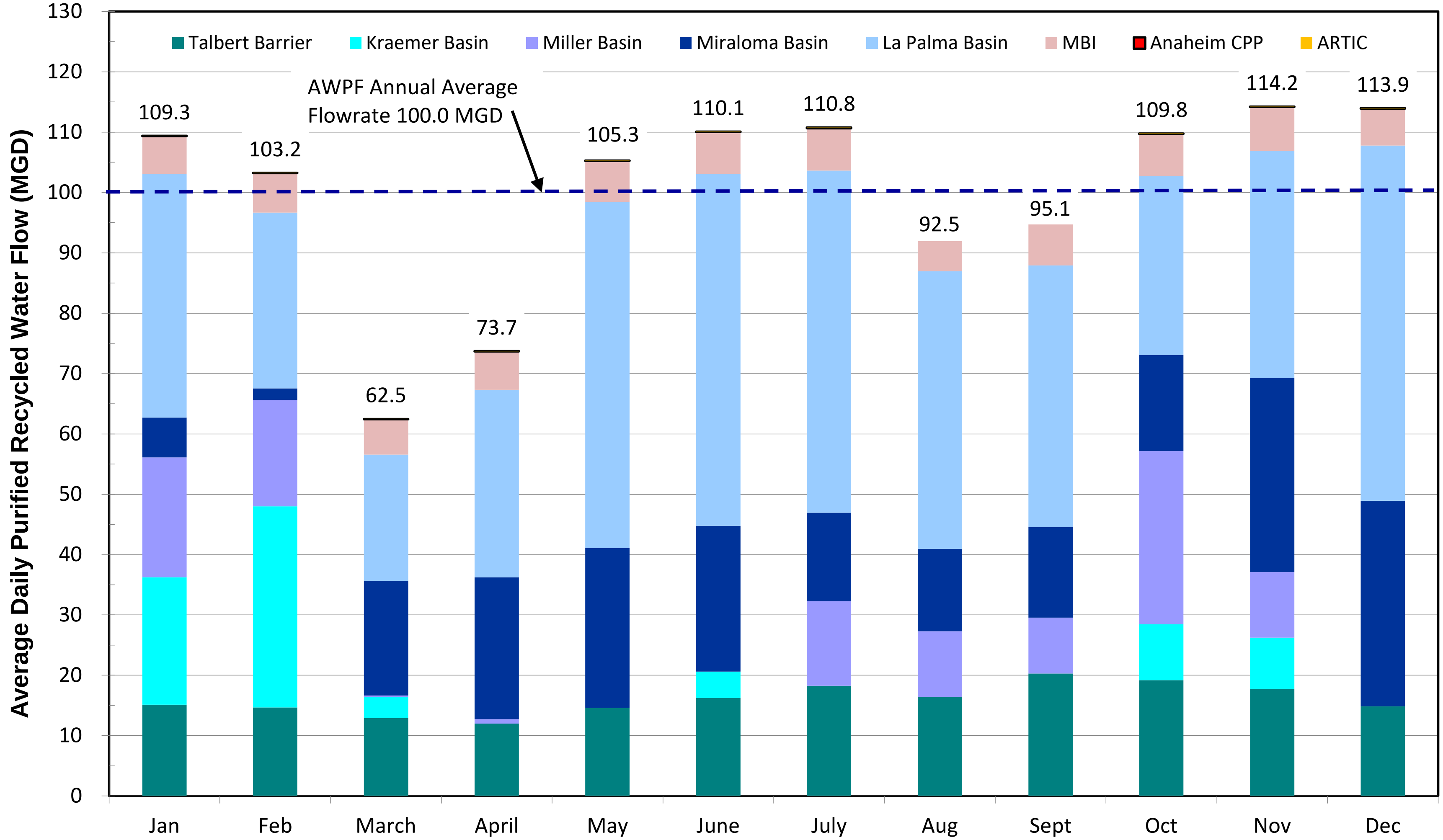


Figure 2-1. 2023 Purified Recycled Water Volume

Approximately 16% of the AWPF production was injected at the Talbert Barrier. Over 6% of the purified recycled water was injected via the MBI Project. Small amounts of purified recycled water were used for non-potable purposes at the Anaheim CPP and ARTIC. Non-potable use at Anaheim Adventure Park is included in the Miraloma Basin purified recycled water volume.

Figure 2-2 illustrates the average daily AWPF deliveries by month with the reuse location. At times in 2023, the AWPF operated at reduced production rates or was off-line entirely. AWPF operations are discussed in more detail in Section 2.3.

Overall, the AWPF was on-line 98.85% of the time during 2023 with daily average purified recycled water production ranging from 4.9 MGD (on August 29 for a planned shutdown) up to 120.8 MGD (on November 15) compared with its GWRSFE design production capacity of 130 MGD. OCWD's current RWQCB permit authorizes purified recycled water production up to 130 MGD for groundwater replenishment and non-potable use (RWQCB, 2022a).



Note: March-April average daily flows reflect reduced production due to heavy rains and use of Kraemer and Miller Basins for SAR flows

Figure 2-2. 2023 Average Daily Purified Recycled Water Flow by Month

2.1.1 Source Water in 2023

The AWPF feedwater (Q1) during 2023 was a variable blend of secondary effluent from OC San:

- OC San Plant 1 AS and TF effluents; and
- OC San Plant 2 TF/SC effluent.

Although the AWPF influent may be supplemented with tertiary effluent from IRWD, no tertiary effluent from MWRP was influent to the GWRS in 2023. IRWD distributed 666 MG of MWRP tertiary effluent to the SEJB4 connection located at OC San Plant 1 in 2023. The SEJB4 connection is located upstream of the AWPF screening facility and MWRP flows to this connection may commingle with Plant 1 AS effluent. However, in 2023 none of the MWRP effluent was considered to have reached the GWRS because, under the agreement between OC San, OCWD, and IRWD, MWRP effluent is considered to be last into GWRS and first flows to the OC San ocean outfall system when flows are spilling over the GWRS influent weir overflow (OCWD et al., 2011).

The AWPF source water exhibited consistently low turbidity and nitrogen levels in 2023 because of the NdN operation of the AS facilities (see Sections 2.2.2.1 and 2.2.3.2).

2.1.1.1 Secondary Effluent Flow Equalization and Influent Screening

Like other wastewater treatment plants, both OC San plants experience a daily diurnal flow pattern, peaking during the daytime and declining to minimal levels at night. Variations in secondary effluent flow are managed by equalization facilities to provide a more consistent feedwater flow rate to the GWRS. Secondary effluent flow equalization (SEFE) facilities store secondary effluent during the day when flows are higher and release it during the night when flows are lower, thereby enabling the AWPF to operate at a more constant flow rate.

At Plant 1, SEFE facilities located adjacent to the AWPF consist of two 7.5 million gallon (MG) above-ground tanks and a pump station, which are pictured on Figure 2-3. During the day, Plant 1 AS secondary effluent flows exceeding those needed for the AWPF production rate setpoint are pumped to the SEFE tanks for storage; at night and during the early morning, Plant 1 SEFE flows are released by gravity to the GWRS influent screening facility.

At Plant 2, flow equalization tanks store TF/SC secondary effluent that is pumped at a controlled flow rate to the AWPF influent screening facility via a 60-inch diameter pipeline. Shown on Figure 2-4, the Plant 2 SEFE facilities consist of two above-ground storage tanks (2.5 and 3.5 MG) and a pump station.

Secondary effluent is delivered to the influent screening facility, which consists of five fine screens that remove suspended solids larger than 2 millimeters (mm). Influent screening helps protect and extend the life of the downstream membrane treatment processes at the AWPF.

Screened secondary effluent flows from the influent screening facility to the MF system. Solids with screen wash wastewater are returned to Plant 1 for treatment and disposal with other OC San solids.

Figure 2-3. OC San Plant 1 Secondary Effluent Flow Equalization (SEFE) Tanks and Pump Station

Figure 2-4. OC San Plant 2 Secondary Effluent Flow Equalization (SEFE) Tanks and Pump Station

2.1.1.2 TF Effluent and TF/SC Effluent Fractions

The OC San secondary effluent supplied as source water for the AWPF was a blend of Plant 1 AS effluent (P1 AS1 and P1 AS2, collectively AS) and TF effluent (P1 TF or TF) prior to mid-December 2022; Plant 2 TF/SC effluent (P2 TF/SC or TF/SC) was added to the AWPF feedwater beginning on December 12, 2022. The blend is variable, with typically more secondary effluent flow provided by the AS facilities. During 2023, the Q1 source water to the AWPF consisted of 41,319 MG of AS effluent, 8,213 MG of TF effluent, and 5,992 MG of TF/SC effluent, as illustrated on Figure 2-5, for a total annual influent flow of 55,525 MG (rounded). On an annual average daily flow basis, the theoretical volumes of secondary effluent available to the AWPF were approximately 113.2 MGD of AS effluent, 22.5 MGD of TF effluent, and 16.4 MGD of TF/SC effluent for a total of 152.1 MGD; these values represent the average measured flows entering the Q1 influent station during 2023. However, due various hydraulic and operational factors, recycling all Q1 flows is not feasible.

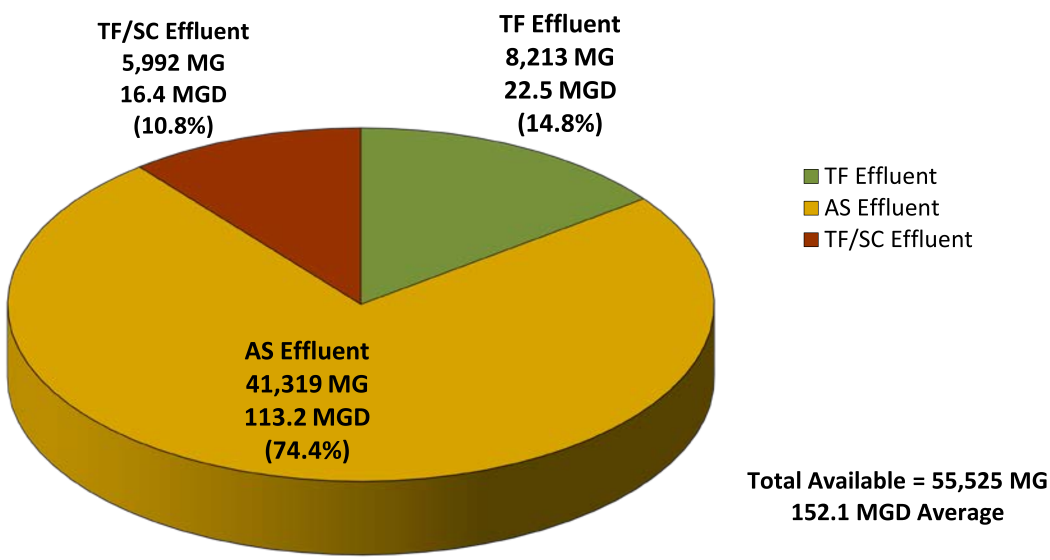
The volume of TF effluent made up nearly 15% of the total influent during 2023; however, the day-to-day operation varied with the daily proportion of TF effluent in AWPF source water ranging from 5.7% (May 2) to 27.4% (February 25). The average proportion of TF effluent in the AWPF source water during 2023 (14.8%) was less than that in 2022 (20.4%) likely due to periodic lower Plant 1 flows for OC San's maintenance work and the addition of TF/SC effluent to the source water stream.

During 2023 the volume of TF/SC effluent made up nearly 11% on average of the total AWPF influent. The day-to-day operation varied with the daily proportion of TF/SC effluent in the AWPF source water ranging from 0.0% on multiple days (listed below) up to 26.7% (May 2).

- No TF/SC effluent was used as AWPF source water on:
  - February 23-26 while OC San performed testing at the Plant 2 Ocean Outfall Booster Station;
  - March 1-13 due to AWPF production curtailments for Anaheim Forebay operations;
  - April 7, 13-17, and 19 due to unscheduled AWPF shutdowns;
  - August 9-17 and 19-31 due to operational issues with Plant 2 headworks gates that combined reclaimable and non-reclaimable wastewater flows, and due to a planned shutdown for AWPF maintenance;
  - September 1-30 due to continued Plant 2 headworks gate issues; and
  - October 1-2 due to continued Plant 2 headworks gate issues.

On an annual basis in 2023, the sum of TF/SC effluent and TF effluent in the AWPF source water averaged 25.6%; monthly averages of the sum of TF/SC effluent and TF effluent in the AWPF source water ranged from 12.0% (September) to 35.4% (January).

Figure 2-6 shows the average daily flow rate of AS effluent, TF effluent, and TF/SC effluent for each month in 2023. Of the 2023 total available influent flow stream (152.1 MGD), about 5,427 MG, or 14.9 MGD on average, was not sent to the AWPF and instead directed to the ocean outfall via the influent weir overflow at the screening facility. The unreclaimed flow volume in 2023 was greater than that in 2022 (3,394 MG or 12.3 MGD on average), primarily due to more periods of reduced purified recycled water production. The monthly influent weir overflow during 2023 ranged from approximately 87 MG, or 2.9 MGD on average, in September to 1,677 MG, or 54.1 MGD, in March. The net total MFF flow during 2023 was approximately 50,098 MG or an annual average daily flow of 137.3 MGD.



Note: Weir overflow (5,427 MG) not included in total available

Figure 2-5. 2023 AWPF Average Influent Flow Sources and Volumes

*Available flow includes weir overflow sent to OC San ocean outfall for discharge. Difference between available flow and MFF flow is weir overflow return.

Figure 2-6. 2023 AWPF Influent Sources and Average Flows by Month

2.2 Purified Recycled Water Quality and Compliance Record

AWPF purified recycled water quality is monitored for compliance with the GWRS permit (RWQCB, 2022a). Except for turbidity and transmittance, all permit-required final purified recycled water monitoring was performed on finished product water (FPW), also referred to as final product water, following post-treatment and just prior to pumping for distribution. Turbidity is monitored continuously on the RO product (ROP) flow stream. Transmittance is measured continuously on the UV/AOP feed (UVF) flow stream (UVF is immediately downstream of the hydrogen peroxide addition to the ROP). As a backup for the redundant on-line analyzers, daily composite sampling and laboratory analysis for transmittance is also conducted at the UVF station.

Water quality results are reported to the RWQCB in conformance with the permit requirements on a quarterly basis. Beginning in 2023, this quarterly reporting transitioned to digital reporting to the state GeoTracker database, as required in the current permit (RWQCB, 2022a). Also beginning in 2023, water quality results were separately reported digitally to DDW via the California Laboratory Intake Portal (CLIP). Additionally, water quality is monitored throughout the AWPF treatment train to measure and optimize process performance. The AWPF process schematic and monitoring locations are illustrated on Figure 2-7. This operational monitoring is discussed in more detail in Section 2.3. The “One-Time RO and AOP Optimization Report”, which is required by the permit (RWQCB, 2022a [Attachment D, Section VII.C.3 and Attachment E, Table E-20]) is presented in Section 2.4. Appendix A summarizes all available water quality data for the AWPF purified recycled water during 2023. Appendix B lists laboratory methods of analyses, and Appendix C presents water quality constituents with associated laboratory methods.

AWPF influent (Q1) flow is metered, and its quality is monitored for selected constituents to control and optimize the operation of the treatment processes; the GWRS permit requires quarterly Q1 composite sampling for Biochemical Oxygen Demand (5-day) (BOD_5), Total Suspended Solids (TSS), and Total Dissolved Solids (TDS). The Q1 sampling point is at the screening facility influent chamber immediately downstream of the fine screens; this location provides a representative sample of the Q1 source water because it is downstream of all SEFE facilities and upstream of the sodium hypochlorite injection prior to the MF system. The ratio of AS to TF plus TF/SC effluent flows in the Q1 supply is variable, as described in detail in Section 2.1.1.2.

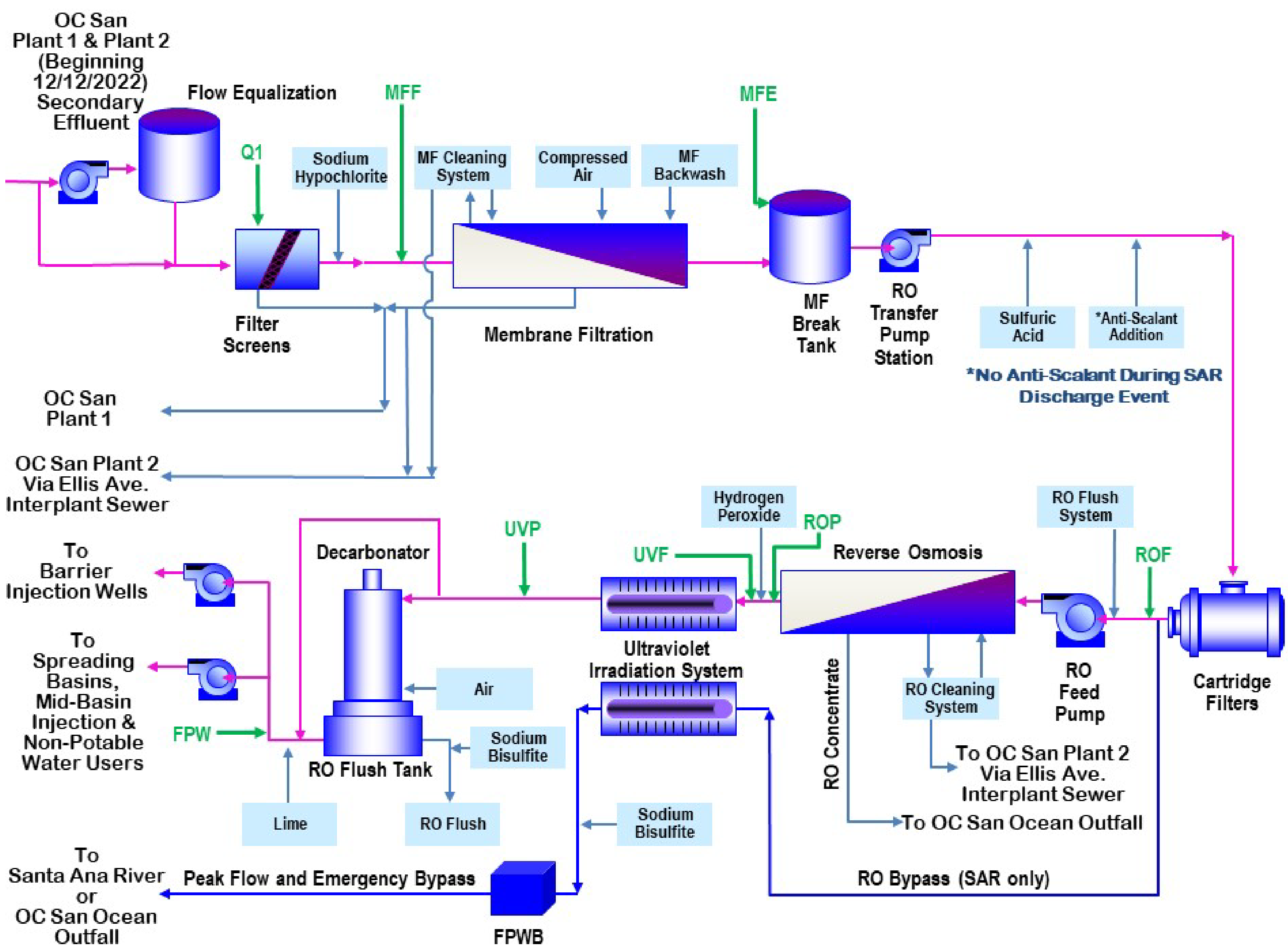


Figure 2-7. AWPF Process Sampling Locations Diagram

In addition to the required finished product water compliance monitoring, process-specific monitoring is performed for pathogen reduction compliance. The operational performance of each of OC San's secondary treatment processes is independently monitored and may be reported for GWRS secondary treatment virus log reduction credit when needed. The integrity of each MF cell is monitored via daily pressure decay testing and MF effluent (MFE) turbidity measurements downstream of each group of four MF cells ("half-trains") and the bulk MF in the downstream MF break tank. The performance of the bulk MF system is monitored by comparing upstream water quality in the MF feed (MFF) after sodium hypochlorite addition with downstream water quality in the MFE.

Similarly, the performance of the RO system is monitored upstream at the RO feed (ROF), after acid and threshold inhibitor (antiscalant) are added, and then downstream at the ROP station. On-line total organic carbon (TOC) and electrical conductivity (EC) analyzers monitor the ROF and ROP flow streams and provide continuous indication of the RO process performance and act as surrogates for monitoring pathogen removal. Monitoring the UV/AOP process feed (UVF) and product (UVP) streams are indicators of its disinfection and organics degradation performance.

Furthermore, both select unit process and FPW monitoring are required under the GWRS permit (RWQCB, 2022a), which also contains requirements from the *Water Quality Control Policy for Recycled Water* (SWRCB, 2018). Health-based constituents of emerging concern (CECs) and bioanalytical screening tools are assessed in FPW, while performance indicator CECs and CEC surrogates are assessed in both FPW and upstream (ROF) and downstream (ROP) of the RO process.

2.2.1 Source Water Compliance in 2023

The Title 22 Water Recycling Regulations for Groundwater Recharge Reuse Projects (GRRPs) require that the recycled municipal wastewater used for groundwater recharge is from a wastewater agency that is not in violation of effluent limits pertaining to groundwater replenishment, as established in the wastewater agency's RWQCB Permit (CCR, 2018; Title 22 GRRP Regulations Section 60320.200(j)). Additionally, the wastewater agency supplying recycled municipal wastewater must administer a pretreatment and pollutant source control program as described in the Title 22 GRRP Regulations (Section 60320.206).

OC San administers an industrial pretreatment and pollutant source control program as a requirement of its own separate NPDES permit for sewage collection, treatment, and discharge (RWQCB, 2021b). OC San serves as the Control Authority to implement and enforce its EPA-approved Multijurisdictional Pretreatment Program, under which OC San operates its Source Control Program and permits, monitors, and regulates industrial facilities.

OC San maintains a comprehensive industrial pretreatment and source control program to prevent contaminants, which may be harmful to the treatment facilities, environment, and to human health and drinking water supplies, from entering the wastewater tributary to both Plants 1 and 2. Through an expanded comprehensive monitoring program required by the Title 22 GRRP Regulations, OC San can ensure that the treated municipal wastewater (secondary effluent and, if any, disinfected tertiary effluent from IRWD) delivered to the GWRS AWPF protects GWRS recycled water quality.

OC San's pretreatment and source control activities for the first half of 2023 (January through June) are summarized in their *FY 2022/23 Pretreatment Program Annual Report* dated `October 31, 2023 (OC San, 2023). The pretreatment and source control activities for the second half of 2023 (July through December) will be summarized in the OC San FY 2023/24 Pretreatment Program report.

2.2.2 Finished Product Water Compliance in 2023

Table 2-1 summarizes the average purified recycled water quality for selected constituents during 2023 at various points in the AWPF treatment process. The GWRS permit requirements are shown for comparison. For other parameters, Appendix A contains the quarterly monitoring results for 2023. All FPW water quality compliance requirements were met in 2023. The performance of individual treatment processes measured by water quality is discussed later in this section.

It is interesting to compare 2023 average Q1 and FPW quality for selected constituents with average values in 2022 to monitor for any trends. Table 2-2 compares these two years' results and shows that some changes occurred in the average water quality of Q1 and FPW in 2023 as compared to the previous year.

The average Q1 total dissolved solids (TDS) concentration increased from 2022 (1,016 milligrams per liter [mg/L]) to 2023 (1,268 mg/L) due to the addition of P2 TF/SC effluent to the AWPF source water blend that began December 12, 2022. The average Q1 chloride levels also increased from 2022 (299 mg/L) to 2023 (391 mg/L) due to the P2 TF/SC effluent contribution. The increase in average Q1 TDS and chloride levels is related to the acceptance of P2 TF/SC effluent, as the average 2022 Q1 concentrations prior to December 12, 2022, (988 mg/L and 277 mg/L for TDS and chloride, respectively) were lower than the post-December 12, 2022, and 2023 corresponding values.

For the FPW quality, average TDS levels slightly increased from 2022 (53 mg/L) to 2023 (57 mg/L). Average FPW chloride concentrations also increased from 2022 (6.9 mg/L) to 2023 (8.7 mg/L). The increase in average TDS and chloride concentrations in FPW followed the same trend as those in the Q1 stream and can be attributed to the addition of P2 TF/SC effluent to the AWPF source water blend that began on December 12, 2022.

Average Q1 total suspended solids levels decreased from 2022 (7.5 mg/L) to 2023 (4.4 mg/L). Average Q1 turbidity slightly increased from 2022 (1.1 Nephelometric Turbidity Units [NTU]) to 2023 (1.6 NTU).

The average Q1 total nitrogen concentration increased somewhat from 2022 (13.1 mg/L) to 2023 (15.1 mg/L). The average FPW total nitrogen concentration was the same in 2022 (1.1 mg/L) and 2023 (1.1 mg/L). Total nitrogen removal is discussed further below in Section 2.2.2.1.

As determined by laboratory analysis, the average Q1 TOC concentration was higher in 2022 (10.61 mg/L) than in 2023 (9.25 mg/L), while the average FPW TOC concentration remained effectively the same in 2022 (0.08 mg/L) as in 2023 (0.07 mg/L).

The annual average concentration of N-nitrosodimethylamine (NDMA) in the Q1 source water decreased from 2022 (35.1 nanograms per liter [ng/L]) to 2023 (28.2 ng/L). The FPW average NDMA concentration also decreased from 2022 (1.0 ng/L) to 2023 (0.7 ng/L). None of the FPW samples analyzed for NDMA in 2023 exceeded the DDW Notification Level (NL) of 10 ng/L.

The annual average Q1 concentrations of 1,4-dioxane decreased from 2022 (1.1 micrograms per liter [µg/L]) to 2023 (0.6 µg/L). The FPW average 1,4-dioxane concentrations in both 2022 and 2023 were below the laboratory Reportable Detection Limit (RDL) of 0.5 µg/L; furthermore, all individual FPW sample results during 2022 and 2023 were below the RDL and below the DDW NL of 1 µg/L for 1,4-dioxane.

Table 2-1. 2023 Average Water Quality[1]

Parameter Name	Units	Q1	MFF	MFE	ROF	ROP	UVP	FPW	Permit Limit
Electrical Conductivity	µS/cm	2,157	2,185[2]	1,993	2,146[2]	49[2]	58	115[2]	900[3]
Total Dissolved Solids	mg/L	1,268	na	na	1,246	25	na	57	500[3]
Total Suspended Solids	mg/L	4.4	5.2	<2.5	na	na	na	<2.5	N/A
Turbidity	NTU	1.6	3.02[2]	0.04[2]	0.03[2]	0.02[4]	na	0.04[2]	≤0.2 / ≤0.5[3]
Ultraviolet percent transmittance (%UVT) @254nm	%	na	na	70.7	na	96.7[4]	na	na	≥90
pH	UNITS	7.43	7.15[2]	7.37	6.90[2]	5.17[2]	5.80	8.27[2]	6 - 9
Total Hardness (as CaCO3)	mg/L	367	na	na	353	<1	na	35.4	240[3]
Calcium	mg/L	83.4	na	na	81.5	<0.5	na	13.7	N/A
Magnesium	mg/L	38.5	na	na	36.3	<0.5	na	<0.5	N/A
Sodium	mg/L	284	na	na	273	8.1	na	8.3	45
Potassium	mg/L	21.2	na	na	21.2	0.5	na	0.5	N/A
Bromide	mg/L	0.95	na	na	na	na	na	0.03	N/A
Chloride	mg/L	391	na	na	384	7.4	8.3	8.7	55
Sulfate	mg/L	221	na	na	216	0.2	na	0.3	100
Bicarbonate (as CaCO3)	mg/L	232	na	na	200	8.8	na	39.3	N/A
Nitrate Nitrogen	mg/L	7.42	na	na	5.74	0.78	na	0.77	3[3]
Nitrite Nitrogen	mg/L	0.9	na	na	na	<0.002	na	0.055	1[3]
Ammonia Nitrogen	mg/L	5.3	na	na	na	0.5	na	0.4	N/A
Organic Nitrogen	mg/L	1.2	na	na	na	0.02	na	0.01	N/A
Total Nitrogen	mg/L	15.1	na	na	na	na	na	1.1	10
Phosphate Phosphorus	mg/L	0.49	na	na	na	na	na	<0.01	N/A
Iron	ug/L	322	na	na	97	<5	na	<5	300
Manganese	ug/L	53.7	na	na	52.5	<1	na	<1	50
Aluminum	ug/L	9.4	na	na	<5	<5	na	<5	200[3]
Arsenic	ug/L	1.8	na	na	1.8	<1	na	<1	10
Barium	ug/L	60.5	na	na	53.4	<1	na	<1	1,000
Boron	mg/L	0.51	na	na	0.50	0.30	na	0.31	N/A
Cadmium	ug/L	<1	na	na	<1	<1	na	<1	5
Chromium	ug/L	0.1	na	na	0.7	<1	na	<1	50
Copper	ug/L	6.8	na	na	10.1	0.3	na	<1	1,000[3]
Cyanide	ug/L	<5	na	na	4.0	<5	na	<5	150
Fluoride	mg/L	0.83	na	na	na	na	na	<0.1	2
Lead	ug/L	<1	na	na	0.4	<1	na	<1	15
Mercury	ug/L	<1	na	na	<1	<1	na	<1	2
Nickel	ug/L	5.5	na	na	5.5	<1	na	<1	100
Perchlorate	ug/L	na	na	na	na	na	na	<2	6
Selenium	ug/L	4.2	na	na	4.3	<1	na	<1	50
Silica	mg/L	18.5	na	na	19.6	<1	na	0.9	N/A
Silver	ug/L	0.3	na	na	<1	<1	na	<1	100
Zinc	ug/L	15.6	na	na	22.8	<5	na	<5	5,000
1,2,3-Trichloropropane	ug/L	<0.005	na	na	<0.005	<0.005	<0.005	<0.005	0.005
N-nitrosodimethylamine	ng/L	28.2[5]	na	na	18.1[5]	6[5]	<2[5]	0.7[5]	N/A
1,4-Dioxane	ug/L	0.6	na	na	0.6	<0.5	<0.5	<0.5	N/A
Perfluorooctanoic Acid	ng/L	10.5	na	na	14.6	<2	na	<2	N/A
Perfluorooctane Sulfonic Acid	ng/L	8.9	na	na	9.6	<2	na	<2	N/A
Perfluorobutane Sulfonic Acid	ng/L	6.0	na	na	8.6	<2	na	<2	N/A
Perfluorohexane Sulfonic Acid	ng/L	4.8	na	na	5.2	<2	na	<2	N/A
Total Trihalomethanes	ug/L	2.4	na	na	9.6	4.1	3.3	2.4	80
Dibromoacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Dichloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Monobromoacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Monochloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Trichloroacetic Acid	ug/L	na	na	na	na	na	na	<1	60,total HAA5
Total Organic Carbon (unfiltered)	mg/L	9.25	9.29	na	7.38	0.07	0.14[6]	0.07	0.5[3]
Total Coliform	MPN/100 mL	810,704	19,912	<1	na	<1	na	<1	2.2 / 23 / 240[3]
Escherichia coli (E. coli)	MPN/100 mL	223,213	1,599	<1	na	<1	na	<1	N/A

Q1 Secondary Effluent (AWPF Influent)
MFF Microfiltration Feed
MFE Microfiltration Effluent
ROF Reverse Osmosis Feed
ROP Reverse Osmosis Product
UVF Ultraviolet UV/AOP Feed
UVP Ultraviolet UV/AOP Product
FPW Finished Product Water
na Not analyzed
N/A Not applicable

[1] For purposes of calculating annual averages, 10% of the Reportable Detection Limit (RDL) was used for all non-detect (ND) values. If all data for the period were ND, then the average is shown as "<RDL". Number of significant digits shown match those in raw data.

[2] On-line average

[3] See Appendix A for more information

[4] On-line average shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.

[5] Average results shown using In-house Method NDMA-LOW with RDL = 10 ng/L for Q1 and ROF, and In-house Method NDMA-LOW with RDL = 2 ng/L for ROP, UVP, and FPW. See Appendix A.

[6] Average shown is based on two available samples.

Table 2-2. Comparison Between 2022 and 2023 Average Water Quality[1]

Parameter Name	Units	2022 Q1	2023 Q1	2022 FPW	2023 FPW	Permit Limit
Electrical Conductivity	µS/cm	1,706	2,157	106[2]	115[2]	900[3]
Total Dissolved Solids	mg/L	1,016	1,268	53	57	500[3]
Total Suspended Solids	mg/L	7.5	4.4	<2.5	<2.5	N/A
Turbidity	NTU	1.1	1.6	0.03[2]	0.04[2]	≤0.2 / ≤0.5[3]
Ultraviolet percent transmittance (%UVT) @254nm	%	na	na	na	na	≥90
pH	UNITS	7.35	7.43	8.36[2]	8.27[2]	6 - 9
Total Hardness (as CaCO3)	mg/L	319	367	34.7	35.4	240[3]
Calcium	mg/L	77.9	83.4	13.9	13.7	N/A
Magnesium	mg/L	30.2	38.5	<0.5	<0.5	N/A
Sodium	mg/L	227	284	7.5	8.3	45
Potassium	mg/L	19.9	21.2	0.5	0.5	N/A
Bromide	mg/L	na	1.0	<0.01[4]	0.03	N/A
Chloride	mg/L	299	391	6.9	8.7	55
Sulfate	mg/L	200	221	0.1	0.3	100
Bicarbonate (as CaCO3)	mg/L	na	232	40.6	39.3	N/A
Nitrate Nitrogen	mg/L	7.29	7.42	0.77	0.77	3[3]
Nitrite Nitrogen	mg/L	1.200	0.889	0.069	0.055	1[3]
Ammonia Nitrogen	mg/L	3.6	5.3	0.4	0.4	N/A
Organic Nitrogen	mg/L	1.2	1.2	0.01	0.01	N/A
Total Nitrogen	mg/L	13.1	15.1	1.1	1.1	5 / 10[4]
Phosphate Phosphorus	mg/L	0.54	0.49	<0.01	<0.01	N/A
Iron	ug/L	463	322	<5	<5	300
Manganese	ug/L	44.4	53.7	<1	<1	50
Aluminum	ug/L	12.0	9.4	0.7	<5	200[3]
Arsenic	ug/L	1.2	1.8	<1	<1	10
Barium	ug/L	40.6	60.5	<1	<1	1,000
Boron	mg/L	0.43	0.51	0.25	0.31	N/A
Cadmium	ug/L	<1	<1	<1	<1	5
Chromium	ug/L	<1	0.1	<1	<1	50
Copper	ug/L	8.5	6.8	<1	<1	1,000[3]
Cyanide	ug/L	<5	<5	<5	<5	150
Fluoride	mg/L	0.93	0.83	<0.1	<0.1	2
Lead	ug/L	<1	<1	<1	<1	15
Mercury	ug/L	<1	<1	<1	<1	2
Nickel	ug/L	6.0	5.5	<1	<1	100
Perchlorate	ug/L	na	na	<2	<2	6
Selenium	ug/L	2.3	4.2	<1	<1	50
Silica	mg/L	18.6	18.5	1.2	0.9	N/A
Silver	ug/L	0.3	0.3	<1	<1	100
Zinc	ug/L	15.1	15.6	<1	<5	5,000
1,2,3-Trichloropropane	ug/L	<0.005	<0.005	<0.005	<0.005	0.005
N-nitrosodimethylamine	ng/L	35.1[5]	28.2[5]	1.0[5]	0.7[5]	N/A
1,4-Dioxane	ug/L	1.1	0.6	<0.5	<0.5	N/A
Perfluorooctanoic Acid	ng/L	na	10.5	<2	<2	N/A
Perfluorooctane Sulfonic Acid	ng/L	na	8.9	<2	<2	N/A
Perfluorobutane Sulfonic Acid	ng/L	na	6.0	<2	<2	N/A
Perfluorohexane Sulfonic Acid	ng/L	na	4.8	<2	<2	N/A
Total Trihalomethanes	ug/L	0.5	2.4	1.9	2.4	80
Dibromoacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Dichloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Monobromoacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Monochloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Trichloroacetic Acid	ug/L	na	na	<1	<1	60,total HAA5
Total Organic Carbon (unfiltered)	mg/L	10.61	9.25	0.08	0.07	0.5[3]
Total Coliform	MPN/100 mL	542,675	810,704	0.11	<1	2.2 / 23 / 240[3]
Escherichia coli (E. coli)	MPN/100 mL	142,177	223,213	<1	<1	N/A

Q1 Secondary Effluent (AWPF Influent) na Not analyzed
FPW Finished Product Water N/A Not applicable

1 For purposes of calculating annual averages, 10% of the Reportable Detection Limit (RDL) was used for all non-detect (ND) values. If all data for the period were ND, then the average is shown as "<RDL". Number of significant digits shown match those in raw data.
2 On-line average
3 See Appendix A for more information
4 Total nitrogen limit was changed from 5 mg/L (RWQCB, 2004a) to 10 mg/L (RWQCB, 2022a)
5 Average results shown using In-house Method NDMA-LOW with RDL = 10 ng/L for Q1, and In-house Method NDMA-LOW with RDL = 2 ng/L for FPW. See Appendix A.

2.2.2.1 Total Nitrogen Removal in 2023

Performance data for AWPF total nitrogen removal are summarized in Table 2-3 and Figure 2-8. On an annual basis, the Q1 total nitrogen concentration (sum of ammonia, nitrite, nitrate, and organic nitrogen, all expressed as nitrogen) averaged approximately 15.1 mg/L during 2023, which was greater than the 2022 average (13.1 mg/L). Total nitrogen concentrations in the Q1 flow stream were an indication of OC San's NdN operation of the AS facilities at Plant 1, which began in late 2009. Prior to the introduction of NdN operation in 2009, concentrations of total nitrogen at Q1 were roughly double the current concentrations, as described in more detail in prior annual reports. The addition of non-nitrified P2 TF/SC effluent to the AWPF source water beginning in December 2022 had a small increasing effect on the Q1 total nitrogen concentration that continued through 2023 (15.0 mg/L average in December 2022 and 15.1 mg/L average in 2023).

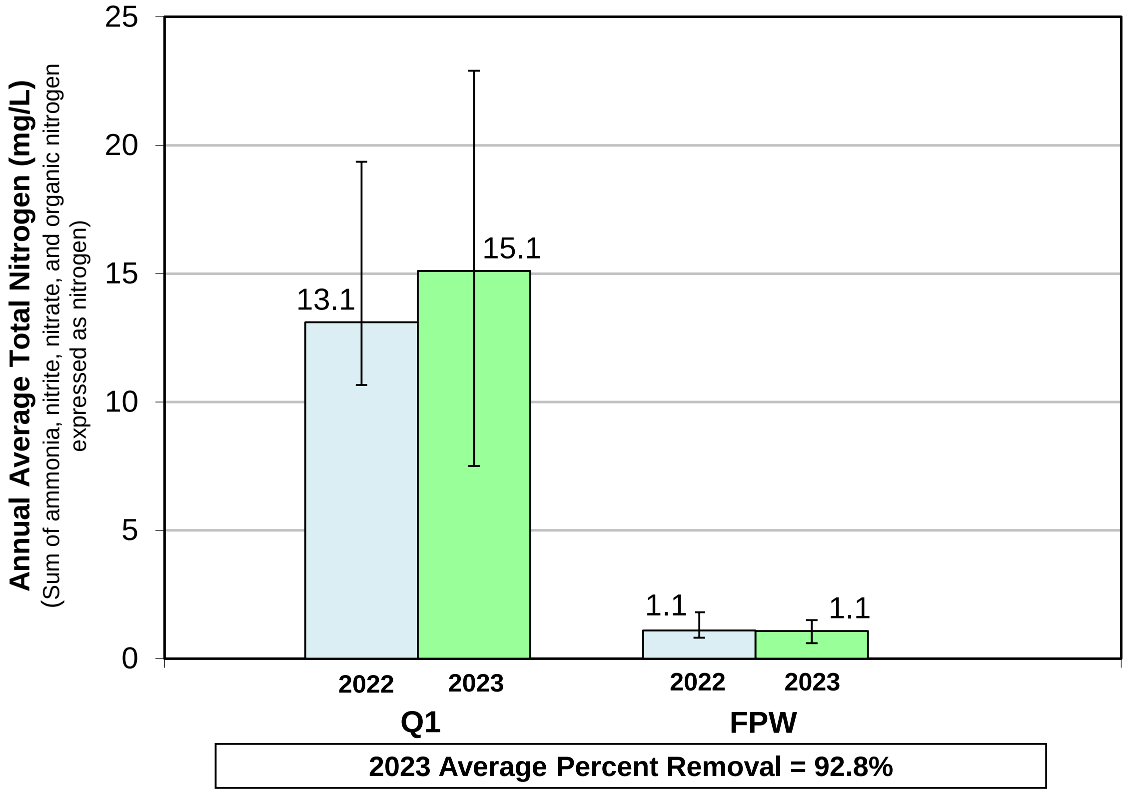
The AWPF treatment consistently achieved low concentrations of total nitrogen levels in the FPW, ranging from approximately 0.6 to 1.5 mg/L based on individual samples in 2023. Removal of total nitrogen occurs primarily, if not exclusively, via the RO process. The annual average FPW total nitrogen concentration remained the same low value over the past two years, 1.1 mg/L in 2022 and 2023. Figure 2-8 presents the 2023 annual average total nitrogen reduction performance of the AWPF and compares it with that achieved in the previous year.

Table 2-3. 2023 AWPF Total Nitrogen Removal Performance

Month	Total Nitrogen [1,2]			
	Secondary Effluent Q1		AWPF Effluent FPW	
	Avg. (mg/L)	Max. (mg/L)	Avg. (mg/L)	Max. (mg/L)
January	15.9	19.4	1.0	1.3
February	16.3	17.6	1.1	1.3
March	14.7	18.4	1.0	1.1
April	12.9	21.1	0.9	1.1
May	18.9	22.9	1.1	1.3
June	19.0	20.8	1.1	1.3
July	15.5	16.4	1.3	1.4
August	12.0	13.1	1.1	1.4
September	10.2	12.3	0.9	1.1
October	13.2	14.9	1.3	1.5
November	14.6	15.8	1.2	1.3
December	17.2	18.8	1.2	1.2
Annual Average	15.1	---	1.1	---
Maximum	---	22.9	---	1.5
Average % Removal	92.8%			

[1] Total nitrogen is based on the sum of ammonia, nitrite, nitrate, and organic nitrogen, all expressed as nitrogen.

[2] Total nitrogen data based on weekly Q1 and weekly FPW individual grab sample results.



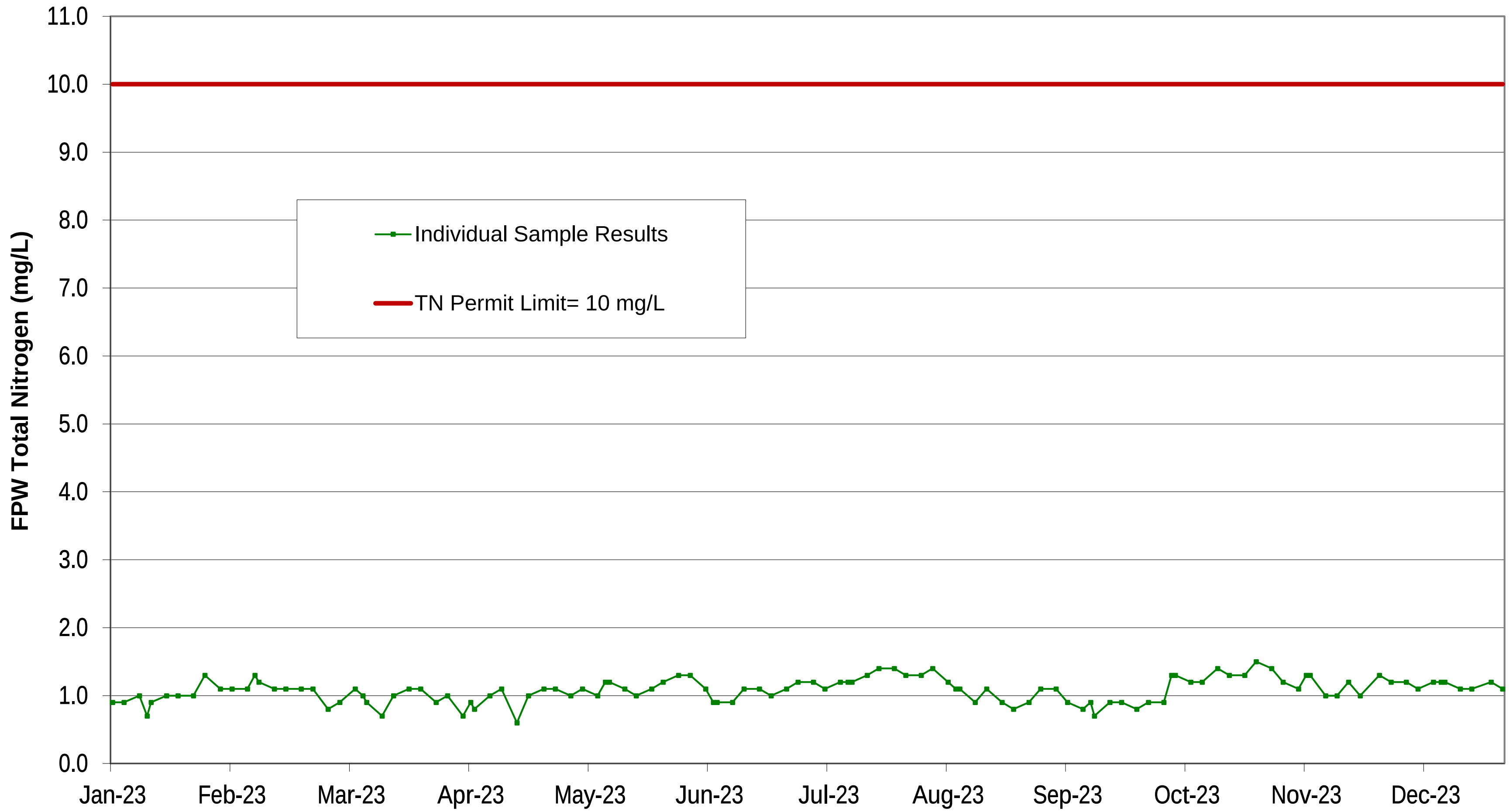
Note: Black bars represent the range in individual grab samples for the years shown.

Figure 2-8. 2023 AWPF Total Nitrogen Removal Performance

Figure 2-9 illustrates the FPW total nitrogen concentration during 2023, showing it was always well below the total nitrogen GWRS permit limit of 10 mg/L (RWQCB, 2022a). The required FPW sampling frequency for total nitrogen analyses was reduced to weekly in 2023 under the new permit (RWQCB, 2022a). Prior to adoption of the new permit in December 2022, the FPW total nitrogen limit was 5 mg/L with a required sampling frequency of twice per week at least three days apart.

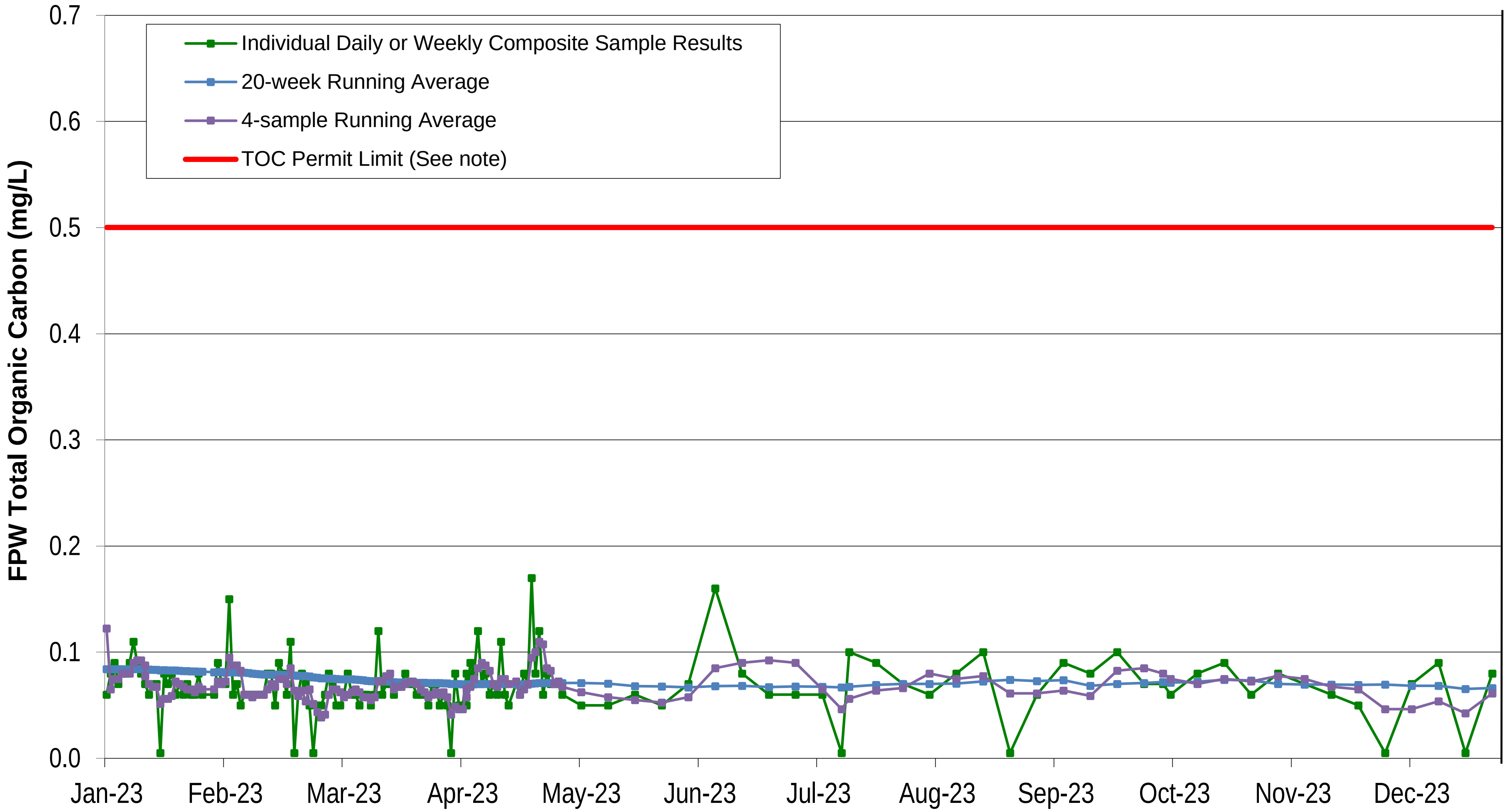
2.2.2.2 Total Organic Carbon Removal in 2023

Figure 2-10 shows the TOC concentration in the FPW during 2023 based on 24-hour composite samples taken daily from January through April and weekly from May through December. The GWRS permit requires FPW 24-hour composite samples be taken at least weekly for TOC analysis (RWQCB, 2022a). The maximum individual daily composite FPW TOC result in 2023 was 0.17 mg/L (April 22). The running 20-week average TOC concentration in the FPW was generally about 0.07 mg/L. The running 4-sample average TOC concentration in the FPW was also approximately 0.07 mg/L. The overall FPW annual average TOC concentration was 0.07 mg/L as well (Table 2-1).



Note: Reportable Detection Limit is 0.3 mg/L using Method X1-351.2

Figure 2-9. 2023 Purified Recycled Water Total Nitrogen



Note: Reportable Detection Limit is 0.05 mg/L using Method 5310C.
TOC Permit Limit is based on a 20-week running average of all TOC results and the average of the last 4 TOC results..

Figure 2-10. 2023 Purified Recycled Water Total Organic Carbon

Compliance with the permit TOC limit is determined monthly based on a 20-week running average of all TOC results and the running average of the last four samples of FPW. Prior to 2023, the TOC limit was based on the running average TOC concentration of the most recent 20 composite samples (not 20 weeks) of FPW and the running average of the last four composite samples of FPW. The TOC limit is calculated based on the DDW-specified maximum RWC at each recharge location. The TOC limit for all recharge sites (Talbert Barrier, K-M-M-L Basins, and MBI Project) is 0.5 mg/L (determined by dividing 0.5 mg/L by the DDW-specified maximum allowable RWC at that location, which is 100% for all sites).

During 2023, the running 20-week average FPW TOC and the running average of the last four samples was consistently well below 0.5 mg/L and in compliance with the permit requirements.

2.2.2.3 Total Coliform Removal in 2023

Regarding disinfection through the entire AWPF, total coliform levels in Q1 averaged approximately 811,000 Most Probable Number per 100 milliliters (MPN/100 mL) in 2023. (See Table 2-1 presented earlier.) Sodium hypochlorite addition upstream of MF reduced the total coliform levels to an average of approximately 20,000 MPN/100 mL in the MFF, representing an average total coliform removal of 1.6-log. MF treatment further reduced all MFE total coliform results to non-detect (less than 1 MPN/100 mL). Total coliform levels were maintained at less than 1 MPN/100 mL through the RO and UV/AOP processes. Compliance was always sustained with the Title 22-based permit limit for total coliform, which requires that the FPW shall not exceed 240 MPN/100 mL in any single sample, 23 MPN/100 mL in more than one sample in any 30-day period, and the 7-day median shall not exceed 2.2 MPN/100 mL. Throughout 2023, the total coliform levels in the FPW were less than 1 MPN/100 mL.

In addition to total coliform, which is required to be monitored daily, concentrations of *E. coli* were also voluntarily analyzed to confirm bacteria removals through the AWPF. *E. coli* concentrations were diminished by adding sodium hypochlorite upstream of the MF process in 2023. (See Table 2-1 presented earlier.) The Q1 *E. coli* level averaged approximately 223,000 MPN/100 mL, and the MFF *E. coli* levels averaged approximately 1,600 MPN/100 mL following disinfection. Confirming the MF, RO, and UV/AOP expected performance, the average MFE, ROP, and FPW results for *E. coli* were less than 1 MPN/100 mL consistently in 2023.

2.2.3 Summary of GWRS Pathogen Log Reduction Compliance in 2023

Table 2-4 summarizes the daily total pathogen log reduction value (LRV) credits achievable by the GWRS, demonstrating compliance with the permit and Title 22 Water Recycling Regulations for GRRPs (CCR, 2018). The pathogen log reduction achieved by each treatment process is discussed in Sections 2.2.3.1 (Secondary treatment), 2.2.3.2 (MF), 2.2.3.3 (RO), and 2.2.3.4 (UV/AOP). Figure 2-11 illustrates the daily total pathogen log reduction values actually achieved during 2023.

GWRS complies with pathogen reduction requirements using the MF, RO, and UV/AOP processes at the AWPF noted above plus underground retention as an environmental barrier. The GWRS may also claim credit for primary and secondary treatment by OC San; however, no pathogen reduction credits for primary and secondary treatment were claimed in 2023.

Table 2-4. Summary of Pathogenic Microorganism Control for the GWRS

Pathogen	Minimum Log Reduction Requirements[1]	Pathogen Log Reduction Credits Available by Treatment Process					
		Secondary Treat-ment[2]	MF and Cl_2	RO[3]	UV/AOP	Underground Retention Time[4]	Total[3,4]
Giardia cysts	10	0	≥4.0	≥2.0	6.0	0	≥12.0
Cryptosporidium oocysts	10	0	≥4.0	≥2.0	6.0	0	≥12.0
Viruses	12	0.18	0	≥2.0	6.0	4 (5)	≥12.0

[1] Per Title 22 Water Recycling Criteria (CCR, 2018) and GWRS permit (RWQCB, 2022a).

[2] Since December 2, 2022, 0.18-log virus reduction credit could be claimed for secondary treatment at OC San. However, no pathogen reduction credits claimed for secondary treatment in 2023.

[3] Daily pathogen log reduction credits achieved by RO in 2023 were equal to or greater than 2.0-log, except on 5/15/2023 when the LRV credit was 1.97-log and 8/30/2023 when the LRV credit was 1.77-log. The MF process achieved greater than or equal to 4.0-log reduction of Giardia cysts and Cryptosporidium oocysts on 5/15/2023 and 8/30/2023 to make up for the RO process shortfall. See Sections 2.2.3.2 and 2.2.3.3 and Appendix D.

[4] Daily virus LRV credit of 4-log for underground retention time in 2023, with two exceptions on 5/15/2023 and 8/30/2023 when 5-log virus LRV credits were taken. See Figure 2-11.

In addition to the pathogen log reduction achieved by OC San and the MF, RO, and UV/AOP systems, GWRS provides a minimum underground retention time prior to withdrawal at the nearest drinking water well of more than four months via established primary and secondary boundary areas at the Talbert Barrier and Anaheim Forebay that were confirmed by added tracer studies; the MBI Project area has approved boundary areas based on groundwater modeling which were verified by intrinsic tracer tests using chloride and sulfate conducted between 2015 and 2023; an updated project boundary for the MBI area was submitted to DDW for approval in February 2024 (OCWD, 2024). Currently all drinking water wells are located outside these boundary areas with more than six months (typically many years) of subsurface travel prior to the extraction of GWRS water recharge or injection. Based on the 1-log virus reduction credit per month of underground retention time allowed by the Title 22 Water Recycling Criteria for groundwater recharge (CCR, 2018), GWRS therefore provides at least 4-log reduction of viruses after surface spreading and direct injection. As noted in Table 2-4, 4-log virus reduction credits for underground retention time were taken during 2023, except on May 15 and August 30 when 5-log virus reduction credits were taken. The additional 1-log virus reduction credit for underground retention time enabled the GWRS to make up for the slightly lower virus reduction

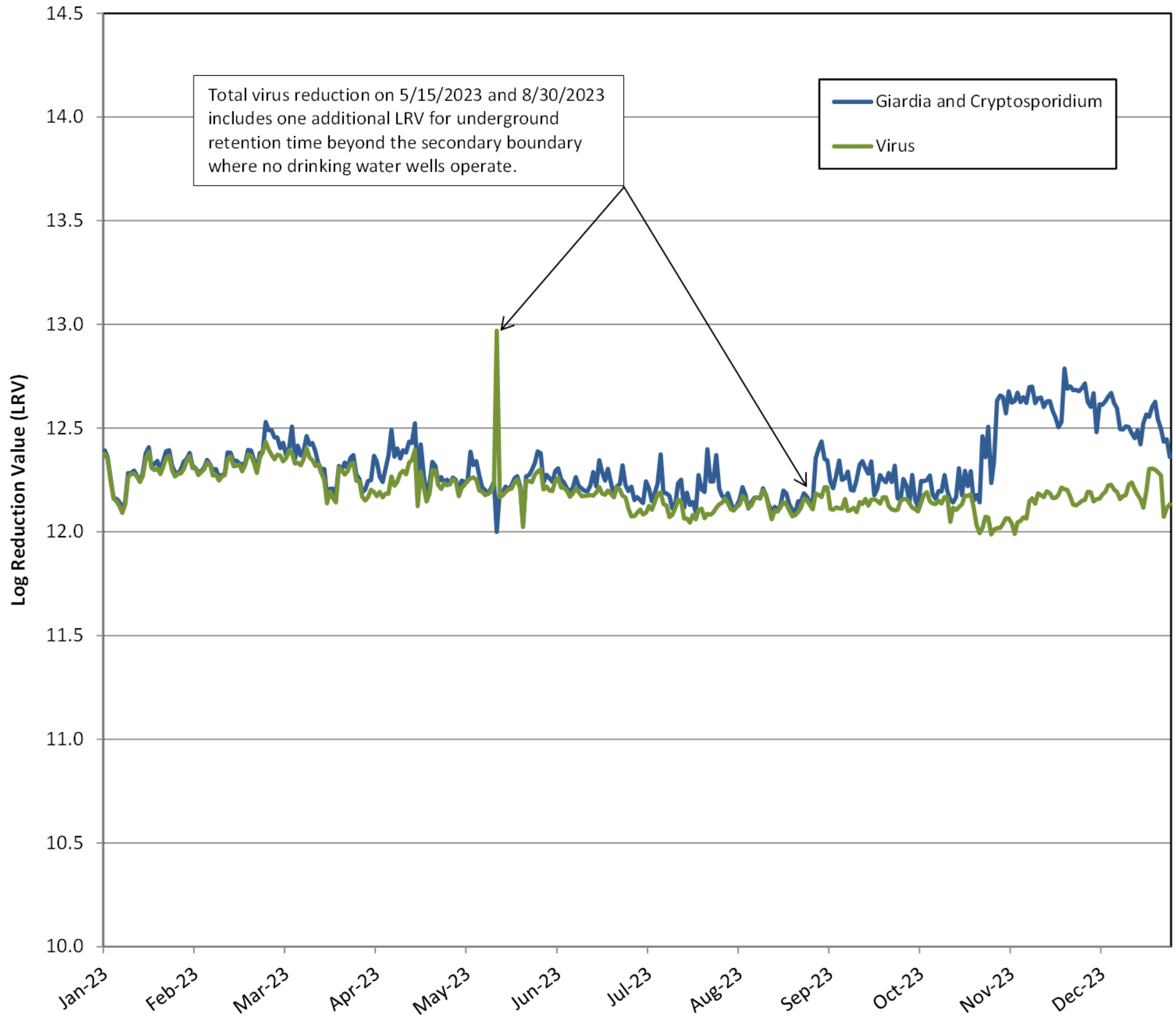


Figure 2-11. Summary of Daily GWRS Pathogen Log Reduction Credits Achieved in 2023

credits documented for the RO process on May 15 and August 30 (See Section 2.2.3.3 and monthly pathogenic microorganism reduction reports in Appendix D). No production wells are located within 5-months travel time of the GWRS recharge facilities.

2.2.3.1 Secondary Treatment Pathogen Log Reduction Monitoring

Since December 2022, the AWPF has been eligible to receive virus reduction credit for the primary and secondary treatment conducted by OC San. To receive this credit, effluent from each of the four secondary treatment processes that provides influent to the AWPF (P1 AS1, P1 AS2, P1 TF, P2 TF/SC) is monitored daily by OC San. The turbidity of the blended AWPF influent is also measured by OCWD, as an indicator of the blended secondary effluent quality before (MFF) and following (MFE) MF treatment.

The OC San secondary treatment pathogen log reduction credit is a contingent credit and is only claimed by OCWD when needed to meet the total minimum 12-log virus reduction credit required by Title 22. This contingent credit was not required in 2023, and therefore, no secondary treatment pathogen log reduction was claimed.

2.2.3.2 MF System Pathogen Log Reduction Monitoring

The MF process receives pathogen log reduction credits for *Giardia* cysts and *Cryptosporidium* oocysts in accordance with the updated OOP (OCWD and DDB Engineering, Inc., 2022). No credit for reduction of enteric virus is attributed to the MF process. A combination of on-line turbidimeters and daily pressure decay test (PDT) results are used to show compliance with pathogen removal requirements. The critical control points and critical limits designated for MFE turbidity and MF PDT (See Section 2.3.2) establish the criteria that enable the MF process to demonstrate at least 4-log reduction of *Giardia* cysts and *Cryptosporidium* oocysts.

The MFE turbidity and MF PDT results are recorded and used to calculate the pathogen log removal credit achieved by each MF cell in accordance with the *Membrane Filtration Guidance Manual* (USEPA, 2005). The calculated pathogen log removal is automatically displayed in the GWRS process control system (PCS) and recorded as explained in the OOP. If a log removal result based on the PDT calculation for an individual MF cell is less than 4-log based on the retesting protocol described below, the affected cell is taken out of service until the cell can inspected and restored to comply with the 4-log reduction requirement.

Monthly reports are submitted to DDW documenting the daily pathogen log reduction values achieved by the MF process; each day, the overall process is assigned the lowest daily individual cell log reduction value derived from the PDT results. Appendix D contains copies of the 2023 monthly reports submitted to DDW and the RWQCB documenting pathogenic microorganism control achieved by GWRS.

MF membrane integrity is monitored continuously with on-line turbidimeters on the MFF and MFE flow streams, and continuous readings are averaged to determine the daily averages. One bulk MFF turbidimeter measures the combined MFF turbidity (a second bulk MFF turbidimeter is a standby unit). The MFE turbidity is continuously measured using 12 individual high-resolution laser turbidimeters, each assigned each "half-train" group of four MF cells. In addition, one bulk MFE turbidimeter continuously tracks the combined MFE flow stream to supplement the 12 "half-train" turbidimeters.

Table 2-5 summarizes the monthly MF system performance for 2023 in terms of turbidity reduction. Average monthly MFF turbidity results are based on the daily average MFF turbidity readings for the bulk MFF stream. Monthly average MFE turbidity results are based on the average of the daily average results of the 12 individual turbidimeters serving the MF "half-trains".

Table 2-5. 2023 MF Performance

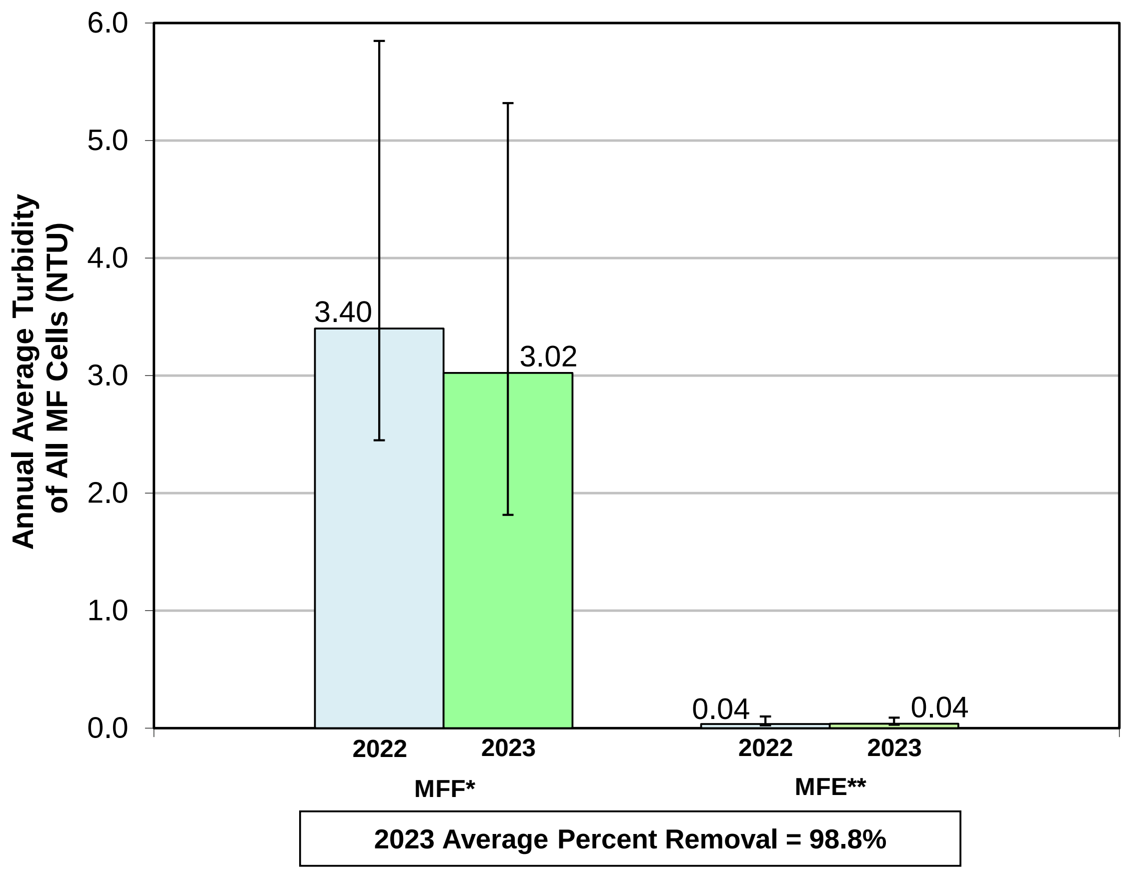
Month	Turbidity			
	MF Feed MFF[1]		MF Effluent MFE[1]	
	Avg. (NTU)	Max (NTU)	Avg. (NTU)	Max (NTU)
January	3.24	4.24	0.04	0.08
February	3.56	5.28	0.04	0.05
March	3.50	4.95	0.04	0.07
April	2.94	3.73	0.04	0.06
May	3.49	5.32	0.04	0.04
June	2.87	4.27	0.03	0.04
July	3.17	4.55	0.04	0.05
August	2.52	3.62	0.04	0.09
September	2.45	3.69	0.03	0.03
October	2.53	3.23	0.03	0.04
November	2.67	3.17	0.04	0.05
December	3.33	5.12	0.03	0.04
Annual Average	3.02	---	0.04	---
Maximum	---	5.32	---	0.09
Average % Removal	98.8%			

[1] Based on daily average turbidity readings from MFF and MFE on-line turbidimeters. Values shown represent the monthly average for all MF cells. Daily average MFE turbidity readings from 12 individual analyzers (one per group of 4 MF cells) are used to determine the monthly average MFE turbidity.

The daily average MFF turbidity ranged from 1.82 to 5.32 NTU based on daily averages of on-line turbidimeter readings taken upstream of the MF process. The annual average on-line MFF turbidity was 3.02 NTU in 2023. The OC San Plant 1 original AS1 plant (Project P1-82 or P1 AS1) and the newer AS2 plant (Project No. P1-102 or P1 AS2) have operated in the NdN mode achieving nitrification and partial denitrification since 2009 and 2012, respectively; because of these operational changes at Plant 1, low MFF turbidity has been reliably achieved, demonstrating the benefits of biological NdN.

The daily average MFE turbidity during 2023 ranged from 0.03 to 0.09 NTU, with an annual average turbidity of 0.04 NTU based on on-line turbidimeter readings taken from 12 MFE turbidimeters (one per bank of four MF cells).

On an annual average basis, the MFF turbidity of 3.02 NTU was consistently reduced through the MF process to an MFE turbidity of 0.04 NTU, which is equivalent to a 98.8% reduction (See Table 2-5, Figure 2-12, and Appendix D). The maximum MFE turbidity reading of 0.09 NTU was reached on a single day (August 30), demonstrating membrane integrity, i.e., the MFE turbidity was consistently less than 0.2 NTU throughout 2023. The elevated MFE turbidity reading on August 30 may have been associated with the planned AWPF low production/shutdown period in late August; MFE turbidity readings on before and after the one-day elevated reading were unremarkable.



* MFF on-line turbidimeter results
**MFE on-line turbidimeter results
Note: Black bars represent the range in daily average turbidity for the years shown.

Figure 2-12. 2023 MF Turbidity Removal Performance

Figure 2-12 presents the annual average turbidity reduction achieved by the MF system in 2023 and compares it with the MF system performance during 2022. Overall, the average turbidity removal rate of 98.8% in 2023 was essentially the same as the 98.9% removal rate in 2022.

Continuous MFF and MFE turbidity readings, plus daily MF PDT results are critical control points and compliance with those critical limits supports the pathogen reduction by the MF process. (See Appendix E, Figures E-3 and E-4 for MFF and MFE turbidity, respectively). Corresponding daily average PDT results for all cells confirm MF membrane integrity based on pressure decay results were within the target range throughout 2023. OCWD tracks the daily PDT results for each MF cell to recognize trends and confirm membrane integrity.

OCWD Operations staff continued to follow the PDT retesting protocol that began in July 2022, which consists of the following steps for all MF cells (polypropylene [PP] and polyvinylidene difluoride [PVDF] membranes):

- Retest cells that yield abnormally high PDT results typically above 0.50 psi/min, except for cells that have incrementally increased over time and require continuous investigative efforts and corrective maintenance (e.g., pinning, air scour hose replacements or valve adjustments);
- Any cell that yields a calculated LRV value below 4.00-log must undergo a retest and successfully pass prior to being placed back into service;
- If a second test is performed and failed, the cell remains out of service until a full clean-in-place (CIP) can be completed;
- Due to varying membrane ages, Operations staff has the option to place cells into fixed filtration/production rates to temper elevated transmembrane pressures (TMPs). As flow rate is part of the calculated LRV value, Operations staff can manually set fixed filtration reductions as low as 2,400 gpm to achieve a passing LRV (greater than 4.00-log);
- If a cell passes its LRV (greater than 4.00-log) at a reduced filtration rate, it must continue to operate at that fixed rate until the next daily programmed PDT can take place and a new LRV value is calculated.

During 2023, the PDT retesting protocol commonly resolved an MF cell's low daily LRV test result. MF cells that were unable to achieve the PDT value necessary for an LRV calculation of at least 4.00-log for *Giardia* cysts or *Cryptosporidium* oocysts were taken out of service until the issue had been corrected. The PDT retesting protocol appeared to help control the MF operational issues commonly encountered during cold winter months. In addition, Operations staff could switch struggling cells from automatic to reduced manual fixed filtration rates to enable them to demonstrate higher LRV values.

2.2.3.3 RO System Pathogen Log Reduction Monitoring

The RO process receives a nominal pathogen log reduction credit of 2-log each for *Giardia* cysts, *Cryptosporidium* oocysts, and enteric virus, based on a tiered monitoring conducted in accordance with the OOP to determine the actual daily credit achieved (OCWD and DDB Engineering, Inc., 2022). Three tiers are approved under the GWRS permit (RWQCB, 2022a) to demonstrate pathogen reduction credits for the RO process:

- Tier 1 is based on a grab or on-line strontium, sulfate, or adenosine triphosphate (ATP) measurements of the bulk (common header) ROF and ROP from each RO unit. This methodology was not implemented in 2023.
- Tier 2 is based on continuous on-line TOC measurements of the bulk ROF and bulk ROP. Tier 2 was used throughout 2023 and details about the methodology are provided below.
- Tier 3 is based on continuous on-line EC measurements of the bulk ROF and ROP from each RO unit. Tier 3 is generally a backup approach if TOC readings are unavailable.

In 2023, OCWD continued to use Tier 2 as the primary means to demonstrate pathogen reduction credit, with Tier 3 used to supplement and confirm Tier 2 results. Under Tier 2, the RO process performance for pathogen reduction is measured using TOC removal; this methodology uses on-line TOC as a surrogate for RO membrane integrity and pathogen reduction. TOC removal as a continuous indicator of membrane integrity in 2023 compared on-line ROF and ROP TOC data. (See also critical control points discussion in Section 2.3.2 and Appendix E, Figure E-8 for ROP TOC results.)

Two redundant on-line TOC analyzers (one duty and one standby) continuously monitor the bulk (common header) ROF flow stream, providing full redundancy; likewise, two redundant on-line TOC analyzers (one duty and one standby) continuously monitor the bulk (common header) ROP flow stream, providing full redundancy. Minimum, maximum, and average results are recorded daily along with the calculated average percent daily TOC removal. Monthly reports are submitted to DDW and the RWQCB documenting the daily pathogen log reduction values achieved by the RO process (See also Appendix D for copies of the monthly reports).

The three-stage RO process is designed to remove inorganic and organic compounds as well as bacteria and virus pathogens, producing up to 130 MGD of product water at a recovery rate of approximately 85%. Monthly performance data for the RO process in 2023 for key constituents, EC and TOC, are summarized in Table 2-6. Regarding salinity removal in 2023, the bulk ROF EC averaged 2,106 µS/cm, and the bulk ROP EC averaged 48 µS/cm based on semi-weekly grab samples. This represents an average salinity removal rate for the RO process of 97.7% during 2023.

Table 2-6. 2023 RO Performance

Month	Electrical Conductivity[1,2] RO Feed ROF[4] Avg. (µS/cm)	Electrical Conductivity[1,2] RO Feed ROF[4] Max. (µS/cm)	Electrical Conductivity[1,2] RO Product ROP[4] Avg. (µS/cm)	Electrical Conductivity[1,2] RO Product ROP[4] Max. (µS/cm)	Total Organic Carbon[3] RO Feed ROF Avg. (mg/L)	Total Organic Carbon[3] RO Feed ROF Max. (mg/L)	Total Organic Carbon[3] RO Product ROP Avg. (mg/L)	Total Organic Carbon[3] RO Product ROP Max. (mg/L)
January	2,332	2,660	51	62	7.33	9.58	0.08	0.24
February	2,303	2,410	50	54	8.03	8.70	0.06	0.11
March	1,746	2,000	34	39	8.21	9.17	0.06	0.08
April	1,964	2,210	36	53	7.64	8.02	0.06	0.17
May	2,234	2,320	52	56	7.58	8.87	0.06	0.12
June	2,253	2,350	54	54	7.15	7.51	0.06	0.11
July	2,270	2,360	61	65	7.08	7.53	0.07	0.13
August	1,795	2,460	46	68	7.29	7.87	0.07	0.10
September	1,568	1,620	33	39	7.37	8.00	0.07	0.14
October	2,102	2,410	52	62	6.91	8.37	0.07	0.14
November	2,368	2,540	60	69	6.81	7.07	0.07	0.11
December	2,275	2,370	48	51	7.17	7.75	0.05	0.16
Annual Average	2,106	---	48	---	7.38	---	0.07	---
Maximum	---	2,660	---	69	---	9.58	---	0.24
Average % Removal	97.7%				99.1%			

[1] Electrical Conductivity (EC) data for RO are not normalized with respect to ROF pressure or temperature

[2] EC semi-weekly grab sample results

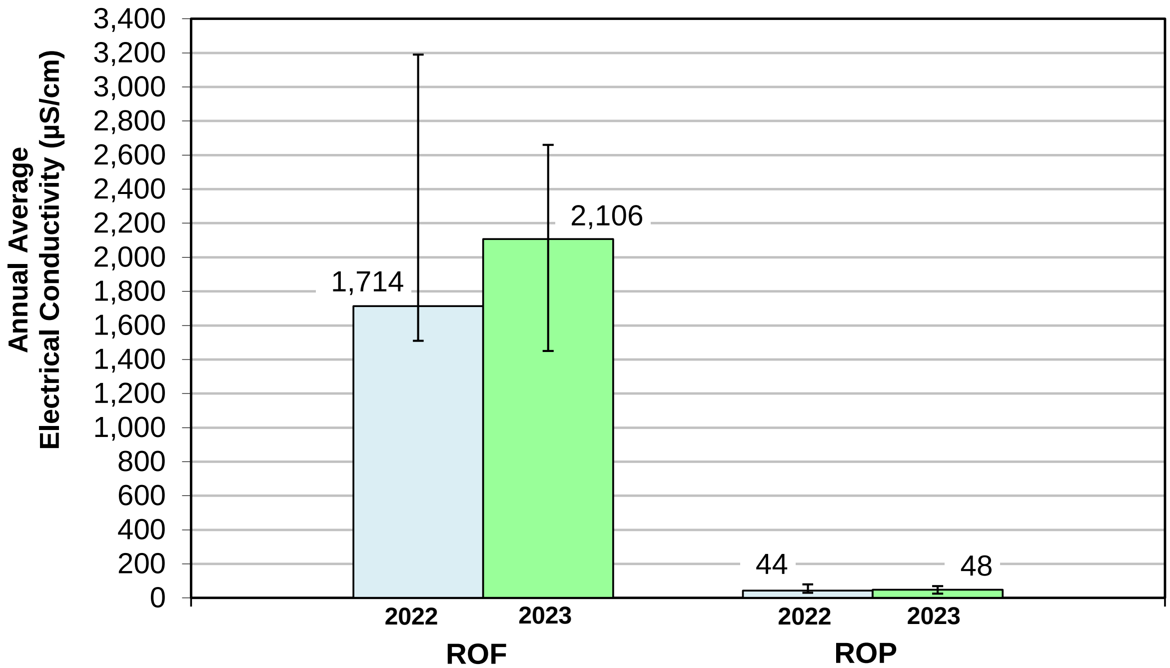
[3] TOC daily grab sample results

[4] Lower EC due to less P2 TF/SC effluent to AWPF source water in March, August, and September.

Figure 2-13 presents the 2023 annual average EC reduction performance of the RO system and compares it with the RO system's average EC reduction the previous year. As indicated by the black bars, the ROF EC increased to 2,660 µS/cm on January 18, due to the volume of higher salinity P2 TF/SC effluent blended with the AWPF source water (16% of the AWPF source water). The annual average EC reduction was effectively the same in 2023 and 2022 at 97.7% and 97.4%, respectively.

Figure 2-14 presents the annual average TOC removal performance of the RO system, comparing 2022 and 2023 laboratory-analyzed composite sample results. The average TOC removal of 99.1% in 2023 was essentially identical to the 99.0% average TOC removal rate achieved in 2022. In general, this TOC removal performance indicates rejection rates remained constant over this period.

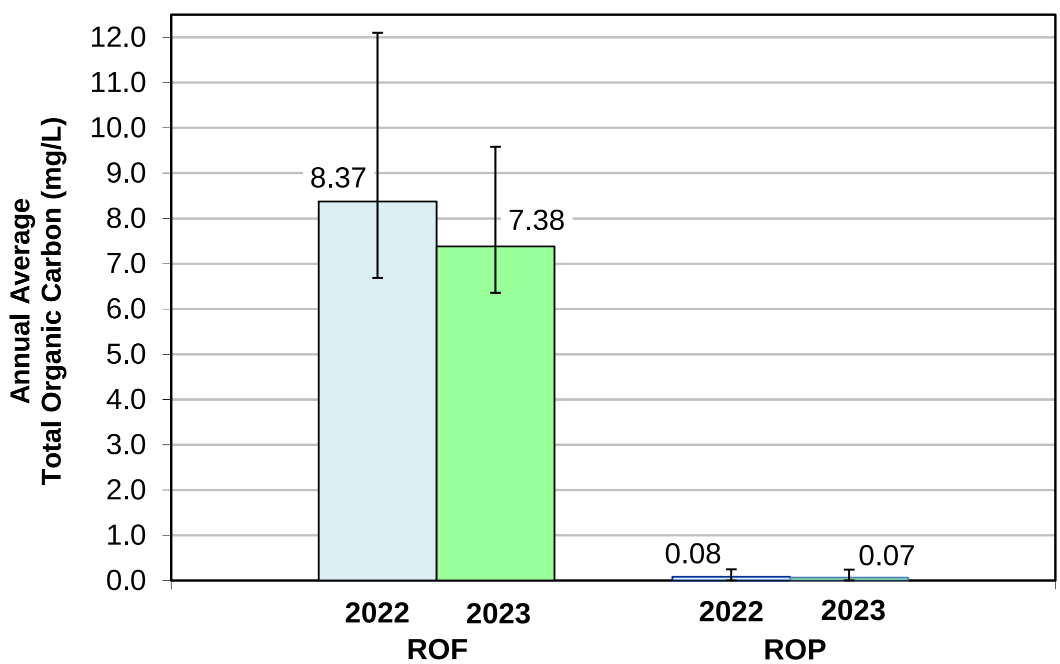
The TOC concentration in the ROF based on daily composite samples averaged 7.38 mg/L in 2023, which is lower than the 8.37 mg/L average observed in 2022. The ROF TOC concentration range in 2023 (6.36 to 9.58 mg/L) was more narrow than in the prior year (6.69 to 12.10 mg/L) as shown by the vertical black bars on Figure 2-14. Throughout 2023, the ROP TOC concentration was consistently below the 0.5 mg/L permit limit (20-week running average and 4-sample running



2023 Average Percent Removal = 97.7%

Note: Black bars represent the range in individual grab samples for the years shown.

Figure 2-13. 2023 RO Electrical Conductivity Removal Performance



2023 Average Percent Removal = 99.1%

Note: Black bars represent the range in individual grab samples for the years shown.
Daily RO LRV compliance uses on-line RO TOC data (not grab sample data). See Section 2.2.3.3.

Figure 2-14. 2023 RO Total Organic Carbon Removal Performance

average, assessed at FPW). Available operating records are indicative of the dependable performance of the RO system in 2023. The TOC concentration in the ROP based on daily composite samples averaged 0.07 mg/L during 2023, ranging from less than the 0.05 mg/L RDL (non-detectable) to 0.24 mg/L (January 11); for comparison, on-line ROP TOC average reading on January 11 was 0.04 mg/L.

Figure 2-15 shows the daily average on-line ROF and ROP TOC results in 2023. The outlier daily average on-line ROF TOC reading of 4.8 mg/L on August 9 was uncorroborated by the grab sample result on that date which showed the ROF TOC concentration was 7.8 mg/L; reasons for the discrepancy were not apparent. Furthermore, the daily average on-line ROP TOC on August 9 was 0.06 mg/L, which was the same as the monthly average on-line ROP TOC in August 2023.

It is interesting to observe an increasing trend in the daily average on-line ROF TOC occurred between late February and mid-March 2023. The increased on-line ROF TOC concentrations appeared to correlate with the absence of P2 TF/SC effluent in the AWPF Q1 feedwater during that period (See Figure 2-6), during which time on-line ROF TOC concentrations were more comparable to 2022 concentrations when only P1 effluent was available. Later a minor increase in daily average on-line ROF TOC readings occurred in September through October 2023 when P2 TF/SC effluent was again unavailable. A review of the AWPF influent (Q1) TOC results based on daily composite and weekly grab samples showed seasonal differences, with winter average concentrations (9.5 mg/L) being greater than summer average concentrations (8.9 mg/L). With that in mind, the daily average on-line ROF TOC trends may have been impacted by seasonality as well as P2 TF/SC effluent availability.

Figure 2-16 illustrates the minimum daily average pathogen LRVs achieved by the RO process based on TOC monitoring in 2023 as reported to DDW and the RWQCB; Appendix D includes monthly pathogen reduction reports in 2023. The annual daily average demonstrated pathogen LRV by the RO process in 2023 was 2.19-log. The maximum daily pathogen LRV demonstrated by the RO process was 2.43-log on February 25, 2023.

The daily pathogen log reduction values demonstrated by the RO process during 2023 were equal to or greater than 2.00-log based on on-line TOC readings, except for five values:

- 1.97-log reduction on May 15, 2023
- 1.77-log reduction on August 30, 2023
- 1.99-log reduction on October 27, October 31, and November 8, 2023.

A review of the 1.97-log pathogen LRV on May 15, 2023, revealed that the daily average bulk ROP TOC concentration (0.155 mg/L) was affected by a brief ROP TOC spike (See Appendix D, p. D-45). While the ROF TOC concentration was somewhat above average, the elevated ROP TOC level

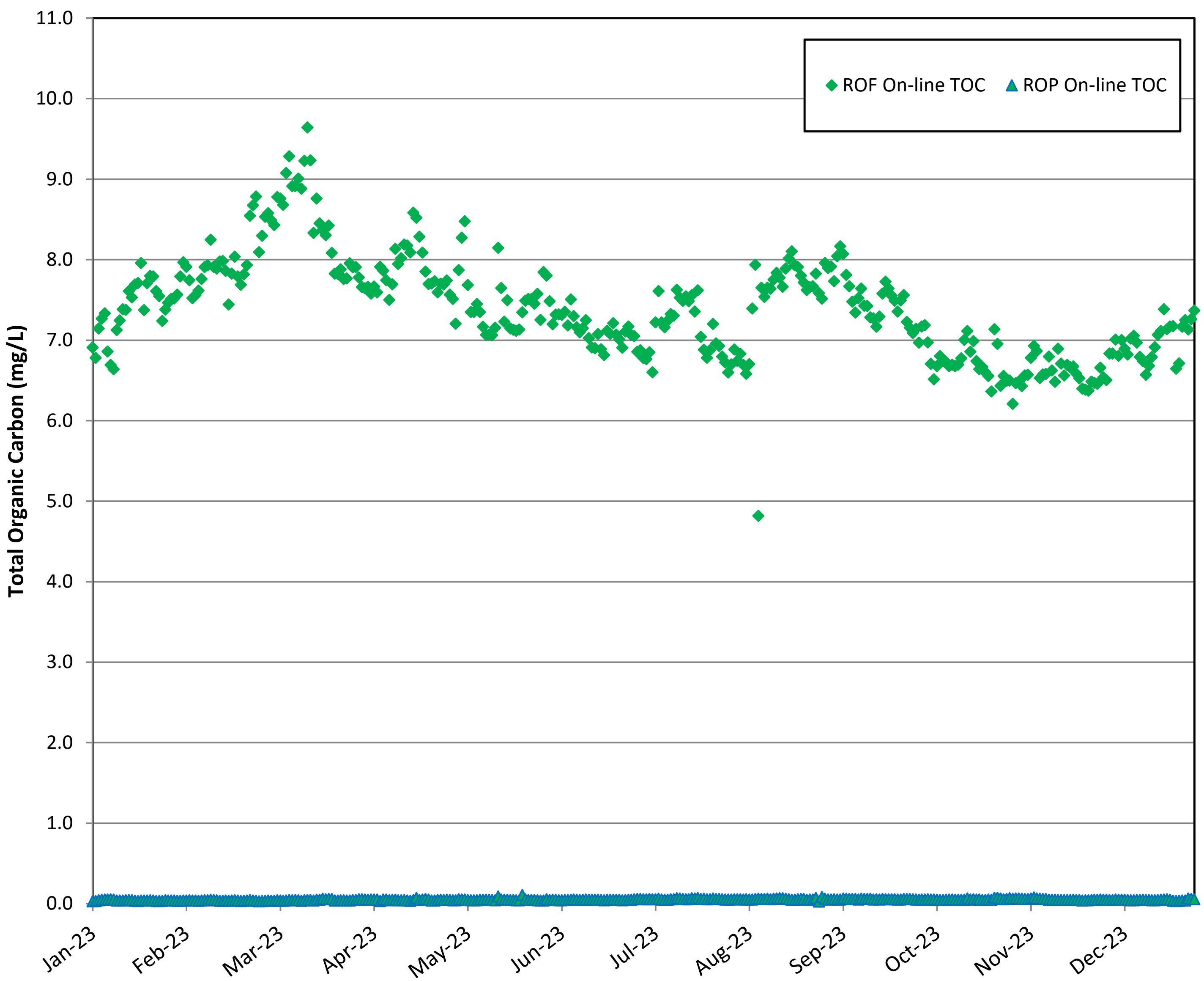


Figure 2-15. TOC Reduction Achieved by the RO Process in 2023

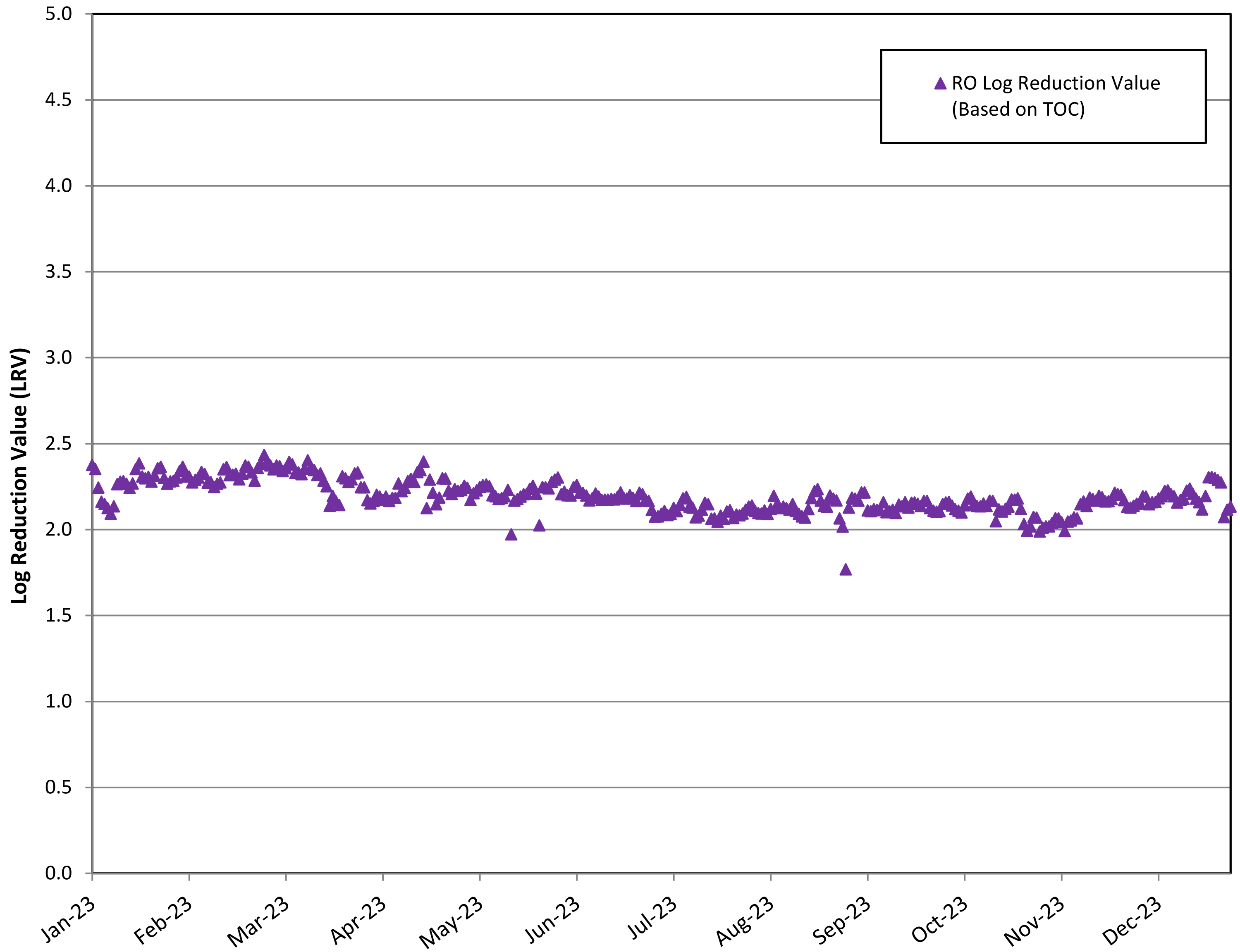


Figure 2-16. RO Log Reduction Values in 2023: *Giardia* Cysts, *Cryptosporidium* Oocysts, and Virus

lasted for approximately 8 hours on May 15-16 and reached as high as 0.176 mg/L. Grab samples identified a slight increase in acetone during this event. Investigations showed that the AWPF was operating normally with no production changes and OC San confirmed no other potentially relevant activities as possible contributors to the event.

The 1.77-log LRV achieved by the RO process on August 30, 2023, occurred after restarting the AWPF following a scheduled shutdown. A sulfuric acid leak into the bulk ROF stream during the outage caused the ROF pH to drop below 2.0, which affected the RO system upon restart, resulting in multiple unit failures and elevated ROP TOC and EC levels. During startup, cycling of RO units and low pH passing through the system contributed to fluctuations in water quality and elevated TOC values. The bulk ROP TOC exceeded the target 0.1 mg/L for 252 minutes, reaching a maximum concentration of 0.296 mg/L (Appendix D, p. D-67 and D-72). The faulty sulfuric acid valve was repaired and Operations staff issued a directive to secure all bulk storage tank valves to avoid similar startup issues in the future.

The reported daily pathogen reduction values of 1.99-log for the RO process on October 27 and 31 and November 8, 2023, appear to be unrelated to any TOC analyzer stability issues, abnormal ROF or ROP readings, or operational changes.

2.2.3.4 UV/AOP Pathogen Log Reduction Monitoring

The UV/AOP system receives up to 6-log pathogen log reduction credits each for *Giardia* cysts, *Cryptosporidium* oocysts, and enteric virus in accordance with the OOP (OCWD and DDB Engineering, Inc., 2022). The on-line UV transmittance analyzer and ballast power level are used to verify the 6-log pathogen removal. The GWRS permit (RWQCB, 2022a) requires the UV/AOP achieve an adenovirus reduction equivalent dose (RED) of at least 300 mJ/cm^2 to receive a daily LRV credit of 6-log. By continuously monitoring critical control points, a UV transmittance of at least 95% combined with a minimum UV power level of 74 kW per train ensures that a minimum EED of 0.31 kWh/kgal achieves the required 6-log pathogen reduction. The UV/AOP validation completed by OCWD in December 2022 found that the 300 mJ/cm^2 adenovirus RED is achieved at a minimum EED of 0.08 kWh/kgal. By maintaining a higher EED of 0.31 kWh/kgal, the required adenovirus RED is always met and exceeded.

The UV/AOP system continuously monitors UV transmittance, UV train power levels, calculated EED, and UV dose which are all critical control points (See Section 2.3.2 and Appendix E, Figures E-9, E-10, E-11, and E-12). The pathogen reduction credits achieved by the UV/AOP process are based on these critical control points with the approval of DDW. Following start-up of the GWRSFE, results of the UV/AOP validation study performed on December 27-28, 2022, were approved by DDW on October 10, 2023, to establish the updated required UV/AOP setpoints for pathogen reduction credit (DDW, 2023). Prior to October 10, 2023, the minimum EED required for 6-log virus reduction credit was 0.23 kWh/kgal; beginning October 10, 2023, the minimum EED requirement for 6-log virus reduction credit is 0.31 kWh/kgal.

Operating records for January 1 through October 9, 2023 show that the daily average calculated EED ranged from 0.256 to 0.575 kWh/kgal, which is greater than the minimum EED of 0.23 kWh/kgal for virus reduction approved by DDW for the UV/AOP system for that period (prior to October 10, 2023). From October 10 through December 31, 2023, operating records show that the daily average calculated EED ranged from 0.331 to 0.372 kWh/kgal, which is greater than the minimum EED of 0.31 kWh/kgal for 6-log virus reduction approved by DDW for the UV/AOP system.

The daily average on-line UV transmittance (%UVT) values during 2023 were well above the minimum 95% target.

The on-line UV train power throughout 2023 was greater than the minimum critical limit of 74 kW for each operational UV train. Individual UV trains were secured periodically for maintenance. The overall UV system average power level during 2023 was between 80.3 and 101.5 kW, which is well above the critical limit of 74 kW. Furthermore, the UV train power target, in addition to the %UVT, are used to ensure that each train meets the minimum 111 mJ/cm^2 required for disinfection. Throughout 2023, the calculated UV dose for each train and the UV system overall was always more than two times the minimum UV dose of 111 mJ/cm^2. The average calculated UV dose reached as high as 530 mJ/cm^2 on August 29 when the AWPF production was purposely reduced to less than 5 MGD and three UV trains were on-line. Overall, the minimum daily UV dose for all UV trains during 2023 was 279 mJ/cm^2, and the average daily calculated UV dose for all UV trains during 2023 was 336 mJ/cm^2.

On this basis, the UV/AOP system demonstrated ample disinfection and can be credited for 6-log reduction of *Giardia* cysts, *Cryptosporidium* oocysts, and viruses throughout 2023. Figure 2-17 illustrates the daily LRV credits achieved by the UV/AOP system in 2023.

2.2.4 CEC Monitoring and Compliance with SWRCB Recycled Water Policy

The SWRCB adopted an updated *Water Quality Control Policy for Recycled Water* in 2018 (aka Recycled Water Policy) (SWRCB, 2018). The RWQCB included the same SWRCB Recycled Water Policy requirements in the GWRS permit that was issued in December 2022 (RWQCB, 2022a).

The Recycled Water Policy requires submittal of a Quality Assurance Project Plan (QAPP) for review and approval by the SWRCB and RWQCB. The SWRCB approved the initial OCWD QAPP in June 2021, with the exception of the Aryl Hydrocarbon Receptor (AhR) bioassay (SWRCB, 2021a). At that time, the laboratory for AhR analysis listed in the OCWD's approved 2021 QAPP for the Recycled Water Policy had not yet secured method approval. In the meantime, the

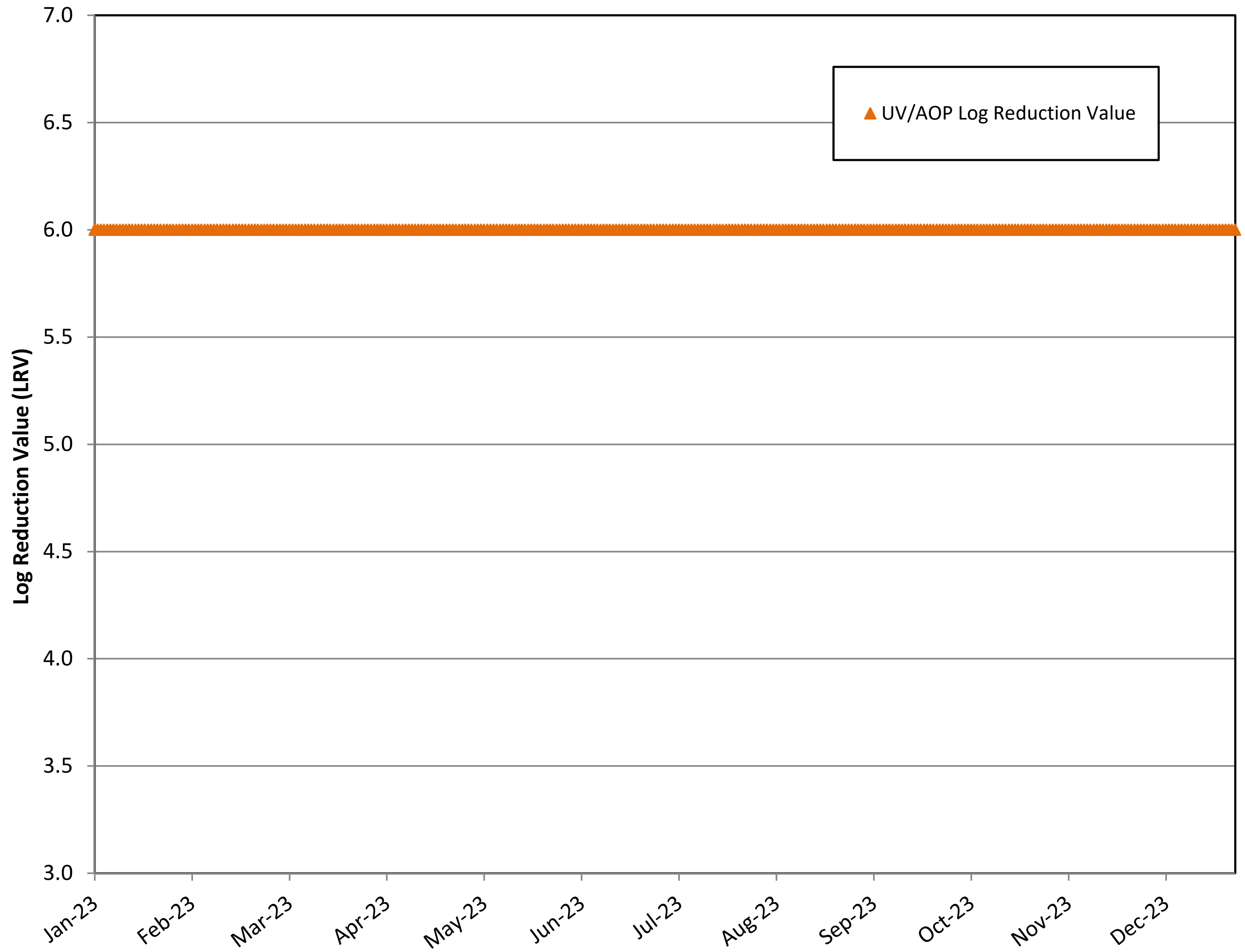


Figure 2-17. UV/AOP Log Reduction Values in 2023: *Giardia* Cysts, *Cryptosporidium* Oocysts and Virus

SWRCB approved the OCWD in-house laboratory methods for several analytes for purpose of monitoring outlined in the Recycled Water Policy, namely 1,4-dioxane, NDMA, NMOR, sucralose, and sulfamethoxazole (SWRCB, 2021b-d).

After evaluating other laboratories approved by the SWRCB Division of Water Quality, OCWD updated the QAPP in 2023 to add a second laboratory option for both required bioanalytical screening tools, estrogen receptor α (ER-a) and AhR. The updated QAPP also revised the methodology for PFOS and PFOA analysis. The updated QAPP was approved by the SWRCB on October 11, 2023 (SWRCB, 2023).

Initial phase quarterly monitoring of CECs and surrogates was conducted per the approved QAPP and GWRS permit monitoring and reporting requirements (RWQCB, 2022a) beginning in July 2021 and continuing through 2023 as follows:

- CECs (relevance/indicator type shown in parentheses)
    - 1,4-Dioxane (health) in ROF*, ROP*, and FPW;
    - NDMA (health and performance) in ROF, ROP*, UVP*, and FPW;
    - Perfluorooctane sulfonate (PFOS) (health) in ROF*, ROP*, and FPW;
    - Perfluorooctanoic acid (PFOA) (health) in ROF*, ROP*, and FPW;
    - N-nitrosomorpholine (NMOR) (health) in ROF*, ROP*, and FPW;
    - Sucralose (performance) in ROF, ROP*, and FPW; and
    - Sulfamethoxazole (performance) in ROF, ROP*, and FPW.
- Surrogates for CECs
    - Electrical conductivity (EC) in ROF, ROP, and FPW; and
    - Total Organic Carbon (TOC) in ROF, ROP, UVP*, and FPW.
- Bioanalytical screening tools
    - ER-a in FPW;
    - AhR in FPW.

* Monitoring location not required for CEC monitoring in the GWRS permit (RWQCB, 2022a). Location is monitored voluntarily.

Table 2-7 summarizes the monitoring requirements for subsurface injection projects (i.e., those using RO and AOP advanced treatment) and presents the results for GWRS in 2023.

Table 2-7. Summary of CEC and Surrogate Monitoring for GWRS in 2023

Constituent	Constituent Group	Relevance/Indicator Type		Required Reporting Limit	RDL	Units	ROF		ROP		UVP		FPW		Removal Percentages (%)			
		Health	Performance[1]				No. Of Samples	Average[2]	No. Of Samples	Average[2]	No. Of Samples	Average[2]	No. Of Samples	Average[2]	Average	Minimum	Maximum	Target[3]
CECs to be monitored[3]																		
Groundwater Recharge Reuse - Subsurface Applications																		
1,4-Dioxane	Industrial chemical	✓		0.5[4]	0.5	µg/L	58*	0.6*	58*	<0.5*	54*	<0.5*	28	<0.5	91.5%*	0.0%*	95.5%*	N/A
NDMA[5]	Disinfection byproduct	✓	✓	2	2	ng/L	56	18.1	56	6.0	52	<2	56	0.7	98.9%	80.0%	99.5%	>80%
NMOR	Industrial chemical	✓		2	2	ng/L	56*	21.5*	56*	<2*	52*	<2*	56	<2	99.1%*	80.0%*	99.9%*	N/A
PFOS	Consumer/industrial chemical	✓		6.5	2	ng/L	4*	9.6*	4*	<2*	na	na	4	<2	97.9%*	97.8%*	98.1%*	N/A
PFOA	Consumer/industrial chemical	✓		7	2	ng/L	4*	14.6*	4*	<2*	na	na	4	<2	98.6%*	97.5%*	99.3%*	N/A
Sucralose[6]	Food additive		✓	100	1000 (ROF) 100 (ROP/FPW)	ng/L	4	67,500	4	<100	na	na	4	<100	100.0%	100.0%	100.0%	>90%
Sulfamethoxazole[6]	Antibiotic		✓	10	10 (ROF) 1 (ROP/FPW)	ng/L	4	688	4	<1	na	na	4	<1	100.0%	100.0%	100.0%	>90%
Surrogates to be monitored[3]																		
Groundwater Recharge Reuse - Subsurface Applications																		
Electrical Conductivity (EC)[7,8]				N/A	1	µm/cm	363	2,106	55	48	na	na	363	111	94.7%	90.8%	97.3%	>90%
Total Organic Carbon (TOC)[7,8]				N/A	0.05	mg/L	377	7.38	366	0.07	2	0.14	156	0.07	99.1%	97.3%	99.9%	>90%
Bioanalytical Screening Tools for CECs																		
Groundwater Recharge Reuse - Subsurface Applications																		
Estrogen receptor-α[9]				0.5	0.5	ng/L	na	na	na	na	na	na	9	<0.5	N/A	N/A	N/A	N/A
Aryl hydrocarbon receptor (AhR)[10]				0.5	0.5	ng/L	na	na	na	na	na	na	7	<0.5	N/A	N/A	N/A	N/A

[1] Results shown for initial assessment monitoring phase and may be refined for subsequent monitoring phases.

[2] Average of all available 2023 data based on using 10% of the RDL for non-detectable readings unless noted otherwise.

[3] GWRS compliance with the 2018 Recycled Water Policy is based on monitoring and reporting requirements for subsurface application (SWRCB, 2018) and Order No. R8-2022-0050 (RWQCB, 2022a).

[4] Recycled Water Policy required reporting limit is 0.1 µg/L. A higher reporting may be approved, as long as the ratio between the reporting limit and the monitoring trigger limit of 0.1 µg/L is no less than two. A reporting limit of 0.5 µg/L has been approved for GWRS.

[5] Percent removals for NDMA shown for ROF to UVP.

[6] Percentage removals for sucralose and sulfamethoxazole shown for ROF to ROP.

[7] Based on grab sample results. On-line measurements are also taken and available results are reported in Appendix E.

[8] Percent removals for EC and TOC shown for ROF to FPW.

[9] Estrogen receptor-α results shown as the required bioanalytical equivalent concentration (BEQ) of agonist 17-beta Estradiol measured in ng/L. The Monitoring Trigger Level (MTL) is 3.5 ng/L The calculated BEQ/MTL ratio is less than the 0.15 threshold that would require a response action.

[10] Aryl hydrocarbon receptor (AhR) results shown as the required bioanalytical equivalent concentration (BEQ) of agonist 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) measured in ng/L. The Monitoring Trigger Level (MTL) is 0.5 ng/L. The calculated BEQ/MTL ratio is less than the 1.0 threshold that would require a response

* Monitoring location not required for CEC monitoring in the GWRS permit (RWQCB, 2022a). Location is monitored voluntarily.

na = Not analyzed

N/A = Not applicable

2.3 Performance and Operational Record

The overall performance and operational record of the AWPF are summarized below in terms of general operating records, including start/restart issues, downtimes, operator certifications, compliance with critical control points, and focused studies to optimize performance and increase water production.

Appendix F includes a list of OCWD operators with their grades of certification as well as summaries of equipment calibration records for 2023. As of December 2023, OCWD had approximately 60 water production staff, of which 24 are certified operators; four operators have the highest wastewater certification level (WWTP V), more than half of the operators have drinking water treatment certifications (T-1 through T-4), and two operators have advanced water treatment certifications (AWT-3). The Chief Plant Operator and the Operations Manager are both certified AWT-3 operators. Additionally, OCWD is phasing in the permit requirement for additional California-Nevada Section of the Advanced Water Works Association/California Water Environment Association advanced water treatment operator (AWTO) certifications for some operators (RWQCB, 2022a). By December 1, 2025, the permit specifies that the Chief Plant Operator have an AWT-5 certification and that each operational shift be staffed by an AWT-3 or higher certified operator. OCWD tracks the expiration dates for all certified operators to ensure certifications are maintained. The AWPF control room is staffed 24 hours per day, 7 days per week.

Appendix F also contains records of the cross-connection control and product water protection inspections that occurred at the AWPF in 2023. The purpose of this inspection program is to prevent bypass treatment and reversal of flow into the AWPF's product water lines. Inspections are completed by an independent Backflow Prevention Device Tester certified by the Orange County Health Care Agency (OCHA). The main connection to the City of Fountain Valley potable supply, which feeds a tank via an air gap connection and is used to supply industrial water to the AWPF, contains a double check assembly which is visually inspected yearly and tested every four years per City of Fountain Valley requirements. Onsite backflow devices at the AWPF are tested annually. If the annual inspection finds any repairs are required, they are completed and documented, then the backflow devices are retested.

2.3.1 General Operational Performance

The AWPF continued to successfully operate and produce purified recycled water for groundwater recharge through 2023. The original AWPF began operation on January 10, 2008, with a 70 MGD design production capacity, following a rigorous commissioning and acceptance testing period. The GWRSIE began operation on May 21, 2015, first enabling the AWPF to produce up to 85 MGD and later up to 100 MGD of purified recycled water; final acceptance and completion of the GWRSIE construction project followed on July 31, 2015. Construction of the GWRSFE began in late 2019 and continued through 2022 with commissioning of the new facilities on December 5-6, 2022 and UV/AOP validation testing conducted on December 27-28, 2022. The expanded AWPF began normal operation with P2 TF/SC effluent as part of the source water blend on December 12, 2022, producing up to 130 MGD of purified recycled water for recharge.

The AWPF was on-line 361 days in 2023 (98.9% of the year). Table 2-8 summarizes the AWPF off-line events during 2023. Appendix F contains detailed descriptions of all plant shutdowns in 2023.

Table 2-8. Summary of AWPF Shutdowns in 2023

Start Date and Time	Duration (hours)	Cause
4/6/2023 at 0709 hours	7.60	Unplanned shutdown due to a communication failure in the ROP cabinet
4/17/2023 at 1447 hours	23.68	Unplanned shutdown due to low flow detection in all RO units' 3rd stages that required investigation
5/31/2023 at 0525 hours	13.4	Planned shutdown for annual medium voltage testing
6/1/2023 at 0915 hours	3.45	Unplanned shutdown due to multiple process alarms pertaining to loss of communication and equipment failures at GWRS Pipeline valve vaults
8/29/2023 at 0820 hours	35.25	Planned shutdown for (1) coordination with Orange County 405 partners construction work (relocation of GWRS Pipeline fiber optics), (2) replacement of flow meter on waste line to Ellis Interplant sewer, and (3) replacement of ROP/Decarbonation bypass valve actuator
10/26/2023 at 0627 hours	10.35	Unplanned shutdown due to pipe break in plant water supply piping (from OC San P1) that feeds the influent screening facility spray wash water
11/8/2023 at 0755 hours	1.75	Planned shutdown for DDW pre-inspection test run that required demonstration of shutdown alarms
11/13/2023 at 1445 hours	1.43	Planned shutdown for GWRSFE DDW inspection that required demonstration of shutdown alarms
12/29/2023 at 0155 hours	3.80	Unplanned shutdown due to unscheduled power outage

2.3.2 Critical Control Points

Operation of the AWPF involves performance monitoring at multiple points or steps along the entire treatment process. This performance monitoring enables the operators to track how the system is doing at each step and gives them ample time to take corrective actions if necessary. Such performance monitoring ensures that the purified recycled water is safe, complies with regulatory requirements, and may be recharged and/or reused.

Critical control points and critical limits are shown in Table 2-9, as well as important process monitoring and control criteria used to operate the AWPF. Developed over time, the critical control points and critical limits were originally identified in the OOP (OMMP in 2008) and later modified in 2015-2016 with review and oversight by the Independent Advisory Panel ([Panel] NWRI, 2017). At the request of the Panel and in compliance with the groundwater recharge regulations (CCR, 2018), PDT results were added as an indicator of MF membrane integrity. Since 2017 and in response to new requirements from DDW (DDW, 2017), some critical control points and critical limits have been adapted to demonstrate daily pathogen log reduction values for compliance with the groundwater recharge regulations (CCR, 2018). OCWD submitted an updated OOP to DDW in 2018 (OCWD, 2018) documenting the criteria for pathogen log reduction values and adding electrical energy dose (EED) as an indicator of UV/AOP performance. In November 2022 OCWD submitted an updated OOP for the GWRSFE to DDW (OCWD and DDB Engineering, Inc., 2022). Results of the GWRSFE UV/AOP validation test conducted in December 2022 revised the minimum EED and increased the target hydrogen peroxide dose. Evaluation of operating records for each critical control point with respect to the associated critical limit provides an indication of performance during the year.

Appendix E contains plots of data from the AWPF PCS showing how the AWPF operation compared with the critical limits listed above during 2023. Except for PDT monitoring and hydrogen peroxide dosage, the critical control point readings are from continuous on-line analyzers rather than sampling and laboratory analyses. PDT readings are taken daily at each MF cell; hydrogen peroxide dosage is checked once per operator shift. The plots in Appendix E are based on daily averages of the continuous data recorded at least every 15 minutes. Exceedance of a critical control point triggers alarms in the AWPF PCS for the operators to take corrective actions if a limit is exceeded. The critical control points and corresponding critical limits are used for operating the AWPF and were not historically used for permit compliance. However, in order to comply with Title 22 regulations (CCR, 2018) and current RWQCB permit (RWQCB, 2022a), some critical control points have been adopted for demonstrating pathogen LRVs by each unit process; this is described in Sections 2.2.3.2 (MF), 2.2.3.3 (RO), and 2.2.3.4 (UV/AOP).

Table 2-9. Summary of Critical Control Points and Critical Limits

Parameter		Flow Stream or Process	Target Operating Range
1.	Combined Chlorine Residual	MFF (bulk)	3 to 5 mg/L
2.	Combined Chlorine Residual	ROF (bulk)	< 5 mg/L
3.	Turbidity	MFF (bulk)	< 5 NTU optimum ≤ 20 NTU for membrane warranty > 20 NTU for no more than 4 hours < 50 NTU at all times
4.	Turbidity	MFE (half MF train)[1]	< 0.15 NTU optimum > 0.20 NTU for no more than 72 minutes within 24 hours < 0.5 NTU at all times
5.	Turbidity	ROP (bulk)	0.01 to 0.15 NTU
6.	Transmembrane Pressure (TMP)	MF (cell)[2]	3 to 12.5 psi
7.	Pressure Decay Test (PDT)[3] based on daily testing	MF (cell)[2]	LRV calculation from PDT result ≤ 4.00 LRV triggers shutdown of cell and work order to be issued
8.	Electrical Conductivity (EC)	ROP (unit)[4]	< 90 µS/cm < 100 µS/cm for individual units
9.	Total Organic Carbon (TOC)	ROP (bulk)	< 0.1 mg/L
10.	Hydrogen Peroxide (H_2O_2) Dose	UV/AOP Feed (bulk)	≥ 4 mg/L
11.	UV Transmittance (UVT)	UV/AOP Feed (bulk)	95% minimum (at 254 nanometers)
12.	Electrical Energy Dose (EED)	UV/AOP Feed (train)[6]	0.31 kWh/kgal minimum[5]
13.	Average UV Train Power	UV/AOP (train)[6]	74 kW per train minimum[7]
14.	pH	FPW	< 9.0 units at all times <8.5 units as daily average

[1] A half-train is four MF cells. The GWRS has 12 half-train turbidimeters for 48 MF cells.
[2] TMP and PDT are assessed on each of the 48 MF cells.
[3] PDT is also known as Membrane Integrity Testing (MIT).
[4] EC is measured on the interstage and effluent of each of the 27 RO units. RO Trains F-I have full per stage EC monitoring capabilities. RO Trains A-E have been retrofitted to monitor EC per stage in an indirect fashion, from a stream corresponding to a set of vessels in each stage, which is representative of the entire stage.
[5] EED is used to demonstrate compliance with 6-log virus reduction for each UV train. It is calculated based on the UV train power and UV train flow as follows: $\mathbf{EED_{Train} = (Power_{Train} / Q_{Train}) \times 16.667}$

Where: EED_{Train} = Electrical Energy Dose to a given train in units of kWh/kgal
$Power_{Train}$ = Train power in units of kW
Q_{Train} = Train flow in units of gpm
16.667 = Conversion factor equal to (1000 gal/kgal) ÷ (60 min/hr)

[6] EED and train power are assessed on each of the 16 UV Trains.
[7] Low-low alarm ensures the 300 mJ/cm^2 adenovirus RED requirement will be met at all times, with a significant safety factor. At a maximum flow per UV train of 8.75 MGD, equivalent to 6,076 gpm, automatic train shutdown will occur at an EED of 0.16 kWh/kgal. This is much greater than the required automatic shutdown trigger of 0.08 kWh/kgal. The equation relating train power to EED is above.

2.3.3 MF System Operation and Performance

2.3.3.1 MF System Facilities

MF removes suspended and colloidal solids, including bacteria and protozoa, and serves as a pretreatment step before the RO process. Screened secondary effluent flows by gravity to below-grade MF cells, pictured on Figure 2-18. From 2015 through September 2018, the MF system featured a total of 36 submerged MF cells containing polypropylene hollow-fiber membranes with a nominal pore size of 0.2 micrometers (microns). Polyvinylidene difluoride (PVDF) hollow fiber membranes were installed in two of the 36 MF cells to assess their performance for use in the GWRSFE: Cell E04 PVDF membranes with a nominal pore size of 0.1 microns in September 2018, and Cell E03 PVDF membranes with a nominal pore size of 0.04 microns in January 2019. In September 2022 as part of the GWRSFE construction, two existing polypropylene cells (E01 and E02) were replaced with 0.04-micron PVDF membranes. Beginning in October 2022, 12 additional MF cells with PVDF hollow fiber membranes and nominal pore sizes of 0.04 microns were commissioned as part of the GWRSFE and placed into operation (Cells E05 through E08 and F01 through F08). This resulted in the entire Train E and F portion of the MF facility containing cells with PVDF membranes. Also in October 2022, Cell E04 was replaced with a 0.04 micron PVDF membrane to match the other cells in Trains E and F. With completion of the GWRSFE, the entire MF system operated with a total of 48 cells divided into six trains, each with eight cells containing 684 in-basin submerged membrane elements per cell. Of the total MF system, four trains (Trains A through D, 32 cells) featured polypropylene membranes and two trains (Trains E and F, 16 cells) featured PVDF membranes in 2023.

Figure 2-18. MF System

Filtrate pumps, operating in a vacuum mode, continuously pull water through the MF membranes using a piping manifold and discharge the filtrate, or MF effluent, to the MF Break Tank. The maximum rated filtrate production capacity of the MF system is 162.2 MGD with one cell out of service or in backwash. The design average filtrate production capacity of the MF system is 153 MGD based on 89% recovery to account for backwashing and clean-in-place (CIP) cycles and to enable the RO system to produce 130 MGD of ROP. The MF cells with polypropylene membranes are regularly backwashed using filtrate from the MF using citric acid and sodium hydroxide with a proprietary chemical to remove foulants and restore membrane performance. The MF cells with PVDF membranes are periodically cleaned-in-place using sodium hypochlorite and citric acid with maintenance washes. Waste backwash is returned to OC San Plant 1 for treatment. MF CIP spent cleaning solutions are sent to OC San Plant 2.

2.3.3.2 MF System Operation

The MF system operated well during 2023 and produced exceptional MF effluent (MFE) water quality that was fully compliant with Title 22 water recycling criteria. Various cells were temporarily taken off-line for normal membrane integrity testing (aka PDT), preventive maintenance on valves and instruments, and CIP procedures. Some temporary cell downtimes were required to investigate and correct elevated PDT values, adjust valves, repair piping, and resolve instrument communication issues.

Factors used to calculate MF process LRVs include flow rate, pressure/resistance, water temperature/viscosity, and PDT. In 2023, lower LRV issues generally occurred with specific cells with higher-than-normal PDTs. Investigations found LRV issues were related to valve seating issues, and corrective actions were taken to return the cell to service. Cells with older membranes tended to experience LRV issues that were resolved by replacing their membranes; for example, MF Train D's polypropylene membranes installed in 2016-2017 were replaced between March and June 2023, and MF Cell E03's older (2019) PVDF membranes were replaced in November 2023.

Table 2-10 lists the MF membrane types and installation dates as of the end of 2023.

Table 2-10. Summary of MF Membrane Types and Installation Dates as of December 31, 2023

MF Train[1]	MF Cell(s)	Membrane Type[2]	Installation Date
A	A01 – A02	Memcor/Dupont Polypropylene	December 2022
	A03 – A04	Memcor/Dupont Polypropylene	November 2022
	A05 - A06	Memcor/Dupont Polypropylene	February 2023
	A07 – A08	Memcor/Dupont Polypropylene	January 2023
B	B01 – B08	Memcor/Dupont Polypropylene	September 2021—March 2022
C	C01 – C08	Memcor/Dupont Polypropylene	November 2020 – March 2021

Continued

MF Train[1]	MF Cell(s)	Membrane Type[2]	Installation Date
D	D01 – D02	Memcor/Dupont Polypropylene	April 2023
	D03 - D04	Memcor/Dupont Polypropylene	March 2023
	D05 – D06	Memcor/Dupont Polypropylene	May 2023
	D07 – D08	Memcor/Dupont Polypropylene	June 2023
E	E01[1]	Memcor/Dupont PVDF	September 2022
	E02[1]	Memcor/Dupont PVDF	September 2022
	E03	Memcor/Dupont PVDF	November 2023
	E04	Memcor/Dupont PVDF	October 2022
	E05 – E08	Memcor/Dupont PVDF	October 2022
F	F01 – F08	Memcor/Dupont PVDF	November 2022

[1] MF Cells E01 and E02 Evoqua polypropylene membranes were replaced with Memcor/Dupont PVDF membranes in the GWRSFE.

2.3.4 RO System Operation and Performance

The RO process demineralizes water and removes inorganics, organics, viruses, and a wide range of other contaminants using spiral-wound, thin-film composite polyamide membranes. The RO system performed well during 2023. Beginning in mid-2015 and continuing through 2023, the three-stage RO system operated at an ROF pH of 6.9 and recovery rate of 85%.

2.3.4.1 RO System Facilities

MF effluent is pumped from the MF Break Tank to the RO system by the RO Transfer Pump Station. The RO process features pretreatment chemical addition using sulfuric acid and antiscalant (threshold inhibitor), cartridge filtration, and high-pressure feed pumps that supply the pressure vessels containing the RO membranes. Immediately upstream of the RO system are 16 cartridge filters using 10-micron filters. The RO system features 27 units (26 duty units and one standby unit), each rated at 5 MGD permeate capacity, and arranged in nine trains.

Shown on Figure 2-19, each RO unit consists of 150 pressure vessels arranged in three banks (stages). The original 15 RO units (Trains A-E) are configured in a 78:48:24 array; the six GWRSIE RO units (Trains F-G) are configured in a 77:49:24 array with turbocharger energy recovery devices (ERDs) that also provide interstage flux balancing and monitoring capabilities. The six GWRSFE RO units (Trains H-I) are configured in a 77:49:24 array. As part of the GWRSFE, interstage booster pumps were installed on 21 RO units (Trains A-E and H-I). At a design recovery rate of 85%, the total nominal rated permeate capacity of the RO system is 130 MGD. Concentrate (i.e., reject) from the RO process is sent to the OC San ocean outfall for disposal. The RO system would be bypassed during a peak wet weather SAR discharge event.

Figure 2-19. RO System

Table 2-11 lists the RO trains, units, membrane types, and dates installed in the RO system. Five RO units' membranes were replaced in 2023: B03, C03, D03, F01, and F02. Highlights of the RO system operation in 2023 are discussed below.

Table 2-11. RO System Membrane Types and Installation Dates

RO Train[1,2]	RO Unit	Membrane Type[3]	Installation Date
A	A01	LG Chemical	October 2018
	A02	LG Chemical	October 2018
	A03	LG Chemical	October 2018
B	B01	Dupont-Filmtec BW30XFRLE	October 2020
	B02	Dupont-FilmTec BW30XFRLE	May 2022
	B03	Dupont-FilmTec BW30XFRLE	January 2023
C	C01	Dupont-FilmTec BW30XFRLE	October 2020
	C02	Dupont-FilmTec BW30XFRLE	April 2022
	C03	Dupont-FilmTec BW30XFRLE	January 2023
D	D01	Dupont-FilmTec BW30XFRLE	October 2020
	D02	Dupont-FilmTec BW30XFRLE	April 2022
	D03	Dupont-FilmTec BW30XFRLE	March 2023
E	E01	Hydranautics ESPA2-LD	March 2017
	E02	Hydranautics ESPA2-LD	March 2017
	E03	Hydranautics ESPA2-LD	March 2017
F	F01	Dupont-FilmTec BW30XFRLE	December 2023
	F02	Dupont-FilmTec BW30XFRLE	December 2023
	F03	Dupont-FilmTec XFRLE-400	April 2015
G	G01	Dupont-FilmTec XFRLE-400	May 2015
	G02	Dupont-FilmTec XFRLE-400	May 2015
	G03	Dupont-FilmTec XFRLE-400	May 2015
H	H01	Dupont FilmTec BW30XFRLE	September 2022
	H02	Dupont FilmTec BW30XFRLE	September 2022
	H03	Dupont FilmTec BW30XFRLE	September 2022
I	I01	Dupont-FilmTec BW30XFRLE	September 2022
	I02	Dupont-FilmTec BW30XFRLE	September 2022
	I03	Dupont-FilmTec BW30XFRLE	September 2022

[1] Trains F and G have ERDs. Trains A through E and Trains H and I do not have ERDs.
[2] Trains A through E and Trains H and I have interstage booster pumps. Trains F and G do not have interstage booster pumps.
[3] Thin Film Composite Polyamide RO Membranes.

2.3.5 Ultraviolet/Advanced Oxidation Process Operation and Performance

The UV/AOP (hydrogen peroxide advanced oxidation and UV light exposure) system performance is demonstrated by the UVP results as compared with those in the UV/AOP influent, or feed water stream (UVF).

2.3.5.1 UV/AOP System Facilities

The UV/AOP system consists of two steps: hydrogen peroxide addition and UV light treatment. UV light exposure is used for primary disinfection and for photolysis of UV light-sensitive contaminants such as N-nitrosodimethylamine (NDMA). Hydrogen peroxide exposed to UV light produces hydroxyl radicals that result in an advanced oxidation process to destroy UV-resistant contaminants such as 1,4-dioxane. The closed, in-vessel type UV system utilizes low-pressure high-output lamps. The UV system is arranged with 16 trains. Each train contains six reactors and has a rated maximum capacity of 8.75 MGD for a total of 140 MGD capacity with all trains in service. Figure 2-20 shows a photo of two UV trains.

Figure 2-20. UV/AOP System

2.3.5.2 UV/AOP System Operation

The UV/AOP system currently operates with a minimum 95% UVT, minimum EED of 0.31 kWh/kgal, and a hydrogen peroxide dose of 4 mg/L. UV/AOP compliance data are tracked through SCADA and compiled into monthly reports.

As a result of the DDW-approved UV/AOP validation tests, the minimum EED requirement was increased from 0.23 kWh/kgal to 0.31 kWh/kgal beginning October 10, 2023 (DDW, 2023). From January through early August, the UV/AOP System was operated at EED levels between 0.26 and 0.36 kWh/kgal. As discussed in Section 2.2.3.4, the UV/AOP system the UV/AOP System was operated at EED levels between 0.32 and 0.37 kWh/kgal from August 9 through December 2023, to achieve 6-log pathogen reduction.

Normally the hydrogen peroxide metering pumps operate in a two-duty, one-standby arrangement. Operations staff on each shift (i.e., twice daily) check the accuracy of the pump feed rates using calibration columns and manual pump drawdowns. Beginning on October 4, 2023, the minimum hydrogen peroxide dose was increased from 3 to 4 mg/L based on the UV/AOP validation tests that were conducted in December 2022 and approved by DDW in October 2023 (DDW, 2023).

The UV/AOP system operated well during 2023. Standby reactors came on-line when necessary. I&E staff were able to correct various issues, including replacing UV intensity sensors, ballasts, power supply to control panels, and UV lamps. One of the chiller pumps was replaced (Train F) and other chiller pump leak and air entrainment issues were resolved. Small leaks in the hydrogen peroxide feed system were also addressed. OCWD staff continued replacing UV lamps according to the normal preventive maintenance schedule (See Appendix F).

2.3.5.3 1,4-Dioxane Removal

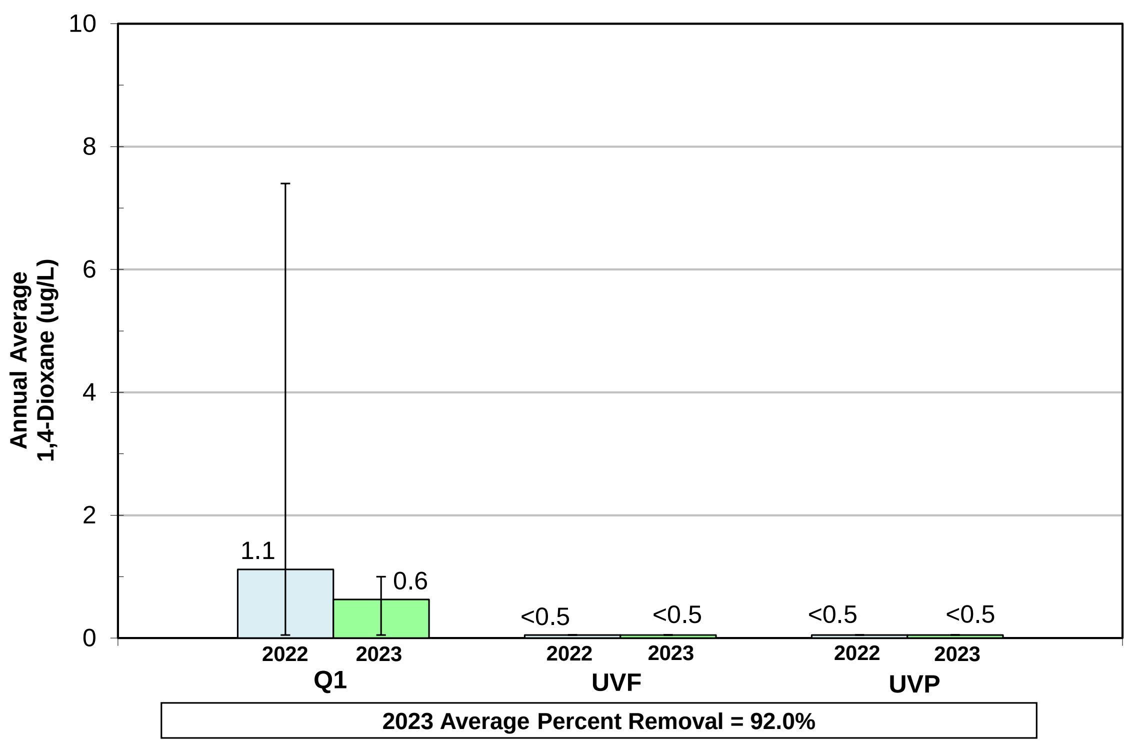
Performance of the UV/AOP system, as well as that of the RO system, can be measured based on removal of 1,4-dioxane. Table 2-12 and Figure 2-21 show how well 1,4-dioxane was removed by both the RO and UV/AOP processes. As was demonstrated in 2023, 1,4-dioxane was neither detected in UVF (after RO treatment) nor in UVP (after UV-AOP treatment). The RO/UV/AOP treatment processes removed 92.0% of the 1,4-dioxane in the AWPF source water, which was equivalent to 1.1-log reduction in 1,4-dioxane in 2023.

Table 2-12. 2023 RO/UV/AOP 1,4-Dioxane Removal Performance

Month	1,4 Dioxane					
	Secondary Effluent Q1		UV Influent UVF		UV Effluent UVP	
	Avg. [1] (µg/L)	Max. (µg/L)	Avg. [1] (µg/L)	Max. (µg/L)	Avg. [1] (µg/L)	Max. (µg/L)
January	0.7	0.7	<0.5	<0.5	<0.5	<0.5
February	0.7	0.8	<0.5	<0.5	<0.5	<0.5
March	0.2	0.5	<0.5	<0.5	<0.5	<0.5
April	0.4	0.8	<0.5	<0.5	<0.5	<0.5
May	0.6	0.7	<0.5	<0.5	<0.5	<0.5
June	0.7	0.9	<0.5	<0.5	<0.5	<0.5
July	0.7	0.8	<0.5	<0.5	<0.5	<0.5
August	0.6	0.6	<0.5	<0.5	<0.5	<0.5
September	0.7	0.9	<0.5	<0.5	<0.5	<0.5
October	0.8	1.0	<0.5	<0.5	<0.5	<0.5
November	0.7	0.7	<0.5	<0.5	<0.5	<0.5
December	0.7	0.9	<0.5	<0.5	<0.5	<0.5
Annual Average	0.6	---	<0.5	---	<0.5	---
Maximum	---	1.0	---	<0.5	---	<0.5
Average % Removal (RO/UV/AOP System) [2]	92.0%					
Average Log Removal (RO/UV/AOP System) [2]	1.1					

[1] Average of weekly grab samples. For purposes of calculating monthly averages, 10% of the Reportable Detection Limit (RDL) was used for all non-detect (ND) values. If all data for the month were ND, then the average is shown as "<RDL".

[2] Average % removal and log removal calculated based on non-detect (ND) = 10% of RDL.



Note: Black bars represent the range in individual weekly grab samples for the years shown.

Figure 2-21. 2023 RO/UV/AOP 1,4-Dioxane Removal Performance

2.3.5.4 NDMA Removal

In addition to disinfection and 1,4-dioxane removal, a key performance criterion for the UV/AOP system relates to destruction of NDMA as shown in Table 2-13 and illustrated on Figure 2-22. The 2023 average concentration of NDMA in the UVF was approximately 6.5 ng/L, based on weekly grab samples ranging from non-detect (<2) to 11.6 ng/L (using OCWD's in-house NDMA-LOW laboratory method with an RDL of 2 ng/L). UVF NDMA results reflect net effects of formation via MFF chlorine addition and partial removal via RO treatment. For comparison purposes, the average concentration of NDMA in the Q1 stream during 2023 was approximately 28.2 ng/L, ranging from non-detect (<2) to 63.4 ng/L.

All UVP NDMA results in 2023 were non-detect (<2 ng/L). Overall, comparison of the average UVF and UVP NDMA concentrations in 2023, the UV/AOP system attained an average NDMA removal rate of 96.9%, or a 1.5 log reduction if 10% of the detection limit is assigned to the non-detect values. The average NDMA removal rate from the AWPF source water (Q1) through the UV/AOP system (UVP) during 2023 was 99.3%, or a 2.2-log reduction (assigning 10% of the detection limit to non-detect values).

In 2023, all FPW NDMA results were below the DDW notification level for NDMA (10 ng/L). The highest NDMA concentration in the Q1 influent, 63.4 ng/L, occurred on August 25, 2023. The NDMA concentration in the FPW was non-detect (<2 ng/L) on that date. The UVP NDMA concentration on that day was also non-detect (<2 ng/L), demonstrating the efficacy of the UV/AOP process.

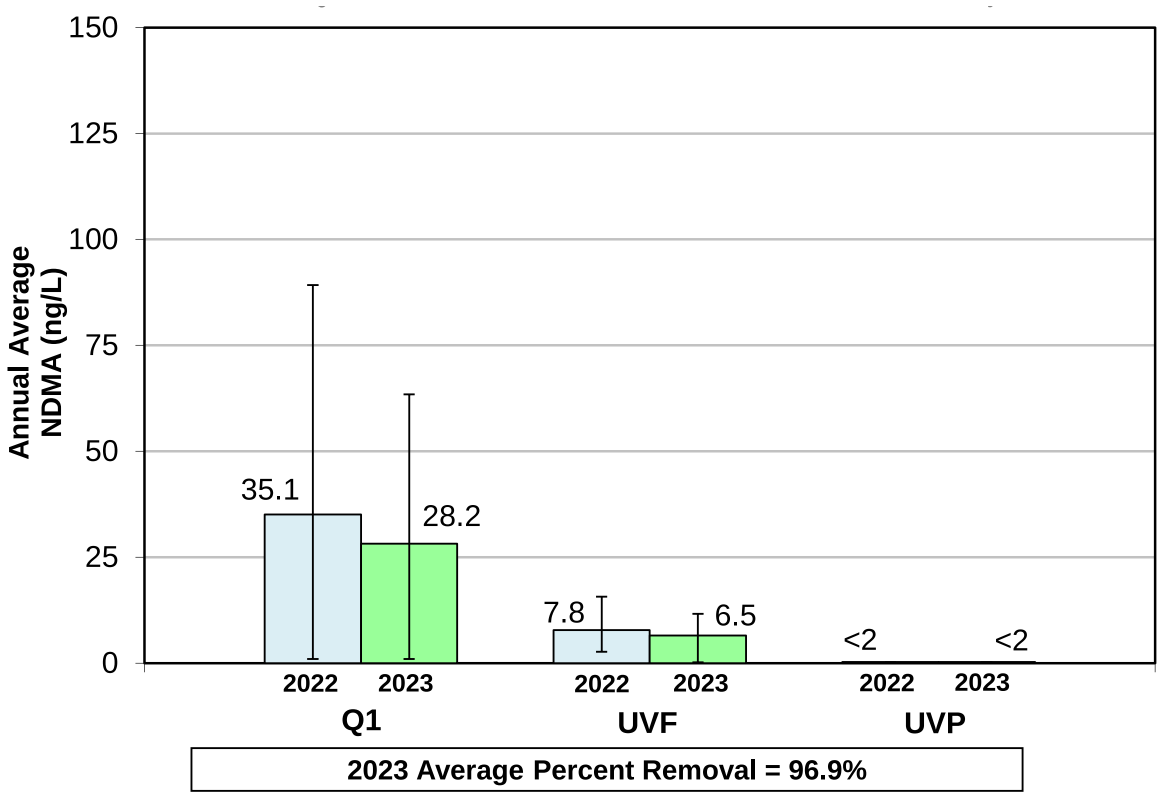
Comparing the available raw data for NDMA concentrations in FPW and UVP revealed that detectable levels were found more frequently in FPW than in UVP. For example, the highest daily concentration of NDMA in the FPW (3 ng/L) occurred on July 14, yet NDMA was non-detect in the UVP stream (<2 ng/L). Low concentrations of NDMA in the FPW, well below the DDW notification level (10 ng/L), were detected periodically throughout 2023, whereas UVP NDMA concentrations were consistently non-detect throughout the year. It is suspected that the slightly higher FPW values were due to NDMA rebound occurring after UV treatment in the post-treatment FPW stabilization processes.

Potential causes for rebound during post-treatment include reformation of NDMA from previously photolyzed NDMA and/or formation of "new" NDMA from precursor compounds, both of which are likely dependent on the combined chlorine (chloramine) concentration. Investigations by OCWD into this NDMA rebound have revealed that the lime used during post-treatment is not a likely source of NDMA or precursor material, but the increase in pH caused by the lime allows for greater formation of NDMA in the presence of combined chlorine and

Table 2-13. 2023 UV/AOP NDMA Removal Performance

Month	NDMA Secondary Effluent Q1 Avg.[1] (ng/L)	NDMA Secondary Effluent Q1 Max. (ng/L)	NDMA UV Influent UVF Avg.[1] (ng/L)	NDMA UV Influent UVF Max. (ng/L)	NDMA UV Effluent UVP Avg.[1] (ng/L)	NDMA UV Effluent UVP Max. (ng/L)
January	23.1	34.8	6.7	9.8	<2	<2
February	21.3	22.9	5.5	6.4	<2	<2
March	28.3	33.6	7.1	9.4	<2	<2
April	41.3	50.0	7.7	8.6	<2	<2
May	33.2	44.2	8.7	11.6	<2	<2
June	30.8	42.9	6.6	9.6	<2	<2
July	28.1	42.4	7.5	9.7	<2	<2
August	43.6	63.4	9.0	11.6	<2	<2
September	24.7	30.1	6.5	10.3	<2	<2
October	25.9	42.4	5.0	7.4	<2	<2
November	24.4	45.0	4.5	7.6	<2	<2
December	16.7	28.5	3.6	5.5	<2	<2
Annual Average	28.2	---	6.5	---	<2	---
Maximum	---	63.4	---	11.6	---	<2
Average % Removal (by UV/AOP)	96.9%					
Average Log Removal (by UV/AOP)	1.5					

[1] Average of weekly grab samples. For purposes of calculating monthly averages, 10% of the Reportable Detection Limit (RDL) was used for all non-detect (ND) values. If all data for the month were ND, then the average is shown as "< RDL".



Note: Black bars represent the range in individual weekly grab samples for the years shown.

Figure 2-22. 2023 UV/AOP NDMA Removal Performance precursors. Accordingly, the post-treatment pH target of 8.5 attempts to limit NDMA formation while also managing cement mortar-lined distribution pipeline stability and aquifer metals mobilization. It is also believed that removal of NDMA precursors may be a function of RO membrane age based on historic observations.

2.3.6 Decarbonation and Lime System Operation and Performance

Post-treatment systems include decarbonation and lime addition for pH adjustment and corrosivity control prior to recharging the finished product water. Post-treatment is required to stabilize the ROP stream because excess carbon dioxide builds up through the RO system due to the lower ROF pH. The excess carbon dioxide and removal of alkalinity drives down the pH of the ROP water. To remove excess carbon dioxide, which remains through the closed UV/AOP process, a portion of UVP is sent to forced draft decarbonation towers. These towers are filled with plastic media and the water being treated is trickled down over the media while a counter-current fan blows air onto the water, off-gassing, or releasing the excess carbon dioxide and yielding decarbonated product water (DPW). To ensure that all carbon dioxide is not removed, a portion of the UVP is bypassed around the decarbonation process and then mixed with the DPW. Adjusting the percentage of UVP that is bypassed around the decarbonation process helps to control the FPW pH and alkalinity.

Figure 2-23 shows a decarbonation tower. The total design capacity of the decarbonation system with seven decarbonators is 78 MGD, allowing for part of the UV-disinfected purified water to be treated by the decarbonators and bypassing the remaining flow. Decarbonated water is blended with the bypassed flow prior to lime stabilization in the FPW channel.

Hydrated lime (in the form of calcium hydroxide) addition is the final post-treatment step, adding minerals back into the RO/UV/AOP-treated water in the form of calcium and alkalinity to help stabilize the FPW water, raise pH, and reduce its corrosivity. Figure 2-24 shows a photo of the lime system, which features lime storage silos, slaker mixing tanks, slurry aging tanks, pumps, and saturators that prepare and deliver a saturated lime solution to the FPW channels. The lime system employs gravimetric feeders (based on weight) to control the amount of lime delivered.

A Tekkem lime delivery system began operation in late 2014 replacing the original GWRS lime delivery system. The Tekkem system is gravimetric, meaning that it uses weight to ensure the correct lime slurry concentration is maintained. The lime system consists of several components including: bulk storage of hydrated lime in silos; screw feeders moving dry lime to slaker tanks where it is mixed with water before being transferred; slurry aging tanks with loop pumps that convey slurry to a dosing assembly that feeds the saturators; polymer feed system to control lime

Figure 2-23. Decarbonation System

Figure 2-24. Lime Post-Treatment System

particle carryover; and saturators acting as solids contact clarifiers to feed saturated lime solution to the FPW channel. Anionic polymer is added to the saturators as a coagulant aid to reduce lime particle carryover. Lime sludge is pumped to OC San's Ellis Avenue Interplant Sewer and conveyed to Plant 2 for treatment and disposal.

During 2023, OCWD continued to optimize flow patterns through the decarbonation towers and RO flush supply tanks to stabilize the DPW prior to introducing DPW to the lime stabilization process. Operation of the lime saturators is enhanced by using fully decarbonated DPW because decarbonation expels carbon dioxide which can cause excess calcium carbonate precipitation in the saturators. One RO flush supply tank (A01) receives fully decarbonated DPW and supplies DPW to the RO flush pumps, dilution water for hydrogen peroxide, and dilution water for all lime processes (slurry production, polymer dilution, and saturator dilution). The other RO flush supply tank (A02) receives a blend of decarbonated and bypassed flow. The RO flush tanks discharge to segregated, parallel FPW channels where their respective amounts of lime saturated water are added and mixed. These streams are then blended in the common FPW channel.

The decarbonation bypass flow rate is adjusted for continuous management of the FPW pH (i.e., more bypass decreases the FPW pH; less bypass increases the FPW pH). The lime dose is also reduced to control high FPW pH periods when the decarbonation bypass flow rate cannot be further decreased. The partially decarbonated bypass flow (from RO flush tank A02) is the primary variable used to maintain FPW pH stability; most of the lime-saturated water is added to the partially decarbonated bypass stream under normal operating conditions.

Adjustments to the ROP/decarbonation bypass flow were made from time to time during 2023 by changing the decarbonation tower feed valve settings; the purpose of these adjustments was to limit back pressure on the UV and RO processes while maintaining the FPW pH near the target pH of 8.5. The decarbonation bypass monthly average flow ranged from 75% to 90% of the AWPF production during 2023. The decarbonator feed valves were automatically adjusted to as low as 40% open in response to changes in AWPF production flows designated in the PCS by Operations; for example, production was reduced in March 2023 due to heavy rains, and from August to October 2023 due to lack of P2 TF/SC effluent availability for OC San's construction project. Adjustments to the decarbonator feed valves' settings in response to the AWPF production flows helps control FPW pH near the 8.5 target and balance backpressure on the RO process.

Following up on a decarbonation bypass valve issue that began in early 2022, a replacement actuator was installed in August 2023. One of the decarbonation bypass valves had experienced a water intrusion leak in its actuator resulting in erratic operation, causing it to be fixed in a 40.5% open position at times and then returning to normal modulating operation at other times. From January 2022 until August 2023, it was stuck in a fixed position, which required that other decarbonator bypass valves regulate the flow. A replacement actuator was delivered in

December 2022, but installation awaited the AWPF planned shutdown in August 2023. Since August 29, 2023, the decarbonization system has operated with all three bypass valves.

The lime dose averaged 26 mg/L in 2023, with brief intermittent reductions to as low as 19 mg/L for FPW pH control. The FPW pH was maintained between 7.4 and 8.4 based on grab samples, with an average of 8.0 in 2023. The daily average continuous on-line FPW pH ranged from 7.19 in May to 8.77 in August.

2.3.7 Purified Recycled Water Pumping Operation and Performance

Purified recycled water, or FPW, is conveyed by the Barrier Pump Station to the Talbert Barrier and by the Product Water Pump Station to K-M-M-L Basins, MBI Project, and non-potable uses. The Barrier Pump Station features four 600-horsepower pumps discharging FPW to the Talbert Barrier injection wells. The Product Water Pump Station features five 2,250-horsepower pumps discharging FPW to K-M-M-L Basins via the 13-mile GWRS Pipeline. Laterals from the GWRS Pipeline convey purified recycled water to the MBI Project and two non-potable water customers, Anaheim CPP and ARTIC. A third non-potable water customer, Anaheim Adventure Park, is located at Miraloma Basin. Both pump stations are housed in the building shown in Figure 2-25. Purified recycled water flows discharged to the Talbert Barrier, K-M-M-L Basins, MBI Project, Anaheim CPP, and ARTIC are metered, totalized, and recorded.

While the Product Water Pump Station and GWRS Pipeline performed well during 2023, an unexpected AWPF shutdown occurred on June 1 due to loss of communication and alarms at valve vaults 1, 2, and 3 along the pipeline. Upon inspection, evidence of tampering was found at vault #2 where the disconnect was depowered. Vandals attempted to steal copper wire from the control panels at vault #2, but were not completely successful. I&E staff and programmers were able to restore power and reset equipment for all three vaults, allowing normal FPW conveyance to resume.

Figure 2-25. Barrier and Product Water Pump Stations

2.4 One-Time RO and AOP Optimization Report

The GWRS permit (RWQCB, 2022a) requires completion of a one-time report describing optimization of the RO and AOP processes following the initial 12-months of operation of the GWRSFE. This report may be included in the GWRS Annual Report. This section summarizes the optimization of the RO and UV/AOP processes from December 12, 2022, when the GWRSFE came on-line, through December 11, 2023.

2.4.1 RO Optimization

The Title 22 GRRP Regulations require optimization of the RO process including:

- Ongoing performance monitoring of the RO process that indicates when the integrity of the process has been compromised;
- The effectiveness of the RO treatment in the first 12 months of GWRSFE operation;
- RO process failures, if any; and
- A description of actions taken in the event that ongoing performance monitoring indicates that process integrity is compromised.

As described in Section 2.2.3.3, the RO system is monitored continuously for both TOC and EC to demonstrate required pathogen reduction credits for the RO process. This continuous TOC and EC performance monitoring is also used to ensure process integrity. The 2023 continuous EC and TOC monitoring results for the ROP monitoring locations are shown in Figures E-7 and E-8 of Appendix E.

2.4.1.1 Bulk ROF and ROP TOC Optimization

Current (pre-GWRSFE) RO process TOC critical control limits for the GWRS are based on the control chart theory, which assumes that values falling within three standard deviations (3σ) of the mean of a dataset indicates a process is "in control". The probability of a single value falling outside the 3σ limit is 0.3% (Moore, 1995). If a series of values falls outside 3σ of the mean, the process is considered to no longer be in control (Bauman et al. 2006). Control chart theory as it applies to the GWRS ROP dataset was previously used to establish the current ROP TOC critical control limit 0.1 mg/L (OCWD, 2014).

Data from the first 12 months of GWRSFE operation (December 2022-December 2023) were exported from the redundant on-line TOC analyzers located on the bulk ROF stream and bulk ROP stream. Each analyzer records data every four minutes. The redundant analyzers generally operated within acceptable deviation ranges (<3%) in their respective readings throughout 2023. Occasional brief spikes of false high or low TOC readings were recorded. These false spikes, which generally are recorded on only a single four-minute reading between two otherwise normal values, are identified as false because they occur on one analyzer and not the second analyzer. An attempt was made to remove these false spikes from the dataset for the optimization exercise, because the purpose is to identify the performance of the analyzer during normal plant operation. Similarly, negative values were removed from the dataset. Negative values are generally recorded due to lack of fluid passing through the sensor or due to entrapped air; these values do not represent normal operation. Additionally, data from days when the AWPF was off-line (Table 2-8) were excluded. High TOC values often occur either during or after a plant shutdown due to the analyzers not receiving the full amount of flow as they would when the AWPF is in normal operation. As another data cleaning step, times when the instruments were in simulation mode were excluded. Simulation mode (SIM) is generally used for brief periods of less than a day when an instrument is undergoing calibration or maintenance.

Because there are 360 TOC values obtained from each of the on-line TOC sensors in a day during standard every 4-minute data collection, some values outside of the control limits are expected. Based on the nature of the RO process, one or two consecutive values outside the 3σ control limit is expected given the probability of such an occurrence based on random chance is 0.3% assuming a normal statistical distribution.

Statistical values for the validated ROP and ROF TOC datasets are summarized in Table 2-14. The redundant ROF and ROP TOC analyzers are noted as ROF1 and ROF2, and ROP1 and ROP2, respectively. The mean values of the two redundant ROF analyzers (7.309 and 7.534 mg/L for ROF1 and ROF2, respectively) are within a relative percent difference of 3%. This indicates, as previously noted, that the ROF analyzers operate within acceptable deviation of each other. The mean values of the two ROP analyzers (0.058 and 0.046 mg/L for ROP1 and ROP2, respectively) are within 23% relative percent difference of each other.

Table 2-14. Statistical Summary of ROF and ROP TOC Data During First Year of GWRSFE Operations

Dataset	Sample Size	Mean (mg/L)	Median (mg/L)	Standard Deviation (mg/L)	Min (mg/L)	Max (mg/L)	Skewness
ROF1 TOC	123,875	7.309	7.201	0.688	0.000	10.999	0.886
ROF2 TOC	124,849	7.534	7.447	0.689	3.869	11.180	0.731
ROP1 TOC	124,507	0.058	0.057	0.013	0.000	0.203	2.233
ROP2 TOC	126,317	0.046	0.045	0.017	0.000	0.190	1.707

Frequency histograms suggest the redundant GWRS ROF (Figure 2-26) datasets are both normally distributed, as well as that the distributions of the data generated by the redundant ROF analyzers are generally the same shape. Skewness measures whether the distribution of a dataset is symmetric around the mean. A skewness of 0 indicates a dataset that is perfectly symmetrical. A positive skewness indicates a dataset has a tail extending towards higher values. The skewness of both ROF TOC analyzers is close to zero but slightly positive (0.886 and 0.731 for ROF1 and ROF2, respectively), indicating a relatively symmetrical dataset with a slight positive tail.

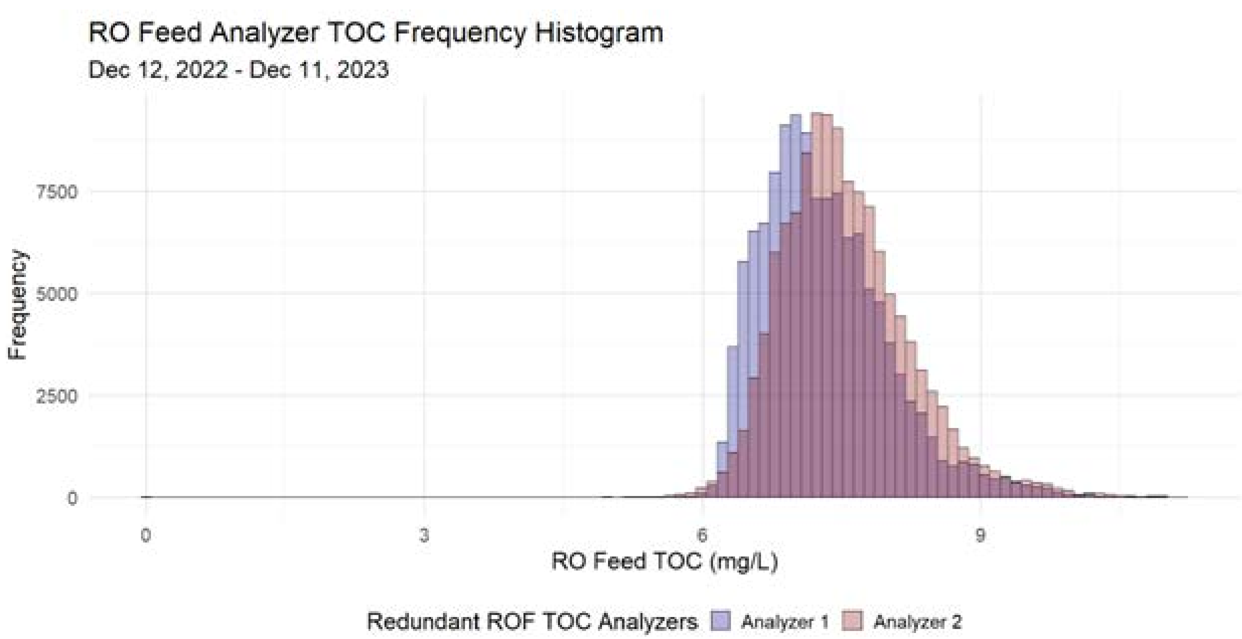


Figure 2-26. Reverse Osmosis Feed TOC Analyzer Frequency Histogram, December 2022-December 2023

The redundant GWRS ROP TOC datasets (Figure 2-27, top) both have a small positive skewness of 2.233 and 1.707 for ROP1 and ROP2, respectively. This positive skewness indicates the presence of positive outliers or TOC spikes in the dataset. Log-transforming the ROP TOC datasets results in a reduction of the skewness and a distribution that is more symmetrical, indicating the ROP TOC datasets are generally log-normal (Figure 2-27, bottom). Because log operation cannot be performed on a zero value, zeroes were removed from the log transformed ROP dataset. There were 122 and 82 zero values removed from the log-transformed ROP1 and ROP2 datasets, respectively. The skewness of the log-transformed datasets is 0.748 and 0.212 for ROP1 and ROP2, respectively.

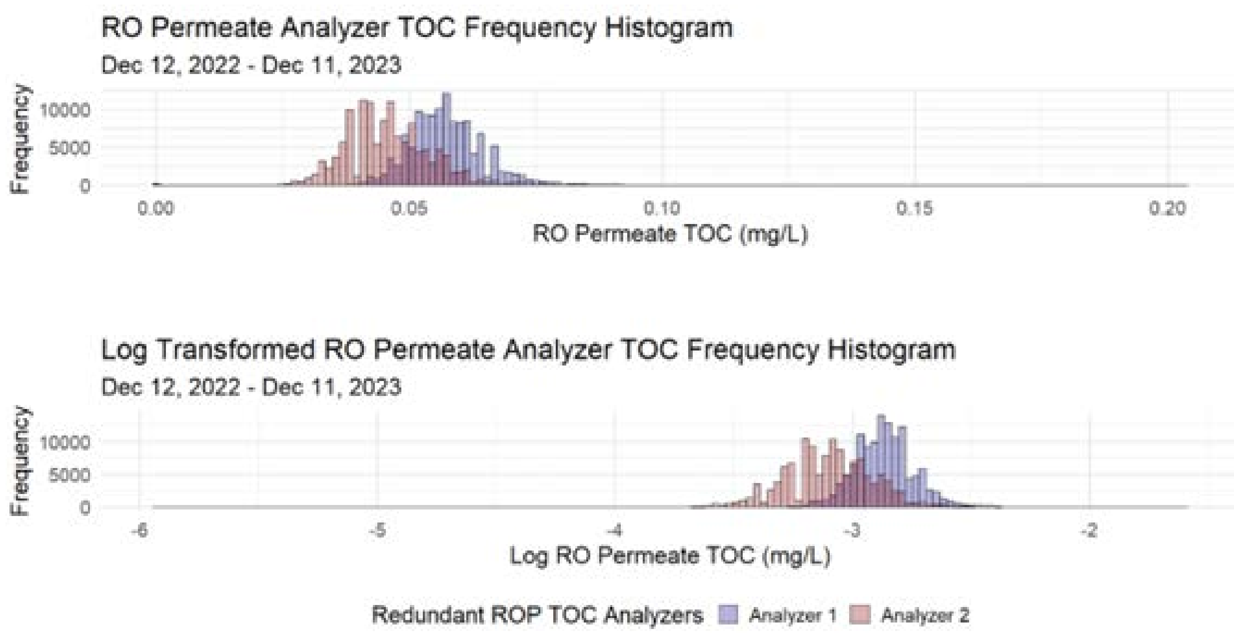


Figure 2-27. Reverse Osmosis Permeate TOC Analyzer Frequency Histogram (top) and Log-Transformed Frequency Histogram (bottom), December 2022-December 2023

As previously noted (OCWD, 2014), standard control charts assume a normal distribution. If data do not follow a normal distribution, as in the case of the ROP TOC dataset, then the control limits must be adapted to the new distribution type (Metodoloki, 2012). One way to correct for the abnormal distribution is to generate a representative random sample from the underlying dataset. To compare control limits generated via the original dataset, versus control limits generated using a representative random sample, the statistical programming package R was used to generate 15 random samples that were normally distributed around the mean of each dataset. Control limits were then calculated on both the original dataset as well as the random sample. The equation used to generate the control limits is provided in Equation 2.1.

Equation 2.1

$$CL = \mu \pm 3\sigma$$

Where:
CL = upper and lower control limit
μ = mean
σ = standard deviation

Table 2-15 provides a comparison of statistics calculated on the original RO TOC datasets versus random subsamples of each dataset. Control limits were calculated using Equation 2.1. Overall, statistics based on the subsamples were similar to the statistics for the original datasets, with the exception of skewness being reduced in the subsamples. The upper control limits for each of the subsamples were similar to the upper control limits generated using the larger datasets.

Table 2-15. GWRS ROF and ROP TOC Dataset and Sample Statistics and Calculated Control Limits

GWRS TOC Dataset	Sample Size	Mean (mg/L)	Variance	Skewness	Standard Deviation	Upper Control Limit [1]	Lower Control Limit[1]
ROF1 (all)	123,875	7.309	0.474	0.886	0.688	9.37	5.24
ROF1 (sample)	15	7.469	0.364	0.064	0.603	9.28	5.66
ROF2 (all)	124,849	7.534	0.475	0.731	0.689	9.60	5.47
ROF2 (sample)	15	7.436	0.455	0.216	0.675	9.46	5.41
ROP1 (all)	124,507	0.058	0.000	2.233	0.013	0.083	0.032
ROP1 (sample)	15	0.059	0.000	-0.089	0.010	0.090	0.029
ROP2 (all)	126,317	0.046	0.000	1.707	0.017	0.073	0.019
ROP2 (sample)	15	0.042	0.000	0.672	0.007	0.063	0.021

[1]ROF upper and lower thresholds are not formal Control Limits, but are instead intended to inform operator actions when ROP TOC is elevated. Similarly, the ROP lower control limit is only intended to trigger investigation of analyzer accuracy, not as a formal trigger for response actions.

Based on the above analysis, it is recommended that the ROP control limit be set at 0.019 and 0.090 mg/L. For the purpose of a practical application of these limits, these limits should be rounded to 0.02 and 0.1 mg/L. The proposed ROP upper control limit of 0.1 mg/L is the same limit used prior to the GWRSFE, indicating there was little change to the ROP TOC concentration before and after the Final Expansion. The purpose of the ROP lower control limit is to trigger investigation of analyzer accuracy, not as a formal trigger for response actions.

Consistent with current practice for the RO process at the GWRS AWPF, if the process surpasses these control limits for 15 consecutive points (i.e., one hour based on 4-minute on-line TOC reads), then the process needs to be closely observed. The first step operators take is to check the TOC level in the ROF analyzers. Based on the above analysis, a recommended normal range for the ROF analyzers following completion of the GWRSFE is between 5.2 and 9.6 mg/L. This upper range is slightly lower than the previous recommended value for the RO process of 11.0 mg/L, and may reflect lower TOC influent water from OC San Plant 2. During periods of time when only Plant 1 water is influent to the AWPF, the pre-GWRSFE ROF upper range of 11.0 mg/L should be considered.

If ROF TOC levels are within the normal range, operators would then check ROP EC (see next subsections). If EC values are larger than critical limits for specific RO trains, operators shall take an EC profile and take an RO sample to isolate and repair RO trains as necessary. If the ROP EC values are less than the critical limit, the next step would be to check the ROP TOC meter logs and calibration. If after doing so, ROP TOC values are still above 0.1 mg/L, on-line monitoring for ROF and ROP should be maintained. Operators should observe for shutdown criteria (i.e., more significantly elevated ROP TOC) and follow current shutdown protocol.

On-line ROF and ROP data from the December 2022-December 2023 analysis period were plotted against the proposed control limits (Figure 2-28 and Figure 2-29). The ROF dataset was generally observed to be within its normal range, other than during the period from late February into March of 2023 when the ROF TOC exceeded upper end. During this period, the AWPF was not accepting any influent from OC San Plant 2. Influent from OC San Plant 1 generally has higher TOC than influent from Plant 2. It is again therefore recommended that, during periods of time when only Plant 1 water is influent to the AWPF, the pre-GWRSFE ROF upper control limit of 11.0 mg/L be considered.

The ROP dataset also generally was observed to be within proposed control limits, with some brief concentration deviations above the upper limit that were not sustained long enough to trigger enhanced observation or investigation as described above. These short duration ROP concentration increases often coincide with operational activities such as new RO membranes coming on-line or AWPF shutdowns, but occasionally indicate true TOC increases. In the latter case when sustained for more than one hour, operators collect grab samples for organic contaminants and continue observing the TOC concentration for shutdown criteria.

These sustained TOC peaks occurred twice in 2024. The first event occurred on May 15 and lasted approximately eight hours, with ROP TOC concentrations peaking at 0.176 mg/L. The AWPF was otherwise operating normally, and OC San operators confirmed no potentially relevant activities at OC San P1 or P2 contributing to the event. Samples were collected by operators and lab results found a slight increase in acetone concentration. The second event occurred on August 30 and was associated with a planned AWPF shutdown. The event, which lasted approximately four hours and resulted in a peak ROP TOC concentration of 0.296 mg/L, was related to a leaking sulfuric acid valve upstream of the RO process. Corrective actions on the valve were completed, and the ROP TOC peak resolved.

The GWRS always operated below the TOC permit limit of 0.5 mg/L (20-week running average and 4-sample running average, assessed at FPW) during the assessment period. No RO process failures resulting in ROP TOC concentrations above the 0.5 mg/L permit limit occurred.

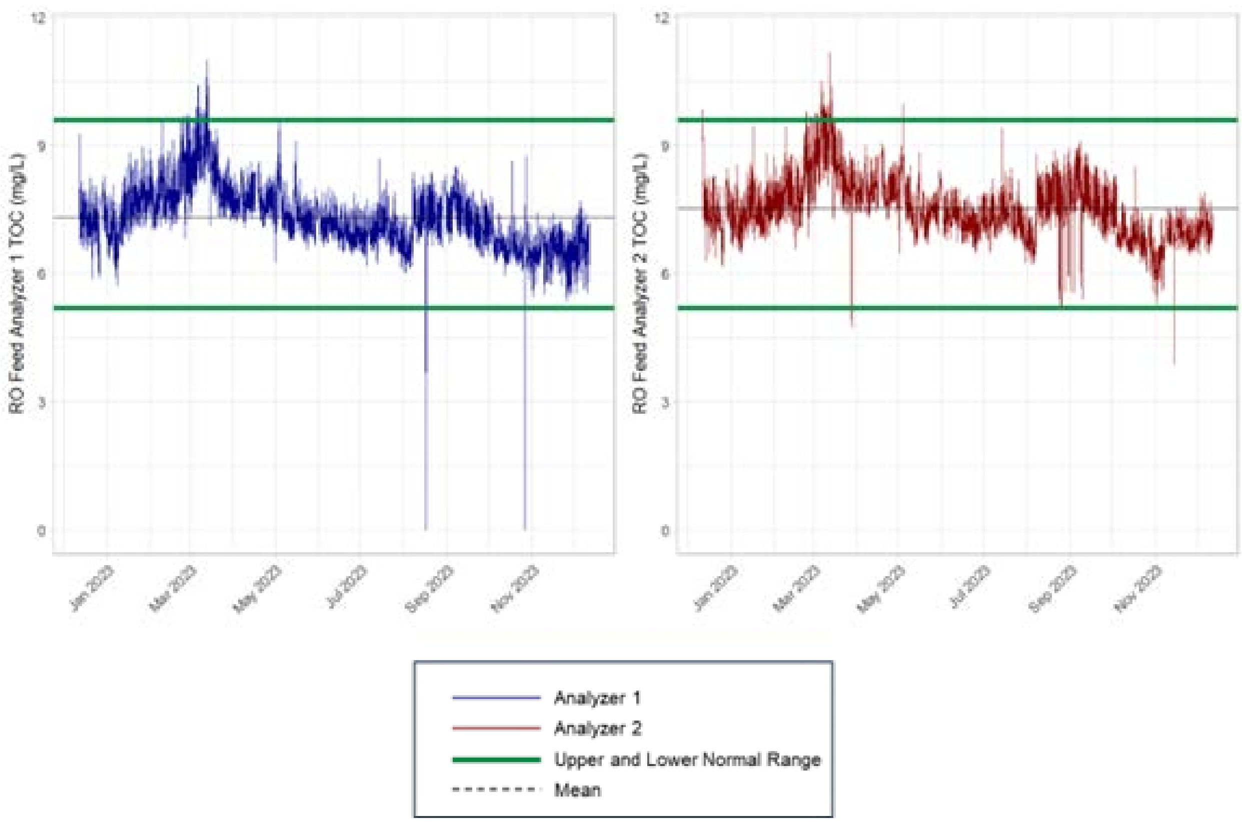


Figure 2-28. Continuous On-line ROF TOC Data and Upper and Lower Normal Range, December 2022-December 2023

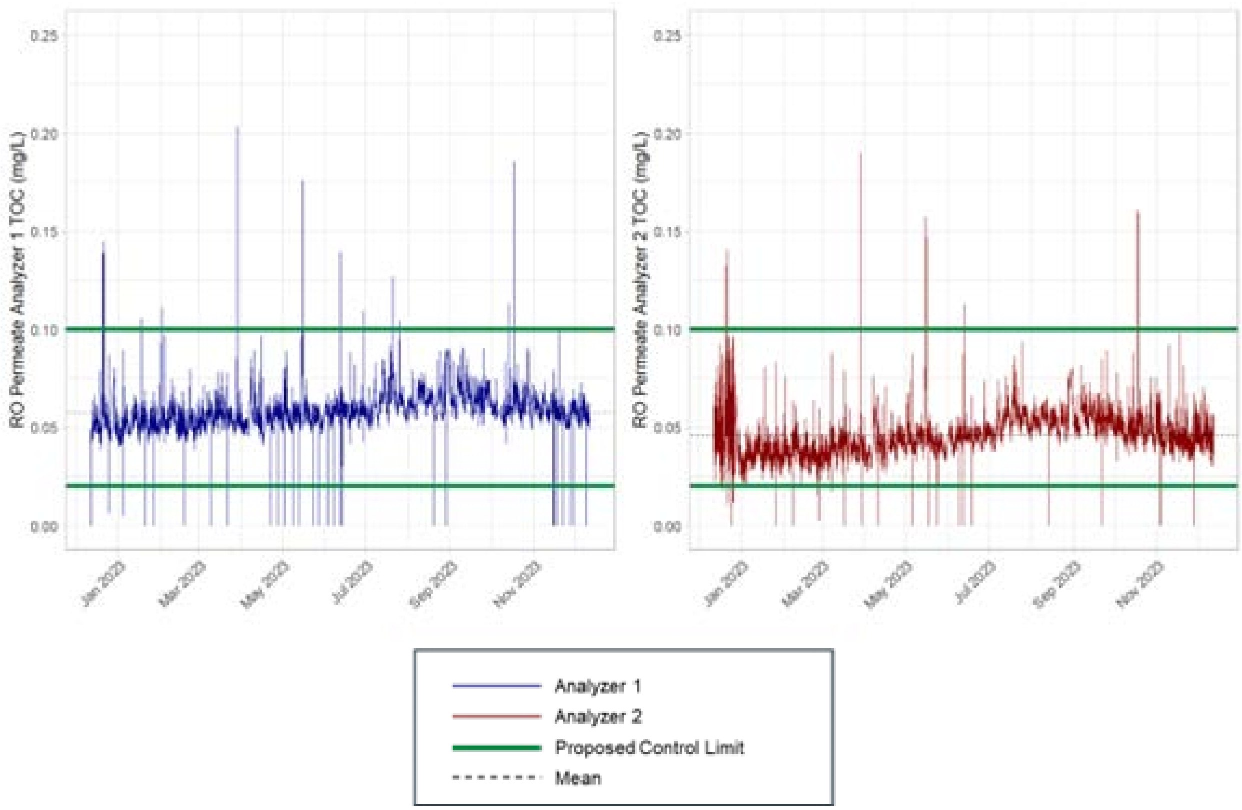


Figure 2-29. Continuous On-line ROP TOC Data and Proposed Control Limits, December 2022-December 2023

2.4.1.2 Bulk ROP EC Analysis

The initial RO process EC critical control limit for the GWRS was set at 60 µS/cm for bulk permeate when the project came online in 2008. A 2015 statistical analysis of the EC data resulted in a modification of the limit to 95 µS/cm for bulk permeate and 110 µS/cm for the permeate of individual units, to account for membrane aging.

Soon after the startup of the GWRSFE, a preliminary statistical analysis was completed to establish RO process EC critical control limits for both the combined bulk permeate of all three stages of the RO process (<90 µS/cm) and for the combined permeate of the three-stage RO process for individual RO units (<100 µS/cm). Similar to the process described in Section 2.4.1.1 for RO bulk permeate TOC, this section describes optimization of the RO bulk permeate EC (all units combined) during the first twelve months of GWRSFE operation using control chart theory, which assumes that values falling within three standard deviations (3σ) of the mean of a dataset indicates a process is “in control”.

Data from the first 12 months of GWRSFE operation (December 2022-December 2023) were exported from the on-line EC analyzers located on the bulk permeate (all units combined) of the

RO process. The bulk permeate EC analyzer scans every second and records data in the SCADA historian every 1 minute.

As described above for the TOC optimization, an attempt was made to remove false spikes from the EC dataset for the optimization exercise because the purpose is to identify the performance of the analyzer during normal plant operation. Unlike the TOC dataset, the bulk ROP EC dataset contained no negative values. Data from days when the AWPF was off-line (Table 2-8) were excluded. High EC values often occur either during or after a plant shutdown due to the analyzers not receiving the full amount of flow as they would when the AWPF is in normal operation, or due to flushing of the RO unit prior to coming back on-line.

Statistical values for the validated bulk ROP EC dataset are summarized in Table 2-16. Skewness is close to zero, and the median is close to the mean of the dataset, indicating the dataset is close to normal. The frequency histogram also demonstrates the normal distribution of the ROP EC dataset (Figure 2-30).

Table 2-16. Statistical Summary of Bulk ROP EC Data During First Year of GWRSFE Operations

Dataset	Sample Size	Mean (µS/cm)	Median (µS/cm)	Standard Deviation	Min (µS/cm)	Max (µS/cm)	Skewness
Bulk ROP EC	503,580	49.38	50.04	12.27	20.71	185.46	-0.021

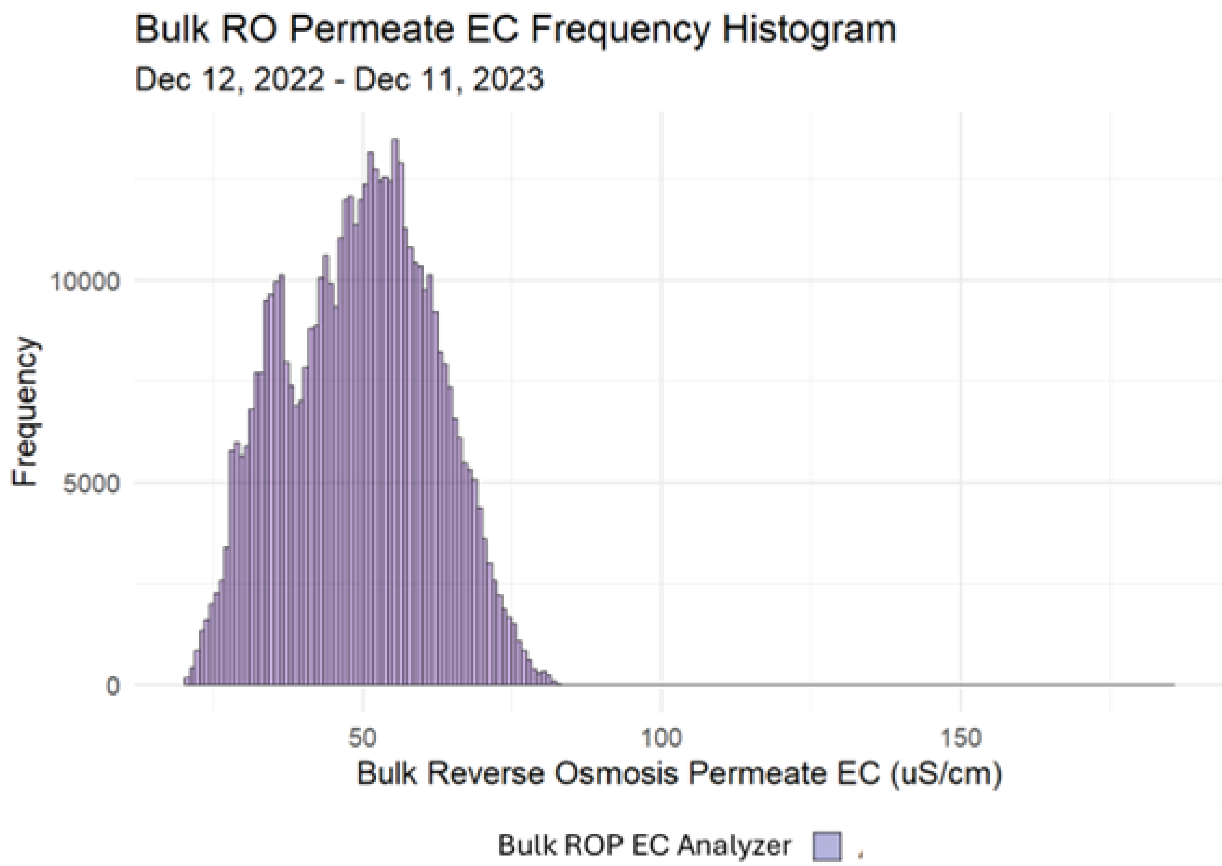


Figure 2-30. Bulk ROP EC Frequency Histogram, December 2022-December 2023

Because the dataset was normal, a random sample was not generated prior to calculating thresholds. Upper and lower thresholds were calculated using the same control chart theory described in Section 2.4.1.1 (Equation 2.1). Table 2-17 provides a summary of proposed upper and CCLs for bulk ROP EC.

Table 2-17. Bulk ROP EC Statistics and Calculated Thresholds

GWRS Dataset	Sample Size	Mean (µS/ cm)	Variance	Skewness	Standard Deviation	Upper CCL	Lower CCL
Bulk ROP EC	503,580	49.38	150.6	-0.021	12.27	86.19	12.57

The calculated upper threshold of 86.19 µS/cm is consistent with the existing bulk RO permeate EC CCL of 90 µS/cm. Therefore, it is recommended that the existing CCL be maintained. The CCL may be adjusted as needed in the future to consider membrane age, with changes documented in regular updates to the OOP. The calculated lower threshold of 12.57 µS/cm is consistent with the current lo-lo alarm limit on the bulk ROP EC analyzer (15 µS/cm). This lower threshold is intended to signal a potential problem with the analyzer requiring operator investigation and may also be adjusted as membranes age.

Consistent with current practice for the RO process at the GWRS AWPF, operator response to exceedance of an EC alarm may include:

- Checking conductivity meter;
- Conducting conductivity profile to locate source of problem;
- Conducting membrane probing; and
- Conducting individual element flow tests of suspect membranes.

On-line EC data from the December 2022-December 2023 analysis period were plotted against the calculated bulk ROP EC upper and lower CCL (Figure 2-31). The EC datasets were generally observed to be within proposed thresholds.

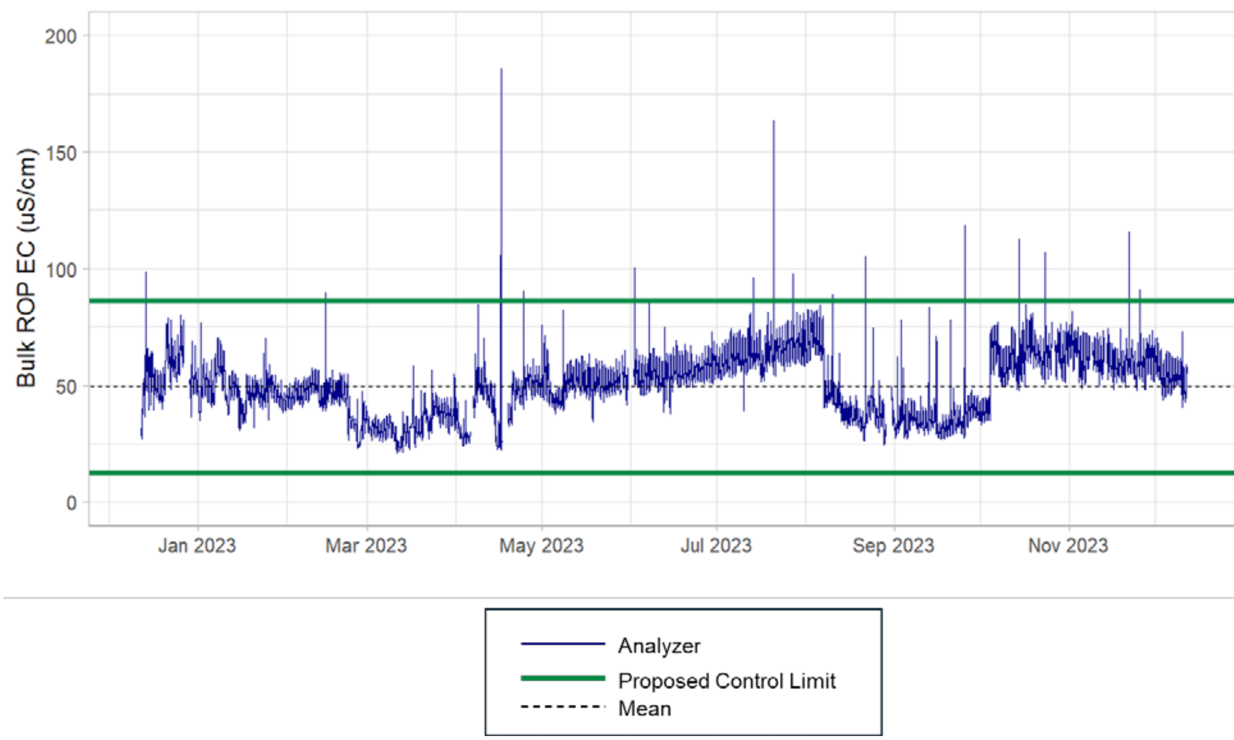


Figure 2-31. Continuous On-line Bulk ROP EC Data and Proposed Control Limits, December 2022-December 2023

2.4.1.3 Individual Unit ROP EC Per Stage Analysis

As noted above, prior to the GWRSFE, critical control limits were established for both the combined bulk permeate of all three stages of the RO process, as well as for the combined permeate of the three-stage RO process for individual units. With the Final Expansion, it is now also possible to monitor the permeate EC of each individual stage of each RO unit. Newer Trains F-I have full per-stage EC monitoring capabilities. Older Trains A-E have been retrofitted to also monitor EC per stage, but in an indirect fashion. The EC measurements on these older trains come from a permeate stream corresponding to a set of vessels in each stage, which is representative of the entire stage. With the ability to measure per-stage permeate, the upper operating range for each stage was preliminarily established at 75 µS/cm for Stage 1 permeate, 190 µS/cm for Stage 2 permeate, and 430 µS/cm for Stage 3 permeate. This analysis is intended to validate these upper thresholds.

Following the first twelve months of operation of the GWRSFE, the GWRS permit (RWQCB, 2022a) requires baseline upper and lower EC integrity values be established for each stage of each RO unit. The following analysis describes the process for determination of integrity values or thresholds for two representative RO units. The integrity values for each RO unit shall be described in the OOP as required in the GWRS permit. Integrity values are not intended to be static and are subject to change as membranes age.

Data from the first 12 months of GWRSFE operation (December 2022-December 2023) were exported from the on-line EC analyzers located on the Stage 1, Stage 2, and Stage 3 permeate stream of two RO units (Unit B01 and Unit E01). Each analyzer scans every second and records data in the SCADA historian every 1 minute. For the purposes of this analysis, 4-minute averaging was applied to the 1-minute data. The Unit B01 Dupont-Filmtec BW30XFRLE membranes were installed in October 2020 and therefore were two to three years old during the analysis period and can be considered representative of “mid-life” membranes. Unit E01 was selected to represent a unit toward the end of life. Hydranautics ESPA2-LD membranes were installed in Unit E01 in March 2017 and were approximately six years old during the analysis period, representing “end-life” membranes. Information about the installation date and membrane type of each RO unit is provided in Table 2-11. The Unit E01 membranes were replaced with new Dupont-Filmtec BW30XFRLE membranes in early 2024.

As described above for the TOC optimization, an attempt was made to remove false spikes from the EC dataset for the optimization exercise because the purpose is to identify the performance of the analyzer during normal plant operation. Negative values were also removed from the dataset. Negative values are generally recorded due to lack of fluid passing through the sensor; these values do not represent normal operation. Additionally, data from days when the AWPF was off-line (Table 2-8) were excluded. High EC values often occur either during or after a plant shutdown due to the analyzers not receiving the full amount of flow as they would when the

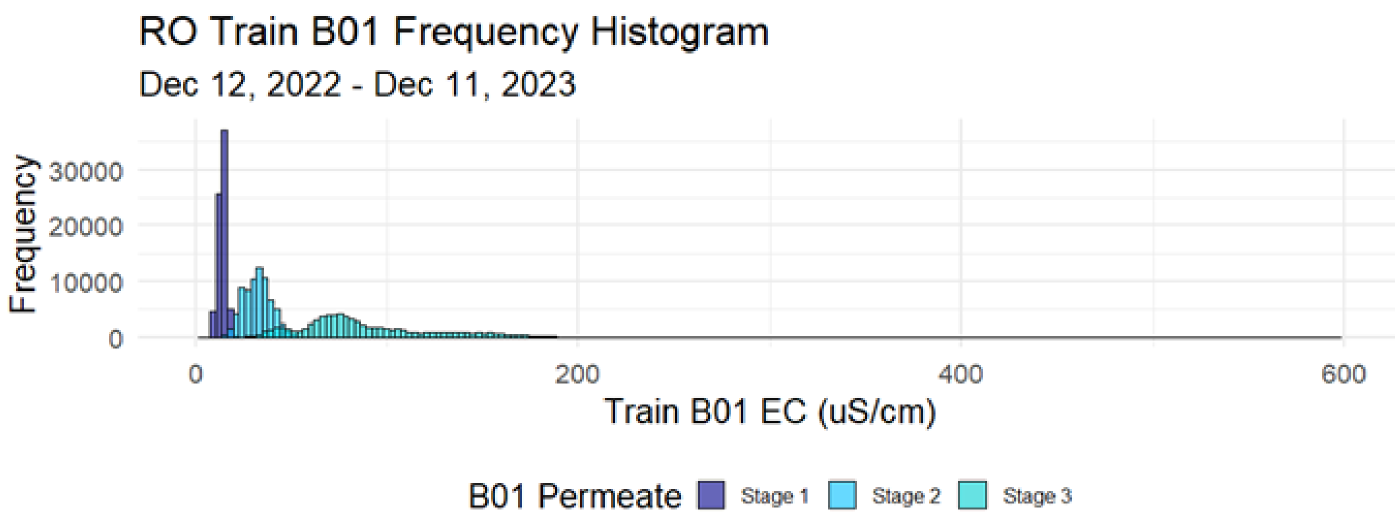
AWPF is in normal operation, or due to flushing of the RO unit prior to coming back on-line. Data from days when each RO unit was in STANDBY mode was also excluded. RO units generally are placed in STANDBY when the flow through the AWPF is less than the maximum design flow and therefore all RO units are not needed. Finally, days when RO units were undergoing a CIP were also excluded.

Statistical values for the validated Unit B01 and Unit E01 EC datasets are summarized in Table 2-18. The permeate dataset for each stage of each RO unit is listed separately (Stages 1 through 3). As expected, given the relative age of the membranes in each unit, the mean EC for each stage of Unit B01 (14, 32, and 88 µS/ cm for Stages 1 through 3, respectively) is lower than mean EC for the comparable stage of Unit E01 (32, 83, and 315 µS/cm for Stages 1 through 3, respectively).

Skewness for all datasets is close to one, indicating all datasets are close to normal, which is further illustrated on Figure 2-32.

Table 2-18. Statistical Summary of RO Units B01 and E01 Stage 1, 2, & 3 EC Data During First Year of GWRSFE Operations

Dataset	Sample Size	Mean (µS/ cm)	Median (µS/cm)	Standard Deviation	Min (µS/cm)	Max (µS/cm)	Skewness
Unit B01 Stage 1	72,671	13.75	14.07	2.06	2.77	22.85	-0.138
Unit B01 Stage 2	72,671	32.15	32.23	7.02	3.65	54.67	0.120
Unit B01 Stage 3	72,671	87.58	79.04	34.14	7.01	257.1	0.830
Unit E01 Stage 1	108,126	32.46	32.47	6.06	14.73	86.85	-0.154
Unit E01 Stage 2	108,126	82.63	82.06	19.72	32.57	277.7	0.061
Unit E01 Stage 3	108,126	315.4	315.7	92.01	97.66	612.2	0.032



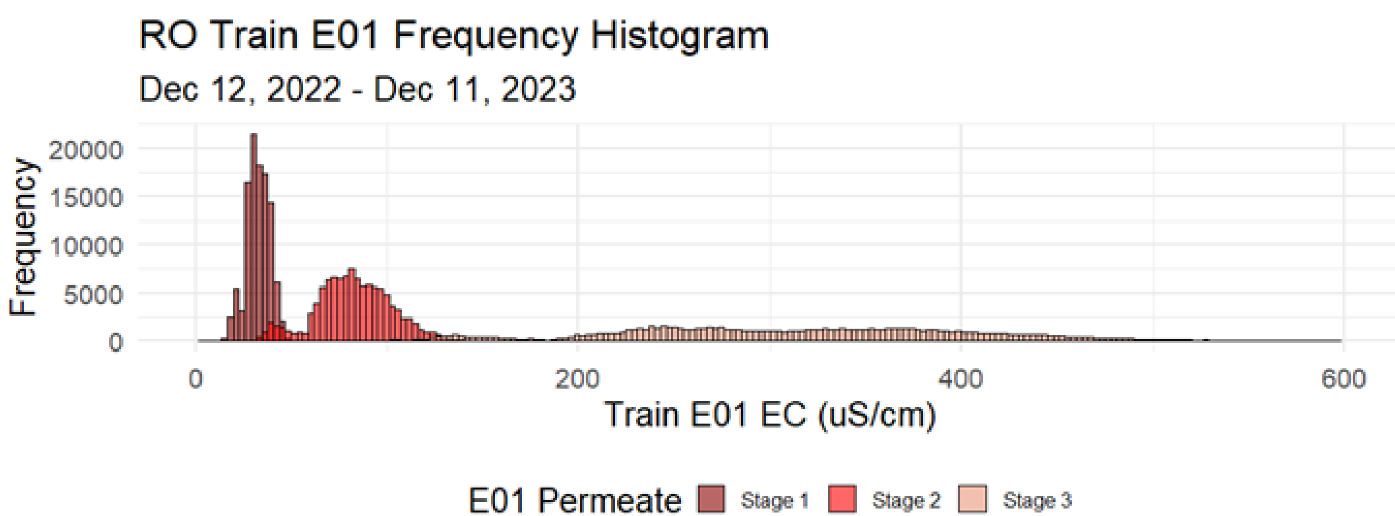


Figure 2-32. Reverse Osmosis Unit B01 EC Frequency Histogram (top) and Unit E01 Frequency Histogram (bottom), December 2022- December 2023

Since all datasets were normal, a random sample was not generated for the EC datasets prior to calculating thresholds. Upper and lower thresholds were calculated using the same control chart theory described in Section 2.4.1.1, which assumes that values falling within three standard deviations (3σ) of the mean of a dataset indicates a process is "in control."

Table 2-19 provides a summary of proposed upper and lower operating thresholds for each unit and stage. Thresholds were calculated using Equation 2.1. Lower threshold for B01 Stage 3 was not reasonable, falling below zero. This is due to the relatively large standard deviation of the datasets. Since negative EC data cannot be generated, it is suggested that the lower threshold for B01 Stage 3 be calculated as greater than the B01 Stage 2 threshold and separated by the same ratio as between the B01 Stage 1 and Stage 2 lower thresholds. I.e., because the B01 Stage 2 lower threshold is approximately 1.5 times the B01 Stage 1 threshold, the B01 Stage 3 threshold is proposed to be approximately 17 µS/cm, or 1.5 times the B01 Stage 2 threshold.

Table 2-19. RO Unit B01 and E01 EC Statistics and Calculated Thresholds

GWRS EC Dataset	Sample Size	Mean (µS/cm)	Variance	Skewness	Standard Deviation (µS/cm)	Upper Threshold (µS/cm)	Lower Threshold (µS/cm)
B01 Stage 1	72,671	13.75	4.24	-0.138	2.06	19.93	7.57
B01 Stage 2	72,671	32.15	49.23	0.120	7.02	53.20	11.10
B01 Stage 3	72,671	87.58	1,170	0.830	34.14	190.0	-14.86
E01 Stage 1	108,126	32.46	36.76	-0.154	6.06	50.65	14.27
E01 Stage 2	108,126	82.63	389.0	0.061	19.72	141.8	23.47
E01 Stage 3	108,126	315.4	8,466	0.032	92.01	591.4	39.34

Based on the above analysis, it is recommended that the upper EC threshold for RO units with new to mid-life membranes such as unit B01 be set as low as 20 µS/cm for Stage 1, 60 µS/cm for Stage 2, and 200 µS/cm for Stage 3. For older RO units near the end of life like Unit E01, it is recommended that upper thresholds be set as high as 60 µS/cm for Stage 1, 150 µS/cm for Stage 2 and 600 µS/cm for Stage 3. Thresholds should be adjusted as needed to consider membrane age, with changes documented in regular updates to the OOP. Current upper operating thresholds of 75 µS/cm for Stage 1, 190 µS/cm for Stage 2, and 430 µS/cm for Stage 3 are reasonable given this analysis, although lowering the Stage 1 and Stage 2 thresholds for newer membranes may be warranted. However, any changes are subject to operational judgement to avoid nuisance alarms and shall be documented in the OOP. Exceedance of the EC thresholds has no nexus with regulatory limits.

Consistent with current practice for the RO process at the GWRS AWPF, operator response to exceedance of an EC alarm may include:

- Checking conductivity meter;
- Conducting conductivity profile to locate source of problem;
- Conducting membrane probing; and
- Conducting individual element flow tests of suspect membranes.

On-line EC data from the December 2022-December 2023 analysis period were plotted against the proposed thresholds for RO unit B01 (Figure 2-33) and unit E01 (Figure 2-34). The EC datasets were generally observed to be within proposed thresholds, other than brief EC spikes when the concentration exceeded the upper threshold.

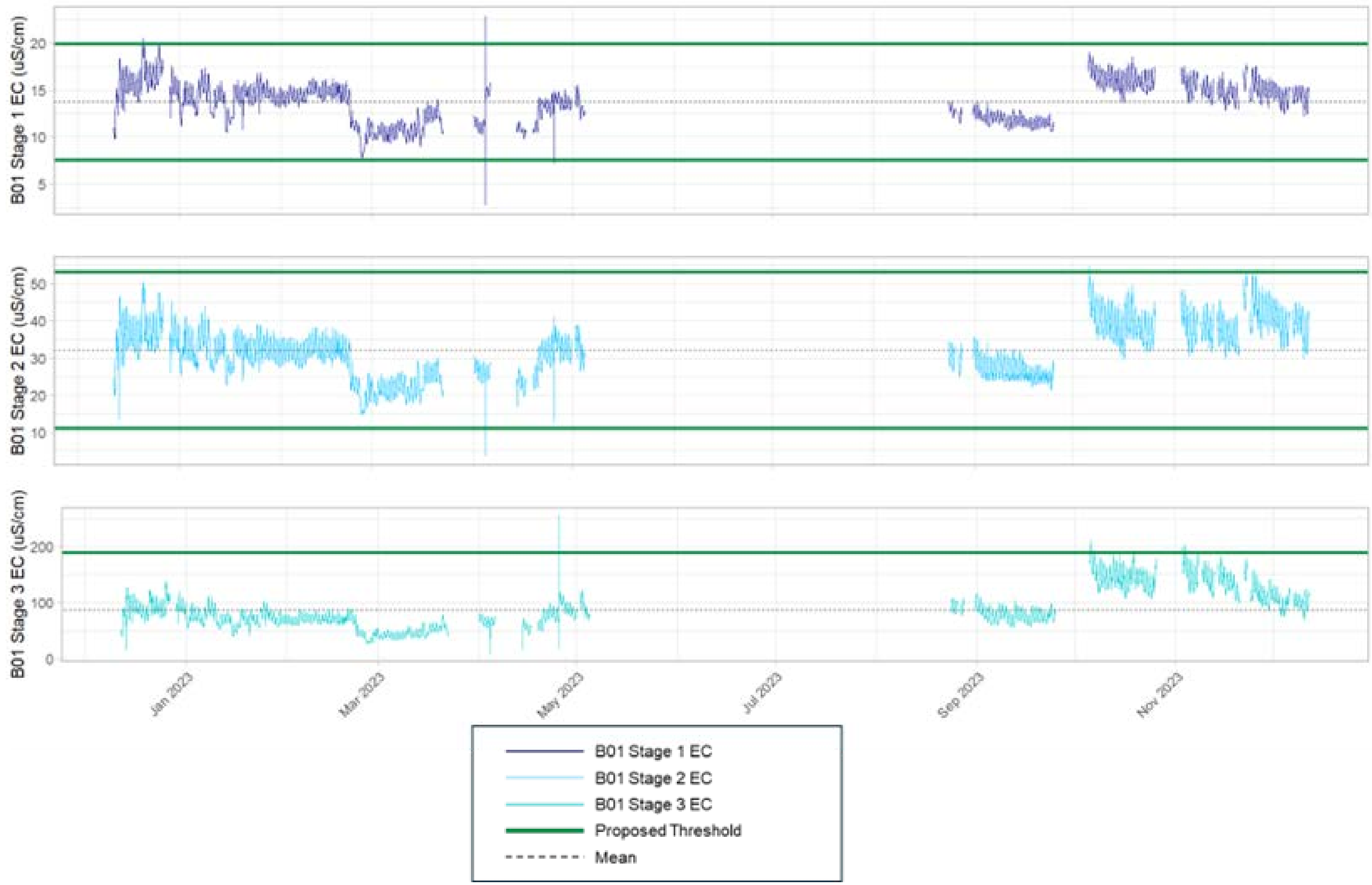


Figure 2-33. Continuous On-Line Unit B01 ROP EC Data and Proposed Upper and Lower Thresholds, December 2022-December 2023

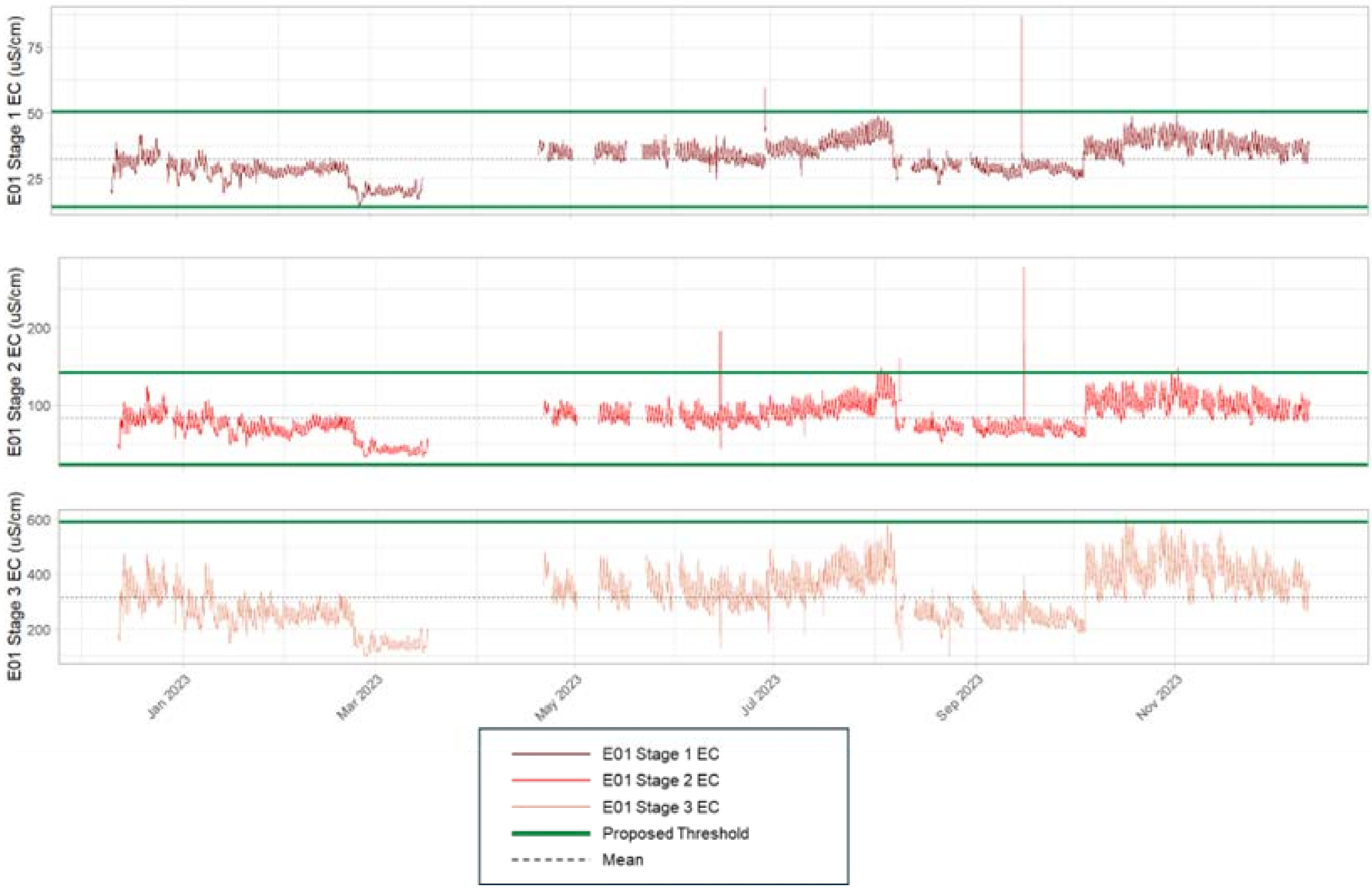


Figure 2-34. Continuous On-line Unit E01 ROP EC Data and Proposed Upper and Lower Thresholds, December 2022-December 2023

2.4.2 AOP Optimization

The Title 22 GRRP Regulations require optimization of the AOP process describe:

- The results of the AOP operational parameter monitoring performed;
- The removal differential of the AOP indicator compound 1,4-dioxane;
- A description of the efficacy of the operational parameters to reflect the removal differential of 1,4-dioxane;
- A description of the actions to be taken if 1,4-dioxane removal does not meet the 0.5-log reduction design criteria, or the operational parameter monitoring fails to correspond to the 1,4-dioxane removal differential, or the operational parameter limits are not being met.

In December 2022, OCWD performed a re-validation of the GWRS AWPF UV/AOP. The intent of the validation was to assess the ability of the UV/AOP to reduce 1,4-dioxane and NDMA with the new combined Plant 1 and Plant 2 AWPF source water at a target UV transmittance of 95%T or higher. A 0.5-log reduction of 1,4-dioxane is required under the Title 22 GRRP Regulations. No specific reduction in NDMA is required, however NDMA was analyzed as a surrogate for pathogen removal.

The results of the validation suggested that the minimum required UV electrical energy dose to achieve 0.5-log reduction of 1,4-dioxane at 95%T is 0.31 kWh/kgal, with a minimum required hydrogen peroxide dose of 4 mg/L or greater. The minimum required UV electrical energy dose needed to achieve the target pathogen removal is 0.08 kWh/kgal. Since the EED required for 1,4-dioxane removal is higher than the EED required for pathogen removal, the higher 0.31 kWh/kgal EED target dictates the operational limit. The results of the UV-AOP validation, including the proposed operational setpoints for EED and hydrogen peroxide dose, were reviewed by DDW and approved in October 2023 (OCWD, 2023).

The GWRS UV-AOP operated under the new EED and hydrogen peroxide operational setpoints from October 2023 onward. As discussed in Section 2.3.5.3, no 1,4-dioxane was detected in the UV feed (after RO treatment) nor UV product in 2023. The combined RO/UV/AOP treatment processes removed 92.0% of the 1,4-dioxane in the AWPF source water, which was equivalent to 1.1-log reduction in 1,4-dioxane. In 2023, the UV/AOP process always met the established EED CCLs of 0.23 kWh/kgal (prior to October 10, 2023) and 0.31 kWh/kgal (after October 10, 2023).

EED is monitored on each of the sixteen UV trains. Failure to achieve the target EED of 0.31 kWh/kgal on any single UV train triggers automatic alarm and operator response. Operators check the number of reactors in service for the affected UV train as well as the number of failed lamps and power usage. Any failed lamps are replaced. If the EED is less than 0.310 kWh/kgal for fifteen minutes, operators manually switch all trains to safe mode operation with all lamps operating at 100% ballast power. Flow may be reduced to the affected train, or flow may be switched to a standby UV train. If flow reduction and other adjustments does not increase EED above the 0.31 kWh/kgal target, the affected UV train shall be manually shut down.

2.5 Santa Ana River Discharges

The AWPF did not discharge to the Santa Ana River to provide peak flow relief for OC San at any time during 2023. The emergency peak flow/rain event system was last tested in January 2021, when the AWPF discharged all treated water to the OC San 66-inch diameter Interplant Line, which conveyed it to the OC San ocean outfall. No purified recycled water was produced for recharge during the 2021 test.

Discharges to the Santa Ana River are covered by a separate permit, RWQCB Order No. R8-2022-0002 NPDES No. CA8000408, entitled *"Waste Discharge Requirements and National Pollutant Discharge Elimination System Permit for the Orange County Water District Groundwater Replenishment System Advanced Water Treatment Facility Emergency Discharge to Reach 1 of the Santa Ana River,"* which was adopted by the RWQCB on March 18, 2022 (RWQCB, 2022b).

After completion of the GWRSIE in 2015, the AWPF could produce up to 100 MGD of purified recycled water. With completion of the GWRSFE in 2022, the AWPF can produce up to 130 MGD of purified recycled water. Thus, it is feasible for the AWPF to continue normal purified recycled water production and provide at least 100 MGD of emergency peak flow relief for the OC San ocean outfall without having to discharge to the Santa Ana River. The maximum daily purified recycled water production by the AWPF reached 120.8 MGD in mid-November 2023.

2.6 Non-Potable Water Quality

A small portion of GWRS purified recycled water is used for non-potable use and supplied to three customers as described earlier in this section: Anaheim CPP, ARTIC, and Anaheim Adventure Park. The requirements for non-potable uses are incorporated into the RWQCB Order No. R8-2022-0050 (RWQCB, 2022a). The purified recycled water complied with the requirements for non-potable water use set forth in the GWRS permit during 2023. Section 2.2 and Appendix A present the GWRS purified recycled water quality during 2023 including the constituents monitored for non-potable water use.

2.7 Anticipated Changes

The GWRSFE began operation on December 12, 2022, and the GWRSFE construction contract was closed out on March 31, 2023.

The OC San Plant 2 reclaimable secondary effluent (P2 TF/SC effluent) has higher salinity than Plant 1 secondary effluent (P1 AS1, P1 AS2, and P1 TF). While forecasted TDS concentrations of the P2 TF/SC effluent TDS were higher than those of P1 AS1, AS2, and TF effluents, the actual values are greater than expected. OCWD is working with OC San and the City of Newport Beach to evaluate options and implement wastewater collection system improvements to manage the salinity of source water from Plant 2.

OCWD may secure a future RWQCB permit to recharge purified recycled water at additional sites, including those described in the GWRS Title 22 Engineering Report (OCWD and DDB Engineering, Inc., 2021) and OOP (OCWD and DDB Engineering, Inc., 2022):

- Burris-Riverview Spreading Basins, which will be supplied via a new turnout from the GWRS Pipeline in Anaheim. Plans for the new turnout are underway;
- Santiago System, which consists of Blue Diamond and Bond Spreading Basins and the local Santiago Creek streambed above Hart Park in the City of Orange;
- Lower Santa Ana River, from Carbon Creek Diversion near K-M-M-L Basins to Orangewood Avenue in Anaheim; and
- Lower Santiago Creek, from Hart Park in Orange to the creek's confluence with the Santa Ana River in Santa Ana.

3. TALBERT BARRIER OPERATIONS

Talbert Barrier operations in 2023 focused on optimizing injection of the purified recycled water supply both for preventing seawater intrusion and replenishing the Basin. Operation of the barrier injection facilities, which are located as shown on Figure 3-1, is presented in this section:

- Barrier injection facilities;
- Injection water sources;
- Injection water volumes; and
- Barrier operations.

3.1 Barrier Injection Facilities

Table 3-1 lists the Talbert Barrier injection wells with their associated aquifers and injection depths. Sites OCWD-I1 through OCWD-I23 feature nested injection wells with up to four individual casings in one 30-inch borehole, each injecting into a different aquifer. These legacy injection wells are nested as schematically illustrated on Figure 3-2. Site OCWD-I24 is a modern nested injection well. Modern well sites OCWD-I25 and OCWD-I33 through OCWD-I36 are single point wells. Modern injection well sites OCWD-I26 through OCWD-I32 feature clustered injection wells with up to three individual, single-point wells at each site that are spaced approximately 20 feet apart. Figure 3-3 schematically illustrates these newer cluster-type injection well sites.

Eight of the modern injection well sites (OCWD-I24 and OCWD-I26 through OCWD-I32) each have a deeper Main aquifer injection zone primarily for replenishing the Basin, in addition to injection zones in shallower aquifers susceptible to seawater intrusion. Modern cluster-type injection well OCWD-I26 is pictured on Figure 3-4.

3.2 Injection Water Sources

Three types of water were injected at the Talbert Barrier during 2023:

1. Purified recycled water produced by the AWPF;
2. Imported potable water from the MWD OC-44 turnout delivered via the City of Huntington Beach; and
3. Fountain Valley (FV) potable water comprised of a blend of groundwater and imported water.

The injection supply was predominantly GWRS purified recycled water conveyed to the injection wells from the AWPF by the barrier pump station and pipeline. Negligible volumes of OC-44 and FV potable water were used periodically during AWPF shutdowns, which are described in Appendix F. Both OC-44 and FV water are potable drinking water sources approved by DDW.

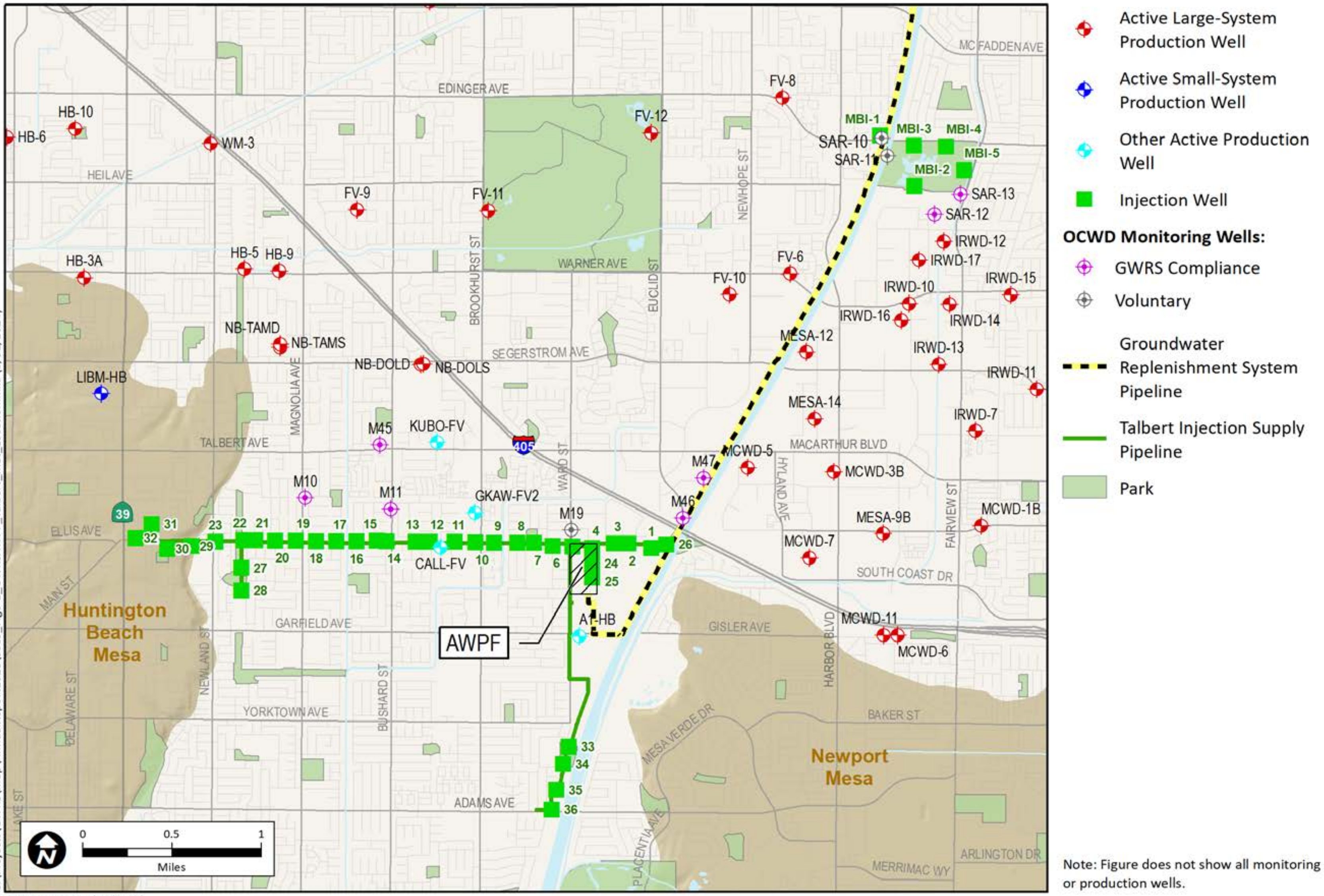


Figure 3-1. Talbert Barrier Well Locations

Table 3-1. Talbert Barrier Injection Well Design Criteria

<table>
<tr><th colspan="7">Aquifers and Perforated Intervals at Talbert Barrier</th></tr>
<tr><th rowspan="2">Injection Well No.</th><th rowspan="2">No. of Casings</th><th colspan="5">Aquifers and Perforated Interval Depth in feet below ground surface (ft bgs)</th></tr>
<tr><th>Talbert</th><th>Alpha</th><th>Beta</th><th>Lambda</th><th>Main</th></tr>
<tr><td>OCWD-I1</td><td>4</td><td>65-100</td><td>150-200</td><td>235-350</td><td>365-400</td><td>---</td></tr>
<tr><td>OCWD-I2</td><td>4</td><td>64-96</td><td>147-210</td><td>225-325</td><td>350-390</td><td>---</td></tr>
<tr><td>OCWD-I3</td><td>4</td><td>65-96</td><td>145-200</td><td>225-325</td><td>340-380</td><td>---</td></tr>
<tr><td>OCWD-I4</td><td>4</td><td>65-95</td><td>120-190</td><td>215-310</td><td>330-355</td><td>---</td></tr>
<tr><td>OCWD-I5</td><td>4</td><td>70-90</td><td>115-180</td><td>210-265</td><td>320-245</td><td>---</td></tr>
<tr><td>OCWD-I6</td><td>4</td><td>70-100</td><td>120-175</td><td>195-250</td><td>315-335</td><td>---</td></tr>
<tr><td>OCWD-I7</td><td>4</td><td>70-95</td><td>110-150</td><td>165-250</td><td>315-336</td><td>---</td></tr>
<tr><td>OCWD-I8</td><td>4</td><td>60-95</td><td>110-165</td><td>180-240</td><td>300-325</td><td>---</td></tr>
<tr><td>OCWD-I9</td><td>4</td><td>65-90</td><td>110-150</td><td>175-235</td><td>300-330</td><td>---</td></tr>
<tr><td>OCWD-I10</td><td>4</td><td>60-90</td><td>105-185</td><td>205-290</td><td>305-330</td><td>---</td></tr>
<tr><td>OCWD-I11</td><td>3</td><td>65-95</td><td>115-180</td><td>200-225</td><td>---</td><td>---</td></tr>
<tr><td>OCWD-I12</td><td>4</td><td>60-95</td><td>110-165</td><td>180-260</td><td>290-310</td><td>---</td></tr>
<tr><td>OCWD-I13</td><td>4</td><td>77-100</td><td>120-160</td><td>175-250</td><td>280-305</td><td>---</td></tr>
<tr><td>OCWD-I14</td><td>4</td><td>70-95</td><td>115-150</td><td>175-250</td><td>265-300</td><td>---</td></tr>
<tr><td>OCWD-I15</td><td>4</td><td>70-93</td><td>115-145</td><td>70-235</td><td>262-285</td><td>---</td></tr>
<tr><td>OCWD-I16</td><td>3</td><td>63-120</td><td>---</td><td>145-210</td><td>245-285</td><td>---</td></tr>
<tr><td>OCWD-I17</td><td>3</td><td>62-130</td><td>---</td><td>150-215</td><td>250-275</td><td>---</td></tr>
<tr><td>OCWD-I18</td><td>3</td><td>57-125</td><td>---</td><td>150-210</td><td>260-275</td><td>---</td></tr>
<tr><td>OCWD-I19</td><td>3</td><td>57-127</td><td>---</td><td>145-200</td><td>235-270</td><td>---</td></tr>
<tr><td>OCWD-I20</td><td>3</td><td>90-125</td><td>---</td><td>140-170</td><td>230-250</td><td>---</td></tr>
<tr><td>OCWD-I21</td><td>3</td><td>55-125</td><td>---</td><td>150-170</td><td>230-250</td><td>---</td></tr>
<tr><td>OCWD-I22</td><td>2</td><td>60-160</td><td>---</td><td>---</td><td>250-275</td><td>---</td></tr>
<tr><td>OCWD-I23</td><td>2</td><td>70-155</td><td>---</td><td>---</td><td>215-252</td><td>---</td></tr>
<tr><td>OCWD-I24</td><td>2</td><td>---</td><td colspan="3">120-330</td><td>420-605</td></tr>
<tr><td>OCWD-I25</td><td>1</td><td>---</td><td colspan="3">120-320</td><td>---</td></tr>
<tr><td>OCWD-I26</td><td>3</td><td colspan="2">56-195</td><td colspan="2">271-400</td><td>476-660</td></tr>
<tr><td>OCWD-I27</td><td>3</td><td colspan="2">78-148</td><td colspan="2">210-260</td><td>355-420</td></tr>
<tr><td>OCWD-I28</td><td>3</td><td colspan="2">80-140</td><td colspan="2">185-235</td><td>360-460</td></tr>
<tr><td>OCWD-I29</td><td>3</td><td>---</td><td>90-120</td><td colspan="2">200-250</td><td>365-475</td></tr>
<tr><td>OCWD-I30</td><td>3</td><td>---</td><td>95-160</td><td colspan="2">230-295</td><td>425-650</td></tr>
<tr><td>OCWD-I31</td><td>3</td><td>---</td><td>90-165</td><td colspan="2">235-295</td><td>440-590</td></tr>
<tr><td>OCWD-I32</td><td>3</td><td>---</td><td>90-155</td><td colspan="2">226-295</td><td>425-670</td></tr>
<tr><td>OCWD-I33</td><td>1</td><td>61-156</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I34</td><td>1</td><td>60-135</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I35</td><td>1</td><td>60-115</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
<tr><td>OCWD-I36</td><td>1</td><td>60-110</td><td>---</td><td colspan="2">See Note 1</td><td>---</td></tr>
</table>

[1] OCWD-I33 through OCWD-I36 each has one casing perforated in the merged Talbert/Beta/Lambda Aquifers

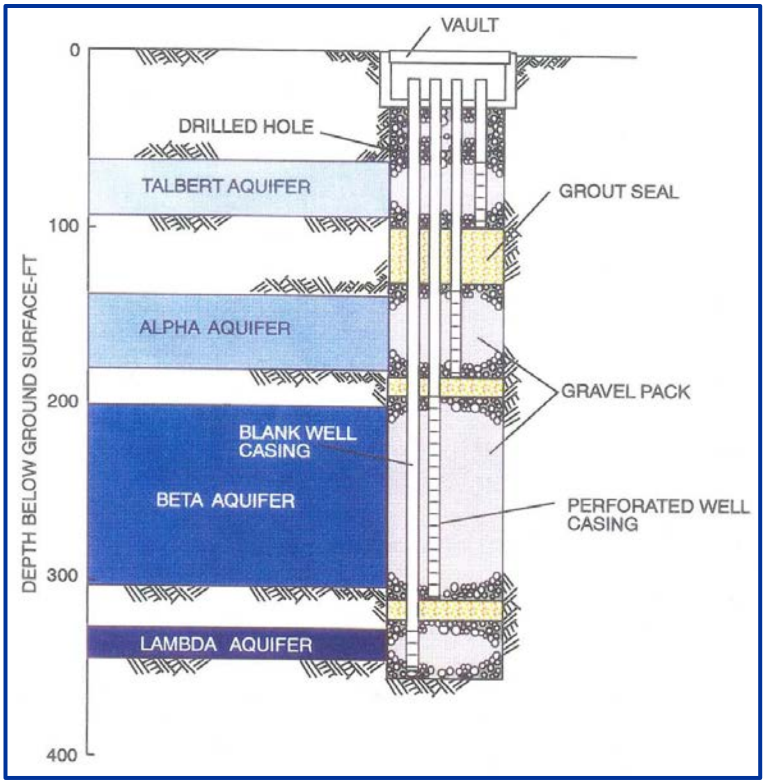


Figure 3-2. Typical Legacy Nested Injection Well

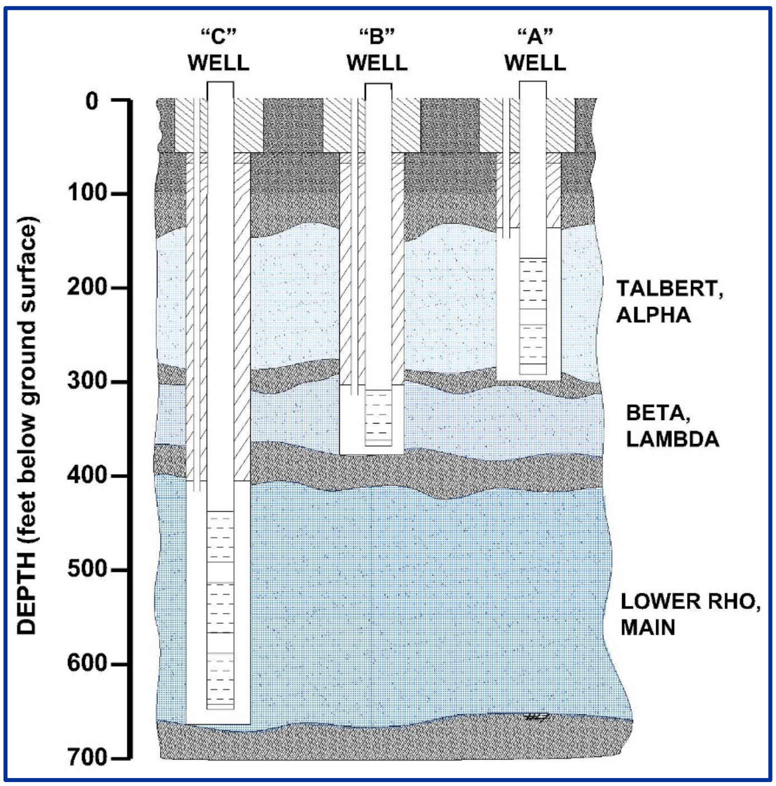


Figure 3-3. Typical Modern Cluster-Type Injection Well

Figure 3-4. Modern Injection Well Site OCWD-I26

OC-44 imported water was supplied via a reduced pressure principle backflow prevention device and a pressure reducing valve into the barrier pipeline supplying the injection wells. A limited volume of OC-44 imported water was used on one day in 2023, primarily to keep the barrier pipeline pressurized. A limited volume of FV potable water was used on 15 days in 2023 to pressurize the barrier pipeline and to maintain a small injection flow into selected wells for operational purposes. During 2023, FV potable water was used preferentially for this purpose over OC-44 imported water due to its lower cost.

3.3 Injection Water Volumes and Flow Rates

The volume of water injected at the Talbert Barrier in 2023 is presented below and compared with historical barrier injection.

3.3.1 2023 Injection Water Volumes and Flow Rates

The total annual average daily flow rate of all sources (purified recycled water, OC-44 imported water and FV potable water) injected at the Talbert Barrier in 2023 was 16.05 MGD (including periods of low or no injection during AWPF outages). On a volumetric basis, a total volume of approximately 5,858 MG (17,978 AF) of purified recycled water, OC-44 imported water, and FV potable water was injected at the Talbert Barrier during 2023.

Figure 3-5 illustrates the volumes and average daily flow rates of each of the water sources injected at the Talbert Barrier during 2023. As noted above, essentially all the barrier injection was GWRS purified recycled water (approximately 16.04 MGD on average (rounded to 5,853 MG or 17,963 AF). Less than 0.01 MGD on average (rounded to 0.12 MG or 0.35 AF) of OC-44 potable water was injected at the barrier during 2023. Nearly 0.01 MGD on average (rounded to 4.7 MG or 14.5 AF) of FV potable water was injected at the barrier during 2023.

Table 3-2 summarizes the 2023 monthly average daily flow rates and volumes of purified recycled water and potable water injected at the barrier. As discussed above, potable water was used when the AWPF was temporarily off-line due to brief shutdowns to keep the barrier pipeline pressurized and maintain a small injection flow into selected wells until purified recycled water production resumed.

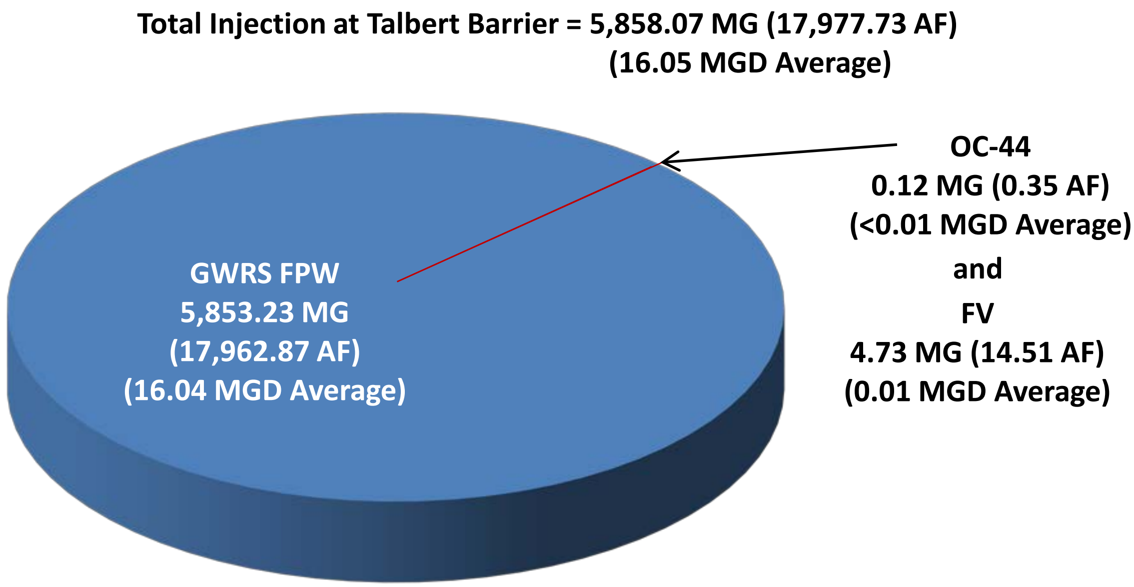


Figure 3-5. 2023 Talbert Barrier Injection Water Sources: Volumes and Average Flow Rates

Table 3-2. 2023 Monthly Injection Water Quantity at Talbert Barrier

Month	GWRS FPW		OC-44		FV		Total Injection Flow Rate and Volume			
	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(Avg. MGD)	(MG)	(AF)	(m^3)
January	15.13	469.07	0.00	0.12	0.01	0.25	15.14	469.43	1,440.63	1,776,994
February	14.69	411.25	0.00	0.00	0.00	0.00	14.69	411.25	1,262.08	1,556,758
March	12.94	401.27	0.00	0.00	0.00	0.00	12.94	401.27	1,231.45	1,518,976
April	12.02	360.55	0.00	0.00	0.04	1.24	12.06	361.78	1,110.27	1,369,505
May	14.59	452.44	0.00	0.00	0.03	0.82	14.62	453.26	1,391.01	1,715,792
June	16.22	486.67	0.00	0.00	0.01	0.29	16.23	486.96	1,494.43	1,843,353
July	18.27	566.46	0.00	0.00	0.00	0.00	18.27	566.46	1,738.38	2,144,271
August	16.43	509.32	0.00	0.00	0.03	0.99	16.46	510.31	1,566.08	1,931,739
September	20.28	608.46	0.00	0.00	0.00	0.00	20.28	608.46	1,867.28	2,303,259
October	19.18	594.44	0.00	0.00	0.01	0.30	19.18	594.73	1,825.16	2,251,311
November	17.75	532.56	0.00	0.00	0.02	0.60	17.77	533.16	1,636.21	2,018,235
December	14.86	460.75	0.00	0.00	0.01	0.25	14.87	461.00	1,414.75	1,745,068
Total	**16.04**	**5,853.23**	**0.00**	**0.12**	**0.01**	**4.73**	**16.05**	**5,858.07**	**17,977.73**	**22,175,261**

Abbreviations:

GWRS FPW	Groundwater Replenishment System Finished Product Water (Purified Recycled Water)
OC-44	MWD Turnout OC-44 via Huntington Beach (Imported Potable Water)
FV	City of Fountain Valley (Potable Water - groundwater and imported water)
MGD	Million Gallons per Day shown as an average (avg.) flow rate
MG	Million Gallons
AF	Acre-feet
m^3	Cubic Meters

3.3.2 Historical Injection Water Quantity

OCWD has operated the Talbert Barrier, injecting recycled water and potable water, since 1976. OCWD has historically injected water from six sources at the Talbert Barrier. Recycled water produced by WF-21, IWF-21, and the GWRS AWPF has been injected at the barrier. Diluents injected at the barrier have included (1) deep well groundwater, (2) potable blend of groundwater and imported water from the City of Fountain Valley, and (3) imported potable water from the MWD OC-44 turnout.

Table 3-3 and Figure 3-6 summarize the annual volumes of water from the six available sources that have been injected at the Talbert Barrier since the OCWD water reclamation projects began operation. In the 16 years since GWRS has been in operation, the average total injection at the Talbert Barrier has been approximately 22,610 AFY, with the annual total injection volumes ranging from a low of 17,978 AF in 2023 to a high of 38,531 AF in 2010. Maintaining groundwater elevations at or slightly above protective levels drives the demand for injection water at the Talbert Barrier, and these demands can vary seasonally and annually based on both the Basin accumulated overdraft condition and local groundwater pumping demands. Overall, the annual injection volumes from 2008 through 2023 have been significantly greater than pre-GWRS injection volumes.

The injection wells were supplied high quality recycled water by WF-21 from 1976 to 2004. WF-21 recycled water that was treated with GAC, but not RO, is referred to as AWT water. AWT water was injected from 1976 to 2000. A portion of the WF-21 water was treated with RO from 1977 until 2000, after which time all WF-21 water was treated with RO until 2004. This WF-21 RO product water was injected from 1977 through 2004. Purified recycled water from IWF-21 received 100% RO treatment and was injected at the Talbert Barrier from 2004 to 2006. Injection of GWRS purified recycled water began in January 2008. Additional specific treatment processes of these water reclamation facilities are described in detail in Section 1.3.

Table 3-3. Historical Injection Water Quantity at Talbert Barrier

	Injection Quantity								Q-10[1] or GWRS Average Quality[4] (mg/L)		OC-44[2] Average Quality[4,8] (mg/L)		FV[3] Average Quality[4,8] (mg/L)		Total Flow-Weighted Average Quality[4] (mg/L)	
Year	AWT (MG)	RO (MG)	GWRS (MG)	Well (MG)	FV (MG)	OC-44 (MG)	Total (MG)	Total (AF)	Cl-	TDS	Cl-	TDS	Cl-	TDS	Cl-	TDS
1976	290.15	0.00		542.80			832.95	2,556.06								
1977	1,192.30	235.30		2,875.30			4,302.90	13,204.25	80	415					80	415
1978	1,760.60	1,368.20		1,575.40			4,704.20	14,435.71	103	442					103	442
1979	1,695.20	1,338.50		1,487.00			4,520.70	13,872.61	78	400					78	400
1980	258.50	1,311.00		1,054.30			2,623.80	8,051.62	57	231					57	231
1981	90.60	1,107.30		1,344.30			2,542.20	7,801.21	50	204					50	204
1982	4.60	1,179.90		1,166.90			2,351.40	7,215.71	47	174					47	174
1983	0.00	1,220.56		1,173.21			2,393.77	7,345.73	37	154					37	154
1984	231.71	313.22		488.40			1,033.33	3,170.97	79	339					79	339
1985	476.18	568.12		577.26			1,621.56	4,976.06	103	389					103	389
1986	630.73	519.38		772.42			1,922.53	5,899.64	102	379					102	379
1987	408.50	469.46		590.04			1,468.00	4,504.83	93	366					93	366
1988	968.37	1,187.03		1,213.41			3,368.81	10,337.82	89	319					89	319
1989	949.27	1,098.75		1,814.02			3,862.04	11,851.39	87	342					87	342
1990	785.13	1,267.19		1,837.44			3,889.76	11,936.45	90	320					90	320
1991	1,084.19	1,226.75		2,967.16			5,278.10	16,196.83	109	380					109	380
1992	1,257.92	1,338.84		2,413.57			5,010.33	15,375.13	89	336					89	336
1993	860.11	1,494.87		2,026.14			4,381.12	13,444.28	85	328					85	328
1994	157.31	947.22		896.85			2,001.38	6,141.61	50	248					50	248
1995	203.47	655.98		740.20			1,599.65	4,908.82	49	243					49	243
1996	56.73	741.22		521.84			1,319.79	4,050.02	26	151					26	151
1997	16.40	690.27		545.54			1,252.21	3,842.64	22	129					22	129
1998	5.44	776.08		578.51			1,360.03	4,173.51	23	127					23	127
1999	450.08	1,327.24		1,191.98			2,969.30	9,111.85	57	239					57	239
2000	207.50	771.75		1,863.75			2,843.00	8,724.27	37	233					37	233
2001		1,071.62		2,166.06	1,350.83		4,588.51	14,080.70	33	252					33	252
2002		1,367.55		1,180.56	1,576.61		4,124.72	12,657.47	34	226					34	226
2003		1,053.38		751.59	1,591.85	33.73	3,430.55	10,527.28	38	237	98	374			39	238
2004[5]		935.30		421.22	1,321.64	2,559.46	5,237.62	16,072.61	32	230	93	390			62	308
2005		1,238.02		4.84	953.44	2,703.43	4,899.73	15,035.73	24	177	78	464			54	336
2006[6]		663.01			551.37	1,658.75	2,873.13	8,816.73	19	127	67	386			47	276
2007					0.00	2,245.52	2,245.52	6,890.80			89	474			89	474
2008[7]			7,247.08		0.00	1,712.25	8,959.33	27,493.37	4	40	97	560			21	140
2009			11,011.23		0.00	55.21	11,066.44	33,959.43	5	46	97	653			5	49
2010			12,465.25		0.00	44.62	12,509.86	38,393.98	4	43	89	532			5	45
2011			8,384.84		0.15	2.27	8,387.26	25,741.30	5	43	83	539	54	391	5	44
2012			7,978.15		0.09	0.97	7,979.21	24,488.96	7	45	83	479	67	410	7	45
2013			9,804.46		0.00	1.83	9,806.30	30,096.46	7	50	84	559			7	50
2014[8]			10,734.25		0.00	2.46	10,736.71	32,949.80	7	54	na	na			7	54
2015			11,820.22		0.00	5.52	11,825.74	36,291.90	11	64	na	na			11	64
2016			11,288.83		0.36	2.39	11,291.58	34,652.64	7	57	na	na	na	na	7	57
2017			8,554.73		0.00	5.06	8,559.78	26,269.04	5	50	na	na			5	50
2018			8,096.61		0.00	7.38	8,103.99	24,870.25	5	53	na	na	na	na	5	53
2019			8,613.03		0.13	1.83	8,614.98	26,438.44	5	49	na	na	na	na	5	49
2020			7,865.47		0.45	5.12	7,871.05	24,155.33	6	55	na	na	na	na	6	55
2021			8,374.46		0.59	2.27	8,377.32	25,709.01	5	50	na	na	na	na	5	50
2022			7,395.48		7.06	1.21	7,403.74	22,721.22	7	53	na	na	na	na	7	53
2023			5,853.23		4.73	0.12	5,858.07	17,977.73	9	57	na	na	na	na	9	57
TOTALS	**14,040.99**	**29,483.01**	**139,634.08**	**36,782.01**	**7,354.57**	**11,051.27**	**238,345.93**	**731,441.50**								

Abbreviations:

- AWT - Granular Activated Carbon Effluent disinfected using chlorine (Recycled Water) at Water Factory 21
- RO - Reverse Osmosis Effluent disinfected using chlorine prior to March 2001 at Water Factory 21 and using UV/AOP from March 2001 until August 2006 (Recycled Water) at Interim Water Factory 21
- GWRS - Groundwater Replenishment System Finished Product Water (Purified Recycled Water)
- Well - Deep Well Water (Colored Groundwater)
- FV - City of Fountain Valley Potable (Domestic) Water (groundwater and imported water)
- OC-44 - MWD Turnout OC-44 Potable Imported Water (via City of Huntington Beach and Southeast Barrier Pipeline)
- Cl- - Chloride
- TDS - Total Dissolved Solids
- mg/L - milligrams per liter
- MG - million gallons
- AF - acre-feet
- na - not analyzed (because blending is no longer required)

Notes:

[1] Q-10 water was mixed in the Water Factory 21 and Interim Water Factory 21 blending reservoir from multiple sources prior to injection into the barrier: AWT, RO, Well and FV.

[2] OC-44 water is provided directly into the barrier (via backflow prevention and pressure reduction devices).

[3] FV water is provided directly into the barrier (via backflow prevention device and a pressure reduction valve).

[4] Chloride and TDS concentrations shown for each year are based on a 12-month flow-weighted average of available samples.

[5] Water Factory 21 ceased operation on January 15, 2004. Interim Water Factory 21 began operation on June 21, 2004

[6] Interim Water Factory 21 ceased operation on August 8, 2006.

[7] GWRS began operation on January 10, 2008.

[8] Blending was not required for Talbert Barrier injection after December 2009. Beginning in December 2009, injection water quality was essentially the same as GWRS water because only limited volumes of OC-44 and FV water were used. OC-44 and FV water quality not analyzed beginning in 2014 because blending no longer required.

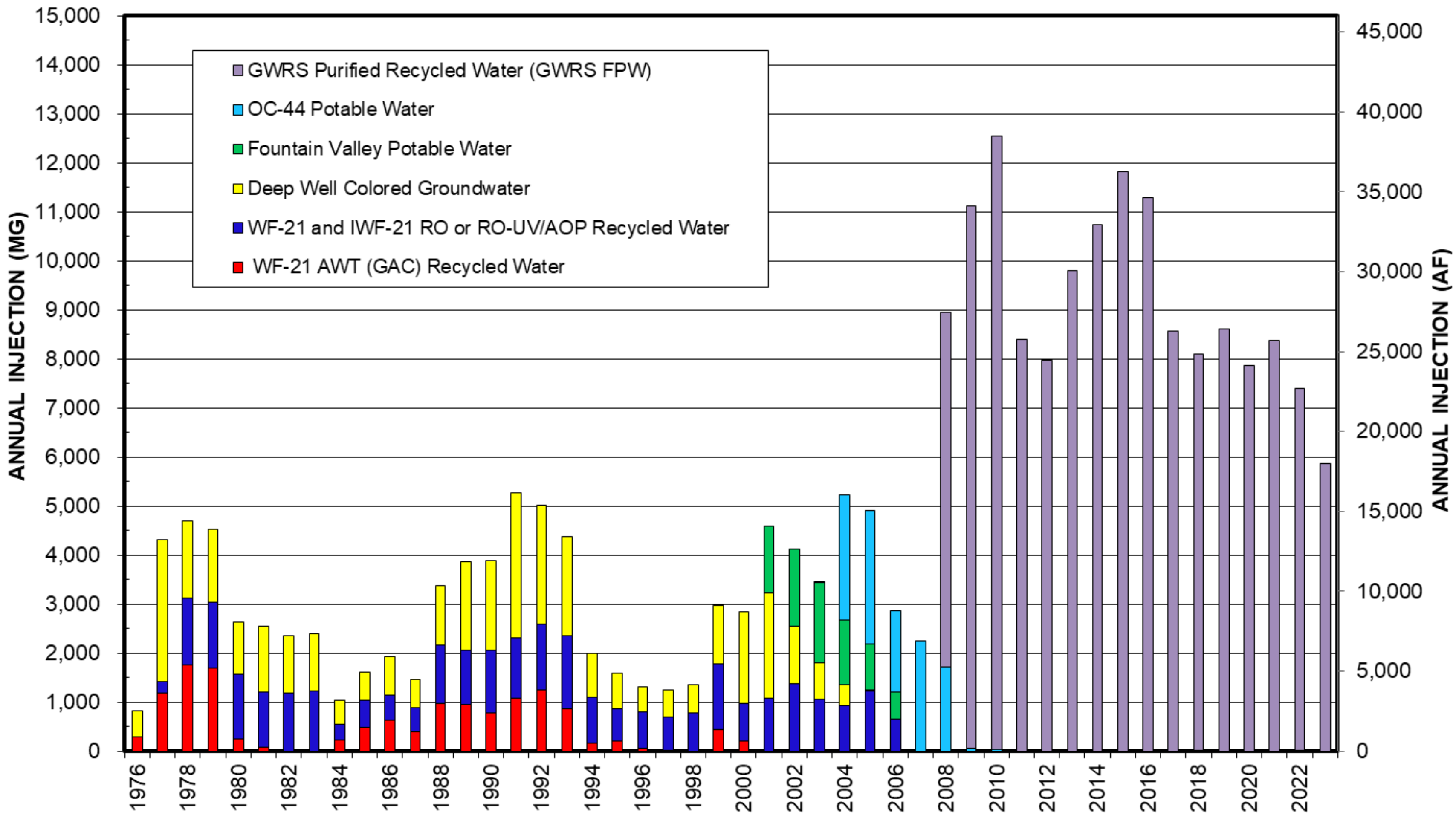


Figure 3-6. Historical Injection Water Quantity at Talbert Barrier

The three diluent water sources that have been historically injected at the barrier are listed below:

1. **Deep Well water** – groundwater that is low in salts but high in color and TOC and produced from deep aquifers that are not susceptible to seawater intrusion; deep well water was injected from 1976 to 2005.

2. **Potable water from the City of Fountain Valley** – variable blend of groundwater and surface imported water that was injected primarily from 2001 to 2006. Since then, small amounts of potable water from the City of Fountain Valley have been sporadically used to maintain pressure in the injection conveyance system and to maintain small injection flow into selected wells for operational purposes when purified recycled water was unavailable during brief periods when the AWPF was off-line. Negligible volumes of this water source (less than 1 MG) were used during 2011, 2012, 2016, and 2019 through 2021. Significantly more (4.73-7.06 MG) City of Fountain Valley potable water was used during 2022 and 2023 because it was less expensive than OC-44 imported water throughout both years.

3. **Potable water from the MWD OC-44 turnout** – imported water from the MWD OC-44 turnout delivered via the City of Huntington Beach was injected from late 2003 through 2023. As shown in Table 3-3, only minor amounts of MWD OC-44 water (less than 8 MG/year) have been used over the last 13 years, primarily for maintaining pressure in the barrier pipeline and for maintaining small injection flow into selected wells for operational purposes during AWPF shutdowns.

3.4 Barrier Operations

Injection of purified recycled water produced by the AWPF began on January 10, 2008. During 2023, AWPF purified recycled water was the primary injection water source, comprising essentially 100% of the water injected. Imported water from the MWD OC-44 and FV connections was used for maintaining a small injection flow during AWPF and BPS shutdowns and pressurizing the barrier distribution system just prior to plant startup after such shutdowns. During calendar year 2023, the MWD OC-44 connection was used briefly for one day and the FV connection was used periodically on 15 days during or immediately following AWPF or BPS shutdowns, as discussed in Section 3.2. For both the OC-44 and FV connections since 2009, minimal volumes of potable water have been used, as shown by the small annual totals discussed in Section 3.3.1.

Annual barrier injection in 2023 was 17,978 AF, representing a decrease of 21% from the prior year and the lowest barrier injection since GWRS came on-line in 2008. Injection demand for seawater intrusion control was low during 2023 due to favorably high Basin conditions, as well as in the Talbert Gap area where groundwater levels were effectively maintained at or above protective elevations seaward of the barrier without becoming excessively high or above ground surface.

Figure 3-6 shows that annual barrier injection declined in 2023 for the second consecutive year following a five-year period where injection levels were relatively stable. The 21% reduction in annual barrier injection from 2022 to 2023 resulted mainly from a wet year occurring within the context of the existing high Basin conditions. This caused groundwater levels to continue to rise in the Talbert area and throughout the Basin, resulting in less barrier injection to maintain protective elevations and to prevent excessively high groundwater levels in the coastal area. From June 2022 to June 2023, groundwater levels in the Talbert Barrier area increased approximately 1-2 feet in the Shallow and Principal aquifers, with Basin-wide groundwater storage increasing by 69,000 AF. The Basin accumulated overdraft was 189,000 AF as of June 30, 2023, representing a favorably high Basin condition within the District's targeted overdraft range of 150,000 to 200,000 AF. Groundwater elevations were maintained slightly above mean sea level seaward of the barrier throughout 2023 to protect against seawater intrusion, as discussed in more detail in Section 4.3.

Operation of the barrier was consistent and stable during 2023 due to a constant, reliable AWPF water supply with very low turbidity. As discussed in the previous section, an insignificant volume of potable water was used on one day from the MWD OC-44 connection and 15 days from the FV connection due to brief AWPF or BPS shutdowns. During 2023, there were four instances of planned AWPF shutdowns for maintenance, construction, or testing activities: May 31, August 28-30, November 8, and November 13. Each of the planned AWPF shutdowns lasted less than one day except for the shutdown in August, which lasted 35 hours. There were also four instances of unplanned AWPF shutdowns during 2023, all related to unscheduled power outages or other system failures and all lasting less than 24 hours: April 6, April 17-18, June 12, October 26, and December 29. FV potable water was used exclusively to pressurize the barrier distribution system during each of the planned and unplanned AWPF shutdowns. There was also one instance of an unplanned BPS shutdown on January 24, after which OC-44 and FV potable water was used to pressurize the barrier distribution system prior to restart.

As shown in Table 3-2 presented earlier, monthly injection flow rates during 2023 ranged from a low daily average flow rate of 12.06 MGD in April to a high daily average flow rate of 20.28 MGD in September, with the highest monthly injection volume occurring in September (608.46 MG or 1,867.28 AF). Typically, the volume of injection required to achieve and maintain protective groundwater elevations is greater in the summer and early fall months when groundwater pumping is greater. This was the case in 2023, with the highest average flow rates occurring during July, September, and October. Average flow rates in August 2023 were not as high as the other summer months, largely due to the planned 35-hour AWPF shutdown and reduced influent flows from OC San.

Injection was maintained at relatively high rates at the on-line injection wells during 2023. Like 2022 however, many injection wells were kept off-line on stand-by for several months or the entire year during 2023 because they were not needed to maintain protective elevations for seawater intrusion control. Taking injection wells off-line for these reasons usually occurs in the winter and early spring months when groundwater levels are typically higher. Such was the case during 2023, but like 2022 several legacy wells were not needed at all and thus remained off-line on stand-by throughout 2023.

In some years when injection requirements are relatively high due to low groundwater levels, a few injection wells must be taken off-line during the peak injection summer months because of hydraulic restrictions in the barrier pipeline. Typically, these include I30C, I31C, and I32C, which are used for replenishing the Basin rather than seawater intrusion control and are at a higher ground surface elevation on the Huntington Beach Mesa along the west end of the barrier. During 2023 however, no wells were taken off-line for hydraulic restrictions. When Talbert Barrier injection is reduced due to high groundwater elevations as during 2023, the surplus GWRS water can generally be pumped up to K-M-M-L Basins for surface recharge and to the five MBI wells to maintain the AWPF operating at or near full capacity to the extent possible.

3.4.1 Seasonal and Vertical Distribution of Injection

For operational reasons related to the hydrogeology of the area, the aquifer zones that receive injection have been grouped into three major categories:

- Shallow Zone: Talbert and Alpha aquifers;
- Intermediate Zone: Beta, Lambda, Omicron, and Upper Rho aquifers; and
- Deep Zone: Lower Rho and Main aquifers.

These aquifers are described in more detail in Section 4 – Groundwater Monitoring at the Talbert Barrier. The shallow and intermediate zones are both susceptible to seawater intrusion. The 23 legacy injection well sites only inject into the shallow and intermediate zones. Most of the modern injection well sites constructed since 2000 inject into all three zones, with deep zone injection being primarily intended for replenishing the Basin rather than for seawater intrusion control. Therefore, injection into the deep zone is a lower priority when surplus injection supply and pipeline capacity are available over and above what is needed for seawater intrusion control in the shallow and intermediate zones. During 2023, 42% of all barrier injection was into the shallow zone, 35% into the intermediate zone, and 23% into the deep zone.

Figure 3-7 displays the 2023 monthly injection quantities grouped by aquifer zone and shows that seasonal trends are attributed to variations in shallow and intermediate zone injection totals, while deep zone injection remains largely stable month-to-month. The typical seasonal pattern of combined shallow and intermediate zone injection held true for 2023: (1) moderate injection to begin the year and decreasing through the winter and early spring months, (2) steadily increasing in the late spring and peaking in late summer or early fall when temperatures and coastal pumping are at their highest, and (3) declining for the remainder of the year as the weather cools and coastal pumping declines.

Deep zone groundwater elevations are typically lower than in the shallow and intermediate zones, and therefore, deep zone injection rates can often be maintained year-round, even during relatively high Basin conditions. As shown on Figure 3-7, injection into the deep zone for Basin replenishment remained relatively constant during 2023, as sufficient pipeline capacity existed throughout the year to supply the lower priority deep zone injection wells due to the lower shallow and intermediate zone injection totals. Deep zone injection totals were only slightly reduced relative to other months in April and August, due to brief AWPF shutdowns.

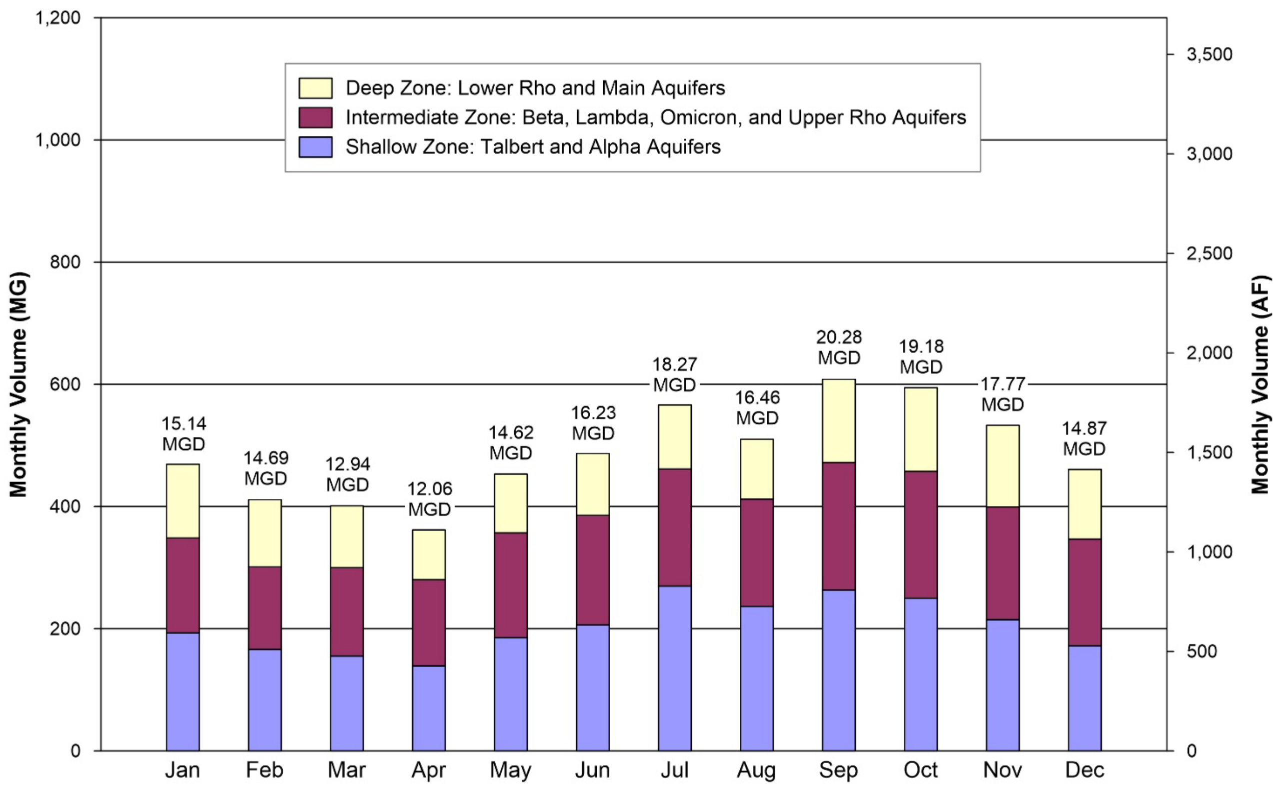


Figure 3-7. 2023 Talbert Barrier Monthly Injection Quantity by Aquifer Zone

3.4.2 Spatial Distribution of Injection along the Barrier

During 2023, injection rates and daily injection volumes at every injection point were measured using the process control system (PCS) that was installed as part of GWRS. Flow was continuously monitored for each injection well so that precise daily and monthly injection volumes were directly obtained for each injection well casing. The monthly volumes for each injection well casing were downloaded to spreadsheets, checked, adjusted slightly to match reported monthly total barrier injection, and uploaded to the OCWD Water Resources Management System (WRMS) database.

Table 3-4 shows the annual volume injected into each of the 36 injection well sites during 2023. Each well site consists of one to four discretely measured injection casings (installed at different depth zones). Table 3-4 is a summary of the total injection at each site grouped into the three different aquifer depth zones that were described above (shallow, intermediate, and deep). The injection volumes in Table 3-4 represent adjusted values. The measured monthly per well casing flow volumes were adjusted so that the sum of all individual wells for each month exactly equals the total barrier injection reported in Table 3-2 for that month (recorded from the AWPF Barrier Pump Station flow meter). For all injection well points, the raw transmitter injection measurements were multiplied by a small correction factor each month to obtain the values shown in Table 3-4. For a given month, all well points were adjusted by the same factor. During 2023, the monthly adjustments ranged from approximately 1.0% to 5.2% and were within expected standards for comparing the Barrier Pump Station flow meter totals with the sum of all individual injection well transmitter readings over the course of each month. To keep the discrepancy acceptably small, OCWD staff frequently run diagnostic checks on flow meters and transmitters and re-calibrate them as necessary.

Table 3-4. 2023 Injection Quantity at Talbert Barrier Well Sites

	Well Site	Shallow Zone [1] (AF)	Intermediate Zone [2] (AF)	Deep Zone [3] (AF)	Total [4] (AF)	Total [4] (MG)
West	I32	1,047.65	448.37	885.38	2,381.41	775.98
	I31	303.56	299.81	406.37	1,009.74	329.02
	I30	452.93	287.74	551.74	1,292.41	421.13
	I29	25.11	295.58	218.51	539.19	175.70
	I23	0.00	0.00	–	0.00	0.00
	I28	374.30	585.93	788.76	1,748.98	569.91
	I27	292.40	612.35	648.09	1,552.84	505.99
	I22	51.28	41.21	–	92.49	30.14
	I21	–	69.81	–	69.81	22.75
	I20	287.65	377.73	–	665.37	216.81
	I19	–	31.58	–	31.58	10.29
	I18	0.00	0.00	–	0.00	0.00
	I17	237.81	213.57	–	451.38	147.08
	I16	0.00	0.00	–	0.00	0.00
	I15	0.00	0.00	–	0.00	0.00
	I14	149.79	25.48	–	175.26	57.11
	I13	435.37	266.98	–	702.36	228.86
	I12	324.72	179.98	–	504.70	164.46
	I11	484.43	92.53	–	576.96	188.00
	I10	0.00	0.00	–	0.00	0.00
	I9	0.00	0.00	–	0.00	0.00
	I8	0.00	0.00	–	0.00	0.00
	I7	713.53	212.71	–	926.24	301.82
	I6	26.53	62.74	–	89.27	29.09
	I5	357.86	621.46	–	979.32	319.11
	I25	–	0.00	–	0.00	0.00
	I24	–	0.00	0.00	0.00	0.00
	I4	330.53	782.83	–	1,113.37	362.79
	I3	0.00	0.00	–	0.00	0.00
	I2	0.00	180.14	–	180.14	58.70
	I1	223.67	238.12	–	461.78	150.47
East	I26	588.79	425.87	595.00	1,609.66	524.51
Southeast Barrier	I33	155.36	–	–	155.36	50.62
Southeast Barrier	I34	120.74	–	–	120.74	39.34
Southeast Barrier	I35	304.04	–	–	304.04	99.07
Southeast Barrier	I36	243.47	–	–	243.47	79.34
	Total:	7,531.50	6,352.52	4,093.85	17,977.87	5,858.10
	Percent:	41.89%	35.34%	22.77%		

1. Shallow Zone: Talbert and Alpha aquifers.
2. Intermediate Zone: Beta, Lambda, Omicron, and Upper Rho aquifers.
3. Deep Zone: Lower Rho and Main aquifers
4. Per well injection totals above represent adjusted values (by month) to reconcile with the reported total barrier injection in Table 3-2.

AF: Acre-feet; MG: Million Gallons; –: Well not screened to inject into this zone.

Figure 3-8 graphically depicts the annual volume injected into each of the 36 injection well sites during 2023. The injection volumes are divided into the same three depth zones described above: shallow, intermediate, and deep. The 36 well sites on Figure 3-8 are generally ordered geographically from west to east (left to right) on the bar graph (rather than by well number) to give a visual sense of how the injection is spatially distributed along the barrier alignment. Notice the large annual injection amounts for the west-end modern well sites I27, I28, and I32, as is characteristic every year. Annual injection amounts for west-end modern well sites I30 and I31 are typically comparable with I27, I28, and I32, but during 2023 were slightly lower than usual due to being off-line for electrical repairs from March-August. West-end modern injection well I29 had very low injection because the well was off-line for electrical repairs from March-August and because I29A was only on-line for one week during 2023. I29A was on stand-by for most of the year since it was not needed to maintain groundwater levels above protective elevations and to avoid groundwater levels from becoming unnecessarily elevated in the low-lying area farther to the west near Huntington Lake.

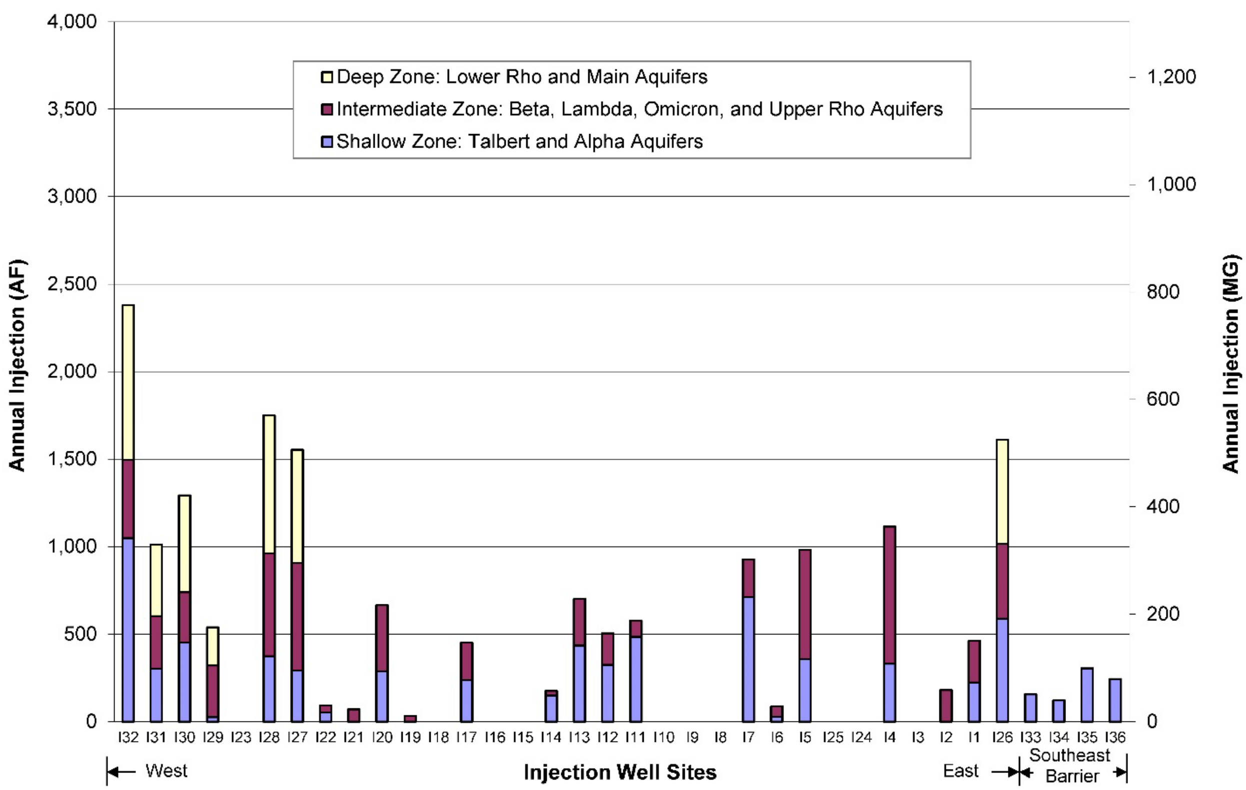


Figure 3-8. 2023 Talbert Barrier Injection Quantity at Each Well Site

East-side modern well I26 also had a large annual injection volume that was evenly distributed throughout the three depth zones at that site. Southeast barrier modern injection wells I33 and I34 had lower annual injection totals than I35 and I36 during 2023 because they were both off-line on stand-by for approximately 6 months, whereas I35 was on stand-by just over 2 months and I36 was on stand-by just two weeks. The stand-by time at the southeast barrier wells was during the winter and spring months as they were not needed then to maintain protective elevations due to higher groundwater levels.

Amongst the legacy wells, I4, I5, and I7 were the top performers with the highest annual injection totals, each all over 900 AF, while I1, I11, I12, I13, I17, and I20 also had relatively high injection totals during 2023.

The legacy well sites (I1 through I23) tend to have lower injection capacities than the modern wells. However, I4, I5 and I7 performed comparably with combined shallow and intermediate zone injection totals at the modern injection wells during 2023 (Figure 3-8). Of all the legacy wells active during 2023, I4 had the highest combined shallow and intermediate zone annual injection of over 1,100 AF, outperforming I5 which had annual injection of nearly 980 AF. I4 and I5 were both off-line only during AWPF shutdowns and I5 was on stand-by for one week in August and off-line for an additional week in September for GWRSFE construction dewatering. During 2023, I1, I11, I12, I13, I17, and I20 also had relatively high combined shallow and intermediate zone annual injection ranging from approximately 450 to 700 AF, while the other legacy injection wells had relatively low combined shallow and intermediate zone annual injection volumes ranging from zero to 180 AF, with the lower end of this range mostly due to legacy wells being off-line on stand-by for several months or for the entire year.

Similar to 2022, legacy wells I2 and I21 had very low annual injection in 2023 of approximately 180 and 70 AF, respectively, even though they were both on-line almost all year; these two wells, in addition to I3 which was off-line during 2023, are poor performers and have lost capacity over the years due to leaky well seals and/or irreversible clogging. A total of 9 legacy wells had zero or negligible injection during 2023 (I3, I8, I9, I10, I15, I16, I18, I19, and I23) as compared to 10 wells in 2022; these wells were off-line on stand-by nearly the entire year and were not needed to maintain protective elevations (Figure 3-8). In the case of I8, it is typically not used since its access hatch is in the traffic lane on Ellis Avenue, making access both difficult and unsafe for OCWD Barrier Operations staff.

Table 3-5 shows which wells were off- or on-line on a weekly basis during 2023, including an explanation for inactive status. An injection well site is only shown to be off-line if it was secured for the majority of the specified week (4 days or more). Since the legacy wells are each typically operated with all zones at that site being on or all zones off (except for I2 in which only the intermediate zones are operable), Table 3-5 only shows a status entry for each entire legacy site. For the modern injection well sites I26 through I32 featuring a cluster of three separate injection wells (shallow “A”, intermediate “B”, and deep “C”), each individual injection zone is operated independently. Modern well I24 features I24/1 for the upper casing (intermediate zone) and

Table 3-5. 2023 Talbert Barrier Injection Wells Operational Status

West → East

Well	JAN				FEB				MAR				APR				MAY				JUN				JUL				AUG				SEP				OCT				NOV				DEC			
I32A																																																
I32B																																																
I32C																																																
I31A										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																
I31B										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																
I31C										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																
I30A										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																	
I30B										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																	
I30C										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																	
I29A	S	S	S	S	S	S	S	S	S	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	S	S	S	S	S	S	S	S	S		S	S	S	S	S	S
I29B										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																
I29C										M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M																
I23	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I28A	S	S	S	S	S	S	S	S	S	S	S	S	S		S	S	S	S	S	S	S	S	S																		S		S		S	S	S	S
I28B																																																
I28C																																																
I27A	S	S	S	S	S	S	S	S	S	S	S	S	S		S	S	S	S	S	S	S	S	S	S	S																			S	S	S	S	S
I27B																																																
I27C																																																
I22	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S						S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I21																																																
I20	S			S	S	S	S	S	S		S	S	S																																			
I19	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I18	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I17																																																
I16	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I15	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I14	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S												S	S	S	S	S	S	S	S	S	S	S	S
I13																																								S								
I12																																																
I11																																																
I10	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I9	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I8	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I7																																																
I6	S	S	S	S	S	S	S	S	S								S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I5																																S	C															
I25/1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I24/1	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I24/2	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M	M
I4																																																
I3	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S	C	S	S	S	S	S	S	S	S	S	S	S	S	S	S	S
I2																																	C															
I1																																	C															
I26A																																	C															
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I26C																																	C															
I33A	S	S	S	S	S	S	S	S	S	S		S	S		S	S	S	S	S	S													S								S		S	S	S	S		S
I34A	S	S	S	S	S	S	S	S	S	S	S	S	S		S	S																					S	S	S	S	S		S	S	S	S	S	S
I35A												S	S		S																												S	S	S	S	S	S
I36A												S	S																																			

Southeast Barrier: I33A, I34A, I35A, I36A

☐ Well in Operation: GWRS Recycled Water
☐ Well in Operation: OC-44 Potable Water
☐ Well in Operation: City Fountain Valley
M Maintenance Repair
R Redevelopment
Z GWRS off-line
P Pipeline Restriction
C Construction
S Stand-by

Wells were specified as off-line if non-operational for the majority of the specified week or longer. Letters designate the reason for the well being off-line (not all letters are used in every year).

I24/2 for the lower casing (deep zone) due to its nested well construction with two casings in the same borehole but both can be operated independently. Modern well I25 is a single-point well screened primarily in the intermediate zone and is designated I25/1. Therefore, Table 3-5 shows a separate status entry for each individual injection zone for these modern wells. As described above, several legacy injection wells remained off-line for either all or a major portion of 2023 due to relatively high groundwater conditions. Eleven legacy wells were on-line for the majority of 2023: I1, I2, I4, I5, I7, I11, I12, I13, I17, I20, and I21, as indicated in Table 3-5. Protective elevations were maintained throughout the year with the use of these eleven legacy wells, intermittent use of other legacy wells, and most of the modern injection wells.

In years with lower groundwater levels and a higher injection requirement for seawater intrusion control in the shallow and intermediate zones, deep zone modern injection wells commonly need to be taken off-line during peak summer months due to pipeline hydraulic restrictions, i.e., to maintain safe flow velocities at critical points along the barrier pipeline identified as bottlenecks based on operational data. Barrier pipeline improvements are planned to remove these bottlenecks to maximize injection during years with lower Basin conditions and higher injection requirements. Due to the reduced injection into the shallow and intermediate zones during 2023, deep zone modern injection wells were on-line throughout 2023, when not undergoing maintenance or being taken off-line for construction activities. I24/2 was off-line all year for maintenance and I29C, I30C, and I31C were off-line for almost six months for maintenance, while I26C, I27C, I28C, and I32C were on-line almost the entire year.

3.4.3 Injection Well Repairs and Redevelopment

The Talbert Barrier consists of 109 individual injection well points arranged into 36 injection well sites. During 2023, 26 of the 36 injection well sites were operated over the course of the year, with 8 of the 23 legacy well sites off-line on stand-by for the entire year since they were not needed to maintain protective elevations and modern injection well sites I24 and I25 were off-line all year due to maintenance issues. In general, various injection wells are typically placed off-line for either brief or extended periods during the year for the following reasons:

- Well redevelopment and backwash pumping to restore and improve injection rates;
- Maintenance repairs (plumbing, electrical, communications, well vaults, pipeline, etc.);
- Availability of injection water supply, including AWPF shutdowns;
- Optimize distribution of injection for controlling seawater intrusion and maintaining protective groundwater elevations;
- Reduce or redistribute injection to avoid overly high groundwater conditions;
- Hydraulic restrictions on the barrier pipeline and appurtenances (bottlenecks); and
- OCWD and OC San construction activities requiring localized dewatering in the vicinity of the injection barrier.

No legacy wells were redeveloped from 2020 to 2023, with the last legacy well redevelopments occurring in 2018-2019. Since implementing GWRS purified recycled water as the primary injection source, a legacy redevelopment cycle of approximately two to three years of on-line run time has been sufficient to maintain injection flow rates without significant reductions in well efficiency and thus maintain overall barrier capacity. Redevelopment of eight legacy wells and four modern wells is currently planned for 2024. A detailed description of legacy well redevelopment is provided in Section 3.3.3 of the 2016 annual report.

None of the modern injection wells have required extensive redevelopment to date. Modern injection well sites I24, I25, and I26 were constructed and placed on-line over 20 years ago in 1999-2000, while I27 and I28 went on-line in 2004, and finally I29 through I36 went on-line in 2008 with the commencement of GWRS. Sustained injection capacity over the life of these wells thus far has largely been attributed to regularly scheduled short duration backwash pumping of these injection wells, either by the airlift pumping method using a portable compressor (most modern wells) or backwash pumping with dedicated submersible pumps (I24 and I25 sites). Airlift pumped flows from the modern injection wells are discharged to the storm drain under a "*de minimis*" permit from the RWQCB (RWQCB, 2020b), whereas backwash pumping from the on-site modern injection wells (I24/1, I24/2, and I25/1) is desilted and discharged to the AWPF RO concentrate (brine) line sending flows to the OC San outfall.

The three on-site modern injection wells (I24/1, I24/2, and I25/1) are equipped with dedicated submersible pumps allowing for regular backwash pumping. The submersible pump backwash frequency is based on the cumulative volume injected. The other modern injection wells (sites I26 through I36) are equipped with dedicated air lines and are regularly backwashed by OCWD staff using the airlift pumping method, which requires a portable air compressor to be transported to each site. The airlift pumping backwash frequency is also based on the cumulative volume injected like the submersible pump wells. Details of the modern injection well backwash procedures are provided in Section 3.4.3 of the 2022 Annual Report.

Historically, there has been some evidence of erosion of the barrier distribution pipeline materials via the presence of measurable amounts of sand found during maintenance blow-off activities and on in-line bypass filters. In fact, I32C located at this west-end terminus of the barrier pipeline is the first modern injection well showing initial signs of requiring more extensive redevelopment, since ongoing airlift pumping may not be removing all the injected fine-grained material from the lower portion of its screened interval. Therefore, I32C is one of the four modern wells scheduled for redevelopment in 2024.

To help limit potential pipeline erosion, the quality of the lime used during post-treatment operations has been improved and specific post-treatment stability targets have been adjusted. Barrier Operations and AWPF Operations staff continue to closely monitor the lime post-treatment process and operating parameters (e.g., pH) to help minimize the potential for well clogging. Bypass filter monitoring at I32 and the AWPF will continue during 2024.

The AWPF began receiving water from OC San Plant 2 in mid-December 2022. The additional source increased the overall TDS of the combined influent, requiring a slight adjustment to the decarbonation bypass volume but no significant changes to the post-treatment process or the associated operating parameters. However, the monthly average TDS of GWRS-FPW increased slightly as well as the monthly chloride concentration from 4-9 mg/L during January through November 2022 to 5-12 mg/L from December 2022 through 2023. The flow-weighted annual average chloride concentration for 2023 was 9 mg/L as compared to 7 mg/L for 2022. The TDS and chloride concentration of GWRS-FPW is also related to the age of the RO membranes.

4. GROUNDWATER MONITORING AT THE TALBERT BARRIER

OCWD has maintained a comprehensive groundwater monitoring program in the vicinity of the Talbert Barrier for decades as part of the operation of its water recycling program as well as the assessment of the effectiveness of the barrier in preventing seawater intrusion. This section presents the following for 2023:

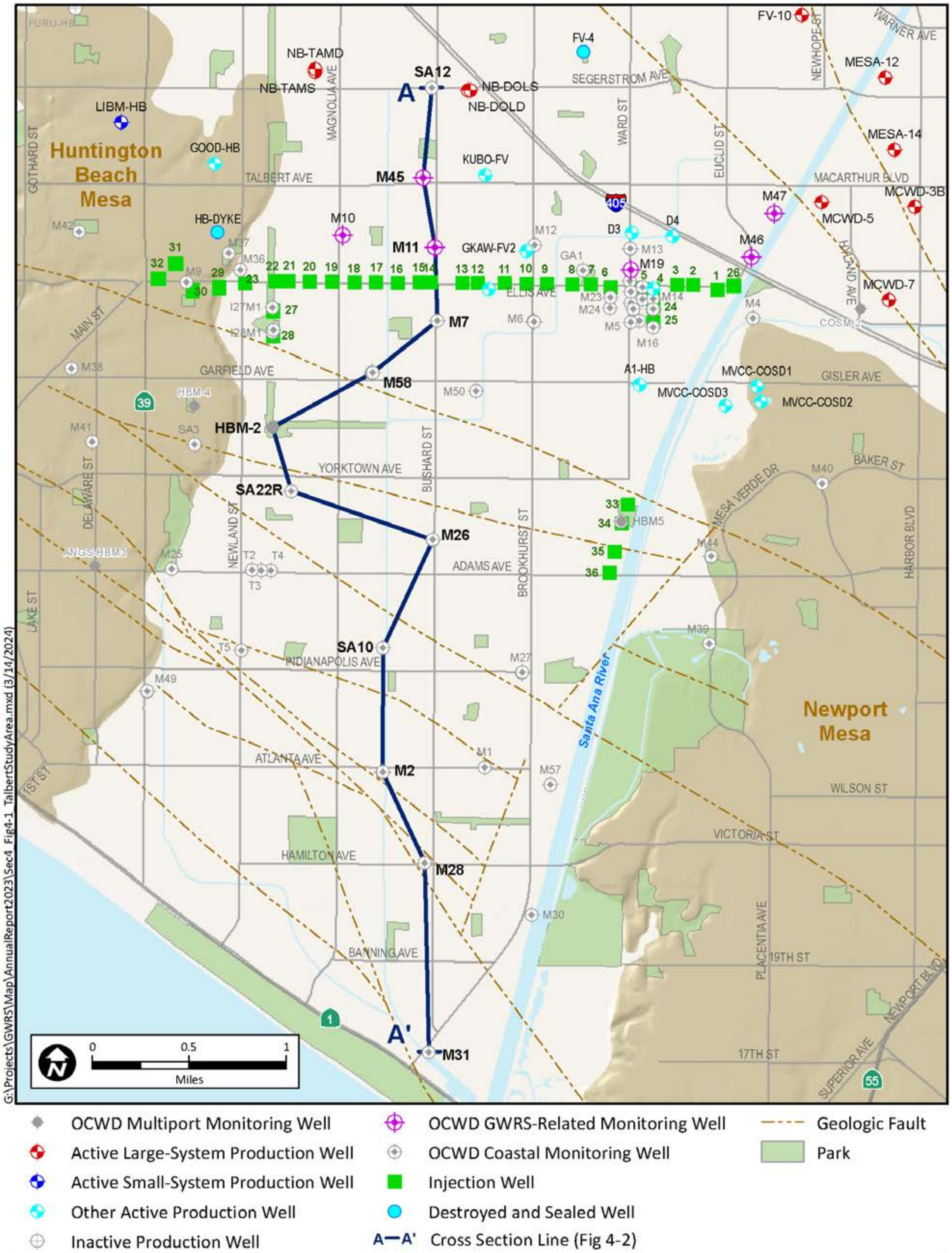
- Description of Talbert Gap aquifers;
- Overview of groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.

4.1 Talbert Gap Aquifers

Earlier studies (DWR, 1966) delineated numerous discrete aquifer units comprising the Talbert Gap area of the Orange County Groundwater Basin. In general, from shallowest to deepest, these include:

- Talbert aquifer;
- Alpha aquifer;
- Beta aquifer;
- Lambda aquifer;
- Omicron aquifer;
- Upper Rho aquifer;
- Lower Rho aquifer;
- Main aquifer; and
- Lower Main aquifer.

The Talbert aquifer is the primary conduit for inland migration of seawater. Being the shallowest of the potable aquifers listed above, it is also the youngest and therefore has not been appreciably folded or uplifted by the Newport-Inglewood Fault system that runs roughly parallel to the coastline through the Talbert Gap area as shown on Figure 4-1. Therefore, the Talbert aquifer is relatively horizontal, continuous, and in direct hydraulic connection with the Pacific Ocean. The Talbert aquifer is approximately 50 to 80 feet thick within the Talbert Gap area and is comprised of relatively coarse sand and gravel deposited by the ancestral SAR. The Talbert Gap was formed by the contemporaneous erosional processes of the ancestral SAR between the uplifted areas now known as the Huntington Beach Mesa and the Newport Mesa. Therefore, the Talbert aquifer does not occur beneath these mesas.



SOURCE: OCWD (04/2023)

Figure 4-1. Talbert Gap Study Area and Well Location Map

The aquifers below the Talbert aquifer are considerably older and have thus been uplifted and offset to varying degrees by the Newport-Inglewood Fault system illustrated on Figure 4-2. Unlike the Talbert aquifer, these deeper aquifers exist not only within the Talbert Gap but also extend beneath the mesas. As discussed later in this section, the Alpha, Beta, Lambda, Omicron, and Upper Rho zones are all susceptible to seawater intrusion via hydraulic connection with the Talbert aquifer. That is, seawater migrating inland within the Talbert aquifer can flow into deeper aquifers via mergence zones where there is no depositional or hydraulic separation between horizontally or vertically adjacent (i.e., merged) aquifers.

The Main and Lower Main aquifers were not previously considered to be susceptible to seawater intrusion within the Talbert Gap area due to their considerable depth and vertical isolation from the shallower aquifers (DWR, 1966). Furthermore, due to the higher degree of faulting and offset, the Lower Main aquifer is thought to be non-existent seaward of approximately Yorktown Avenue. The Main aquifer is discontinuous and offset across the Newport-Inglewood Fault system, and thus largely hydraulically isolated from the ocean. Seaward of this fault zone, the Main aquifer is brackish and isolated from the inland portion of the Basin. Significant groundwater withdrawals from the Main aquifer in the coastal area over the last 30 years often causes groundwater elevations in the Main aquifer to seasonally decrease to 50-100 ft below mean sea level (see Section 4.3.2); these low groundwater elevations in the coastal area could increase the potential for leakage of saline water inland across the Newport-Inglewood Fault system within the Main aquifer (Herndon and Bonsangue, 2006). OCWD continues to monitor Main aquifer chloride concentrations in the coastal area.

As required by state regulation (CCR, 2018), OCWD has established retention time boundary areas for control of pathogenic microorganisms and response retention time in the area downgradient of the Talbert Barrier. Potable drinking water wells are prohibited within the 12-month underground retention time boundary illustrated on Figure 4-3. The boundary area is based on a September 2000 model simulation informed by earlier tracer studies (RWQCB, 2004). The boundary area is enforced by local well permitting authorities including the City of Fountain Valley and Orange County Health Care Agency, as well as DDW.

In 2023, OCWD conducted an analysis to update this boundary area to ensure compliance with the state's Final Groundwater Recharge Reuse Project (GRRP) regulations (CCR, 2018). The proposed revised 12-month underground retention time boundary, which is slightly smaller than the original boundary area shown in Figure 4-3, is currently under review by DDW. If approved, the revised primary and secondary 12-month boundary area will be presented for adoption by the OCWD Board of Directors, and if adopted, provided to local well permitting authorities to enforce.

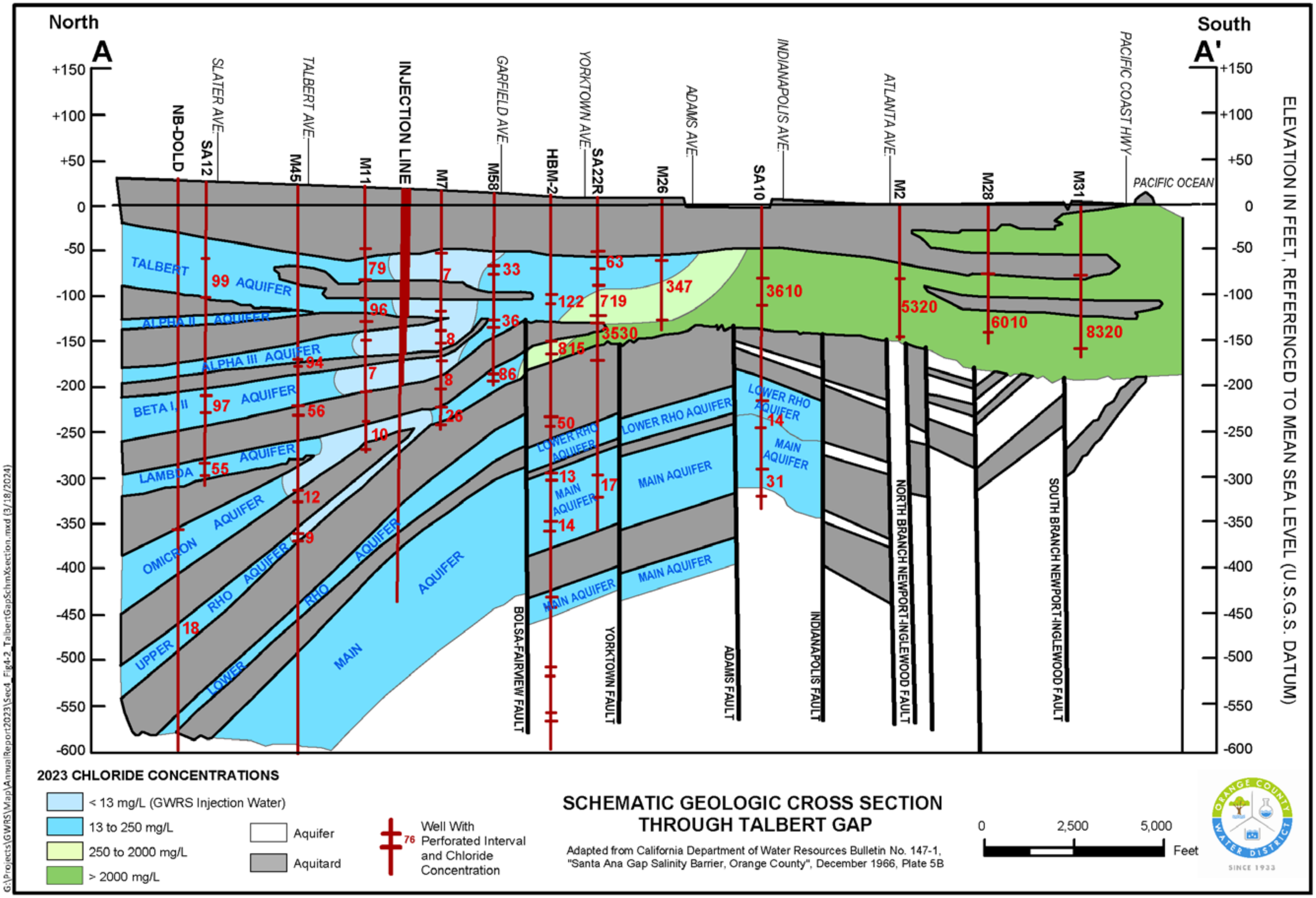
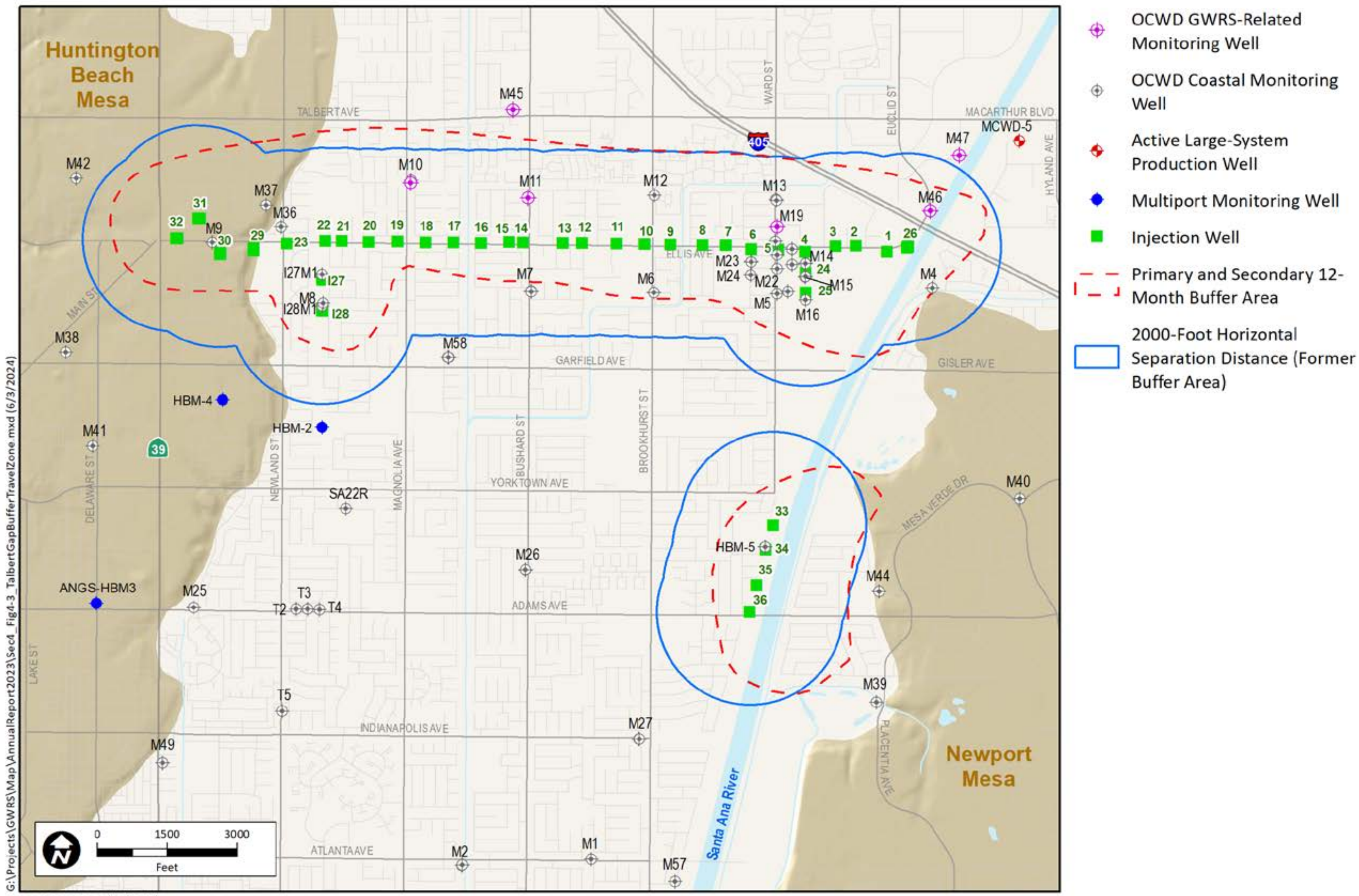


Figure 4-2. Schematic Geological Cross Section Through Talbert Gap



SOURCE: OCWD (04/2023)

Figure 4-3. Talbert Barrier Boundary Areas

4.2 Groundwater Monitoring Program

As part of the groundwater monitoring program required by the permit for the GWRS (RWQCB, 2022a), OCWD-owned monitoring wells and several municipal and private wells in the Talbert Barrier area were sampled in 2023. OCWD performs coastal groundwater monitoring at numerous additional wells on a semi-annual basis for the purposes of monitoring seawater intrusion. The locations of municipal production wells, private wells, OCWD's GWRS permit compliance wells, and other monitoring wells in the Talbert Gap area are shown on Figure 4-1.

Under the earlier WF-21 permit, OCWD monitoring well sites M9, M10, and M19 were sampled monthly. These wells were constructed between 1967-68, prior to injection of WF-21 recycled water. Under the subsequent initial GWRS permit, quarterly compliance monitoring was required from OCWD monitoring well sites M10, M11, M45, M46, and M47. The three newer GWRS compliance monitoring wells M45, M46, and M47 were constructed during 2004-05. The GWRS monitoring program began in mid-2004. On December 2, 2022, a new GWRS permit was issued by the RWQCB (RWQCB, 2022a). Table 4-1 summarizes the screened interval depths and aquifer zones for the five compliance monitoring wells and M19.

The new GWRS permit requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Required monitoring reduced or eliminated for the following constituents:
  - MBAS, silver, and thiobencarb no longer required; and
  - Color and odor reduced from quarterly to annually.
- Required monitoring added for the following constituents:
  - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
  - Hexavalent chromium annually; and
  - Dichloromethane, bromodichloromethane, chloroform, and NDMA quarterly.

Sampling of monitoring well site M19 is not required under the GWRS permit. However, this monitoring well site continued to be monitored voluntarily through 2023. At monitoring well site M19, only Zone 3 (M19/3) is tested quarterly like GWRS compliance wells and annually for the full comprehensive suite of analytes, as its water quality consistently reflects the presence of GWRS water; Zones 1 and 2 (M19/1 and M19/2) are tested twice a year for a reduced set of analytes for the assessment of seawater intrusion, as their water quality is not regularly influenced by the presence of GWRS water.

Table 4-1. Monitoring Wells at the Talbert Barrier

OCWD Well Name	Date Completed	Nearest Injection Well [1]	Approximate Distance and Direction from Barrier	Nearest Drinking Water Well(s)	Well Depth (ft bgs)	Aquifer Name(s)
OCWD-M10/1	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	80-160	Talbert and Alpha
OCWD-M10/2	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	175-195	Beta
OCWD-M10/3	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	215-240	Beta
OCWD-M10/4	11/01/1967	OCWD-I19	1,300 ft N	NB-TAMS, NB-TAMD	280-305	Lambda, Omicron and Upper Rho
OCWD-M11/1	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	70-105	Talbert
OCWD-M11/2	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	125-150	Talbert and Alpha
OCWD-M11/3	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	170-225	Beta
OCWD-M11/4	10/01/1967	OCWD-I14	950 ft N	NB-DOLS, NB-DOLD	260-290	Lambda and Omicron
OCWD-M19/1[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	60-110	Talbert
OCWD-M19/2[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	130-195	Alpha
OCWD-M19/3[2]	01/01/1968	OCWD-I5	500 ft N	MCWD-5	215-265	Beta
OCWD-M45/1	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	195-205	Alpha and Beta
OCWD-M45/2	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	250-260	Beta
OCWD-M45/3	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	335-345	Omicron
OCWD-M45/4	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	380-390	Upper Rho
OCWD-M45/5	02/28/2005	OCWD-I15	2,900 ft N	NB-DOLS, NB-DOLD	780-790	Main
OCWD-M46A/1	11/02/2005	OCWD-I26	900 ft NE	MCWD-5	350-370	Lambda and Omicron
OCWD-M46/2	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	420-430	Upper Rho
OCWD-M46/3	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	515-535	Lower Rho
OCWD-M46/4	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	640-660	Main
OCWD-M46/5	07/29/2004	OCWD-I26	900 ft NE	MCWD-5	890-910	Main
OCWD-M47/1	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	355-375	Beta
OCWD-M47/2	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	470-480	Upper Rho
OCWD-M47/3	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	580-600	Lower Rho
OCWD-M47/4	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	745-765	Main
OCWD-M47/5	05/13/2005	OCWD-I26	2,250 ft NE	MCWD-5	940-960	Main

[1] The closest injection well is not necessarily the fastest source of injection water based on estimated arrival times and inferred groundwater flow directions.
[2] Monitoring well site OCWD-M19 is not a compliance well per the existing GWRS permit but is monitored voluntarily.

Monitoring well site M45 is located approximately halfway between the Talbert Barrier Ellis Avenue alignment and the City of Newport Beach municipal wells (NB-TAMS, NB-TAMD, NB-DOLS, and NB-DOLD) located north of the barrier (Figure 4-1). Well sites M46 and M47 are located approximately one-quarter and one-half the distance, respectively, between injection well site I26 and the nearest municipal production well MCWD-5, which is owned and operated by Mesa Water. These three newer compliance monitoring wells were each constructed with five nested casings designed to monitor the individual aquifers tapped by the nearby production wells.

4.3 Groundwater Elevations and Directions of Flow

Groundwater flow directions in the vicinity of the Talbert Barrier vary considerably due to barrier injection and seasonal fluctuations in coastal pumping as well as historical changes in pumping patterns, such as new well fields coming on-line. Also, due to the vertical distribution of coastal pumping, each of the aquifers receiving injection water has a somewhat different groundwater flow path.

To evaluate groundwater flow directions in the vicinity of the Talbert Barrier for the assessment of seawater intrusion control, observed groundwater elevations are contoured at the end of each water year (end of June). Groundwater elevation contour maps are prepared for the Shallow aquifer (Talbert and Alpha aquifers) and deeper Main aquifer, as shown in Figures 4-4 and 4-6, respectively. Groundwater elevation contour maps for the intermediate depth Lambda aquifer can be found in the annual reports for 2022 and earlier (DDBE, 2023).

Seaward of the barrier, monitoring wells screened in the Talbert, Alpha, and to a lesser extent Lambda aquifer have historically been intruded by seawater. Therefore, the observed end of June groundwater elevations used to construct those contour maps were first adjusted to freshwater equivalent elevations (heads) for wells with elevated salinity having chloride concentrations greater than 250 mg/L. For wells with chloride concentrations less than 250 mg/L, the freshwater equivalent adjustment is negligibly small. This adjustment accounts for the difference in density between fresh groundwater and the heavier saline groundwater, with the freshwater equivalent heads ranging from 0-2.5 ft higher than the observed elevations of brackish groundwater seaward of the Talbert Barrier. This upward adjustment is larger for higher levels of salinity and greater well depths. The freshwater equivalent head adjustment is necessary to accurately infer the variable-density groundwater flow direction and is based on the principle that an equivalent weight of water column in a monitoring well has a greater water column height if fresh than if saline (Guo and Langevin, 2002).

The freshwater equivalent head was calculated for monitoring wells seaward of the Talbert Barrier having elevated salinity using the formula below:

$h_f = h_w + z_f$ where:

h_f = freshwater equivalent head (ft msl)

h_w = head in well (observed groundwater elevation, ft msl)

z_f = freshwater equivalent head adjustment (ft)
= 0.025 x (seawater fraction in well) x (water column height in well)
= 0.025 x (well chloride/seawater chloride) x (bottom screen depth – depth to water)

The above formula uses the chloride concentration of the pumped well sample closest to the date of the water level measurement as a reasonable approximation of the average chloride concentration throughout the entire water column in the well at the time of the water level measurement. This approximation was verified at a couple of selected brackish monitoring wells to yield acceptably close estimates of the freshwater equivalent head adjustment calculated by using the weighted average of depth-specific field EC profile values measured in-situ at 10-ft intervals throughout the entire water column of each well.

4.3.1 Talbert and Alpha Aquifers

Figure 4-4 shows interpreted groundwater elevation contours and inferred groundwater flow directions within the shallow Talbert and Alpha aquifers for June 30, 2023, in the Talbert Gap area. These contours represent freshwater equivalent heads for monitoring wells with elevated salinity seaward of the barrier. For discussion purposes below, these freshwater equivalent heads will be referred to simply as groundwater elevations. The contours not overlying the Huntington Beach and Newport Mesas (i.e., within the Talbert Gap) represent groundwater elevations for the Talbert aquifer. A more-detailed one-foot contour interval was used in the Talbert Barrier area and seaward to better illustrate the groundwater flow patterns. On the mesas, the contours represent Alpha aquifer groundwater elevations since the Talbert aquifer does not exist beneath the mesas as was described earlier in Section 4.1; however, the Talbert aquifer is in lateral hydraulic connection with the Alpha aquifer beneath the Huntington Beach Mesa, such that they behave as one aquifer system.

Figure 4-4 also shows the Talbert aquifer mergence zones, which can act as drains transmitting water from the Talbert aquifer into the deeper Alpha, Beta, and Lambda aquifers due to a typically downward vertical gradient. Therefore, as groundwater flows laterally within the Talbert aquifer to the southwest in the Talbert Gap area, groundwater also flows vertically from the Talbert aquifer down into the Alpha, Beta, and Lambda aquifers. As shown on Figure 4-4 for June 2023 and typical of recent years, a relatively steep and uniform southwest seaward gradient existed in the Talbert aquifer north of the barrier but largely flattened out south of the barrier due to vertical flow losses to the mergence zones.

As shown on Figure 4-4, groundwater elevations in the Talbert aquifer were at or above mean sea level throughout the Talbert Gap in June 2023 and were similar to the prior June. Along the Ellis Avenue barrier alignment, groundwater elevations ranged from 9 ft msl on the east end to 3 ft msl on the west end, resulting in a local west-southwest gradient with inferred groundwater flow from the Talbert aquifer into the Alpha aquifer beneath the Huntington Beach Mesa (via their mergence zones) where groundwater elevations are lower. Farther seaward along the southeast portion of the barrier near the SAR and Adams Avenue, groundwater elevations were approximately 5-6 feet above mean sea level with inferred groundwater flow primarily seaward to the southwest into a very subtle depression of approximately 4 ft msl likely caused by vertical flow draining from the Talbert to Lambda aquifer via their respective mergence zones in this area. This subtle depression is likely transient and is not significant enough to cause any noticeable intrusion into this area over the longer term as evidenced by generally declining chloride concentrations at monitoring wells in this vicinity. Also, there is some uncertainty with inferring groundwater flow directions from the relatively flat lateral gradients in this seaward area because of salinity-induced vertical gradients as well as uncertainty in the equivalent freshwater head adjustments (e.g., assumed vertically constant salinity profile within the water column of the brackish monitoring wells).

This June 2023 condition represents sufficient barrier injection to largely overcome the vertical losses to the mergence zones while still maintaining a predominantly seaward and/or relatively flat gradient with groundwater elevations above mean sea level and only marginally (one foot) lower than the farthest seaward contour of 5 ft msl. Therefore, these Talbert aquifer groundwater elevations were at an optimal level in which they were high enough to be protective of seawater intrusion but with minimal or no losses to the ocean.

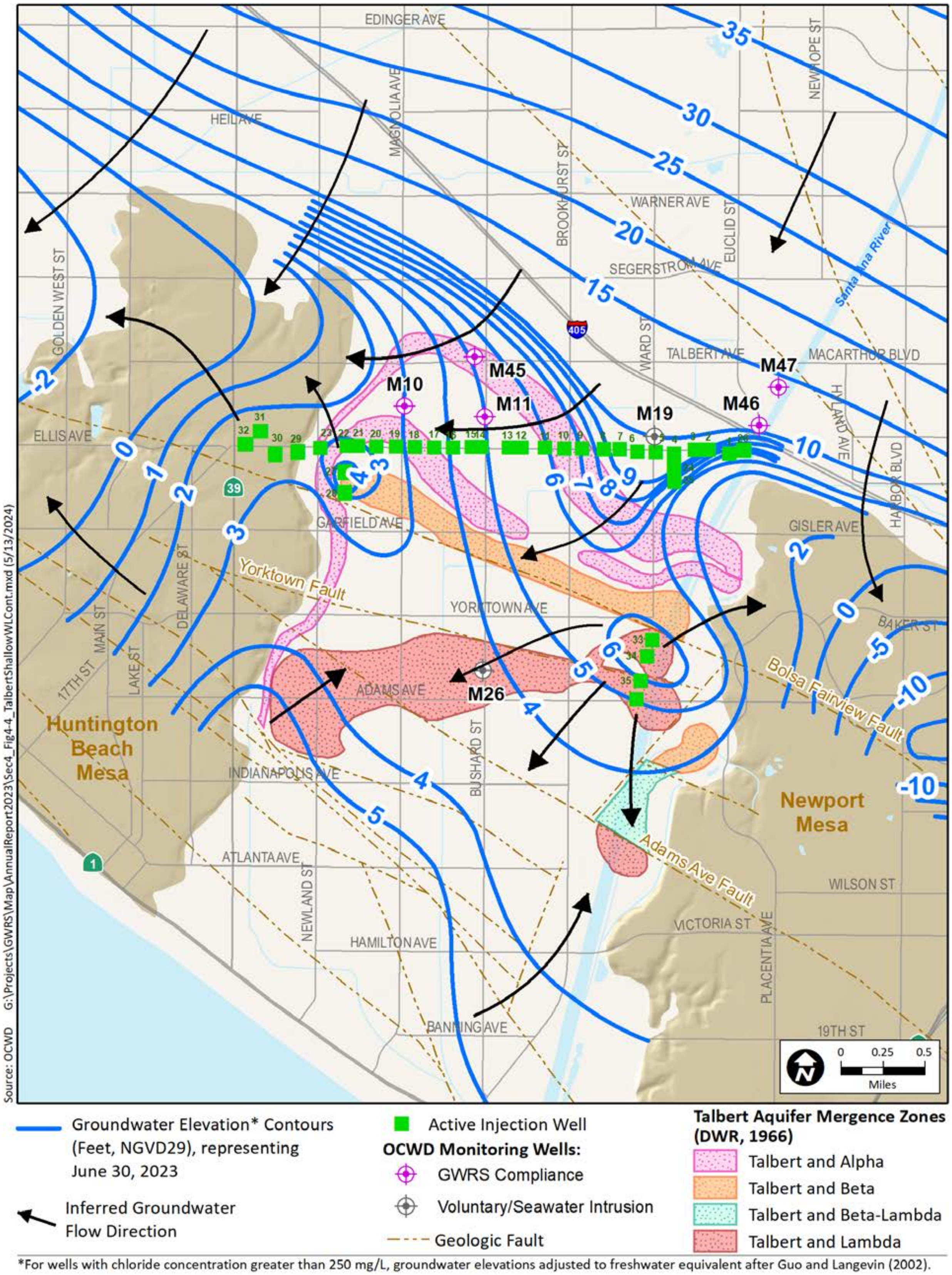


Figure 4-4. Shallow Aquifer Potentiometric Surface with Inferred Groundwater Flow Directions in the Talbert Gap Area During 2023

4.3.1.1 Key Monitoring Well M26

Monitoring well M26 is strategically located seaward of the barrier in the Talbert-Lambda mergence zone in the middle of the Talbert Gap (Figure 4-2 and Figure 4-4) and is screened across the merged Talbert and Lambda aquifers. Therefore, M26 is a key monitoring well for evaluating barrier injection requirements versus seawater intrusion potential. M26 is located approximately 1,000 feet north of Adams Avenue, which approximately represents the line at which the goal is to achieve protective groundwater elevations of approximately 3 feet above mean sea level (ft msl). This protective elevation is based on the Ghyben-Herzberg relation (Ghyben, 1888; Herzberg, 1901; Freeze and Cherry, 1979, pp. 375-376), which accounts for the depth of the Talbert aquifer at that location along with the density difference between saline and fresh groundwater. If this protective elevation is achieved in the Talbert-Lambda mergence zone area, at least on average during the year, then there would be no net annual inland movement of brackish groundwater; brackish water in the Talbert aquifer would ideally be maintained slightly seaward of the mergence zone and thus prevented from migrating down into the Lambda aquifer that is tapped by inland production wells.

Figure 4-5 shows the historical inter-relationship between coastal groundwater production, Talbert Barrier injection, and groundwater elevations at M26 over the last 15 years since the commencement of GWRS in January 2008. Groundwater elevations at M26 were approximately 15 feet below mean sea level at the beginning of 2008. This represented the lowest conditions at this well over the last 15 years because barrier injection supply was limited during 2007 before GWRS AWPF startup. Also, Basin pumping reached a historical maximum during 2007.

With the startup of several new injection wells in January 2008, coinciding with commencement of GWRS, the injection volume was significantly increased from previous years. This caused groundwater elevations at M26 to rise over a two-year period to reach protective elevations by the beginning of 2010 (Figure 4-5). Since then, groundwater elevations at M26 have consistently been maintained at or above protective elevations except for brief periods related to AWPF shutdowns, such as in June 2014.

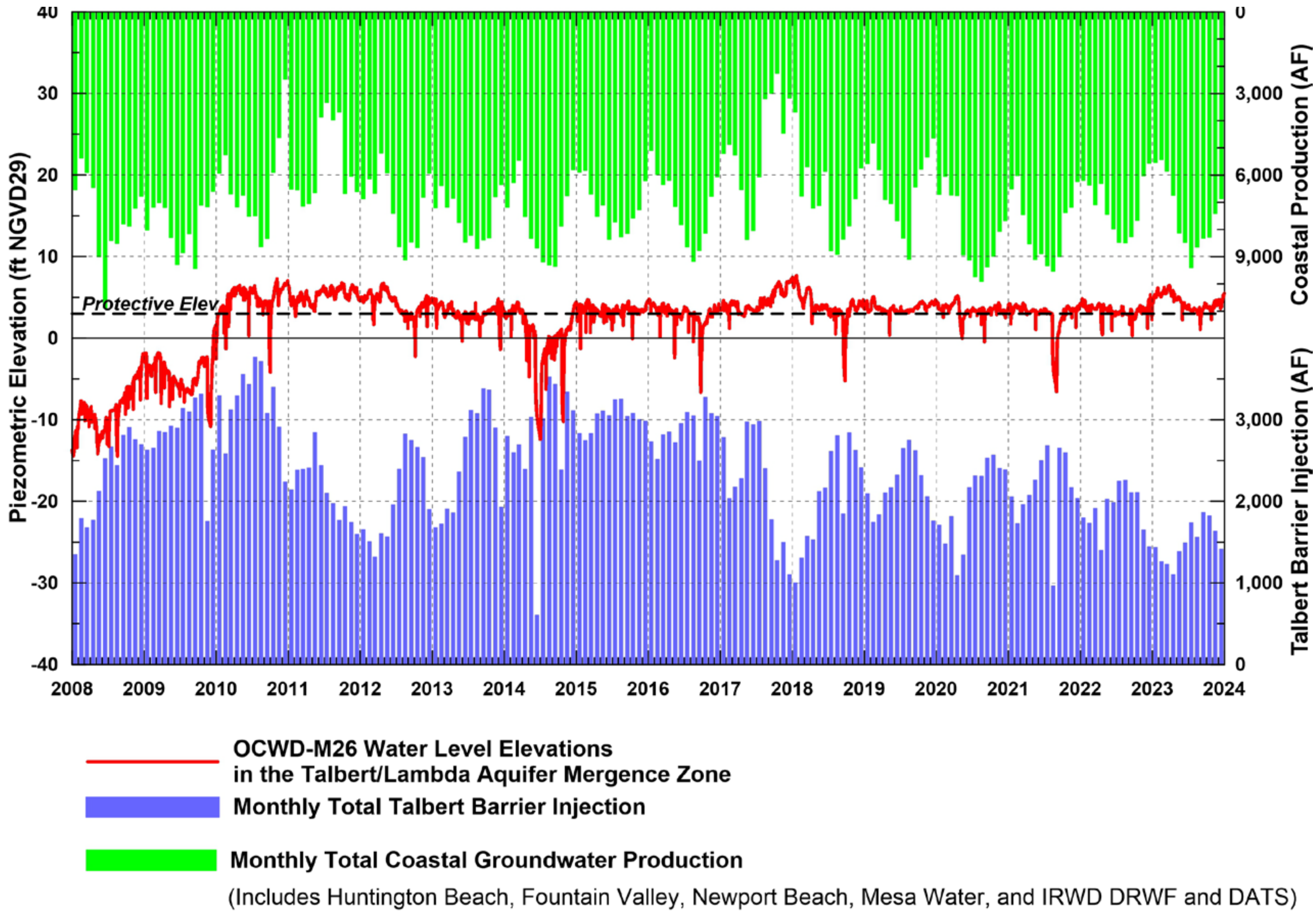


Figure 4-5. Talbert Barrier Injection, Coastal Production, and M26 Groundwater Levels

4.3.2 Main Aquifer

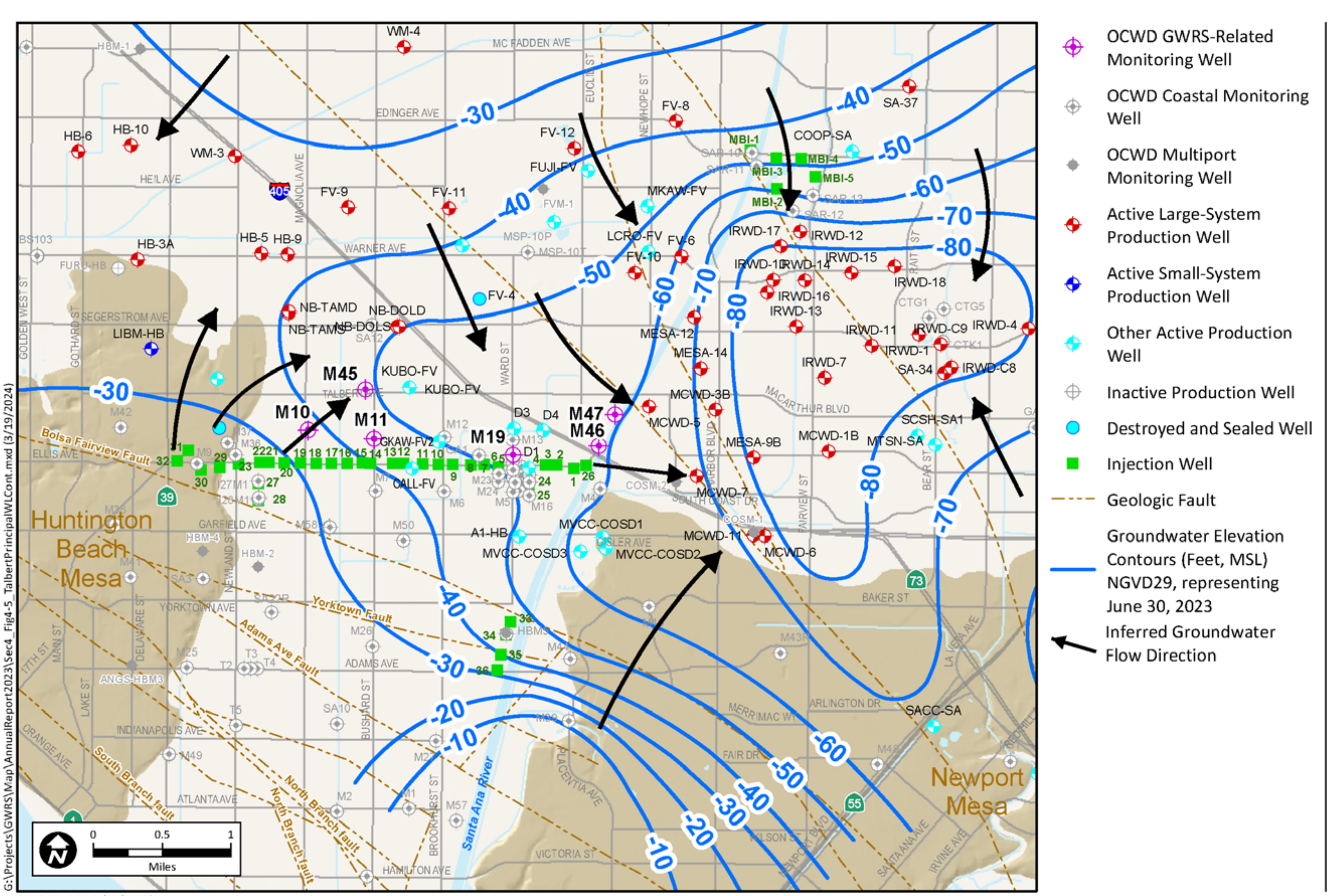
Figure 4-6 shows interpreted groundwater elevation contours and inferred groundwater flow directions within the lower portion of the Principal aquifer system for June 30, 2023. Over 90% of Basin pumping occurs from the Principal aquifer system, which vertically from top to bottom includes the Beta, Lambda, Omicron, Upper Rho, Lower Rho, and Main aquifers. The groundwater elevation contours shown on Figure 4-6 most closely represent the lower portion of the Principal aquifer system and thus for convenience will be referred to herein more specifically as Main aquifer groundwater elevations. The Main aquifer typically has the lowest groundwater elevations in the area.

Consistent with prior years, the June 2023 Main aquifer groundwater elevations shown on Figure 4-6 indicate a large pumping depression to the north-northeast of the barrier. The southern portion of the pumping depression encompasses the Mesa Water production wells, and the northern extent encompasses the majority of the IRWD Dyer Road Well Field (DRWF). At approximately -80 ft msl, the June 2023 Main aquifer groundwater elevations were approximately 0-5 ft higher than the prior June in the Mesa Water and IRWD DRWF areas.

North-northwest of the barrier, production wells owned by the cities of Huntington Beach and Newport Beach are relatively fewer and more spread out, and therefore create a less pronounced pumping depression. June 2023 Main aquifer groundwater elevations in this area were approximately -40 ft msl (Figure 4-6), approximately 5-10 ft higher than the prior June.

Figure 4-6 shows Main aquifer groundwater elevations of approximately -30 ft msl at the west end of the Talbert Barrier. Three of the six Talbert Barrier west-end deep injection wells were off-line for electrical repairs for approximately six months during 2023; thus, June 2023 Main aquifer groundwater elevations were approximately 5-10 ft lower than the prior June in this area. As shown in Figure 4-6, the inferred groundwater flow direction from the west end of the barrier was predominantly inland to the north-northeast towards the Newport Beach well field and Huntington Beach wells HB-5 and HB-9, as in previous years.

On the east end of the barrier, there are only two Main aquifer injection wells: I24/2 and I26C. As illustrated on Figure 4-6, their combined injection is typically not substantial enough to create a noticeable mound in the Main aquifer, especially given the aforementioned pumping depression to the east-northeast caused by the Mesa Water and IRWD DRWF and the pumping influence of the nearby OCWD Deep wells (D1, D3, and D4) used periodically for GAP blending supply. These two deep injection wells are typically kept on-line throughout the year, but I24/2 was off-line throughout 2023 for maintenance repairs as discussed in Section 3. June 2023 Main aquifer groundwater elevations near the east end of the barrier were approximately -55 ft msl,



SOURCE: OCWD (04/2023)

Figure 4-6. Main Aquifer Potentiometric Surface with Inferred Groundwater Flow Directions in the Talbert Gap Area During 2023

approximately 5 feet higher than the prior June. Although Main aquifer groundwater elevations shown on Figure 4-6 were well below sea level, the Main aquifer is not directly susceptible to seawater intrusion in this area due to the Newport-Inglewood Fault Zone acting as an effective barrier to inland groundwater flow in the Main aquifer. All eight Main aquifer injection wells are primarily used for Basin replenishment.

4.3.3 Barrier Monitoring Well Trends

The groundwater elevation contour maps in the previous sections for the Shallow aquifer (Figure 4-4) and Main aquifer (Figure 4-6) represent one snapshot in time at the end of the water year (June 30). Throughout the calendar year, groundwater elevation trends in the barrier monitoring wells typically exhibit a seasonal pattern: (1) rising or remaining high during the winter and early spring months, (2) declining in the late spring and summer months to a low point in September, and (3) recovering in the fall months to the end of the year. In the coastal area, these seasonal groundwater level trends are largely controlled by coastal pumping which is greatest in the summer months due to seasonal water demands and to a lesser degree by barrier injection. During 2023, groundwater elevation trends at the barrier compliance monitoring wells followed this typical seasonal pattern.

4.4 Groundwater Quality

This section describes monitoring well groundwater quality in the vicinity of the Talbert Barrier. Groundwater quality for production wells in the vicinity of the Talbert Barrier is also summarized.

4.4.1 Monitoring Wells

Quarterly compliance groundwater quality data for the Talbert Barrier monitoring wells for 2023 are presented in Appendix G. General groundwater quality data for the barrier compliance monitoring wells for the last five years (2019-23) are summarized in Appendix H. Barrier compliance monitoring wells were tested for an extensive list of inorganic and organic parameters including constituents with secondary MCLs, 1,4-dioxane, and NDMA.

Table 4-2 shows all instances of secondary MCL exceedances at barrier compliance monitoring wells during 2023. Apparent color was detected at concentrations exceeding the secondary MCL of 15 color units at four separate monitoring well casings all screened in the Main aquifer at three sites (M45, M46, and M47). Apparent color is monitored annually at the barrier compliance wells and all exceedances were from the annual monitoring event in Q1. The elevated color levels are likely due to the presence of naturally occurring organic matter in this very old groundwater commonly found within the Main and Lower Main aquifers in this coastal area and therefore unrelated to purified recycled water injection.

Table 4-2. Secondary MCL Exceedances at Talbert Barrier Compliance Wells

	Background (pre-2008)		2021		2022		**2023**		Notes/Trends
	Range	Mean	Range	Mean	Range	Mean	**Range[1]**	**Mean**	
APCOLOR (Secondary MCL = 15 Color Units)									
OCWD-M45/5	100-120	114	96-110	102	90-110	98	**110**	**110**	Colored water zone; concentrations stable at background pre-GWRS levels.
OCWD-M46/4	30-40	34	13-15	14	15-20	19	**15**	**15**	Colored water zone; concentrations stable below background pre-GWRS levels.
OCWD-M46/5	25-50	35	55-63	58	60-70	66	**70**	**70**	Colored water zone; concentrations slightly increasing, unrelated to GWRS injection.
OCWD-M47/5	70-80	79	60-76	67	70-80	74	**60**	**60**	Colored water zone; concentrations stable below background pre-GWRS levels.

[1] Sampled once in 2023.

Earlier changes in the GWRS groundwater monitoring program reduced the required frequency for some analytes from quarterly to annually based on a history of no detections (RWQCB, 2011 and CDPH, 2010; RWQCB 2018 and DDW, 2018) and eliminated a former permit requirement for total coliform monitoring at the GWRS groundwater compliance monitoring wells (RWQCB, 2018; DDW, 2018). The GWRS permit Monitoring and Reporting Program issued by the RWQCB in November 2020 formally incorporated both the removal of the total coliform monitoring requirement and the select monitoring frequency reductions (RWQCB, 2020). As noted in Section 4.2, additional changes to the required constituents for Talbert Barrier compliance monitoring were also made as part of the new GWRS permit (RWQCB, 2022a).

As noted in previous annual reports, dissolved chloride concentrations can be used to trace the subsurface movement of injection water because chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer. Thus, chloride is a relatively good conservative tracer. Arrival times at the Talbert Barrier have been documented previously in the GWRS Ramp Up Demonstration Report (DDB Engineering, Inc., 2009b). Arrival times at the Talbert Barrier were recently re-analyzed and re-confirmed (Section 4.1).

For tracking purposes, GWRS chloride concentrations are very low with an annual average ranging from 4-11 mg/L since 2008 and are therefore much lower than pre-GWRS (WF-21) injection which predominantly ranged from approximately 50-100 mg/L (with a few sporadic years slightly lower in the 20-50 mg/L range). Chloride concentrations in GWRS water are also noticeably lower than fresh native groundwater. Native groundwater inland of the barrier that is not impacted by seawater intrusion typically possesses chloride concentrations within the range of older pre-GWRS injection water in the shallow zones (Talbert and Alpha aquifers); lower than pre-GWRS injection water but still noticeably higher than GWRS water in the intermediate depth zones (Beta, Lambda, Omicron, and Upper Rho aquifers); and just slightly higher than GWRS water in the deeper Lower Rho and Main aquifer zones (15-20 mg/L). Only the shallow and intermediate depth aquifer zones are susceptible to seawater intrusion and have thus historically received pre-GWRS injection water.

In 2000-2001, OCWD discovered elevated levels of 1,4-dioxane and NDMA present in injection water produced by WF-21. Subsequently, OCWD began frequent monitoring for 1,4-dioxane and NDMA at several locations: in the WF-21 source water, intermediate treatment steps, final product water, and monitoring and production wells located near the Talbert Barrier. By 2001, OC San and OCWD implemented additional source control measures and installed a UV/AOP treatment process as part of WF-21 to produce injection water in compliance with drinking water guidance levels for 1,4-dioxane and NDMA.

During GWRS arrival at a well, antecedent higher chloride concentrations characteristically decrease; this is typically accompanied by a contemporaneous decrease in any antecedent 1,4-dioxane concentrations present due to the historical impact of WF-21 injection. During high Basin conditions, several wells often exhibit a shift or reversal in the typically inland hydraulic gradient emanating from the barrier, causing older pre-GWRS (WF-21) water to migrate back to these wells; therefore, these gradient reversals typically lead to an increase in both chloride and 1,4-dioxane concentrations back toward pre-GWRS levels. These shifts can be observed seasonally within a given year and/or across multi-year periods. At some wells however, a gradient reversal indicated by increasing chloride concentrations may not lead to an increase in 1,4-dioxane concentrations if the pre-GWRS antecedent condition was native groundwater devoid of 1,4-dioxane. The chloride versus 1,4-dioxane relationship can be summarized as follows:

a) GWRS arrival – decrease in both chloride and 1,4-dioxane (if the latter is present in the pre-GWRS background condition);
b) Re-arrival of WF-21 water (gradient reversal) – increase in chloride and 1,4-dioxane (if the latter is present in the pre-GWRS background condition); and
c) Re-arrival of native groundwater (gradient reversal) – chloride increase without any increase in 1,4-dioxane.

Figure 4-7 for OCWD-M11/4 (Lambda and Omicron aquifers) presents an illustrative example of the correlation between chloride and 1,4-dioxane. From 2013-2014, chloride concentrations at M11/4 were low and stable at GWRS levels, indicating approximately 100% GWRS arrival during that time. During that same time, 1,4-dioxane concentrations were also low and stable and were largely non-detect, confirming the 100% GWRS water arrival. During 2015, both chloride and 1,4-dioxane concentrations increased notably, signaling some proportion of older WF-21 water migrating back to this well due to a reversal in the gradient from landward to seaward.

Chloride and 1,4-dioxane time series graphs like Figure 4-7 for all five barrier compliance wells and voluntary monitoring well M19 were shown and discussed in detail in the 2022 and prior annual reports.

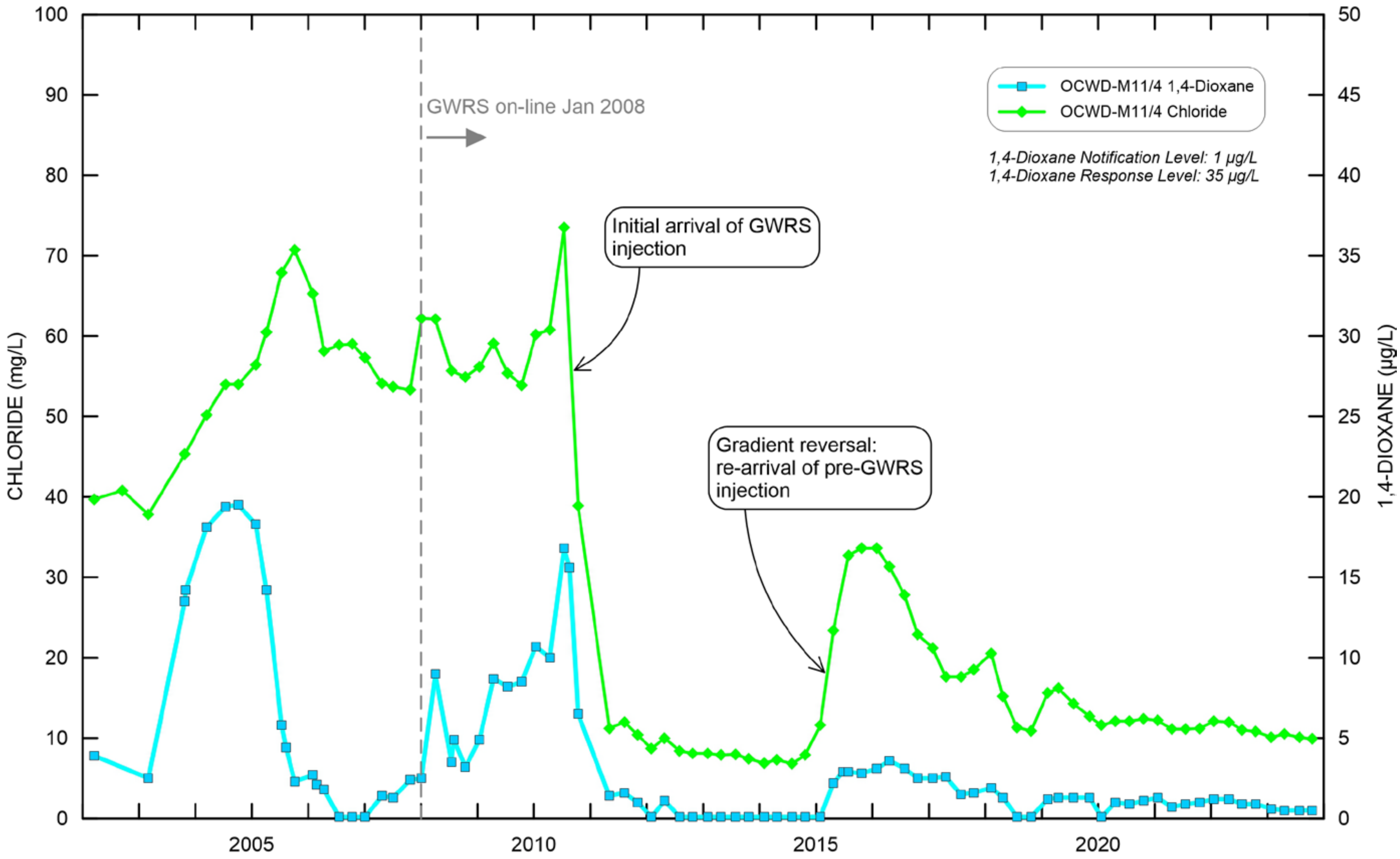


Figure 4-7. Compliance Monitoring Well OCWD-M11/4 Chloride and 1,4-Dioxane Concentrations

OCWD has continued testing for NDMA and voluntary testing for 1,4-dioxane at monitoring wells and production wells near the Talbert Barrier. NDMA and 1,4-dioxane concentrations from the compliance monitoring wells are presented in Appendix H. During 2023, all NDMA results were below regulatory limits. Concentrations of 1,4-dioxane were detected above the Notification Level (NL) of 1 µg/L at the following compliance wells during 2023:

- M10/3 (4.1 – 4.4 µg/L)
- M10/4 (0.8 – 1.1 µg/L)
- M45/3 (1.8 – 4.6 µg/L)
- M45/4 (0.8 – 1.1 µg/L)

These detections were all well below the Response Level (RL) of 35 µg/L. Concentrations of 1,4-dioxane exceeding the NL have frequently been detected at these wells as shown in previous annual reports. These detections are not linked to GWRS injection which is devoid of 1,4-dioxane; rather, they are attributed to some percentage of pre-GWRS (WF-21) water either remaining or re-arriving at these wells due to the gradient reversals exemplified in Figure 4-7. As was discussed above, these gradient reversals often occur during high Basin conditions, as during 2022-2023.

4.4.2 Production Wells

Groundwater quality data for water samples collected during 2023 from several potable and non-potable production wells in the vicinity of the Talbert Barrier are summarized in Table 4-3.

OCWD has established a primary boundary of 12 months underground travel time from the injection operation at the Talbert Barrier. Any new drinking water wells are to be constructed outside this primary boundary. The secondary boundary is defined as the area less than 12 months underground travel time from the Talbert Barrier injection operations. Generally, any new drinking water wells proposed to be constructed near the secondary boundary must be evaluated to assess any potential impact that the proposed well may have on the primary boundary, potentially changing the boundaries. In the case of the Talbert Barrier, the secondary boundary coincides with the primary boundary; therefore, drinking water wells are to be constructed outside the secondary boundary.

The Talbert Barrier injection operation complies with the GWRS permit requirements for underground retention time. The primary boundary is supported by Resolution No. 05-4-40 adopted by the OCWD Board of Directors on April 20, 2005 (OCWD, 2005). OCWD has notified the OCHCA and the City of Fountain Valley, which are the well permitting agencies in this area, of this boundary area requirement. The Orange County Well Standards Advisory Board has also been notified. No new drinking water wells have been installed in the 12-month underground retention area. As noted in Section 4.2, DDW is currently evaluating an updated and slightly smaller retention time boundary for the Talbert Barrier. If approved by DDW, this revised

Table 4-3. 2023 Water Quality for Potable and Non-Potable Wells Within the Influence of the Talbert Barrier

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Injection Site (ft)[2]	Concentration [3,4]								
				Arsenic (As) ug/L	Chloride (Cl) mg/L	Bromide (Br) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodi-methylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Wells												
MCWD-5	960	400 - 940	3,300	2.8 (2.7 - 2.8)	12.5 (12.2 - 12.8)	0.02 (ND - 0.02)	167 (164 - 170)	1.18 (1.13 - 1.22)	ND	0.09 (0.08 - 0.10)	ND	0.6 (0.6 - 0.7)
MCWD-7	793	363 - 753	4,200	1.7 (1.6 - 1.8)	43.5 (41.9 - 44.6)	0.12 (0.06 - 0.16)	286 (278 - 290)	0.65 (0.61 - 0.68)	ND	0.18 (0.16 - 0.19)	ND	1.7 (1.5 - 2.1)
NB-DOLD	739	399 - 729	5,300	2.8 (2.7 - 2.9)	18.4 (18.0 - 18.5)	0.02 (ND - 0.03)	206 (194 - 212)	0.23 (0.21 - 0.25)	ND	0.10 (0.09 - 0.10)	ND	1.8 (1.7 - 1.9)
NB-DOLS	366	201 - 356	5,300	1.4 (1.3 - 1.4)	65.0 (60.0 - 79.0)	0.20 (0.12 - 0.27)	501 (368 - 638)	2.29 (2.11 - 2.43)	ND	0.21 (0.19 - 0.25)	ND	ND
MCWD-3B	592	242 - 572	5,400	2.8 (2.6 - 2.9)	23.8 (21.7 - 25.9)	0.04 (ND - 0.07)	243 (240 - 246)	1.04 (0.99 - 1.09)	ND	0.09 (0.08 - 0.09)	ND	2.8 (2.3 - 3.4)
NB-TAMD	700	395 - 690	5,700	3.8 (3.6 - 4.1)	9.4 (8.2 - 9.9)	0.01 (ND - 0.01)	136 (108 - 158)	0.58 (0.52 - 0.62)	ND	0.07 (0.06 - 0.08)	ND	0.2 (ND - 0.5)
NB-TAMS	370	170 - 360	5,800	2.2 (2.2 - 2.3)	67.8 (65.9 - 70.1)	0.19 (0.09 - 0.25)	565 (522 - 604)	2.70 (2.66 - 2.73)	ND	0.26 (0.25 - 0.27)	ND	0.9 (0.6 - 1.3)
FV-10	990	460 - 980	7,600	1.6	31.3	0.09	290	1.82	ND	0.08	ND	1.5
HB-3A	660	370 - 640	7,600	2.6 (2.5 - 2.8)	77.7 (59.7 - 104.0)	0.52 (0.39 - 0.75)	260 (254 - 266)	ND	ND	0.37 (0.24 - 0.49)	ND	0.5
HB-5	820	223 - 800	8,000	2.8 (2.7 - 2.8)	23.6 (21.6 - 27.7)	0.01 (ND - 0.02)	263 (250 - 272)	0.76 (0.73 - 0.79)	ND	0.17 (0.16 - 0.18)	ND	ND
HB-9	996	556 - 996	8,000	1.3 (1.2 - 1.4)	13.3 (12.9 - 13.5)	ND	215 (204 - 226)	ND	ND	0.54 (0.52 - 0.56)	ND	ND
Small System and Private Wells												
GKAW-FV2	125	120 - 125	900	1.6	96.3 (91.6 - 101.0)	0.30 (0.28 - 0.32)	666 (658 - 674)	3.12	0.009	0.25 (0.24 - 0.26)	ND	2.4
KUBO-FV	133	122 - 132	2,900	1.9	89.6 (89.1 - 90.1)	0.29 (0.27 - 0.31)	670 (644 - 696)	4.00	ND	0.24 (0.23 - 0.25)	NR[5]	ND
LIBM-HB		NA	4,100	1.6 (1.5 - 1.6)	38.8 (36.2 - 40.9)	0.09 (ND - 0.13)	226 (184 - 268)	2.26 (2.17 - 2.40)	ND	0.08 (0.07 - 0.09)	ND	ND
Private Irrigation Wells												
CALL-FV		NA	400	2.1	8.5 (6.9 - 10.0)	0.02 (ND - 0.03)	83 (78 - 88)	1.57 (1.50 - 1.64)	ND	0.03 (ND - 0.06)	ND	ND
A1-HB	305	188 - 300	1,800	1.9	36.6 (35.0 - 38.1)	0.12 (0.11 - 0.13)	305 (296 - 314)	1.51	0.005	0.13 (0.12 - 0.14)	ND	0.8 (0.7 - 0.8)

[1] feet below ground surface

[2] Distance from Injection Site: Straight line shortest distance to the nearest Talbert Barrier injection well, estimated to the nearest 100 feet

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the detection limit

[5] NR: Not Required (this parameter was not monitored at this site during the year)

boundary will be presented to the OCWD Board of Directors for their approval, then distributed to the local well permitting agencies for enforcement.

The active municipal well closest to the Talbert Barrier is MCWD-5, which is owned and operated by Mesa Water and located approximately 3,300 feet northeast of the eastern end of the barrier. OCWD staff previously estimated the travel time for injection water to reach MCWD-5 to range from three to eight years (depending on the specific aquifer screened by the multi-aquifer production well) based on groundwater level conditions and injection operations over the last several years.

NDMA concentrations at MCWD-5 decreased below the RDL in early 2010 and remained below the RDL of 2 ng/L through 2023. To reduce drinking water concentrations of NDMA, a UV treatment system was previously operated at the MCWD-5 well site from 2001-2010. The steady decline in NDMA levels below the RDL led to a DDW-approved shutdown of the UV system in 2010 via an amendment to Mesa Water's Domestic Water Supply Permit.

Concentrations of 1,4-dioxane and chloride for MCWD-5 and injection water for the period 2002-2023 are shown on Figure 4-8. Prior to commencement of GWRS injection from 2002-2008, concentrations of 1,4-dioxane at MCWD-5 were highly variable but with a gradually decreasing trend likely due to OCWD and OC San implementing source control measures and installing a UV/AOP post-treatment process to WF-21 in 2000-2001. Intermittent increases in 1,4-dioxane concentrations during this time were likely attributable to shifts in gradient direction based on groundwater level variations as was explained in Section 4.4.1 for the GWRS compliance monitoring wells based on comparing 1,4-dioxane and chloride concentration trends. In 2008, 1,4-dioxane concentrations declined further and more steadily, likely signaling arrival of imported OC-44 potable injection devoid of 1,4-dioxane that began in late 2004. Concentrations of 1,4-dioxane have continued to gradually decrease over time since 2008 due to increasing percentages of GWRS water arriving at MCWD-5, except for minor intermittent increases in some years likely caused by subtle shifts in the gradient direction based on groundwater level variations. Figure 4-8 shows one such temporary increase in both 1,4-dioxane and chloride during 2013, likely resulting from high Basin conditions causing a shift in the gradient direction which likely brought older pre-GWRS water back to this well.

Concentrations of 1,4-dioxane have remained well below the DDW RL of 35 μg/L at MCWD-5 since sampling began in 2002 and over the last several years have gradually declined, falling below the DDW NL of 1 μg/L for the first time in 2021. During 2023, 1,4-dioxane concentrations at MCWD-5 remained low and stable at 0.6-0.7 μg/L, just above the new RDL of 0.5 μg/L.

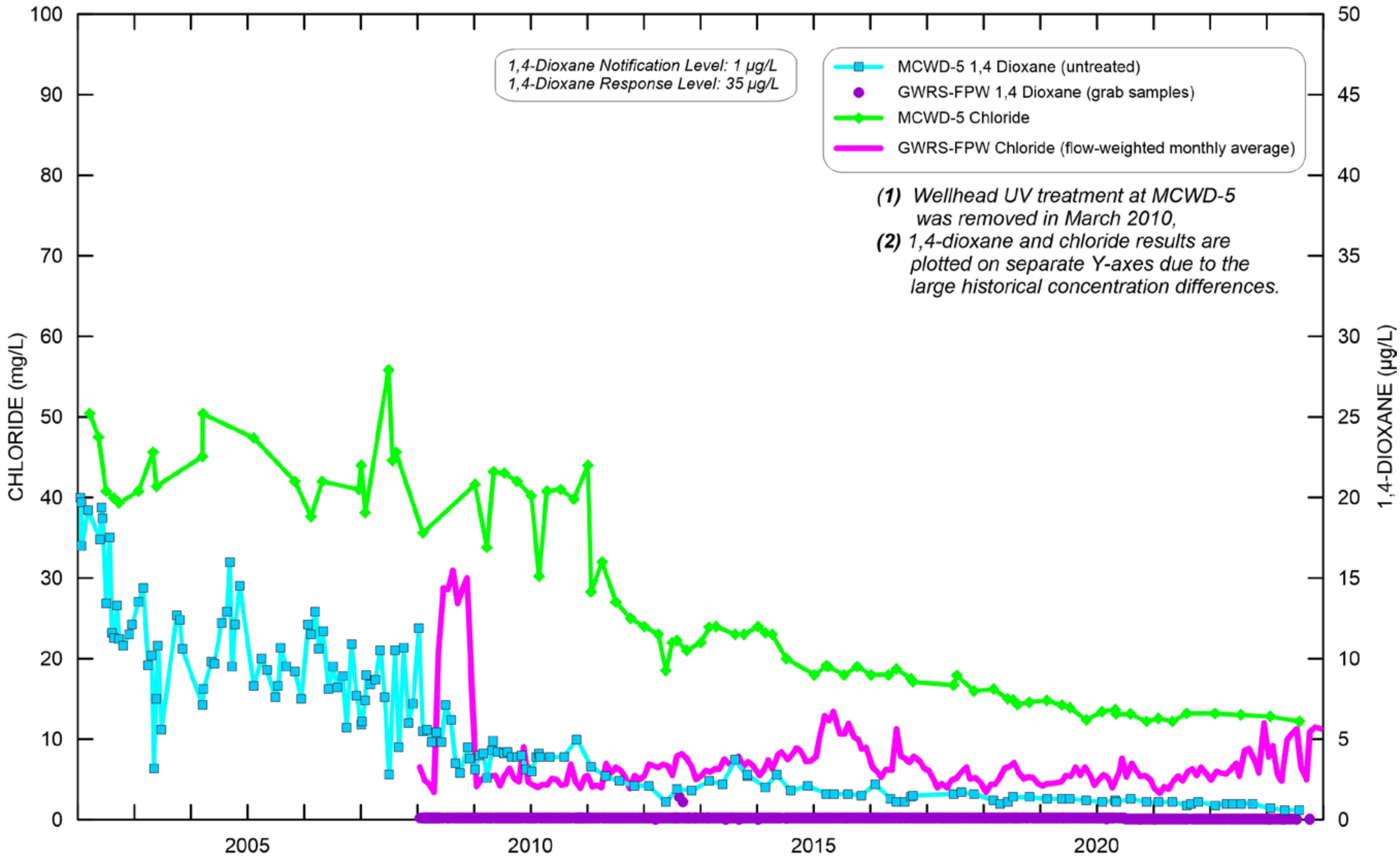


Figure 4-8. MCWD-5 Pre-Treatment and Injection Water Chloride and 1,4-Dioxane Concentrations

Since 1,4-dioxane concentrations at MCWD-5 did not quite drop below the new RDL during 2023, GWRS arrival at this well is likely still blended with at least some small percentage of older pre-GWRS injection water. Due to the vertical blending in the well from the various screened intervals at MCWD-5, travel times for the individual aquifer zones screened at MCWD-5 are not discernable based on the vertically blended 1,4-dioxane concentrations from the pumped samples. The low 1,4-dioxane concentrations at MCWD-5 over the last several years (Figure 4-8) could represent a blend of nearly 100% GWRS injection water from one or more of the screened aquifer zones along with a small fraction of older pre-GWRS injection water from one or more of the other screened aquifer zones.

Figure 4-8 shows chloride concentrations at MCWD-5 ranged from 36-56 mg/L prior to GWRS injection from 2002-2008, reflective of a blend of native groundwater and pre-GWRS (WF-21) injection. Chloride concentrations sharply decreased in early 2011, signaling the arrival of GWRS water in one or more of the screened interval zones at MCWD-5. This initial GWRS arrival of just over three years is consistent with the fastest portion of the previously calculated travel time range of three to eight years, especially given a somewhat steeper gradient from the barrier since commencement of GWRS due to the higher injection volumes.

Except for the temporary increase in 2013, chloride concentrations at MCWD-5 have decreased steadily since 2011 down to approximately 12 mg/L during 2023, still slightly higher than GWRS injection water chloride concentrations (Figure 4-8). These declining chloride concentrations confirm the progressive arrival of greater proportions of GWRS water but still less than 100% and are consistent with the decline in 1,4-dioxane concentrations just slightly above the RDL.

In 2012, OCWD became aware that existing private well GKAW-FV2/1 near the Talbert Barrier was being used to supply water to an occupied residence in Fountain Valley. Historically, this well had been used only for irrigation purposes. More recent inquiries with the owner have revealed that, beginning in approximately 2011, the well water is also being used for potable purposes with a reverse osmosis treatment system. Well GKAW-FV2/1 is located approximately 900 feet north of injection well site I10 and is perforated from 120-125 ft bgs in the Talbert aquifer. The underground retention time at this private drinking water well is estimated to be greater than 15 years since groundwater samples indicate that GWRS purified recycled water has not yet reached this well despite its proximity to the barrier.

During 2023, the chloride concentration at GKAW-FV2/1 ranged from 92-101 mg/L while 1,4-dioxane concentrations were detected at 2.4 μg/L (Table 4-3), both indicative of pre-GWRS injection water and likely some proportion of ambient groundwater. Since the inception of GWRS, the groundwater flow direction in the Talbert aquifer at GKAW-FV2/1 has predominantly been seaward to the southwest towards the barrier (rather than inland towards GKAW-FV2/1), similar to what was shown in Figure 4-4 for the Talbert aquifer during June 2023 in the vicinity of this well. All water quality sample results reported by the OCWD Laboratory are reviewed by

OCWD Water Quality Department staff and then sent to the well owner. This is consistent with typical practice by OCWD Water Quality staff for both public and private wells but is of particular importance for GKAW-FV2/1 since this well is near the Talbert Barrier.

5. KRAEMER-MILLER-MIRALOMA-LA PALMA BASINS OPERATIONS

During 2023, OCWD spread GWRS purified recycled water at Kraemer-Miller-Miraloma-La Palma (K-M-M-L) Basins to recharge the Orange County Groundwater Basin (Figure 1-1). Operation of the recharge facilities is presented in this section:

- Spreading facilities;
- Spreading water sources;
- Spreading water volumes; and
- K-M-M-L Basins operations.

5.1 Spreading Facilities

Table 5-1 summarizes the area, storage capacity and potential recharge water source(s) for each surface recharge facility owned or operated by OCWD. K-M-M-L Basins are the only spreading basins that receive GWRS purified recycled water. The locations of the surface spreading facilities are shown in Figure 5-1.

Table 5-1. Area and Storage Capacities of Recharge Facilities

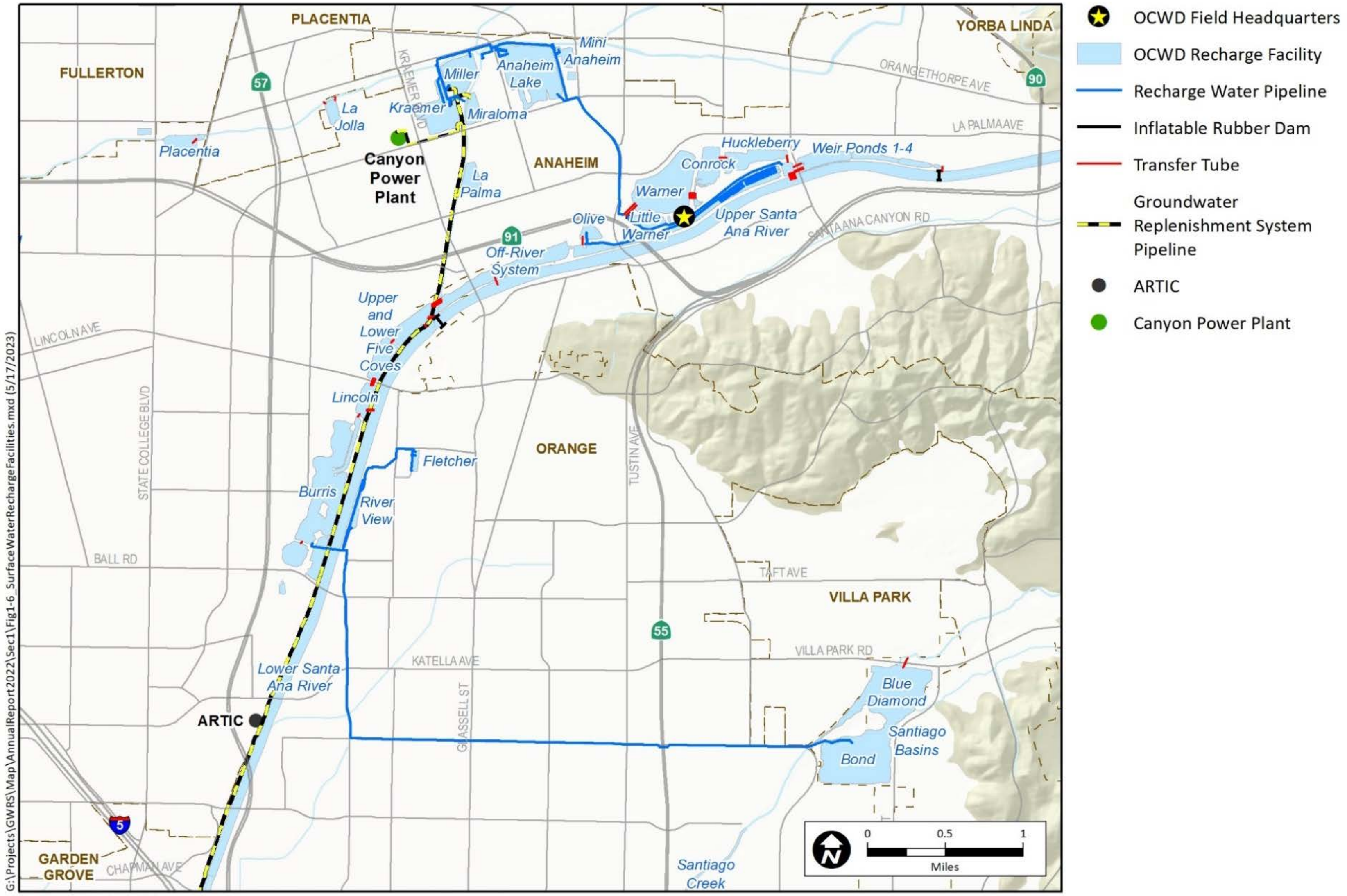
Facility	Wetted Area (acres)	Maximum Storage Capacity (AF)	Possible Recharge Sources			
			GWRS Purified Recycled Water	Captured Storm Water	Imported Water	SAR Base Flow
Kraemer Basin	31	1,055	✓	✓	✓	✓
Miller Basin	25	350	✓	✓	✓	✓
Miraloma Basin[1]	11	53	✓	✓	✓	✓
La Palma Basin[2]	14	101	✓	✓	✓	✓
Other Basins[3,4]	1,018	23,688		✓	✓	✓

[1] Miraloma Basin has been essentially dedicated for GWRS purified recycled water recharge since coming on-line in 2012 to minimize basin clogging and maintain high percolation rates (small volume of non-GWRS water recharged there in 2017).

[2] La Palma Basin continues to be dedicated for only GWRS purified recycled water recharge since coming on-line in 2016 to minimize basin clogging and maintain high percolation rates.

[3] OCWD owns and/or operates a total of 27 surface water recharge basins near the SAR and Santiago Creek. These other basins are not used for recharge of GWRS water.

[4] Quagga mussel control requirements restrict the recharge of imported Colorado River water in some of the other basins.



SOURCE: OCWD (04/2023)

Figure 5-1. Surface Water Recharge Facilities

Kraemer Basin is one of eleven deep basins used for percolation. Figure 5-2 shows a photo of Kraemer Basin, which first recharged GWRS purified recycled water on February 19, 2008. Kraemer Basin covers an area of approximately 31 acres and has a maximum storage capacity of about 1,055 AF. Based on percolation tests with low turbidity water, its maximum percolation rate is estimated at 65 MGD (100 cubic feet per second [CFS]).

Figure 5-2. Kraemer Basin

Miller Basin is a flood control basin owned by the County of Orange and conjunctively used by OCWD as a recharge basin through a cooperative agreement. Miller Basin covers an area of approximately 25 acres and has a maximum storage capacity of about 350 AF. In winter, its usable storage capacity (and thus recharge potential) is reduced for flood control purposes. More storage capacity is available at Miller Basin in the summer. Its estimated maximum percolation rate is 29 MGD (45 CFS), assuming percolation of low turbidity GWRS and/or imported water. Shown on Figure 5-3, GWRS purified recycled water recharge first began at Miller Basin on January 17, 2008.

Figure 5-3. Miller Basin with GWRS Purified Recycled Water in 2008

Miraloma Basin is located immediately southeast of Kraemer-Miller Basins and along Carbon Creek Diversion Channel. Pictured on Figure 5-4, Miraloma Basin covers an area of approximately 11 acres and has a maximum storage capacity of about 53 AF. Based on the observed percolation of GWRS purified recycled water, its maximum percolation rate is estimated at 30 MGD (46 CFS). GWRS purified recycled water recharge first began at Miraloma Basin on July 26, 2012. Since then, OCWD has predominately recharged purified recycled water at Miraloma Basin, though the recharge was briefly supplemented with a small volume of non-GWRS water in 2017. The AAP is located at Miraloma Basin and began operation in July 2021.

La Palma Basin is the newest spreading basin located south of Kraemer and Miraloma Basins along Carbon Creek Diversion Channel as shown on Figure 5-5. La Palma Basin covers an area of approximately 14 acres and has a maximum storage capacity of about 101 AF. La Palma Basin has demonstrated exceptional percolation capabilities, achieving an estimated maximum percolation rate of 65 MGD (100 CFS). GWRS purified recycled water spreading first began at La Palma Basin on November 9, 2016. Since then, La Palma Basin has been dedicated to recharging purified recycled water and recharged more than 42% of all GWRS production during 2023.

Figure 5-4. Miraloma Basin with GWRS Purified Recycled Water in 2012

Figure 5-5. La Palma Basin with GWRS Purified Recycled Water in 2016

5.2 Spreading Water Sources

Water from three sources is typically percolated at K-M-M-L Basins: (1) GWRS purified recycled water; (2) SAR base flow and captured storm flow; and (3) untreated imported water. During 2023, only GWRS and SAR water were percolated at K-M-M-L Basins. Due to relatively high Basin conditions and less Basin pumping due to PFAS, no imported replenishment water was purchased during 2023. Except for a minor volume of other water recharged at Miraloma Basin in 2017, both Miraloma Basin and La Palma Basin have been dedicated to recharging GWRS purified recycled water since their inception to prevent long-term clogging and maintain their exceptionally high percolation rates.

Prior to 2014, the volume of diluent water (recharge water of non-wastewater origin) was formally recorded for determining compliance with the maximum allowable Recycled Water Contribution (RWC), which was 75% at Kraemer-Miller-Miraloma Basins (La Palma Basin was not in operation at that time). Diluent consisted of SAR captured storm flow and imported water; SAR base flow was not classified as a diluent because the year-round base flow is principally comprised of tertiary treated wastewater effluent from upstream dischargers. Recharge of diluent at the nearby Anaheim Lake, Mini-Anaheim Lake, and La Jolla Basin were applied to the RWC calculation because of their effective blending with GWRS recharge at K-M-M-L Basins.

In 2014 DDW approved a maximum RWC at K-M-M-L Basins of 100%, eliminating the blending requirement. The volumes of spreading water from the aforementioned sources are reported herein for K-M-M-L Basins, but determination of the RWC and compliance with the RWC limit are no longer required. Therefore, the two non-GWRS sources are grouped together herein as “other water.” The volumes of water recharged at Anaheim Lake, Mini-Anaheim Lake, and La Jolla Basins can be found in the 2022 and earlier annual reports.

5.3 Spreading Water Volumes and Flow Rates

Spreading water volumes recharged in K-M-M-L Basins in 2023 are presented below and compared with historical spreading amounts.

5.3.1 2023 Spreading Water Quantities

Table 5-2 presents the monthly recharge volumes at each of the individual GWRS recharge basins. During 2023, a total volume of approximately 33,934 MG (104,138 AF) of GWRS purified recycled water and other water, comprised of SAR water and imported water, was recharged at K-M-M-L Basins.

The monthly volumes of water that were recharged at K-M-M-L Basins during calendar year 2023 based on OCWD Forebay Operations’ percolation records. The percolation records typically differ slightly from the AWPF purified recycled water production records due to storage effects in the spreading basins, GWRS Pipeline, flow measurement/metering inaccuracies, and unmeasured rainfall and local runoff to the basins. Based on AWPF flow records during 2023, the following volumes and average daily flow rates of GWRS purified recycled water were delivered to the Anaheim Forebay:

- Kraemer Basin received 2,368 MG (7,267 AF), or 6.49 MGD on average;
- Miller Basin received 3,405 MG (10,450 AF), or 9.33 MGD on average;
- Miraloma Basin received 6,939 MG (21,294 AF), or 19.01 MGD on average; and
- La Palma Basin received 15,531 MG (47,662 AF), or 42.55 MGD on average.

The total volume of GWRS purified recycled water recharged at the K-M-M-L Basins during 2023 was 28,242 MG (86,673 AF). The annual average daily flow rate of GWRS purified recycled water spread in 2023 was 77.38 MGD.

Captured flow was diverted from the SAR and recharged at Kraemer and Miller Basins during 2023. No imported replenishment water was purchased in 2023 due to high Basin conditions and reduced pumping due to PFAS. In 2023, a total of approximately 5,741 MG (17,618 AF) of other (non-GWRS) water comprised solely of SAR flows was recharged at Kraemer and Miller Basins. Kraemer and Miller Basins received both GWRS purified recycled water and non-GWRS (other) water during 2023. Miraloma and La Palma Basins received only GWRS purified recycled water during 2023 (excluding any unmeasured rainfall or site runoff). Miraloma and La Palma Basins have been dedicated almost exclusively to GWRS water as noted in Section 5.2.

Figure 5-6 illustrates the total 2023 water supply volumes recharged at K-M-M-L Basins. As noted above, a total of approximately 28,242 MG (86,673 AF) of GWRS purified recycled water was recharged at K-M-M-L Basins. Approximately 55% of the GWRS purified recycled water pumped to the Anaheim Forebay was recharged at La Palma Basin during 2023.

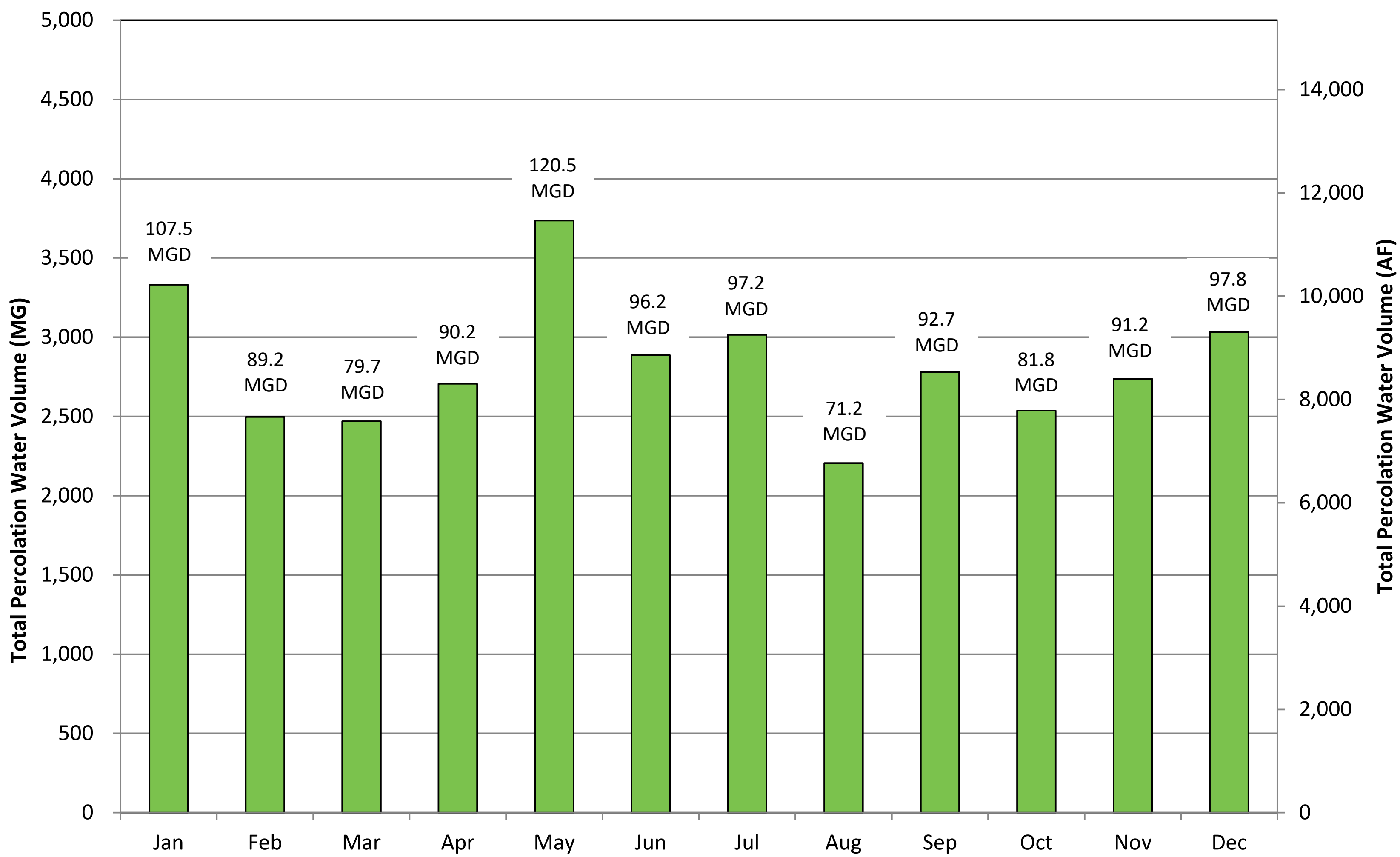
Figure 5-6 also shows how the recharge of GWRS purified recycled water at K-M-M-L Basins varied on a month-to-month basis. The monthly volume of purified recycled water delivered to K-M-M-L Basins varied throughout 2023, ranging from 4,151 AF in March to 8,838 AF in December; the low volume in March was due to above average rainfall, which reduced AWPF production (See Table 5-2) since Kraemer-Miller Basins were full with captured SAR storm flow. The amounts of other (SAR) water varied seasonally based on winter/spring rainfall and unusual rainfall in late August leading to higher captured SAR storm flow recharge in September. Other water monthly volumes ranged from 1 AF in October to 3,680 AF in March. The monthly volume of GWRS purified recycled water exceeded the monthly volume of other water recharged at K-M-M-L Basins throughout 2023.

Table 5-2. 2023 Summary of Spreading Water Locations and Volumes at K-M-M-L Basins [1]

Month	Kraemer Basin				Miller Basin				Miraloma Basin				La Palma Basin				Total GWRS Water		Total Change in Storage	Total Other Water	TOTAL PERCOLATION		
	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	GWRS Water (AF)	Change in Storage (AF)	Other Water (AF)	Total Percolation (AF)	(AF)	(MG)	(AF)	(AF)	(AF)	(MG)	Average (MGD)
Jan	2,008	116	2,242	4,134	1,889	270	0	1,619	631	0	0	631	3,838	-2	0	3,840	8,366	2,726	385	2,242	10,224	3,332	107.5
Feb	2,861	12	464	3,313	1,516	-123	0	1,639	166	-40	0	206	2,502	-4	0	2,506	7,045	2,296	-154	464	7,664	2,497	89.2
Mar	329	62	2,197	2,464	25	213	1,484	1,296	1,805	33	0	1,772	1,991	-56	0	2,047	4,151	1,352	252	3,680	7,579	2,470	79.7
Apr	0	-15	1,646	1,661	65	69	1,616	1,612	2,165	4	0	2,161	2,862	-8	0	2,870	5,092	1,659	50	3,262	8,304	2,706	90.2
May	0	8	1507	1,499	0	-1	1,834	1,835	2,519	-22	0	2,541	5,455	-135	0	5,590	7,973	2,598	-150	3,341	11,465	3,736	120.5
Jun	405	-378	304	1,087	0	-266	12	278	2,224	24	0	2,200	5,365	70	0	5,295	7,994	2,605	-551	316	8,860	2,887	96.2
Jul	0	-60	0	60	1,331	13	1,081	2,399	1,395	-4	0	1,399	5,393	0	0	5,393	8,119	2,645	-51	1,081	9,251	3,014	97.2
Aug	0	126	175	49	1,034	-54	44	1,132	1,299	-3	0	1,302	4,377	90	0	4,287	6,710	2,187	159	219	6,770	2,206	71.2
Sep	0	-6	2,320	2,326	856	32	0	824	1,377	6	0	1,371	3,994	-18	0	4,012	6,227	2,029	14	2,320	8,533	2,780	92.7
Oct	881	165	0	716	2,733	61	1	2,673	1,512	58	0	1,454	2,823	-117	0	2,940	7,948	2,590	167	1	7,783	2,536	81.8
Nov	783	-4	0	787	1,001	-96	131	1,228	2,961	-2	0	2,963	3,464	45	0	3,419	8,209	2,675	-57	131	8,397	2,736	91.2
Dec	0	0	0	0	0	115	559	444	3,242	17	0	3,225	5,596	-43	0	5,639	8,838	2,880	90	559	9,308	3,033	97.8
TOTAL	7,267	26	10,855	18,096	10,450	233	6,762	16,979	21,294	69	0	21,225	47,662	-176	0	47,838	86,673	28,242	152	17,618	104,138	33,934	93.0

[1] Volumes include:

- GWRS purified recycled water (GWRS water) data are based on AWPF flow meter records and Forebay Operations' records for flows discharged to individual spreading basins.
- Other water calculated as: Total Percolation - GWRS water + Change in Storage, based on Forebay Operations' records and typically include Santa Ana River (SAR) water and/or imported water.
- Total percolation volumes are based on Forebay Operations' percolation records.
- Change in Storage represents water retained in the basin that has not yet percolated based on Forebay Operations' records at the beginning and end of each month. The change in storage values were also adjusted for some months to account for unmeasured inter-basin water transfers and to balance reported GWRS deliveries with measured total percolation for each basin.



Note: Total percolation water is GWRS water plus other water less change in basin storage at K-M-M-L Basins. Other water is SAR water and/or imported water. Average total percolation flow rate shown in MGD.

Figure 5-6. 2023 Monthly Percolation Water Volumes at K-M-M-L Basins

The annual average daily flow rate of GWRS purified recycled water recharged at K-M-M-L Basins was 77.4 MGD during 2023, which was attributed to completion of the GWRSFE and greater AWPF production capacity. The combined average daily flow rate of other water (SAR water only in 2023) recharged at Kraemer and Miller Basins was approximately 15.7 MGD.

5.3.2 Historical Spreading Water Quantity

Prior to 2008, only SAR water and imported water were recharged at Kraemer-Miller Basins. GWRS purified recycled water spreading began at Kraemer Basin in February 2008 and continued through 2023. Purified recycled water spreading began at Miller Basin in January 2008 and continued through 2023. Purified recycled water spreading began at Miraloma Basin in July 2012 and has essentially been constant since, except for the April 2020 – January 2021 construction period for the AAP. Purified recycled water spreading began at La Palma Basin in November 2016 and continued through 2023.

Table 5-3 and Figure 5-7 compare the volume of purified recycled water and other water recharged at K-M-M-L Basins in 2023 with historical recharge data since the GWRS began operation in January 2008. Since 2008, the highest purified recycled water volume that was delivered to K-M-M-L Basins occurred in 2023 (28,242 MG or 86,673 AF) because of GWRSFE being on-line, which increased AWPF production capacity up to 130 MGD. In addition, the high coastal groundwater levels in 2023 resulted in less injection into the Talbert seawater intrusion barrier and relatively higher flow available for surface recharge at K-M-M-L Basins. Prior to GWRSFE, the previous peak purified recycled water volume delivered to K-M-M-L Basins occurred in 2019 (24,240 MG or 74,391 AF). The purified recycled water volumes delivered to K-M-M-L Basins from 2020 through 2022 were approximately 10% to 20% less than the 2019 peak volume due to the four Centennial Park MBI wells coming on-line in 2020, as well as AWPF shutdowns for GWRSFE construction, GWRS Pipeline inspection, and demand response program power curtailments that limited deliveries to the Forebay. Completion of these projects and the GWRSFE by 2023 boosted purified recycled water deliveries to K-M-M-L Basins by approximately 30% to 45%.

The combined total of 104,138 AF (GWRS and other water) recharged at K-M-M-L Basins during 2023 was approximately 21% greater than the 2022 volume, primarily attributable to the increased volume of GWRS purified recycled water recharge at K-M-M-L Basins. The recharge volume of other water (SAR and/or imported) at K-M-M-L Basins in 2023 was approximately 13% less than in 2022; the additional SAR flow in 2023 stemming from the above average rainfall nearly offset the lack of any imported water recharged in 2023. Rainfall at the OCWD Field Headquarters in Anaheim was significantly greater in 2023 (24.36 in) than in 2022 (6.71 in). No imported replenishment water was purchased and recharged during 2023 (0 AF) as compared with 2022 (19,842 AF).

Table 5-3. Summary of Annual Spreading Water Sources and Volumes Since 2008 at K-M-M-L Basins

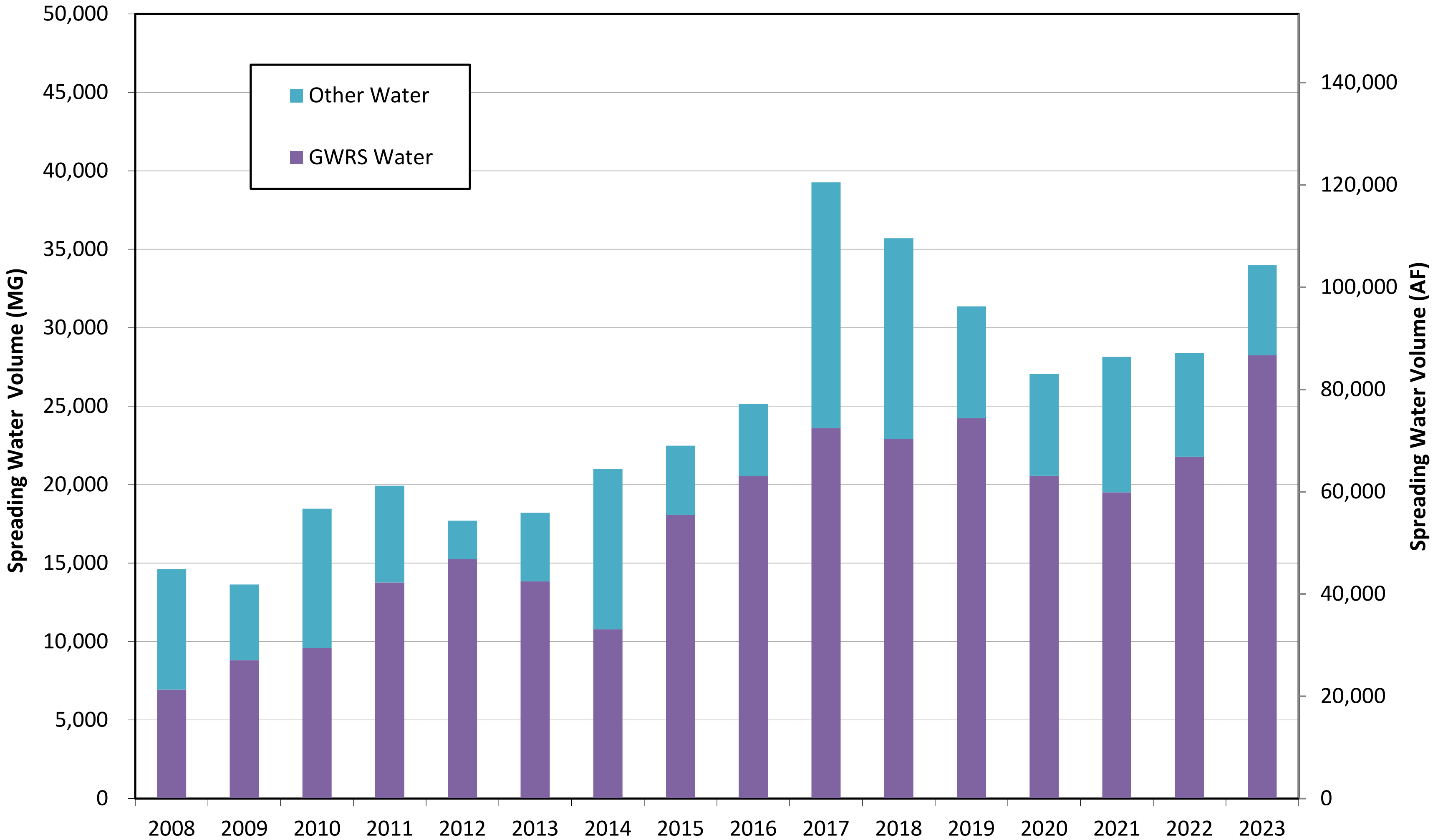
Year	GWRS Purified Recycled Water[1] (AF)	Other Water[2,3] (AF)	TOTAL PERCOLATION[4]	
			(AF)	(MG)
2008	21,307	23,538	44,845	14,613
2009	27,023	14,822	41,845	13,635
2010	29,473	27,191	56,664	18,464
2011	42,283	18,872	61,155	19,927
2012	46,865	7,495	54,360	17,713
2013	42,478	13,420	55,898	18,214
2014	33,091	31,350	64,441	20,998
2015	55,472	13,525	68,891	22,448
2016	63,048	14,142	76,863	25,046
2017	72,458	48,029	120,153	39,152
2018	70,307	39,277	108,919	35,491
2019	74,391	21,879	96,393	31,410
2020	63,097	19,959	83,308	27,146
2021	59,884	26,497	86,010	28,026
2022	66,853	20,251	86,377	28,146
2023	86,673	17,618	104,138	33,934
TOTAL	**854,702**	**357,865**	**1,210,260**	**394,365**

[1] GWRS purified recycled water flows are based on AWPF flow records.

[2] Other water is Santa Ana River (SAR) water and/or imported water.

[3] Other water calculated as: Total Percolation - GWRS water + Change in Storage in K-M-M-L Basins.

[4] Totals are based on percolation records measured by OCWD Forebay Operations staff.



Note: Other water consists of SAR water and/or imported water

Figure 5-7. Annual Spreading Water Sources and Volumes Since 2008 at K-M-M-L Basins

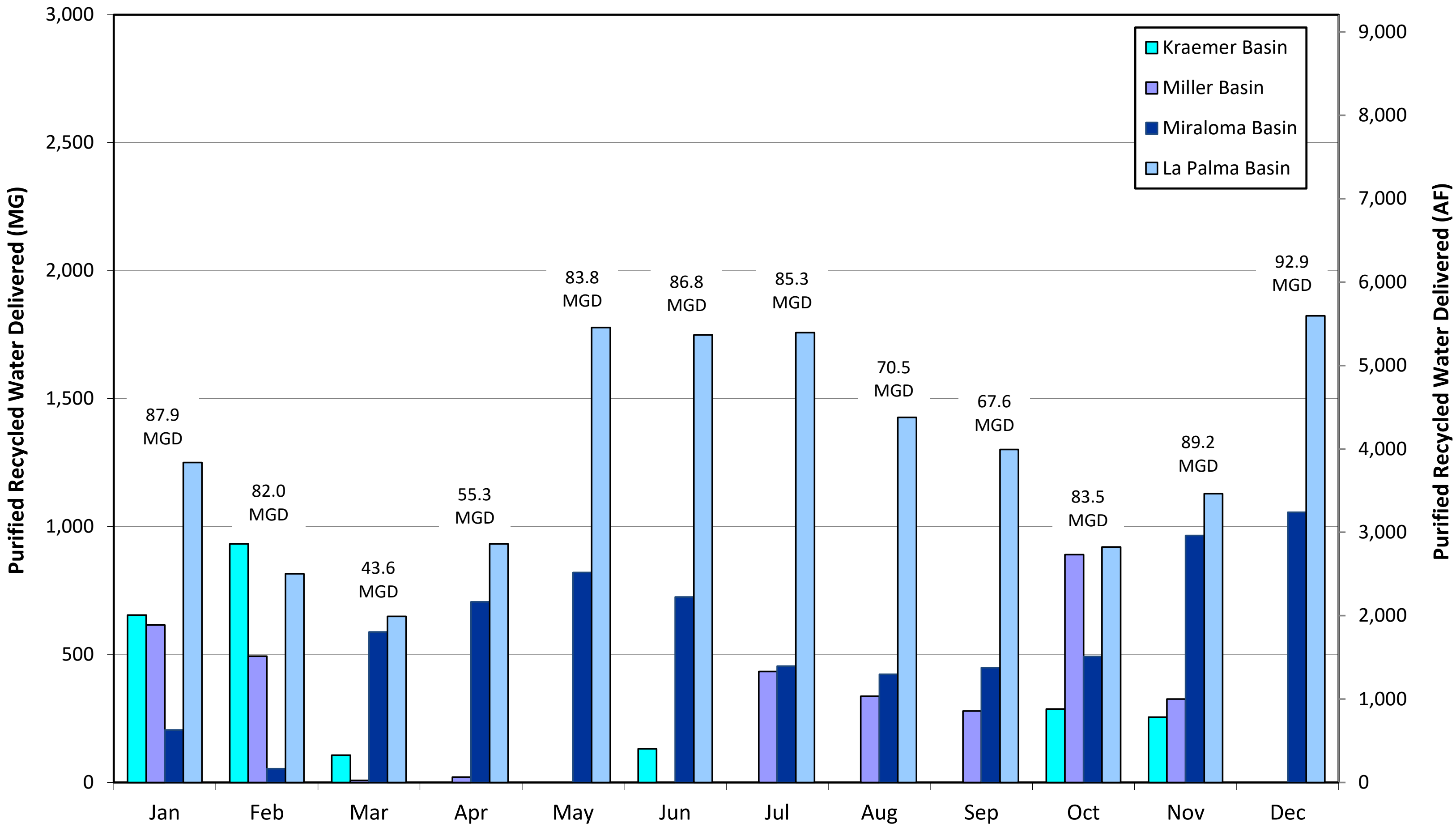
5.4 K-M-M-L Basins Operations

Purified recycled water produced by the AWPF was pumped to the Anaheim Forebay and spread at K-M-M-L Basins in 2023. La Palma Basin was the primary site for recharging purified recycled water throughout 2023, as detailed in Table 5-4 and illustrated on Figure 5-8. Miraloma Basin required a relatively steady flowrate to ensure a proper water level for AAP operations. Miraloma Basin recharged purified recycled water throughout 2023, accounting for nearly 25% of the K-M-M-L Basins volume. In total, La Palma Basin received approximately 55% of the purified recycled water spread at K-M-M-L Basins. Lesser volumes of purified recycled water were received and spread at Kraemer Basin (8%) and Miller Basin (12%) of the K-M-M-L Basins total volume in 2023. Kraemer and Miller Basins were utilized to also recharge other water during 2023.

OCWD does not have a regularly scheduled cleaning cycle for K-M-M-L Basins. The need for a basin to be taken out of service and cleaned depends on the percolation performance.

Table 5-4. 2023 Monthly Purified Recycled Water Flow Rates at K-M-M-L Basins

Month	Kraemer Basin (Avg. MGD)	Miller Basin (Avg. MGD)	Miraloma Basin (Avg. MGD)	La Palma Basin (Avg. MGD)	TOTAL (Avg. MGD)
January	21.1	19.9	6.6	40.3	87.9
February	33.3	17.6	1.9	29.1	82.0
March	3.5	0.3	19.0	20.9	43.6
April	0.0	0.7	23.5	31.1	55.3
May	0.0	0.0	26.5	57.3	83.8
June	4.4	0.0	24.2	58.3	86.8
July	0.0	14.0	14.7	56.7	85.3
August	0.0	10.9	13.7	46.0	70.5
September	0.0	9.3	15.0	43.4	67.6
October	9.3	28.7	15.9	29.7	83.5
November	8.5	10.9	32.2	37.6	89.2
December	0.0	0.0	34.1	58.8	92.9
TOTAL	**6.5**	**9.3**	**19.0**	**42.5**	**77.4**



Note: Average Flow Rate in MGD to All Basins.

Figure 5-8. 2023 Purified Recycled Water Spreading Operations at K-M-M-L Basins

6. GROUNDWATER MONITORING AT THE ANAHEIM FOREBAY

OCWD has maintained a comprehensive groundwater monitoring program in the Anaheim and Orange Forebay areas for decades as part of its recharge operations and to monitor groundwater quality. Much of OCWD's current Forebay groundwater monitoring program was initially developed as part of the Santa Ana River Water Quality and Health (SARWQH) Study, which was conducted from 1994-2004 in the Anaheim Forebay (OCWD, 2004a; NWRI, 2004). The SARWQH Study assessed the use of SAR surface water as a recharge source for the Basin, given the potential for groundwater quality impacts due to the significant treated wastewater fraction in SAR base flow, as well as the agricultural and urban runoff components of storm flow.

For the purposes of GWRS permit compliance, OCWD began groundwater monitoring activities in the Anaheim Forebay downgradient of the GWRS spreading basins in 2005, well in advance of the initial delivery and spreading of GWRS purified recycled water in 2008. This annual report for 2023 marks 16 years of Forebay GWRS compliance monitoring. This section describes the following for calendar year 2023:

- Anaheim Forebay aquifer system;
- Groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.

On December 2, 2022, a new GWRS permit was issued by the RWQCB (RWQCB, 2022a). Forebay compliance monitoring is slightly different under the new permit than under the previous GWRS permit (RWQCB, 2004) and Monitoring and Reporting Program (RWQCB, 2020). Changes to the monitoring program under the new permit are described in Section 6.2.

6.1 Anaheim Forebay Aquifer System

Earlier studies (DWR, 1934; DWR, 1967) divided the alluvial Orange County Groundwater Basin (the Basin) into the Pressure and Forebay areas. The Forebay refers to the inland area of intake or recharge generally characterized by higher permeability sediments (e.g., sands and gravels) and unconfined aquifer conditions. In contrast, the Pressure area refers to the coastal and central regions of the Basin where the presence of low-permeability clay and silt deposits limits surface percolation and creates confined or pressurized aquifer conditions at depth.

During the SARWQH Study, OCWD gained valuable insight into the local hydrogeology in the vicinity of K-M-M-L Basins through: (1) the installation of several multi-depth nested monitoring wells; (2) extensive groundwater quality testing; and (3) the performance of large-scale artificial tracer tests from various recharge basins (OCWD, 2004a; LLNL, 2004). These studies generally confirmed that most sediments down to approximately 1,000 ft bgs are coarse-grained, high-permeability sands and gravels, with only a minimal presence of intervening low-permeability sediments that do not appear to be laterally extensive.

For the purposes of the OCWD Basin-wide Groundwater Flow Model (Phraner, 2001; OCWD, 2004b) and the Annual Groundwater Storage Change calculation (OCWD, 2007), the Basin has been vertically characterized into three distinct aquifer systems: (1) Shallow, (2) Principal, and (3) Deep. Over 90% of groundwater production in the Basin occurs from the Principal aquifer. The approximate vertical intervals of the three aquifer systems in the immediate vicinity of K-M-M-L Basins are presented in Table 6-1. It should be noted that the Principal and Deep aquifers rapidly thicken and deepen to the west/southwest of this area, conforming to the Basin's overall synclinal structure (Herndon and Bonsangue, 2006).

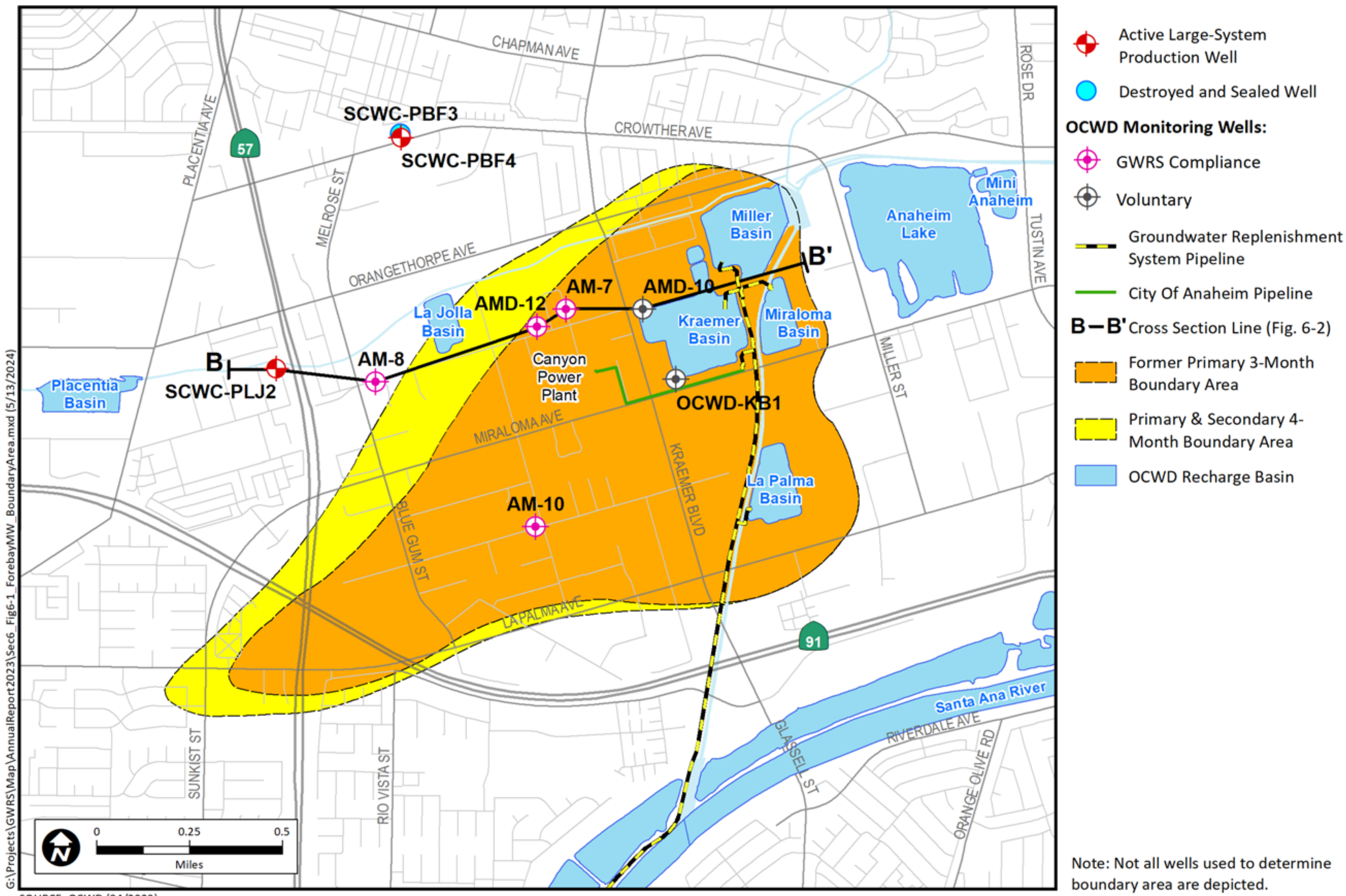
Table 6-1. Approximate Aquifer System Depths in the Vicinity of K-M-M-L Basins

Shallow Aquifer (ft bgs)	Principal Aquifer (ft bgs)	Deep Aquifer (ft bgs)
0 – 250	250 – 1,250	1,250 – 1,750

As required by state regulations (CCR, 2018), OCWD has established retention time boundary areas for the control of pathogenic microorganisms and response retention time in the area downgradient of K-M-M-L Basins that are illustrated on Figure 6-1; potable drinking water wells are prohibited in these areas. The boundary areas are based upon an artificial tracer test conducted in Kraemer Basin (Clark, 2009), with sequential modifications via numerical modeling and GIS to incorporate Miraloma Basin (OCWD, 2011; OCWD, 2012, CDPH, 2012; RWQCB, 2012; RWQCB, 2014) and La Palma Basin (OCWD and DDB Engineering, Inc., 2014, RWQCB 2016, OCWD, 2016). No existing public water supply wells are located inside the existing boundary areas. Due to changes to the GWRS Pathogen Log Reduction Requirements (Section 2.2.3, Table 2-4) following the state's adoption of the Final Groundwater Recharge Reuse Project (GRRP) regulations (CCR, 2018), the four-month boundary area now serves as both the primary and secondary project boundary. The boundary areas are enforced by the City of Anaheim and Orange County Health Care Agency well permitting authorities, as well as DDW.

6.2 Groundwater Monitoring Program

As part of the comprehensive groundwater monitoring program required by the December 2022 GWRS permit and its Monitoring and Reporting Program (RWQCB, 2022a), the following OCWD compliance monitoring well sites in the vicinity of K-M-M-L Basins were sampled in 2023: nested monitoring well AMD-12, plus single-point monitoring wells AM-7, AM-8, and AM-10. Although not required under the permit, another single-point monitoring well, OCWD-KB1, was also



SOURCE: OCWD (04/2023)

Figure 6-1. Selected Forebay Monitoring Well Locations and Boundary Areas

sampled in 2023 because of its proximity to the Kraemer Basin recharge site. Nested monitoring well AMD-10 was previously a compliance monitoring well but is no longer required under the new GWRS permit. AMD-10 will continue to be monitored voluntarily for a subset of metals and organic constituents.

The locations of these wells and nearby municipal production wells are shown on Figure 6-1. A generalized geologic cross-section showing these wells in relation to the nearby recharge basins is presented on Figure 6-2. Note compliance well AM-10 is not shown on the cross-section since it is located farther south along the flow path emanating from La Palma Basin. Table 6-2 summarizes the screened interval depths and aquifer zones for the four compliance monitoring wells as well as AMD-10 and OCWD-KB1.

Other than the removal of well AMD-10 as a compliance well, the new GWRS permit (RWQCB, 2022a) requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Reduced or eliminated the following constituents:
  - MBAS, silver, and thiobencarb no longer required; and
  - Color and odor reduced from quarterly to annually.
- Added the following constituents:
  - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
  - Hexavalent chromium annually; and
  - Dichloromethane, bromodichloromethane and chloroform quarterly; and
  - NDMA annually.

Groundwater levels are measured at least quarterly for the OCWD monitoring wells shown on Figure 6-1, as well as at several other monitoring wells in the general vicinity to determine groundwater flow directions in this area and to track changes in groundwater storage, as this unconfined area represents the majority of the Basin's available groundwater storage capacity.

6.3 Groundwater Elevations and Directions of Flow

Figure 6-3 illustrates the inferred groundwater flow paths within the Shallow aquifer near K-M-M-L Basins, based on the groundwater elevation contours representing June 30, 2023. As shown by the inferred flow arrows on Figure 6-3, the dominant groundwater flow direction was west-southwest away from the recharge basins as in previous years. Groundwater contour maps prepared each year for the Principal aquifer indicate a very similar groundwater flow direction. The Shallow and Principal aquifers behave quite similarly in the immediate vicinity of the Anaheim spreading grounds due to the lack of a laterally continuous aquitard between them.

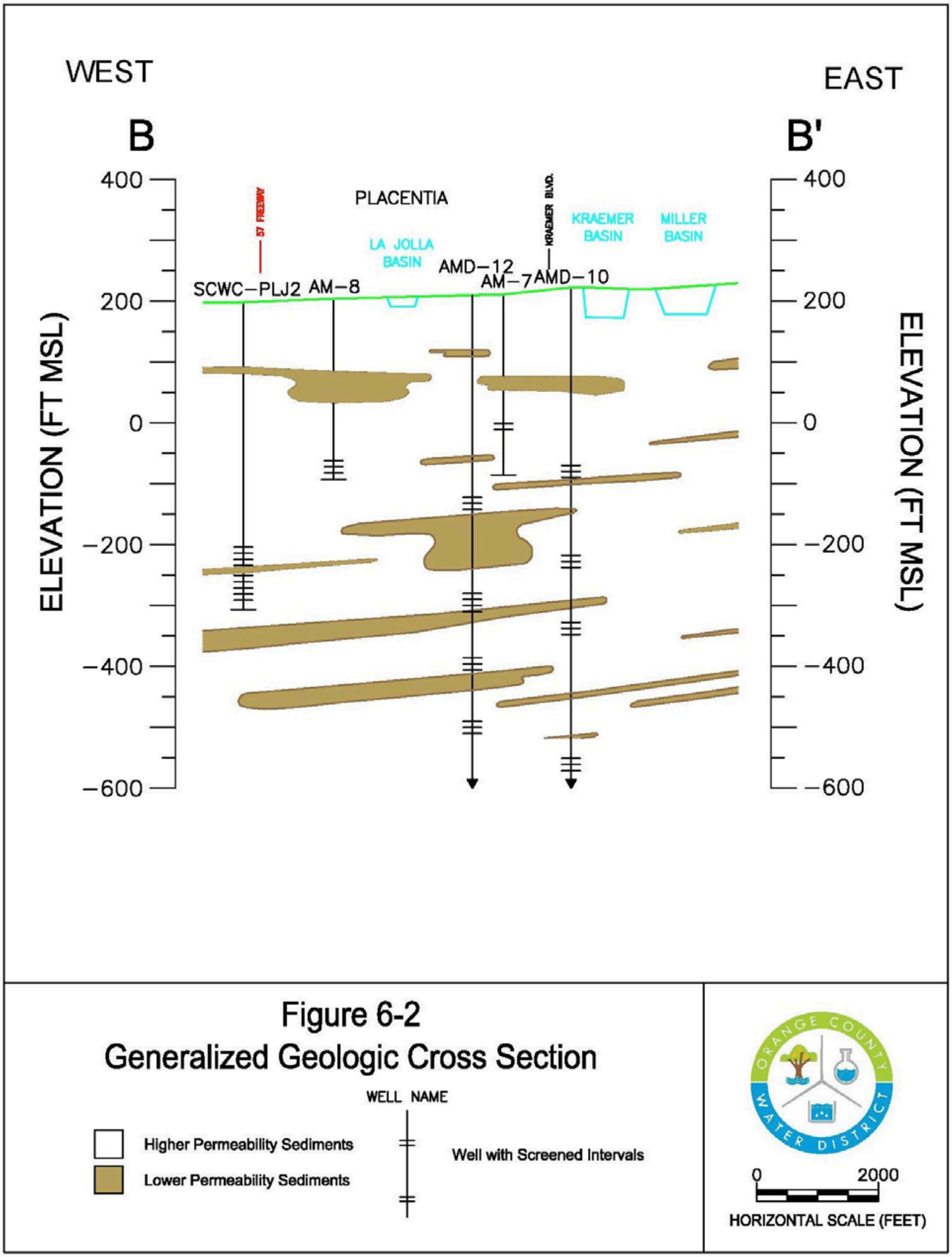
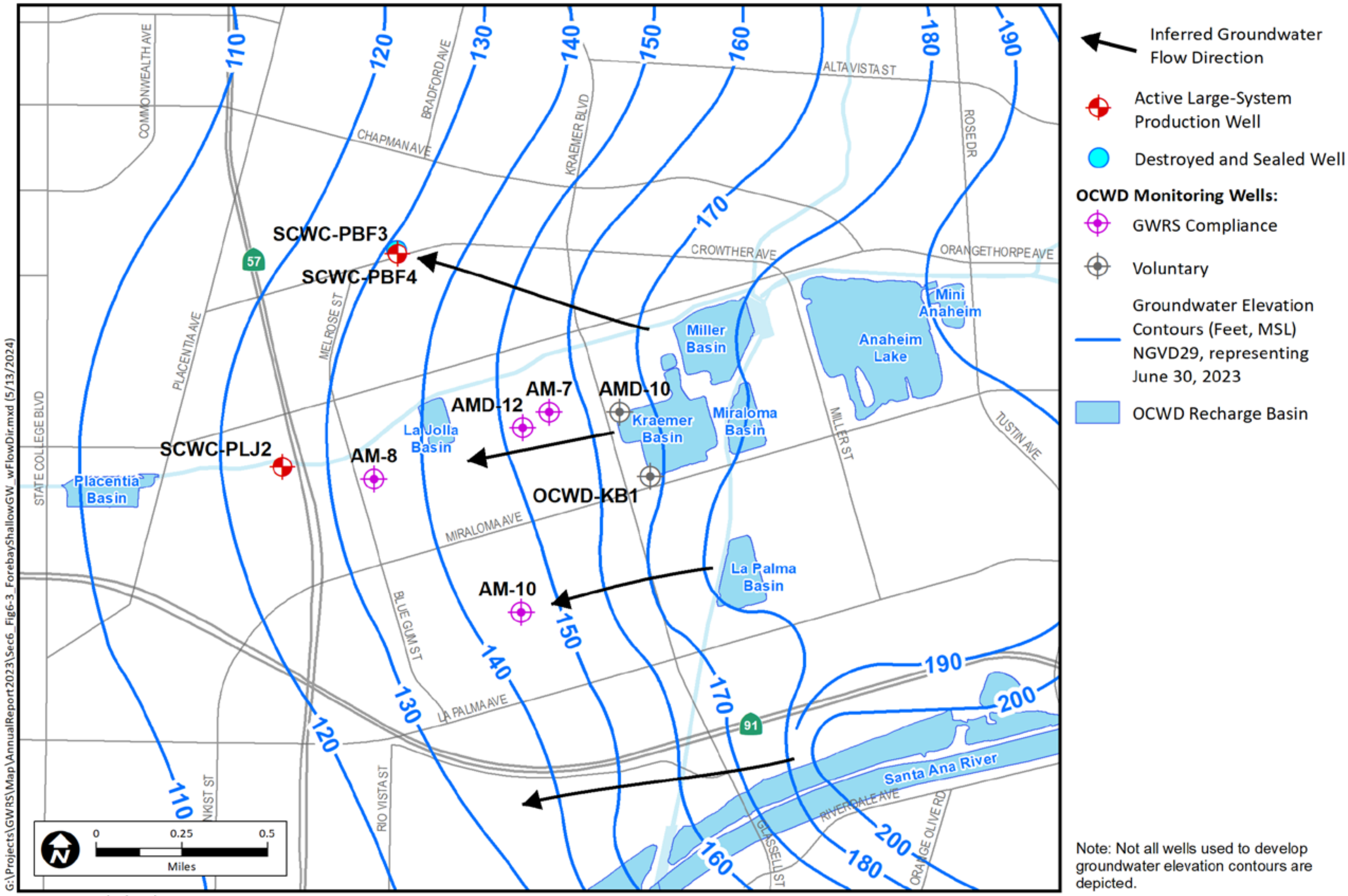


Figure 6-2. Generalized Geologic Cross Section in the Anaheim Forebay

Table 6-2. Monitoring Wells Near K-M-M-L Basins

OCWD Well Name	Date Completed	Nearest GWRS Recharge Basin [1]	Approximate Distance and Direction from Basin	Well Depth (ft bgs)	Aquifer Name	Nearest Drinking Water Well
AM-7/1	09/19/1990	Kraemer	1,135 ft W	210-225	Shallow	SCWC-PLJ2
AM-8/1	09/22/1990	Kraemer	3,900 ft SW	268-285	Shallow	SCWC-PLJ2
AMD-10/1[2]	10/13/1997	Kraemer	55 ft NW	292-312	Principal	SCWC-PLJ2
AMD-10/2[2]	10/13/1997	Kraemer	55 ft NW	440-460	Principal	SCWC-PLJ2
AMD-10/3[2]	10/13/1997	Kraemer	55 ft NW	550-570	Principal	SCWC-PLJ2
AMD-10/4[2]	10/13/1997	Kraemer	55 ft NW	774-794	Principal	SCWC-PLJ2
AMD-10/5[2]	10/13/1997	Kraemer	55 ft NW	934-954	Principal	SCWC-PLJ2
AMD-12/1	11/30/2004	Kraemer	1,510 ft W	300-350	Principal	SCWC-PLJ2
AMD-12/2	11/30/2004	Kraemer	1,510 ft W	490-520	Principal	SCWC-PLJ2
AMD-12/3	11/30/2004	Kraemer	1,510 ft W	595-615	Principal	SCWC-PLJ2
AMD-12/4	11/30/2004	Kraemer	1,510 ft W	725-745	Principal	SCWC-PLJ2
AMD-12/5	11/30/2004	Kraemer	1,510 ft W	940-960	Principal	SCWC-PLJ2
AM-10/1	09/12/1990	La Palma	3,000 ft SW	217-235	Shallow	SCWC-PLJ2
OCWD-KB1/1[3]	10/13/1987	Kraemer	100 ft SW	180-200	Shallow	SCWC-PLJ2

[1] The closest GWRS recharge basin is not necessarily the source of GWRS water arrival at each well based on the inferred groundwater flow paths.
[2] As of December 2, 2022, AMD-10/1 through AMD-10/5 are no longer compliance wells per the new GWRS permit. These wells will continue to be monitored on a voluntary basis for a targeted subset of metals and organic constituents.
[3] Monitoring well site OCWD-KB1/1 is not a compliance well per the existing GWRS permit but is monitored voluntarily due to its proximity to Kraemer Basin.



SOURCE: OCWD (04/2023)

Figure 6-3. Shallow Aquifer Groundwater Elevation Contours and Inferred Groundwater Flow Directions in the Anaheim Forebay Area During 2023

The groundwater flow gradients and directions do not change significantly from year to year in the Anaheim Forebay. Groundwater level trends at the Forebay monitoring wells are influenced by OCWD's managed recharge activities, local precipitation, groundwater production, and the Basin's overall groundwater storage condition. Groundwater level hydrographs for the four compliance wells as well as the two voluntary wells AMD-10 and OCWD-KB1 can be found in the 2022 or prior annual reports.

Groundwater level trends in the Anaheim Forebay at all six monitoring wells typically follow a seasonal pattern: (1) rising during the winter and early spring months, (2) declining in the late spring and summer months, and (3) recovering somewhat in the late fall months near the end of the year. These seasonal trends are typically caused by a combination of increased recharge (both natural and managed) from local rainfall and captured SAR storm flows during the winter months and increased groundwater pumping during the warmer and drier summer months.

During 2023, groundwater level trends at all six monitoring wells varied somewhat from the typical seasonal pattern: (1) rising throughout the first half of the year to an unusually late annual high in late June (rather than in March/April), (2) declining less than usual during the summer months, and (3) not recovering in the late fall months but rather a mild decline through the end of the year. The prolonged rise in groundwater levels through the first half of the year and the relatively mild summer decline was likely due to larger than usual GWRS and SAR recharge volumes stemming from GWRSFE and nearly double the long-term annual average rainfall, respectively.

As shown in Table 6-2, the four single-point monitoring wells OCWD-KB1, AM-7, AM-8, and AM-10 are screened in the Shallow aquifer, whereas all casings for the two nested wells AMD-10 and AMD-12 are individually screened entirely in the Principal aquifer. However, all six monitoring wells have very similar groundwater elevation trends; only small differences are seen with depth within the Principal aquifer at nested monitoring wells AMD-10 and AMD-12. As discussed in Section 6.1, the Anaheim Forebay area in the vicinity of K-M-M-L Basins is largely devoid of any laterally extensive low-permeability aquitards. Therefore, the Shallow and Principal aquifers behave quite similarly, have similar groundwater flow directions, and relatively rapid vertical transport of recharge water occurs as evidenced by water quality trends.

6.4 Groundwater Quality

This section describes monitoring well groundwater quality for general constituents and arsenic in the Anaheim Forebay area in the vicinity of K-M-M-L Basins.

6.4.1 Monitoring Wells – General Water Quality

Quarterly compliance groundwater quality data for 2023 are presented in Appendix I. General groundwater quality data for the past five years (2019-2023) are summarized in Appendix J for the compliance monitoring wells. Compliance monitoring wells were tested for an extensive list of inorganic and organic parameters, including constituents with secondary MCLs, 1,4-dioxane, and NDMA.

In 2022, DDW approved changes to the groundwater monitoring program. Priority pollutants with no detection in the most recent two years of quarterly monitoring were eliminated from the required monitoring. Also, AMD-10 was eliminated as a compliance monitoring well because of its cross-gradient location relative to La Palma Basin, as well as the combination of its very close proximity to Kraemer, Miller, and Miraloma Basins plus its relatively deep screened intervals leading to the inconsistent presence of GWRS water at this location during its 15-year inclusion in the prior GWRS compliance monitoring program. The revised monitoring program was included in the new GWRS permit and Monitoring and Reporting Program (M&RP) issued by the RWQCB in December 2022.

During 2023, groundwater quality at the compliance monitoring wells complied with all Federal and State Primary Drinking Water Standards for the specific analytes tested using DDW-approved methods. All 1,4-dioxane and NDMA results were non-detect in 2023. Total arsenic at the four compliance wells remained relatively low and stable below 4 μg/L, well below the Primary MCL of 10 μg/L. Arsenic and chloride trends are discussed in Section 6.4.2.

As shown in Table 6-3, some of the analyses at monitoring well sites AM-7 and AM-8 during 2023 revealed constituents above the EPA Secondary MCL for iron, likely due to particulate iron from corrosion of their aging mild steel well casings (over 30 years old) and confirmed by low dissolved iron concentrations at both wells. These Secondary MCL exceedances at AM-7 and AM-8 during 2023 were consistent with historical data collected since 2008 and were not associated with the presence of GWRS purified recycled water.

Table 6-3. Secondary MCL Exceedances at Forebay Monitoring Wells.

	Background (pre-2008)		2022		**2023**		Notes/Trends
	Range	Mean	Range	Mean	**Range**	**Mean**	
IRON (Secondary MCL = 300 μg/L)							
AM-7/1	2-1,290	192	311	838	**445-689**	**546**	Increase since 2021 due to corrosion of aging mild steel casing.
AM-8/1	8-1,660	414	269-647	478	**295-891**	**530**	Increase since 2015 due to corrosion of aging mild steel casing.

6.4.2 Monitoring Wells – Intrinsic Chloride Tracer and Arsenic

As shown earlier in Section 4 for the Talbert Barrier area, dissolved chloride concentrations can be used to trace the subsurface movement of groundwater because chloride is relatively unaffected by sorption, chemical, or biological reactions in the aquifer. Thus, chloride is a good conservative tracer. Groundwater flow paths determined from groundwater level monitoring are also verified by comparing groundwater quality changes and trends in the recharge source water with nearby monitoring wells, primarily using chloride concentrations and EC.

For tracking purposes, GWRS water has a very low chloride concentration with an annual average ranging from 4-11 mg/L since 2008. The chloride concentration of GWRS water is largely dependent on the performance and age of the AWPF RO membranes, as well as OC San feed water quality. In comparison, background chloride concentrations in all four compliance monitoring wells and two voluntary wells prior to 2008 had much higher chloride concentrations ranging from approximately 80-120 mg/L, reflective of SAR water and MWD imported supplies from the Colorado River, which were historically OCWD's primary source of recharge water in the Anaheim Forebay. Occasional decreases below this background range prior to GWRS start-up were indicative of periods of greater SAR storm flow recharge and/or greater recharge of MWD imported supplies from the State Water Project (SWP), both of which have lower TDS and chloride concentrations, but still significantly greater than GWRS water.

Since the initial deliveries of GWRS water in January 2008 to Kraemer-Miller Basins, in July 2012 to Miraloma Basin, and in November 2016 to La Palma Basin, the migration of GWRS water in the subsurface was evidenced by chloride concentrations decreasing below 60 mg/L at all six monitoring well sites: OCWD-KB1, AMD-10, AMD-12, AM-7, AM-8, and AM-10. These chloride concentrations below 60 mg/L were lower than the bulk of historical recharge source waters. Also, the timing of these chloride concentration decreases corresponded well with previously established groundwater travel times away from Kraemer-Miller Basins (LLNL, 2004; Clark, 2009).

Since applied recharge in the Anaheim Forebay comes from multiple sources, water quality responses (e.g., chloride concentrations) at the monitoring wells do not always follow a single source water trend. Comparing Table 5-2 and Figure 5-6 presented in Section 5 provides a temporal sense of the volume and proportion of GWRS purified recycled water relative to other recharge sources at K-M-M-L Basins in 2023. These factors influence the strength, timing, and flow paths of both the GWRS low chloride signal and the non-GWRS higher chloride signal of other recharged water (SAR and/or imported). Knowing the monthly recharge source history at K-M-M-L Basins, increasing and decreasing chloride trends can be interpreted in terms of increasing and decreasing percentages of GWRS and/or non-GWRS other recharge arriving at the monitoring wells.

Figure 6-4 shows chloride concentration trends for the 10-year period 2014-2023 for compliance wells AM-7, AMD-12/1, AM-8, and AM-10. Since the running 10-year period displayed in these figures begins in 2014, the first arrival of the low-chloride GWRS signal at many of these monitoring wells may not be presented in these figures. First arrival is discussed more thoroughly in Section 6.4.2 of prior years' annual reports, including arrival at the deeper zones at AMD-12 as well as the two voluntary wells OCWD-KB1 and AMD-10.

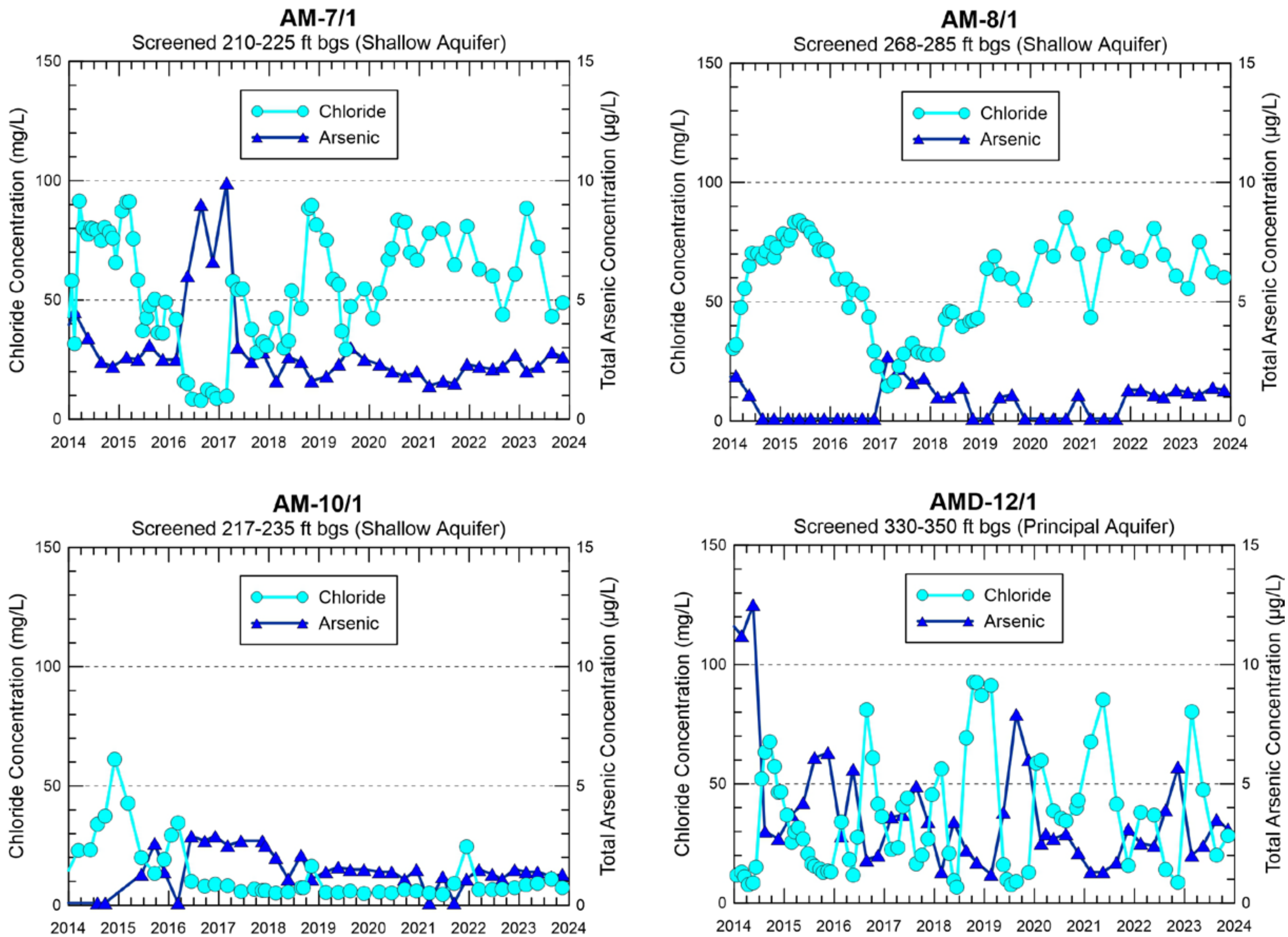


Figure 6-4. Monitoring Wells AM-7, AM-8, AM-10, and AMD-12/1 Chloride and Arsenic Concentrations

Figure 6-4 shows periodic arrivals of the low-chloride GWRS signal at the four compliance wells, such as the sustained arrival of 100% GWRS water at AM-7 from early 2016 to early 2017 denoted by chloride concentrations at low GWRS levels. Figure 6-4 also shows the periodic decreasing and increasing chloride trends signaling alternating arrivals of GWRS and non-GWRS other recharge sources, respectively, most notable at AMD-12/1. Alternatively, the low-chloride GWRS signal at AM-10 has been largely continuous since La Palma Basin came on-line in November 2016 dedicated to recharging only GWRS water.

Previous studies have indicated the potential for surface spreading of reverse osmosis purified wastewater to mobilize metals from alluvial aquifer sediments (Li, et al., 2006). In addition to the metals testing for the quarterly compliance monitoring, OCWD implemented a supplemental monthly sampling program of selected monitoring wells downgradient of K-M-M-L Basins to coincide with the first GWRS purified recycled water deliveries to the basins in January 2008.

Of all the metals with potential for mobilization, arsenic represents the greatest public health concern and has a Primary MCL of 10 μg/L. In addition to chloride trends discussed above, Figure 6-4 also features time series plots of quarterly arsenic concentrations at the four compliance wells AM-7, AMD-12/1, AM-8, and AM-10 for the 10-year period 2014-2023. Arsenic trends associated with the earlier arrival of GWRS water are discussed more thoroughly in Section 6.4.3 of prior years' annual reports for all zones at the four compliance wells and the two voluntary wells. Pre-GWRS arsenic concentrations for the 2000-2007 period at these wells ranged from non-detect (< 1 μg/L) to 5.3 μg/L (at AM-7); other higher pre-GWRS arsenic concentrations were documented at AMD-10/1 (4.6 μg/L) and KBS-1 (3.5 μg/L). As indicated below, this is likely reflective of pre-GWRS recharge activities in this area. Arsenic concentrations at the deeper zones of monitoring well AMD-12 (AMD-12/2 through AMD-12/5) are not shown on Figure 6-4; they generally remain within pre-GWRS background levels, ranging from non-detect to less than 2 μg/L due to lower percentages of GWRS water along those longer dispersive flow paths.

During 2023, arsenic concentrations in all zones of the four compliance wells were either non-detect or remained at relatively low and stable concentrations below 4 μg/L, well below the Primary MCL of 10 μg/L.

Over the course of the GWRS groundwater monitoring program, an inverse relationship between the chloride concentration (representing percentage of GWRS water present) and the observed arsenic concentration at monitoring wells has been observed, i.e., arsenic concentrations have been shown to increase non-linearly as chloride concentrations decrease with the sustained arrival of large percentages of GWRS water, as evidenced by the chloride/arsenic plots in Figure 6-4, most notably for example at AM-7 from early 2016 to early 2017.

A broader review of the chloride and arsenic concentration trends since 2008 for the four compliance wells and two voluntary wells in the vicinity of K-M-M-L Basins indicates a generally non-linear and spatially variable relationship between the percentage of GWRS water and arsenic concentration in groundwater, after a minimum threshold percentage of GWRS water reached the monitoring well. The threshold percentage of GWRS water required to cause an initial arsenic concentration rise above background appears to increase with travel distance downgradient from K-M-M-L Basins, implying a greater degree of geochemical stabilization within the aquifer with increased travel distance and/or less available arsenic for mobilization at locations farther downgradient from the recharge basins.

The historical dataset suggests that repeated cycles of sustained 100% GWRS recharge arrival events have resulted in diminishing arsenic peaks with each subsequent sufficiently sustained event due primarily to arsenic mass removal from the aquifer matrix. Similarly, following each sustained 100% GWRS event, low arsenic concentrations due to the subsequent arrival of other recharge sources (SAR flows and/or imported water) have generally been below the pre-GWRS baseline arsenic concentrations due to arsenic mass removal during the prior sustained 100% GWRS events.

Although the GWRS purified recycled water was the likely cause of the increased arsenic concentrations, it is not an arsenic source. The mechanism leading to the arsenic increases are the result of complex geochemical interactions between the GWRS water and arsenic bound to and/or comprising the aquifer matrix. A historical review of SAR water quality analyses showed arsenic concentrations during the late 1980s as high as 8-16 µg/L, which is similar in magnitude to the maximum arsenic peaks observed at the four compliance and two voluntary wells in prior years corresponding to the first arrival of sustained 100% GWRS recharge events. More recent SAR arsenic concentrations over the last couple years at the compliance wells generally range from 2-6 µg/L.

Arsenic is known to adsorb onto naturally occurring alumina, iron, or manganese oxyhydroxides found on mineral surfaces within an alluvial aquifer matrix (Bowell, 1994). The higher initial pH or lower ionic strength of GWRS water relative to surrounding groundwater has the potential to release this adsorbed arsenic by altering the surface charge of these mineral surfaces relative to their isoelectric point (Welch and Stollenwerk, 2003). OCWD performed a laboratory study in 2012 with Stanford University aiming to identify the geochemical controls governing metals mobilization with GWRS purified recycled water and Forebay aquifer sediments, as well as optimizing post-treatment operating parameters such as pH. Findings revealed the important role of specific divalent cations in controlling the mobilization of arsenic and that the magnitude of observed arsenic desorption is inversely correlated to the concentrations of calcium and magnesium in GWRS water (Fakhreddine et al., 2015). Cation bridging within finer-grained portions of the aquifer is thought to be the mechanism controlling arsenic mobilization, along with pH-mediated sorption also playing a role.

To limit arsenic mobilization, the operation of the AWPF post-treatment decarbonation and lime stabilization processes were modified during 2010-2015. Completion of the GWRSIE post-treatment system upgrades in 2015 improved the ability to more closely control the FPW pH, targeting 8.5. During 2016-2023, there were no notable changes to post-treatment operations or GWRS-FPW quality, except for a slight increase in TDS in 2023 due to the AWPF receiving water from OC San Plant 2 for GWRSFE. This resulted in a marginally higher annual average chloride concentration of 9 mg/L in 2023 (Table 3-3). OCWD's metals monitoring will continue to evaluate the effects of any operational changes and the DDW, RWQCB, and NWRI GWRS Independent Advisory Panel will continue to be informed of any pertinent findings.

6.4.3 Production Well

The closest downgradient potable production well is SCWC-PLJ2 (Figure 6-3) owned and operated by Golden State Water Company (formerly Southern California Water Company). As was shown previously on Figure 6-1, this well is located farther downgradient outside of the primary and secondary four-month boundary area.

Other potable production wells are located well outside the K-M-M-L Basins' retention time boundary area.

Table 6-4 summarizes 2023 water quality data at large system production well SCWC-PLJ2, which complied with all federal and state drinking water standards.

Well SCWC-PLJ2 is screened in the Principal aquifer and likely has never received 100% GWRS water as indicated by chloride concentrations in the well having never decreased to GWRS levels.

Figure 6-5 shows that chloride concentrations in this well ranged from 80-100 mg/L prior to the commencement of GWRS recharge in Kraemer-Miller Basins in 2008 and then significantly decreased upon arrival of GWRS water from these basins in 2009 to a low of 23 mg/L by mid-2010. Since then, chloride concentrations at SCWC-PLJ2 have generally cycled within a range of 20-75 mg/L and ranged from 51-66 mg/L during 2023 (Table 6-4). Like the upgradient monitoring wells discussed previously, the proportion of GWRS water at this well fluctuates with recharge operations and supplies.

As shown in Table 6-4 and Figure 6-5, arsenic concentrations at SCWC-PLJ2 during 2023 were non-detect. Historically, both before and after GWRS recharge began at Kraemer-Miller Basins in 2008, arsenic concentrations at SCWC-PLJ2 were low with only intermittent detections, ranging from below the RDL of 1 µg/L to a one-time maximum of 2 µg/L. During 2023, there were no detections of either NDMA or 1,4-dioxane at SCWC-PLJ2 (Table 6-4).

Table 6-4. 2023 Water Quality for Potable Well Within the Influence of K-M-M-L Basins

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Recharge Site (ft)[2]	Concentration [3,4]								
				Arsenic (As) ug/L	Chloride (Cl) mg/L	Bromide (Br) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodimethylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Well												
SCWC-PLJ2	504	402 - 492	5,300	ND	60.2 (51.3 - 66.0)	0.04 (ND - 0.06)	346 (310 - 388)	1.19 (1.07 - 1.42)	ND	0.31 (0.24 - 0.34)	ND	ND

[1] feet below ground surface

[2] Distance from purified recycled water spreading: Straight line shortest distance to eastern edge of Kraemer Basin, estimated to the nearest 100 feet

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the detection limit

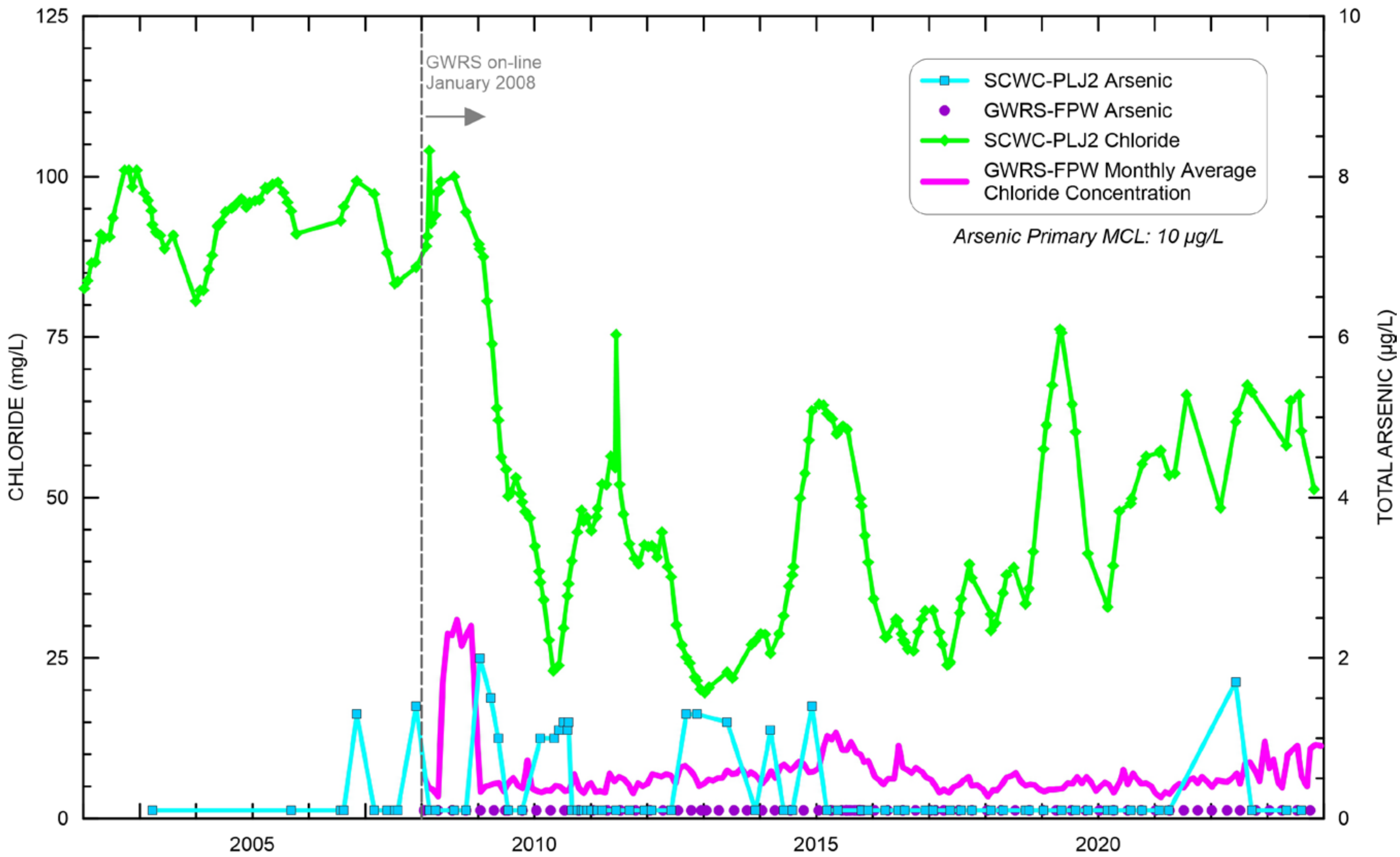


Figure 6-5. SCWC-PLJ2 Pre-Treatment and Injection Water Chloride and Arsenic Concentrations

7. MBI PROJECT OPERATIONS

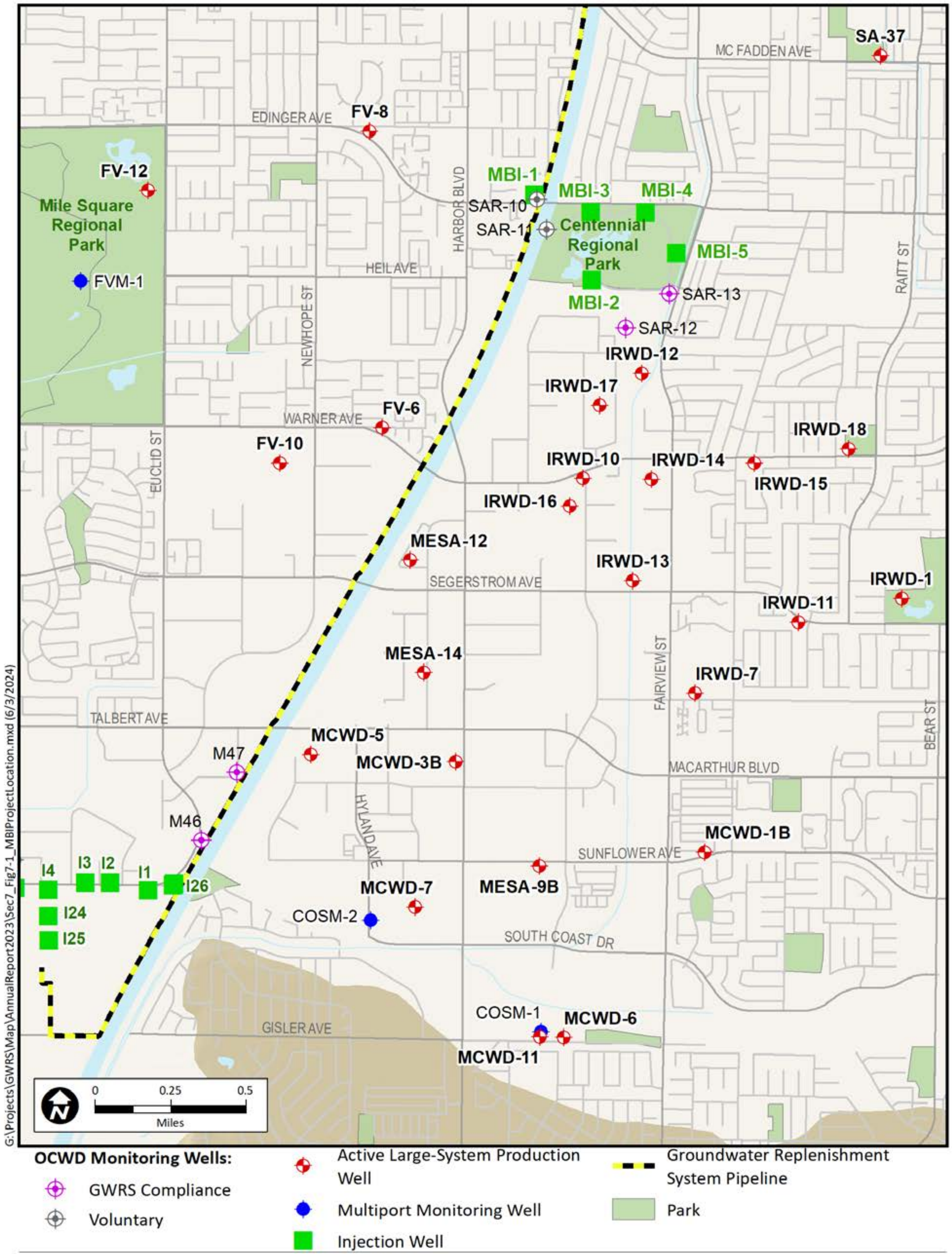
The Mid-Basin Injection (MBI) Project was implemented in two parts: an initial Demonstration MBI (DMBI) Project that became operational in April 2015, and subsequent MBI Centennial Park Project that began operation in March 2020 (Figure 1-1). An annual operations summary of the MBI Project including total injection water source, volumes, and flowrates, is presented in this section.

The primary objective of the MBI Project is to provide replenishment of a heavily pumped area of the Principal aquifer with purified recycled water from the GWRS AWPF. The MBI Project also increases the recharge capacity of the Basin, thereby reserving recharge capacity in the OCWD Forebay spreading grounds for available SAR and imported water flows. Together, the DMBI Project (injection well MBI-1) and MBI Centennial Park Project (injection wells MBI-2, MBI-3, MBI-4, and MBI-5) comprise the MBI Project. Figure 7-1 shows the location of the MBI Project.

7.1 MBI Project Components

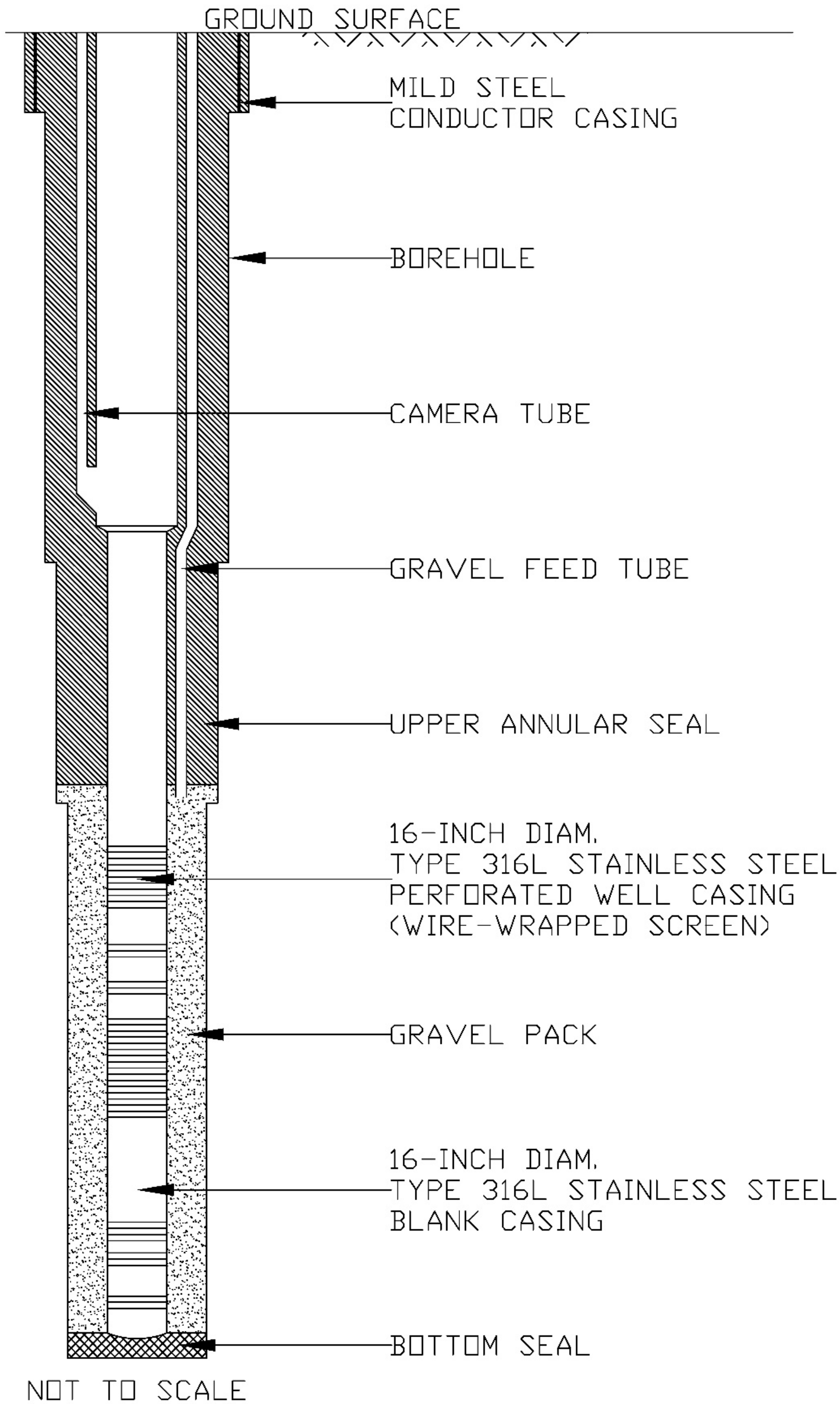
The MBI Project consists of five injection wells (MBI-1 through MBI-5) along with two nearby downgradient multi-depth nested compliance monitoring wells (SAR-12 and SAR-13), located approximately three miles north of the Talbert Barrier, along the GWRS Pipeline at the Santa Ana River and Edinger Avenue (Figure 7-1). As part of the DMBI Project, multi-depth monitoring wells SAR-10 and SAR-11 were also installed immediately downgradient of MBI-1; however, monitoring at SAR-10 and SAR-11 is no longer required as SAR-12 and SAR-13 now serve as the required permit compliance monitoring wells for the MBI Project (RWQCB, 2019 and RWQCB, 2022a).

Figure 7-2 shows a generalized well construction diagram representing the five MBI wells, while Table 7-1 summarizes their well construction details. Figure 7-3 shows a photo of an MBI Centennial Park injection well vault. All MBI wells have injected exclusively 100% GWRS water, including MBI-1 starting in 2015 and the four additional wells in March 2020. The concurrent operation of all five injection wells marking the commencement of the full-scale intrinsic tracer test, as required by state regulations (CCR, 2018), is discussed further in Section 8 along with groundwater level and quality data at all four MBI Project monitoring wells.



SOURCE: OCWD (03/2023)

Figure 7-1. MBI Project Location Map



Note: Well construction details generalized to represent all five MBI wells. For screened interval depths, refer to Table 7-1 and for specific as-built diagrams of each injection well, refer to 2020 GWRS Annual Report.

Figure 7-2. Generalized MBI Well Construction Diagram

Table 7-1. MBI Well Construction Summary

MBI-1		MBI-2		MBI-3		MBI-4		MBI-5		
Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Screened Interval (ft bgs)	Screened Length (ft)	Aquifer Unit
530-540 595-605	10 10	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	---- ----	Upper Rho
660-710	50	645-675	30	655-680	25	650-675[1]	25	610-620[1] 630-665[1]	10 35	Lower Rho
----	----	695-720	25	715-735	20	702-722	20	680-715[1]	35	Upper Main
770-780	10	735-745	10	756-766	10	745-755	10	----	----	Main 1
800-830[2]	0	750-760 800-810	10 10	780-815	35	775-830	55	760-800[1]	40	Main 2
----	----	----	----	----	----	----	----	----	----	Main 3
970-980	10	920-930	10	945-965 975-985	20 10	930-940 955-975	10 20	915-935[1]	20	Main 4
990-1,000	10	980-995	15	1,005-1,015	10	----	----	----	----	Main 5
----	----	1,050-1,060	10	1,048-1,058	10	1,030-1,040	10	1,005-1,030[1]	25	Main 6
1,100-1,120	20	1,070-1,085	15	1,095-1,115	20	1,074-1,089	15	1,045-1,060[1]	15	Main 7
1,175-1,190	15	----	----	----	----	----	----	----	----	Main 8
Total:	135		135		160		165		180	

[1] Screened interval depths listed here are based on post-construction downhole video survery and differ from the depths listed in the GWRS Title 22 Engineering Report (OCWD, 2021).

[2] The screened interval from 800-830 ft bgs at MBI-1 was swaged off with a liner due to sand production during test pumping.

Figure 7-3. MBI Centennial Park Injection Well

7.2 MBI Project Injection Water Source, Volumes and Flow Rates

Purified recycled water produced by the GWRS AWPF and delivered via the GWRS Pipeline was the only source of water injected at the five MBI wells (MBI-1 through MBI-5) during 2023. No other water sources are available at the MBI well sites. Blending with other sources is not required (RWQCB, 2022a). When the AWPF or the GWRS Pipeline are off-line, the MBI wells are also off-line.

A total volume of approximately 2,395 MG (7,351 AF) of purified recycled water was injected at the MBI Project wells during 2023. A minor volume of approximately 18 MG (56 AF) was pumped from the MBI wells during 2023 during the regular backwash events throughout the year to maintain the injection capacity. The total backwash volume during 2023 represented only 0.7% of total MBI injection. Monthly quantities of GWRS purified recycled water injected and backwash pumped at the MBI Project are summarized in Table 7-2 and illustrated in Figure 7-4.

Table 7-2. 2023 Monthly Injection and Backwash Quantities at MBI Project

Month	Total MBI Injection[1]			Total MBI Backwash Pumping	
	(Avg. MGD)	(MG)	(AF)	(MG)	(AF)
January	6.26	193.92	595.11	1.68	5.17
February	6.52	182.52	560.12	1.70	5.21
March	5.86	181.70	557.62	1.84	5.66
April	6.33	189.75	582.32	1.29	3.97
May	6.82	211.40	648.76	1.46	4.47
June	6.97	209.00	641.40	1.29	3.96
July	7.04	218.21	669.66	1.28	3.93
August[2]	5.49	170.04	521.83	2.11	6.48
September	7.15	214.59	658.55	1.36	4.18
October	6.98	216.42	664.17	1.29	3.95
November	7.26	217.81	668.43	1.49	4.58
December	6.13	190.00	583.09	1.32	4.04
Totals	**6.56**	**2,395.35**	**7,351.06**	**18.12**	**55.60**

[1] All MBI wells (MBI-1, MBI-2, MBI-3, MBI-4, and MBI-5) total injection volume of GWRS FPW is shown. Average daily injection rates are based on the total number of days in each month. Refer to Table 7-3 for on-line daily average injection rates.

[2] Injection volume was limited by the planned AWPF shutdown, August 28-30.

As shown in Table 7-2, the average daily injection rate for the MBI Project during 2023 was 6.56 MGD and ranged from 5.49 MGD in August to 7.26 MGD in November. The MBI Project injection volumes and average daily injection rates were less in August because AWPF production was reduced/off-line from August 28-30 for a planned shutdown related to construction and maintenance activities (See Section 2). Total MBI injection volume during 2023 was 5% less than the prior year, despite fewer days off-line. This decrease was primarily due to more frequent automatic injection rate reductions in response to elevated injection levels reaching the flow control set point.

Table 7-2 shows a total MBI backwash volume of 18.12 MG (55.60 AF) in 2023, a decrease of 21% relative to the 22.94 MG (70.39 AF) backwashed the prior year. This decline is attributed to the conclusion of an operational test, which increased the backwash frequency at MBI-3 and MBI-5 from monthly to biweekly from February 2022 to April 2023. Consequently, these wells underwent biweekly backwashing throughout most of 2022 and monthly backwashing throughout the majority of 2023.

Figure 7-4 shows that total monthly injection volumes were distributed somewhat evenly among the five MBI Project wells throughout 2023, with MBI-5 consistently receiving slightly more injection than the other wells, and MBI-3 receiving less. Figure 7-4 also shows that aside from

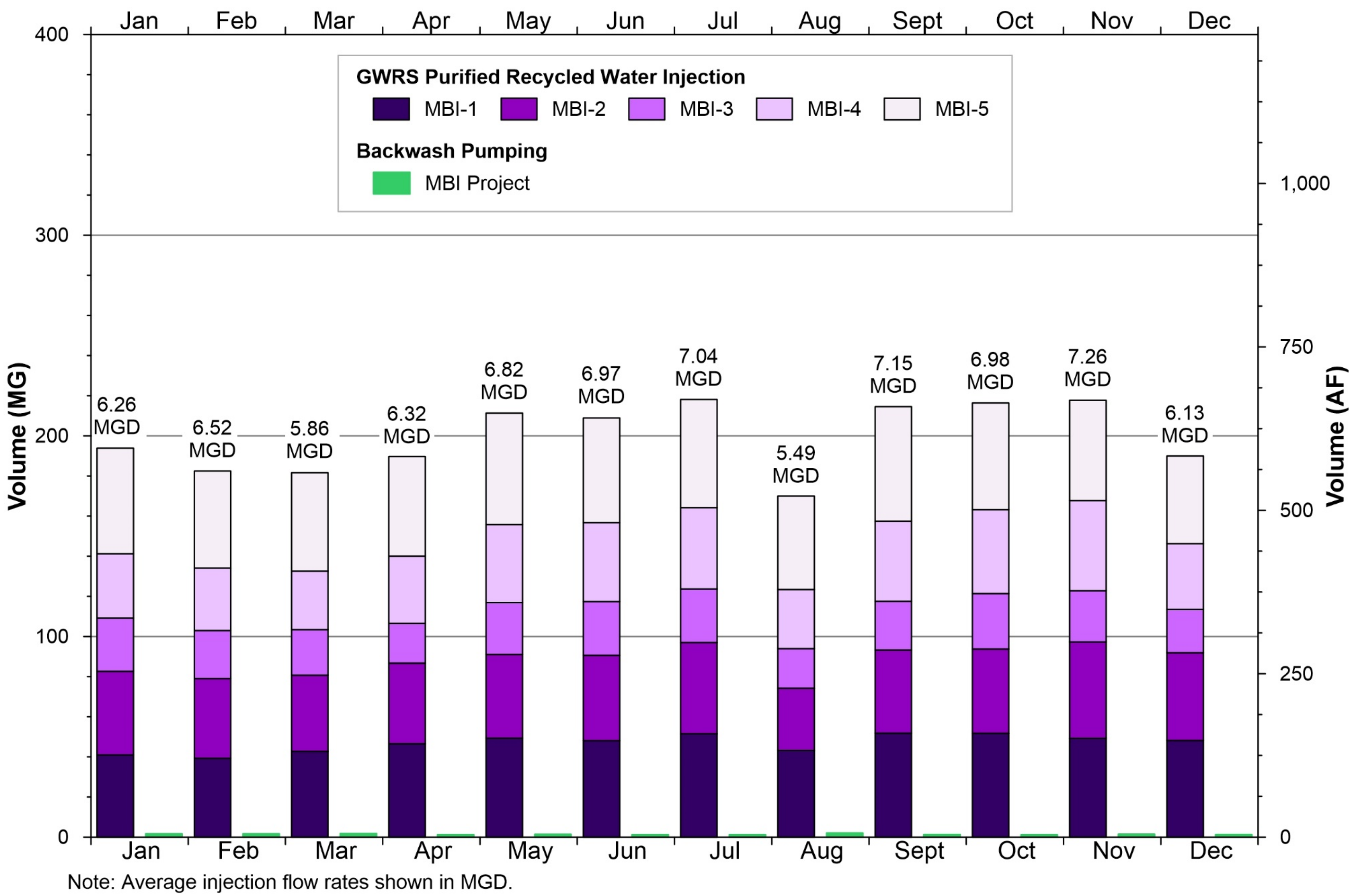


Figure 7-4. 2023 Monthly Injection and Backwash Quantities at MBI Project

August when MBI wells were off-line for two days, MBI Project injection volumes and average daily injection rates remained stable year-round and were only minimally impacted by regional water level fluctuations. Monthly injection typically has an inverse correlation with seasonal water levels, i.e., injection is slightly lower in the winter months when regional water levels are higher due to less groundwater pumping during those cooler and wetter months. Figure 7-4 shows that monthly injection followed the typical seasonal pattern wherein injection was moderate and decreasing to begin the year, reached a seasonal low in the late winter/early spring, then increased through the warmer summer and early fall months before again decreasing in the final 1-2 months of the year.

7.3 MBI Project Injection Rates and Yields

OCWD Operations staff continuously monitor operational data from the MBI Project injection wells to target optimal and sustainable operating conditions throughout the year. Optimal operating conditions targeted at each well consist of injection rate set point and backwash frequency, which are adjusted as needed.

An injection rate set point is programmed into the PCS for each MBI well as an operational range within which the automated downhole flow control valve can feasibly operate. To avoid excessive opening and closing of the flow control valves attempting to maintain a precisely constant injection rate, operational experience led to implementing an injection rate set point range. For example, an injection rate set point with a range of 1,100-1,400 gpm would be programmed for a Centennial Park well if the average injection rate were desired to be approximately 1,250 gpm. Adjustments are typically made to the injection rate set points after a backwash in response to well performance during the preceding backwash cycle for the purpose of maximizing injection volume over time without increasing the required backwash frequency. To avoid irreversible injection well fouling and otherwise avoid elevated operating pressures, if the measured injection level within an MBI well rises to higher than 10 feet bgs, the injection rate is automatically reduced by the downhole flow control valve. This is known as an automatic injection rate reduction, or AIRR.

Injection operations were continuous throughout 2023 except for brief planned and unplanned AWPF shutdowns totaling 4 days off-line. During 2023, there were four instances of planned AWPF shutdowns for maintenance, construction, or testing activities: May 31, August 28-30, November 8, and November 13. Each of the planned AWPF shutdowns lasted less than one day except for the shutdown in August, which lasted 35 hours. There were also four instances of unplanned AWPF shutdowns during 2023, all related to unscheduled power outages or other system failures and all lasting less than 24 hours: April 6, April 17-18, June 12, October 26, and December 29. For a complete list of AWPF shutdowns, see Appendix F.

Injection yield is defined as the injection flow rate in gpm per foot of groundwater level rise from static conditions within the injection well and is comparable to the specific capacity for a production well. Injection at the MBI Project wells resumed 30 minutes after each backwash to allow groundwater levels to recover to near-static conditions. Just prior to resuming injection, a static water level is measured in the injection well and used to calculate the injection yield for the next injection cycle. The first injection yield value following a backwash event and 30-minute static water level measurement is typically recorded one day after injection is resumed, allowing the injection mound to stabilize.

Table 7-3 shows the average daily injection rates for the five MBI wells in 2022 and 2023, while Table 7-4 shows the average daily injection yields for the same wells and years. Due to the interconnected nature of injection rates and yields, the trends observed in the two mimic each other as shown graphically in the 2022 and prior annual reports and discussed here. In 2023, average daily injection rates and yields increased at MBI-1 and decreased at the other four MBI wells compared to the prior year. Throughout both years, MBI-5 consistently had the highest daily average injection rates and yields, and MBI-3 had the lowest. The notable decrease in average daily injection rates and yields at MBI-3 and MBI-5 resulted from 5-6 fewer backwash events in 2023 compared to 2022. At MBI-2 and MBI-4, average daily injection rates and yields remained stable from 2022 to 2023. The total average daily injection rate of the five MBI wells combined during 2023 was 6.56 MGD (4,556 gpm) based on flow meters at each well, representing a 5% (0.4 MGD) decrease relative to the prior year (Table 7-3). Although injection rates and yields showed some slight year-to-year variations, they remained relatively steady throughout the year when accounting for differences in the MBI-3 and MBI-5 backwash cycles, indicating a continued stabilization in well performance that began in 2022.

Table 7-3. 2023 and 2022 MBI Project Average Daily Injection Rates

Year	Days Online	Average Daily Injection Rates (MGD)[1]					
		MBI-1	MBI-2	MBI-3	MBI-4	MBI-5	Total
2023	361	1.54	1.36	0.80	1.19	1.68	6.56
2022	354	1.46	1.37	0.99	1.18	1.93	6.93
2023-2022 Change	2%	6%	-1%	-19%	1%	-13%	-5%

[1] Average daily injection rates based on number of calendar days per year, regardless of days off-line.

Table 7-4. 2023 and 2022 MBI Project Average Injection Yields

Year	Average Daily Injection Yields (gpm/ft)					
	MBI-1	MBI-2	MBI-3	MBI-4	MBI-5	Average
2023	15	16	8	14	17	14
2022	14	16	11	14	21	15
2023-2022 Change	7%	0%	-27%	0%	-19%	-8%

7.4 MBI Project Backwash Pumping Rates and Frequency

Table 7-5 summarizes the annual average pumping rates, durations, and frequency during 2023. MBI-3 had the lowest backwash pumping rate of all five wells because greater backwash pumping rates have been found to produce large quantities of fine sand from the aquifer formation at that well. The lower pumping rate at MBI-3 was based on the results of a dynamic video survey performed in January 2021 for the purpose of determining the optimum backwash pumping rate with minimal sand production. The pumping rates of all MBI backwash events were very stable throughout 2023 due to consistent backwash pumping rate set points, with minor variations in the pumping rates likely caused by fluctuations in regional groundwater levels.

Table 7-5. 2023 MBI Project Backwash Pumping Rates, Duration, and Frequency

	MBI-1	MBI-2	MBI-3	MBI-4	MBI-5
Avg. Pumping Rate (gpm)	3,500	3,300	1,200	3,300	2,700
Avg. Duration (minutes)	40	45	95	45	85
No. of Backwashes	52	13	16	13	16
Approx. Frequency	weekly	monthly	biweekly/ monthly[1]	monthly	biweekly/ monthly[1]

1. Backwash frequency reduced from biweekly to monthly in April at conclusion of operational test.

For injection wells that produce sand during backwash pumping (MBI-1, MBI-3, and MBI-5), the duration of each backwash was determined by the rate of sand production from the aquifer formation, with pumping continuing until the sand content decreased to a target of approximately 1 PPM. During 2023, the backwash duration averaged approximately 40 minutes at MBI-1, 95 minutes at MBI-3, and 85 minutes at MBI-5. For injection wells with negligible sand production (MBI-2 and MBI-4), the duration of each backwash was fixed at 45 minutes throughout the year.

The required backwash frequency provides a gauge of injection performance. For a given injection rate, the longer the time required between backwashes, the better the injection performance (i.e., the slower the rate of clogging). Based on early operational data prior to relining of the Unit 1 GWRS Pipeline, backwash pumping at approximately three times per week was required for MBI-1 to achieve and maintain its design injection rate of 2 MGD (1,400 gpm).

From 2016 to August 2018, slightly lower injection rates at MBI-1 averaging 1.5 MGD (1,000 gpm) had resulted in a more acceptable weekly backwash frequency. Post-rehabilitation of the Unit 1 GWRS Pipeline, MBI-1 operational data in 2018 and 2019 indicated a higher sustainable injection rate of 1.7-2.0 MGD with a backwash frequency of one week. Table 7-5 shows that a weekly backwash frequency was maintained at MBI-1 during 2023, which is more frequent than the four newer MBI wells and more frequent than required by the modern injection wells at the Talbert Barrier (4-8 weeks). Potential reasons for the faster rate of injection yield decline and thus more frequent backwashes at MBI-1 include the following:

- Differences in local geology at the MBI-1 site versus the Talbert Barrier;
- Well design differences at MBI-1 versus MBI-2, MBI-3, MBI-4, and MBI-5; and
- Previously accumulated particulate matter in MBI-1 from erosion of the interior mortar lining in the GWRS Unit 1 Pipeline prior to relining with epoxy coating in 2018.

Due to these factors, a weekly backwash interval will be maintained at MBI-1 for 2024.

The four MBI wells in Centennial Park have generally been backwashed monthly since they came on-line in March 2020. Based on the decline in injection yields observed at each of the four wells during 2021, the backwash frequency was increased at MBI-3 and MBI-5 from monthly to biweekly (Table 7-5) from June 2022 to April 2023 as an operational test to mitigate the loss of injection capacity. During 2023, Operations staff analyzed the test results and found a per well increase of approximately 10-15% in the monthly average injection during the testing period. However, it was determined that the added electrical cost and staff time required for the extra backwashes outweighed the benefit, rendering it financially unsuitable. As a result, MBI-3 and MBI-5 will be maintained at a monthly backwash frequency for 2024 and beyond.

8. GROUNDWATER MONITORING AT THE MBI PROJECT

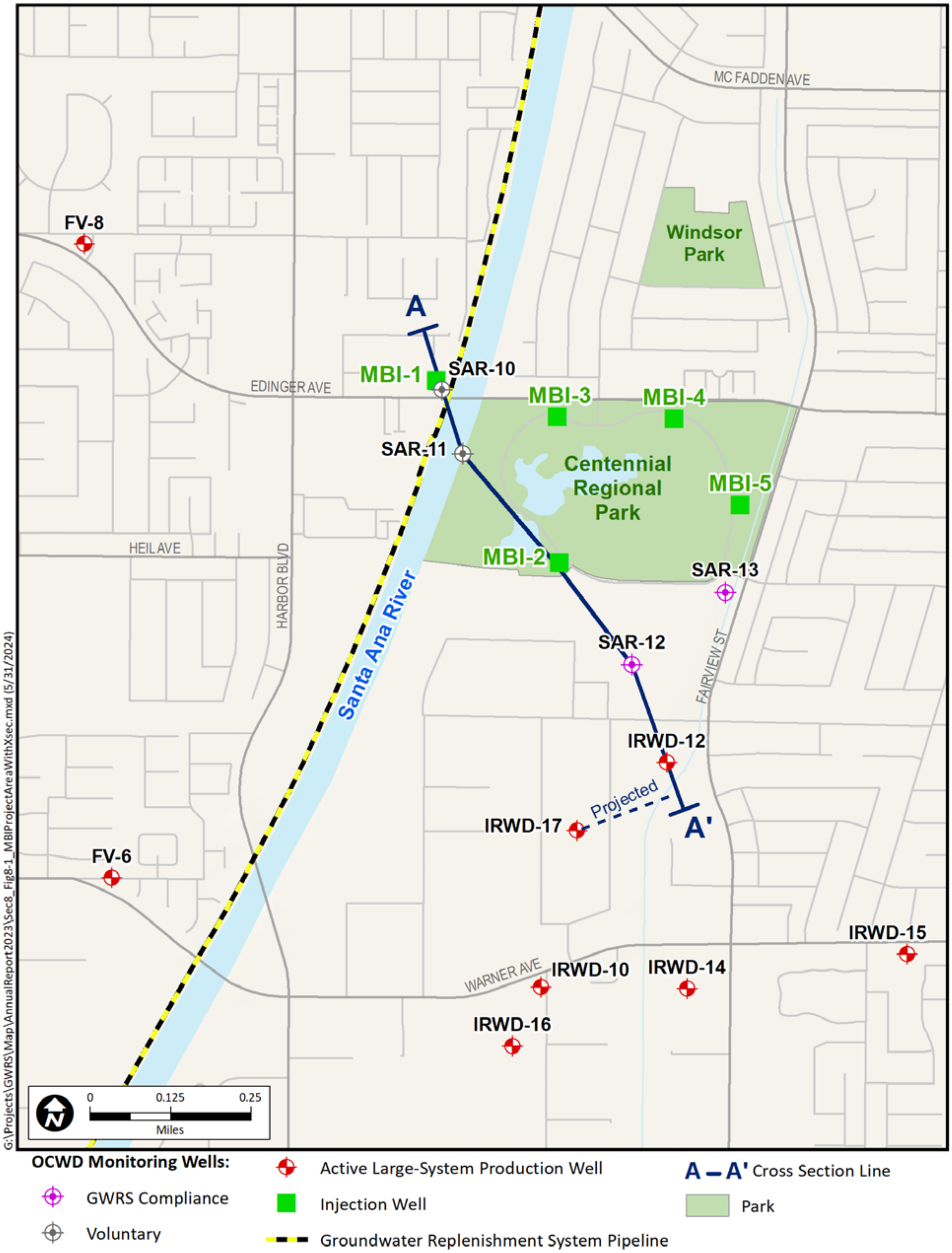
OCWD has maintained a comprehensive groundwater monitoring program throughout the Basin for decades, testing ambient groundwater for various organic, inorganic, and microbiological constituents at OCWD monitoring wells and potable drinking water wells.

As a part of the DMBI Project, OCWD began groundwater monitoring activities in 2012 at nested monitoring wells SAR-10 and SAR-11, prior to injecting GWRS purified recycled water at injection well MBI-1 in April 2015. Figure 8-1 shows the location of the MBI Project monitoring wells. Nested monitoring wells SAR-12 and SAR-13 were constructed during late 2017 as part of the subsequent MBI Centennial Park Project. As discussed in Section 7, these two wells were strategically located downgradient of MBI-1 and the four newer MBI wells in Centennial Park, along the flow path towards the nearest drinking water wells IRWD-12 and IRWD-17. SAR-12 and SAR-13 serve as the two required downgradient compliance monitoring wells (CCR, 2018; RWQCB, 2019; RWQCB, 2022a) for the combined five injection well MBI Project which went on-line in March 2020. Data from compliance monitoring wells SAR-12 and SAR-13 are included in this section. Data from monitoring wells SAR-10 and SAR-11, along with a detailed discussion of water quality trends and arrival times at all four monitoring wells can be found in the 2022 and previous annual reports.

Commencement of GWRS purified recycled water injection at MBI-2, MBI-3, MBI-4, and MBI-5 on March 18, 2020, along with continued injection of GWRS water at MBI-1, marked the start of the full-scale intrinsic tracer test to comply with requirements (RWQCB, 2019) to track the injected GWRS water signal as it migrated to the compliance monitoring wells SAR-12 and SAR-13 and farther downgradient to municipal drinking water production wells IRWD-12 and IRWD-17. For purposes of the intrinsic tracer test, all five MBI wells were placed fully on-line on the same day and were operated at relatively high and stable injection rates to the extent possible for the remainder of 2020, except for a three-week off-line period from April 24 to May 13 related to a planned AWPF shutdown for GWRSFE construction activities and GWRS Pipeline inspection. The tracer test was completed in late 2023 and, as of spring 2024, the MBI Tracer Test Report is under review by DDW.

This section presents the following for calendar year 2023:

- Aquifers in the MBI Project area;
- Overview of groundwater monitoring program;
- Groundwater elevations and directions of flow; and
- Groundwater quality.



SOURCE: OCWD (03/2023)

Figure 8-1. MBI Project Area and Well Location Map

8.1 Aquifers in the MBI Project Area

Earlier studies (DWR, 1934; DWR, 1967) divided the Basin into the Forebay and Pressure areas. As was discussed in Section 6, the Forebay refers to the inland area of intake or recharge generally characterized by coarse-grained high permeability sediments (e.g., sands and gravels) and unconfined aquifer conditions, allowing for surface percolation of applied water to replenish the Basin. In contrast, the Pressure area refers to the coastal and central regions of the Basin where the presence of intervening fine-grained low-permeability clay and silt deposits creates confined or pressurized aquifer conditions at depth, thus making large-scale percolation of surface water impractical in these areas. Therefore, the most feasible method of recharge in the Pressure area is by direct injection into targeted confined aquifers.

For the purposes of the OCWD Basin-wide Groundwater Flow Model (Phraner, et al., 2001; OCWD, 2004b) and the Annual Groundwater Storage Change calculation (OCWD, 2007), the Basin has been vertically characterized into three distinct aquifer systems: (1) Shallow, (2) Principal, and (3) Deep. Over 90% of groundwater production in the Basin occurs from the Principal aquifer system. The approximate vertical intervals of the three aquifer systems in the vicinity of the MBI Project are presented in Table 8-1. The Principal and Deep aquifers are both approximately 1,000 feet thick in the MBI Project area and both rise and thin slightly to the southeast towards the IRWD Dyer Road Well Field (DRWF), conforming to the Basin's overall synclinal structure that plunges to the northwest towards the Buena Park area (Herndon and Bonsangue, 2006).

Table 8-1. Approximate Aquifer System Depths in the MBI Project Area

Shallow Aquifer (ft bgs)	Principal Aquifer (ft bgs)	Deep Aquifer (ft bgs)
0 – 250	250 -1,250	1,250 – 2,250

Figure 8-2 shows a schematic geological cross-section through the MBI Project area, extending to the southeast to IRWD-12. Since the cross-section in Figure 8-2 is a generalized schematic, it shows both IRWD-12 and IRWD-17, which are the two nearest municipal production wells directly downgradient from the MBI Project. Figure 8-1 presented earlier shows the schematic cross-section alignment (A-A'), with IRWD-17 being perpendicularly projected onto that alignment.

Extrapolating the same aquifer naming scheme used in the Talbert Barrier area from earlier studies (see Section 4 and DWR, 1966), Figure 8-2 shows that the Shallow aquifer system is comprised of both the Talbert and Alpha aquifers in the MBI Project area, like at the Talbert Barrier.

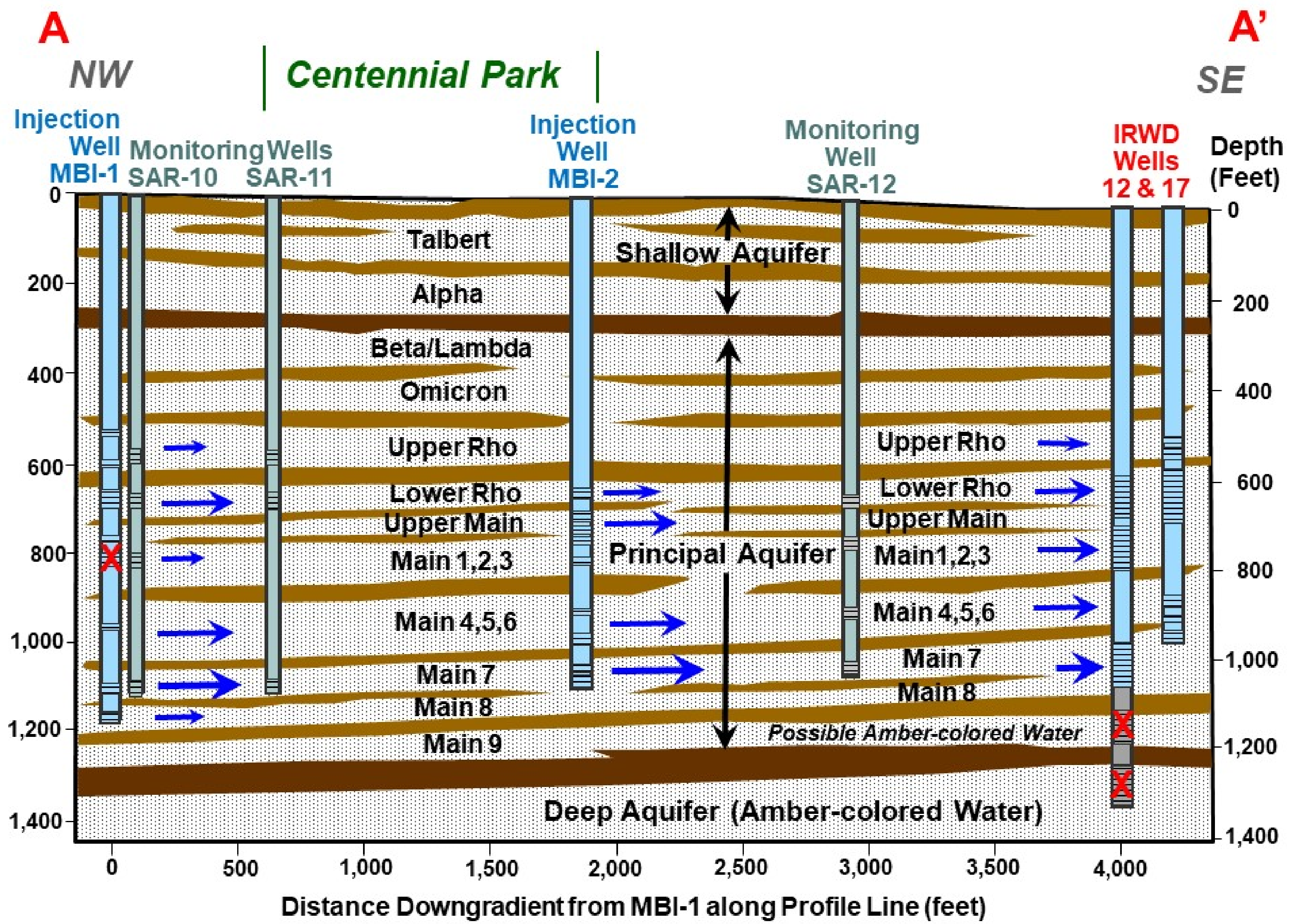


Figure 8-2. Schematic Geological Cross Section Through the MBI Project Area

The Principal aquifer system, from shallowest to deepest, consists of the following individual aquifers:

- Beta and Lambda aquifers, often locally merged;
- Omicron aquifer;
- Upper Rho aquifer;
- Lower Rho aquifer; and
- Main aquifer.

The Main aquifer is the most prolific and thickest aquifer within the Principal aquifer system, typically segregated into multiple discrete subunits separated by low-permeability aquitards that are not entirely laterally extensive (Figure 8-2). Although these Main aquifer subunits tend to be somewhat hydraulically connected to one another with only minor vertical head gradients between them, they were individually correlated across the MBI Project area based on lithologic and geophysical logs from the MBI injection and monitoring wells. Based on the MBI well logs, these Main aquifer subunits have varying hydraulic conductivities and thicknesses that affect the rate of injected GWRS water transport. The individual Main aquifer subunits were numbered from 1 to 9 (from shallow to deep, respectively) with some of these subunits (e.g., subunits 1, 2, and 3) being grouped together based on the interpreted stratigraphy, as shown in Figure 8-2.

Due to the synclinal structure of the Basin plunging to the northwest, the aquifers comprising the Principal aquifer system rise slightly to the southeast from MBI-1 to the nearest production wells, IRWD-12 and IRWD-17. The shallowest Principal aquifer system zones (Beta and Lambda) were interpreted to be approximately 50 feet shallower at IRWD-12 and IRWD-17, while the deepest Principal aquifer system zones (Main 8 and Main 9) were interpreted to be as much as 100-150 feet shallower at IRWD-12 and IRWD-17 than at the MBI-1 site (Figure 8-2). The correlated aquifer names and depths in the MBI Project area and the nearby production wells were based on review of all hydrogeologic data for the MBI wells and nearby production wells, including geophysical logs, existing OCWD Basin-wide geologic cross-sections in the vicinity, and depth-specific groundwater level and quality data, especially from SAR-10, SAR-11, SAR-12, and SAR-13.

All five MBI wells were screened entirely within the Principal aquifer system and were constructed similarly to nearby production wells (Figure 8-2 and Table 7-1).

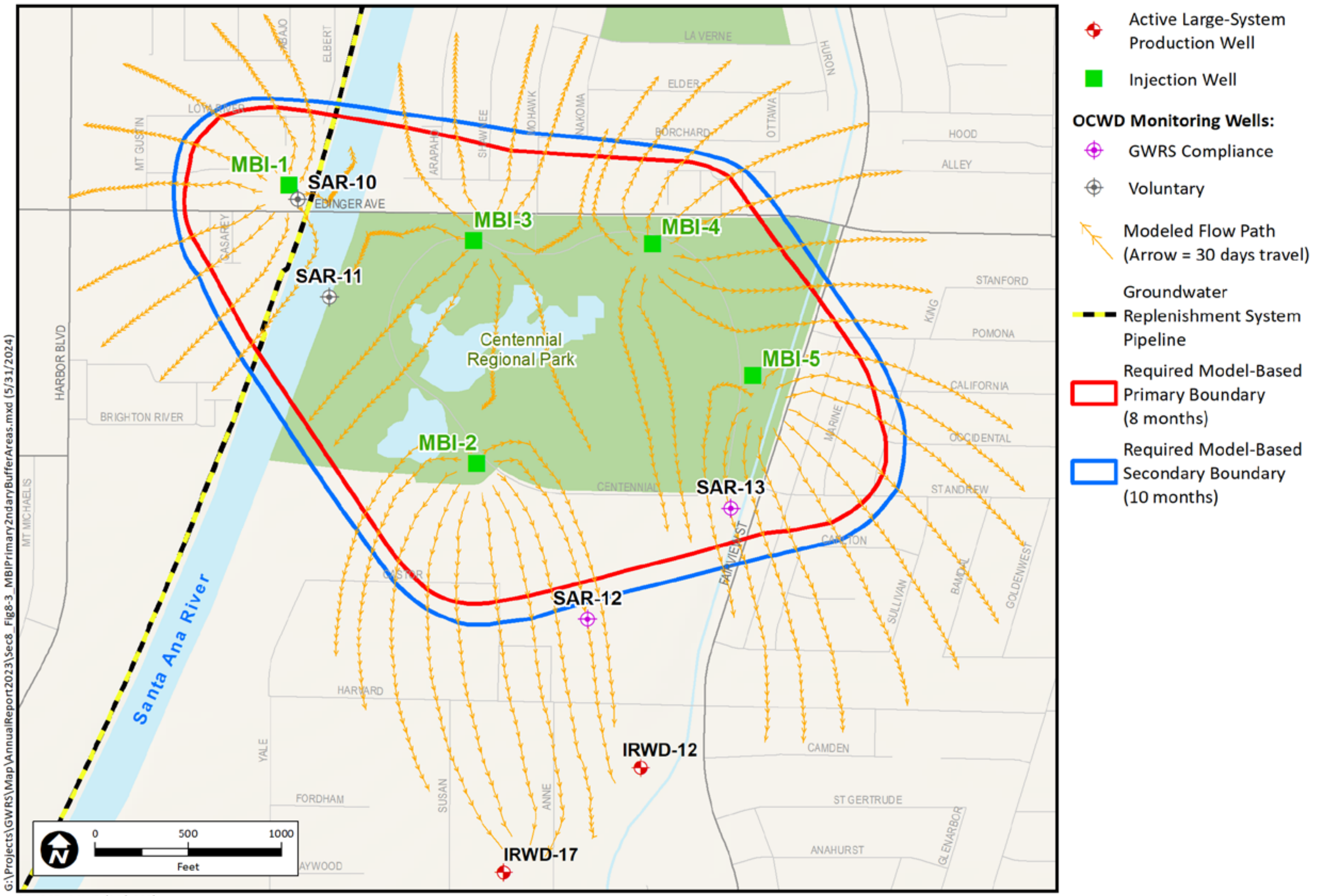
The Principal aquifer system has significantly lower groundwater levels than the Shallow and Deep aquifer systems in the MBI Project area and throughout much of the Basin, due to the large volume of pumping from the Principal aquifer system. Therefore, the greatest need for replenishing the Basin in the MBI Project area is within the Principal aquifer system, especially due to the proximity to the IRWD DRWF, where pumping often lowers groundwater levels to 100 feet below mean sea level in the summer months.

Downward vertical gradients typically exist between the individual aquifer units comprising the Principal aquifer system in the MBI Project area and throughout the larger Pressure area of the Basin, with groundwater levels generally becoming progressively lower with each successively deeper Principal aquifer system unit; groundwater levels are typically highest in the shallowest Beta and Lambda aquifers, and lowest in the deepest Main aquifer subunit. These vertical gradients have consequences for injection well performance. For production or injection wells screened across these Principal aquifer system units, groundwater level differences can cause wellbore flow under static or idle conditions, effectively producing water from screened intervals with higher head (pressure) and injecting this same water back out of the well into screened intervals with lower groundwater head. Under pumping and injection conditions, such groundwater level differences and each unit's transmissivity can significantly influence the amount of water produced from or injected into each screened interval (OCWD, 2010).

Spinner log tests were performed at MBI-1 and the four MBI wells in Centennial Park to determine the relative contribution of each individual screened interval during backwash pumping and injection conditions. At MBI-1, pumping and injection spinner log tests were conducted in August 2015, but then a new injection spinner log test was conducted at MBI-1 in July 2020 when injection spinner logs were also completed at the four MBI wells in Centennial Park. The pumping and injection contribution within each Principal aquifer system unit varies considerably from one MBI well to another (refer to Table 8-2 of the 2021 Annual Report for the percent contribution of pumping versus injection for each screened interval) and is likely caused primarily by differences in aquifer thickness, screened interval length, and hydraulic conductivity at the different MBI locations. These local heterogeneities in the MBI Project area are confirmed and consistent with the lithologic and geophysical logs at the five MBI wells.

As required by state regulation (CCR, 2018), OCWD has established retention time boundary areas for control of pathogenic microorganisms and response retention time in the area downgradient of MBI. Initial model-based boundaries for the project were developed using MODFLOW (Harbaugh and McDonald, 1996) plus MODPATH (Pollock, 1994) particle tracking and approved by the State Water Resource Control Board Division of Drinking Water (DDW) in 2019. Potable drinking water wells are prohibited within the 8-month primary underground retention time boundary illustrated on Figure 8-3. Additionally, no drinking water wells are located within the 10-month secondary underground retention time boundary. The boundary area is enforced by local well permitting authorities including the Orange County Health Care Agency, as well as DDW.

Beginning on March 18, 2020, with the commencement of injection at MBI-2 through MBI-5 along with continued injection of GWRS water at MBI-1, OCWD conducted a full-scale intrinsic tracer test to confirm the model-based retention time boundaries displayed in Figure 8-3. Proposed 4-month primary and 5-month secondary boundary areas based on both the tracer



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SOURCE: OCWD (04/2023)

Figure 8-3. MBI Project Boundary Areas

test study results and refined flow and transport modeling were presented to DDW in the MBI Tracer Test Report in spring 2024 and are currently under review by DDW.

8.2 Groundwater Monitoring Program

The MBI Project follows a groundwater monitoring program like those conducted within the other GWRS recharge areas (Talbert Barrier and K-M-M-L Basins). SAR-12 and SAR-13 serve as the two required downgradient compliance monitoring wells in the GWRS permit (RWQCB, 2022a) for the combined five injection well MBI Project.

Table 8-2 summarizes the screened interval depths and aquifer zones for all four MBI monitoring wells (SAR-10, SAR-11, SAR-12, and SAR-13). For monitoring the fate and transport of injected GWRS water, SAR-10 and SAR-11 were screened in Principal aquifer zones corresponding to individual screened intervals at MBI-1, while SAR-12 and SAR-13 were screened in Principal aquifer zones corresponding to individual screened intervals common to the four newer Centennial Park wells (MBI-2, MBI-3, MBI-4, and MBI-5).

Table 8-2. Monitoring Wells at the MBI Project

OCWD Well Name	*Date Completed*	*Nearest Injection Well* [1]	*Approximate Distance and Direction from MBI well*	*Nearest Drinking Water Well*	*Well Depth (ft bgs)*	*Aquifer Name*
SAR-10/1[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	590-600	Upper Rho
SAR-10/2[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	690-710	Lower Rho
SAR-10/3[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	800-820	Main 2
SAR-10/4[2]	05/10/2012	MBI-1	80 ft SE	IRWD-12	1,100-1,115	Main 7
SAR-11/1[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	592-602	Upper Rho
SAR-11/2[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	675-690	Lower Rho
SAR-11/3[2]	11/10/2011	MBI-1	650 ft SE	IRWD-12	1,100-1,110	Main 7
SAR-12/1	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	605-625	Lower Rho
SAR-12/2	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	755-775	Main 2
SAR-12/3	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	915-930	Main 4
SAR-12/4	01/15/2018	MBI-2	1,000 ft SE	IRWD-12	1,045-1,055	Main 7
SAR-13/1	10/30/2017	MBI-5	500 ft S	IRWD-12	600-620	Lower Rho
SAR-13/2	10/30/2017	MBI-5	500 ft S	IRWD-12	750-770	Main 2
SAR-13/3	10/30/2017	MBI-5	500 ft S	IRWD-12	910-930	Main 4
SAR-13/4	10/30/2017	MBI-5	500 ft S	IRWD-12	1,045-1,055	Main 7

[1] The closest injection well is not necessarily the fastest source of injection water based on estimated arrival times and inferred groundwater flow directions.

[2] Monitoring well sites SAR-10 and SAR-11 are not compliance wells per the GWRS permit (RWQCB, 2022a). Monitoring at these sites continues voluntarily.

Groundwater levels at SAR-10, SAR-11, SAR-12, and SAR-13 were manually measured approximately monthly during 2023. In addition, all zones of all four wells were equipped with automated data loggers and pressure transducers for at least daily groundwater level monitoring prior to commencement of the MBI Project intrinsic tracer test in March 2020 to monitor the associated rise in groundwater levels. The monthly hand-measured water levels were used to verify that the pressure transducers were accurate and within acceptable calibration limits.

The new GWRS permit requires the same monitoring locations and frequencies as the previous GWRS permit, although the constituents required for monitoring were changed slightly as follows:

- Required monitoring reduced or eliminated for the following constituents:
    - MBAS, silver, and thiobencarb no longer required; and
    - Color and odor reduced from quarterly to annually.
- Required monitoring added for the following constituents:
    - Lead, arsenic, beryllium, cadmium, trivalent chromium, selenium and thallium quarterly;
    - Hexavalent chromium annually;
    - Dichloromethane, bromodichloromethane, chloroform, and NDMA quarterly; and
    - Acrolein and acrylonitrile quarterly through third quarter 2023, after which time monitoring may cease if all results are non-detect.

Groundwater level and quality results from all four monitoring wells have been instrumental in determining groundwater flow patterns and velocities within the MBI Project area as described in Section 8.4 of the 2021 and 2022 annual reports. Data from these four monitoring wells were also used to help refine and calibrate a groundwater flow and transport model of the MBI Project area as summarized in Section 8.5 of the 2022 annual report and described in the MBI Tracer Test Report currently under review by DDW.

8.3 Groundwater Elevations and Directions of Flow

This section discusses groundwater elevations and groundwater flow paths within the Principal aquifer system in the MBI Project area.

8.3.1 Principal Aquifer System

For the MBI Project, the Principal aquifer system is of primary concern since all five MBI wells are screened in this aquifer zone, as are the nearest downgradient production wells IRWD-12 and IRWD-17 that have been shown to receive some proportion of injected GWRS water from the project. Principal aquifer system groundwater elevations vary considerably due to seasonal fluctuations in the amount and location of Basin pumping, as well as year-to-year changes in Basin groundwater storage. However, regional groundwater flow directions have remained relatively stable in the greater MBI Project area over the last several years.

Figure 8-4 shows interpreted groundwater elevation contours and inferred groundwater flow directions for the Principal aquifer system for June 30, 2023. Groundwater levels from SAR-10/4, SAR-11/3, SAR-12/4, and SAR-13/4, all screened in the Main 7 Principal aquifer subunit (Table 8-2), were used to help construct and constrain these Basin-wide regional contours in the MBI Project area, and all five MBI wells were operational at the time of the groundwater level measurements. IRWD-12 was off-line during all of 2023 and IRWD-17 was pumping during the time of the groundwater level measurements and therefore neither well had a static water level measurement during the late June timeframe to help constrain the contours downgradient of the MBI Project. The only downgradient IRWD production well in this vicinity that had a reliable static water level for the contour map in Figure 8-4 was IRWD-16 measured at -82 ft msl.

As shown on Figure 8-4, groundwater elevations in the Principal aquifer system were approximately 48 feet below mean sea level in the northwest portion of the MBI Project area between SAR-10 and SAR-11 and approximately 63 feet below mean sea level in the southeast portion of the MBI Project area between SAR-12 and SAR-13, both areas approximately 2-3 feet higher than in June 2022. The small rise in Principal aquifer groundwater levels from June 2022 to June 2023 indicated that the 10,000 AF increase in Principal aquifer system storage from June 2022 to June 2023 throughout the Basin was locally offset by a combination of increased pumping at the IRWD DRWF and reduced injection at the MBI Project in 2023 as compared to 2022.

Based on the Principal aquifer system groundwater elevation contours in Figure 8-4, the inferred groundwater flow direction in the MBI Project area in June 2023 was to the south towards the IRWD DRWF, similar to the last couple years since full-scale injection from all five MBI wells began in 2020. The inferred groundwater flow direction was southeasterly prior to the MBI Project wells coming on-line in 2020.

The closest downgradient production wells to the MBI Project are IRWD-12 and IRWD-17, both located approximately 2,200 feet downgradient from the nearest MBI wells, MBI-5 and MBI-2, respectively. As such, the inferred groundwater flow directions in Figure 8-4 indicated flow from MBI-5 towards IRWD-12 (even though it was off-line in 2023) and from MBI-2 towards IRWD-17. Figure 8-4 shows that Principal aquifer system groundwater elevations near IRWD-12 at the end of June 2023 were approximately 75 feet below mean sea level, just 2-3 feet lower than in June 2022 and generally consistent with the minor change in Principal aquifer system groundwater levels observed throughout the Pressure area of the Basin and at the four MBI monitoring wells during that period. Since Principal aquifer system groundwater elevations from June 2022 to June 2023 were 2-3 feet higher at the MBI monitoring wells and 2-3 feet lower near IRWD -12, the hydraulic gradient from the MBI Project wells to IRWD-12 was slightly steeper in June 2023 than in June 2022 and was likely attributable to increased overall IRWD DRWF pumping during 2023 (even though IRWD-12 was off-line all year). In addition to the effects of MBI Project injection, the hydraulic gradient in this area can be influenced by Basin storage conditions and

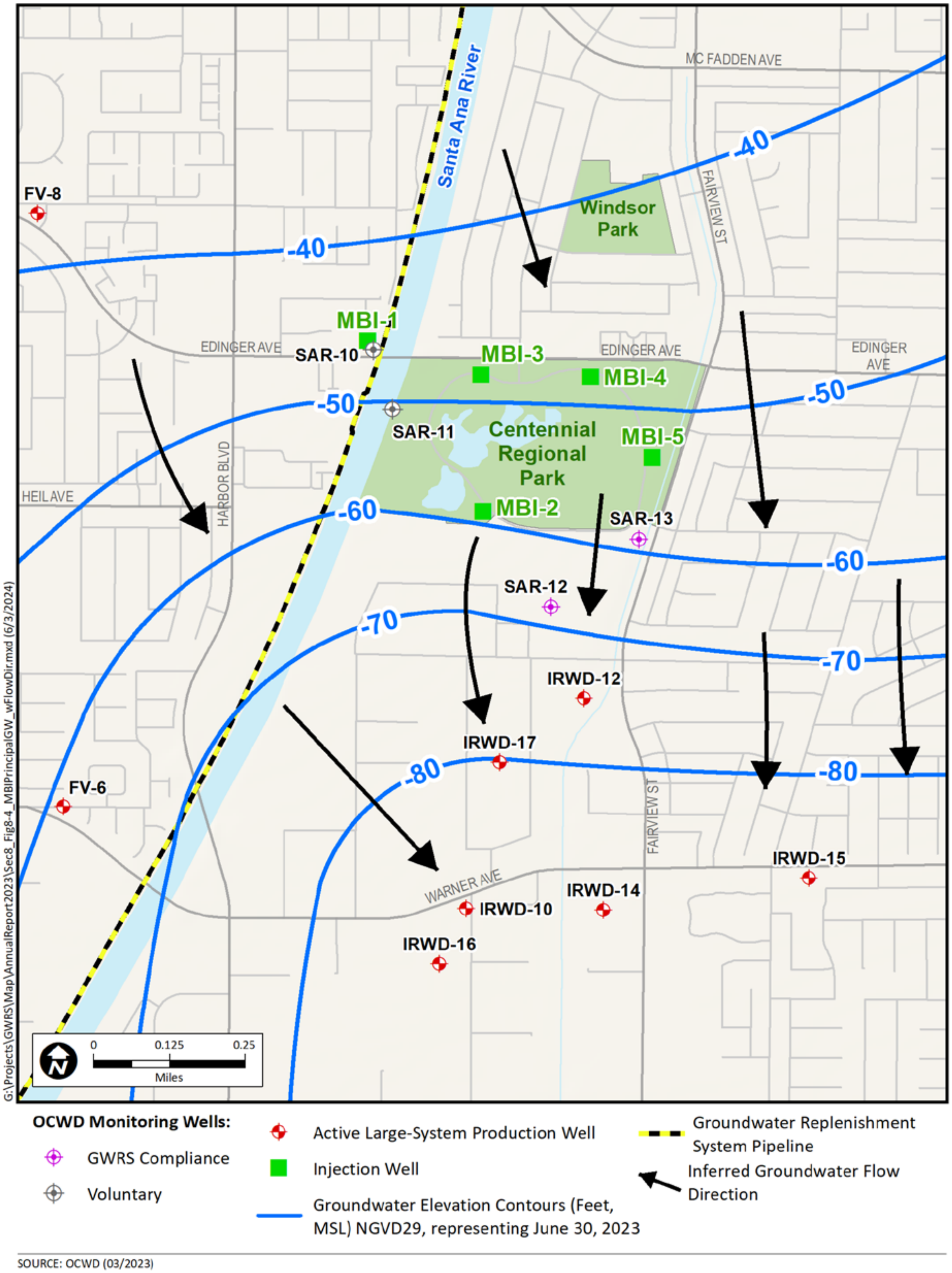

Figure 8-4. Principal Aquifer System Potentiometric Surface with Inferred Groundwater Flow Directions in the MBI Project Area During 2023

also the timing and amount of pumping from nearby production wells, especially in the IRWD DRWF.

During 2023, groundwater elevation trends at the four MBI Project monitoring wells followed the typical seasonal pattern observed in these wells and monitoring wells throughout the basin: (1) rising and/or remaining high during the winter and early spring months, (2) declining in the late spring and summer months, and (3) recovering considerably in the late fall months to the end of the year. In the MBI Project area, these seasonal trends largely result from seasonal water demands which lead to increased pumping during the summer and reduced pumping during the winter, and to a lesser degree from increased Forebay recharge (both natural and managed) from local rainfall and captured SAR storm flows during the winter months.

As mentioned previously, downward vertical gradients typically exist between the individual aquifer units comprising the Principal aquifer system in the MBI Project area and throughout the larger Pressure area of the Basin, with groundwater levels generally becoming progressively lower with each successively deeper Principal aquifer unit. At SAR-12 and SAR-13, the typical downward vertical gradient is not observed prior to or during MBI Centennial Park operations; this is likely due to their proximity to production wells IRWD-12 and IRWD-17, which both have their upper screened intervals within the same aquifer zones as the upper two zones at SAR-12 and SAR-13 (Figure 8-2). SAR-12 is located only 850 ft from IRWD-12, while SAR-13 is located 1,475 ft from IRWD-12, as compared to SAR-10 and SAR-11 which are both over 3,000 ft away from IRWD-12 (Figure 8-1) and thus have a much more dampened response to pumping from IRWD-12 and IRWD-17.

8.4 Groundwater Quality

Monitoring wells SAR-12 and SAR-13 have been sampled quarterly from March 2018 through 2023. SAR-12 and SAR-13 were sampled for background data collection purposes from March 2018 until February 2020, then for compliance monitoring purposes beginning in March 2020 with MBI Project startup. Quarterly compliance groundwater quality data for 2023 are presented in Appendix K and general groundwater quality data for 2020-2023 are presented in Appendix L for SAR-12 and SAR-13. The two MBI Project compliance monitoring wells were tested for an extensive list of inorganic and organic parameters, including constituents with secondary MCLs, 1,4-dioxane, and NDMA. During 2023, groundwater quality at SAR-12 and SAR-13 complied with all Federal and State Primary Drinking Water Standards. Two Secondary MCL exceedances occurred at the MBI monitoring wells during 2023, both at SAR-12/2 for aluminum and iron, which are discussed in Section 8.4.2.

Table 8-3. Secondary MCL Exceedances at MBI Monitoring Wells

	Background (pre-2020)		2022		**2023**		Notes/Trends
	Range	Mean	Range	Mean	**Range**	**Mean**	
ALUMINUM (Secondary MCL = 200 µg/L)							
SAR-12/2	10-42	21	4-8	6	**1-218**	**55**	One-time spike above background level in Q3 coincident with initial GWRS arrival; returned to background level in Q4.
IRON (Secondary MCL = 300 µg/L)							
SAR-12/2	11-43	25	11-15	13	**8-612**	**163**	One-time spike above background level in Q3 coincident with initial GWRS arrival; returned to background level in Q4.

8.4.1 Monitoring Wells – Chloride, NDMA, and 1,4-Dioxane

As discussed in Sections 4 and 6 related to the Talbert Barrier and Anaheim Forebay recharge facilities, respectively, chloride has been effectively used as an intrinsic tracer of GWRS water in the subsurface arriving at nearby downgradient monitoring wells. Chloride is a conservative tracer and thus is expected to migrate at the same groundwater velocity as the injected water without any significant reactions with other constituents in the groundwater or aquifer substrate. Fortunately for tracking purposes, GWRS-FPW has a very low and relatively stable chloride concentration with an annual average ranging from 5-11 mg/L since 2020 when the MBI tracer test began.

Ambient background chloride concentrations at all Principal aquifer subunits ranged from 11-16 mg/L prior to the commencement of GWRS injection at the MBI Project monitoring wells. The lack of chloride variability between these aquifer subunits and the lack of seasonal chloride variation provided a reliable and stable antecedent chloride condition that was noticeably higher than GWRS water at the monitoring wells. Also, as discussed in Section 8.4.2, chloride concentrations at the nearest downgradient production well IRWD-12 were similarly stable within approximately the same range over a much longer historical period than the MBI Project monitoring wells.

Beginning in mid-2020 and continuing through 2021, the sampling frequency at SAR-12 and SAR-13 was voluntarily increased to biweekly to track the injected GWRS water for the MBI intrinsic tracer test, then reduced back down to quarterly in the beginning of 2022. GWRS arrival estimates for the MBI monitoring wells are provided in previous annual reports (e.g., DDBE, 2023). The MBI Tracer Test Report was submitted to DDW in February 2024 and is currently under review by DDW.

As discussed in Section 4.4.1, OCWD has historically monitored for NDMA in the vicinity of the Talbert Barrier for GWRS permit compliance purposes and to track the release of NDMA within the aquifers receiving injection in the late 1990s and early 2000s from WF-21. Since then, through a combination of industrial source control, appropriate polymer selection and waste stream diversion at OC San, improved NDMA rejection by RO membranes, and UV treatment, the concentration of NDMA in GWRS-FPW has been significantly reduced (OCWD, 2015).

Figure 8-5 for SAR-13/4 (Main 7 aquifer) presents an illustrative example of the correlation between chloride and NDMA. From 2018-2020, chloride concentrations at SAR-13/4 were stable at approximately 12 mg/L, indicating no arrival of GWRS water from MBI-1 during that time. Concurrent NDMA concentrations were consistently non-detect, confirming no GWRS water arrival. In mid-2020, chloride concentrations decreased while NDMA concentrations increased notably, signaling GWRS arrival. In fall 2021 chloride concentrations briefly rose along with a contemporaneous decrease in NDMA concentrations , indicating some proportion of older native pre-GWRS water migrating to this well following a 21-day AWPF shutdown in August-September 2021. Chloride and NDMA time series graphs like Figure 8-5 for all four MBI monitoring wells were shown and discussed in detail in the 2022 and previous annual reports. During 2023, NDMA concentrations at MBI Project compliance monitoring wells SAR-12 and SAR-13 were generally representative of recent GWRS-levels, ranging from non-detect to 5.2 ng/L, well below the notification level of 10 ng/L.

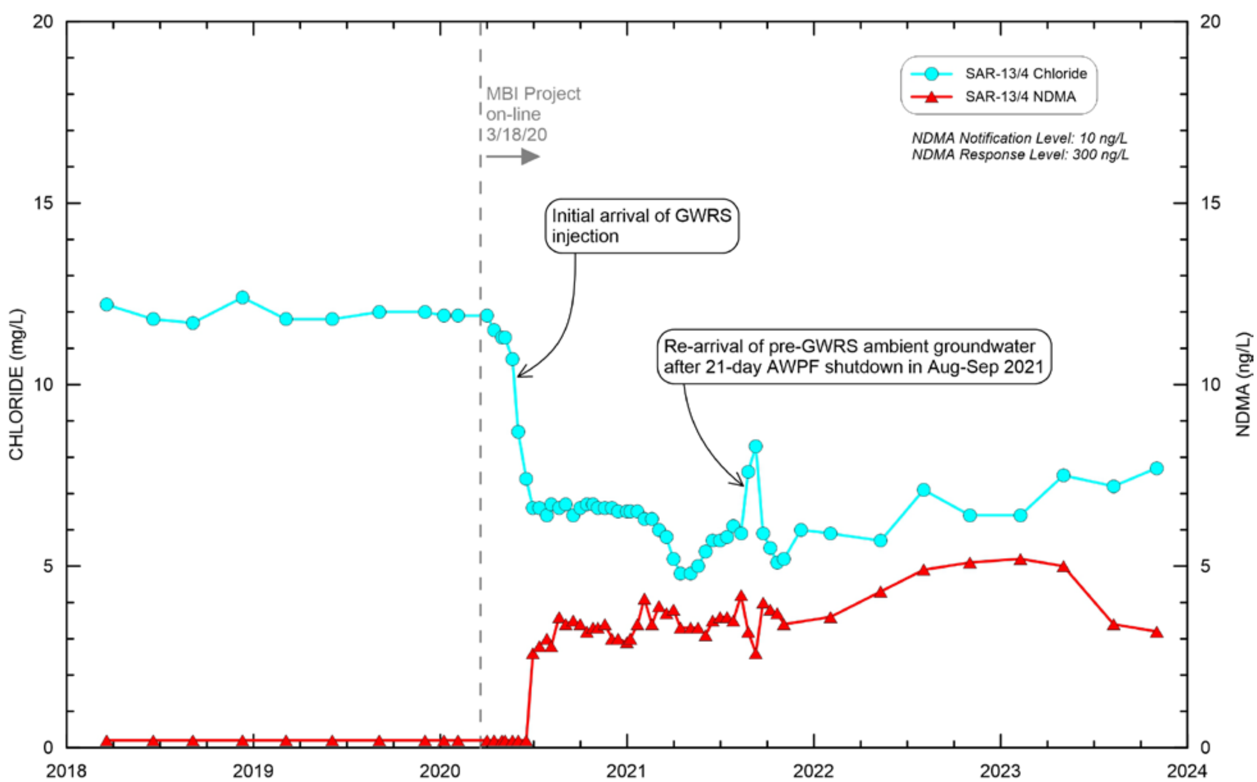

Figure 8-5. Monitoring Well SAR-13/4 Chloride and NDMA Concentrations

During 2023, all zones at SAR-12 and SAR-13 continued to be non-detect for 1,4-dioxane, as expected since historical ambient levels at the compliance wells and GWRS-levels since 2015 were all non-detect.

8.4.2 Monitoring Wells – Metals

This subsection describes groundwater monitoring results at the compliance wells SAR-12 and SAR-13 for key metals, arsenic, aluminum, and iron, all of which have shown some degree of mobilization from aquifer sediments downgradient of GWRS recharge at the MBI wells. A comprehensive list of 2023 groundwater quality results for all monitored metals at SAR-12 and SAR-13 is available in Appendix K. For a description of vanadium trends related to the arrival of GWRS water at MBI Project monitoring wells, see Section 8.4.4 of the 2022 Annual Report.

8.4.2.1 Arsenic

One of the main constituents monitored along the injection flow path is arsenic since mobilization of aquifer sediment-bound arsenic has been shown to occur at some locations in association with the recharge and injection of GWRS purified recycled water. The primary MCL for total arsenic is 10 µg/L. Total arsenic and other total metals were sampled at least quarterly at SAR-12 and SAR-13 from 2018 through 2023.

As previously documented, the mobilization of arsenic from aquifer sediments has been observed at some locations downgradient of GWRS water injected at the Talbert Barrier and percolated in K-M-M-L Basins in the Anaheim Forebay area. However, GWRS water is not an arsenic source as GWRS arsenic concentrations have remained below the RDL of 1 µg/L since GWRS inception in 2008. Figure 8-6 and Figure 8-7 show total arsenic and chloride concentrations during 2018-2023 for SAR-12 and SAR-13, respectively.

At SAR-12, the pre-injection ambient background arsenic concentrations ranged from below the RDL of 1 to 2.2 µg/L for all four zones. At SAR-12/1, Figure 8-6 shows that arsenic concentrations remained at ambient background levels during 2020-2023 since very little to no GWRS water has arrived at this well based on very stable chloride concentrations above 10 mg/L. At SAR-12/2, arsenic concentrations also remained at ambient background levels during 2020-2023 even though initial arrival of some proportion of GWRS water appears to have finally occurred during August 2023 based on chloride concentrations decreasing to 10 mg/L for the first time at this well (and substantiated by a similar contemporaneous decrease in sulfate). At SAR-12/3, where GWRS water arrived in early April 2021, arsenic concentrations began increasing gradually in August 2021 to a historical high of 3.2 µg/L in October 2023, still well below the MCL of 10 µg/L. At SAR-12/4, where GWRS water arrived in September 2020, arsenic concentrations have remained stable at ambient background levels of approximately 2 µg/L through 2023.

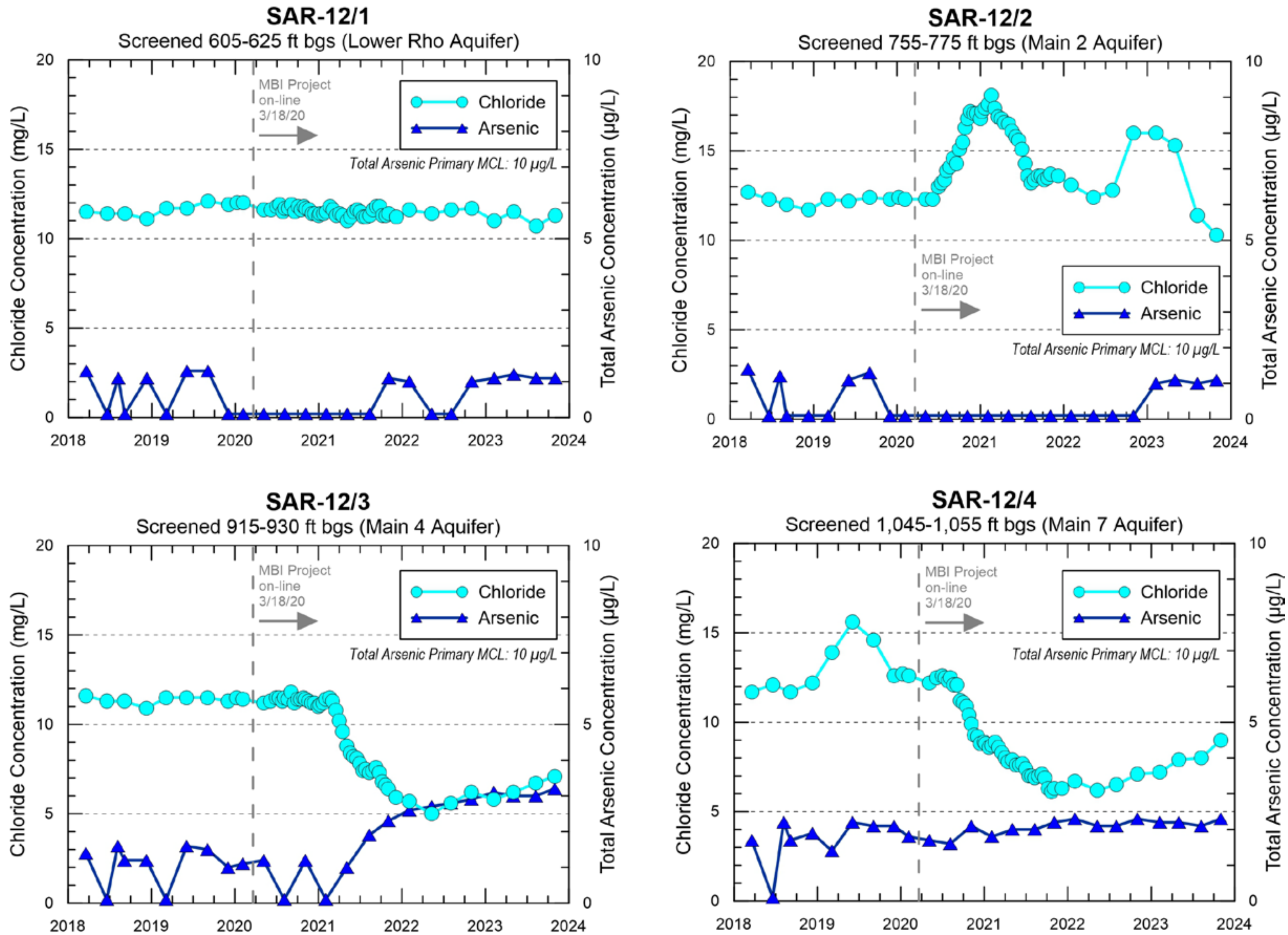

Figure 8-6. Monitoring Well SAR-12 Chloride and Dissolved Arsenic Concentrations

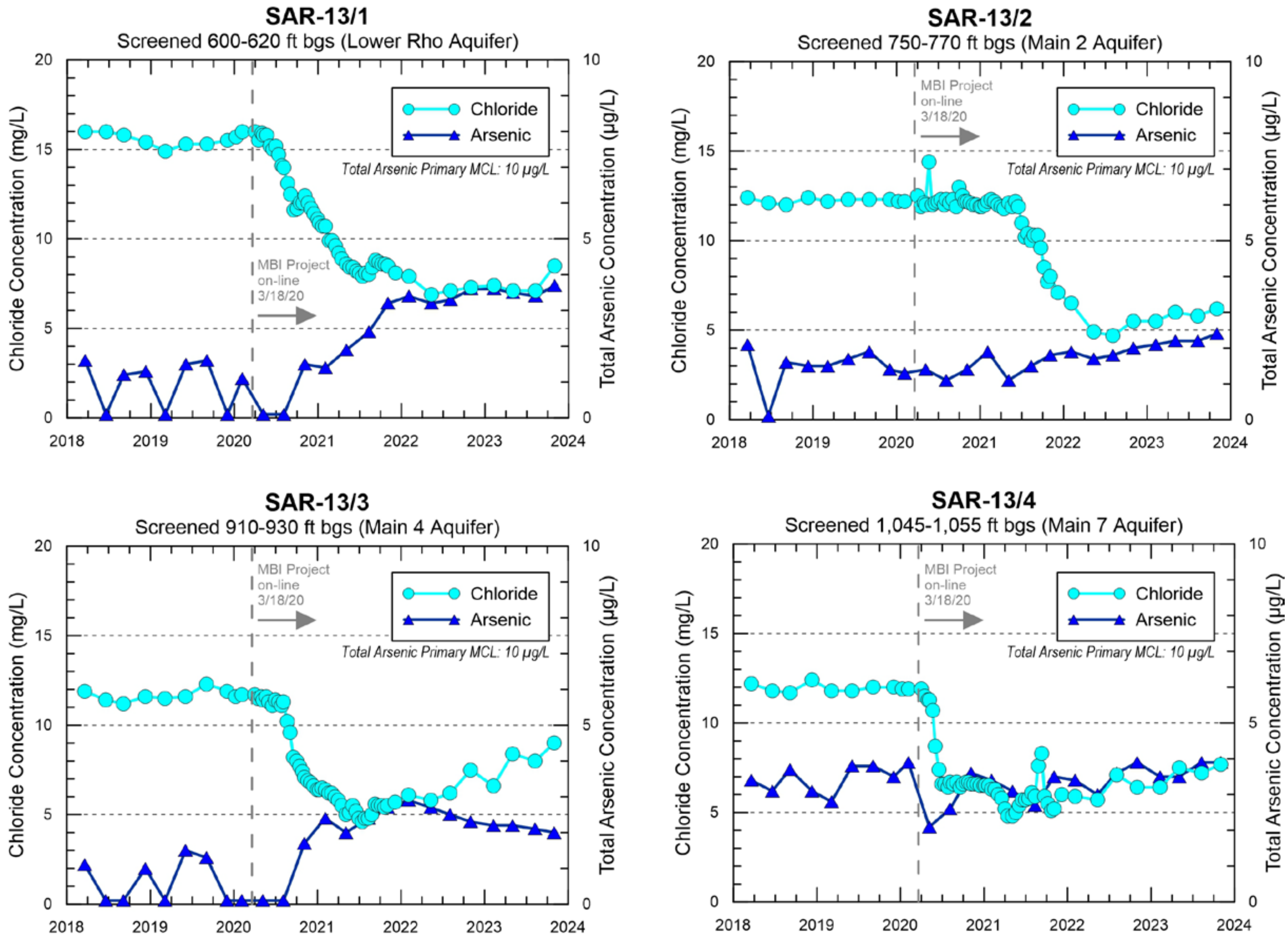

Figure 8-7. Monitoring Well SAR-13 Chloride and Dissolved Arsenic Concentrations

Figure 8-7 shows that the pre-injection ambient background arsenic concentrations at SAR-13/1, SAR-13/2, and SAR-13/3 were consistent with those at all other MBI Project monitoring wells, while the pre-injection ambient background arsenic concentrations at SAR-13/4 were elevated relative to all others, ranging from 2.8-3.8 µg/L. At SAR-13/1, where GWRS water arrived in mid-August 2020, arsenic concentrations began gradually increasing in early-2021, reaching a historical high of 3.7 µg/L in November 2023. At SAR-13/2, where GWRS water arrived in July 2021, arsenic concentrations began increasing above background levels in late 2022 and reached a historical high of 2.4 µg/L in November 2023. At SAR-13/3, where GWRS water arrived in August 2020, arsenic concentrations increased slightly in late-2020 from below the RDL to 1.7 µg/L in November 2020 and have since remained slightly elevated above background levels, peaking at 2.9 µg/L in February 2022 before gradually decreasing to 2.0 µg/L by November 2023. At SAR-13/4, where GWRS water arrived in May 2020, arsenic concentrations remained within the higher ambient background levels at this well during 2020-2023.

The source of the arsenic release in the MBI Project area is likely the oxidation of iron sulfide minerals, such as pyrite, which was detected in some aquifer sediment samples collected from the DMBI Project well borings. Arsenic is known to be associated with pyrite and can be released into the aqueous phase during oxidation by introducing oxidizing GWRS water into a geochemically reduced aquifer, as measured by oxidation-reduction potential (ORP). Prior to the arrival of GWRS water, all MBI Project monitoring well zones showed negative ORP, while GWRS water has positive ORP. However, the oxidation of pyrite can also create hydroferrous oxide (HFO) coatings on the aquifer mineral surfaces. These HFO coatings can provide additional sorption sites for arsenic and other species that are controlled by pH and other geochemical factors, thereby limiting the extent of mobilization. This geochemistry may help limit arsenic mobilization and may also help to explain sulfate concentrations in some of the zones at MBI Project compliance wells (e.g., SAR-13/3, and SAR-13/4) never declining as low as GWRS levels despite chloride concentrations indicative of 100% GWRS water.

8.4.2.2 Aluminum

Aluminum is regulated via a California primary and secondary MCL of 1,000 µg/L and 200 µg/L, respectively, as well as a PHG of 600 µg/L. Total aluminum concentrations along with chloride concentrations for 2018-2023 at compliance wells SAR-12 and SAR-13 are shown in Figure 8-8 and Figure 8-9, respectively.

As indicated in Table 8-3 and Figure 8-8, during 2023 aluminum concentrations at SAR-12/2 experienced a one-time spike to slightly above the secondary MCL to 218 µg/L in August and then decreased to below the RDL of 5 µg/L in October. This was the first time that aluminum had been detected above background levels at this well and coincided with chloride concentrations decreasing for the first time below background levels, signaling initial arrival of some proportion

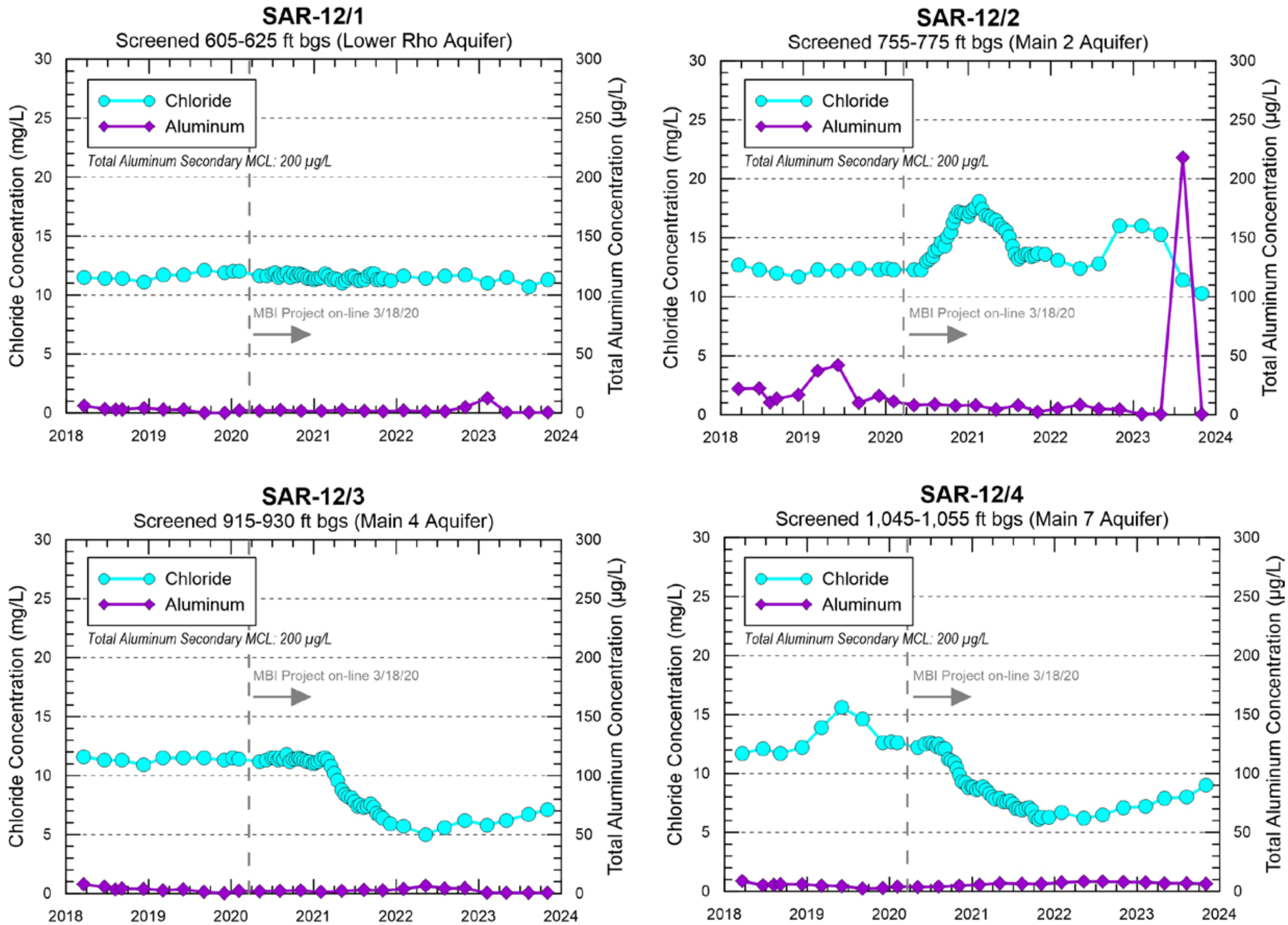

Figure 8-8. Monitoring Well SAR-12 Chloride and Total Aluminum Concentrations

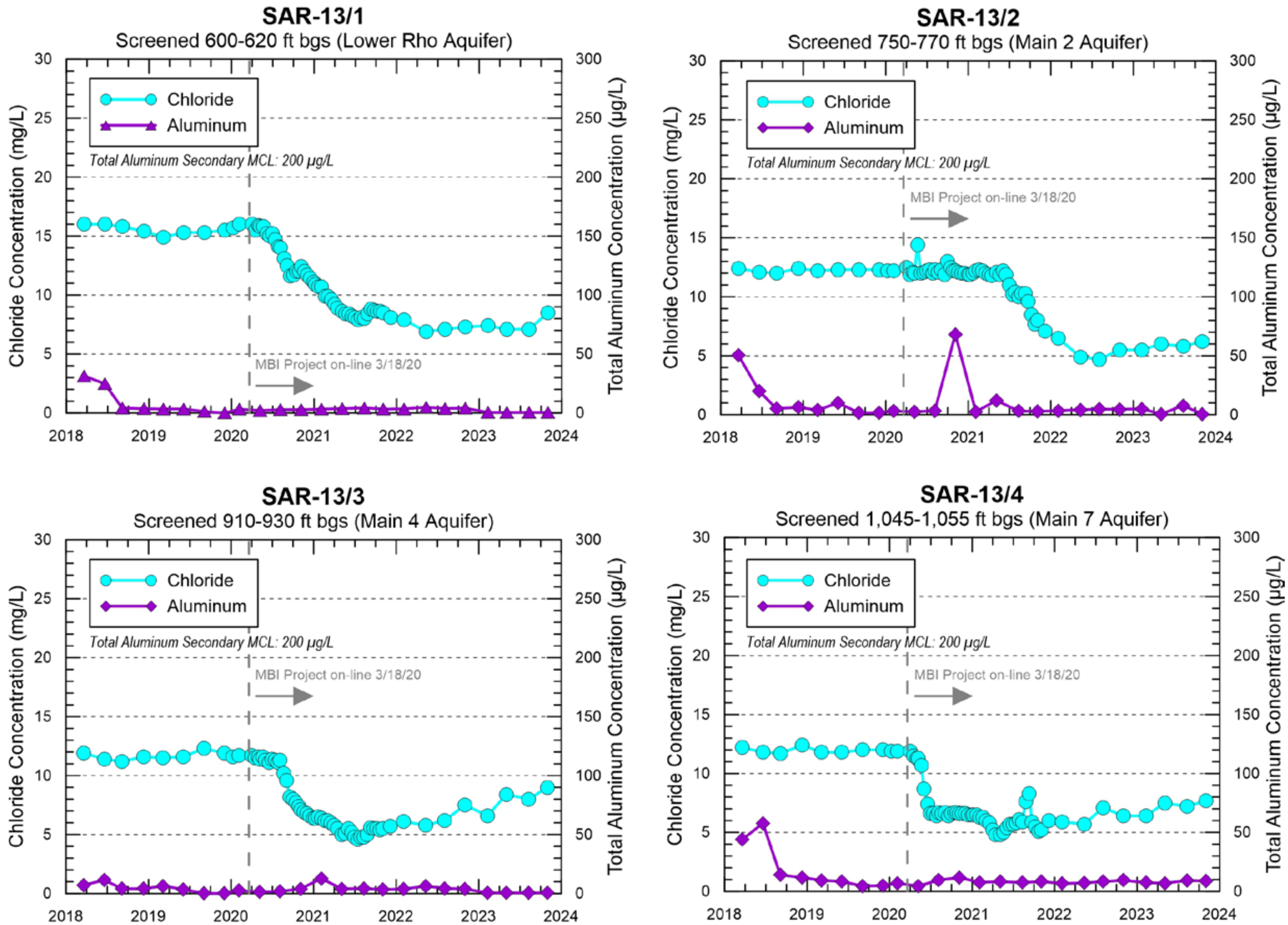

Figure 8-9. Monitoring Well SAR-13 Chloride and Total Aluminum Concentrations

of GWRS water. The delayed GWRS arrival at SAR-12/2 (Main 2 aquifer zone) may be due to a slight shift in the gradient resulting from IRWD-12 being off-line during 2023, as IRWD-12 is also screened in the Main 2 aquifer zone (Figure 8-2).

The one-time aluminum spike at SAR-12/2 in August 2023 was likely attributed to aluminum desorbed from the aquifer mineral surfaces and transported along the leading edge of the GWRS water to this well, as aluminum concentrations in GWRS water have remained at or below 5 µg/L since 2015. The subsequent trailing arrival of GWRS water was then devoid of detectable aluminum due to mass removal, as evidenced by the immediate decrease in aluminum concentrations in October 2023 to below the new (2023) RDL of 5 µg/L and lower than pre-GWRS ambient concentrations at this well. A lesser aluminum peak of 42 µg/L occurred in 2019 at SAR-12/2 prior to the Centennial Park MBI wells coming on-line and was not associated with GWRS arrival from earlier injection at MBI-1 as evidenced by contemporaneously high and stable chloride concentrations (Figure 8-8). This 2019 (total) aluminum peak had much lower and stable dissolved aluminum concentrations (Figure 8-17 of 2022 Annual Report), indicating that localized particle association was contributing to the elevated total aluminum concentrations, potentially due to pH-mediated aluminum hydroxide dissolution from the SAR-12/2 aquifer zone. This phenomenon was also observed at SAR-10/1 as documented in Section 8.4.5 of the 2022 Annual Report.

The other SAR-12 zones with GWRS arrival (SAR-12/3 and SAR-12/4) have not had any aluminum concentrations above background levels (Figure 8-8). SAR-12/1 did show a small temporary increase above historical levels in early 2023 well below the Secondary MCL. Although Figure 8-8 shows no perceptible decrease in background chloride concentrations (which were already very close to those of GWRS water), further analysis revealed a corresponding decrease in sulfate in mid-2023 approximately 12% below background concentrations which could indicate first arrival of a small proportion of GWRS water at this well. During 2023, the delayed and brief arrival of some proportion of GWRS water at both SAR-12/1 and SAR-12/2 may likely be due to a slight shift in the gradient resulting from IRWD-12 being off-line during 2023.

Figure 8-9 shows a similar one-time aluminum spike occurring at SAR-13/2 in late 2020, when aluminum concentrations rose to a one-time high of 68.2 µg/L, still well below the Secondary MCL. GWRS water did not arrive at SAR-13/2 until July 2021, as evidenced by the sharp decline in chloride concentrations during that time (Figure 8-9). Both chloride and sulfate concentrations contemporaneous with the one-time aluminum spike remained very stable at background levels, thus not indicating any perceptible arrival of GWRS water in late 2020. Similar to discussed above for the small aluminum peak in 2019 at SAR-12/2 as well as previously documented for SAR-10/1, dissolved aluminum remained low and stable during the small one-time total aluminum spike at SAR-13/2 and thus was likely attributable to localized particle dissociation caused by pH-mediated aluminum hydroxide dissolution from the SAR-13/2 aquifer zone. After the one-time spike in late 2020, total aluminum concentrations at SAR-13/2 have remained consistently low at ambient background levels from 2021-2023.

Figure 8-9 also shows an even more muted instance of an aluminum increase at SAR-13/3, where, after GWRS arrival, aluminum increased to a historical high of 12.8 µg/L in February 2021, before returning to background levels and remaining there through 2023. As shown on Figure 8-9, SAR-13/1 and SAR-13/4 aluminum concentrations remained within background levels through 2023 despite sustained 100% GWRS arrival at both wells since 2020.

8.4.2.3 Iron

Iron is regulated via a California and Federal Secondary MCL, both set at 300 µg/L. Figure 8-10 and Figure 8-11 show total iron concentrations for 2018-2023 at MBI compliance monitoring wells SAR-12 and SAR-13, respectively. Total iron concentrations at the MBI monitoring wells have followed a nearly identical trend as total aluminum, including at SAR-12/2 where total iron concentrations peaked contemporaneously with aluminum in August 2023 to 612 µg/L, well above the Secondary MCL (Table 8-3). Similar to aluminum discussed above, the elevated total iron concentrations at SAR-12/2 were likely related to the initial arrival of GWRS purified recycled water. The iron was likely released by the oxidation of pyrite and other iron sulfide minerals known to occur in the Principal aquifer system. As with arsenic and aluminum, GWRS water is not a source of iron; GWRS iron concentrations have remained below 5 µg/L since 2015 except for a small one-time increase of 9.6 µg/L in October 2021, far below the Secondary MCL. The SAR-12/2 iron concentrations declined during the fourth quarter of 2023 along with chloride concentrations declining down to a historic low of 10 mg/L, indicating sustained arrival of an increasing proportion of GWRS water.

At SAR-12/1, iron concentrations experienced a subtle increase to 52 µg/L in February 2023, still well below the Secondary MCL and thought to be due to a small proportion of GWRS water finally arriving at this well as discussed in Section 8.4.2.2 for aluminum. No other compliance monitoring wells had iron concentrations above the background ambient range during 2023.

8.4.3 Production Wells

Data for water samples collected from potable production wells in the vicinity of the MBI Project are summarized in Table 8-4. Municipal production well IRWD-12 is the nearest downgradient drinking water well from the MBI Project, located 1,850 feet from MBI-2 (Figure 8-4). Municipal production well IRWD-17 is the next nearest downgradient from the MBI injection wells, located 2,200 feet from MBI-2. Municipal production well FV-8 is located upgradient to the northwest of the MBI Project and FV-6 is located to the southwest and somewhat cross-gradient of the MBI Project based on the June 2023 Principal aquifer system groundwater elevation contours in Figure 8-4. The production wells listed in Table 8-4 and shown on Figure 8-4 are located less than one mile from the nearest MBI well.

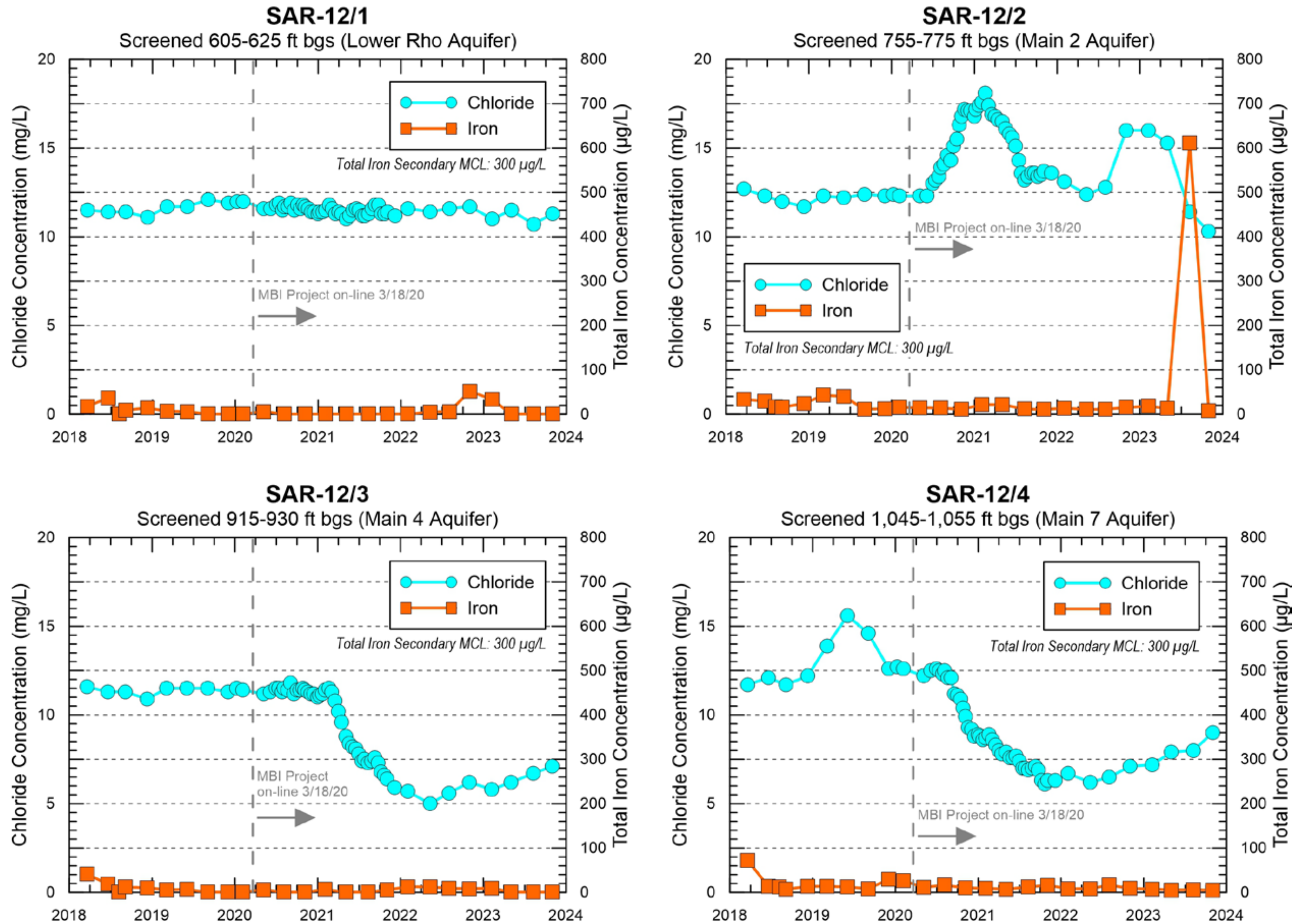

Figure 8-10. Monitoring Well SAR-12 Chloride and Total Iron Concentrations

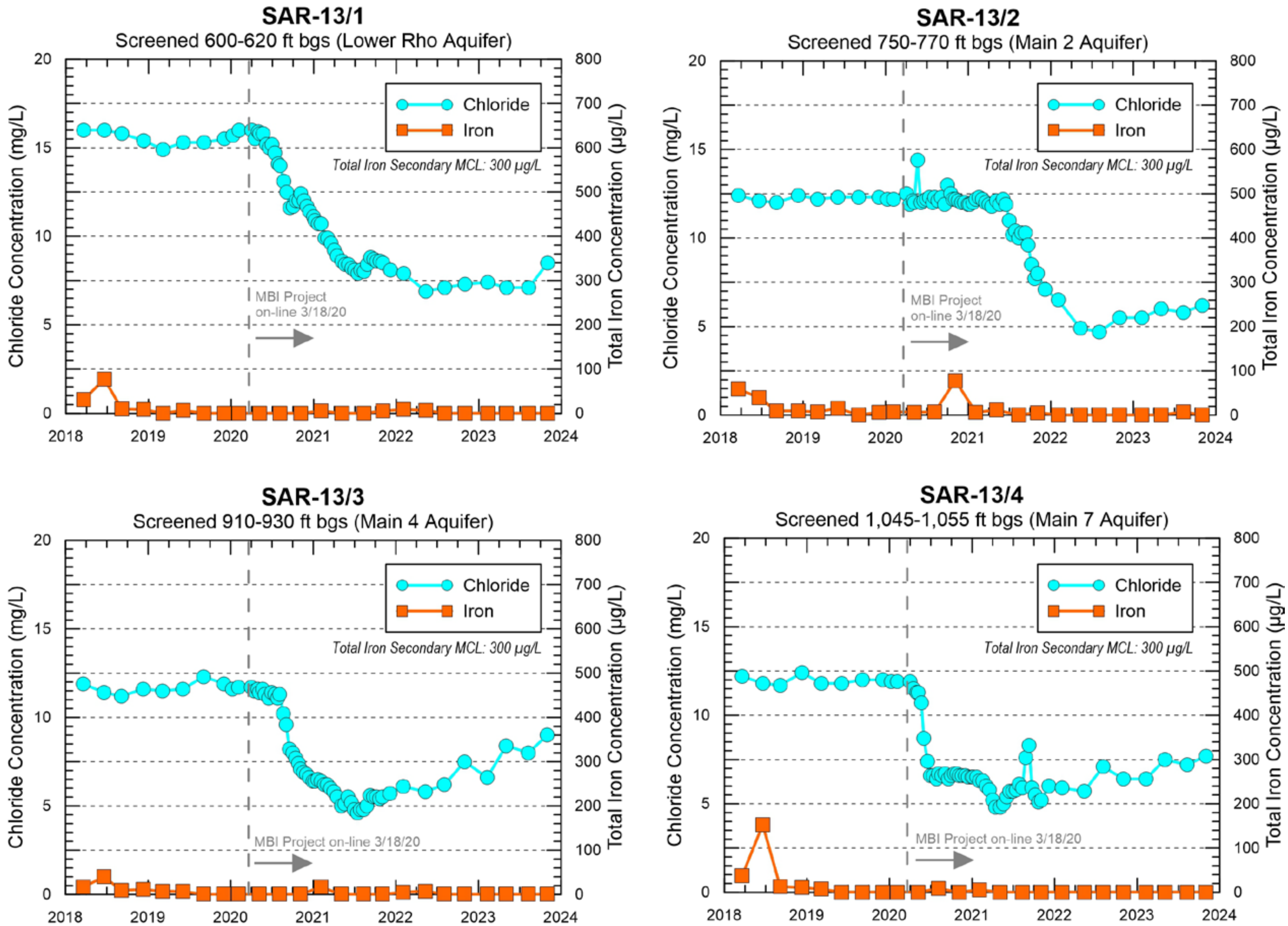

Figure 8-11. Monitoring Well SAR-13 Chloride and Total Iron Concentrations

Table 8-4. 2023 Water Quality for Potable Wells Within the Influence of the MBI Project

OCWD Well Name	Well Depth (ft bgs)[1]	Perforation Interval (ft bgs)[1]	Distance from Injection Site (ft)[2]	Concentration [3,4]								
				Arsenic (As), ug/L	Chloride (Cl) mg/L	Sulfate (SO4) mg/L	Total Dissolved Solids (TDS) mg/L	Nitrate Nitrogen (NO3-N) mg/L	Nitrite Nitrogen (NO2-N) mg/L	Total Organic Carbon (Unfiltered) (TOC) mg/L	n-Nitrosodi-methylamine (NDMA) ng/L	1,4-Dioxane (14DIOX) ug/L
Large System Municipal Wells												
IRWD-12	1,335	580 - 1,040	1,850	Well did not operate during 2023								
IRWD-17	980	504 - 960	2,200	2.0 (1.9 - 2.2)	12.3 (11.0 - 13.7)	22.7 (19.7 - 26.2)	202 (192 - 210)	0.69 (0.64 - 0.78)	ND	0.01 (ND - 0.05)	ND	ND
FV-8[5]	864	312 - 844	3,100	1.1 (1.1 - 1.2)	29.5 (28.6 - 31.2)	61.9 (59.9 - 64.5)	343 (328 - 358)	1.28 (1.18 - 1.33)	ND	0.06 (0.05 - 0.08)	NR[6]	ND
FV-6	1,120	370 - 1,110	4,500	1	32.6 (31.2 - 33.5)	61.8 (59.0 - 63.7)	324 (304 - 356)	0.84 (0.80 - 0.87)	ND	0.12 (0.11 - 0.13)	NR[6]	1.2 (1.1 - 1.3)

[1] Feet below ground surface

[2] Approximate straight-line distance to nearest MBI injection well

[3] Concentrations are annual averages with annual ranges in parenthesis for the given year

[4] ND: Not detected or less than the detection limit

[5] Upgradient from injection site

[6] NR: Not Required (this parameter was not monitored at this site during the year)

As discussed earlier in Section 8.4, intrinsic tracers have been used to track the arrival of injected GWRS water at the downgradient MBI Project monitoring wells. The results of this intrinsic tracer test and groundwater modeling results were documented in the MBI Tracer Test Report which was submitted to DDW in February 2024. The model-based boundary areas currently permitted in the MBI area assume a primary boundary of eight months and a secondary boundary of ten months (Figure 8-3) and are subject to revision based on the tracer test modeling results currently under review by DDW.

The GWRS arrival signal at the two nearest downgradient production wells IRWD-12 and IRWD-17 is more dampened relative to the signal at project monitoring wells due to dispersive transport farther downgradient and vertical blending from these long-screened interval production wells.

Figure 8-12 shows chloride and arsenic concentrations for 2014-2023 at the nearest downgradient production well IRWD-12, which did not operate during 2023. The relatively stable chloride concentrations prior to 2020 confirmed that similar ambient concentrations as observed at SAR-12 and SAR-13 prior to MBI Project injection were representative of longer-term regional conditions in this area. Chloride concentrations at IRWD-12 began to noticeably decline below stable ambient levels in the second half of 2020, continued their decline in 2021, and remained well below ambient background levels in 2022, thus confirming the arrival of an increasing percentage of GWRS water at this well. Based on the considerable magnitude of the chloride reduction (and supported by the intrinsic tracers sulfate and field-measured electrical conductivity) from 2020-2022, the 2020 GWRS arrival at IRWD-12 is interpreted to be from the 2020 MBI Project tracer test rather than from older GWRS injection at MBI-1.

As shown on Figure 8-12, arsenic concentrations have gradually increased since about 6 months after initial GWRS arrival with increasing proportions of GWRS water, reaching a historical maximum of 2.1 µg/L in late 2022, well below the primary MCL of 10 µg/L. IRWD-12 was not sampled during 2023 since it was off-line all year. Because arsenic has remained non-detect in GWRS-FPW since injection began (Figure 8-12), the slight but steady increase in arsenic concentrations since GWRS arrival is attributed to oxidation of iron sulfide minerals within the aquifer and is expected to eventually decline with sustained arrival of large proportions of GWRS water due to mass removal from the aquifer sediments.

IRWD-17 has shown minor detections of arsenic over the last several years. Arsenic concentrations at IRWD-17 have ranged historically from below the RDL to 2.4 µg/L. During 2023, five samples collected at least quarterly throughout the year showed minor arsenic detections ranging from 1.9-2.2 µg/L (Table 8-4), well below the primary MCL of 10 µg/L.

IRWD-17 historically had no detections of NDMA through 2023. For 1,4-dioxane, there have not been any detections at IRWD-17 except from 2019-2022 with low detections ranging from the newer RDL of 0.5 to 1.1 µg/L, before declining again to non-detect throughout 2023, as shown in

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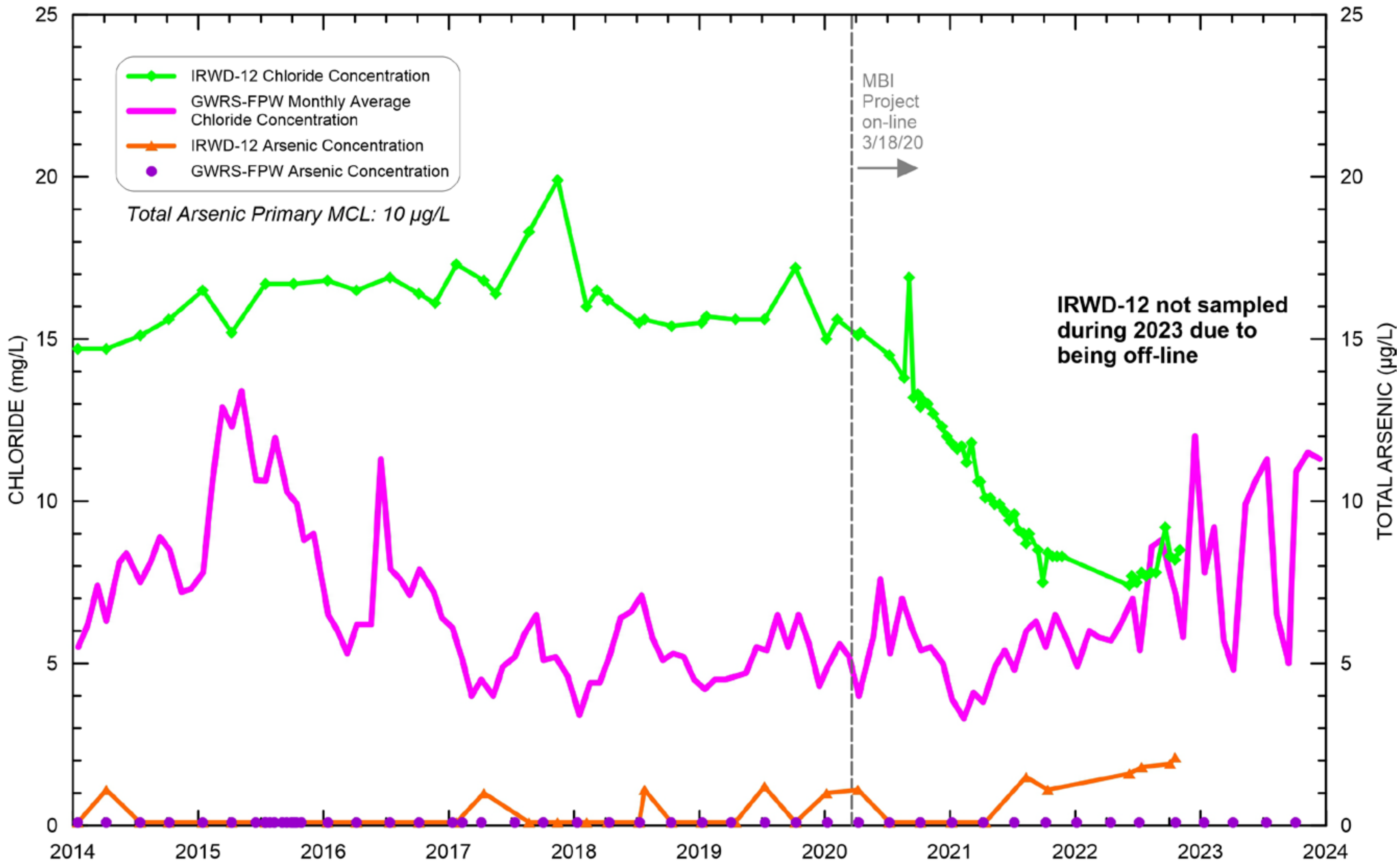

Figure 8-12. Municipal Production Well IRWD-12 Chloride and Arsenic Concentrations

Table 8-4. These minor detections of 1,4-dioxane during 2019-2022 likely indicate a small percentage of historical (pre-GWRS) injection water arriving at IRWD-17 from the Talbert Barrier approximately 2 miles away.

Production well FV-6 has also had low concentrations of 1,4-dioxane over recent years as well as during 2023 (Table 8-4), historically remaining less than 3 µg/L. Similar to IRWD-17, the low 1,4-dioxane concentrations at FV-6 likely indicated some percentage of pre-GWRS injection water from the Talbert Barrier arriving at this well

ACRONYMS LIST

1,2,3-TCP	1,2,3-trichloropropane
3σ	three standard deviations
AAP	Anaheim Adventure Park
ABF	ammonium bifluoride (antiscalant)
AF	acre-foot, acre-feet
AFY	acre-feet per year
AhR	aryl hydrocarbon receptor
AI	Aggressive Index or Aggressivity Index
AIRR	automatic injection rate reduction
AL	action level
AOP	advanced oxidation process
ARTIC	Anaheim Regional Transportation Intermodal Center
AS	activated sludge
AS1	OC San Plant No. 1 P1-82 Activated Sludge Plant 1
AS2	OC San Plant No. 1 P1-102 Activated Sludge Plant 2
ASTM	American Society for Testing and Materials (ASTM International)
ATP	adenosine triphosphate
AVG	average
AWC	American Water Chemicals
AWPF	advanced water purification facility
AWT	advanced water treatment
AWTO	advanced water treatment operator
Basin	Orange County Groundwater Basin

Basin Model	OCWD Basin-wide Groundwater Flow Model
bgs	below ground surface
BP	Basin Plan (Water Quality Control Plan for the Santa Ana River Basin)
BPL	UV reactor ballast power level
BPP	basin production percentage
BPS	barrier pump station
BWW	backwash waste
CA UCMR	California Unregulated Chemical Monitoring Regulations
CBOD	carbonaceous biochemical oxygen demand
CCPP	calcium carbonate precipitation potential
CDPH	California Department of Public Health (formerly DHS; now DDW)
CEC	chemicals of emerging concern or constituents of emerging concern
cfm	cubic feet per minute
CFS	cubic feet per second
CIP	clean-in-place
Cl^-	chloride
CLIP	California Laboratory Intake Portal (for DDW)
CPP	(Anaheim) Canyon Power Plant
CPTP	Coastal Pumping Transfer Program
CUP	Conjunctive Use Program
CY	calendar year
DBP	disinfection by-product
DDW	Division of Drinking Water, State Water Resources Control Board (formerly DHS, then CDPH)
DHS	California Department of Health Services (later CDPH, now DDW)

DMBI	Demonstration Mid-Basin Injection
DOC	dissolved organic carbon
DPW	decarbonated product water
DRWF	Dyer Road Well Field
DWEL	drinking water equivalent level
DWR	California Department of Water Resources
EC	electrical conductivity
EED	electrical energy dose
EPA	U. S. Environmental Protection Agency
ER-a	estrogen receptor α
F-EC	field electrical conductivity
FPW	finished product water or final product water (purified recycled water)
FPWB	finished product water bypass structure
ft	foot, feet
FV	Fountain Valley, City of Fountain Valley
GAC	granular activated carbon
GAP	Green Acres Project
GeoTracker	State water quality database (for RWQCB)
gpm, GPM	gallons per minute
GRRP	Groundwater Recharge Reuse Project
GSWC	Golden State Water Company (formerly Southern California Water Company)
GWRS	Groundwater Replenishment System
GWRSIE	Groundwater Replenishment System Initial Expansion
GWRSFE	Groundwater Replenishment System Final Expansion

HFO	hydroferrous oxide
hr	hour(s)
I	injection well numbering designation
I&E	instrumentation and electrical
IRWD	Irvine Ranch Water District
IWF-21	Interim Water Factory 21
kgal	thousand gallons
K-M-M-L	Kraemer-Miller-Miraloma-La Palma (Basins)
kW	kilowatt
kWh	kilowatt-hours
LLNL	Lawrence Livermore National Laboratory
LP	UV reactor lamp output
LRV	log reduction value (for pathogenic microorganisms)
LSI	Langelier Saturation Index
M	monitoring well numbering designation
m^3	cubic meter
m^3/day	cubic meters per day
MBI	Mid-Basin Injection
MCL	maximum contaminant level
MCWD	Mesa Water District (formerly Mesa Consolidated Water District)
Mesa Water	Mesa Water District
MF	membrane filtration
MFE	membrane filtration effluent (filtrate)
MFF	membrane filtration feed
MFL	million fibers greater than 10 microns in length per liter

MG	million gallons
mil gal	million gallons
mJ/cm^2	millijoules per square centimeter
MGD	million gallons per day
mg/L	milligrams per liter
micron	micrometer
mL	milliliters
MPN	most probable number
msl	mean sea level
MWD	Metropolitan Water District of Southern California
MWRP	Michelson Water Recycling Plant (IRWD facility)
na	not analyzed
N/A	not applicable
ND	non-detect, not detected (numerically designated as 10% of the reportable detection limit for purposes of calculating the average)
NDMA	N-nitrosodimethylamine
NdN	nitrification/partial denitrification
ng/L	nanograms per liter
NL	California Notification Level
nm	nanometers
nr	not reported
NR	Not Required
NS	not sampled
NTU	nephelometric turbidity unit
NWRI	National Water Research Institute

OC-44	MWD Turnout designation in Huntington Beach
OCHCA	Orange County Health Care Agency
OC San	Orange County Sanitation District (aka OCSD)
OCWD	Orange County Water District
OMMP	Operation, Maintenance, and Monitoring Plan
OOP	Operation Optimization Plan
ORP	oxidation reduction potential
%	percent
P1	OC San Reclamation Plant No. 1
P1 AS1	OC San Reclamation Plant No. 1 Activated Sludge Plant 1 (effluent)
P1 AS2	OC San Reclamation Plant No. 1 Activated Sludge Plant 2 (effluent)
P1 TF	OC San Reclamation Plant No. 1 Trickling Filter (effluent)
P2	OC San Treatment Plant No. 2
P2 TF/SC	OC San Treatment Plant No. 2 Trickling Filter/Solids Contact (effluent)
Panel	Independent Advisory Panel
PCS	process control system
PDT	pressure decay test
PEPS	Primary Effluent Pump Station
PFAS	Per- and polyfluoroalkyl substances
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctane sulfonic acid
PISB	Primary Influent Splitter Box
Plant 1	OC San Reclamation Plant No. 1
Plant 2	OC San Treatment Plant No. 2
PMCL	Primary Maximum Contaminant Level

PP	polypropylene
PPM	parts per million
psi	pounds per square inch
PVDF	polyvinylidene difluoride
PWPS	product water pump station
Q	flow rate
Q1	secondary effluent from OC San Plant No. 1 (same as Q-1)
R	number of reactors in service in a UV train
RAS	return activated sludge
RDL	reportable detection limit
RfD	Reference Dose
RL	California Response Level
RO	reverse osmosis
ROF	reverse osmosis feed
ROP	reverse osmosis product
%RW	percentage recycled water (instantaneous; not averaged over 60 months)
RWC	recycled water contribution (monthly; averaged over 60 months)
RWQCB	Regional Water Quality Control Board, Santa Ana Region
SALS	Steve Anderson Lift Station (at OC San Plant No. 1)
SAR	Santa Ana River
SARI	Santa Ana Regional Interceptor
SARWQH	Santa Ana River Water Quality and Health (Study)
SCADA	supervisory control and data acquisition (see also PCS)
SCE	Southern California Edison
SCWC	Southern California Water Company, now Golden State Water Company

SEB	Southeast Barrier Pipeline
SIM	simulation mode
SMCL	secondary maximum contaminant level
SOC	synthetic organic compound
SWRCB	State Water Resources Control Board
TDS	total dissolved solids
TF	trickling filter(s)
TIC	tentatively identified compound
TMP	transmembrane pressure
TOC	total organic carbon
TR	trace
ug/L, µg/L	micrograms per liter
µmhos/cm, µm/cm, um/cm	micromhos per centimeter
UPS	uninterruptible power supply
UR	unregulated chemicals requiring monitoring
µS	microsiemens (same as micromhos)
µS/cm	microsiemens per centimeter (same as micromhos per centimeter)
USEPA	United States Environmental Protection Agency
UV	ultraviolet (light exposure or irradiation)
UV/AOP	ultraviolet/advanced oxidation process
UVF	ultraviolet/advanced oxidation process feed
UVP	ultraviolet/advanced oxidation process product
UV%T, %UVT	percent UV Transmissivity
VFD	variable frequency drive

VOC	volatile organic compound
WF-21	Water Factory 21
WRMS	Water Resources Management System
YLWD	Yorba Linda Water District

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APPENDICES

Appendix A

Water Quality Requirements for

Groundwater Replenishment System

and

Final Product Water Quality Data

January 1 through December 31, 2023

Advanced Water Purification Facility

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
Total Purified Recycled Water Flow	Plant Monitoring	N/A	MGD	91.30	96.44	99.51	112.61					≤ 130
REQUIRED REVERSE OSMOSIS PRODUCT MONITORING[5]												
Turbidity	Plant Monitoring	N/A	NTU	0.017	0.015	0.017	0.015		5			<0.2/0.5[6]
REQUIRED ULTRAVIOLET FEED MONITORING												
Ultraviolet Transmittance (UV%/T) at 254	Plant Monitoring	0.10%	%	96.5	96.5	97.2	96.7					≥95%
BIOLOGICAL												
Aryl Hydrocarbon receptor as 2,3,7,8-tetrachlorodibenzop-dioxin (TCDD)	BIOASCEC	0.5	ng/L	Not Sampled	Not Sampled	ND	ND			0.5		N/A
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	9223B	1	MPN	ND	ND	ND	ND					N/A
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	BIOASCEC	0.5	ng/L	ND	ND	ND	ND			3.5		N/A
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	9223B	1	MPN	ND	ND	ND	ND					2.2[7]
INORGANIC												
Aggressive Index (AI)	Plant Monitoring		A.I.	11.69	11.62	11.65	11.60					NA
Alkalinity-Phenolphthalein (ALKPHE)	2320B	1	mg/L	ND	0.2	ND	ND					N/A
Aluminum (Al)	X200.8	5	ug/L	ND	ND	ND	ND	1,000	200			200
Ammonia Nitrogen (NH3-N)	350.1	0.1	mg/L	0.53	0.43	0.30	0.41					N/A
Antimony (Sb)	X200.8	1	ug/L	ND	ND	ND	ND	6				6
Apparent Color (unfiltered) (APCOLR)	2120B	3	UNITS	ND	Not Required	Not Required	Not Required		15			15
Arsenic (As)	X200.8	1	ug/L	ND	ND	ND	ND	10				10
Asbestos (ASBESTOS)	100.2	0.18	MFL	ND	Not Required	Not Required	Not Required	7				7
Barium (Ba)	X200.8	1	ug/L	ND	ND	ND	ND	1,000				1,000
Beryllium (Be)	X200.8	1	ug/L	ND	ND	ND	ND	4				4
Bicarbonate (as CaCO3) (HCO3Ca)	2320B	1	mg/L	40.52	40.65	39.26	36.62					N/A
Bicarbonate (as HCO3) (HCO3)	CALC	1.2	mg/L	49.42	49.55	47.85	44.65					N/A
Biochemical Oxygen Demand (BOD)	5210B	2	mg/L	ND	ND	ND	ND					20/Mo; 30/wk
Boron (B)	X200.7	0.1	mg/L	0.29	0.27	0.35	0.32			1	0.75	0.75
Bromate (BrO3)	300.1B	5	ug/L	ND	ND	ND	ND	10				10
Bromide (Br)	300.1B / X1-300.0	0.01 - 0.1	mg/L	0.014	0.012	0.035	0.046					N/A
Cadmium (Cd)	X200.8	1	ug/L	ND	ND	ND	ND	5				5
Calcium (Ca)	X200.7	0.5	mg/L	14.43	13.79	13.71	12.92					N/A
Calcium Hardness (CaHRD)	X200.7	0.25	mg/L	36.07	34.47	34.23	32.29					N/A
Carbonate (as CaCO3) (CO3Ca)	2320B	1	mg/L	ND	0.26	0.20	ND					N/A
Cation-Anion meq balance (CATANI)	CALC		RATIO	-1.98	-1.38	-9.24	-0.18					N/A
Chlorate (CLO3)	300.1B	10	ug/L	10.70	ND	ND	10.50			800		N/A
Chloride (Cl)	X1-300.0	0.5	mg/L	7.57	8.43	7.60	11.23		500[9,10]		55	55[9]
Chlorite (CLO2)	300.1B	10	ug/L	ND	ND	ND	ND	1,000				1,000
Chromium (Cr)	X200.8	1	ug/L	ND	ND	ND	ND	50				50

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
INORGANIC (Continued)												
Cobalt (Co)	X200.8	1	ug/L	ND	ND	ND	ND					N/A
Copper (Cu)	X200.8	1	ug/L	ND	ND	ND	ND	1,300	1,000			1,000
Corrosivity (CORROS)	2330B	-100	S.I.	-0.80	-0.64	-0.65	-0.78					N/A
Cyanide (CN)	X1-335.4	5	ug/L	ND	ND	ND	ND	150				150
Electrical Conductivity (EC)	2510B	1	uS/cm	108.5	113.4	107.9	112.6		900			N/A
Fluoride (F)	X1-300.0	0.1	mg/L	ND	ND	ND	ND	2			1	1
Free Chlorine (FRCL2)	4500CLF	0.1	mg/L	ND	ND	ND	ND					N/A
Gadolinium (Gd)	X200.8	10	ng/L	ND	ND	ND	ND					N/A
Hexavalent Chromium (CrVI)	X1-218.7	0.2	ug/L	ND	ND	ND	ND					N/A
Hydrogen Peroxide (H2O2)	4500H202	0.1	mg/L	2.64	2.63	2.70	3.34					N/A
Hydroxide (as CaCO3) (OHCa)	2320B	1	mg/L	ND	ND	ND	ND					N/A
Iron (Fe)	X200.7	5	ug/L	ND	ND	ND	ND		300		300	300
Lead (Pb)	X200.8	1	ug/L	ND	ND	ND	ND	15				15
Magnesium (Mg)	X200.7	0.5	mg/L	ND	ND	ND	ND					N/A
Manganese (Mn)	X200.8	1	ug/L	ND	ND	ND	ND		50	500		50
Manganese (dissolved) (Mn-DIS)	X200.8	1	ug/L	ND	Not Required	Not Required	Not Required					N/A
Mercury (Hg)	X200.8	1	ug/L	ND	ND	ND	ND	2				2
Molybdenum (Mo)	X200.8	1	ug/L	Not Required	ND	ND	ND					N/A
Nickel (Ni)	X200.8	1	ug/L	ND	ND	ND	ND	100				100
Nitrate (NO3)	CALC	0.4	mg/L	2.63	3.23	3.76	3.95	45				45
Nitrate + Nitrite Nitrogen (NO3NO2-N)	CALC	0.1	mg/L	0.66	0.79	0.90	0.95	10 [11]				10
Nitrate Nitrogen (NO3-N)	4500NO3F	0.1	mg/L	0.60	0.73	0.85	0.89	10 [11]				10
Nitrite (NO2)	CALC	0.007	mg/L	0.205	0.173	0.176	0.175					N/A
Nitrite Nitrogen (NO2-N)	4500NO3F	0.002	mg/L	0.062	0.053	0.053	0.053	1 [11]				1
Organic Nitrogen (ORG-N)	X1-351.2	0.1	mg/L	0.01	ND	ND	ND					N/A
Perchlorate (CLO4)	332.0	2	ug/L	ND	ND	ND	ND	6				6
pH (pH)	4500H+B	1	UNITS	7.9	8.1	8.1	8.0				6 - 9	6 - 9
Phosphate Phosphorus (orthophosphate) (PO4-P)	365.1	0.01	mg/L	ND	ND	ND	ND					N/A
Potassium (K)	X200.7	0.5	mg/L	0.38	0.42	0.63	0.67					N/A
Selenium (Se)	X200.8	1	ug/L	ND	ND	ND	ND	50				50
Silica (SIO2)	4500SIOC	1	mg/L	1.1	ND	1.1	1.4					N/A
Silver (Ag)	X200.8	1	ug/L	ND	ND	ND	ND		100 [10]		50	50
Sodium (Na)	X200.7	0.5	mg/L	7.4	7.5	8.2	10.0					NA
Strontium (Sr)	X200.8	1	ug/L	2.8	3.4	3.7	3.2					N/A
Sulfate (SO4)	X1-300.0	0.3 - 0.5	mg/L	ND	ND	0.5	0.6		250		500	250
Surfactants (MBAS)	5540C	0.02	mg/L	ND	Not Required	Not Required	Not Required		0.5 [10]		0.05	0.05
Suspended Solids (SUSSOL)	2540D	2.5	mg/L	ND	ND	ND	ND					20/Mo; 30/wk

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Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
INORGANIC (Continued)												
Temperature (Laboratory) (TEMP)	4500H+B	1	C	22.2	21.7	21.7	22.1					N/A
Thallium (Tl)	X200.8	1	ug/L	ND	ND	ND	ND	2				2
Threshold Odor Number (Median) (ODOR)	2150B	0	TON	ND	Not Required	Not Required	Not Required		3			3
Title 22 Cation-Anion Balance (T22CAB)	CALC		meq/L	-1.49	-1.28	-8.77	0.18					N/A
Title 22 Total Anions (T22ANI)	CALC		meq/L	1.02	1.02	1.26	1.09					N/A
Title 22 Total Cations (T22CAT)	CALC		meq/L	1.06	1.07	1.06	1.12					N/A
Total Alkalinity (as CaCO3) (TOTALK)	2320B	1	mg/L	40.5	40.8	39.4	36.6					N/A
Total Anions (TOTANI)	CALC		meq/L	1.02	1.02	1.27	1.10					N/A
Total Cations (TOTCAT)	CALC		meq/L	1.00	1.01	1.16	1.10					N/A
Total Chlorine (TOTCL2)	4500CLF	0.1	mg/L	1.0	0.9	1.1	1.0					N/A
Total Dissolved Solids (TDS)	2540C	2.5	mg/L	53.92	59.00	55.67	58.80		[12]		580	580[12]
Total Hardness (as CaCO3) (TOTHRD)	X200.7	1	mg/L	36.8	36.7	34.7	33.4					N/A
Total Inorganic Nitrogen (TIN)	350.1 / CALC	0.1	mg/L	1.19	1.22	1.20	1.36				3.4	3.4
Total Kjeldahl Nitrogen (TKN)	X1-351.2	0.2	mg/L	0.35	0.24	0.15	0.22					N/A
Total Nitrogen (TOT-N)	CALC	0.3	mg/L	1.014	1.038	1.069	1.200					10
Total Organic Carbon (Unfiltered) (TOC)	5310C	0.05	mg/L	0.067	0.073	0.069	0.062					0.5[13]
Trivalent Chromium (CrIII)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Ultraviolet (absorbance) (UVAB)	5910B	0.005	1/cm	0.009	0.009	0.010	0.009					N/A
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	5910B	0.0001	L/mg-cm	0.123	0.166	0.210	0.132					N/A
Vanadium (V)	X200.8	1	ug/L	ND	ND	ND	ND			50		N/A
Zinc (Zn)	X200.8	1	ug/L	ND	ND	ND	ND		5,000			5,000
ORGANIC												
1,1,1,2-Tetrachloroethane (1112PC)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,1,1-Trichloroethane (111TCA)	524.2	0.5	ug/L	ND	ND	ND	ND	200				200
1,1,1-Trichloropropanone (111TCP)	551.1	0.1	ug/L	ND	ND	ND	ND					
1,1,2,2-Tetrachloroethane (1122PC)	524.2	0.5	ug/L	ND	ND	ND	ND	1				1
1,1,2-Trichloroethane (112TCA)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,1-Dichloro-2-propanone (11DC2P)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
1,1-Dichloroethane (11DCA)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,1-Dichloroethene (11DCE)[14]	524.2	0.5	ug/L	ND	ND	ND	ND	6				6
1,1-Dichloropropene (11DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,2,3-Trichlorobenzene (123TCB)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,2,3-Trichloropropane (123TCP)	14DIOX / 504.1 / 524.2 / 524M-TCP	0.005 - 0.5	ug/L	ND	ND	ND	ND	0.005				0.005
1,2,4-Trichlorobenzene (124TCB)	524.2 / 625.1 / 8270C	0.5 - 9.6	ug/L	ND	ND	ND	ND	5				5
1,2,4-Trimethylbenzene (124TMB)	524.2	0.5	ug/L	ND	ND	ND	ND			330		N/A
1,2-Dibromo-3-chloropropane (DBCP)[15]	14DIOX / 504.1 / 524.2 / 524M-TCP	0.01 - 0.5	ug/L	ND	ND	ND	ND	0.2				0.2

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
1,2-Dibromoethane (EDB)[16]	14DIOX / 504.1 / 524.2 / 524M-TCP	0.005 - 0.5	ug/L	ND	ND	ND	ND	0.05				0.05
1,2-Dichlorobenzene (12DCB)	524.2 / 625.1 / 8270C	0.5 - 9.6	ug/L	ND	ND	ND	ND	600				600
1,2-Dichloroethane (12DCA)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
1,2-Dichloropropane (12DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
1,2-Diphenylhydrazine (12DPH)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
1,3,5-Trimethylbenzene (135TMB)	524.2	0.5	ug/L	ND	ND	ND	ND			330		N/A
1,3-Dichlorobenzene (13DCB)	524.2 / 625.1 / 8270C	0.5 - 9.6	ug/L	ND	ND	ND	ND					N/A
1,3-Dichloropropane (13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
1,4-Dichlorobenzene (14DCB)	524.2 / 625.1 / 8270C	0.5 - 9.6	ug/L	ND	ND	ND	ND	5				5
1,4-Dioxane (14DIOX)	14DIOX / 522	0.07 - 0.5	ug/L	ND	ND	ND	ND			1 (NL & MTL)		N/A
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	533	2	ng/L	ND	ND	ND	ND					N/A
17a-Estradiol (aESTRA)	CEC	1	ng/L	ND	ND	ND	ND					N/A
17a-Ethynylestradiol (aETEST)[17]	CEC	2	ng/L	ND	ND	ND	ND					N/A
17b-Estradiol (bESTRA)	CEC	2	ng/L	ND	ND	ND	ND					N/A
2,2-Dichloropropane (22DCP)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1613B	4.8	pg/L	ND	ND	ND	ND	30				30
2,4,5-Trichlorophenol (245TCP)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2,4,6-Trichlorophenol (246TCP)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2,4-Dichlorophenol (24DCPH)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2,4-Dimethylphenol (24DMP)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2,4-Dinitrophenol (24DNP)	625.1 / 8270C	10 - 50	ug/L	ND	ND	ND	ND					N/A
2,4-Dinitrotoluene (24DNT)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2,6-Dinitrotoluene (26DNT)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Chloroethylvinyl ether (2ClEVE)	14DIOX	1	ug/L	ND	ND	ND	ND					N/A
2-Chloronapthalene (2ClNAP)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Chlorophenol (2ClPNL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Chlorotoluene (2CLTOL)	524.2	0.5	ug/L	ND	ND	ND	ND			140		N/A
2-Methyl naphthalene (2MNAP)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Methyl-4,6-Dinitrophenol (2MDNP)	625.1 / 8270C	5 - 48	ug/L	ND	ND	ND	ND					N/A
2-Methylphenol (oCRESL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Nitroaniline (oNTANL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
2-Nitrophenol (2NPNL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
3- & 4-Methylphenol (mpCRESL)	8270C	1 - 5	ug/L	ND	ND	ND	ND					N/A
3,3'-Dichlorobenzidine (DCBZDE)	625.1 / 8270C	5 - 25	ug/L	ND	ND	ND	ND					N/A
3-Nitroaniline (mNTANL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	533	2	ng/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
4:2 Fluorotelomer sulfonate (4:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
4-Androstene-3,17-dione (ANDROS)	CEC	2	ng/L	ND	ND	ND	ND					N/A
4-Bromophenyl phenyl ether (4BrPPE)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4-Chloro-3-methylphenol (43CMP) [18]	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4-Chloroaniline (pClANL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4-Chlorophenyl phenyl ether (4ClPPE)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4-Chlorotoluene (4CLTOL)	524.2	0.5	ug/L	ND	ND	ND	ND			140		N/A
4-Isopropyltoluene (4IPTOL)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
4-Nitroaniline (pNTANL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
4-Nitrophenol (4NPNL)	625.1 / 8270C	5 - 25	ug/L	ND	ND	ND	ND					N/A
4-n-Octylphenol (4nOCPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
4-tert-Octylphenol (4tOCPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
6:2 Fluorotelomer sulfonate (6:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
8:2 Fluorotelomer sulfonate (8:2FTS)	533	2	ng/L	ND	ND	ND	ND					N/A
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	533	2	ng/L	ND	ND	ND	ND					N/A
Acetaldehyde (ACEALD)	556	2	ug/L	ND	7.2	ND	2.4					N/A
Acetone (ACETNE)	524.2	10	ug/L	ND	2.4	ND	ND					N/A
Acrolein (ACROLN)	524.2	5	ug/L	ND	ND	ND	ND					N/A
Acrylonitrile (ACRYLO)	524.2	2	ug/L	ND	ND	ND	ND					N/A
Aniline (ANLN)	625.1 / 8270C	1 - 9.7	ug/L	ND	ND	ND	ND					N/A
Aspartame (ASPATM)	CEC	100	ng/L	ND	ND	ND	ND					N/A
Atenolol (ATENOL)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Benzaldehyde (BENALD)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Benzene (BENZ)	524.2	0.5	ug/L	ND	ND	ND	ND	1				1
Benzidine (BNZDE)	625.1 / 8270C	10 - 50	ug/L	ND	ND	ND	ND					N/A
Benzoic Acid (BNZACD)	625.1 / 8270C	48 - 500	ug/L	ND	ND	ND	ND					N/A
Benzyl Alcohol (BNZALC)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroethoxy) methane (B2CEM)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroethyl) ether (B2CLEE)	524.2 / 625.1 / 8270C	1 - 24	ug/L	ND	ND	ND	ND					N/A
bis (2-chloroisopropyl) ether (B2CIPE)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Bisphenol A (BisPHA)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Bromobenzene (BRBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Bromochloroacetic Acid (BCAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Bromochloroacetonitrile (BCAN)	551.1	0.5	ug/L	0.2	0.3	0.2	0.4					N/A
Bromochloromethane (CH2BrC)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Bromodichloroacetic Acid (BDCAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Bromodichloromethane (CHBrCl)[19]	524.2	0.5	ug/L	0.77	0.50	0.50	1.90	80				80, total TTHMs
Bromoform (CHBr3)	524.2	0.5	ug/L	ND	ND	ND	ND	80				80, total TTHMs

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AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Bromomethane (CH3Br)[20]	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Carbazole (CARBZL)	8270C	1 - 5	ug/L	ND	ND	ND	ND					N/A
Carbon Disulfide (CS2)	524.2	0.5	ug/L	ND	ND	ND	ND			160		N/A
Carbon tetrachloride (CCl4)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
Chlorobenzene (CLBENZ)[21]	524.2	0.5	ug/L	ND	ND	ND	ND	70				70
Chlorodibromoacetic Acid (CDBAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Chlorodifluoromethane (FREN22)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloroethane (ClETHA)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloroform (CHCl3)	524.2	0.5	ug/L	2.28	1.2	0.80	2.9	80				80, total TTHMs
Chloromethane (CH3Cl)[22]	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Chloropicrin (ClPICR)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
cis-1,2-Dichloroethene (c12DCE)[23]	524.2	0.5	ug/L	ND	ND	ND	ND	6				6
cis-1,3-Dichloropropene (c13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.50				0.5, total 13DCP
Crotonaldehyde (CRTALD)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Cyclohexanone (CYCHXN)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Decanal (DECNAL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Dibenzofuran (DBFUR)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Dibromoacetic Acid (DBAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Dibromoacetonitrile (DBAN)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
Dibromochloromethane (CHBr2C)[25]	524.2	0.5	ug/L	ND	ND	ND	TR	80				80, total TTHMs
Dibromomethane (CH2Br2)	524.2	0.5	ug/L	ND	ND	ND	ND					N/A
Dichloroacetic Acid (DCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Dichloroacetonitrile (DCAN)	551.1	0.1	ug/L	0.4	0.6	0.3	0.6					N/A
Dichlorodifluoromethane (CCl2F2)	524.2	0.5	ug/L	ND	ND	ND	ND			1,000		N/A
Diclofenac (DICLFN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Diethylstilbestrol (DESTBL)	CEC	2	ng/L	ND	ND	ND	ND					N/A
Diisopropyl ether (DIPE)	524.2	1	ug/L	ND	ND	ND	ND					N/A
Dilantin (DILANT)	CEC	10	ng/L	ND	ND	ND	ND					N/A
Dissolved Organic Carbon (DOC)	5310C	0.05	mg/L	0.08	0.11	0.11	0.13					N/A
Endosulfan II (ENDOII)[26]	508.1 / 525.2 / 8081A_LL	0.0097 - 0.1	ug/L	ND	ND	ND	ND					N/A
Epitestosterone (cis-Testosterone) (EPITES)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Equilin (EQUILN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Estriol (ESTRIO)	CEC	2	ng/L	ND	ND	ND	ND					N/A
Estrone (ESTRON)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Ethyl tert-butyl ether (ETBE)	524.2	1	ug/L	ND	ND	ND	ND					N/A
Ethylbenzene (EtBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND	300				300
Fluoxetine (FLUXET)	CEC	5	ng/L	ND	ND	ND	ND					N/A

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AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Formaldehyde (FORALD)	556	2	ug/L	8.8	13	14	15			100		N/A
Freon 123a (FR123A)	524.2	0.5 - 2	ug/L	ND	ND	ND	ND					N/A
Glyoxal (GLYOXL)	556	2	ug/L	ND	ND	2.1	ND					N/A
HCH-alpha (Alpha-BHC) (BHCa)	508.1 / 525.2 / 8081A_LL	0.0019 - 0.1	ug/L	ND	ND	ND	ND					N/A
HCH-beta (Beta-BHC) (BHCb)	508.1 / 525.2 / 8081A_LL	0.0073 - 0.1	ug/L	ND	ND	ND	ND					N/A
HCH-delta (Delta-BHC) (BHCd)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Heptanal (HEPNAL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Hexachlorobutadiene (HClBut)	524.2 / 625.1 / 8270C	0.5 - 9.6	ug/L	ND	ND	ND	ND					N/A
Hexachloroethane (HCE)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	533	2	ng/L	ND	ND	ND	ND					N/A
Hexanal (HEXNAL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Imidacloprid (IMIDCP)	CEC	1	ng/L	Not Required	ND	ND	ND					N/A
Iohexol (IOHEXL)	CEC	20	ng/L	ND	ND	ND	ND					N/A
Iopromide (IOPRMD)	CEC	10	ng/L	ND	ND	ND	ND					N/A
Isophorone (IPHOR)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Isopropylbenzene (ISPBNZ)	524.2	0.5	ug/L	ND	ND	ND	ND			770		N/A
Linuron (LINURN)	CEC	0.005	ug/L	ND	ND	ND	ND					N/A
m,p-Xylene (mp-XYL)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
Meprobamate (MEPROB)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Methyl Ethyl Ketone (MEK) (MEK)	524.2	2.5	ug/L	ND	ND	ND	ND					N/A
Methyl Isobutyl Ketone (MIBK) (MIBK)	524.2	2.5	ug/L	ND	ND	ND	ND			120		N/A
Methyl tert-butyl ether (MTBE)	524.2	0.2	ug/L	ND	ND	ND	ND	13	5			5
Methylene Chloride (CH2Cl2)[27]	524.2	0.5	ug/L	0.09	0.28	TR	TR	5				5
Methylglyoxal (MGLYOX)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Methylisothiocyanate (MITC)	14DIOX	0.05	ug/L	ND	ND	ND	ND					N/A
Metolachlor (METOCL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Monobromoacetic Acid (MBAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Monochloroacetic Acid (MCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Naphthalene (NAP)	524.2/ 525.2/ 625.1/ 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND			17		N/A
Naproxen (NAPRXN)	CEC	5	ng/L	ND	ND	ND	ND					N/A
n-Butylbenzene (nBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Neotame (NEOTAM)	CEC	10	ng/L	ND	ND	ND	ND					N/A
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	537.1	2	ng/L	Not Required	ND	ND	ND					N/A
Nitrobenzene (NBENZ)	625.1 / 8270C	1 - 24	ug/L	ND	ND	ND	ND					N/A
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	537.1	2	ng/L	Not Required	ND	ND	ND					N/A

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AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
N-Nitrosodiethylamine (NDEA)	NDMA-LOW	2	ng/L	ND	ND	ND	ND			10		N/A
n-Nitrosodimethylamine (NDMA)	NDMA-LOW	2	ng/L	0.74	1.19	0.68	0.36			10 (NL & MTL)		N/A
n-Nitroso-di-n-propylamine (NDPA)	625.1 / 8270C / NDMA-LOW	2 - 9,600	ng/L	ND	ND	ND	ND			10		N/A
n-Nitrosodiphenylamine (NDPhA)	625.1 / 8270C	1,000 - 9,600	ng/L	ND	ND	ND	ND					N/A
N-Nitrosomorpholine (NMOR)	NDMA-LOW	2	ng/L	ND	ND	ND	ND			12		N/A
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	533	2	ng/L	ND	ND	ND	ND					N/A
Nonanal (NONNAL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Nonylphenol (NONYPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
o-Xylene (o-XYL)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
PCB-1016 (PCB16)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1221 (PCB21)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1232 (PCB32)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1242 (PCB42)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1248 (PCB48)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1254 (PCB54)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCB-1260 (PCB60)[28]	508.1	0.1	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
PCBs, Total (TOTPCB)[28]	508.1	0.5	ug/L	ND	ND	ND	ND	0.5[28]				0.5[28]
Perfluoro butane sulfonic acid (PFBS)	533	2	ng/L	ND	ND	ND	ND			500		N/A
Perfluoro heptanoic acid (PFHpA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro hexane sulfonic acid (PFHxS)	533	2	ng/L	ND	ND	ND	ND			3		N/A
Perfluoro nonanoic acid (PFNA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro octane sulfonic acid (PFOS)	533	2	ng/L	ND	ND	ND	ND			6.5 (NL) & 13 (MTL)		N/A
Perfluoro octanoic acid (PFOA)	533	2	ng/L	ND	ND	ND	ND			5.1 (NL) & 14 (MTL)		N/A
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro-3-methoxypropanoic acid (PFMPA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoro-4-methoxybutanoic acid (PFMBA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorobutanoic acid (PFBA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorodecanoic acid (PFDA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorododecanoic acid (PFDoA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoroheptanesulfonic Acid (PFHpS)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorohexanoic acid (PFHxA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoropentanesulfonic acid (PFPeS)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluoropentanoic acid (PFPeA)	533	2	ng/L	ND	ND	ND	ND					N/A
Perfluorotetradecanoic acid (PFTA)	537.1	2	ng/L	Not Required	ND	ND	ND					N/A
Perfluorotridecanoic acid (PFTrDA)	537.1	2	ng/L	Not Required	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
ORGANIC (Continued)												
Perfluoroundecanoic acid (PFUnA)	533	2	ng/L	ND	ND	ND	ND					N/A
Phenol (PHENOL)	625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
PhenylPhenol (PHNYPH)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Progesterone (PRGSTR)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Propylbenzene (PRPBNZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Pyridine (PYRDN)	8270c	5 - 25	ug/L	ND	ND	ND	ND					N/A
sec-Butylbenzene (sBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Styrene (STYR)	524.2	0.5	ug/L	ND	ND	ND	ND	100				100
Sucralose (SUCRAL)	CEC	100	ng/L	ND	ND	ND	ND					N/A
Sum of five Haloacetic Acids (HAA5)	CALC	1	ug/L	ND	ND	ND	ND	60				60
Sum of nine Haloacetic Acids (HAA9)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Sum of Six Brominated Haloacetic Acids (HAA6Br)	CALC	1	ug/L	ND	ND	ND	ND					N/A
Terbufos Sulfone (TERSUL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Tert-amyl methyl ether (TAME)	524.2	1	ug/L	ND	ND	ND	ND					N/A
tert-butyl alcohol (TBA)	524.2	2	ug/L	ND	ND	ND	ND			12		N/A
tert-Butylbenzene (tBBENZ)	524.2	0.5	ug/L	ND	ND	ND	ND			260		N/A
Testosterone (trans-Testosterone) (TESTOR)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Tetrabromobisphenol A (TBBISA)	CEC	0.2	ug/L	ND	ND	ND	ND					N/A
Tetrachloroethene (PCE)[29]	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
Toluene (TOLU)	524.2	0.5	ug/L	ND	ND	ND	ND	150				150
Total 1,3-Dichloropropene (x13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5
Total Trihalomethanes (TTHMs)	524.2	0.5	ug/L	3.03	1.61	1.30	4.70	80				80
Total Xylenes (m,p,&o) (TOTALX)[30]	524.2	0.5	ug/L	ND	ND	ND	ND	1,750				1,750[30]
trans-1,2 Dichloroethene (t12DCE)[31]	524.2	0.5	ug/L	ND	ND	ND	ND	10				10
trans-1,3-Dichloropropene (t13DCP)	524.2	0.5	ug/L	ND	ND	ND	ND	0.50				0.5, total 13DCP
Tribromoacetic Acid (TBAA)	552.2	1	ug/L	ND	ND	ND	ND					N/A
Trichloroacetic Acid (TCAA)[24]	552.2	1	ug/L	ND	ND	ND	ND					60, total HAA5
Trichloroacetonitrile (TCAN)	551.1	0.1	ug/L	ND	ND	ND	ND					N/A
Trichloroethene (TCE)[32]	524.2	0.5	ug/L	ND	ND	ND	ND	5				5
Trichlorofluoromethane (Freon 11) (CCl3F)	524.2	0.5	ug/L	ND	ND	ND	ND	150				150
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)[33]	524.2	0.5	ug/L	ND	ND	ND	ND	1,200				1,200
Trimethoprim (TRIMTP)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Tris-2-chloroethyl phosphate (TCEP)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Vinyl chloride (VNYLCL)	524.2	0.5	ug/L	ND	ND	ND	ND	0.5				0.5

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AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
RADIOLOGICALS												
Gross Alpha Excluding Uranium (TOTa-U)	CALC	DLR[34] 3, 1.08	pCi/L	0.105	ND	0.210	3.880	15				15
Natural Uranium (NTUr)	X200.8	DLR[34] 1, 0.67 - 1.0	pCi/L	ND	ND	ND	ND	20				20
Radium 226 + Radium 228 (Ra6Ra8)	CALC	DLR[34] 1, 0.41 - 0.716	pCi/L	-0.095	0.160	0.086	-0.171	5				5
Radium 226 + Radium 228 Counting Error (Ra68CE)	CALC	0.41 - 0.716	pCi/L	0.186	0.694	0.103	0.158					N/A
Total Alpha (TOTa)	7110C	1.08	pCi/L	0.105	-0.314	0.210	3.880					N/A
Total Alpha Counting Error (TOTaCE)	7110C	1.08	pCi/L	0.738	0.647	0.819	1.450					N/A
Total Beta (TOTb)	900.0	DLR[34] 4, 0.147 - 3.4	pCi/L	2.55	6.66	7.58	5.82	50				50
Total Beta Counting Error (TOTbCE)	900.0	0.147 - 3.4	pCi/L	1.30	1.370	2.660	1.810					N/A
Total Radium 226 (TRa226)	903.0	0.41 - 0.737	pCi/L	-0.095	0.017	0.086	-0.171	5				5, Ra226+Ra228
Total Radium 226 Counting Error (TRa6CE)	903.0	0.41 - 0.737	pCi/L	0.186	0.057	0.103	0.158					N/A
Total Radium 228 (TRa228)	RA-05	0.0491 - 0.643	pCi/L	ND	0.143	ND	ND	5				5, Ra226+Ra228
Total Radium 228 Counting Error (TRa8CE)	RA-05	0.0491 - 0.643	pCi/L	ND	0.637	ND	ND					N/A
Total Strontium-90 (TS90)	905.0MOD	DLR[34] 2, 1.36 - 1.86	pCi/L	0.59	0.985	0.710	0.944	8				8
Total Strontium-90 Counting Error (TS90CE)	905.0MOD	1.36 - 1.86	pCi/L	0.706	0.920	0.734	0.684					N/A
Total Tritium (TTr)	906.0	DLR[34] 1000, 434	pCi/L	142.63	70.02	146.68	316.75	20,000				20,000
Total Tritium Counting Error (TTrCE)	906.0	434	pCi/L	272.0	276.5	274.3	275.0					N/A
SEMI-ORGANIC												
1-Naphthol (NPTHOL)	531.2	5	ug/L	ND	ND	ND	ND					N/A
2,4,5-T (245T)	515.4	0.2	ug/L	ND	ND	ND	ND					N/A
2,4,5-TP (Silvex) (245TP)	515.4	0.2	ug/L	ND	ND	ND	ND	50				50
2,4,6-Trinitrotoluene (246TNT)	8330A	0.11 - 1	ug/L	ND	ND	ND	ND			1		N/A
2,4-DB (24DB)	515.4	2	ug/L	ND	ND	ND	ND					N/A
2,4-Dichlorophenoxyacetic Acid (24D)	515.4	0.4	ug/L	ND	ND	ND	ND	70				70
3,5-Dichlorobenzoic Acid (35DBA)	515.4	1	ug/L	ND	ND	ND	ND					N/A
3-Hydroxycarbofuran (HYDCFR)	531.2	2	ug/L	ND	ND	ND	ND					N/A
4,4'-DDD (DDD)	508.1 / 525.2 / 8081A_LL	0.0097 - 0.1	ug/L	ND	ND	ND	ND					N/A
4,4'-DDE (DDE)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
4,4'-DDT (DDT)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Acenaphthene (ACNAPE)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Acenaphthylene (ACENAP)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Acetaminophen (ACTMNP)	CEC	5	ng/L	ND	ND	ND	ND					N/A
Acetochlor (ACETOC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

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AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

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SEMI-ORGANIC (Continued)												
Acifluorfen (ACIFEN)	515.4	0.4	ug/L	ND	ND	ND	ND					N/A
Alachlor (ALACHL)	525.2	0.1	ug/L	ND	ND	ND	ND	2				2
Aldicarb (ALDI)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Aldicarb sulfone (ALDISN)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Aldicarb sulfoxide (ALDISX)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Aldrin (ALDRIN)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Ametryn (AMERYN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Anthracene (ANTHRA)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Atrazine (ATRAZ)	525.2 / CEC	0.001 - 0.1	ug/L	ND	ND	ND	ND	1				1
Baygon (BAYGON)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Bentazon (BENTAZ)	515.4	2	ug/L	ND	ND	ND	ND	18				18
Benzo(a)anthracene (BaANTH)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Benzo(a)pyrene (BaPYRE)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND	0.2				0.2
Benzo(b)fluoranthene (BbFLUR)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Benzo(g,h,i)perylene (BghiPR)	525.2 / 625.1 / 8270C	0.1 - 10	ug/L	ND	ND	ND	ND					N/A
Benzo[k]fluoranthene (BkFLUR)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
bis (2-ethylhexyl) adipate (DEHA)[35]	525.2	2	ug/L	ND	ND	ND	ND	400				400
bis (2-ethylhexyl) phthalate (DEHP)[36]	525.2 / 625.1 / 8270C	2 - 25	ug/L	ND	ND	ND	ND	4				4
Bromacil (BROMAC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butachlor (BUTACL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butanal (BUTAN)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Butylate (BTYATE)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Butylbenzyl phthalate (BBP)	525.2 / 625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Caffeine (CAFFEI)	525.2 / CEC	3 - 100	ng/L	ND	ND	ND	ND					N/A
Captan (CAPTAN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Carbamazepine (CBMAZP)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Carbaryl (CARBAR)	531.2	2	ug/L	ND	ND	ND	ND					N/A
Carbofuran (CARBOF)	531.2	1	ug/L	ND	ND	ND	ND	18				18
Chlordane (CIDANE)	508.1 / 8081A / 8081A_LL	0.048 - 0.1	ug/L	ND	ND	ND	ND	0.1				0.1
Chlordane-alpha (CLDA)	525.2 / 8081A / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Chlordane-gamma (CLDG)	525.2 / 8081A / 8081A_LL	0.015 - 0.1	ug/L	ND	ND	ND	ND					N/A
Chlorobenzilate (CLBZLA)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chloroneb (CLNEB)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlorothalonil (CLTNIL)	508.1 / 525.2	0.05 - 0.1	ug/L	ND	ND	ND	ND					N/A
Chlorpropham (CPRPHM)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Chlorpyrifos (CIPYRI)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

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SEMI-ORGANIC (Continued)												
Chrysene (CHRYS)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Dalapon (DALAPN)	515.4 / 552.2	0.4 - 1	ug/L	ND	ND	ND	ND	200				200
DCPA-Dacthal (DCPA)	515.4 / 525.2	0.1	ug/L	ND	ND	ND	ND			1.2		N/A
Diazinon (DIAZI)	525.2	0.1	ug/L	ND	ND	ND	ND			1.2		N/A
Dibenzo(a,h)anthracene (DBahAN)	525.2 / 625.1 / 8270C	0.1 - 10	ug/L	ND	ND	ND	ND					N/A
Dicamba (DICAMB)	515.4	0.6	ug/L	ND	ND	ND	ND					N/A
Dichlorprop (24DP)	515.4	0.3	ug/L	ND	ND	ND	ND					N/A
Dichlorvos (DCLVOS)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Dieldrin (DIELDR)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Diethyl phthalate (DEP)	525.2 / 625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Dimethoate (DMTH)	525.2	1	ug/L	ND	ND	ND	ND					N/A
Dimethyl phthalate (DMP)	525.2 / 625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Di-n-butylphthalate (DnBP)	525.2 / 625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Di-n-octyl phthalate (DnOP)	525.2 / 625.1 / 8270C	1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Dinoseb (DINOSB)	515.4	0.4	ug/L	ND	ND	ND	ND	7				7
Diphenamid (DPHNMD)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Diquat (DIQUAT)	549.2	4	ug/L	ND	ND	ND	ND	20				20
Diuron (DIURON)	CEC	0.005	ug/L	ND	ND	ND	ND					N/A
Endosulfan I (ENDOI)[37]	508.1 / 525.2 / 8081A_LL	0.0019 - 0.1	ug/L	ND	ND	ND	ND					N/A
Endosulfan sulfate (ENDOSL)	508.1 / 525.2 / 8081A_LL	0.0048 - 0.1	ug/L	ND	ND	ND	ND					N/A
Endothall (ENDOTL)	548.1	45	ug/L	ND	ND	ND	ND	100				100
Endrin (ENDRIN)	508.1 / 525.2 / 8081A_LL	0.0039 - 0.1	ug/L	ND	ND	ND	ND	2				2
Endrin Aldehyde (ENDR-A)	508.1 / 525.2 / 8081A_LL	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Endrin Ketone (ENDR-K)	8081A_LL	0.0048 - 0.0049	ug/L	ND	ND	Not Required	Not Required					N/A
EPTC (EPTC)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Erythromycin (ERYTHN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Ethion (ETHION)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ethoprop (ETHPRP)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ethylene Glycol (GLYCOL)	8015B	10,000	ug/L	ND	ND	ND	ND			14,000		N/A
Etridiazole (ETRDZL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Fluoranthene (FLANTH)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Fluorene (FLUOR)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Gemfibrozil (GMFIBZ)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Glyphosate (GLYPHO)	547	25	ug/L	ND	ND	ND	ND	700				700
HCH-gamma (Lindane) (LINDNE)	508.1 / 525.2 / 8081A_LL	0.0019 - 0.1	ug/L	ND	ND	ND	ND	0.2				0.2
Heptachlor (HEPTA)	508.1 / 525.2 / 8081A_LL	0.0019 - 0.1	ug/L	ND	ND	ND	ND	0.01				0.01

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SEMI-ORGANIC (Continued)												
Heptachlor epoxide (HEPEPX)	508.1 / 525.2 / 8081A_LL	0.0097 - 0.1	ug/L	ND	ND	ND	ND	0.01				0.01
Hexachlorobenzene (HEXCLB)	508.1 /525.2 /625.1 /8270C	0.05 - 9.6	ug/L	ND	ND	ND	ND	1				1
Hexachlorocyclopentadiene (HClCPD)	508.1 /525.2 /625.1 /8270C	0.05 - 25	ug/L	ND	ND	ND	ND	50				50
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	8330A	0.1 - 1.0	ug/L	ND	ND	ND	ND			0.3		N/A
Hexazinone (HEXZON)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Ibuprofen (IBPRFN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Indeno(1,2,3-cd)pyrene (INDPYR)	525.2 / 625.1 / 8270C	0.1 - 10	ug/L	ND	ND	ND	ND			160		N/A
Malathion (MALATH)	525.2	2	ug/L	ND	ND	ND	ND					N/A
Methiocarb (MTHCRB)	531.2	4	ug/L	ND	ND	ND	ND					N/A
Methomyl (MTHOMY)	531.2	1	ug/L	ND	ND	ND	ND					N/A
Methoxychlor (METHOX)	508.1 / 525.2 / 8081A_LL	0.0097 - 0.1	ug/L	ND	ND	ND	ND	30				30
methyl-Parathion (MPARA)	525.2	0.5	ug/L	ND	ND	ND	ND					N/A
Metribuzin (MTRBZN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Molinate (MOLINT)	525.2	0.1	ug/L	ND	ND	ND	ND	20				20
N,N-diethyl-m-toluamide (DEET)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Norflurazon (NORFLR)	525.2	1	ug/L	ND	ND	ND	ND					N/A
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	8330A	0.21 - 1	ug/L	ND	ND	ND	ND			350		N/A
Oxamyl (OXAMYL)	531.2	2	ug/L	ND	ND	ND	ND	50				50
Oxybenzone (BP3)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Paraquat (PARAQT)	549.2	4	ug/L	ND	ND	ND	ND					N/A
Parathion (PARA)	525.2	0.5	ug/L	ND	ND	ND	ND					N/A
Pentachlorophenol (PCP)	515.4 / 525.2 / 625.1 / 8270C / CEC	0.2 - 9.6	ug/L	ND	ND	ND	ND	1				1
Pentanal (PENTNL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Permethrin-(total of cis/trans) (PMTHRN)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Phenanthrene (PHENAN)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Picloram (PICLOR)	515.4	0.6	ug/L	ND	ND	ND	ND	500				500
Primidone (PRIMDN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Prometryn (PROMET)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Pronamide (PROAMD)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Propachlor (PROPCL)	508.1 / 525.2	0.05 - 0.2	ug/L	ND	ND	ND	ND			90		N/A
Propanal (PROPNL)	556	2	ug/L	ND	ND	Not Required	ND					N/A
Propazine (PROPAZ)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Pyrene (PYRENE)	525.2 / 625.1 / 8270C	0.1 - 9.6	ug/L	ND	ND	ND	ND					N/A
Simazine (SIMAZ)	525.2 / CEC	0.005 - 0.1	ug/L	ND	ND	ND	ND	4				4
Sulfamethoxazole (SULTHZ)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Tebuthiuron (TBTURN)	525.2	2	ug/L	ND	ND	ND	ND					N/A

WATER QUALITY -- GWRS SYSTEM PURIFIED RECYCLED WATER (FINISHED PRODUCT WATER, EXCEPT AS NOTED[1])
AVERAGES FOR ALL AVAILABLE DATA FOR 2023[2]

Parameters[3]	Methods	Reportable Detection Limit	Units	2023 Quarter 1	2023 Quarter 2	2023 Quarter 3	2023 Quarter 4	Primary MCL or Action Level[4]	Secondary MCL[5]	Notification Level or Monitoring Trigger Level[6]	RWQCB Basin Plan Limt	Permit Requirement
SEMI-ORGANIC (Continued)												
Terbacil (TRBACL)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A
Thiobencarb (THIO)	525.2	0.1	ug/L	ND	ND	ND	ND	70	1			1
Toxaphene Mixture (TOXA)	508.1 / 8081A_LL	0.097 - 1	ug/L	ND	ND	ND	ND	3				3
Triclosan (TRICLN)	CEC	1	ng/L	ND	ND	ND	ND					N/A
Trifluralin (TRFLRN)	508.1 / 525.2	0.01 - 0.1	ug/L	ND	ND	ND	ND					N/A
Trithion (TRTION)	525.2	0.1	ug/L	ND	ND	ND	ND					N/A

APPENDIX A
Orange County Water District
GWRS WATER QUALITY REQUIREMENTS

Purified Recycled Water Monitoring

Footnotes:

1 Purified Recycled Water (also called Finished Product Water (FPW) or Final Product Water) is the final recycled water flow stream.
2 For purposes of calculating quarterly averages, 10% of corresponding Reportable Detection Limits (RDL) was used for all non-detect (ND) values. If all data for the quarter were ND, then the average is shown as ND.
3 Permit and monitoring and reporting requirements per RWQCB Order No. R8-2022-0050.
4 Primary maximum contaminant levels (MCLs) are incorporated as 4-week running average permit limits unless otherwise noted.
5 Secondary MCLs are incorporated as annual average permit limits unless otherwise noted.
6 Exceedance of Division of Drinking Water Notification Levels (NLs) or Recycled Water Policy Monitoring Trigger Levels (MTLs) results in implementation of required response actions. For constituents with both NLs and MTLs (i.e., 1,4-dioxane, NDMA, PFOS, PFOA), NL and MTL exceedance response actions may differ. NLs and MTLs are not associated with effluent limitations in RWQCB Order No. R8-2022-0050.
7 Reverse Osmosis Product turbidity shall not exceed: 0.2 Nephelometric Turbidity Units (NTU) more than 5 percent of the time in any 24-hour period; and 0.5 NTU at any time.
8 The 7-day average concentration of total coliform shall not exceed 2.2 MPN/100mL. No more than one sample in any 30-day period shall exceed a concentration of 23 MPN/100mL. No sample shall exceed a concentration of 240 MPN/100mL.
9 Chloride has a recommended Secondary MCL of 250 mg/L and a RWQCB Basin Plan Water Quality Objective of 55 mg/L. The daily maximum permit limit, which is based on the upper range of the Secondary MCL, is 500 mg/L. The annual average limit is 55 mg/L.
10 Chloride, silver, and methylene blue activated substances (MBAS) secondary MCLs are expressed as a daily maximum effluent limitation in RWQCB Order No. R8-2022-0050. Most secondary MCLs are expressed as annual average effluent limitations.
11 Nitrate, nitrite, and nitrate+nitrite primary MCLs are expressed as daily maximum effluent limitations in RWQCB Order No. R8-2022-0050. Most primary MCLs are expressed as running 4-week average effluent limitations.
12 Total Dissolved Solids has a Secondary MCL of 500 mg/L and a RWQCB Basin Plan Water Quality Objective of 580 mg/L. The permit limit is based upon the Basin Plan Water Quality Objective.
13 TOC limit of 0.5 mg/L is based on a Recycled Water Contribution (RWC) of 100%. TOC must not exceed 0.5 mg/L based on a 20-week running average of all TOC results and the average of the last four monitoring results for TOC.
14 Alternate name for 1,1-Dichloroethene is 1,1-Dichloroethylene.
15 Alternate name for 1,2-Dibromo-3-chloropropane is Dibromochloropropane (DBCP).
16 Alternate name for Dibromoethane is Ethylene Dibromide (EDB).
17 Alternate name for 17a-Ethynyl Estradiol is Ethinyl Estradiol.
18 Alternate name for 4-Chloro-3-methylphenol is 3-Methyl-4-Chlorophenol.
19 Alternate name for Bromodichloromethane is Dichlorobromomethane.
20 Alternate name for Bromomethane is Methyl Bromide.
21 Alternate name for Chlorobenzene is Monochlorobenzene .
22 Alternate name for Chloromethane is Methyl Chloride.
23 Alternate name for cis-1,2-Dichloroethene is cis-1,2-Dichloroethylene.
24 Total Haloacetic acids (five) (HAA5) are listed separately as Monochloroacetic Acid, Dichloroacetic Acid, Trichloroacetic Acid, Monobromoacetic Acid, and Dibromoacetic Acid.
25 Alternate name for Dibromochloromethane is Chlorodibromomethane.
26 Alternate name for Endosulfan II is Beta Endosulfan.
27 Alternate name for Methylene chloride is Dichloromethane.
28 Polychlorinated Biphenyls are listed separately as PCB-1016, PCB-1221, PCB-1232, PCB-1242, PCB-1248, PCB-1254, and PCB-1260; however the PMCL is for the total mixture of PCB congeners (TOTPCB) and not individual PCB's.
29 Alternate name for Tetrachloroethene is Tetrachloroethylene.
30 Primary MCL for Total Xylenes and not isomers (o-, m-, p-xylene).
31 Alternate name for trans-1,2-Dichloroethene is trans-1,2-Dichloroethylene.
32 Alternate name for Trichloroethene is Trichloroethylene.
33 Alternate name for Trichlorotrifluoroethane (Freon 113) is 1,1,2-Trichloro-1,2,2-Trifluoroethane.
34 California Detection Level for purposes of Reporting (DLR).
35 Alternate name for bis (2-ethylhexyl) adipate is Di(2-ethylhexyl)adipate.
36 Alternate name for bis (2-ethylhexyl) phthalate is Di(2-ethylhexyl)phthalate (DEHP).
37 Alternate name for Endosulfan I is Alpha Endosulfan.

GWRS 2023 Quarterly Sampling Dates
OCWD Water Quality Department
GWRS FINAL PRODUCT WATER (GWRS-FPW)

Station Name	Quarter 1[1]	Quarter 2[2]	Quarter 3[3]	Quarter 4[4]
GWRS-FPW	01/11/2023	04/05/2023	07/12/2023	10/04/2023

Qtr 1: Additional sample collected on 1/16/2023

Qtr 2: Additional samples collected on 4/19/2023, 4/25/2023, and 6/6/2023

Qtr 3: Additional samples collected on 8/8/2023, 8/23/2023, 9/12/2023, and 9/18/2023

Qtr 4: Additional sample collected on 12/5/2023

Notes for Appendix A Tables:

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2021 and are not limited to the quarterly compliance samples.

► Appendices B and C contain a list of all methods and reportable detection limits (RDL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate. RWQCB Order No. R8-2022-0050 does not have a permit limit for TDS or EC.

► Analysis for priority pollutants is performed by multiple inorganic and organic methods

► MCL: Maximum Contaminant Level

► NA: Not applicable

► ND: Not detected at reportable detection limit (RDL)

► NL: SWRCB DDW (formerly CDPH) Notification Level. Exceedance of notification levels triggers required response actions. Notification levels are not permit effluent limitations.

► NS: Not sampled

► SMCL: Secondary Maximum Contaminant Level

► TR: Trace

Summary of 2023 Water Quality Analyses Per Permit Table Sections

**** NO PERMIT EXCEEDANCES WERE REPORTED ****

Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
EFFLUENT MONITORING FOR RECYCLED WATER (TITLE 22) (RWQCB ORDER NO. R8-2022-0050 TABLE E-3)										
Final Product Water	Total Coliform (Colilert - MPN/100mL) (TCOLIQ), MPN	OCWD	9223B	1	2.2	ND	ND	ND	ND	ND
Final Product Water	Electrical Conductivity (EC), uS/cm	OCWD	2510B	1	N/A	108.5	113.4	107.9	112.6	107.95 - 113.38
Final Product Water	Total Dissolved Solids (TDS), mg/L	OCWD	2540C	2.5	580	53.92	59.00	55.67	58.80	53.92 - 59.00
Final Product Water	BOD (24-hr composite) (BOD), mg/L	Eurofins CalScience / Weck Lab	5210B	2	20	ND	ND	ND	ND	ND
Final Product Water	Total Suspended Solids (SUSSOL), mg/L	OCWD	2540D	2.5	20	ND	ND	ND	ND	ND
Final Product Water	Chloride (Cl), mg/L	OCWD	300.0	0.5	55	7.57	8.43	7.60	11.23	7.57 - 11.23
Final Product Water	Sulfate (SO4), mg/L	OCWD	300.0	0.3 / 0.5	250	ND	ND	0.5	0.6	ND - 0.6
Final Product Water	Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	0.3	10	1.014	1.038	1.069	1.200	1.014 - 1.2
Final Product Water	Nitrate + Nitrite Nitrogen (NO3NO2-N), mg/L	OCWD	Calculated	0.1	10	0.66	0.79	0.90	0.95	0.66 - 0.95
Final Product Water	Nitrate Nitrogen (NO3-N), mg/L	OCWD	4500-NO3F	0.1	10	0.60	0.73	0.85	0.89	0.60 - 0.89
Final Product Water	Nitrite Nitrogen (NO2-N), mg/L	OCWD	4500-NO3F	0.002	1	0.062	0.053	0.053	0.053	0.05 - 0.06
Final Product Water	Ammonia Nitrogen (NH3-N), mg/L	OCWD	350.1	0.1	NA	0.53	0.43	0.30	0.41	0.30 - 0.53
Final Product Water	Total Inorganic Nitrogen (TIN). mg/L	OCWD	350.1 / Calculated	0.1	3.4	1.19	1.22	1.20	1.36	1.19 - 1.36
Final Product Water	Iron (Fe), ug/L	OCWD	200.7	5	300	ND	ND	ND	ND	ND
Final Product Water	Manganese (Mn), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Methylene Blue Activated Substances (MBAS), mg/L	OCWD	5540C	0.02	0.05	ND	Not Required	Not Required	Not Required	ND
Final Product Water	Threshold Odor Number (Median) (ODOR), TON	OCWD	2150B	0	3	ND	Not Required	Not Required	Not Required	ND
Final Product Water	Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	2120B	3	15	ND	Not Required	Not Required	Not Required	ND
Final Product Water	Lead (Pb), ug/L	OCWD	200.8	1	15	ND	ND	ND	ND	ND
Final Product Water	Copper (Cu), ug/L	OCWD	200.8	1	1000	ND	ND	ND	ND	ND
Final Product Water	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	0.5	0.067	0.073	0.069	0.062	0.062 - 0.073
Final Product Water	Silver (Ag), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Zinc (Zn), ug/L	OCWD	200.8	5	5,000	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - INORGANIC (RWQCB ORDER NO. R8-2022-0050 TABLE E-4)										
Final Product Water	Aluminum (Al), ug/L	OCWD	200.8	5	200	ND	ND	ND	ND	ND
Final Product Water	Antimony (Sb), ug/L	OCWD	200.8	1	6	ND	ND	ND	ND	ND
Final Product Water	Arsenic (As), ug/L	OCWD	200.8	1	10	ND	ND	ND	ND	ND
Final Product Water	Asbestos (ASBESTOS), MFL	Eurofins CEI	100.2	0.18	7	ND	Not Required	Not Required	Not Required	ND
Final Product Water	Barium (Ba), ug/L	OCWD	200.8	1	1,000	ND	ND	ND	ND	ND
Final Product Water	Beryllium (Be), ug/L	OCWD	200.8	1	4	ND	ND	ND	ND	ND
Final Product Water	Cadmium (Cd), ug/L	OCWD	200.8	1	5	ND	ND	ND	ND	ND
Final Product Water	Chromium (Cr), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Cyanide (CN), ug/L	OCWD	335.4	5	150	ND	ND	ND	ND	ND
Final Product Water	Fluoride (F), mg/L	OCWD	300.0	0.1	2	ND	ND	ND	ND	ND
Final Product Water	Mercury (Hg), ug/L	OCWD	200.8	1	2	ND	ND	ND	ND	ND
Final Product Water	Nickel (Ni), ug/L	OCWD	200.8	1	100	ND	ND	ND	ND	ND
Final Product Water	Perchlorate (CLO4), ug/L	OCWD	332.0	2	6	ND	ND	ND	ND	ND
Final Product Water	Selenium (Se), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
Final Product Water	Thallium (Tl), ug/L	OCWD	200.8	1	2	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - VOLATILE ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-5)										
Final Product Water	Benzene (BENZ), ug/L	OCWD	524.2	0.5	1	ND	ND	ND	ND	ND
Final Product Water	Carbon Tetrachloride (CCl4), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	1,2-Dichlorobenzene (12DCB), ug/L	OCWD	524.2	0.5	600	ND	ND	ND	ND	ND
Final Product Water	1,4-Dichlorobenzene (14DCB), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

** NO PERMIT EXCEEDANCES WERE REPORTED **

Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
PRIMARY DRINKING WATER STANDARDS - VOLATILE ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-5 Continued)										
Final Product Water	1,1-Dichloroethane (11DCA), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,2-Dichloroethane (12DCA), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	1,1-Dichloroethylene (11DCE), ug/L	OCWD	524.2	0.5	6	ND	ND	ND	ND	ND
Final Product Water	cis-1,2-Dichloroethylene (c12DCE), ug/L	OCWD	524.2	0.5	6	ND	ND	ND	ND	ND
Final Product Water	trans-1,2-Dichloroethylene (t12DCE), ug/L	OCWD	524.2	0.5	10	ND	ND	ND	ND	ND
Final Product Water	Dichloromethane (CH2Cl2), ug/L	OCWD	524.2	0.5	5	0.09	0.28	TR	TR	TR - 0.28
Final Product Water	1,2-Dichloropropane (12DCP), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,3-Dichloropropene (x13DCP), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	Ethylbenzene (EtBENZ), ug/L	OCWD	524.2	0.5	300	ND	ND	ND	ND	ND
Final Product Water	Methyl-tert-butyl ether (MTBE), ug/L	OCWD	524.2	0.5	13	ND	ND	ND	ND	ND
Final Product Water	Monochlorobenzene (ClBENZ), ug/L	OCWD	524.2	0.5	70	ND	ND	ND	ND	ND
Final Product Water	Styrene (STYR), ug/L	OCWD	524.2	0.5	100	ND	ND	ND	ND	ND
Final Product Water	1,1,2,2-Tetrachloroethane (1122PC), ug/L	OCWD	524.2	0.5	1	ND	ND	ND	ND	ND
Final Product Water	Tetrachloroethylene (PCE), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Toluene (TOLU), ug/L	OCWD	524.2	0.5	150	ND	ND	ND	ND	ND
Final Product Water	1,2,4-Trichlorobenzene (124TCB), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	1,1,1-Trichloroethane (111TCA), ug/L	OCWD	524.2	0.5	200	ND	ND	ND	ND	ND
Final Product Water	1,1,2-Trichloroethane (112TCA), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Trichloroethylene (TCE), ug/L	OCWD	524.2	0.5	5	ND	ND	ND	ND	ND
Final Product Water	Trichlorofluoromethane (CCl3F), ug/L	OCWD	524.2	0.5	150	ND	ND	ND	ND	ND
Final Product Water	1,1,2-Trichloro-1,1,2- Trifluoroethane (Cl3F3E), ug/L	OCWD	524.2	0.5	1,200	ND	ND	ND	ND	ND
Final Product Water	Vinyl Chloride (VNYLCL), ug/L	OCWD	524.2	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	m,p-Xylene (mp-XYL), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
Final Product Water	o-Xylene (o-XYL), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
Final Product Water	Xylenes (TOTALX), ug/L	OCWD	524.2	0.5	1,750	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - SYNTHETIC ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-6)										
Final Product Water	Alachlor (ALACHL), ug/L	OCWD	525.2	0.1	2	ND	ND	ND	ND	ND
Final Product Water	Atrazine (ATRAZ), ug/L	OCWD	525.2	0.1	1	ND	ND	ND	ND	ND
Final Product Water	Bentazon (BENTAZ), ug/L	Weck Lab	515.4	2	18	ND	ND	ND	ND	ND
Final Product Water	Benzo(a)pyrene (BaPYRE), ug/L	OCWD	525.2	0.1	0.2	ND	ND	ND	ND	ND
Final Product Water	Carbofuran (CARBOF), ug/L	OCWD	531.2	1	18	ND	ND	ND	ND	ND
Final Product Water	Chlordane (ClDANE), ug/L	Weck Lab	508.1	0.1	0.1	ND	ND	ND	ND	ND
Final Product Water	2,4-Dichlorophenoxyacetic acid (24D), ug/L	Weck Lab	515.4	0.4	70	ND	ND	ND	ND	ND
Final Product Water	Dalapon (DALAPN), ug/L	OCWD /Weck Lab	515.4 / 552.2	0.4 / 1	200	ND	ND	ND	ND	ND
Final Product Water	1,2-Dibromo-3-chloropropane (DBCP), ug/L	OCWD	504.1	0.01	0.2	ND	ND	ND	ND	ND
Final Product Water	Di(2-ethylhexyl) adipate (DEHA), ug/L	OCWD	525.2	2	400	ND	ND	ND	ND	ND
Final Product Water	Di(2-ethylhexyl) phthalate (DEHP), ug/L	OCWD	525.2	2	4	ND	ND	ND	ND	ND
Final Product Water	Dinoseb (DINOSB), ug/L	Weck Lab	515.4	0.4	7	ND	ND	ND	ND	ND
Final Product Water	Diquat (DIQUAT), ug/L	OCWD	549.2	4	20	ND	ND	ND	ND	ND
Final Product Water	Endothall (ENDOTL), ug/L	Weck Lab	548.1	45	100	ND	ND	ND	ND	ND
Final Product Water	Endrin (ENDRIN), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	2	ND	ND	ND	ND	ND
Final Product Water	Ethylene Dibromide (EDB), ug/L	OCWD	504.1	0.01	0.05	ND	ND	ND	ND	ND
Final Product Water	Glyphosate (GLYPHO), ug/L	OCWD	547	25	700	ND	ND	ND	ND	ND
Final Product Water	Heptachlor (HEPTA), ug/L	Weck Lab	508.1	0.01	0.01	ND	ND	ND	ND	ND
Final Product Water	Heptachlor Epoxide (HEPEPX), ug/L	Weck Lab	508.1	0.01	0.01	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

** NO PERMIT EXCEEDANCES WERE REPORTED **

Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
PRIMARY DRINKING WATER STANDARDS - SYNTHETIC ORGANIC CHEMICALS (RWQCB ORDER NO. R8-2022-0050 TABLE E-6 Continued)										
Final Product Water	Hexachlorobenzene (HEXCLB), ug/L	OCWD /Weck Lab	508.1 / 525.2	0.05 / 0.1	1	ND	ND	ND	ND	ND
Final Product Water	Hexachlorocyclopentadiene (HEXCIPD), ug/L	OCWD /Weck Lab	508.1 / 525.2	0.05 - 0.2	50	ND	ND	ND	ND	ND
Final Product Water	Gamma BHC (Lindane) (LINDNE), ug/L	OCWD /Weck Lab	508.1 / 525.2	0.01 - 0.1	0.2	ND	ND	ND	ND	ND
Final Product Water	Methoxychlor (METHOX), ug/L	OCWD /Weck Lab	508.1 / 525.2	0.01 - 0.1	30	ND	ND	ND	ND	ND
Final Product Water	Molinate (MOLINT), ug/L	OCWD	525.2	0.1	20	ND	ND	ND	ND	ND
Final Product Water	Oxamyl (OXAMYL), ug/L	OCWD	531.2	2	50	ND	ND	ND	ND	ND
Final Product Water	Pentachlorophenol (PCP), ug/L	OCWD /Weck Lab	515.4 / 525.2	0.2 / 1	1	ND	ND	ND	ND	ND
Final Product Water	Picloram (PICLOR), ug/L	Weck Lab	515.4	0.6	500	ND	ND	ND	ND	ND
Final Product Water	Polychlorinated Biphenyls (PCBs) (TOTPCB), ug/L	Weck Lab	508.1	0.5	0.5	ND	ND	ND	ND	ND
Final Product Water	Simazine (SIMAZ), ug/L	OCWD	525.2 / CEC	0.005 / 0.1	4	ND	ND	ND	ND	ND
Final Product Water	Thiobencarb (THIO), ug/L	OCWD	525.2	0.1	70	ND	ND	ND	ND	ND
Final Product Water	Toxaphene (TOXA), ug/L	Weck Lab	508.1	1	3	ND	ND	ND	ND	ND
Final Product Water	1,2,3-Trichloropropane (123TCP), ug/L	OCWD	SRL524M	0.005	0.005	ND	ND	ND	ND	ND
Final Product Water	2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), pg/L	Eurofins Sac	1613B	4.8	30	ND	ND	ND	ND	ND
Final Product Water	2-(2,4,5-trichlorophenoxy) propionic acid (Silvex) (245TP), ug/L	Weck Lab	515.4	0.2	50	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - DISINFECTION BYPRODUCTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-7)										
Final Product Water	Total Trihalomethanes (TTHMs), ug/L	OCWD	524.2	0.5	80	3.03	1.61	1.3	4.7	1.3 - 4.7
Final Product Water	Sum of five Haloacetic Acids (HAA5), ug/L	OCWD	Calculated	1	60	ND	ND	ND	ND	ND
Final Product Water	Bromodichloromethane (CHBrCl), ug/L	OCWD	524.2	0.5	80, total TTHMs	0.77	0.50	0.5	1.9	0.5 - 1.9
Final Product Water	Bromoform (CHBr3), ug/L	OCWD	524.2	0.5	80, total TTHMs	ND	ND	ND	ND	ND
Final Product Water	Chloroform (CHCl3), ug/L	OCWD	524.2	0.5	80, total TTHMs	2.28	1.2	0.8	2.9	0.8 - 2.9
Final Product Water	Dibromochloromethane (CHBr2C), ug/L	OCWD	524.2	0.5	80, total TTHMs	ND	ND	ND	TR	ND - TR
Final Product Water	Monochloroacetic Acid (MCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Dichloroacetic Acid (DCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Trichloroacetic Acid (TCAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Monobromoacetic Acid (MBAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Dibromoacetic Acid (DBAA), ug/L	OCWD	552.2	1	60, total HAA5	ND	ND	ND	ND	ND
Final Product Water	Bromate (BRO3), ug/L	OCWD	300.1B	5	10	ND	ND	ND	ND	ND
Final Product Water	Chlorite (ClO2), ug/L	OCWD	300.1B	10	1,000	ND	ND	ND	ND	ND
PRIMARY DRINKING WATER STANDARDS - RADIONUCLIDES (RWQCB ORDER NO. R8-2022-0050 TABLE E-8)										
Final Product Water	Combined Radium-226 and Radium-228 (Ra6Ra8), pCi/L	FGL	Calculated (Ra226 by 903.0; Ra228 by Ra-05)	0.41 - 0.716	5	-0.095	0.16	0.086	-0.171	-0.171 - 0.16
Final Product Water	Gross Alpha Excluding Uranium (TOTa-U), pCi/L	FGL	SM7110C	1.08	15	0.105	-0.314	0.21	3.88	-4.19
Final Product Water	Uranium (NTUr), pCi/L	FGL	200.8	0.67 - 1	20	ND	ND	ND	ND	ND
Final Product Water	Beta/Photon emitters (TOTb), pCi/L	FGL	900.0	0.147 - 3.4	50	2.55	6.66	7.58	5.82	2.55 - 7.58
Final Product Water	Strontium-90 (TS90), pCi/L	Eberline	905.0 MOD	1.36 - 1.859	8	0.59	0.99	0.71	0.94	0.59 - 0.99
Final Product Water	Tritium (TTr), pCi/L	FGL	906.0	434	20,000	142.63	70.02	146.68	316.75	70.02 - 316.75
CONSTITUENTS WITH NOTIFICATION AND RESPONSE LEVELS (RWQCB ORDER NO. R8-2022-0050 TABLE E-9)										
Final Product Water	Boron (B), mg/L	OCWD	200.7	0.1	0.75	0.29	0.27	0.35	0.32	0.27 - 0.35
Final Product Water	n-Butylbenzene (nBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND
Final Product Water	sec-Butylbenzene (sBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND
Final Product Water	tert-Butylbenzene (tBBENZ), ug/L	OCWD	524.2	0.5	260	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

** NO PERMIT EXCEEDANCES WERE REPORTED **

Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
CONSTITUENTS WITH NOTIFICATION AND RESPONSE LEVELS (RWQCB ORDER NO. R8-2022-0050 TABLE E-9 Continued)										
Final Product Water	Carbon disulfide (CS2), ug/L	OCWD	524.2	0.5	160	ND	ND	ND	ND	ND
Final Product Water	Chlorate (CLO3), ug/L	OCWD	300.1B	10	800	10.7	ND	ND	10.5	ND - 10.7
Final Product Water	2-Chlorotoluene (2ClTOL), ug/L	OCWD	524.2	0.5	140	ND	ND	ND	ND	ND
Final Product Water	4-Chlorotoluene (4ClTOL), ug/L	OCWD	524.2	0.5	140	ND	ND	ND	ND	ND
Final Product Water	Diazinon (DIAZI), ug/L	OCWD	525.2	0.1	1.2	ND	ND	ND	ND	ND
Final Product Water	Dichlorodifluoromethane (CCl2F2), ug/L	OCWD	524.2	0.5	1,000	ND	ND	ND	ND	ND
Final Product Water	1,4-Dioxane (14DIOX), ug/L	OCWD	522	0.07	1	ND	ND	ND	ND	ND
Final Product Water	Ethylene glycol (GLYCOL), ug/L	Weck Lab	8015B	10,000	14,000	ND	ND	ND	ND	ND
Final Product Water	Formaldehyde (FORALD), ug/L	Weck Lab	556	2	100	8.8	13	14	15	8.8 - 15
Final Product Water	HMX (Octogen) (HMX), ug/L	Eurofins Denver / Weck Lab	8330A	0.21 - 1.0	350	ND	ND	ND	ND	ND
Final Product Water	Isopropylbenzene (ISPBNZ), ug/L	OCWD	524.2	0.5	770	ND	ND	ND	ND	ND
Final Product Water	Manganese (Mn), ug/L	OCWD	200.8	1	500	ND	ND	ND	ND	ND
Final Product Water	Methyl isobutyl ketone (MIBK), ug/L	OCWD	524.2	2.5	120	ND	ND	ND	ND	ND
Final Product Water	Naphthalene (NAP), ug/L	OCWD	525.2 / 524.2	0.1	17	ND	ND	ND	ND	ND
Final Product Water	N-Nitrosodiethylamine (NDEA), ng/L	OCWD	NDMA-LOW	2	10	ND	ND	ND	ND	ND
Final Product Water	N-nitrosodymethylamine (NDMA), ng/L	OCWD	NDMA-LOW	2	10	0.74	1.19	0.68	0.36	0.36 - 1.19
Final Product Water	N-Nitrosodi-n-propylamine (NDPA), ng/L	OCWD	NDMA-LOW	2	10	ND	ND	ND	ND	ND
Final Product Water	Perfluorobutanesulfonic acid (PFBS), ng/L	OCWD	533	2	500	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanesulfonic acid (PFOS), ng/L	OCWD	533	2	6.5	ND	ND	ND	ND	ND
Final Product Water	Perfluorohexanesulfonic acid (PFHxS), ng/L	OCWD	533	2	3	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic acid (PFOA), ng/L	OCWD	533	2	5.1	ND	ND	ND	ND	ND
Final Product Water	Propachlor (PROPCL), ug/L	OCWD / Weck	508.1 / 525.2	0.05 - 0.20	90	ND	ND	ND	ND	ND
Final Product Water	n-Propylbenzene (PRPBNZ), ug/L	OCWD	524.2	0.05	260	ND	ND	ND	ND	ND
Final Product Water	1,3,5-Trinitroperhydro-1,3,5-triazine (RDX), ug/L	Eurofins Denver / Weck Lab	8330A	0.1 - 1	0.3	ND	ND	ND	ND	ND
Final Product Water	Tertiary butyl alcohol (TBA), ug/L	OCWD	524.2	2	12	ND	ND	ND	ND	ND
Final Product Water	1,2,4-Trimethylbenzene (124TMB), ug/L	OCWD	524.2	0.5	330	ND	ND	ND	ND	ND
Final Product Water	1,3,5-Trimethylbenzene (135TMB), ug/L	OCWD	524.2	0.5	330	ND	ND	ND	ND	ND
Final Product Water	2,4,6-Trinitrotoluene (246TNT), ug/L	Eurofins Denver / Weck Lab	8330A	0.11 - 1	1	ND	ND	ND	ND	ND
Final Product Water	Vanadium (V), ug/L	OCWD	200.8	1	50	ND	ND	ND	ND	ND
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10)										
Final Product Water	Aldrin (ALDRIN), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Dieldrin (DIELDR), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDT (DDT), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDE (DDE), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	4,4' - DDD (DDD), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Alpha-endosulfan (ENDOI), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Beta-endosulfan (ENDOII), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Endosulfan sulfate (ENDOSL), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Endrin aldehyde (ENDR-A), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Alpha-BHC (BHCa), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Beta-BHC (BHCb), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Delta-BHC (BHCd), ug/L	OCWD / Weck	508.1 / 525.2	0.01 / 0.1	NA	ND	ND	ND	ND	ND
Final Product Water	Acrolein (ACROLN), ug/L	OCWD	524.2	5	NA	ND	ND	ND	ND	ND
Final Product Water	Acrylonitrile (ACRYLO), ug/L	OCWD	524.2	2	NA	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10 Continued)										
Final Product Water	Chlorobenzene (ClBENZ)	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-5.								
Final Product Water	Chloroethane (ClETHA), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	1,1-Dichloroethylene (11DCE)	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-5.								
Final Product Water	Methyl chloride (CH3Cl), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	Methyl bromide (CH3Br), ug/L	OCWD	524.2	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	2-chloroethyl vinyl ether (2ClEVE), ug/L	OCWD	14DIOX	1	NA	ND	ND	ND	ND	ND
Final Product Water	2,4,6-trichlorophenol (246TCP), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	3-methyl-3-chlorophenol (P-chloro-m-cresol) (43CMP), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2-Chlorophenol (2ClPNL), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dichlorophenol (24DCPH), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dimethylphenol (24DMP), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2-nitrophenol (2NPNL), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	4-nitrophenol (4NPNL), ug/L	Eurofins CalScience /Weck	625.1	5 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-dinitrophenol (24DNP), ug/L	Eurofins CalScience /Weck	625.1	10 - 48	NA	ND	ND	ND	ND	ND
Final Product Water	2-methyl-4,6-dinitrophenol (2MDNP), ug/L	Eurofins CalScience /Weck	625.1	5 - 48	NA	ND	ND	ND	ND	ND
Final Product Water	Phenol (PHENOL), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	1	NA	ND	ND	ND	ND	ND
Final Product Water	Acenaphthene (ACNAPE), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Benzidine (BNZDE), ug/L	Eurofins CalScience /Weck	625.1	10 - 48	NA	ND	ND	ND	ND	ND
Final Product Water	Hexachloroethane (HCE), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Bis(2-Chloroethyl)ether (B2CLEE), ug/L	OCWD / Eurofins CalScience /Weck	524.2 / 625.1	1 - 24	NA	ND	ND	ND	ND	ND
Final Product Water	2-Chloronaphthalene (2ClNAP), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	1,3-Dichlorobenzene (13DCB), ug/L	OCWD / Eurofins CalScience /Weck	524.2 / 625.1	0.5 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	3,3'-Dichlorobenzidine (DCBZDE), ug/L	Eurofins CalScience /Weck	625.1	5 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2,4-Dinitrotoluene (24DNT), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	2,6-Dinitrotoluene (26DNT), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Fluoranthene (FLANTH), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	4-Chlorophenyl Phenyl Ether (4ClPPE), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	4-Bromophenyl Phenyl Ether (4BrPPE), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Bis (2-Chloroisopropyl) Ether (B2ClPE), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Bis (2-Chloroethoxyl) Methane (B2CEM), ug/L	Eurofins CalScience /Weck	625.1	1 - 9.6	NA	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
REMAINING PRIORITY POLLUTANTS (RWQCB ORDER NO. R8-2022-0050 TABLE E-10 Continued)										
Final Product Water	Hexachlorobutadiene (HClBut), ug/L	OCWD / Eurofins CalScience /Weck	524.2 / 625.1	0.5 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Isophorone (IPHOR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Nitrobenzene (NBENZ), ug/L	Eurofins CalScience /Weck	625.1	1 - 24	NA	ND	ND	ND	ND	ND
Final Product Water	N-Nitrosodiphenylamine (NDPhA), ng/L	Eurofins CalScience /Weck	625.1	1,000 - 9,600	NA	ND	ND	ND	ND	ND
Final Product Water	Bis(2-ethylhexyl) phthalate or Di(2-ethylhexyl) phthalate (DEHP	CONSTITUENT HAS A PRIMARY MCL. SEE TABLE E-6.								
Final Product Water	Butylbenzyl Phthalate (BBP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Di-n-butyl phthalate (DnBP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Di-n-octyl phthalate (DnOP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Diethyl phthalate (DEP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Dimethyl Phthalate (DMP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(a)anthracene (BaANTH), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(b)fluoranthene (BbFLUR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Benzo(k)fluoranthene (BkFLUR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Chrysene (CHRYS), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Acenaphthylene (ACENAP), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Anthracene (ANTHRA), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	1,12-benzoperylene (BghiPR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Fluorene (FLUOR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Phenanthrene (PHENAN), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	1,2,5,6-dibenzanthracene (DBahAN), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Indeno(1,2,3-cd)pyrene (INDPYR), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
Final Product Water	Pyrene (PYRENE), ug/L	OCWD / Eurofins CalScience /Weck	525.2 / 625.1	0.1 - 9.6	NA	ND	ND	ND	ND	ND
CEC MONITORING: HEALTH AND PERFORMANCE SURROGATES (RWQCB ORDER NO. R8-2022-0050 TABLE E-12)										
Final Product Water	1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX / 522	0.5 / 0.07	NA	ND	ND	ND	ND	ND
Final Product Water	n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	2	NA	0.74	1.19	0.68	0.36	0.36 - 1.19
RO Feed	n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	0.01	NA	19.01	21.08	20.57	11.49	11.49 - 21.08
RO Feed - Final Product Water	NDMA Removal Percentage, %	OCWD	Calculated	0.1%	NA	96.9%	94.9%	97.5%	98.5%	94.88% - 98.51%
Final Product Water	n-Nitrosomorpholine (NMOR), ng/L	OCWD	NDMA-LOW	2	NA	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic sulfonate (PFOS), ng/L	OCWD	537.1	2	NA	ND	ND	ND	ND	ND
Final Product Water	Perfluorooctanoic acid (PFOA), ng/L	OCWD	537.1	2	NA	ND	ND	ND	ND	ND

Summary of 2023 Water Quality Analyses Per Permit Table Sections

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Station Description	Category	Labs	Reported Methods	RDL	Permit Limit	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4	Annual Average Range
CEC MONITORING: HEALTH AND PERFORMANCE SURROGATES (RWQCB ORDER NO. R8-2022-0050 TABLE E-12 Continued)										
Final Product Water	Sucralose (SUCRAL), ng/L	OCWD	CEC	100	NA	ND	ND	ND	ND	ND
RO Feed	Sucralose (SUCRAL), ng/L	OCWD	CEC	1,000	NA	51,100	71,000	71,000	76,900	51,100 - 76,900
RO Feed - Final Product Water	Sucralose Removal Percentage, %	OCWD	Calculated	0.1%	NA	100.0%	100.0%	100.0%	100.0%	100.0%
Final Product Water	Sulfamethoxazole (SULTHZ), ng/L	OCWD	CEC	1	NA	ND	ND	ND	ND	ND
RO Feed	Sulfamethoxazole (SULTHZ), ng/L	OCWD	CEC	10	NA	560	610	660	920	560- 920
RO Feed - Final Product Water	Sulfamethoxazole Removal Percentage, %	OCWD	Calculated	0.1%	NA	100%	100%	100%	100%	100%
Final Product Water	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	108.5	113.4	107.9	112.6	107.95 - 113.38
RO Permeate	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	44.54	46.61	47.89	53.53	44.54 - 53.53
RO Feed	Specific Conductance (EC), uS/cm	OCWD	2510B	1	NA	2,114.29	2,142.86	1,907.69	2,246.43	1,907.69 - 2,246.43
RO Feed - Final Product Water	EC Removal Percentage, %	OCWD	Calculated	0.1%	NA	94.9%	94.7%	94.3%	95.0%	94.3% - 95.0%
Final Product Water	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	NA	0.067	0.073	0.069	0.062	0.062 - 0.073
RO Permeate	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	NA	0.064	0.062	0.072	0.062	0.062 - 0.072
RO Feed	Total Organic Carbon (TOC), mg/L	OCWD	5310C	0.05	NA	7.838	7.459	7.243	6.962	6.962 - 7.838
RO Feed - Final Product Water	TOC Removal Percentage, %	OCWD	Calculated	0.1%	NA	99.1%	99.0%	99.1%	99.1%	99.02% - 99.15%
CEC MONITORING: BIOANALYTICAL SCREENING TOOLS (RWQCB ORDER NO. R8-2022-0050 TABLE E-13)										
Final Product Water	Estrogen receptor alpha (ER-alpha), ng/L	Trussell / BDS Amsterdam	BIOASSAY CEC	0.5	NA	ND	ND	ND	ND	ND
Final Product Water	Aryl hydrocarbon receptor (AhR), ng/L	BDS Amsterdam	BIOASSAY CEC	0.5	NA	NA	NA	ND	ND	ND

Note: Table E-11 was excluded since the table of analytes was set for groundwater monitoring wells only.

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	GWRS-FPW Qtr 1	GWRS-FPW Qtr 2	GWRS-FPW Qtr 3	GWRS-FPW Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
1613B	2,3,7,8-Tetrachlorodibenzo-p-dioxin	Eurofins Sac.	ND	ND	ND	ND
504.1	EDB, DBCP & 123TCP	OCWD	ND	ND	ND	ND
508.1	Chlorinated Pesticides	Weck Lab	ND	ND	ND	ND
515.4	Chlorinated Acids	Weck Lab	ND	ND	ND	ND
522	1.4-Dioxane in drinking water	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
524M-TCP	123TCP & EDB	OCWD	ND	ND	ND	ND
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	ND	ND	ND
531.2	Carbamates	OCWD	ND	ND	ND	ND
533	PFAS Compounds	OCWD	ND	ND	ND	ND
537.1	PFAS Compounds	OCWD	Not Required	ND	ND	ND
547	Glyphosate	OCWD	ND	ND	ND	ND
548.1	Endothall	Weck Lab	ND	ND	ND	ND
549.2	Diquat and Paraquat	OCWD	ND	ND	ND	ND
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND - Detections	ND - Detections	ND - Detections	ND - Detections
552.2	Disinfection Byproducts (DBPs) - Haloacetic Acids	OCWD	ND	ND	ND	ND
556	Determination of Carbonyl Compounds	Weck Lab	ND < NL	ND < NL	ND < NL	ND < NL
625.1	Semi-Volatile Organic Compounds, including Priority Pollutants	Eurf CalSc. / Weck Lab	ND	ND	ND	ND
8015B	Nonhalogenated Organics	Weck Lab	ND	ND	ND	ND
8081A_LL	Chlorine Containing Pesticides	Eurofins CalScience	ND	ND	Not Required	Not Required
8270C	Semivolatile Organics	Weck Lab	ND	ND	ND	ND
8330A	Nitroaromatics and Nitramines	EurDenver / Weck Lab	ND	ND	ND	ND
CEC	Chemicals of Emerging Concern	OCWD	ND	ND	ND	ND
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

GWRS-FPW
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
1/6/2023	8:00	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
1/6/2023	8:00	Chloroform (CHCl3)	0.8	ug/L	0.5
1/6/2023	8:00	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5
1/11/2023	9:15	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5
1/11/2023	9:15	Chloroform (CHCl3)	1.9	ug/L	0.5
1/11/2023	9:15	Total Trihalomethanes (TTHMs)	2.6	ug/L	0.5
1/13/2023	7:45	Bromodichloromethane (CHBrCl)	1.1	ug/L	0.5
1/13/2023	7:45	Chloroform (CHCl3)	2.8	ug/L	0.5
1/13/2023	7:45	Total Trihalomethanes (TTHMs)	4	ug/L	0.5
1/20/2023	8:45	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
1/20/2023	8:45	Chloroform (CHCl3)	2.5	ug/L	0.5
1/20/2023	8:45	Total Trihalomethanes (TTHMs)	3.3	ug/L	0.5
1/27/2023	8:37	Bromodichloromethane (CHBrCl)	0.8	ug/L	0.5
1/27/2023	8:37	Chloroform (CHCl3)	1.9	ug/L	0.5
1/27/2023	8:37	Total Trihalomethanes (TTHMs)	2.7	ug/L	0.5
2/3/2023	8:10	Bromodichloromethane (CHBrCl)	0.9	ug/L	0.5
2/3/2023	8:10	Chloroform (CHCl3)	2.3	ug/L	0.5
2/3/2023	8:10	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
2/3/2023	8:10	Total Trihalomethanes (TTHMs)	3.2	ug/L	0.5
2/10/2023	7:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/10/2023	7:55	Chloroform (CHCl3)	1.3	ug/L	0.5
2/10/2023	7:55	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
2/10/2023	7:55	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5
2/17/2023	8:29	Chloroform (CHCl3)	TR	ug/L	0.5
2/17/2023	8:29	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5
2/24/2023	8:26	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
2/24/2023	8:26	Chloroform (CHCl3)	2.5	ug/L	0.5
2/24/2023	8:26	Total Trihalomethanes (TTHMs)	3.1	ug/L	0.5
3/3/2023	8:37	Bromodichloromethane (CHBrCl)	1.1	ug/L	0.5
3/3/2023	8:37	Chloroform (CHCl3)	3.6	ug/L	0.5
3/3/2023	8:37	Total Trihalomethanes (TTHMs)	4.7	ug/L	0.5
3/10/2023	7:30	Bromodichloromethane (CHBrCl)	1	ug/L	0.5
3/10/2023	7:30	Chloroform (CHCl3)	3.5	ug/L	0.5
3/10/2023	7:30	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
3/10/2023	7:30	Total Trihalomethanes (TTHMs)	4.5	ug/L	0.5
3/17/2023	8:45	Bromodichloromethane (CHBrCl)	0.9	ug/L	0.5
3/17/2023	8:45	Chloroform (CHCl3)	2.7	ug/L	0.5
3/17/2023	8:45	Total Trihalomethanes (TTHMs)	3.7	ug/L	0.5

GWRS-FPW
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
3/24/2023	8:00	Bromodichloromethane (CHBrCl)	1	ug/L	0.5
3/24/2023	8:00	Chloroform (CHCl3)	2.5	ug/L	0.5
3/24/2023	8:00	Total Trihalomethanes (TTHMs)	3.5	ug/L	0.5
3/31/2023	8:56	Bromodichloromethane (CHBrCl)	1.3	ug/L	0.5
3/31/2023	8:56	Chloroform (CHCl3)	3.4	ug/L	0.5
3/31/2023	8:56	Total Trihalomethanes (TTHMs)	4.7	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/11/2023	9:15	Bromochloroacetonitrile (BCAN)	0.2	ug/L	0.1
1/11/2023	9:15	Dichloroacetonitrile (DCAN)	0.4	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/11/2023	9:15	Formaldehyde (FORALD)	8.8	ug/L	2

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/17/2023	8:29	n-Nitrosodimethylamine (NDMA)	2.7	ng/L	2
3/17/2023	8:45	n-Nitrosodimethylamine (NDMA)	2.8	ng/L	2
3/24/2023	8:00	n-Nitrosodimethylamine (NDMA)	2.7	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/5/2023	9:20	Bromodichloromethane (CHBrCl)	1.5	ug/L	0.5
4/5/2023	9:20	Chloroform (CHCl3)	3.2	ug/L	0.5
4/5/2023	9:20	Total Trihalomethanes (TTHMs)	4.7	ug/L	0.5
4/7/2023	8:10	Bromodichloromethane (CHBrCl)	1	ug/L	0.5
4/7/2023	8:10	Chloroform (CHCl3)	2.5	ug/L	0.5
4/7/2023	8:10	Total Trihalomethanes (TTHMs)	3.6	ug/L	0.5
4/14/2023	7:40	Bromodichloromethane (CHBrCl)	0.7	ug/L	0.5

GWRS-FPW
Organic Detections by Method

Year 2023, Quarter 2

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
4/14/2023	7:40	Chloroform (CHCl3)	1.6	ug/L	0.5
4/14/2023	7:40	Total Trihalomethanes (TTHMs)	2.3	ug/L	0.5
4/21/2023	7:40	Acetone (ACETNE)	17.4	ug/L	10
4/21/2023	7:40	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
4/21/2023	7:40	Chloroform (CHCl3)	0.9	ug/L	0.5
4/21/2023	7:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
4/21/2023	7:40	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5
4/28/2023	7:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
4/28/2023	7:55	Chloroform (CHCl3)	0.8	ug/L	0.5
4/28/2023	7:55	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5
5/5/2023	7:40	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/5/2023	7:40	Chloroform (CHCl3)	0.8	ug/L	0.5
5/5/2023	7:40	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5
5/12/2023	7:30	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
5/12/2023	7:30	Chloroform (CHCl3)	0.8	ug/L	0.5
5/12/2023	7:30	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5
5/19/2023	7:35	Bromodichloromethane (CHBrCl)	0.5	ug/L	0.5
5/19/2023	7:35	Chloroform (CHCl3)	0.9	ug/L	0.5
5/19/2023	7:35	Methylene Chloride (CH2Cl2)	0.5	ug/L	0.5
5/19/2023	7:35	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5
5/26/2023	7:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/26/2023	7:20	Chloroform (CHCl3)	0.7	ug/L	0.5
5/26/2023	7:20	Methylene Chloride (CH2Cl2)	1.2	ug/L	0.5
5/26/2023	7:20	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5
6/2/2023	7:10	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
6/2/2023	7:10	Chloroform (CHCl3)	0.8	ug/L	0.5
6/2/2023	7:10	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
6/2/2023	7:10	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5
6/9/2023	8:15	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
6/9/2023	8:15	Chloroform (CHCl3)	0.9	ug/L	0.5
6/9/2023	8:15	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5
6/16/2023	7:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
6/16/2023	7:20	Chloroform (CHCl3)	0.6	ug/L	0.5
6/16/2023	7:20	Methylene Chloride (CH2Cl2)	0.8	ug/L	0.5
6/16/2023	7:20	Total Trihalomethanes (TTHMs)	0.6	ug/L	0.5

GWRS-FPW
Organic Detections by Method

Year 2023, Quarter 2

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/5/2023	9:20	Bromochloroacetonitrile (BCAN)	0.3	ug/L	0.1
4/5/2023	9:20	Dichloroacetonitrile (DCAN)	0.6	ug/L	0.1

METHOD: 556

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/5/2023	9:20	Acetaldehyde (ACEALD)	7.2	ug/L	2
4/5/2023	9:20	Formaldehyde (FORALD)	13	ug/L	2

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/7/2023	8:10	n-Nitrosodimethylamine (NDMA)	2.9	ng/L	2
4/14/2023	7:40	n-Nitrosodimethylamine (NDMA)	2.9	ng/L	2
4/21/2023	7:40	n-Nitrosodimethylamine (NDMA)	2.3	ng/L	2
4/28/2023	7:55	n-Nitrosodimethylamine (NDMA)	2.3	ng/L	2
5/5/2023	7:40	n-Nitrosodimethylamine (NDMA)	2.5	ng/L	2
6/2/2023	7:10	n-Nitrosodimethylamine (NDMA)	2.2	ng/L	2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/12/2023	9:05	Bromodichloromethane (CHBrCl)	0.5	ug/L	0.5
7/12/2023	9:05	Chloroform (CHCl3)	0.8	ug/L	0.5
7/12/2023	9:05	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
7/12/2023	9:05	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

METHOD: 551.1

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/12/2023	9:05	Bromochloroacetonitrile (BCAN)	0.2	ug/L	0.1
7/12/2023	9:05	Dichloroacetonitrile (DCAN)	0.3	ug/L	0.1

GWRS-FPW
Organic Detections by Method

Year 2023, Quarter 3

METHOD: 556

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
8/23/2023	9:00	Formaldehyde (FORALD)	14	ug/L	2
8/23/2023	9:00	Glyoxal (GLYOXL)	2.1	ug/L	2

METHOD: NDMA-LOW

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
7/14/2023	8:30	n-Nitrosodimethylamine (NDMA)	3	ng/L	2
7/28/2023	8:45	n-Nitrosodimethylamine (NDMA)	2.3	ng/L	2
8/18/2023	8:25	n-Nitrosodimethylamine (NDMA)	2	ng/L	2

Year 2023, Quarter 4

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/4/2023	10:15	Bromodichloromethane (CHBrCl)	1.9	ug/L	0.5
10/4/2023	10:15	Chloroform (CHCl3)	2.9	ug/L	0.5
10/4/2023	10:15	Dibromochloromethane (CHBr2C)	TR	ug/L	0.5
10/4/2023	10:15	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
10/4/2023	10:15	Total Trihalomethanes (TTHMs)	4.7	ug/L	0.5

METHOD: 551.1

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/4/2023	10:15	Bromochloroacetonitrile (BCAN)	0.4	ug/L	0.1
10/4/2023	10:15	Dichloroacetonitrile (DCAN)	0.6	ug/L	0.1

METHOD: 556

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/4/2023	10:15	Acetaldehyde (ACEALD)	2.4	ug/L	2
10/4/2023	10:15	Formaldehyde (FORALD)	15	ug/L	2

METHOD: NDMA-LOW

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/6/2023	7:35	n-Nitrosodimethylamine (NDMA)	2.4	ng/L	2

Appendix B

Laboratory Methods of Analysis

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

Laboratory Method: 100.2

Laboratory: EUROFINS CEI, INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Asbestos (ASBESTOS)	0.18	MFL

Laboratory Method: 14DIOX

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
1,2,3-Trichloropropane (123TCP)	0.005	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.005	ug/L
1,4-Dioxane (14DIOX)	0.5	ug/L
2-Chloroethylvinyl ether (2ClEVE)	1	ug/L
Methylisothiocyanate (MITC)	0.05	ug/L

Laboratory Method: 1600

Laboratory: O.C. HEALTH CARE AGENCY

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Enterococcus(Membrane Filtration-CFU/100ml) (ENTRCC)	1	CFU/100

Laboratory Method: 1601

Laboratory: CEL ANALYTICAL INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Bacteriophage, Male Specific (BACTMLSP)	0	P/A PERL
Bacteriophage, Somatic (BACTSOMT)	0	P/A PERL

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2023

Laboratory Method: 1601

Laboratory: O.C. HEALTH CARE AGENCY

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Bacteriophage, Male Specific (BACTMLSP)	1	P/A PERL
Bacteriophage, Somatic (BACTSOMT)	1	P/A PERL

Laboratory Method: 1602

Laboratory: CEL ANALYTICAL INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Somatic Phage (SOMPHAGE)	1	pfu/100

Laboratory Method: 1613B

Laboratory: EUROFINS SACRAMENTO

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	4.8	pg/L

Laboratory Method: 2120B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Apparent Color (unfiltered) (APCOLR)	3 - 6	UNITS
True Color (filtered) (TRCOLR)	3 - 6	UNITS

Laboratory Method: 2130B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Turbidity (TURB)	0.1	NTU

Laboratory Method: 2150B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Threshold Odor Number (Median) (ODOR)	0	TON

Laboratory Method: 2320B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Alkalinity-Phenolphthalein (ALKPHE)	1	mg/L
Bicarbonate (as CaCO3) (HCO3Ca)	1	mg/L
Carbonate (as CaCO3) (CO3Ca)	1	mg/L
Hydroxide (as CaCO3) (OHCa)	1	mg/L
Total Alkalinity (as CaCO3) (TOTALK)	1	mg/L

Laboratory Method: 2330B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Corrosivity (CORROS)	-100	S.I.

Laboratory Method: 2510B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Electrical Conductivity (EC)	1	uS/cm

Laboratory Method: 2540C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Dissolved Solids (TDS)	2.5	mg/L

Laboratory Method: 2540D

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Suspended Solids (SUSSOL)	2.5	mg/L

Laboratory Method: 300.1B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Bromate (BrO3)	5	ug/L
Bromide (Br)	0.01 - 0.04	mg/L
Chlorate (CLO3)	10	ug/L
Chlorite (CLO2)	10	ug/L

Laboratory Method: 332.0

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Perchlorate (CLO4)	2	ug/L

Laboratory Method: 350.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Ammonia Nitrogen (NH3-N)	0.1 - 1	mg/L

Laboratory Method: 350.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Inorganic Nitrogen (TIN)	0.1	mg/L

Laboratory Method: 365.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Phosphate Phosphorus (orthophosphate) (PO4-P)	0.01 - 0.02	mg/L

Laboratory Method: 4500CLF

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Free Chlorine (FRCL2)	0.1 - 0.2	mg/L
Total Chlorine (TOTCL2)	0.1 - 0.2	mg/L

Laboratory Method: 4500H+B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
pH (pH)	1	UNITS
Temperature (Laboratory) (TEMP)	1	C

Laboratory Method: 4500H2O2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Hydrogen Peroxide (H2O2)	0.1 - 0.2	mg/L

Laboratory Method: 4500NO3F

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Nitrate (NO3)	0.8	mg/L
Nitrate Nitrogen (NO3-N)	0.1 - 0.2	mg/L
Nitrite Nitrogen (NO2-N)	0.002 - 0.01	mg/L

Laboratory Method: 4500SIOC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Silica (SIO2)	1	mg/L

Laboratory Method: 504.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,2,3-Trichloropropane (123TCP)	0.05	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.01	ug/L

Laboratory Method: 508.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
4,4'-DDD (DDD)	0.01	ug/L
4,4'-DDE (DDE)	0.01	ug/L
4,4'-DDT (DDT)	0.01	ug/L
Aldrin (ALDRIN)	0.01	ug/L
Chlordane (ClDANE)	0.1	ug/L
Chlorothalonil (CLTNIL)	0.05	ug/L
Dieldrin (DIELDR)	0.01	ug/L

Laboratory Method: 508.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Endosulfan I (ENDOI)	0.01	ug/L
Endosulfan II (ENDOII)	0.01	ug/L
Endosulfan sulfate (ENDOSL)	0.01	ug/L
Endrin (ENDRIN)	0.01	ug/L
Endrin Aldehyde (ENDR-A)	0.01	ug/L
HCH-alpha (Alpha-BHC) (BHCa)	0.01	ug/L
HCH-beta (Beta-BHC) (BHCb)	0.01	ug/L
HCH-delta (Delta-BHC) (BHCd)	0.01	ug/L
HCH-gamma (Lindane) (LINDNE)	0.01	ug/L
Heptachlor (HEPTA)	0.01	ug/L
Heptachlor epoxide (HEPEPX)	0.01	ug/L
Hexachlorobenzene (HEXCLB)	0.05	ug/L
Hexachlorocyclopentadiene (HClCPD)	0.05 - 0.2	ug/L
Methoxychlor (METHOX)	0.01	ug/L
PCB-1016 (PCB16)	0.1	ug/L
PCB-1221 (PCB21)	0.1	ug/L
PCB-1232 (PCB32)	0.1	ug/L
PCB-1242 (PCB42)	0.1	ug/L
PCB-1248 (PCB48)	0.1	ug/L
PCB-1254 (PCB54)	0.1	ug/L
PCB-1260 (PCB60)	0.1	ug/L
PCBs, Total (TOTPCB)	0.5	ug/L
Propachlor (PROPCL)	0.05 - 0.2	ug/L
Toxaphene Mixture (TOXA)	1	ug/L
Trifluralin (TRFLRN)	0.01	ug/L

Laboratory Method: 515.4

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,4,5-T (245T)	0.2	ug/L
2,4,5-TP (Silvex) (245TP)	0.2	ug/L

Laboratory Method: 515.4

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,4-DB (24DB)	2	ug/L
2,4-Dichlorophenoxyacetic Acid (24D)	0.4	ug/L
3,5-Dichlorobenzoic Acid (35DBA)	1	ug/L
Acifluorfen (ACIFEN)	0.4	ug/L
Bentazon (BENTAZ)	2	ug/L
Dalapon (DALAPN)	0.4	ug/L
DCPA-Dacthal (DCPA)	0.1	ug/L
Dicamba (DICAMB)	0.6	ug/L
Dichlorprop (24DP)	0.3	ug/L
Dinoseb (DINOSB)	0.4	ug/L
Pentachlorophenol (PCP) (PCP)	0.2	ug/L
Picloram (PICLOR)	0.6	ug/L

Laboratory Method: 5210B

Laboratory: EUROFINS CALSCIENCE TUSTIN

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Biochemical Oxygen Demand (BOD)	2	mg/L

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Biochemical Oxygen Demand (BOD)	2	mg/L

Laboratory Method: 522

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,4-Dioxane (14DIOX)	0.07	ug/L

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2023

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
1,1,1,2-Tetrachloroethane (1112PC)	0.5	ug/L
1,1,1-Trichloroethane (111TCA)	0.5	ug/L
1,1,2,2-Tetrachloroethane (1122PC)	0.5	ug/L
1,1,2-Trichloroethane (112TCA)	0.5	ug/L
1,1-Dichloroethane (11DCA)	0.5	ug/L
1,1-Dichloroethene (11DCE)	0.5	ug/L
1,1-Dichloropropene (11DCP)	0.5	ug/L
1,2,3-Trichlorobenzene (123TCB)	0.5	ug/L
1,2,3-Trichloropropane (123TCP)	0.5	ug/L
1,2,4-Trichlorobenzene (124TCB)	0.5	ug/L
1,2,4-Trimethylbenzene (124TMB)	0.5	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.5	ug/L
1,2-Dibromoethane (EDB)	0.5	ug/L
1,2-Dichlorobenzene (12DCB)	0.5	ug/L
1,2-Dichloroethane (12DCA)	0.5	ug/L
1,2-Dichloropropane (12DCP)	0.5	ug/L
1,3,5-Trimethylbenzene (135TMB)	0.5	ug/L
1,3-Dichlorobenzene (13DCB)	0.5	ug/L
1,3-Dichloropropane (13DCP)	0.5	ug/L
1,4-Dichlorobenzene (14DCB)	0.5	ug/L
2,2-Dichloropropane (22DCP)	0.5	ug/L
2-Chlorotoluene (2CLTOL)	0.5	ug/L
4-Chlorotoluene (4CLTOL)	0.5	ug/L
4-Isopropyltoluene (4IPTOL)	0.5	ug/L
Acetone (ACETNE)	10	ug/L
Acrolein (ACROLN)	5	ug/L
Acrylonitrile (ACRYLO)	2	ug/L
Benzene (BENZ)	0.5	ug/L
bis (2-chloroethyl) ether (B2CLEE)	2.5	ug/L
Bromobenzene (BRBENZ)	0.5	ug/L
Bromochloromethane (CH2BrC)	0.5	ug/L
Bromodichloromethane (CHBrCl)	0.5	ug/L
Bromoform (CHBr3)	0.5	ug/L
Bromomethane (CH3Br)	0.5	ug/L

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Carbon Disulfide (CS2)	0.5	ug/L
Carbon tetrachloride (CCl4)	0.5	ug/L
Chlorobenzene (CLBENZ)	0.5	ug/L
Chlorodifluoromethane (FREN22)	0.5	ug/L
Chloroethane (ClETHA)	0.5	ug/L
Chloroform (CHCl3)	0.5	ug/L
Chloromethane (CH3Cl)	0.5	ug/L
cis-1,2-Dichloroethene (c12DCE)	0.5	ug/L
cis-1,3-Dichloropropene (c13DCP)	0.5	ug/L
Dibromochloromethane (CHBr2C)	0.5	ug/L
Dibromomethane (CH2Br2)	0.5	ug/L
Dichlorodifluoromethane (CCl2F2)	0.5	ug/L
Diisopropyl ether (DIPE)	1	ug/L
Ethyl tert-butyl ether (ETBE)	1	ug/L
Ethylbenzene (EtBENZ)	0.5	ug/L
Freon 123a (FR123A)	0.5 - 2	ug/L
Hexachlorobutadiene (HClBut)	0.5	ug/L
Isopropylbenzene (ISPBNZ)	0.5	ug/L
m,p-Xylene (mp-XYL)	0.5	ug/L
Methyl Ethyl Ketone (MEK) (MEK)	2.5	ug/L
Methyl Isobutyl Ketone (MIBK) (MIBK)	2.5	ug/L
Methyl tert-butyl ether (MTBE)	0.2	ug/L
Methylene Chloride (CH2Cl2)	0.5	ug/L
Naphthalene (NAP)	0.5	ug/L
n-Butylbenzene (nBBENZ)	0.5	ug/L
o-Xylene (o-XYL)	0.5	ug/L
Propylbenzene (PRPBNZ)	0.5	ug/L
sec-Butylbenzene (sBBENZ)	0.5	ug/L
Styrene (STYR)	0.5	ug/L
Tert-amyl methyl ether (TAME)	1	ug/L
tert-butyl alcohol (TBA)	2	ug/L
tert-Butylbenzene (tBBENZ)	0.5	ug/L
Tetrachloroethene (PCE)	0.5	ug/L
Toluene (TOLU)	0.5	ug/L

Laboratory Method: 524.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total 1,3-Dichloropropene (x13DCP)	0.5	ug/L
Total Trihalomethanes (TTHMs)	0.5	ug/L
Total Xylenes (m,p,&o) (TOTALX)	0.5	ug/L
trans-1,2 Dichloroethene (t12DCE)	0.5	ug/L
trans-1,3-Dichloropropene (t13DCP)	0.5	ug/L
Trichloroethene (TCE)	0.5	ug/L
Trichlorofluoromethane (Freon 11) (CCl3F)	0.5	ug/L
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)	0.5	ug/L
Vinyl chloride (VNYLCL)	0.5	ug/L

Laboratory Method: 524M-TCP

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,2,3-Trichloropropane (123TCP)	0.005	ug/L
1,2-Dibromo-3-chloropropane (DBCP)	0.01	ug/L
1,2-Dibromoethane (EDB)	0.005	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,4-Dinitrotoluene (24DNT)	0.1	ug/L
2,6-Dinitrotoluene (26DNT)	0.1	ug/L
4,4'-DDD (DDD)	0.1	ug/L
4,4'-DDE (DDE)	0.1	ug/L
4,4'-DDT (DDT)	0.1	ug/L
Acenaphthene (ACNAPE)	0.1	ug/L
Acenaphthylene (ACENAP)	0.1	ug/L
Acetochlor (ACETOC)	0.1	ug/L
Alachlor (ALACHL)	0.1	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Aldrin (ALDRIN)	0.1	ug/L
Ametryn (AMERYN)	0.1	ug/L
Anthracene (ANTHRA)	0.1	ug/L
Atrazine (ATRAZ)	0.1	ug/L
Benzo(a)anthracene (BaANTH)	0.1	ug/L
Benzo(a)pyrene (BaPYRE)	0.1	ug/L
Benzo(b)fluoranthene (BbFLUR)	0.1	ug/L
Benzo(g,h,i)perylene (BghiPR)	0.1	ug/L
Benzo[k]fluoranthene (BkFLUR)	0.1	ug/L
bis (2-ethylhexyl) adipate (DEHA)	2	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	2	ug/L
Bromacil (BROMAC)	0.1	ug/L
Butachlor (BUTACL)	0.1	ug/L
Butylate (BTYATE)	0.1	ug/L
Butylbenzyl phthalate (BBP)	2	ug/L
Caffeine (CAFFEI)	100	ng/L
Captan (CAPTAN)	0.1	ug/L
Chlordane-alpha (CLDA)	0.1	ug/L
Chlordane-gamma (CLDG)	0.1	ug/L
Chlorobenzilate (CLBZLA)	0.1	ug/L
Chloroneb (CLNEB)	0.1	ug/L
Chlorothalonil (CLTNIL)	0.1	ug/L
Chlorpropham (CPRPHM)	0.1	ug/L
Chlorpyrifos (ClPYRI)	0.1	ug/L
Chrysene (CHRYS)	0.1	ug/L
DCPA-Dacthal (DCPA)	0.1	ug/L
Diazinon (DIAZI)	0.1	ug/L
Dibenzo(a,h)anthracene (DBahAN)	0.1	ug/L
Dichlorvos (DCLVOS)	0.1	ug/L
Dieldrin (DIELDR)	0.1	ug/L
Diethyl phthalate (DEP)	2	ug/L
Dimethoate (DMTH)	1	ug/L
Dimethyl phthalate (DMP)	2	ug/L
Di-n-butylphthalate (DnBP)	2	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Di-n-octyl phthalate (DnOP)	2	ug/L
Diphenamid (DPHNMD)	0.1	ug/L
Endosulfan I (ENDOI)	0.1	ug/L
Endosulfan II (ENDOII)	0.1	ug/L
Endosulfan sulfate (ENDOSL)	0.1	ug/L
Endrin (ENDRIN)	0.1	ug/L
Endrin Aldehyde (ENDR-A)	0.1	ug/L
EPTC (EPTC)	0.1	ug/L
Ethion (ETHION)	0.1	ug/L
Ethoprop (ETHPRP)	0.1	ug/L
Etridiazole (ETRDZL)	0.1	ug/L
Fluoranthene (FLANTH)	0.1	ug/L
Fluorene (FLUOR)	0.1	ug/L
HCH-alpha (Alpha-BHC) (BHCa)	0.1	ug/L
HCH-beta (Beta-BHC) (BHCb)	0.1	ug/L
HCH-delta (Delta-BHC) (BHCd)	0.1	ug/L
HCH-gamma (Lindane) (LINDNE)	0.1	ug/L
Heptachlor (HEPTA)	0.1	ug/L
Heptachlor epoxide (HEPEPX)	0.1	ug/L
Hexachlorobenzene (HEXCLB)	0.1	ug/L
Hexachlorocyclopentadiene (HClCPD)	0.1	ug/L
Hexazinone (HEXZON)	0.1	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	0.1	ug/L
Isophorone (IPHOR)	0.1	ug/L
Malathion (MALATH)	2	ug/L
Methoxychlor (METHOX)	0.1	ug/L
methyl-Parathion (MPARA)	0.5	ug/L
Metolachlor (METOCL)	0.1	ug/L
Metribuzin (MTRBZN)	0.1	ug/L
Molinate (MOLINT)	0.1	ug/L
Naphthalene (NAP)	0.1	ug/L
Norflurazon (NORFLR)	1	ug/L
Parathion (PARA)	0.5	ug/L
Pentachlorophenol (PCP) (PCP)	1	ug/L

Laboratory Method: 525.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Permethrin-(total of cis/trans) (PMTHRN)	0.1	ug/L
Phenanthrene (PHENAN)	0.1	ug/L
Prometryn (PROMET)	0.1	ug/L
Pronamide (PROAMD)	0.1	ug/L
Propachlor (PROPCL)	0.1	ug/L
Propazine (PROPAZ)	0.1	ug/L
Pyrene (PYRENE)	0.1	ug/L
Simazine (SIMAZ)	0.1	ug/L
Tebuthiuron (TBTURN)	2	ug/L
Terbacil (TRBACL)	0.1	ug/L
Terbufos Sulfone (TERSUL)	0.1	ug/L
Thiobencarb (THIO)	0.1	ug/L
Trifluralin (TRFLRN)	0.1	ug/L
Trithion (TRTION)	0.1	ug/L

Laboratory Method: 531.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
1-Naphthol (NPTHOL)	5	ug/L
3-Hydroxycarbofuran (HYDCFR)	2	ug/L
Aldicarb (ALDI)	1	ug/L
Aldicarb sulfone (ALDISN)	2	ug/L
Aldicarb sulfoxide (ALDISX)	2	ug/L
Baygon (BAYGON)	1	ug/L
Carbaryl (CARBAR)	2	ug/L
Carbofuran (CARBOF)	1	ug/L
Methiocarb (MTHCRB)	4	ug/L
Methomyl (MTHOMY)	1	ug/L
Oxamyl (OXAMYL)	2	ug/L

Laboratory Method: 5310C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Dissolved Organic Carbon (DOC)	0.05	mg/L
Total Organic Carbon (Unfiltered) (TOC)	0.05	mg/L

Laboratory Method: 533

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	2	ng/L
11-chloroeicosafluoro3oxaundecane1sulfonicacid-FRB (B-11CLPF)	2	ng/L
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	2	ng/L
4,8-dioxa-3H-perfluorononanoic acid (FRB) (B-ADONA)	2	ng/L
4:2 Fluorotelomer sulfonate (4:2FTS)	2	ng/L
4:2 Fluorotelomer sulfonate (FRB) (B-4:2FTS)	2	ng/L
6:2 Fluorotelomer sulfonate (6:2FTS)	2	ng/L
6:2 Fluorotelomer sulfonate (FRB) (B-6:2FTS)	2	ng/L
8:2 Fluorotelomer sulfonate (8:2FTS)	2	ng/L
8:2 Fluorotelomer sulfonate (FRB) (B-8:2FTS)	2	ng/L
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	2	ng/L
9-chlorohexadecafluoro-3-oxanone1sulfonic acid-FRB (B-9CLPF3)	2	ng/L
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	2	ng/L
Hexafluoropropylene oxide dimer acid (GenX) (FRB) (B-HFPODA)	2	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	2	ng/L
Nonafluoro-3,6-dioxaheptanoic acid (FRB) (B-NFDHA)	2	ng/L
Perfluoro butane sulfonic acid (PFBS)	2	ng/L
Perfluoro butane sulfonic acid (FRB) (B-PFBS)	2	ng/L
Perfluoro heptanoic acid (PFHpA)	2	ng/L
Perfluoro heptanoic acid (FRB) (B-PFHpA)	2	ng/L
Perfluoro hexane sulfonic acid (PFHxS)	2	ng/L
Perfluoro hexane sulfonic acid (FRB) (B-PFHxS)	2	ng/L
Perfluoro nonanoic acid (PFNA)	2	ng/L
Perfluoro nonanoic acid (FRB) (B-PFNA)	2	ng/L
Perfluoro octane sulfonic acid (PFOS)	2	ng/L

Laboratory Method: 533

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Perfluoro octane sulfonic acid (FRB) (B-PFOS)	2	ng/L
Perfluoro octanoic acid (PFOA)	2	ng/L
Perfluoro octanoic acid (FRB) (B-PFOA)	2	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	2	ng/L
Perfluoro(2-ethoxyethane)sulfonic acid FRB) (B-PFEESA)	2	ng/L
Perfluoro-3-methoxypropanoic acid (PFMPA)	2	ng/L
Perfluoro-3-methoxypropanoic acid (FRB) (B-PFMPA)	2	ng/L
Perfluoro-4-methoxybutanoic acid (PFMBA)	2	ng/L
Perfluoro-4-methoxybutanoic acid (FRB) (B-PFMBA)	2	ng/L
Perfluorobutanoic acid (PFBA)	2	ng/L
Perfluorobutanoic acid (FRB) (B-PFBA)	2	ng/L
Perfluorodecanoic acid (PFDA)	2	ng/L
Perfluorodecanoic acid (FRB) (B-PFDA)	2	ng/L
Perfluorododecanoic acid (PFDoA)	2	ng/L
Perfluorododecanoic acid (FRB) (B-PFDoA)	2	ng/L
Perfluoroheptanesulfonic Acid (PFHpS)	2	ng/L
Perfluoroheptanesulfonic Acid (FRB) (B-PFHpS)	2	ng/L
Perfluorohexanoic acid (PFHxA)	2	ng/L
Perfluorohexanoic acid (FRB) (B-PFHxA)	2	ng/L
Perfluoropentanesulfonic acid (PFPeS)	2	ng/L
Perfluoropentanesulfonic acid (FRB) (B-PFPeS)	2	ng/L
Perfluoropentanoic acid (PFPeA)	2	ng/L
Perfluoropentanoic acid (FRB) (B-PFPeA)	2	ng/L
Perfluoroundecanoic acid (PFUnA)	2	ng/L
Perfluoroundecanoic acid (FRB) (B-PFUnA)	2	ng/L

Laboratory Method: 537.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	2	ng/L
N-ethyl perfluorooctanesulfonamidoacetic acid(FRB) (B-EtFOSA)	2	ng/L

Laboratory Method: 537.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	2	ng/L
N-methyl perfluorooctanesulfonamidoacetic acid-FRB (B-MeFOSA)	2	ng/L
Perfluorotetradecanoic acid (PFTA)	2	ng/L
Perfluorotetradecanoic acid (FRB) (B-PFTA)	2	ng/L
Perfluorotridecanoic acid (PFTrDA)	2	ng/L
Perfluorotridecanoic acid (FRB) (B-PFTrDA)	2	ng/L

Laboratory Method: 547

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Glyphosate (GLYPHO)	25	ug/L

Laboratory Method: 548.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Endothall (ENDOTL)	45	ug/L

Laboratory Method: 549.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Diquat (DIQUAT)	4	ug/L
Paraquat (PARAQT)	4	ug/L

Laboratory Method: 551.1

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,1,1-Trichloropropanone (111TCP)	0.1	ug/L
1,1-Dichloro-2-propanone (11DC2P)	0.1	ug/L
Bromochloroacetonitrile (BCAN)	0.1	ug/L
Chloropicrin (ClPICR)	0.1	ug/L
Dibromoacetonitrile (DBAN)	0.1	ug/L
Dichloroacetonitrile (DCAN)	0.1	ug/L
Trichloroacetonitrile (TCAN)	0.1	ug/L

Laboratory Method: 552.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Bromochloroacetic Acid (BCAA)	1	ug/L
Bromodichloroacetic Acid (BDCAA)	1	ug/L
Chlorodibromoacetic Acid (CDBAA)	1	ug/L
Dalapon (DALAPN)	1	ug/L
Dibromoacetic Acid (DBAA)	1	ug/L
Dichloroacetic Acid (DCAA)	1	ug/L
Monobromoacetic Acid (MBAA)	1	ug/L
Monochloroacetic Acid (MCAA)	1	ug/L
Tribromoacetic Acid (TBAA)	1	ug/L
Trichloroacetic Acid (TCAA)	1	ug/L

Laboratory Method: 5540C

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Surfactants (MBAS)	0.02 - 0.04	mg/L

Laboratory Method: 556

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Acetaldehyde (ACEALD)	2	ug/L
Benzaldehyde (BENALD)	2	ug/L
Butanal (BUTAN)	2	ug/L
Crotonaldehyde (CRTALD)	2	ug/L
Cyclohexanone (CYCHXN)	2	ug/L
Decanal (DECNAL)	2	ug/L
Formaldehyde (FORALD)	2	ug/L
Glyoxal (GLYOXL)	2	ug/L
Heptanal (HEPNAL)	2	ug/L
Hexanal (HEXNAL)	2	ug/L
Methylglyoxal (MGLYOX)	2	ug/L
Nonanal (NONNAL)	2	ug/L
Pentanal (PENTNL)	2	ug/L
Propanal (PROPNL)	2	ug/L

Laboratory Method: 5910B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Ultraviolet (absorbance) (UVAB)	0.005	1/cm
Ultraviolet percent transmittance @254nm (UV%T-254)	0.1	%
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	0.0001	L/mg-cm

Laboratory Method: 625.1

Laboratory: EUROFINS CALSCIENCE TUSTIN

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,2,4-Trichlorobenzene (124TCB)	9.6	ug/L
1,2-Dichlorobenzene (12DCB)	9.6	ug/L
1,2-Diphenylhydrazine (12DPH)	9.6	ug/L
1,3-Dichlorobenzene (13DCB)	9.6	ug/L

Laboratory Method: 625.1

Laboratory: EUROFINS CALSCIENCE TUSTIN

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,4-Dichlorobenzene (14DCB)	9.6	ug/L
2,4,5-Trichlorophenol (245TCP)	9.6	ug/L
2,4,6-Trichlorophenol (246TCP)	9.6	ug/L
2,4-Dichlorophenol (24DCPH)	9.6	ug/L
2,4-Dimethylphenol (24DMP)	9.6	ug/L
2,4-Dinitrophenol (24DNP)	48	ug/L
2,4-Dinitrotoluene (24DNT)	9.6	ug/L
2,6-Dinitrotoluene (26DNT)	9.6	ug/L
2-Chloronaphthalene (2ClNAP)	9.6	ug/L
2-Chlorophenol (2ClPNL)	9.6	ug/L
2-Methyl naphthalene (2MNAP)	9.6	ug/L
2-Methyl-4,6-Dinitrophenol (2MDNP)	48	ug/L
2-Methylphenol (oCRESL)	9.6	ug/L
2-Nitroaniline (oNTANL)	9.6	ug/L
2-Nitrophenol (2NPNL)	9.6	ug/L
3,3'-Dichlorobenzidine (DCBZDE)	9.6	ug/L
3-Nitroaniline (mNTANL)	9.6	ug/L
4-Bromophenyl phenyl ether (4BrPPE)	9.6	ug/L
4-Chloro-3-methylphenol (43CMP)	9.6	ug/L
4-Chloroaniline (pClANL)	9.6	ug/L
4-Chlorophenyl phenyl ether (4ClPPE)	9.6	ug/L
4-Nitroaniline (pNTANL)	9.6	ug/L
4-Nitrophenol (4NPNL)	9.6	ug/L
Acenaphthene (ACNAPE)	9.6	ug/L
Acenaphthylene (ACENAP)	9.6	ug/L
Aniline (ANLN)	9.6	ug/L
Anthracene (ANTHRA)	9.6	ug/L
Benzidine (BNZDE)	48	ug/L
Benzo(a)anthracene (BaANTH)	9.6	ug/L
Benzo(a)pyrene (BaPYRE)	9.6	ug/L
Benzo(b)fluoranthene (BbFLUR)	9.6	ug/L
Benzo(g,h,i)perylene (BghiPR)	9.6	ug/L
Benzo[k]fluoranthene (BkFLUR)	9.6	ug/L
Benzoic Acid (BNZACD)	48	ug/L

Laboratory Method: 625.1

Laboratory: EUROFINS CALSCIENCE TUSTIN

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Benzyl Alcohol (BNZALC)	9.6	ug/L
bis (2-chloroethoxy) methane (B2CEM)	9.6	ug/L
bis (2-chloroethyl) ether (B2CLEE)	24	ug/L
bis (2-chloroisopropyl) ether (B2CIPE)	9.6	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	9.6	ug/L
Butylbenzyl phthalate (BBP)	9.6	ug/L
Chrysene (CHRYS)	9.6	ug/L
Dibenzo(a,h)anthracene (DBahAN)	9.6	ug/L
Dibenzofuran (DBFUR)	9.6	ug/L
Diethyl phthalate (DEP)	9.6	ug/L
Dimethyl phthalate (DMP)	9.6	ug/L
Di-n-butylphthalate (DnBP)	9.6	ug/L
Di-n-octyl phthalate (DnOP)	9.6	ug/L
Fluoranthene (FLANTH)	9.6	ug/L
Fluorene (FLUOR)	9.6	ug/L
Hexachlorobenzene (HEXCLB)	9.6	ug/L
Hexachlorobutadiene (HClBut)	9.6	ug/L
Hexachlorocyclopentadiene (HClCPD)	24	ug/L
Hexachloroethane (HCE)	9.6	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	9.6	ug/L
Isophorone (IPHOR)	9.6	ug/L
Naphthalene (NAP)	9.6	ug/L
Nitrobenzene (NBENZ)	24	ug/L
n-Nitroso-di-n-propylamine (NDPA)	9600	ng/L
n-Nitrosodiphenylamine (NDPhA)	9600	ng/L
Pentachlorophenol (PCP) (PCP)	9.6	ug/L
Phenanthrene (PHENAN)	9.6	ug/L
Phenol (PHENOL)	9.6	ug/L
Pyrene (PYRENE)	9.6	ug/L

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,2,4-Trichlorobenzene (124TCB)	1	ug/L

Laboratory Method: 625.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
1,2-Dichlorobenzene (12DCB)	1	ug/L
1,2-Diphenylhydrazine (12DPH)	1	ug/L
1,3-Dichlorobenzene (13DCB)	1	ug/L
1,4-Dichlorobenzene (14DCB)	1	ug/L
2,4,6-Trichlorophenol (246TCP)	1	ug/L
2,4-Dichlorophenol (24DCPH)	1	ug/L
2,4-Dimethylphenol (24DMP)	1	ug/L
2,4-Dinitrophenol (24DNP)	10	ug/L
2,4-Dinitrotoluene (24DNT)	1	ug/L
2,6-Dinitrotoluene (26DNT)	1	ug/L
2-Chloronaphthalene (2ClNAP)	1	ug/L
2-Chlorophenol (2ClPNL)	1	ug/L
2-Methyl-4,6-Dinitrophenol (2MDNP)	5	ug/L
2-Nitrophenol (2NPNL)	1	ug/L
3,3'-Dichlorobenzidine (DCBZDE)	5	ug/L
4-Bromophenyl phenyl ether (4BrPPE)	1	ug/L
4-Chloro-3-methylphenol (43CMP)	1	ug/L
4-Chlorophenyl phenyl ether (4ClPPE)	1	ug/L
4-Nitrophenol (4NPNL)	5	ug/L
Acenaphthene (ACNAPE)	1	ug/L
Acenaphthylene (ACENAP)	1	ug/L
Anthracene (ANTHRA)	1	ug/L
Benzidine (BNZDE)	10	ug/L
Benzo(a)anthracene (BaANTH)	1	ug/L
Benzo(a)pyrene (BaPYRE)	1	ug/L
Benzo(b)fluoranthene (BbFLUR)	1	ug/L
Benzo(g,h,i)perylene (BghiPR)	2	ug/L
Benzo[k]fluoranthene (BkFLUR)	1	ug/L
bis (2-chloroethoxy) methane (B2CEM)	1	ug/L
bis (2-chloroethyl) ether (B2CLEE)	1	ug/L
bis (2-chloroisopropyl) ether (B2CIPE)	1	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	5	ug/L
Butylbenzyl phthalate (BBP)	1	ug/L
Chrysene (CHRYS)	1	ug/L

Laboratory Method: 625.1

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Dibenzo(a,h)anthracene (DBahAN)	2	ug/L
Diethyl phthalate (DEP)	1	ug/L
Dimethyl phthalate (DMP)	1	ug/L
Di-n-butylphthalate (DnBP)	1	ug/L
Di-n-octyl phthalate (DnOP)	1	ug/L
Fluoranthene (FLANTH)	1	ug/L
Fluorene (FLUOR)	1	ug/L
Hexachlorobenzene (HEXCLB)	1	ug/L
Hexachlorobutadiene (HClBut)	1	ug/L
Hexachlorocyclopentadiene (HClCPD)	5	ug/L
Hexachloroethane (HCE)	1	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	2	ug/L
Isophorone (IPHOR)	1	ug/L
Naphthalene (NAP)	1	ug/L
Nitrobenzene (NBENZ)	1	ug/L
n-Nitroso-di-n-propylamine (NDPA)	1000	ng/L
n-Nitrosodiphenylamine (NDPhA)	1000	ng/L
Pentachlorophenol (PCP) (PCP)	1	ug/L
Phenanthrene (PHENAN)	1	ug/L
Phenol (PHENOL)	1	ug/L
Pyrene (PYRENE)	1	ug/L

Laboratory Method: 7110C

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Alpha (TOTa)	1.08	pCi/L
Total Alpha Counting Error (TOTaCE)	1.08	pCi/L

Laboratory Method: 8015B

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Ethylene Glycol (GLYCOL)	10000	ug/L

Laboratory Method: 8081A_LL

Laboratory: EUROFINS CALSCIENCE TUSTIN

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
4,4'-DDD (DDD)	0.0097	ug/L
4,4'-DDE (DDE)	0.0048-0.0049	ug/L
4,4'-DDT (DDT)	0.0048-0.0049	ug/L
Aldrin (ALDRIN)	0.0048-0.0049	ug/L
Chlordane (ClDANE)	0.048 - 0.049	ug/L
Chlordane-alpha (CLDA)	0.0048-0.0049	ug/L
Chlordane-gamma (CLDG)	0.015	ug/L
Dieldrin (DIELDR)	0.0048-0.0049	ug/L
Endosulfan I (ENDOI)	0.0019	ug/L
Endosulfan II (ENDOII)	0.0097	ug/L
Endosulfan sulfate (ENDOSL)	0.0048-0.0049	ug/L
Endrin (ENDRIN)	0.0048-0.0049	ug/L
Endrin Aldehyde (ENDR-A)	0.048 - 0.049	ug/L
Endrin Ketone (ENDR-K)	0.0048-0.0049	ug/L
HCH-alpha (Alpha-BHC) (BHCa)	0.0019	ug/L
HCH-beta (Beta-BHC) (BHCb)	0.0073	ug/L
HCH-delta (Delta-BHC) (BHCd)	0.0048-0.0049	ug/L
HCH-gamma (Lindane) (LINDNE)	0.0019	ug/L
Heptachlor (HEPTA)	0.0019	ug/L
Heptachlor epoxide (HEPEPX)	0.0097	ug/L
Methoxychlor (METHOX)	0.0097	ug/L
Toxaphene Mixture (TOXA)	0.097	ug/L

ORANGE COUNTY WATER DISTRICT
LABORATORY METHODS OF ANALYSES FOR 2023

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
1,2,4-Trichlorobenzene (124TCB)	1 - 5	ug/L
1,2-Dichlorobenzene (12DCB)	1 - 5	ug/L
1,2-Diphenylhydrazine (12DPH)	1 - 5	ug/L
1,3-Dichlorobenzene (13DCB)	1 - 5	ug/L
1,4-Dichlorobenzene (14DCB)	1 - 5	ug/L
2,4,5-Trichlorophenol (245TCP)	1 - 5	ug/L
2,4,6-Trichlorophenol (246TCP)	1 - 5	ug/L
2,4-Dichlorophenol (24DCPH)	1 - 5	ug/L
2,4-Dimethylphenol (24DMP)	1 - 5	ug/L
2,4-Dinitrophenol (24DNP)	10 - 50	ug/L
2,4-Dinitrotoluene (24DNT)	1 - 5	ug/L
2,6-Dinitrotoluene (26DNT)	1 - 5	ug/L
2-Chloronaphthalene (2ClNAP)	1 - 5	ug/L
2-Chlorophenol (2ClPNL)	1 - 5	ug/L
2-Methyl naphthalene (2MNAP)	1 - 5	ug/L
2-Methyl-4,6-Dinitrophenol (2MDNP)	5 - 25	ug/L
2-Methylphenol (oCRESL)	1 - 5	ug/L
2-Nitroaniline (oNTANL)	1 - 5	ug/L
2-Nitrophenol (2NPNL)	1 - 5	ug/L
3- & 4-Methylphenol (mpCRESL)	1 - 5	ug/L
3,3'-Dichlorobenzidine (DCBZDE)	5 - 25	ug/L
3-Nitroaniline (mNTANL)	1 - 5	ug/L
4-Bromophenyl phenyl ether (4BrPPE)	1 - 5	ug/L
4-Chloro-3-methylphenol (43CMP)	1 - 5	ug/L
4-Chloroaniline (pClANL)	1 - 5	ug/L
4-Chlorophenyl phenyl ether (4ClPPE)	1 - 5	ug/L
4-Nitroaniline (pNTANL)	1 - 5	ug/L
4-Nitrophenol (4NPNL)	5 - 25	ug/L
Acenaphthene (ACNAPE)	1 - 5	ug/L
Acenaphthylene (ACENAP)	1 - 5	ug/L
Aniline (ANLN)	1 - 5	ug/L
Anthracene (ANTHRA)	1 - 5	ug/L
Benzidine (BNZDE)	10 - 50	ug/L
Benzo(a)anthracene (BaANTH)	1 - 5	ug/L

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Benzo(a)pyrene (BaPYRE)	1 - 5	ug/L
Benzo(b)fluoranthene (BbFLUR)	1 - 5	ug/L
Benzo(g,h,i)perylene (BghiPR)	2 - 10	ug/L
Benzo[k]fluoranthene (BkFLUR)	1 - 5	ug/L
Benzoic Acid (BNZACD)	100 - 500	ug/L
Benzyl Alcohol (BNZALC)	1 - 5	ug/L
bis (2-chloroethoxy) methane (B2CEM)	1 - 5	ug/L
bis (2-chloroethyl) ether (B2CLEE)	1 - 5	ug/L
bis (2-chloroisopropyl) ether (B2CIPE)	1 - 5	ug/L
bis (2-ethylhexyl) phthalate (DEHP)	5 - 25	ug/L
Butylbenzyl phthalate (BBP)	1 - 5	ug/L
Carbazole (CARBZL)	1 - 5	ug/L
Chrysene (CHRYS)	1 - 5	ug/L
Dibenzo(a,h)anthracene (DBahAN)	2 - 10	ug/L
Dibenzofuran (DBFUR)	1 - 5	ug/L
Diethyl phthalate (DEP)	1 - 5	ug/L
Dimethyl phthalate (DMP)	1 - 5	ug/L
Di-n-butylphthalate (DnBP)	1 - 5	ug/L
Di-n-octyl phthalate (DnOP)	1 - 5	ug/L
Fluoranthene (FLANTH)	1 - 5	ug/L
Fluorene (FLUOR)	1 - 5	ug/L
Hexachlorobenzene (HEXCLB)	1 - 5	ug/L
Hexachlorobutadiene (HClBut)	1 - 5	ug/L
Hexachlorocyclopentadiene (HClCPD)	5 - 25	ug/L
Hexachloroethane (HCE)	1 - 5	ug/L
Indeno(1,2,3-cd)pyrene (INDPYR)	2 - 10	ug/L
Isophorone (IPHOR)	1 - 5	ug/L
Naphthalene (NAP)	1 - 5	ug/L
Nitrobenzene (NBENZ)	1 - 5	ug/L
n-Nitroso-di-n-propylamine (NDPA)	1,000 - 5,000	ng/L
n-Nitrosodiphenylamine (NDPhA)	1,000 - 5,000	ng/L
Pentachlorophenol (PCP) (PCP)	1 - 5	ug/L
Phenanthrene (PHENAN)	1 - 5	ug/L
Phenol (PHENOL)	1 - 5	ug/L

Laboratory Method: 8270C

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Pyrene (PYRENE)	1 - 5	ug/L
Pyridine (PYRDN)	5 - 25	ug/L

Laboratory Method: 8330A

Laboratory: EUROFINS DENVER

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,4,6-Trinitrotoluene (246TNT)	0.11	ug/L
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.21 - 0.22	ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.21 - 0.22	ug/L

Laboratory: WECK LABORATORIES, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
2,4,6-Trinitrotoluene (246TNT)	0.34 - 1	ug/L
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	0.1 - 1	ug/L
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	0.3 - 1	ug/L

Laboratory Method: 900.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Beta (TOTb)	0.147 - 3.4	pCi/L
Total Beta Counting Error (TOTbCE)	0.147 - 3.4	pCi/L

Laboratory Method: 903.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Radium 226 (TRa226)	0.41 - 0.716	pCi/L
Total Radium 226 Counting Error (TRa6CE)	0.41 - 0.716	pCi/L

Laboratory Method: 905.0MOD

Laboratory: EBERLINE ANALYTICAL

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Strontium-90 (TS90)	1.36 - 1.859	pCi/L
Total Strontium-90 Counting Error (TS90CE)	1.36 - 1.859	pCi/L

Laboratory Method: 906.0

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Tritium (TTr)	434	pCi/L
Total Tritium Counting Error (TTrCE)	434	pCi/L

Laboratory Method: 9221B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Coliform (Mult. Tube Fermentation) (TCOLIM)	1.1	MPN

Laboratory Method: 9221E

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Fecal Coliform (Mult. Tube Fermentation) (FCOLIM)	1.1	MPN

Laboratory Method: 9222B

Laboratory: O.C. HEALTH CARE AGENCY

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Total Coliform (Membrane Filtration-CFU/100ml) (TCOLIF)	1	CFU/100

Laboratory Method: 9223B

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	1 - 3,400	MPN
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	1 - 3,400	MPN

Laboratory Method: AI

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Aggressive Index (AI)	0	A.I.

Laboratory Method: BIOASCEC

Laboratory: BIODETECTION SYSTEMS-AMSTERDAM

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Aryl Hydrocarbon Receptor as TCDD (AhRTCDD)	0.5	ng/L
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	0.5	ng/L

Laboratory: TRUSSELL TECHNOLOGIES, INC.

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	0.5	ng/L

Laboratory Method: CALC

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Gross Alpha Excluding Uranium (TOTa-U)	1.08	pCi/L
Radium 226 + Radium 228 (Ra6Ra8)	0.41 - 0.716	pCi/L
Radium 226 + Radium 228 Counting Error (Ra68CE)	0.41 - 0.716	pCi/L

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Aggressive Index (AI)		A.I.
Bicarbonate (as CaCO3) (HCO3Ca)	1	mg/L
Bicarbonate (as HCO3) (HCO3)	1.2	mg/L
Carbonate (as CaCO3) (CO3Ca)	1	mg/L
Cation-Anion meq balance (CATANI)		RATIO
Hydroxide (as CaCO3) (OHCa)	1	mg/L
Nitrate (NO3)	0.1 - 0.9	mg/L
Nitrate + Nitrite Nitrogen (NO3NO2-N)	0.1 - 0.2	mg/L
Nitrate Nitrogen (NO3-N)	0.09	mg/L
Nitrite (NO2)	0.007 - 0.033	mg/L
Sum of five Haloacetic Acids (HAA5)	1	ug/L
Sum of nine Haloacetic Acids (HAA9)	1	ug/L
Sum of Six Brominated Haloacetic Acids (HAA6Br)	1	ug/L
Title 22 Cation-Anion Balance (T22CAB)		meq/L
Title 22 Total Anions (T22ANI)		meq/L
Title 22 Total Cations (T22CAT)		meq/L
Total Anions (TOTANI)		meq/L
Total Cations (TOTCAT)		meq/L
Total Inorganic Nitrogen (TIN)	0.1	mg/L
Total Nitrogen (TOT-N)	0.2 - 2	mg/L
Trivalent Chromium (CrIII)	1	ug/L

Laboratory Method: CEC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
17a-Estradiol (aESTRA)	1	ng/L
17a-Ethynylestradiol (aETEST)	2	ng/L
17b-Estradiol (bESTRA)	2	ng/L
4-Androstene-3,17-dione (ANDROS)	2	ng/L
4-n-Octylphenol (4nOCPH)	0.2	ug/L
4-tert-Octylphenol (4tOCPH)	0.2	ug/L
Acetaminophen (ACTMNP)	5	ng/L
Aspartame (ASPATM)	100	ng/L
Atenolol (ATENOL)	5	ng/L
Atrazine (ATRAZ)	0.001	ug/L
Bisphenol A (BisPHA)	0.2	ug/L
Caffeine (CAFFEI)	3 - 30	ng/L
Carbamazepine (CBMAZP)	1	ng/L
Diclofenac (DICLFN)	5	ng/L
Diethylstilbestrol (DESTBL)	2	ng/L
Dilantin (DILANT)	10	ng/L
Diuron (DIURON)	0.005	ug/L
Epitestosterone (cis-Testosterone) (EPITES)	1	ng/L
Equilin (EQUILN)	5	ng/L
Erythromycin (ERYTHN)	1	ng/L
Estriol (ESTRIO)	2	ng/L
Estrone (ESTRON)	1	ng/L
Fluoxetine (FLUXET)	5	ng/L
Gemfibrozil (GMFIBZ)	1	ng/L
Ibuprofen (IBPRFN)	1 - 10	ng/L
Imidacloprid (IMIDCP)	1	ng/L
Iohexol (IOHEXL)	20 - 1,000	ng/L
Iopromide (IOPRMD)	10	ng/L
Linuron (LINURN)	0.005	ug/L
Meprobamate (MEPROB)	5	ng/L
N,N-diethyl-m-toluamide (DEET)	1	ng/L
Naproxen (NAPRXN)	5	ng/L
Neotame (NEOTAM)	10	ng/L
Nonylphenol (NONYPH)	0.2	ug/L

Laboratory Method: CEC

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Oxybenzone (BP3)	1	ng/L
Pentachlorophenol (PCP) (PCP)	0.2	ug/L
PhenylPhenol (PHNYPH)	0.2	ug/L
Primidone (PRIMDN)	1	ng/L
Progesterone (PRGSTR)	1	ng/L
Simazine (SIMAZ)	0.005	ug/L
Sucralose (SUCRAL)	100 - 1,000	ng/L
Sulfamethoxazole (SULTHZ)	1 - 10	ng/L
Testosterone (trans-Testosterone) (TESTOR)	1	ng/L
Tetrabromobisphenol A (TBBISA)	0.2	ug/L
Triclosan (TRICLN)	1	ng/L
Trimethoprim (TRIMTP)	5	ng/L
Tris-2-chloroethyl phosphate (TCEP)	5	ng/L

Laboratory Method: M-TEC

Laboratory: O.C. HEALTH CARE AGENCY

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
E. Coli (Membrane Filtration - CFU/100ml) (ECOLI)	1	CFU/100

Laboratory Method: NDMA-LOW

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
N-Nitrosodiethylamine (NDEA)	2 - 10	ng/L
n-Nitrosodimethylamine (NDMA)	2 - 10	ng/L
n-Nitroso-di-n-propylamine (NDPA)	2 - 10	ng/L
N-Nitrosomorpholine (NMOR)	2 - 10	ng/L

Laboratory Method: RA-05

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Total Radium 228 (TRa228)	0.0491 - 0.643	pCi/L
Total Radium 228 Counting Error (TRa8CE)	0.0491 - 0.643	pCi/L

Laboratory Method: X1-218.6

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Hexavalent Chromium (CrVI)	0.2	ug/L

Laboratory Method: X1-218.7

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Hexavalent Chromium (CrVI)	0.2 - 2	ug/L

Laboratory Method: X1-300.0

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Bromide (Br)	0.01 - 0.1	mg/L
Chloride (Cl)	0.5 - 5	mg/L
Fluoride (F)	0.1	mg/L
Nitrate (NO3)	0.4	mg/L
Nitrate Nitrogen (NO3-N)	0.1	mg/L
Sulfate (SO4)	0.3 - 5	mg/L

Laboratory Method: X1-335.4

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Cyanide (CN)	5	ug/L

Laboratory Method: X1-351.2

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Organic Nitrogen (ORG-N)	0.1	mg/L
Total Kjeldahl Nitrogen (TKN)	0.2 - 2	mg/L

Laboratory Method: X200.7

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Boron (B)	0.1	mg/L
Boron (dissolved) (B-DIS)	0.1	mg/L
Calcium (Ca)	0.5	mg/L
Calcium Hardness (CaHRD)	0.25	mg/L
Iron (Fe)	5 - 25	ug/L
Iron (dissolved) (Fe-DIS)	5	ug/L
Magnesium (Mg)	0.5	mg/L
Potassium (K)	0.5	mg/L
Sodium (Na)	0.5	mg/L
Total Hardness (as CaCO3) (TOTHRD)	1	mg/L

Laboratory Method: X200.8

Laboratory: FRUIT GROWERS LABORATORY, INC.

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Natural Uranium (NTUr)	0.67 - 1	pCi/L

Laboratory Method: X200.8

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	*Reportable Detection Limit Range*	*Units*
Aluminum (Al)	5	ug/L
Aluminum (dissolved) (Al-DIS)	5	ug/L
Antimony (Sb)	1	ug/L
Antimony (dissolved) (Sb-DIS)	1	ug/L
Arsenic (As)	1	ug/L
Arsenic (dissolved) (As-DIS)	1	ug/L
Barium (Ba)	1	ug/L
Barium (dissolved) (Ba-DIS)	1	ug/L
Beryllium (Be)	1	ug/L
Beryllium (dissolved) (Be-DIS)	1	ug/L
Cadmium (Cd)	1	ug/L
Cadmium (dissolved) (Cd-DIS)	1	ug/L
Chromium (Cr)	1	ug/L
Chromium (dissolved) (Cr-DIS)	1	ug/L
Cobalt (Co)	1	ug/L
Cobalt (dissolved) (Co-DIS)	1	ug/L
Copper (Cu)	1	ug/L
Copper (dissolved) (Cu-DIS)	1	ug/L
Gadolinium (Gd)	10	ng/L
Lead (Pb)	1	ug/L
Lead (dissolved) (Pb-DIS)	1	ug/L
Manganese (Mn)	1	ug/L
Manganese (dissolved) (Mn-DIS)	1	ug/L
Mercury (Hg)	1	ug/L
Mercury (dissolved) (Hg-DIS)	1	ug/L
Molybdenum (Mo)	1	ug/L
Nickel (Ni)	1	ug/L
Nickel (dissolved) (Ni-DIS)	1	ug/L
Selenium (Se)	1	ug/L
Selenium (dissolved) (Se-DIS)	1	ug/L
Silver (Ag)	1	ug/L
Silver (dissolved) (Ag-DIS)	1	ug/L
Strontium (Sr)	1 - 10	ug/L
Thallium (Tl)	1	ug/L

Laboratory Method: X200.8

Laboratory: ORANGE COUNTY WATER DISTRICT

Constituent Name & Abbreviation	Reportable Detection Limit Range	Units
Thallium (dissolved) (Tl-DIS)	1	ug/L
Uranium (U) (U)	1	ug/L
Vanadium (V)	1	ug/L
Vanadium (dissolved) (V-DIS)	1	ug/L
Zinc (Zn)	5	ug/L
Zinc (dissolved) (Zn-DIS)	5	ug/L

Appendix C

Water Quality Constituents
With Laboratory Methods

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: BIOLOGICAL

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Aryl Hydrocarbon Receptor as TCDD (AhRTCDD)	BIOASCEC	0.5	ng/L	BDS-AMST
Bacteriophage, Male Specific (BACTMLSP)	1601	1	P/A PERL	OCHCA
Bacteriophage, Male Specific (BACTMLSP)	1601	0	P/A PERL	CELANASF
Bacteriophage, Somatic (BACTSOMT)	1601	1	P/A PERL	OCHCA
Bacteriophage, Somatic (BACTSOMT)	1601	0	P/A PERL	CELANASF
E. Coli (Colilert - MPN/100mL) (ECOLIQ)	9223B	1 - 3,400	MPN	OCWD
E. Coli (Membrane Filtration - CFU/100ml) (ECOLI)	M-TEC	1	CFU/100	OCHCA
Enterococcus(Membrane Filtration-CFU/100ml) (ENTRCC)	1600	1	CFU/100	OCHCA
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	BIOASCEC	0.5	ng/L	TRUSSELL
Estrogen Receptor alpha as 17-beta Estradiol (ERa17bES)	BIOASCEC	0.5	ng/L	BDS-AMST
Fecal Coliform (Mult. Tube Fermentation) (FCOLIM)	9221E	1.1	MPN	OCWD
Somatic Phage (SOMPHAGE)	1602	1	pfu/100	CELANASF
Total Coliform (Colilert - MPN/100mL) (TCOLIQ)	9223B	1 - 3,400	MPN	OCWD
Total Coliform (Membrane Filtration-CFU/100ml) (TCOLIF)	9222B	1	CFU/100	OCHCA
Total Coliform (Mult. Tube Fermentation) (TCOLIM)	9221B	1.1	MPN	OCWD

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Aggressive Index (AI)	AI	0	A.I.	OCWD
Aggressive Index (AI)	CALC		A.I.	OCWD
Alkalinity-Phenolphthalein (ALKPHE)	2320B	1	mg/L	OCWD
Aluminum (Al)	X200.8	5	ug/L	OCWD
Aluminum (dissolved) (Al-DIS)	X200.8	5	ug/L	OCWD

Laboratory Abbreviation Descriptions:

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Ammonia Nitrogen (NH3-N)	350.1	0.1 - 1	mg/L	OCWD
Antimony (Sb)	X200.8	1	ug/L	OCWD
Antimony (dissolved) (Sb-DIS)	X200.8	1	ug/L	OCWD
Apparent Color (unfiltered) (APCOLR)	2120B	3 - 6	UNITS	OCWD
Arsenic (As)	X200.8	1	ug/L	OCWD
Arsenic (dissolved) (As-DIS)	X200.8	1	ug/L	OCWD
Asbestos (ASBESTOS)	100.2	0.18	MFL	EUROFCEI
Barium (Ba)	X200.8	1	ug/L	OCWD
Barium (dissolved) (Ba-DIS)	X200.8	1	ug/L	OCWD
Beryllium (Be)	X200.8	1	ug/L	OCWD
Beryllium (dissolved) (Be-DIS)	X200.8	1	ug/L	OCWD
Bicarbonate (as CaCO3) (HCO3Ca)	2320B	1	mg/L	OCWD
Bicarbonate (as CaCO3) (HCO3Ca)	CALC	1	mg/L	OCWD
Bicarbonate (as HCO3) (HCO3)	CALC	1.2	mg/L	OCWD
Biochemical Oxygen Demand (BOD)	5210B	2	mg/L	WECKLAB
Biochemical Oxygen Demand (BOD)	5210B	2	mg/L	EURFCALT
Boron (B)	X200.7	0.1	mg/L	OCWD
Boron (dissolved) (B-DIS)	X200.7	0.1	mg/L	OCWD
Bromate (BrO3)	300.1B	5	ug/L	OCWD
Bromide (Br)	300.1B	0.01 - 0.04	mg/L	OCWD
Bromide (Br)	X1-300.0	0.01 - 0.1	mg/L	OCWD
Cadmium (Cd)	X200.8	1	ug/L	OCWD
Cadmium (dissolved) (Cd-DIS)	X200.8	1	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: INORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Calcium (Ca)	X200.7	0.5	mg/L	OCWD
Calcium Hardness (CaHRD)	X200.7	0.25	mg/L	OCWD
Carbonate (as CaCO3) (CO3Ca)	2320B	1	mg/L	OCWD
Carbonate (as CaCO3) (CO3Ca)	CALC	1	mg/L	OCWD
Cation-Anion meq balance (CATANI)	CALC		RATIO	OCWD
Chlorate (CLO3)	300.1B	10	ug/L	OCWD
Chloride (Cl)	X1-300.0	0.5 - 5	mg/L	OCWD
Chlorite (CLO2)	300.1B	10	ug/L	OCWD
Chromium (Cr)	X200.8	1	ug/L	OCWD
Chromium (dissolved) (Cr-DIS)	X200.8	1	ug/L	OCWD
Cobalt (Co)	X200.8	1	ug/L	OCWD
Cobalt (dissolved) (Co-DIS)	X200.8	1	ug/L	OCWD
Copper (Cu)	X200.8	1	ug/L	OCWD
Copper (dissolved) (Cu-DIS)	X200.8	1	ug/L	OCWD
Corrosivity (CORROS)	2330B	-100	S.I.	OCWD
Cyanide (CN)	X1-335.4	5	ug/L	OCWD
Electrical Conductivity (EC)	2510B	1	uS/cm	OCWD
Fluoride (F)	X1-300.0	0.1	mg/L	OCWD
Free Chlorine (FRCL2)	4500CLF	0.1 - 0.2	mg/L	OCWD
Gadolinium (Gd)	X200.8	10	ng/L	OCWD
Hexavalent Chromium (CrVI)	X1-218.6	0.2	ug/L	OCWD
Hexavalent Chromium (CrVI)	X1-218.7	0.2 - 2	ug/L	OCWD
Hydrogen Peroxide (H2O2)	4500H2O2	0.1 - 0.2	mg/L	OCWD

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Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: INORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Hydroxide (as CaCO3) (OHCa)	2320B	1	mg/L	OCWD
Hydroxide (as CaCO3) (OHCa)	CALC	1	mg/L	OCWD
Iron (Fe)	X200.7	5 - 25	ug/L	OCWD
Iron (dissolved) (Fe-DIS)	X200.7	5	ug/L	OCWD
Lead (Pb)	X200.8	1	ug/L	OCWD
Lead (dissolved) (Pb-DIS)	X200.8	1	ug/L	OCWD
Magnesium (Mg)	X200.7	0.5	mg/L	OCWD
Manganese (Mn)	X200.8	1	ug/L	OCWD
Manganese (dissolved) (Mn-DIS)	X200.8	1	ug/L	OCWD
Mercury (Hg)	X200.8	1	ug/L	OCWD
Mercury (dissolved) (Hg-DIS)	X200.8	1	ug/L	OCWD
Molybdenum (Mo)	X200.8	1	ug/L	OCWD
Nickel (Ni)	X200.8	1	ug/L	OCWD
Nickel (dissolved) (Ni-DIS)	X200.8	1	ug/L	OCWD
Nitrate (NO3)	4500NO3F	0.8	mg/L	OCWD
Nitrate (NO3)	CALC	0.1 - 0.9	mg/L	OCWD
Nitrate (NO3)	X1-300.0	0.4	mg/L	OCWD
Nitrate + Nitrite Nitrogen (NO3NO2-N)	CALC	0.1 - 0.2	mg/L	OCWD
Nitrate Nitrogen (NO3-N)	4500NO3F	0.1 - 0.2	mg/L	OCWD
Nitrate Nitrogen (NO3-N)	CALC	0.09	mg/L	OCWD
Nitrate Nitrogen (NO3-N)	X1-300.0	0.1	mg/L	OCWD
Nitrite (NO2)	CALC	0.007 - 0.033	mg/L	OCWD
Nitrite Nitrogen (NO2-N)	4500NO3F	0.002 - 0.01	mg/L	OCWD
Organic Nitrogen (ORG-N)	X1-351.2	0.1	mg/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Perchlorate (CLO4)	332.0	2	ug/L	OCWD
pH (pH)	4500H+B	1	UNITS	OCWD
Phosphate Phosphorus (orthophosphate) (PO4-P)	365.1	0.01 - 0.02	mg/L	OCWD
Potassium (K)	X200.7	0.5	mg/L	OCWD
Selenium (Se)	X200.8	1	ug/L	OCWD
Selenium (dissolved) (Se-DIS)	X200.8	1	ug/L	OCWD
Silica (SIO2)	4500SIOC	1	mg/L	OCWD
Silver (Ag)	X200.8	1	ug/L	OCWD
Silver (dissolved) (Ag-DIS)	X200.8	1	ug/L	OCWD
Sodium (Na)	X200.7	0.5	mg/L	OCWD
Strontium (Sr)	X200.8	1 - 10	ug/L	OCWD
Sulfate (SO4)	X1-300.0	0.3 - 5	mg/L	OCWD
Surfactants (MBAS)	5540C	0.02 - 0.04	mg/L	OCWD
Suspended Solids (SUSSOL)	2540D	2.5	mg/L	OCWD
Temperature (Laboratory) (TEMP)	4500H+B	1	C	OCWD
Thallium (Tl)	X200.8	1	ug/L	OCWD
Thallium (dissolved) (Tl-DIS)	X200.8	1	ug/L	OCWD
Threshold Odor Number (Median) (ODOR)	2150B	0	TON	OCWD
Title 22 Cation-Anion Balance (T22CAB)	CALC		meq/L	OCWD
Title 22 Total Anions (T22ANI)	CALC		meq/L	OCWD
Title 22 Total Cations (T22CAT)	CALC		meq/L	OCWD
Total Alkalinity (as CaCO3) (TOTALK)	2320B	1	mg/L	OCWD

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Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: INORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Total Anions (TOTANI)	CALC		meq/L	OCWD
Total Cations (TOTCAT)	CALC		meq/L	OCWD
Total Chlorine (TOTCL2)	4500CLF	0.1 - 0.2	mg/L	OCWD
Total Dissolved Solids (TDS)	2540C	2.5	mg/L	OCWD
Total Hardness (as CaCO3) (TOTHRD)	X200.7	1	mg/L	OCWD
Total Inorganic Nitrogen (TIN)	350.1	0.1	mg/L	OCWD
Total Inorganic Nitrogen (TIN)	CALC	0.1	mg/L	OCWD
Total Kjeldahl Nitrogen (TKN)	X1-351.2	0.2 - 2	mg/L	OCWD
Total Nitrogen (TOT-N)	CALC	0.2 - 2	mg/L	OCWD
Total Organic Carbon (Unfiltered) (TOC)	5310C	0.05	mg/L	OCWD
Trivalent Chromium (CrIII)	CALC	1	ug/L	OCWD
True Color (filtered) (TRCOLR)	2120B	3 - 6	UNITS	OCWD
Turbidity (TURB)	2130B	0.1	NTU	OCWD
Ultraviolet (absorbance) (UVAB)	5910B	0.005	1/cm	OCWD
Ultraviolet percent transmittance @254nm (UV%T-254)	5910B	0.1	%	OCWD
Uranium (U) (U)	X200.8	1	ug/L	OCWD
UV Absorbance/TOC (unfiltered) ratio (UV/TOC)	5910B	0.0001	L/mg-cm	OCWD
Vanadium (V)	X200.8	1	ug/L	OCWD
Vanadium (dissolved) (V-DIS)	X200.8	1	ug/L	OCWD
Zinc (Zn)	X200.8	5	ug/L	OCWD
Zinc (dissolved) (Zn-DIS)	X200.8	5	ug/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
1,1,1,2-Tetrachloroethane (1112PC)	524.2	0.5	ug/L	OCWD
1,1,1-Trichloroethane (111TCA)	524.2	0.5	ug/L	OCWD
1,1,1-Trichloropropanone (111TCP)	551.1	0.1	ug/L	OCWD
1,1,2,2-Tetrachloroethane (1122PC)	524.2	0.5	ug/L	OCWD
1,1,2-Trichloroethane (112TCA)	524.2	0.5	ug/L	OCWD
1,1-Dichloro-2-propanone (11DC2P)	551.1	0.1	ug/L	OCWD
1,1-Dichloroethane (11DCA)	524.2	0.5	ug/L	OCWD
1,1-Dichloroethene (11DCE)	524.2	0.5	ug/L	OCWD
1,1-Dichloropropene (11DCP)	524.2	0.5	ug/L	OCWD
1,2,3-Trichlorobenzene (123TCB)	524.2	0.5	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	14DIOX	0.005	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	504.1	0.05	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	524.2	0.5	ug/L	OCWD
1,2,3-Trichloropropane (123TCP)	524M-TCP	0.005	ug/L	OCWD
1,2,4-Trichlorobenzene (124TCB)	524.2	0.5	ug/L	OCWD
1,2,4-Trichlorobenzene (124TCB)	625.1	1	ug/L	WECKLAB
1,2,4-Trichlorobenzene (124TCB)	625.1	9.6	ug/L	EURFCALT
1,2,4-Trichlorobenzene (124TCB)	8270C	1 - 5	ug/L	WECKLAB
1,2,4-Trimethylbenzene (124TMB)	524.2	0.5	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	14DIOX	0.01	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	504.1	0.01	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	524.2	0.5	ug/L	OCWD
1,2-Dibromo-3-chloropropane (DBCP)	524M-TCP	0.01	ug/L	OCWD
1,2-Dibromoethane (EDB)	14DIOX	0.005	ug/L	OCWD
1,2-Dibromoethane (EDB)	504.1	0.01	ug/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
1,2-Dibromoethane (EDB)	524.2	0.5	ug/L	OCWD
1,2-Dibromoethane (EDB)	524M-TCP	0.005	ug/L	OCWD
1,2-Dichlorobenzene (12DCB)	524.2	0.5	ug/L	OCWD
1,2-Dichlorobenzene (12DCB)	625.1	1	ug/L	WECKLAB
1,2-Dichlorobenzene (12DCB)	625.1	9.6	ug/L	EURFCALT
1,2-Dichlorobenzene (12DCB)	8270C	1 - 5	ug/L	WECKLAB
1,2-Dichloroethane (12DCA)	524.2	0.5	ug/L	OCWD
1,2-Dichloropropane (12DCP)	524.2	0.5	ug/L	OCWD
1,2-Diphenylhydrazine (12DPH)	625.1	1	ug/L	WECKLAB
1,2-Diphenylhydrazine (12DPH)	625.1	9.6	ug/L	EURFCALT
1,2-Diphenylhydrazine (12DPH)	8270C	1 - 5	ug/L	WECKLAB
1,3,5-Trimethylbenzene (135TMB)	524.2	0.5	ug/L	OCWD
1,3-Dichlorobenzene (13DCB)	524.2	0.5	ug/L	OCWD
1,3-Dichlorobenzene (13DCB)	625.1	1	ug/L	WECKLAB
1,3-Dichlorobenzene (13DCB)	625.1	9.6	ug/L	EURFCALT
1,3-Dichlorobenzene (13DCB)	8270C	1 - 5	ug/L	WECKLAB
1,3-Dichloropropane (13DCP)	524.2	0.5	ug/L	OCWD
1,4-Dichlorobenzene (14DCB)	524.2	0.5	ug/L	OCWD
1,4-Dichlorobenzene (14DCB)	625.1	1	ug/L	WECKLAB
1,4-Dichlorobenzene (14DCB)	625.1	9.6	ug/L	EURFCALT
1,4-Dichlorobenzene (14DCB)	8270C	1 - 5	ug/L	WECKLAB
1,4-Dioxane (14DIOX)	14DIOX	0.5	ug/L	OCWD
1,4-Dioxane (14DIOX)	522	0.07	ug/L	OCWD
11-chloroeicosafluoro-3-oxaundecane-1sulfonic acid (11CLPF)	533	2	ng/L	OCWD
17a-Estradiol (aESTRA)	CEC	1	ng/L	OCWD
17a-Ethynylestradiol (aETEST)	CEC	2	ng/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
17b-Estradiol (bESTRA)	CEC	2	ng/L	OCWD
2,2-Dichloropropane (22DCP)	524.2	0.5	ug/L	OCWD
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1613B	4.8	pg/L	EUROTSAC
2,4,5-Trichlorophenol (245TCP)	625.1	9.6	ug/L	EURFCALT
2,4,5-Trichlorophenol (245TCP)	8270C	1 - 5	ug/L	WECKLAB
2,4,6-Trichlorophenol (246TCP)	625.1	9.6	ug/L	EURFCALT
2,4,6-Trichlorophenol (246TCP)	625.1	1	ug/L	WECKLAB
2,4,6-Trichlorophenol (246TCP)	8270C	1 - 5	ug/L	WECKLAB
2,4-Dichlorophenol (24DCPH)	625.1	1	ug/L	WECKLAB
2,4-Dichlorophenol (24DCPH)	625.1	9.6	ug/L	EURFCALT
2,4-Dichlorophenol (24DCPH)	8270C	1 - 5	ug/L	WECKLAB
2,4-Dimethylphenol (24DMP)	625.1	1	ug/L	WECKLAB
2,4-Dimethylphenol (24DMP)	625.1	9.6	ug/L	EURFCALT
2,4-Dimethylphenol (24DMP)	8270C	1 - 5	ug/L	WECKLAB
2,4-Dinitrophenol (24DNP)	625.1	48	ug/L	EURFCALT
2,4-Dinitrophenol (24DNP)	625.1	10	ug/L	WECKLAB
2,4-Dinitrophenol (24DNP)	8270C	10 - 50	ug/L	WECKLAB
2,4-Dinitrotoluene (24DNT)	525.2	0.1	ug/L	OCWD
2,4-Dinitrotoluene (24DNT)	625.1	1	ug/L	WECKLAB
2,4-Dinitrotoluene (24DNT)	625.1	9.6	ug/L	EURFCALT
2,4-Dinitrotoluene (24DNT)	8270C	1 - 5	ug/L	WECKLAB
2,6-Dinitrotoluene (26DNT)	525.2	0.1	ug/L	OCWD
2,6-Dinitrotoluene (26DNT)	625.1	1	ug/L	WECKLAB
2,6-Dinitrotoluene (26DNT)	625.1	9.6	ug/L	EURFCALT
2,6-Dinitrotoluene (26DNT)	8270C	1 - 5	ug/L	WECKLAB
2-Chloroethylvinyl ether (2ClEVE)	14DIOX	1	ug/L	OCWD
2-Chloronaphthalene (2ClNAP)	625.1	9.6	ug/L	EURFCALT

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
2-Chloronaphthalene (2ClNAP)	625.1	1	ug/L	WECKLAB
2-Chloronaphthalene (2ClNAP)	8270C	1 - 5	ug/L	WECKLAB
2-Chlorophenol (2ClPNL)	625.1	1	ug/L	WECKLAB
2-Chlorophenol (2ClPNL)	625.1	9.6	ug/L	EURFCALT
2-Chlorophenol (2ClPNL)	8270C	1 - 5	ug/L	WECKLAB
2-Chlorotoluene (2CLTOL)	524.2	0.5	ug/L	OCWD
2-Methyl naphthalene (2MNAP)	625.1	9.6	ug/L	EURFCALT
2-Methyl naphthalene (2MNAP)	8270C	1 - 5	ug/L	WECKLAB
2-Methyl-4,6-Dinitrophenol (2MDNP)	625.1	5	ug/L	WECKLAB
2-Methyl-4,6-Dinitrophenol (2MDNP)	625.1	48	ug/L	EURFCALT
2-Methyl-4,6-Dinitrophenol (2MDNP)	8270C	5 - 25	ug/L	WECKLAB
2-Methylphenol (oCRESL)	625.1	9.6	ug/L	EURFCALT
2-Methylphenol (oCRESL)	8270C	1 - 5	ug/L	WECKLAB
2-Nitroaniline (oNTANL)	625.1	9.6	ug/L	EURFCALT
2-Nitroaniline (oNTANL)	8270C	1 - 5	ug/L	WECKLAB
2-Nitrophenol (2NPNL)	625.1	1	ug/L	WECKLAB
2-Nitrophenol (2NPNL)	625.1	9.6	ug/L	EURFCALT
2-Nitrophenol (2NPNL)	8270C	1 - 5	ug/L	WECKLAB
3- & 4-Methylphenol (mpCRESL)	8270C	1 - 5	ug/L	WECKLAB
3,3'-Dichlorobenzidine (DCBZDE)	625.1	5	ug/L	WECKLAB
3,3'-Dichlorobenzidine (DCBZDE)	625.1	9.6	ug/L	EURFCALT
3,3'-Dichlorobenzidine (DCBZDE)	8270C	5 - 25	ug/L	WECKLAB
3-Nitroaniline (mNTANL)	625.1	9.6	ug/L	EURFCALT
3-Nitroaniline (mNTANL)	8270C	1 - 5	ug/L	WECKLAB
4,8-dioxa-3H-perfluorononanoic acid (ADONA)	533	2	ng/L	OCWD
4:2 Fluorotelomer sulfonate (4:2FTS)	533	2	ng/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
4-Androstene-3,17-dione (ANDROS)	CEC	2	ng/L	OCWD
4-Bromophenyl phenyl ether (4BrPPE)	625.1	1	ug/L	WECKLAB
4-Bromophenyl phenyl ether (4BrPPE)	625.1	9.6	ug/L	EURFCALT
4-Bromophenyl phenyl ether (4BrPPE)	8270C	1 - 5	ug/L	WECKLAB
4-Chloro-3-methylphenol (43CMP)	625.1	1	ug/L	WECKLAB
4-Chloro-3-methylphenol (43CMP)	625.1	9.6	ug/L	EURFCALT
4-Chloro-3-methylphenol (43CMP)	8270C	1 - 5	ug/L	WECKLAB
4-Chloroaniline (pClANL)	625.1	9.6	ug/L	EURFCALT
4-Chloroaniline (pClANL)	8270C	1 - 5	ug/L	WECKLAB
4-Chlorophenyl phenyl ether (4ClPPE)	625.1	9.6	ug/L	EURFCALT
4-Chlorophenyl phenyl ether (4ClPPE)	625.1	1	ug/L	WECKLAB
4-Chlorophenyl phenyl ether (4ClPPE)	8270C	1 - 5	ug/L	WECKLAB
4-Chlorotoluene (4CLTOL)	524.2	0.5	ug/L	OCWD
4-Isopropyltoluene (4IPTOL)	524.2	0.5	ug/L	OCWD
4-Nitroaniline (pNTANL)	625.1	9.6	ug/L	EURFCALT
4-Nitroaniline (pNTANL)	8270C	1 - 5	ug/L	WECKLAB
4-Nitrophenol (4NPNL)	625.1	5	ug/L	WECKLAB
4-Nitrophenol (4NPNL)	625.1	9.6	ug/L	EURFCALT
4-Nitrophenol (4NPNL)	8270C	5 - 25	ug/L	WECKLAB
4-n-Octylphenol (4nOCPH)	CEC	0.2	ug/L	OCWD
4-tert-Octylphenol (4tOCPH)	CEC	0.2	ug/L	OCWD
6:2 Fluorotelomer sulfonate (6:2FTS)	533	2	ng/L	OCWD
8:2 Fluorotelomer sulfonate (8:2FTS)	533	2	ng/L	OCWD
9-chlorohexadecafluoro-3-oxanone-1-sulfonic acid (9CLPF3)	533	2	ng/L	OCWD
Acetaldehyde (ACEALD)	556	2	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Acetone (ACETNE)	524.2	10	ug/L	OCWD
Acrolein (ACROLN)	524.2	5	ug/L	OCWD
Acrylonitrile (ACRYLO)	524.2	2	ug/L	OCWD
Aniline (ANLN)	625.1	9.6	ug/L	EURFCALT
Aniline (ANLN)	8270C	1 - 5	ug/L	WECKLAB
Aspartame (ASPATM)	CEC	100	ng/L	OCWD
Atenolol (ATENOL)	CEC	5	ng/L	OCWD
Benzaldehyde (BENALD)	556	2	ug/L	WECKLAB
Benzene (BENZ)	524.2	0.5	ug/L	OCWD
Benzidine (BNZDE)	625.1	10	ug/L	WECKLAB
Benzidine (BNZDE)	625.1	48	ug/L	EURFCALT
Benzidine (BNZDE)	8270C	10 - 50	ug/L	WECKLAB
Benzoic Acid (BNZACD)	625.1	48	ug/L	EURFCALT
Benzoic Acid (BNZACD)	8270C	100 - 500	ug/L	WECKLAB
Benzyl Alcohol (BNZALC)	625.1	9.6	ug/L	EURFCALT
Benzyl Alcohol (BNZALC)	8270C	1 - 5	ug/L	WECKLAB
bis (2-chloroethoxy) methane (B2CEM)	625.1	1	ug/L	WECKLAB
bis (2-chloroethoxy) methane (B2CEM)	625.1	9.6	ug/L	EURFCALT
bis (2-chloroethoxy) methane (B2CEM)	8270C	1 - 5	ug/L	WECKLAB
bis (2-chloroethyl) ether (B2CLEE)	524.2	2.5	ug/L	OCWD
bis (2-chloroethyl) ether (B2CLEE)	625.1	24	ug/L	EURFCALT
bis (2-chloroethyl) ether (B2CLEE)	625.1	1	ug/L	WECKLAB
bis (2-chloroethyl) ether (B2CLEE)	8270C	1 - 5	ug/L	WECKLAB
bis (2-chloroisopropyl) ether (B2CIPE)	625.1	1	ug/L	WECKLAB
bis (2-chloroisopropyl) ether (B2CIPE)	625.1	9.6	ug/L	EURFCALT
bis (2-chloroisopropyl) ether (B2CIPE)	8270C	1 - 5	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Bisphenol A (BisPHA)	CEC	0.2	ug/L	OCWD
Bromobenzene (BRBENZ)	524.2	0.5	ug/L	OCWD
Bromochloroacetic Acid (BCAA)	552.2	1	ug/L	OCWD
Bromochloroacetonitrile (BCAN)	551.1	0.1	ug/L	OCWD
Bromochloromethane (CH2BrC)	524.2	0.5	ug/L	OCWD
Bromodichloroacetic Acid (BDCAA)	552.2	1	ug/L	OCWD
Bromodichloromethane (CHBrCl)	524.2	0.5	ug/L	OCWD
Bromoform (CHBr3)	524.2	0.5	ug/L	OCWD
Bromomethane (CH3Br)	524.2	0.5	ug/L	OCWD
Carbazole (CARBZL)	8270C	1 - 5	ug/L	WECKLAB
Carbon Disulfide (CS2)	524.2	0.5	ug/L	OCWD
Carbon tetrachloride (CCl4)	524.2	0.5	ug/L	OCWD
Chlorobenzene (CLBENZ)	524.2	0.5	ug/L	OCWD
Chlorodibromoacetic Acid (CDBAA)	552.2	1	ug/L	OCWD
Chlorodifluoromethane (FREN22)	524.2	0.5	ug/L	OCWD
Chloroethane (ClETHA)	524.2	0.5	ug/L	OCWD
Chloroform (CHCl3)	524.2	0.5	ug/L	OCWD
Chloromethane (CH3Cl)	524.2	0.5	ug/L	OCWD
Chloropicrin (ClPICR)	551.1	0.1	ug/L	OCWD
cis-1,2-Dichloroethene (c12DCE)	524.2	0.5	ug/L	OCWD
cis-1,3-Dichloropropene (c13DCP)	524.2	0.5	ug/L	OCWD
Crotonaldehyde (CRTALD)	556	2	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Cyclohexanone (CYCHXN)	556	2	ug/L	WECKLAB
Decanal (DECNAL)	556	2	ug/L	WECKLAB
Dibenzofuran (DBFUR)	625.1	9.6	ug/L	EURFCALT
Dibenzofuran (DBFUR)	8270C	1 - 5	ug/L	WECKLAB
Dibromoacetic Acid (DBAA)	552.2	1	ug/L	OCWD
Dibromoacetonitrile (DBAN)	551.1	0.1	ug/L	OCWD
Dibromochloromethane (CHBr2C)	524.2	0.5	ug/L	OCWD
Dibromomethane (CH2Br2)	524.2	0.5	ug/L	OCWD
Dichloroacetic Acid (DCAA)	552.2	1	ug/L	OCWD
Dichloroacetonitrile (DCAN)	551.1	0.1	ug/L	OCWD
Dichlorodifluoromethane (CCl2F2)	524.2	0.5	ug/L	OCWD
Diclofenac (DICLFN)	CEC	5	ng/L	OCWD
Diethylstilbestrol (DESTBL)	CEC	2	ng/L	OCWD
Diisopropyl ether (DIPE)	524.2	1	ug/L	OCWD
Dilantin (DILANT)	CEC	10	ng/L	OCWD
Dissolved Organic Carbon (DOC)	5310C	0.05	mg/L	OCWD
Endosulfan II (ENDOII)	508.1	0.01	ug/L	WECKLAB
Endosulfan II (ENDOII)	525.2	0.1	ug/L	OCWD
Endosulfan II (ENDOII)	8081A_LL	0.0097	ug/L	EURFCALT
Epitestosterone (cis-Testosterone) (EPITES)	CEC	1	ng/L	OCWD
Equilin (EQUILN)	CEC	5	ng/L	OCWD
Estriol (ESTRIO)	CEC	2	ng/L	OCWD
Estrone (ESTRON)	CEC	1	ng/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Ethyl tert-butyl ether (ETBE)	524.2	1	ug/L	OCWD
Ethylbenzene (EtBENZ)	524.2	0.5	ug/L	OCWD
Fluoxetine (FLUXET)	CEC	5	ng/L	OCWD
Formaldehyde (FORALD)	556	2	ug/L	WECKLAB
Freon 123a (FR123A)	524.2	0.5 - 2	ug/L	OCWD
Glyoxal (GLYOXL)	556	2	ug/L	WECKLAB
HCH-alpha (Alpha-BHC) (BHCa)	508.1	0.01	ug/L	WECKLAB
HCH-alpha (Alpha-BHC) (BHCa)	525.2	0.1	ug/L	OCWD
HCH-alpha (Alpha-BHC) (BHCa)	8081A_LL	0.0019	ug/L	EURFCALT
HCH-beta (Beta-BHC) (BHCb)	508.1	0.01	ug/L	WECKLAB
HCH-beta (Beta-BHC) (BHCb)	525.2	0.1	ug/L	OCWD
HCH-beta (Beta-BHC) (BHCb)	8081A_LL	0.0073	ug/L	EURFCALT
HCH-delta (Delta-BHC) (BHCd)	508.1	0.01	ug/L	WECKLAB
HCH-delta (Delta-BHC) (BHCd)	525.2	0.1	ug/L	OCWD
HCH-delta (Delta-BHC) (BHCd)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Heptanal (HEPNAL)	556	2	ug/L	WECKLAB
Hexachlorobutadiene (HClBut)	524.2	0.5	ug/L	OCWD
Hexachlorobutadiene (HClBut)	625.1	1	ug/L	WECKLAB
Hexachlorobutadiene (HClBut)	625.1	9.6	ug/L	EURFCALT
Hexachlorobutadiene (HClBut)	8270C	1 - 5	ug/L	WECKLAB
Hexachloroethane (HCE)	625.1	9.6	ug/L	EURFCALT
Hexachloroethane (HCE)	625.1	1	ug/L	WECKLAB
Hexachloroethane (HCE)	8270C	1 - 5	ug/L	WECKLAB
Hexafluoropropylene oxide dimer acid (GenX) (HFPODA)	533	2	ng/L	OCWD
Hexanal (HEXNAL)	556	2	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Imidacloprid (IMIDCP)	CEC	1	ng/L	OCWD
Iohexol (IOHEXL)	CEC	20 - 1,000	ng/L	OCWD
Iopromide (IOPRMD)	CEC	10	ng/L	OCWD
Isophorone (IPHOR)	525.2	0.1	ug/L	OCWD
Isophorone (IPHOR)	625.1	1	ug/L	WECKLAB
Isophorone (IPHOR)	625.1	9.6	ug/L	EURFCALT
Isophorone (IPHOR)	8270C	1 - 5	ug/L	WECKLAB
Isopropylbenzene (ISPBNZ)	524.2	0.5	ug/L	OCWD
Linuron (LINURN)	CEC	0.005	ug/L	OCWD
m,p-Xylene (mp-XYL)	524.2	0.5	ug/L	OCWD
Meprobamate (MEPROB)	CEC	5	ng/L	OCWD
Methyl Ethyl Ketone (MEK) (MEK)	524.2	2.5	ug/L	OCWD
Methyl Isobutyl Ketone (MIBK) (MIBK)	524.2	2.5	ug/L	OCWD
Methyl tert-butyl ether (MTBE)	524.2	0.2	ug/L	OCWD
Methylene Chloride (CH2Cl2)	524.2	0.5	ug/L	OCWD
Methylglyoxal (MGLYOX)	556	2	ug/L	WECKLAB
Methylisothiocyanate (MITC)	14DIOX	0.05	ug/L	OCWD
Metolachlor (METOCL)	525.2	0.1	ug/L	OCWD
Monobromoacetic Acid (MBAA)	552.2	1	ug/L	OCWD
Monochloroacetic Acid (MCAA)	552.2	1	ug/L	OCWD
Naphthalene (NAP)	524.2	0.5	ug/L	OCWD
Naphthalene (NAP)	525.2	0.1	ug/L	OCWD
Naphthalene (NAP)	625.1	1	ug/L	WECKLAB
Naphthalene (NAP)	625.1	9.6	ug/L	EURFCALT

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Naphthalene (NAP)	8270C	1 - 5	ug/L	WECKLAB
Naproxen (NAPRXN)	CEC	5	ng/L	OCWD
n-Butylbenzene (nBBENZ)	524.2	0.5	ug/L	OCWD
Neotame (NEOTAM)	CEC	10	ng/L	OCWD
N-ethyl perfluorooctanesulfonamidoacetic acid (EtFOSA)	537.1	2	ng/L	OCWD
Nitrobenzene (NBENZ)	625.1	1	ug/L	WECKLAB
Nitrobenzene (NBENZ)	625.1	24	ug/L	EURFCALT
Nitrobenzene (NBENZ)	8270C	1 - 5	ug/L	WECKLAB
N-methyl perfluorooctanesulfonamidoacetic acid (MeFOSA)	537.1	2	ng/L	OCWD
N-Nitrosodiethylamine (NDEA)	NDMA-LOW	2 - 10	ng/L	OCWD
n-Nitrosodimethylamine (NDMA)	NDMA-LOW	2 - 10	ng/L	OCWD
n-Nitroso-di-n-propylamine (NDPA)	625.1	1000	ng/L	WECKLAB
n-Nitroso-di-n-propylamine (NDPA)	625.1	9600	ng/L	EURFCALT
n-Nitroso-di-n-propylamine (NDPA)	8270C	1,000 - 5,000	ng/L	WECKLAB
n-Nitroso-di-n-propylamine (NDPA)	NDMA-LOW	2 - 10	ng/L	OCWD
n-Nitrosodiphenylamine (NDPhA)	625.1	1000	ng/L	WECKLAB
n-Nitrosodiphenylamine (NDPhA)	625.1	9600	ng/L	EURFCALT
n-Nitrosodiphenylamine (NDPhA)	8270C	1,000 - 5,000	ng/L	WECKLAB
N-Nitrosomorpholine (NMOR)	NDMA-LOW	2 - 10	ng/L	OCWD
Nonafluoro-3,6-dioxaheptanoic acid (NFDHA)	533	2	ng/L	OCWD
Nonanal (NONNAL)	556	2	ug/L	WECKLAB
Nonylphenol (NONYPH)	CEC	0.2	ug/L	OCWD
o-Xylene (o-XYL)	524.2	0.5	ug/L	OCWD
PCB-1016 (PCB16)	508.1	0.1	ug/L	WECKLAB
PCB-1221 (PCB21)	508.1	0.1	ug/L	WECKLAB

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
PCB-1232 (PCB32)	508.1	0.1	ug/L	WECKLAB
PCB-1242 (PCB42)	508.1	0.1	ug/L	WECKLAB
PCB-1248 (PCB48)	508.1	0.1	ug/L	WECKLAB
PCB-1254 (PCB54)	508.1	0.1	ug/L	WECKLAB
PCB-1260 (PCB60)	508.1	0.1	ug/L	WECKLAB
PCBs, Total (TOTPCB)	508.1	0.5	ug/L	WECKLAB
Perfluoro butane sulfonic acid (PFBS)	533	2	ng/L	OCWD
Perfluoro heptanoic acid (PFHpA)	533	2	ng/L	OCWD
Perfluoro hexane sulfonic acid (PFHxS)	533	2	ng/L	OCWD
Perfluoro nonanoic acid (PFNA)	533	2	ng/L	OCWD
Perfluoro octane sulfonic acid (PFOS)	533	2	ng/L	OCWD
Perfluoro octanoic acid (PFOA)	533	2	ng/L	OCWD
Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	533	2	ng/L	OCWD
Perfluoro-3-methoxypropanoic acid (PFMPA)	533	2	ng/L	OCWD
Perfluoro-4-methoxybutanoic acid (PFMBA)	533	2	ng/L	OCWD
Perfluorobutanoic acid (PFBA)	533	2	ng/L	OCWD
Perfluorodecanoic acid (PFDA)	533	2	ng/L	OCWD
Perfluorododecanoic acid (PFDoA)	533	2	ng/L	OCWD
Perfluoroheptanesulfonic Acid (PFHpS)	533	2	ng/L	OCWD
Perfluorohexanoic acid (PFHxA)	533	2	ng/L	OCWD
Perfluoropentanesulfonic acid (PFPeS)	533	2	ng/L	OCWD
Perfluoropentanoic acid (PFPeA)	533	2	ng/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Perfluorotetradecanoic acid (PFTA)	537.1	2	ng/L	OCWD
Perfluorotridecanoic acid (PFTrDA)	537.1	2	ng/L	OCWD
Perfluoroundecanoic acid (PFUnA)	533	2	ng/L	OCWD
Phenol (PHENOL)	625.1	1	ug/L	WECKLAB
Phenol (PHENOL)	625.1	9.6	ug/L	EURFCALT
Phenol (PHENOL)	8270C	1 - 5	ug/L	WECKLAB
PhenylPhenol (PHNYPH)	CEC	0.2	ug/L	OCWD
Progesterone (PRGSTR)	CEC	1	ng/L	OCWD
Propylbenzene (PRPBNZ)	524.2	0.5	ug/L	OCWD
Pyridine (PYRDN)	8270C	5 - 25	ug/L	WECKLAB
sec-Butylbenzene (sBBENZ)	524.2	0.5	ug/L	OCWD
Styrene (STYR)	524.2	0.5	ug/L	OCWD
Sucralose (SUCRAL)	CEC	100 - 1,000	ng/L	OCWD
Sum of five Haloacetic Acids (HAA5)	CALC	1	ug/L	OCWD
Sum of nine Haloacetic Acids (HAA9)	CALC	1	ug/L	OCWD
Sum of Six Brominated Haloacetic Acids (HAA6Br)	CALC	1	ug/L	OCWD
Terbufos Sulfone (TERSUL)	525.2	0.1	ug/L	OCWD
Tert-amyl methyl ether (TAME)	524.2	1	ug/L	OCWD
tert-butyl alcohol (TBA)	524.2	2	ug/L	OCWD
tert-Butylbenzene (tBBENZ)	524.2	0.5	ug/L	OCWD
Testosterone (trans-Testosterone) (TESTOR)	CEC	1	ng/L	OCWD
Tetrabromobisphenol A (TBBISA)	CEC	0.2	ug/L	OCWD
Tetrachloroethene (PCE)	524.2	0.5	ug/L	OCWD

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Constituent Type: ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Toluene (TOLU)	524.2	0.5	ug/L	OCWD
Total 1,3-Dichloropropene (x13DCP)	524.2	0.5	ug/L	OCWD
Total Trihalomethanes (TTHMs)	524.2	0.5	ug/L	OCWD
Total Xylenes (m,p,&o) (TOTALX)	524.2	0.5	ug/L	OCWD
trans-1,2 Dichloroethene (t12DCE)	524.2	0.5	ug/L	OCWD
trans-1,3-Dichloropropene (t13DCP)	524.2	0.5	ug/L	OCWD
Tribromoacetic Acid (TBAA)	552.2	1	ug/L	OCWD
Trichloroacetic Acid (TCAA)	552.2	1	ug/L	OCWD
Trichloroacetonitrile (TCAN)	551.1	0.1	ug/L	OCWD
Trichloroethene (TCE)	524.2	0.5	ug/L	OCWD
Trichlorofluoromethane (Freon 11) (CCl3F)	524.2	0.5	ug/L	OCWD
Trichlorotrifluoroethane (Freon 113) (Cl3F3E)	524.2	0.5	ug/L	OCWD
Trimethoprim (TRIMTP)	CEC	5	ng/L	OCWD
Tris-2-chloroethyl phosphate (TCEP)	CEC	5	ng/L	OCWD
Vinyl chloride (VNYLCL)	524.2	0.5	ug/L	OCWD

Constituent Type: ORGANIC FRB

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
11-chloroeicosafluoro3oxaundecane1sulfonicacid-FRB (B-11CLPF)	533	2	ng/L	OCWD
4,8-dioxa-3H-perfluorononanoic acid (FRB) (B-ADONA)	533	2	ng/L	OCWD
4:2 Fluorotelomer sulfonate (FRB) (B-4:2FTS)	533	2	ng/L	OCWD
6:2 Fluorotelomer sulfonate (FRB) (B-6:2FTS)	533	2	ng/L	OCWD

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: ORGANIC FRB

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
8:2 Fluorotelomer sulfonate (FRB) (B-8:2FTS)	533	2	ng/L	OCWD
9-chlorohexadecafluoro-3-oxanone1sulfonic acid-FRB (B-9CLPF3)	533	2	ng/L	OCWD
Hexafluoropropylene oxide dimer acid (GenX) (FRB) (B-HFPODA)	533	2	ng/L	OCWD
N-ethyl perfluorooctanesulfonamidoacetic acid(FRB) (B-EtFOSA)	537.1	2	ng/L	OCWD
N-methyl perfluorooctanesulfonamidoacetic acid-FRB (B-MeFOSA)	537.1	2	ng/L	OCWD
Nonafluoro-3,6-dioxaheptanoic acid (FRB) (B-NFDHA)	533	2	ng/L	OCWD
Perfluoro butane sulfonic acid (FRB) (B-PFBS)	533	2	ng/L	OCWD
Perfluoro heptanoic acid (FRB) (B-PFHpA)	533	2	ng/L	OCWD
Perfluoro hexane sulfonic acid (FRB) (B-PFHxS)	533	2	ng/L	OCWD
Perfluoro nonanoic acid (FRB) (B-PFNA)	533	2	ng/L	OCWD
Perfluoro octane sulfonic acid (FRB) (B-PFOS)	533	2	ng/L	OCWD
Perfluoro octanoic acid (FRB) (B-PFOA)	533	2	ng/L	OCWD
Perfluoro(2-ethoxyethane)sulfonic acid FRB) (B-PFEESA)	533	2	ng/L	OCWD
Perfluoro-3-methoxypropanoic acid (FRB) (B-PFMPA)	533	2	ng/L	OCWD
Perfluoro-4-methoxybutanoic acid (FRB) (B-PFMBA)	533	2	ng/L	OCWD
Perfluorobutanoic acid (FRB) (B-PFBA)	533	2	ng/L	OCWD
Perfluorodecanoic acid (FRB) (B-PFDA)	533	2	ng/L	OCWD
Perfluorododecanoic acid (FRB) (B-PFDoA)	533	2	ng/L	OCWD
Perfluoroheptanesulfonic Acid (FRB) (B-PFHpS)	533	2	ng/L	OCWD
Perfluorohexanoic acid (FRB) (B-PFHxA)	533	2	ng/L	OCWD
Perfluoropentanesulfonic acid (FRB) (B-PFPeS)	533	2	ng/L	OCWD
Perfluoropentanoic acid (FRB) (B-PFPeA)	533	2	ng/L	OCWD

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Constituent Type: ORGANIC FRB

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Perfluorotetradecanoic acid (FRB) (B-PFTA)	537.1	2	ng/L	OCWD
Perfluorotridecanoic acid (FRB) (B-PFTrDA)	537.1	2	ng/L	OCWD
Perfluoroundecanoic acid (FRB) (B-PFUnA)	533	2	ng/L	OCWD

Constituent Type: RADIOLOGICALS

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Gross Alpha Excluding Uranium (TOTa-U)	CALC	1.08	pCi/L	FGL
Natural Uranium (NTUr)	X200.8	0.67 - 1	pCi/L	FGL
Radium 226 + Radium 228 (Ra6Ra8)	CALC	0.41 - 0.716	pCi/L	FGL
Radium 226 + Radium 228 Counting Error (Ra68CE)	CALC	0.41 - 0.716	pCi/L	FGL
Total Alpha (TOTa)	7110C	1.08	pCi/L	FGL
Total Alpha Counting Error (TOTaCE)	7110C	1.08	pCi/L	FGL
Total Beta (TOTb)	900.0	0.147 - 3.4	pCi/L	FGL
Total Beta Counting Error (TOTbCE)	900.0	0.147 - 3.4	pCi/L	FGL
Total Radium 226 (TRa226)	903.0	0.41 - 0.716	pCi/L	FGL
Total Radium 226 Counting Error (TRa6CE)	903.0	0.41 - 0.716	pCi/L	FGL
Total Radium 228 (TRa228)	RA-05	0.0491 - 0.643	pCi/L	FGL
Total Radium 228 Counting Error (TRa8CE)	RA-05	0.0491 - 0.643	pCi/L	FGL
Total Strontium-90 (TS90)	905.0MOD	1.36 - 1.859	pCi/L	EBER
Total Strontium-90 Counting Error (TS90CE)	905.0MOD	1.36 - 1.859	pCi/L	EBER
Total Tritium (TTr)	906.0	434	pCi/L	FGL
Total Tritium Counting Error (TTrCE)	906.0	434	pCi/L	FGL

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
1-Naphthol (NPTHOL)	531.2	5	ug/L	OCWD
2,4,5-T (245T)	515.4	0.2	ug/L	WECKLAB
2,4,5-TP (Silvex) (245TP)	515.4	0.2	ug/L	WECKLAB
2,4,6-Trinitrotoluene (246TNT)	8330A	0.34 - 1	ug/L	WECKLAB
2,4,6-Trinitrotoluene (246TNT)	8330A	0.11	ug/L	EURDENVR
2,4-DB (24DB)	515.4	2	ug/L	WECKLAB
2,4-Dichlorophenoxyacetic Acid (24D)	515.4	0.4	ug/L	WECKLAB
3,5-Dichlorobenzoic Acid (35DBA)	515.4	1	ug/L	WECKLAB
3-Hydroxycarbofuran (HYDCFR)	531.2	2	ug/L	OCWD
4,4'-DDD (DDD)	508.1	0.01	ug/L	WECKLAB
4,4'-DDD (DDD)	525.2	0.1	ug/L	OCWD
4,4'-DDD (DDD)	8081A_LL	0.0097	ug/L	EURFCALT
4,4'-DDE (DDE)	508.1	0.01	ug/L	WECKLAB
4,4'-DDE (DDE)	525.2	0.1	ug/L	OCWD
4,4'-DDE (DDE)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
4,4'-DDT (DDT)	508.1	0.01	ug/L	WECKLAB
4,4'-DDT (DDT)	525.2	0.1	ug/L	OCWD
4,4'-DDT (DDT)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Acenaphthene (ACNAPE)	525.2	0.1	ug/L	OCWD
Acenaphthene (ACNAPE)	625.1	1	ug/L	WECKLAB
Acenaphthene (ACNAPE)	625.1	9.6	ug/L	EURFCALT
Acenaphthene (ACNAPE)	8270C	1 - 5	ug/L	WECKLAB
Acenaphthylene (ACENAP)	525.2	0.1	ug/L	OCWD
Acenaphthylene (ACENAP)	625.1	1	ug/L	WECKLAB
Acenaphthylene (ACENAP)	625.1	9.6	ug/L	EURFCALT
Acenaphthylene (ACENAP)	8270C	1 - 5	ug/L	WECKLAB

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ORANGE COUNTY WATER DISTRICT
Water Quality Constituents With Laboratory Methods For 2023

Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Acetaminophen (ACTMNP)	CEC	5	ng/L	OCWD
Acetochlor (ACETOC)	525.2	0.1	ug/L	OCWD
Acifluorfen (ACIFEN)	515.4	0.4	ug/L	WECKLAB
Alachlor (ALACHL)	525.2	0.1	ug/L	OCWD
Aldicarb (ALDI)	531.2	1	ug/L	OCWD
Aldicarb sulfone (ALDISN)	531.2	2	ug/L	OCWD
Aldicarb sulfoxide (ALDISX)	531.2	2	ug/L	OCWD
Aldrin (ALDRIN)	508.1	0.01	ug/L	WECKLAB
Aldrin (ALDRIN)	525.2	0.1	ug/L	OCWD
Aldrin (ALDRIN)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Ametryn (AMERYN)	525.2	0.1	ug/L	OCWD
Anthracene (ANTHRA)	525.2	0.1	ug/L	OCWD
Anthracene (ANTHRA)	625.1	1	ug/L	WECKLAB
Anthracene (ANTHRA)	625.1	9.6	ug/L	EURFCALT
Anthracene (ANTHRA)	8270C	1 - 5	ug/L	WECKLAB
Atrazine (ATRAZ)	525.2	0.1	ug/L	OCWD
Atrazine (ATRAZ)	CEC	0.001	ug/L	OCWD
Baygon (BAYGON)	531.2	1	ug/L	OCWD
Bentazon (BENTAZ)	515.4	2	ug/L	WECKLAB
Benzo(a)anthracene (BaANTH)	525.2	0.1	ug/L	OCWD
Benzo(a)anthracene (BaANTH)	625.1	1	ug/L	WECKLAB
Benzo(a)anthracene (BaANTH)	625.1	9.6	ug/L	EURFCALT
Benzo(a)anthracene (BaANTH)	8270C	1 - 5	ug/L	WECKLAB
Benzo(a)pyrene (BaPYRE)	525.2	0.1	ug/L	OCWD
Benzo(a)pyrene (BaPYRE)	625.1	1	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Benzo(a)pyrene (BaPYRE)	625.1	9.6	ug/L	EURFCALT
Benzo(a)pyrene (BaPYRE)	8270C	1 - 5	ug/L	WECKLAB
Benzo(b)fluoranthene (BbFLUR)	525.2	0.1	ug/L	OCWD
Benzo(b)fluoranthene (BbFLUR)	625.1	9.6	ug/L	EURFCALT
Benzo(b)fluoranthene (BbFLUR)	625.1	1	ug/L	WECKLAB
Benzo(b)fluoranthene (BbFLUR)	8270C	1 - 5	ug/L	WECKLAB
Benzo(g,h,i)perylene (BghiPR)	525.2	0.1	ug/L	OCWD
Benzo(g,h,i)perylene (BghiPR)	625.1	2	ug/L	WECKLAB
Benzo(g,h,i)perylene (BghiPR)	625.1	9.6	ug/L	EURFCALT
Benzo(g,h,i)perylene (BghiPR)	8270C	2 - 10	ug/L	WECKLAB
Benzo[k]fluoranthene (BkFLUR)	525.2	0.1	ug/L	OCWD
Benzo[k]fluoranthene (BkFLUR)	625.1	1	ug/L	WECKLAB
Benzo[k]fluoranthene (BkFLUR)	625.1	9.6	ug/L	EURFCALT
Benzo[k]fluoranthene (BkFLUR)	8270C	1 - 5	ug/L	WECKLAB
bis (2-ethylhexyl) adipate (DEHA)	525.2	2	ug/L	OCWD
bis (2-ethylhexyl) phthalate (DEHP)	525.2	2	ug/L	OCWD
bis (2-ethylhexyl) phthalate (DEHP)	625.1	5	ug/L	WECKLAB
bis (2-ethylhexyl) phthalate (DEHP)	625.1	9.6	ug/L	EURFCALT
bis (2-ethylhexyl) phthalate (DEHP)	8270C	5 - 25	ug/L	WECKLAB
Bromacil (BROMAC)	525.2	0.1	ug/L	OCWD
Butachlor (BUTACL)	525.2	0.1	ug/L	OCWD
Butanal (BUTAN)	556	2	ug/L	WECKLAB
Butylate (BTYATE)	525.2	0.1	ug/L	OCWD
Butylbenzyl phthalate (BBP)	525.2	2	ug/L	OCWD
Butylbenzyl phthalate (BBP)	625.1	1	ug/L	WECKLAB
Butylbenzyl phthalate (BBP)	625.1	9.6	ug/L	EURFCALT
Butylbenzyl phthalate (BBP)	8270C	1 - 5	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Caffeine (CAFFEI)	525.2	100	ng/L	OCWD
Caffeine (CAFFEI)	CEC	3 - 30	ng/L	OCWD
Captan (CAPTAN)	525.2	0.1	ug/L	OCWD
Carbamazepine (CBMAZP)	CEC	1	ng/L	OCWD
Carbaryl (CARBAR)	531.2	2	ug/L	OCWD
Carbofuran (CARBOF)	531.2	1	ug/L	OCWD
Chlordane (ClDANE)	508.1	0.1	ug/L	WECKLAB
Chlordane (ClDANE)	8081A_LL	0.048 - 0.049	ug/L	EURFCALT
Chlordane-alpha (CLDA)	525.2	0.1	ug/L	OCWD
Chlordane-alpha (CLDA)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Chlordane-gamma (CLDG)	525.2	0.1	ug/L	OCWD
Chlordane-gamma (CLDG)	8081A_LL	0.015	ug/L	EURFCALT
Chlorobenzilate (CLBZLA)	525.2	0.1	ug/L	OCWD
Chloroneb (CLNEB)	525.2	0.1	ug/L	OCWD
Chlorothalonil (CLTNIL)	508.1	0.05	ug/L	WECKLAB
Chlorothalonil (CLTNIL)	525.2	0.1	ug/L	OCWD
Chlorpropham (CPRPHM)	525.2	0.1	ug/L	OCWD
Chlorpyrifos (ClPYRI)	525.2	0.1	ug/L	OCWD
Chrysene (CHRYS)	525.2	0.1	ug/L	OCWD
Chrysene (CHRYS)	625.1	1	ug/L	WECKLAB
Chrysene (CHRYS)	625.1	9.6	ug/L	EURFCALT
Chrysene (CHRYS)	8270C	1 - 5	ug/L	WECKLAB
Dalapon (DALAPN)	515.4	0.4	ug/L	WECKLAB
Dalapon (DALAPN)	552.2	1	ug/L	OCWD
DCPA-Dacthal (DCPA)	515.4	0.1	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
DCPA-Dacthal (DCPA)	525.2	0.1	ug/L	OCWD
Diazinon (DIAZI)	525.2	0.1	ug/L	OCWD
Dibenzo(a,h)anthracene (DBahAN)	525.2	0.1	ug/L	OCWD
Dibenzo(a,h)anthracene (DBahAN)	625.1	2	ug/L	WECKLAB
Dibenzo(a,h)anthracene (DBahAN)	625.1	9.6	ug/L	EURFCALT
Dibenzo(a,h)anthracene (DBahAN)	8270C	2 - 10	ug/L	WECKLAB
Dicamba (DICAMB)	515.4	0.6	ug/L	WECKLAB
Dichlorprop (24DP)	515.4	0.3	ug/L	WECKLAB
Dichlorvos (DCLVOS)	525.2	0.1	ug/L	OCWD
Dieldrin (DIELDR)	508.1	0.01	ug/L	WECKLAB
Dieldrin (DIELDR)	525.2	0.1	ug/L	OCWD
Dieldrin (DIELDR)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Diethyl phthalate (DEP)	525.2	2	ug/L	OCWD
Diethyl phthalate (DEP)	625.1	9.6	ug/L	EURFCALT
Diethyl phthalate (DEP)	625.1	1	ug/L	WECKLAB
Diethyl phthalate (DEP)	8270C	1 - 5	ug/L	WECKLAB
Dimethoate (DMTH)	525.2	1	ug/L	OCWD
Dimethyl phthalate (DMP)	525.2	2	ug/L	OCWD
Dimethyl phthalate (DMP)	625.1	1	ug/L	WECKLAB
Dimethyl phthalate (DMP)	625.1	9.6	ug/L	EURFCALT
Dimethyl phthalate (DMP)	8270C	1 - 5	ug/L	WECKLAB
Di-n-butylphthalate (DnBP)	525.2	2	ug/L	OCWD
Di-n-butylphthalate (DnBP)	625.1	9.6	ug/L	EURFCALT
Di-n-butylphthalate (DnBP)	625.1	1	ug/L	WECKLAB
Di-n-butylphthalate (DnBP)	8270C	1 - 5	ug/L	WECKLAB
Di-n-octyl phthalate (DnOP)	525.2	2	ug/L	OCWD
Di-n-octyl phthalate (DnOP)	625.1	1	ug/L	WECKLAB

Laboratory Abbreviation Descriptions:

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Di-n-octyl phthalate (DnOP)	625.1	9.6	ug/L	EURFCALT
Di-n-octyl phthalate (DnOP)	8270C	1 - 5	ug/L	WECKLAB
Dinoseb (DINOSB)	515.4	0.4	ug/L	WECKLAB
Diphenamid (DPHNMD)	525.2	0.1	ug/L	OCWD
Diquat (DIQUAT)	549.2	4	ug/L	OCWD
Diuron (DIURON)	CEC	0.005	ug/L	OCWD
Endosulfan I (ENDOI)	508.1	0.01	ug/L	WECKLAB
Endosulfan I (ENDOI)	525.2	0.1	ug/L	OCWD
Endosulfan I (ENDOI)	8081A_LL	0.0019	ug/L	EURFCALT
Endosulfan sulfate (ENDOSL)	508.1	0.01	ug/L	WECKLAB
Endosulfan sulfate (ENDOSL)	525.2	0.1	ug/L	OCWD
Endosulfan sulfate (ENDOSL)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Endothall (ENDOTL)	548.1	45	ug/L	WECKLAB
Endrin (ENDRIN)	508.1	0.01	ug/L	WECKLAB
Endrin (ENDRIN)	525.2	0.1	ug/L	OCWD
Endrin (ENDRIN)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
Endrin Aldehyde (ENDR-A)	508.1	0.01	ug/L	WECKLAB
Endrin Aldehyde (ENDR-A)	525.2	0.1	ug/L	OCWD
Endrin Aldehyde (ENDR-A)	8081A_LL	0.048 - 0.049	ug/L	EURFCALT
Endrin Ketone (ENDR-K)	8081A_LL	0.0048-0.0049	ug/L	EURFCALT
EPTC (EPTC)	525.2	0.1	ug/L	OCWD
Erythromycin (ERYTHN)	CEC	1	ng/L	OCWD
Ethion (ETHION)	525.2	0.1	ug/L	OCWD
Ethoprop (ETHPRP)	525.2	0.1	ug/L	OCWD
Ethylene Glycol (GLYCOL)	8015B	10000	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Etridiazole (ETRDZL)	525.2	0.1	ug/L	OCWD
Fluoranthene (FLANTH)	525.2	0.1	ug/L	OCWD
Fluoranthene (FLANTH)	625.1	1	ug/L	WECKLAB
Fluoranthene (FLANTH)	625.1	9.6	ug/L	EURFCALT
Fluoranthene (FLANTH)	8270C	1 - 5	ug/L	WECKLAB
Fluorene (FLUOR)	525.2	0.1	ug/L	OCWD
Fluorene (FLUOR)	625.1	1	ug/L	WECKLAB
Fluorene (FLUOR)	625.1	9.6	ug/L	EURFCALT
Fluorene (FLUOR)	8270C	1 - 5	ug/L	WECKLAB
Gemfibrozil (GMFIBZ)	CEC	1	ng/L	OCWD
Glyphosate (GLYPHO)	547	25	ug/L	OCWD
HCH-gamma (Lindane) (LINDNE)	508.1	0.01	ug/L	WECKLAB
HCH-gamma (Lindane) (LINDNE)	525.2	0.1	ug/L	OCWD
HCH-gamma (Lindane) (LINDNE)	8081A_LL	0.0019	ug/L	EURFCALT
Heptachlor (HEPTA)	508.1	0.01	ug/L	WECKLAB
Heptachlor (HEPTA)	525.2	0.1	ug/L	OCWD
Heptachlor (HEPTA)	8081A_LL	0.0019	ug/L	EURFCALT
Heptachlor epoxide (HEPEPX)	508.1	0.01	ug/L	WECKLAB
Heptachlor epoxide (HEPEPX)	525.2	0.1	ug/L	OCWD
Heptachlor epoxide (HEPEPX)	8081A_LL	0.0097	ug/L	EURFCALT
Hexachlorobenzene (HEXCLB)	508.1	0.05	ug/L	WECKLAB
Hexachlorobenzene (HEXCLB)	525.2	0.1	ug/L	OCWD
Hexachlorobenzene (HEXCLB)	625.1	1	ug/L	WECKLAB
Hexachlorobenzene (HEXCLB)	625.1	9.6	ug/L	EURFCALT
Hexachlorobenzene (HEXCLB)	8270C	1 - 5	ug/L	WECKLAB
Hexachlorocyclopentadiene (HClCPD)	508.1	0.05 - 0.2	ug/L	WECKLAB
Hexachlorocyclopentadiene (HClCPD)	525.2	0.1	ug/L	OCWD
Hexachlorocyclopentadiene (HClCPD)	625.1	5	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	*Method*	*Reportable Detection Limit Range*	*Units*	*Laboratory*
Hexachlorocyclopentadiene (HClCPD)	625.1	24	ug/L	EURFCALT
Hexachlorocyclopentadiene (HClCPD)	8270C	5 - 25	ug/L	WECKLAB
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	8330A	0.1 - 1	ug/L	WECKLAB
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)	8330A	0.21 - 0.22	ug/L	EURDENVR
Hexazinone (HEXZON)	525.2	0.1	ug/L	OCWD
Ibuprofen (IBPRFN)	CEC	1 - 10	ng/L	OCWD
Indeno(1,2,3-cd)pyrene (INDPYR)	525.2	0.1	ug/L	OCWD
Indeno(1,2,3-cd)pyrene (INDPYR)	625.1	2	ug/L	WECKLAB
Indeno(1,2,3-cd)pyrene (INDPYR)	625.1	9.6	ug/L	EURFCALT
Indeno(1,2,3-cd)pyrene (INDPYR)	8270C	2 - 10	ug/L	WECKLAB
Malathion (MALATH)	525.2	2	ug/L	OCWD
Methiocarb (MTHCRB)	531.2	4	ug/L	OCWD
Methomyl (MTHOMY)	531.2	1	ug/L	OCWD
Methoxychlor (METHOX)	508.1	0.01	ug/L	WECKLAB
Methoxychlor (METHOX)	525.2	0.1	ug/L	OCWD
Methoxychlor (METHOX)	8081A_LL	0.0097	ug/L	EURFCALT
methyl-Parathion (MPARA)	525.2	0.5	ug/L	OCWD
Metribuzin (MTRBZN)	525.2	0.1	ug/L	OCWD
Molinate (MOLINT)	525.2	0.1	ug/L	OCWD
N,N-diethyl-m-toluamide (DEET)	CEC	1	ng/L	OCWD
Norflurazon (NORFLR)	525.2	1	ug/L	OCWD
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	8330A	0.3 - 1	ug/L	WECKLAB
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)	8330A	0.21 - 0.22	ug/L	EURDENVR
Oxamyl (OXAMYL)	531.2	2	ug/L	OCWD
Oxybenzone (BP3)	CEC	1	ng/L	OCWD

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Paraquat (PARAQT)	549.2	4	ug/L	OCWD
Parathion (PARA)	525.2	0.5	ug/L	OCWD
Pentachlorophenol (PCP) (PCP)	515.4	0.2	ug/L	WECKLAB
Pentachlorophenol (PCP) (PCP)	525.2	1	ug/L	OCWD
Pentachlorophenol (PCP) (PCP)	625.1	1	ug/L	WECKLAB
Pentachlorophenol (PCP) (PCP)	625.1	9.6	ug/L	EURFCALT
Pentachlorophenol (PCP) (PCP)	8270C	1 - 5	ug/L	WECKLAB
Pentachlorophenol (PCP) (PCP)	CEC	0.2	ug/L	OCWD
Pentanal (PENTNL)	556	2	ug/L	WECKLAB
Permethrin-(total of cis/trans) (PMTHRN)	525.2	0.1	ug/L	OCWD
Phenanthrene (PHENAN)	525.2	0.1	ug/L	OCWD
Phenanthrene (PHENAN)	625.1	1	ug/L	WECKLAB
Phenanthrene (PHENAN)	625.1	9.6	ug/L	EURFCALT
Phenanthrene (PHENAN)	8270C	1 - 5	ug/L	WECKLAB
Picloram (PICLOR)	515.4	0.6	ug/L	WECKLAB
Primidone (PRIMDN)	CEC	1	ng/L	OCWD
Prometryn (PROMET)	525.2	0.1	ug/L	OCWD
Pronamide (PROAMD)	525.2	0.1	ug/L	OCWD
Propachlor (PROPCL)	508.1	0.05 - 0.2	ug/L	WECKLAB
Propachlor (PROPCL)	525.2	0.1	ug/L	OCWD
Propanal (PROPNL)	556	2	ug/L	WECKLAB
Propazine (PROPAZ)	525.2	0.1	ug/L	OCWD
Pyrene (PYRENE)	525.2	0.1	ug/L	OCWD
Pyrene (PYRENE)	625.1	1	ug/L	WECKLAB
Pyrene (PYRENE)	625.1	9.6	ug/L	EURFCALT
Pyrene (PYRENE)	8270C	1 - 5	ug/L	WECKLAB

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Constituent Type: SEMI-ORGANIC

Constituent Name & Abbreviation	Method	Reportable Detection Limit Range	Units	Laboratory
Simazine (SIMAZ)	525.2	0.1	ug/L	OCWD
Simazine (SIMAZ)	CEC	0.005	ug/L	OCWD
Sulfamethoxazole (SULTHZ)	CEC	1 - 10	ng/L	OCWD
Tebuthiuron (TBTURN)	525.2	2	ug/L	OCWD
Terbacil (TRBACL)	525.2	0.1	ug/L	OCWD
Thiobencarb (THIO)	525.2	0.1	ug/L	OCWD
Toxaphene Mixture (TOXA)	508.1	1	ug/L	WECKLAB
Toxaphene Mixture (TOXA)	8081A_LL	0.097	ug/L	EURFCALT
Triclosan (TRICLN)	CEC	1	ng/L	OCWD
Trifluralin (TRFLRN)	508.1	0.01	ug/L	WECKLAB
Trifluralin (TRFLRN)	525.2	0.1	ug/L	OCWD
Trithion (TRTION)	525.2	0.1	ug/L	OCWD

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Appendix D

Pathogenic Microorganism Reduction Reports

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus(1)	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
01/01/23	12.39	12.39	12.38	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/02/23	12.36	12.36	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/03/23	12.26	12.26	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/04/23	12.16	12.16	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/05/23	12.16	12.16	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/06/23	12.14	12.14	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/07/23	12.11	12.11	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/08/23	12.15	12.15	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/09/23	12.28	12.28	12.26	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/10/23	12.28	12.28	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/11/23	12.29	12.29	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/12/23	12.27	12.27	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/13/23	12.24	12.24	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/14/23	12.28	12.28	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/15/23	12.38	12.38	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/16/23	12.41	12.41	12.38	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/17/23	12.31	12.31	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/18/23	12.33	12.33	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/19/23	12.34	12.34	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/20/23	12.29	12.29	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/21/23	12.34	12.34	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/22/23	12.39	12.39	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/23/23	12.39	12.39	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/24/23	12.32	12.32	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/25/23	12.29	12.29	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/26/23	12.28	12.28	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/27/23	12.30	12.30	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/28/23	12.34	12.34	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/29/23	12.35	12.35	12.34	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/30/23	12.38	12.38	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
01/31/23	12.32	12.32	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
01/01/23	0.00	4.02	2.38	6.00	0.00	12.39
01/02/23	0.00	4.01	2.35	6.00	0.00	12.36
01/03/23	0.00	4.01	2.24	6.00	0.00	12.26
01/04/23	0.00	4.00	2.16	6.00	0.00	12.16
01/05/23	0.00	4.01	2.15	6.00	0.00	12.16
01/06/23	0.00	4.02	2.12	6.00	0.00	12.14
01/07/23	0.00	4.01	2.09	6.00	0.00	12.11
01/08/23	0.00	4.01	2.13	6.00	0.00	12.15
01/09/23	0.00	4.02	2.26	6.00	0.00	12.28
01/10/23	0.00	4.01	2.28	6.00	0.00	12.28
01/11/23	0.00	4.01	2.28	6.00	0.00	12.29
01/12/23	0.00	4.00	2.27	6.00	0.00	12.27
01/13/23	0.00	4.00	2.24	6.00	0.00	12.24
01/14/23	0.00	4.02	2.27	6.00	0.00	12.28
01/15/23	0.00	4.03	2.35	6.00	0.00	12.38
01/16/23	0.00	4.02	2.38	6.00	0.00	12.41
01/17/23	0.00	4.00	2.31	6.00	0.00	12.31
01/18/23	0.00	4.03	2.30	6.00	0.00	12.33
01/19/23	0.00	4.04	2.31	6.00	0.00	12.34
01/20/23	0.00	4.01	2.28	6.00	0.00	12.29
01/21/23	0.00	4.03	2.31	6.00	0.00	12.34
01/22/23	0.00	4.03	2.36	6.00	0.00	12.39
01/23/23	0.00	4.03	2.37	6.00	0.00	12.39
01/24/23	0.00	4.02	2.30	6.00	0.00	12.32
01/25/23	0.00	4.02	2.27	6.00	0.00	12.29
01/26/23	0.00	4.00	2.28	6.00	0.00	12.28
01/27/23	0.00	4.02	2.28	6.00	0.00	12.30
01/28/23	0.00	4.04	2.30	6.00	0.00	12.34
01/29/23	0.00	4.01	2.34	6.00	0.00	12.35
01/30/23	0.00	4.02	2.36	6.00	0.00	12.38
01/31/23	0.00	4.01	2.31	6.00	0.00	12.32

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (1)	Total
Date	LRV	LRV	LRV	LRV	LRV	LRV
01/01/23	0.00	0.00	2.38	6.00	4.00	12.38
01/02/23	0.00	0.00	2.35	6.00	4.00	12.35
01/03/23	0.00	0.00	2.24	6.00	4.00	12.24
01/04/23	0.00	0.00	2.16	6.00	4.00	12.16
01/05/23	0.00	0.00	2.15	6.00	4.00	12.15
01/06/23	0.00	0.00	2.12	6.00	4.00	12.12
01/07/23	0.00	0.00	2.09	6.00	4.00	12.09
01/08/23	0.00	0.00	2.13	6.00	4.00	12.13
01/09/23	0.00	0.00	2.26	6.00	4.00	12.26
01/10/23	0.00	0.00	2.28	6.00	4.00	12.28
01/11/23	0.00	0.00	2.28	6.00	4.00	12.28
01/12/23	0.00	0.00	2.27	6.00	4.00	12.27
01/13/23	0.00	0.00	2.24	6.00	4.00	12.24
01/14/23	0.00	0.00	2.27	6.00	4.00	12.27
01/15/23	0.00	0.00	2.35	6.00	4.00	12.35
01/16/23	0.00	0.00	2.38	6.00	4.00	12.38
01/17/23	0.00	0.00	2.31	6.00	4.00	12.31
01/18/23	0.00	0.00	2.30	6.00	4.00	12.30
01/19/23	0.00	0.00	2.31	6.00	4.00	12.31
01/20/23	0.00	0.00	2.28	6.00	4.00	12.28
01/21/23	0.00	0.00	2.31	6.00	4.00	12.31
01/22/23	0.00	0.00	2.36	6.00	4.00	12.36
01/23/23	0.00	0.00	2.37	6.00	4.00	12.37
01/24/23	0.00	0.00	2.30	6.00	4.00	12.30
01/25/23	0.00	0.00	2.27	6.00	4.00	12.27
01/26/23	0.00	0.00	2.28	6.00	4.00	12.28
01/27/23	0.00	0.00	2.28	6.00	4.00	12.28
01/28/23	0.00	0.00	2.30	6.00	4.00	12.30
01/29/23	0.00	0.00	2.34	6.00	4.00	12.34
01/30/23	0.00	0.00	2.36	6.00	4.00	12.36
01/31/23	0.00	0.00	2.31	6.00	4.00	12.31

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/23	5.04	4.89	5.14	5.05	4.08	4.03	4.14	4.02	4.96	5.18	4.97	4.94	5.07	5.10	5.03	5.01
01/02/23	5.04	4.90	5.13	5.04	4.16	4.03	4.13	4.10	4.92	5.08	4.97	4.89	5.05	5.08	5.02	5.02
01/03/23	5.00	4.86	5.10	5.09	4.08	4.13	4.12	4.07	4.87	5.11	4.95	4.87	5.02	5.07	5.04	5.04
01/04/23	4.94	4.87	5.12	5.13	4.09	4.09	4.08	N/A *	4.87	5.18	4.95	4.87	5.03	5.09	5.07	5.00
01/05/23	4.93	5.21	5.10	5.10	4.07	4.02	4.07	N/A *	4.87	5.08	4.93	4.85	5.04	5.09	5.06	4.98
01/06/23	4.87	5.12	5.14	5.05	4.05	4.02	4.08	N/A *	4.85	5.07	4.95	4.83	4.98	5.07	5.03	4.96
01/07/23	4.89	5.11	5.13	5.01	4.01	4.04	4.17	N/A *	4.84	5.06	4.90	4.81	5.19	5.06	5.01	4.97
01/08/23	4.90	5.11	5.07	5.05	4.14	4.04	4.20	N/A *	4.82	5.00	4.89	4.75	5.25	5.03	5.01	4.94
01/09/23	4.90	5.07	5.06	4.96	4.19	4.09	4.18	N/A *	4.86	5.06	4.88	4.72	5.22	5.02	5.00	4.91
01/10/23	4.88	5.01	5.05	4.98	4.23	4.06	4.17	N/A *	4.83	5.01	4.88	4.73	5.23	5.05	4.99	4.92
01/11/23	4.85	5.11	5.02	4.99	4.23	4.06	4.17	N/A *	4.79	4.98	4.84	5.01	5.21	5.03	5.01	4.91
01/12/23	5.14	5.15	4.99	4.98	4.17	4.06	4.15	N/A *	4.81	5.34	4.84	5.04	5.19	5.02	5.00	4.89
01/13/23	5.07	5.04	5.25	4.90	4.18	4.05	4.17	4.29	4.74	5.50	4.79	5.02	5.22	5.02	4.97	4.88
01/14/23	5.02	5.09	5.22	4.93	4.20	4.02	4.14	4.91	4.79	5.54	4.77	5.03	5.23	5.00	4.97	4.88
01/15/23	5.01	5.03	5.28	4.93	4.18	4.03	4.13	5.08	4.76	5.45	4.81	5.02	5.19	4.98	4.98	4.86
01/16/23	5.02	5.05	5.25	4.92	4.15	4.03	N/A *	5.11	4.73	5.48	4.79	5.02	5.19	4.97	4.99	4.85
01/17/23	5.00	5.04	5.24	4.83	4.15	4.19	N/A *	5.06	4.68	5.45	4.77	4.99	5.18	4.94	4.98	4.85
01/18/23	4.96	4.93	5.28	4.81	4.08	4.09	N/A *	5.01	4.65	5.41	4.74	4.98	5.15	4.92	4.95	4.81
01/19/23	4.96	4.99	5.20	4.80	4.07	4.07	N/A *	5.00	4.67	5.29	4.71	4.97	5.07	4.92	4.95	4.74
01/20/23	4.93	5.18	5.24	4.83	4.05	4.06	5.01	5.07	4.67	5.37	4.93	4.95	5.11	4.90	4.97	4.74
01/21/23	4.94	5.14	5.17	4.82	4.26	4.04	5.26	5.02	4.58	5.41	5.01	4.93	5.15	4.91	4.99	4.73
01/22/23	4.96	5.10	5.23	4.96	4.24	4.03	5.19	5.03	4.60	5.33	4.98	4.97	4.98	5.06	5.00	4.90
01/23/23	4.93	5.19	5.17	5.03	4.23	4.11	5.17	5.05	4.58	5.37	4.94	4.98	4.90	5.16	4.96	5.02
01/24/23	4.87	5.13	5.17	5.03	4.20	4.02	5.12	5.05	4.56	5.26	4.96	4.96	5.01	5.17	4.96	4.93
01/25/23	4.92	5.05	5.15	5.08	4.16	4.03	5.08	4.98	4.53	5.29	4.97	4.90	5.02	5.10	4.96	4.89
01/26/23	4.90	5.02	5.07	5.01	4.14	4.13	5.15	4.96	4.86	5.22	4.94	4.89	5.04	5.08	4.89	4.86
01/27/23	4.83	4.97	5.12	4.97	4.11	4.09	5.09	4.97	4.93	5.24	4.89	4.87	5.04	5.08	4.85	4.89
01/28/23	4.85	4.98	5.13	4.98	4.10	4.05	5.02	4.97	4.88	5.31	4.90	4.84	4.99	5.10	4.85	4.79
01/29/23	4.85	4.93	5.09	5.00	4.06	4.03	5.03	4.93	4.85	5.23	4.92	4.82	4.96	5.10	4.86	4.79
01/30/23	4.84	4.99	5.06	5.00	4.02	4.04	5.10	5.00	4.86	5.19	4.90	4.82	4.93	5.10	4.82	4.80
01/31/23	4.76	4.94	5.07	4.95	4.01	4.04	5.09	4.98	4.85	5.08	4.85	4.82	4.89	5.09	4.99	4.80

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/23	4.98	4.96	5.05	4.71	5.00	4.85	4.90	5.04	4.19	4.05	4.09	4.03	4.08	4.06	4.05	4.15
01/02/23	4.91	4.93	5.02	4.71	4.99	4.82	4.86	5.01	4.18	4.06	4.07	4.03	4.10	4.16	4.21	4.14
01/03/23	4.90	4.89	5.03	4.66	4.99	4.82	4.83	5.01	4.14	4.12	4.05	4.01	4.18	4.15	4.30	4.13
01/04/23	4.89	4.87	5.08	4.66	4.95	4.78	4.83	4.99	4.11	4.12	4.01	4.00	4.20	4.13	4.18	4.09
01/05/23	4.86	4.82	5.09	4.64	4.91	4.71	4.78	4.95	4.06	4.06	4.01	4.24	4.16	4.09	4.18	4.09
01/06/23	4.80	4.78	5.02	4.60	4.92	4.70	4.77	4.92	4.05	4.02	4.20	4.20	4.16	4.07	4.18	4.06
01/07/23	4.81	4.71	4.96	4.57	4.92	4.68	4.78	4.89	4.07	4.04	4.17	4.16	4.15	4.07	4.12	4.02
01/08/23	4.80	4.66	4.91	4.57	4.89	4.65	4.78	4.87	4.04	4.08	4.17	4.12	4.13	4.03	4.08	4.01
01/09/23	4.76	4.59	4.90	4.51	4.83	4.64	4.78	4.85	4.02	4.03	4.10	4.13	4.12	4.02	4.06	4.19
01/10/23	4.71	5.06	4.88	4.49	4.81	4.62	4.76	4.83	4.09	4.04	4.10	4.11	4.06	4.01	4.08	4.20
01/11/23	4.68	5.18	4.84	4.50	4.70	4.58	4.74	4.80	4.24	4.07	4.10	4.07	4.05	4.01	4.02	4.17
01/12/23	4.71	5.17	4.79	4.51	4.68	4.56	4.72	4.82	4.18	4.12	4.11	4.06	4.05	4.01	4.00	4.20
01/13/23	4.65	5.17	4.79	4.46	4.57	4.52	4.69	4.82	4.18	4.18	4.09	4.05	4.05	4.20	4.00	4.14
01/14/23	4.60	5.13	4.77	4.44	4.68	4.81	4.66	4.75	4.14	4.17	4.06	4.02	4.10	4.20	4.30	4.10
01/15/23	4.59	5.14	4.80	4.43	4.68	4.97	4.67	4.72	4.13	4.17	4.05	4.03	4.23	4.18	4.23	4.13
01/16/23	4.56	5.13	4.88	4.40	4.60	4.93	4.63	4.69	4.14	4.07	4.04	4.02	4.25	4.16	4.28	4.15
01/17/23	4.55	5.04	4.75	4.37	4.28	4.92	4.60	4.49	4.06	4.04	4.00	4.08	4.21	4.15	4.17	4.13
01/18/23	4.47	5.01	4.61	4.29	4.27	4.91	4.55	4.37	4.03	4.12	4.06	4.14	4.17	4.14	4.14	4.03
01/19/23	4.79	5.00	4.56	4.26	4.99	4.88	4.54	4.68	4.04	4.09	4.17	4.11	4.14	4.14	4.15	4.04
01/20/23	5.00	4.99	4.91	4.55	4.86	4.88	4.72	5.07	4.01	4.17	4.13	4.09	4.11	4.09	4.17	4.02
01/21/23	4.94	4.98	5.12	4.73	4.89	4.86	4.91	5.04	4.11	4.19	4.13	4.07	4.12	4.12	4.16	4.03
01/22/23	4.90	4.94	5.06	4.68	4.70	4.83	4.91	4.99	4.23	4.09	4.10	4.06	4.11	4.10	4.13	4.20
01/23/23	4.88	4.97	5.07	4.69	4.58	4.85	4.91	5.02	4.15	4.03	4.07	4.05	4.07	4.05	4.10	4.15
01/24/23	4.93	4.99	5.07	4.72	4.86	4.87	4.92	5.05	4.14	4.04	4.08	4.04	4.05	4.02	4.10	4.15
01/25/23	4.89	4.88	5.05	4.70	4.80	4.86	4.90	5.04	4.14	4.06	4.05	4.02	4.03	4.04	4.08	4.13
01/26/23	4.79	4.87	5.01	4.63	4.80	4.80	4.87	4.99	4.09	4.07	4.02	4.00	4.00	4.07	4.17	4.03
01/27/23	4.72	4.81	4.97	4.59	4.89	4.75	4.86	4.96	4.03	4.03	4.02	4.15	4.14	4.16	4.26	4.07
01/28/23	4.74	4.77	4.97	4.57	4.87	4.75	4.86	4.96	4.04	4.04	4.07	4.14	4.15	4.11	4.19	4.08
01/29/23	4.75	5.09	4.93	4.56	4.84	4.72	4.86	4.91	4.01	4.16	4.18	4.11	4.19	4.09	4.19	4.04
01/30/23	4.72	5.19	4.89	4.56	4.79	4.70	4.83	4.88	4.02	4.22	4.15	4.09	4.24	4.10	4.18	4.02
01/31/23	4.70	5.15	4.94	4.51	4.48	4.70	4.80	4.87	4.22	4.16	4.07	4.07	4.22	4.09	4.14	4.03

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
01/01/23	4.91	5.03	4.06	4.97	5.31	5.36	5.26	N/A **	5.18	5.32	N/A **	5.06	5.09	5.13	N/A **	N/A **
01/02/23	4.96	5.07	4.01	4.95	5.28	5.35	5.15	N/A **	5.18	5.29	N/A **	5.07	5.12	5.11	N/A **	N/A **
01/03/23	4.86	5.10	4.09	4.99	5.32	5.33	5.21	5.27	5.14	5.30	N/A **	5.01	5.15	5.20	5.37	5.37
01/04/23	4.84	5.05	4.09	4.96	5.28	5.27	5.32	5.20	5.15	5.48	N/A **	5.09	5.17	5.14	5.33	5.29
01/05/23	4.91	5.00	4.13	4.95	5.30	5.36	5.18	5.28	5.15	5.36	N/A	5.05	5.17	5.10	5.27	5.21
01/06/23	4.88	4.99	4.08	4.94	5.41	5.31	5.19	5.26	5.09	5.20	5.17	5.11	5.22	5.16	5.29	5.22
01/07/23	4.90	5.00	4.04	4.93	5.40	5.38	5.32	5.26	5.10	5.15	4.61	5.11	5.20	5.06	5.23	5.17
01/08/23	4.92	5.04	4.18	4.96	N/A **	5.55	5.15	5.26	5.06	N/A **	4.58	5.08	5.13	5.08	5.15	5.14
01/09/23	4.91	5.04	4.07	5.00	5.32	5.21	5.14	5.28	5.12	5.46	5.08	5.00	5.23	5.20	5.24	5.29
01/10/23	4.93	5.00	4.08	4.94	5.27	5.19	5.28	5.28	5.15	5.37	5.16	5.16	5.16	5.15	5.20	5.26
01/11/23	4.93	5.01	4.16	4.95	5.28	5.17	5.21	5.32	5.14	5.25	5.11	5.05	5.15	5.04	5.23	5.20
01/12/23	4.88	5.08	4.17	5.00	5.30	5.23	5.10	5.23	5.12	5.25	5.04	5.04	5.28	5.02	5.25	5.20
01/13/23	4.92	5.02	4.19	4.99	5.25	5.20	5.27	5.28	5.29	5.39	5.08	5.10	5.19	5.04	5.21	5.35
01/14/23	4.97	5.07	4.12	4.90	5.29	5.22	5.20	5.41	5.19	5.43	5.12	5.15	5.19	5.03	5.21	5.24
01/15/23	4.87	5.14	4.21	5.00	5.32	5.22	5.15	5.31	5.10	5.22	5.07	5.13	5.30	5.07	5.26	5.15
01/16/23	4.88	5.09	4.18	4.89	5.28	5.18	5.22	5.27	5.10	5.19	5.05	5.13	5.19	5.18	5.16	5.26
01/17/23	4.87	5.12	4.11	4.89	5.24	5.18	5.18	5.36	5.17	5.18	5.08	5.16	5.11	4.99	5.16	5.31
01/18/23	4.81	5.25	4.18	5.00	5.25	5.25	5.16	5.26	5.14	5.26	5.05	5.08	5.22	4.99	5.21	5.24
01/19/23	4.83	5.14	4.12	4.90	5.21	5.22	5.30	5.23	5.10	5.34	5.04	5.03	5.23	4.96	5.21	5.24
01/20/23	4.89	5.14	4.04	4.89	5.19	5.16	5.27	5.39	5.14	5.46	5.12	5.02	5.18	5.03	5.19	5.33
01/21/23	4.89	5.23	4.07	4.97	5.21	5.24	5.18	5.27	5.07	5.30	5.09	5.02	5.08	5.00	5.29	5.20
01/22/23	5.05	5.11	4.08	4.94	5.26	5.25	5.14	5.22	5.15	5.28	5.03	4.96	5.24	4.97	5.23	5.19
01/23/23	5.08	5.04	4.06	4.87	5.30	5.30	5.17	5.21	5.21	5.36	5.01	4.95	5.18	4.98	5.12	5.25
01/24/23	4.88	4.95	4.28	5.01	5.27	5.31	5.17	5.24	5.15	5.31	5.12	5.06	5.09	4.98	5.20	5.30
01/25/23	4.88	5.04	4.26	4.81	5.25	5.23	5.14	5.20	5.13	5.29	4.96	5.07	4.99	4.94	5.20	5.35
01/26/23	4.42	4.72	4.00	4.85	4.45	4.49	5.16	5.24	5.17	5.39	4.95	4.99	5.15	4.96	5.14	5.34
01/27/23	4.78	5.00	4.02	4.94	5.19	5.19	5.16	5.15	5.17	5.30	5.08	5.00	5.10	5.00	5.26	5.35
01/28/23	4.87	5.07	4.06	4.93	5.30	5.26	5.11	5.14	5.01	5.28	4.99	5.00	5.03	4.86	5.21	5.29
01/29/23	4.97	4.98	4.03	4.88	5.27	5.28	5.15	5.16	5.13	5.46	5.03	4.95	5.06	5.08	5.17	N/A **
01/30/23	4.81	4.86	4.25	5.03	5.28	5.21	5.14	5.24	5.11	5.24	5.05	5.11	5.07	4.87	5.29	N/A **
01/31/23	4.86	5.00	4.21	4.78	5.33	5.19	5.09	5.25	5.05	5.19	4.97	4.97	5.03	4.92	5.10	5.41

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
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MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
01/01/23	0.030	0.033	0.020	0.025	0.024	0.026	0.047	0.052	0.032	0.035	0.027	0.030	0.034	0.036	0.037	0.054	0.073	0.081	0.111	0.112	0.149	0.179	0.042	0.050	0.036
01/02/23	0.031	0.036	0.021	0.043	0.024	0.026	0.047	0.050	0.032	0.034	0.028	0.030	0.035	0.047	0.037	0.038	0.081	0.095	0.111	0.111	0.215***	0.257***	0.040	0.061	0.037
01/03/23	0.032	0.057	0.023	0.056	0.026	0.026	0.049	0.050	0.034	0.035	0.030	0.033	0.036	0.037	0.037	0.044	0.088	0.092	0.111	0.111	0.310***	0.378***	0.044	0.156	0.039
01/04/23	0.032	0.046	0.021	0.027	0.024	0.026	0.046	0.050	0.033	0.035	0.029	0.034	0.035	0.038	0.036	0.040	0.063	0.113	0.063	0.111	0.233***	0.430***	0.041	0.044	0.035
01/05/23	0.035	0.049	0.019	0.022	0.023	0.025	0.044	0.049	0.032	0.034	0.028	0.031	0.035	0.067	0.035	0.048	0.041	0.049	0.028	0.039	0.026	0.029	0.043	0.051	0.033
01/06/23	0.034	0.047	0.020	0.033	0.022	0.028	0.044	0.051	0.031	0.033	0.028	0.032	0.035	0.038	0.035	0.036	0.039	0.040	0.030	0.044	0.037	0.085	0.041	0.044	0.032
01/07/23	0.035	0.039	0.019	0.022	0.023	0.026	0.045	0.048	0.032	0.033	0.030	0.045	0.035	0.037	0.035	0.036	0.040	0.047	0.035	0.058	0.045	0.053	0.040	0.041	0.033
01/08/23	0.036	0.039	0.021	0.026	0.024	0.025	0.045	0.050	0.033	0.034	0.031	0.033	0.035	0.038	0.036	0.037	0.041	0.048	0.038	0.039	0.060	0.071	0.044	0.054	0.033
01/09/23	0.037	0.043	0.021	0.034	0.024	0.040	0.045	0.047	0.034	0.037	0.032	0.034	0.036	0.041	0.037	0.042	0.041	0.042	0.045	0.129	0.099***	0.337***	0.070***	0.395***	0.034
01/10/23	0.033	0.040	0.020	0.024	0.024	0.032	0.045	0.053	0.033	0.036	0.030	0.034	0.039	0.443***	0.036	0.040	0.040	0.046	0.047	0.053	0.093***	0.250***	0.063	0.129	0.033
01/11/23	0.027	0.031	0.020	0.031	0.025	0.028	0.045	0.047	0.033	0.035	0.028	0.030	0.035	0.037	0.035	0.064	0.039	0.056	0.050	0.118	0.050	0.063	0.040	0.052	0.032
01/12/23	0.029	0.033	0.020	0.023	0.025	0.029	0.045	0.046	0.032	0.034	0.028	0.037	0.035	0.040	0.035	0.045	0.039	0.041	0.100	0.149	0.084	0.113	0.041	0.045	0.032
01/13/23	0.029	0.037	0.024	0.056	0.024	0.025	0.045	0.047	0.033	0.034	0.028	0.030	0.036	0.049	0.036	0.039	0.040	0.051	0.156	0.186	0.161***	0.219***	0.041	0.045	0.033
01/14/23	0.029	0.034	0.024	0.033	0.024	0.028	0.046	0.048	0.033	0.039	0.029	0.032	0.037	0.051	0.037	0.040	0.042	0.053	0.179***	0.204***	0.279***	0.353***	0.042	0.051	0.033
01/15/23	0.028	0.030	0.022	0.045	0.025	0.029	0.046	0.053	0.034	0.037	0.030	0.032	0.036	0.077	0.036	0.037	0.041	0.044	0.199***	0.214***	0.363***	0.364***	0.041	0.046	0.033
01/16/23	0.028	0.036	0.021	0.026	0.023	0.025	0.045	0.047	0.033	0.035	0.029	0.031	0.036	0.055	0.035	0.037	0.043	0.058	0.131***	0.224***	0.219***	0.364***	0.040	0.044	0.033
01/17/23	0.029	0.032	0.022	0.031	0.024	0.026	0.046	0.051	0.033	0.036	0.030	0.033	0.037	0.042	0.036	0.037	0.045	0.054	0.028	0.038	0.035	0.053	0.040	0.063	0.034
01/18/23	0.030	0.032	0.022	0.024	0.025	0.035	0.046	0.048	0.034	0.041	0.032	0.036	0.038	0.050	0.037	0.076	0.046	0.048	0.028	0.033	0.037	0.042	0.042	0.045	0.034
01/19/23	0.029	0.040	0.021	0.029	0.024	0.029	0.044	0.048	0.033	0.041	0.029	0.051	0.036	0.046	0.036	0.041	0.042	0.059	0.030	0.044	0.036	0.089	0.043	0.056	0.033
01/20/23	0.027	0.047	0.025	0.250***	0.024	0.026	0.043	0.045	0.032	0.036	0.027	0.034	0.035	0.038	0.036	0.073	0.039	0.044	0.028	0.035	0.030	0.044	0.040	0.057	0.032
01/21/23	0.028	0.032	0.026	0.086	0.024	0.030	0.045	0.058	0.032	0.035	0.026	0.029	0.035	0.045	0.036	0.045	0.039	0.043	0.027	0.030	0.030	0.031	0.040	0.045	0.032
01/22/23	0.028	0.035	0.022	0.032	0.024	0.031	0.045	0.048	0.032	0.050	0.027	0.029	0.035	0.038	0.036	0.037	0.040	0.053	0.030	0.036	0.033	0.052	0.042	0.048	0.032
01/23/23	0.028	0.032	0.022	0.026	0.024	0.026	0.045	0.048	0.032	0.036	0.028	0.040	0.035	0.040	0.036	0.047	0.042	0.048	0.031	0.039	0.040	0.068	0.042	0.061	0.033
01/24/23	0.029	0.060	0.021	0.026	0.024	0.031	0.046	0.062	0.033	0.035	0.028	0.030	0.036	0.040	0.037	0.062	0.044	0.045	0.030	0.031	0.042	0.045	0.042	0.044	0.033
01/25/23	0.029	0.031	0.022	0.060	0.025	0.030	0.046	0.047	0.033	0.035	0.029	0.031	0.036	0.039	0.037	0.044	0.047	0.051	0.035	0.041	0.050	0.071	0.044	0.051	0.034
01/26/23	0.028	0.031	0.021	0.027	0.022	0.029	0.044	0.048	0.033	0.034	0.028	0.030	0.037	0.058	0.039	0.124	0.052	0.066	0.036	0.043	0.061	0.070	0.044	0.054	0.034
01/27/23	0.028	0.029	0.021	0.031	0.024	0.025	0.044	0.062	0.033	0.035	0.027	0.040	0.036	0.056	0.038	0.045	0.051	0.060	0.038	0.041	0.043	0.070	0.038	0.048	0.033
01/28/23	0.028	0.031	0.022	0.025	0.024	0.026	0.044	0.047	0.033	0.034	0.027	0.029	0.036	0.057	0.037	0.039	0.048	0.052	0.039	0.045	0.025	0.035	0.032	0.043	0.033
01/29/23	0.028	0.032	0.022	0.044	0.024	0.027	0.045	0.047	0.034	0.038	0.028	0.031	0.036	0.058	0.037	0.048	0.053	0.056	0.043	0.049	0.027	0.041	0.031	0.040	0.034
01/30/23	0.028	0.030	0.023	0.054	0.025	0.028	0.046	0.058	0.033	0.035	0.028	0.030	0.037	0.066	0.039	0.124	0.059	0.067	0.047	0.049	0.025	0.028	0.033	0.038	0.035
01/31/23	0.029	0.034	0.023	0.027	0.025	0.026	0.047	0.060	0.034	0.063	0.029	0.055	0.036	0.038	0.038	0.076	0.064	0.070	0.049	0.054	0.027	0.056	0.035	0.046	0.036

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

*** Erroneous value due to instrumentation isse.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
01/01/23	0.015	0.015	6.914	6.469	7.528	0.029	0.024	0.036	2,099	1,903	2,371	41	35	50	99.58	2.38	98.05	1.71
01/02/23	0.015	0.015	6.779	6.378	7.315	0.030	0.020	0.038	2,392	2,203	2,711	51	45	62	99.55	2.35	97.86	1.67
01/03/23	0.015	0.015	7.147	6.854	7.857	0.041	0.028	0.056	2,400	2,198	2,638	52	45	60	99.43	2.24	97.85	1.67
01/04/23	0.015	0.015	7.265	6.867	7.819	0.050	0.043	0.288***	2,406	2,231	2,615	50	43	56	99.31	2.16	97.94	1.69
01/05/23	0.015	0.015	7.344	6.225	8.468	0.052	0.047	0.062	2,337	2,138	2,537	47	41	55	99.29	2.15	97.98	1.69
01/06/23	0.015	0.015	6.864	6.386	7.515	0.052	0.047	0.060	2,314	1,693	2,744	50	42	64	99.25	2.12	97.85	1.67
01/07/23	0.015	0.015	6.693	6.106	7.519	0.054	0.052	0.058	2,618	2,410	2,942	58	51	70	99.19	2.09	97.77	1.65
01/08/23	0.015	0.015	6.637	6.233	7.289	0.049	0.046	0.060	2,632	2,514	2,892	59	55	68	99.27	2.13	97.75	1.65
01/09/23	0.015	0.015	7.119	6.771	7.635	0.039	0.031	0.051	2,520	2,259	2,760	55	48	65	99.45	2.26	97.80	1.66
01/10/23	0.015	0.015	7.250	6.764	7.870	0.038	0.033	0.042	2,336	2,113	2,602	49	43	59	99.47	2.28	97.89	1.68
01/11/23	0.015	0.015	7.383	6.992	7.898	0.039	0.032	0.045	2,207	2,040	2,501	44	38	54	99.48	2.28	98.00	1.70
01/12/23	0.015	0.015	7.379	6.882	8.057	0.040	0.035	0.053	2,381	2,232	2,532	49	44	56	99.46	2.27	97.93	1.68
01/13/23	0.015	0.020	7.614	7.135	8.293	0.044	0.038	0.051	2,452	2,302	2,604	50	44	55	99.43	2.24	97.96	1.69
01/14/23	0.015	0.015	7.531	6.992	8.407	0.041	0.034	0.050	2,439	2,107	2,565	48	39	53	99.46	2.27	98.03	1.71
01/15/23	0.015	0.015	7.700	7.129	8.513	0.034	0.029	0.045	2,020	1,858	2,338	36	31	44	99.55	2.35	98.24	1.75
01/16/23	0.015	0.015	7.707	6.939	8.792	0.032	0.023	0.056	2,165	2,034	2,296	37	34	43	99.59	2.38	98.29	1.77
01/17/23	0.014	0.015	7.970	7.257	8.990	0.039	0.032	0.102***	2,354	2,149	2,795	41	34	55	99.51	2.31	98.27	1.76
01/18/23	0.014	0.015	7.375	6.992	8.105	0.037	0.029	0.044	2,649	2,505	2,844	48	43	54	99.50	2.30	98.20	1.75
01/19/23	0.014	0.015	7.710	7.285	8.246	0.038	0.028	0.050	2,542	2,370	2,710	47	41	53	99.51	2.31	98.16	1.73
01/20/23	0.015	0.015	7.797	7.343	8.270	0.041	0.032	0.050	2,372	1,825	2,603	46	32	54	99.47	2.28	98.05	1.71
01/21/23	0.015	0.015	7.794	7.217	8.367	0.038	0.033	0.045	2,411	2,282	2,533	48	45	52	99.51	2.31	97.99	1.70
01/22/23	0.015	0.015	7.618	7.130	8.472	0.034	0.026	0.041	2,316	2,203	2,467	46	41	52	99.56	2.36	98.02	1.70
01/23/23	0.015	0.015	7.545	7.152	8.049	0.033	0.027	0.041	2,300	2,165	2,454	45	40	53	99.57	2.37	98.05	1.71
01/24/23	0.015	0.015	7.245	6.849	7.855	0.036	0.029	0.042	2,413	2,206	2,711	47	41	56	99.50	2.30	98.04	1.71
01/25/23	0.015	0.015	7.380	6.767	7.966	0.040	0.031	0.144***	2,453	1,913	2,699	49	35	59	99.46	2.27	97.99	1.70
01/26/23	0.015	0.015	7.472	6.997	8.805	0.039	0.031	0.047	2,519	2,337	2,644	50	45	54	99.47	2.28	98.00	1.70
01/27/23	0.015	0.015	7.511	6.860	8.156	0.039	0.031	0.050	2,533	2,367	2,745	48	43	54	99.48	2.28	98.09	1.72
01/28/23	0.015	0.015	7.520	6.896	8.115	0.037	0.027	0.044	2,477	2,354	2,580	46	42	51	99.50	2.30	98.14	1.73
01/29/23	0.015	0.015	7.571	7.104	8.310	0.035	0.031	0.043	2,390	2,265	2,585	44	40	50	99.54	2.34	98.15	1.73
01/30/23	0.015	0.015	7.790	7.231	8.493	0.034	0.023	0.053	2,316	2,154	2,471	43	39	46	99.57	2.36	98.15	1.73
01/31/23	0.015	0.015	7.968	7.393	8.641	0.039	0.032	0.056	2,371	2,211	2,572	44	39	50	99.51	2.31	98.16	1.74

Notes:

*** ROP TOC above internal critical control point (0.1mg/l) observed for less than 15 min. Value on backup ROP TOC analyzer was not elevated.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
01/01/23	96.28	110.424	36,875.7	0.33	3	6
01/02/23	96.69	110.321	36,979.7	0.34	3	6
01/03/23	96.54	110.331	34,619.1	0.31	3	6
01/04/23	96.97	110.448	35,292.8	0.32	3	6
01/05/23	96.42	110.245	32,986.7	0.30	3	6
01/06/23	96.63	109.665	36,221.3	0.33	3	6
01/07/23	96.65	110.427	35,037.7	0.32	3	6
01/08/23	96.75	110.245	34,871.1	0.32	3	6
01/09/23	96.65	109.174	34,264.8	0.31	3	6
01/10/23	96.53	110.246	34,806.5	0.32	3	6
01/11/23	97.03	110.436	34,209.7	0.32	3	6
01/12/23	96.68	110.477	33,810.0	0.31	3	6
01/13/23	96.52	104.557	35,036.5	0.32	3	6
01/14/23	96.29	110.378	35,619.7	0.33	3	6
01/15/23	95.97	110.505	36,706.1	0.33	3	6
01/16/23	96.22	110.399	37,814.2	0.34	3	6
01/17/23	96.19	111.656	37,412.7	0.34	3	6
01/18/23	96.17	107.983	38,029.2	0.34	3	6
01/19/23	95.77	106.629	36,751.8	0.35	3	6
01/20/23	95.91	106.716	37,664.7	0.36	3	6
01/21/23	96.26	107.204	37,624.3	0.35	3	6
01/22/23	96.09	110.946	36,283.8	0.34	3	6
01/23/23	96.20	108.935	37,865.3	0.34	3	6
01/24/23	96.08	109.035	37,939.0	0.35	3	6
01/25/23	96.07	107.239	37,673.2	0.34	3	6
01/26/23	96.07	109.296	36,923.3	0.34	3	6
01/27/23	96.06	110.403	36,848.9	0.34	3	6
01/28/23	96.09	110.334	37,694.7	0.34	3	6
01/29/23	96.24	110.327	37,658.0	0.34	3	6
01/30/23	96.14	110.443	37,199.2	0.34	3	6
01/31/23	96.25	110.364	36,258.6	0.34	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus(1)	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
02/01/23	12.31	12.31	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/02/23	12.29	12.29	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/03/23	12.29	12.29	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/04/23	12.31	12.31	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/05/23	12.35	12.35	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/06/23	12.33	12.33	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/07/23	12.30	12.30	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/08/23	12.30	12.30	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/09/23	12.26	12.26	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/10/23	12.27	12.27	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/11/23	12.28	12.28	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/12/23	12.38	12.38	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/13/23	12.38	12.38	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/14/23	12.34	12.34	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/15/23	12.34	12.34	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/16/23	12.33	12.33	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/17/23	12.33	12.33	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/18/23	12.33	12.33	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/19/23	12.39	12.39	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/20/23	12.39	12.39	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/21/23	12.35	12.35	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/22/23	12.31	12.31	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/23/23	12.38	12.38	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/24/23	12.38	12.38	12.38	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/25/23	12.53	12.53	12.43	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/26/23	12.49	12.49	12.40	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/27/23	12.49	12.49	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
02/28/23	12.45	12.45	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
02/01/23	0.00	4.00	2.31	6.00	0.00	12.31
02/02/23	0.00	4.01	2.27	6.00	0.00	12.29
02/03/23	0.00	4.00	2.29	6.00	0.00	12.29
02/04/23	0.00	4.01	2.30	6.00	0.00	12.31
02/05/23	0.00	4.01	2.33	6.00	0.00	12.35
02/06/23	0.00	4.00	2.32	6.00	0.00	12.33
02/07/23	0.00	4.03	2.27	6.00	0.00	12.30
02/08/23	0.00	4.03	2.28	6.00	0.00	12.30
02/09/23	0.00	4.02	2.25	6.00	0.00	12.26
02/10/23	0.00	4.01	2.27	6.00	0.00	12.27
02/11/23	0.00	4.00	2.27	6.00	0.00	12.28
02/12/23	0.00	4.03	2.35	6.00	0.00	12.38
02/13/23	0.00	4.02	2.36	6.00	0.00	12.38
02/14/23	0.00	4.02	2.32	6.00	0.00	12.34
02/15/23	0.00	4.02	2.32	6.00	0.00	12.34
02/16/23	0.00	4.01	2.32	6.00	0.00	12.33
02/17/23	0.00	4.03	2.29	6.00	0.00	12.33
02/18/23	0.00	4.01	2.32	6.00	0.00	12.33
02/19/23	0.00	4.02	2.37	6.00	0.00	12.39
02/20/23	0.00	4.03	2.37	6.00	0.00	12.39
02/21/23	0.00	4.01	2.33	6.00	0.00	12.35
02/22/23	0.00	4.02	2.28	6.00	0.00	12.31
02/23/23	0.00	4.02	2.36	6.00	0.00	12.38
02/24/23	0.00	4.00	2.38	6.00	0.00	12.38
02/25/23	0.00	4.10	2.43	6.00	0.00	12.53
02/26/23	0.00	4.09	2.40	6.00	0.00	12.49
02/27/23	0.00	4.12	2.37	6.00	0.00	12.49
02/28/23	0.00	4.10	2.35	6.00	0.00	12.45

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (1)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
02/01/23	0.00	0.00	2.31	6.00	4.00	12.31
02/02/23	0.00	0.00	2.27	6.00	4.00	12.27
02/03/23	0.00	0.00	2.29	6.00	4.00	12.29
02/04/23	0.00	0.00	2.30	6.00	4.00	12.30
02/05/23	0.00	0.00	2.33	6.00	4.00	12.33
02/06/23	0.00	0.00	2.32	6.00	4.00	12.32
02/07/23	0.00	0.00	2.27	6.00	4.00	12.27
02/08/23	0.00	0.00	2.28	6.00	4.00	12.28
02/09/23	0.00	0.00	2.25	6.00	4.00	12.25
02/10/23	0.00	0.00	2.27	6.00	4.00	12.27
02/11/23	0.00	0.00	2.27	6.00	4.00	12.27
02/12/23	0.00	0.00	2.35	6.00	4.00	12.35
02/13/23	0.00	0.00	2.36	6.00	4.00	12.36
02/14/23	0.00	0.00	2.32	6.00	4.00	12.32
02/15/23	0.00	0.00	2.32	6.00	4.00	12.32
02/16/23	0.00	0.00	2.32	6.00	4.00	12.32
02/17/23	0.00	0.00	2.29	6.00	4.00	12.29
02/18/23	0.00	0.00	2.32	6.00	4.00	12.32
02/19/23	0.00	0.00	2.37	6.00	4.00	12.37
02/20/23	0.00	0.00	2.37	6.00	4.00	12.37
02/21/23	0.00	0.00	2.33	6.00	4.00	12.33
02/22/23	0.00	0.00	2.28	6.00	4.00	12.28
02/23/23	0.00	0.00	2.36	6.00	4.00	12.36
02/24/23	0.00	0.00	2.38	6.00	4.00	12.38
02/25/23	0.00	0.00	2.43	6.00	4.00	12.43
02/26/23	0.00	0.00	2.40	6.00	4.00	12.40
02/27/23	0.00	0.00	2.37	6.00	4.00	12.37
02/28/23	0.00	0.00	2.35	6.00	4.00	12.35

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/23	4.81	5.26	4.98	4.89	4.00	N/A *	5.09	4.93	4.83	5.06	4.84	4.75	5.07	5.05	5.12	4.79
02/02/23	4.78	5.24	4.95	4.90	4.04	N/A *	5.01	4.89	4.84	5.01	4.82	4.70	5.23	5.05	5.09	4.77
02/03/23	4.77	5.23	5.08	4.94	4.18	N/A *	5.02	4.93	4.82	4.95	4.82	4.70	5.22	5.04	5.09	4.73
02/04/23	4.67	5.22	4.94	4.91	4.18	N/A *	5.02	4.86	4.80	4.97	4.79	4.69	5.21	4.99	5.09	4.75
02/05/23	4.78	5.17	4.91	4.87	4.21	N/A *	5.02	4.88	4.82	4.94	4.75	4.88	5.24	4.99	5.10	4.71
02/06/23	4.74	5.21	4.94	4.91	4.15	N/A *	5.06	4.89	4.78	4.94	4.69	5.01	5.21	4.97	5.03	4.68
02/07/23	4.63	5.14	4.84	4.89	4.09	N/A *	5.01	4.88	4.74	5.36	4.69	4.99	5.17	4.96	5.02	4.68
02/08/23	4.94	5.23	5.22	4.81	4.09	N/A *	4.99	4.88	4.71	5.18	4.67	5.04	5.15	4.95	5.05	4.67
02/09/23	4.95	5.20	5.23	4.89	4.02	N/A *	4.93	5.04	4.71	5.15	4.59	5.03	5.17	4.92	5.04	4.68
02/10/23	4.96	5.14	5.27	5.06	4.01	4.58	5.02	5.07	4.70	5.17	4.58	5.00	5.17	4.95	5.06	4.64
02/11/23	4.94	5.18	5.19	4.99	4.00	5.30	4.95	5.03	4.66	5.18	4.57	5.07	5.17	4.95	5.04	4.58
02/12/23	4.92	5.13	5.27	4.99	4.05	5.17	4.95	5.11	4.68	5.17	4.58	5.06	5.16	4.98	4.99	4.59
02/13/23	4.91	5.12	5.21	4.96	4.02	5.12	4.89	5.10	4.63	5.15	4.54	5.02	5.17	4.94	5.00	4.57
02/14/23	4.86	5.12	5.29	4.97	4.07	5.14	4.89	5.05	4.62	5.16	4.50	4.99	5.12	4.91	5.01	4.57
02/15/23	4.92	5.14	5.21	4.88	4.27	5.11	4.88	5.03	4.62	5.15	4.84	5.00	5.15	4.89	5.01	4.59
02/16/23	4.85	5.09	5.11	4.84	4.21	5.10	5.05	5.00	4.59	5.03	4.87	4.99	5.12	4.85	5.00	4.52
02/17/23	4.83	5.09	5.14	5.07	4.19	5.06	5.13	4.96	4.52	5.01	4.82	5.01	5.04	5.12	4.96	4.68
02/18/23	4.86	5.05	5.25	5.13	N/A *	5.12	5.09	4.94	4.48	5.06	4.82	5.02	5.02	5.19	4.94	4.81
02/19/23	4.90	5.01	5.16	5.17	N/A *	5.12	5.10	4.93	4.51	5.07	4.82	4.94	5.02	5.16	4.96	4.74
02/20/23	4.88	5.03	5.15	5.20	N/A *	5.11	5.15	4.96	4.51	5.03	4.78	4.97	4.99	5.16	4.93	4.77
02/21/23	4.91	5.04	5.21	5.16	N/A *	5.10	5.13	4.95	4.86	5.06	4.80	4.97	5.03	5.13	4.96	4.79
02/22/23	4.79	5.00	5.09	5.18	N/A *	5.09	5.09	4.96	4.97	5.02	4.78	4.94	5.05	5.12	4.98	4.78
02/23/23	4.79	5.06	5.15	5.22	N/A *	5.18	5.15	4.30	N/A **	5.04	4.78	4.95	5.05	5.19	4.96	4.80
02/24/23	4.84	5.06	5.15	5.21	4.80	5.19	5.17	4.99	N/A **	5.03	4.76	4.92	5.14	5.23	4.98	4.78
02/25/23	4.82	5.02	5.14	5.24	5.22	5.19	5.08	4.98	4.95	5.02	4.73	4.88	5.08	5.24	4.93	4.75
02/26/23	4.87	5.02	5.16	5.14	5.13	5.19	5.13	4.99	4.86	4.96	4.69	4.91	5.04	5.16	4.93	4.75
02/27/23	4.83	5.28	5.20	5.17	5.10	5.17	5.11	4.93	4.85	5.00	4.72	4.90	5.14	5.12	4.90	4.74
02/28/23	4.89	5.30	5.19	5.21	5.16	5.18	5.11	4.99	4.94	5.02	4.72	4.94	5.26	5.18	4.91	4.73

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for membrane replacement.

** Cel out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/23	4.63	5.11	4.92	4.49	4.36	4.62	4.79	4.81	4.18	4.25	4.06	4.05	4.19	4.07	4.09	4.20
02/02/23	4.57	5.09	4.81	4.47	4.55	4.79	4.75	4.78	4.16	4.35	4.04	4.05	4.14	4.01	4.06	4.11
02/03/23	4.60	5.04	4.78	4.40	4.68	4.94	4.71	4.75	4.14	4.32	4.01	4.00	4.11	4.01	4.04	4.11
02/04/23	4.55	5.08	4.76	4.38	4.65	4.92	4.72	4.73	4.13	4.24	4.04	4.19	4.10	4.02	4.01	4.09
02/05/23	4.52	5.05	4.72	4.37	4.63	4.91	4.71	4.76	4.14	4.15	4.02	4.17	4.11	4.04	4.01	4.11
02/06/23	4.49	4.98	4.70	4.34	4.60	4.91	4.68	4.98	4.11	4.09	4.00	4.16	4.09	4.18	4.04	4.07
02/07/23	4.81	4.91	4.68	4.29	4.82	4.87	4.64	5.05	4.08	4.21	4.22	4.11	4.05	4.12	4.24	4.03
02/08/23	5.01	4.93	4.87	4.52	4.98	4.84	4.69	5.01	4.06	4.16	4.18	4.08	4.03	4.13	4.18	4.03
02/09/23	5.00	4.94	5.05	4.72	4.92	4.87	4.87	5.04	4.04	4.41	4.12	4.06	4.05	4.13	4.16	4.02
02/10/23	4.99	4.89	5.08	4.67	4.90	4.84	4.92	5.05	4.03	4.36	4.11	4.08	4.18	4.08	4.13	4.25
02/11/23	4.98	4.89	5.08	4.68	4.89	4.81	4.92	5.04	4.02	4.23	4.15	4.05	4.21	4.09	4.11	4.20
02/12/23	4.93	4.90	5.02	4.68	4.81	4.81	4.88	5.06	4.14	4.04	4.13	4.03	4.20	4.08	4.11	4.13
02/13/23	4.90	4.89	5.02	4.66	4.82	4.79	4.89	5.06	4.22	4.03	4.10	4.02	4.19	4.06	4.09	4.15
02/14/23	4.91	4.91	4.98	4.65	4.87	4.80	4.86	4.98	4.14	4.02	4.06	4.06	4.16	4.02	4.05	4.16
02/15/23	4.91	4.86	4.99	4.65	4.57	4.78	4.84	4.97	4.13	4.10	4.05	4.23	4.18	4.02	4.03	4.13
02/16/23	4.87	4.83	4.97	4.64	4.32	4.73	4.90	4.97	4.15	4.17	4.05	4.17	4.16	4.01	4.03	4.12
02/17/23	4.79	5.07	4.90	4.58	4.33	4.72	4.84	4.92	4.11	4.20	4.03	4.09	4.09	4.18	4.16	4.09
02/18/23	4.68	5.12	4.93	4.53	4.34	4.70	4.79	4.91	4.06	4.19	4.01	4.06	4.04	4.12	4.23	4.07
02/19/23	4.75	5.07	4.94	4.54	4.56	4.70	4.82	4.93	4.07	4.17	4.13	4.06	4.05	4.15	4.18	4.02
02/20/23	4.69	5.08	4.90	4.55	4.75	4.69	4.80	4.91	4.05	4.10	4.18	4.03	4.04	4.11	4.16	4.03
02/21/23	4.69	5.12	4.85	4.52	4.73	4.81	4.79	4.86	4.03	4.06	4.13	4.03	4.03	4.09	4.11	4.01
02/22/23	4.74	5.11	4.84	4.52	4.72	4.94	4.80	4.88	4.03	4.08	4.11	4.02	4.08	4.12	4.15	4.09
02/23/23	4.79	5.16	4.91	4.54	4.75	4.91	4.81	4.92	4.02	4.10	4.12	4.27	4.29	4.17	4.19	4.23
02/24/23	4.82	5.22	4.92	4.54	4.74	4.92	4.74	4.89	4.00	4.13	4.14	4.25	4.31	4.18	4.23	4.26
02/25/23	4.78	5.18	4.90	4.54	4.69	4.93	4.74	5.05	4.16	4.10	4.15	4.21	4.28	4.15	4.21	4.27
02/26/23	5.04	5.06	4.86	4.52	4.69	4.92	4.75	5.13	4.23	4.09	4.12	4.17	4.29	4.13	4.19	4.22
02/27/23	5.14	5.06	5.01	4.66	4.61	4.91	4.77	5.10	4.19	4.31	4.12	4.15	4.25	4.12	4.13	4.20
02/28/23	5.12	5.13	5.15	4.77	4.72	4.93	4.88	5.10	4.23	4.36	4.11	4.15	4.27	4.10	4.18	4.21

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	E01	**E02**	**E03**	**E04**	**E05**	**E06**	**E07**	**E08**	**F01**	**F02**	**F03**	**F04**	**F05**	**F06**	**F07**	**F08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
02/01/23	4.92	4.97	4.09	4.70	5.24	5.16	5.15	5.11	5.18	5.17	5.06	4.99	5.09	4.95	5.10	5.18
02/02/23	4.88	4.90	4.08	4.92	5.25	5.19	5.09	5.26	5.09	5.22	5.02	5.07	5.08	4.88	5.23	5.13
02/03/23	4.83	4.95	4.24	4.83	5.30	5.23	5.05	5.19	5.10	5.19	4.95	4.96	5.03	4.91	5.13	5.14
02/04/23	4.97	4.93	4.11	4.81	5.31	5.21	5.22	5.19	4.97	5.16	5.11	4.98	5.04	4.96	5.03	5.24
02/05/23	4.83	4.95	4.09	4.99	5.36	5.34	5.16	5.23	5.11	5.24	5.04	5.07	5.10	4.94	5.23	5.20
02/06/23	4.87	5.03	4.19	4.80	5.32	5.26	5.15	5.19	5.05	5.19	4.94	5.01	5.08	4.89	5.12	5.20
02/07/23	5.00	5.02	4.09	4.85	5.29	5.21	5.19	5.23	5.08	5.12	5.01	5.02	5.09	4.98	5.11	5.34
02/08/23	4.86	5.10	4.09	4.99	5.25	5.18	5.16	5.48	5.08	5.19	5.05	5.04	5.08	4.97	4.94	5.35
02/09/23	4.89	4.95	4.13	4.85	5.21	5.29	5.02	5.29	5.11	5.25	5.06	5.07	5.03	4.93	5.18	5.30
02/10/23	5.03	4.73	4.04	4.82	5.14	5.24	5.07	5.22	5.21	5.18	5.00	4.98	5.04	4.96	5.16	5.44
02/11/23	4.90	4.78	4.09	4.94	5.19	5.22	5.13	5.33	5.11	5.21	5.16	5.03	5.08	4.97	5.18	5.35
02/12/23	4.88	4.88	4.21	4.80	5.24	5.24	5.21	5.28	5.03	5.25	5.00	5.02	4.96	4.95	5.20	5.20
02/13/23	4.83	4.93	4.14	4.83	5.20	5.26	5.13	5.27	5.00	5.22	4.94	5.03	5.07	4.96	5.09	5.40
02/14/23	4.77	4.94	4.06	4.96	5.18	5.24	5.03	5.41	5.14	5.30	4.95	5.04	5.04	4.95	5.07	5.28
02/15/23	4.79	5.06	4.17	4.84	5.18	5.27	5.08	5.25	5.09	5.27	5.06	5.01	4.93	4.91	5.16	5.22
02/16/23	4.93	4.94	4.15	4.74	5.19	5.24	5.11	5.19	4.94	5.20	4.98	4.93	5.18	4.84	4.95	5.21
02/17/23	4.82	4.97	4.16	4.89	5.27	5.16	5.07	5.19	4.98	5.24	5.06	4.93	5.02	4.81	5.07	5.17
02/18/23	4.78	5.00	4.21	4.88	5.29	5.18	5.05	5.23	5.00	5.19	5.00	4.89	5.01	4.80	5.14	5.16
02/19/23	4.85	4.88	4.11	4.82	5.22	5.15	5.07	5.23	4.98	5.16	5.00	4.87	5.10	4.80	5.17	5.14
02/20/23	4.83	4.91	4.13	4.68	5.21	5.17	5.13	5.16	5.00	5.29	5.07	4.94	4.93	4.88	4.99	5.13
02/21/23	4.85	5.03	4.17	4.83	5.35	5.20	5.11	5.18	5.00	5.29	4.95	5.00	4.96	4.88	5.17	5.15
02/22/23	4.90	4.88	4.05	4.75	5.23	5.12	5.27	5.15	4.96	5.22	4.97	4.95	4.97	4.86	5.15	5.33
02/23/23	4.85	4.88	4.09	4.77	5.14	5.18	5.23	5.17	4.98	5.22	5.01	4.97	5.16	4.90	4.96	5.32
02/24/23	4.74	4.88	4.10	4.89	5.10	5.32	5.14	5.29	5.08	5.22	5.10	5.02	5.09	4.90	5.08	5.18
02/25/23	4.84	4.92	4.27	4.84	5.25	N/A***	5.20	N/A***	5.06	5.20	5.10	5.03	5.06	4.84	N/A***	5.22
02/26/23	4.87	4.90	4.23	4.78	5.28	N/A***	5.12	N/A***	5.13	5.16	4.95	5.07	5.03	4.83	N/A***	5.23
02/27/23	4.85	4.96	4.17	4.90	5.29	5.30	5.04	5.28	5.12	5.41	4.97	5.06	5.02	4.91	N/A***	5.19
02/28/23	4.78	4.97	4.18	4.84	5.25	5.24	5.19	5.27	5.07	5.24	5.04	5.08	5.02	4.98	N/A***	5.24

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

*** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
02/01/23	0.029	0.032	0.023	0.056	0.025	0.026	0.047	0.049	0.033	0.035	0.028	0.034	0.036	0.039	0.037	0.039	0.074	0.082	0.055	0.062	0.028	0.037	0.033	0.035	0.037
02/02/23	0.029	0.031	0.023	0.041	0.025	0.029	0.046	0.057	0.033	0.059	0.028	0.044	0.036	0.040	0.037	0.039	0.085	0.090	0.063	0.071	0.027	0.031	0.048	0.075	0.038
02/03/23	0.030	0.037	0.024	0.035	0.025	0.027	0.046	0.048	0.035	0.039	0.030	0.044	0.037	0.053	0.038	0.040	0.055	0.092	0.044	0.065	0.030	0.063	0.077	0.097	0.035
02/04/23	0.029	0.033	0.023	0.025	0.025	0.027	0.045	0.051	0.034	0.036	0.028	0.041	0.036	0.039	0.037	0.038	0.038	0.046	0.035	0.045	0.033	0.038	0.085	0.089	0.033
02/05/23	0.029	0.031	0.024	0.058	0.025	0.027	0.044	0.047	0.033	0.036	0.028	0.042	0.036	0.047	0.037	0.039	0.038	0.044	0.035	0.038	0.032	0.034	0.087	0.098	0.033
02/06/23	0.029	0.032	0.024	0.028	0.026	0.030	0.045	0.047	0.034	0.037	0.029	0.031	0.037	0.069	0.038	0.047	0.038	0.055	0.035	0.041	0.033	0.036	0.088	0.102	0.033
02/07/23	0.031	0.036	0.024	0.042	0.027	0.029	0.045	0.047	0.036	0.044	0.029	0.039	0.037	0.041	0.038	0.041	0.039	0.049	0.036	0.042	0.041	0.065	0.089	0.092	0.034
02/08/23	0.033	0.036	0.024	0.027	0.026	0.028	0.045	0.047	0.036	0.039	0.030	0.052	0.038	0.055	0.038	0.060	0.039	0.041	0.039	0.042	0.038	0.041	0.091	0.100	0.034
02/09/23	0.033	0.036	0.027	0.036	0.027	0.030	0.045	0.047	0.036	0.040	0.030	0.033	0.038	0.067	0.038	0.041	0.039	0.048	0.039	0.046	0.041	0.042	0.080	0.091	0.035
02/10/23	0.033	0.035	0.029	0.079	0.027	0.029	0.045	0.051	0.035	0.054	0.030	0.041	0.038	0.064	0.038	0.043	0.039	0.046	0.040	0.051	0.048	0.073	0.072	0.077	0.035
02/11/23	0.034	0.036	0.031	0.038	0.027	0.032	0.046	0.049	0.035	0.052	0.030	0.033	0.038	0.048	0.038	0.042	0.040	0.050	0.042	0.049	0.048	0.051	0.073	0.084	0.035
02/12/23	0.033	0.036	0.029	0.047	0.026	0.027	0.045	0.047	0.034	0.036	0.029	0.031	0.037	0.039	0.037	0.038	0.039	0.057	0.042	0.051	0.051	0.055	0.077	0.082	0.034
02/13/23	0.034	0.040	0.030	0.032	0.026	0.031	0.045	0.047	0.035	0.037	0.029	0.031	0.038	0.039	0.037	0.040	0.040	0.045	0.043	0.050	0.050	0.080	0.066	0.080	0.035
02/14/23	0.034	0.040	0.033	0.064	0.027	0.030	0.045	0.048	0.035	0.038	0.030	0.032	0.039	0.047	0.038	0.071	0.041	0.046	0.046	0.065	0.037	0.050	0.057	0.134	0.036
02/15/23	0.034	0.037	0.033	0.039	0.026	0.034	0.044	0.047	0.036	0.040	0.029	0.030	0.038	0.040	0.036	0.040	0.040	0.054	0.047	0.051	0.034	0.060	0.061	0.080	0.035
02/16/23	0.034	0.040	0.036	0.039	0.026	0.027	0.044	0.049	0.034	0.039	0.028	0.031	0.037	0.055	0.036	0.041	0.040	0.047	0.049	0.056	0.026	0.044	0.056	0.065	0.035
02/17/23	0.036	0.041	0.039	0.044	0.027	0.031	0.046	0.050	0.035	0.040	0.029	0.031	0.038	0.050	0.037	0.044	0.042	0.045	0.053	0.067	0.025	0.030	0.098	0.186	0.036
02/18/23	0.037	0.042	0.042	0.043	0.027	0.032	0.047	0.049	0.036	0.037	0.030	0.033	0.039	0.073	0.037	0.038	0.043	0.045	0.057	0.066	0.024	0.026	0.116	0.146	0.037
02/19/23	0.037	0.039	0.043	0.045	0.027	0.029	0.046	0.048	0.036	0.056	0.031	0.034	0.038	0.041	0.037	0.043	0.044	0.051	0.059	0.060	0.025	0.034	0.138 ****	0.269 ****	0.038
02/20/23	0.037	0.040	0.045	0.094	0.029	0.031	0.047	0.048	0.037	0.055	0.032	0.038	0.039	0.054	0.037	0.039	0.046	0.051	0.066	0.069	0.025	0.031	0.170 ****	0.220 ****	0.039
02/21/23	0.033	0.040	0.031	0.049	0.027	0.036	0.056	0.065	0.036	0.040	0.031	0.036	0.038	0.041	0.038	0.060	0.042	0.047	0.054	0.068	0.026	0.060	0.125 ****	0.207 ****	0.037
02/22/23	0.030	0.032	0.024	0.086	0.024	0.027	0.061	0.063	0.034	0.036	0.030	0.035	0.038	0.041	0.036	0.079	0.040	0.061	0.048	0.049	0.025	0.028	0.088	0.103	0.035
02/23/23	0.029	0.033	0.023	0.032	0.024	0.030	0.061	0.063	0.034	0.036	0.030	0.040	0.038	0.041	0.036	0.060	0.039	0.045	0.048	0.053	0.026	0.035	0.087	0.095	0.035
02/24/23	0.029	0.032	0.029	0.062	0.024	0.029	0.061	0.067	0.034	0.042	0.030	0.039	0.037	0.041	0.036	0.049	0.041	0.049	0.044	0.051	0.026	0.030	0.087	0.095	0.036
02/25/23	0.029	0.041	0.029	0.044	0.023	0.026	0.060	0.071	0.032	0.034	0.030	0.035	0.036	0.042	0.035	0.069	0.042	0.050	0.041	0.049	0.025	0.029	0.088	0.095	0.035
02/26/23	0.029	0.045	0.024	0.030	0.022	0.026	0.058	0.061	0.032	0.035	0.029	0.038	0.035	0.041	0.034	0.035	0.044	0.054	0.039	0.040	0.028	0.045	0.091	0.100	0.034
02/27/23	0.030	0.037	0.024	0.027	0.022	0.024	0.059	0.063	0.033	0.041	0.029	0.036	0.035	0.045	0.034	0.038	0.049	0.055	0.040	0.042	0.029	0.034	0.090	0.096	0.035
02/28/23	0.031	0.042	0.026	0.030	0.023	0.028	0.060	0.063	0.033	0.038	0.031	0.043	0.036	0.048	0.035	0.059	0.054	0.058	0.042	0.062	0.031	0.039	0.092	0.118	0.036

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

**** Erroneous value due to instrumentation issue.

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
02/01/23	0.015	0.015	7.920	7.313	8.746	0.039	0.030	0.064	2,394	2,232	2,524	45	40	50	99.51	2.31	98.13	1.73
02/02/23	0.015	0.015	7.753	7.095	8.485	0.041	0.031	0.051	2,357	2,210	2,512	44	40	49	99.47	2.27	98.13	1.73
02/03/23	0.015	0.015	7.524	7.096	8.088	0.039	0.034	0.044	2,417	2,252	2,553	46	42	52	99.49	2.29	98.10	1.72
02/04/23	0.015	0.015	7.559	6.975	8.109	0.038	0.033	0.044	2,415	2,293	2,515	47	44	52	99.50	2.30	98.04	1.71
02/05/23	0.015	0.015	7.619	7.158	8.299	0.035	0.029	0.041	2,321	2,219	2,478	45	42	51	99.54	2.33	98.05	1.71
02/06/23	0.015	0.015	7.760	7.287	8.354	0.037	0.031	0.046	2,298	2,130	2,465	46	41	53	99.52	2.32	97.99	1.70
02/07/23	0.015	0.015	7.910	7.275	8.507	0.042	0.034	***** 0.212	2,355	2,225	2,489	48	44	53	99.47	2.27	97.97	1.69
02/08/23	0.015	0.015	7.929	7.224	8.596	0.042	0.036	0.051	2,377	2,185	2,514	49	43	54	99.47	2.28	97.95	1.69
02/09/23	0.015	0.015	8.254	7.478	9.440	0.047	0.032	0.061	2,472	2,321	2,644	51	47	57	99.43	2.25	97.93	1.68
02/10/23	0.015	0.015	7.916	7.187	8.597	0.043	0.037	0.052	2,487	2,341	2,662	51	42	57	99.46	2.27	97.96	1.69
02/11/23	0.015	0.015	7.894	7.328	8.564	0.042	0.036	0.052	2,473	2,369	2,639	50	47	56	99.47	2.27	97.97	1.69
02/12/23	0.015	0.015	7.982	7.340	8.753	0.036	0.032	0.043	2,355	2,247	2,518	44	41	49	99.55	2.35	98.12	1.73
02/13/23	0.015	0.015	7.990	7.294	8.757	0.035	0.028	0.046	2,307	2,132	2,535	44	39	51	99.57	2.36	98.08	1.72
02/14/23	0.015	0.015	7.872	7.472	8.775	0.038	0.030	0.047	2,373	2,166	2,645	45	40	52	99.52	2.32	98.11	1.72
02/15/23	0.015	0.015	7.442	6.662	8.067	0.036	0.024	0.044	2,462	2,326	2,579	48	43	53	99.52	2.32	98.06	1.71
02/16/23	0.015	0.015	7.810	6.985	8.641	0.037	0.030	0.052	2,473	2,255	2,810	48	42	56	99.53	2.32	98.07	1.71
02/17/23	0.015	0.015	8.042	7.313	8.721	0.041	0.032	0.053	2,537	2,394	2,739	47	42	52	99.49	2.29	98.15	1.73
02/18/23	0.015	0.015	7.805	7.171	8.617	0.037	0.027	0.048	2,553	2,440	2,688	48	43	52	99.52	2.32	98.13	1.73
02/19/23	0.015	0.015	7.691	7.106	8.407	0.033	0.027	0.039	2,471	2,326	2,666	47	41	54	99.58	2.37	98.10	1.72
02/20/23	0.015	0.015	7.811	7.292	8.399	0.034	0.023	0.043	2,434	2,301	2,649	48	43	54	99.57	2.37	98.05	1.71
02/21/23	0.015	0.015	7.938	7.566	8.616	0.037	0.031	0.043	2,383	2,233	2,509	46	42	50	99.53	2.33	98.08	1.72
02/22/23	0.015	0.015	8.531	7.705	9.306	0.044	0.034	0.064	2,003	1,752	2,473	36	27	54	99.48	2.28	98.18	1.74
02/23/23	0.015	0.015	8.673	7.830	9.716	0.038	0.030	0.045	1,796	1,701	1,881	34	31	37	99.56	2.36	98.10	1.72
02/24/23	0.015	0.015	8.797	7.884	9.806	0.036	0.024	0.045	1,725	1,617	1,826	33	30	36	99.59	2.38	98.07	1.72
02/25/23	0.015	0.015	8.109	6.857	9.453	0.030	0.024	0.038	1,476	1,379	1,697	26	23	33	99.63	2.43	98.24	1.75
02/26/23	0.015	0.015	8.298	7.306	9.182	0.033	0.029	0.051	1,570	1,449	1,733	28	24	33	99.60	2.40	98.24	1.75
02/27/23	0.015	0.015	8.534	7.706	9.675	0.036	0.032	0.046	1,831	1,569	2,107	35	27	43	99.58	2.37	98.10	1.72
02/28/23	0.015	0.015	8.583	7.429	9.673	0.038	0.033	0.046	1,837	1,647	2,078	36	30	40	99.55	2.35	98.04	1.71

Notes:

***** ROP TOC above internal critical control point (0.1 mg/l) observed for less than 15 min. Value on backup ROP TOC analyzer was not elevated.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
	UVT %	FLOW	POWER	EED	Peroxide Dose	Log
Date	avg	MG	kW	kWh/kgal	mg/L	Removal
02/01/23	96.37	110.417	37,966.9	0.33	3	6
02/02/23	96.07	110.455	36,537.8	0.33	3	6
02/03/23	96.09	110.437	37,591.2	0.34	3	6
02/04/23	96.13	110.469	37,741.9	0.34	3	6
02/05/23	96.16	110.487	37,660.0	0.34	3	6
02/06/23	96.41	110.316	37,451.4	0.34	3	6
02/07/23	96.50	110.355	36,470.8	0.33	3	6
02/08/23	96.46	110.443	36,065.1	0.33	3	6
02/09/23	95.99	110.438	36,372.4	0.33	3	6
02/10/23	96.26	110.412	37,974.2	0.34	3	6
02/11/23	96.22	110.443	37,118.0	0.34	3	6
02/12/23	96.32	110.301	37,125.9	0.34	3	6
02/13/23	96.45	108.621	36,806.8	0.33	3	6
02/14/23	96.58	110.210	35,673.9	0.33	3	6
02/15/23	96.69	110.212	35,340.5	0.32	3	6
02/16/23	96.30	109.022	35,061.3	0.32	3	6
02/17/23	96.26	111.118	36,695.6	0.33	3	6
02/18/23	96.24	109.631	37,213.5	0.34	3	6
02/19/23	96.55	109.679	36,378.7	0.33	3	6
02/20/23	96.54	110.369	35,463.9	0.32	3	6
02/21/23	96.59	110.441	35,631.2	0.32	3	6
02/22/23	96.86	64.879	32,160.5	0.32	3	6
02/23/23	96.35	80.258	22,987.8	0.33	3	6
02/24/23	96.20	80.293	27,071.5	0.33	3	6
02/25/23	96.19	83.472	28,136.2	0.34	3	6
02/26/23	96.40	88.585	29,387.8	0.34	3	6
02/27/23	96.43	90.464	30,335.1	0.34	3	6
02/28/23	96.45	90.436	31,036.8	0.34	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus(1)	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
03/01/23	12.46	12.46	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/02/23	12.40	12.40	12.37	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/03/23	12.43	12.43	12.34	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/04/23	12.37	12.37	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/05/23	12.41	12.41	12.39	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/06/23	12.51	12.51	12.38	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/07/23	12.35	12.35	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/08/23	12.42	12.42	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/09/23	12.37	12.37	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/10/23	12.39	12.39	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/11/23	12.46	12.46	12.40	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/12/23	12.42	12.42	12.36	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/13/23	12.43	12.43	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/14/23	12.39	12.39	12.32	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/15/23	12.33	12.33	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/16/23	12.30	12.30	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/17/23	12.30	12.30	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/18/23	12.17	12.17	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/19/23	12.21	12.21	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/20/23	12.21	12.21	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/21/23	12.18	12.18	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/22/23	12.32	12.32	12.31	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/23/23	12.30	12.30	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/24/23	12.33	12.33	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/25/23	12.31	12.31	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/26/23	12.36	12.36	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/27/23	12.37	12.37	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/28/23	12.28	12.28	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/29/23	12.25	12.25	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/30/23	12.19	12.19	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
03/31/23	12.20	12.20	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
03/01/23	0.00	4.08	2.37	6.00	0.00	12.46
03/02/23	0.00	4.04	2.37	6.00	0.00	12.40
03/03/23	0.00	4.09	2.34	6.00	0.00	12.43
03/04/23	0.00	4.01	2.36	6.00	0.00	12.37
03/05/23	0.00	4.01	2.39	6.00	0.00	12.41
03/06/23	0.00	4.13	2.38	6.00	0.00	12.51
03/07/23	0.00	4.02	2.33	6.00	0.00	12.35
03/08/23	0.00	4.08	2.33	6.00	0.00	12.42
03/09/23	0.00	4.05	2.32	6.00	0.00	12.37
03/10/23	0.00	4.04	2.35	6.00	0.00	12.39
03/11/23	0.00	4.06	2.40	6.00	0.00	12.46
03/12/23	0.00	4.06	2.36	6.00	0.00	12.42
03/13/23	0.00	4.08	2.35	6.00	0.00	12.43
03/14/23	0.00	4.07	2.32	6.00	0.00	12.39
03/15/23	0.00	4.01	2.33	6.00	0.00	12.33
03/16/23	0.00	4.02	2.28	6.00	0.00	12.30
03/17/23	0.00	4.05	2.25	6.00	0.00	12.30
03/18/23	0.00	4.03	2.14	6.00	0.00	12.17
03/19/23	0.00	4.01	2.19	6.00	0.00	12.21
03/20/23	0.00	4.04	2.16	6.00	0.00	12.21
03/21/23	0.00	4.04	2.14	6.00	0.00	12.18
03/22/23	0.00	4.01	2.31	6.00	0.00	12.32
03/23/23	0.00	4.00	2.30	6.00	0.00	12.30
03/24/23	0.00	4.06	2.28	6.00	0.00	12.33
03/25/23	0.00	4.02	2.29	6.00	0.00	12.31
03/26/23	0.00	4.03	2.33	6.00	0.00	12.36
03/27/23	0.00	4.04	2.33	6.00	0.00	12.37
03/28/23	0.00	4.03	2.25	6.00	0.00	12.28
03/29/23	0.00	4.01	2.24	6.00	0.00	12.25
03/30/23	0.00	4.02	2.17	6.00	0.00	12.19
03/31/23	0.00	4.05	2.15	6.00	0.00	12.20

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
Date	OC San *LRV*	$MF+Cl_2$ *LRV*	RO *LRV*	UV/AOP *LRV*	Underground travel time (1) *LRV*	Total *LRV*
03/01/23	0.00	0.00	2.37	6.00	4.00	12.37
03/02/23	0.00	0.00	2.37	6.00	4.00	12.37
03/03/23	0.00	0.00	2.34	6.00	4.00	12.34
03/04/23	0.00	0.00	2.36	6.00	4.00	12.36
03/05/23	0.00	0.00	2.39	6.00	4.00	12.39
03/06/23	0.00	0.00	2.38	6.00	4.00	12.38
03/07/23	0.00	0.00	2.33	6.00	4.00	12.33
03/08/23	0.00	0.00	2.33	6.00	4.00	12.33
03/09/23	0.00	0.00	2.32	6.00	4.00	12.32
03/10/23	0.00	0.00	2.35	6.00	4.00	12.35
03/11/23	0.00	0.00	2.40	6.00	4.00	12.40
03/12/23	0.00	0.00	2.36	6.00	4.00	12.36
03/13/23	0.00	0.00	2.35	6.00	4.00	12.35
03/14/23	0.00	0.00	2.32	6.00	4.00	12.32
03/15/23	0.00	0.00	2.33	6.00	4.00	12.33
03/16/23	0.00	0.00	2.28	6.00	4.00	12.28
03/17/23	0.00	0.00	2.25	6.00	4.00	12.25
03/18/23	0.00	0.00	2.14	6.00	4.00	12.14
03/19/23	0.00	0.00	2.19	6.00	4.00	12.19
03/20/23	0.00	0.00	2.16	6.00	4.00	12.16
03/21/23	0.00	0.00	2.14	6.00	4.00	12.14
03/22/23	0.00	0.00	2.31	6.00	4.00	12.31
03/23/23	0.00	0.00	2.30	6.00	4.00	12.30
03/24/23	0.00	0.00	2.28	6.00	4.00	12.28
03/25/23	0.00	0.00	2.29	6.00	4.00	12.29
03/26/23	0.00	0.00	2.33	6.00	4.00	12.33
03/27/23	0.00	0.00	2.33	6.00	4.00	12.33
03/28/23	0.00	0.00	2.25	6.00	4.00	12.25
03/29/23	0.00	0.00	2.24	6.00	4.00	12.24
03/30/23	0.00	0.00	2.17	6.00	4.00	12.17
03/31/23	0.00	0.00	2.15	6.00	4.00	12.15

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/23	4.85	5.24	5.12	5.14	5.12	5.12	5.02	4.93	4.91	5.02	4.69	4.94	5.35	5.17	5.05	4.74
03/02/23	4.81	5.27	5.12	5.14	5.19	5.14	5.10	4.98	5.15	4.93	4.68	4.86	5.34	5.15	5.14	4.71
03/03/23	4.81	5.28	5.13	5.12	5.12	5.10	5.13	4.98	5.28	4.92	4.68	4.87	5.32	5.13	5.18	4.69
03/04/23	4.79	5.24	5.14	5.18	5.06	5.11	5.13	4.98	5.28	4.97	4.01	5.13	5.27	5.16	5.17	4.74
03/05/23	4.81	5.22	5.12	5.15	5.08	5.08	5.05	4.96	5.23	4.96	4.01	5.13	5.27	5.16	5.17	4.74
03/06/23	4.82	5.21	5.16	5.08	5.11	5.07	5.03	4.95	5.31	5.05	4.67	5.12	5.35	5.25	5.18	4.68
03/07/23	4.80	5.29	5.15	5.10	5.07	5.10	5.05	4.95	5.23	5.02	4.68	5.15	5.27	5.10	5.15	4.69
03/08/23	4.79	5.29	5.14	5.04	5.13	5.11	5.08	4.97	5.24	4.98	4.68	5.12	5.27	5.15	5.13	4.69
03/09/23	4.81	5.24	5.11	5.07	5.11	5.14	5.23	4.99	5.26	4.96	4.65	5.11	5.31	5.19	5.12	4.68
03/10/23	4.82	5.21	5.11	5.11	5.08	5.17	5.17	4.97	5.23	4.98	4.70	5.10	5.31	5.20	5.08	4.66
03/11/23	5.01	5.31	5.12	5.19	5.09	5.04	5.11	4.90	5.24	5.06	4.73	5.10	5.30	5.13	5.05	4.70
03/12/23	5.01	5.31	5.12	5.19	5.11	5.03	5.12	4.93	5.27	5.04	4.92	5.15	5.28	5.19	5.15	4.72
03/13/23	5.02	5.27	5.17	5.23	5.13	5.20	5.13	5.02	5.36	5.07	4.92	5.09	5.28	5.14	5.22	N/A *
03/14/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
03/15/23	5.00	5.20	5.14	5.05	5.06	5.14	5.16	4.95	5.39	5.12	4.96	5.09	5.37	5.13	5.22	4.78
03/16/23	4.97	5.24	5.08	5.10	5.08	5.08	5.12	4.94	5.26	5.26	4.91	5.06	5.30	5.12	5.16	4.74
03/17/23	5.02	5.27	5.30	5.10	5.09	5.06	5.13	4.98	5.22	5.33	4.96	5.14	5.32	5.11	5.13	4.70
03/18/23	4.94	5.20	5.33	5.13	4.99	5.03	5.11	4.93	5.19	5.25	4.90	5.09	5.29	5.10	5.15	4.71
03/19/23	5.18	5.21	5.32	5.11	5.10	5.15	5.08	5.11	5.19	5.40	4.89	5.14	5.27	5.14	5.17	4.75
03/20/23	5.16	5.21	5.24	5.06	5.07	5.09	5.05	5.06	5.19	5.39	4.86	5.12	5.24	5.11	5.15	4.74
03/21/23	5.16	5.23	5.27	5.07	5.07	5.15	5.10	5.12	5.17	5.34	4.91	5.12	5.24	5.13	5.18	4.73
03/22/23	5.14	5.21	5.22	5.07	5.01	5.22	5.04	5.07	5.13	5.29	4.86	5.07	5.20	5.09	5.12	4.72
03/23/23	5.12	5.24	5.26	5.01	5.08	5.36	5.08	5.36	5.16	5.28	4.88	5.06	5.23	5.09	5.11	4.68
03/24/23	5.11	5.19	5.19	5.03	4.97	5.21	5.01	5.02	5.11	5.14	4.81	5.04	5.18	5.06	5.08	4.66
03/25/23	5.15	5.20	5.23	5.09	5.05	5.25	5.07	5.09	5.10	5.24	4.85	5.04	5.23	5.10	5.11	4.70
03/26/23	5.06	5.15	5.17	5.04	4.99	5.18	5.04	5.00	5.12	5.21	4.82	5.02	5.20	5.07	5.09	4.69
03/27/23	5.12	5.20	5.23	5.04	5.03	5.21	5..06	5.01	5.11	5.31	4.84	5.06	5.24	5.07	5.09	4.67
03/28/23	5.09	5.16	5.22	5.02	4.97	5.12	5.03	5.00	5.08	5.29	4.81	5.05	5.19	5.01	5.08	4.65
03/29/23	5.19	5.20	5.24	5.05	5.01	5.23	5.07	5.10	5.11	5.23	4.84	5.05	5.19	5.09	5.10	4.67
03/30/23	5.08	5.21	5.22	5.06	4.99	5.13	5.02	5.02	5.11	5.25	4.97	5.06	5.17	5.05	5.08	4.66
03/31/23	5.08	5.18	5.25	5.07	5.08	5.20	5.31	5.01	5.14	5.26	5.03	5.00	5.23	5.10	5.10	4.72

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/23	5.15	5.07	5.14	4.74	4.86	4.92	4.92	5.07	4.22	4.19	4.08	4.11	4.25	4.16	4.15	4.18
03/02/23	5.10	5.08	5.11	4.76	4.76	4.89	4.91	5.08	4.17	4.15	4.04	4.09	4.26	4.27	4.18	4.21
03/03/23	5.06	5.12	5.09	4.78	4.66	4.89	4.91	5.09	4.15	4.31	4.09	4.11	4.24	4.24	4.29	4.21
03/04/23	5.05	5.00	5.11	4.79	4.84	4.86	4.87	5.07	4.14	4.13	4.16	4.08	4.19	4.18	4.21	4.16
03/05/23	5.06	5.01	5.11	4.74	4.79	4.88	4.84	5.07	4.14	4.07	4.15	4.08	4.21	4.18	4.29	4.15
03/06/23	4.91	5.04	5.09	4.73	4.89	4.90	4.84	5.07	4.16	4.27	4.16	N/A **	4.19	4.20	4.23	4.14
03/07/23	5.05	4.78	5.16	4.79	4.93	4.96	4.96	5.07	4.15	4.26	4.15	N/A **	4.19	4.21	4.21	4.13
03/08/23	5.13	5.10	5.17	4.76	4.65	4.91	4.89	5.11	4.10	4.10	4.14	N/A **	4.18	4.20	4.21	4.08
03/09/23	5.06	5.10	5.13	4.73	4.65	4.88	4.89	5.10	4.10	4.16	4.14	N/A **	4.21	4.20	4.19	4.05
03/10/23	4.99	5.00	5.01	4.70	4.82	4.69	4.86	5.05	4.06	4.07	4.12	5.27	4.26	4.17	4.19	4.08
03/11/23	4.95	5.03	5.03	4.65	4.82	4.74	4.82	5.04	4.06	4.11	4.12	5.16	4.30	4.17	4.18	4.08
03/12/23	5.03	5.06	5.11	4.66	4.82	4.88	4.93	5.07	4.07	4.10	4.14	5.09	4.28	4.20	4.20	4.06
03/13/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	4.10	4.09	N/A **	5.05	4.27	4.18	4.16	4.12
03/14/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	4.11	4.07	N/A **	5.00	4.26	4.12	4.11	4.18
03/15/23	5.07	4.98	5.13	4.78	4.83	4.90	4.91	5.11	4.01	4.06	N/A **	5.00	4.20	4.12	4.17	4.18
03/16/23	5.04	5.03	5.15	4.82	4.86	4.91	4.94	5.16	4.26	4.06	N/A **	4.98	4.30	4.15	4.20	4.19
03/17/23	5.01	4.99	5.12	4.78	4.71	4.85	4.93	5.14	4.22	4.05	4.41	4.98	4.28	4.15	4.20	4.18
03/18/23	5.06	5.03	5.10	4.75	4.86	4.86	4.88	5.05	4.25	4.03	5.44	5.02	4.23	4.13	4.14	4.12
03/19/23	5.04	5.02	5.07	4.74	4.87	4.86	4.88	5.05	4.22	4.03	5.38	5.01	4.23	4.13	4.14	4.13
03/20/23	5.06	5.08	5.12	4.73	4.91	4.88	4.93	5.03	4.17	4.04	5.27	4.97	4.22	4.15	4.15	4.15
03/21/23	5.03	5.13	5.07	4.71	4.90	4.80	4.91	5.02	4.16	4.04	5.26	4.97	4.22	4.14	4.15	4.15
03/22/23	5.04	5.20	5.06	4.72	4.85	4.84	4.94	4.99	4.11	4.01	5.32	5.20	4.18	4.08	4.15	4.12
03/23/23	5.02	5.17	5.02	4.68	4.85	4.78	4.90	4.99	4.11	4.00	5.25	5.19	4.18	4.07	4.15	4.12
03/24/23	4.93	5.19	4.98	4.69	4.41	4.81	4.85	4.97	4.12	4.17	5.17	5.18	4.20	4.09	4.08	4.06
03/25/23	4.88	5.12	4.95	4.66	4.36	4.77	4.85	4.95	4.11	4.15	5.16	5.15	4.19	4.11	4.08	4.06
03/26/23	4.94	5.20	5.07	4.67	4.81	4.85	4.86	4.97	4.05	4.11	5.15	5.19	4.15	4.17	4.05	4.05
03/27/23	4.90	5.14	5.02	4.64	4.80	4.95	4.85	4.97	4.05	4.11	5.15	5.20	4.15	4.14	4.05	4.04
03/28/23	4.90	5.07	5.03	4.65	4.82	5.02	4.87	4.97	4.10	4.11	5.22	5.14	4.16	4.18	4.25	4.06
03/29/23	4.78	5.03	4.96	4.64	4.59	4.93	4.82	4.92	4.10	4.10	5.22	5.15	4.16	4.18	4.25	4.06
03/30/23	4.75	5.02	4.93	4.61	4.61	4.87	4.75	4.91	4.08	4.05	5.12	N/A *	4.13	4.13	4.16	4.02
03/31/23	4.78	5.04	4.92	4.61	4.72	4.88	4.75	4.96	4.05	4.06	5.12	5.18	4.16	4.12	4.21	4.05

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint

** Cell Offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
03/01/23	4.74	4.99	4.12	4.83	5.36	5.28	5.13	5.25	5.09	5.21	4.96	5.12	5.12	4.94	N/A *	5.26
03/02/23	4.86	4.96	4.14	4.83	5.27	5.27	5.05	5.22	5.12	5.18	4.91	5.08	5.14	4.87	5.28	5.22
03/03/23	4.93	4.80	4.22	4.74	5.21	5.20	5.18	5.25	5.15	5.11	4.92	5.02	4.96	4.86	5.28	5.21
03/04/23	4.88	4.82	4.19	4.70	5.24	5.17	5.18	N/A *	5.20	5.06	5.11	5.00	5.02	4.89	N/A *	5.23
03/05/23	4.84	5.05	4.22	4.89	5.22	5.21	5.12	5.40	4.89	5.23	5.02	5.01	5.05	4.86	5.41	5.24
03/06/23	4.89	4.90	4.13	4.73	5.22	5.19	4.99	5.37	4.96	5.20	5.18	5.01	5.00	4.77	N/A *	5.28
03/07/23	4.77	4.87	4.02	4.63	5.22	5.17	4.95	5.23	5.12	5.15	5.09	4.98	4.98	4.85	5.18	5.22
03/08/23	4.80	4.85	4.20	4.87	5.17	5.18	4.99	5.23	5.12	5.18	4.96	5.04	4.91	4.91	5.12	5.18
03/09/23	4.76	4.99	4.10	4.78	5.06	5.12	5.23	5.24	5.09	N/A *	5.07	5.07	4.91	4.86	5.12	5.18
03/10/23	4.79	4.92	4.04	4.80	5.16	5.16	4.98	5.14	5.09	5.25	4.93	5.03	5.07	4.92	5.17	5.21
03/11/23	4.85	5.00	4.15	4.85	5.25	5.19	5.03	5.11	5.09	5.27	4.94	5.01	4.93	4.97	5.17	5.14
03/12/23	4.88	5.05	4.12	4.77	5.27	5.21	5.15	5.28	5.15	5.19	5.09	5.01	4.96	4.76	5.12	5.21
03/13/23	4.94	5.03	4.08	4.78	5.19	5.18	5.08	5.32	5.09	5.25	4.99	5.19	5.05	4.80	5.20	5.16
03/14/23	5.02	5.00	4.08	4.90	5.25	5.25	4.97	5.41	5.12	5.20	5.16	5.05	5.00	4.92	5.11	5.20
03/15/23	4.89	4.88	4.04	4.81	5.32	5.34	5.15	5.29	5.14	5.26	4.99	5.09	5.13	4.82	5.13	5.25
03/16/23	4.90	5.07	4.02	4.92	5.31	5.41	5.35	5.31	5.19	5.36	5.13	5.15	5.15	5.07	5.26	5.22
03/17/23	4.98	5.27	4.08	5.07	5.31	5.40	5.36	5.37	5.26	5.33	5.16	5.11	N/A *	5.06	5.23	N/A *
03/18/23	4.96	5.30	4.08	5.07	5.41	5.42	5.28	5.35	5.24	5.43	5.15	5.15	N/A *	5.05	5.23	N/A *
03/19/23	5.01	5.19	4.01	5.08	5.42	5.43	5.27	5.41	5.21	5.45	5.15	5.19	N/A *	5.05	5.28	N/A *
03/20/23	5.00	5.15	4.08	4.97	5.43	5.42	5.32	5.38	5.22	5.45	5.15	5.17	N/A *	5.03	5.29	N/A *
03/21/23	4.98	5.10	4.13	5.03	N/A *	5.34	5.36	5.34	5.24	5.38	5.12	5.12	N/A *	5.06	5.24	5.22
03/22/23	4.96	5.05	4.02	5.02	N/A *	5.44	5.34	N/A *	5.28	5.37	5.15	5.12	N/A *	5.09	5.22	5.34
03/23/23	4.95	5.07	4.04	4.96	5.40	5.41	5.31	5.37	5.19	5.42	5.15	5.16	N/A *	4.98	5.24	5.38
03/24/23	5.00	5.15	4.10	4.98	5.40	5.42	N/A *	5.40	5.24	5.37	5.14	5.19	N/A *	5.01	5.21	N/A *
03/25/23	5.03	5.07	4.02	5.04	N/A *	5.43	N/A *	5.45	5.27	5.29	5.18	5.14	5.20	5.04	5.16	N/A *
03/26/23	5.03	5.22	4.03	5.01	N/A *	5.39	N/A *	5.42	5.18	5.39	5.10	5.12	5.26	5.00	5.23	N/A *
03/27/23	5.02	5.23	4.06	4.90	N/A *	5.42	N/A *	5.49	5.20	5.36	5.11	5.15	5.23	4.96	5.16	N/A *
03/28/23	4.96	5.15	4.03	4.93	N/A *	5.44	N/A *	N/A *	5.22	5.33	5.15	5.13	5.13	4.95	5.17	N/A *
03/29/23	4.95	5.18	4.01	4.93	5.47	5.45	5.34	5.50	5.21	5.31	5.13	5.11	5.14	4.93	5.19	N/A *
03/30/23	N/A *	5.22	4.03	4.98	5.44	5.45	5.36	5.48	5.30	5.41	N/A *	5.23	5.17	4.97	5.20	5.40
03/31/23	5.00	5.23	4.05	5.00	5.39	5.49	5.36	5.46	5.26	5.42	5.17	5.21	5.18	4.99	5.21	5.37

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
03/01/23	0.032	0.065	0.028	0.031	0.024	0.025	0.062	0.084	0.035	0.042	0.031	0.034	0.037	0.043	0.036	0.047	0.061	0.067	0.045	0.046	0.036	0.050	0.094	0.100	0.038
03/02/23	0.031	0.054	0.029	0.034	0.025	0.033	0.053	0.074	0.034	0.040	0.031	0.036	0.037	0.050	0.037	0.070	0.053	0.067	0.042	0.044	0.038	0.060	0.075	0.096	0.037
03/03/23	0.032	0.047	0.030	0.038	0.025	0.029	0.049	0.052	0.034	0.037	0.030	0.033	0.038	0.071	0.036	0.053	0.046	0.047	0.044	0.050	0.042	0.054	0.060	0.070	0.038
03/04/23	0.034	0.043	0.033	0.055	0.028	0.040	0.052	0.054	0.035	0.045	0.033	0.045	0.039	0.063	0.037	0.040	0.048	0.052	0.045	0.046	0.048	0.054	0.060	0.063	0.039
03/05/23	0.038	0.053	0.040	0.101	0.028	0.033	0.051	0.056	0.034	0.042	0.031	0.056	0.039	0.059	0.037	0.059	0.052	0.056	0.044	0.045	0.053	0.063	0.060	0.061	0.041
03/06/23	0.037	0.040	0.037	0.041	0.040	0.074	0.066	0.090	0.036	0.041	0.032	0.051	0.038	0.041	0.039	0.046	0.056	0.060	0.046	0.055	0.061	0.075	0.062	0.071	0.044
03/07/23	0.041	0.069	0.038	0.083	0.026	0.031	0.055	0.069	0.035	0.048	0.034	0.044	0.040	0.082	0.038	0.052	0.053	0.062	0.042	0.050	0.055	0.088	0.061	0.080	0.042
03/08/23	0.034	0.071	0.027	0.051	0.028	0.041	0.051	0.058	0.034	0.036	0.035	0.038	0.040	0.043	0.037	0.040	0.045	0.055	0.040	0.055	0.045	0.057	0.054	0.059	0.038
03/09/23	0.033	0.036	0.028	0.053	0.029	0.066	0.052	0.056	0.034	0.038	0.036	0.057	0.040	0.043	0.040	0.067	0.046	0.048	0.041	0.043	0.049	0.091	0.056	0.062	0.039
03/10/23	0.036	0.040	0.029	0.029	0.028	0.039	0.052	0.058	0.034	0.044	0.036	0.044	0.051	0.094	0.038	0.042	0.051	0.058	0.040	0.041	0.054	0.059	0.059	0.068	0.043
03/11/23	0.039	0.056	0.034	0.043	0.026	0.028	0.051	0.056	0.035	0.036	0.035	0.041	0.048	0.057	0.039	0.081	0.055	0.059	0.043	0.047	0.061	0.070	0.064	0.072	0.044
03/12/23	0.040	0.046	0.035	0.041	0.026	0.034	0.051	0.062	0.034	0.037	0.039	0.047	0.046	0.059	0.038	0.040	0.064	0.074	0.044	0.046	0.069	0.080	0.067	0.077	0.049
03/13/23	0.050	0.058	0.049	0.057	0.048	0.099	0.054	0.056	N/A *	N/A *	N/A *	N/A *	0.044	0.056	0.038	0.059	0.086	0.092	0.047	0.050	0.082	0.102	0.069	0.085	0.056
03/14/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.042	0.046	0.038	0.040	0.097	0.104	0.063	0.135	0.096	0.103	0.068	0.072	0.059
03/15/23	0.108	0.125	0.061	0.125	0.032	0.106	0.034	0.077	0.040	0.227 ***	0.043	0.053	0.042	0.064	0.042	0.063	0.075	0.110	0.052	0.080	0.069	0.116	0.069	0.070	0.058
03/16/23	0.066	0.110	0.056	0.059	0.030	0.034	0.032	0.035	0.036	0.104	0.044	0.046	0.031	0.063	0.041	0.053	0.031	0.036	0.023	0.023	0.035	0.044	0.072	0.075	0.041
03/17/23	0.034	0.042	0.053	0.056	0.031	0.038	0.032	0.037	0.033	0.034	0.044	0.045	0.035	0.141	0.040	0.040	0.031	0.038	0.023	0.023	0.037	0.044	0.072	0.073	0.036
03/18/23	0.034	0.037	0.053	0.075	0.030	0.031	0.031	0.033	0.037	0.141	0.045	0.047	0.038	0.052	0.042	0.056	0.032	0.042	0.023	0.029	0.045	0.054	0.075	0.085	0.037
03/19/23	0.037	0.069	0.055	0.068	0.031	0.032	0.033	0.045	0.034	0.036	0.045	0.048	0.033	0.038	0.041	0.044	0.032	0.033	0.027	0.029	0.057	0.068	0.075	0.079	0.037
03/20/23	0.034	0.038	0.053	0.058	0.030	0.035	0.032	0.035	0.035	0.044	0.046	0.048	0.033	0.057	0.042	0.077	0.032	0.041	0.026	0.026	0.051	0.067	0.080	0.099	0.037
03/21/23	0.034	0.043	0.028	0.032	0.028	0.031	0.031	0.035	0.036	0.040	0.044	0.047	0.030	0.033	0.041	0.042	0.033	0.037	0.027	0.052	0.033	0.053	0.090	0.093	0.035
03/22/23	0.032	0.035	0.029	0.035	0.028	0.030	0.031	0.035	0.034	0.037	0.023	0.025	0.028	0.030	0.041	0.100	0.030	0.033	0.025	0.030	0.035	0.046	0.084	0.093	0.030
03/23/23	0.034	0.037	0.031	0.053	0.028	0.032	0.032	0.033	0.033	0.035	0.022	0.025	0.027	0.030	0.040	0.043	0.030	0.039	0.022	0.025	0.031	0.036	0.075	0.080	0.031
03/24/23	0.033	0.035	0.028	0.032	0.029	0.029	0.031	0.033	0.034	0.046	0.024	0.030	0.029	0.035	0.042	0.064	0.030	0.033	0.026	0.036	0.033	0.045	0.074	0.078	0.031
03/25/23	0.034	0.041	0.031	0.041	0.029	0.036	0.033	0.052	0.033	0.034	0.024	0.025	0.027	0.035	0.042	0.118	0.030	0.040	0.024	0.024	0.036	0.042	0.075	0.086	0.031
03/26/23	0.033	0.036	0.028	0.030	0.028	0.029	0.032	0.033	0.034	0.049	0.024	0.030	0.028	0.030	0.042	0.045	0.031	0.039	0.026	0.053	0.039	0.044	0.075	0.083	0.031
03/27/23	0.033	0.043	0.029	0.033	0.029	0.039	0.032	0.039	0.034	0.036	0.024	0.029	0.028	0.028	0.041	0.046	0.031	0.034	0.028	0.031	0.044	0.053	0.075	0.084	0.031
03/28/23	0.033	0.035	0.028	0.031	0.028	0.030	0.031	0.033	0.034	0.035	0.025	0.030	0.028	0.033	0.044	0.071	0.031	0.036	0.026	0.026	0.048	0.053	0.077	0.083	0.031
03/29/23	0.033	0.046	0.029	0.035	0.029	0.033	0.031	0.038	0.034	0.040	0.024	0.040	0.027	0.030	0.040	0.042	0.032	0.033	0.036	0.043	0.049	0.073	0.067	0.090	0.031
03/30/23	0.032	0.034	0.029	0.031	0.029	0.032	0.031	0.034	0.034	0.036	0.024	0.025	0.028	0.029	0.040	0.041	0.034	0.044	0.032	0.032	0.061	0.071	0.056	0.062	0.031
03/31/23	0.033	0.037	0.031	0.035	0.029	0.033	0.032	0.038	0.034	0.042	0.024	0.025	0.028	0.031	0.040	0.047	0.036	0.042	0.033	0.033	0.072	0.082	0.057	0.064	0.032

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cell out of service due to low production setpoint

*** Elevated value due to short term turbidity spike.

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
03/01/23	0.015	0.015	8.501	7.651	9.528	0.036	0.028	0.045	1,713	1,656	1,819	32	30	37	99.58	2.37	98.14	1.73
03/02/23	0.015	0.015	8.436	7.505	9.306	0.036	0.032	0.043	1,720	1,633	1,811	31	27	35	99.57	2.37	98.19	1.74
03/03/23	0.015	0.015	8.771	8.098	9.437	0.040	0.031	0.045	1,738	1,650	1,840	32	28	37	99.54	2.34	98.14	1.73
03/04/23	0.015	0.015	8.765	8.068	9.422	0.039	0.026	0.045	1,710	1,635	1,795	32	28	35	99.56	2.36	98.15	1.73
03/05/23	0.015	0.015	8.681	7.931	9.585	0.035	0.031	0.041	1,639	1,547	1,734	30	26	34	99.60	2.39	98.16	1.73
03/06/23	0.015	0.015	9.077	8.232	10.194	0.038	0.033	0.050	1,641	1,534	1,749	31	26	35	99.58	2.38	98.13	1.73
03/07/23	0.015	0.015	9.293	8.627	10.282	0.044	0.018	0.088	1,657	1,573	1,759	32	27	37	99.53	2.33	98.08	1.72
03/08/23	0.015	0.015	8.921	8.170	9.718	0.041	0.000	0.051	1,693	1,609	1,776	34	28	37	99.54	2.33	98.02	1.70
03/09/23	0.015	0.015	8.917	8.265	9.762	0.043	0.034	0.051	1,709	1,626	1,773	32	28	36	99.52	2.32	98.14	1.73
03/10/23	0.015	0.015	9.011	8.234	9.709	0.040	0.034	0.048	1,646	1,562	1,725	29	26	32	99.56	2.35	98.25	1.76
03/11/23	0.015	0.015	8.888	8.103	9.819	0.035	0.028	0.042	1,531	1,441	1,624	24	21	26	99.60	2.40	98.46	1.81
03/12/23	0.015	0.015	9.229	8.474	10.398	0.040	0.031	0.051	1,579	1,502	1,697	25	22	28	99.56	2.36	98.44	1.81
03/13/23	0.015	0.015	9.647	8.611	10.999	0.044	0.035	0.054	1,593	1,497	1,726	27	21	34	99.55	2.35	98.29	1.77
03/14/23	0.015	0.015	9.254	8.386	10.295	0.045	0.038	0.051	1,740	1,551	2,026	31	24	37	99.52	2.32	98.22	1.75
03/15/23	0.015	0.015	8.339	7.135	9.306	0.039	0.029	0.049	1,721	1,522	2,037	29	23	36	99.53	2.33	98.29	1.77
03/16/23	0.015	0.015	8.766	8.168	9.345	0.046	0.038	0.050	1,886	1,739	2,176	36	32	44	99.48	2.28	98.12	1.73
03/17/23	0.015	0.015	8.457	7.888	9.030	0.047	0.038	0.057	2,043	1,908	2,258	32	24	42	99.44	2.25	98.42	1.80
03/18/23	0.015	0.015	8.367	7.832	8.931	0.061	0.053	0.078	2,057	1,931	2,222	31	28	36	99.27	2.14	98.47	1.82
03/19/23	0.015	0.015	8.308	7.633	9.104	0.053	0.049	0.061	2,014	1,910	2,146	31	28	37	99.36	2.19	98.44	1.81
03/20/23	0.015	0.015	8.422	7.919	9.378	0.058	0.051	0.069	1,999	1,837	2,211	38	28	46	99.31	2.16	98.12	1.73
03/21/23	0.015	0.015	8.099	7.359	9.321	0.058	0.038	0.093	1,993	1,865	2,181	38	34	45	99.28	2.14	98.08	1.72
03/22/23	0.015	0.015	7.822	7.354	8.317	0.038	0.031	0.042	1,867	1,723	2,106	32	27	37	99.51	2.31	98.29	1.77
03/23/23	0.015	0.015	7.823	7.295	8.448	0.039	0.036	0.043	2,036	1,872	2,255	36	30	45	99.50	2.30	98.22	1.75
03/24/23	0.015	0.015	7.885	7.520	8.318	0.042	0.038	0.048	2,103	1,971	2,280	41	37	47	99.47	2.28	98.05	1.71
03/25/23	0.015	0.015	7.756	7.317	8.133	0.040	0.032	0.044	2,094	1,984	2,233	40	37	45	99.49	2.29	98.07	1.71
03/26/23	0.015	0.015	7.771	7.341	8.362	0.037	0.029	0.042	2,017	1,912	2,170	38	34	44	99.53	2.33	98.10	1.72
03/27/23	0.015	0.015	7.956	7.550	8.632	0.037	0.033	0.045	1,968	1,826	2,164	38	33	44	99.54	2.33	98.08	1.72
03/28/23	0.015	0.015	7.912	7.469	8.705	0.045	0.038	0.089	2,006	1,802	2,140	38	33	45	99.43	2.25	98.08	1.72
03/29/23	0.015	0.015	7.910	7.504	8.362	0.045	0.035	0.057	1,920	1,644	2,080	37	29	42	99.43	2.24	98.09	1.72
03/30/23	0.015	0.015	7.777	7.287	8.189	0.053	0.050	0.059	1,956	1,853	2,138	36	32	45	99.32	2.17	98.17	1.74
03/31/23	0.015	0.015	7.656	7.322	8.064	0.054	0.047	0.068	2,009	1,875	2,151	36	31	43	99.29	2.15	98.19	1.74

Notes:

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Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
03/01/23	96.67	90.098	29,826.9	0.34	3	6
03/02/23	96.64	89.939	29,375.9	0.33	3	6
03/03/23	96.46	67.875	29,105.2	0.32	3	6
03/04/23	96.61	55.013	22,717.7	0.34	3	6
03/05/23	96.98	55.129	18,158.0	0.33	3	6
03/06/23	96.70	55.104	17,362.3	0.31	3	6
03/07/23	96.89	55.045	17,971.9	0.33	3	6
03/08/23	96.13	55.044	17,370.1	0.32	3	6
03/09/23	96.55	55.648	16,944.1	0.31	3	6
03/10/23	96.78	55.702	18,361.2	0.33	3	6
03/11/23	96.96	55.646	17,831.0	0.32	3	6
03/12/23	97.14	53.345	16,996.1	0.31	3	6
03/13/23	96.99	57.687	15,841.5	0.30	3	6
03/14/23	96.68	59.000	18,099.8	0.32	3	6
03/15/23	96.44	60.203	19,840.0	0.33	3	6
03/16/23	96.49	59.915	20,014.8	0.34	3	6
03/17/23	96.36	60.017	20,269.0	0.34	3	6
03/18/23	96.54	60.034	21,611.6	0.35	3	6
03/19/23	96.64	60.001	20,179.1	0.34	3	6
03/20/23	96.53	62.891	19,980.1	0.33	3	6
03/21/23	96.53	65.318	20,889.8	0.33	3	6
03/22/23	96.68	65.298	21,311.5	0.33	3	6
03/23/23	97.03	65.388	21,726.2	0.32	3	6
03/24/23	97.10	65.438	20,009.4	0.30	3	6
03/25/23	97.34	65.400	19,230.8	0.29	3	6
03/26/23	97.59	65.195	18,679.3	0.29	3	6
03/27/23	97.49	65.090	18,207.0	0.28	3	6
03/28/23	97.57	65.142	18,243.0	0.28	3	6
03/29/23	97.68	65.238	17,981.4	0.28	3	6
03/30/23	97.62	65.202	17,949.2	0.28	3	6
03/31/23	97.55	62.088	17,833.9	0.27	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

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	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus(1)	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
04/01/23	12.24	12.24	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/02/23	12.25	12.25	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/03/23	12.37	12.37	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/04/23	12.34	12.34	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/05/23	12.27	12.27	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/06/23	12.24	12.24	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/07/23	12.31	12.31	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/08/23	12.37	12.37	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/09/23	12.49	12.49	12.27	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/10/23	12.36	12.36	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/11/23	12.40	12.40	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/12/23	12.35	12.35	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/13/23	12.39	12.39	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/14/23	12.38	12.38	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/15/23	12.43	12.43	12.33	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/16/23	12.43	12.43	12.35	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/17/23	12.52	12.52	12.40	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/18/23	12.25	12.25	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/19/23	12.42	12.42	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/20/23	12.27	12.27	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/21/23	12.18	12.18	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/22/23	12.24	12.24	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/23/23	12.34	12.34	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/24/23	12.32	12.32	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/25/23	12.24	12.24	12.23	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/26/23	12.26	12.26	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/27/23	12.24	12.24	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/28/23	12.25	12.25	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/29/23	12.23	12.23	12.23	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
04/30/23	12.26	12.26	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

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	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
04/01/23	0.00	4.08	2.17	6.00	0.00	12.24
04/02/23	0.00	4.05	2.20	6.00	0.00	12.25
04/03/23	0.00	4.17	2.19	6.00	0.00	12.37
04/04/23	0.00	4.17	2.17	6.00	0.00	12.34
04/05/23	0.00	4.07	2.19	6.00	0.00	12.27
04/06/23	0.00	4.07	2.17	6.00	0.00	12.24
04/07/23	0.00	4.12	2.18	6.00	0.00	12.31
04/08/23	0.00	4.18	2.18	6.00	0.00	12.37
04/09/23	0.00	4.22	2.27	6.00	0.00	12.49
04/10/23	0.00	4.14	2.22	6.00	0.00	12.36
04/11/23	0.00	4.16	2.24	6.00	0.00	12.40
04/12/23	0.00	4.07	2.28	6.00	0.00	12.35
04/13/23	0.00	4.10	2.29	6.00	0.00	12.39
04/14/23	0.00	4.11	2.28	6.00	0.00	12.38
04/15/23	0.00	4.10	2.33	6.00	0.00	12.43
04/16/23	0.00	4.08	2.35	6.00	0.00	12.43
04/17/23	0.00	4.13	2.40	6.00	0.00	12.52
04/18/23	0.00	4.13	2.12	6.00	0.00	12.25
04/19/23	0.00	4.13	2.29	6.00	0.00	12.42
04/20/23	0.00	4.06	2.21	6.00	0.00	12.27
04/21/23	0.00	4.04	2.15	6.00	0.00	12.18
04/22/23	0.00	4.05	2.19	6.00	0.00	12.24
04/23/23	0.00	4.04	2.30	6.00	0.00	12.34
04/24/23	0.00	4.02	2.30	6.00	0.00	12.32
04/25/23	0.00	4.02	2.23	6.00	0.00	12.24
04/26/23	0.00	4.06	2.21	6.00	0.00	12.26
04/27/23	0.00	4.00	2.24	6.00	0.00	12.24
04/28/23	0.00	4.03	2.22	6.00	0.00	12.25
04/29/23	0.00	4.00	2.23	6.00	0.00	12.23
04/30/23	0.00	4.01	2.25	6.00	0.00	12.26

Notes:

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Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (1)	Total
	LRV	LRV	LRV	LRV	LRV	LRV
04/01/23	0.00	0.00	2.17	6.00	4.00	12.17
04/02/23	0.00	0.00	2.20	6.00	4.00	12.20
04/03/23	0.00	0.00	2.19	6.00	4.00	12.19
04/04/23	0.00	0.00	2.17	6.00	4.00	12.17
04/05/23	0.00	0.00	2.19	6.00	4.00	12.19
04/06/23	0.00	0.00	2.17	6.00	4.00	12.17
04/07/23	0.00	0.00	2.18	6.00	4.00	12.18
04/08/23	0.00	0.00	2.18	6.00	4.00	12.18
04/09/23	0.00	0.00	2.27	6.00	4.00	12.27
04/10/23	0.00	0.00	2.22	6.00	4.00	12.22
04/11/23	0.00	0.00	2.24	6.00	4.00	12.24
04/12/23	0.00	0.00	2.28	6.00	4.00	12.28
04/13/23	0.00	0.00	2.29	6.00	4.00	12.29
04/14/23	0.00	0.00	2.28	6.00	4.00	12.28
04/15/23	0.00	0.00	2.33	6.00	4.00	12.33
04/16/23	0.00	0.00	2.35	6.00	4.00	12.35
04/17/23	0.00	0.00	2.40	6.00	4.00	12.40
04/18/23	0.00	0.00	2.12	6.00	4.00	12.12
04/19/23	0.00	0.00	2.29	6.00	4.00	12.29
04/20/23	0.00	0.00	2.21	6.00	4.00	12.21
04/21/23	0.00	0.00	2.15	6.00	4.00	12.15
04/22/23	0.00	0.00	2.19	6.00	4.00	12.19
04/23/23	0.00	0.00	2.30	6.00	4.00	12.30
04/24/23	0.00	0.00	2.30	6.00	4.00	12.30
04/25/23	0.00	0.00	2.23	6.00	4.00	12.23
04/26/23	0.00	0.00	2.21	6.00	4.00	12.21
04/27/23	0.00	0.00	2.24	6.00	4.00	12.24
04/28/23	0.00	0.00	2.22	6.00	4.00	12.22
04/29/23	0.00	0.00	2.23	6.00	4.00	12.23
04/30/23	0.00	0.00	2.25	6.00	4.00	12.25

Notes:

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	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/23	5.13	5.14	5.21	5.10	4.97	5.17	5.19	4.98	5.12	5.26	5.01	5.01	5.21	5.04	5.07	4.68
04/02/23	5.17	N/A *	5.23	N/A *	N/A *	N/A *	5.28	5.13	5.20	5.21	5.04	5.03	5.19	5.08	5.07	4.70
04/03/23	5.13	5.22	5.23	5.06	5.14	5.24	5.14	5.02	5.19	5.23	4.99	5.02	5.22	5.06	5.09	4.67
04/04/23	5.12	5.22	5.20	5.18	5.04	5.21	5.18	5.06	5.12	5.26	4.99	5.05	5.16	5.13	5.10	4.77
04/05/23	5.14	5.20	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/06/23	5.15	5.21	5.31	5.28	5.05	5.17	5.24	5.02	5.14	5.45	5.04	5.03	5.19	5.17	5.13	4.86
04/07/23	5.13	5.23	5.24	5.32	5.09	5.20	5.15	5.00	5.18	5.52	5.00	5.04	5.23	5.21	5.09	4.93
04/08/23	5.10	5.14	5.22	5.25	5.07	5.18	5.16	5.03	5.17	5.43	5.00	5.06	5.25	5.23	5.07	4.91
04/09/23	5.12	5.19	5.28	5.25	5.04	5.18	5.21	5.03	5.30	5.39	5.02	5.05	5.25	5.23	5.08	4.89
04/10/23	5.08	5.19	5.25	5.25	5.03	5.20	5.25	5.05	5.32	5.43	5.01	5.04	5.25	5.21	5.11	4.89
04/11/23	5.11	5.22	5.30	5.27	5.09	5.20	5.18	5.08	5.26	5.29	5.01	5.01	5.17	5.20	5.10	4.86
04/12/23	5.08	5.14	5.20	5.19	5.03	5.15	5.15	5.09	5.23	5.30	4.97	5.00	5.16	5.18	5.08	4.84
04/13/23	5.07	5.14	5.19	5.19	5.03	5.14	5.15	5.04	5.23	5.26	4.96	4.96	5.16	5.19	5.07	4.83
04/14/23	5.05	5.08	5.16	5.20	5.15	5.14	5.14	5.02	5.23	5.20	4.96	4.97	5.18	5.15	5.05	4.80
04/15/23	5.02	5.12	5.25	5.20	5.13	5.12	5.12	5.02	5.32	5.32	4.98	4.99	5.15	5.14	5.06	4.85
04/16/23	5.07	5.11	5.22	5.20	5.19	5.21	5.17	5.07	5.23	5.32	4.96	4.95	5.31	5.14	5.04	4.87
04/17/23	5.06	5.09	5.21	5.21	5.15	5.14	5.20	5.00	5.14	5.31	N/A *	N/A *	N/A *	N/A *	5.09	4.63
04/18/23	5.05	5.36	5.19	N/A *	5.19	5.13	5.11	5.02	5.32	5.47	5.00	5.01	5.41	5.13	5.05	4.71
04/19/23	5.05	5.23	5.18	5.16	5.12	5.12	5.10	4.97	5.20	5.32	4.94	4.99	5.34	5.15	5.07	4.68
04/20/23	5.06	5.20	5.19	5.18	5.09	5.05	5.18	4.96	5.13	5.29	4.90	4.94	5.26	5.16	5.04	4.66
04/21/23	5.00	5.16	5.19	5.13	5.06	5.08	5.12	4.99	5.09	5.30	4.91	5.05	5.23	5.09	5.01	4.66
04/22/23	5.07	5.10	5.17	5.13	5.12	5.07	5.03	5.00	5.07	5.34	4.92	5.05	5.25	5.12	5.05	4.61
04/23/23	4.96	5.18	5.16	5.19	5.05	5.09	5.07	5.03	5.11	5.26	4.92	5.03	5.24	5.11	5.02	4.57
04/24/23	4.96	5.11	5.17	5.13	5.05	5.04	5.03	4.97	5.13	5.19	4.90	4.97	5.23	5.08	5.10	4.58
04/25/23	4.99	5.11	5.13	5.10	5.02	5.05	5.05	4.92	5.05	5.20	4.90	5.02	5.23	5.08	5.13	4.58
04/26/23	4.97	5.12	5.25	5.10	4.99	4.94	5.05	4.88	5.00	5.15	4.86	5.00	5.19	5.04	5.12	4.53
04/27/23	5.12	5.08	5.24	5.07	4.96	4.94	5.00	4.89	5.05	5.16	4.79	4.95	5.16	5.03	5.15	4.51
04/28/23	5.10	5.04	5.21	5.07	4.88	4.94	4.97	5.00	5.05	5.16	4.78	4.97	5.14	5.02	5.08	4.51
04/29/23	5.08	4.98	5.14	5.04	4.87	5.11	4.93	5.03	5.06	5.11	4.77	4.94	5.10	4.99	5.07	4.50
04/30/23	5.07	5.05	5.19	5.02	4.97	5.10	4.94	5.06	4.99	5.13	4.76	4.92	5.06	4.99	5.05	4.49

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)

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	MicroFiltration Process online monitoring results Log Removal Value															
	C01	**C02**	**C03**	**C04**	**C05**	**C06**	**C07**	**C08**	**D01**	**D02**	**D03**	**D04**	**D05**	**D06**	**D07**	**D08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/23	4.87	5.18	5.05	4.68	4.85	4.96	4.83	4.97	4.10	4.10	5.24	5.24	4.18	4.17	4.24	4.08
04/02/23	4.88	5.18	5.02	4.69	4.74	4.95	4.86	4.97	4.08	4.10	5.24	5.26	4.18	4.17	4.24	4.08
04/03/23	4.99	5.06	5.05	4.68	4.75	4.98	N/A *	5.00	N/A *	N/A **	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/04/23	5.13	5.17	5.02	4.65	4.77	4.95	4.87	5.05	N/A *	N/A **	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/05/23	5.15	5.12	5.00	4.62	4.64	4.92	4.84	5.13	4.09	N/A **	5.22	5.25	4.31	4.17	4.22	4.07
04/06/23	5.12	5.15	5.17	4.73	4.94	4.98	4.87	5.12	4.10	N/A **	5.19	5.25	4.31	4.18	4.22	4.07
04/07/23	5.12	5.14	5.15	4.82	4.71	4.97	4.86	5.13	4.12	N/A **	5.18	5.26	4.31	4.19	N/A *	4.29
04/08/23	5.09	5.17	5.15	4.81	4.74	4.94	4.87	5.12	4.21	N/A **	5.15	5.28	4.32	4.18	N/A *	N/A *
04/09/23	5.12	5.17	5.15	4.80	4.90	4.92	4.91	5.12	4.22	N/A **	5.16	5.25	4.29	N/A *	N/A *	N/A *
04/10/23	5.11	5.16	5.14	4.82	4.89	4.90	4.91	5.14	4.19	5.47	5.17	5.26	4.28	4.17	4.21	4.26
04/11/23	5.05	5.12	5.08	4.75	4.67	4.84	4.88	5.10	4.16	5.44	5.13	5.20	4.26	4.17	4.22	4.25
04/12/23	4.99	5.08	5.02	4.72	4.48	4.84	4.87	5.07	4.15	5.33	5.22	5.22	4.27	4.12	4.21	4.17
04/13/23	5.02	N/A *	5.05	4.73	4.87	4.92	4.88	5.10	4.15	5.32	5.18	5.20	4.27	4.12	4.20	4.16
04/14/23	4.99	5.06	5.06	4.74	4.79	4.88	4.87	5.04	4.12	5.16	5.10	5.13	4.20	4.11	4.17	4.13
04/15/23	5.02	5.04	5.04	4.74	4.62	4.86	4.89	5.06	4.12	5.15	5.07	5.12	4.19	4.10	4.18	4.13
04/16/23	5.03	5.05	5.03	4.74	4.62	4.87	4.89	5.07	4.14	N/A *	5.18	5.24	4.24	4.13	4.20	4.17
04/17/23	5.00	5.14	5.01	4.73	4.76	4.88	4.87	5.05	4.14	5.27	5.17	5.24	4.24	4.13	4.20	4.18
04/18/23	5.17	5.30	5.11	4.72	4.79	4.85	4.87	5.02	4.16	5.26	5.18	5.20	4.26	4.13	4.15	4.16
04/19/23	5.00	5.24	5.05	4.68	4.44	4.84	4.87	5.02	4.13	5.17	5.16	5.16	4.23	4.15	4.14	4.15
04/20/23	4.94	5.21	5.00	4.65	4.27	4.82	4.88	5.01	4.06	5.11	5.11	5.13	4.18	4.16	4.14	4.10
04/21/23	4.88	5.14	5.00	4.65	4.30	4.82	4.84	4.98	4.04	5.14	5.10	5.17	4.11	4.12	4.20	4.08
04/22/23	4.87	5.11	4.98	4.65	4.29	4.86	4.82	4.98	4.05	5.16	5.11	5.16	4.08	4.13	4.30	4.06
04/23/23	4.89	5.10	5.02	4.64	4.27	4.92	4.83	5.01	4.04	5.15	5.11	5.12	4.15	4.10	4.23	4.04
04/24/23	4.84	5.10	5.01	4.62	4.43	4.90	4.82	5.00	N/A **	5.14	5.10	5.13	4.20	4.11	4.17	4.02
04/25/23	4.72	5.08	4.92	4.59	4.45	4.86	4.81	4.94	N/A **	5.10	5.07	5.20	4.12	4.10	4.14	4.02
04/26/23	4.97	5.02	4.88	4.54	4.27	4.81	4.80	4.86	N/A **	5.06	5.02	5.22	4.08	4.07	4.13	4.15
04/27/23	5.02	5.00	4.84	4.52	4.32	4.83	4.77	4.95	N/A **	5.06	5.07	5.20	4.07	4.01	4.06	4.11
04/28/23	4.97	4.97	5.03	4.61	4.44	4.81	4.70	5.02	4.55	5.01	5.21	5.16	4.05	4.03	4.05	4.08
04/29/23	4.95	4.91	5.12	4.68	4.55	4.77	4.70	5.01	5.51	4.95	5.18	5.17	4.05	4.11	4.05	4.00
04/30/23	4.95	4.91	5.04	4.67	4.49	4.80	4.83	5.00	5.26	4.91	5.14	5.17	4.03	4.09	4.04	4.01

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint.

** Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
04/01/23	5.05	5.23	4.10	5.05	5.33	5.57	5.37	5.45	5.22	5.41	5.21	5.16	5.26	5.01	5.24	5.34
04/02/23	5.03	5.25	4.05	5.03	5.36	5.43	5.39	5.49	5.27	5.43	5.16	5.17	5.26	5.07	5.26	5.41
04/03/23	5.00	5.20	4.17	5.16	5.37	5.42	5.39	5.51	5.29	N/A *	5.12	5.17	5.23	5.09	5.23	5.30
04/04/23	5.07	5.27	4.17	5.09	5.41	5.37	5.35	5.47	5.28	5.42	5.24	5.16	5.18	5.12	N/A *	5.35
04/05/23	5.07	5.25	4.13	5.08	5.48	5.44	5.39	5.47	5.24	5.43	5.24	5.17	5.16	5.09	5.29	5.35
04/06/23	5.04	5.27	4.12	4.99	5.48	5.48	5.40	5.46	5.22	5.39	5.17	5.18	5.19	5.04	5.24	N/A *
04/07/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/08/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/09/23	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/10/23	5.02	5.25	4.14	5.06	5.46	5.45	5.31	5.47	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/11/23	4.97	5.24	4.21	5.05	5.47	5.46	5.32	5.49	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/12/23	5.00	5.34	4.07	5.03	5.39	5.47	5.30	5.47	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
04/13/23	4.97	5.41	4.10	5.01	5.35	5.47	5.31	5.48	5.30	5.44	5.18	5.21	5.26	5.02	5.25	5.33
04/14/23	4.99	5.25	4.22	5.00	5.35	5.51	5.35	5.50	5.29	5.43	5.15	5.20	5.20	5.06	5.21	5.38
04/15/23	4.97	5.28	4.10	5.04	5.34	5.60	5.41	5.49	5.26	5.51	5.18	5.17	5.21	5.04	5.22	5.34
04/16/23	4.99	5.38	4.08	5.07	5.38	5.52	5.38	5.44	5.26	5.44	5.16	5.15	5.23	5.05	5.21	5.33
04/17/23	5.10	N/A *	4.13	5.11	5.40	5.39	5.34	5.41	5.31	5.38	5.15	5.17	5.16	5.08	5.21	5.31
04/18/23	5.03	5.37	4.20	5.16	5.39	5.39	5.36	5.42	5.23	5.49	5.21	5.16	5.17	5.02	5.30	5.32
04/19/23	5.03	5.32	4.16	5.14	5.37	5.42	5.34	5.41	5.26	5.45	5.18	5.15	5.17	5.02	5.33	5.35
04/20/23	5.01	5.24	4.08	5.14	5.37	5.45	5.30	5.41	5.29	5.38	5.15	5.14	5.18	4.99	5.21	5.37
04/21/23	4.97	5.13	4.16	5.14	5.40	5.45	5.37	5.42	5.25	5.35	5.12	5.19	5.15	5.08	5.16	5.36
04/22/23	5.01	5.14	4.09	5.10	5.36	5.52	5.34	5.45	5.26	5.38	5.18	5.15	5.19	4.95	5.20	5.39
04/23/23	5.01	5.18	4.07	5.11	5.37	5.48	5.33	5.47	5.30	5.38	5.16	5.17	5.18	4.92	5.18	5.39
04/24/23	4.98	5.14	4.20	5.06	5.35	5.43	5.32	5.41	5.25	5.38	5.11	5.14	5.15	5.13	5.17	5.32
04/25/23	4.94	5.06	4.02	4.98	5.29	5.44	5.29	5.38	5.20	5.40	5.12	5.09	5.27	4.89	5.16	5.37
04/26/23	4.93	5.08	4.06	4.93	5.33	5.35	5.19	5.42	5.18	5.30	5.07	5.10	5.14	4.90	5.14	5.32
04/27/23	5.00	5.02	4.00	4.95	5.35	5.40	5.28	5.36	5.14	5.36	5.04	5.09	5.09	4.94	5.21	5.30
04/28/23	4.95	4.96	4.13	4.88	5.39	5.44	5.26	5.31	5.14	5.29	5.00	5.06	5.14	4.88	5.16	5.29
04/29/23	4.95	4.99	N/A *	4.85	5.48	5.40	5.21	5.32	5.21	5.22	5.17	5.07	5.11	4.82	5.06	5.31
04/30/23	4.99	5.04	N/A *	4.90	5.32	5.35	5.21	5.29	5.18	5.31	5.12	5.00	5.12	4.84	5.13	5.30

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
04/01/23	0.032	0.034	0.030	0.037	0.028	0.030	0.031	0.033	0.034	0.036	0.024	0.026	0.029	0.031	0.043	0.073	0.038	0.048	0.038	0.039	0.086	0.095	0.058	0.062	0.043
04/02/23	0.032	0.033	0.031	0.036	0.029	0.041	0.032	0.040	0.034	0.035	0.024	0.027	0.029	0.029	0.042	0.047	0.041	0.050	0.040	0.040	0.106	0.123	0.056	0.060	0.048
04/03/23	0.033	0.036	0.031	0.040	0.028	0.029	0.032	0.038	0.035	0.051	0.025	0.035	N/A *	N/A *	N/A *	N/A *	0.044	0.046	0.040	0.040	0.126	0.137	0.057	0.060	0.040
04/04/23	0.034	0.041	0.030	0.035	0.028	0.031	0.033	0.040	0.033	0.040	0.026	0.040	N/A *	N/A *	N/A *	N/A *	0.051	0.060	0.056	0.057	0.170	0.186	0.059	0.062	0.043
04/05/23	0.032	0.034	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030	0.042	0.025	0.036	0.027	0.032	0.040	0.048	0.039	0.054	0.041	0.060	0.106	0.185	0.061	0.066	0.050
04/06/23	0.036	0.063	0.029	0.035	0.029	0.033	0.036	0.056	0.035	0.055	0.030	0.052	0.028	0.091	0.041	0.044	0.031	0.038	0.026	0.027	0.072	0.079	0.061	0.065	0.037
04/07/23	0.033	0.055	0.026	0.032	0.027	0.030	0.032	0.035	0.031	0.044	0.025	0.038	0.026	0.029	0.040	0.045	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
04/08/23	0.033	0.035	0.026	0.029	0.028	0.031	0.032	0.044	0.030	0.034	0.026	0.034	0.028	0.101	0.040	0.042	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.030
04/09/23	0.034	0.036	0.028	0.032	0.030	0.035	0.032	0.035	0.031	0.067	0.026	0.034	0.028	0.039	0.041	0.045	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	0.031
04/10/23	0.034	0.036	0.028	0.030	0.030	0.035	0.033	0.035	0.030	0.032	0.026	0.051	0.033	0.063	0.041	0.047	0.033	0.050	0.043	0.290 ***	N/A *	N/A *	N/A *	N/A *	0.033
04/11/23	0.035	0.069	0.028	0.035	0.030	0.032	0.033	0.035	0.031	0.032	0.025	0.035	0.031	0.034	0.041	0.054	0.033	0.036	0.021	0.021	N/A *	N/A *	N/A *	N/A *	0.030
04/12/23	0.034	0.037	0.028	0.033	0.030	0.034	0.033	0.040	0.031	0.040	0.028	0.040	0.033	0.045	0.041	0.043	0.035	0.048	0.023	0.025	N/A *	N/A *	N/A *	N/A *	0.031
04/13/23	0.035	0.038	0.031	0.068	0.029	0.033	0.032	0.034	0.029	0.031	0.026	0.031	0.031	0.033	0.041	0.042	0.037	0.051	0.021	0.021	0.023	0.044	0.051	0.148	0.032
04/14/23	0.033	0.036	0.030	0.037	0.028	0.033	0.031	0.033	0.030	0.059	0.024	0.026	0.031	0.041	0.040	0.048	0.038	0.051	0.019	0.020	0.022	0.039	0.046	0.049	0.031
04/15/23	0.033	0.035	0.030	0.034	0.029	0.034	0.031	0.033	0.029	0.030	0.024	0.027	0.031	0.034	0.039	0.041	0.039	0.043	0.019	0.019	0.022	0.039	0.048	0.056	0.031
04/16/23	0.034	0.047	0.033	0.037	0.028	0.029	0.031	0.034	0.028	0.034	0.023	0.027	0.037	0.048	0.043	0.049	0.040	0.053	0.019	0.019	0.021	0.029	0.047	0.048	0.030
04/17/23	0.034	0.037	0.032	0.035	0.031	0.035	0.036	0.053	0.031	0.049	0.025	0.027	0.034	0.038	0.041	0.043	0.045	0.049	0.020	0.020	0.024	0.033	0.048	0.059	0.034
04/18/23	0.038	0.057	0.044	0.214 ***	0.031	0.042	0.036	0.040	0.032	0.062	0.027	0.030	0.039	0.083	0.042	0.055	0.050	0.057	0.021	0.024	0.028	0.047	0.054	0.070	0.038
04/19/23	0.037	0.042	0.037	0.041	0.029	0.031	0.033	0.037	0.031	0.038	0.026	0.030	0.038	0.040	0.043	0.050	0.052	0.070	0.021	0.022	0.026	0.029	0.057	0.064	0.036
04/20/23	0.038	0.044	0.039	0.044	0.032	0.037	0.035	0.037	0.033	0.035	0.028	0.030	0.040	0.041	0.044	0.053	0.057	0.067	0.022	0.022	0.031	0.039	0.060	0.065	0.038
04/21/23	0.039	0.040	0.041	0.042	0.033	0.037	0.034	0.037	0.033	0.034	0.028	0.031	0.041	0.051	0.045	0.052	0.059	0.062	0.023	0.023	0.035	0.042	0.065	0.075	0.039
04/22/23	0.039	0.059	0.040	0.043	0.033	0.045	0.034	0.036	0.032	0.038	0.028	0.030	0.040	0.042	0.045	0.048	0.061	0.073	0.024	0.025	0.038	0.051	0.070	0.073	0.041
04/23/23	0.038	0.042	0.041	0.043	0.033	0.047	0.034	0.039	0.032	0.034	0.028	0.032	0.041	0.052	0.045	0.045	0.066	0.074	0.024	0.024	0.044	0.049	0.072	0.073	0.042
04/24/23	0.039	0.041	0.042	0.045	0.033	0.035	0.037	0.042	0.033	0.051	0.029	0.031	0.047	0.052	0.045	0.049	0.068	0.071	0.024	0.033	0.053	0.060	0.082	0.089	0.044
04/25/23	0.033	0.041	0.031	0.045	0.030	0.034	0.035	0.040	0.031	0.040	0.026	0.037	0.038	0.048	0.044	0.055	0.052	0.074	0.027	0.029	0.045	0.065	0.081	0.093	0.039
04/26/23	0.033	0.040	0.025	0.033	0.028	0.029	0.033	0.035	0.030	0.039	0.024	0.042	0.030	0.049	0.041	0.059	0.030	0.038	0.025	0.025	0.030	0.036	0.060	0.070	0.033
04/27/23	0.033	0.037	0.027	0.064	0.028	0.029	0.033	0.035	0.031	0.035	0.025	0.034	0.033	0.049	0.042	0.062	0.030	0.037	0.025	0.025	0.031	0.038	0.047	0.052	0.032
04/28/23	0.031	0.034	0.027	0.032	0.028	0.030	0.033	0.047	0.031	0.045	0.025	0.031	0.033	0.081	0.041	0.058	0.032	0.039	0.025	0.030	0.031	0.035	0.046	0.047	0.032
04/29/23	0.031	0.033	0.026	0.028	0.027	0.029	0.033	0.035	0.030	0.033	0.025	0.049	0.033	0.038	0.041	0.079	0.035	0.049	0.030	0.030	0.032	0.040	0.046	0.053	0.032
04/30/23	0.030	0.034	0.026	0.032	0.028	0.032	0.032	0.037	0.030	0.032	0.025	0.042	0.032	0.047	0.042	0.059	0.034	0.043	0.030	0.030	0.030	0.033	0.048	0.053	0.032

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cell out of service due to low production setpoint.

*** Elevated value due to short term turbidity spike.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
04/01/23	0.015	0.015	7.646	7.318	8.187	0.052	0.047	0.058	2,018	1,921	2,135	34	30	41	99.32	2.17	98.29	1.77
04/02/23	0.015	0.015	7.666	7.246	8.183	0.048	0.045	0.056	1,927	1,829	2,076	29	27	33	99.37	2.20	98.49	1.82
04/03/23	0.015	0.015	7.572	7.208	7.928	0.049	0.047	0.054	1,935	1,791	2,136	27	24	30	99.36	2.19	98.62	1.86
04/04/23	0.015	0.015	7.663	7.351	8.049	0.052	0.050	0.054	1,986	1,864	2,124	27	25	29	99.33	2.17	98.64	1.87
04/05/23	0.015	0.015	7.593	7.306	8.058	0.049	0.045	0.053	1,995	1,867	2,114	28	25	30	99.36	2.19	98.61	1.86
04/06/23	0.015	0.025	7.886	7.608	8.703	0.054	0.034	0.221 ****	2,160	1,772	9,505 ******	73	28	1167 ******	99.32	2.17	96.63	1.47
04/07/23	0.015	0.015	7.870	7.288	8.459	0.051	0.041	0.089	1,684	1,599	1,774	46	37	57	99.35	2.18	97.25	1.56
04/08/23	0.015	0.015	7.749	7.164	8.352	0.051	0.041	0.059	1,787	1,558	2,016	51	43	57	99.35	2.18	97.14	1.54
04/09/23	0.015	0.016	7.505	7.141	7.979	0.041	0.036	0.045	1,884	1,801	2,001	51	47	57	99.46	2.27	97.28	1.56
04/10/23	0.015	0.023	7.680	7.356	8.455	0.046	0.037	0.377 *****	1,925	1,826	2,086	51	44	59	99.40	2.22	97.36	1.58
04/11/23	0.015	0.015	8.140	7.655	8.692	0.047	0.039	0.054	1,959	1,847	2,095	49	44	57	99.43	2.24	97.47	1.60
04/12/23	0.015	0.015	7.948	7.642	8.396	0.042	0.038	0.047	2,007	1,895	2,175	46	41	52	99.48	2.28	97.73	1.64
04/13/23	0.015	0.015	8.012	7.679	8.703	0.041	0.037	0.046	1,909	1,671	2,167	44	39	51	99.49	2.29	97.70	1.64
04/14/23	0.015	0.015	8.195	7.502	8.756	0.043	0.033	0.058	1,740	1,673	1,807	35	26	42	99.47	2.28	98.01	1.70
04/15/23	0.015	0.015	8.176	7.551	8.773	0.038	0.036	0.041	1,699	1,657	1,772	26	23	34	99.54	2.33	98.44	1.81
04/16/23	0.015	0.015	8.097	7.510	8.739	0.036	0.028	0.069	1,625	1,574	1,688	26	22	30	99.55	2.35	98.43	1.80
04/17/23	0.015	0.016	8.729	7.957	9.955	0.035	0.030	0.056	1,580	1,537	1,654	25	20	44	99.60	2.40	98.42	1.80
04/18/23	0.016	0.026	8.547	7.848	10.379	0.064	0.038	0.196 ****	2,681	1,621	20,345 ******	68	31	508 ******	99.25	2.12	97.46	1.60
04/19/23	0.015	0.016	8.286	7.716	8.957	0.043	0.037	0.049	1,710	1,623	1,818	37	33	42	99.49	2.29	97.85	1.67
04/20/23	0.015	0.015	8.099	7.538	8.974	0.050	0.041	0.271 *****	1,960	1,661	2,331	44	33	56	99.39	2.21	97.77	1.65
04/21/23	0.015	0.015	7.852	7.600	8.153	0.056	0.052	0.062	2,170	1,957	2,358	48	39	55	99.29	2.15	97.79	1.65
04/22/23	0.015	0.015	7.702	7.255	8.159	0.050	0.041	0.060	2,238	2,132	2,326	48	45	53	99.35	2.19	97.84	1.67
04/23/23	0.015	0.015	7.708	7.302	8.182	0.039	0.035	0.045	2,149	2,038	2,296	46	42	52	99.50	2.30	97.85	1.67
04/24/23	0.015	0.015	7.736	7.404	8.344	0.039	0.034	0.051	2,163	1,980	2,403	47	40	58	99.49	2.30	97.81	1.66
04/25/23	0.015	0.015	7.593	7.389	8.047	0.045	0.041	0.052	2,217	2,065	2,401	50	44	58	99.41	2.23	97.74	1.65
04/26/23	0.015	0.015	7.702	7.356	8.055	0.048	0.045	0.056	2,209	2,074	2,314	53	49	58	99.38	2.21	97.61	1.62
04/27/23	0.015	0.015	7.700	7.417	8.491	0.045	0.040	0.050	2,206	2,066	2,321	51	45	55	99.42	2.24	97.71	1.64
04/28/23	0.015	0.015	7.740	7.422	8.217	0.046	0.042	0.051	2,256	2,127	2,427	51	46	58	99.40	2.22	97.75	1.65
04/29/23	0.015	0.015	7.565	7.207	8.029	0.045	0.038	0.049	2,279	2,161	2,415	51	46	57	99.41	2.23	97.75	1.65
04/30/23	0.015	0.015	7.516	7.179	8.081	0.042	0.032	0.050	2,221	2,117	2,365	50	46	58	99.44	2.25	97.76	1.65

Notes:

**** Elevated value due to short term TOC spike.

***** ROP TOC above internal critical control point (0.1 mg/L) observed for less than 15 minutes. Value on backup ROP TOC analyzer was not elevated.

****** Short-term EC spike due to residual sulfuric acid in piping during plant restart after unplanned plant outage caused by PCS controller failure.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
04/01/23	97.50	60.750	17,947.5	0.29	3	6
04/02/23	97.52	55.136	17,578.9	0.30	3	6
04/03/23	97.75	45.464	15,886.5	0.30	3	6
04/04/23	97.66	45.292	13,751.7	0.30	3	6
04/05/23	97.61	45.249	13,828.6	0.31	3	6
04/06/23	97.83	30.430	14,324.8	0.31	3	6
04/07/23	97.54	45.239	11,352.2	0.31	3	6
04/08/23	96.90	45.616	13,912.9	0.31	3	6
04/09/23	96.41	45.451	14,919.4	0.33	3	6
04/10/23	96.21	52.288	16,156.5	0.35	3	6
04/11/23	96.07	65.755	19,027.4	0.35	3	6
04/12/23	96.07	65.751	22,220.2	0.34	3	6
04/13/23	96.55	65.660	22,589.9	0.34	3	6
04/14/23	96.97	80.777	21,047.0	0.32	3	6
04/15/23	97.03	65.517	24,583.3	0.30	3	6
04/16/23	97.09	65.449	19,524.4	0.30	3	6
04/17/23	96.89	41.257	19,350.2	0.30	3	6
04/18/23	96.72	33.402	13,514.1	0.33	3	6
04/19/23	96.17	100.849	13,400.7	0.41	3	6
04/20/23	96.25	100.523	33,374.1	0.34	3	6
04/21/23	96.28	100.522	34,474.1	0.35	3	6
04/22/23	96.31	100.773	33,960.9	0.34	3	6
04/23/23	96.09	100.612	33,969.1	0.34	3	6
04/24/23	96.12	104.778	34,686.7	0.34	3	6
04/25/23	96.13	110.778	36,690.5	0.34	3	6
04/26/23	96.19	104.239	36,487.8	0.34	3	6
04/27/23	96.31	104.259	34,923.5	0.34	3	6
04/28/23	96.32	110.833	35,084.1	0.33	3	6
04/29/23	96.44	110.944	36,574.6	0.33	3	6
04/30/23	96.37	110.798	36,022.4	0.33	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
05/01/23	12.25	12.25	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/02/23	12.20	12.20	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/03/23	12.25	12.25	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/04/23	12.24	12.24	12.23	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/05/23	12.24	12.24	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/06/23	12.39	12.39	12.26	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/07/23	12.32	12.32	12.26	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/08/23	12.34	12.34	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/09/23	12.27	12.27	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/10/23	12.22	12.22	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/11/23	12.20	12.20	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/12/23	12.18	12.18	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/13/23	12.21	12.21	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/14/23	12.24	12.24	12.23	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/15/23	12.00	12.00	12.97 (1)	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/16/23	12.20	12.20	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/17/23	12.19	12.19	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/18/23	12.22	12.22	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/19/23	12.20	12.20	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/20/23	12.22	12.22	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/21/23	12.26	12.26	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/22/23	12.27	12.27	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/23/23	12.22	12.22	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/24/23	12.04	12.04	12.02	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/25/23	12.27	12.27	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/26/23	12.27	12.27	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/27/23	12.30	12.30	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/28/23	12.33	12.33	12.28	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/29/23	12.39	12.39	12.29	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/30/23	12.38	12.38	12.30	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
05/31/23	12.24	12.24	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

(1) Additional log-virus credit taken for 1 month beyond secondary boundary where no drinking water wells operate.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
05/01/23	0.00	4.01	2.24	6.00	0.00	12.25
05/02/23	0.00	4.02	2.17	6.00	0.00	12.20
05/03/23	0.00	4.04	2.21	6.00	0.00	12.25
05/04/23	0.00	4.01	2.23	6.00	0.00	12.24
05/05/23	0.00	4.00	2.25	6.00	0.00	12.24
05/06/23	0.00	4.13	2.26	6.00	0.00	12.39
05/07/23	0.00	4.06	2.26	6.00	0.00	12.32
05/08/23	0.00	4.09	2.25	6.00	0.00	12.34
05/09/23	0.00	4.07	2.20	6.00	0.00	12.27
05/10/23	0.00	4.02	2.19	6.00	0.00	12.22
05/11/23	0.00	4.02	2.18	6.00	0.00	12.20
05/12/23	0.00	4.00	2.18	6.00	0.00	12.18
05/13/23	0.00	4.02	2.19	6.00	0.00	12.21
05/14/23	0.00	4.01	2.23	6.00	0.00	12.24
05/15/23	0.00	4.03	1.97	6.00	0.00	12.00
05/16/23	0.00	4.03	2.17	6.00	0.00	12.20
05/17/23	0.00	4.01	2.18	6.00	0.00	12.19
05/18/23	0.00	4.03	2.19	6.00	0.00	12.22
05/19/23	0.00	4.00	2.20	6.00	0.00	12.20
05/20/23	0.00	4.02	2.21	6.00	0.00	12.22
05/21/23	0.00	4.02	2.24	6.00	0.00	12.26
05/22/23	0.00	4.01	2.25	6.00	0.00	12.27
05/23/23	0.00	4.01	2.21	6.00	0.00	12.22
05/24/23	0.00	4.02	2.02	6.00	0.00	12.04
05/25/23	0.00	4.02	2.25	6.00	0.00	12.27
05/26/23	0.00	4.03	2.25	6.00	0.00	12.27
05/27/23	0.00	4.06	2.24	6.00	0.00	12.30
05/28/23	0.00	4.06	2.28	6.00	0.00	12.33
05/29/23	0.00	4.10	2.29	6.00	0.00	12.39
05/30/23	0.00	4.08	2.30	6.00	0.00	12.38
05/31/23	0.00	4.03	2.20	6.00	0.00	12.24

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (1)	Total
	LRV	LRV	LRV	LRV	LRV	LRV
05/01/23	0.00	0.00	2.24	6.00	4.00	12.24
05/02/23	0.00	0.00	2.17	6.00	4.00	12.17
05/03/23	0.00	0.00	2.21	6.00	4.00	12.21
05/04/23	0.00	0.00	2.23	6.00	4.00	12.23
05/05/23	0.00	0.00	2.25	6.00	4.00	12.25
05/06/23	0.00	0.00	2.26	6.00	4.00	12.26
05/07/23	0.00	0.00	2.26	6.00	4.00	12.26
05/08/23	0.00	0.00	2.25	6.00	4.00	12.25
05/09/23	0.00	0.00	2.20	6.00	4.00	12.20
05/10/23	0.00	0.00	2.19	6.00	4.00	12.19
05/11/23	0.00	0.00	2.18	6.00	4.00	12.18
05/12/23	0.00	0.00	2.18	6.00	4.00	12.18
05/13/23	0.00	0.00	2.19	6.00	4.00	12.19
05/14/23	0.00	0.00	2.23	6.00	4.00	12.23
05/15/23	0.00	0.00	1.97	6.00	5.00	12.97
05/16/23	0.00	0.00	2.17	6.00	4.00	12.17
05/17/23	0.00	0.00	2.18	6.00	4.00	12.18
05/18/23	0.00	0.00	2.19	6.00	4.00	12.19
05/19/23	0.00	0.00	2.20	6.00	4.00	12.20
05/20/23	0.00	0.00	2.21	6.00	4.00	12.21
05/21/23	0.00	0.00	2.24	6.00	4.00	12.24
05/22/23	0.00	0.00	2.25	6.00	4.00	12.25
05/23/23	0.00	0.00	2.21	6.00	4.00	12.21
05/24/23	0.00	0.00	2.02	6.00	4.00	12.02
05/25/23	0.00	0.00	2.25	6.00	4.00	12.25
05/26/23	0.00	0.00	2.25	6.00	4.00	12.25
05/27/23	0.00	0.00	2.24	6.00	4.00	12.24
05/28/23	0.00	0.00	2.28	6.00	4.00	12.28
05/29/23	0.00	0.00	2.29	6.00	4.00	12.29
05/30/23	0.00	0.00	2.30	6.00	4.00	12.30
05/31/23	0.00	0.00	2.20	6.00	4.00	12.20

Notes:

(1) Additional log-virus credit taken for 1 month beyond secondary boundary where no drinking water wells operate.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/23	5.02	5.02	5.11	5.08	4.87	5.02	4.92	5.01	4.94	5.16	4.91	4.92	5.09	4.97	5.02	4.48
05/02/23	5.10	5.07	5.25	5.05	5.00	5.13	5.00	5.07	5.03	5.10	4.96	4.96	5.08	5.00	5.05	4.47
05/03/23	5.12	5.10	5.23	5.06	5.00	5.17	4.97	5.05	5.06	5.09	4.99	4.99	5.12	5.01	5.03	4.47
05/04/23	5.05	5.08	5.18	5.09	4.96	5.12	5.18	5.06	5.06	5.13	4.96	4.93	5.05	5.18	5.00	4.45
05/05/23	5.02	5.05	5.07	5.30	4.91	5.01	5.14	5.04	4.96	5.13	4.97	4.93	5.02	5.17	5.04	4.54
05/06/23	5.03	5.00	5.15	5.23	4.92	5.04	5.13	5.00	4.93	5.08	4.95	4.86	5.06	5.13	5.02	4.64
05/07/23	5.01	5.04	5.14	5.22	4.86	5.04	5.12	4.97	5.18	5.07	4.94	4.86	5.06	5.10	5.03	4.60
05/08/23	5.00	4.97	5.25	5.17	4.85	5.06	5.12	4.96	5.12	5.09	4.91	4.88	5.05	5.11	5.03	4.62
05/09/23	4.98	5.02	5.17	5.15	4.88	4.99	5.11	4.96	5.16	5.04	4.94	4.88	5.02	5.15	4.99	4.64
05/10/23	5.00	4.97	5.18	5.13	4.76	4.98	5.08	4.93	5.18	4.99	4.87	4.83	4.97	5.13	4.98	4.62
05/11/23	5.05	4.88	5.16	5.11	4.74	4.96	5.09	4.95	5.16	5.03	4.85	4.81	4.96	5.06	4.98	4.61
05/12/23	5.03	4.90	5.04	5.09	5.05	4.95	5.03	4.92	5.09	4.93	4.86	4.80	4.97	5.03	5.00	4.57
05/13/23	5.05	4.98	5.14	5.09	5.10	5.00	5.00	4.93	5.10	4.92	4.85	4.79	5.03	5.05	5.03	4.58
05/14/23	5.01	4.91	5.13	5.17	5.01	4.89	5.14	4.96	5.06	4.95	4.87	4.74	5.15	5.01	4.96	4.58
05/15/23	4.96	4.86	5.01	5.10	4.98	4.83	5.04	4.88	5.02	4.92	4.83	4.73	5.15	5.02	4.90	4.58
05/16/23	4.95	5.12	4.96	5.06	4.93	4.85	5.00	4.82	5.03	4.84	4.80	4.71	5.16	5.01	4.90	4.55
05/17/23	4.90	5.08	4.98	5.07	4.91	4.84	4.96	4.82	5.07	4.82	4.82	4.92	5.15	5.03	4.91	4.53
05/18/23	4.95	5.09	5.01	5.12	4.98	4.89	5.01	4.87	5.10	5.10	4.81	4.94	5.17	5.01	4.93	4.53
05/19/23	4.95	5.10	5.00	5.12	5.00	4.95	5.03	4.91	5.04	5.27	4.83	4.96	5.19	5.01	4.90	4.54
05/20/23	4.90	5.11	5.02	5.08	5.01	4.91	5.04	4.84	5.04	5.28	4.80	4.94	5.22	5.01	4.91	4.55
05/21/23	4.93	5.06	5.01	5.11	4.98	4.86	5.02	4.89	5.03	5.26	4.83	4.95	5.21	5.06	4.93	4.52
05/22/23	4.94	5.11	5.06	5.08	4.94	4.88	5.07	4.92	5.01	5.28	4.79	4.97	5.17	5.01	4.89	4.52
05/23/23	5.22	5.06	5.21	5.13	4.92	4.88	5.03	4.90	5.00	5.23	4.78	4.96	5.17	4.99	4.92	4.79
05/24/23	5.10	5.03	5.28	5.03	4.95	4.91	5.01	5.06	5.08	5.23	4.77	4.95	5.13	4.99	5.07	4.91
05/25/23	5.05	5.09	5.19	5.08	4.91	5.09	4.99	5.07	5.03	5.25	4.74	4.94	5.15	4.95	5.08	4.93
05/26/23	5.09	5.03	5.19	5.01	4.91	5.12	4.98	5.00	5.00	5.21	4.94	4.94	5.16	4.96	5.07	4.88
05/27/23	5.06	5.08	5.16	5.08	4.94	5.09	4.98	5.02	4.94	5.16	4.97	4.91	5.12	4.93	5.07	4.85
05/28/23	5.05	5.02	5.15	5.03	4.89	5.10	4.99	5.02	4.97	5.16	4.96	4.92	5.13	4.91	5.06	4.86
05/29/23	5.02	5.04	5.21	5.00	4.89	5.06	4.96	5.06	4.96	5.17	4.95	4.91	5.15	4.94	5.01	4.85
05/30/23	5.06	5.02	5.16	5.04	4.87	5.11	4.95	5.04	4.94	5.16	4.94	4.88	5.14	5.13	5.08	4.82
05/31/23	5.08	5.04	5.09	5.18	4.91	5.13	5.07	5.05	4.97	5.18	4.95	4.93	5.15	5.19	5.13	4.92

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/23	4.88	4.86	5.02	4.62	4.50	4.78	4.87	4.99	5.19	4.91	5.11	5.13	NA *	4.09	4.03	4.01
05/02/23	4.90	4.92	5.01	4.63	4.50	4.78	4.82	5.03	5.20	4.95	5.12	5.10	NA *	4.03	4.05	4.02
05/03/23	4.95	4.96	5.00	4.69	4.29	4.79	4.89	5.07	5.24	4.96	5.14	5.14	NA *	4.08	4.06	4.04
05/04/23	4.85	4.86	4.97	4.64	4.47	4.76	4.90	5.01	5.21	4.92	5.14	5.14	NA *	4.11	4.26	4.01
05/05/23	4.85	4.87	4.92	4.60	4.42	4.76	4.82	4.96	5.18	4.88	5.10	5.04	NA *	4.01	4.17	4.00
05/06/23	4.78	4.89	4.88	4.55	4.25	4.73	4.82	4.95	5.15	4.90	5.09	5.06	NA *	4.13	4.16	4.18
05/07/23	4.77	5.08	4.89	4.55	4.44	4.71	4.84	4.94	5.13	4.94	5.08	5.10	NA *	4.11	4.11	4.06
05/08/23	4.75	5.16	4.96	4.56	4.42	4.72	4.78	4.93	5.13	4.97	5.12	5.10	NA *	4.10	4.10	4.10
05/09/23	4.76	5.14	4.92	4.54	4.28	4.70	4.78	4.91	5.08	4.95	5.10	5.07	NA *	4.09	4.08	4.07
05/10/23	4.62	5.12	4.87	4.54	4.50	4.88	4.80	4.89	5.09	5.04	5.06	5.08	NA *	4.06	4.02	4.04
05/11/23	4.54	5.01	4.83	4.51	4.64	4.94	4.77	4.86	5.09	5.05	5.07	5.10	NA *	4.04	4.03	4.02
05/12/23	4.54	4.98	4.82	4.45	4.41	4.86	4.74	4.79	5.09	5.03	5.07	5.05	4.51	4.01	4.03	4.00
05/13/23	4.55	5.00	4.82	4.47	4.46	4.86	4.76	4.80	5.11	5.06	5.11	4.98	5.20	4.02	4.02	4.18
05/14/23	4.56	4.99	4.80	4.47	4.47	4.85	4.79	4.82	5.09	5.04	5.18	4.97	5.21	4.01	4.02	4.08
05/15/23	4.90	4.90	4.73	4.38	4.16	4.81	4.74	4.76	4.96	4.89	5.12	4.89	5.09	4.03	4.15	4.03
05/16/23	4.87	4.84	4.69	4.58	4.11	4.77	4.67	4.80	4.95	4.84	4.99	4.91	4.93	4.03	4.06	4.07
05/17/23	4.78	4.86	4.87	4.75	4.30	4.76	4.64	4.99	5.04	4.92	4.98	5.00	5.02	4.01	4.10	4.04
05/18/23	4.76	4.86	5.02	4.65	4.40	4.79	4.63	5.01	5.06	4.93	4.91	4.98	5.09	4.11	4.08	4.03
05/19/23	4.80	4.84	5.00	4.65	4.36	4.79	4.77	5.03	5.09	4.96	4.89	4.96	5.20	4.11	4.08	4.00
05/20/23	4.83	4.85	5.01	4.67	4.41	4.79	4.91	5.06	5.11	4.99	5.03	5.04	5.13	4.09	4.11	4.02
05/21/23	4.85	4.90	5.06	4.67	4.45	4.80	4.86	5.03	5.10	4.98	5.06	5.09	5.18	4.06	4.11	4.02
05/22/23	4.86	4.87	5.00	4.66	4.44	4.76	4.89	4.98	5.07	4.97	5.05	5.10	5.16	4.12	4.04	4.01
05/23/23	4.84	4.85	4.93	4.67	4.41	4.75	4.91	4.98	5.06	4.97	5.11	5.09	5.10	NA *	4.01	4.02
05/24/23	4.80	4.78	4.92	4.64	4.53	4.76	4.88	5.00	5.08	4.90	5.17	5.07	5.09	NA *	4.02	4.03
05/25/23	4.77	4.78	4.91	4.60	4.53	4.73	4.84	4.95	5.27	4.97	5.13	5.09	5.12	NA *	4.02	4.15
05/26/23	4.72	4.97	4.91	4.60	4.50	4.68	4.85	4.91	5.20	4.96	5.15	5.07	5.09	NA *	4.03	4.11
05/27/23	4.71	5.01	4.88	4.57	4.64	4.67	4.82	4.93	5.21	4.93	5.14	5.09	5.09	NA *	4.14	4.11
05/28/23	4.72	5.00	4.86	4.56	4.65	4.69	4.80	4.95	5.20	4.93	5.11	5.13	5.15	5.40	4.27	4.12
05/29/23	4.72	5.03	4.87	4.56	4.33	4.78	4.84	4.93	5.13	4.82	5.17	5.05	5.12	5.20	4.17	4.10
05/30/23	4.72	5.02	4.83	4.53	4.38	4.88	4.84	4.91	5.15	4.74	5.10	5.02	5.15	5.18	4.15	4.08
05/31/23	4.73	5.06	4.83	4.57	4.53	4.88	4.85	4.92	5.29	4.86	5.14	5.07	5.30	5.24	4.18	4.07

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results – Log Removal Value															
	E01	**E02**	**E03**	**E04**	**E05**	**E06**	**E07**	**E08**	**F01**	**F02**	**F03**	**F04**	**F05**	**F06**	**F07**	**F08**
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
05/01/23	4.90	4.96	4.11	4.98	5.35	5.41	5.25	5.33	5.20	5.32	5.06	5.02	5.13	4.85	5.10	5.25
05/02/23	4.88	5.04	4.09	5.05	5.43	5.45	5.31	5.40	5.24	5.44	5.15	5.14	5.15	4.87	5.12	5.22
05/03/23	4.88	5.05	4.07	5.05	5.45	5.46	5.44	5.42	5.21	5.45	5.19	5.12	5.30	4.81	5.18	5.28
05/04/23	4.75	4.87	4.13	4.88	5.27	5.20	5.14	5.36	5.22	5.24	5.12	5.11	5.13	4.75	5.06	5.30
05/05/23	4.80	4.80	4.02	4.73	5.20	5.18	5.08	5.22	4.94	5.28	5.07	5.05	4.93	4.74	4.95	5.20
05/06/23	4.69	4.82	4.20	4.64	5.15	5.29	5.20	5.19	4.95	5.11	4.92	4.90	5.07	4.76	5.09	5.26
05/07/23	4.79	4.88	4.07	4.66	5.13	5.30	5.10	5.29	5.09	5.15	4.88	5.12	4.94	4.78	4.96	4.98
05/08/23	4.96	4.72	4.09	4.64	5.12	5.19	5.11	5.24	5.05	5.20	5.07	4.91	4.88	4.83	4.96	4.99
05/09/23	4.71	4.78	4.19	4.50	5.21	5.22	5.16	5.21	4.94	5.13	5.05	4.98	4.92	4.84	4.91	5.15
05/10/23	4.73	4.88	4.03	4.72	5.27	5.16	5.09	5.23	4.98	5.14	5.02	5.00	4.97	4.75	4.86	5.10
05/11/23	4.86	4.71	4.06	4.53	5.26	5.07	5.04	5.25	5.02	5.15	5.04	4.98	4.94	4.69	5.21	5.18
05/12/23	4.66	4.67	4.09	4.49	5.18	5.13	5.11	5.16	4.95	5.05	5.05	4.93	5.05	4.67	4.85	5.26
05/13/23	4.73	4.85	4.03	4.61	5.23	5.14	5.04	5.16	5.07	5.07	5.10	4.92	4.89	4.68	4.84	5.22
05/14/23	4.80	4.83	4.02	4.55	5.25	5.15	5.13	5.19	4.97	5.18	4.89	4.88	4.91	4.68	5.09	5.12
05/15/23	4.72	4.79	4.05	4.50	5.23	5.24	5.22	5.34	4.92	5.22	4.92	5.20	4.88	4.68	4.91	5.06
05/16/23	4.61	4.66	4.05	4.49	5.18	5.16	4.92	5.01	4.93	5.11	5.09	4.96	4.93	4.68	4.98	4.92
05/17/23	4.82	4.67	4.09	4.44	5.21	5.18	4.95	5.24	5.03	5.18	4.93	4.93	4.96	4.68	4.96	5.18
05/18/23	4.88	4.66	4.07	4.47	5.24	5.19	5.03	5.27	5.32	5.23	4.96	5.09	4.89	4.74	4.89	5.13
05/19/23	4.91	4.82	4.04	4.63	5.30	5.17	5.15	5.25	5.01	5.33	5.20	4.87	4.91	4.77	4.92	5.12
05/20/23	4.79	4.81	4.07	4.51	5.20	5.25	5.12	5.28	5.07	5.23	4.91	4.87	4.96	4.73	4.95	5.21
05/21/23	4.74	4.79	4.12	4.45	5.11	5.19	5.05	5.19	5.04	5.22	4.99	5.11	4.94	4.72	4.92	5.25
05/22/23	4.74	4.75	4.02	4.51	5.17	5.24	5.17	5.10	5.03	5.24	5.01	5.07	4.92	4.72	4.96	5.32
05/23/23	4.81	4.73	4.02	4.51	5.24	5.30	5.28	5.17	5.05	5.15	4.93	4.95	5.08	4.73	4.98	5.41
05/24/23	4.92	4.81	4.04	4.46	5.35	5.21	5.11	5.20	5.08	5.19	4.93	5.09	4.92	4.72	4.95	5.20
05/25/23	4.78	4.83	4.05	4.51	5.23	5.18	5.06	5.24	5.11	5.25	5.09	4.92	4.96	4.66	5.12	5.20
05/26/23	4.80	4.97	4.03	4.52	5.13	5.14	5.04	5.35	4.91	5.22	5.04	4.94	4.95	4.62	4.96	5.30
05/27/23	4.90	4.74	4.06	4.64	5.11	5.13	5.07	5.30	5.05	5.18	4.95	4.94	4.91	4.63	4.95	5.28
05/28/23	4.79	4.74	4.06	4.53	5.20	5.05	5.11	5.19	4.99	5.14	4.94	4.97	4.90	4.67	5.06	5.10
05/29/23	4.83	4.76	4.14	4.50	5.18	5.22	5.07	5.20	5.04	5.06	4.97	5.13	4.94	NA **	4.97	5.18
05/30/23	4.87	4.73	4.08	4.61	5.19	5.19	5.17	5.15	5.05	5.11	4.98	4.93	4.94	4.76	4.95	5.22
05/31/23	4.79	4.77	4.03	4.52	5.24	5.58	5.33	5.17	4.05	5.31	5.02	5.01	5.10	4.65	5.02	5.11

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for membrane maintenance.

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
05/01/23	0.030	0.048	0.025	0.028	0.027	0.028	0.032	0.033	0.030	0.031	0.024	0.027	0.033	0.037	0.041	0.064	0.036	0.044	0.036	0.036	0.032	0.040	0.047	0.047	0.033
05/02/23	0.030	0.044	0.026	0.040	0.028	0.034	0.032	0.040	0.031	0.048	0.025	0.030	0.031	0.037	0.041	0.044	0.033	0.043	0.030	0.036	0.031	0.040	0.049	0.057	0.032
05/03/23	0.030	0.041	0.027	0.028	0.028	0.030	0.032	0.035	0.031	0.033	0.025	0.035	0.029	0.040	0.042	0.054	0.030	0.039	0.026	0.026	0.029	0.036	0.051	0.057	0.032
05/04/23	0.031	0.037	0.029	0.040	0.028	0.032	0.035	0.046	0.032	0.035	0.027	0.037	0.030	0.034	0.043	0.045	0.031	0.035	0.027	0.027	0.030	0.037	0.050	0.055	0.033
05/05/23	0.031	0.037	0.026	0.038	0.028	0.047	0.034	0.044	0.030	0.040	0.027	0.037	0.029	0.031	0.043	0.063	0.030	0.032	0.027	0.030	0.028	0.033	0.053	0.059	0.032
05/06/23	0.030	0.044	0.027	0.032	0.027	0.028	0.033	0.042	0.030	0.036	0.029	0.031	0.029	0.030	0.043	0.052	0.031	0.034	0.030	0.030	0.028	0.033	0.055	0.056	0.033
05/07/23	0.030	0.038	0.027	0.029	0.028	0.030	0.033	0.043	0.030	0.033	0.033	0.036	0.029	0.030	0.043	0.044	0.033	0.036	0.029	0.030	0.029	0.033	0.057	0.061	0.033
05/08/23	0.030	0.033	0.027	0.030	0.028	0.029	0.032	0.035	0.031	0.037	0.036	0.038	0.029	0.033	0.043	0.044	0.033	0.036	0.032	0.037	0.028	0.029	0.061	0.066	0.034
05/09/23	0.030	0.033	0.027	0.029	0.028	0.029	0.032	0.035	0.031	0.031	0.040	0.044	0.030	0.034	0.043	0.043	0.035	0.044	0.039	0.045	0.028	0.033	0.063	0.064	0.036
05/10/23	0.030	0.032	0.027	0.029	0.028	0.030	0.032	0.035	0.031	0.032	0.047	0.053	0.032	0.047	0.043	0.044	0.037	0.046	0.041	0.041	0.030	0.034	0.067	0.075	0.037
05/11/23	0.031	0.033	0.028	0.033	0.028	0.029	0.033	0.035	0.031	0.032	0.055	0.059	0.032	0.047	0.043	0.050	0.038	0.042	0.047	0.053	0.029	0.030	0.071	0.075	0.039
05/12/23	0.030	0.033	0.027	0.031	0.028	0.031	0.032	0.043	0.031	0.032	0.035	0.060	0.029	0.056	0.045	0.092	0.033	0.042	0.037	0.050	0.031	0.036	0.061	0.071	0.035
05/13/23	0.031	0.033	0.026	0.028	0.027	0.028	0.033	0.046	0.030	0.033	0.024	0.027	0.028	0.030	0.044	0.049	0.029	0.036	0.028	0.029	0.031	0.039	0.047	0.055	0.032
05/14/23	0.031	0.035	0.027	0.029	0.028	0.030	0.034	0.036	0.031	0.033	0.026	0.027	0.028	0.030	0.043	0.045	0.031	0.039	0.029	0.032	0.032	0.040	0.050	0.051	0.032
05/15/23	0.032	0.038	0.027	0.029	0.029	0.031	0.034	0.036	0.032	0.052	0.027	0.034	0.030	0.088	0.043	0.045	0.034	0.050	0.035	0.050	0.036	0.041	0.054	0.060	0.034
05/16/23	0.032	0.076	0.027	0.033	0.029	0.033	0.033	0.035	0.032	0.055	0.026	0.060	0.032	0.131	0.043	0.081	0.037	0.039	0.039	0.044	0.039	0.044	0.063	0.069	0.036
05/17/23	0.031	0.034	0.026	0.029	0.028	0.030	0.032	0.035	0.032	0.046	0.025	0.061	0.030	0.058	0.043	0.052	0.036	0.052	0.039	0.049	0.037	0.040	0.062	0.071	0.035
05/18/23	0.030	0.033	0.025	0.029	0.028	0.035	0.031	0.036	0.031	0.046	0.023	0.025	0.027	0.030	0.041	0.043	0.031	0.034	0.029	0.030	0.035	0.040	0.052	0.053	0.032
05/19/23	0.031	0.034	0.026	0.055	0.029	0.032	0.032	0.039	0.032	0.034	0.025	0.047	0.029	0.036	0.042	0.065	0.033	0.035	0.029	0.033	0.037	0.038	0.054	0.062	0.033
05/20/23	0.031	0.034	0.026	0.028	0.029	0.030	0.032	0.039	0.032	0.043	0.025	0.029	0.030	0.053	0.043	0.071	0.036	0.039	0.033	0.033	0.039	0.045	0.058	0.062	0.034
05/21/23	0.031	0.033	0.026	0.028	0.028	0.032	0.032	0.046	0.031	0.033	0.024	0.032	0.029	0.031	0.042	0.043	0.039	0.042	0.035	0.035	0.044	0.049	0.061	0.063	0.035
05/22/23	0.032	0.039	0.026	0.028	0.029	0.030	0.032	0.034	0.032	0.033	0.025	0.028	0.030	0.040	0.042	0.046	0.044	0.053	0.041	0.048	0.049	0.054	0.067	0.071	0.037
05/23/23	0.033	0.043	0.027	0.032	0.029	0.036	0.033	0.039	0.032	0.033	0.026	0.060	0.031	0.034	0.043	0.044	0.050	0.056	0.048	0.049	0.055	0.060	0.072	0.076	0.040
05/24/23	0.032	0.034	0.028	0.039	0.029	0.030	0.033	0.037	0.032	0.033	0.026	0.028	0.031	0.037	0.043	0.049	0.056	0.060	0.050	0.052	0.062	0.071	0.079	0.082	0.042
05/25/23	0.032	0.034	0.028	0.031	0.029	0.031	0.033	0.035	0.032	0.035	0.027	0.030	0.031	0.033	0.043	0.047	0.046	0.060	0.041	0.070	0.049	0.070	0.072	0.090	0.038
05/26/23	0.032	0.035	0.028	0.030	0.030	0.034	0.033	0.035	0.032	0.048	0.030	0.032	0.030	0.032	0.043	0.049	0.036	0.039	0.025	0.025	0.035	0.040	0.062	0.065	0.035
05/27/23	0.032	0.035	0.027	0.029	0.030	0.040	0.033	0.035	0.032	0.035	0.031	0.035	0.030	0.033	0.047	0.085	0.034	0.035	0.025	0.025	0.036	0.040	0.064	0.070	0.035
05/28/23	0.032	0.034	0.027	0.029	0.030	0.031	0.033	0.035	0.032	0.033	0.034	0.039	0.030	0.031	0.049	0.054	0.034	0.035	0.024	0.025	0.036	0.038	0.066	0.068	0.036
05/29/23	0.032	0.034	0.027	0.030	0.029	0.030	0.033	0.040	0.032	0.033	0.036	0.039	0.030	0.031	0.045	0.047	0.035	0.039	0.024	0.025	0.038	0.046	0.068	0.069	0.036
05/30/23	0.032	0.038	0.029	0.033	0.029	0.032	0.035	0.040	0.032	0.034	0.033	0.060	0.030	0.045	0.045	0.066	0.035	0.060	0.025	0.070	0.039	0.070	0.066	0.071	0.036
05/31/23	0.034	0.053	0.030	0.043	0.031	0.080	0.036	0.056	0.033	0.054	0.026	0.036	0.031	0.043	0.048	0.075	0.034	0.038	0.027	0.040	0.036	0.061	0.060	0.078	0.035

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
05/01/23	0.015	0.015	7.214	6.272	8.081	0.041	0.037	0.049	2,378	2,056	2,810	55	45	69	99.43	2.24	97.70	1.64
05/02/23	0.015	0.015	7.866	7.213	8.617	0.053	0.043	0.066	2,329	2,111	2,539	54	43	64	99.33	2.17	97.66	1.63
05/03/23	0.015	0.015	8.264	7.925	8.782	0.051	0.041	0.067	2,156	1,941	2,384	49	41	57	99.38	2.21	97.74	1.65
05/04/23	0.015	0.015	8.476	7.947	9.393	0.050	0.042	0.073	2,097	1,991	2,175	44	41	49	99.41	2.23	97.89	1.68
05/05/23	0.015	0.015	7.695	7.405	8.489	0.044	0.039	0.088	2,158	2,055	2,283	43	39	47	99.43	2.25	98.00	1.70
05/06/23	0.015	0.015	7.349	7.043	7.889	0.041	0.034	0.045	2,239	2,145	2,353	44	41	49	99.45	2.26	98.02	1.70
05/07/23	0.015	0.015	7.352	6.893	7.969	0.040	0.037	0.046	2,192	2,102	2,314	44	40	49	99.45	2.26	98.01	1.70
05/08/23	0.015	0.015	7.449	7.055	7.971	0.042	0.031	0.050	2,172	2,005	2,369	46	39	55	99.44	2.25	97.89	1.68
05/09/23	0.015	0.015	7.361	7.008	8.015	0.047	0.041	0.051	2,254	2,117	2,495	50	45	59	99.37	2.20	97.77	1.65
05/10/23	0.015	0.015	7.164	6.865	7.531	0.046	0.041	0.051	2,322	2,177	2,554	52	48	60	99.36	2.19	97.74	1.65
05/11/23	0.015	0.015	7.069	6.806	7.510	0.047	0.042	0.051	2,361	2,251	2,497	53	49	58	99.33	2.18	97.77	1.65
05/12/23	0.015	0.015	7.071	6.829	7.443	0.047	0.038	0.051	2,325	2,171	2,525	52	45	61	99.34	2.18	97.77	1.65
05/13/23	0.015	0.015	7.056	6.774	7.510	0.045	0.042	0.049	2,354	2,265	2,491	54	51	59	99.36	2.19	97.71	1.64
05/14/23	0.015	0.015	7.157	6.828	7.755	0.042	0.038	0.054	2,234	2,109	2,406	52	46	62	99.41	2.23	97.66	1.63
05/15/23	0.015	0.015	8.131	7.473	8.962	0.087	0.054	0.155***	2,258	2,115	2,484	53	47	59	98.93	1.97	97.67	1.63
05/16/23	0.015	0.015	7.666	7.209	8.706	0.052	0.041	0.108***	2,253	2,106	2,444	50	45	59	99.32	2.17	97.76	1.65
05/17/23	0.015	0.015	7.229	7.027	7.499	0.048	0.040	0.066	2,296	2,119	2,526	51	44	57	99.33	2.18	97.79	1.66
05/18/23	0.015	0.015	7.497	7.217	7.970	0.048	0.043	0.056	2,092	1,738	2,513	45	35	57	99.36	2.19	97.86	1.67
05/19/23	0.014	0.015	7.144	6.862	7.604	0.045	0.041	0.051	2,307	2,112	2,530	52	46	61	99.38	2.20	97.75	1.65
05/20/23	0.015	0.015	7.126	6.828	7.400	0.044	0.038	0.050	2,313	2,180	2,478	53	48	61	99.38	2.21	97.70	1.64
05/21/23	0.015	0.015	7.113	6.729	7.709	0.041	0.038	0.050	2,173	2,030	2,440	50	45	60	99.42	2.24	97.69	1.64
05/22/23	0.015	0.015	7.130	6.837	7.791	0.040	0.036	0.045	2,205	2,051	2,429	51	44	59	99.44	2.25	97.71	1.64
05/23/23	0.015	0.015	7.343	7.033	7.952	0.045	0.024	0.060	2,258	2,096	2,418	51	45	57	99.38	2.21	97.74	1.65
05/24/23	0.015	0.015	7.489	7.301	7.813	0.071	0.038	0.061	2,297	2,104	2,462	52	45	58	99.05	2.02	97.75	1.65
05/25/23	0.015	0.015	7.512	7.230	7.854	0.043	0.037	0.049	2,332	2,138	2,477	52	46	58	99.43	2.25	97.76	1.65
05/26/23	0.014	0.015	7.514	7.273	7.854	0.043	0.038	0.047	2,341	2,148	2,590	52	46	61	99.43	2.25	97.77	1.65
05/27/23	0.015	0.015	7.453	7.106	7.875	0.043	0.040	0.048	2,354	2,221	2,541	53	48	59	99.42	2.24	97.77	1.65
05/28/23	0.015	0.015	7.576	7.143	7.978	0.040	0.037	0.043	2,259	2,133	2,527	51	47	63	99.47	2.28	97.74	1.65
05/29/23	0.015	0.015	7.250	6.912	7.764	0.037	0.034	0.042	2,331	2,200	2,553	55	49	64	99.49	2.29	97.65	1.63
05/30/23	0.015	0.015	7.840	7.487	8.310	0.039	0.035	0.044	2,140	1,970	2,404	48	42	58	99.50	2.30	97.76	1.65
05/31/23	0.015	0.015	8.167	7.706	8.500	0.051	0.042	0.075	2,200	1,959	2,376	46	29	60	99.38	2.20	97.89	1.68

Notes:

*** Value affected by short term TOC spike.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
Date	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
05/01/23	96.37	98.936	35,213.6	0.32	3	6
05/02/23	96.31	83.109	31,546.0	0.33	3	6
05/03/23	96.23	96.191	28,668.6	0.33	3	6
05/04/23	96.33	102.216	30,738.7	0.34	3	6
05/05/23	96.39	108.985	33,644.7	0.33	3	6
05/06/23	96.29	110.162	35,377.0	0.33	3	6
05/07/23	96.10	110.132	36,683.4	0.33	3	6
05/08/23	95.94	110.409	37,397.9	0.34	3	6
05/09/23	96.15	113.811	37,958.2	0.35	3	6
05/10/23	95.93	115.489	38,809.5	0.34	3	6
05/11/23	96.12	115.655	38,957.3	0.33	3	6
05/12/23	96.19	115.530	37,827.9	0.33	3	6
05/13/23	96.58	115.394	35,962.2	0.32	3	6
05/14/23	96.75	115.166	35,380.8	0.31	3	6
05/15/23	96.83	113.658	34,481.8	0.30	3	6
05/16/23	96.84	113.926	35,283.0	0.30	3	6
05/17/23	96.52	114.701	35,121.1	0.30	3	6
05/18/23	96.40	108.627	35,737.0	0.31	3	6
05/19/23	96.19	110.541	35,312.3	0.32	3	6
05/20/23	96.13	110.542	36,866.8	0.33	3	6
05/21/23	96.15	110.561	37,020.2	0.33	3	6
05/22/23	96.45	110.501	36,623.3	0.33	3	6
05/23/23	96.48	110.568	35,666.8	0.32	3	6
05/24/23	96.38	110.594	35,677.5	0.32	3	6
05/25/23	96.24	110.449	36,102.5	0.33	3	6
05/26/23	96.54	110.316	36,634.1	0.33	3	6
05/27/23	96.36	110.392	35,081.0	0.32	3	6
05/28/23	96.29	53.402	36,391.9	0.33	3	6
05/29/23	96.28	110.223	36,734.9	0.33	3	6
05/30/23	96.25	98.614	35,152.0	0.33	3	6
05/31/23	96.82	25.057	24,473.3	0.33	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	MFE NTU		ROP NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
06/01/23	12.28	12.28	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/02/23	12.26	12.26	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/03/23	12.24	12.24	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/04/23	12.29	12.29	12.25	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/05/23	12.31	12.31	12.26	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/06/23	12.25	12.25	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/07/23	12.24	12.24	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/08/23	12.21	12.21	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/09/23	12.19	12.19	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/10/23	12.21	12.21	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/11/23	12.26	12.26	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/12/23	12.22	12.22	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/13/23	12.21	12.21	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/14/23	12.20	12.20	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/15/23	12.19	12.19	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/16/23	12.22	12.22	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/17/23	12.29	12.29	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/18/23	12.22	12.22	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/19/23	12.35	12.35	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/20/23	12.29	12.29	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/21/23	12.25	12.25	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/22/23	12.30	12.30	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/23/23	12.24	12.24	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/24/23	12.17	12.17	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/25/23	12.22	12.22	12.21	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/26/23	12.23	12.23	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/27/23	12.32	12.32	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/28/23	12.22	12.22	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/29/23	12.20	12.20	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
06/30/23	12.22	12.22	12.07	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
06/01/23	0.00	4.06	2.22	6.00	0.00	12.28
06/02/23	0.00	4.06	2.20	6.00	0.00	12.26
06/03/23	0.00	4.04	2.20	6.00	0.00	12.24
06/04/23	0.00	4.05	2.25	6.00	0.00	12.29
06/05/23	0.00	4.05	2.26	6.00	0.00	12.31
06/06/23	0.00	4.04	2.21	6.00	0.00	12.25
06/07/23	0.00	4.02	2.21	6.00	0.00	12.24
06/08/23	0.00	4.01	2.20	6.00	0.00	12.21
06/09/23	0.00	4.03	2.17	6.00	0.00	12.19
06/10/23	0.00	4.03	2.18	6.00	0.00	12.21
06/11/23	0.00	4.05	2.21	6.00	0.00	12.26
06/12/23	0.00	4.03	2.19	6.00	0.00	12.22
06/13/23	0.00	4.04	2.17	6.00	0.00	12.21
06/14/23	0.00	4.02	2.17	6.00	0.00	12.20
06/15/23	0.00	4.02	2.17	6.00	0.00	12.19
06/16/23	0.00	4.05	2.18	6.00	0.00	12.22
06/17/23	0.00	4.11	2.17	6.00	0.00	12.29
06/18/23	0.00	4.03	2.19	6.00	0.00	12.22
06/19/23	0.00	4.13	2.22	6.00	0.00	12.35
06/20/23	0.00	4.11	2.18	6.00	0.00	12.29
06/21/23	0.00	4.07	2.18	6.00	0.00	12.25
06/22/23	0.00	4.11	2.20	6.00	0.00	12.30
06/23/23	0.00	4.05	2.18	6.00	0.00	12.24
06/24/23	0.00	4.01	2.17	6.00	0.00	12.17
06/25/23	0.00	4.01	2.21	6.00	0.00	12.22
06/26/23	0.00	4.02	2.20	6.00	0.00	12.23
06/27/23	0.00	4.15	2.17	6.00	0.00	12.32
06/28/23	0.00	4.06	2.17	6.00	0.00	12.22
06/29/23	0.00	4.08	2.11	6.00	0.00	12.20
06/30/23	0.00	4.14	2.07	6.00	0.00	12.22

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
06/01/23	0.00	0.00	2.22	6.00	4.00	12.22
06/02/23	0.00	0.00	2.20	6.00	4.00	12.20
06/03/23	0.00	0.00	2.20	6.00	4.00	12.20
06/04/23	0.00	0.00	2.25	6.00	4.00	12.25
06/05/23	0.00	0.00	2.26	6.00	4.00	12.26
06/06/23	0.00	0.00	2.21	6.00	4.00	12.21
06/07/23	0.00	0.00	2.21	6.00	4.00	12.21
06/08/23	0.00	0.00	2.20	6.00	4.00	12.20
06/09/23	0.00	0.00	2.17	6.00	4.00	12.17
06/10/23	0.00	0.00	2.18	6.00	4.00	12.18
06/11/23	0.00	0.00	2.21	6.00	4.00	12.21
06/12/23	0.00	0.00	2.19	6.00	4.00	12.19
06/13/23	0.00	0.00	2.17	6.00	4.00	12.17
06/14/23	0.00	0.00	2.17	6.00	4.00	12.17
06/15/23	0.00	0.00	2.17	6.00	4.00	12.17
06/16/23	0.00	0.00	2.18	6.00	4.00	12.18
06/17/23	0.00	0.00	2.17	6.00	4.00	12.17
06/18/23	0.00	0.00	2.19	6.00	4.00	12.19
06/19/23	0.00	0.00	2.22	6.00	4.00	12.22
06/20/23	0.00	0.00	2.18	6.00	4.00	12.18
06/21/23	0.00	0.00	2.18	6.00	4.00	12.18
06/22/23	0.00	0.00	2.20	6.00	4.00	12.20
06/23/23	0.00	0.00	2.18	6.00	4.00	12.18
06/24/23	0.00	0.00	2.17	6.00	4.00	12.17
06/25/23	0.00	0.00	2.21	6.00	4.00	12.21
06/26/23	0.00	0.00	2.20	6.00	4.00	12.20
06/27/23	0.00	0.00	2.17	6.00	4.00	12.17
06/28/23	0.00	0.00	2.17	6.00	4.00	12.17
06/29/23	0.00	0.00	2.11	6.00	4.00	12.11
06/30/23	0.00	0.00	2.07	6.00	4.00	12.07

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	A01 LRV	A02 LRV	A03 LRV	A04 LRV	A05 LRV	A06 LRV	A07 LRV	A08 LRV	B01 LRV	B02 LRV	B03 LRV	B04 LRV	B05 LRV	B06 LRV	B07 LRV	B08 LRV
06/01/23	5.08	5.07	5.20	5.26	4.97	5.09	5.17	5.06	5.03	5.26	4.97	4.94	5.14	5.22	5.13	5.07
06/02/23	5.08	5.02	5.27	5.18	4.90	5.06	5.11	5.02	4.94	5.21	4.90	4.93	5.07	5.15	5.07	5.08
06/03/23	5.08	4.97	5.18	5.22	4.86	5.07	5.11	5.00	5.19	5.22	4.90	4.86	5.05	5.13	5.04	5.03
06/04/23	5.07	5.03	5.17	5.18	4.86	5.06	5.15	5.01	5.21	5.20	4.89	4.86	5.10	5.12	5.03	5.02
06/05/23	5.04	5.01	5.19	5.23	4.83	5.05	5.13	4.99	5.18	5.22	4.85	4.85	5.12	5.12	5.05	5.01
06/06/23	5.02	5.03	5.08	5.15	4.84	5.06	5.05	4.98	5.18	5.08	4.84	4.83	5.05	5.03	5.04	5.02
06/07/23	5.01	4.95	5.12	5.15	5.07	4.98	5.05	4.96	5.12	5.05	4.82	4.81	5.02	5.05	5.03	5.01
06/08/23	5.04	4.99	4.99	5.11	5.00	5.02	5.05	4.97	5.14	5.05	4.80	4.81	5.02	5.04	4.99	4.99
06/09/23	5.03	4.98	5.11	5.18	4.99	4.96	5.07	4.98	5.14	5.12	4.83	4.82	5.21	5.05	4.99	4.96
06/10/23	5.02	4.93	5.08	5.19	5.00	5.00	5.06	4.94	5.16	5.11	4.83	4.81	5.23	5.05	5.00	4.99
06/11/23	4.98	4.92	5.09	5.14	4.98	5.02	5.04	4.99	5.14	5.10	4.82	4.81	5.23	5.10	5.03	5.01
06/12/23	4.97	5.16	5.08	5.19	4.99	4.95	5.06	4.98	5.11	5.10	4.84	4.92	5.23	5.09	4.99	4.98
06/13/23	4.99	5.14	5.07	5.19	4.96	4.95	5.04	4.94	5.13	5.09	4.86	4.94	5.21	5.07	4.96	4.95
06/14/23	4.99	5.12	5.07	5.14	4.97	4.91	5.03	4.97	5.09	5.38	4.81	4.94	5.22	5.03	4.95	4.96
06/15/23	4.98	5.15	5.12	5.17	4.98	4.97	5.03	4.93	5.11	5.39	4.78	4.95	5.21	5.02	4.97	4.95
06/16/23	4.97	5.08	5.06	5.17	4.94	4.91	5.07	4.91	5.06	5.33	4.78	4.93	5.17	4.99	4.99	4.94
06/17/23	4.98	5.09	5.06	5.09	4.96	4.84	5.04	4.89	5.11	5.32	4.72	4.93	5.19	4.99	4.95	4.94
06/18/23	4.95	5.05	4.99	5.13	4.98	4.89	5.08	4.87	5.07	5.34	4.71	4.94	5.17	5.01	4.94	4.95
06/19/23	5.17	5.12	5.20	5.11	4.93	4.87	5.02	4.86	5.02	5.27	4.70	4.91	5.12	5.01	4.94	4.90
06/20/23	5.12	5.00	5.21	5.10	4.92	5.14	4.97	4.85	5.05	5.26	4.70	4.88	5.15	4.99	4.93	4.89
06/21/23	5.09	5.05	5.14	5.12	4.93	5.13	4.95	5.07	5.05	5.19	4.66	4.90	5.17	4.98	4.95	4.88
06/22/23	5.09	5.07	5.19	5.07	4.95	5.12	4.98	5.07	5.00	5.33	4.87	4.94	5.12	4.98	4.95	4.88
06/23/23	5.13	5.08	5.21	5.08	4.92	5.13	4.98	5.06	5.01	5.30	4.92	4.94	5.12	5.01	4.93	4.90
06/24/23	5.11	5.11	5.19	5.09	4.92	5.15	5.00	5.07	5.00	5.27	4.91	4.92	5.10	4.95	5.07	4.90
06/25/23	5.10	5.03	5.18	5.08	4.91	5.07	4.99	5.08	4.97	5.22	4.90	4.90	5.13	4.94	5.12	4.87
06/26/23	5.09	5.05	5.21	5.05	4.86	5.09	5.02	5.06	4.98	5.25	4.89	4.90	5.12	5.10	5.12	4.84
06/27/23	5.07	5.01	5.22	5.24	4.88	5.11	5.16	5.06	4.90	5.21	4.87	4.85	5.12	5.12	5.11	4.99
06/28/23	5.09	5.02	5.20	5.22	4.89	5.08	5.19	5.07	4.87	5.21	4.85	4.78	5.11	5.08	5.06	5.03
06/29/23	5.06	5.03	5.16	5.24	4.86	5.10	5.13	5.02	5.11	5.25	4.82	4.80	5.12	5.16	5.07	5.00
06/30/23	5.02	4.98	5.20	5.18	4.83	5.05	5.11	5.00	5.20	5.19	4.80	4.84	5.08	5.15	5.08	5.02

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
06/01/23	4.78	5.14	4.90	4.65	4.42	4.91	4.83	4.95	5.26	4.93	5.14	5.09	5.22	5.26	4.26	4.13
06/02/23	4.71	5.04	4.87	4.59	4.34	4.88	4.80	4.88	5.19	4.88	5.11	5.02	5.12	5.21	4.16	4.06
06/03/23	4.66	4.99	4.81	4.54	4.31	4.85	4.76	4.89	5.19	4.81	5.12	5.02	5.13	5.15	4.16	4.04
06/04/23	4.88	4.96	4.81	4.65	4.30	4.83	4.75	4.86	5.17	4.79	5.13	5.03	5.12	5.13	4.12	4.05
06/05/23	4.89	4.97	4.81	4.73	4.30	4.83	4.77	4.91	5.16	4.85	5.13	5.06	5.09	5.15	NA *	4.05
06/06/23	4.86	4.95	4.95	4.71	4.37	4.80	4.74	5.04	5.12	5.10	5.09	5.10	5.09	5.15	NA *	4.04
06/07/23	4.85	4.88	5.00	4.63	4.46	4.78	4.77	5.00	5.02	5.11	5.10	5.08	5.09	5.12	NA *	4.05
06/08/23	4.83	4.89	4.99	4.62	4.49	4.81	4.87	4.96	5.07	5.09	5.13	5.03	5.13	5.11	NA *	4.07
06/09/23	4.85	4.90	5.03	4.63	4.50	4.78	4.93	4.97	5.12	5.08	5.08	5.03	5.29	5.11	NA *	4.05
06/10/23	4.81	4.88	5.02	4.63	4.51	4.74	4.93	4.97	5.06	5.13	5.07	5.04	5.22	5.11	5.29	4.03
06/11/23	4.78	4.89	5.01	4.64	4.48	4.76	4.92	5.00	5.01	5.06	5.06	5.04	5.20	5.13	5.13	4.05
06/12/23	4.80	4.90	5.02	4.68	4.57	4.81	4.95	5.02	5.06	5.11	5.03	5.01	5.23	5.15	5.12	4.03
06/13/23	4.85	4.91	5.02	4.66	4.50	4.80	4.94	4.98	5.15	5.13	5.07	5.00	5.23	5.18	5.20	4.04
06/14/23	4.83	5.07	4.96	4.64	4.41	4.77	4.87	4.93	5.08	5.02	5.11	5.04	5.19	5.21	5.21	4.02
06/15/23	4.81	5.13	4.90	4.62	4.42	4.74	4.83	4.91	5.07	5.01	5.06	5.05	5.19	5.21	5.15	4.02
06/16/23	4.79	5.08	4.87	4.59	4.45	4.70	4.82	4.91	5.05	4.98	5.04	5.04	5.19	5.17	5.09	4.05
06/17/23	4.75	5.07	4.89	4.56	4.46	4.81	4.83	4.92	5.03	4.96	5.07	5.15	5.20	5.18	5.13	4.21
06/18/23	4.72	5.05	4.91	4.52	4.40	4.87	4.80	4.90	4.99	4.90	5.13	5.17	5.19	5.18	5.14	4.09
06/19/23	4.69	5.04	4.87	4.51	4.36	4.84	4.80	4.86	4.93	4.91	5.26	5.11	5.16	5.16	5.11	NA *
06/20/23	4.66	5.00	4.85	4.48	4.32	4.80	4.79	4.86	5.06	4.93	5.19	5.13	5.17	5.12	5.06	NA *
06/21/23	4.66	5.02	4.84	4.48	4.25	4.80	4.78	4.86	5.28	4.96	5.17	5.16	5.17	5.12	5.04	NA *
06/22/23	4.65	5.03	4.81	4.49	4.24	4.85	4.81	4.88	5.24	4.97	5.18	5.12	5.21	5.25	5.06	NA *
06/23/23	4.68	5.02	4.80	4.49	4.23	4.85	4.81	4.84	5.23	4.90	5.17	5.07	5.21	5.32	5.10	5.19
06/24/23	4.70	4.99	4.82	4.46	4.26	4.85	4.79	4.83	5.23	4.88	5.15	5.06	5.19	5.30	5.08	5.40
06/25/23	4.69	4.96	4.79	4.44	4.36	4.84	4.78	4.83	5.24	4.90	5.18	5.10	5.26	5.29	5.04	5.22
06/26/23	4.89	4.95	4.77	4.61	4.28	4.80	4.77	5.00	5.22	4.87	5.14	5.11	5.23	5.26	5.05	5.15
06/27/23	4.91	4.94	4.94	4.71	4.18	4.79	4.76	5.11	5.17	4.81	5.12	5.03	5.19	5.21	5.02	5.16
06/28/23	4.90	4.91	5.01	4.68	4.36	4.79	4.73	5.06	5.13	4.77	5.13	5.03	5.17	5.19	5.03	5.13
06/29/23	4.90	4.89	5.05	4.71	4.45	4.77	4.67	5.05	5.10	4.74	5.14	5.08	5.15	5.23	5.03	5.08
06/30/23	4.86	4.92	5.08	4.70	4.40	4.78	4.67	5.04	5.14	4.79	5.11	5.15	5.14	5.23	5.04	5.09

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for membrane replacement.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
06/01/23	4.86	4.80	4.06	4.51	5.23	5.45	5.22	5.23	4.18	5.26	5.03	5.01	5.14	4.65	5.03	5.13
06/02/23	4.95	4.82	4.14	4.48	5.24	5.23	5.11	5.24	5.04	5.16	5.06	5.10	4.96	4.71	5.00	5.23
06/03/23	4.85	4.75	4.11	4.49	5.21	5.38	5.15	5.19	5.10	5.29	5.04	4.97	4.95	4.73	4.92	5.29
06/04/23	4.83	4.72	4.08	4.51	5.27	5.34	5.12	5.18	5.08	5.28	5.03	5.00	4.95	4.65	4.91	5.26
06/05/23	4.87	4.74	4.14	4.68	5.30	5.19	5.01	5.22	4.99	5.16	5.04	5.09	4.91	4.72	5.04	5.25
06/06/23	4.84	4.89	4.08	4.44	5.20	5.22	5.05	5.30	5.03	5.23	5.10	5.02	4.90	4.73	5.00	5.21
06/07/23	4.85	5.03	4.02	4.43	5.30	5.30	5.11	5.25	4.96	5.24	5.09	4.98	4.88	4.70	5.08	5.24
06/08/23	4.85	4.79	4.01	4.48	5.33	5.31	5.13	5.20	4.94	5.20	4.98	5.08	4.87	4.72	4.90	5.30
06/09/23	4.74	4.70	4.03	4.48	5.22	5.27	5.42	5.22	5.05	5.24	5.06	4.90	4.91	4.66	4.95	5.25
06/10/23	4.72	4.76	4.12	4.39	5.28	NA **	5.20	5.23	5.01	5.28	5.04	5.10	4.94	4.71	4.95	5.30
06/11/23	4.85	4.83	4.09	4.44	5.34	NA **	5.17	5.23	5.27	5.20	5.09	5.03	4.95	4.71	4.94	5.26
06/12/23	4.79	4.82	4.04	4.43	5.31	NA **	5.26	5.20	5.14	5.19	5.15	5.00	5.05	4.73	4.94	5.20
06/13/23	4.76	4.89	4.04	4.40	5.29	NA **	5.09	5.26	4.98	5.25	5.08	5.02	4.95	4.71	4.98	5.39
06/14/23	4.85	4.78	4.09	4.43	5.26	5.41	5.13	5.24	5.15	5.14	4.95	5.08	4.98	4.70	4.89	5.22
06/15/23	4.79	4.82	4.16	4.36	5.19	NA **	5.15	5.24	5.00	5.17	5.12	4.99	4.94	4.64	4.89	5.24
06/16/23	4.90	4.83	4.22	4.33	5.17	NA **	5.07	5.23	5.02	5.26	5.05	5.16	4.91	4.60	4.88	5.27
06/17/23	4.79	4.79	4.11	4.38	5.26	NA **	5.17	5.13	5.05	5.27	4.97	4.94	4.93	4.67	4.87	5.23
06/18/23	4.78	4.80	4.03	4.34	5.24	NA **	5.19	5.17	5.01	5.36	5.06	4.96	4.88	4.74	4.90	5.31
06/19/23	4.87	4.84	4.13	4.34	5.23	NA **	5.16	5.21	5.04	5.25	4.98	5.10	4.86	4.81	4.97	5.22
06/20/23	4.75	4.86	4.11	4.38	5.23	NA **	5.14	5.20	5.03	5.22	5.00	4.98	4.91	4.64	4.93	5.24
06/21/23	4.75	5.11	4.07	4.47	5.21	5.42	5.15	5.28	5.03	5.22	5.11	5.00	4.93	4.73	4.89	5.29
06/22/23	4.86	4.92	4.11	4.54	5.16	5.41	5.14	5.24	5.10	5.19	4.96	5.10	4.89	4.80	4.92	5.22
06/23/23	4.82	4.94	4.05	4.50	5.25	5.36	5.28	5.25	5.13	5.25	5.06	5.00	4.91	4.72	4.82	5.23
06/24/23	4.77	5.00	4.01	4.44	5.28	5.31	5.23	5.32	4.99	5.36	5.01	5.05	4.95	4.72	5.05	5.36
06/25/23	4.87	4.86	4.01	4.46	5.32	5.33	5.14	5.22	5.02	5.15	5.03	5.03	5.11	4.76	4.85	5.20
06/26/23	4.92	4.87	4.02	4.45	5.24	5.34	5.18	5.27	5.02	5.15	5.06	5.03	4.97	4.69	4.88	5.24
06/27/23	4.97	5.00	4.15	4.38	5.25	5.24	5.14	5.27	5.02	5.24	5.03	5.05	5.00	4.73	5.13	5.27
06/28/23	4.78	4.94	4.06	4.40	5.35	5.24	5.10	5.21	5.11	5.26	4.93	5.05	5.01	4.78	4.89	5.18
06/29/23	4.79	4.85	4.08	4.40	5.20	5.24	5.18	5.21	5.03	5.17	5.07	5.02	4.98	4.69	4.90	5.28
06/30/23	4.91	4.95	4.14	4.42	5.24	5.43	5.07	5.27	5.12	5.19	5.06	5.06	4.94	4.73	4.91	5.16

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
06/01/23	0.033	0.038	0.027	0.031	0.028	0.029	0.035	0.042	0.032	0.036	0.025	0.031	0.028	0.032	0.044	0.047	0.033	0.036	0.025	0.026	0.034	0.042	0.059	0.062	0.034
06/02/23	0.031	0.034	0.027	0.031	0.029	0.032	0.034	0.038	0.032	0.034	0.026	0.028	0.028	0.029	0.044	0.049	0.034	0.039	0.023	0.024	0.035	0.046	0.060	0.060	0.034
06/03/23	0.032	0.035	0.028	0.031	0.029	0.035	0.034	0.037	0.032	0.034	0.029	0.030	0.028	0.029	0.045	0.048	0.034	0.036	0.023	0.023	0.037	0.047	0.061	0.061	0.035
06/04/23	0.032	0.034	0.028	0.030	0.029	0.031	0.034	0.036	0.033	0.045	0.032	0.038	0.028	0.032	0.045	0.047	0.037	0.044	0.023	0.024	0.039	0.044	0.061	0.061	0.035
06/05/23	0.031	0.037	0.026	0.030	0.029	0.033	0.032	0.037	0.032	0.034	0.031	0.041	0.029	0.035	0.047	0.079	0.039	0.041	0.024	0.024	0.042	0.047	0.066	0.070	0.036
06/06/23	0.031	0.034	0.025	0.031	0.029	0.030	0.031	0.035	0.032	0.038	0.024	0.026	0.029	0.030	0.045	0.048	0.040	0.060	0.033	0.070	0.036	0.070	0.054	0.071	0.034
06/07/23	0.030	0.032	0.024	0.028	0.028	0.029	0.031	0.034	0.031	0.032	0.023	0.026	0.029	0.055	0.045	0.056	0.038	0.043	0.026	0.027	0.024	0.030	0.046	0.054	0.031
06/08/23	0.031	0.032	0.025	0.027	0.029	0.031	0.032	0.035	0.032	0.038	0.025	0.027	0.029	0.030	0.047	0.070	0.041	0.044	0.026	0.029	0.026	0.030	0.044	0.045	0.032
06/09/23	0.031	0.033	0.025	0.027	0.029	0.032	0.034	0.036	0.032	0.035	0.025	0.031	0.029	0.030	0.052	0.075	0.046	0.052	0.028	0.028	0.028	0.030	0.046	0.052	0.034
06/10/23	0.031	0.038	0.025	0.027	0.030	0.036	0.033	0.035	0.032	0.048	0.025	0.034	0.029	0.030	0.052	0.056	0.050	0.055	0.028	0.028	0.030	0.035	0.046	0.048	0.034
06/11/23	0.031	0.035	0.025	0.028	0.029	0.033	0.032	0.035	0.031	0.032	0.024	0.026	0.028	0.029	0.050	0.053	0.053	0.056	0.028	0.028	0.031	0.038	0.045	0.046	0.034
06/12/23	0.031	0.035	0.025	0.027	0.030	0.033	0.032	0.034	0.032	0.040	0.025	0.038	0.029	0.029	0.051	0.053	0.058	0.064	0.028	0.028	0.032	0.035	0.046	0.050	0.035
06/13/23	0.031	0.033	0.024	0.026	0.030	0.031	0.032	0.033	0.031	0.039	0.024	0.032	0.028	0.029	0.051	0.052	0.064	0.068	0.028	0.028	0.034	0.039	0.047	0.051	0.035
06/14/23	0.031	0.036	0.025	0.026	0.031	0.037	0.032	0.034	0.031	0.036	0.024	0.033	0.028	0.030	0.046	0.053	0.047	0.070	0.027	0.030	0.029	0.036	0.046	0.050	0.033
06/15/23	0.031	0.033	0.025	0.027	0.032	0.035	0.032	0.034	0.032	0.035	0.024	0.027	0.029	0.034	0.042	0.042	0.028	0.034	0.026	0.026	0.025	0.029	0.045	0.051	0.031
06/16/23	0.031	0.033	0.026	0.027	0.032	0.034	0.034	0.036	0.032	0.035	0.025	0.027	0.029	0.033	0.042	0.043	0.028	0.033	0.026	0.026	0.024	0.028	0.046	0.050	0.031
06/17/23	0.031	0.032	0.026	0.027	0.032	0.033	0.033	0.038	0.032	0.035	0.026	0.030	0.029	0.031	0.042	0.043	0.029	0.033	0.028	0.033	0.026	0.122	0.045	0.045	0.032
06/18/23	0.032	0.035	0.026	0.028	0.032	0.034	0.034	0.035	0.033	0.033	0.027	0.030	0.029	0.032	0.042	0.043	0.029	0.036	0.028	0.028	0.025	0.029	0.046	0.053	0.032
06/19/23	0.032	0.036	0.026	0.031	0.032	0.036	0.033	0.036	0.033	0.137	0.025	0.030	0.029	0.037	0.042	0.044	0.029	0.031	0.028	0.030	0.024	0.032	0.047	0.050	0.032
06/20/23	0.032	0.035	0.027	0.032	0.031	0.033	0.031	0.033	0.035	0.337***	0.024	0.027	0.029	0.032	0.042	0.043	0.029	0.033	0.028	0.028	0.025	0.027	0.046	0.049	0.032
06/21/23	0.032	0.033	0.026	0.029	0.032	0.036	0.032	0.034	0.033	0.035	0.025	0.027	0.029	0.031	0.042	0.043	0.029	0.034	0.029	0.038	0.026	0.027	0.048	0.053	0.032
06/22/23	0.032	0.037	0.027	0.029	0.033	0.036	0.032	0.035	0.033	0.035	0.025	0.029	0.029	0.031	0.044	0.052	0.030	0.032	0.028	0.028	0.027	0.032	0.049	0.050	0.033
06/23/23	0.031	0.034	0.027	0.029	0.033	0.035	0.033	0.036	0.033	0.035	0.026	0.029	0.028	0.030	0.047	0.066	0.031	0.033	0.028	0.028	0.028	0.029	0.051	0.053	0.033
06/24/23	0.030	0.034	0.026	0.027	0.032	0.033	0.032	0.035	0.032	0.033	0.024	0.027	0.027	0.028	0.046	0.051	0.032	0.034	0.028	0.028	0.027	0.031	0.053	0.057	0.033
06/25/23	0.031	0.033	0.027	0.028	0.033	0.034	0.033	0.037	0.033	0.046	0.025	0.027	0.028	0.030	0.044	0.048	0.034	0.035	0.029	0.030	0.029	0.033	0.056	0.057	0.034
06/26/23	0.031	0.033	0.026	0.029	0.032	0.034	0.033	0.035	0.033	0.036	0.025	0.031	0.027	0.028	0.044	0.046	0.036	0.040	0.030	0.030	0.030	0.035	0.058	0.060	0.034
06/27/23	0.031	0.038	0.027	0.031	0.032	0.034	0.033	0.038	0.033	0.035	0.025	0.028	0.027	0.029	0.044	0.045	0.038	0.043	0.030	0.030	0.031	0.036	0.063	0.065	0.035
06/28/23	0.032	0.036	0.027	0.033	0.034	0.041	0.033	0.035	0.034	0.037	0.026	0.030	0.028	0.028	0.044	0.046	0.042	0.048	0.030	0.030	0.034	0.036	0.068	0.069	0.036
06/29/23	0.032	0.034	0.028	0.033	0.033	0.035	0.033	0.035	0.034	0.035	0.026	0.033	0.028	0.031	0.044	0.046	0.046	0.053	0.030	0.030	0.037	0.040	0.072	0.077	0.037
06/30/23	0.032	0.035	0.027	0.030	0.033	0.035	0.033	0.035	0.034	0.041	0.026	0.035	0.028	0.029	0.045	0.046	0.049	0.052	0.031	0.033	0.039	0.043	0.078	0.082	0.038

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

*** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
06/01/23	0.015	0.015	7.488	7.213	7.845	0.045	0.041	0.054	2,301	1,802	2,487	51	37	59	99.40	2.22	97.79	1.66
06/02/23	0.015	0.015	7.200	6.850	7.572	0.046	0.042	0.051	2,365	2,209	2,546	55	50	63	99.37	2.20	97.66	1.63
06/03/23	0.015	0.015	7.318	6.927	7.814	0.047	0.043	0.052	2,313	2,178	2,496	55	49	62	99.36	2.20	97.64	1.63
06/04/23	0.015	0.015	7.325	6.777	7.960	0.041	0.038	0.046	2,220	2,043	2,496	52	46	61	99.43	2.25	97.66	1.63
06/05/23	0.015	0.015	7.313	6.967	7.760	0.040	0.036	0.047	2,238	2,054	2,506	52	46	62	99.45	2.26	97.66	1.63
06/06/23	0.015	0.015	7.349	6.965	7.956	0.045	0.038	0.051	2,311	2,142	2,540	54	47	61	99.39	2.21	97.69	1.64
06/07/23	0.015	0.015	7.184	6.833	7.623	0.044	0.040	0.048	2,350	2,139	2,594	55	48	63	99.39	2.21	97.67	1.63
06/08/23	0.015	0.015	7.501	7.100	7.994	0.048	0.042	0.055	2,329	2,166	2,509	57	50	66	99.37	2.20	97.56	1.61
06/09/23	0.015	0.015	7.302	6.995	7.708	0.049	0.044	0.161***	2,255	2,112	2,406	56	50	63	99.32	2.17	97.54	1.61
06/10/23	0.015	0.015	7.162	6.912	7.704	0.047	0.043	0.055	2,212	2,084	2,383	54	47	62	99.35	2.18	97.57	1.61
06/11/23	0.015	0.015	7.098	6.766	7.612	0.044	0.040	0.051	2,136	2,026	2,302	53	48	60	99.38	2.21	97.52	1.61
06/12/23	0.015	0.015	7.156	6.694	7.486	0.046	0.038	0.083	2,115	1,943	2,280	64	39	906****	99.36	2.19	96.98	1.52
06/13/23	0.015	0.015	7.249	6.999	8.014	0.049	0.044	0.054	2,159	2,024	2,287	55	47	60	99.33	2.17	97.47	1.60
06/14/23	0.015	0.015	7.032	6.769	7.669	0.047	0.043	0.054	2,142	1,731	2,390	53	38	63	99.33	2.17	97.52	1.61
06/15/23	0.015	0.015	6.908	6.577	7.320	0.046	0.042	0.050	2,247	2,094	2,448	56	49	64	99.33	2.17	97.51	1.60
06/16/23	0.014	0.015	6.898	6.640	7.432	0.046	0.042	0.051	2,304	2,169	2,539	58	52	69	99.34	2.18	97.47	1.60
06/17/23	0.015	0.015	7.074	6.788	7.375	0.047	0.045	0.051	2,236	2,065	2,481	56	49	64	99.33	2.17	97.51	1.60
06/18/23	0.015	0.015	6.892	6.507	7.419	0.044	0.039	0.226***	2,211	2,064	2,478	55	50	64	99.35	2.19	97.51	1.60
06/19/23	0.015	0.015	6.811	6.559	7.550	0.041	0.037	0.049	2,314	2,164	2,542	58	51	67	99.39	2.22	97.51	1.60
06/20/23	0.015	0.015	7.120	6.865	7.581	0.047	0.041	0.052	2,271	2,108	2,485	56	49	64	99.35	2.18	97.54	1.61
06/21/23	0.015	0.015	7.080	6.752	7.515	0.047	0.043	0.053	2,316	2,126	2,573	57	50	67	99.34	2.18	97.54	1.61
06/22/23	0.015	0.015	7.213	6.863	7.567	0.046	0.042	0.051	2,260	2,079	2,449	55	49	62	99.37	2.20	97.55	1.61
06/23/23	0.014	0.015	7.076	6.612	7.636	0.046	0.042	0.050	2,312	2,190	2,404	57	52	62	99.35	2.18	97.55	1.61
06/24/23	0.015	0.015	7.012	6.597	7.449	0.048	0.043	0.051	2,298	2,202	2,399	57	52	62	99.32	2.17	97.53	1.61
06/25/23	0.015	0.015	6.908	6.457	7.402	0.042	0.038	0.048	2,261	2,169	2,402	56	52	64	99.39	2.21	97.52	1.60
06/26/23	0.015	0.015	7.105	6.715	7.699	0.044	0.041	0.052	2,268	2,132	2,466	57	51	66	99.38	2.20	97.48	1.60
06/27/23	0.015	0.015	7.174	6.773	7.826	0.048	0.044	0.073	2,299	2,172	2,492	59	53	67	99.33	2.17	97.45	1.59
06/28/23	0.015	0.015	7.067	6.734	7.501	0.048	0.043	0.060	2,289	2,160	2,469	58	52	66	99.32	2.17	97.48	1.60
06/29/23	0.015	0.015	7.054	6.666	7.551	0.054	0.045	0.062	2,303	2,146	2,502	58	51	68	99.23	2.11	97.47	1.60
06/30/23	0.015	0.015	6.861	6.574	7.507	0.058	0.054	0.062	2,330	2,215	2,476	60	52	66	99.16	2.07	97.43	1.59

Notes:

*** Erroneous value due to instrument issue.

**** Short term EC spike due to residual sulfuic acid in piping during plant restart after unplanned plant outage caused by PCS controller failure.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	UltraViolet / AOP Process online monitoring results					
	UVT %	FLOW	POWER	EED	Peroxide Dose	Log
Date	avg	MG	kW	kWh/kgal	mg/L	Removal
06/01/23	95.92	107.039	35,511.1	0.33	3	6
06/02/23	96.04	115.604	37,936.2	0.33	3	6
06/03/23	96.14	115.539	37,786.8	0.33	3	6
06/04/23	96.11	115.466	37,838.1	0.33	3	6
06/05/23	96.21	115.414	37,603.8	0.33	3	6
06/06/23	96.34	115.396	37,165.4	0.32	3	6
06/07/23	96.24	113.498	37,240.9	0.33	3	6
06/08/23	96.21	111.213	36,828.9	0.33	3	6
06/09/23	96.31	108.624	36,129.0	0.33	3	6
06/10/23	96.31	108.607	35,633.2	0.33	3	6
06/11/23	96.52	110.406	35,092.9	0.32	3	6
06/12/23	96.50	90.964	29,929.0	0.33	3	6
06/13/23	96.24	107.341	35,331.8	0.33	3	6
06/14/23	96.33	108.350	35,435.3	0.33	3	6
06/15/23	96.50	110.539	34,980.2	0.32	3	6
06/16/23	96.64	113.395	34,922.5	0.31	3	6
06/17/23	96.54	113.264	35,316.6	0.31	3	6
06/18/23	96.44	115.097	36,444.9	0.32	3	6
06/19/23	96.43	113.448	36,194.6	0.32	3	6
06/20/23	96.43	111.617	35,901.2	0.32	3	6
06/21/23	96.25	110.203	36,442.7	0.33	3	6
06/22/23	96.49	109.244	34,873.7	0.32	3	6
06/23/23	96.53	108.677	34,582.4	0.32	3	6
06/24/23	96.53	110.231	35,015.2	0.32	3	6
06/25/23	96.63	110.167	34,592.9	0.31	3	6
06/26/23	96.42	112.168	36,101.2	0.32	3	6
06/27/23	96.50	114.805	36,100.6	0.31	3	6
06/28/23	96.48	112.456	35,865.6	0.32	3	6
06/29/23	96.41	111.741	36,072.9	0.32	3	6
06/30/23	96.41	115.078	36,715.3	0.32	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	*LRV*	*LRV*	*Y/N*	*Y/N*	*Y/N*	>0.2	>0.5	>0.2	>0.5	>0.5
07/01/23	12.15	12.15	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/02/23	12.17	12.17	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/03/23	12.15	12.15	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/04/23	12.14	12.14	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/05/23	12.24	12.24	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/06/23	12.21	12.21	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/07/23	12.15	12.15	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/08/23	12.19	12.19	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/09/23	12.23	12.23	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/10/23	12.37	12.37	12.19	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/11/23	12.19	12.19	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/12/23	12.19	12.19	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/13/23	12.17	12.17	12.07	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/14/23	12.11	12.11	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/15/23	12.13	12.13	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/16/23	12.24	12.24	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/17/23	12.25	12.25	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/18/23	12.12	12.12	12.06	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/19/23	12.19	12.19	12.06	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/20/23	12.13	12.13	12.04	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/21/23	12.14	12.14	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/22/23	12.10	12.10	12.06	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/23/23	12.27	12.27	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/24/23	12.20	12.20	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/25/23	12.19	12.19	12.07	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/26/23	12.40	12.40	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/27/23	12.24	12.24	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/28/23	12.24	12.24	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/29/23	12.37	12.37	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/30/23	12.21	12.21	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
07/31/23	12.17	12.17	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
07/01/23	0.00	4.08	2.08	6.00	0.00	12.15
07/02/23	0.00	4.08	2.09	6.00	0.00	12.17
07/03/23	0.00	4.05	2.11	6.00	0.00	12.15
07/04/23	0.00	4.06	2.08	6.00	0.00	12.14
07/05/23	0.00	4.15	2.09	6.00	0.00	12.24
07/06/23	0.00	4.08	2.13	6.00	0.00	12.21
07/07/23	0.00	4.04	2.11	6.00	0.00	12.15
07/08/23	0.00	4.04	2.14	6.00	0.00	12.19
07/09/23	0.00	4.05	2.18	6.00	0.00	12.23
07/10/23	0.00	4.18	2.19	6.00	0.00	12.37
07/11/23	0.00	4.06	2.13	6.00	0.00	12.19
07/12/23	0.00	4.06	2.13	6.00	0.00	12.19
07/13/23	0.00	4.10	2.07	6.00	0.00	12.17
07/14/23	0.00	4.03	2.08	6.00	0.00	12.11
07/15/23	0.00	4.02	2.12	6.00	0.00	12.13
07/16/23	0.00	4.08	2.15	6.00	0.00	12.24
07/17/23	0.00	4.11	2.15	6.00	0.00	12.25
07/18/23	0.00	4.05	2.06	6.00	0.00	12.12
07/19/23	0.00	4.13	2.06	6.00	0.00	12.19
07/20/23	0.00	4.09	2.04	6.00	0.00	12.13
07/21/23	0.00	4.06	2.08	6.00	0.00	12.14
07/22/23	0.00	4.03	2.06	6.00	0.00	12.10
07/23/23	0.00	4.17	2.10	6.00	0.00	12.27
07/24/23	0.00	4.09	2.11	6.00	0.00	12.20
07/25/23	0.00	4.13	2.07	6.00	0.00	12.19
07/26/23	0.00	4.31	2.09	6.00	0.00	12.40
07/27/23	0.00	4.16	2.08	6.00	0.00	12.24
07/28/23	0.00	4.15	2.09	6.00	0.00	12.24
07/29/23	0.00	4.26	2.11	6.00	0.00	12.37
07/30/23	0.00	4.07	2.13	6.00	0.00	12.21
07/31/23	0.00	4.03	2.14	6.00	0.00	12.17

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
Date	OC San *LRV*	$MF+Cl_2$ *LRV*	RO *LRV*	UV/AOP *LRV*	Underground travel time *LRV*	Total *LRV*
07/01/23	0.00	0.00	2.08	6.00	4.00	12.08
07/02/23	0.00	0.00	2.09	6.00	4.00	12.09
07/03/23	0.00	0.00	2.11	6.00	4.00	12.11
07/04/23	0.00	0.00	2.08	6.00	4.00	12.08
07/05/23	0.00	0.00	2.09	6.00	4.00	12.09
07/06/23	0.00	0.00	2.13	6.00	4.00	12.13
07/07/23	0.00	0.00	2.11	6.00	4.00	12.11
07/08/23	0.00	0.00	2.14	6.00	4.00	12.14
07/09/23	0.00	0.00	2.18	6.00	4.00	12.18
07/10/23	0.00	0.00	2.19	6.00	4.00	12.19
07/11/23	0.00	0.00	2.13	6.00	4.00	12.13
07/12/23	0.00	0.00	2.13	6.00	4.00	12.13
07/13/23	0.00	0.00	2.07	6.00	4.00	12.07
07/14/23	0.00	0.00	2.08	6.00	4.00	12.08
07/15/23	0.00	0.00	2.12	6.00	4.00	12.12
07/16/23	0.00	0.00	2.15	6.00	4.00	12.15
07/17/23	0.00	0.00	2.15	6.00	4.00	12.15
07/18/23	0.00	0.00	2.06	6.00	4.00	12.06
07/19/23	0.00	0.00	2.06	6.00	4.00	12.06
07/20/23	0.00	0.00	2.04	6.00	4.00	12.04
07/21/23	0.00	0.00	2.08	6.00	4.00	12.08
07/22/23	0.00	0.00	2.06	6.00	4.00	12.06
07/23/23	0.00	0.00	2.10	6.00	4.00	12.10
07/24/23	0.00	0.00	2.11	6.00	4.00	12.11
07/25/23	0.00	0.00	2.07	6.00	4.00	12.07
07/26/23	0.00	0.00	2.09	6.00	4.00	12.09
07/27/23	0.00	0.00	2.08	6.00	4.00	12.08
07/28/23	0.00	0.00	2.09	6.00	4.00	12.09
07/29/23	0.00	0.00	2.11	6.00	4.00	12.11
07/30/23	0.00	0.00	2.13	6.00	4.00	12.13
07/31/23	0.00	0.00	2.14	6.00	4.00	12.14

Notes:

Date	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/23	5.03	4.92	5.15	5.20	4.87	5.04	5.07	4.99	5.22	5.16	4.77	4.79	5.04	5.10	5.07	5.01
07/02/23	5.01	5.00	5.10	5.17	4.87	5.01	5.09	4.95	5.20	5.28	4.77	4.79	5.04	5.07	5.09	4.94
07/03/23	5.04	4.92	5.14	5.16	4.96	4.98	5.11	4.93	5.15	5.15	4.72	4.79	4.99	5.09	5.06	4.89
07/04/23	5.02	4.91	5.09	5.26	5.00	4.98	5.06	4.94	5.21	5.11	4.73	4.75	5.02	5.07	5.05	4.92
07/05/23	5.08	4.93	5.07	5.10	4.99	4.98	5.05	4.97	5.14	5.09	4.72	4.73	5.18	5.06	5.02	4.88
07/06/23	4.95	4.89	5.06	5.08	4.98	4.95	5.02	4.92	5.17	5.09	4.70	4.68	5.29	5.07	5.02	4.83
07/07/23	4.97	4.88	5.10	5.10	4.99	4.91	5.04	4.90	5.15	5.09	4.73	4.67	5.22	5.05	5.02	4.84
07/08/23	4.95	4.87	5.00	5.08	4.98	4.92	5.05	4.90	5.02	5.07	4.70	4.89	5.23	5.03	5.02	4.85
07/09/23	5.03	5.16	5.06	5.13	4.97	4.90	5.08	4.93	5.10	4.98	4.70	4.97	5.19	5.04	5.04	4.83
07/10/23	4.95	5.14	5.08	5.09	5.00	4.95	5.08	4.93	5.12	5.37	4.68	4.92	5.22	4.99	5.00	4.82
07/11/23	5.01	5.13	5.05	5.08	4.97	4.93	5.03	4.92	5.13	5.35	4.67	4.86	5.20	5.02	4.95	4.77
07/12/23	4.95	5.09	5.06	5.06	4.95	4.92	5.05	4.97	5.17	5.43	4.67	4.88	5.23	5.02	4.97	4.78
07/13/23	4.88	5.12	4.98	5.08	4.97	4.94	5.06	4.94	5.15	5.40	4.69	4.86	5.20	5.02	5.00	4.80
07/14/23	4.96	5.12	4.98	5.09	4.99	4.95	5.05	4.94	5.15	5.52	4.63	4.86	5.18	5.08	5.00	4.80
07/15/23	4.93	5.08	5.35	5.07	4.93	4.93	5.01	4.92	5.13	5.45	4.65	4.84	5.17	5.02	4.96	4.75
07/16/23	5.06	5.07	5.21	5.04	4.90	5.24	4.93	4.82	5.14	5.36	4.64	4.85	5.19	4.95	4.96	4.73
07/17/23	5.03	5.03	5.16	5.10	4.88	5.16	4.97	5.01	5.06	5.36	4.57	4.86	5.14	4.93	4.97	4.72
07/18/23	5.09	5.03	5.27	5.00	4.90	5.10	4.95	5.06	4.98	5.30	4.75	4.80	5.11	4.87	4.93	4.66
07/19/23	5.12	5.05	5.20	4.99	4.92	5.13	4.98	5.03	4.96	5.36	4.86	4.79	5.11	4.90	4.91	4.64
07/20/23	5.07	4.99	5.27	4.99	4.90	5.12	4.98	5.04	4.99	5.39	4.84	4.82	5.08	4.90	4.90	4.64
07/21/23	5.09	5.05	5.25	5.00	4.94	5.14	4.94	5.08	5.04	5.36	4.77	4.80	5.04	5.08	4.92	4.66
07/22/23	5.05	5.07	5.15	4.98	4.95	5.11	4.93	5.09	5.02	5.32	4.76	4.81	5.05	5.13	4.90	4.65
07/23/23	5.02	5.06	5.13	5.17	4.85	5.13	5.12	5.07	4.95	5.33	4.80	4.79	5.09	5.06	4.90	4.88
07/24/23	4.97	5.06	5.18	5.13	4.85	5.09	5.11	5.03	5.20	5.30	4.76	4.76	5.11	5.06	5.12	4.87
07/25/23	4.99	5.03	5.21	5.11	4.83	5.07	5.11	5.00	5.23	5.25	4.73	4.77	5.17	5.11	5.10	4.84
07/26/23	5.03	5.11	5.13	5.18	4.83	5.04	5.18	4.99	5.22	5.21	4.78	4.76	5.11	5.11	5.11	4.86
07/27/23	5.05	4.99	5.20	5.13	4.87	5.07	5.10	5.03	5.20	5.25	4.73	4.71	5.05	5.11	5.08	4.87
07/28/23	5.01	4.99	5.15	5.15	5.11	5.01	5.09	5.00	5.15	5.23	4.69	4.71	4.96	5.09	5.04	4.80
07/29/23	5.04	4.90	5.16	5.16	5.09	4.98	5.08	4.97	5.16	5.18	4.73	4.69	5.00	5.05	5.02	4.79
07/30/23	5.03	4.99	5.18	5.09	5.09	5.06	5.09	4.98	5.14	5.21	4.69	4.71	5.00	5.05	5.10	4.82
07/31/23	4.96	5.00	5.15	5.14	5.07	5.01	5.05	5.00	5.13	5.14	4.69	4.68	5.18	5.07	5.11	4.84

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/23	4.85	4.88	5.00	4.67	4.42	4.75	4.81	5.00	5.12	4.99	5.10	5.15	5.16	5.24	5.06	5.08
07/02/23	4.85	4.87	5.00	4.65	4.41	4.74	4.89	4.97	5.13	5.13	5.10	5.12	5.15	5.24	5.05	5.12
07/03/23	4.82	4.85	4.99	4.61	4.41	4.72	4.88	4.98	5.10	5.12	5.10	5.04	5.37	5.21	5.03	5.11
07/04/23	4.78	4.82	4.95	4.60	4.39	4.71	4.89	4.99	5.03	5.05	5.07	5.00	5.28	5.17	5.05	5.11
07/05/23	4.78	4.81	4.98	4.58	4.37	4.69	4.88	4.94	5.09	4.98	5.07	5.05	5.28	5.15	5.03	5.09
07/06/23	4.79	5.01	4.95	4.57	4.32	4.66	4.85	4.91	5.12	5.04	5.06	5.01	5.26	5.15	5.03	5.07
07/07/23	4.74	5.05	4.83	4.54	4.25	4.61	4.83	4.88	5.02	4.95	5.06	4.97	5.25	5.14	5.15	5.05
07/08/23	4.69	5.03	4.80	4.51	4.22	4.73	4.83	4.86	5.02	4.92	5.06	4.97	5.28	5.15	5.10	5.04
07/09/23	4.71	5.02	4.83	4.50	4.21	4.87	4.82	4.87	5.04	4.99	5.07	5.01	5.25	5.18	5.08	5.06
07/10/23	4.69	5.03	4.86	4.50	4.24	4.86	4.80	4.86	5.04	4.97	5.05	5.05	5.23	5.16	5.09	5.06
07/11/23	4.72	5.04	4.86	4.51	4.28	4.83	4.82	4.86	5.08	4.98	5.05	5.09	5.25	5.14	5.13	5.04
07/12/23	4.72	5.04	4.83	4.51	4.27	4.82	4.85	4.87	5.11	5.01	5.04	5.15	5.26	5.15	5.14	5.08
07/13/23	4.71	5.04	4.86	4.50	4.23	4.84	4.85	4.87	5.07	4.99	5.00	5.09	5.27	5.16	5.11	5.06
07/14/23	4.72	5.03	4.84	4.50	4.22	4.84	4.83	4.86	5.02	4.97	5.13	5.10	5.30	5.14	5.08	5.11
07/15/23	4.70	4.98	4.81	4.46	4.23	4.79	4.79	4.86	5.02	4.96	5.22	5.16	5.29	5.12	5.04	5.03
07/16/23	4.69	4.95	4.74	4.43	4.19	4.76	4.76	4.79	5.00	4.92	5.17	5.10	5.26	5.12	5.04	5.05
07/17/23	4.68	4.94	4.71	4.60	4.11	4.73	4.75	4.70	5.19	4.89	5.16	5.05	5.17	5.09	5.01	5.01
07/18/23	4.84	4.88	4.72	4.68	4.05	4.72	4.74	4.88	5.21	4.88	5.10	5.10	5.17	5.10	5.08	4.99
07/19/23	4.94	4.87	4.93	4.67	4.14	4.72	4.71	5.00	5.15	4.86	5.13	5.17	5.14	5.24	5.09	5.08
07/20/23	4.92	4.86	5.01	4.67	4.43	4.74	4.70	5.01	5.14	4.88	5.15	5.15	5.13	5.23	5.06	5.17
07/21/23	4.90	4.88	4.97	4.67	4.39	4.74	4.69	4.97	5.11	4.82	5.12	5.09	5.15	5.21	5.05	5.15
07/22/23	4.86	4.87	4.98	4.65	4.36	4.71	4.68	4.99	5.12	4.79	5.10	5.11	5.14	5.21	5.07	5.13
07/23/23	4.86	4.85	4.98	4.63	4.36	4.70	4.82	5.00	5.14	4.80	5.09	5.09	5.11	5.23	5.07	5.11
07/24/23	4.88	4.89	5.00	4.68	4.84	4.70	4.88	4.95	5.16	4.80	5.11	5.10	5.15	5.21	5.09	5.13
07/25/23	4.87	4.82	4.97	4.67	5.14	4.70	4.87	4.93	5.12	4.84	5.12	5.03	5.09	5.17	5.08	5.16
07/26/23	4.83	4.78	4.94	4.63	5.12	4.66	4.87	4.94	5.05	4.78	5.07	5.05	5.07	5.16	5.08	5.09
07/27/23	4.79	4.78	4.92	4.61	5.11	4.63	4.85	4.94	5.11	4.93	5.07	5.01	5.10	5.18	5.00	5.13
07/28/23	4.75	4.96	4.91	4.60	5.08	4.60	4.83	4.89	5.14	5.13	5.08	5.02	5.08	5.20	5.00	5.13
07/29/23	4.75	5.10	4.85	4.58	5.05	4.58	4.82	4.87	5.09	5.10	5.08	5.04	5.06	5.18	5.04	5.13
07/30/23	4.75	5.11	4.85	4.56	5.05	4.74	4.83	4.92	5.09	5.12	5.07	5.05	5.33	5.14	5.05	5.09
07/31/23	4.75	5.08	4.93	4.53	5.07	4.87	4.82	4.91	5.11	5.17	5.06	5.06	5.31	5.17	5.03	5.08

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
07/01/23	4.77	4.97	4.08	4.46	5.26	5.48	5.12	5.24	5.10	5.27	5.08	5.08	4.91	4.74	4.92	5.28
07/02/23	4.73	5.01	4.08	4.40	5.19	5.36	5.21	5.25	5.02	5.39	4.97	5.00	4.92	4.68	4.96	5.37
07/03/23	4.80	4.93	4.05	4.46	5.17	5.31	5.10	5.19	4.99	5.22	5.02	5.01	4.88	4.65	5.01	5.23
07/04/23	4.82	4.84	4.06	4.45	5.19	5.32	5.11	5.27	4.99	5.26	5.01	5.06	4.90	4.62	4.94	5.17
07/05/23	4.75	4.93	4.15	4.39	5.24	5.22	5.11	5.30	4.95	5.26	5.00	4.95	4.92	4.60	4.82	5.15
07/06/23	4.80	4.84	4.08	4.44	5.28	5.15	5.09	5.21	4.97	5.12	5.02	5.15	4.85	4.57	4.84	5.12
07/07/23	4.88	4.82	4.04	4.36	5.17	5.24	5.17	5.12	5.08	5.22	5.01	5.06	4.91	4.65	4.85	5.09
07/08/23	4.96	4.84	4.04	4.31	5.19	5.17	5.06	5.20	4.92	5.19	4.98	5.00	4.92	4.63	4.89	5.12
07/09/23	4.76	4.98	4.05	4.38	5.20	5.15	5.11	5.10	4.94	5.15	4.94	5.08	4.82	4.63	4.98	5.22
07/10/23	4.80	5.08	4.18	4.42	5.17	5.24	5.19	5.01	5.05	5.16	4.94	4.92	4.85	4.71	4.87	5.44
07/11/23	4.88	4.83	4.06	4.44	5.22	5.22	5.10	5.26	4.95	5.21	4.94	4.91	4.93	4.73	4.83	5.27
07/12/23	4.83	4.87	4.06	4.85	5.20	5.20	5.14	5.23	4.98	5.22	4.90	5.05	4.93	4.84	4.88	5.21
07/13/23	4.72	4.87	4.10	4.90	5.22	5.20	5.15	5.16	5.00	5.23	4.94	5.02	4.94	4.70	4.86	5.25
07/14/23	4.78	4.81	4.03	4.77	5.37	5.12	5.08	5.24	4.97	5.16	5.00	4.85	4.92	4.57	4.82	5.30
07/15/23	4.78	4.83	4.02	4.93	5.20	5.37	5.09	5.19	4.93	5.21	5.17	5.08	4.96	4.72	4.85	5.27
07/16/23	4.92	4.97	4.08	4.94	5.17	5.24	5.11	5.20	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
07/17/23	4.82	4.91	4.11	4.84	5.21	5.30	5.03	5.22	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *	N/A *
07/18/23	4.84	4.94	4.08	4.86	5.21	5.60	4.99	5.20	5.17	5.28	5.01	5.05	4.91	4.73	4.79	5.36
07/19/23	5.00	4.99	4.13	4.96	5.24	5.24	5.10	5.31	5.09	5.29	5.00	4.95	4.90	4.66	4.79	5.29
07/20/23	4.80	4.83	4.09	4.86	5.23	5.21	5.10	5.18	5.07	5.22	5.00	5.11	4.88	4.69	4.88	5.31
07/21/23	4.74	4.86	4.06	4.82	5.17	5.28	5.17	5.19	4.98	5.24	4.96	4.97	4.90	4.72	4.95	5.42
07/22/23	4.90	4.97	4.03	4.83	5.14	5.27	5.17	5.30	5.05	5.33	4.94	4.99	4.92	4.68	4.87	5.23
07/23/23	4.85	5.02	4.17	4.88	5.23	5.27	5.13	5.20	5.00	5.15	4.95	5.04	4.85	4.64	5.14	5.23
07/24/23	4.85	5.28	4.09	4.86	5.23	5.27	5.15	5.23	5.00	5.16	5.10	5.02	4.85	4.69	4.89	5.32
07/25/23	4.91	4.93	4.13	4.85	5.30	5.23	5.10	5.30	5.10	5.20	4.92	4.90	4.89	4.72	4.90	5.16
07/26/23	4.81	4.92	4.31	4.98	5.24	5.23	5.01	5.24	4.97	5.13	4.94	5.09	4.85	4.82	4.91	5.15
07/27/23	4.79	5.02	4.16	4.84	5.26	5.23	5.14	5.21	4.97	5.17	5.03	5.03	4.91	4.72	4.90	5.26
07/28/23	4.80	4.86	4.15	4.80	5.29	5.21	5.08	5.23	5.01	5.21	5.02	4.98	4.84	4.65	4.87	5.25
07/29/23	4.80	4.91	4.26	4.88	5.23	5.26	5.12	5.22	5.01	5.27	5.01	4.94	4.84	4.73	4.87	5.21
07/30/23	4.86	4.94	4.07	4.83	5.17	5.33	5.10	5.13	4.96	5.33	5.01	4.97	4.88	4.66	4.80	5.27
07/31/23	4.78	4.88	4.03	4.89	5.20	5.21	5.19	5.15	5.03	5.20	5.00	5.03	4.87	4.74	4.89	5.18

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cells out of service for maintenance.

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
07/01/23	0.032	0.033	0.028	0.030	0.033	0.035	0.033	0.035	0.035	0.036	0.027	0.030	0.028	0.031	0.045	0.047	0.054	0.058	0.033	0.033	0.043	0.049	0.084	0.086	0.040
07/02/23	0.031	0.034	0.027	0.030	0.033	0.035	0.032	0.034	0.034	0.036	0.026	0.032	0.028	0.030	0.046	0.060	0.059	0.062	0.033	0.034	0.044	0.046	0.088	0.092	0.040
07/03/23	0.031	0.034	0.027	0.029	0.032	0.033	0.032	0.035	0.033	0.035	0.025	0.027	0.028	0.029	0.046	0.054	0.063	0.066	0.034	0.036	0.048	0.052	0.094	0.097	0.041
07/04/23	0.032	0.034	0.027	0.029	0.033	0.035	0.033	0.037	0.034	0.039	0.025	0.032	0.028	0.030	0.046	0.056	0.069	0.075	0.037	0.044	0.052	0.055	0.101	0.104	0.043
07/05/23	0.032	0.035	0.027	0.029	0.033	0.036	0.034	0.037	0.034	0.038	0.026	0.030	0.028	0.030	0.047	0.053	0.075	0.080	0.044	0.044	0.057	0.065	0.109	0.115	0.045
07/06/23	0.034	0.036	0.030	0.032	0.036	0.042	0.036	0.039	0.038	0.042	0.029	0.034	0.029	0.042	0.053	0.059	0.083	0.088	0.049	0.055	0.069	0.072	0.121	0.125	0.050
07/07/23	0.033	0.036	0.028	0.032	0.035	0.037	0.034	0.037	0.035	0.040	0.027	0.033	0.028	0.042	0.050	0.052	0.062	0.091	0.052	0.052	0.050	0.073	0.084	0.132	0.043
07/08/23	0.032	0.038	0.026	0.028	0.033	0.035	0.032	0.035	0.033	0.037	0.025	0.028	0.028	0.029	0.048	0.053	0.045	0.053	0.052	0.052	0.034	0.038	0.057	0.060	0.037
07/09/23	0.033	0.036	0.027	0.028	0.033	0.036	0.033	0.035	0.033	0.036	0.025	0.028	0.028	0.029	0.048	0.050	0.045	0.048	0.053	0.054	0.035	0.041	0.058	0.062	0.038
07/10/23	0.033	0.035	0.027	0.028	0.035	0.039	0.033	0.035	0.034	0.036	0.026	0.028	0.028	0.034	0.049	0.050	0.046	0.050	0.062	0.075	0.037	0.045	0.058	0.060	0.039
07/11/23	0.034	0.036	0.028	0.030	0.034	0.040	0.034	0.036	0.035	0.037	0.026	0.030	0.029	0.036	0.050	0.054	0.046	0.049	0.065	0.066	0.039	0.043	0.060	0.063	0.040
07/12/23	0.034	0.036	0.028	0.029	0.035	0.036	0.034	0.038	0.036	0.039	0.027	0.029	0.030	0.033	0.049	0.051	0.045	0.050	0.050	0.072	0.041	0.045	0.061	0.064	0.039
07/13/23	0.033	0.036	0.028	0.031	0.035	0.037	0.034	0.038	0.036	0.039	0.027	0.030	0.030	0.032	0.047	0.050	0.044	0.047	0.038	0.038	0.042	0.047	0.062	0.063	0.038
07/14/23	0.033	0.057	0.027	0.029	0.034	0.036	0.034	0.038	0.036	0.038	0.027	0.029	0.030	0.034	0.048	0.049	0.042	0.044	0.038	0.038	0.047	0.052	0.065	0.068	0.038
07/15/23	0.034	0.041	0.027	0.031	0.035	0.038	0.033	0.036	0.036	0.039	0.027	0.030	0.030	0.032	0.049	0.051	0.043	0.049	0.038	0.038	0.054	0.060	0.069	0.073	0.039
07/16/23	0.035	0.051	0.029	0.033	0.035	0.038	0.034	0.038	0.037	0.040	0.028	0.033	0.030	0.037	0.051	0.052	0.045	0.051	0.038	0.038	N/A *	N/A *	N/A *	N/A *	0.036
07/17/23	0.033	0.036	0.027	0.031	0.033	0.039	0.032	0.036	0.048	0.082	0.025	0.030	0.030	0.034	0.051	0.053	0.047	0.051	0.039	0.040	N/A *	N/A *	N/A *	N/A *	0.037
07/18/23	0.031	0.034	0.026	0.029	0.031	0.035	0.030	0.033	0.055	0.380 **	0.022	0.025	0.030	0.031	0.053	0.059	0.051	0.061	0.040	0.041	0.095	0.115	0.092	0.106	0.041
07/19/23	0.032	0.033	0.025	0.041	0.030	0.032	0.030	0.031	0.032	0.044	0.022	0.024	0.029	0.030	0.051	0.058	0.042	0.054	0.039	0.070	0.058	0.104	0.069	0.094	0.038
07/20/23	0.032	0.040	0.013	0.030	0.031	0.035	0.031	0.034	0.032	0.040	0.024	0.034	0.028	0.032	0.045	0.052	0.031	0.036	0.032	0.035	0.025	0.029	0.049	0.054	0.031
07/21/23	0.032	0.037	0.025	0.027	0.030	0.032	0.031	0.059	0.034	0.263 **	0.023	0.026	0.028	0.029	0.043	0.045	0.032	0.050	0.032	0.033	0.027	0.032	0.051	0.052	0.032
07/22/23	0.032	0.036	0.025	0.027	0.030	0.033	0.031	0.033	0.031	0.031	0.022	0.029	0.028	0.031	0.042	0.043	0.033	0.037	0.031	0.031	0.026	0.031	0.050	0.053	0.032
07/23/23	0.033	0.034	0.026	0.030	0.030	0.032	0.031	0.036	0.031	0.038	0.024	0.083	0.028	0.029	0.042	0.047	0.038	0.041	0.031	0.031	0.027	0.029	0.051	0.054	0.033
07/24/23	0.033	0.036	0.026	0.028	0.031	0.033	0.032	0.038	0.032	0.080	0.023	0.032	0.028	0.029	0.042	0.045	0.042	0.045	0.031	0.031	0.028	0.031	0.053	0.056	0.034
07/25/23	0.034	0.036	0.026	0.028	0.031	0.033	0.032	0.037	0.032	0.036	0.024	0.029	0.028	0.030	0.042	0.052	0.047	0.051	0.031	0.031	0.029	0.032	0.053	0.080	0.034
07/26/23	0.034	0.036	0.026	0.028	0.031	0.033	0.031	0.035	0.032	0.033	0.023	0.028	0.027	0.032	0.042	0.043	0.053	0.059	0.031	0.031	0.029	0.034	0.053	0.056	0.034
07/27/23	0.034	0.039	0.026	0.030	0.031	0.033	0.031	0.036	0.041	0.380 **	0.024	0.035	0.028	0.031	0.043	0.050	0.048	0.060	0.033	0.035	0.032	0.040	0.054	0.060	0.035
07/28/23	0.034	0.042	0.026	0.030	0.031	0.033	0.031	0.033	0.032	0.034	0.023	0.025	0.028	0.029	0.042	0.044	0.032	0.034	0.034	0.034	0.031	0.034	0.054	0.061	0.033
07/29/23	0.035	0.037	0.026	0.030	0.032	0.033	0.031	0.040	0.033	0.036	0.024	0.029	0.028	0.032	0.043	0.049	0.034	0.039	0.033	0.033	0.034	0.037	0.055	0.060	0.034
07/30/23	0.035	0.037	0.026	0.028	0.032	0.034	0.031	0.035	0.033	0.035	0.025	0.027	0.028	0.031	0.043	0.045	0.037	0.039	0.035	0.035	0.036	0.040	0.060	0.069	0.035
07/31/23	0.035	0.037	0.026	0.029	0.032	0.033	0.032	0.036	0.033	0.034	0.025	0.028	0.028	0.031	0.043	0.045	0.040	0.043	0.036	0.039	0.038	0.041	0.061	0.066	0.036

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

* Cells out of service for maintenance.

** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
07/01/23	0.015	0.015	6.875	6.526	7.455	0.058	0.054	0.062	2,278	2,166	2,421	58	54	66	99.16	2.08	97.44	1.59
07/02/23	0.015	0.015	6.783	6.465	7.250	0.055	0.052	0.060	2,240	2,136	2,443	58	53	67	99.19	2.09	97.42	1.59
07/03/23	0.015	0.015	6.764	6.415	7.178	0.053	0.049	0.058	2,300	2,168	2,502	60	55	69	99.22	2.11	97.38	1.58
07/04/23	0.015	0.015	6.853	6.438	7.307	0.057	0.053	0.061	2,345	2,229	2,530	61	56	69	99.18	2.08	97.39	1.58
07/05/23	0.015	0.015	6.601	6.188	7.317	0.053	0.049	0.060	2,327	2,141	2,618	62	55	73	99.19	2.09	97.35	1.58
07/06/23	0.015	0.015	7.211	6.665	7.740	0.054	0.047	0.064	2,418	2,275	2,623	63	55	72	99.25	2.13	97.41	1.59
07/07/23	0.014	0.015	7.608	7.198	8.083	0.060	0.053	0.074	2,406	2,218	2,638	62	52	73	99.22	2.11	97.41	1.59
07/08/23	0.015	0.015	7.229	6.850	7.827	0.052	0.047	0.058	2,474	2,346	2,660	65	59	73	99.28	2.14	97.38	1.58
07/09/23	0.015	0.015	7.161	6.802	7.681	0.047	0.044	0.053	2,365	2,221	2,569	62	57	71	99.34	2.18	97.38	1.58
07/10/23	0.015	0.015	7.239	6.861	7.705	0.047	0.041	0.055	2,292	1,648	2,520	60	40	70	99.35	2.19	97.37	1.58
07/11/23	0.015	0.015	7.327	6.946	7.907	0.054	0.049	0.059	2,355	2,210	2,570	63	55	74	99.26	2.13	97.34	1.58
07/12/23	0.015	0.015	7.305	6.900	7.776	0.054	0.048	0.058	2,381	2,236	2,528	65	57	72	99.25	2.13	97.29	1.57
07/13/23	0.015	0.015	7.625	7.158	8.042	0.065	0.052	0.076	2,367	2,223	2,478	63	58	69	99.15	2.07	97.32	1.57
07/14/23	0.015	0.015	7.537	7.050	9.400	0.062	0.056	0.070	2,384	2,258	2,513	64	52	72	99.17	2.08	97.32	1.57
07/15/23	0.015	0.015	7.487	7.181	8.024	0.057	0.051	0.066	2,368	2,247	2,523	64	59	74	99.23	2.12	97.29	1.57
07/16/23	0.015	0.015	7.548	7.141	8.323	0.053	0.049	0.060	2,253	2,134	2,374	58	52	65	99.30	2.15	97.43	1.59
07/17/23	0.015	0.015	7.483	7.050	8.088	0.053	0.044	0.067	2,271	2,121	2,408	59	52	69	99.29	2.15	97.40	1.59
07/18/23	0.015	0.015	7.561	7.130	8.290	0.065	0.053	0.082	2,365	2,224	2,552	64	56	73	99.14	2.06	97.29	1.57
07/19/23	0.015	0.015	7.359	6.910	8.062	0.063	0.052	0.077	2,429	2,263	2,640	66	59	76	99.14	2.06	97.29	1.57
07/20/23	0.015	0.015	7.622	7.210	8.447	0.069	0.054	0.079	2,374	2,252	2,512	64	55	91	99.10	2.04	97.31	1.57
07/21/23	0.015	0.015	7.049	6.723	7.844	0.058	0.051	0.064	2,408	2,243	2,584	65	55	74	99.17	2.08	97.28	1.57
07/22/23	0.015	0.015	6.882	6.501	7.305	0.060	0.056	0.069	2,445	2,324	2,620	67	61	74	99.13	2.06	97.27	1.56
07/23/23	0.015	0.015	6.784	6.433	7.253	0.053	0.048	0.058	2,401	2,280	2,597	65	60	74	99.21	2.10	97.28	1.57
07/24/23	0.015	0.015	6.872	6.611	7.388	0.053	0.048	0.059	2,385	2,208	2,610	65	57	76	99.23	2.11	97.26	1.56
07/25/23	0.015	0.015	7.202	6.678	7.904	0.062	0.051	0.093	2,415	2,280	2,637	67	59	77	99.14	2.07	97.24	1.56
07/26/23	0.015	0.015	6.961	6.548	7.309	0.057	0.052	0.060	2,414	2,242	2,656	67	59	77	99.18	2.09	97.24	1.56
07/27/23	0.015	0.015	6.916	6.061	7.246	0.057	0.051	0.062	2,437	2,298	2,603	67	61	75	99.17	2.08	97.24	1.56
07/28/23	0.014	0.015	6.801	6.522	7.240	0.055	0.051	0.061	2,404	2,213	2,596	66	60	80	99.19	2.09	97.24	1.56
07/29/23	0.015	0.015	6.727	6.464	7.208	0.052	0.047	0.065	2,390	2,244	2,597	68	61	80	99.23	2.11	97.15	1.54
07/30/23	0.015	0.015	6.605	6.126	7.157	0.049	0.046	0.054	2,370	2,199	2,635	67	60	77	99.26	2.13	97.19	1.55
07/31/23	0.015	0.015	6.693	6.018	7.244	0.049	0.042	0.056	2,383	2,243	2,655	66	59	77	99.27	2.14	97.23	1.56

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
07/01/23	96.29	115.154	37,080.7	0.32	3	6
07/02/23	95.97	115.180	38,158.4	0.33	3	6
07/03/23	96.07	114.301	37,672.0	0.33	3	6
07/04/23	95.95	115.137	38,308.6	0.33	3	6
07/05/23	96.14	114.116	38,285.3	0.34	3	6
07/06/23	96.28	113.584	37,492.2	0.33	3	6
07/07/23	96.15	114.871	37,203.9	0.33	3	6
07/08/23	95.90	115.147	37,949.9	0.33	3	6
07/09/23	95.89	115.111	38,317.9	0.33	3	6
07/10/23	96.10	115.228	38,241.7	0.33	3	6
07/11/23	96.23	109.910	37,203.2	0.33	3	6
07/12/23	96.31	106.584	35,809.7	0.33	3	6
07/13/23	96.15	106.966	35,108.8	0.33	3	6
07/14/23	96.08	107.275	35,691.1	0.34	3	6
07/15/23	96.52	108.840	36,000.9	0.34	3	6
07/16/23	96.14	100.621	33,998.8	0.32	3	6
07/17/23	95.94	100.825	32,805.9	0.33	3	6
07/18/23	96.35	104.184	33,780.1	0.33	3	6
07/19/23	96.55	112.063	34,936.5	0.32	3	6
07/20/23	96.52	104.338	34,987.7	0.32	3	6
07/21/23	96.74	110.932	33,994.2	0.32	3	6
07/22/23	96.75	114.487	33,437.7	0.30	3	6
07/23/23	96.69	114.447	34,471.2	0.30	3	6
07/24/23	96.83	113.020	34,724.2	0.30	3	6
07/25/23	96.55	114.484	33,883.1	0.30	3	6
07/26/23	96.82	114.647	35,472.1	0.31	3	6
07/27/23	96.72	115.811	34,013.4	0.30	3	6
07/28/23	96.80	119.493	35,224.9	0.30	3	6
07/29/23	96.93	117.900	35,671.1	0.30	3	6
07/30/23	97.03	115.892	34,555.9	0.29	3	6
07/31/23	96.99	115.077	33,357.7	0.29	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	MFE NTU		ROP NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
08/01/23	12.22	12.22	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/02/23	12.16	12.16	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/03/23	12.13	12.13	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/04/23	12.32	12.32	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/05/23	12.18	12.18	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/06/23	12.21	12.21	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/07/23	12.47	12.47	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/08/23	12.28	12.28	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/09/23	12.22	12.22	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/10/23	12.31	12.31	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/11/23	12.25	12.25	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/12/23	12.31	12.31	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/13/23	12.45	12.45	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/14/23	12.26	12.26	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/15/23	12.23	12.23	12.09	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/16/23	12.33	12.33	12.08	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/17/23	12.26	12.26	12.07	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/18/23	12.34	12.34	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/19/23	12.28	12.28	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/20/23	12.28	12.28	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/21/23	12.39	12.39	12.24	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/22/23	12.35	12.35	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/23/23	12.40	12.40	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/24/23	12.30	12.30	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/25/23	12.34	12.34	12.20	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/26/23	12.40	12.40	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/27/23	12.29	12.29	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/28/23	12.17	12.17	12.06	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/29/23	13.04	13.04	12.02	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/30/23	12.22	12.22	12.77 *	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
08/31/23	12.56	12.56	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

* Additional log-virus credit taken for 1 month beyond secondary boundary where no drinking water wells operate.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
08/01/23	0.00	4.11	2.11	6.00	0.00	12.22
08/02/23	0.00	4.07	2.10	6.00	0.00	12.16
08/03/23	0.00	4.04	2.09	6.00	0.00	12.13
08/04/23	0.00	4.21	2.11	6.00	0.00	12.32
08/05/23	0.00	4.09	2.09	6.00	0.00	12.18
08/06/23	0.00	4.09	2.12	6.00	0.00	12.21
08/07/23	0.00	4.27	2.20	6.00	0.00	12.47
08/08/23	0.00	4.14	2.14	6.00	0.00	12.28
08/09/23	0.00	4.10	2.12	6.00	0.00	12.22
08/10/23	0.00	4.18	2.13	6.00	0.00	12.31
08/11/23	0.00	4.12	2.12	6.00	0.00	12.25
08/12/23	0.00	4.20	2.12	6.00	0.00	12.31
08/13/23	0.00	4.30	2.15	6.00	0.00	12.45
08/14/23	0.00	4.15	2.11	6.00	0.00	12.26
08/15/23	0.00	4.14	2.09	6.00	0.00	12.23
08/16/23	0.00	4.25	2.08	6.00	0.00	12.33
08/17/23	0.00	4.19	2.07	6.00	0.00	12.26
08/18/23	0.00	4.22	2.12	6.00	0.00	12.34
08/19/23	0.00	4.10	2.18	6.00	0.00	12.28
08/20/23	0.00	4.05	2.22	6.00	0.00	12.28
08/21/23	0.00	4.15	2.24	6.00	0.00	12.39
08/22/23	0.00	4.18	2.17	6.00	0.00	12.35
08/23/23	0.00	4.26	2.14	6.00	0.00	12.40
08/24/23	0.00	4.16	2.13	6.00	0.00	12.30
08/25/23	0.00	4.14	2.20	6.00	0.00	12.34
08/26/23	0.00	4.22	2.18	6.00	0.00	12.40
08/27/23	0.00	4.13	2.17	6.00	0.00	12.29
08/28/23	0.00	4.10	2.06	6.00	0.00	12.17
08/29/23	0.00	5.02	2.02	6.00	0.00	13.04
08/30/23	0.00	4.45	1.77	6.00	0.00	12.22
08/31/23	0.00	4.43	2.13	6.00	0.00	12.56

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
08/01/23	0.00	0.00	2.11	6.00	4.00	12.11
08/02/23	0.00	0.00	2.10	6.00	4.00	12.10
08/03/23	0.00	0.00	2.09	6.00	4.00	12.09
08/04/23	0.00	0.00	2.11	6.00	4.00	12.11
08/05/23	0.00	0.00	2.09	6.00	4.00	12.09
08/06/23	0.00	0.00	2.12	6.00	4.00	12.12
08/07/23	0.00	0.00	2.20	6.00	4.00	12.20
08/08/23	0.00	0.00	2.14	6.00	4.00	12.14
08/09/23	0.00	0.00	2.12	6.00	4.00	12.12
08/10/23	0.00	0.00	2.13	6.00	4.00	12.13
08/11/23	0.00	0.00	2.12	6.00	4.00	12.12
08/12/23	0.00	0.00	2.12	6.00	4.00	12.12
08/13/23	0.00	0.00	2.15	6.00	4.00	12.15
08/14/23	0.00	0.00	2.11	6.00	4.00	12.11
08/15/23	0.00	0.00	2.09	6.00	4.00	12.09
08/16/23	0.00	0.00	2.08	6.00	4.00	12.08
08/17/23	0.00	0.00	2.07	6.00	4.00	12.07
08/18/23	0.00	0.00	2.12	6.00	4.00	12.12
08/19/23	0.00	0.00	2.18	6.00	4.00	12.18
08/20/23	0.00	0.00	2.22	6.00	4.00	12.22
08/21/23	0.00	0.00	2.24	6.00	4.00	12.24
08/22/23	0.00	0.00	2.17	6.00	4.00	12.17
08/23/23	0.00	0.00	2.14	6.00	4.00	12.14
08/24/23	0.00	0.00	2.13	6.00	4.00	12.13
08/25/23	0.00	0.00	2.20	6.00	4.00	12.20
08/26/23	0.00	0.00	2.18	6.00	4.00	12.18
08/27/23	0.00	0.00	2.17	6.00	4.00	12.17
08/28/23	0.00	0.00	2.06	6.00	4.00	12.06
08/29/23	0.00	0.00	2.02	6.00	4.00	12.02
08/30/23	0.00	0.00	1.77	6.00	5.00 *	12.77
08/31/23	0.00	0.00	2.13	6.00	4.00	12.13

Notes:

* Additional log-virus credit taken for 1 month beyond secondary boundary where no drinking water wells operate.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	MicroFiltration Process online monitoring results Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/23	4.99	5.00	5.12	5.13	4.99	5.05	5.03	4.98	5.19	5.11	4.67	4.64	5.27	5.05	5.02	4.76
08/02/23	4.97	5.03	5.11	5.14	4.99	5.03	5.07	4.90	5.09	5.11	4.65	4.84	5.26	5.03	5.03	4.72
08/03/23	5.01	4.96	5.05	5.06	5.03	4.93	5.03	4.96	5.11	5.16	4.62	4.88	5.26	5.03	5.04	4.74
08/04/23	4.99	4.94	5.07	5.05	5.02	4.93	5.04	4.93	5.09	5.10	4.62	4.91	5.21	5.02	5.00	4.76
08/05/23	4.98	5.02	5.08	5.04	5.02	4.92	5.03	4.92	5.05	5.23	4.61	4.90	5.21	5.03	5.02	4.77
08/06/23	4.93	4.92	5.08	5.09	5.01	4.92	5.00	4.95	5.10	5.27	4.57	4.92	5.22	5.05	5.04	4.77
08/07/23	4.89	5.09	5.00	5.08	4.99	4.91	4.98	4.93	5.04	5.20	4.58	4.85	4.97	4.99	5.02	4.69
08/08/23	4.93	5.14	5.09	5.07	5.00	4.93	5.00	4.93	5.03	5.23	4.58	4.89	5.02	5.03	5.04	4.73
08/09/23	4.95	5.29	5.15	5.09	5.04	4.99	5.09	4.94	5.13	5.27	4.59	4.87	5.41	5.08	5.06	4.75
08/10/23	4.96	5.22	5.08	5.05	4.98	5.00	5.13	4.97	5.13	5.25	4.59	4.89	5.32	5.04	5.03	4.76
08/11/23	4.99	5.22	5.35	5.05	5.07	5.32	5.04	4.95	5.13	5.23	4.62	4.92	5.31	5.08	5.01	4.75
08/12/23	5.12	5.16	5.31	5.06	5.07	5.28	5.08	4.91	5.11	5.22	4.63	4.94	5.27	5.05	5.00	4.71
08/13/23	5.10	5.16	5.33	5.11	4.97	5.26	5.11	5.06	5.09	5.26	4.62	4.91	5.34	5.05	5.01	4.74
08/14/23	5.18	5.19	5.41	5.10	5.05	5.31	5.07	5.11	5.09	5.28	4.81	4.89	5.31	5.11	5.01	4.71
08/15/23	5.18	5.21	5.35	5.06	5.02	5.26	5.05	5.16	5.12	5.28	4.78	4.88	5.28	5.09	5.06	4.71
08/16/23	5.10	5.18	5.37	5.11	5.00	5.21	5.06	5.13	5.14	5.28	4.76	4.89	5.26	5.26	5.06	4.71
08/17/23	5.12	5.17	5.31	5.10	5.03	5.26	5.07	5.17	5.16	5.21	4.78	4.91	5.32	5.25	5.07	4.72
08/18/23	5.10	5.16	5.30	5.14	5.03	5.23	5.18	5.11	5.12	5.22	4.79	4.88	5.29	5.20	5.04	4.79
08/19/23	5.11	5.17	5.29	5.10	5.05	5.23	5.15	5.09	5.25	5.27	4.77	4.88	5.26	5.20	5.02	4.85
08/20/23	5.09	5.19	5.31	5.18	5.05	5.23	5.19	5.13	5.26	5.25	4.77	4.89	5.27	5.22	5.04	4.87
08/21/23	5.09	5.18	5.28	5.16	5.05	5.27	5.19	5.10	5.29	5.26	4.75	4.87	5.29	5.23	5.07	4.86
08/22/23	5.13	5.15	5.29	5.19	5.01	5.26	5.18	5.09	5.26	5.30	4.73	4.87	5.09	5.22	5.03	4.80
08/23/23	5.09	5.14	5.29	5.13	5.16	5.23	5.10	5.06	5.26	5.19	4.74	4.86	5.00	5.18	5.01	4.80
08/24/23	5.10	5.15	5.22	5.15	5.17	5.23	5.13	5.05	5.22	5.23	4.74	4.87	4.90	5.14	5.09	4.82
08/25/23	5.06	5.15	5.27	5.19	5.14	5.23	5.17	5.08	5.26	5.19	4.76	4.83	5.15	5.15	5.11	4.81
08/26/23	5.08	5.09	5.27	5.11	5.12	5.20	5.17	5.11	5.18	5.27	4.75	4.83	5.52	5.12	5.09	4.82
08/27/23	5.13	5.18	5.33	5.16	5.13	5.17	5.19	5.08	5.21	5.24	4.70	4.85	5.40	5.13	5.10	4.82
08/28/23	5.07	5.10	5.23	5.13	5.10	5.15	5.11	5.09	5.23	5.23	4.71	4.86	5.30	5.14	5.10	4.83
08/29/23	5.10	5.17	5.32	5.15	5.12	5.25	5.14	5.11	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **
08/30/23	5.20	5.17	5.42	5.22	5.11	5.24	5.29	5.14	5.16	5.20	4.68	4.99	5.21	5.13	5.08	4.78
08/31/23	5.15	5.14	5.33	5.21	5.16	5.21	5.23	5.13	5.18	5.20	4.72	4.96	5.26	5.12	5.11	4.86

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/23	4.74	5.07	4.86	4.49	5.03	4.86	4.79	4.86	5.07	5.12	5.04	4.98	5.26	5.18	5.10	5.05
08/02/23	4.69	5.02	4.82	4.49	4.97	4.81	4.78	4.84	4.99	5.08	5.01	4.98	5.25	5.16	5.25	5.05
08/03/23	4.70	4.99	4.83	4.46	4.99	4.78	4.79	4.82	4.98	5.04	4.96	4.96	5.27	5.14	5.17	5.07
08/04/23	4.66	4.99	4.79	4.44	4.96	4.78	4.78	4.79	5.00	5.01	4.94	4.96	5.27	5.10	5.19	5.07
08/05/23	4.63	4.99	4.78	4.43	4.92	4.79	4.78	4.77	5.01	5.02	4.98	4.95	5.22	5.10	5.18	5.04
08/06/23	4.67	5.01	4.80	4.44	4.94	4.81	4.79	4.75	5.03	5.03	4.98	4.97	5.25	5.19	5.16	5.03
08/07/23	4.63	4.97	4.80	4.71	4.97	4.80	4.77	4.74	5.02	5.02	4.95	5.10	5.26	5.17	5.16	5.01
08/08/23	4.68	4.97	4.84	4.79	4.93	4.82	4.77	4.93	4.99	5.08	4.93	5.11	5.31	5.17	5.20	5.03
08/09/23	4.75	5.01	4.85	4.80	4.99	4.84	4.80	5.07	5.03	5.11	5.09	5.13	5.38	5.26	5.25	5.07
08/10/23	4.70	5.02	4.79	4.78	4.98	4.80	4.79	5.04	5.02	5.09	5.21	5.14	5.36	5.18	5.23	5.07
08/11/23	4.68	5.03	4.78	4.79	4.96	4.81	4.80	5.06	4.99	5.07	5.18	5.12	5.36	5.17	5.23	5.06
08/12/23	4.68	5.06	4.76	4.79	5.04	4.81	4.81	5.05	5.15	5.04	5.18	5.13	5.36	5.19	5.17	5.03
08/13/23	4.71	5.04	4.77	4.75	5.05	4.79	4.79	5.04	5.45	5.08	5.18	5.10	5.32	5.38	5.20	5.07
08/14/23	4.96	5.04	4.79	4.78	5.01	4.80	4.79	5.05	5.40	5.11	5.18	5.08	5.42	5.48	5.23	5.20
08/15/23	5.02	5.05	5.00	4.77	5.01	4.81	4.78	5.04	5.31	5.12	5.17	5.08	5.35	5.39	5.12	5.31
08/16/23	4.99	5.03	5.09	4.76	5.17	4.82	4.78	5.04	5.31	5.09	5.11	5.08	5.33	5.26	4.96	5.27
08/17/23	5.00	5.03	5.06	4.76	5.35	4.79	4.81	5.02	5.36	5.08	5.11	5.11	5.31	5.26	5.00	5.29
08/18/23	5.01	5.01	5.03	4.77	5.35	4.78	4.81	5.00	5.35	5.08	5.16	5.14	5.35	5.26	5.02	5.27
08/19/23	4.98	5.02	5.04	4.77	5.29	4.79	4.91	5.01	5.26	5.10	5.17	5.13	5.31	5.24	4.97	5.25
08/20/23	4.99	5.01	5.04	4.74	5.32	4.79	4.98	5.03	5.25	5.13	5.17	5.11	5.33	5.24	5.00	5.26
08/21/23	5.02	5.00	5.03	4.77	5.32	4.79	5.00	5.01	5.31	5.08	5.17	5.04	5.35	5.24	5.00	5.29
08/22/23	5.00	4.98	5.00	4.76	5.23	4.79	4.99	4.98	5.27	5.17	5.16	5.06	5.36	5.20	5.03	5.27
08/23/23	4.97	5.17	4.99	4.72	5.20	4.75	4.94	4.97	5.23	5.28	5.14	5.09	5.28	5.21	5.00	5.25
08/24/23	4.96	5.18	5.02	4.69	5.19	4.79	4.95	4.98	5.23	5.23	5.14	5.02	5.43	5.22	4.98	5.22
08/25/23	4.96	5.12	5.03	4.70	5.21	4.87	4.97	4.98	5.22	5.25	5.14	5.06	5.45	5.21	4.97	5.22
08/26/23	4.95	5.15	4.98	4.71	5.30	4.88	4.96	5.00	5.26	5.31	5.11	5.14	5.36	5.24	4.96	5.25
08/27/23	4.95	5.18	4.98	4.70	5.30	4.89	4.94	5.04	5.26	5.26	5.13	5.11	5.39	5.23	5.02	5.24
08/28/23	4.91	5.14	4.94	4.67	5.03	4.88	4.91	4.97	5.21	5.24	5.18	5.09	5.44	5.23	5.05	5.27
08/29/23	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	5.35	5.25	5.19	5.09	5.46	5.22	5.02	5.33
08/30/23	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	N/A **	5.24	5.31	5.19	5.16	5.34	5.34	5.10	5.35
08/31/23	4.98	5.19	5.01	4.75	5.17	4.89	4.94	5.01	5.28	5.28	5.19	5.14	5.37	5.31	5.09	5.32

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
08/01/23	4.85	4.91	4.11	4.94	5.14	5.21	5.27	5.28	5.08	5.19	5.05	5.02	4.90	4.86	4.96	5.17
08/02/23	5.06	5.00	4.07	4.95	5.15	5.26	5.06	5.36	4.95	5.20	5.02	4.99	4.89	4.72	4.85	5.24
08/03/23	4.85	4.89	4.04	5.01	5.23	5.20	5.12	5.25	5.03	5.11	4.96	4.99	4.80	4.67	4.86	5.21
08/04/23	4.75	4.86	4.21	4.93	5.20	5.19	5.18	5.23	4.99	5.08	5.03	5.00	4.83	4.73	4.90	5.22
08/05/23	4.84	4.98	4.09	4.76	5.18	5.28	5.11	5.27	4.92	5.27	5.01	5.02	4.87	4.66	4.89	5.29
08/06/23	4.78	4.91	4.09	4.90	5.21	5.26	4.97	5.18	5.05	5.21	4.91	5.05	4.84	4.63	4.85	5.24
08/07/23	4.80	4.94	4.27	4.96	5.27	5.23	5.14	5.24	4.95	5.26	5.08	5.00	4.87	4.62	4.88	5.18
08/08/23	4.86	4.92	4.14	4.95	5.27	5.25	5.12	5.25	5.14	5.28	5.04	4.97	4.93	4.66	4.87	5.18
08/09/23	4.77	4.82	4.10	4.97	5.19	5.25	4.98	5.18	5.05	5.19	5.01	4.95	4.79	4.64	4.88	5.14
08/10/23	4.78	4.89	4.18	4.89	5.19	5.31	5.15	5.14	5.01	5.16	5.04	4.93	4.80	4.57	4.93	5.06
08/11/23	4.77	4.91	4.12	5.04	5.27	5.30	5.16	5.28	5.17	5.34	5.01	4.99	4.95	4.71	4.82	5.18
08/12/23	4.80	4.89	4.20	5.00	5.28	5.32	5.16	5.22	5.13	5.26	5.02	5.05	4.87	4.68	4.83	5.22
08/13/23	4.89	4.99	4.30	5.02	5.33	5.30	5.12	5.24	5.00	5.21	5.07	5.13	4.87	4.66	4.85	5.28
08/14/23	4.82	4.93	4.15	4.93	5.43	5.24	5.13	5.31	5.13	5.26	5.01	5.07	4.92	4.67	4.86	5.26
08/15/23	4.84	4.96	4.14	4.98	5.24	5.28	5.13	5.25	4.96	5.22	5.01	4.97	4.92	4.77	4.84	5.20
08/16/23	4.90	4.99	4.25	4.98	5.25	5.30	5.13	5.23	5.01	5.24	4.99	5.00	5.08	4.66	4.84	5.31
08/17/23	4.81	5.02	4.19	5.03	5.29	5.25	5.08	5.20	5.16	5.21	4.96	5.00	4.87	4.64	4.85	5.29
08/18/23	4.80	5.05	4.22	4.97	5.24	5.19	5.10	5.19	5.09	5.10	5.01	4.99	4.83	4.69	4.87	5.30
08/19/23	4.89	4.96	4.10	5.02	5.26	5.27	5.16	5.32	5.11	5.17	5.17	5.12	4.85	4.66	4.89	5.29
08/20/23	4.83	4.94	4.05	5.07	5.28	5.30	5.15	5.23	5.07	5.22	4.92	4.99	4.87	4.69	4.83	5.30
08/21/23	4.83	5.00	4.15	5.02	5.22	5.40	5.09	5.19	5.03	5.26	5.09	4.98	4.90	4.71	4.86	5.32
08/22/23	4.85	4.94	4.18	4.96	5.19	5.32	5.19	5.25	5.03	5.32	5.05	5.09	4.90	4.71	4.89	5.30
08/23/23	4.81	4.94	4.26	5.03	5.25	5.33	5.18	5.23	5.07	5.19	5.04	5.04	4.85	4.66	4.85	5.20
08/24/23	4.91	5.00	4.16	5.03	5.28	5.34	5.09	5.23	5.05	5.20	5.07	5.02	4.83	4.70	4.90	5.29
08/25/23	4.81	4.95	4.14	4.95	5.28	5.31	5.20	5.27	5.01	5.24	5.08	5.02	4.84	4.69	4.88	5.21
08/26/23	4.87	4.96	4.22	4.97	5.29	5.30	5.15	5.24	5.10	5.23	5.03	5.03	4.83	4.61	4.84	5.13
08/27/23	4.97	5.03	4.13	4.98	5.25	5.33	5.08	5.21	5.04	5.18	5.08	5.03	4.83	4.74	4.89	5.25
08/28/23	N/A**	N/A**	4.10	N/A**	N/A**	N/A**	N/A**	N/A**	5.04	5.19	5.04	5.03	4.83	4.70	4.86	5.29
08/29/23	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**
08/30/23	4.90	4.99	4.45	5.35	5.36	5.35	5.41	5.27	5.25	5.19	5.02	5.09	4.95	N/A**	N/A**	N/A**
08/31/23	4.87	5.04	4.43	5.06	5.31	5.32	5.25	5.30	5.18	5.27	5.03	5.08	4.84	4.73	4.84	5.24

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
08/01/23	0.034	0.039	0.026	0.030	0.032	0.033	0.027	0.034	0.040	0.096	0.024	0.030	0.028	0.030	0.043	0.048	0.036	0.050	0.036	0.039	0.036	0.045	0.056	0.066	0.035
08/02/23	0.033	0.036	0.026	0.029	0.032	0.037	0.025	0.028	0.032	0.037	0.023	0.027	0.028	0.029	0.042	0.045	0.030	0.033	0.033	0.033	0.033	0.037	0.052	0.053	0.032
08/03/23	0.034	0.036	0.027	0.030	0.033	0.039	0.026	0.029	0.033	0.035	0.024	0.026	0.029	0.030	0.043	0.047	0.031	0.032	0.032	0.032	0.036	0.040	0.058	0.064	0.034
08/04/23	0.033	0.036	0.027	0.031	0.033	0.035	0.025	0.027	0.032	0.034	0.024	0.027	0.028	0.029	0.042	0.043	0.031	0.036	0.032	0.032	0.039	0.043	0.062	0.065	0.034
08/05/23	0.033	0.037	0.027	0.030	0.033	0.036	0.025	0.027	0.032	0.034	0.024	0.026	0.027	0.032	0.042	0.044	0.032	0.034	0.032	0.032	0.043	0.045	0.068	0.072	0.035
08/06/23	0.034	0.039	0.027	0.031	0.032	0.035	0.025	0.027	0.032	0.037	0.024	0.031	0.028	0.032	0.042	0.043	0.033	0.035	0.035	0.036	0.048	0.056	0.076	0.077	0.036
08/07/23	0.033	0.037	0.026	0.030	0.032	0.034	0.024	0.028	0.032	0.034	0.023	0.026	0.028	0.031	0.038	0.043	0.033	0.039	0.034	0.040	0.055	0.064	0.076	0.093	0.035
08/08/23	0.034	0.048	0.027	0.032	0.032	0.034	0.024	0.028	0.033	0.035	0.025	0.027	0.028	0.030	0.042	0.043	0.039	0.042	0.046	0.080	0.061	0.065	0.098	0.103	0.041
08/09/23	0.036	0.055	0.027	0.034	0.030	0.035	0.023	0.030	0.034	0.036	0.026	0.030	0.029	0.032	0.042	0.044	0.042	0.046	0.049	0.051	0.071	0.079	0.115	0.135	0.044
08/10/23	0.036	0.039	0.026	0.029	0.027	0.029	0.021	0.025	0.033	0.035	0.024	0.026	0.029	0.032	0.042	0.045	0.045	0.050	0.052	0.056	0.076	0.090	0.090	0.123	0.042
08/11/23	0.036	0.041	0.025	0.030	0.027	0.030	0.020	0.022	0.032	0.051	0.023	0.025	0.028	0.032	0.042	0.044	0.045	0.048	0.056	0.056	0.083	0.087	0.049	0.051	0.039
08/12/23	0.037	0.041	0.026	0.032	0.027	0.029	0.020	0.023	0.032	0.034	0.023	0.031	0.030	0.033	0.042	0.043	0.050	0.058	0.058	0.061	0.091	0.098	0.050	0.054	0.041
08/13/23	0.036	0.041	0.026	0.031	0.028	0.031	0.020	0.023	0.032	0.040	0.025	0.028	0.029	0.032	0.044	0.048	0.055	0.060	0.067	0.073	0.102	0.110	0.052	0.060	0.043
08/14/23	0.036	0.039	0.026	0.030	0.028	0.034	0.020	0.023	0.033	0.036	0.028	0.032	0.029	0.031	0.046	0.052	0.062	0.070	0.074	0.075	0.110	0.117	0.054	0.056	0.045
08/15/23	0.036	0.039	0.026	0.030	0.029	0.031	0.021	0.023	0.033	0.036	0.036	0.045	0.029	0.033	0.047	0.050	0.069	0.072	0.081	0.085	0.122	0.130	0.058	0.065	0.049
08/16/23	0.035	0.038	0.027	0.030	0.028	0.032	0.023	0.031	0.033	0.036	0.048	0.053	0.029	0.032	0.046	0.049	0.075	0.079	0.066	0.093	0.088	0.136	0.063	0.065	0.047
08/17/23	0.037	0.041	0.026	0.030	0.028	0.031	0.022	0.027	0.032	0.034	0.050	0.052	0.030	0.032	0.044	0.048	0.065	0.080	0.051	0.090	0.036	0.040	0.059	0.068	0.040
08/18/23	0.037	0.042	0.027	0.032	0.028	0.031	0.023	0.027	0.032	0.034	0.056	0.064	0.029	0.032	0.045	0.047	0.064	0.070	0.032	0.032	0.034	0.039	0.052	0.058	0.038
08/19/23	0.036	0.043	0.027	0.031	0.029	0.032	0.023	0.027	0.032	0.034	0.076	0.107	0.029	0.030	0.045	0.047	0.064	0.068	0.027	0.032	0.034	0.038	0.050	0.051	0.039
08/20/23	0.036	0.039	0.026	0.030	0.029	0.032	0.023	0.026	0.033	0.034	0.085	0.102	0.028	0.030	0.044	0.048	0.065	0.069	0.027	0.029	0.034	0.047	0.051	0.052	0.040
08/21/23	0.035	0.037	0.024	0.028	0.027	0.030	0.021	0.025	0.031	0.033	0.065	0.070	0.027	0.029	0.043	0.045	0.065	0.069	0.029	0.029	0.036	0.047	0.055	0.080	0.038
08/22/23	0.034	0.037	0.024	0.030	0.026	0.029	0.020	0.023	0.030	0.033	0.063	0.066	0.028	0.030	0.042	0.043	0.066	0.067	0.029	0.029	0.033	0.080	0.048	0.049	0.037
08/23/23	0.033	0.036	0.024	0.030	0.027	0.030	0.020	0.024	0.030	0.033	0.099	0.167	0.028	0.030	0.043	0.045	0.067	0.075	0.029	0.029	0.032	0.036	0.048	0.050	0.040
08/24/23	0.034	0.037	0.024	0.027	0.026	0.029	0.022	0.026	0.030	0.033	0.066	0.147	0.027	0.030	0.044	0.050	0.041	0.069	0.030	0.032	0.040	0.047	0.050	0.060	0.036
08/25/23	0.036	0.037	0.025	0.029	0.027	0.030	0.024	0.028	0.032	0.033	0.029	0.032	0.028	0.029	0.045	0.048	0.027	0.029	0.032	0.033	0.046	0.050	0.050	0.052	0.033
08/26/23	0.034	0.037	0.023	0.027	0.026	0.028	0.023	0.029	0.030	0.032	0.028	0.030	0.027	0.029	0.044	0.051	0.026	0.028	0.031	0.032	0.046	0.051	0.052	0.058	0.032
08/27/23	0.033	0.038	0.023	0.026	0.027	0.032	0.022	0.025	0.030	0.033	0.028	0.032	0.026	0.028	0.046	0.052	0.026	0.029	0.031	0.031	0.048	0.051	0.054	0.056	0.033
08/28/23	0.032	0.036	0.022	0.025	0.029	0.031	0.024	0.029	0.032	0.033	0.031	0.038	0.025	0.028	0.044	0.049	0.028	0.029	N/A**	N/A**	0.051	0.052	0.056	0.058	0.030
08/29/23	0.032	0.034	0.021	0.023	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.024	0.026	0.043	0.048	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	N/A**	0.030
08/30/23	0.037	0.063	0.030	0.056	0.060	0.050	0.036	0.087	N/A**	N/A**	N/A**	N/A**	0.030	0.052	0.051	0.058	0.031	0.041	0.049	0.052	0.074	0.136	0.072	0.075	0.049
08/31/23	0.035	0.038	0.030	0.100	0.028	0.031	0.029	0.100	0.030	0.046	0.034	0.184	0.027	0.030	0.043	0.049	0.030	0.050	0.037	0.047	0.047	0.066	0.063	0.070	0.036

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Cell out of service due to low production setpoint.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
Date	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
08/01/23	0.015	0.015	6.887	6.543	7.386	0.054	0.048	0.058	2,470	2,309	2,746	68	60	81	99.22	2.11	97.26	1.56
08/02/23	0.015	0.015	6.746	6.301	7.264	0.054	0.049	0.059	2,546	2,387	2,824	69	61	81	99.20	2.10	97.27	1.56
08/03/23	0.015	0.015	6.833	6.422	7.326	0.055	0.051	0.068	2,547	2,390	2,767	74	67	81	99.19	2.09	97.10	1.54
08/04/23	0.015	0.016	6.700	6.216	7.192	0.052	0.048	0.055	2,515	2,375	2,760	70	61	81	99.22	2.11	97.21	1.55
08/05/23	0.016	0.016	6.582	6.307	7.000	0.053	0.051	0.060	2,496	2,365	2,679	70	64	83	99.19	2.09	97.18	1.55
08/06/23	0.016	0.016	6.702	6.296	7.217	0.051	0.047	0.056	2,337	2,185	2,546	68	61	79	99.24	2.12	97.10	1.54
08/07/23	0.016	0.016	7.375	6.632	8.588	0.047	0.000	0.058	1,919	1,654	2,364	53	41	69	99.36	2.20	97.26	1.56
08/08/23	0.016	0.016	7.939	7.164	8.759	0.057	0.051	0.061	1,724	1,636	2,124	47	42	63	99.28	2.14	97.29	1.57
08/09/23	0.016	0.020	7.904	7.405	8.392	0.059	0.056	0.063	1,722	1,661	1,807	47	43	52	99.25	2.12	97.26	1.56
08/10/23	0.016	0.016	7.657	7.109	8.300	0.056	0.051	0.062	1,714	1,637	1,773	47	42	51	99.26	2.13	97.27	1.56
08/11/23	0.016	0.016	7.541	6.984	8.361	0.057	0.051	0.064	1,643	1,537	1,746	44	39	49	99.25	2.12	97.33	1.57
08/12/23	0.016	0.016	7.653	7.100	8.166	0.059	0.053	0.065	1,605	1,561	1,669	44	40	64	99.23	2.12	97.26	1.56
08/13/23	0.016	0.016	7.640	7.125	8.249	0.054	0.047	0.060	1,528	1,474	1,582	40	35	45	99.29	2.15	97.36	1.58
08/14/23	0.016	0.016	7.750	7.198	8.418	0.060	0.056	0.066	1,521	1,464	1,611	38	33	42	99.22	2.11	97.52	1.61
08/15/23	0.016	0.016	7.843	7.143	8.545	0.064	0.060	0.070	1,580	1,505	1,707	37	32	41	99.19	2.09	97.67	1.63
08/16/23	0.016	0.016	7.781	7.262	8.360	0.065	0.062	0.070	1,632	1,556	1,714	37	33	43	99.16	2.08	97.71	1.64
08/17/23	0.016	0.016	7.670	7.086	8.314	0.066	0.062	0.069	1,610	1,539	1,688	37	33	41	99.15	2.07	97.70	1.64
08/18/23	0.016	0.016	7.889	7.409	8.421	0.060	0.052	0.072	1,609	1,530	1,996	37	33	45	99.24	2.12	97.68	1.63
08/19/23	0.016	0.016	8.017	7.390	8.574	0.053	0.048	0.059	1,566	1,527	1,640	36	32	40	99.34	2.18	97.71	1.64
08/20/23	0.016	0.016	8.102	7.446	8.889	0.049	0.044	0.055	1,502	1,401	1,549	34	31	38	99.40	2.22	97.72	1.64
08/21/23	0.016	0.016	7.940	7.092	8.877	0.046	0.043	0.057	1,396	1,301	1,574	31	26	37	99.42	2.24	97.79	1.66
08/22/23	0.016	0.016	7.909	7.300	8.676	0.054	0.051	0.060	1,593	1,485	1,720	39	34	45	99.32	2.17	97.56	1.61
08/23/23	0.016	0.016	7.809	5.603	8.647	0.057	0.051	0.062	1,667	1,599	1,729	42	36	49	99.27	2.14	97.50	1.60
08/24/23	0.016	0.016	7.721	5.826	8.397	0.057	0.051	0.062	1,665	1,597	1,725	42	38	46	99.26	2.13	97.49	1.60
08/25/23	0.016	0.016	7.634	5.249	8.413	0.048	0.043	0.059	1,608	1,519	1,716	37	32	42	99.37	2.20	97.68	1.63
08/26/23	0.016	0.016	7.660	7.057	8.298	0.051	0.042	0.060	1,560	1,511	1,605	36	31	44	99.34	2.18	97.66	1.63
08/27/23	0.016	0.016	7.678	7.087	8.341	0.052	0.044	0.059	1,515	1,450	1,579	37	33	43	99.32	2.17	97.55	1.61
08/28/23	0.016	0.016	7.850	5.684	8.689	0.068	0.051	0.078	1,513	1,459	1,631	30	25	42	99.14	2.06	98.01	1.70
08/29/23	0.016	0.016	7.919	5.623	8.598	0.076	0.072	0.080	1,590	1,538	1,637	30	26	33	99.04	2.02	98.13	1.73
08/30/23	0.018	0.018	7.919	5.548	9.443	0.135***	0.080	0.265***	2,319****	1,581	9,332****	221****	37	1260****	98.29	1.77	90.49	1.02
08/31/23	0.017	0.018	7.979	5.939	8.934	0.060	0.050	0.080	1,625	1,571	1,685	38	33	49	99.25	2.13	97.65	1.63

Notes:

*** Short term TOC spike following plant restart after a planned outage.

**** Short term spike due to residual sulfuric acid in piping following corrective maintenance of sulfuric acid tank during plant outage.

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	UltraViolet / AOP Process online monitoring results					
Date	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
08/01/23	97.12	116.113	33,428.9	0.29	3	6
08/02/23	97.19	115.334	33,080.0	0.28	3	6
08/03/23	97.17	115.262	32,274.3	0.28	3	6
08/04/23	97.23	115.157	32,048.1	0.28	3	6
08/05/23	97.29	115.261	31,495.1	0.27	3	6
08/06/23	97.44	114.919	31,020.2	0.27	3	6
08/07/23	97.42	108.494	30,056.8	0.27	3	6
08/08/23	98.07	93.864	28,254.7	0.27	3	6
08/09/23	97.99	95.198	25,274.1	0.27	3	6
08/10/23	97.88	100.593	30,601.6	0.32	3	6
08/11/23	97.98	100.521	33,161.8	0.33	3	6
08/12/23	98.05	95.945	33,122.3	0.33	3	6
08/13/23	98.28	94.078	32,073.0	0.34	3	6
08/14/23	98.21	93.482	31,838.7	0.34	3	6
08/15/23	98.22	94.738	32,580.6	0.35	3	6
08/16/23	98.21	98.225	33,203.8	0.35	3	6
08/17/23	98.12	96.271	33,202.4	0.34	3	6
08/18/23	98.19	95.324	33,201.5	0.35	3	6
08/19/23	98.23	99.767	33,202.8	0.34	3	6
08/20/23	98.43	95.330	33,076.2	0.34	3	6
08/21/23	98.14	98.285	33,670.8	0.35	3	6
08/22/23	98.11	105.044	35,160.2	0.34	3	6
08/23/23	97.91	99.805	34,643.6	0.34	3	6
08/24/23	97.62	100.513	34,169.1	0.34	3	6
08/25/23	98.17	100.467	33,497.3	0.33	3	6
08/26/23	97.76	94.489	32,853.4	0.33	3	6
08/27/23	97.61	94.901	32,575.9	0.34	3	6
08/28/23	98.16	26.149	27,417.7	0.36	3	6
08/29/23	97.56	5.180	8,654.7	0.45	3	6
08/30/23	98.02	8.298	2,393.6	0.49	3	6
08/31/23	96.61	95.052	3,725.6	0.38	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

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Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	MFE NTU		ROP NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
09/01/23	12.36	12.36	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/02/23	12.40	12.40	12.18	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/03/23	12.44	12.44	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/04/23	12.35	12.35	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/05/23	12.34	12.34	12.22	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/06/23	12.24	12.24	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/07/23	12.21	12.21	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/08/23	12.27	12.27	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/09/23	12.34	12.34	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/10/23	12.25	12.25	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/11/23	12.26	12.26	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/12/23	12.29	12.29	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/13/23	12.20	12.20	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/14/23	12.20	12.20	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/15/23	12.25	12.25	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/16/23	12.32	12.32	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/17/23	12.34	12.34	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/18/23	12.31	12.31	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/19/23	12.28	12.28	12.13	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/20/23	12.34	12.34	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/21/23	12.18	12.18	12.16	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/22/23	12.21	12.21	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/23/23	12.27	12.27	12.14	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/24/23	12.25	12.25	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/25/23	12.24	12.24	12.17	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/26/23	12.28	12.28	12.12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/27/23	12.24	12.24	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/28/23	12.32	12.32	12.10	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/29/23	12.16	12.16	12.11	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
09/30/23	12.15	12.15	12.15	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
09/01/23	0.00	4.17	2.18	6.00	0.00	12.36
09/02/23	0.00	4.22	2.18	6.00	0.00	12.40
09/03/23	0.00	4.27	2.17	6.00	0.00	12.44
09/04/23	0.00	4.13	2.22	6.00	0.00	12.35
09/05/23	0.00	4.13	2.22	6.00	0.00	12.34
09/06/23	0.00	4.13	2.11	6.00	0.00	12.24
09/07/23	0.00	4.10	2.11	6.00	0.00	12.21
09/08/23	0.00	4.15	2.12	6.00	0.00	12.27
09/09/23	0.00	4.23	2.11	6.00	0.00	12.34
09/10/23	0.00	4.14	2.11	6.00	0.00	12.25
09/11/23	0.00	4.10	2.16	6.00	0.00	12.26
09/12/23	0.00	4.19	2.10	6.00	0.00	12.29
09/13/23	0.00	4.10	2.10	6.00	0.00	12.20
09/14/23	0.00	4.08	2.12	6.00	0.00	12.20
09/15/23	0.00	4.16	2.10	6.00	0.00	12.25
09/16/23	0.00	4.18	2.14	6.00	0.00	12.32
09/17/23	0.00	4.21	2.13	6.00	0.00	12.34
09/18/23	0.00	4.15	2.16	6.00	0.00	12.31
09/19/23	0.00	4.15	2.13	6.00	0.00	12.28
09/20/23	0.00	4.18	2.16	6.00	0.00	12.34
09/21/23	0.00	4.02	2.16	6.00	0.00	12.18
09/22/23	0.00	4.06	2.15	6.00	0.00	12.21
09/23/23	0.00	4.14	2.14	6.00	0.00	12.27
09/24/23	0.00	4.09	2.17	6.00	0.00	12.25
09/25/23	0.00	4.07	2.17	6.00	0.00	12.24
09/26/23	0.00	4.16	2.12	6.00	0.00	12.28
09/27/23	0.00	4.13	2.11	6.00	0.00	12.24
09/28/23	0.00	4.22	2.10	6.00	0.00	12.32
09/29/23	0.00	4.06	2.11	6.00	0.00	12.16
09/30/23	0.00	4.01	2.15	6.00	0.00	12.15

Notes:

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	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
09/01/23	0.00	0.00	2.18	6.00	4.00	12.18
09/02/23	0.00	0.00	2.18	6.00	4.00	12.18
09/03/23	0.00	0.00	2.17	6.00	4.00	12.17
09/04/23	0.00	0.00	2.22	6.00	4.00	12.22
09/05/23	0.00	0.00	2.22	6.00	4.00	12.22
09/06/23	0.00	0.00	2.11	6.00	4.00	12.11
09/07/23	0.00	0.00	2.11	6.00	4.00	12.11
09/08/23	0.00	0.00	2.12	6.00	4.00	12.12
09/09/23	0.00	0.00	2.11	6.00	4.00	12.11
09/10/23	0.00	0.00	2.11	6.00	4.00	12.11
09/11/23	0.00	0.00	2.16	6.00	4.00	12.16
09/12/23	0.00	0.00	2.10	6.00	4.00	12.10
09/13/23	0.00	0.00	2.10	6.00	4.00	12.10
09/14/23	0.00	0.00	2.12	6.00	4.00	12.12
09/15/23	0.00	0.00	2.10	6.00	4.00	12.10
09/16/23	0.00	0.00	2.14	6.00	4.00	12.14
09/17/23	0.00	0.00	2.13	6.00	4.00	12.13
09/18/23	0.00	0.00	2.16	6.00	4.00	12.16
09/19/23	0.00	0.00	2.13	6.00	4.00	12.13
09/20/23	0.00	0.00	2.16	6.00	4.00	12.16
09/21/23	0.00	0.00	2.16	6.00	4.00	12.16
09/22/23	0.00	0.00	2.15	6.00	4.00	12.15
09/23/23	0.00	0.00	2.14	6.00	4.00	12.14
09/24/23	0.00	0.00	2.17	6.00	4.00	12.17
09/25/23	0.00	0.00	2.17	6.00	4.00	12.17
09/26/23	0.00	0.00	2.12	6.00	4.00	12.12
09/27/23	0.00	0.00	2.11	6.00	4.00	12.11
09/28/23	0.00	0.00	2.10	6.00	4.00	12.10
09/29/23	0.00	0.00	2.11	6.00	4.00	12.11
09/30/23	0.00	0.00	2.15	6.00	4.00	12.15

Notes:

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	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	A02	A03	A04	A05	A06	A07	A08	B01	B02	B03	B04	B05	B06	B07	B08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/23	5.11	5.14	5.31	5.28	5.16	5.24	5.17	5.12	5.18	5.22	4.73	4.94	5.29	5.11	5.08	4.82
09/02/23	5.12	5.13	5.29	5.16	5.13	5.23	5.17	5.09	5.19	5.29	4.76	4.92	5.23	5.09	5.09	4.86
09/03/23	5.10	5.29	5.39	5.17	5.14	5.20	5.16	5.10	5.25	5.38	4.76	4.91	5.27	5.10	5.07	4.85
09/04/23	5.11	5.23	5.31	5.16	5.14	5.22	5.15	5.10	5.22	5.38	4.72	4.91	5.25	5.11	5.07	4.81
09/05/23	5.11	5.21	5.31	5.14	5.17	5.27	5.17	5.17	5.20	5.35	4.72	4.90	5.29	5.10	5.06	4.78
09/06/23	5.01	5.18	5.28	5.19	5.12	5.26	5.13	5.09	5.20	5.41	4.72	4.89	5.31	5.10	5.08	4.79
09/07/23	5.06	5.18	5.25	5.11	5.10	5.36	5.12	5.09	5.20	5.33	4.70	4.93	5.05	5.07	5.06	4.80
09/08/23	5.01	5.17	5.33	5.13	5.13	5.19	5.11	5.07	5.22	5.29	4.77	4.93	5.13	5.05	5.03	4.79
09/09/23	5.12	5.22	5.38	5.13	5.11	5.28	5.13	5.06	5.22	5.30	4.76	4.94	5.26	5.04	5.05	4.79
09/10/23	5.13	5.24	5.33	5.17	5.12	5.32	5.12	5.19	5.20	5.31	4.71	4.91	5.31	5.06	5.06	4.79
09/11/23	5.16	5.21	5.37	5.14	5.05	5.27	5.11	5.12	5.23	5.32	4.71	4.90	4.95	5.09	5.03	4.79
09/12/23	5.09	5.18	5.34	5.13	5.10	5.33	5.16	5.13	5.21	5.36	N/A *	4.90	5.13	5.07	5.02	4.77
09/13/23	5.17	5.20	5.35	5.15	5.11	5.27	5.10	5.10	5.19	5.31	5.00	4.92	5.02	5.03	5.05	4.77
09/14/23	5.10	5.17	5.32	5.15	5.05	5.14	5.10	5.10	5.20	5.35	4.97	4.89	5.17	5.10	5.04	4.76
09/15/23	5.10	5.19	5.30	5.16	5.10	5.26	5.18	5.09	5.16	5.37	4.98	4.90	4.96	5.12	5.01	4.79
09/16/23	5.09	5.20	5.31	5.11	5.10	5.26	5.16	5.12	5.27	5.35	4.95	4.91	5.13	5.10	5.00	4.92
09/17/23	5.06	5.16	5.28	5.11	5.09	5.18	5.19	5.14	5.31	5.33	4.94	4.89	5.26	5.12	5.03	4.89
09/18/23	5.07	5.15	5.32	5.16	5.08	5.21	5.15	5.17	5.24	5.35	4.95	4.86	5.27	5.11	5.02	4.84
09/19/23	5.08	5.21	5.31	5.16	5.08	5.18	5.19	5.09	5.26	5.30	4.94	4.87	4.97	5.06	5.03	4.91
09/20/23	5.06	5.16	5.31	5.19	5.16	5.22	5.18	5.07	5.28	5.31	4.94	4.86	4.72	5.06	5.01	5.09
09/21/23	5.10	5.18	5.35	5.18	5.16	5.20	5.17	5.16	5.26	5.32	4.96	4.88	4.79	5.08	5.05	5.13
09/22/23	5.04	5.18	5.33	5.17	5.18	5.21	5.16	5.08	5.26	5.36	4.97	4.89	5.10	5.06	5.03	5.12
09/23/23	5.06	5.22	5.33	5.16	5.12	5.22	5.14	5.11	5.24	5.30	4.98	4.88	5.36	5.04	5.01	5.13
09/24/23	5.08	5.11	5.28	5.08	5.15	5.18	5.14	5.14	5.29	5.33	4.97	4.98	5.33	5.03	5.00	5.14
09/25/23	5.04	5.16	5.28	5.09	5.16	5.20	5.15	5.09	5.33	5.32	4.97	4.95	5.30	5.03	5.02	5.11
09/26/23	5.03	5.17	5.32	5.05	5.17	5.26	5.10	5.06	5.25	5.38	5.01	4.94	5.31	5.04	5.12	5.10
09/27/23	5.07	5.12	5.28	5.09	5.14	5.22	5.11	5.06	5.21	5.53	4.98	4.91	5.17	5.02	5.10	5.08
09/28/23	5.03	5.35	5.29	5.13	5.13	5.20	5.10	5.08	5.24	5.49	4.95	4.86	5.29	5.00	5.07	5.06
09/29/23	5.04	5.21	5.32	5.08	5.11	5.21	5.14	5.11	5.24	5.45	4.94	4.90	5.56	5.01	5.08	5.07
09/30/23	5.03	N/A *	5.30	5.02	5.13	5.17	5.18	5.12	5.22	5.38	4.94	4.92	4.99	4.97	5.09	5.06

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/23	4.98	5.20	4.98	4.77	5.20	4.88	4.92	4.99	5.31	5.26	5.18	5.09	5.43	5.25	5.06	5.26
09/02/23	4.95	5.20	4.99	4.75	5.19	4.90	4.92	4.99	5.29	5.27	5.15	5.10	5.41	5.22	5.07	5.27
09/03/23	4.95	5.18	4.98	4.74	5.20	4.92	4.94	4.99	5.30	5.29	5.15	5.09	5.41	5.20	5.07	5.27
09/04/23	4.95	5.18	4.95	4.73	5.23	4.88	4.91	4.99	5.32	5.28	5.17	5.09	5.44	5.21	5.05	5.27
09/05/23	4.95	5.15	4.95	4.69	5.16	4.86	4.90	4.99	5.26	5.25	5.17	5.11	5.43	5.21	5.06	5.26
09/06/23	4.91	5.12	4.97	4.75	5.14	4.87	4.90	5.00	5.24	5.21	5.18	5.12	5.36	5.16	5.06	5.29
09/07/23	4.88	5.10	4.94	4.80	5.21	4.85	4.90	5.06	5.18	5.17	5.22	5.15	5.31	5.14	5.02	5.28
09/08/23	4.88	5.12	4.92	4.77	5.21	4.84	4.92	5.07	5.20	5.20	5.22	5.15	5.36	5.19	5.00	5.26
09/09/23	4.90	5.16	4.96	4.79	5.20	4.85	4.91	5.03	5.36	5.23	5.19	5.08	5.41	5.21	5.04	5.26
09/10/23	4.93	5.13	4.95	4.81	5.19	4.85	4.91	5.03	5.39	5.20	5.14	5.03	5.41	5.24	5.04	5.25
09/11/23	4.92	5.12	4.92	4.82	5.15	4.85	4.91	5.03	5.31	5.20	5.14	5.03	5.38	5.27	5.00	5.28
09/12/23	4.90	5.10	4.94	4.79	5.14	4.86	4.91	5.02	5.30	5.21	5.16	4.98	5.40	5.26	4.99	5.31
09/13/23	4.90	5.11	4.97	4.78	5.10	4.85	4.87	5.03	5.32	5.20	5.17	4.95	5.38	5.21	5.00	5.30
09/14/23	4.97	5.08	5.04	4.79	5.22	4.82	4.86	5.01	5.26	5.19	5.13	4.94	5.34	5.20	4.98	5.28
09/15/23	5.03	5.08	5.05	4.77	5.26	4.83	4.89	5.01	5.26	5.16	5.15	4.91	5.39	5.24	5.00	5.32
09/16/23	5.00	5.10	5.02	4.79	5.21	4.83	4.86	5.02	5.22	5.16	5.14	4.88	5.37	5.24	5.04	5.30
09/17/23	4.97	5.09	5.04	4.79	5.32	4.80	4.86	5.01	5.20	5.20	5.16	4.89	5.34	5.21	5.02	5.26
09/18/23	4.97	5.11	5.08	4.76	5.31	4.80	4.94	5.01	5.21	5.19	5.14	4.87	5.34	5.18	5.00	5.29
09/19/23	5.02	5.11	5.04	4.76	5.21	4.81	4.97	4.99	5.18	5.24	5.09	4.88	5.30	5.19	5.01	5.29
09/20/23	5.01	5.11	5.02	4.76	5.20	4.81	4.96	4.96	5.22	5.29	5.13	4.87	5.31	5.18	5.03	5.26
09/21/23	4.98	5.09	5.00	4.77	5.25	4.81	4.97	4.96	5.25	5.26	5.14	4.85	5.39	5.19	5.01	5.30
09/22/23	4.96	5.14	5.03	4.77	5.27	4.80	4.96	4.96	5.23	5.29	5.11	4.82	5.43	5.22	4.98	5.25
09/23/23	4.98	5.18	5.07	4.77	5.24	4.84	4.94	4.95	5.17	5.33	5.15	4.80	5.40	5.19	4.99	5.25
09/24/23	4.99	5.19	5.03	4.77	5.21	4.88	4.96	4.97	5.17	5.30	5.13	4.79	5.41	5.19	5.01	5.24
09/25/23	4.99	5.20	5.04	4.77	5.18	4.91	4.97	5.00	5.19	5.27	5.15	4.79	5.37	5.19	5.05	5.24
09/26/23	4.98	5.18	5.05	4.75	5.19	4.90	4.95	4.99	5.22	5.29	5.14	4.79	5.37	5.19	5.02	5.31
09/27/23	4.95	5.16	4.99	4.75	5.19	4.87	4.91	4.97	5.18	5.25	5.11	4.76	5.38	5.13	5.02	5.28
09/28/23	4.95	5.12	4.99	4.74	5.19	4.86	4.92	4.95	5.18	5.24	5.11	4.76	5.34	5.16	5.03	5.25
09/29/23	4.93	5.11	4.99	4.72	5.16	4.85	4.93	4.95	5.15	5.23	5.14	4.77	5.38	5.15	5.05	5.20
09/30/23	4.92	5.11	4.98	4.74	5.12	4.84	4.92	4.94	5.13	5.23	5.14	4.75	5.39	5.14	5.03	5.21

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
09/01/23	4.82	5.07	4.17	5.06	5.30	5.29	5.21	5.32	5.06	5.23	5.09	5.05	4.81	4.73	4.90	5.20
09/02/23	4.86	4.94	4.22	4.90	5.28	5.27	5.26	5.34	5.02	5.23	5.00	5.04	4.79	4.74	4.91	5.33
09/03/23	4.80	4.98	4.27	4.89	5.27	5.25	5.17	5.27	5.16	5.21	5.05	5.03	4.78	4.70	4.81	5.32
09/04/23	4.75	4.99	4.13	4.85	5.20	5.31	5.09	5.27	5.08	5.23	5.02	5.01	5.05	4.69	4.82	5.18
09/05/23	4.77	4.99	4.13	4.86	5.16	5.28	5.08	5.28	5.03	5.18	5.00	5.01	4.84	4.70	4.86	5.27
09/06/23	4.80	4.96	4.13	4.87	5.19	5.18	5.10	5.17	5.03	5.12	4.99	5.03	4.76	4.62	4.84	5.16
09/07/23	4.89	4.98	4.10	4.82	5.22	5.14	5.00	5.12	5.01	5.13	5.02	5.03	5.05	4.61	4.72	5.17
09/08/23	4.81	5.11	4.15	5.03	5.22	5.28	5.02	5.23	5.02	5.15	4.93	5.05	4.77	4.67	4.88	5.21
09/09/23	4.72	5.19	4.23	4.97	5.22	5.31	5.05	5.24	5.05	5.14	4.94	5.09	4.78	4.63	4.82	5.29
09/10/23	4.75	5.08	4.14	4.98	5.21	5.35	5.04	5.27	5.01	5.21	4.98	5.10	4.84	4.62	4.83	5.29
09/11/23	4.80	5.08	4.10	5.10	5.20	5.35	5.05	5.17	5.03	5.26	4.99	4.99	4.86	4.66	4.84	5.23
09/12/23	4.98	5.11	4.19	5.00	5.26	5.31	5.08	5.26	5.04	5.17	5.06	5.01	4.92	4.63	4.89	5.28
09/13/23	4.82	5.01	4.10	5.00	5.24	5.31	5.10	5.28	5.05	5.20	5.05	5.04	4.90	4.67	4.90	5.34
09/14/23	4.78	4.99	4.08	5.01	5.20	5.27	5.10	5.20	5.05	5.22	5.04	5.01	4.85	4.67	4.84	5.19
09/15/23	4.82	5.03	4.16	4.83	5.16	5.27	5.06	5.16	5.04	5.18	5.09	5.01	4.80	4.60	4.84	5.13
09/16/23	4.77	4.85	4.18	4.92	5.24	5.25	5.11	5.20	5.00	5.24	5.09	5.03	4.79	4.60	4.77	5.23
09/17/23	4.78	4.94	4.21	4.95	5.26	5.23	5.22	5.19	5.05	5.19	4.97	5.02	4.83	4.63	4.75	5.22
09/18/23	4.84	4.97	4.15	4.96	5.24	5.25	5.16	5.23	5.00	5.25	4.97	5.06	4.82	4.63	4.78	5.24
09/19/23	4.78	4.97	4.15	4.93	5.21	5.26	5.06	5.27	4.95	5.31	4.99	5.03	4.87	4.59	4.89	5.28
09/20/23	4.82	5.08	4.18	5.00	5.22	5.35	5.10	5.27	4.98	5.22	5.06	4.98	4.88	4.66	4.84	5.23
09/21/23	4.84	5.06	4.02	4.94	5.23	5.38	5.10	5.28	5.02	5.25	5.02	5.07	4.81	4.68	4.85	5.25
09/22/23	4.86	5.13	4.06	4.86	5.27	5.29	5.08	5.21	5.05	5.27	5.01	5.03	4.83	4.71	4.82	5.27
09/23/23	4.88	5.27	4.14	4.83	5.29	5.22	5.10	5.17	5.16	5.25	4.99	4.97	4.85	4.59	4.81	5.23
09/24/23	4.80	5.13	4.09	4.88	5.28	5.28	5.06	5.28	4.98	5.25	5.00	5.06	4.87	4.64	4.85	5.35
09/25/23	4.80	5.10	4.07	4.84	5.28	5.23	5.05	5.20	5.00	5.23	5.06	4.98	4.84	4.69	4.88	5.25
09/26/23	4.89	5.15	4.16	4.78	5.28	5.24	5.10	5.20	5.08	5.18	4.95	5.07	4.85	4.63	4.78	5.27
09/27/23	4.79	5.07	4.13	4.83	5.28	5.27	5.11	5.21	4.97	5.18	4.98	5.05	4.88	4.65	4.82	5.27
09/28/23	4.78	5.04	4.22	4.87	5.26	5.22	5.13	5.19	5.09	5.18	5.06	4.98	4.85	4.66	4.82	5.24
09/29/23	4.80	5.01	4.06	4.90	5.26	5.19	5.06	5.14	5.05	5.15	4.86	5.00	4.88	4.67	4.77	5.23
09/30/23	4.72	5.00	4.01	4.91	5.23	5.22	5.06	5.18	4.99	5.19	5.08	5.03	4.90	4.62	4.80	5.20

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
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MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
09/01/23	0.037	0.040	0.023	0.027	0.027	0.031	0.022	0.025	0.027	0.031	0.023	0.025	0.027	0.028	0.041	0.047	0.025	0.026	0.029	0.031	0.032	0.038	0.060	0.065	0.031
09/02/23	0.041	0.048	0.024	0.027	0.029	0.036	0.022	0.024	0.027	0.028	0.024	0.027	0.027	0.028	0.041	0.043	0.025	0.027	0.029	0.030	0.031	0.045	0.059	0.060	0.031
09/03/23	0.040	0.047	0.023	0.029	0.028	0.033	0.022	0.025	0.027	0.028	0.024	0.027	0.029	0.040	0.040	0.042	0.026	0.028	0.032	0.034	0.031	0.039	0.060	0.067	0.032
09/04/23	0.038	0.042	0.024	0.029	0.028	0.031	0.022	0.027	0.028	0.032	0.024	0.028	0.031	0.036	0.041	0.044	0.026	0.028	0.031	0.032	0.031	0.047	0.061	0.064	0.032
09/05/23	0.036	0.040	0.023	0.030	0.027	0.030	0.022	0.025	0.028	0.033	0.024	0.027	0.030	0.035	0.040	0.047	0.026	0.028	0.036	0.042	0.030	0.035	0.062	0.064	0.032
09/06/23	0.035	0.038	0.024	0.028	0.028	0.031	0.023	0.027	0.030	0.032	0.027	0.033	0.036	0.049	0.039	0.042	0.026	0.031	0.033	0.040	0.028	0.032	0.057	0.064	0.032
09/07/23	0.036	0.043	0.025	0.030	0.027	0.029	0.022	0.025	0.028	0.031	0.026	0.030	0.034	0.040	0.037	0.039	0.026	0.028	0.032	0.032	0.028	0.085	0.057	0.061	0.031
09/08/23	0.038	0.044	0.025	0.034	0.026	0.029	0.021	0.025	0.028	0.031	0.025	0.032	0.031	0.036	0.036	0.039	0.026	0.029	0.034	0.039	0.027	0.031	0.056	0.057	0.031
09/09/23	0.037	0.045	0.024	0.029	0.027	0.028	0.021	0.023	0.027	0.029	0.025	0.028	0.033	0.042	0.036	0.039	0.026	0.028	0.033	0.033	0.028	0.048	0.056	0.057	0.031
09/10/23	0.036	0.065	0.025	0.029	0.026	0.030	0.020	0.030	0.027	0.030	0.024	0.028	0.032	0.037	0.039	0.046	0.025	0.027	0.033	0.037	0.028	0.034	0.058	0.061	0.031
09/11/23	0.035	0.039	0.025	0.031	0.026	0.029	0.021	0.024	0.028	0.030	0.025	0.028	0.032	0.036	0.043	0.049	0.026	0.030	0.033	0.033	0.029	0.032	0.057	0.059	0.032
09/12/23	0.034	0.041	0.024	0.032	0.026	0.033	0.021	0.024	0.027	0.034	0.025	0.033	0.031	0.034	0.041	0.046	0.025	0.028	0.035	0.041	0.030	0.032	0.059	0.060	0.031
09/13/23	0.035	0.048	0.024	0.031	0.027	0.031	0.021	0.032	0.028	0.037	0.024	0.032	0.031	0.034	0.040	0.043	0.027	0.030	0.034	0.040	0.027	0.035	0.053	0.061	0.031
09/14/23	0.037	0.046	0.026	0.034	0.027	0.032	0.022	0.031	0.028	0.035	0.024	0.029	0.030	0.033	0.038	0.052	0.028	0.031	0.029	0.030	0.023	0.025	0.047	0.048	0.030
09/15/23	0.035	0.050	0.027	0.034	0.028	0.037	0.021	0.026	0.027	0.031	0.024	0.029	0.029	0.033	0.038	0.042	0.028	0.030	0.028	0.028	0.024	0.027	0.048	0.050	0.030
09/16/23	0.034	0.051	0.025	0.030	0.029	0.033	0.023	0.030	0.027	0.029	0.023	0.026	0.029	0.038	0.037	0.040	0.029	0.035	0.030	0.031	0.024	0.028	0.048	0.049	0.030
09/17/23	0.033	0.037	0.024	0.029	0.027	0.031	0.021	0.028	0.025	0.029	0.022	0.028	0.028	0.030	0.036	0.040	0.029	0.032	0.030	0.035	0.023	0.031	0.049	0.050	0.029
09/18/23	0.035	0.043	0.025	0.031	0.027	0.032	0.021	0.026	0.030	0.034	0.023	0.028	0.027	0.034	0.036	0.040	0.027	0.030	0.027	0.030	0.022	0.026	0.049	0.052	0.029
09/19/23	0.035	0.039	0.026	0.032	0.027	0.031	0.020	0.025	0.031	0.034	0.023	0.032	0.027	0.037	0.035	0.039	0.024	0.029	0.022	0.023	0.019	0.023	0.048	0.051	0.028
09/20/23	0.035	0.038	0.026	0.031	0.027	0.029	0.020	0.024	0.032	0.034	0.022	0.030	0.026	0.029	0.035	0.037	0.024	0.026	0.022	0.022	0.019	0.023	0.048	0.050	0.028
09/21/23	0.035	0.039	0.025	0.029	0.027	0.031	0.020	0.023	0.033	0.040	0.023	0.091	0.027	0.029	0.038	0.042	0.024	0.026	0.022	0.022	0.020	0.025	0.049	0.054	0.029
09/22/23	0.034	0.037	0.024	0.028	0.027	0.028	0.020	0.027	0.033	0.038	0.023	0.029	0.026	0.030	0.037	0.041	0.024	0.029	0.022	0.022	0.020	0.022	0.049	0.050	0.028
09/23/23	0.034	0.037	0.024	0.028	0.026	0.028	0.021	0.031	0.032	0.035	0.023	0.027	0.025	0.030	0.037	0.047	0.023	0.025	0.022	0.022	0.020	0.021	0.049	0.053	0.028
09/24/23	0.033	0.037	0.024	0.026	0.027	0.032	0.019	0.024	0.032	0.036	0.022	0.044	0.025	0.029	0.039	0.044	0.024	0.027	0.022	0.022	0.020	0.025	0.050	0.052	0.028
09/25/23	0.033	0.037	0.023	0.026	0.027	0.030	0.019	0.025	0.031	0.034	0.022	0.026	0.025	0.027	0.038	0.044	0.024	0.026	0.022	0.022	0.021	0.025	0.050	0.053	0.028
09/26/23	0.034	0.037	0.023	0.026	0.027	0.030	0.022	0.027	0.031	0.035	0.022	0.025	0.025	0.027	0.038	0.044	0.024	0.028	0.022	0.022	0.021	0.025	0.051	0.053	0.028
09/27/23	0.035	0.051	0.023	0.027	0.029	0.032	0.021	0.025	0.031	0.034	0.022	0.025	0.026	0.029	0.038	0.040	0.024	0.025	0.024	0.030	0.022	0.029	0.056	0.061	0.029
09/28/23	0.036	0.047	0.024	0.026	0.028	0.032	0.020	0.024	0.032	0.034	0.022	0.029	0.027	0.031	0.037	0.040	0.024	0.027	0.026	0.026	0.023	0.026	0.060	0.060	0.030
09/29/23	0.035	0.048	0.023	0.025	0.027	0.030	0.020	0.023	0.031	0.033	0.022	0.025	0.027	0.028	0.036	0.040	0.024	0.026	0.026	0.026	0.023	0.028	0.061	0.064	0.030
09/30/23	0.034	0.045	0.024	0.030	0.028	0.030	0.020	0.023	0.032	0.039	0.023	0.036	0.027	0.028	0.037	0.039	0.025	0.033	0.026	0.026	0.026	0.028	0.062	0.063	0.030

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
09/01/23	0.016	0.016	7.902	5.591	8.597	0.052	0.045	0.060	1,630	1,555	1,698	31	28	40	99.35	2.18	98.10	1.72
09/02/23	0.016	0.017	7.920	7.439	8.508	0.052	0.048	0.057	1,602	1,552	1,666	35	30	41	99.34	2.18	97.83	1.66
09/03/23	0.016	0.016	7.727	5.606	8.535	0.053	0.049	0.066	1,539	1,491	1,603	37	33	44	99.32	2.17	97.57	1.61
09/04/23	0.016	0.016	8.043	7.402	8.808	0.049	0.044	0.054	1,545	1,490	1,653	35	28	42	99.39	2.22	97.75	1.65
09/05/23	0.016	0.017	8.171	7.664	8.893	0.050	0.045	0.059	1,539	1,457	1,657	32	27	40	99.39	2.22	97.90	1.68
09/06/23	0.016	0.016	8.080	7.520	8.910	0.063	0.056	0.067	1,613	1,548	1,696	37	31	43	99.23	2.11	97.72	1.64
09/07/23	0.016	0.016	7.818	7.340	8.484	0.061	0.055	0.072	1,635	1,568	1,704	38	33	43	99.22	2.11	97.69	1.64
09/08/23	0.017	0.018	7.679	7.125	8.531	0.058	0.051	0.064	1,641	1,568	1,730	36	32	39	99.24	2.12	97.83	1.66
09/09/23	0.020	0.022	7.488	7.063	8.186	0.058	0.050	0.072	1,630	1,596	1,700	34	30	40	99.23	2.11	97.90	1.68
09/10/23	0.017	0.017	7.344	6.903	8.079	0.057	0.049	0.067	1,586	1,548	1,648	35	32	41	99.23	2.11	97.76	1.65
09/11/23	0.016	0.017	7.525	7.063	8.112	0.052	0.047	0.058	1,546	1,468	1,657	34	29	40	99.31	2.16	97.79	1.66
09/12/23	0.016	0.016	7.644	7.190	8.308	0.061	0.056	0.072	1,608	1,537	1,710	35	29	44	99.21	2.10	97.82	1.66
09/13/23	0.016	0.016	7.432	6.910	8.061	0.058	0.051	0.067	1,629	1,550	1,706	37	31	41	99.21	2.10	97.75	1.65
09/14/23	0.016	0.016	7.429	6.999	8.175	0.057	0.053	0.060	1,655	1,589	1,723	37	32	44	99.23	2.12	97.78	1.65
09/15/23	0.016	0.018	7.286	6.751	7.864	0.059	0.051	0.067	1,633	1,550	1,709	35	29	40	99.20	2.10	97.88	1.67
09/16/23	0.016	0.016	7.272	6.773	7.793	0.052	0.045	0.060	1,621	1,578	1,674	31	28	34	99.28	2.14	98.11	1.72
09/17/23	0.016	0.016	7.173	6.610	7.818	0.053	0.043	0.066	1,584	1,543	1,624	31	27	37	99.27	2.13	98.03	1.71
09/18/23	0.016	0.016	7.291	6.816	7.881	0.051	0.047	0.058	1,561	1,486	1,679	31	28	36	99.31	2.16	97.99	1.70
09/19/23	0.016	0.016	7.573	6.928	8.438	0.057	0.051	0.067	1,606	1,535	1,698	32	28	37	99.25	2.13	97.99	1.70
09/20/23	0.016	0.016	7.733	7.159	8.473	0.054	0.047	0.063	1,623	1,551	1,716	33	29	38	99.30	2.16	97.96	1.69
09/21/23	0.016	0.016	7.643	7.017	8.223	0.053	0.020	0.091	1,630	1,592	1,683	36	29	42	99.30	2.16	97.82	1.66
09/22/23	0.016	0.016	7.561	6.964	8.253	0.054	0.043	0.065	1,646	1,612	1,686	35	30	40	99.29	2.15	97.89	1.68
09/23/23	0.016	0.016	7.494	6.920	8.078	0.055	0.047	0.062	1,609	1,571	1,654	36	32	41	99.27	2.14	97.76	1.65
09/24/23	0.016	0.016	7.360	6.801	7.995	0.050	0.041	0.060	1,546	1,486	1,591	32	29	37	99.32	2.17	97.90	1.68
09/25/23	0.016	0.016	7.494	6.882	8.335	0.051	0.045	0.081	1,544	1,469	1,655	34	28	42	99.32	2.17	97.77	1.65
09/26/23	0.016	0.016	7.568	6.728	8.417	0.057	0.052	0.065	1,593	1,524	1,676	38	32	45	99.25	2.12	97.62	1.62
09/27/23	0.016	0.016	7.236	6.452	8.041	0.056	0.049	0.064	1,630	1,560	1,715	40	35	47	99.22	2.11	97.54	1.61
09/28/23	0.016	0.016	7.156	6.661	7.711	0.056	0.051	0.062	1,643	1,599	1,686	41	37	45	99.21	2.10	97.53	1.61
09/29/23	0.015	0.018	7.093	6.574	7.721	0.056	0.047	0.062	1,636	1,579	1,705	40	34	45	99.22	2.11	97.54	1.61
09/30/23	0.015	0.015	7.143	6.664	7.580	0.051	0.046	0.056	1,632	1,593	1,684	38	35	43	99.29	2.15	97.65	1.63

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
09/01/23	96.81	96.354	32,983.1	0.35	3	6
09/02/23	97.01	95.355	33,230.1	0.34	3	6
09/03/23	97.11	94.417	32,726.6	0.35	3	6
09/04/23	97.08	91.573	32,732.4	0.35	3	6
09/05/23	97.13	95.168	31,890.6	0.35	3	6
09/06/23	96.96	96.797	33,289.6	0.35	3	6
09/07/23	96.88	95.138	33,299.6	0.34	3	6
09/08/23	97.03	95.209	33,265.1	0.35	3	6
09/09/23	97.14	92.613	33,269.4	0.35	3	6
09/10/23	97.25	95.036	32,044.3	0.35	3	6
09/11/23	97.29	95.247	33,248.8	0.35	3	6
09/12/23	97.03	90.696	33,246.2	0.35	3	6
09/13/23	96.97	97.843	31,552.8	0.35	3	6
09/14/23	96.81	97.447	34,321.5	0.34	3	6
09/15/23	96.90	91.557	31,745.1	0.33	3	6
09/16/23	97.18	95.460	29,744.2	0.34	3	6
09/17/23	97.44	94.875	33,121.5	0.35	3	6
09/18/23	97.38	95.279	32,991.9	0.35	3	6
09/19/23	97.30	95.311	33,185.0	0.35	3	6
09/20/23	97.26	95.913	34,259.6	0.35	3	6
09/21/23	97.01	95.217	32,516.1	0.35	3	6
09/22/23	97.13	96.299	33,035.6	0.35	3	6
09/23/23	97.25	96.846	33,240.9	0.34	3	6
09/24/23	97.61	96.824	33,231.2	0.34	3	6
09/25/23	97.66	95.289	33,218.0	0.34	3	6
09/26/23	97.69	96.834	33,290.1	0.35	3	6
09/27/23	97.93	100.206	33,280.5	0.34	3	6
09/28/23	97.36	100.354	33,245.0	0.33	3	6
09/29/23	97.40	100.267	33,268.6	0.33	3	6
09/30/23	97.27	95.479	33,265.1	0.33	3	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
10/01/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/02/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/03/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/04/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/05/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/06/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/07/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/08/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/09/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/10/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/11/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/12/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/13/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/14/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/15/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/16/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/17/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/18/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/19/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/20/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/21/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/22/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/23/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/24/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/25/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/26/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/27/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/28/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/29/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/30/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
10/31/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
10/01/23	0.00	4.10	2.16	6.00	0.00	12.25
10/02/23	0.00	4.06	2.16	6.00	0.00	12.22
10/03/23	0.00	4.01	2.14	6.00	0.00	12.14
10/04/23	0.00	4.16	2.12	6.00	0.00	12.27
10/05/23	0.00	4.04	2.11	6.00	0.00	12.15
10/06/23	0.00	4.02	2.10	6.00	0.00	12.12
10/07/23	0.00	4.10	2.14	6.00	0.00	12.24
10/08/23	0.00	4.07	2.18	6.00	0.00	12.25
10/09/23	0.00	4.06	2.19	6.00	0.00	12.25
10/10/23	0.00	4.12	2.15	6.00	0.00	12.27
10/11/23	0.00	4.04	2.14	6.00	0.00	12.18
10/12/23	0.00	4.02	2.13	6.00	0.00	12.16
10/13/23	0.00	4.05	2.15	6.00	0.00	12.20
10/14/23	0.00	4.06	2.14	6.00	0.00	12.19
10/15/23	0.00	4.11	2.17	6.00	0.00	12.27
10/16/23	0.00	4.03	2.17	6.00	0.00	12.20
10/17/23	0.00	4.11	2.05	6.00	0.00	12.15
10/18/23	0.00	4.03	2.12	6.00	0.00	12.14
10/19/23	0.00	4.06	2.10	6.00	0.00	12.17
10/20/23	0.00	4.19	2.12	6.00	0.00	12.31
10/21/23	0.00	4.04	2.13	6.00	0.00	12.18
10/22/23	0.00	4.12	2.18	6.00	0.00	12.29
10/23/23	0.00	4.05	2.17	6.00	0.00	12.22
10/24/23	0.00	4.11	2.18	6.00	0.00	12.29
10/25/23	0.00	4.03	2.12	6.00	0.00	12.15
10/26/23	0.00	4.15	2.03	6.00	0.00	12.18
10/27/23	0.00	4.15	1.99	6.00	0.00	12.14
10/28/23	0.00	4.44	2.02	6.00	0.00	12.46
10/29/23	0.00	4.29	2.07	6.00	0.00	12.36
10/30/23	0.00	4.44	2.07	6.00	0.00	12.51
10/31/23	0.00	4.25	1.99	6.00	0.00	12.24

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
10/01/23	0.00	0.00	2.16	6.00	4	12.16
10/02/23	0.00	0.00	2.16	6.00	4	12.16
10/03/23	0.00	0.00	2.14	6.00	4	12.14
10/04/23	0.00	0.00	2.12	6.00	4	12.12
10/05/23	0.00	0.00	2.11	6.00	4	12.11
10/06/23	0.00	0.00	2.10	6.00	4	12.10
10/07/23	0.00	0.00	2.14	6.00	4	12.14
10/08/23	0.00	0.00	2.18	6.00	4	12.18
10/09/23	0.00	0.00	2.19	6.00	4	12.19
10/10/23	0.00	0.00	2.15	6.00	4	12.15
10/11/23	0.00	0.00	2.14	6.00	4	12.14
10/12/23	0.00	0.00	2.13	6.00	4	12.13
10/13/23	0.00	0.00	2.15	6.00	4	12.15
10/14/23	0.00	0.00	2.14	6.00	4	12.14
10/15/23	0.00	0.00	2.17	6.00	4	12.17
10/16/23	0.00	0.00	2.17	6.00	4	12.17
10/17/23	0.00	0.00	2.05	6.00	4	12.05
10/18/23	0.00	0.00	2.12	6.00	4	12.12
10/19/23	0.00	0.00	2.10	6.00	4	12.10
10/20/23	0.00	0.00	2.12	6.00	4	12.12
10/21/23	0.00	0.00	2.13	6.00	4	12.13
10/22/23	0.00	0.00	2.18	6.00	4	12.18
10/23/23	0.00	0.00	2.17	6.00	4	12.17
10/24/23	0.00	0.00	2.18	6.00	4	12.18
10/25/23	0.00	0.00	2.12	6.00	4	12.12
10/26/23	0.00	0.00	2.03	6.00	4	12.03
10/27/23	0.00	0.00	1.99	6.00	4	11.99
10/28/23	0.00	0.00	2.02	6.00	4	12.02
10/29/23	0.00	0.00	2.07	6.00	4	12.07
10/30/23	0.00	0.00	2.07	6.00	4	12.07
10/31/23	0.00	0.00	1.99	6.00	4	11.99

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/23	5.00	N/A**	5.28	5.07	5.13	5.16	5.11	5.06	5.24	5.41	4.93	4.89	5.17	4.98	5.11	5.09
10/02/23	5.00	5.23	5.21	5.09	5.16	5.14	5.12	5.13	5.25	5.40	4.89	4.90	5.31	4.94	5.08	5.07
10/03/23	4.97	5.19	5.21	5.07	5.09	5.46	5.13	5.07	5.18	5.37	4.90	4.90	5.26	4.95	5.09	5.07
10/04/23	5.04	5.16	5.35	5.11	5.07	5.31	5.12	5.09	5.23	5.45	4.90	4.88	5.25	4.96	5.11	5.07
10/05/23	5.06	5.16	5.33	5.04	5.04	5.23	5.13	5.07	5.16	5.38	4.91	4.85	4.95	4.90	5.05	5.02
10/06/23	5.10	5.13	5.24	4.99	5.03	5.22	5.07	5.07	5.16	5.33	4.92	4.82	5.09	4.87	5.02	4.98
10/07/23	5.04	5.13	5.25	4.97	5.00	5.15	5.08	5.10	5.17	5.26	4.89	4.83	5.16	4.83	5.02	4.94
10/08/23	5.04	N/A**	5.19	5.01	5.02	5.16	5.07	5.08	5.16	5.29	4.87	4.85	5.18	4.85	5.00	4.94
10/09/23	5.02	5.20	5.16	4.97	5.03	5.14	5.07	5.09	5.09	5.28	5.03	4.81	5.16	4.86	5.02	4.93
10/10/23	5.01	5.06	5.23	5.03	4.98	5.16	5.03	5.08	5.11	5.32	4.95	4.79	5.13	4.91	5.00	4.90
10/11/23	4.99	5.04	5.18	5.03	4.99	5.12	5.01	5.03	5.26	5.29	4.93	4.77	5.10	4.94	5.05	4.91
10/12/23	4.96	5.09	5.09	4.98	4.94	5.12	5.14	5.04	5.28	5.24	4.91	4.76	5.07	4.93	5.02	5.03
10/13/23	4.95	5.07	5.16	5.03	4.92	5.17	5.10	5.05	5.24	5.28	4.93	4.78	5.10	4.92	5.01	5.05
10/14/23	4.97	5.04	5.14	5.02	4.89	5.05	5.09	5.07	5.21	5.25	4.91	4.77	5.14	4.89	4.99	5.00
10/15/23	4.95	5.08	5.15	5.05	4.96	5.11	5.06	5.06	5.20	5.19	4.92	4.77	5.14	4.87	4.96	4.99
10/16/23	4.97	5.04	5.22	5.03	5.06	5.08	5.11	5.03	5.24	5.33	4.93	4.77	5.12	4.87	4.93	4.99
10/17/23	4.92	5.04	5.11	5.00	5.02	5.02	5.10	5.04	5.20	5.22	4.94	4.75	4.53	4.88	4.96	4.95
10/18/23	4.93	5.02	5.15	4.96	5.03	5.03	5.04	5.07	5.13	5.22	4.89	4.73	4.61	4.87	4.97	4.94
10/19/23	4.89	4.99	5.12	4.87	5.00	4.96	5.02	4.96	5.12	N/A**	4.87	4.71	4.92	4.86	4.96	4.92
10/20/23	4.90	4.99	5.11	4.96	4.98	4.94	5.06	4.98	5.09	N/A**	4.86	4.84	N/A**	N/A**	4.94	4.88
10/21/23	4.94	5.04	5.11	4.95	4.97	4.99	5.02	5.04	5.09	5.35	4.87	4.85	N/A**	4.91	4.93	4.84
10/22/23	4.89	4.95	5.07	4.95	4.99	5.00	5.04	5.02	5.10	5.26	4.86	N/A**	N/A**	4.86	4.93	4.85
10/23/23	4.95	5.06	5.10	4.96	4.98	5.03	5.07	4.97	5.12	5.19	4.87	N/A**	N/A**	4.85	4.93	4.85
10/24/23	4.87	5.01	5.08	4.91	4.97	4.91	5.04	4.96	5.09	5.21	4.85	4.90	5.32	4.82	4.91	4.83
10/25/23	4.85	4.96	5.08	4.96	4.98	4.91	4.99	4.95	5.08	5.31	4.80	4.86	5.24	4.83	4.91	4.83
10/26/23	4.91	5.00	5.07	4.94	4.96	4.91	5.00	4.95	5.11	5.33	4.79	4.85	5.28	4.83	4.91	4.85
10/27/23	4.95	4.99	5.07	4.90	4.99	4.91	5.00	4.98	5.07	5.33	4.83	4.84	5.31	4.80	4.92	4.82
10/28/23	4.91	4.90	5.05	4.88	4.97	4.87	5.02	4.97	5.04	5.28	4.79	4.82	4.61	4.77	4.98	4.76
10/29/23	4.96	4.93	5.02	4.86	4.95	4.85	5.01	4.90	5.04	5.30	4.77	4.81	4.29	4.77	5.01	4.77
10/30/23	4.96	5.00	5.03	4.86	4.93	N/A**	4.97	4.89	5.02	5.34	4.76	4.78	4.77	4.73	4.99	4.73
10/31/23	4.87	4.95	5.01	4.80	4.90	N/A**	4.99	4.91	5.02	5.36	4.73	4.80	4.37	4.73	4.97	4.72

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

** Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/23	4.96	5.13	4.98	4.76	5.19	4.84	4.94	4.93	5.14	5.28	5.11	4.75	5.39	5.18	5.01	5.19
10/02/23	4.95	5.11	4.99	4.85	5.21	4.84	4.94	4.99	5.15	5.29	5.19	4.81	5.39	5.17	5.01	5.18
10/03/23	4.94	5.12	4.97	4.86	5.15	4.83	4.91	5.03	5.14	5.24	5.19	4.83	5.37	5.20	5.01	5.20
10/04/23	4.92	5.13	4.98	4.80	5.07	4.83	4.90	5.02	5.08	5.17	5.17	4.81	5.34	5.19	5.01	5.23
10/05/23	4.89	5.06	4.92	4.79	5.04	4.81	4.87	4.99	5.18	5.17	5.18	4.77	5.29	5.13	4.97	5.15
10/06/23	4.87	5.06	4.89	4.75	5.02	4.78	4.84	4.96	5.27	5.20	5.12	4.78	5.26	5.18	4.97	5.20
10/07/23	4.87	5.05	4.89	4.74	4.99	4.80	4.81	4.95	5.16	5.18	5.09	4.73	5.26	5.18	4.97	5.27
10/08/23	4.84	5.00	4.90	4.72	5.02	4.80	4.82	4.94	5.13	5.16	5.10	4.76	5.24	5.18	4.95	5.24
10/09/23	4.82	5.00	4.91	4.70	4.98	4.77	4.83	4.95	5.09	5.16	5.09	4.76	5.22	5.13	4.95	5.18
10/10/23	4.98	4.96	5.00	4.70	4.92	4.73	4.84	4.94	5.05	5.06	5.10	4.73	5.23	5.14	4.95	5.13
10/11/23	4.94	4.94	4.98	4.68	5.01	4.69	4.80	4.91	5.07	4.96	5.08	4.71	5.21	5.11	4.92	5.16
10/12/23	4.88	4.94	4.96	4.67	5.15	4.70	4.80	4.90	5.11	4.77	5.07	4.88	5.19	5.11	4.93	5.17
10/13/23	4.87	4.94	4.99	4.67	5.10	4.72	4.81	4.91	5.11	4.88	5.06	5.11	5.19	5.12	4.95	5.14
10/14/23	4.90	4.98	4.97	4.68	5.08	4.70	4.82	4.89	5.10	5.29	5.09	5.12	5.20	5.13	4.95	5.13
10/15/23	4.88	4.98	4.94	4.67	5.05	4.68	4.90	4.87	5.09	5.19	5.09	5.12	5.21	5.15	4.94	5.12
10/16/23	4.86	4.97	4.94	4.66	5.05	4.70	4.95	4.86	5.08	5.07	5.07	5.06	5.20	5.10	4.94	5.10
10/17/23	4.88	4.96	4.90	4.65	5.05	4.70	4.89	4.86	5.06	4.63	5.08	5.06	5.30	5.09	4.95	5.13
10/18/23	4.85	5.10	4.85	4.62	5.01	4.66	4.85	4.84	5.03	4.49	5.05	5.08	5.38	5.09	4.97	5.15
10/19/23	4.97	5.13	4.87	4.61	5.02	4.78	4.87	N/A**	5.05	4.64	5.04	5.04	5.31	5.04	4.91	5.07
10/20/23	4.89	5.12	4.90	4.59	5.00	4.82	4.87	N/A**	5.05	4.66	5.07	5.05	5.27	5.04	4.90	5.11
10/21/23	4.84	5.08	4.90	4.56	5.00	4.81	4.85	4.84	5.04	5.12	5.06	5.01	5.27	5.09	5.02	5.13
10/22/23	4.81	5.06	4.90	4.57	5.00	4.80	4.86	4.84	5.00	5.00	5.06	5.01	5.27	5.09	5.01	5.12
10/23/23	4.82	5.06	4.92	4.57	4.99	4.78	4.86	4.83	4.98	5.25	5.07	5.06	5.30	5.09	4.99	5.15
10/24/23	4.81	4.98	4.85	4.49	4.94	4.77	4.83	4.80	5.01	4.99	5.06	5.10	5.21	5.03	4.95	5.06
10/25/23	4.77	5.00	4.84	4.49	4.91	4.75	4.80	4.78	5.00	4.76	5.06	5.08	5.17	5.05	4.94	5.06
10/26/23	4.78	5.06	4.87	4.52	4.94	4.74	4.78	4.77	4.99	4.77	5.06	4.98	5.19	5.04	4.95	5.04
10/27/23	4.78	5.01	4.81	4.49	4.94	4.72	4.82	4.77	5.01	4.54	5.05	4.95	5.23	4.99	4.94	5.07
10/28/23	4.71	4.95	4.76	4.44	4.84	4.70	4.78	4.74	4.91	4.70	5.00	4.97	5.22	5.00	4.89	5.04
10/29/23	4.70	4.97	4.74	4.65	4.88	4.72	4.77	4.74	4.91	4.68	5.06	5.10	5.20	5.04	4.93	5.04
10/30/23	4.73	4.98	N/A**	4.75	4.91	4.72	4.76	4.73	4.99	4.44	5.16	5.14	5.21	5.04	4.93	5.03
10/31/23	4.72	4.95	N/A**	4.69	4.85	4.66	4.75	4.82	4.95	4.25	5.13	5.09	5.20	5.03	4.86	5.01

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)

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system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
10/01/23	4.76	5.04	4.10	4.74	5.21	5.18	5.03	5.28	5.03	5.20	5.01	5.00	4.86	4.68	4.84	5.24
10/02/23	4.79	5.11	4.06	4.77	5.28	5.19	5.04	5.37	4.97	5.16	4.99	5.06	4.82	4.64	4.88	5.26
10/03/23	4.80	5.12	4.01	4.87	5.43	5.19	5.11	5.28	4.96	5.10	5.00	5.04	4.80	4.61	5.02	5.23
10/04/23	4.85	5.19	4.16	4.87	5.23	5.29	5.07	5.26	5.05	5.21	5.02	4.95	4.78	4.58	4.83	5.26
10/05/23	4.78	5.04	4.04	4.86	5.23	5.28	5.04	5.28	4.95	5.22	5.01	5.10	4.76	4.62	4.79	5.21
10/06/23	4.77	5.03	4.02	4.70	5.25	5.23	5.07	5.22	4.98	5.32	5.00	4.96	4.76	4.68	4.85	5.19
10/07/23	4.81	5.05	4.10	4.80	5.26	5.18	5.08	5.19	5.06	5.15	4.99	5.01	4.78	4.66	4.85	5.24
10/08/23	4.79	5.00	4.07	4.97	5.25	5.23	5.03	5.23	4.96	5.17	4.91	4.97	4.87	4.61	4.78	5.23
10/09/23	4.93	5.02	4.06	4.90	5.22	5.17	4.93	5.16	4.96	5.15	4.90	4.92	4.88	4.63	4.76	5.14
10/10/23	4.71	5.08	4.12	4.73	5.15	5.22	4.99	5.16	4.97	5.09	4.92	4.98	4.79	4.58	4.75	5.17
10/11/23	4.72	5.00	4.04	4.72	5.11	5.37	5.06	5.19	4.91	5.08	5.12	4.96	4.83	4.58	4.76	5.26
10/12/23	4.81	4.97	4.02	4.67	5.26	5.18	5.16	5.24	4.91	5.22	4.94	4.93	4.80	4.75	4.80	5.18
10/13/23	4.73	4.99	4.05	4.66	5.29	5.19	5.03	5.30	5.03	5.17	4.91	5.08	4.75	4.56	4.76	5.37
10/14/23	4.69	4.98	4.06	4.68	5.29	5.21	4.90	5.16	4.92	5.11	5.01	4.95	4.87	4.54	4.76	5.21
10/15/23	4.78	4.99	4.11	4.68	5.20	5.18	5.05	5.18	4.93	5.13	4.95	4.96	4.78	4.63	4.79	5.19
10/16/23	4.65	4.99	4.03	4.70	5.19	5.17	4.92	5.18	4.96	5.11	4.95	4.99	4.76	4.68	4.71	5.27
10/17/23	4.61	5.02	4.11	4.71	5.24	5.23	4.97	5.12	4.98	5.10	4.99	4.96	4.79	4.78	4.67	5.22
10/18/23	4.69	5.04	4.03	4.49	5.14	5.19	5.01	5.02	4.93	5.15	4.82	4.91	4.75	4.77	4.70	5.16
10/19/23	4.75	5.05	4.06	4.74	5.15	5.28	5.02	5.16	4.96	5.13	4.84	4.92	4.66	4.76	4.71	5.18
10/20/23	4.76	4.92	4.19	4.84	5.19	5.23	5.00	5.15	4.97	5.25	4.91	4.90	4.75	4.74	4.83	5.14
10/21/23	4.70	4.97	4.04	4.83	5.21	5.27	5.04	5.29	5.18	5.27	4.89	4.90	4.74	4.77	4.75	5.13
10/22/23	4.75	4.95	4.12	4.65	5.20	5.29	5.04	5.23	4.94	5.24	4.86	4.89	4.81	4.80	4.75	5.18
10/23/23	4.78	4.90	4.05	4.76	5.19	5.18	5.04	5.17	4.97	5.34	5.04	4.90	4.79	4.80	4.89	5.17
10/24/23	4.66	5.01	4.11	4.88	5.16	5.24	4.98	5.17	5.07	5.16	4.93	5.05	4.76	4.83	4.77	5.13
10/25/23	4.64	5.05	4.03	4.81	5.15	5.27	5.01	5.12	5.01	5.16	5.09	4.93	4.77	4.77	4.79	5.18
10/26/23	4.73	4.84	4.15	4.73	5.19	5.20	5.02	5.13	4.91	5.17	4.87	4.90	4.74	4.69	4.87	5.19
10/27/23	4.76	4.68	4.15	4.75	5.23	5.14	5.03	5.26	4.92	5.17	4.88	4.89	4.74	4.83	4.84	5.14
10/28/23	4.69	4.98	N/A***	4.95	5.21	5.25	4.97	5.11	4.96	5.10	4.96	4.89	4.71	4.72	4.72	5.11
10/29/23	4.70	4.93	N/A***	4.92	5.22	5.22	5.08	5.17	4.95	5.22	4.93	4.91	4.74	4.77	4.74	5.06
10/30/23	4.71	4.99	N/A***	4.85	5.17	5.12	4.98	5.21	4.90	5.14	4.85	5.16	4.71	4.79	4.73	5.09
10/31/23	4.77	4.92	N/A***	4.88	5.10	5.09	5.01	5.11	4.90	5.12	4.93	4.93	4.66	4.67	4.72	5.17

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

*** Cell offline for membrane replacement.

Date	MicroFiltration Process online monitoring results Effluent Turbidity - NTU A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
10/01/23	0.034	0.036	0.023	0.026	0.027	0.029	0.019	0.023	0.032	0.034	0.023	0.030	0.027	0.032	0.036	0.039	0.025	0.027	0.026	0.027	0.026	0.028	0.061	0.062	0.030
10/02/23	0.035	0.047	0.024	0.029	0.027	0.031	0.020	0.022	0.033	0.035	0.025	0.030	0.034	0.046	0.036	0.039	0.024	0.026	0.028	0.029	0.028	0.034	0.062	0.065	0.031
10/03/23	0.037	0.043	0.024	0.031	0.027	0.029	0.019	0.027	0.032	0.033	0.024	0.027	0.032	0.037	0.035	0.043	0.024	0.029	0.029	0.030	0.029	0.032	0.061	0.062	0.031
10/04/23	0.038	0.048	0.026	0.035	0.027	0.030	0.020	0.022	0.032	0.034	0.025	0.071	0.032	0.035	0.037	0.040	0.025	0.028	0.035	0.039	0.032	0.034	0.061	0.065	0.033
10/05/23	0.039	0.047	0.025	0.028	0.028	0.029	0.020	0.023	0.033	0.034	0.026	0.028	0.033	0.037	0.038	0.044	0.027	0.028	0.039	0.039	0.036	0.043	0.063	0.064	0.034
10/06/23	0.037	0.041	0.026	0.034	0.028	0.031	0.020	0.022	0.033	0.034	0.029	0.040	0.032	0.035	0.041	0.050	0.027	0.029	0.039	0.039	0.039	0.041	0.063	0.064	0.034
10/07/23	0.036	0.039	0.027	0.033	0.029	0.030	0.020	0.022	0.033	0.036	0.033	0.038	0.032	0.033	0.042	0.046	0.027	0.032	0.042	0.044	0.043	0.046	0.063	0.078	0.036
10/08/23	0.036	0.038	0.026	0.030	0.028	0.030	0.021	0.023	0.033	0.034	0.040	0.046	0.031	0.038	0.041	0.043	0.027	0.029	0.048	0.053	0.048	0.052	0.064	0.068	0.037
10/09/23	0.037	0.043	0.026	0.028	0.030	0.034	0.022	0.031	0.033	0.041	0.048	0.056	0.031	0.036	0.040	0.042	0.028	0.032	0.053	0.053	0.053	0.056	0.064	0.067	0.039
10/10/23	0.037	0.042	0.026	0.033	0.029	0.033	0.023	0.026	0.035	0.040	0.053	0.068	0.030	0.031	0.039	0.042	0.028	0.034	0.053	0.053	0.058	0.063	0.061	0.066	0.039
10/11/23	0.037	0.040	0.026	0.032	0.030	0.039	0.025	0.030	0.032	0.037	0.051	0.072	0.030	0.032	0.038	0.040	0.028	0.032	0.063	0.069	0.064	0.068	0.060	0.060	0.040
10/12/23	0.037	0.040	0.026	0.032	0.029	0.031	0.023	0.032	0.033	0.034	0.023	0.034	0.030	0.031	0.039	0.040	0.029	0.029	0.067	0.067	0.071	0.075	0.060	0.060	0.039
10/13/23	0.037	0.040	0.025	0.028	0.028	0.032	0.022	0.025	0.033	0.034	0.023	0.025	0.029	0.033	0.038	0.040	0.026	0.029	0.042	0.079	0.040	0.076	0.050	0.060	0.033
10/14/23	0.036	0.042	0.025	0.029	0.029	0.031	0.021	0.028	0.033	0.043	0.023	0.025	0.028	0.032	0.038	0.044	0.026	0.031	0.030	0.030	0.023	0.026	0.045	0.050	0.030
10/15/23	0.036	0.037	0.026	0.031	0.028	0.029	0.021	0.024	0.033	0.033	0.024	0.027	0.029	0.035	0.037	0.039	0.026	0.027	0.030	0.030	0.023	0.025	0.046	0.047	0.030
10/16/23	0.036	0.038	0.026	0.029	0.028	0.037	0.021	0.024	0.033	0.034	0.024	0.027	0.029	0.037	0.038	0.042	0.028	0.030	0.030	0.030	0.024	0.025	0.047	0.048	0.030
10/17/23	0.036	0.039	0.025	0.028	0.028	0.035	0.021	0.025	0.033	0.037	0.024	0.026	0.029	0.044	0.039	0.052	0.030	0.032	0.030	0.030	0.025	0.028	0.050	0.051	0.031
10/18/23	0.036	0.040	0.026	0.029	0.029	0.030	0.022	0.026	0.034	0.038	0.024	0.028	0.029	0.035	0.039	0.042	0.033	0.035	0.032	0.053	0.027	0.030	0.052	0.054	0.032
10/19/23	0.037	0.044	0.026	0.036	0.029	0.037	0.022	0.026	0.034	0.040	0.026	0.030	0.030	0.031	0.040	0.049	0.037	0.040	0.036	0.045	0.029	0.031	0.055	0.057	0.033
10/20/23	0.036	0.038	0.025	0.032	0.029	0.032	0.021	0.022	0.033	0.034	0.024	0.028	0.028	0.032	0.041	0.045	0.041	0.043	0.038	0.039	0.031	0.034	0.058	0.060	0.034
10/21/23	0.037	0.040	0.025	0.028	0.029	0.048	0.021	0.030	0.033	0.034	0.024	0.026	0.029	0.030	0.040	0.043	0.044	0.047	0.038	0.038	0.034	0.036	0.062	0.074	0.035
10/22/23	0.036	0.038	0.024	0.026	0.028	0.028	0.020	0.037	0.033	0.034	0.024	0.028	0.028	0.037	0.040	0.044	0.049	0.054	0.041	0.052	0.036	0.039	0.066	0.068	0.035
10/23/23	0.036	0.038	0.024	0.025	0.028	0.030	0.020	0.024	0.033	0.034	0.024	0.026	0.028	0.030	0.040	0.042	0.055	0.060	0.041	0.041	0.038	0.041	0.071	0.073	0.037
10/24/23	0.036	0.039	0.024	0.027	0.029	0.032	0.022	0.025	0.033	0.034	0.024	0.026	0.028	0.034	0.040	0.042	0.060	0.063	0.041	0.041	0.041	0.044	0.075	0.079	0.038
10/25/23	0.037	0.040	0.025	0.026	0.030	0.037	0.021	0.025	0.033	0.042	0.025	0.042	0.028	0.029	0.040	0.049	0.065	0.072	0.041	0.041	0.044	0.047	0.081	0.085	0.039
10/26/23	0.038	0.039	0.026	0.030	0.030	0.037	0.023	0.026	0.033	0.041	0.026	0.036	0.030	0.042	0.042	0.050	0.076	0.087	0.044	0.047	0.050	0.055	0.091	0.098	0.045
10/27/23	0.038	0.040	0.026	0.027	0.030	0.032	0.023	0.027	0.033	0.034	0.026	0.028	0.029	0.031	0.039	0.044	0.046	0.083	0.042	0.047	0.037	0.056	0.065	0.098	0.036
10/28/23	0.038	0.040	0.025	0.028	0.029	0.030	0.022	0.025	0.032	0.034	0.025	0.029	0.029	0.037	0.037	0.039	0.028	0.029	0.040	0.040	0.029	0.034	0.048	0.049	0.032
10/29/23	0.038	0.039	0.025	0.027	0.029	0.030	0.021	0.024	0.033	0.040	0.025	0.035	0.032	0.037	0.037	0.039	0.030	0.031	0.040	0.040	0.031	0.036	0.051	0.054	0.033
10/30/23	0.038	0.040	0.025	0.027	0.029	0.030	0.021	0.024	0.033	0.041	0.025	0.027	0.030	0.033	0.037	0.038	0.032	0.034	0.040	0.040	0.034	0.042	0.055	0.057	0.033
10/31/23	0.040	0.053	0.025	0.027	0.029	0.030	0.022	0.024	0.033	0.044	0.027	0.036	0.030	0.030	0.037	0.039	0.035	0.040	0.040	0.040	0.036	0.040	0.061	0.065	0.035

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
10/01/23	0.015	0.015	6.971	6.526	7.513	0.048	0.045	0.057	1,574	1,539	1,614	38	33	44	99.30	2.16	97.58	1.62
10/02/23	0.015	0.015	7.169	6.651	7.667	0.050	0.044	0.056	1,566	1,498	1,662	39	34	44	99.31	2.16	97.53	1.61
10/03/23	0.015	0.015	7.188	6.659	7.747	0.052	0.047	0.058	1,614	1,550	1,797	40	36	44	99.27	2.14	97.55	1.61
10/04/23	0.015	0.015	6.979	6.574	7.598	0.053	0.047	0.063	1,965	1,582	2,422	54	35	74	99.24	2.12	97.25	1.56
10/05/23	0.015	0.015	6.710	6.474	7.136	0.052	0.047	0.064	2,320	2,145	2,558	65	55	76	99.22	2.11	97.19	1.55
10/06/23	0.015	0.015	6.516	6.337	6.821	0.052	0.046	0.060	2,404	2,219	2,603	67	59	77	99.20	2.10	97.20	1.55
10/07/23	0.015	0.015	6.676	6.463	7.146	0.048	0.044	0.057	2,360	2,215	2,525	61	54	71	99.28	2.14	97.42	1.59
10/08/23	0.015	0.015	6.804	6.452	7.267	0.045	0.041	0.054	2,217	2,034	2,476	56	50	66	99.34	2.18	97.47	1.60
10/09/23	0.015	0.015	6.749	6.415	7.276	0.043	0.038	0.051	2,277	2,108	2,537	57	50	67	99.36	2.19	97.52	1.60
10/10/23	0.015	0.015	6.725	6.347	7.126	0.048	0.042	0.054	2,303	2,115	2,518	58	50	67	99.29	2.15	97.49	1.60
10/11/23	0.015	0.015	6.676	6.398	7.090	0.049	0.036	0.059	2,395	2,217	2,644	63	57	74	99.27	2.14	97.36	1.58
10/12/23	0.015	0.015	6.698	6.467	7.005	0.049	0.044	0.061	2,435	2,213	2,648	63	54	73	99.27	2.13	97.40	1.59
10/13/23	0.014	0.015	6.675	6.511	6.864	0.047	0.041	0.056	2,386	2,163	2,628	58	48	68	99.29	2.15	97.59	1.62
10/14/23	0.015	0.015	6.692	6.428	7.075	0.049	0.043	0.098	2,391	2,193	2,645	58	49	76	99.27	2.14	97.55	1.61
10/15/23	0.015	0.015	6.771	6.363	7.346	0.046	0.038	0.054	2,310	2,083	2,605	61	52	77	99.32	2.17	97.37	1.58
10/16/23	0.015	0.015	7.001	6.732	7.536	0.048	0.038	0.057	2,258	2,014	2,616	63	50	82	99.32	2.17	97.21	1.55
10/17/23	0.015	0.015	7.106	6.602	8.390	0.064	0.044	0.160 ****	2,432	2,247	2,642	69	61	78	99.11	2.05	97.15	1.55
10/18/23	0.015	0.015	6.864	6.579	7.436	0.052	0.045	0.061	2,447	2,249	2,694	68	60	78	99.24	2.12	97.21	1.55
10/19/23	0.014	0.015	6.980	6.708	7.450	0.055	0.046	0.067	2,382	2,236	2,667	67	58	79	99.21	2.10	97.18	1.55
10/20/23	0.015	0.015	6.743	6.461	7.105	0.051	0.044	0.057	2,337	2,197	2,460	65	58	72	99.24	2.12	97.22	1.56
10/21/23	0.015	0.015	6.640	6.263	7.053	0.049	0.042	0.057	2,376	2,231	2,538	64	58	71	99.26	2.13	97.31	1.57
10/22/23	0.015	0.015	6.672	6.331	7.323	0.045	0.041	0.055	2,276	2,133	2,557	59	53	69	99.33	2.18	97.40	1.59
10/23/23	0.015	0.015	6.605	6.280	7.094	0.044	0.038	0.054	2,318	2,091	2,561	61	51	75	99.33	2.17	97.36	1.58
10/24/23	0.015	0.015	6.557	6.306	6.962	0.043	0.000	0.057	2,350	2,145	2,602	62	53	70	99.34	2.18	97.35	1.58
10/25/23	0.015	0.015	6.364	6.098	6.796	0.048	0.043	0.061	2,388	2,220	2,625	63	55	75	99.24	2.12	97.35	1.58
10/26/23	0.015	0.015	7.017	6.587	7.814	0.065	0.047	0.103 ****	2,293	2,061	2,536	60	43	81	99.07	2.03	97.39	1.58
10/27/23	0.014	0.015	6.953	6.503	7.908	0.071	0.061	0.091	2,352	2,187	2,597	63	52	73	98.98	1.99	97.32	1.57
10/28/23	0.015	0.015	6.435	6.049	7.214	0.062	0.056	0.069	2,481	2,360	2,697	66	60	76	99.04	2.02	97.33	1.57
10/29/23	0.015	0.015	6.559	5.956	7.341	0.055	0.052	0.063	2,320	2,154	2,643	60	53	73	99.15	2.07	97.40	1.58
10/30/23	0.015	0.015	6.492	6.296	6.867	0.055	0.049	0.067	2,455	2,239	2,735	63	52	76	99.15	2.07	97.43	1.59
10/31/23	0.015	0.015	6.503	6.168	6.905	0.067	0.062	0.072	2,490	2,279	2,692	66	59	75	98.97	1.99	97.33	1.57

Notes:

**** Value affected by a short term TOC spike.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
10/01/23	97.41	94.374	33,263.0	0.35	3	6
10/02/23	97.43	95.103	33,013.0	0.35	3	6
10/03/23	96.97	95.111	33,270.3	0.35	3	6
10/04/23	96.79	107.464	33,333.6	0.35	4	6
10/05/23	96.30	115.125	37,265.2	0.34	4	6
10/06/23	96.61	115.508	38,459.6	0.33	4	6
10/07/23	96.63	115.402	38,473.5	0.33	4	6
10/08/23	96.58	114.042	38,431.4	0.33	4	6
10/09/23	96.49	115.483	38,008.3	0.33	4	6
10/10/23	96.62	115.356	38,419.2	0.33	4	6
10/11/23	96.71	115.274	38,441.1	0.33	4	6
10/12/23	96.44	114.501	38,446.3	0.33	4	6
10/13/23	96.46	111.656	38,322.7	0.33	4	6
10/14/23	96.53	105.991	38,091.5	0.33	4	6
10/15/23	96.53	113.652	35,526.4	0.33	4	6
10/16/23	96.34	107.399	38,012.7	0.33	4	6
10/17/23	96.06	115.256	36,038.7	0.33	4	6
10/18/23	96.17	118.571	38,405.6	0.34	4	6
10/19/23	96.31	101.213	39,978.8	0.34	4	6
10/20/23	96.38	108.421	35,181.0	0.34	4	6
10/21/23	96.47	110.093	37,442.4	0.35	4	6
10/22/23	96.21	110.278	38,373.0	0.35	4	6
10/23/23	96.17	112.489	38,404.7	0.35	4	6
10/24/23	96.11	118.837	38,413.8	0.34	4	6
10/25/23	96.28	119.576	40,197.6	0.34	4	6
10/26/23	96.64	48.810	38,297.2	0.34	4	6
10/27/23	96.23	119.974	19,446.4	0.35	4	6
10/28/23	96.43	119.888	40,987.8	0.34	4	6
10/29/23	96.29	114.627	40,801.8	0.34	4	6
10/30/23	96.30	119.404	39,466.7	0.34	4	6
10/31/23	96.31	117.161	40,676.7	0.34	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.23 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
11/01/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/02/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/03/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/04/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/05/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/06/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/07/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/08/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/09/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/10/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/11/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/12/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/13/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/14/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/15/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/16/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/17/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/18/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/19/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/20/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/21/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/22/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/23/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/24/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/25/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/26/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/27/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/28/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/29/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
11/30/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
11/01/23	0.00	4.33	2.01	6.00	0.00	12.34
11/02/23	0.00	4.62	2.02	6.00	0.00	12.63
11/03/23	0.00	4.64	2.02	6.00	0.00	12.66
11/04/23	0.00	4.61	2.04	6.00	0.00	12.65
11/05/23	0.00	4.50	2.07	6.00	0.00	12.57
11/06/23	0.00	4.61	2.06	6.00	0.00	12.68
11/07/23	0.00	4.58	2.04	6.00	0.00	12.62
11/08/23	0.00	4.64	1.99	6.00	0.00	12.63
11/09/23	0.00	4.62	2.05	6.00	0.00	12.67
11/10/23	0.00	4.57	2.05	6.00	0.00	12.63
11/11/23	0.00	4.58	2.07	6.00	0.00	12.65
11/12/23	0.00	4.56	2.06	6.00	0.00	12.62
11/13/23	0.00	4.55	2.15	6.00	0.00	12.70
11/14/23	0.00	4.54	2.16	6.00	0.00	12.70
11/15/23	0.00	4.48	2.14	6.00	0.00	12.62
11/16/23	0.00	4.46	2.19	6.00	0.00	12.64
11/17/23	0.00	4.47	2.18	6.00	0.00	12.65
11/18/23	0.00	4.43	2.17	6.00	0.00	12.60
11/19/23	0.00	4.43	2.20	6.00	0.00	12.63
11/20/23	0.00	4.44	2.19	6.00	0.00	12.63
11/21/23	0.00	4.42	2.16	6.00	0.00	12.58
11/22/23	0.00	4.39	2.16	6.00	0.00	12.55
11/23/23	0.00	4.33	2.18	6.00	0.00	12.50
11/24/23	0.00	4.32	2.21	6.00	0.00	12.53
11/25/23	0.00	4.58	2.21	6.00	0.00	12.79
11/26/23	0.00	4.49	2.20	6.00	0.00	12.69
11/27/23	0.00	4.53	2.17	6.00	0.00	12.70
11/28/23	0.00	4.55	2.13	6.00	0.00	12.68
11/29/23	0.00	4.56	2.13	6.00	0.00	12.68
11/30/23	0.00	4.54	2.14	6.00	0.00	12.68

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
Date	LRV	LRV	LRV	LRV	LRV	LRV
11/01/23	0.00	0.00	2.01	6.00	4	12.01
11/02/23	0.00	0.00	2.02	6.00	4	12.02
11/03/23	0.00	0.00	2.02	6.00	4	12.02
11/04/23	0.00	0.00	2.04	6.00	4	12.04
11/05/23	0.00	0.00	2.07	6.00	4	12.07
11/06/23	0.00	0.00	2.06	6.00	4	12.06
11/07/23	0.00	0.00	2.04	6.00	4	12.04
11/08/23	0.00	0.00	1.99	6.00	4	11.99
11/09/23	0.00	0.00	2.05	6.00	4	12.05
11/10/23	0.00	0.00	2.05	6.00	4	12.05
11/11/23	0.00	0.00	2.07	6.00	4	12.07
11/12/23	0.00	0.00	2.06	6.00	4	12.06
11/13/23	0.00	0.00	2.15	6.00	4	12.15
11/14/23	0.00	0.00	2.16	6.00	4	12.16
11/15/23	0.00	0.00	2.14	6.00	4	12.14
11/16/23	0.00	0.00	2.19	6.00	4	12.19
11/17/23	0.00	0.00	2.18	6.00	4	12.18
11/18/23	0.00	0.00	2.17	6.00	4	12.17
11/19/23	0.00	0.00	2.20	6.00	4	12.20
11/20/23	0.00	0.00	2.19	6.00	4	12.19
11/21/23	0.00	0.00	2.16	6.00	4	12.16
11/22/23	0.00	0.00	2.16	6.00	4	12.16
11/23/23	0.00	0.00	2.18	6.00	4	12.18
11/24/23	0.00	0.00	2.21	6.00	4	12.21
11/25/23	0.00	0.00	2.21	6.00	4	12.21
11/26/23	0.00	0.00	2.20	6.00	4	12.20
11/27/23	0.00	0.00	2.17	6.00	4	12.17
11/28/23	0.00	0.00	2.13	6.00	4	12.13
11/29/23	0.00	0.00	2.13	6.00	4	12.13
11/30/23	0.00	0.00	2.14	6.00	4	12.14

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	A01 LRV	A02 LRV	A03 LRV	A04 LRV	A05 LRV	A06 LRV	A07 LRV	A08 LRV	B01 LRV	B02 LRV	B03 LRV	B04 LRV	B05 LRV	B06 LRV	B07 LRV	B08 LRV
11/01/23	5.11	5.05	5.23	4.84	4.95	4.97	4.98	4.90	5.00	5.26	4.70	4.82	4.38	4.69	4.97	4.75
11/02/23	5.04	5.09	5.14	4.83	4.89	4.95	4.95	4.89	5.00	5.28	4.72	4.81	5.21	4.71	5.02	4.73
11/03/23	5.07	5.12	5.16	4.83	4.92	5.07	4.96	5.08	4.98	5.30	4.69	4.75	4.76	4.69	4.98	4.72
11/04/23	5.01	5.09	5.14	4.80	4.89	5.05	4.95	5.04	4.97	5.32	4.65	4.76	4.84	4.69	4.96	4.72
11/05/23	5.08	5.09	5.11	4.87	4.89	5.04	4.98	5.07	4.99	5.30	4.83	4.77	4.50	4.69	5.00	4.72
11/06/23	5.06	5.03	5.13	5.04	4.88	5.05	4.99	5.08	5.15	5.26	4.83	4.78	4.79	4.71	4.99	4.73
11/07/23	5.04	5.04	5.15	4.99	4.92	5.05	4.98	5.01	5.19	5.24	4.79	4.73	4.87	4.66	4.95	4.69
11/08/23	4.99	5.06	5.26	4.98	4.91	5.07	5.19	5.05	5.22	5.47	4.80	4.76	5.13	4.86	4.95	4.96
11/09/23	5.01	5.03	5.13	4.99	4.87	5.06	5.10	5.04	5.18	5.34	4.79	4.73	5.02	4.83	4.99	4.95
11/10/23	5.02	N/A *	5.05	5.00	4.88	5.04	5.06	5.03	5.06	5.17	4.75	4.74	5.07	4.79	4.94	4.82
11/11/23	4.98	N/A *	5.11	4.94	5.10	4.96	5.06	4.93	5.09	5.20	4.73	4.70	4.82	4.79	4.92	4.81
11/12/23	4.99	N/A *	5.05	4.91	5.08	4.92	5.06	4.98	5.06	5.18	4.72	4.72	4.98	4.83	4.94	4.87
11/13/23	5.03	N/A *	5.11	4.95	5.03	5.04	5.04	5.02	5.17	5.18	4.73	4.73	5.18	4.81	4.96	4.88
11/14/23	4.97	4.96	5.16	4.93	5.03	4.99	4.99	5.01	5.13	5.21	4.70	4.68	5.12	4.77	4.96	4.80
11/15/23	5.00	5.08	5.08	4.91	4.98	4.93	5.03	4.97	5.01	5.15	4.73	4.72	4.64	4.75	4.94	4.79
11/16/23	4.95	5.07	5.10	4.94	5.00	4.91	5.13	4.95	5.04	5.14	4.72	4.68	4.93	4.91	4.95	4.80
11/17/23	4.99	5.11	5.08	4.90	5.00	4.90	5.05	4.94	5.03	5.09	4.70	4.66	4.60	5.03	4.92	4.80
11/18/23	4.93	5.04	5.07	4.90	5.06	4.94	5.02	4.97	5.08	5.07	4.79	4.75	4.58	4.97	4.91	4.76
11/19/23	4.90	N/A *	5.04	4.92	4.96	4.91	5.00	4.95	5.10	5.08	4.82	4.95	4.89	4.96	4.89	4.76
11/20/23	4.93	5.10	5.06	4.93	4.90	4.92	4.98	4.94	5.10	5.11	4.81	5.00	5.09	4.96	4.92	4.76
11/21/23	4.97	5.04	5.04	4.88	4.97	4.97	5.02	4.96	5.07	5.47	4.79	4.92	5.25	4.94	4.87	4.76
11/22/23	4.95	4.97	5.03	4.89	5.01	4.92	5.02	4.90	5.06	5.47	4.80	4.91	5.12	4.94	4.87	4.77
11/23/23	4.94	4.98	4.94	4.87	4.87	4.86	5.00	4.88	5.06	5.38	4.80	4.89	5.21	4.92	4.87	4.77
11/24/23	4.89	5.00	5.03	4.92	4.91	4.98	5.03	4.89	5.08	5.40	4.81	4.92	4.76	4.98	4.91	4.74
11/25/23	4.91	5.00	5.03	4.89	4.94	4.86	5.04	4.91	5.05	5.46	4.80	4.93	5.25	4.98	4.89	4.77
11/26/23	4.89	4.99	4.98	4.87	4.87	4.90	4.99	4.90	5.00	5.33	4.77	4.89	5.16	4.90	4.86	4.71
11/27/23	4.86	5.00	4.99	4.81	4.97	4.83	4.96	4.83	5.02	5.35	4.77	4.91	5.19	4.91	4.81	4.69
11/28/23	5.08	4.93	5.18	4.81	4.90	4.78	4.96	4.83	4.99	5.23	4.73	4.87	5.00	4.90	4.94	4.73
11/29/23	5.06	4.96	5.23	4.79	4.88	5.09	4.93	4.87	5.03	5.25	4.73	4.85	5.04	4.91	4.99	4.73
11/30/23	5.11	4.96	5.13	4.79	4.92	5.09	4.98	5.04	4.96	5.34	4.75	4.91	4.85	4.91	4.99	4.66

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

	MicroFiltration Process online monitoring results Log Removal Value															
	C01	**C02**	**C03**	**C04**	**C05**	**C06**	**C07**	**C08**	**D01**	**D02**	**D03**	**D04**	**D05**	**D06**	**D07**	**D08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
11/01/23	4.67	4.90	N/A *	4.66	4.80	4.64	4.71	4.92	5.00	4.33	5.10	5.11	5.15	5.14	4.87	5.00
11/02/23	4.62	4.90	4.83	4.66	4.76	4.65	4.69	4.93	5.07	4.70	5.09	5.09	5.13	5.20	4.87	5.05
11/03/23	4.65	4.94	4.83	4.65	4.75	4.65	4.68	4.92	5.16	5.04	5.09	5.07	5.15	5.18	4.85	5.14
11/04/23	4.64	4.90	4.78	4.66	4.75	4.67	4.67	4.91	5.14	5.06	5.08	5.09	5.17	5.16	4.84	5.13
11/05/23	4.66	4.90	4.78	4.69	4.84	4.67	4.72	4.92	5.11	5.02	5.07	5.09	5.13	5.17	4.89	5.16
11/06/23	4.63	4.91	4.78	4.66	4.81	4.62	4.71	4.93	5.11	4.99	5.12	5.06	5.19	5.16	4.95	5.19
11/07/23	4.81	4.90	4.73	4.60	4.90	4.58	4.68	4.90	5.07	4.96	5.09	5.04	5.13	5.12	4.85	5.11
11/08/23	4.96	4.93	4.78	4.68	5.18	4.64	4.73	4.92	5.14	4.96	5.08	5.06	5.13	5.15	4.90	5.08
11/09/23	4.91	4.87	4.79	4.64	5.16	4.62	4.71	4.92	5.15	4.96	5.08	5.05	5.12	5.12	4.88	5.07
11/10/23	4.82	4.78	4.69	4.57	5.04	4.58	4.64	4.86	5.05	4.92	5.08	5.08	5.10	5.10	4.86	5.05
11/11/23	4.85	4.80	4.85	4.58	5.03	4.59	4.61	4.83	5.04	5.01	5.08	5.08	5.11	5.11	4.83	5.02
11/12/23	4.87	4.84	4.97	4.56	5.03	4.58	4.61	4.85	5.06	5.19	5.09	5.07	5.12	5.13	4.86	5.03
11/13/23	4.85	4.83	4.97	4.55	5.03	4.58	4.73	4.87	5.08	5.21	5.10	5.08	5.09	5.18	4.82	5.09
11/14/23	4.82	4.77	4.92	4.54	5.03	4.54	4.89	4.85	5.09	5.14	5.06	5.05	5.17	5.16	4.81	5.14
11/15/23	4.76	4.92	4.89	4.48	4.96	4.70	4.82	4.81	5.04	5.07	5.02	5.03	5.27	5.13	4.83	5.02
11/16/23	4.77	5.02	4.86	4.46	4.94	4.78	4.81	4.77	4.99	5.05	5.01	5.00	5.25	5.12	4.83	5.04
11/17/23	4.78	5.02	4.85	4.47	4.96	4.76	4.82	4.76	5.00	5.06	5.01	5.00	5.20	5.15	4.94	5.07
11/18/23	4.74	4.99	4.87	4.43	4.91	4.75	4.79	4.77	5.03	5.07	5.02	5.01	5.19	5.13	4.93	5.05
11/19/23	4.77	5.00	4.86	4.43	4.94	4.74	4.79	4.79	5.00	5.07	5.03	5.04	5.21	5.13	4.93	4.99
11/20/23	4.76	5.01	4.85	4.44	4.97	4.75	4.79	4.74	4.95	5.05	5.00	5.06	5.19	5.16	4.95	5.01
11/21/23	4.74	4.94	4.86	4.42	4.90	4.75	4.75	4.69	4.90	5.03	4.97	4.99	5.14	5.06	4.90	5.03
11/22/23	4.72	4.92	4.86	4.39	4.87	4.72	4.74	4.70	4.92	5.02	4.98	5.00	5.15	4.97	4.93	4.97
11/23/23	4.71	4.90	4.82	4.33	4.88	4.68	4.75	4.69	4.93	5.01	4.97	4.98	5.12	5.02	4.93	4.98
11/24/23	4.70	4.93	4.82	4.32	4.85	4.66	4.75	4.68	4.89	5.05	5.05	5.03	5.11	5.06	4.94	4.97
11/25/23	4.69	4.95	4.81	4.58	4.85	4.69	4.73	4.72	4.88	5.02	5.16	5.15	5.10	5.07	4.91	4.97
11/26/23	4.68	4.94	4.78	4.72	4.83	4.67	4.75	4.71	4.95	4.94	5.19	5.12	5.12	4.99	4.91	4.98
11/27/23	4.61	4.85	4.75	4.65	4.76	4.63	4.72	4.84	4.91	4.94	5.15	5.08	5.03	5.07	4.89	4.96
11/28/23	4.55	4.84	4.74	4.60	4.75	4.63	4.66	4.97	4.99	4.90	5.09	5.04	5.00	5.23	4.89	5.02
11/29/23	4.56	4.90	4.75	4.59	4.75	4.64	4.65	4.95	5.09	5.24	5.11	5.02	5.01	5.15	4.90	5.20
11/30/23	4.54	4.83	4.72	4.59	4.74	4.61	4.65	4.92	5.09	4.66	5.10	5.00	5.03	5.15	4.93	5.07

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	E01	E02	E03	E04	E05	E06	E07	E08	F01	F02	F03	F04	F05	F06	F07	F08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
11/01/23	4.80	4.90	5.39	4.80	5.16	5.24	5.06	5.14	4.89	5.27	4.96	4.95	4.77	4.78	4.75	5.05
11/02/23	4.62	4.96	5.32	4.70	5.11	5.16	5.01	5.15	4.89	5.10	4.88	5.15	4.72	4.83	4.77	5.26
11/03/23	4.64	4.98	5.15	4.69	5.12	5.21	4.93	5.07	4.94	5.15	4.91	4.90	4.74	4.74	4.80	5.17
11/04/23	4.73	5.13	5.17	4.61	5.16	5.28	4.98	5.03	4.98	5.23	4.83	4.93	4.82	4.68	4.89	5.16
11/05/23	4.63	4.96	5.24	4.74	5.26	5.13	4.98	5.08	5.14	5.10	4.77	5.06	4.76	4.75	4.71	5.21
11/06/23	4.61	4.89	5.16	4.76	5.21	5.14	4.94	5.05	4.97	5.16	4.83	4.90	4.83	4.71	4.73	5.13
11/07/23	4.67	4.91	5.15	4.76	5.11	5.15	4.97	5.01	4.94	5.19	4.86	4.88	4.73	4.72	4.77	5.14
11/08/23	4.67	4.87	5.21	4.78	4.10	4.60	4.19	4.25	4.92	5.14	4.82	4.93	4.71	4.77	4.76	5.14
11/09/23	4.63	5.01	5.19	4.78	4.10	4.10	4.10	4.10	4.95	5.10	4.88	4.89	4.68	4.74	4.82	5.06
11/10/23	4.68	5.30	5.19	4.77	4.10	4.10	4.10	4.10	4.91	5.13	4.84	4.90	4.70	4.74	4.91	5.01
11/11/23	4.70	4.90	5.14	4.75	4.10	4.10	4.10	4.10	4.87	5.06	4.81	4.91	4.70	4.71	4.70	4.99
11/12/23	4.79	4.92	5.04	4.72	4.10	4.10	4.10	4.10	4.88	5.01	4.85	4.91	4.77	4.63	4.63	5.09
11/13/23	4.66	5.05	5.23	4.70	4.64	4.41	5.03	4.83	4.89	5.15	4.87	4.90	4.69	4.84	4.75	5.09
11/14/23	4.65	5.01	5.25	4.62	5.16	5.11	5.03	5.15	4.92	5.10	4.87	4.87	4.63	4.80	4.71	5.08
11/15/23	4.64	4.89	5.09	4.63	5.10	5.13	4.84	5.06	4.86	5.09	4.81	4.84	4.67	4.66	4.76	5.08
11/16/23	4.65	4.93	5.09	4.68	5.08	5.16	4.83	5.01	4.84	5.11	4.78	4.82	4.72	4.72	4.81	5.09
11/17/23	4.72	4.93	5.24	4.66	5.04	5.16	4.85	5.07	4.83	5.03	4.82	5.05	4.66	4.86	4.73	4.96
11/18/23	4.80	4.77	5.07	4.61	5.19	5.19	4.91	4.99	4.92	5.04	4.82	4.85	4.69	4.72	4.73	4.97
11/19/23	4.67	4.78	5.07	4.75	5.11	5.19	5.15	5.01	4.90	5.04	4.84	4.88	4.68	4.63	4.84	4.99
11/20/23	4.66	4.81	5.16	4.76	5.11	5.02	4.76	5.05	4.81	5.04	4.88	4.90	4.60	4.67	4.64	4.96
11/21/23	4.65	4.80	5.10	4.75	5.17	5.03	4.75	4.92	4.79	5.04	4.80	4.89	4.57	4.71	4.56	5.12
11/22/23	4.54	5.01	5.12	4.67	5.10	5.10	4.74	4.96	4.79	4.99	4.85	4.88	4.54	4.69	4.76	4.97
11/23/23	4.51	4.77	5.13	4.65	4.95	5.00	4.73	4.98	4.86	5.05	4.86	4.86	4.52	4.72	4.60	5.18
11/24/23	4.65	4.80	5.08	4.71	5.06	4.97	4.78	4.99	4.79	5.17	4.74	4.79	4.54	4.64	4.60	5.10
11/25/23	4.63	4.79	5.36	4.63	4.99	4.97	4.91	5.12	4.73	5.03	4.77	4.75	4.56	4.51	4.61	5.02
11/26/23	4.49	4.75	4.95	4.69	5.02	4.98	4.82	4.89	4.75	5.01	4.78	4.76	4.61	4.58	4.62	4.97
11/27/23	4.53	4.72	4.94	4.71	5.14	5.01	4.81	4.96	4.83	5.12	4.77	4.73	4.60	4.59	4.63	5.02
11/28/23	4.76	4.74	5.13	4.60	5.00	5.06	4.81	5.01	4.78	4.97	4.82	4.73	4.53	4.56	4.65	4.93
11/29/23	4.77	4.72	5.01	4.71	5.18	5.09	4.84	4.95	4.72	4.98	4.75	4.74	4.53	4.67	4.65	5.03
11/30/23	4.56	4.63	4.93	4.67	5.03	5.19	5.21	4.94	4.83	5.05	4.71	4.79	4.59	4.60	4.63	5.03

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Effluent Turbidity - NTU																								
	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
Date	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
11/01/23	0.042	0.051	0.025	0.038	0.029	0.032	0.022	0.024	0.033	0.034	0.027	0.060	0.030	0.034	0.039	0.043	0.039	0.057	0.040	0.041	0.040	0.047	0.068	0.071	0.036
11/02/23	0.040	0.044	0.026	0.029	0.029	0.031	0.022	0.024	0.033	0.035	0.027	0.029	0.030	0.033	0.041	0.044	0.046	0.056	0.048	0.051	0.044	0.047	0.076	0.081	0.038
11/03/23	0.040	0.044	0.027	0.030	0.029	0.030	0.022	0.024	0.033	0.041	0.027	0.029	0.030	0.034	0.040	0.049	0.049	0.054	0.052	0.057	0.049	0.053	0.084	0.085	0.040
11/04/23	0.039	0.042	0.025	0.028	0.029	0.034	0.021	0.026	0.032	0.033	0.027	0.029	0.029	0.032	0.040	0.042	0.058	0.079	0.056	0.056	0.054	0.060	0.085	0.085	0.041
11/05/23	0.040	0.059	0.025	0.029	0.030	0.032	0.021	0.024	0.032	0.034	0.028	0.051	0.029	0.031	0.039	0.040	0.063	0.069	0.056	0.056	0.060	0.064	0.085	0.085	0.042
11/06/23	0.041	0.046	0.025	0.027	0.030	0.032	0.021	0.027	0.033	0.036	0.028	0.030	0.029	0.030	0.040	0.042	0.071	0.076	0.057	0.058	0.067	0.072	0.085	0.085	0.044
11/07/23	0.041	0.044	0.026	0.029	0.031	0.034	0.023	0.031	0.034	0.037	0.029	0.034	0.030	0.031	0.041	0.048	0.079	0.097	0.061	0.062	0.075	0.079	0.085	0.085	0.046
11/08/23	0.041	0.060	0.027	0.054	0.030	0.033	0.025	0.047	0.033	0.053	0.029	0.036	0.029	0.033	0.040	0.045	0.085	0.091	0.064	0.065	0.082	0.085	0.085	0.085	0.048
11/09/23	0.042	0.044	0.026	0.030	0.030	0.031	0.023	0.028	0.033	0.034	0.029	0.030	0.029	0.030	0.041	0.046	0.075	0.092	0.056	0.070	0.065	0.091	0.070	0.085	0.043
11/10/23	0.042	0.045	0.026	0.028	0.030	0.031	0.023	0.026	0.034	0.037	0.029	0.031	0.030	0.032	0.041	0.042	0.056	0.070	0.047	0.050	0.036	0.039	0.050	0.051	0.037
11/11/23	0.042	0.045	0.027	0.040	0.030	0.033	0.023	0.025	0.034	0.037	0.029	0.031	0.030	0.032	0.041	0.043	0.056	0.060	0.048	0.048	0.040	0.042	0.051	0.052	0.038
11/12/23	0.041	0.044	0.026	0.029	0.030	0.031	0.023	0.025	0.033	0.034	0.030	0.037	0.029	0.030	0.041	0.042	0.054	0.057	0.048	0.048	0.041	0.043	0.050	0.052	0.037
11/13/23	0.042	0.047	0.026	0.028	0.030	0.033	0.023	0.024	0.034	0.048	0.032	0.054	0.029	0.034	0.041	0.061	0.059	0.083	0.049	0.051	0.045	0.047	0.051	0.055	0.037
11/14/23	0.042	0.082	0.026	0.028	0.030	0.031	0.022	0.024	0.034	0.037	0.031	0.032	0.029	0.031	0.042	0.047	0.055	0.062	0.051	0.051	0.050	0.060	0.050	0.051	0.039
11/15/23	0.043	0.044	0.026	0.028	0.030	0.031	0.022	0.027	0.034	0.036	0.032	0.034	0.029	0.033	0.042	0.046	0.055	0.056	0.051	0.051	0.055	0.059	0.051	0.052	0.039
11/16/23	0.040	0.045	0.025	0.028	0.029	0.032	0.022	0.027	0.033	0.033	0.029	0.034	0.029	0.030	0.042	0.049	0.043	0.059	0.048	0.050	0.046	0.063	0.052	0.056	0.036
11/17/23	0.040	0.042	0.025	0.038	0.028	0.029	0.022	0.024	0.032	0.033	0.026	0.027	0.029	0.032	0.040	0.043	0.032	0.036	0.048	0.089	0.037	0.039	0.051	0.052	0.034
11/18/23	0.040	0.041	0.025	0.027	0.029	0.033	0.022	0.029	0.032	0.033	0.027	0.028	0.028	0.032	0.040	0.040	0.031	0.035	0.061	0.242**	0.039	0.042	0.052	0.054	0.036
11/19/23	0.039	0.042	0.025	0.027	0.029	0.031	0.022	0.029	0.033	0.033	0.028	0.029	0.029	0.033	0.039	0.045	0.034	0.044	0.056	0.060	0.043	0.047	0.054	0.055	0.036
11/20/23	0.040	0.042	0.025	0.027	0.029	0.036	0.023	0.028	0.033	0.034	0.028	0.029	0.029	0.042	0.039	0.049	0.033	0.038	0.052	0.275**	0.047	0.050	0.055	0.056	0.036
11/21/23	0.039	0.042	0.025	0.027	0.028	0.038	0.022	0.024	0.029	0.034	0.026	0.030	0.029	0.039	0.039	0.041	0.031	0.034	0.037	0.040	0.041	0.050	0.048	0.060	0.033
11/22/23	0.039	0.045	0.025	0.027	0.026	0.028	0.023	0.025	0.028	0.030	0.026	0.028	0.029	0.030	0.039	0.041	0.033	0.050	0.036	0.036	0.035	0.037	0.043	0.044	0.032
11/23/23	0.038	0.044	0.024	0.027	0.026	0.028	0.022	0.024	0.027	0.030	0.027	0.033	0.029	0.044	0.038	0.046	0.031	0.034	0.037	0.040	0.037	0.039	0.045	0.047	0.032
11/24/23	0.038	0.046	0.024	0.035	0.026	0.027	0.022	0.024	0.027	0.028	0.026	0.037	0.032	0.046	0.038	0.039	0.031	0.039	0.039	0.040	0.038	0.041	0.045	0.050	0.032
11/25/23	0.039	0.056	0.024	0.027	0.026	0.033	0.022	0.028	0.027	0.028	0.026	0.027	0.031	0.035	0.039	0.048	0.033	0.038	0.038	0.038	0.040	0.042	0.047	0.049	0.033
11/26/23	0.038	0.042	0.024	0.027	0.026	0.027	0.022	0.023	0.027	0.028	0.026	0.027	0.030	0.034	0.039	0.041	0.032	0.035	0.038	0.038	0.044	0.049	0.050	0.052	0.033
11/27/23	0.039	0.053	0.024	0.026	0.026	0.026	0.022	0.026	0.027	0.028	0.027	0.028	0.030	0.033	0.039	0.048	0.035	0.056	0.040	0.046	0.047	0.050	0.054	0.057	0.034
11/28/23	0.035	0.044	0.024	0.026	0.025	0.032	0.023	0.034	0.026	0.030	0.025	0.030	0.030	0.058	0.040	0.044	0.035	0.039	0.042	0.045	0.041	0.088	0.066	0.080	0.034
11/29/23	0.032	0.048	0.025	0.031	0.025	0.027	0.022	0.024	0.026	0.028	0.025	0.026	0.029	0.030	0.041	0.043	0.035	0.040	0.043	0.043	0.026	0.030	0.079	0.079	0.034
11/30/23	0.032	0.039	0.025	0.030	0.026	0.031	0.023	0.024	0.027	0.028	0.026	0.027	0.029	0.032	0.041	0.043	0.039	0.058	0.043	0.043	0.029	0.032	0.079	0.079	0.035

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results																	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)						Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
11/01/23	0.015	0.015	6.210	5.969	6.516	0.061	0.056	0.070	2,570	2,422	2,801	69	62	79	99.03	2.01	97.32	1.57
11/02/23	0.015	0.015	6.461	5.757	6.876	0.062	0.057	0.068	2,506	2,276	2,702	65	56	73	99.04	2.02	97.39	1.58
11/03/23	0.014	0.015	6.483	6.132	6.775	0.062	0.059	0.067	2,497	2,294	2,656	68	63	73	99.04	2.02	97.29	1.57
11/04/23	0.015	0.015	6.432	6.175	6.839	0.059	0.054	0.064	2,408	2,236	2,607	62	51	71	99.08	2.04	97.43	1.59
11/05/23	0.015	0.015	6.562	6.164	7.318	0.056	0.053	0.062	2,222	2,048	2,541	59	51	72	99.14	2.07	97.35	1.58
11/06/23	0.015	0.015	6.568	6.283	6.955	0.057	0.052	0.067	2,289	2,056	2,537	60	51	72	99.14	2.06	97.37	1.58
11/07/23	0.015	0.015	6.780	6.349	7.280	0.062	0.056	0.067	2,389	2,263	2,567	63	58	71	99.09	2.04	97.38	1.58
11/08/23	0.016	0.017	6.988	6.546	7.479	0.071	0.062	0.103***	2,290	2,093	2,423	59	39	70	98.98	1.99	97.41	1.59
11/09/23	0.015	0.016	6.868	5.757	7.478	0.062	0.056	0.071	2,401	2,263	2,579	63	57	70	99.10	2.05	97.36	1.58
11/10/23	0.015	0.015	6.521	5.640	6.997	0.058	0.055	0.064	2,431	2,252	2,659	62	56	73	99.11	2.05	97.43	1.59
11/11/23	0.015	0.015	6.572	5.929	6.945	0.056	0.052	0.061	2,347	2,167	2,600	60	50	70	99.15	2.07	97.45	1.59
11/12/23	0.015	0.015	6.582	6.007	7.073	0.057	0.052	0.062	2,287	2,112	2,594	60	54	72	99.14	2.06	97.39	1.58
11/13/23	0.016	0.022	6.792	6.242	7.200	0.048	0.033	0.072	2,172	1,963	2,446	44	27	111	99.29	2.15	97.99	1.70
11/14/23	0.015	0.015	6.622	5.851	7.148	0.046	0.040	0.058	2,359	2,134	2,556	62	53	72	99.31	2.16	97.38	1.58
11/15/23	0.015	0.015	6.483	5.830	7.002	0.047	0.042	0.060	2,367	2,202	2,515	61	54	67	99.27	2.14	97.43	1.59
11/16/23	0.015	0.015	6.886	6.350	7.126	0.045	0.038	0.098	2,242	2,038	2,479	57	49	66	99.35	2.19	97.47	1.60
11/17/23	0.014	0.015	6.704	6.066	7.125	0.045	0.038	0.055	2,355	2,196	2,534	58	51	64	99.33	2.18	97.53	1.61
11/18/23	0.015	0.015	6.559	6.116	6.994	0.045	0.041	0.055	2,391	2,269	2,509	60	54	73	99.32	2.17	97.49	1.60
11/19/23	0.015	0.015	6.698	6.416	7.274	0.043	0.037	0.054	2,242	2,084	2,456	57	51	65	99.36	2.20	97.44	1.59
11/20/23	0.015	0.015	6.664	5.981	7.225	0.043	0.034	0.050	2,314	2,143	2,530	58	50	69	99.35	2.19	97.49	1.60
11/21/23	0.015	0.015	6.672	6.341	7.186	0.046	0.038	0.059	2,394	2,266	2,541	60	55	67	99.31	2.16	97.49	1.60
11/22/23	0.015	0.015	6.592	6.308	7.266	0.045	0.038	0.067	2,425	2,303	2,613	61	55	69	99.31	2.16	97.50	1.60
11/23/23	0.015	0.015	6.525	5.903	6.944	0.043	0.037	0.054	2,374	2,221	2,575	59	53	65	99.34	2.18	97.52	1.61
11/24/23	0.015	0.015	6.398	6.086	6.766	0.039	0.033	0.046	2,251	2,099	2,599	55	48	69	99.39	2.21	97.56	1.61
11/25/23	0.015	0.015	6.379	5.654	6.730	0.040	0.033	0.051	2,432	2,284	2,644	59	54	70	99.38	2.21	97.56	1.61
11/26/23	0.015	0.015	6.370	5.677	6.763	0.040	0.035	0.048	2,377	2,219	2,615	59	52	70	99.37	2.20	97.51	1.60
11/27/23	0.015	0.015	6.492	6.189	6.929	0.044	0.035	0.056	2,403	2,186	2,672	58	49	70	99.32	2.17	97.57	1.61
11/28/23	0.015	0.015	6.470	6.224	6.791	0.048	0.041	0.062	2,473	2,320	2,635	62	56	71	99.26	2.13	97.49	1.60
11/29/23	0.015	0.015	6.454	5.792	6.791	0.048	0.042	0.057	2,451	2,210	2,614	62	53	70	99.25	2.13	97.48	1.60
11/30/23	0.015	0.015	6.664	6.073	7.053	0.049	0.042	0.058	2,453	2,292	2,602	61	52	69	99.27	2.14	97.51	1.60

Notes:

*** Value affected by a short term TOC spike.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
11/01/23	96.68	119.942	39,564.7	0.34	4	6
11/02/23	96.62	120.081	41,012.0	0.34	4	6
11/03/23	96.51	118.514	40,997.3	0.34	4	6
11/04/23	96.44	118.335	40,164.8	0.34	4	6
11/05/23	96.51	111.739	40,334.9	0.34	4	6
11/06/23	96.64	117.747	40,236.7	0.34	4	6
11/07/23	96.63	118.924	39,818.3	0.34	4	6
11/08/23	97.01	79.607	39,411.4	0.34	4	6
11/09/23	96.54	118.695	29,934.7	0.36	4	6
11/10/23	96.61	120.412	40,178.0	0.34	4	6
11/11/23	96.64	115.822	40,485.0	0.34	4	6
11/12/23	96.34	109.300	38,512.1	0.34	4	6
11/13/23	96.59	57.130	34,404.1	0.34	4	6
11/14/23	96.51	119.152	24,145.4	0.36	4	6
11/15/23	96.61	120.783	40,233.3	0.34	4	6
11/16/23	96.46	120.378	40,927.0	0.34	4	6
11/17/23	96.50	119.736	40,613.2	0.34	4	6
11/18/23	96.70	120.684	40,684.7	0.34	4	6
11/19/23	96.85	115.770	40,042.9	0.34	4	6
11/20/23	96.73	119.995	39,833.4	0.34	4	6
11/21/23	96.86	120.015	40,603.6	0.34	4	6
11/22/23	97.18	120.728	40,836.7	0.34	4	6
11/23/23	97.00	114.314	40,920.2	0.34	4	6
11/24/23	96.85	110.691	39,076.3	0.35	4	6
11/25/23	97.09	112.504	38,497.2	0.35	4	6
11/26/23	96.85	116.449	38,923.1	0.34	4	6
11/27/23	96.60	120.437	39,559.6	0.34	4	6
11/28/23	96.61	117.072	40,690.0	0.34	4	6
11/29/23	96.80	109.467	39,092.6	0.33	4	6
11/30/23	96.55	109.498	38,474.6	0.33	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

minimum EED = 0.31 kwh/kgal

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Total Documented Pathogenic Microorganism Reduction Achieved			Minimum Required Log Reduction Achieved			Compliance % Exceedance Time				
							MFE		ROP		
	Giardia	Cryptosporidium	Virus	Giardia (10)	Cryptosporidium (10)	Virus (12)	NTU		NTU		TOC
Date	LRV	LRV	LRV	Y/N	Y/N	Y/N	>0.2	>0.5	>0.2	>0.5	>0.5
12/01/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/02/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/03/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/04/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/05/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/06/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/07/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/08/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/09/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/10/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/11/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/12/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/13/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/14/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/15/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/16/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/17/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/18/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/19/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/20/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/21/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/22/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/23/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/24/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/25/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/26/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/27/23	13	13	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/28/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/29/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/30/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0
12/31/23	12	12	12	Y	Y	Y	0.0	0.0	0.0	0.0	0.0

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	Documented Giardia and Cryptosporidium Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time (ToT)	Total
Date	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
12/01/23	0.00	4.54	2.15	6.00	0.00	12.69
12/02/23	0.00	4.56	2.15	6.00	0.00	12.72
12/03/23	0.00	4.43	2.19	6.00	0.00	12.63
12/04/23	0.00	4.41	2.19	6.00	0.00	12.60
12/05/23	0.00	4.52	2.15	6.00	0.00	12.67
12/06/23	0.00	4.32	2.16	6.00	0.00	12.48
12/07/23	0.00	4.45	2.16	6.00	0.00	12.61
12/08/23	0.00	4.43	2.18	6.00	0.00	12.61
12/09/23	0.00	4.44	2.19	6.00	0.00	12.63
12/10/23	0.00	4.43	2.22	6.00	0.00	12.65
12/11/23	0.00	4.44	2.23	6.00	0.00	12.67
12/12/23	0.00	4.42	2.20	6.00	0.00	12.62
12/13/23	0.00	4.40	2.19	6.00	0.00	12.59
12/14/23	0.00	4.34	2.16	6.00	0.00	12.49
12/15/23	0.00	4.32	2.17	6.00	0.00	12.49
12/16/23	0.00	4.33	2.18	6.00	0.00	12.51
12/17/23	0.00	4.28	2.23	6.00	0.00	12.51
12/18/23	0.00	4.24	2.24	6.00	0.00	12.48
12/19/23	0.00	4.25	2.21	6.00	0.00	12.45
12/20/23	0.00	4.31	2.18	6.00	0.00	12.49
12/21/23	0.00	4.26	2.16	6.00	0.00	12.42
12/22/23	0.00	4.41	2.12	6.00	0.00	12.52
12/23/23	0.00	4.37	2.19	6.00	0.00	12.57
12/24/23	0.00	4.25	2.30	6.00	0.00	12.55
12/25/23	0.00	4.30	2.30	6.00	0.00	12.60
12/26/23	0.00	4.33	2.30	6.00	0.00	12.63
12/27/23	0.00	4.25	2.29	6.00	0.00	12.54
12/28/23	0.00	4.22	2.27	6.00	0.00	12.50
12/29/23	0.00	4.36	2.07	6.00	0.00	12.43
12/30/23	0.00	4.33	2.11	6.00	0.00	12.45
12/31/23	0.00	4.23	2.13	6.00	0.00	12.36

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Documented Virus Reduction Achieved					
	OC San	$MF+Cl_2$	RO	UV/AOP	Underground travel time	Total
	LRV	*LRV*	*LRV*	*LRV*	*LRV*	*LRV*
12/01/23	0.00	0.00	2.15	6.00	4.00	12.15
12/02/23	0.00	0.00	2.15	6.00	4.00	12.15
12/03/23	0.00	0.00	2.19	6.00	4.00	12.19
12/04/23	0.00	0.00	2.19	6.00	4.00	12.19
12/05/23	0.00	0.00	2.15	6.00	4.00	12.15
12/06/23	0.00	0.00	2.16	6.00	4.00	12.16
12/07/23	0.00	0.00	2.16	6.00	4.00	12.16
12/08/23	0.00	0.00	2.18	6.00	4.00	12.18
12/09/23	0.00	0.00	2.19	6.00	4.00	12.19
12/10/23	0.00	0.00	2.22	6.00	4.00	12.22
12/11/23	0.00	0.00	2.23	6.00	4.00	12.23
12/12/23	0.00	0.00	2.20	6.00	4.00	12.20
12/13/23	0.00	0.00	2.19	6.00	4.00	12.19
12/14/23	0.00	0.00	2.16	6.00	4.00	12.16
12/15/23	0.00	0.00	2.17	6.00	4.00	12.17
12/16/23	0.00	0.00	2.18	6.00	4.00	12.18
12/17/23	0.00	0.00	2.23	6.00	4.00	12.23
12/18/23	0.00	0.00	2.24	6.00	4.00	12.24
12/19/23	0.00	0.00	2.21	6.00	4.00	12.21
12/20/23	0.00	0.00	2.18	6.00	4.00	12.18
12/21/23	0.00	0.00	2.16	6.00	4.00	12.16
12/22/23	0.00	0.00	2.12	6.00	4.00	12.12
12/23/23	0.00	0.00	2.19	6.00	4.00	12.19
12/24/23	0.00	0.00	2.30	6.00	4.00	12.30
12/25/23	0.00	0.00	2.30	6.00	4.00	12.30
12/26/23	0.00	0.00	2.30	6.00	4.00	12.30
12/27/23	0.00	0.00	2.29	6.00	4.00	12.29
12/28/23	0.00	0.00	2.27	6.00	4.00	12.27
12/29/23	0.00	0.00	2.07	6.00	4.00	12.07
12/30/23	0.00	0.00	2.11	6.00	4.00	12.11
12/31/23	0.00	0.00	2.13	6.00	4.00	12.13

Notes:

Orange County Water District - Ground Water Replenishment System (GWRS)

State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report

system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results Log Removal Value															
	A01	**A02**	**A03**	**A04**	**A05**	**A06**	**A07**	**A08**	**B01**	**B02**	**B03**	**B04**	**B05**	**B06**	**B07**	**B08**
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
12/01/23	5.09	4.93	5.18	4.78	4.91	5.06	4.91	5.01	4.94	5.29	4.95	4.91	5.19	4.85	4.98	4.66
12/02/23	5.03	4.91	5.15	4.75	4.87	5.00	4.90	4.95	4.94	5.25	4.90	4.92	5.42	4.89	4.96	4.70
12/03/23	5.02	4.91	5.15	4.98	4.85	4.95	4.91	4.99	5.20	5.24	4.87	4.89	5.74	4.87	4.97	4.68
12/04/23	5.00	5.14	5.08	4.94	4.80	5.01	5.15	4.94	5.21	5.22	4.86	4.87	5.08	5.03	4.97	4.68
12/05/23	5.02	5.07	5.09	4.90	4.77	5.01	5.03	4.87	5.18	5.21	4.84	4.84	4.52	4.99	4.97	4.83
12/06/23	5.03	5.09	5.10	4.91	4.78	4.98	5.04	4.87	5.14	5.17	4.79	4.85	4.32	4.96	4.93	4.84
12/07/23	4.96	5.07	5.15	4.90	4.75	4.96	5.08	4.91	5.14	5.20	4.84	4.81	4.80	5.00	4.94	4.86
12/08/23	5.02	4.98	5.06	4.85	5.04	4.94	5.04	4.84	5.11	5.01	4.84	4.80	4.66	5.01	4.94	4.80
12/09/23	4.99	5.03	5.10	4.92	4.99	4.95	5.09	4.86	5.18	5.06	4.85	4.79	4.96	5.02	4.92	4.78
12/10/23	4.97	5.00	5.04	4.89	4.94	4.94	5.04	4.84	5.12	5.10	4.78	4.79	5.10	5.00	4.92	4.78
12/11/23	4.95	4.92	5.03	4.88	4.96	4.88	5.02	4.81	5.07	5.05	4.78	4.78	4.88	4.90	4.90	4.75
12/12/23	4.94	4.95	5.01	4.84	4.97	4.82	5.05	4.82	5.07	4.96	4.80	4.69	4.75	4.88	4.91	4.69
12/13/23	4.94	5.04	5.01	4.87	4.95	4.87	4.97	4.79	5.03	4.98	4.80	4.65	4.52	4.94	4.88	4.70
12/14/23	4.92	5.04	5.06	4.85	4.89	4.90	4.95	4.79	5.05	5.00	4.78	4.90	4.72	4.88	4.88	4.73
12/15/23	4.93	4.93	4.99	4.87	4.92	4.88	4.98	4.79	5.02	5.00	4.73	4.99	4.94	4.91	4.88	4.77
12/16/23	4.91	4.99	5.02	4.82	4.94	4.79	4.94	4.76	5.01	5.09	4.71	4.97	4.80	4.91	4.86	4.77
12/17/23	4.86	5.03	4.94	4.88	4.83	4.83	4.96	4.77	5.04	5.43	4.74	4.96	4.83	4.92	4.83	4.77
12/18/23	4.89	4.97	4.95	4.86	4.89	4.84	4.95	4.76	4.99	5.45	4.72	4.96	5.09	4.93	4.83	4.73
12/19/23	4.84	4.95	4.96	4.84	4.87	4.76	4.99	4.78	5.02	5.50	4.69	4.95	5.37	4.89	4.85	4.70
12/20/23	4.86	4.98	5.02	4.80	4.83	4.74	4.97	4.82	5.04	5.56	4.71	4.96	4.86	4.93	4.91	4.73
12/21/23	4.88	4.89	4.92	4.81	4.84	4.75	4.90	4.74	4.90	5.41	4.65	4.91	4.53	4.85	4.84	4.68
12/22/23	4.81	4.89	4.87	4.80	4.82	4.70	4.88	4.74	4.94	5.35	4.65	4.90	5.04	4.86	4.82	4.68
12/23/23	4.79	4.88	4.88	4.72	4.73	4.68	4.82	4.66	4.81	5.33	4.60	4.91	4.59	4.84	4.76	4.59
12/24/23	4.80	4.84	5.10	4.68	4.72	4.58	4.82	4.63	4.83	5.32	4.52	4.90	4.25	4.79	4.73	4.56
12/25/23	5.04	4.84	5.16	4.70	4.72	4.60	4.85	4.64	4.85	5.33	4.49	4.87	4.34	4.81	4.76	4.54
12/26/23	5.07	4.85	5.08	4.65	4.70	4.94	4.79	4.64	4.79	5.40	4.52	4.85	4.94	4.84	4.77	4.59
12/27/23	4.99	4.81	5.07	4.69	4.63	4.99	4.78	4.89	4.78	5.31	4.75	4.87	5.21	4.73	4.75	4.50
12/28/23	5.00	4.72	5.07	4.66	4.63	4.92	4.79	4.95	4.70	5.22	4.84	4.77	5.22	4.67	4.91	4.48
12/29/23	5.00	4.73	5.05	4.65	4.68	4.98	4.83	4.95	5.12	5.22	4.87	4.81	5.13	4.68	4.98	4.49
12/30/23	4.98	4.80	5.08	4.98	4.59	4.94	4.73	4.89	5.19	5.13	4.85	4.77	4.63	4.90	4.97	4.46
12/31/23	4.97	5.06	5.11	4.93	4.58	4.89	5.01	4.91	5.21	5.18	4.81	4.75	4.74	5.06	4.93	4.48

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

	MicroFiltration Process online monitoring results															
	Log Removal Value															
	C01	C02	C03	C04	C05	C06	C07	C08	D01	D02	D03	D04	D05	D06	D07	D08
Date	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV	LRV
12/01/23	4.55	4.82	4.70	4.61	4.72	4.61	4.65	4.89	5.05	4.66	5.08	5.02	5.02	5.13	4.90	5.08
12/02/23	4.56	4.81	4.71	4.61	4.71	4.61	4.65	4.91	4.93	5.01	5.08	5.04	5.01	5.10	4.90	5.02
12/03/23	4.48	4.80	4.75	4.60	4.69	4.58	4.66	4.89	4.95	4.43	5.04	5.08	5.03	5.09	4.90	5.04
12/04/23	4.66	4.74	4.68	4.60	4.66	4.55	4.63	4.87	4.99	4.41	5.01	5.06	4.97	5.10	4.86	5.05
12/05/23	4.79	4.70	4.66	4.54	4.81	4.54	4.59	4.86	4.94	4.73	5.04	5.01	4.95	5.10	4.86	5.05
12/06/23	4.75	4.72	4.57	4.51	4.99	4.51	4.60	4.85	4.94	4.78	5.05	5.02	4.93	5.07	4.85	5.00
12/07/23	4.74	4.69	4.48	4.48	4.92	4.45	4.53	4.84	4.92	4.88	5.00	5.05	4.88	5.06	4.85	5.01
12/08/23	4.76	4.64	4.81	4.46	4.93	4.43	4.52	4.83	4.88	5.12	4.96	5.03	4.83	5.06	4.86	5.01
12/09/23	4.77	4.60	4.95	4.45	4.95	4.44	4.54	4.82	4.86	5.04	4.96	4.98	4.79	5.03	4.84	5.02
12/10/23	4.69	4.54	4.85	4.45	4.98	4.43	4.51	4.83	4.90	4.56	4.97	4.98	4.96	4.99	4.84	5.01
12/11/23	4.65	4.84	4.84	4.45	4.98	4.66	4.69	4.79	4.93	5.12	5.00	4.95	5.09	5.05	4.84	4.93
12/12/23	4.64	5.01	4.81	4.42	4.90	4.70	4.76	4.74	4.86	4.84	4.96	4.95	5.04	5.09	4.92	4.97
12/13/23	4.64	4.97	4.77	4.40	4.87	4.67	4.78	4.71	4.87	4.90	5.00	4.95	4.99	5.03	5.03	4.95
12/14/23	4.66	4.95	4.79	4.34	4.82	4.68	4.80	4.70	4.91	5.12	5.00	4.95	5.03	4.98	4.96	4.97
12/15/23	4.65	4.94	4.81	4.32	4.83	4.65	4.78	4.65	4.89	5.00	4.98	4.96	5.03	5.01	4.92	4.98
12/16/23	4.61	4.93	4.81	4.33	4.83	4.65	4.80	4.63	4.87	4.58	4.95	4.96	5.02	5.01	4.95	4.92
12/17/23	4.60	4.90	4.76	4.28	4.77	4.65	4.77	4.64	4.87	4.35	4.92	4.96	5.03	4.99	5.00	4.93
12/18/23	4.50	4.87	4.71	4.24	4.74	4.62	4.73	4.62	4.88	4.97	4.90	4.90	5.03	5.01	5.00	4.94
12/19/23	4.47	4.86	4.75	4.25	4.70	4.62	4.73	4.60	4.89	4.78	4.92	4.87	4.97	4.95	4.96	4.93
12/20/23	4.53	4.89	4.81	4.31	4.74	4.62	4.73	4.57	4.84	4.53	5.05	4.95	4.94	4.92	4.97	4.89
12/21/23	4.50	4.84	4.76	4.26	4.71	4.55	4.69	4.55	4.81	5.06	5.18	5.08	4.94	4.92	4.95	4.86
12/22/23	4.44	4.81	4.68	4.41	4.68	4.53	4.68	4.51	4.78	5.04	5.14	5.09	4.89	4.90	4.92	4.87
12/23/23	4.37	4.80	4.62	4.68	4.62	4.56	4.68	4.64	4.71	4.83	5.08	5.10	4.86	4.90	4.90	4.82
12/24/23	4.31	4.75	4.55	4.56	4.55	4.48	4.65	4.85	4.98	4.76	5.10	5.09	4.88	5.10	4.87	4.85
12/25/23	4.30	4.70	4.52	4.49	4.48	4.42	4.67	4.86	5.01	4.71	5.06	5.08	4.88	5.10	4.90	5.04
12/26/23	4.33	4.72	4.55	4.55	4.53	4.48	4.64	4.86	4.97	4.69	5.02	5.06	4.82	5.08	4.91	5.02
12/27/23	4.25	4.67	4.52	4.58	4.45	4.46	4.61	4.86	4.96	4.73	5.04	5.10	4.80	5.07	4.87	4.98
12/28/23	4.22	4.54	4.43	4.47	4.35	4.38	4.59	4.84	4.91	4.61	5.00	5.07	4.78	5.03	4.81	5.03
12/29/23	4.55	4.59	4.36	4.50	5.01	4.44	4.57	4.79	5.01	4.52	5.03	5.08	4.71	5.05	4.78	4.97
12/30/23	4.64	4.58	4.69	4.50	4.88	4.33	4.57	4.79	5.01	4.46	4.99	5.03	4.73	5.04	4.81	4.98
12/31/23	4.65	4.54	4.84	4.49	4.84	4.23	4.50	4.76	4.94	4.38	4.99	4.93	4.67	5.00	4.81	4.99

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Log Removal Value

Date	E01 LRV	E02 LRV	E03 LRV	E04 LRV	E05 LRV	E06 LRV	E07 LRV	E08 LRV	F01 LRV	F02 LRV	F03 LRV	F04 LRV	F05 LRV	F06 LRV	F07 LRV	F08 LRV
12/01/23	4.58	4.71	4.94	4.54	4.97	5.08	4.70	4.95	4.91	5.01	4.71	4.94	4.59	4.70	4.64	5.00
12/02/23	4.63	4.88	4.95	4.59	5.03	5.01	4.69	4.94	4.92	4.98	4.70	4.84	4.47	4.66	4.60	4.98
12/03/23	4.55	5.04	4.95	4.59	4.99	5.01	4.82	4.96	4.86	5.04	4.75	4.82	4.50	4.56	4.60	4.97
12/04/23	4.55	4.76	4.98	4.64	4.94	4.99	4.81	5.13	4.77	4.86	4.81	4.88	4.49	4.62	4.70	5.12
12/05/23	4.55	4.74	5.08	4.84	5.11	4.96	4.79	4.87	4.86	4.91	4.76	4.73	4.61	4.60	4.53	4.93
12/06/23	4.51	4.91	5.19	4.61	5.01	5.09	4.84	4.99	4.75	4.92	4.88	4.77	4.45	4.52	4.50	4.93
12/07/23	4.50	4.68	4.98	4.63	4.91	4.85	4.75	5.04	4.82	4.87	4.84	4.85	4.55	4.75	4.66	4.98
12/08/23	4.48	4.64	4.92	4.67	5.04	5.01	4.71	4.90	4.84	4.90	4.74	4.76	4.60	4.50	4.59	4.99
12/09/23	4.74	4.81	4.88	4.52	4.96	4.93	4.71	4.95	4.74	4.96	4.65	4.72	4.46	4.46	4.45	4.87
12/10/23	4.74	4.80	4.85	4.50	4.99	4.81	4.69	5.08	4.76	4.95	4.81	4.88	N/A *	4.58	4.65	5.13
12/11/23	4.44	4.88	4.89	4.54	5.05	4.87	5.04	5.04	4.74	4.96	4.87	4.82	4.53	4.55	4.62	4.90
12/12/23	4.46	4.82	5.05	4.54	4.85	4.92	4.78	4.91	4.68	4.94	4.84	4.80	4.47	4.49	4.60	4.84
12/13/23	4.54	4.78	5.00	4.44	5.08	4.92	4.68	4.88	4.62	4.87	4.79	4.88	4.44	4.56	4.64	5.10
12/14/23	4.47	4.95	4.93	4.63	5.02	4.93	5.07	4.94	4.79	5.21	4.83	4.69	4.49	4.52	4.56	4.91
12/15/23	4.50	4.78	4.91	4.63	5.08	4.95	4.85	5.09	4.69	4.82	4.83	4.71	4.66	4.44	4.54	4.82
12/16/23	4.59	4.96	4.87	4.65	5.22	5.03	4.84	4.97	4.73	4.94	4.73	4.78	4.57	4.48	4.62	5.07
12/17/23	4.49	4.91	4.89	4.57	4.92	5.21	4.87	4.99	4.82	4.91	4.59	4.71	4.39	4.48	4.59	4.84
12/18/23	4.46	4.76	4.93	4.68	4.97	4.94	4.77	5.11	4.69	4.84	4.76	4.61	4.50	4.43	4.75	4.83
12/19/23	4.47	4.78	4.86	4.72	5.12	4.96	4.73	5.01	4.69	4.85	4.71	4.73	4.51	4.49	4.59	4.84
12/20/23	4.57	4.88	4.99	4.63	5.02	4.98	4.76	4.98	4.67	4.92	4.60	4.75	4.46	4.40	4.48	4.83
12/21/23	4.62	4.82	4.95	4.61	4.89	4.98	4.73	5.06	4.68	4.97	4.70	4.83	4.59	4.42	4.67	4.87
12/22/23	4.45	4.93	4.98	4.64	4.94	4.98	4.67	5.04	4.91	4.95	4.66	4.84	4.58	4.51	4.54	4.86
12/23/23	4.45	4.80	5.06	4.49	4.87	5.02	4.82	4.95	4.68	5.06	4.82	4.85	4.47	4.44	4.55	4.83
12/24/23	4.59	4.74	5.03	4.56	4.90	4.97	4.76	5.00	4.65	4.91	4.73	4.83	4.49	4.33	4.66	4.82
12/25/23	4.52	4.98	5.05	4.64	5.08	4.95	4.75	5.05	4.81	4.96	4.68	4.71	4.47	4.42	4.59	4.85
12/26/23	4.44	4.69	4.96	4.55	4.81	5.05	4.82	5.09	4.68	4.93	4.86	4.64	4.41	4.33	4.49	4.88
12/27/23	4.47	4.62	4.79	4.45	4.94	4.83	4.80	4.98	4.64	4.88	4.73	4.70	4.55	4.53	4.53	5.16
12/28/23	4.50	4.77	4.87	4.56	4.96	4.91	4.89	4.81	4.73	4.87	4.61	4.64	4.37	4.49	4.50	4.88
12/29/23	4.67	4.76	5.00	4.53	4.89	5.03	4.81	5.08	4.70	5.02	4.72	4.74	4.53	4.39	4.39	4.81
12/30/23	4.59	4.69	5.01	4.68	4.97	4.91	4.71	4.91	4.67	4.77	4.80	4.85	4.66	4.32	4.48	4.83
12/31/23	4.49	4.69	5.02	4.76	5.05	4.88	4.71	4.95	4.85	4.82	4.67	4.83	4.46	4.52	4.57	5.06

Notes:

Giardia and Crypto LRV based on USEPA Membrane Filtration Guidance Manual and sensitive at less than 3 micron.

* Cell offline for maintenance.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

MicroFiltration Process online monitoring results

Effluent Turbidity - NTU

Date	A01-A04		A05-A08		B01-B04		B05-B08		C01-C04		C05-C08		D01-D04		D05-D08		E01-E04		E05-E08		F01-F04		F05-F08		MFE
	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg	max	avg
12/01/23	0.032	0.036	0.025	0.029	0.026	0.029	0.022	0.023	0.027	0.027	0.025	0.043	0.029	0.029	0.040	0.041	0.039	0.045	0.046	0.049	0.035	0.266**	0.082	0.084	0.036
12/02/23	0.032	0.036	0.025	0.027	0.026	0.029	0.022	0.026	0.027	0.028	0.026	0.028	0.029	0.032	0.040	0.041	0.041	0.062	0.049	0.049	0.037	0.039	0.084	0.084	0.036
12/03/23	0.034	0.039	0.025	0.026	0.027	0.029	0.022	0.024	0.027	0.032	0.026	0.027	0.029	0.029	0.040	0.042	0.046	0.064	0.049	0.049	0.043	0.046	0.084	0.084	0.038
12/04/23	0.033	0.038	0.025	0.029	0.026	0.027	0.024	0.027	0.028	0.028	0.026	0.030	0.029	0.030	0.040	0.042	0.047	0.049	0.049	0.049	0.049	0.053	0.084	0.084	0.038
12/05/23	0.033	0.035	0.025	0.029	0.027	0.032	0.024	0.029	0.028	0.029	0.027	0.028	0.029	0.039	0.040	0.042	0.051	0.065	0.051	0.052	0.056	0.061	0.084	0.084	0.040
12/06/23	0.031	0.040	0.025	0.027	0.026	0.029	0.022	0.024	0.030	0.032	0.026	0.027	0.027	0.030	0.040	0.046	0.038	0.056	0.043	0.052	0.044	0.063	0.072	0.084	0.035
12/07/23	0.030	0.033	0.026	0.028	0.026	0.027	0.022	0.023	0.031	0.034	0.025	0.027	0.026	0.031	0.040	0.048	0.027	0.029	0.037	0.038	0.031	0.034	0.065	0.068	0.032
12/08/23	0.029	0.032	0.026	0.029	0.026	0.027	0.022	0.023	0.031	0.034	0.025	0.033	0.025	0.032	0.039	0.056	0.029	0.044	0.040	0.100	0.032	0.033	0.067	0.068	0.033
12/09/23	0.029	0.034	0.026	0.028	0.026	0.027	0.022	0.028	0.031	0.032	0.025	0.032	0.025	0.026	0.039	0.040	0.028	0.032	0.041	0.075	0.033	0.035	0.069	0.074	0.033
12/10/23	0.029	0.031	0.025	0.028	0.026	0.027	0.021	0.026	0.031	0.033	0.027	0.163	0.025	0.026	0.040	0.043	0.029	0.031	0.087	0.245**	0.035	0.036	0.070	0.070	0.037
12/11/23	0.029	0.031	0.026	0.028	0.026	0.027	0.022	0.024	0.032	0.050	0.027	0.031	0.025	0.027	0.040	0.044	0.032	0.047	0.074	0.163	0.037	0.040	0.071	0.075	0.037
12/12/23	0.029	0.031	0.026	0.028	0.026	0.026	0.022	0.023	0.031	0.032	0.027	0.028	0.025	0.026	0.041	0.045	0.032	0.034	0.044	0.117	0.039	0.042	0.075	0.076	0.035
12/13/23	0.029	0.031	0.026	0.027	0.026	0.030	0.022	0.023	0.032	0.034	0.026	0.043	0.025	0.026	0.041	0.043	0.030	0.035	0.027	0.030	0.036	0.056	0.070	0.080	0.032
12/14/23	0.029	0.031	0.026	0.028	0.027	0.034	0.023	0.024	0.032	0.036	0.026	0.030	0.026	0.027	0.041	0.054	0.030	0.045	0.029	0.033	0.034	0.040	0.053	0.080	0.031
12/15/23	0.029	0.036	0.026	0.028	0.027	0.029	0.023	0.029	0.032	0.045	0.026	0.027	0.026	0.028	0.040	0.043	0.028	0.031	0.029	0.031	0.034	0.034	0.038	0.045	0.030
12/16/23	0.028	0.038	0.025	0.035	0.027	0.033	0.023	0.026	0.031	0.046	0.026	0.027	0.026	0.029	0.040	0.041	0.029	0.043	0.029	0.034	0.033	0.035	0.038	0.038	0.030
12/17/23	0.028	0.030	0.025	0.027	0.027	0.031	0.022	0.032	0.031	0.032	0.026	0.028	0.026	0.028	0.040	0.045	0.030	0.040	0.029	0.031	0.033	0.034	0.037	0.041	0.030
12/18/23	0.028	0.030	0.025	0.034	0.027	0.028	0.022	0.024	0.031	0.032	0.026	0.028	0.026	0.027	0.041	0.061	0.030	0.035	0.030	0.031	0.034	0.049	0.038	0.040	0.030
12/19/23	0.029	0.031	0.026	0.028	0.027	0.038	0.023	0.033	0.032	0.033	0.027	0.028	0.027	0.033	0.041	0.043	0.033	0.047	0.030	0.033	0.034	0.040	0.039	0.040	0.031
12/20/23	0.029	0.036	0.026	0.031	0.027	0.036	0.023	0.030	0.032	0.035	0.027	0.040	0.028	0.034	0.042	0.042	0.035	0.038	0.031	0.045	0.034	0.040	0.039	0.043	0.031
12/21/23	0.029	0.031	0.026	0.030	0.027	0.030	0.023	0.030	0.032	0.034	0.027	0.032	0.028	0.031	0.042	0.062	0.036	0.041	0.031	0.035	0.030	0.036	0.042	0.045	0.031
12/22/23	0.028	0.031	0.025	0.028	0.027	0.029	0.022	0.024	0.032	0.033	0.027	0.029	0.026	0.028	0.041	0.042	0.039	0.044	0.033	0.036	0.030	0.036	0.043	0.044	0.031
12/23/23	0.028	0.030	0.025	0.027	0.027	0.028	0.022	0.028	0.032	0.033	0.028	0.036	0.027	0.028	0.043	0.045	0.042	0.046	0.035	0.038	0.030	0.033	0.046	0.049	0.032
12/24/23	0.030	0.043	0.025	0.029	0.027	0.029	0.022	0.024	0.032	0.033	0.028	0.029	0.027	0.030	0.043	0.054	0.046	0.050	0.039	0.041	0.030	0.034	0.050	0.051	0.033
12/25/23	0.029	0.043	0.026	0.030	0.027	0.028	0.023	0.028	0.032	0.033	0.029	0.031	0.027	0.028	0.043	0.045	0.050	0.063	0.043	0.047	0.031	0.034	0.053	0.055	0.034
12/26/23	0.030	0.034	0.027	0.031	0.028	0.035	0.024	0.031	0.033	0.036	0.031	0.049	0.027	0.029	0.044	0.046	0.052	0.055	0.047	0.051	0.032	0.036	0.057	0.062	0.036
12/27/23	0.030	0.032	0.028	0.038	0.028	0.043	0.023	0.030	0.033	0.042	0.028	0.033	0.028	0.030	0.043	0.046	0.041	0.060	0.044	0.055	0.031	0.033	0.048	0.063	0.034
12/28/23	0.029	0.031	0.027	0.030	0.028	0.033	0.023	0.029	0.033	0.040	0.027	0.034	0.027	0.030	0.043	0.044	0.030	0.041	0.032	0.034	0.031	0.033	0.039	0.041	0.031
12/29/23	0.031	0.038	0.029	0.064	0.030	0.036	0.024	0.033	0.035	0.053	0.034	0.040	0.027	0.031	0.043	0.051	0.029	0.034	0.034	0.036	0.032	0.034	0.041	0.045	0.033
12/30/23	0.032	0.038	0.030	0.033	0.030	0.031	0.024	0.026	0.034	0.039	0.039	0.052	0.026	0.027	0.043	0.055	0.030	0.033	0.038	0.041	0.032	0.042	0.044	0.048	0.033
12/31/23	0.032	0.038	0.030	0.035	0.030	0.045	0.024	0.027	0.034	0.036	0.039	0.042	0.026	0.028	0.043	0.044	0.033	0.050	0.044	0.048	0.035	0.040	0.047	0.048	0.035

Notes:

Effluent turbidity ntu limit 0.20 , values of 0.5 ntu require shutdown of cell.

** Erroneous value due to instrument issue.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	Reverse Osmosis Process online monitoring results															Calculated TOC removal based on Daily Avg		Calculated EC removal based on Daily Avg	
	Turbidity (ntu)		Total Organic Carbon (TOC - ppm)						Electro Conductivity (EC)									
	ROP		ROF			ROP			ROF			ROP						
	avg	max	avg	min	max	avg	min	max	avg	min	max	avg	min	max	%	Log	%	Log
12/01/23	0.015	0.015	6.538	5.951	6.947	0.046	0.041	0.056	2,430	2,261	2,608	61	55	67	99.29	2.15	97.51	1.60
12/02/23	0.015	0.015	6.500	5.832	7.239	0.046	0.038	0.056	2,427	2,317	2,548	58	52	65	99.30	2.15	97.61	1.62
12/03/23	0.015	0.015	6.827	5.991	7.282	0.044	0.038	0.052	2,236	2,042	2,460	52	43	61	99.36	2.19	97.66	1.63
12/04/23	0.015	0.015	6.839	6.381	7.517	0.044	0.037	0.061	2,258	2,090	2,473	53	46	63	99.36	2.19	97.64	1.63
12/05/23	0.015	0.015	6.998	5.831	7.471	0.050	0.038	0.062	2,302	2,127	2,492	54	47	63	99.29	2.15	97.64	1.63
12/06/23	0.015	0.015	6.814	6.280	7.522	0.047	0.037	0.062	2,385	2,257	2,585	54	46	62	99.31	2.16	97.75	1.65
12/07/23	0.015	0.015	7.000	6.665	7.387	0.048	0.041	0.059	2,405	2,269	2,589	54	49	61	99.31	2.16	97.76	1.65
12/08/23	0.014	0.015	6.901	6.525	7.477	0.046	0.038	0.059	2,458	2,325	2,616	55	50	61	99.34	2.18	97.76	1.65
12/09/23	0.015	0.015	6.819	6.456	7.315	0.044	0.033	0.056	2,451	2,322	2,628	55	50	61	99.36	2.19	97.76	1.65
12/10/23	0.015	0.015	7.020	6.698	7.621	0.042	0.035	0.054	2,282	2,083	2,521	49	42	58	99.40	2.22	97.84	1.67
12/11/23	0.015	0.015	7.051	6.760	7.387	0.042	0.030	0.056	2,324	2,124	2,574	50	43	58	99.41	2.23	97.87	1.67
12/12/23	0.015	0.015	6.971	6.704	7.466	0.043	0.036	0.056	2,426	2,271	2,652	52	46	59	99.38	2.20	97.87	1.67
12/13/23	0.015	0.015	6.796	6.480	7.203	0.044	0.038	0.054	2,481	2,289	2,714	54	48	63	99.36	2.19	97.82	1.66
12/14/23	0.015	0.015	6.736	5.662	7.167	0.047	0.037	0.067	2,513	2,352	2,684	54	46	61	99.30	2.16	97.86	1.67
12/15/23	0.016	0.018	6.571	5.924	6.938	0.044	0.037	0.056	2,510	2,357	2,668	53	48	59	99.33	2.17	97.90	1.68
12/16/23	0.018	0.018	6.687	6.359	7.038	0.044	0.034	0.060	2,482	2,330	2,594	50	45	54	99.34	2.18	98.00	1.70
12/17/23	0.018	0.018	6.796	6.557	7.565	0.040	0.033	0.050	2,320	2,159	2,549	45	41	54	99.41	2.23	98.04	1.71
12/18/23	0.018	0.018	6.888	6.116	7.555	0.040	0.032	0.056	2,307	2,098	2,512	47	39	57	99.42	2.24	97.98	1.69
12/19/23	0.018	0.018	7.066	6.650	7.683	0.044	0.038	0.051	2,319	2,168	2,489	49	41	56	99.38	2.21	97.89	1.68
12/20/23	0.018	0.018	7.115	6.805	7.554	0.047	0.038	0.055	2,309	2,179	2,455	47	33	55	99.34	2.18	97.95	1.69
12/21/23	0.018	0.018	7.385	6.999	7.778	0.051	0.040	0.059	2,142	1,923	2,402	44	37	53	99.31	2.16	97.95	1.69
12/22/23	0.016	0.018	7.142	6.634	7.724	0.055	0.051	0.060	2,197	2,065	2,327	44	39	48	99.24	2.12	98.01	1.70
12/23/23	0.015	0.015	7.179	6.857	7.780	0.046	0.034	0.059	2,195	2,036	2,513	43	37	53	99.36	2.19	98.05	1.71
12/24/23	0.015	0.015	7.181	6.665	7.758	0.036	0.028	0.041	2,234	2,096	2,529	44	39	54	99.50	2.30	98.02	1.70
12/25/23	0.015	0.015	6.644	6.012	7.160	0.033	0.028	0.037	2,277	2,111	2,534	49	42	60	99.50	2.30	97.86	1.67
12/26/23	0.015	0.015	6.715	6.369	7.575	0.034	0.030	0.041	2,386	2,239	2,613	52	46	58	99.50	2.30	97.83	1.66
12/27/23	0.015	0.015	7.165	6.429	7.721	0.037	0.032	0.043	2,357	2,145	2,649	49	42	59	99.48	2.29	97.91	1.68
12/28/23	0.015	0.015	7.250	6.615	8.132	0.039	0.033	0.058	2,351	2,193	2,599	48	41	56	99.47	2.27	97.97	1.69
12/29/23	0.016	0.017	7.240	6.564	8.221	0.061	0.042	0.370***	2,406	2,113	7,818***	52	40	140***	99.15	2.07	97.84	1.67
12/30/23	0.016	0.017	7.249	6.226	7.778	0.056	0.051	0.064	2,301	2,118	2,458	47	41	55	99.23	2.11	97.95	1.69
12/31/23	0.016	0.016	7.370	6.153	8.155	0.054	0.049	0.062	2,230	2,079	2,544	46	41	57	99.26	2.13	97.93	1.68

Notes:

*** Short term spike due to plant restart after unplanned plant outage.

Orange County Water District - Ground Water Replenishment System (GWRS)
State Water Resources Control Board - Div. of Drinking Water - Title 22 Groundwater Recharge Report
system no. 3090001 , Project no. 745

Date	UltraViolet / AOP Process online monitoring results					
	UVT % avg	FLOW MG	POWER kW	EED kWh/kgal	Peroxide Dose mg/L	Log Removal
12/01/23	96.54	117.272	38,700.7	0.34	4	6
12/02/23	96.64	117.517	39,394.7	0.34	4	6
12/03/23	96.51	114.558	39,651.6	0.34	4	6
12/04/23	96.48	117.449	38,651.9	0.33	4	6
12/05/23	96.46	118.255	39,435.5	0.34	4	6
12/06/23	96.54	119.120	40,020.5	0.34	4	6
12/07/23	96.31	119.926	40,404.5	0.34	4	6
12/08/23	96.46	119.560	40,910.2	0.34	4	6
12/09/23	96.51	118.206	40,484.7	0.34	4	6
12/10/23	96.46	117.051	39,742.1	0.34	4	6
12/11/23	96.68	120.062	40,143.6	0.34	4	6
12/12/23	96.71	120.293	40,766.2	0.34	4	6
12/13/23	96.59	120.626	40,854.1	0.34	4	6
12/14/23	96.65	117.500	40,322.9	0.34	4	6
12/15/23	96.96	115.282	38,975.3	0.33	4	6
12/16/23	96.84	113.344	38,345.4	0.34	4	6
12/17/23	96.72	115.374	38,290.6	0.34	4	6
12/18/23	96.82	114.265	38,397.1	0.33	4	6
12/19/23	96.98	115.359	38,391.0	0.33	4	6
12/20/23	97.29	101.243	37,467.3	0.33	4	6
12/21/23	97.09	114.388	34,228.1	0.34	4	6
12/22/23	97.28	114.377	38,347.7	0.34	4	6
12/23/23	97.22	115.969	38,342.1	0.33	4	6
12/24/23	97.09	115.838	38,381.0	0.33	4	6
12/25/23	97.23	113.816	38,345.8	0.33	4	6
12/26/23	97.26	109.641	37,936.8	0.34	4	6
12/27/23	97.33	114.982	37,056.1	0.34	4	6
12/28/23	97.28	114.943	38,371.0	0.33	4	6
12/29/23	97.35	74.668	38,389.9	0.33	4	6
12/30/23	96.84	104.415	26,256.2	0.36	4	6
12/31/23	96.80	110.174	35,665.8	0.34	4	6

Notes:

Based on August 28, 2009 letter from California Department of Public Health (now DDW).

minimum UVT = 95%

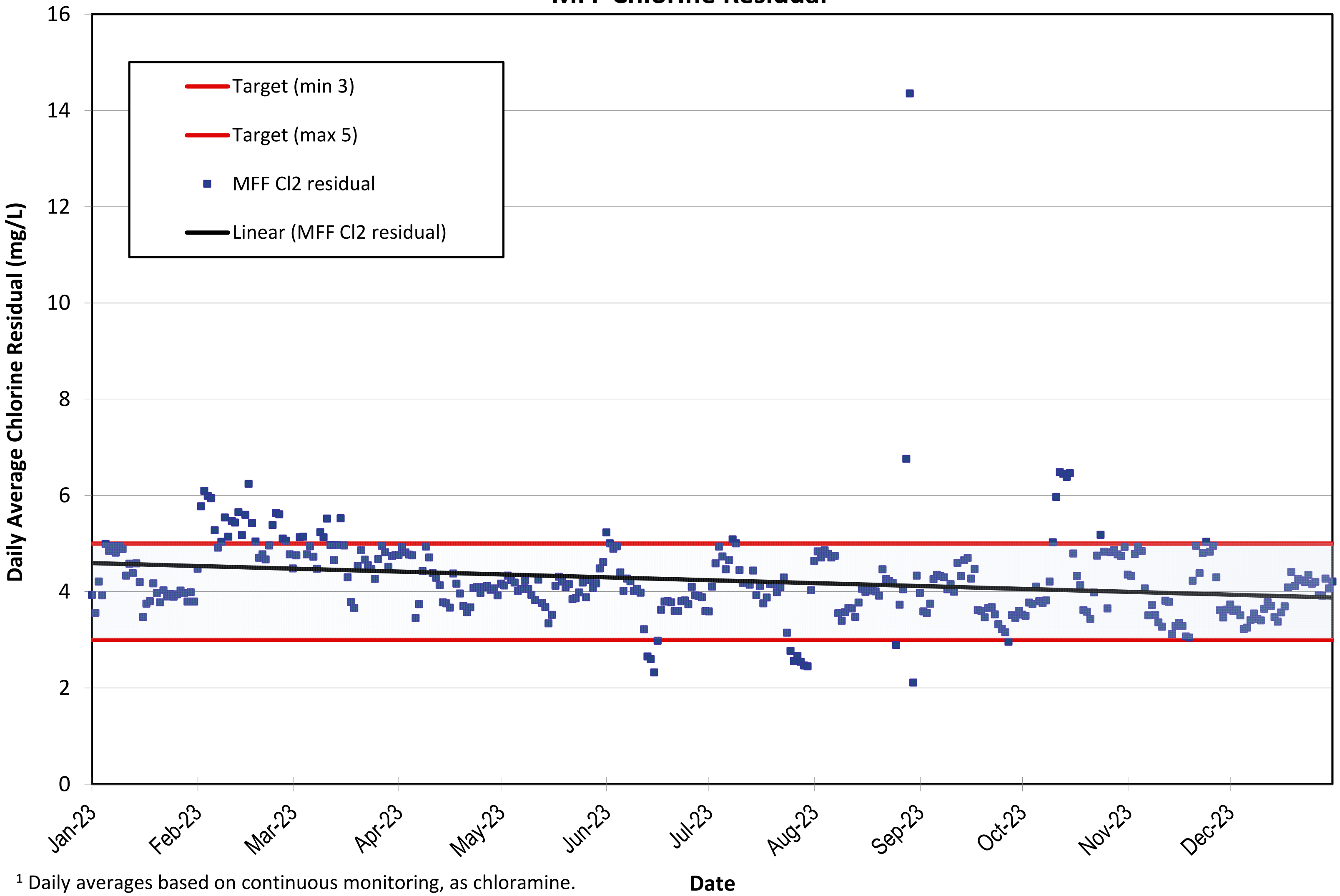
minimum EED = 0.31 kwh/kgal

Appendix E

Critical Control Points

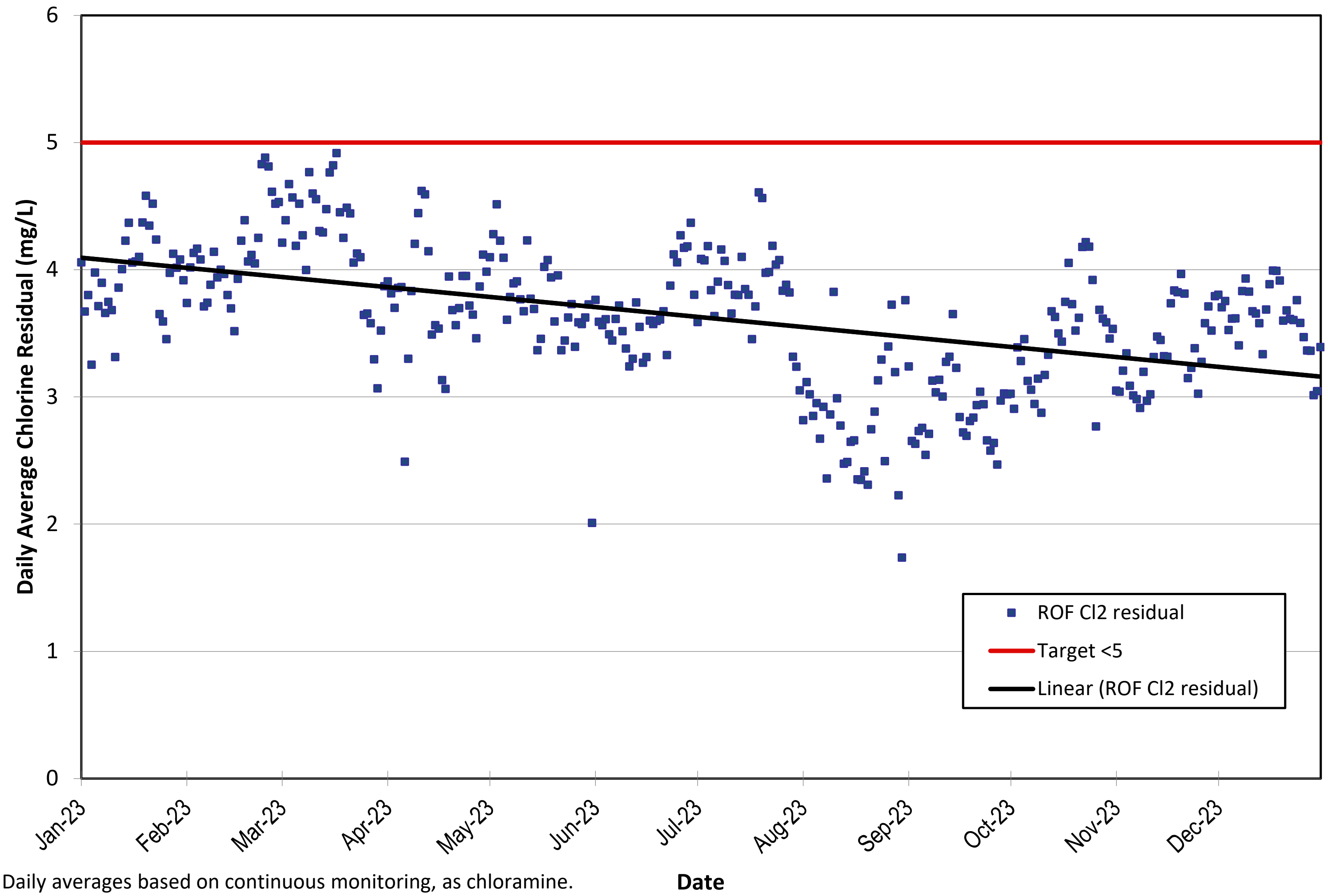
Orange County Water District
Groundwater Replenishment System
2023 Annual Report

Figure E-1
MFF Chlorine Residual[1]



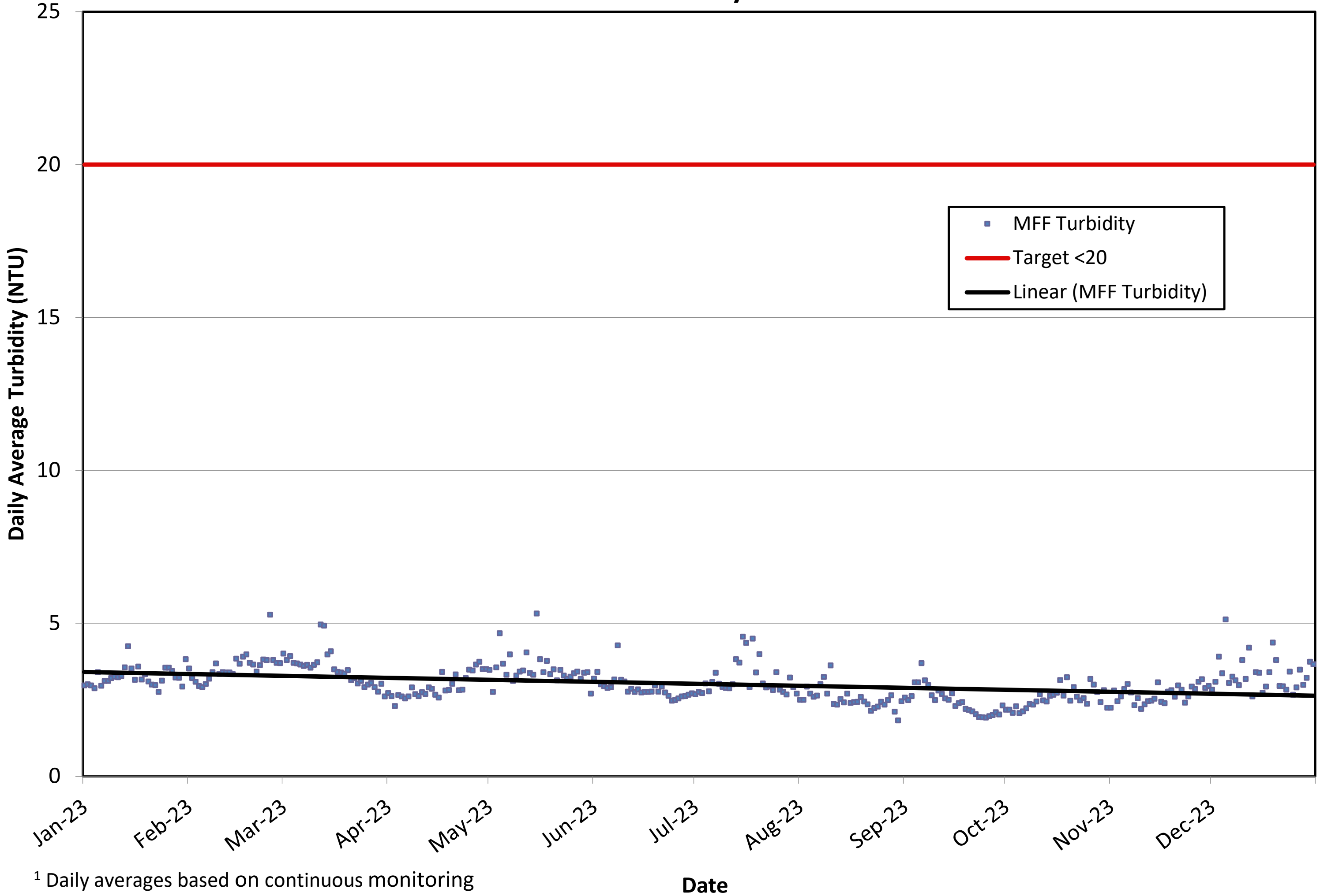
[1] Daily averages based on continuous monitoring, as chloramine.

Figure E-2
ROF Chlorine Residual[1]



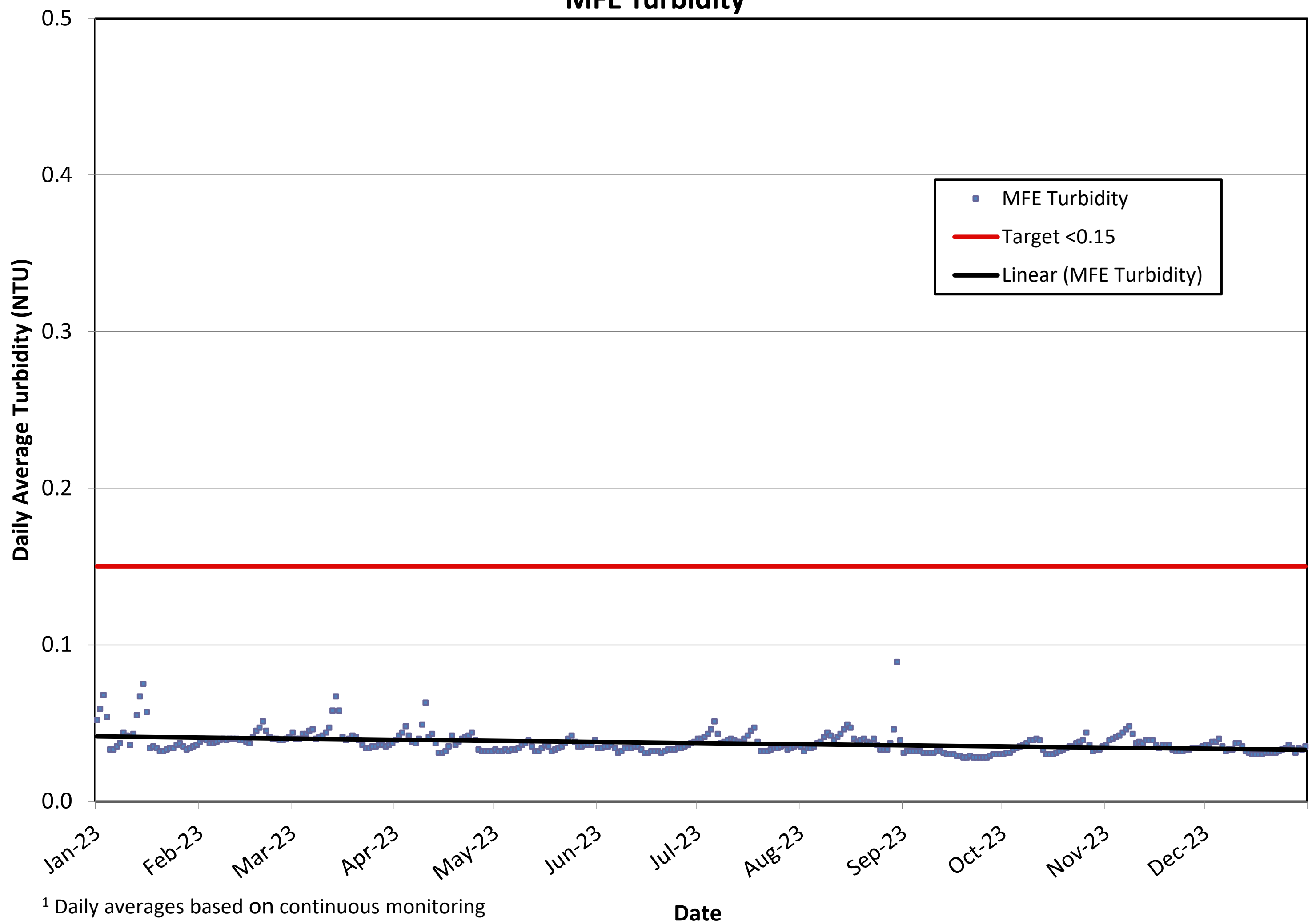
[1] Daily averages based on continuous monitoring, as chloramine.

Figure E-3
MFF Turbidity[1]



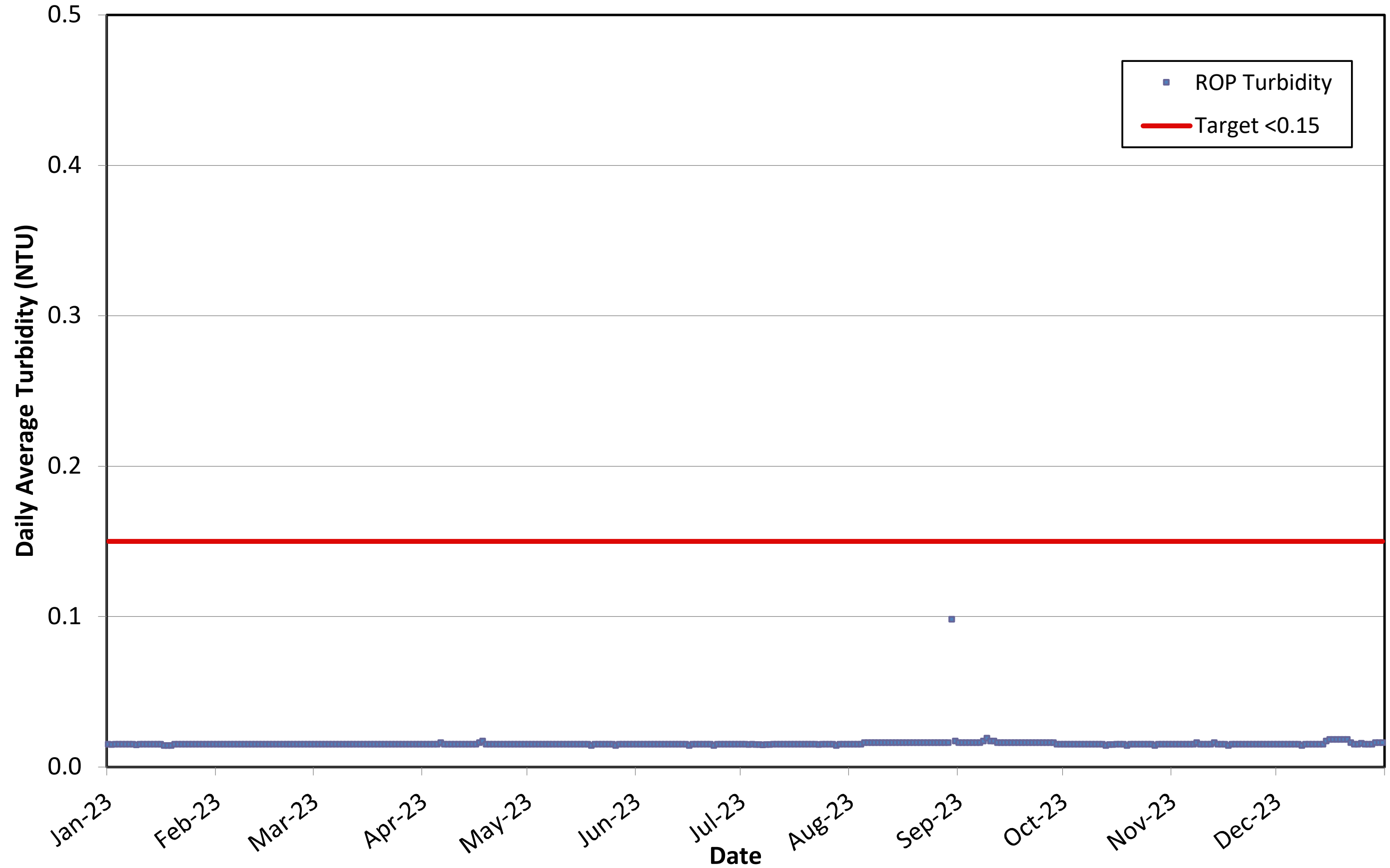
[1] Daily averages based on continuous monitoring

Figure E-4
MFE Turbidity[1]



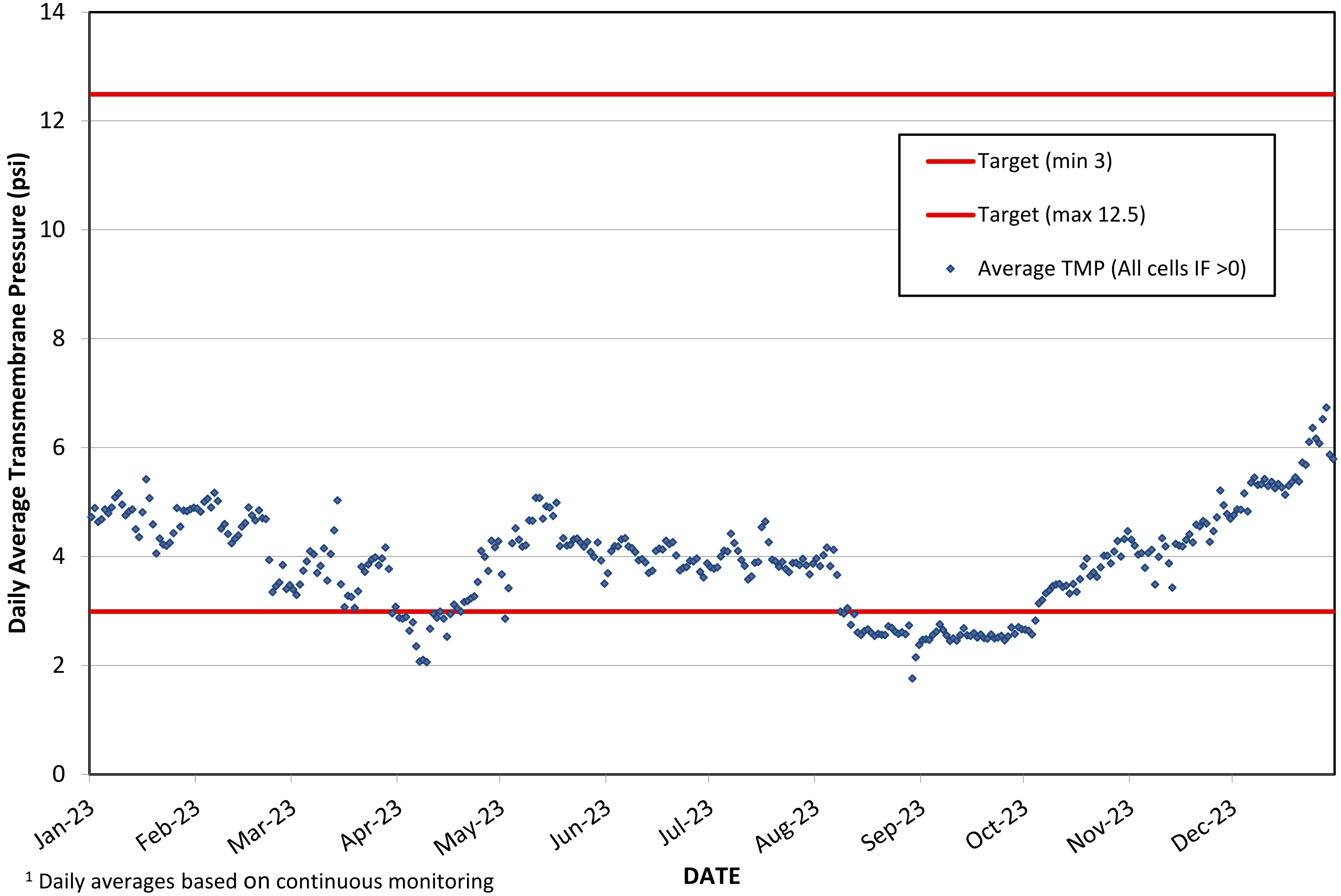
[1] Daily averages based on continuous monitoring

Figure E-5
ROP Turbidity[1]



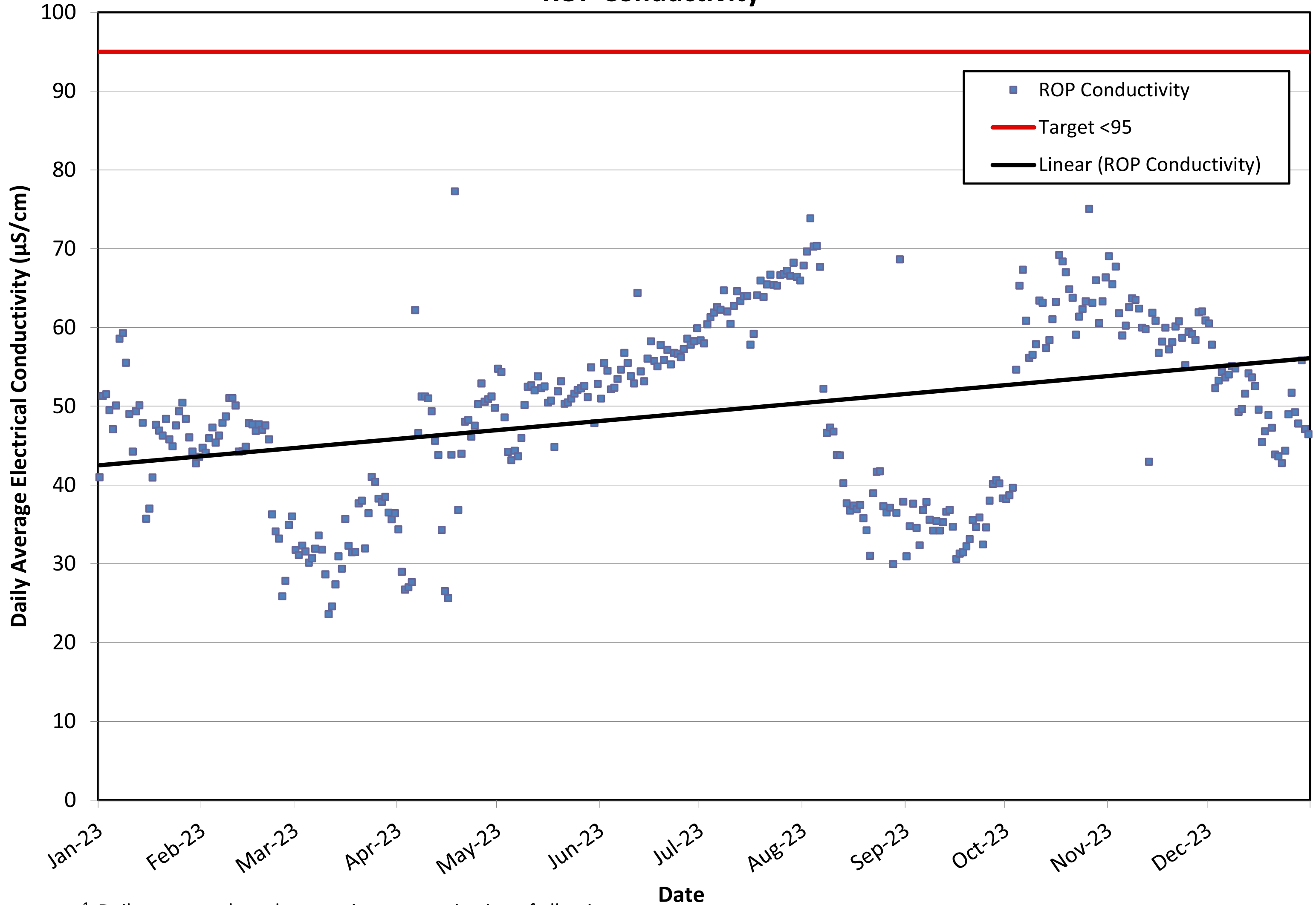
[1] Turbidity shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.
Daily averages based on continuous monitoring

Figure E-6
MF Transmembrane Pressure (TMP)[1]
Average of All Operational Cells with TMP > 0



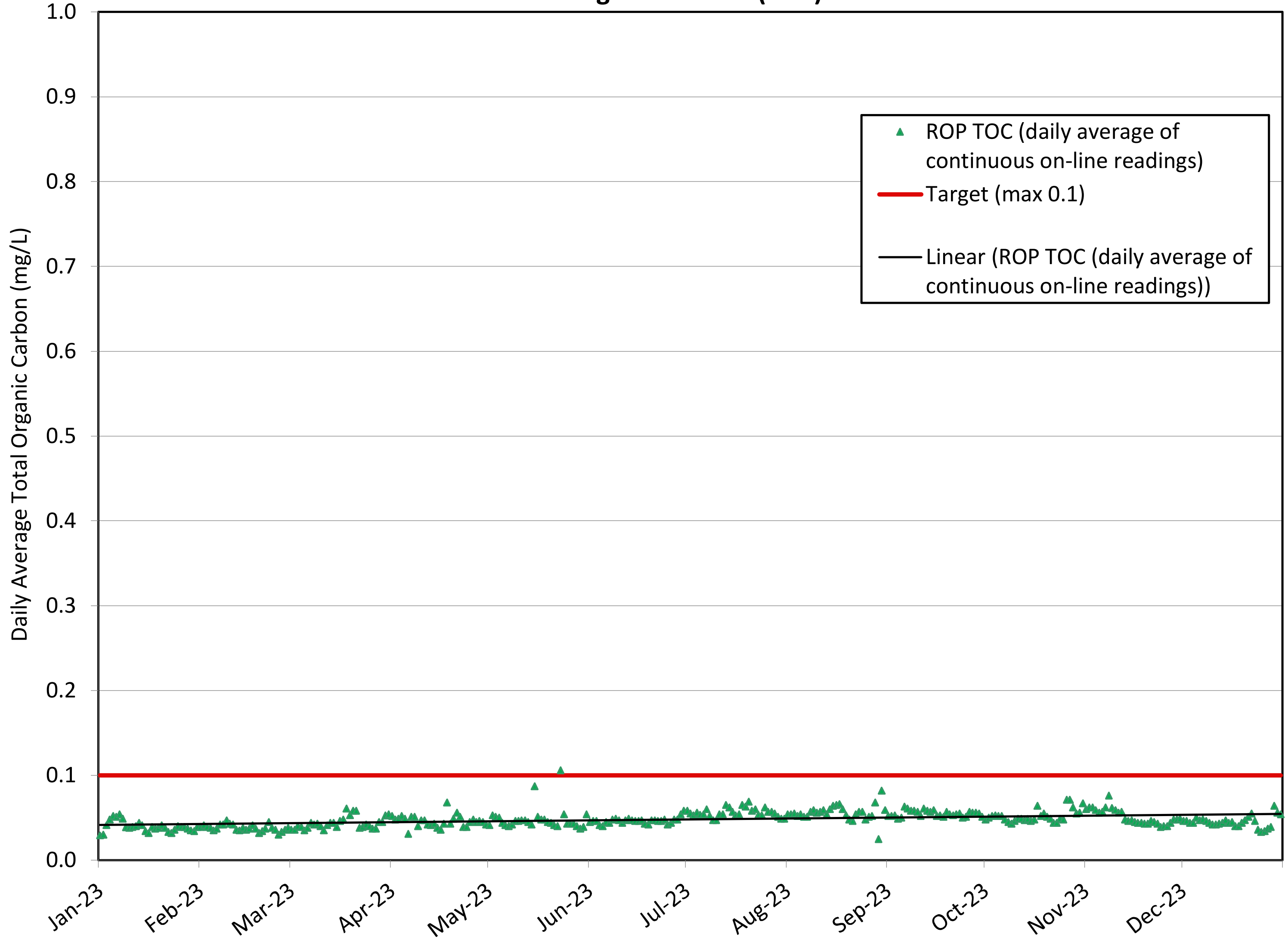
[1] Daily averages based on continuous monitoring

Figure E-7
ROP Conductivity[1]



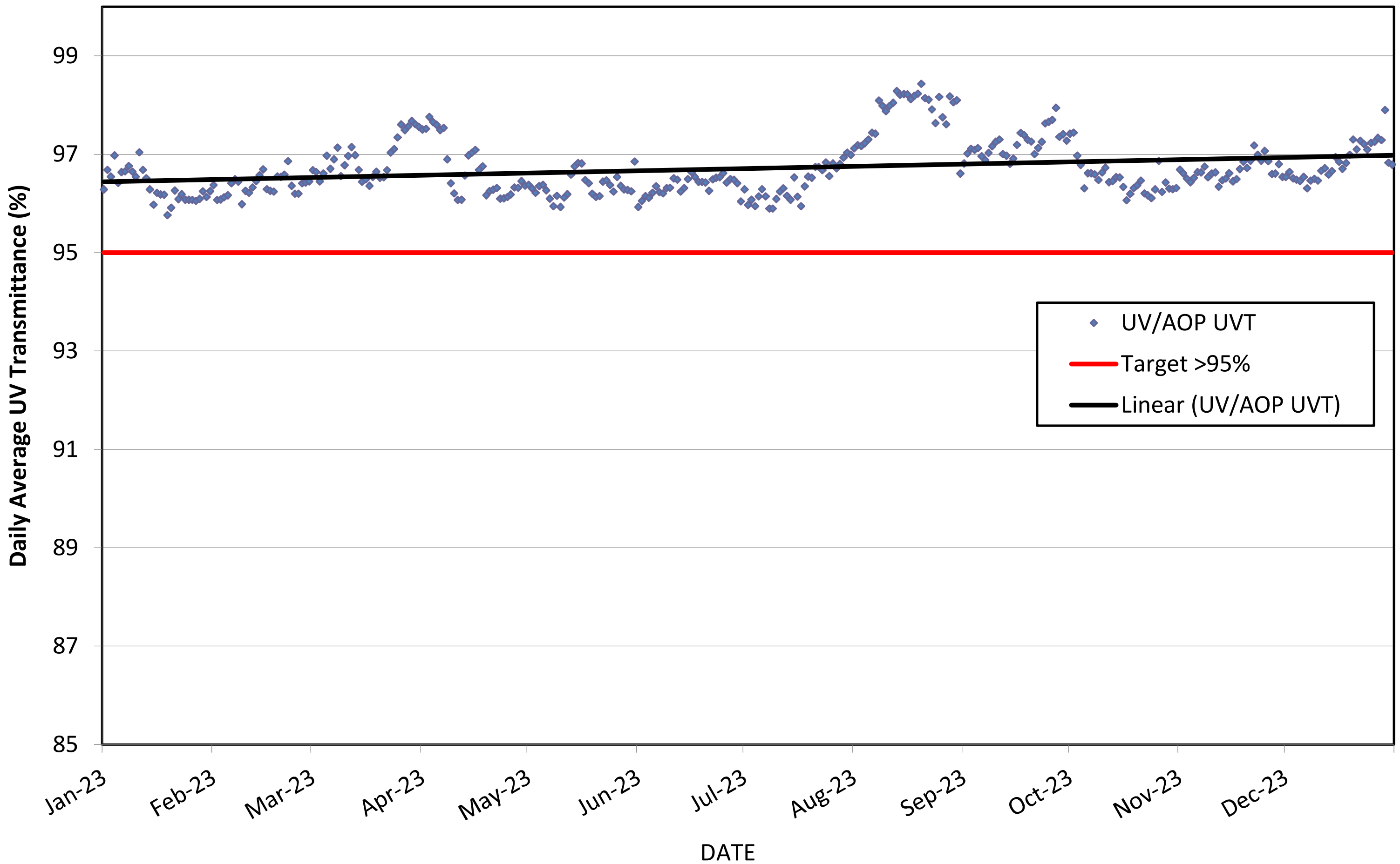
[1] Daily averages based on continuous monitoring of all units.
Electrical conductivity data for ROP are not normalized

Figure E-8
ROP Total Organic Carbon (TOC)[1]



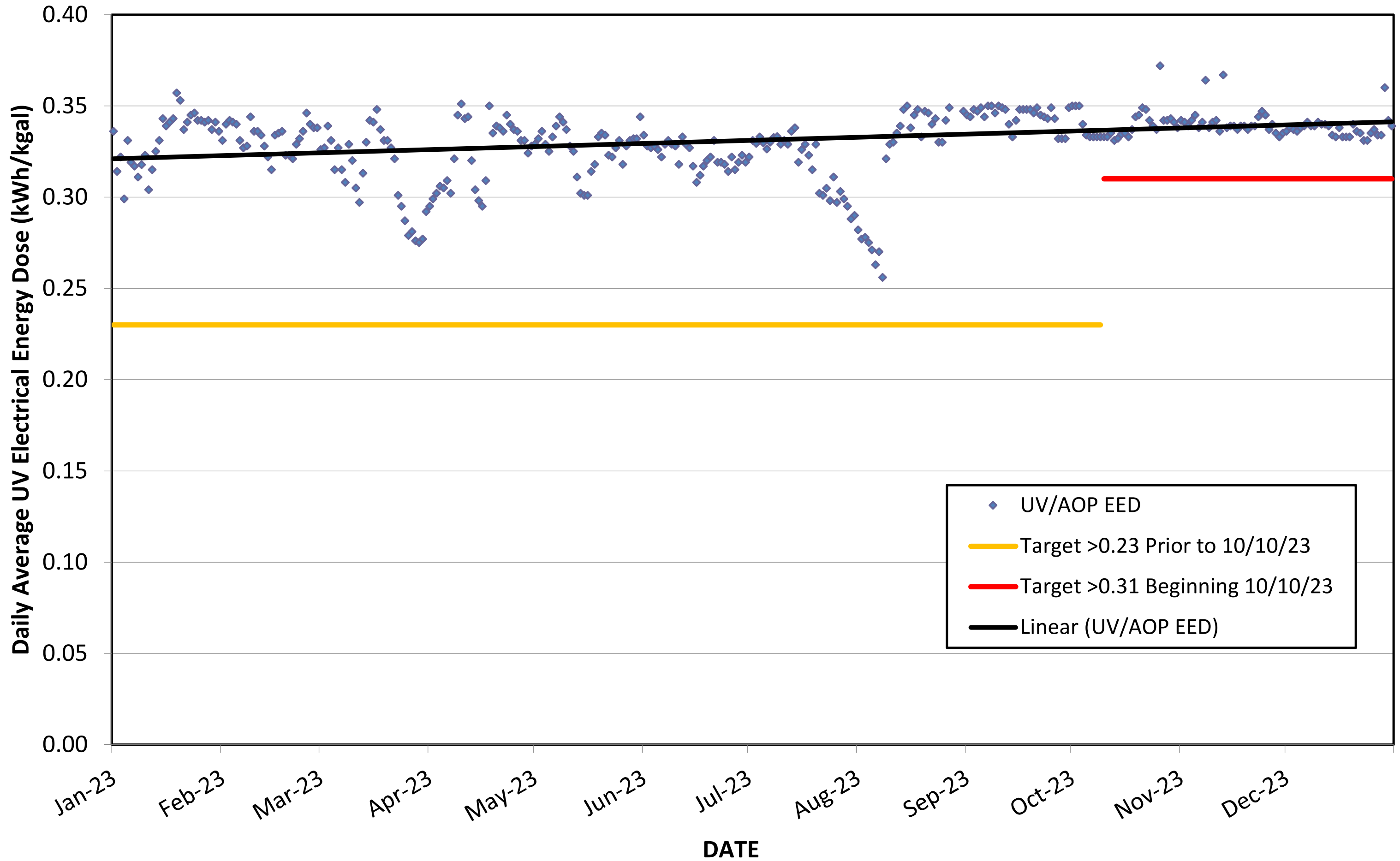
[1] Daily averages based on continuous monitoring of all units

Figure E-9
UV/AOP UV Transmittance [1]



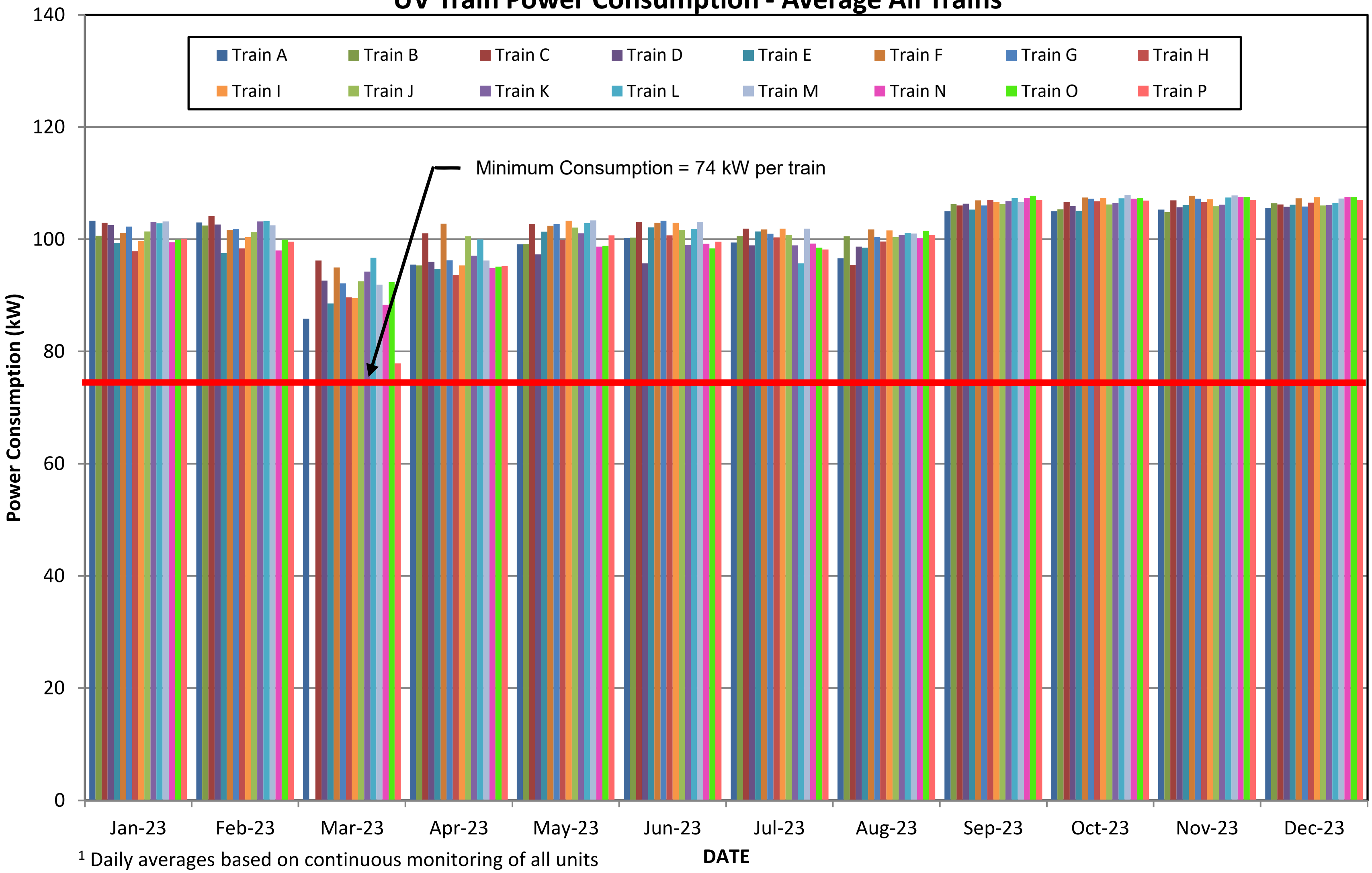
[1] UV Transmittance shown for UVF, which is effectively ROP downstream of hydrogen peroxide addition.
Daily averages based on continuous monitoring

Figure E-10
UV/AOP Electrical Energy Dose (EED)[1]



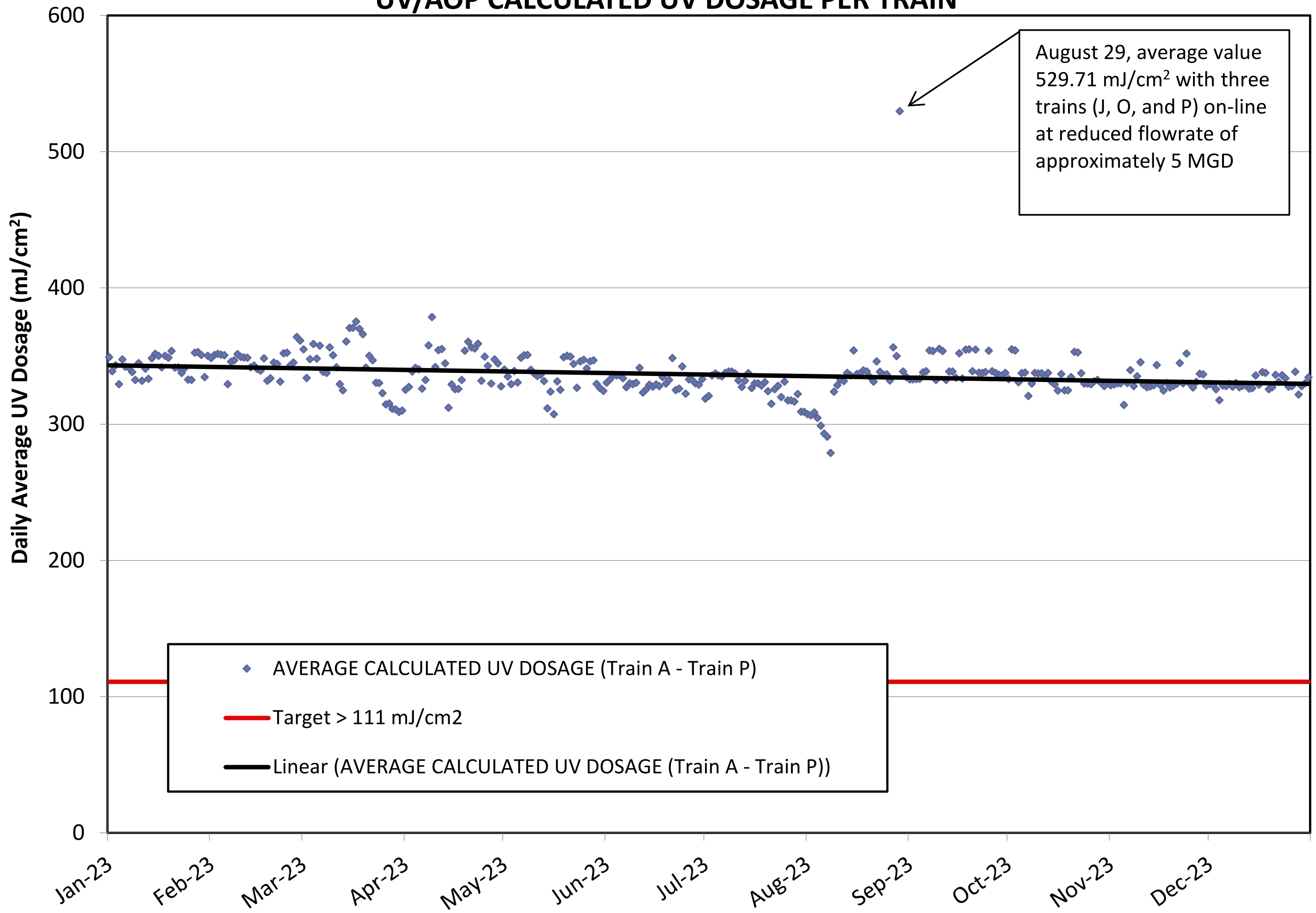
[1] Daily averages based on continuous monitoring of all units

Figure E-11
UV Train Power Consumption - Average All Trains



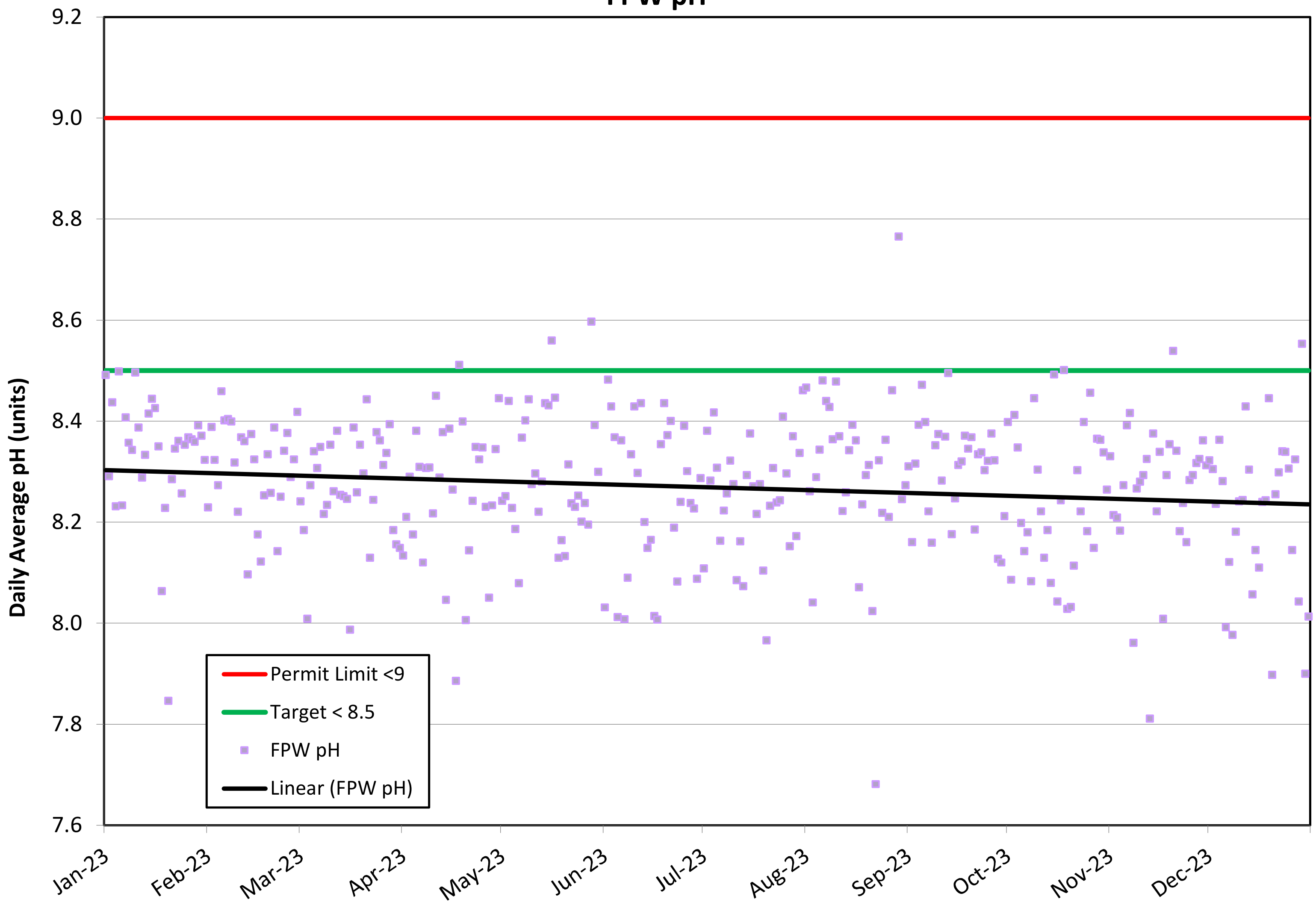
[1] Daily averages based on continuous monitoring of all units

Figure E-12
UV/AOP CALCULATED UV DOSAGE PER TRAIN[1]



[1] Daily averages based on continuous monitoring of all units

Figure E-13
FPW pH[1]



[1] Daily averages based on continuous monitoring

Appendix F

Operator Certifications, Operations and Maintenance Summary and Calibration Records

Orange County Water District Groundwater Replenishment System 2023 Annual Report

Orange County Water District
Groundwater Replenishment System
Advanced Water Purification Facility

Operations Certification Levels
(As of December 2023)

Listed according to level of Operator Certification, high-to-low

Operator	OCWD Job Title	WWTP Certification Level & No.		DWT Certification Level & No.		AWTO Certification Level & No.	
Derrick Mansell	Operations Manager	V	V-28340			AWT-3	233
Craig Liebzeit	Chief Plant Operator	V	V-43546	T-2	34896	AWT-3	242
Jacob Bermudez	Shift Supervisor	V	V-43637				
Russell Sutton	Shift Supervisor	V	V-5143				
John Souza	Shift Supervisor	IV	IV-3998				
Christopher Owens	Shift Supervisor			T-4	29560		
Luis Torres	Lead Plant Operator	III	III-28285	T-2	27383		
Mike Ewing	Lead Plant Operator	III	III-10199				
Curtis Sanders	Lead Plant Operator	III	III-28461				
Anthony Lockhart	Lead Plant Operator	II	II-44824	T-3	38600		
Philip Jacobs	Sr. Plant Operator III	III	III-42110				
Chris Vu	Sr. Plant Operator III	III	III-10630				
Heinz Roehler	Sr. Plant Operator III	III	III-3534				
Princewell Obinma	Plant Operator II	III	III-72860	T-1	43850		
Stanley Vielma	Plant Operator II			T-3	27226		
Kevin Johnson	Plant Operator II			T-3	43691		
Jason McCullough	Plant Operator II			T-3	41305		
Jonathan Mok	Plant Operator II	II	II-43357	T-2	41147		
Charles Spade	Plant Operator II	II	II-7966				
Eric Gautier	Plant Operator II	II	II-10135				
Ricardo Noguera	Plant Operator II	II	III-44599	T-2	45491		
Jason Kuhn	Plant Operator II	II	III-44098	T-2	40759		
Ron Eversole	Plant Operator I			T-2	44791		
Andy King	Plant Operator I			T-1	44056		

Plant Shutdown Summary for Advanced Water Purification Facility
2023 Groundwater Replenishment System Annual Report

Cause of AWPF Shutdown		Hours Offline per Month												Annual Total
		Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	
1	Planned shutdown for medium voltage testing, relocating fiber optic, replacing flowmeter & valve actuator					13.40			35.25					48.65
2	Planned shutdown for DDW inspection to demonstrate automatic system shutdown compliance alarms											3.18		3.18
3	Unplanned shutdown due to I/O card failures in ROP cabinet causing RO system to fail.				7.60									7.60
4	Unplanned shutdown due to false 3rd stage potential scaling event that required RO system investigation				23.68									23.68
5	Unplanned shutdown due to loss of power at GWRS Pipeline valve vaults						3.45							3.45
6	Unplanned shutdown due to spray wash water line break at influent screens										10.35			10.35
7	Unplanned shutdown due to power outage												3.80	3.80
Total Hours Offline		**0.00**	**0.00**	**0.00**	**31.28**	**13.40**	**3.45**	**0.00**	**35.25**	**0.00**	**10.35**	**3.18**	**3.80**	**100.71**
Total Days Offline		**0.00**	**0.00**	**0.00**	**1.30**	**0.56**	**0.14**	**0.00**	**1.47**	**0.00**	**0.43**	**0.13**	**0.16**	**4.20**

Appendix F
Plant Shutdown Summary

F.1 January 2023

January 1 - 31: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of January.

F.2 February 2023

February 1 - 28: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of February.

F.3 March 2023

March 1 - 31: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of March.

F.4 April 2023

April 1 - 30: Total Downtime 31.28 hours (4.34%)

The AWPF / GWRS experienced two unexpected shutdowns during the month of April.

The first shutdown occurred April 6 at 0709 hours. The plant unexpectedly failed as a result of I/O card failures in the RO permeate cabinet which caused all the online RO units to fail simultaneously subsequently followed by other related systems. I&E staff was able to identify, reset, and resolve the issue and the plant was placed back online. The GWRS resumed FPW distribution on April 6 at 1445 hours. The total downtime GWRS experienced during the shutdown was 7.60 hours.

During the shutdown staff used 0.21 MG of City of Fountain Valley potable water to keep the Talbert Seawater Barrier injection system pressurized until the GWRS plant resumed FPW injection.

The second shutdown occurred April 17 at 1447 hours. GWRS unscheduled shutdown due to all online RO unit 3rd stage flows dropping below 50 GPM indicative of a potential scaling event. OPS secured the plant preemptively to investigate the issue further. It was confirmed through water quality lab results that there were no significant elevated constituents that would contribute to an RO system wide scaling event. The units were thoroughly flushed and once placed back online all 3rd stage flows returned to normal. GWRS resumed FPW distribution on April 18 at 14.28 hours. The total downtime GWRS experienced during shutdown was 23.68 hours.

During the shutdown staff used 1.03 MG of City of Fountain Valley potable water rot keep the Talbert Seawater Barrier injection system pressurized until the GWRS plant resumed FPW injection.

F.5 May 2023

May 1 - 31: Total Downtime 13.4 hours (1.80%)

The AWPF / GWRS experienced one scheduled shutdown during May for GWRS I&E annual medium voltage testing. The 13.4-hour long shutdown began May 31 at 0525 hours and ended when the GWRS resumed FPW distribution on May 31 at 1843 hours.

F.6 June 2023

June 1 - 30: Total Downtime 3.45 hours (0.48%)

The AWPF / GWRS experienced one unexpected shutdown during June.

The shutdown occurred June 1 at 0915 hours due to multiple process variable alarms pertaining to vaults 1, 2, and 3 for the finished product water recharge basin distribution pipeline. All three vaults lost communication and had various equipment failures. There was evidence of tampering for vault #2's disconnect which was intentionally de-powered. I&E staff and programmers were able to reset equipment and restore power for all three valve vaults, allowing operations to resume distribution. GWRS resumed FPW distribution on June 1 at 1142 hours. The total downtime GWRS experienced during the shutdown was 3.45 hours.

F.7 July 2023

July 1 - 31: Total Downtime 0.0 hours (0%)

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of July.

F.8 August 2023

August 1 - 31: Total Downtime 35.25 hours (4.74%)

The AWPF / GWRS experienced one scheduled shutdown during August.

During August 28-30, a portion of our recharge pipeline fiber optics required relocation to accommodate Orange Couty 405 partners construction work. This would require the GWRS to suspend flows to the recharge basins and operate at a lower production rate of 15 mgd supplying only the Talbert Barrier injection wells for 3 days. The OCWD utilized this time to address a couple of minor issues that can only be done while the plant is secured. On August 29, GWRS was fully secured so staff could replace our Ellis sewer interplant waste line to OC San Plant No. 2 flow meter. Staff also replaced a back actuator for the RO product / decarb bypass valve FV-7120. The 35.25-hour long shutdown began August 29 at 0820 hours and ended when the GWRS resumed FPW distribution on August 30 at 1935 hours.

F.9 September 2023

<u>September 1 - 30: Total Downtime 0.0 hours (0.00%)</u>

The AWPF / GWRS experienced no shutdowns or process interruptions during the month of September.

F.10 October 2023

<u>October 1 - 31: Total Downtime 10.35 hours (1.39%)</u>

The AWPF / GWRS experienced one unexpected shutdown during October.

The shutdown occurred October 26, as a result of a break in the plant water supply piping coming from OC San Plant 1 that feeds the spray wash water for the influent screens causing high differential pressure and level. The leak lead to the A/S meter vault flooding along with the GWRS SCADA logic securing the plant due to the MF system starving for water as the screens continued to plug. Operation along with OC San Plant 1 isolated the line and hooked up to an alternate source water supply. Maintenance staff pumped out the A/S vault followed by I&E performing corrective maintenance on all affected telemetry. Once all telemetry was functioning, GWRS was brought back online. GWRS resumed FPW distribution on October 26 at 1648 hours. The total downtime GWRS experienced during the shutdown was 10.35 hours.

F.11 November 2023

<u>November 1 - 30: Total Downtime 3.18 hours (0.44%)</u>

The AWPF / GWRS experienced two scheduled shutdowns during November.

The first shutdown occurred November 8, as part of a DDW pre-inspection test run. As part of the GWRS Final Expansion new compliance requirements were implemented. This required OCWD to install new logic programming for specific systems to automatically shutdown if compliance thresholds were exceeded. After installing new logic programming, we scheduled a test date to prove out and confirm the system response. The total downtime GWRS experienced during the shutdown was 1.75 hours.

The second shutdown occurred November 13, as part of the official GWRS Final Expansion DDW inspection. As part of the inspection scope OCWD was required to prove out newly required automatic system shutdown compliance alarms. The total downtime GWRS experienced during the shutdown was 1.43 hours.

F.12 December 2023

<u>December 1 - 31: Total Downtime 3.8 hours (0.51%)</u>

The AWPF / GWRS experienced one unexpected shutdown during December.

The shutdown occurred December 29 at 0155 hours, as a result of a power outage resulting in plant-wide equipment failure. GWRS resumed FPW distribution on December 29 at 0543 hours. The total downtime GWRS experienced during the shutdown was 3.80 hours.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/11/23	21.0	6.20	2.51	2.50
February	2/7/23	21.0	5.93	2.78	3.11
March	3/18/23	21.0	5.10	2.67	2.43
April	4/26/23	21.0	4.18	2.67	2.54
May	5/22/23	21.0	5.22	2.78	2.87
June	6/18/23	21.0	4.92	2.49	1.97
July	7/15/23	21.0	2.99	2.91	2.14
August	8/11/23	21.0	2.71	1.86	1.74
September	9/8/23	21.0	1.99	1.92	1.35
October	10/4/23	21.0	3.43	2.25	2.16
	10/31/23	21.2	4.67	3.25	2.90
November	11/27/23	21.1	5.74	3.53	2.95
December	12/24/23	21.1	7.62	3.51	2.79

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/4/23	21.0	5.20	2.74	1.85
	1/31/23	21.0	4.60	2.66	2.75
February	2/26/23	21.1	4.20	2.09	1.73
April	4/17/23	21.1	3.80	2.20	1.88
May	5/15/23	21.0	5.87	2.27	2.41
June	6/11/23	21.0	3.85	2.56	2.10
July	7/8/23	21.0	5.00	2.37	2.16
August	8/6/23	21.0	4.50	2.76	2.56
September	9/2/23	21.0	2.01	1.00	1.46
	9/27/23	21.0	2.19	1.06	1.36
October	10/31/23	21.1	4.80	2.42	2.42
December	12/3/23	21.0	3.68	2.49	2.23
	12/30/23	21.0	6.69	2.86	2.50

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/12/23	21.0	5.52	2.84	2.33
February	2/7/23	21.0	6.82	3.27	2.77
March	3/16/23	21.0	4.00	2.52	4.00
April	4/25/23	21.1	5.08	3.18	2.24
May	5/22/23	21.0	3.65	2.89	2.34
June	6/18/23	21.0	6.10	2.90	2.32
July	7/15/23	21.0	5.15	2.44	1.98
August	8/10/23	21.0	3.20	11.92	1.44
September	9/7/23	21.0	2.18	1.13	1.57
October	10/3/23	21.0	2.22	1.24	1.26
	10/31/23	21.2	4.86	3.08	3.17
November	11/27/23	21.0	4.44	3.02	2.83
December	12/23/23	21.0	6.04	3.90	2.75

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/21/23	21.0	5.51	2.62	2.24
February	2/16/23	21.0	5.57	2.80	2.28
April	4/3/23	21.0	3.26	2.38	2.40
May	5/4/23	21.0	4.17	2.22	2.04
	5/30/23	21.1	4.80	1.89	1.78
June	6/26/23	21.0	4.37	2.39	2.02
July	7/22/23	21.0	3.85	2.94	2.06
August	8/17/23	21.0	2.96	1.78	1.53
September	9/13/23	21.0	2.90	1.92	1.90
October	10/9/23	21.0	4.10	2.53	2.40
November	11/5/23	21.1	4.70	2.91	2.88
December	12/2/23	21.0	4.07	3.06	2.61
	12/29/23	21.0	7.50	2.99	2.69

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/8/23	10.0	7.70	3.85	3.74
	1/23/23	9.9	6.89	3.22	(See Note 1)
February	2/1/23	10.0	9.00	3.69	(See Note 1)
	2/14/23	9.7	8.49	3.72	2.91
April	4/13/23	21.0	2.93	1.67	2.04
May	5/11/23	21.0	6.42	2.23	2.86
June	6/6/23	21.0	5.76	3.67	3.16
July	7/2/23	21.0	7.70	2.05	2.85
	7/27/23	21.0	6.42	3.28	2.85
August	8/22/23	21.0	3.50	1.82	1.80
September	9/19/23	21.0	2.52	1.64	1.36
October	10/15/23	21.0	3.05	2.36	2.48
November	11/10/23	21.0	5.15	2.02	3.01
December	12/8/23	21.0	7.50	2.33	2.48

[1] CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/3/23	4.5	5.83	4.57	(See Note 1)
	1/9/23	4.8	6.23	4.69	4.03
	1/17/23	6.2	6.04	4.87	(See Note 1)
	1/26/23	5.9	7.10	3.63	(See Note 1)
March	3/22/23	21.0	4.34	2.54	2.26
April	4/28/23	21.0	5.67	3.41	2.87
May	5/24/23	21.0	6.22	2.16	2.56
June	6/19/23	21.0	5.88	3.26	2.79
July	7/15/23	21.0	5.27	2.70	3.11
August	8/10/23	21.0	3.92	2.05	1.39
September	9/7/23	21.0	2.60	1.45	1.15
October	10/2/23	21.0	2.61	1.31	1.41
November	11/2/23	21.0	4.84	1.81	2.52
	11/28/23	21.0	5.83	2.58	2.87
December	12/25/23	21.0	9.01	3.43	1.50

[1] CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/6/23	10.0	8.95	5.12	(See Note 1)
February	2/15/23	21.0	4.53	2.87	2.82
March	3/30/23	21.0	3.90	2.23	2.04
May	5/4/23	21.0	5.30	2.74	2.38
	5/30/23	21.0	4.24	1.89	1.95
June	6/26/23	21.0	4.73	3.08	2.66
July	7/22/23	21.0	5.10	3.36	2.37
August	8/17/23	21.0	2.60	2.60	1.94
September	9/14/23	21.0	2.35	1.61	1.78
October	10/11/23	21.0	3.45	2.81	2.55
November	11/7/23	21.0	5.78	3.40	2.60
December	12/4/23	21.0	6.20	2.72	2.83
	12/30/23	21.0	8.61	3.20	3.40

1 CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit A08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/11/23	(See Note 1)			
February	2/9/23	21.0	7.40	3.09	2.69
March	3/18/23	21.1	4.35	2.84	2.70
April	4/27/23	21.0	5.60	2.31	2.96
May	5/23/23	21.0	4.62	3.38	2.88
June	6/20/23	21.0	5.33	3.13	3.14
July	7/17/23	21.0	6.29	2.39	3.09
August	8/13/23	21.0	3.39	2.25	2.04
September	9/9/23	21.0	2.14	1.73	1.65
October	10/6/23	21.0	3.26	2.42	2.40
November	11/2/23	21.0	4.24	2.16	2.97
	11/29/23	21.0	6.30	2.88	2.57
December	12/26/23	21.0	7.56	3.77	3.45

1 Unit wetting. No CIP performed.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/25/23	21.0	6.30	2.80	2.67
February	2/20/23	21.0	6.96	2.59	2.57
April	4/9/23	21.0	2.42	1.39	1.42
May	5/7/23	21.0	6.90	3.01	2.37
June	6/2/23	21.0	5.43	2.80	2.52
	6/28/23	21.0	5.80	2.79	2.11
July	7/23/23	21.0	4.74	2.51	2.21
August	8/18/23	21.0	3.00	1.55	1.27
September	9/15/23	21.0	7.10	1.15	1.17
October	10/10/23	21.0	3.56	2.28	2.03
November	11/6/23	21.0	4.66	2.81	2.38
December	12/2/23	21.0	5.59	2.94	2.54
	12/28/23	21.1	10.39	3.84	2.32

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/11/23	21.0	5.34	1.77	1.10
February	2/6/23	21.2	5.90	2.46	1.81
March	3/15/23	21.1	2.26	1.89	1.85
April	4/22/23	20.9	2.24	0.66	2.21
May	5/18/23	21.0	7.80	2.63	1.48
June	6/13/23	21.0	3.74	1.97	1.67
July	7/9/23	21.0	3.86	1.62	1.17
August	8/4/23	21.0	6.90	3.46	2.37
September	9/1/23	21.0	2.20	1.38	1.36
	9/27/23	21.0	1.43	1.21	1.28
October	10/24/23	21.0	4.20	1.91	1.91
November	11/20/23	21.0	3.28	1.74	1.56
December	12/16/23	21.0	4.87	1.80	1.02

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/19/23	21.1	7.00	3.06	3.14
February	2/14/23	21.0	7.29	3.35	2.46
March	3/29/23	21.0	5.50	3.58	2.76
April	4/30/23	21.0	7.12	3.26	3.04
May	5/25/23	21.0	6.37	3.57	3.01
June	6/22/23	21.0	5.61	3.25	2.50
July	7/18/23	21.0	7.13	3.93	3.45
August	8/13/23	21.1	3.09	1.84	1.81
September	9/11/23	21.0	2.74	1.87	2.80
October	10/9/23	21.0	3.90	2.99	2.51
November	11/4/23	21.0	5.61	3.25	3.08
December	12/1/23	21.0	5.57	2.55	2.37
	12/26/23	21.0	9.68	4.52	3.41

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/10/23	21.1	9.00	3.85	3.08
February	2/5/23	21.0	7.22	3.42	3.12
March	3/2/23	21.0	3.59	2.67	2.01
April	4/20/23	21.1	4.30	2.73	2.48
May	5/16/23	21.0	9.13	3.23	3.53
June	6/11/23	21.0	5.65	3.28	2.82
July	7/7/23	21.0	7.00	3.76	3.02
August	8/2/23	21.0	6.76	3.17	2.91
	8/27/23	21.0	2.37	1.80	1.79
September	9/24/23	21.0	2.80	1.84	1.89
October	10/19/23	21.0	5.17	3.12	3.36
November	11/18/23	21.0	5.28	3.39	2.87
December	12/14/23	21.0	6.94	2.64	2.93

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/6/23	21.1	3.42	2.81	2.13
February	2/1/23	21.0	6.52	2.91	2.39
	2/27/23	21.3	6.25	3.64	1.50
April	4/15/23	21.0	3.15	1.87	2.09
May	5/13/23	21.0	4.46	1.89	2.20
June	6/8/23	21.0	4.63	2.49	2.42
July	7/4/23	21.0	5.35	2.58	2.32
	7/30/23	21.0	4.49	2.56	2.04
August	8/25/23	21.0	2.40	1.44	1.26
September	9/22/23	21.0	1.93	1.12	1.41
October	10/18/23	21.0	3.18	2.41	2.33
November	11/19/23	21.0	5.68	2.58	2.76
December	12/15/23	21.0	5.47	2.79	2.12

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/21/23	21.0	5.53	3.66	3.28
February	2/16/23	21.2	7.10	3.42	2.46
April	4/3/23	21.1	4.00	1.90	1.50
May	5/4/23	21.0	5.60	1.79	1.89
	5/29/23	21.0	5.14	3.22	2.27
June	6/25/23	21.0	4.20	2.55	1.93
July	7/21/23	21.0	3.81	1.77	4.23
August	8/15/23	21.0	2.14	1.40	1.33
September	9/13/23	21.0	2.09	1.64	1.58
October	10/9/23	21.0	3.60	1.95	2.11
November	11/7/23	21.0	4.51	3.10	2.01
December	12/3/23	21.0	5.80	2.90	2.57
	12/30/23	21.1	8.79	3.03	3.22

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/30/23	21.0	7.52	4.25	2.72
March	3/1/23	21.0	3.38	1.92	1.52
April	4/23/23	21.0	3.87	2.46	2.26
May	5/23/23	21.0	6.20	3.11	2.57
June	6/23/23	21.0	4.21	3.20	2.29
July	7/24/23	21.0	4.77	2.90	2.91
August	8/23/23	21.0	2.77	2.01	1.77
September	9/25/23	21.0	2.20	1.71	1.68
October	10/27/23	21.0	4.44	2.92	2.83
November	11/27/23	21.1	6.81	3.63	3.06
December	12/28/23	21.0	7.53	2.90	3.43

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit B08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/21/23	21.0	5.50	2.54	2.39
February	2/16/23	21.0	7.60	2.76	3.19
April	4/3/23	21.1	3.08	2.31	2.24
May	5/4/23	21.0	4.46	2.46	2.52
	5/31/23	21.1	6.50	2.14	2.23
June	6/26/23	21.0	4.95	3.26	2.44
July	7/23/23	21.0	5.07	3.51	2.40
August	8/18/23	21.0	3.10	1.76	1.47
September	9/16/23	21.0	1.66	1.29	1.41
October	10/12/23	21.0	3.25	2.14	2.03
November	11/7/23	21.0	5.30	2.58	1.76
December	12/4/23	21.0	4.31	2.32	2.00
	12/31/23	21.0	6.93	3.45	3.26

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/18/23	20.6	15.90	5.00	3.34
February	2/6/23	15.0	14.05	3.77	3.33
	2/25/23	15.0	5.20	1.90	1.80
April	4/4/23	15.1	3.46	2.05	1.92
	4/25/23	15.1	5.62	3.13	2.75
May	5/15/23	15.0	8.20	4.02	2.50
June	6/3/23	15.0	6.35	3.18	2.87
	6/25/23	17.0	6.33	3.50	3.04
July	7/17/23	17.1	10.73	4.15	3.47
August	8/13/23	21.0	2.86	1.54	1.28
September	9/13/23	21.0	2.23	2.10	1.91
October	10/10/23	21.0	3.59	2.54	2.20
November	11/6/23	21.0	5.37	3.39	3.12
December	12/4/23	21.1	9.33	3.16	3.52
	12/28/23	19.2	13.29	5.49	3.81

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/10/23	21.0	11.70	3.42	3.87
	1/28/23	15.0	11.80	2.53	2.54
February	2/16/23	15.1	13.20	3.28	2.96
March	3/20/23	15.0	4.97	2.70	2.75
April	4/16/23	15.0	3.51	2.10	2.16
May	5/6/23	15.0	5.39	2.07	2.40
	5/25/23	15.0	5.09	3.10	2.76
June	6/14/23	15.2	5.75	3.17	2.22
July	7/5/23	17.0	8.50	3.98	3.44
	7/27/23	17.0	6.38	2.89	2.64
August	8/23/23	21.0	3.33	2.03	1.80
September	9/21/23	21.0	2.08	1.85	1.47
October	10/17/23	21.0	5.11	2.12	2.43
November	11/14/23	21.0	8.40	3.41	2.99
December	12/10/23	21.0	14.10	3.90	3.79

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/19/23	20.6	10.99	3.45	2.60
February	2/7/23	15.1	10.85	3.68	3.08
	2/26/23	15.1	5.40	2.94	2.64
April	4/5/23	15.2	5.30	2.38	2.40
	4/28/23	15.1	8.20	2.26	4.46
May	5/17/23	15.1	8.87	2.95	3.08
June	6/5/23	15.1	6.86	3.35	3.17
	6/27/23	17.0	7.98	3.54	2.41
July	7/18/23	17.0	5.44	2.47	2.39
August	8/14/23	21.0	4.50	2.00	1.86
September	9/13/23	21.1	3.10	2.01	2.07
October	10/10/23	21.0	4.88	4.88	2.86
November	11/10/23	21.0	7.18	3.66	2.99
December	12/7/23	21.0	8.15	2.75	2.41
	12/29/23	17.0	12.90	4.58	3.93

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/19/23	20.1	13.60	4.80	2.98
February	2/7/23	15.3	11.08	3.96	3.52
	2/27/23	15.0	5.71	3.25	4.29
April	4/6/23	15.1	5.60	2.75	2.51
	4/27/23	15.0	8.00	3.45	2.91
May	5/16/23	15.0	7.51	3.16	3.18
June	6/4/23	15.0	7.78	3.45	3.03
	6/25/23	17.0	6.27	3.15	2.71
July	7/16/23	17.0	6.99	3.86	3.58
August	8/7/23	17.1	7.43	3.36	2.52
September	9/5/23	21.0	3.23	1.88	1.59
October	10/2/23	21.0	2.40	1.80	1.78
	10/29/23	21.0	6.21	3.63	2.81
November	11/25/23	21.0	5.53	2.74	3.19
December	12/21/23	21.1	14.30	4.65	2.45

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/19/23	21.2	12.60	4.32	2.79
February	2/7/23	15.1	8.43	4.23	3.48
	2/26/23	15.0	4.90	2.90	2.11
April	4/5/23	15.0	4.28	2.52	2.26
	4/27/23	15.0	5.01	3.05	3.20
May	5/16/23	15.0	7.86	2.74	2.69
June	6/5/23	15.0	6.40	2.60	2.60
	6/28/23	17.0	5.10	2.76	1.89
July	7/20/23	17.0	7.10	2.51	1.95
August	8/15/23	21.0	3.90	1.61	1.10
September	9/14/23	21.0	4.80	0.83	0.88
October	10/10/23	21.0	4.10	1.96	1.68
November	11/7/23	21.0	5.67	2.93	2.28
December	12/4/23	21.0	7.58	2.95	2.64
	12/28/23	18.5	10.88	3.14	1.66

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/14/23	21.0	14.10	3.50	2.53
February	2/1/23	15.0	9.10	3.40	3.05
	2/20/23	15.2	7.54	3.34	3.24
March	3/27/23	15.0	6.16	3.57	3.18
April	4/21/23	15.0	4.50	3.11	2.74
May	5/10/23	15.0	7.83	3.70	2.60
	5/28/23	15.0	5.17	3.18	2.85
June	6/17/23	15.0	4.89	2.44	2.87
July	7/8/23	17.0	9.80	3.67	3.29
	7/29/23	17.0	6.04	3.28	2.89
August	8/24/23	21.0	3.22	2.11	1.60
September	9/22/23	21.0	1.32	1.70	1.77
October	10/18/23	21.0	6.02	3.10	2.01
November	11/15/23	21.0	7.40	3.99	3.34
December	12/11/23	21.1	13.30	5.39	3.68
	12/31/23	16.5	14.88	4.71	3.96

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/20/23	21.0	12.10	3.25	2.99
February	2/8/23	15.0	4.10	3.65	3.00
	2/27/23	15.0	2.91	1.84	1.78
April	4/7/23	15.0	2.56	1.73	1.66
	4/29/23	15.0	6.66	3.17	2.74
May	5/19/23	15.0	4.81	2.46	2.15
June	6/8/23	15.0	4.83	2.92	4.83
	6/30/23	17.0	5.92	3.19	1.93
July	7/22/23	17.0	5.64	2.87	2.57
August	8/19/23	21.0	3.23	1.76	1.46
September	9/18/23	21.0	2.47	1.40	1.28
October	10/15/23	21.0	4.50	1.99	2.33
November	11/12/23	21.0	4.16	3.19	2.41
December	12/10/23	21.0	6.16	3.23	3.39

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit C08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/18/23	21.0	10.54	3.09	3.50
February	2/6/23	15.0	6.52	3.28	2.69
	2/24/23	15.0	4.40	1.56	1.46
April	4/4/23	15.3	3.54	2.26	1.79
	4/26/23	15.0	7.00	2.89	2.55
May	5/15/23	15.0	7.50	3.59	2.55
June	6/4/23	15.0	5.18	3.14	2.29
	6/26/23	17.0	5.00	2.99	2.90
July	7/17/23	17.0	7.80	3.47	2.95
August	8/7/23	17.0	4.15	2.10	1.85
September	9/5/23	21.0	2.22	1.77	1.77
October	10/1/23	21.0	2.18	1.57	1.63
	10/31/23	21.2	7.10	3.56	3.21
November	11/27/23	21.0	6.60	4.05	3.33
December	12/23/23	21.0	14.03	3.50	3.52

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/10/23	10.0	11.57	4.44	(See Note 1)
	1/21/23	8.8	6.40	4.40	(See Note 1)
	1/30/23	7.2	7.93	4.42	3.50
February	2/12/23	10.0	10.40	3.39	(See Note 1)
	2/25/23	10.0	7.90	2.62	(See Note 1)
March	3/15/23	10.1	4.47	4.51	2.35
April	4/8/23	10.0	3.85	2.43	(See Note 1)
May	5/24/23	20.9	3.58	1.51	1.84
June	6/20/23	20.8	3.95	2.24	1.78
July	7/16/23	21.0	4.43	2.81	2.53
August	8/12/23	21.1	1.90	1.66	1.29
September	9/9/23	21.0	1.17	1.03	0.91
October	10/5/23	21.0	2.41	1.33	1.25
November	11/1/23	21.0	4.60	2.43	2.13
	11/27/23	21.0	5.64	2.40	2.08
December	12/23/23	21.0	6.70	3.01	2.66

1 CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/29/23	9.4	9.03	4.63	(See Note 1)
February	2/8/23	8.0	8.07	4.02	(See Note 1)
	2/16/23	6.3	8.29	5.38	4.10
March	3/1/23	10.0	5.10	5.10	2.69
	3/23/23	0.0	0.00	0.00	(See Note 1)
April	4/5/23	(See Note 2)			
May	5/9/23	21.0	9.00	3.65	2.95
June	6/5/23	21.0	8.55	3.55	2.70
July	7/1/23	21.0	7.19	3.80	3.26
	7/27/23	21.0	8.71	3.60	3.37
August	8/22/23	21.0	3.64	2.37	2.13
September	9/18/23	21.0	2.90	1.49	1.63
October	10/14/23	21.0	3.28	2.13	2.11
November	11/10/23	21.0	7.19	3.54	2.38
December	12/6/23	21.0	10.43	4.88	4.21

1 CIP using caustic only.
2 Unit wetting. No CIP performed.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/5/23	8.2	10.40	4.47	3.72
	1/18/23	10.0	8.36	4.50	(See Note 1)
	1/28/23	8.4	8.13	4.22	(See Note 1)
February	2/6/23	7.2	7.28	4.52	4.19
	2/18/23	9.4	7.04	6.59	(See Note 1)
March	3/2/23	10.0	5.70	3.10	(See Note 1)
	3/15/23	(See Note 2)			
April	4/26/23	21.0	3.97	2.78	2.90
May	5/22/23	21.0	5.00	2.79	2.94
June	6/18/23	21.0	5.80	2.80	2.65
July	7/14/23	21.0	5.40	2.68	2.72
August	8/9/23	21.0	3.20	1.86	1.84
September	9/6/23	21.1	2.07	1.92	1.88
October	10/2/23	21.0	2.40	1.93	1.72
	10/28/23	21.0	4.86	2.83	2.53
November	11/23/23	21.0	4.20	2.14	1.88
December	12/19/23	21.0	7.20	3.07	2.84

1 CIP using caustic only.
2 Unit wetting. No CIP performed.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/4/23	8.6	7.85	4.65	4.40
	1/17/23	10.0	11.30	5.61	(See Note 1)
	1/26/23	7.4	14.50	4.45	(See Note 1)
February	2/3/23	6.1	9.82	3.99	3.87
	2/14/23	8.6	9.30	3.40	(See Note 1)
	2/22/23	6.3	10.60	2.10	(See Note 1)
March	3/8/23	(See Note 2)			
April	4/23/23	21.0	3.06	2.14	2.02
May	5/19/23	21.0	4.21	2.73	2.31
June	6/15/23	21.0	3.50	3.07	2.59
July	7/11/23	21.0	4.94	2.64	2.43
August	8/6/23	21.0	4.33	3.49	2.87
September	9/3/23	21.0	2.20	1.47	1.49
	9/6/23	1.9	1.65	1.75	(See Note 3)
October	10/1/23	21.0	2.10	1.68	1.69
	10/28/23	21.1	3.97	3.06	2.71
November	11/24/23	21.0	3.92	2.89	2.58
December	12/20/23	21.0	4.72	2.94	2.85

1 CIP using caustic only.
2 Unit wetting. No CIP performed.
3 D04 was started in error on 9/6/23 when D03 was scheduled for a full CIP. D04 completed the caustic CIP and was put back into filtration mode.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/1/23	10.0	7.51	3.89	(See Note 1)
	1/14/23	10.1	12.90	3.64	(See Note 1)
	1/26/23	9.8	15.90	3.71	3.67
February	2/8/23	9.6	10.10	3.49	(See Note 1)
	2/21/23	10.0	6.73	3.33	(See Note 1)
March	3/8/23	10.0	8.50	3.51	2.87
April	4/1/23	10.0	4.77	3.08	(See Note 1)
	4/21/23	10.2	4.91	3.12	(See Note 1)
	4/30/23	6.8	5.74	4.90	4.64
May	5/12/23	(See Note 2)			
June	6/8/23	20.9	4.00	1.50	2.06
July	7/2.23	17.8	4.80	2.31	1.64
	7/28/23	21.0	5.01	2.18	2.13
August	8/24/23	21.0	2.70	2.64	1.06
September	9/21/23	21.1	1.35	1.06	1.03
October	10/17/23	21.0	3.84	1.66	1.66
November	11/13/23	21.0	4.35	2.47	2.40
December	12/10/23	21.0	4.39	2.70	1.11

1 CIP using caustic only.
2 Unit wetting. No CIP performed.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/12/23	9.4	8.70	3.86	3.05
	1/25/23	10.0	5.52	3.94	(See Note 1)
February	2/5/23	8.9	6.21	3.36	(See Note 1)
	2/16/23	8.9	9.32	4.05	3.56
March	3/1/23	10.0	3.84	2.62	(See Note 1)
	3/25/23	10.0	7.12	4.00	(See Note 1)
April	4/18/23	10.2	6.62	3.32	3.53
	4/28/23	7.7	7.71	4.20	(See Note 1)
May	5/6/23	6.4	6.50	3.57	(See Note 1)
	5/17/23	8.7	12.63	4.55	4.85
	5/25/23	(See Note 2)			
June	6/22/23	21.0	2.47	1.68	1.79
July	7/18/23	21.0	4.88	1.93	1.89
August	8/13/23	21.0	2.70	1.24	0.99
September	9/10/23	21.0	1.66	1.22	1.32
October	10/5/23	21.0	3.18	2.91	1.48
November	11/1/23	21.1	4.50	2.81	2.37
	11/27/23	21.0	5.14	3.15	2.93
December	12/23/23	21.0	4.72	3.38	2.87

1 CIP using caustic only.
2 Unit wetting. No CIP performed.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	10.0	11.70	4.88	(See Note 1)
	1/13/23	8.9	12.40	4.21	3.59
	1/26/23	10.0	11.20	2.90	(See Note 1)
February	2/6/23	9.1	10.64	4.13	(See Note 1)
	2/17/23	7.9	11.00	4.59	4.13
March	3/1/23	10.0	6.00	2.51	(See Note 1)
	3/26/23	10.0	7.58	4.34	(See Note 1)
April	4/21/23	10.0	7.40	3.51	3.43
May	5/3/23	10.0	6.68	3.92	(See Note 1)
	5/14/23	8.7	9.80	4.74	(See Note 1)
	5/27/23	10.0	7.43	3.00	(See Note 1)
July	7/6/23	21.0	4.00	2.83	2.12
	7/31/23	21.0	4.88	2.62	1.94
August	8/26/23	21.0	2.55	2.13	1.91
September	9/23/23	21.0	2.24	1.78	1.64
October	10/19/23	21.0	4.38	3.62	2.10
November	11/15/23	21.0	6.04	3.56	3.35
December	12/12/23	21.0	6.02	3.47	3.12

1 CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit D08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/9/23	7.3	7.97	4.57	4.10
	1/21/23	10.0	7.43	5.30	(See Note 1)
	1/31/23	7.8	8.70	3.49	(See Note 1)
February	2/9/23	7.2	8.90	4.04	3.50
	2/22/23	10.0	7.20	2.75	(See Note 1)
March	3/13/23	10.0	4.37	2.44	(See Note 1)
April	4/6/23	10.1	6.50	2.24	2.16
	4/25/23	9.4	8.31	4.61	(See Note 1)
May	5/5/23	7.9	10.20	0.00	(See Note 1)
	5/12/23	5.7	12.20	4.27	(See Note 1)
	5/24/23	9.4	5.76	4.12	3.62
June	6/16/23	7.5	7.75	3.68	(See Note 1)
July	7/19/23	21.0	3.42	1.46	2.03
August	8/14/23	21.0	1.81	1.05	1.01
September	9/10/23	21.0	1.72	0.91	0.95
October	10/6/23	21.0	1.93	1.63	1.07
November	11/2/23	21.0	3.78	2.03	1.83
	11/28/23	21.0	3.94	1.91	1.76
December	12/24/23	21.0	4.50	2.94	1.87

1 CIP using caustic only.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/1/23	MW (See Note 1)			
	1/4/23	MW (See Note 1)			
	1/7/23	MW (See Note 1)			
	1/10/23	MW (See Note 1)			
	1/13/23	MW (See Note 1)			
	1/16/23	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/22/23	21.1	5.92	3.93	3.25
	1/25/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/6/23	MW (See Note 1)			
	2/9/23	MW (See Note 1)			
	2/12/23	MW (See Note 1)			
	2/15/23	MW (See Note 1)			
	2/18/23	21.0	9.10	2.25	3.49
	2/21/23	MW (See Note 1)			
	2/24/23	MW (See Note 1)			
	2/27/23	MW (See Note 1)			
March	3/2/23	MW (See Note 1)			
	3/5/23	MW (See Note 1)			
	3/8/23	MW (See Note 1)			
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/16/23	MW (See Note 1)			
	3/18/23	21.0	2.90	2.34	1.85
	3/21/23	MW (See Note 1)			
	3/23/23	MW (See Note 1)			
	3/26/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
April	4/3/23	MW (See Note 1)			
	4/11/23	MW (See Note 1)			
	4/13/23	MW (See Note 1)			
	4/16/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/23/23	21.0	3.70	2.10	2.02
	4/26/23	MW (See Note 1)			
	4/29/23	MW (See Note 1)			
May	5/1/23	MW (See Note 1)			
	5/4/23	MW (See Note 1)			
	5/7/23	MW (See Note 1)			
	5/9/23	MW (See Note 1)			
	5/12/23	MW (See Note 1)			
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/20/23	21.0	7.52	4.62	3.81
	5/23/23	MW (See Note 1)			
	5/26/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/7/23	MW (See Note 1)			
	6/10/23	MW (See Note 1)			
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/18/23	21.1	6.86	3.45	2.94
	6/21/23	MW (See Note 1)			
	6/23/23	MW (See Note 1)			
	6/26/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			
July	7/2/23	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/7/23	MW (See Note 1)			
	7/10/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	21.0	6.50	3.91	4.17
	7/18/23	MW (See Note 1)			
	7/21/23	MW (See Note 1)			
	7/24/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	MW (See Note 1)			
	8/1/23	MW (See Note 1)			
	8/4/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/12/23	21.1	4.34	3.47	2.93
	8/15/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/3/23	MW (See Note 1)			
	9/6/23	MW (See Note 1)			
	9/9/23	MW (See Note 1)			
	9/11/23	21.0	5.96	3.16	2.74
	9/14/23	MW (See Note 1)			
	9/16/23	MW (See Note 1)			
	9/19/23	MW (See Note 1)			
	9/22/23	MW (See Note 1)			
	9/25/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
October	10/3/23	MW (See Note 1)			
	10/6/23	MW (See Note 1)			
	10/8/23	21.0	6.80	3.64	3.49
	10/11/23	MW (See Note 1)			
	10/13/23	MW (See Note 1)			
	10/16/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/22/23	MW (See Note 1)			
	10/25/23	MW (See Note 1)			
	10/28/23	MW (See Note 1)			
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/5/23	21.0	5.77	4.06	4.01
	11/8/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/14/23	MW (See Note 1)			
	11/17/23	MW (See Note 1)			
	11/20/23	MW (See Note 1)			
	11/22/23	MW (See Note 1)			
	11/26/23	MW (See Note 1)			
	11/28/23	MW (See Note 1)			
December	12/1/23	MW (See Note 1)			
	12/3/23	21.0	13.00	4.77	3.01
	12/6/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/12/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/17/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/23/23	MW (See Note 1)			
	12/25/23	MW (See Note 1)			
	12/28/23	MW (See Note 1)			
	12/31/23	21.1	14.97	4.99	3.83

[1] Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	MW (See Note 1)			
	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/11/23	MW (See Note 1)			
	1/14/23	MW (See Note 1)			
	1/17/23	MW (See Note 1)			
	1/20/23	21.1	5.45	2.72	2.15
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/29/22	MW (See Note 1)			
February	2/1/23	MW (See Note 1)			
	2/5/23	MW (See Note 1)			
	2/8/23	MW (See Note 1)			
	2/11/23	MW (See Note 1)			
	2/14/23	MW (See Note 1)			
	2/17/23	21.0	7.90	3.21	2.82
	2/20/19	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			

[1] Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
March	3/1/23	MW (See Note 1)			
	3/4/23	MW (See Note 1)			
	3/7/23	MW (See Note 1)			
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/16/23	MW (See Note 1)			
	3/17/23	21.0	2.41	1.52	1.22
	3/20/23	MW (See Note 1)			
	3/23/23	MW (See Note 1)			
	3/25/23	MW (See Note 1)			
	3/28/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			
April	4/5/23	MW (See Note 1)			
	4/12/23	MW (See Note 1)			
	4/15/23	MW (See Note 1)			
	4/19.23	MW (See Note 1)			
	4/22/23	21.1	2.68	1.83	6.46
	4/25/23	MW (See Note 1)			
	4/27/23	MW (See Note 1)			
	4/30/23	MW (See Note 1)			
May	5/3/23	MW (See Note 1)			
	5/6/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/11/23	MW (See Note 1)			
	5/14/23	MW (See Note 1)			
	5/17/23	MW (See Note 1)			
	5/19/23	21.0	6.90	3.81	2.64
	5/22/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/3/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	MW (See Note 1)			
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/17/23	21.0	6.10	2.94	2.98
	6/20/23	MW (See Note 1)			
	6/23/23	MW (See Note 1)			
	6/26/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			
July	7/1/23	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	21.0	6.08	3.05	2.99
	7/17/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	MW (See Note 1)			
	8/4/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/11/12	21.0	3.74	3.14	1.78
	8/14/23	MW (See Note 1)			
	8/17/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/25/23	MW (See Note 1)			
	8/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
September	9/3/23	MW (See Note 1)			
	9/5/23	MW (See Note 1)			
	9/8/23	MW (See Note 1)			
	9/11/23	21.0	4.55	2.86	2.17
	9/14/23	MW (See Note 1)			
	9/16/23	MW (See Note 1)			
	9/19/23	MW (See Note 1)			
	9/22/23	MW (See Note 1)			
	9/25/23	MW (See Note 1)			
	9/28/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/6/23	MW (See Note 1)			
	10/9/23	21.0	5.19	2.63	2.03
	10/11/23	MW (See Note 1)			
	10/14/23	MW (See Note 1)			
	10/17/23	MW (See Note 1)			
	10/20/23	MW (See Note 1)			
	10/22/23	MW (See Note 1)			
	10/25/23	MW (See Note 1)			
	10/29/23	MW (See Note 1)			
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/6/23	21.0	6.32	3.45	2.62
	11/9/23	MW (See Note 1)			
	11/12/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/27/23	MW (See Note 1)			
	11/29/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12/5/23	21.0	12.47	4.24	3.26
	12/7/23	MW (See Note 1)			
	12/10/23	MW (See Note 1)			
	12/13/23	MW (See Note 1)			
	12/16/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/21/03	MW (See Note 1)			
	12/24/23	MW (See Note 1)			
	12/27/23	MW (See Note 1)			
	12/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	MW (See Note 1)			
	1/4/23	MW (See Note 1)			
	1/7/23	MW (See Note 1)			
	1/10/23	MW (See Note 1)			
	1/14/23	MW (See Note 1)			
	1/17/23	MW (See Note 1)			
	1/20/23	20.4	9.20	6.87	5.83
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/30/23	MW (See Note 1)			
February	2/1/23	MW (See Note 1)			
	2/5/23	MW (See Note 1)			
	2/8/23	MW (See Note 1)			
	2/11/23	MW (See Note 1)			
	2/14/23	MW (See Note 1)			
	2/17/23	21.2	13.09	6.07	4.83
	2/20/23	MW (See Note 1)			
	2/24/23	MW (See Note 1)			
	2/27/23	MW (See Note 1)			
March	3/1/23	MW (See Note 1)			
	3/4/23	MW (See Note 1)			
	3/7/23	MW (See Note 1)			
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/16/23	MW (See Note 1)			
	3/17/23	21.0	7.20	3.67	3.60
	3/20/23	MW (See Note 1)			
	3/23/23	MW (See Note 1)			
	3/25/23	MW (See Note 1)			
	3/30/23	MW (See Note 1)			
April	4/2/23	MW (See Note 1)			
	4/10/23	MW (See Note 1)			
	4/13/23	MW (See Note 1)			
	4/16/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/23/23	21.0	6.96	3.80	4.10
	4/25/23	MW (See Note 1)			
	4/27/23	MW (See Note 1)			
May	5/3/23	MW (See Note 1)			
	5/5/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/11/23	MW (See Note 1)			
	5/14/23	MW (See Note 1)			
	5/17/23	MW (See Note 1)			
	5/20/23	MW (See Note 1)			
	5/23/23	19.7	5.99	4.18	3.51
	5/25/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	MW (See Note 1)			
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	21.0	5.17	3.05	4.64
	6/23/23	MW (See Note 1)			
	6/26/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/1/23	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/7/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	MW (See Note 1)			
	7/18/23	MW (See Note 1)			
	7/19/23	21.0	3.34	2.02	2.75
	7/22/23	MW (See Note 1)			
	7/25/23	MW (See Note 1)			
	7/28/23	MW (See Note 1)			
	7/31/23	MW (See Note 1)			
August	8/2/23	MW (See Note 1)			
	8/3/23	MW (See Note 1)			
	8/6/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/12/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/16/23	21.0	3.24	1.73	1.68
	8/19/23	MW (See Note 1)			
	8/22/23	MW (See Note 1)			
	8/25/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/2/23	MW (See Note 1)			
	9/5/23	MW (See Note 1)			
	9/8/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	MW (See Note 1)			
	9/16/23	21.0	3.30	1.94	4.25
	9/19/23	MW (See Note 1)			
	9/22/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
	10/1/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/6/23	MW (See Note 1)			
	10/9/23	MW (See Note 1)			
	10/12/23	MW (See Note 1)			
	10/14/23	21.0	3.66	2.06	2.49
	10/16/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/21/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/25/23	MW (See Note 1)			
November	11/1/23	(See Note 2)			
	11/4/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/10/23	MW (See Note 1)			
	11/13/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/19/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/27/23	MW (See Note 1)			
	11/30/23	21.0	3.67	1.74	1.34
December	12/2/23	MW (See Note 1)			
	12/5/23	MW (See Note 1)			
	12/8/23	MW (See Note 1)			
	12/11/23	MW (See Note 1)			
	12/14/23	MW (See Note 1)			
	12/16/23	MW (See Note 1)			
	12/19/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	MW (See Note 1)			
	12/28/23	21.1	2.41	1.37	1.44
	12/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	MW (See Note 1)			
	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/10/23	21.1	4.99	2.56	2.67
	1/14/23	MW (See Note 1)			
	1/17/23	MW (See Note 1)			
	1/20/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/29/23	MW (See Note 1)			
February	2/1/23	MW (See Note 1)			
	2/4/23	MW (See Note 1)			
	2/7/23	21.0	6.04	2.97	2.44
	2/10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
March	3/1/23	MW (See Note 1)			
	3/3/23	MW (See Note 1)			
	3/7/23	21.1	7.45	3.69	3.00
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/24/23	MW (See Note 1)			
	3/26/23	MW (See Note 1)			
	3/30/23	MW (See Note 1)			
April	4/2/23	MW (See Note 1)			
	4/10/23	21.0	2.07	1.80	2.39
	4/13/23	MW (See Note 1)			
	4/15/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/23/23	MW (See Note 1)			
	4/25/23	MW (See Note 1)			
	4/28/23	MW (See Note 1)			
May	5/1/23	MW (See Note 1)			
	5/4/23	MW (See Note 1)			
	5/7/23	MW (See Note 1)			
	5/9/23	21.0	7.30	3.58	3.31
	5/12/23	MW (See Note 1)			
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/21/23	MW (See Note 1)			
	5/23/23	MW (See Note 1)			
	5/26/23	MW (See Note 1)			
	5/29/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/7/23	21.1	5.66	4.70	3.17
	6/10/23	MW (See Note 1)			
	6/13/23	MW (See Note 1)			
	6/16/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/24/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/2/23	MW (See Note 1)			
	7/5/23	21.0	7.26	3.26	3.16
	7/7/23	MW (See Note 1)			
	7/11/23	MW (See Note 1)			
	7/14/23	MW (See Note 1)			
	7/16/23	MW (See Note 1)			
	7/19/23	MW (See Note 1)			
	7/22/23	MW (See Note 1)			
	7/25/23	MW (See Note 1)			
	7/28/23	MW (See Note 1)			
	7/30/23	MW (See Note 1)			
August	8/2/23	21.0	5.98	3.03	2.73
	8/5/23	MW (See Note 1)			
	8/8/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/16/23	MW (See Note 1)			
	8/19/23	MW (See Note 1)			
	8/22/23	MW (See Note 1)			
	8/24/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/2/23	21.1	5.40	3.14	3.27
	9/4/23	MW (See Note 1)			
	9/7/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/29/23	21.0	7.30	3.66	3.63
October	10/2/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/7/23	MW (See Note 1)			
	10/10/23	MW (See Note 1)			
	10/13/23	MW (See Note 1)			
	10/16/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/22/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/27/23	19.9	6.40	3.53	2.15
	10/30/23	MW (See Note 1)			
November	11/2/23	MW (See Note 1)			
	11/5/23	MW (See Note 1)			
	11/9/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/15/23	MW (See Note 1)			
	11.18.23	MW (See Note 1)			
	11/20/23	MW (See Note 1)			
	11/23/23	MW (See Note 1)			
	11/26/23	21.1	8.20	3.45	2.58
	11/28/23	MW (See Note 1)			
December	12/1/23	MW (See Note 1)			
	12/4/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/10/23	MW (See Note 1)			
	12/13/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/21/23	MW (See Note 1)			
	12/24/23	21.1	12.04	4.88	3.41
	12/27/23	MW (See Note 1)			
	12/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	MW (See Note 1)			
	1/5/23	MW (See Note 1)			
	1/11/23	MW (See Note 1)			
	1/14/23	MW (See Note 1)			
	1/18/23	MW (See Note 1)			
	1/21/23	MW (See Note 1)			
	1/24/23	MW (See Note 1)			
	1/27/23	21.0	6.60	3.02	1.49
	1/30/23	MW (See Note 1)			
February	2/2/23	MW (See Note 1)			
	2/5/23	MW (See Note 1)			
	2/8/23	MW (See Note 1)			
	2/11/23	MW (See Note 1)			
	2/14/23	MW (See Note 1)			
	2/17/23	MW (See Note 1)			
	2/20/23	MW (See Note 1)			
	2/24/23	21.0	7.60	3.72	3.00
	2/28/23	MW (See Note 1)			
March	3/3/23	MW (See Note 1)			
	3/6/23	MW (See Note 1)			
	3/8/23	MW (See Note 1)			
	3/11/23	MW (See Note 1)			
	3/14/23	MW (See Note 1)			
	3/17/23	MW (See Note 1)			
	3/19/23	MW (See Note 1)			
April	4/1/23	MW (See Note 1)			
	4/5/23	21.1	2.90	1.82	1.74
	4/13/23	MW (See Note 1)			
	4/15/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/23/23	MW (See Note 1)			
	4/26/23	MW (See Note 1)			
	4/28/23	MW (See Note 1)			
May	5/1/23	MW (See Note 1)			
	5/4/23	MW (See Note 1)			
	5/6/23	MW (See Note 1)			
	5/9/23	MW (See Note 1)			
	5/12/23	21.0	5.70	4.20	3.04
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/20/23	MW (See Note 1)			
	5/23/23	MW (See Note 1)			
	5/26/23	MW (See Note 1)			
	5/29/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/7/23	MW (See Note 1)			
	6/10/23	21.0	6.34	3.51	3.03
	6/13/23	MW (See Note 1)			
	6/16/23	MW (See Note 1)			
	6/19/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/24/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/2/23	MW (See Note 1)			
	7/5/23	MW (See Note 1)			
	7/8/23	21.0	8.00	4.06	3.23
	7/10/23	MW (See Note 1)			
	7/13/23	MW (See Note 1)			
	7/16/23	MW (See Note 1)			
	7/19/23	MW (See Note 1)			
	7/22/23	MW (See Note 1)			
	7/24/23	MW (See Note 1)			
	7/27/23	MW (See Note 1)			
	7/30/23	MW (See Note 1)			
August	8/2/23	MW (See Note 1)			
	8/4/23	21.0	6.60	3.92	2.80
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/16/23	MW (See Note 1)			
	8/19/23	MW (See Note 1)			
	8/21/23	MW (See Note 1)			
	8/24/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/2/23	MW (See Note 1)			
	9/5/23	21.0	4.60	2.96	2.64
	9/8/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	MW (See Note 1)			
	9/16/23	MW (See Note 1)			
	9/19/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/2/23	21.0	5.72	3.07	2.63
	10/5/23	MW (See Note 1)			
	10/8/23	MW (See Note 1)			
	10/11/23	MW (See Note 1)			
	10/13/23	MW (See Note 1)			
	10/16/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/22/23	MW (See Note 1)			
	10/24/23	MW (See Note 1)			
	10/28/23	MW (See Note 1)			
	10/30/23	21.0	6.31	3.32	2.85
November	11/2/23	MW (See Note 1)			
	11/5/23	MW (See Note 1)			
	11/8/23	MW (See Note 1)			
	11/14/23	MW (See Note 1)			
	11/17/23	MW (See Note 1)			
	11/20/23	MW (See Note 1)			
	11/23/23	MW (See Note 1)			
	11/26/23	MW (See Note 1)			
	11/28/23	21.0	10.00	4.12	3.25
December	12/1/23	MW (See Note 1)			
	12/4/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/12/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/24/23	MW (See Note 1)			
	12/26/23	21.0	8.49	5.03	3.37
	12/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/1/23	21.0	5.12	2.52	2.35
	1/4/23	MW (See Note 1)			
	1/7/23	MW (See Note 1)			
	1/10/23	MW (See Note 1)			
	1/13/23	MW (See Note 1)			
	1/16/23	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/29/23	23.6	6.46	3.72	2.50
February	2/1/23	MW (See Note 1)			
	2/4/23	MW (See Note 1)			
	2/7/23	MW (See Note 1)			
	2./10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/20/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
March	3/1/23	21.0	6.55	4.01	3.01
	3/4/23	MW (See Note 1)			
	3/7/23	MW (See Note 1)			
	3/10/23	MW (See Note 1)			
	3/12/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/24/23	MW (See Note 1)			
	3/26/23	MW (See Note 1)			
	3/31/23	21.1	2.20	1.72	1.23
April	4/5/23	MW (See Note 1)			
	4/11/23	MW (See Note 1)			
	4/14/23	MW (See Note 1)			
	4/19/23	MW (See Note 1)			
	4/19/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/27/23	MW (See Note 1)			
	4/30/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/5/23	21.0	6.68	3.99	2.94
	5/8/23	MW (See Note 1)			
	5/11/23	MW (See Note 1)			
	5/14/23	MW (See Note 1)			
	5/16/23	MW (See Note 1)			
	5/19/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/30/23	MW (See Note 1)			
June	6/3/23	21.0	5.96	3.42	3.42
	6/6/23	MW (See Note 1)			
	6/22/23	MW (See Note 1)			
	6/25/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	MW (See Note 1)			
July	7/3/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/11/23	MW (See Note 1)			
	7/14/23	21.0	7.00	3.08	3.21
	7/17/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
August	8/1/23	MW (See Note 1)			
	8/3/23	MW (See Note 1)			
	8/6/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/12/23	21.2	4.37	3.20	2.61
	8/15/23	MW (See Note 1)			
	8/17/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/6/23	MW (See Note 1)			
	9/12/23	21.0	4.70	2.61	2.90
	9/15/23	MW (See Note 1)			
	9/17/23	MW (See Note 1)			
	9/20/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/28/23	MW (See Note 1)			
October	10/1/23	MW (See Note 1)			
	10/4/23	MW (See Note 1)			
	10/7/23	MW (See Note 1)			
	10/10/23	21.0	5.37	2.89	2.29
	10/13/23	MW (See Note 1)			
	10/15/23	MW (See Note 1)			
	10/18/23	MW (See Note 1)			
	10/21/23	MW (See Note 1)			
	10/24/23	MW (See Note 1)			
	10/28/23	MW (See Note 1)			
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/6/23	MW (See Note 1)			
	11/9/23	21.0	6.53	3.23	2.49
	11/11/23	MW (See Note 1)			
	11/15/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/26/23	MW (See Note 1)			
	11/29/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12/5/23	MW (See Note 1)			
	12/7/23	2.1	10.05	4.05	2.84
	12/11/23	MW (See Note 1)			
	12/13/23	MW (See Note 1)			
	12/16/23	MW (See Note 1)			
	12/19/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	MW (See Note 1)			
	12/28/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/6/23	MW (See Note 1)			
	1/9/23	MW (See Note 1)			
	1/12/23	MW (See Note 1)			
	1/15/23	MW (See Note 1)			
	1/18/23	23.6	5.94	3.22	2.48
	1/22/23	MW (See Note 1)			
	1/25/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/6/23	MW (See Note 1)			
	2/9/23	MW (See Note 1)			
	2/12/23	MW (See Note 1)			
	2/15/23	21.1	8.70	3.95	3.48
	2/18/23	MW (See Note 1)			
	2/21/23	MW (See Note 1)			
	2/25/23	MW (See Note 1)			
	2/28/23	MW (See Note 1)			
March	3/3/23	MW (See Note 1)			
	3/5/23	MW (See Note 1)			
	3/8/23	MW (See Note 1)			
	3/11/23	MW (See Note 1)			
	3/14/23	MW (See Note 1)			
	3/15/23	21.0	3.70	2.21	1.67
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
April	4/1/23	MW (See Note 1)			
	4/5/23	MW (See Note 1)			
	4/11/23	MW (See Note 1)			
	4/14/23	MW (See Note 1)			
	4/19/23	MW (See Note 1)			
	4/22/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/27/23	21.0	4.23	2.08	1.90
	4/29/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/5/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/11/23	MW (See Note 1)			
	5/14/23	MW (See Note 1)			
	5/16/23	MW (See Note 1)			
	5/19/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	21.0	8.50	3.76	2.71
	5/27/23	MW (See Note 1)			
	5/30/23	MW (See Note 1)			
June	6/3/23	MW (See Note 1)			
	6/5/23	MW (See Note 1)			
	6/8/23	MW (See Note 1)			
	6/11/23	MW (See Note 1)			
	6/14/23	MW (See Note 1)			
	6/17/23	MW (See Note 1)			
	6/19/23	MW (See Note 1)			
	6/22/23	21.0	7.22	3.58	2.56
	6/25/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/1/23	MW (See Note 1)			
	7/3/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/14/23	MW (See Note 1)			
	7/17/23	MW (See Note 1)			
	7/20/23	21.0	6.68	3.61	2.89
	7/23/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/28/23	MW (See Note 1)			
	7/31/23	MW (See Note 1)			
August	8/3/23	MW (See Note 1)			
	8/6/23	MW (See Note 1)			
	8/8/23	MW (See Note 1)			
	8/11/23	MW (See Note 1)			
	8/14/23	MW (See Note 1)			
	8/16/23	20.9	5.28	3.43	2.56
	8/19/23	MW (See Note 1)			
	8/22/23	MW (See Note 1)			
	8/25/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/2/23	MW (See Note 1)			
	9/5/23	MW (See Note 1)			
	9/8/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	MW (See Note 1)			
	9/16/23	21.0	7.20	3.05	2.90
	9/19/23	MW (See Note 1)			
	9/22/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/8/23	MW (See Note 1)			
	10/11/23	MW (See Note 1)			
	10/14/23	21.0	6.27	3.78	3.03
	10/17/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/22/23	MW (See Note 1)			
	10/25/23	MW (See Note 1)			
	10/28/23	MW (See Note 1)			
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/6/23	MW (See Note 1)			
	11/9/23	MW (See Note 1)			
	11/12/23	21.0	9.80	4.09	3.86
	11/15/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/26/23	MW (See Note 1)			
	11/29/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12/5/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/10/23	21.0	9.21	5.30	4.27
	12/13/23	MW (See Note 1)			
	12/16/23	MW (See Note 1)			
	12/19/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	MW (See Note 1)			
	12/27/23	MW (See Note 1)			
	12/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/4/23	21.1	4.90	2.94	2.43
	1/7/23	MW (See Note 1)			
	1/10/23	MW (See Note 1)			
	1/13/23	MW (See Note 1)			
	1/16/23	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
February	2/1/23	23.6	6.05	3.16	2.68
	2/4/23	MW (See Note 1)			
	2/7/23	MW (See Note 1)			
	2/10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/28/23	MW (See Note 1)			
March	3/3/23	21.0	6.18	3.28	3.13
	3/8/23	MW (See Note 1)			
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/16/23	MW (See Note 1)			
	3/19/23	MW (See Note 1)			
	3/23/23	MW (See Note 1)			
	3/26/23	MW (See Note 1)			
April	4/1/23	MW (See Note 1)			
	4/5/23	MW (See Note 1)			
	4/13/23	21.0	2.62	1.82	2.08
	4/15/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/22/23	MW (See Note 1)			
	4/25/23	MW (See Note 1)			
	4/28/23	MW (See Note 1)			
	4/30/23	MW (See Note 1)			
May	5/3/23	MW (See Note 1)			
	5/6/23	MW (See Note 1)			
	5/9/23	MW (See Note 1)			
	5/11/23	21.0	6.81	3.23	2.81
	5/14/23	MW (See Note 1)			
	5/17/23	MW (See Note 1)			
	5/20/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	21.2	5.62	3.29	3.15
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/20/23	MW (See Note 1)			
	6/23/23	MW (See Note 1)			
	6/26/23	MW (See Note 1)			
	6/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit E08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/1/23	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/7/23	21.0	6.54	3.30	3.04
	7/10/23	MW (See Note 1)			
	7/13/23	MW (See Note 1)			
	7/16/23	MW (See Note 1)			
	7/18/23	MW (See Note 1)			
	7/21/23	MW (See Note 1)			
	7/24/23	MW (See Note 1)			
	7/27/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	MW (See Note 1)			
	8/4/23	21.2	5.13	3.32	2.84
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/16/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/21/23	MW (See Note 1)			
	8/24/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	21.0	4.68	2.88	2.84
	9/7/23	MW (See Note 1)			
	9/9/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/20/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/29/23	MW (See Note 1)			
October	10/1/23	21.0	4.91	2.72	2.36
	10/4/23	MW (See Note 1)			
	10/7/23	MW (See Note 1)			
	10/9/23	MW (See Note 1)			
	10/12/23	MW (See Note 1)			
	10/15/23	MW (See Note 1)			
	10/18/23	MW (See Note 1)			
	10/20/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/26/23	MW (See Note 1)			
	10/29/23	21.0	5.51	2.93	2.77
November	11/1/23	MW (See Note 1)			
	11/4/23	MW (See Note 1)			
	11/6/23	MW (See Note 1)			
	11/10/23	MW (See Note 1)			
	11/12/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/19/23	MW (See Note 1)			
	11/22/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/27/23	21.0	9.68	3.41	2.74
	11/30/23	MW (See Note 1)			
December	12/3/23	MW (See Note 1)			
	12/6/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/11/23	MW (See Note 1)			
	12/14/23	MW (See Note 1)			
	12/17/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	21.0	9.68	2.80	2.72
	12/28/23	MW (See Note 1)			
	12/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/3/23	MW (See Note 1)			
	1/6/23	MW (See Note 1)			
	1/9/23	MW (See Note 1)			
	1/12/23	21.0	5.90	3.86	2.72
	1/16/23	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/22/23	MW (See Note 1)			
	1/25/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/7/23	MW (See Note 1)			
	2/9/23	23.6	5.01	3.29	2.89
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
	2/28/23	MW (See Note 1)			
March	3/3/23	MW (See Note 1)			
	3/6/23	MW (See Note 1)			
	3/11/23	MW (See Note 1)			
	3/12/23	21.0	5.99	3.44	3.49
	3/16/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/24/23	MW (See Note 1)			
	3/27/23	MW (See Note 1)			
	3/30/23	MW (See Note 1)			
April	4/2/23	MW (See Note 1)			
	4/13/23	MW (See Note 1)			
	4/16/23	MW (See Note 1)			
	4/19/23	21.0	2.64	2.07	2.04
	4/22/23	MW (See Note 1)			
	4/25/23	MW (See Note 1)			
	4/28/23	MW (See Note 1)			
	4/30/23	MW (See Note 1)			
May	5/3/23	MW (See Note 1)			
	5/6/23.	MW (See Note 1)			
	5/9/23	MW (See Note 1)			
	5/12/23	MW (See Note 1)			
	5/15/23	MW (See Note 1)			
	5/17/23	21.0	7.50	3.54	3.33
	5/20/23	MW (See Note 1)			
	5/23/23	MW (See Note 1)			
	5/26/23	MW (See Note 1)			
	5/29/23	MW (See Note 1)			
June	6/2/23	MW (See Note 1)			
	6/5/23	MW (See Note 1)			
	6/7/23	MW (See Note 1)			
	6/10/23	MW (See Note 1)			
	6/13/23	MW (See Note 1)			
	6/16/23	21.0	5.49	3.76	2.91
	6/19/23	MW (See Note 1)			
	6/22/23	MW (See Note 1)			
	6/25/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F01

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/3/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	21.1	6.94	3.34	3.55
	7/21/23	MW (See Note 1)			
	7/24/23	MW (See Note 1)			
	7/30/23	MW (See Note 1)			
August	8/2/23	MW (See Note 1)			
	8/4/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/16/23	21.1	5.07	3.59	3.38
	8/19/23	MW (See Note 1)			
	8/22/23	MW (See Note 1)			
	8/25/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/2/23	MW (See Note 1)			
	9/5/23	MW (See Note 1)			
	9/7/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	MW (See Note 1)			
	9/16/23	21.0	6.15	3.41	3.15
	9/19/23	MW (See Note 1)			
	9/22/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/6/23	MW (See Note 1)			
	10/9/23	MW (See Note 1)			
	10/11/23	MW (See Note 1)			
	10/14/23	21.0	6.90	3.91	3.11
	10/17/23	MW (See Note 1)			
	10/20/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/27/23	MW (See Note 1)			
	10/30/23	MW (See Note 1)			
November	11/1/23	MW (See Note 1)			
	11/4/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/14/23	21.0	5.98	3.31	3.07
	11/17/23	MW (See Note 1)			
	11/20/23	MW (See Note 1)			
	11/23/23	MW (See Note 1)			
	11/25/23	MW (See Note 1)			
	11/28/23	MW (See Note 1)			
December	12/1/23	MW (See Note 1)			
	12/4/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/10/23	MW (See Note 1)			
	12/13/23	21.0	11.33	4.45	3.91
	12/15/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/21/23	MW (See Note 1)			
	12/24/23	MW (See Note 1)			
	12/27/23	MW (See Note 1)			
	12/30/23	MW (See Note 1)			

[1] Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/3/23	MW (See Note 1)			
	1/7/23	MW (See Note 1)			
	1/13/23	MW (See Note 1)			
	1/17/23	MW (See Note 1)			
	1/19/23	21.2	4.67	2.68	1.96
	1/22/23	MW (See Note 1)			
	1/25/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/7/23	MW (See Note 1)			
	2/10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	21.1	5.70	2.88	2.06
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
March	3/1/23	MW (See Note 1)			
	3/4/23	MW (See Note 1)			
	3/7/23	MW (See Note 1)			
	3/12/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/17/23	MW (See Note 1)			
	3/19/23	21.1	2.70	1.46	1.34
	3/22/23	MW (See Note 1)			
	3/25/23	MW (See Note 1)			
	3/27/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			
April	4/4/23	MW (See Note 1)			
	4/14/23	MW (See Note 1)			
	4/17/23	MW (See Note 1)			
	4/21/23	MW (See Note 1)			
	4/23/23	MW (See Note 1)			
	4/26/23	21.0	3.92	1.65	3.92
	4/29/23	MW (See Note 1)			
May	5/1/23	MW (See Note 1)			
	5/4/23	MW (See Note 1)			
	5/7/23	MW (See Note 1)			
	5/10/23	MW (See Note 1)			
	5/13/23	MW (See Note 1)			
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/21/23	MW (See Note 1)			
	5/24/23	21.0	5.40	3.00	2.27
	5/27/23	MW (See Note 1)			
	5/30/23	MW (See Note 1)			
June	6/3/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	MW (See Note 1)			
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/17/23	MW (See Note 1)			
	6/20/23	MW (See Note 1)			
	6/23/23	21.0	5.30	2.70	2.18
	6/26/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F02

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/1/223	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/7/23	MW (See Note 1)			
	7/10/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	21.0	4.80	2.39	2.72
	7/26/23	MW (See Note 1)			
	7/27/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	MW (See Note 1)			
	8/4/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/16/23	MW (See Note 1)			
	8/19/23	MW (See Note 1)			
	8/21/23	21.0	4.10	2.38	2.01
	8/24/23	MW (See Note 1)			
	8/27/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/7/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/21/23	21.0	3.86	3.20	2.54
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/8/23	MW (See Note 1)			
	10/11/23	MW (See Note 1)			
	10/14/23	MW (See Note 1)			
	10/17/23	MW (See Note 1)			
	10/19/23	21.0	4.74	2.79	2.26
	10/22/23	MW (See Note 1)			
	10/25/23	MW (See Note 1)			
	10/28/23	MW (See Note 1)			
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/6/23	MW (See Note 1)			
	11/9/23	MW (See Note 1)			
	11/12/23	MW (See Note 1)			
	11/15/23	MW (See Note 1)			
	11/18/23	21.0	4.91	3.33	3.05
	11/21/23	MW (See Note 1)			
	11/23/23	MW (See Note 1)			
	11/26/23	MW (See Note 1)			
	11/29/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12/5/23	MW (See Note 1)			
	12/8/23	MW (See Note 1)			
	12/11/23	MW (See Note 1)			
	12/13/23	MW (See Note 1)			
	12/16/23	21.0	8.03	2.43	4.33
	12/19/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	MW (See Note 1)			
	12/28/23	MW (See Note 1)			
	12/31/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/10/23	MW (See Note 1)			
	1/13/23	MW (See Note 1)			
	1/16/22	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/31/23	21.0	5.19	3.08	2.68
February	2/3/23	MW (See Note 1)			
	2/6/23	MW (See Note 1)			
	2/10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
	2/28/23	23.6	6.23	3.07	2.60
March	3/3/23	MW (See Note 1)			
	3/5/23	MW (See Note 1)			
	3/8/23	MW (See Note 1)			
	3/11/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/16/23	MW (See Note 1)			
	3/19/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/24/23	MW (See Note 1)			
	3/27/23	21.0	4.30	2.61	2.26
	3/31/23	MW (See Note 1)			
April	4/4/23	MW (See Note 1)			
	4/14/23	MW (See Note 1)			
	4/18/23	MW (See Note 1)			
	4/21/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/26/23	MW (See Note 1)			
	4/29/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/4/23	21.0	5.72	3.86	2.16
	5/7/23	MW (See Note 1)			
	5/10/23	MW (See Note 1)			
	5/12/23	MW (See Note 1)			
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/21/23	MW (See Note 1)			
	5/24/23	MW (See Note 1)			
	5/27/23	MW (See Note 1)			
	5/30/23	MW (See Note 1)			
June	6/2/23	21.0	5.90	3.54	3.24
	6/5/23	MW (See Note 1)			
	6/8/23	MW (See Note 1)			
	6/11/23	MW (See Note 1)			
	6/14/23	MW (See Note 1)			
	6/17/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/23/23	MW (See Note 1)			
	6/25/23	MW (See Note 1)			
	6/28/23	MW (See Note 1)			
	6/30/23	21.0	5.67	3.55	4.31

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F03

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/3/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/11/23	MW (See Note 1)			
	7/14/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	MW (See Note 1)			
	7/25/23	MW (See Note 1)			
	7/28/23	MW (See Note 1)			
	7/31/23	21.0	6.18	3.24	2.72
August	8/3/23	MW (See Note 1)			
	8/6/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/12/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
	8/31/23	21.1	4.46	3.28	2.96
September	9/3/23	MW (See Note 1)			
	9/6/23	MW (See Note 1)			
	9/9/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/14/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/29/23	21.0	5.50	1.97	1.81
October	10/2/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/7/23	MW (See Note 1)			
	10/10/23	MW (See Note 1)			
	10/13/23	MW (See Note 1)			
	10/16/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/21/23	MW (See Note 1)			
	10/24/23	MW (See Note 1)			
	10/27/23	21.0	6.06	3.23	3.36
	10/30/23	MW (See Note 1)			
November	11/2/23	MW (See Note 1)			
	11/5/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/24/23	MW (See Note 1)			
	11/27/23	21.1	7.38	4.21	3.75
	11/30/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12//6/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/11/23	MW (See Note 1)			
	12/14/23	MW (See Note 1)			
	12/17/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/22/23	MW (See Note 1)			
	12/25/23	21.0	14.83	5.34	4.35
	12/28/23	MW (See Note 1)			
	12/31/23	MW (See Note 1)			

[1] Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/3/23	MW (See Note 1)			
	1/6/23	MW (See Note 1)			
	1/9/23	21.0	6.24	3.81	3.04
	1/13/23	MW (See Note 1)			
	1/16/23	MW (See Note 1)			
	1/19/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
February	2/1/23	MW (See Note 1)			
	2/4/23	MW (See Note 1)			
	2/7/23	23.6	7.03	3.95	2.86
	2/10/23	MW (See Note 1)			
	2/13/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/23/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
March	3/1/23	MW (See Note 1)			
	3/4/23	MW (See Note 1)			
	3/7/23	20.9	7.98	3.85	3.16
	3/9/23	MW (See Note 1)			
	3/12/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/23/23	MW (See Note 1)			
	3/26/23	MW (See Note 1)			
	3/30/23	MW (See Note 1)			
April	4/2/23	MW (See Note 1)			
	4/13/23	21.0	1.89	2.45	2.16
	4/16/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/21/23	MW (See Note 1)			
	4/25/23	MW (See Note 1)			
	4/28/23	MW (See Note 1)			
May	5/1/23	MW (See Note 1)			
	5/3/23	MW (See Note 1)			
	5/6/23	MW (See Note 1)			
	5/9/23	MW (See Note 1)			
	5/11/23	21.0	9.23	3.44	2.80
	5/14/23	MW (See Note 1)			
	5/17/23	MW (See Note 1)			
	5/20/23	MW (See Note 1)			
	5/23/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/7/23	MW (See Note 1)			
	6/9/23	21.0	7.10	3.64	3.69
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/24/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	MW (See Note 1)			

[1] Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F04

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/3/23	MW (See Note 1)			
	7/5/23	MW (See Note 1)			
	7/8/23	21.0	5.65	3.88	3.70
	7/11/23	MW (See Note 1)			
	7/13/23	MW (See Note 1)			
	7/19/23	MW (See Note 1)			
	7/22/23	MW (See Note 1)			
	7/25/23	MW (See Note 1)			
	7/27/23	MW (See Note 1)			
	7/30/23	MW (See Note 1)			
August	8/2/23	MW (See Note 1)			
	8/5/23	MW (See Note 1)			
	8/6/23	21.1	5.36	3.65	3.16
	8/9/23	MW (See Note 1)			
	8/12/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/21/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/6/23	21.0	4.90	3.60	3.52
	9/9/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/17/23	MW (See Note 1)			
	9/20/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/25/26	MW (See Note 1)			
	9/28/23	MW (See Note 1)			
October	10/1/23	MW (See Note 1)			
	10/4/23	21.0	5.12	3.66	2.95
	10/7/23	MW (See Note 1)			
	10/9/23	MW (See Note 1)			
	10/12/23	MW (See Note 1)			
	10/15/23	MW (See Note 1)			
	10/18/23	MW (See Note 1)			
	10/20/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/27/23	MW (See Note 1)			
	10/29/23	MW (See Note 1)			
November	11/1/23	21.1	6.55	3.70	3.70
	11/4/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/1/23	MW (See Note 1)			
	11/14/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/19/23	MW (See Note 1)			
	11/22/23	MW (See Note 1)			
	11/25/23	MW (See Note 1)			
	11/30/23	21.0	9.05	4.76	4.01
December	12/3/23	MW (See Note 1)			
	12/6/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/12/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/17/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/23/23	MW (See Note 1)			
	12/26/23	MW (See Note 1)			
	12/29/23	21.0	12.60	5.89	3.66

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/11/23	MW (See Note 1)			
	1/14/23	MW (See Note 1)			
	1/18/23	21.2	1.62	1.65	2.55
	1/21/23	MW (See Note 1)			
	1/24/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/6/23	MW (See Note 1)			
	2/9/23	MW (See Note 1)			
	2/12/23	MW (See Note 1)			
	2/15/23	23.6	5.83	2.88	2.49
	2/18/23	MW (See Note 1)			
	2/25/23	MW (See Note 1)			
	2/28/23	MW (See Note 1)			
March	3/3/23	MW (See Note 1)			
	3/6/23	MW (See Note 1)			
	3/9/23	MW (See Note 1)			
	3/12/23	MW (See Note 1)			
	3/14/23	MW (See Note 1)			
	3/25/23	21.0	2.21	1.50	2.11
	3/28/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			
April	4/5/23	MW (See Note 1)			
	4/15/23	MW (See Note 1)			
	4/19/23	MW (See Note 1)			
	4/22/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/27/23	MW (See Note 1)			
	4/30/23	MW (See Note 1)			
May	5/2/23	21.0	2.40	1.61	1.47
	5/5/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/11/23	MW (See Note 1)			
	5/14/23	MW (See Note 1)			
	5/16/23	MW (See Note 1)			
	5/19/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/27/23	MW (See Note 1)			
	5/30/23	21.1	7.18	3.57	3.39
June	6/3/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	MW (See Note 1)			
	6/13/23	MW (See Note 1)			
	6/16/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/24/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	21.0	4.88	3.63	2.92

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F05

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/2/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/9/23	MW (See Note 1)			
	7/11/23	MW (See Note 1)			
	7/14/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	21.0	6.24	2.65	2.85
	8/4/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/10/23	MW (See Note 1)			
	8/13/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/21/23	MW (See Note 1)			
	8/24/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
	8/31/23	21.0	4.37	2.33	2.37
September	9/3/23	MW (See Note 1)			
	9/6/23	MW (See Note 1)			
	9/9/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/20/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/29/23	21.0	4.54	2.83	2.73
October	10/2/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/7/23	MW (See Note 1)			
	10/10/23	MW (See Note 1)			
	10/13/23	MW (See Note 1)			
	10/16/23	MW (See Note 1)			
	10/18/23	MW (See Note 1)			
	10/21/23	MW (See Note 1)			
	10/24/23	MW (See Note 1)			
	10/28/23	21.0	6.80	3.79	2.52
	10/31/23	MW (See Note 1)			
November	11/3/23	MW (See Note 1)			
	11/5/23	MW (See Note 1)			
	11/8/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/15/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	MW (See Note 1)			
	11/23/23	MW (See Note 1)			
	11/26/23	21.0	9.00	3.64	3.46
	11/29/23	MW (See Note 1)			
December	12/2/23	MW (See Note 1)			
	12/4/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/11/23	MW (See Note 1)			
	12/14/23	MW (See Note 1)			
	12/17/23	MW (See Note 1)			
	12/20/23	MW (See Note 1)			
	12/23/23	MW (See Note 1)			
	12/26/23	20.9	10.18	6.63	3.32
	12/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/2/23	MW (See Note 1)			
	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/9/23	21.2	5.60	2.66	2.84
	1/12/23	MW (See Note 1)			
	1/15/23	MW (See Note 1)			
	1/18/23	MW (See Note 1)			
	1/22/23	MW (See Note 1)			
	1/25/23	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
	1/31/23	MW (See Note 1)			
February	2/3/23	MW (See Note 1)			
	2/6/23	21.1	6.70	2.82	2.20
	2/9/23	MW (See Note 1)			
	2/12/23	MW (See Note 1)			
	2/15/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/22/23	MW (See Note 1)			
	2/26/23	MW (See Note 1)			
March	3/1/23	MW (See Note 1)			
	3/3/23	MW (See Note 1)			
	3/7/23	21.1	6.36	3.50	3.00
	3/10/23	MW (See Note 1)			
	3/13/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/21/23	MW (See Note 1)			
	3/24/23	MW (See Note 1)			
	3/27/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			
April	4/2/23	MW (See Note 1)			
	4/13/23	20.7	1.69	1.67	1.39
	4/16/23	MW (See Note 1)			
	4/20/23	MW (See Note 1)			
	4/23/23	MW (See Note 1)			
	4/26/23	MW (See Note 1)			
	4/29/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/4/23	MW (See Note 1)			
	5/7/23	MW (See Note 1)			
	5/10/23	MW (See Note 1)			
	5/12/23	21.0	5.27	2.24	3.18
	5/15/23	MW (See Note 1)			
	5/18/23	MW (See Note 1)			
	5/21/23	MW (See Note 1)			
	5/23/23	MW (See Note 1)			
	5/26/23	MW (See Note 1)			
June	6/1/23	MW (See Note 1)			
	6/4/23	MW (See Note 1)			
	6/7/23	MW (See Note 1)			
	6/10/23	MW (See Note 1)			
	6/13/23	21.0	6.18	3.17	2.32
	6/15/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/24/23	MW (See Note 1)			
	6/27/23	MW (See Note 1)			
	6/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F06

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/3/23	MW (See Note 1)			
	7/6/23	MW (See Note 1)			
	7/8/23	MW (See Note 1)			
	7/11/23	21.0	6.00	4.09	2.95
	7/14/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/22/23	MW (See Note 1)			
	7/25/23	MW (See Note 1)			
	7/28/23	MW (See Note 1)			
	7/31/23	MW (See Note 1)			
August	8/3/23	MW (See Note 1)			
	8/7/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/11/23	21.1	3.78	2.58	2.33
	8/14/23	MW (See Note 1)			
	8/17/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/7/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/13/23	21.0	4.97	3.36	3.20
	9/16/23	MW (See Note 1)			
	9/19/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/24/23	MW (See Note 1)			
	9/27/23	MW (See Note 1)			
	9/30/23	MW (See Note 1)			
October	10/3/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/8/23	MW (See Note 1)			
	10/11/23	21.0	5.50	3.00	2.90
	10/14/23	MW (See Note 1)			
	10/17/23	MW (See Note 1)			
	10/20/23	MW (See Note 1)			
	10/23/23	MW (See Note 1)			
	10/26/23	MW (See Note 1)			
	10/29/23	MW (See Note 1)			
November	11/1/23	MW (See Note 1)			
	11/4/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/10/23	21.0	4.90	3.32	2.58
	11/13/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/19/23	MW (See Note 1)			
	11/22/23	MW (See Note 1)			
	11/25/23	MW (See Note 1)			
	11/28/23	MW (See Note 1)			
	11/30/23	MW (See Note 1)			
December	12/3/23	MW (See Note 1)			
	12/8/23	MW (See Note 1)			
	12/9/23	21.0	9.25	4.36	4.20
	12/12/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/21/23	MW (See Note 1)			
	12/23/23	MW (See Note 1)			
	12/26/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/11/23	21.1	4.63	2.73	2.08
	1/14/23	MW (See Note 1)			
	1/17/23	MW (See Note 1)			
	1/20/23	MW (See Note 1)			
	1/23/23	MW (See Note 1)			
	1/26/23	MW (See Note 1)			
	1/29/23	MW (See Note 1)			
February	2/1/23	MW (See Note 1)			
	2/4/23	MW (See Note 1)			
	2/8/23	21.0	4.79	3.02	2.45
	2/11/23	MW (See Note 1)			
	2.14/23	MW (See Note 1)			
	2/17/23	MW (See Note 1)			
	2/20/23	MW (See Note 1)			
	2/24/23	MW (See Note 1)			
March	3/9/23	MW (See Note 1)			
	3/12/23	MW (See Note 1)			
	3/15/23	MW (See Note 1)			
	3/18/23	MW (See Note 1)			
	3/19/23	21.0	1.97	1.67	1.45
	3/22/23	MW (See Note 1)			
	3/25/23	MW (See Note 1)			
	3/28/23	MW (See Note 1)			
	3/31/23	MW (See Note 1)			
April	4/4/23	MW (See Note 1)			
	4/14/23	MW (See Note 1)			
	4/18/23	MW (See Note 1)			
	4/21/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/27/23	21.0	2.41	1.90	2.02
	4/29/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/5/23	MW (See Note 1)			
	5/6/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/10/23	MW (See Note 1)			
	5/13/23	MW (See Note 1)			
	5/16/23	MW (See Note 1)			
	5/19/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	21.0	5.90	3.73	2.93
	5/27/23	MW (See Note 1)			
	5/30/23	MW (See Note 1)			
June	6/3/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	MW (See Note 1)			
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/18/23	MW (See Note 1)			
	6/21/23	MW (See Note 1)			
	6/23/23	21.0	4.79	2.73	2.24
	6/26/23	MW (See Note 1)			
	6/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F07

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/2/23	MW (See Note 1)			
	7/5/23	MW (See Note 1)			
	7/8/23	MW (See Note 1)			
	7/11/23	MW (See Note 1)			
	7/14/23	MW (See Note 1)			
	7/19/23	MW (See Note 1)			
	7/22/23	MW (See Note 1)			
	7/25/23	21.0	5.01	2.58	2.15
	7/28/23	MW (See Note 1)			
	7/31/23	MW (See Note 1)			
August	8/3/23	MW (See Note 1)			
	8/6/23	MW (See Note 1)			
	8/9/23	MW (See Note 1)			
	8/12/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/18/23	MW (See Note 1)			
	8/21/23	MW (See Note 1)			
	8/23/23	21.0	4.06	2.33	2.29
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/7/23	MW (See Note 1)			
	9/10/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/24/23	21.0	4.40	2.70	2.26
	9/26/23	MW (See Note 1)			
	9/29/23	MW (See Note 1)			
October	10/2/23	MW (See Note 1)			
	10/5/23	MW (See Note 1)			
	10/8/23	MW (See Note 1)			
	10/11/23	MW (See Note 1)			
	10/14/23	MW (See Note 1)			
	10/17/23	MW (See Note 1)			
	10/19/23	MW (See Note 1)			
	10/22/23	21.1	4.50	2.68	2.57
	10/25/23	MW (See Note 1)			
	10/29/23	MW (See Note 1)			
November	11/1/23	MW (See Note 1)			
	11/3/23	MW (See Note 1)			
	11/6/23	MW (See Note 1)			
	11/9/23	MW (See Note 1)			
	11/12/23	MW (See Note 1)			
	11/16/23	MW (See Note 1)			
	11/18/23	MW (See Note 1)			
	11/21/23	21.0	6.12	2.96	3.08
	11/24/23	MW (See Note 1)			
	11/27/23	MW (See Note 1)			
	11/30/24	MW (See Note 1)			
December	12/3/23	MW (See Note 1)			
	12/6/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/12/23	MW (See Note 1)			
	12/14/23	MW (See Note 1)			
	12/1723	MW (See Note 1)			
	12/20/23	21.0	9.50	4.32	3.79
	12/23/23	MW (See Note 1)			
	12/26/23	MW (See Note 1)			
	12/30/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
January	1/5/23	MW (See Note 1)			
	1/8/23	MW (See Note 1)			
	1/12/23	MW (See Note 1)			
	1/15/23	MW (See Note 1)			
	1/19/23	21.0	4.80	2.68	2.22
	1/23/22	MW (See Note 1)			
	1/28/23	MW (See Note 1)			
February	2/3/24	MW (See Note 1)			
	2/6/23	MW (See Note 1)			
	2/9/23	MW (See Note 1)			
	2/12/23	MW (See Note 1)			
	2/16/23	MW (See Note 1)			
	2/19/23	MW (See Note 1)			
	2/21/23	23.6	5.60	2.43	2.29
	2/25/23	MW (See Note 1)			
	2/28/23	MW (See Note 1)			
March	3/3/23	MW (See Note 1)			
	3/6/23	MW (See Note 1)			
	3/8/23	MW (See Note 1)			
	3/11/23	MW (See Note 1)			
	3/14/23	MW (See Note 1)			
	3/22/23	MW (See Note 1)			
April	4/1/23	MW (See Note 1)			
	4/5/23	21.0	2.38	1.85	1.87
	4/15/23	MW (See Note 1)			
	4/19/23	MW (See Note 1)			
	4/21/23	MW (See Note 1)			
	4/24/23	MW (See Note 1)			
	4/27/23	MW (See Note 1)			
	4/29/23	MW (See Note 1)			
May	5/2/23	MW (See Note 1)			
	5/5/23	MW (See Note 1)			
	5/8/23	MW (See Note 1)			
	5/10/23	21.1	9.10	3.13	2.43
	5/13/23	MW (See Note 1)			
	5/17/23	MW (See Note 1)			
	5/20/23	MW (See Note 1)			
	5/22/23	MW (See Note 1)			
	5/25/23	MW (See Note 1)			
	5/28/23	MW (See Note 1)			
	5/31/23	MW (See Note 1)			
June	6/3/23	MW (See Note 1)			
	6/6/23	MW (See Note 1)			
	6/9/23	21.3	3.93	1.93	2.67
	6/12/23	MW (See Note 1)			
	6/15/23	MW (See Note 1)			
	6/17/23	MW (See Note 1)			
	6/20/23	MW (See Note 1)			
	6/23/23	MW (See Note 1)			
	6/26/23	MW (See Note 1)			
	6/29/23	MW (See Note 1)			

1 Maintenance Wash using dilute caustic and no citric.

Microfiltration Plant Clean-In-Place (CIP) / Runtime Summary

Unit F08

Month	Date of CIP	Runtime Between CIP (Days)	TMP Before CIP (psi)	TMP After Caustic CIP (psi)	TMP After Citric CIP (psi)
July	7/1/23	MW (See Note 1)			
	7/4/23	MW (See Note 1)			
	7/6/23	21.0	5.93	2.90	2.81
	7/9/23	MW (See Note 1)			
	7/12/23	MW (See Note 1)			
	7/15/23	MW (See Note 1)			
	7/20/23	MW (See Note 1)			
	7/23/23	MW (See Note 1)			
	7/26/23	MW (See Note 1)			
	7/29/23	MW (See Note 1)			
August	8/1/23	MW (See Note 1)			
	8/4/23	MW (See Note 1)			
	8/6/23	21.0	3.83	1.42	2.93
	8/9/23	MW (See Note 1)			
	8/12/23	MW (See Note 1)			
	8/15/23	MW (See Note 1)			
	8/17/23	MW (See Note 1)			
	8/20/23	MW (See Note 1)			
	8/23/23	MW (See Note 1)			
	8/26/23	MW (See Note 1)			
September	9/1/23	MW (See Note 1)			
	9/4/23	MW (See Note 1)			
	9/6/23	21.0	4.90	2.69	2.84
	9/9/23	MW (See Note 1)			
	9/12/23	MW (See Note 1)			
	9/15/23	MW (See Note 1)			
	9/18/23	MW (See Note 1)			
	9/21/23	MW (See Note 1)			
	9/23/23	MW (See Note 1)			
	9/26/23	MW (See Note 1)			
	9/29/23	MW (See Note 1)			
October	10/2/23	MW (See Note 1)			
	10/4/23	21.0	4.42	2.59	2.77
	10/7/23	MW (See Note 1)			
	10/10/23	MW (See Note 1)			
	10/12/23	MW (See Note 1)			
	10/15/23	MW (See Note 1)			
	10/18/23	MW (See Note 1)			
	10/21/23	MW (See Note 1)			
	10/24/23	MW (See Note 1)			
	10/27/23	MW (See Note 1)			
	10/30/23	MW (See Note 1)			
November	11/1/23	21.1	4.43	3.04	2.67
	11/4/23	MW (See Note 1)			
	11/7/23	MW (See Note 1)			
	11/11/23	MW (See Note 1)			
	11/14/23	MW (See Note 1)			
	11/17/23	MW (See Note 1)			
	11/20/23	MW (See Note 1)			
	11/22/23	MW (See Note 1)			
	11/25/23	MW (See Note 1)			
	11/28/23	MW (See Note 1)			
December	12/1/23	21.0	5.37	3.79	3.79
	12/3/23	MW (See Note 1)			
	12/7/23	MW (See Note 1)			
	12/9/23	MW (See Note 1)			
	12/12/23	MW (See Note 1)			
	12/15/23	MW (See Note 1)			
	12/18/23	MW (See Note 1)			
	12/21/23	MW (See Note 1)			
	12/24/23	MW (See Note 1)			
	12/26/23	MW (See Note 1)			
	12/31/23	21.0	8.06	3.81	2.89

1 Maintenance Wash using dilute caustic and no citric.

Reverse Osmosis Plant Cleaning Summary

Unit A01

Date of Cleaning	Treatment Performed
Sep-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95°F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit A02

Date of Cleaning	Treatment Performed
Sep-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit A03

Date of Cleaning	Treatment Performed
Aug-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit B01

Date of Cleaning	Treatment Performed
Nov-23	3rd Stage Only CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95°F with contact time of 10 hours was completed. The high pH cleaning were followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit B02

Date of Cleaning	Treatment Performed
Aug-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95°F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit B03

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit C01

Date of Cleaning	Treatment Performed
Mar-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solutions at pH 11.5 / 95^{o}F with contact times of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit C02

Date of Cleaning	Treatment Performed
Aug-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit C03

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit D01

Date of Cleaning	Treatment Performed
Nov-23	3rd Stage Only CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 10 hours was completed. The high pH cleaning were followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit D02

Date of Cleaning	Treatment Performed
Aug-23	Full Unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit D03

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit E01

Date of Cleaning	Treatment Performed
Apr-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact times of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit E02

Date of Cleaning	Treatment Performed
Apr-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact times of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit E03

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit F01

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit F02

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit F03

Date of Cleaning	Treatment Performed
Feb-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs showed no changes in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 4.4-5.0 gpm. The #7 (tail) membrane in F03's PV 3-142 showed a flow rate decrease from 5.2 gpm in December down to 4.7 gpm in February. The #7 (tail) membrane in F03's PV 3-148 showed a flow rate decrease from 4.2 gpm in December down to 3.6 gpm in February.
Apr-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs showed flow increases in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 4.8-5.5 gpm. The #7 (tail) membrane in F03's PV 3-142 showed a flow rate increase from 4.7 gpm in February up to 5.5 gpm in April. The #7 (tail) membrane in F03's PV 3-148 showed a flow rate increase from 3.6 gpm in February up to 4.0 gpm in April.
Jun-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs remained steady in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 5.3-5.7 gpm. The #7 (tail) membrane in F03's PV 3-142 showed a flow rate decrease from 5.5 gpm in April down to 5.4 gpm in June. The #7 (tail) membrane in F03's PV 3-148 showed a flow rate increase from 4.0 gpm in April up to 4.1 gpm in June.

Reverse Osmosis Plant Cleaning Summary

Unit G01

Date of Cleaning	Treatment Performed
Jul-23	3rd Stage Only CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours were used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit G02

Date of Cleaning	Treatment Performed
1/1-12/31/2023	None

Reverse Osmosis Plant Cleaning Summary

Unit G03

Date of Cleaning	Treatment Performed
Feb-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs showed some declining changes in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 2.8-4.6 gpm. The #7 (tail) membrane in G03's PV 3-142 showed a flow rate decrease from 4.4 gpm in December down to 4.7 gpm in February. The #7 (tail) membrane in G03's PV 3-148 showed a flow rate decrease from 4.2 gpm in December down to 1.5 gpm in February.
Apr-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs showed flow increases in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 0.5-4.5 gpm. The #7 (tail) membrane in G03's PV 3-142 showed a flow rate decrease from 1.3 gpm in February down to 0.5 gpm in April. The #7 (tail) membrane in G03's PV 3-148 showed a flow rate decrease from 1.5 gpm in February down to 0.5 gpm in April.
Jun-23	Special 3rd stage-only AWC C-219 cleaning The permeability of both of its 3rd stage test PVs remained steady in the #1 (lead) through #6 membranes with their single element permeate flow tests averaging 0.5-4.5 gpm. The #7 (tail) membrane in G03's PV 3-142 showed a flow rate decrease from 0.5 gpm in April down to 0.2 gpm in June. The #7 (tail) membrane in G03's PV 3-148 showed a flow rate decrease from 0.5 gpm in April down to 0.2 gpm in April.

Reverse Osmosis Plant Cleaning Summary

Unit H01

Date of Cleaning	Treatment Performed
Nov-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

<u>Unit H02</u>

Date of Cleaning	Treatment Performed
Nov-23	<u>Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid)</u> 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit H03

Date of Cleaning	Treatment Performed
Nov-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit I01

Date of Cleaning	Treatment Performed
Nov-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.
Dec-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit I02

Date of Cleaning	Treatment Performed
Dec-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95°F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

Reverse Osmosis Plant Cleaning Summary

Unit I03

Date of Cleaning	Treatment Performed
Dec-23	Full unit CIP using 2.2% AWC C-227, followed by full unit acid wash (2% citric acid) 2.2% AWC C-227 cleaning solution at pH 11.5 / 95^{o}F with contact time of 13-14 hours was used. The high pH cleaning was followed by standard 2% citric acid cleaning solution at pH 2.1-2.5 with ambient water temperatures for approximately 3-4 hours of contact time.

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
7343	3 Mo. Rosemount Chlorine Analyzer Maintenance 450-AE-2164	9075	Element Analyzer Total Chlorine - RO Feed	450-CPF-0001	1/19/2023	3	MONTHS	4/21/2023
7344	3 Mo. Rosemount Chlorine Analyzer Maintenance 460-AE-0312	9091	Element Analyzer Total Chlorine - MF Feedwater	460-CPF-0001	1/12/2023	3	MONTHS	4/14/2023
7345	3 Mo. Rosemount Chlorine Analyzer Maintenance 460-AE-0314	9092	Element Analyzer Total Chlorine - MF Feedwater	460-CPF-0001	2/1/2023	3	MONTHS	4/14/2023
7346	3 Mo. Rosemount Chlorine Analyzer Maintenance 710-AE-3425	8675	Element Analyzer Chlorine - Finished Product Water to PWPS	710-CPF-0009	1/26/2023	3	MONTHS	4/28/2023
9284	540-SWGR-125VDC Inspect Batteries & Monitor	12711	540 RO Electric 12KV Switchgear 125 VDC Battery Syst	540-SWG12000	6/8/2022	1	YEARS	6/4/2023
9283	815-SWGR-125VDC Inspect Batteries & Monitor	12712	815 12KV Switchgear 125 VDC Battery System	815-SWG-8001B	6/8/2022	1	YEARS	6/3/2023
3253	Ammonia Sensor Replacement 1 YR 450-AE-2185	13663	Element Analyzer Ammonia	450-CPF-0001	2/7/2023	10	MONTHS	12/1/2023
3204	Area 450 Ammonia Analyzer Weekly	13662	RO Feed Ammonia Analyzer 450-AIT-2185	450-CPF-0001	2/23/2023	1	WEEKS	3/7/2023
3055	AVFM Enclosure PM 100-FIT-5020-East MF CIP Tank E01	17320	Transmitter Flow Indicating - East MF CIP Tank E01	100-PIP-SW	9/19/2022	6	MONTHS	3/14/2023
3056	AVFM Enclosure PM on 100-FIT-5500-160 Bldg South Wall	17345	Transmitter Flow Indicating - south side of 160 building	100-PIP-SD-SITE-MAIN	9/26/2022	6	MONTHS	3/16/2023
3053	AVFM Enclosure PM on 100-FIT-5530-910 Bldg. North Wall	17341	Transmitter Flow Indicating - north side 910 building	100-PIP-SD-SITE-MAIN	9/26/2022	6	MONTHS	3/15/2023
9779	Bi-Weekly Flush M9 Portable TOC Feed Analyzer	13954	Portable M9 TOC Analyzer No.1 RO Feed	510-B02-RO-2200	2/22/2023	2	WEEKS	3/6/2023
2290	Block, Bleed and Check Zero - A01-DPIT-0405 Every 6 MO	4463	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA1	1/3/2023	6	MONTHS	7/7/2023
2291	Block, Bleed and Check Zero -A02- DPIT-0405 Every 6 MO	4473	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA2	7/25/2022	1	YEARS	7/7/2023
2292	Block, Bleed and Check Zero -A03- DPIT-0405 Every 6 MO	4483	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA3	7/25/2022	1	YEARS	7/7/2023
2293	Block, Bleed and Check Zero -A04- DPIT-0405 Every 6 MO	4493	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA4	7/25/2022	1	YEARS	7/7/2023
2294	Block, Bleed and Check Zero -A05- DPIT-0405 Every 6 MO	4503	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA5	7/19/2022	1	YEARS	7/21/2023
2295	Block, Bleed and Check Zero -A06- DPIT-0405 Every 6 MO	4513	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA6	7/19/2022	1	YEARS	7/21/2023
2296	Block, Bleed and Check Zero -A07- DPIT-0405 Every 6 MO	4523	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA7	7/19/2022	1	YEARS	7/21/2023
2297	Block, Bleed and Check Zero -A08- DPIT-0405 Every 6 MO	4533	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA8	7/19/2022	1	YEARS	7/21/2023
2298	Block, Bleed and Check Zero -B01- DPIT-0405 Every 6 MO	4545	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB1	8/23/2022	1	YEARS	8/3/2023
2299	Block, Bleed and Check Zero -B02- DPIT-0405 Every 6 MO	4553	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB2	8/23/2022	1	YEARS	8/3/2023
2300	Block, Bleed and Check Zero -B03- DPIT-0405 Every 6 MO	4561	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB3	8/23/2022	1	YEARS	8/3/2023
2301	Block, Bleed and Check Zero -B04- DPIT-0405 Every 6 MO	5771	Valve Ball 1/2"	216-PIP-PA-MEMDE	8/23/2022	1	YEARS	8/3/2023
2302	Block, Bleed and Check Zero -B05- DPIT-0405 Every 6 MO	4581	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB5	8/16/2022	1	YEARS	8/17/2023
2303	Block, Bleed and Check Zero -B06- DPIT-0405 Every 6 MO	4591	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB6	8/16/2022	1	YEARS	8/17/2023
2304	Block, Bleed and Check Zero -B07- DPIT-0405 Every 6 MO	4601	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB7	8/16/2022	1	YEARS	8/17/2023
2305	Block, Bleed and Check Zero -B08- DPIT-0405 Every 6 MO	4611	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB8	8/16/2022	1	YEARS	8/17/2023
2306	Block, Bleed and Check Zero -D01- DPIT-0405 Every 6 MO	4623	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD1	8/23/2022	1	YEARS	8/3/2023
2307	Block, Bleed and Check Zero -D02- DPIT-0405 Every 6 MO	4633	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD2	8/23/2022	1	YEARS	8/3/2023
2308	Block, Bleed and Check Zero -D03- DPIT-0405 Every 6 MO	4643	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD3	8/23/2022	1	YEARS	8/3/2023
2309	Block, Bleed and Check Zero -D04- DPIT-0405 Every 6 MO	4653	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD4	8/23/2022	1	YEARS	8/3/2023
2310	Block, Bleed and Check Zero -D05- DPIT-0405 Every 6 MO	4663	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD5	8/17/2022	1	YEARS	8/17/2023
2311	Block, Bleed and Check Zero -D06- DPIT-0405 Every 6 MO	4673	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD6	8/17/2022	1	YEARS	8/17/2023
2312	Block, Bleed and Check Zero -D07- DPIT-0405 Every 6 MO	4683	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD7	8/17/2022	1	YEARS	8/17/2023
2313	Block, Bleed and Check Zero -D08- DPIT-0405 Every 6 MO	4693	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD8	8/17/2022	1	YEARS	8/17/2023
2314	Block, Bleed and Check Zero -E01- DPIT-0405 Every 6 MO	4705	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME1	8/17/2022	1	YEARS	8/17/2023
2315	Block, Bleed and Check Zero -E02- DPIT-0405 Every 6 MO	4715	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME2	8/17/2022	1	YEARS	8/17/2023
3507	Block, Bleed, and Check Zero - C01-DPIT-0405 6 MO	30335	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC1	8/29/2022	1	YEARS	9/1/2023
3508	Block, Bleed, and Check Zero - C02-DPIT-0405 6 MO	30377	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC2	8/29/2022	1	YEARS	9/1/2023
3510	Block, Bleed, and Check Zero - C04-DPIT-0405 6 MO	30461	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC4	8/29/2022	1	YEARS	9/1/2023
3511	Block, Bleed, and Check Zero - C05-DPIT-0405 6 MO	30503	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC5	9/2/2022	1	YEARS	9/1/2023
3512	Block, Bleed, and Check Zero - C06-PDIT-0405 6 MO	30545	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC6	9/2/2022	1	YEARS	9/1/2023
3509	Block, Bleed, and Check Zero C03-DPIT-0405 6 MO	30419	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC3	8/29/2022	1	YEARS	9/1/2023
3513	Block, Bleed, and Check Zero C07-DPIT-0405 6 MO	30587	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC7	9/2/2022	1	YEARS	9/1/2023
3514	Block, Bleed, and Check Zero C08-DPIT-0405 6 MO	30629	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC8	9/2/2022	1	YEARS	9/1/2023
2866	Calibration of O2 Analyzer 750- AE-4040	8304	Element Analyzer Oxygen - North Building	750-CPF-0030	8/24/2022	6	MONTHS	8/22/2023
2867	Calibration of O2 Analyzer 750- AE-4045	8305	Element Analyzer Oxygen - South Building	750-CPF-0030	8/24/2022	6	MONTHS	8/22/2023
2868	Calibration of O2 Analyzer 750- AE-4050	8306	Element Analyzer Oxygen - North Trench	750-CPF-0030	8/25/2022	6	MONTHS	8/22/2023
2869	Calibration of O2 Analyzer 750- AE-4055	8307	Element Analyzer Oxygen - South Trench	750-CPF-0030	8/24/2022	6	MONTHS	8/22/2023
3519	Check Calibration of TIT-0420 MF Filtrate Train C Cell 5	30508	Transmitter Temperature Indicating	210-PIP-MFE-MEMC5	2/9/2023	6	MONTHS	8/10/2023
3561	Check Calibration of BFV-0460 MF Filtrate Train C Cell 2	34318	Actuator	210-PIP-MFE-MEMC2	6/17/2022	1	YEARS	6/1/2023
3562	Check Calibration of BFV-0460 MF Filtrate Train C Cell 3	34319	Actuator	210-PIP-MFE-MEMC3	6/17/2022	1	YEARS	6/1/2023
3563	Check Calibration of BFV-0460 MF Filtrate Train C Cell 4	34320	Actuator	210-PIP-MFE-MEMC4	6/17/2022	1	YEARS	6/1/2023
3564	Check Calibration of BFV-0460 MF Filtrate Train C Cell 5	34321	Actuator	210-PIP-MFE-MEMC5	6/3/2022	1	YEARS	6/1/2023
3565	Check Calibration of BFV-0460 MF Filtrate Train C Cell 6	34322	Actuator	210-PIP-MFE-MEMC6	6/3/2022	1	YEARS	6/1/2023
3566	Check Calibration of BFV-0460 MF Filtrate Train C Cell 7	30609	Valve Butterfly 12"	210-PIP-MFE-MEMC7	6/3/2022	1	YEARS	6/1/2023
3567	Check Calibration of BFV-0460 MF Filtrate Train C Cell 8	30651	Valve Butterfly 12"	210-PIP-MFE-MEMC8	6/3/2022	1	YEARS	6/1/2023
3560	Check Calibration of BFV-0460 MF Filtrate Train C Cell1	34317	Actuator	210-PIP-MFE-MEMC1	6/17/2022	1	YEARS	6/1/2023
3642	Check Calibration of BFV-0460 MF Filtrate Train E Cell 3	34325	Actuator	210-PIP-MFE-MEME3	7/13/2022	1	YEARS	7/4/2023
3643	Check Calibration of BFV-0460 MF Filtrate Train E Cell 4	34326	Actuator	210-PIP-MFE-MEME4	7/13/2022	1	YEARS	7/4/2023
7560	Check Calibration of BFV-0460, MF Filtrate Train A Cell 1	3044	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA1	10/20/2022	1	YEARS	10/17/2023
7561	Check Calibration of BFV-0460, MF Filtrate Train A Cell 2	3095	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA2	10/20/2022	1	YEARS	10/17/2023

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
7562	Check Calibration of BFV-0460, MF Filtrate Train A Cell 3	3146	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA3	10/20/2022	1	YEARS	10/17/2023
7563	Check Calibration of BFV-0460, MF Filtrate Train A Cell 4	3197	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA4	10/20/2022	1	YEARS	10/17/2023
7564	Check Calibration of BFV-0460, MF Filtrate Train A Cell 5	3248	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA5	10/25/2022	1	YEARS	10/23/2023
7565	Check Calibration of BFV-0460, MF Filtrate Train A Cell 6	3299	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA6	10/25/2022	1	YEARS	10/23/2023
7566	Check Calibration of BFV-0460, MF Filtrate Train A Cell 7	3350	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA7	10/25/2022	1	YEARS	10/23/2023
7567	Check Calibration of BFV-0460, MF Filtrate Train A Cell 8	3401	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMA8	10/25/2022	1	YEARS	10/23/2023
7568	Check Calibration of BFV-0460, MF Filtrate Train B Cell 1	3474	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB1	11/1/2022	1	YEARS	11/3/2023
7569	Check Calibration of BFV-0460, MF Filtrate Train B Cell 2	3525	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB2	11/1/2022	1	YEARS	11/3/2023
7570	Check Calibration of BFV-0460, MF Filtrate Train B Cell 3	3576	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB3	11/1/2022	1	YEARS	11/3/2023
7571	Check Calibration of BFV-0460, MF Filtrate Train B Cell 4	3627	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB4	11/1/2022	1	YEARS	11/3/2023
7572	Check Calibration of BFV-0460, MF Filtrate Train B Cell 5	3678	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB5	11/17/2022	1	YEARS	11/19/2023
7573	Check Calibration of BFV-0460, MF Filtrate Train B Cell 6	3729	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB6	11/17/2022	1	YEARS	11/19/2023
7574	Check Calibration of BFV-0460, MF Filtrate Train B Cell 7	3780	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB7	11/17/2022	1	YEARS	11/19/2023
7575	Check Calibration of BFV-0460, MF Filtrate Train B Cell 8	3831	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMB8	11/17/2022	1	YEARS	11/19/2023
7576	Check Calibration of BFV-0460, MF Filtrate Train D Cell 1	3904	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD1	11/30/2022	1	YEARS	11/26/2023
7577	Check Calibration of BFV-0460, MF Filtrate Train D Cell 2	3955	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD2	11/30/2022	1	YEARS	11/26/2023
7578	Check Calibration of BFV-0460, MF Filtrate Train D Cell 3	4006	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD3	11/30/2022	1	YEARS	11/26/2023
7579	Check Calibration of BFV-0460, MF Filtrate Train D Cell 4	4057	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD4	11/30/2022	1	YEARS	11/26/2023
7580	Check Calibration of BFV-0460, MF Filtrate Train D Cell 5	4108	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD5	12/9/2022	1	YEARS	12/9/2023
7581	Check Calibration of BFV-0460, MF Filtrate Train D Cell 6	4159	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD6	12/9/2022	1	YEARS	12/9/2023
7582	Check Calibration of BFV-0460, MF Filtrate Train D Cell 7	4210	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD7	12/9/2022	1	YEARS	12/9/2023
7583	Check Calibration of BFV-0460, MF Filtrate Train D Cell 8	4261	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEMD8	12/9/2022	1	YEARS	12/9/2023
7584	Check Calibration of BFV-0460, MF Filtrate Train E Cell 1	4324	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEME1	12/19/2022	1	YEARS	12/17/2023
7585	Check Calibration of BFV-0460, MF Filtrate Train E Cell 2	4375	Actuator Pneumatic Operated with Positioner	210-PIP-MFE-MEME2	12/19/2022	1	YEARS	12/17/2023
7390	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 1 MFE	3007	Transmitter Level Indicating	210-A01-TNK-0340	3/16/2022	1	YEARS	3/9/2023
7391	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 2 MFE	3058	Transmitter Level Indicating	210-A02-TNK-0340	3/16/2022	1	YEARS	3/9/2023
7392	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 3 MFE	3109	Transmitter Level Indicating	210-A03-TNK-0340	3/16/2022	1	YEARS	3/9/2023
7393	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 4 MFE	3160	Transmitter Level Indicating	210-A04-TNK-0340	3/16/2022	1	YEARS	3/9/2023
7394	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 5 MFE	3211	Transmitter Level Indicating	210-A05-TNK-0340	3/17/2022	1	YEARS	3/16/2023
7395	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 6 MFE	3262	Transmitter Level Indicating	210-A06-TNK-0340	3/17/2022	1	YEARS	3/16/2023
7396	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 7 MFE	3313	Transmitter Level Indicating	210-A07-TNK-0340	3/17/2022	1	YEARS	3/16/2023
7397	Check calibration of Cell Level Transmitter LIT-0345 Train A Cell 8 MFE	3364	Transmitter Level Indicating	210-A08-TNK-0340	3/17/2022	1	YEARS	3/16/2023
7398	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 1 MFE	3437	Transmitter Level Indicating	210-B01-TNK-0340	3/22/2022	1	YEARS	3/23/2023
7399	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 2 MFE	3488	Transmitter Level Indicating	210-B02-TNK-0340	3/22/2022	1	YEARS	3/23/2023
7400	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 3 MFE	3539	Transmitter Level Indicating	210-B03-TNK-0340	3/22/2022	1	YEARS	3/23/2023
7401	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 4 MFE	3590	Transmitter Level Indicating	210-B04-TNK-0340	3/22/2022	1	YEARS	3/23/2023
7402	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 5 MFE	3641	Transmitter Level Indicating	210-B05-TNK-0340	3/31/2022	1	YEARS	3/30/2023
7403	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 6 MFE	3692	Transmitter Level Indicating	210-B06-TNK-0340	3/31/2022	1	YEARS	3/30/2023
7404	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 7 MFE	3743	Transmitter Level Indicating	210-B07-TNK-0340	3/31/2022	1	YEARS	3/30/2023
7405	Check calibration of Cell Level Transmitter LIT-0345 Train B Cell 8 MFE	3794	Transmitter Level Indicating	210-B08-TNK-0340	4/1/2022	1	YEARS	3/30/2023
3537	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 1 MFE	30331	Transmitter Level Indicating	210-C01-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3538	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 2 MFE	30373	Transmitter Level Indicating	210-C02-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3539	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 3 MFE	30415	Transmitter Level Indicating	210-C03-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3540	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 4 MFE	30457	Transmitter Level Indicating	210-C04-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3541	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 5 MFE	30499	Transmitter Level Indicating	210-C05-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3543	Check Calibration of Cell Level transmitter LIT-0345 Train C Cell 7 MFE	30583	Transmitter Level Indicating	210-C07-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3544	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell 8 MFE	30625	Transmitter Level Indicating	210-C08-TNK-0340	3/16/2022	1	YEARS	3/14/2023
3542	Check Calibration of Cell Level Transmitter LIT-0345 Train C Cell6 MFE	30541	Transmitter Level Indicating	210-C06-TNK-0340	3/16/2022	1	YEARS	3/14/2023
7406	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 1 MFW	3867	Transmitter Level Indicating	210-D01-TNK-0340	4/7/2022	1	YEARS	4/7/2023
7407	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 2 MFW	3918	Transmitter Level Indicating	210-D02-TNK-0340	4/7/2022	1	YEARS	4/7/2023
7408	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 3 MFW	3969	Transmitter Level Indicating	210-D03-TNK-0340	4/7/2022	1	YEARS	4/7/2023
7409	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 4 MFW	4020	Transmitter Level Indicating	210-D04-TNK-0340	4/7/2022	1	YEARS	4/7/2023
7410	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 5 MFW	4071	Transmitter Level Indicating	210-D05-TNK-0340	4/19/2022	1	YEARS	4/14/2023
7411	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 6 MFW	4122	Transmitter Level Indicating	210-D06-TNK-0340	4/19/2022	1	YEARS	4/14/2023
7412	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 7 MFW	4173	Transmitter Level Indicating	210-D07-TNK-0340	4/19/2022	1	YEARS	4/14/2023
7413	Check calibration of Cell Level Transmitter LIT-0345 Train D Cell 8 MFW	4224	Transmitter Level Indicating	210-D08-TNK-0340	4/19/2022	1	YEARS	4/14/2023
7414	Check calibration of Cell Level Transmitter LIT-0345 Train E Cell 1 MFW	4287	Transmitter Level Indicating	210-E01-TNK-0340	4/25/2022	1	YEARS	4/21/2023
7415	Check calibration of Cell Level Transmitter LIT-0345 Train E Cell 2 MFW	4338	Transmitter Level Indicating	210-E02-TNK-0340	4/25/2022	1	YEARS	4/21/2023
3648	Check Calibration of Cell Level Transmitter LIT-0345 Train E Cell 3	30202	Transmitter Level Indicating	210-E03-TNK-0340	6/9/2022	1	YEARS	6/6/2023
3649	Check Calibration of Cell Level Transmitter LIT-0345 Train E Cell 4	30242	Transmitter Level Indicating	210-E04-TNK-0340	6/9/2022	1	YEARS	6/6/2023
3569	Check Calibration of DPIT-0405 Train C Cell 1	30335	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC1	5/6/2022	1	YEARS	5/2/2023
3570	Check Calibration of DPIT-0405 Train C Cell 2	30377	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC2	5/6/2022	1	YEARS	5/2/2023
3571	Check Calibration of DPIT-0405 Train C Cell 3	30419	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC3	5/6/2022	1	YEARS	5/2/2023

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
3572	Check Calibration of DPIT-0405 Train C Cell 4	30461	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC4	5/6/2022	1	YEARS	5/2/2023
3573	Check Calibration of DPIT-0405 Train C Cell 5	30503	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC5	5/6/2022	1	YEARS	5/2/2023
3574	Check Calibration of DPIT-0405 Train C Cell 6	30545	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC6	5/6/2022	1	YEARS	5/2/2023
3575	Check Calibration of DPIT-0405 Train C Cell 7	30587	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC7	5/11/2022	1	YEARS	5/2/2023
3576	Check Calibration of DPIT-0405 Train C Cell 8	30629	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMC8	5/11/2022	1	YEARS	5/2/2023
3652	Check Calibration of DPIT-0405 Train E Cell 3	30206	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME3	6/9/2022	1	YEARS	6/1/2023
3653	Check Calibration of DPIT-0405 Train E Cell 4	30246	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME4	6/9/2022	1	YEARS	6/1/2023
7350	Check calibration of DPIT-0405, Train A Cell 1 MFE	4463	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA1	12/7/2022	1	YEARS	12/7/2023
7351	Check calibration of DPIT-0405, Train A Cell 2 MFE	4473	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA2	12/9/2022	1	YEARS	12/7/2023
7352	Check calibration of DPIT-0405, Train A Cell 3 MFE	4483	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA3	12/9/2022	1	YEARS	12/7/2023
7353	Check calibration of DPIT-0405, Train A Cell 4 MFE	4493	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA4	12/7/2022	1	YEARS	12/7/2023
7354	Check calibration of DPIT-0405, Train A Cell 5 MFE	4503	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA5	1/12/2023	1	YEARS	1/4/2024
7355	Check calibration of DPIT-0405, Train A Cell 6 MFE	4513	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA6	1/12/2023	1	YEARS	1/4/2024
7356	Check calibration of DPIT-0405, Train A Cell 7 MFE	4523	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA7	1/12/2023	1	YEARS	1/4/2024
7357	Check calibration of DPIT-0405, Train A Cell 8 MFE	4533	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMA8	1/12/2023	1	YEARS	1/4/2024
7358	Check calibration of DPIT-0405, Train B Cell 1 MFE	4545	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB1	2/7/2023	1	YEARS	1/18/2024
7359	Check calibration of DPIT-0405, Train B Cell 2 MFE	4553	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB2	2/7/2023	1	YEARS	1/18/2024
7360	Check calibration of DPIT-0405, Train B Cell 3 MFE	4561	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB3	2/7/2023	1	YEARS	1/18/2024
7361	Check calibration of DPIT-0405, Train B Cell 4 MFE	4571	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB4	2/7/2023	1	YEARS	1/18/2024
7362	Check calibration of DPIT-0405, Train B Cell 5 MFE	4581	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB5	2/9/2023	1	YEARS	2/8/2024
7363	Check calibration of DPIT-0405, Train B Cell 6 MFE	4591	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB6	2/9/2023	1	YEARS	2/8/2024
7364	Check calibration of DPIT-0405, Train B Cell 7 MFE	4601	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB7	2/9/2023	1	YEARS	2/8/2024
7365	Check calibration of DPIT-0405, Train B Cell 8 MFE	4611	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMB8	2/9/2023	1	YEARS	2/8/2024
7366	Check calibration of DPIT-0405, Train D Cell 1 MFW	4623	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD1	2/23/2022	1	YEARS	2/22/2024
7367	Check calibration of DPIT-0405, Train D Cell 2 MFW	4633	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD2	2/23/2022	1	YEARS	2/22/2024
7368	Check calibration of DPIT-0405, Train D Cell 3 MFW	4643	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD3	2/23/2022	1	YEARS	2/22/2024
7369	Check calibration of DPIT-0405, Train D Cell 4 MFW	4653	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD4	2/23/2022	1	YEARS	2/22/2024
7370	Check calibration of DPIT-0405, Train D Cell 5 MFW	4663	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD5	3/9/2022	1	YEARS	3/8/2023
7371	Check calibration of DPIT-0405, Train D Cell 6 MFW	4673	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD6	3/9/2022	1	YEARS	3/8/2023
7372	Check calibration of DPIT-0405, Train D Cell 7 MFW	4683	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD7	3/9/2022	1	YEARS	3/8/2023
7373	Check calibration of DPIT-0405, Train D Cell 8 MFW	4693	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEMD8	3/9/2022	1	YEARS	3/8/2023
7374	Check calibration of DPIT-0405, Train E Cell 1 MFW	4705	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME1	3/9/2022	1	YEARS	3/8/2023
7375	Check calibration of DPIT-0405, Train E Cell 2 MFW	4715	Transmitter Differential Pressure Indicating	210-PIP-MFF-MEME2	3/9/2022	1	YEARS	3/8/2023
7713	Check Calibration of LIT-1207, MF CIP Tank A01	5830	Transmitter Level Indicating 0 - 12 FT	220-A01-TNK-1200	7/6/2022	1	YEARS	7/9/2023
7714	Check Calibration of LIT-1207, MF CIP Tank B01	5847	Transmitter Level Indicating 0 - 12 FT	220-B01-TNK-1200	7/6/2022	1	YEARS	7/9/2023
7715	Check Calibration of LIT-1207, MF CIP Tank D01	5864	Transmitter Level Indicating 0 - 12 FT	220-D01-TNK-1200	7/8/2022	1	YEARS	7/9/2023
7716	Check Calibration of LIT-1207, MF CIP Tank E01	5881	Transmitter Level Indicating 0 - 12 FT	220-E01-TNK-1200	7/8/2022	1	YEARS	7/9/2023
3568	Check Calibration of PIT-0454 MF Effluent Train C Cell 3	30437	Transmitter Pressure Indicating	210-PIP-MFE-MEMC3	8/24/2021	2	YEARS	8/5/2023
3644	Check Calibration of PIT-0454 MF Effluent Train E Cell 3	30222	Transmitter Pressure Indication	210-PIP-MFE-MEME3	6/29/2021	2	YEARS	6/5/2023
3645	Check Calibration of PIT-0454 MF Effluent Train E Cell 4	30262	Transmitter Pressure Indication	210-PIP-MFE-MEME4	6/29/2021	2	YEARS	6/5/2023
7515	Check Calibration of PIT-0454, MF Effluent Train A Cell 1	3051	Transmitter Pressure Indicating	210-PIP-MFE-MEMA1	11/10/2021	2	YEARS	11/4/2023
7516	Check Calibration of PIT-0454, MF Effluent Train A Cell 2	3102	Transmitter Pressure Indicating	210-PIP-MFE-MEMA2	11/10/2021	2	YEARS	11/4/2023
7517	Check Calibration of PIT-0454, MF Effluent Train A Cell 3	3153	Transmitter Pressure Indicating	210-PIP-MFE-MEMA3	11/10/2021	2	YEARS	11/4/2023
7518	Check Calibration of PIT-0454, MF Effluent Train A Cell 4	3204	Transmitter Pressure Indicating	210-PIP-MFE-MEMA4	11/10/2021	2	YEARS	11/4/2023
7519	Check Calibration of PIT-0454, MF Effluent Train A Cell 5	3255	Transmitter Pressure Indicating	210-PIP-MFE-MEMA5	11/12/2021	2	YEARS	11/11/2023
7520	Check Calibration of PIT-0454, MF Effluent Train A Cell 6	3306	Transmitter Pressure Indicating	210-PIP-MFE-MEMA6	11/12/2021	2	YEARS	11/11/2023
7521	Check Calibration of PIT-0454, MF Effluent Train A Cell 7	3357	Transmitter Pressure Indicating	210-PIP-MFE-MEMA7	11/12/2021	2	YEARS	11/11/2023
7522	Check Calibration of PIT-0454, MF Effluent Train A Cell 8	3408	Transmitter Pressure Indicating	210-PIP-MFE-MEMA8	11/12/2021	2	YEARS	11/11/2023
7523	Check Calibration of PIT-0454, MF Effluent Train B Cell 1	3481	Transmitter Pressure Indicating	210-PIP-MFE-MEMB1	11/18/2021	2	YEARS	11/18/2023
7524	Check Calibration of PIT-0454, MF Effluent Train B Cell 2	3532	Transmitter Pressure Indicating	210-PIP-MFE-MEMB2	11/18/2021	2	YEARS	11/18/2023
7525	Check Calibration of PIT-0454, MF Effluent Train B Cell 3	3583	Transmitter Pressure Indicating	210-PIP-MFE-MEMB3	11/18/2021	2	YEARS	11/18/2023
7526	Check Calibration of PIT-0454, MF Effluent Train B Cell 4	3634	Transmitter Pressure Indicating	210-PIP-MFE-MEMB4	11/18/2021	2	YEARS	11/18/2023
7527	Check Calibration of PIT-0454, MF Effluent Train B Cell 5	3685	Transmitter Pressure Indicating	210-PIP-MFE-MEMB5	11/30/2021	2	YEARS	11/25/2023
7528	Check Calibration of PIT-0454, MF Effluent Train B Cell 6	3736	Transmitter Pressure Indicating	210-PIP-MFE-MEMB6	11/30/2021	2	YEARS	11/25/2023
7529	Check Calibration of PIT-0454, MF Effluent Train B Cell 7	3787	Transmitter Pressure Indicating	210-PIP-MFE-MEMB7	11/30/2021	2	YEARS	11/25/2023
7538	Check Calibration of PIT-0454, MF Effluent Train B Cell 8	3838	Transmitter Pressure Indicating	210-PIP-MFE-MEMB8	11/30/2021	2	YEARS	11/25/2023
3552	Check Calibration of PIT-0454, MF Effluent Train C Cell 1	30353	Transmitter Pressure Indication	210-PIP-MFE-MEMC1	7/30/2021	2	YEARS	8/1/2023
3553	Check Calibration of PIT-0454, MF Effluent Train C Cell 2	30395	Transmitter Pressure Indication	210-PIP-MFE-MEMC2	7/30/2021	2	YEARS	8/1/2023
3555	Check Calibration of PIT-0454, MF Effluent Train C Cell 4	30479	Transmitter Pressure Indicating	210-PIP-MFE-MEMC4	7/30/2021	2	YEARS	8/1/2023
3556	Check Calibration of PIT-0454, MF Effluent Train C Cell 5	30521	Transmitter Pressure Indicating	210-PIP-MFE-MEMC5	7/30/2021	2	YEARS	8/1/2023
3557	Check Calibration of PIT-0454, MF Effluent Train C Cell 6	30563	Transmitter Pressure Indicating	210-PIP-MFE-MEMC6	7/30/2021	2	YEARS	8/1/2023
3558	Check Calibration of PIT-0454, MF Effluent Train C Cell 7	30605	Transmitter Pressure Indicating	210-PIP-MFE-MEMC7	7/29/2021	2	YEARS	8/1/2023
3559	Check Calibration of PIT-0454, MF Effluent Train C Cell 8	30647	Transmitter Pressure Indicating	210-PIP-MFE-MEMC8	7/29/2021	2	YEARS	8/1/2023

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
7530	Check Calibration of PIT-0454, MF Effluent Train D Cell 1	3911	Transmitter Pressure Indicating	210-PIP-MFE-MEMD1	11/30/2021	2	YEARS	12/2/2023
7531	Check Calibration of PIT-0454, MF Effluent Train D Cell 2	3962	Transmitter Pressure Indicating	210-PIP-MFE-MEMD2	11/30/2021	2	YEARS	12/2/2023
7532	Check Calibration of PIT-0454, MF Effluent Train D Cell 3	4013	Transmitter Pressure Indicating	210-PIP-MFE-MEMD3	11/30/2021	2	YEARS	12/2/2023
7533	Check Calibration of PIT-0454, MF Effluent Train D Cell 4	4064	Transmitter Pressure Indicating	210-PIP-MFE-MEMD4	11/30/2021	2	YEARS	12/2/2023
7534	Check Calibration of PIT-0454, MF Effluent Train D Cell 5	4115	Transmitter Pressure Indicating	210-PIP-MFE-MEMD5	12/15/2021	2	YEARS	12/9/2023
7535	Check Calibration of PIT-0454, MF Effluent Train D Cell 6	4166	Transmitter Pressure Indicating	210-PIP-MFE-MEMD6	12/15/2021	2	YEARS	12/9/2023
7536	Check Calibration of PIT-0454, MF Effluent Train D Cell 7	4217	Transmitter Pressure Indicating	210-PIP-MFE-MEMD7	12/15/2021	2	YEARS	12/9/2023
7537	Check Calibration of PIT-0454, MF Effluent Train D Cell 8	4268	Transmitter Pressure Indicating	210-PIP-MFE-MEMD8	12/15/2021	2	YEARS	12/9/2023
7539	Check Calibration of PIT-0454, MF Effluent Train E Cell 1	4331	Transmitter Pressure Indicating	210-PIP-MFE-MEME1	12/20/2021	2	YEARS	12/16/2023
7540	Check Calibration of PIT-0454, MF Effluent Train E Cell 2	4382	Transmitter Pressure Indicating	210-PIP-MFE-MEME2	12/20/2021	2	YEARS	12/16/2023
7550	Check Calibration of PIT-0471, MF Filtrate Header Train A Cells 1-4	2995	Transmitter Pressure Indicating	210-PIP-MFE-MEMA	12/1/2021	2	YEARS	11/27/2023
7551	Check Calibration of PIT-0471, MF Filtrate Header Train A Cells 5-8	3005	Transmitter Pressure Indicating	210-PIP-MFE-MEMA	12/1/2021	2	YEARS	11/27/2023
7552	Check Calibration of PIT-0471, MF Filtrate Header Train B Cells 1-4	3425	Transmitter Pressure Indicating	210-PIP-MFE-MEMB	12/1/2021	2	YEARS	11/27/2023
7553	Check Calibration of PIT-0471, MF Filtrate Header Train B Cells 5-8	3435	Transmitter Pressure Indicating	210-PIP-MFE-MEMB	12/1/2021	2	YEARS	11/27/2023
7554	Check Calibration of PIT-0471, MF Filtrate Header Train D Cells 1-4	3855	Transmitter Pressure Indicating	210-PIP-MFE-MEMD	12/9/2021	2	YEARS	11/27/2023
7556	Check Calibration of PIT-0471, MF Filtrate Header Train D Cells 5-8	3865	Transmitter Pressure Indicating	210-PIP-MFE-MEMD	12/9/2021	2	YEARS	11/27/2023
7557	Check Calibration of PIT-0471, MF Filtrate Header Train E Cells 1-4	4285	Transmitter Pressure Indicating	210-PIP-MFE-MEME	12/9/2021	2	YEARS	11/27/2023
7712	Check Calibration of PIT-0750, MF backwash - Do during plant shutdown	6922	Transmitter Pressure Indicating 0 - 60 psi	255-PIP-BW	12/7/2022	1	YEARS	11/24/2023
3515	Check Calibration of TIT-0420 MF Filtrate Train C Cell 1	30340	Transmitter Temperature Indicating	210-PIP-MFE-MEMC1	2/7/2023	6	MONTHS	8/10/2023
3516	Check Calibration of TIT-0420 MF Filtrate Train C Cell 2	30382	Transmitter Temperature Indicating	210-PIP-MFE-MEMC2	2/7/2023	6	MONTHS	8/10/2023
3517	Check Calibration of TIT-0420 MF Filtrate Train C Cell 3	30424	Transmitter Temperature Indicating	210-PIP-MFE-MEMC3	2/7/2023	6	MONTHS	8/10/2023
3518	Check Calibration of TIT-0420 MF Filtrate Train C Cell 4	30466	Transmitter Temperature Indicating	210-PIP-MFE-MEMC4	2/7/2023	6	MONTHS	8/10/2023
3520	Check Calibration of TIT-0420 MF Filtrate Train C Cell 6	30550	Transmitter Temperature Indicating	210-PIP-MFE-MEMC6	2/9/2023	6	MONTHS	8/10/2023
3521	Check Calibration of TIT-0420 MF Filtrate Train C Cell 7	30592	Transmitter Temperature Indicating	210-PIP-MFE-MEMC7	2/9/2023	6	MONTHS	8/10/2023
3522	Check Calibration of TIT-0420 MF Filtrate Train C Cell 8	30634	Transmitter Temperature Indicating	210-PIP-MFE-MEMC8	2/9/2023	6	MONTHS	8/10/2023
3640	Check Calibration of TIT-0420 MF Filtrate Train E Cell 3	30211	Transmitter Temperature Indicating	210-PIP-MFE-MEME3	11/18/2022	6	MONTHS	5/23/2023
3641	Check Calibration of TIT-0420 MF Flitrate Train E Cell 4	30251	Transmitter Temperature Indicating	210-PIP-MFE-MEME4	11/18/2022	6	MONTHS	5/23/2023
7595	Check Calibration of TIT-0420, MF Filtrate Train A Cell 1	3056	Transmitter Temperature Indicating	210-PIP-MFE-MEMA1	1/3/2023	6	MONTHS	7/7/2023
7596	Check Calibration of TIT-0420, MF Filtrate Train A Cell 2	3107	Transmitter Temperature Indicating	210-PIP-MFE-MEMA2	9/9/2022	6	MONTHS	3/9/2023
7597	Check Calibration of TIT-0420, MF Filtrate Train A Cell 3	3158	Transmitter Temperature Indicating	210-PIP-MFE-MEMA3	9/9/2022	6	MONTHS	3/9/2023
7598	Check Calibration of TIT-0420, MF Filtrate Train A Cell 4	3209	Transmitter Temperature Indicating	210-PIP-MFE-MEMA4	9/9/2022	6	MONTHS	3/9/2023
7599	Check Calibration of TIT-0420, MF Filtrate Train A Cell 5	3260	Transmitter Temperature Indicating	210-PIP-MFE-MEMA5	10/4/2022	6	MONTHS	3/16/2023
7600	Check Calibration of TIT-0420, MF Filtrate Train A Cell 6	3311	Transmitter Temperature Indicating	210-PIP-MFE-MEMA6	10/7/2022	6	MONTHS	3/16/2023
7601	Check Calibration of TIT-0420, MF Filtrate Train A Cell 7	3362	Transmitter Temperature Indicating	210-PIP-MFE-MEMA7	10/7/2022	6	MONTHS	3/16/2023
7602	Check Calibration of TIT-0420, MF Filtrate Train A Cell 8	3413	Transmitter Temperature Indicating	210-PIP-MFE-MEMA8	10/7/2022	6	MONTHS	3/16/2023
7603	Check Calibration of TIT-0420, MF Filtrate Train B Cell 1	3486	Transmitter Temperature Indicating	210-PIP-MFE-MEMB1	9/27/2022	6	MONTHS	3/23/2023
7604	Check Calibration of TIT-0420, MF Filtrate Train B Cell 2	3537	Transmitter Temperature Indicating	210-PIP-MFE-MEMB2	9/27/2022	6	MONTHS	3/23/2023
7605	Check Calibration of TIT-0420, MF Filtrate Train B Cell 3	3588	Transmitter Temperature Indicating	210-PIP-MFE-MEMB3	9/27/2022	6	MONTHS	3/23/2023
7606	Check Calibration of TIT-0420, MF Filtrate Train B Cell 4	3639	Transmitter Temperature Indicating	210-PIP-MFE-MEMB4	9/27/2022	6	MONTHS	3/23/2023
7607	Check Calibration of TIT-0420, MF Filtrate Train B Cell 5	3690	Transmitter Temperature Indicating	210-PIP-MFE-MEMB5	10/4/2022	6	MONTHS	3/30/2023
7608	Check Calibration of TIT-0420, MF Filtrate Train B Cell 6	3741	Transmitter Temperature Indicating	210-PIP-MFE-MEMB6	10/4/2022	6	MONTHS	3/30/2023
7609	Check Calibration of TIT-0420, MF Filtrate Train B Cell 7	3792	Transmitter Temperature Indicating	210-PIP-MFE-MEMB7	10/4/2022	6	MONTHS	3/30/2023
7610	Check Calibration of TIT-0420, MF Filtrate Train B Cell 8	3843	Transmitter Temperature Indicating	210-PIP-MFE-MEMB8	1/3/2023	6	MONTHS	7/7/2023
7611	Check Calibration of TIT-0420, MF Filtrate Train D Cell 1	3916	Transmitter Temperature Indicating	210-PIP-MFE-MEMD1	10/7/2022	6	MONTHS	4/7/2023
7612	Check Calibration of TIT-0420, MF Filtrate Train D Cell 2	3967	Transmitter Temperature Indicating	210-PIP-MFE-MEMD2	10/7/2022	6	MONTHS	4/7/2023
7613	Check Calibration of TIT-0420, MF Filtrate Train D Cell 3	4018	Transmitter Temperature Indicating	210-PIP-MFE-MEMD3	10/7/2022	6	MONTHS	4/7/2023
7614	Check Calibration of TIT-0420, MF Filtrate Train D Cell 4	4069	Transmitter Temperature Indicating	210-PIP-MFE-MEMD4	10/7/2022	6	MONTHS	4/7/2023
7615	Check Calibration of TIT-0420, MF Filtrate Train D Cell 5	4120	Transmitter Temperature Indicating	210-PIP-MFE-MEMD5	10/14/2022	6	MONTHS	4/14/2023
7616	Check Calibration of TIT-0420, MF Filtrate Train D Cell 6	4171	Transmitter Temperature Indicating	210-PIP-MFE-MEMD6	10/14/2022	6	MONTHS	4/14/2023
7617	Check Calibration of TIT-0420, MF Filtrate Train D Cell 7	4222	Transmitter Temperature Indicating	210-PIP-MFE-MEMD7	10/14/2022	6	MONTHS	4/14/2023
7618	Check Calibration of TIT-0420, MF Filtrate Train D Cell 8	4273	Transmitter Temperature Indicating	210-PIP-MFE-MEMD8	10/14/2022	6	MONTHS	4/14/2023
7619	Check Calibration of TIT-0420, MF Filtrate Train E Cell 1	4336	Transmitter Temperature Indicating	210-PIP-MFE-MEME1	10/18/2022	6	MONTHS	4/21/2023
7620	Check Calibration of TIT-0420, MF Filtrate Train E Cell 2	4387	Transmitter Temperature Indicating	210-PIP-MFE-MEME2	10/21/2022	6	MONTHS	4/21/2023
7510	Check Calibration of Train Feed Valve A02-BFV-0320 MFE	4442	Valve Butterfly 60"	210-PIP-MFF-MEM	6/9/2022	12	MONTHS	6/11/2023
7511	Check Calibration of Train Feed Valve B02-BFV-0320 MFE	4445	Valve Butterfly 60"	210-PIP-MFF-MEM	6/9/2022	12	MONTHS	6/11/2023
3577	Check Calibration of Train Feed Valve C02-BFV-0320	34419	Actuator	210-PIP-MFF-MEM	6/8/2022	1	YEARS	6/1/2023
7512	Check Calibration of Train Feed Valve D02-BFV-0320 MFW	4448	Valve Butterfly 60"	210-PIP-MFF-MEM	6/9/2022	12	MONTHS	6/11/2023
7513	Check Calibration of Train Feed Valve E01-E02-BFV-0320 MFW	4451	Valve Butterfly 36"	210-PIP-MFF-MEM	6/9/2022	12	MONTHS	6/11/2023
7470	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 1 MFE	4460	Valve Butterfly 24"	210-PIP-MFF-MEMA1	3/9/2022	12	MONTHS	3/9/2023
7471	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 2 MFE	4470	Valve Butterfly 24"	210-PIP-MFF-MEMA2	3/9/2022	12	MONTHS	3/9/2023
7472	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 3 MFE	4480	Valve Butterfly 24"	210-PIP-MFF-MEMA3	3/9/2022	12	MONTHS	3/9/2023
7473	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 4 MFE	4490	Valve Butterfly 24"	210-PIP-MFF-MEMA4	3/9/2022	12	MONTHS	3/9/2023
7474	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 5 MFE	4500	Valve Butterfly 24"	210-PIP-MFF-MEMA5	3/18/2022	12	MONTHS	3/16/2023

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
7475	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 6 MFE	4510	Valve Butterfly 24"	210-PIP-MFF-MEMA6	3/18/2022	12	MONTHS	3/16/2023
7476	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 7 MFE	4520	Valve Butterfly 24"	210-PIP-MFF-MEMA7	3/18/2022	12	MONTHS	3/16/2023
7477	Check Calibration of Unit Feed Valve BFV-0330 Train A Cell 8 MFE	4530	Valve Butterfly 24"	210-PIP-MFF-MEMA8	3/18/2022	12	MONTHS	3/16/2023
7478	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 1 MFE	4542	Valve Butterfly 24"	210-PIP-MFF-MEMB1	4/5/2022	12	MONTHS	3/23/2023
7479	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 2 MFE	4550	Valve Butterfly 24"	210-PIP-MFF-MEMB2	4/5/2022	12	MONTHS	3/23/2023
7480	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 3 MFE	4558	Valve Butterfly 24"	210-PIP-MFF-MEMB3	4/5/2022	12	MONTHS	3/23/2023
7481	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 4 MFE	4568	Valve Butterfly 24"	210-PIP-MFF-MEMB4	4/5/2022	12	MONTHS	3/23/2023
7482	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 5 MFE	4578	Valve Butterfly 24"	210-PIP-MFF-MEMB5	4/4/2022	12	MONTHS	3/30/2023
7483	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 6 MFE	4588	Valve Butterfly 24"	210-PIP-MFF-MEMB6	4/4/2022	12	MONTHS	3/30/2023
7484	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 7 MFE	4598	Valve Butterfly 24"	210-PIP-MFF-MEMB7	4/4/2022	12	MONTHS	3/30/2023
7485	Check Calibration of Unit Feed Valve BFV-0330 Train B Cell 8 MFE	4608	Valve Butterfly 24"	210-PIP-MFF-MEMB8	4/4/2022	12	MONTHS	3/30/2023
3579	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 1	34399	Actuator	210-PIP-MFF-MEMC1	7/8/2022	1	YEARS	7/1/2023
3580	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 2	34400	Actuator	210-PIP-MFF-MEMC2	7/8/2022	1	YEARS	7/1/2023
3581	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 3	34401	Actuator	210-PIP-MFF-MEMC3	7/8/2022	1	YEARS	7/1/2023
3584	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 6	34404	Actuator	210-PIP-MFF-MEMC6	7/8/2022	1	YEARS	7/1/2023
3585	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 7	34405	Actuator	210-PIP-MFF-MEMC7	7/8/2022	1	YEARS	7/1/2023
3586	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell 8	34406	Actuator	210-PIP-MFF-MEMC8	7/8/2022	1	YEARS	7/1/2023
3583	Check Calibration of Unit Feed Valve BFV-0330 Train C Cell5	34403	Actuator	210-PIP-MFF-MEMC5	7/8/2022	1	YEARS	7/1/2023
7486	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 1 MFW	4620	Valve Butterfly 24"	210-PIP-MFF-MEMD1	4/7/2022	12	MONTHS	4/7/2023
7487	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 2 MFW	4630	Valve Butterfly 24"	210-PIP-MFF-MEMD2	4/7/2022	12	MONTHS	4/7/2023
7488	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 3 MFW	4640	Valve Butterfly 24"	210-PIP-MFF-MEMD3	4/7/2022	12	MONTHS	4/7/2023
7489	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 4 MFW	4650	Valve Butterfly 24"	210-PIP-MFF-MEMD4	4/7/2022	12	MONTHS	4/7/2023
7490	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 5 MFW	4660	Valve Butterfly 24"	210-PIP-MFF-MEMD5	4/15/2022	12	MONTHS	4/14/2023
7491	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 6 MFW	4670	Valve Butterfly 24"	210-PIP-MFF-MEMD6	4/15/2022	12	MONTHS	4/14/2023
7492	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 7 MFW	4680	Valve Butterfly 24"	210-PIP-MFF-MEMD7	4/15/2022	12	MONTHS	4/14/2023
7493	Check Calibration of Unit Feed Valve BFV-0330 Train D Cell 8 MFW	4690	Valve Butterfly 24"	210-PIP-MFF-MEMD8	4/15/2022	12	MONTHS	4/14/2023
7494	Check Calibration of Unit Feed Valve BFV-0330 Train E Cell 1 MFW	4702	Valve Butterfly 24"	210-PIP-MFF-MEME1	4/27/2022	12	MONTHS	4/21/2023
7495	Check Calibration of Unit Feed Valve BFV-0330 Train E Cell 2 MFW	4712	Valve Butterfly 24"	210-PIP-MFF-MEME2	4/27/2022	12	MONTHS	4/21/2023
3646	Check Calibration of Unit Feed Valve BFV-0330 Train E Cell 3	34407	Actuator	210-PIP-MFF-MEME3	6/9/2022	1	YEARS	6/6/2023
3647	Check Calibration of Unit Feed Valve BFV-0330 Train E Cell 4	34408	Actuator	210-PIP-MFF-MEME4	6/9/2022	1	YEARS	6/6/2023
3554	Ckeck Calibration of PIT-0454, MF Effluent Train C Cell 3	30437	Transmitter Pressure Indicating	210-PIP-MFE-MEMC3	7/30/2021	2	YEARS	8/1/2023
9680	Clean & Calibrate MFE 250-AIT-0475 CL2 Analyzer	13934	MF Effluent Total Chlorine	250-PIP-MFE	2/22/2023	1	WEEKS	3/9/2023
2055	Element Analyzer Conductivity - RO Concentrate Train A Unit 1	12899	Element Analyzer Conductivity - RO Concentrate Train A Unit 1	510-A01-CPF-5101	12/28/2022	3	MONTHS	3/28/2023
2057	Element Analyzer Conductivity - RO Concentrate Train A Unit 2	12920	Element Analyzer Conductivity - RO Concentrate Train A Unit 2	510-A02-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2059	Element Analyzer Conductivity - RO Concentrate Train A Unit 3	12920	Element Analyzer Conductivity - RO Concentrate Train A Unit 2	510-A02-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2061	Element Analyzer Conductivity - RO Concentrate Train B Unit 1	12966	Element Analyzer Conductivity - RO Concentrate Train B Unit 1	510-B01-CPF-5101	1/4/2023	3	MONTHS	4/4/2023
2063	Element Analyzer Conductivity - RO Concentrate Train B Unit 2	12987	Element Analyzer Conductivity - RO Concentrate Train B Unit 2	510-B02-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2065	Element Analyzer Conductivity - RO Concentrate Train B Unit 3	13008	Element Analyzer Conductivity - RO Concentrate Train B Unit 3	510-B03-CPF-5101	2/23/2023	3	MONTHS	5/23/2023
2067	Element Analyzer Conductivity - RO Concentrate Train C Unit 1	13033	Element Analyzer Conductivity - RO Concentrate Train C Unit 1	510-C01-CPF-5101	1/12/2023	3	MONTHS	4/12/2023
2069	Element Analyzer Conductivity - RO Concentrate Train C Unit 2	13054	Element Analyzer Conductivity - RO Concentrate Train C Unit 2	510-C02-CPF-5101	12/28/2022	3	MONTHS	3/28/2023
2071	Element Analyzer Conductivity - RO Concentrate Train C Unit 3	13075	Element Analyzer Conductivity - RO Concentrate Train C Unit 3	510-C03-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2073	Element Analyzer Conductivity - RO Concentrate Train D Unit 1	13100	Element Analyzer Conductivity - RO Concentrate Train D Unit 1	510-D01-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2075	Element Analyzer Conductivity - RO Concentrate Train D Unit 2	13121	Element Analyzer Conductivity - RO Concentrate Train D Unit 2	510-D02-CPF-5101	1/4/2023	3	MONTHS	4/4/2023
2077	Element Analyzer Conductivity - RO Concentrate Train D Unit 3	13142	Element Analyzer Conductivity - RO Concentrate Train D Unit 3	510-D03-CPF-5101	2/23/2023	3	MONTHS	5/23/2023
2079	Element Analyzer Conductivity - RO Concentrate Train E Unit 1	13167	Element Analyzer Conductivity - RO Concentrate Train E Unit 1	510-E01-CPF-5101	2/24/2023	3	MONTHS	5/24/2023
2081	Element Analyzer Conductivity - RO Concentrate Train E Unit 2	13188	Element Analyzer Conductivity - RO Concentrate Train E Unit 2	510-E02-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
2083	Element Analyzer Conductivity - RO Concentrate Train E Unit 3	13209	Element Analyzer Conductivity - RO Concentrate Train E Unit 3	510-E03-CPF-5101	2/14/2023	3	MONTHS	5/14/2023
3471	Element Analyzer Conductivity - RO Concentrate Train F Unit 1	31194	Element Analyzer Conductivity - RO Concentrate Train F Unit 1	510-F01-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
3472	Element Analyzer Conductivity - RO Concentrate Train F Unit 2	31353	Element Analyzer Conductivity - RO Concentrate Train F Unit 2	510-F02-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
3474	Element Analyzer Conductivity - RO Concentrate Train F Unit 3	31512	Element Analyzer Conductivity - RO Concentrate Train F Unit 3	510-F03-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
3479	Element Analyzer Conductivity - RO Concentrate Train G Unit 1	31674	Element Analyzer Conductivity - RO Concentrate Train G Unit 1	510-G01-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
3480	Element Analyzer Conductivity - RO Concentrate Train G Unit 2	31833	Element Analyzer Conductivity - RO Concentrate Train G Unit 2	510-G02-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
3481	Element Analyzer Conductivity - RO Concentrate Train G Unit 3	31992	Element Analyzer Conductivity - RO Concentrate Train G Unit 3	510-G03-CPF-5101	1/19/2023	3	MONTHS	4/16/2023
2320	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 5 MFE	3211	Transmitter Level Indicating	210-A05-TNK-0340	1/25/2023	1	YEARS	1/25/2024
2321	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 6 MFE	3262	Transmitter Level Indicating	210-A06-TNK-0340	1/25/2023	1	YEARS	1/25/2024
2322	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 7 MFE	3313	Transmitter Level Indicating	210-A07-TNK-0340	1/25/2023	1	YEARS	1/25/2024
2339	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 5 MFW	4071	Transmitter Level Indicating	210-D05-TNK-0340	3/3/2022	1	YEARS	3/1/2024
2340	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 6 MFW	4122	Transmitter Level Indicating	210-D06-TNK-0340	3/3/2022	1	YEARS	3/1/2024
2341	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 7 MFW	4173	Transmitter Level Indicating	210-D07-TNK-0340	3/3/2022	1	YEARS	3/1/2024
2342	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 8 MFW	4224	Transmitter Level Indicating	210-D08-TNK-0340	3/3/2022	1	YEARS	3/1/2024
2326	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 1 MFE	3437	Transmitter Level Indicating	210-B01-TNK-0340	1/30/2023	1	YEARS	2/1/2024
2327	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 2 MFE	3488	Transmitter Level Indicating	210-B02-TNK-0340	1/30/2023	1	YEARS	2/1/2024
2328	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 3 MFE	3539	Transmitter Level Indicating	210-B03-TNK-0340	1/30/2023	1	YEARS	2/1/2024

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
2329	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 4 MFE	3590	Transmitter Level Indicating	210-B04-TNK-0340	1/30/2023	1	YEARS	2/1/2024
2330	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 5 MFE	3641	Transmitter Level Indicating	210-B05-TNK-0340	2/14/2023	1	YEARS	2/15/2024
2331	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 6 MFE	3692	Transmitter Level Indicating	210-B06-TNK-0340	2/14/2023	1	YEARS	2/15/2024
2332	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 7 MFE	3743	Transmitter Level Indicating	210-B07-TNK-0340	2/14/2023	1	YEARS	2/15/2024
2336	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 2 MFW	3918	Transmitter Level Indicating	210-D02-TNK-0340	3/1/2022	1	YEARS	2/22/2024
2337	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 3 MFW	3969	Transmitter Level Indicating	210-D03-TNK-0340	3/1/2022	1	YEARS	2/22/2024
2338	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 4 MFW	4020	Transmitter Level Indicating	210-D04-TNK-0340	3/1/2022	1	YEARS	2/22/2024
2343	Flush Feed Tubing Transmitter LIT-0345 Train E Cell 1 MFW	4287	Transmitter Level Indicating	210-E01-TNK-0340	3/9/2022	1	YEARS	3/1/2024
2344	Flush Feed Tubing Transmitter LIT-0345 Train E Cell 2 MFW	4338	Transmitter Level Indicating	210-E02-TNK-0340	3/9/2022	1	YEARS	3/1/2024
2319	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 4 MFE	3160	Transmitter Level Indicating	210-A04-TNK-0340	1/23/2023	1	YEARS	1/18/2024
2324	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 8 MFE	3364	Transmitter Level Indicating	210-A08-TNK-0340	1/25/2023	1	YEARS	1/25/2024
2333	Flush Feed Tubing Transmitter LIT-0345 Train B Cell 8 MFE	3794	Transmitter Level Indicating	210-B08-TNK-0340	2/14/2023	1	YEARS	2/15/2024
2335	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 1 MFW	3794	Transmitter Level Indicating	210-B08-TNK-0340	3/1/2022	1	YEARS	2/22/2024
2334	Flush Feed Tubing Transmitter LIT-0345 Train D Cell 1 MFW	3867	Transmitter Level Indicating	210-D01-TNK-0340	2/14/2023	1	YEARS	2/15/2024
2316	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 1 MFE	3007	Transmitter Level Indicating	210-A01-TNK-0340	1/23/2023	1	YEARS	1/18/2024
2317	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 2 MFE	3058	Transmitter Level Indicating	210-A02-TNK-0340	1/23/2023	1	YEARS	1/18/2024
2318	Flush Feed Tubing Transmitter LIT-0345 Train A Cell 3 MFE	3109	Transmitter Level Indicating	210-A03-TNK-0340	1/23/2023	1	YEARS	1/18/2024
3587	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 1	30331	Transmitter Level Indicating	210-C01-TNK-0340	6/3/2022	1	YEARS	6/1/2023
3588	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 2	30373	Transmitter Level Indicating	210-C02-TNK-0340	6/3/2022	1	YEARS	6/1/2023
3589	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 3	30415	Transmitter Level Indicating	210-C03-TNK-0340	6/3/2022	1	YEARS	6/1/2023
3590	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 4	30457	Transmitter Level Indicating	210-C04-TNK-0340	6/3/2022	1	YEARS	6/1/2023
3591	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 5	30499	Transmitter Level Indicating	210-C05-TNK-0340	6/9/2022	1	YEARS	6/1/2023
3592	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 6	30541	Transmitter Level Indicating	210-C06-TNK-0340	6/9/2022	1	YEARS	6/1/2023
3593	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 7	30583	Transmitter Level Indicating	210-C07-TNK-0340	6/9/2022	1	YEARS	6/1/2023
3594	Flush Feed Tubing Transmitter LIT-0345 Train C Cell 8	30625	Transmitter Level Indicating	210-C08-TNK-0340	6/9/2022	1	YEARS	6/1/2023
3650	Flush Feed Tubing Transmitter LIT-0345 Train E Cell 3	30202	Transmitter Level Indicating	210-E03-TNK-0340	6/9/2022	1	YEARS	6/6/2023
3651	Flush Feed Tubing Transmitter LIT-0345 Train E Cell 4	30242	Transmitter Level Indicating	210-E04-TNK-0340	6/9/2022	1	YEARS	6/6/2023
9715	Horiba Ammonia Electrode Replacement 1 YR	13410	MF Feed Transmitter Analyzer Indicating Ammonia	255-PIP-MFF-WQAS	5/19/2022	1	YEARS	5/17/2023
9307	Inspect and Clean SEFE Tank A01-LSH-130 Warrick	30095	Switch Level High	142-A01-TNK-0130	2/1/2023	1	YEARS	1/14/2024
9308	Inspect and Clean SEFE Tank A02-LSH-130 Warrick	30105	Switch Level High	142-A02-TNK-0130	2/1/2023	1	YEARS	1/14/2024
9681	M9 Portable TOC No. 1 Replace Consumables 3 MO.	13954	Portable M9 TOC Analyzer No.1 RO Feed	510-B02-RO-2200	12/22/2022	3	MONTHS	3/23/2023
9682	M9 Portable TOC No. 2 Replace Consumables 3 MO.	13955	M9 Portable TOC Analyzer No. 2 Permeate	510-PIP-ROP-ROB2	12/22/2022	3	MONTHS	3/23/2023
9242	MF Effluent Trubidity Wet Calibration HACH FT 660SC	13314	MF Process Effluent Turbidity	250-PIP-MFE	1/17/2023	3	MONTHS	4/16/2023
9179	Planner Order Trojan UV 100% T Standard Solution	8850	Element Analyzer UV Transmittance - Infeed	610-UVT-2220	5/27/2022	1	YEARS	6/4/2023
2982	Polymer Blend Controller 730-A01-FDR-7200 6 mo. PM	1832	Polymer Blend and Feed System Train A	730-A01-FDR-7200	2/23/2023	6	MONTHS	8/23/2023
2981	Polymer Blend Controller 730-B01-FDR-7200 6 mo. PM	1833	Polymer Blend and Feed System Train B	730-B01-FDR-7200	9/16/2022	6	MONTHS	3/13/2023
2980	Polymer Blend Controller 730-C01-FDR-7200 - 6 mo. PM	1834	Polymer Blend and Feed System Train C	730-C01-FDR-7200	10/20/2022	6	MONTHS	4/19/2023
3633	Polymer Blend Controller 730-D01-FDR-7200 6 MO. PM	32422	Polymer Blend and Feed System Train D	730-D01-FDR-7200	2/14/2023	6	MONTHS	8/8/2023
3467	Prominent H2O2 Sensor Calibration Method 3 Month	15073	Transmitter UV Feed PROMINENT Peroxide Analyzer	510-CPF-0010	2/15/2023	3	MONTHS	5/16/2023
3466	Prominent H2O2 Sensor Calibration Method 1 YR	15074	Transmitter UV Product PROMINENT Peroxide Analyzer	805-CPD-0002	5/24/2022	1	YEARS	5/16/2023
3463	Prominent H2O2 Sensor Standardization Method	15073	Transmitter UV Feed PROMINENT Peroxide Analyzer	510-CPF-0010	2/22/2023	2	WEEKS	3/8/2023
3465	Prominent H2O2 Sensor Standardization Method	15074	Transmitter UV Product PROMINENT Peroxide Analyzer	805-CPD-0002	2/22/2023	2	WEEKS	3/8/2023
9149	Replace Consumables ROF TOC M5310 Analyzer 3 MO.	1716	Analyzer Total Organic Compound	450-CPF-0001	1/11/2023	3	MONTHS	4/9/2023
9239	Replace Consumables ROF TOC M5310 Analyzer 3 MO.	13315	RO Feed TOC Analyzer	450-PIP-ROF	1/11/2023	3	MONTHS	4/9/2023
9150	Replace Consumables ROP TOC M5310 Analyzer 3 MO.	1717	Analyzer Total Organic Compound	510-CPF-0010	1/12/2023	3	MONTHS	4/9/2023
9240	Replace Consumables ROP TOC M5310 Analyzer 3 MO.	13316	RO Permate TOC Analyzer	510-CPF-0010	2/14/2023	3	MONTHS	5/15/2023
7003	Replace pH probe of I&E handheld	1745	pH meter, handheld (s/n 003366)	TOOLS	9/28/2022	1	YEARS	9/22/2023
7004	Replace pH probe of I&E handheld	1744	pH meter, handheld (s/n C03416)	TOOLS	9/28/2022	1	YEARS	9/22/2023
9795	RO Concentrate Train H Unit 1 - H01-AE-2322 Wednesday	43524	Element Analyzer Conductivity - RO Concentrate Train H Unit 1	510-H01-CPF-5101	2/23/2023	1	WEEKS	3/9/2023
9796	RO Concentrate Train H Unit 2 - H02-AE-2322 Wednesday	43716	Element Analyzer Conductivity - RO Concentrate Train H Unit 2	510-H02-CPF-5101	2/23/2023	1	WEEKS	3/2/2023
9797	RO Concentrate Train H Unit 3 - H03-AE-2322 Wednesday	43908	Element Analyzer Conductivity - RO Concentrate Train H Unit 3	510-H03-CPF-5101	2/24/2023	1	WEEKS	3/8/2023
9798	RO Concentrate Train I Unit 1 - I01-AE-2322 Wednesday	44101	Element Analyzer Conductivity - RO Concentrate Train I Unit 1	510-I01-CPF-5101	2/23/2023	1	WEEKS	3/9/2023
9799	RO Concentrate Train I Unit 2 - I02-AE-2322 Wednesday	44293	Element Analyzer Conductivity - RO Concentrate Train I Unit 2	510-I02-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9800	RO Concentrate Train I Unit 3 - I03-AE-2322 Wednesday	44485	Element Analyzer Conductivity - RO Concentrate Train I Unit 3	510-I03-CPF-5101	2/23/2023	1	WEEKS	3/2/2023
9801	RO Permeate EC Train H Unit 1 - H01-AE-2225 Wednesday	43545	Element Analyzer Conductivity - RO Product Train H Unit 1	510-H01-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9802	RO Permeate EC Train H Unit 2 - H02-AE-2225 Wednesday	43737	Element Analyzer Conductivity - RO Product Train H Unit 2	510-H02-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9804	RO Permeate EC Train H Unit 3 - H03-AE-2225 Wednesday	43929	Element Analyzer Conductivity - RO Product Train H Unit 3	510-H03-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9805	RO Permeate EC Train I Unit 1 - I01-AE-2225 Wednesday	44122	Element Analyzer Conductivity - RO Product Train I Unit 1	510-I01-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9806	RO Permeate EC Train I Unit 2 - I02-AE-2225 Wednesday	44314	Element Analyzer Conductivity - RO Product Train I Unit 2	510-I02-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
9807	RO Permeate EC Train I Unit 3 - I03-AE-2225 Wednesday	44506	Element Analyzer Conductivity - RO Product Train I Unit 3	510-I03-CPF-5101	2/23/2023	1	WEEKS	3/8/2023
3135	ROP / UVP CL2 Analyzer Weekly Calibration	7341	ROP/UVP CL2 510-AIT-2250 Analyzer	510-CPF-0010	2/22/2023	1	WEEKS	3/7/2023
9044	ROP/UVP CL2 ANALYZER 1 YR	7341	ROP/UVP CL2 510-AIT-2250 Analyzer	510-CPF-0010	4/11/2022	1	YEARS	4/4/2023
7342	Rosemount Free Chlorine Maintenance 450-AE-2162	9073	Element Analyzer Free Chlorine and pH- RO Feed	450-CPF-0001	1/11/2023	3	MONTHS	4/11/2023

PMNUM	DESCRIPTION	ASSETNUM	ASSETDESC	LOCATION	LASTCOMPDATE	FREQUENCY	FREQUNIT	NEXTDATE
2231	Rosemount pH Analyzer 9 Month RO Feed: 450-AIT-2120	9062	Transmitter Analyzer Indicating pH	450-CPF-0001	2/8/2023	9	MONTHS	11/12/2023
2234	Rosemount pH Analyzer 9 Month RO Feed: 450-AIT-2140	9064	Transmitter Analyzer Indicating pH	450-CPF-0001	2/8/2023	9	MONTHS	11/10/2023
3595	Rosemount pH Analyzer Annual Element Analyzer pH MF Train C CIP-C01-AIT-0480	34114	Transmitter Analyzer Indicating pH	210-AS-0400C	6/9/2022	1	YEARS	6/6/2023
3596	Rosemount pH analyzer Annual Element Analyzer pH MF Train C02-AIT-0480	34115	Transmitter Analyzer Indicating pH	210-AS-0400C	6/9/2022	1	YEARS	6/1/2023
2238	Rosemount pH analyzer annual- MF Feedwater-B B01-AIT-0305	7041	Transmitter Analyzer Indicating pH - MF Feedwater B	255-PIP-MFF-WQAS	9/1/2022	1	YEARS	8/26/2023
2237	Rosemount pH analyzer annual-DPW 710-AIT-3310	8668	Transmitter Analyzer Indicating pH	710-CPF-0008	8/16/2022	1	YEARS	8/19/2023
2243	Rosemount pH analyzer annual-Element Analyzer pH - MF Train A CIP-A01-AIT-0480	4392	Transmitter Analyzer Indicating pH	210-AS-0400A	11/2/2022	1	YEARS	11/3/2023
2244	Rosemount pH analyzer annual-Element Analyzer pH - MF Train A CIP-A02-AIT-0480	7200	Transmitter Analyzer Indicating pH	210-AS-0400A	1/3/2023	1	YEARS	12/29/2023
2245	Rosemount pH analyzer annual-Element Analyzer pH - MF Train B CIP-B01-AIT-0480	4401	Transmitter Analyzer Indicating pH	210-AS-0400B	11/2/2022	1	YEARS	11/4/2023
2246	Rosemount pH analyzer annual-Element Analyzer pH - MF Train B CIP-B02-AIT-0480	7246	Transmitter Analyzer Indicating pH	210-AS-0400B	1/11/2023	1	YEARS	1/12/2024
2247	Rosemount pH analyzer annual-Element Analyzer pH - MF Train D CIP-D01-AIT-0480	4410	Transmitter Analyzer Indicating pH	210-AS-0400D	2/7/2023	1	YEARS	1/26/2024
2248	Rosemount pH analyzer annual-Element Analyzer pH - MF Train D CIP-D02-AIT-0480	7214	Transmitter Analyzer Indicating pH	210-AS-0400D	2/15/2023	1	YEARS	2/9/2024
2249	Rosemount pH analyzer annual-Element Analyzer pH - MF Train E CIP-E01-AIT-0480	4419	Transmitter Analyzer Indicating pH	210-AS-0400E	2/24/2023	1	YEARS	2/23/2024
2232	Rosemount pH analyzer annual-FPW: 710-AIT-3410	8673	Transmitter Analyzer Indicating pH	710-CPF-0009	8/5/2022	1	YEARS	8/5/2023
2235	Rosemount pH analyzer annual-RO PW: 510-AIT-2241	13229	Transmitter Analyzer Indicating pH	510-CPF-0010	8/18/2022	1	YEARS	8/12/2023
2236	Rosemount pH analyzer annual-SAR Bypass: 805-AIT-3580	10376	Transmitter Analyzer Indicating pH	805-CPD-0002	5/2/2022	1	YEARS	4/28/2023
70209	Schedule a Hach rep to calibrate the particle counter	14196	Transmitter Analyzer Indicating Particle Counter	710-CPF-0009	11/10/2022	1	YEARS	10/31/2023
9836	SEFE Plant 2 Weekly Ammonia Analyzer PM 1	41035	Element Analyzer Ammonia	144-PIP-EFF		1	WEEKS	3/20/2023
9838	SEFE Plant 2 Weekly Conductivity Analyzer PM 3	41021	Element Analyzer Conductivity	144-PIP-EFF		1	WEEKS	3/20/2023
9837	SEFE Plant 2 Weekly Total CL2 Analyzer PM 2	41028	Element Analyzer Total Chlorine	144-PIP-EFF		1	WEEKS	3/20/2023
9839	SEFE Plant 2 Weekly Turbidity SS 7 PM 4	41013	Element Analyzer Turbidity	144-PIP-EFF		1	WEEKS	3/20/2023
9302	SEFE Tank A01 Flush & Clean LIT-0130A Transmitter	30091	Transmitter Level Indicating	142-A01-TNK-0130	11/9/2022	1	YEARS	11/5/2023
9303	SEFE Tank A01 Flush & Clean LIT-0130B Transmitter	30093	Transmitter Level Indicating	142-A01-TNK-0130	10/31/2022	1	YEARS	11/5/2023
9304	SEFE Tank A02 Flush & Clean LIT-0130A Transmitter	30101	Transmitter Level Indicating	142-A02-TNK-0130	11/9/2022	1	YEARS	11/5/2023
9305	SEFE Tank A02 Flush & Clean LIT-0130B Transmitter	30103	Transmitter Level Indicating	142-A02-TNK-0130	10/31/2022	1	YEARS	11/5/2023
3017	Surge tank level control functional check - 830-A01-TNK-3410	1547	Tank steel 30430 gal	830-A01-TNK-3410	5/5/2022	1	YEARS	4/29/2023
2960	Surge tank level control functional check - 830-A02-TNK-3410	1548	Tank steel 30430 gal	830-A02-TNK-3410	5/5/2022	1	YEARS	4/29/2023
2961	Surge tank level control functional check - 830-A03-TNK-3410	1549	Tank steel 30430 gal	830-A03-TNK-3410	5/5/2022	1	YEARS	4/29/2023
2962	Surge tank level control functional check - 830-A04-TNK-3410	1550	Tank steel 30430 gal	830-A04-TNK-3410	5/5/2022	1	YEARS	4/29/2023
9789	Surge tank level control functional check - 830-A05-TNK-3410	1550	Tank steel 30430 gal	830-A04-TNK-3410		1	YEARS	4/29/2023
2963	Surge tank level control functional check - 830-B01-TNK-3410	1551	Tank steel 5984 gal	830-B01-TNK-3410	5/5/2022	1	YEARS	4/29/2023
7721	Test Overtemperature Thermocouple, TIT-1226 Train A01	5839	Transmitter Temperature Indicating	220-A01-TNK-1200	7/6/2022	1	YEARS	7/9/2023
7722	Test Overtemperature Thermocouple, TIT-1226 Train B01	5856	Transmitter Temperature Indicating	220-B01-TNK-1200	7/6/2022	1	YEARS	7/9/2023
7723	Test Overtemperature Thermocouple, TIT-1226 Train D01	5873	Transmitter Temperature Indicating	220-D01-TNK-1200	7/8/2022	1	YEARS	7/9/2023
7724	Test Overtemperature Thermocouple, TIT-1226 Train E01	5890	Transmitter Temperature Indicating	220-E01-TNK-1200	7/8/2022	1	YEARS	7/9/2023
2116	Transmitter Analyzer Indicating Chlorine	8303	Element Analyzer Chlorine - SAR Bypass	805-CPD-0002	2/22/2023	1	WEEKS	3/9/2023
7339	UV Transmittance Calibration Check 1 Yr. 610-AE-2220	8850	Element Analyzer UV Transmittance - Infeed	610-UVT-2220	5/12/2022	1	YEARS	5/15/2023
9241	UV Transmittance Calibration Check 1 Yr. 610-AE-2240	13317	UV Transmittance Analyzer	510-CPF-0010	5/2/2022	1	YEARS	4/22/2023
9296	UVT 2240 Optiview Cleaning & Transmittance Monthly	13317	UV Transmittance Analyzer	510-CPF-0010	2/2/2023	1	MONTHS	4/1/2023

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Wilkins/Zurn	975 xl2	2	ACD9611

Assembly Location
South Side of Aministration Building

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 6.8 PSID	☐ Held at ____ PSID	☒ Opened at 2.9 PSID	☐ Air Inlet Opened at ____ PSID			
	☐ Closed Tight	☐ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☒ Leaked	☐ Did Not Open	☐ Check Held at ____ PSID	Leaked	☐	☐
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit			
	☐ Other	☐ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	____ PSID	____ PSID	Opened at ____ PSID	Air Inlet ____ PSID	Closed Tight	☐	☐
	☐ Closed Tight	☐ Closed Tight		CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
67	2023-06-08	**Fail**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502

SP Company	SP Phone Number
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Wilkins/Zurn	975 xl2	2	ACD9611

Assembly Location
South Side of Aministration Building

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 7.5 PSID	☐ Held at ____ PSID	☒ Opened at 2.3 PSID	☐ Air Inlet Opened at ____ PSID			
	☐ Closed Tight	☐ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☒ Leaked	☐ Did Not Open	☐ Check Held at ____ PSID	Leaked	☐	☐
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☒ Rubber Kit	☒ Rubber Kit	☒ Rubber Kit	☐ Rubber Kit			
	☐ Other	☒ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	7.7 PSID	____ PSID	Opened at 2.5 PSID	Air Inlet ____ PSID	Closed Tight	☐	☐
	☒ Closed Tight	☒ Closed Tight		CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
65	2023-06-23	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		
Location Address		**Email Address**
10500 Ellis, Fountain Valley CA, 92708		

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Wilkins/Zurn	375	2.5	L55671

Assembly Location
South Side of Administration

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 7.3 PSID ☒ Closed Tight ☐ Leaked	☐ Held at ____ PSID ☒ Closed Tight ☐ Leaked	☒ Opened at 2.5 PSID ☐ Did Not Open	☐ Air Inlet Opened at ____ PSID ☐ Opened Fully ☐ Check Held at ____ PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
68	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		
Location Address		**Email Address**
10500 Ellis, Fountain Valley CA, 92708		

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Conbraco	4020fa	.5	F6547

Assembly Location
Janitorâ€²s Closet in Administration Building

Protection Type		
containment	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at	☐ Held at	☒ Opened at	☐ Air Inlet Opened at			
	8.4 PSID	____ PSID	2.6 PSID	____ PSID			
	☒ Closed Tight	☒ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☐ Leaked	☐ Did Not Open	☐ Check Held at	Leaked	☐	☐
				____ PSID			
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit			
	☐ Other	☐ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	____ PSID	____ PSID	Opened at	Air Inlet ____ PSID	Closed Tight	☐	☐
	☐ Closed Tight	☐ Closed Tight	____ PSID	CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
62	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name		Phone Number	Contact Name
Orange County Water District			
Location Address			**Email Address**
10500 Ellis, Fountain Valley CA, 92708			

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Febco	Lf860	8	A1702100525

Assembly Location
West of Ellis Front Entrance, in Bushes - Serves Ocwd Meters & Hydrants

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 6.8 PSID	☐ Held at ____ PSID	☒ Opened at 3.1 PSID	☐ Air Inlet Opened at ____ PSID			
	☒ Closed Tight	☒ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☐ Leaked	☐ Did Not Open	☐ Check Held at ____ PSID	Leaked	☐	☐
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit			
	☐ Other	☐ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	____ PSID	____ PSID	Opened at	Air Inlet ____ PSID	Closed Tight	☐	☐
	☐ Closed Tight	☐ Closed Tight	____ PSID	CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
78	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
PVB	Watts	800M	1	855143

Assembly Location
In Atrium, Mwdoc

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☐ Held at ____ PSID ☐ Closed Tight ☐ Leaked	☐ Held at ____ PSID ☐ Closed Tight ☐ Leaked	☐ Opened at ____ PSID ☐ Did Not Open	☒ Air Inlet Opened at 2.4 PSID ☒ Opened Fully ☒ Check Held at 1.7 PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
62	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502

SP Company	SP Phone Number
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Watts	909	10	402964

Assembly Location
South Side of Ellisave East Of Admin Bldg

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 6.8 PSID ☒ Closed Tight ☐ Leaked	☐ Held at ____ PSID ☒ Closed Tight ☐ Leaked	☒ Opened at 2.4 PSID ☐ Did Not Open	☐ Air Inlet Opened at ____ PSID ☐ Opened Fully ☐ Check Held at ____ PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
78	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Watts	909	10	402874

Assembly Location
South Side of Ellis, East Of Admin Bldg

Protection Type		
isolation	[ ] Fireline?	[ ] Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	[X] Held at 5.7 PSID	[ ] Held at ___ PSID	[X] Opened at 2.3 PSID	[ ] Air Inlet Opened at ___ PSID			
	[X] Closed Tight	[X] Closed Tight		[ ] Opened Fully	Closed Tight	[ ]	[ ]
	[ ] Leaked	[ ] Leaked	[ ] Did Not Open	[ ] Check Held at ___ PSID	Leaked	[ ]	[ ]
				[ ] Leaked			
REPAIR	[ ] CLEANED	[ ] CLEANED	[ ] CLEANED	[ ] CLEANED	CLEANED	[ ]	[ ]
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	[ ]	[ ]
	[ ] Disc	[ ] Disc	[ ] Disc	[ ] Air Inlet Disc	REPAIR	[ ]	[ ]
	[ ] Spring	[ ] Spring	[ ] Spring	[ ] Air Inlet Spring			
	[ ] Guide	[ ] Guide	[ ] Diaphragm	[ ] Check Disc			
	[ ] Seat	[ ] Seat	[ ] Seat	[ ] Check Spring			
	[ ] O-Ring(s)	[ ] O-Ring(s)	[ ] O-Ring(s)	[ ] Float			
	[ ] Module	[ ] Module	[ ] Module	[ ] Diaphragm			
	[ ] Rubber Kit	[ ] Rubber Kit	[ ] Rubber Kit	[ ] Rubber Kit			
	[ ] Other	[ ] Other	[ ] Other	[ ] Other	Other	[ ]	[ ]
Final Test	___ PSID	___ PSID	Opened at ___ PSID	Air Inlet ___ PSID	Closed Tight	[ ]	[ ]
	[ ] Closed Tight	[ ] Closed Tight		CK Valve ___ PSID			

Line Pressure at Time of Test	Test Date	Test Results
78	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

[X] I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Watts	009m2qt	2	241300

Assembly Location
SW Corner Building G Chemical Area

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 8.7 PSID ☒ Closed Tight ☐ Leaked	☐ Held at ____ PSID ☒ Closed Tight ☐ Leaked	☒ Opened at 3.3 PSID ☐ Did Not Open	☐ Air Inlet Opened at ____ PSID ☐ Opened Fully ☐ Check Held at ____ PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
67	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
RP	Watts	009M2Qt	2	241280

Assembly Location
Building L

Protection Type		
isolation	☐ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 9.3 PSID	☐ Held at ____ PSID	☒ Opened at 3.1 PSID	☐ Air Inlet Opened at ____ PSID			
	☒ Closed Tight	☒ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☐ Leaked	☐ Did Not Open	☐ Check Held at ____ PSID	Leaked	☐	☐
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit			
	☐ Other	☐ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	____ PSID	____ PSID	Opened at ____ PSID	Air Inlet ____ PSID	Closed Tight	☐	☐
	☐ Closed Tight	☐ Closed Tight		CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
67	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502

SP Company	SP Phone Number
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name		Phone Number	Contact Name	
Orange County Water District				
Location Address			**Email Address**	
10500 Ellis, Fountain Valley CA, 92708				
Assembly Type	**Assembly Manufacturer**	**Assembly Model**	**Size**	**Serial Number**
RP	Watts	009m1qt	1	16510
Assembly Location				
Area West of Old Administration Building in pit				
Protection Type	☐ Fireline?		☐ Lead Free?	
isolation				

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 8.5 PSID ☒ Closed Tight ☐ Leaked	☐ Held at ____ PSID ☒ Closed Tight ☐ Leaked	☒ Opened at 2.9 PSID ☐ Did Not Open	☐ Air Inlet Opened at ____ PSID ☐ Opened Fully ☐ Check Held at ____ PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
62	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
DC	Watts	709	.75	143252

Assembly Location
Main Entrance in Planter

Protection Type	Fireline?	Lead Free?
containment	☒ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 2.4 PSID ☐ Closed Tight ☐ Leaked	☒ Held at 2.8 PSID ☐ Closed Tight ☐ Leaked	☐ Opened at ____ PSID ☐ Did Not Open	☐ Air Inlet Opened at ____ PSID ☐ Opened Fully ☐ Check Held at ____ PSID ☐ Leaked	Closed Tight Leaked	☐ ☐	☐ ☐
REPAIR	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Guide ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Disc ☐ Spring ☐ Diaphragm ☐ Seat ☐ O-Ring(s) ☐ Module ☐ Rubber Kit ☐ Other	☐ CLEANED REPLACED ☐ Air Inlet Disc ☐ Air Inlet Spring ☐ Check Disc ☐ Check Spring ☐ Float ☐ Diaphragm ☐ Rubber Kit ☐ Other	CLEANED REPLACED REPAIR Other	☐ ☐ ☐ ☐	☐ ☐ ☐ ☐
Final Test	____ PSID ☐ Closed Tight	____ PSID ☐ Closed Tight	Opened at ____ PSID	Air Inlet ____ PSID CK Valve ____ PSID	Closed Tight	☐	☐

Line Pressure at Time of Test	Test Date	Test Results
74	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

Backflow Test and Maintenance Report
City of Fountain Valley

17300 Mt. Herrman St., Fountain Valley, CA 92708, Email: xconnect@fountainvalley.org, Phone #: (714) 593-4624

Location Name	Phone Number	Contact Name
Orange County Water District		

Location Address	Email Address
10500 Ellis, Fountain Valley CA, 92708	

Assembly Type	Assembly Manufacturer	Assembly Model	Size	Serial Number
DCDA	Watts	709	6	103694

Assembly Location
Main Entrance in Planter

Protection Type		
containment	☒ Fireline?	☐ Lead Free?

	Check Valve #1	Check Valve #2	Relief Valve	PVB/SVB	Shut Off Valves	#1	#2
Initial Test	☒ Held at 4.3 PSID	☒ Held at 2.2 PSID	☐ Opened at ____ PSID	☐ Air Inlet Opened at ____ PSID			
	☐ Closed Tight	☐ Closed Tight		☐ Opened Fully	Closed Tight	☐	☐
	☐ Leaked	☐ Leaked	☐ Did Not Open	☐ Check Held at ____ PSID	Leaked	☐	☐
				☐ Leaked			
REPAIR	☐ CLEANED	☐ CLEANED	☐ CLEANED	☐ CLEANED	CLEANED	☐	☐
	REPLACED	REPLACED	REPLACED	REPLACED	REPLACED	☐	☐
	☐ Disc	☐ Disc	☐ Disc	☐ Air Inlet Disc	REPAIR	☐	☐
	☐ Spring	☐ Spring	☐ Spring	☐ Air Inlet Spring			
	☐ Guide	☐ Guide	☐ Diaphragm	☐ Check Disc			
	☐ Seat	☐ Seat	☐ Seat	☐ Check Spring			
	☐ O-Ring(s)	☐ O-Ring(s)	☐ O-Ring(s)	☐ Float			
	☐ Module	☐ Module	☐ Module	☐ Diaphragm			
	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit	☐ Rubber Kit			
	☐ Other	☐ Other	☐ Other	☐ Other	Other	☐	☐
Final Test	____ PSID	____ PSID	Opened at	Air Inlet ____ PSID	Closed Tight	☐	☐
	☐ Closed Tight	☐ Closed Tight	____ PSID	CK Valve ____ PSID			

Line Pressure at Time of Test	Test Date	Test Results
74	2023-06-08	**Pass**

Comments/Notes/Other

Test Kit Manufacturer	Test Kit Model	Test Kit Serial Number	Test Kit Calibration Date
Mid-West	845-5	0516465	2023-05-18

☒ I certify the information in this report is true, complete, and accurate.

Tester Name	Certification Number
Mark Miller	1502
SP Company	**SP Phone Number**
OC Backflow Test	

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld G Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	399J80165

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☑	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld 6, Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L66297

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE ________

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ______ PSID LEAKED ☐	Held at ______ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ______ PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ______ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments: Valves Are Bad. Can't close 38 1/8" (38 1/10")

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Lime sludge

Type	Size	Make	Model	Serial #
RPDA	3"	Watts	909	13528

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 78

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☒	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-99

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Lime slurry Bypass

Type	Size	Make	Model	Serial #
RP	3/4	WATTS	909	65952

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld 4 Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000 SS	1376 1190105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☑	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 UV Area

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	66562

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

CS 410

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2 qt	241432

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.2 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☑	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld L Garage
Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	389941104

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at ____ PSID LEAKED ☑	Held at ____ PSID CLOSED TIGHT ☐ LEAKED ☑	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
Mark Miller	Mark Miller	1502	6/8/23

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Pit @ admin

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XLII	4273461

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 60

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at x 7.5 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Pit @ admin

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XL	1372184

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMBLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 60

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld C LAB Fire

Type	Size	Make	Model	Serial #
350DCDA	6"	Watts	350 DCDA	V17279

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 2.1 PSID LEAKED ☐	Held at 3.3 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:

10500 Ellis St Fountain Valley, Ca 92708 Bldg GAB Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Wilkins	950	2884718

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1		CHECK VALVE #2		RELIEF VALVE		PVB/SVB	
INITIAL TEST	Held at x 2.2 PSID		Held at 2.4 PSID		Opened at ____ PSID		AIR INLET Opened at ____ PSID	
			CLOSED TIGHT	☒				
	LEAKED	☐	LEAKED	☐	DID NOT OPEN	☐	DID NOT OPEN	☐
REPAIRS	CLEANED	☐	CLEANED	☐	CLEANED	☐	CHECK VALVE	
	REPLACED	☐	REPLACED	☐	REPLACED	☐	Held at ____ PSID	
							LEAKED	☐
	DISC	☐	DISC	☐	DISC(S)	☐		
	SPRING	☐	SPRING	☐	SPRING	☐	CLEANED	☐
	GUIDE	☐	GUIDE	☐	DIAPHRAGM	☐	REPLACED	☐
	HINGE PIN	☐	HINGE PIN	☐	SEAT(S)	☐		
	SEAT	☐	SEAT	☐	O-RING(S)	☐	DISC	☐
	MODULE	☐	MODULE	☐	MODULE	☐	DIAPHRAGM	☐
	OTHER	☐	OTHER	☐	OTHER	☐	FLOAT	☐
	DESCRIBE:	☐	DESCRIBE:	☐	DESCRIBE:	☐	SPRING	☐
							OTHER	☐
							DESCRIBE:	☐
FINAL TEST	Held at ____ PSID		Held at ____ PSID		Opened at ____ PSID		Air Inlet ____ PSID	
			CLOSED TIGHT	☐			Check Valve ____ PSID	

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld C LAB, roof

Type	Size	Make	Model	Serial #
RP	3/4	WATTS	919QT	19885

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 50

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.9 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.3 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-109

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld. C LAB roof

Type	Size	Make	Model	Serial #
RP	3/4	Watts	919QT	90396

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 50

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.1 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld 6 Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	WAtts	007ml	64739

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 2.1 PSID LEAKED ☐	Held at 2.4 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld F Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L66301

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at X 7.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ________________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld F Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	3000SS	370200105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 5.0 PSID LEAKED ☐	Held at 3.9 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
Mark Miller	Mark Miller	1502	6/8/23

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld F Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	WAtts	007M1	63469

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 2.5 PSID LEAKED ☐	Held at 2.6 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld 5 east in rocks

Type	Size	Make	Model	Serial #
RP	1.5"	Watts	009m2	112036

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld T North

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	41449

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 6.3 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.2 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld U South

Type	Size	Make	Model	Serial #
RP	1.5	Watts	009m2	111997

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE ____

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.6 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.2 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld 4 Domestic

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L66561

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 71

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 8.7 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.8 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld U Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	watts	007m1	64798

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 1.8 PSID LEAKED ☐	Held at 2.1 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

F-119

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld U Across on PAd

Type	**Size**	**Make**	**Model**	**Serial #**
RP	2"	watts	009m2	607662

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE: 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.6 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.3 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld Y Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Ames	300OSS	398010105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 2.1 PSID LEAKED ☐	Held at 1.4 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

3/4 Y Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	watts	007m1	64784

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 1.7 PSID LEAKED ☐	Held at 1.8 PSID CLOSED TIGHT ☐ LEAKED ☐	Opened at ______ PSID DID NOT OPEN ☐	AIR INLET Opened at ______ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ______ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ______ PSID	Held at ______ PSID CLOSED TIGHT ☐	Opened at ______ PSID	Air Inlet ______ PSID Check Valve ______ PSID

Comments ________________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld Y west

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	076867

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE: 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.9 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld Q south

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	24169

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 5.6 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.4 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Guard shack

Type	Size	Make	Model	Serial #
RP	1"	Wilkins	975XL	198722

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 6.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address: Between G+K Area 235

10500 Ellis St Fountain Valley, Ca 92708

Type	Size	Make	Model	Serial #
RP	1"	Watts	009m2	245396

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 9.0 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.2 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708 Bld K north

Type	Size	Make	Model	Serial #
RP	2"	Watts	009m2	241290

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.3 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 3.1 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Area 450 AIT

Type	Size	Make	Model	Serial #
RP	1"	watts	009m2	174914

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.6 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.5 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld L Garage
fire bypass

Type	Size	Make	Model	Serial #
DC	3/4	watts	007m2	62977

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 76
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 1.9 PSID LEAKED ☐	Held at 2.0 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Side R R/O
Fire

Type	Size	Make	Model	Serial #
DCDA	6"	Wilkins	350	V37212

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 3.9 PSID LEAKED ☐	Held at 3.5 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R R/O
Fire Bypass

Type	**Size**	**Make**	**Model**	**Serial #**
DA	3/4	Wilkins	950XL	3786036

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY / DOUBLE CHECK VALVE ASSEMBLY				LINE PRESSURE 70
	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 3.2 PSID LEAKED ☐	Held at 3.0 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Bld R Are

Device Location/Address:

10500 Ellis St Fountain Valley, Ca 92708

Type	**Size**	**Make**	**Model**	**Serial #**
DCDA	6"	Ames	3000SS	399020105

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 4.0 PSID LEAKED ☐	Held at 3.3 PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R
Fire Bypass

Type	Size	Make	Model	Serial #
DC	3/4	Watts	007m1	63986

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 2.2 PSID LEAKED ☐	Held at 2.2 PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at ____ PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CLEANED ☐ REPLACED ☐	CHECK VALVE Held at ____ PSID LEAKED ☐
REPAIRS	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________________

The above report is certified to be true.

INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
Mark Miller	Mark Miller	1502	6/8/23

FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld 12
Domestic

Type	Size	Make	Model	Serial #
RP	2"	Watts	009M2 QT	01555

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 6.2 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☒ LEAKED ☐	Opened at 2.9 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld R
inside - industrial
feed to RO

Type	Size	Make	Model	Serial #
RP	4"	watts	909	15304

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 5.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.2 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Bld R
Basement
Noze 12.35

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L87252

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY

DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 6.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.8 PSID DID NOT OPEN ☐	AIR INLET Opened at – PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld C Lab
Industrial

Type	Size	Make	Model	Serial #
RP	3"	Wilkins	375	L 73155

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 7.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.6 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ______

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

City of Fountain Valley Backflow Test and Maintenance Report

17300 Mt. Herrmann St., Fountain Valley, Ca. 92708 OR Fax # (714) 556-7362 Phone# (714) 593-4624

Business/Owner Name: Orange County Water District

Customer Phone #: 714-378-3325

Device Location/Address:
10500 Ellis St Fountain Valley, Ca 92708

Bld C WRB
Domestic

Type	Size	Make	Model	Serial #
RP	4"	Wilkins	375	L73145

BACKFLOW PREVENTION DEVICE FIELD TESTING AND MAINTENANCE REPORT

REDUCED PRESSURE PRINCIPLE ASSEMPLY
DOUBLE CHECK VALVE ASSEMBLY

LINE PRESSURE 70

	CHECK VALVE #1	CHECK VALVE #2	RELIEF VALVE	PVB/SVB
INITIAL TEST	Held at 6.4 PSID LEAKED ☐	Held at ____ PSID CLOSED TIGHT ☑ LEAKED ☐	Opened at 2.8 PSID DID NOT OPEN ☐	AIR INLET Opened at ____ PSID DID NOT OPEN ☐
REPAIRS	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC ☐ SPRING ☐ GUIDE ☐ HINGE PIN ☐ SEAT ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CLEANED ☐ REPLACED ☐ DISC(S) ☐ SPRING ☐ DIAPHRAGM ☐ SEAT(S) ☐ O-RING(S) ☐ MODULE ☐ OTHER ☐ DESCRIBE: ☐	CHECK VALVE Held at ____ PSID LEAKED ☐ CLEANED ☐ REPLACED ☐ DISC ☐ DIAPHRAGM ☐ FLOAT ☐ SPRING ☐ OTHER ☐ DESCRIBE: ☐
FINAL TEST	Held at ____ PSID	Held at ____ PSID CLOSED TIGHT ☐	Opened at ____ PSID	Air Inlet ____ PSID Check Valve ____ PSID

Comments ____________________

The above report is certified to be true.

Mark Miller	Mark Miller	1502	6/8/23
INITIAL TEST (SIGNATURE)	PRINT NAME	CERT TESTER NO.	DATE
FINAL TEST/REPAIRS (SIG)	PRINT NAME	CERT TESTER NO.	DATE

Appendix G

Groundwater Quality Data
at the Talbert Barrier

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

GWRS 2023 Quarterly Sampling Dates
OCWD Water Quality Department
TALBERT BARRIER - GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
OCWD-M10/1-4	01/09/2023	05/18/2023	07/24/2023	10/16/2023
OCWD-M11/1-4	01/25/2023	04/19/2023	07/26/2023	10/18/2023
OCWD-M19/3	01/24/2023	04/17/2023	07/11/2023	10/03/2023
OCWD-M45/1-5	02/06/2023	05/01/2023	08/07/2023	10/30/2023
OCWD-M46/2-5	01/09/2023	05/17/2023	07/10/2023	10/02/2023
OCWD-M46A/1	01/09/2023	05/17/2023	07/10/2023	10/02/2023
OCWD-M47/1-5	01/23/2023	04/18/2023	07/25/2023	10/17/2023

Notes for Appendix G Tables:

► Water quality data are summarized for monitoring wells M10, M11, M19, M45, M46, M46A and M47 in the following tables. OCWD-M19/3 is a non-compliance monitoring well.

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2023 and are not limited to the quarterly compliance samples.

► The annual compliance samples were collected during the first quarter of 2023 per the previously established compliance quarter rotation schedule.

► Results listed in the table for each quarter are the range of the minimum and maximum values detected at the well location, which may consist of one to five well casings. Figures and report text list the well ID (e.g. OCWD-M10), casing number (e.g., M10/1, M10/2, M10/3 and M10/4), as appropriate.

► Appendices B & C contain a list of all methods and reportable detection limits (RDL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at reportable detection limit (RDL)

► NL: SWRCB Division of Drinking Water (DDW) Notification Level

► nr: Not reported

► NR: Not required

► NS: Not sampled

► SMCL: Secondary Maximum Contaminant Level

► TR: Trace

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M10 Qtr 1	OCWD-M10 Qtr 2	OCWD-M10 Qtr 3	OCWD-M10 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	116 - 744	106 - 808	116 - 818	118 - 848
Chloride (Cl), mg/L	OCWD	EPA 300.0	12 - 103	11.5 - 99	10.6 - 96.9	11 - 103
Sulfate (SO4), mg/L	OCWD	EPA 300.0	12.1 - 192	11.8 - 187	10.7 - 196	10 - 204
Sodium (Na), mg/L	OCWD	EPA 200.7	21.4 - 63.8	21.8 - 65.1	21.3 - 65.7	21.1 - 66.9
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 1.6	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.75	ND - 1.89	ND - 2.25	ND - 1.95
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.004	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 123	ND - 46.1	ND - 120	ND - 19.4
Manganese (Mn), ug/L	OCWD	EPA 200.8	2.6 - 30.1	3 - 29.8	2.5 - 30.9	2.7 - 27.8
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.1 - 0.66	-0.14 - 0.62	-0.12 - 0.63	-0.11 - 0.75
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.15	ND	ND - 0.2	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	48.8 - 528	48.2 - 531	45.6 - 529	44.7 - 546
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND - 1.3	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 9.6	ND - 6.9	ND - 8.3	ND - 6.8
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 3.1	ND - 3	ND - 3.1	ND - 3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND - 3.5	ND - 1.5
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 3.2	ND - 3.6	ND - 4	ND - 4.2
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 2.2	ND - 2.5	ND - 2.4	ND - 2.3
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND - 0.3	ND - 0.2	ND - 0.2	ND - 0.2
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.3	ND - 2.9	ND - 4	ND - 3.1
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 4.4	ND - 4.2	ND - 4.1	ND - 4.4

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M10 Qtr 1	OCWD-M10 Qtr 2	OCWD-M10 Qtr 3	OCWD-M10 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < MCL /> NL	ND > NL	ND > NL	ND > NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	ND < RL	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M10/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	12:10	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	12:10	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5

METHOD: ***533***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	12:10	Perfluoro hexane sulfonic acid (PFHxS)	3.7	ng/L	2
1/9/2023	12:10	Perfluoro octane sulfonic acid (PFOS)	2.8	ng/L	2

Year 2023, Quarter 2

METHOD: ***14DIOX***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/18/2023	9:45	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/4/2023	9:25	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
5/18/2023	9:45	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/24/2023	9:20	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5

OCWD-M10/1
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/16/2023 11:45	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/16/2023 11:45	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5

OCWD-M10/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	10:05	cis-1,2-Dichloroethene (c12DCE)	0.5	ug/L	0.5
1/9/2023	10:05	Methyl tert-butyl ether (MTBE)	0.3	ug/L	0.2

METHOD: 533

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	10:05	Perfluoro butane sulfonic acid (PFBS)	2.7	ng/L	2
1/9/2023	10:05	Perfluoro hexane sulfonic acid (PFHxS)	6.2	ng/L	2
1/9/2023	10:05	Perfluoro octane sulfonic acid (PFOS)	3.6	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/4/2023	10:10	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
4/4/2023	10:10	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2
5/18/2023	9:05	cis-1,2-Dichloroethene (c12DCE)	0.5	ug/L	0.5
5/18/2023	9:05	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/24/2023	10:10	cis-1,2-Dichloroethene (c12DCE)	0.8	ug/L	0.5
7/24/2023	10:10	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/16/2023	11:10	cis-1,2-Dichloroethene (c12DCE)	0.7	ug/L	0.5
10/16/2023	11:10	Methyl tert-butyl ether (MTBE)	0.2	ug/L	0.2

OCWD-M10/2
Organic Detections by Method

Year 2023, Quarter 4

METHOD: ***524.2***

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
10/16/2023 11:10	Trichloroethene (TCE)	TR	ug/L	0.5

OCWD-M10/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/9/2023 11:00	1,4-Dioxane (14DIOX)	4.4	ug/L	0.5

METHOD: 533

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/9/2023 11:00	Perfluoro octane sulfonic acid (PFOS)	2.5	ng/L	2

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/9/2023 11:00	Primidone (PRIMDN)	2.888	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
4/4/2023 11:00	1,4-Dioxane (14DIOX)	4.1	ug/L	0.5
5/18/2023 10:30	1,4-Dioxane (14DIOX)	4.2	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
7/24/2023 10:55	1,4-Dioxane (14DIOX)	4.1	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/16/2023 10:35	1,4-Dioxane (14DIOX)	4.4	ug/L	0.5

OCWD-M10/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	13:05	1,4-Dioxane (14DIOX)	1.1	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	13:05	Carbamazepine (CBMAZP)	1.311	ng/L	1
1/9/2023	13:05	Gemfibrozil (GMFIBZ)	2.402	ng/L	1
1/9/2023	13:05	N,N-diethyl-m-toluamide (DEET)	4.769	ng/L	1
1/9/2023	13:05	Primidone (PRIMDN)	1.418	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/4/2023	11:45	1,4-Dioxane (14DIOX)	1	ug/L	0.5
5/18/2023	11:15	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/24/2023	11:40	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/16/2023	9:50	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M11 Qtr 1	OCWD-M11 Qtr 2	OCWD-M11 Qtr 3	OCWD-M11 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	76 - 604	100 - 674	112 - 676	88 - 662
Chloride (Cl), mg/L	OCWD	EPA 300.0	7.6 - 90.5	8.2 - 104	6.8 - 97.4	7 - 96.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	4.4 - 152	3.9 - 171	2.5 - 150	2.4 - 158
Sodium (Na), mg/L	OCWD	EPA 200.7	14.4 - 52.3	13.9 - 55	13.2 - 54.3	13.8 - 54.3
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	0.9 - 2.1	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.15 - 2.28	1.2 - 2.62	1 - 2.08	1.11 - 2.73
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.003	Not Required	Not Required	ND - 0.004
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 7.2	ND - 7.7	ND - 9.3	ND - 8.7
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.95 - 0.78	-0.94 - 0.75	-1.1 - 0.73	-1 - 0.73
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	ND	ND	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	40 - 428	39.9 - 454	35.3 - 444	36.4 - 436
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND - 1.1	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.2 - 2.9	1.4 - 2.9	1.4 - 2.9	1.3 - 2.7
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND - 1.1	ND - 1.2	ND - 1.1
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 2.8	ND - 3.2	ND - 3.5	ND - 3.5
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 3.6	ND - 4.2	ND - 4.1	ND - 4.3
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.1 - 3.5	2.3 - 3.5	2.4 - 3.7	2.3 - 3.6
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 0.9	ND - 0.7	ND - 0.8	ND - 0.6

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M11 Qtr 1	OCWD-M11 Qtr 2	OCWD-M11 Qtr 3	OCWD-M11 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < MCL	ND < NL	ND < NL	ND < NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND	ND	ND	ND
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M11/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/25/2023	9:55	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/19/2023	12:15	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/26/2023	10:00	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/18/2023	9:45	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

OCWD-M11/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/25/2023 11:45	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/25/2023 11:45	Carbamazepine (CBMAZP)	1.286	ng/L	1
1/25/2023 11:45	Sulfamethoxazole (SULTHZ)	2.116	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
4/19/2023 11:10	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
7/26/2023 10:50	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/18/2023 10:30	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M19/3 Qtr 1	OCWD-M19/3 Qtr 2	OCWD-M19/3 Qtr 3	OCWD-M19/3 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	98	174	112	144
Chloride (Cl), mg/L	OCWD	EPA 300.0	11.7	23.9	10.7	17.6
Sulfate (SO4), mg/L	OCWD	EPA 300.0	9.2	26.7	6.7	19.2
Sodium (Na), mg/L	OCWD	EPA 200.7	12.8	18.6	16.2	20.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	1.4	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.73	2.34	1.49	2.16
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND	ND	3	ND
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.53	-0.27	-0.68	-0.26
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	0.1	0.1	0.15
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	70.4	110	54.9	88.6
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.2	1.3	1.3	1.3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	0.38	0.39	0.46	0.47
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	1.1	ND	1
Selenium (Se), ug/L	OCWD	EPA 200.8	1.9	2.9	1.1	1.9
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	1	1	1.2	1.1
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.7	2.6	3.3	3.1
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	0.7	ND	0.8

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M19/3 Qtr 1	OCWD-M19/3 Qtr 2	OCWD-M19/3 Qtr 3	OCWD-M19/3 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	< NL	ND	< NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M19/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/24/2023	10:10	Chloroform (CHCl3)	1	ug/L	0.5
1/24/2023	10:10	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/24/2023	10:10	Sulfamethoxazole (SULTHZ)	1.049	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/17/2023	11:55	1,4-Dioxane (14DIOX)	0.7	ug/L	0.5

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/17/2023	11:55	Chloroform (CHCl3)	1	ug/L	0.5
4/17/2023	11:55	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/11/2023	10:25	Chloroform (CHCl3)	1.2	ug/L	0.5
7/11/2023	10:25	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/3/2023	12:30	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

OCWD-M19/3
Organic Detections by Method

Year 2023, Quarter 4

METHOD: *524.2*

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/3/2023	12:30	Chloroform (CHCl3)	1.1	ug/L	0.5
10/3/2023	12:30	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M45 Qtr 1	OCWD-M45 Qtr 2	OCWD-M45 Qtr 3	OCWD-M45 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	118 - 704	116 - 718	110 - 734	106 - 744
Chloride (Cl), mg/L	OCWD	EPA 300.0	9 - 92.4	10.3 - 94.3	8.7 - 88.9	8.8 - 93.6
Sulfate (SO4), mg/L	OCWD	EPA 300.0	ND - 181	ND - 184	0.4 - 180	ND - 189
Sodium (Na), mg/L	OCWD	EPA 200.7	19.3 - 117	19.6 - 112	19.2 - 117	19.4 - 118
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 2.9	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 2.84	ND - 2.81	ND - 2.69	ND - 2.78
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.144	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 145	ND - 137	ND - 155	ND - 149
Manganese (Mn), ug/L	OCWD	EPA 200.8	3.4 - 14.7	3.8 - 15.8	3.8 - 14.8	2.9 - 14.7
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND - 110	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.38 - 0.66	-0.3 - 0.73	-0.36 - 0.67	-0.34 - 0.81
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.2	ND - 0.2	0.15 - 0.25	ND - 0.2
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	35.9 - 491	35 - 476	34.3 - 478	35.7 - 482
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 2.7	ND - 2	ND - 5.6	ND - 1.9
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 10.5	ND - 13	ND - 8.9	ND - 9.6
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 3.3	ND - 3.1	ND - 3.1	ND - 3.5
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND - 1	ND - 1.2	ND	ND - 2.2
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.21	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 3.6	ND - 3.3	ND - 4.6	ND - 2.6
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 3.4	ND - 3.5	ND - 3.4	ND - 2.9
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.6	ND - 3.6	ND - 3.3	ND - 3.4
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 2.1	ND - 4.6	ND - 3.2	ND - 1.8

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M45 Qtr 1	OCWD-M45 Qtr 2	OCWD-M45 Qtr 3	OCWD-M45 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < MCL /> NL	ND > NL	ND > NL	ND > NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M45/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/6/2023	12:05	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
2/6/2023	12:05	Tetrachloroethene (PCE)	TR	ug/L	0.5
2/6/2023	12:05	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/1/2023	11:30	cis-1,2-Dichloroethene (c12DCE)	TR	ug/L	0.5
5/1/2023	11:30	Tetrachloroethene (PCE)	TR	ug/L	0.5
5/1/2023	11:30	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/7/2023	9:35	cis-1,2-Dichloroethene (c12DCE)	0.6	ug/L	0.5
8/7/2023	9:35	Tetrachloroethene (PCE)	TR	ug/L	0.5
8/7/2023	9:35	Trichloroethene (TCE)	TR	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/30/2023	10:40	cis-1,2-Dichloroethene (c12DCE)	0.7	ug/L	0.5
10/30/2023	10:40	Tetrachloroethene (PCE)	TR	ug/L	0.5
10/30/2023	10:40	Trichloroethene (TCE)	TR	ug/L	0.5

OCWD-M45/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***14DIOX***

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/6/2023 11:25	1,4-Dioxane (14DIOX)	0.5	ug/L	0.5

Year 2023, Quarter 3

METHOD: ***14DIOX***

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
8/7/2023 10:10	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

Year 2023, Quarter 4

METHOD: ***14DIOX***

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/30/2023 11:15	1,4-Dioxane (14DIOX)	0.6	ug/L	0.5

OCWD-M45/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/6/2023 10:45	1,4-Dioxane (14DIOX)	2.1	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/6/2023 10:45	Gemfibrozil (GMFIBZ)	1.351	ng/L	1
2/6/2023 10:45	Primidone (PRIMDN)	2.009	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
5/1/2023 10:25	1,4-Dioxane (14DIOX)	4.6	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
8/7/2023 11:00	1,4-Dioxane (14DIOX)	3.2	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/30/2023 11:55	1,4-Dioxane (14DIOX)	1.8	ug/L	0.5

OCWD-M45/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/6/2023	10:05	1,4-Dioxane (14DIOX)	0.9	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/6/2023	10:05	Carbamazepine (CBMAZP)	1.466	ng/L	1
2/6/2023	10:05	Primidone (PRIMDN)	1.014	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/1/2023	9:45	1,4-Dioxane (14DIOX)	1.1	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/7/2023	11:40	1,4-Dioxane (14DIOX)	0.8	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/30/2023	12:30	1,4-Dioxane (14DIOX)	1	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M46 & 46A Qtr 1	OCWD-M46 & 46A Qtr 3	OCWD-M46 & 46A Qtr 3	OCWD-M46 & 46A Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	77 - 216	72 - 220	72 - 214	94 - 208
Chloride (Cl), mg/L	OCWD	EPA 300.0	6.4 - 15.5	7.2 - 15.6	6.8 - 14.5	7.6 - 14.4
Sulfate (SO4), mg/L	OCWD	EPA 300.0	1 - 28.2	1.2 - 28.1	1.2 - 28	1 - 28.4
Sodium (Na), mg/L	OCWD	EPA 200.7	8.2 - 80.1	8.4 - 82.7	8.4 - 81.9	8.5 - 84.7
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 1.3	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.5	ND - 1.52	ND - 1.52	ND - 1.54
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 31.3	ND - 38	ND - 27.5	ND - 34
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 5.8	ND - 5.4	ND - 5.9	ND - 5.7
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND - 2	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND - 70	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.49 - 0.04	-0.4 - 0.12	-0.38 - 0.11	-0.34 - 0.15
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.2	ND - 0.2	ND - 0.2	ND - 0.25
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	13.9 - 60.8	14.6 - 68.2	14.4 - 72	14.7 - 72.9
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 1.9	ND - 1.5	ND - 2.1	ND - 1.3
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	6.9 - 19.5	ND - 18	ND - 18.6	ND - 18.4
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 4.4	ND - 4.3	ND - 4.2	ND - 4.2
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.36	ND - 0.39	ND - 0.46	ND - 0.45
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 2.6	ND - 2.8	ND - 1.9	ND - 2.1
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.4	ND - 1.2	ND - 1.3	ND - 1.4
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 4.1	ND - 4.3	ND - 3	ND - 2.5
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	1 - 9.1	1.1 - 8.4	1.2 - 9	1.2 - 8.4
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND - 1.7	ND - 1.4	ND - 1	ND - 1

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M46 & M46A Qtr 1	OCWD-M46 & 46A Qtr 2	OCWD-M46 & 46A Qtr 3	OCWD-M46 & 46A Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND < MCL / > NL	ND > NL	ND > NL	ND > NL
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

OCWD-M46A/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	10:20	Chloroform (CHCl3)	1.4	ug/L	0.5
1/9/2023	10:20	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	10:20	n-Nitrosodimethylamine (NDMA)	4.1	ng/L	2

Year 2023, Quarter 2

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/3/2023	9:30	Chloroform (CHCl3)	1.2	ug/L	0.5
4/3/2023	9:30	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/3/2023	9:30	n-Nitrosodimethylamine (NDMA)	4.3	ng/L	2

Year 2023, Quarter 3

METHOD: ***524.2***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/10/2023	10:15	Chloroform (CHCl3)	1.3	ug/L	0.5
7/10/2023	10:15	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/10/2023	10:15	n-Nitrosodimethylamine (NDMA)	3	ng/L	2

OCWD-M46A/1
Organic Detections by Method

Year 2023, Quarter 4

METHOD: ***524.2***

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/2/2023	9:55	Chloroform (CHCl3)	1.4	ug/L	0.5
10/2/2023	9:55	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: ***NDMA-LOW***

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
10/2/2023	9:55	n-Nitrosodimethylamine (NDMA)	2.5	ng/L	2

OCWD-M46/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/9/2023	12:35	Chloroform (CHCl3)	1.4	ug/L	0.5
1/9/2023	12:35	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/3/2023	10:20	Chloroform (CHCl3)	1.1	ug/L	0.5
4/3/2023	10:20	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/10/2023	11:50	Chloroform (CHCl3)	1.2	ug/L	0.5
7/10/2023	11:50	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/2/2023	11:30	Chloroform (CHCl3)	1.1	ug/L	0.5
10/2/2023	11:30	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

OCWD-M46/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time	*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
1/9/2023 11:50	Chloroform (CHCl3)	TR	ug/L	0.5
1/9/2023 11:50	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

OCWD-M46/5
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/9/2023 10:55	1,4-Dioxane (14DIOX)	1.7	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
1/9/2023 10:55	Primidone (PRIMDN)	1.931	ng/L	1

Year 2023, Quarter 2

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
4/3/2023 10:15	1,4-Dioxane (14DIOX)	1	ug/L	0.5
5/17/2023 9:10	1,4-Dioxane (14DIOX)	1.4	ug/L	0.5

Year 2023, Quarter 3

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
7/10/2023 10:45	1,4-Dioxane (14DIOX)	1	ug/L	0.5

Year 2023, Quarter 4

METHOD: 14DIOX

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
10/2/2023 10:25	1,4-Dioxane (14DIOX)	1	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-M47 Qtr 1	OCWD-M47 Qtr 2	OCWD-M47 Qtr 3	OCWD-M47 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	98 - 214	108 - 236	98 - 228	110 - 232
Chloride (Cl), mg/L	OCWD	EPA 300.0	7.1 - 12.7	7.3 - 13.2	6.6 - 12.1	7.6 - 12.5
Sulfate (SO4), mg/L	OCWD	EPA 300.0	3.1 - 35.9	3.4 - 36.5	3.2 - 35.7	3.2 - 35.2
Sodium (Na), mg/L	OCWD	EPA 200.7	12.8 - 83.3	13.3 - 82.8	13 - 82.5	13.7 - 85.4
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 1.3	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.58	ND - 1.66	ND - 1.55	ND - 1.53
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.005	Not Required	Not Required	ND - 0.005
Iron (Fe), ug/L	OCWD	EPA 200.7	6.2 - 59.3	5.3 - 44.8	ND - 47	5.2 - 54.3
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 15.4	ND - 16.1	ND - 17.2	ND - 15.5
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND - 60	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.48 - 0.11	-0.41 - 0.16	-0.41 - 0.19	-0.34 - 0.19
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.35	ND - 0.4	ND - 0.7	ND - 0.15
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	11.5 - 64.7	11.4 - 65.8	11.6 - 64.6	11.7 - 65.1
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 2.2	ND - 1.5	ND - 2	ND - 1.6
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 27.8	ND - 23.5	ND - 30.1	ND - 16.1
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 4.9	ND - 4.8	ND - 4.9	ND - 4.5
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND - 1.3	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.29	ND - 0.26	ND - 0.27	ND - 0.27
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.2	ND - 1.1	ND - 1.3	ND - 1.3
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	ND	ND	ND
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 3.7	ND - 3.7	ND - 3.6	ND - 3.8
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2023 Water Quality Monitoring

Method	Description	Lab	OCWD-M47 Qtr 1	OCWD-M47 Qtr 2	OCWD-M47 Qtr 3	OCWD-M47 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	ND	ND	ND

OCWD-M47/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/23/2023	9:15	Carbamazepine (CBMAZP)	1.076	ng/L	1

OCWD-M47/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
1/23/2023	10:10	Chloroform (CHCl3)	1.2	ug/L	0.5
1/23/2023	10:10	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
4/18/2023	10:25	Chloroform (CHCl3)	1.1	ug/L	0.5
4/18/2023	10:25	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
7/25/2023	10:25	Chloroform (CHCl3)	1.3	ug/L	0.5
7/25/2023	10:25	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/17/2023	10:30	Chloroform (CHCl3)	1.3	ug/L	0.5
10/17/2023	10:30	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

Appendix H

Talbert Barrier Compliance Monitoring Well Groundwater Quality Data

1,4-Dioxane, NDMA and Selected Constituents

Orange County Water District

Groundwater Replenishment System

2023 Annual Report

TABLE H-1
MONITORING WELL OCWD-M10
1,4-dioxane and NDMA Concentrations, 2019 - 2023

M10/1			**M10/2**			**M10/3**			**M10/4**		
Talbert, Alpha-III Aquifers *Perforations: 80-160 ft bgs*			*Beta-I,II Aquifers* *Perforations: 175-195 ft bgs*			*Beta-III Aquifer* *Perforations: 215-240 ft bgs*			*Lambda, Omicron, Upper Rho Aquifers* *Perforations: 280-305 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/21/2019	1.7	<2	1/21/2019	<1	<2	1/21/2019	6.8	<2	1/21/2019	<1	<2
4/15/2019	1.5	<2	4/15/2019	<1	<2	4/15/2019	6.4	<2	4/15/2019	<1	<2
7/22/2019	1.4	<2	7/22/2019	<1	<2	7/22/2019	6.4	<2	7/22/2019	1	<2
10/21/2019	1.5	<2	10/21/2019	<1	<2	10/21/2019	6.7	<2	10/21/2019	1.5	<2
1/20/2020	<1	<2	1/20/2020	<1	<2	1/20/2020	4.8	<2	1/20/2020	1.1	<2
4/20/2020	1	<2	4/20/2020	<1	<2	2/18/2020	5.8	<2	4/20/2020	1.4	<2
7/20/2020	0.8	<2	7/20/2020	<0.5	<2	4/20/2020	5.8	<2	7/20/2020	1.5	<2
10/19/2020	1	<2	10/19/2020	<0.5	<2	7/20/2020	5.2	<2	10/19/2020	1.9	<2
1/18/2021	0.8	<2	1/18/2021	<0.5	<2	10/19/2020	5.2	<2	1/18/2021	1.9	<2
4/19/2021	0.8	<2	4/19/2021	<0.5	<2	1/18/2021	4.5	<2	4/19/2021	1.8	<2
7/19/2021	1.1	<2	7/19/2021	<0.5	<2	4/19/2021	5	<2	7/19/2021	2	<2
10/18/2021	1.5	<2	10/18/2021	0.6	<2	7/19/2021	4.3	<2	10/18/2021	2.5	<2
1/17/2022	1.3	<2	1/17/2022	<0.5	<2	10/18/2021	4.7	<2	1/17/2022	2.1	<2
4/25/2022	0.7	<2	4/25/2022	<0.5	<2	1/17/2022	4.9	<2	4/25/2022	1.2	<2
7/18/2022	1	<2	7/18/2022	<0.5	<2	4/25/2022	4.5	<2	7/18/2022	1.8	<2
10/5/2022	0.8	<2	10/5/2022	<0.5	<2	7/18/2022	5.5	<2	10/5/2022	1.1	<2
1/9/2023	0.7	<2	1/9/2023	<0.5	<2	10/5/2022	3.7	<2	1/9/2023	1.1	<2
4/4/2023	<0.5	<2	4/4/2023	<0.5	<2	1/9/2023	4.4	<2	4/4/2023	1	<2
5/18/2023	0.5	na	7/24/2023	<0.5	<2	4/4/2023	4.1	<2	5/18/2023	0.9	na
7/24/2023	<0.5	<2	10/16/2023	<0.5	<2	5/18/2023	4.2	na	7/24/2023	0.8	<2
10/16/2023	0.7	<2				7/24/2023	4.1	<2	10/16/2023	0.9	<2
						10/16/2023	4.4	<2			

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-2
MONITORING WELL OCWD-M11
1,4-dioxane and NDMA Concentrations, 2019 - 2023

M11/1 *Talbert Aquifer Perforations 70-105 ft bgs*			**M11/2** *Talbert, Alpha-III Aquifers Perforations 125-150 ft bgs*			**M11/3** *Beta-I, Beta-II, Beta-III Aquifers Perforations 170-225 ft bgs*			**M11/4** *Lambda, Omicron Aquifers Perforations 260-290 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
2/7/2019	1	na	2/7/2019	<1	na	2/7/2019	<1	na	2/7/2019	1.2	na
4/17/2019	<1	<2	4/17/2019	1	<2	4/17/2019	<1	<2	4/17/2019	1.3	<2
7/24/2019	1.5	<2	7/24/2019	1.2	<2	7/24/2019	<1	<2	7/24/2019	1.3	<2
11/5/2019	1.6	<2	11/5/2019	1.4	<2	11/5/2019	<1	<2	11/5/2019	1.3	<2
1/22/2020	1.6	<2	1/22/2020	<1	<2	1/22/2020	<1	<2	1/22/2020	<1	<2
4/22/2020	1.1	<2	4/22/2020	<1	<2	4/22/2020	<1	<2	4/22/2020	1	<2
7/22/2020	1.2	<2	7/22/2020	0.6	<2	7/22/2020	<0.5	<2	7/22/2020	0.9	<2
10/21/2020	1.3	<2	10/21/2020	0.8	<2	10/21/2020	<0.5	<2	10/21/2020	1.1	<2
1/20/2021	1.8	<2	1/20/2021	1	<2	1/20/2021	<0.5	<2	1/20/2021	1.3	<2
4/21/2021	1.4	<2	4/21/2021	0.6	<2	4/21/2021	<0.5	<2	4/21/2021	0.7	<2
7/21/2021	1.6	<2	7/21/2021	0.9	<2	7/21/2021	<0.5	<2	7/21/2021	0.9	<2
10/20/2021	1.5	<2	10/20/2021	0.9	<2	10/20/2021	<0.5	<2	10/20/2021	1	<2
1/19/2022	1.4	<2	1/19/2022	0.9	<2	1/19/2022	<0.5	<2	1/19/2022	1.2	<2
4/27/2022	1	<2	4/27/2022	<0.5	<2	4/27/2022	<0.5	<2	4/27/2022	1.2	<2
7/20/2022	1.6	<2	7/20/2022	0.7	<2	7/20/2022	<0.5	<2	7/20/2022	0.9	<2
10/17/2022	1.4	<2	10/17/2022	0.8	<2	10/17/2022	<0.5	<2	10/17/2022	0.9	<2
1/25/2023	0.9	<2	1/25/2023	<0.5	<2	1/25/2023	<0.5	<2	1/25/2023	0.6	<2
4/19/2023	0.7	<2	4/19/2023	<0.5	<2	4/19/2023	<0.5	<2	4/19/2023	0.5	<2
7/26/2023	0.8	<2	7/26/2023	<0.5	<2	7/26/2023	<0.5	<2	7/26/2023	0.5	<2
10/18/2023	0.6	<2	10/18/2023	<0.5	<2	10/18/2023	<0.5	<2	10/18/2023	0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-3
MONITORING WELL OCWD-M45
1,4-dioxane and NDMA Concentrations, 2019 - 2023

M45/1 *Alpha-III, Beta-I,II Perforations 195-205 ft bgs*			M45/2 *Beta-III Aquifer Perforations 250-260 ft bgs*			M45/3 *Omicron Aquifer Perforations 335-345 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/24/19	<1	<2	01/07/19	<1	<2	01/07/19	5.5	<2
5/7/19	<1	<2	05/07/19	<1	<2	05/07/19	3.5	<2
7/9/19	<1	<2	07/09/19	<1	<2	07/09/19	7.2	<2
10/8/19	<1	<2	10/08/19	<1	<2	10/08/19	3.8	<2
2/5/20	<1	<2	02/05/20	<1	<2	02/05/20	3.1	<2
5/4/20	<1	<2	05/04/20	<1	<2	05/04/20	7.4	<2
8/3/20	<0.5	<2	08/03/20	0.5	<2	08/03/20	5.6	<2
11/2/20	<0.5	<2	11/02/20	<0.5	<2	11/02/20	3.9	<2
2/1/21	<0.5	<2	02/01/21	<0.5	<2	02/01/21	2.7	<2
5/3/21	<0.5	<2	05/03/21	<0.5	<2	05/03/21	7.6	<2
8/9/21	<0.5	<2	08/09/21	0.5	<2	08/09/21	3.1	<2
11/1/21	<0.5	<2	11/01/21	<0.5	<2	11/01/21	4.2	<2
1/31/22	<0.5	<2	01/31/22	0.6	<2	01/31/22	5.3	<2
5/9/22	<0.5	<2	05/09/22	0.6	<2	05/09/22	2.3	<2
5/23/22	na	na	5/23/22	na	na	05/23/22	3	na
8/1/22	<0.5	<2	08/01/22	0.6	<2	08/01/22	3.5	<2
10/31/22	<0.5	<2	10/31/22	0.6	<2	10/31/22	2	<2
2/6/23	<0.5	<2	02/06/23	0.5	<2	02/06/23	2.1	<2
5/1/23	<0.5	<2	05/01/23	<0.5	<2	05/01/23	4.6	<2
8/7/23	<0.5	<2	08/07/23	0.6	<2	08/07/23	3.2	<2
10/30/23	<0.5	<2	10/30/23	0.6	<2	10/30/23	1.8	<2

M45/4 *Upper Rho Aquifer Perforations 380-390 ft bgs*			M45/5 *Main Aquifer Perforations 780-790 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/07/19	1.9	<2	01/07/19	<1	<2
05/07/19	<1	<2	05/07/19	<1	<2
07/09/19	<1	<2	07/09/19	<1	<2
10/08/19	<1	<2	10/08/19	<1	<2
02/05/20	1.3	<2	02/05/20	<1	<2
05/04/20	1.8	<2	05/04/20	<1	<2
08/03/20	1.6	<2	08/03/20	<0.5	<2
11/02/20	1.3	<2	11/02/20	<0.5	<2
02/01/21	1.2	<2	02/01/21	<0.5	<2
05/03/21	1.3	<2	05/03/21	<0.5	<2
08/09/21	1.1	<2	08/09/21	<0.5	<2
11/01/21	1.7	<2	11/01/21	<0.5	<2
01/31/22	1.4	<2	01/31/22	<0.5	<2
05/09/22	1.4	<2	05/09/22	<0.5	<2
06/23/22	1.2	na	06/23/22	na	na
08/01/22	1	<2	08/01/22	<0.5	<2
10/31/22	0.8	<2	10/31/22	<0.5	<2
02/06/23	0.9	<2	02/06/23	<0.5	<2
05/01/23	1.1	<2	05/01/23	<0.5	<2
08/07/23	0.8	<2	08/07/23	<0.5	<2
10/30/23	1	<2	10/30/23	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-4
MONITORING WELL OCWD-M46
1,4-dioxane and NDMA Concentrations, 2019 - 2023

M46A/1 *Lambda/Omicron Aquifers Perforations 350-370 ft bgs*			**M46/2** *Upper Rho Aquifer Perforations 420-430 ft bgs*			**M46/3** *Lower Rho Aquifer Perforations 515-535 ft bgs*			**M46/4** *Main Aquifer Perforations 640-660 ft bgs*			**M46/5** *Main Aquifer Perforations 890-910 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/23/19	<1	3.5	01/23/19	<1	<2	01/23/19	<1	<2	01/23/19	<1	<2	01/23/19	1	<2
04/02/19	<1	3.3	04/02/19	<1	<2	04/02/19	<1	<2	04/02/19	<1	<2	04/02/19	1.9	<2
08/06/19	<1	3.1	08/06/19	<1	<2	08/06/19	<1	<2	08/06/19	<1	<2	08/06/19	2.5	<2
10/07/19	<1	2.2	10/07/19	<1	<2	10/07/19	<1	<2	10/07/19	<1	<2	10/07/19	2.6	<2
01/06/20	<1	3.1	01/06/20	<1	<2	01/06/20	<1	<2	01/06/20	<1	<2	01/06/20	2.8	<2
04/08/20	<1	3.5	04/08/20	<1	<2	04/08/20	<1	<2	04/08/20	<1	<2	04/08/20	3.5	<2
07/06/20	<0.5	2.8	07/06/20	<0.5	<2	07/06/20	<0.5	<2	07/06/20	<0.5	<2	07/06/20	3.5	<2
10/05/20	<0.5	2.8	10/05/20	<0.5	<2	10/05/20	<0.5	<2	10/05/20	<0.5	<2	10/05/20	3.5	<2
01/04/21	<0.5	3.5	01/04/21	<0.5	<2	01/04/21	<0.5	<2	01/04/21	<0.5	<2	01/04/21	3.1	<2
04/05/21	<0.5	3.4	04/05/21	<0.5	<2	04/05/21	<0.5	<2	04/05/21	<0.5	<2	04/05/21	3.1	<2
07/06/21	<0.5	2.6	07/06/21	<0.5	<2	07/06/21	<0.5	<2	07/06/21	<0.5	<2	07/06/21	2.6	<2
10/04/21	<0.5	3	10/04/21	<0.5	<2	10/04/21	<0.5	<2	10/04/21	<0.5	<2	10/04/21	2.7	<2
01/03/22	<0.5	3.3	01/03/22	<0.5	<2	01/03/22	<0.5	<2	01/03/22	<0.5	<2	01/03/22	3.4	<2
04/11/22	<0.5	3	04/11/22	<0.5	<2	04/11/22	<0.5	<2	04/11/22	<0.5	<2	04/11/22	3.6	<2
07/05/22	<0.5	3.4	07/05/22	<0.5	<2	07/05/22	<0.5	<2	07/05/22	<0.5	<2	07/05/22	2.8	<2
10/03/22	<0.5	3.6	10/03/22	<0.5	<2	10/03/22	<0.5	<2	10/03/22	<0.5	<2	10/03/22	1.5	<2
01/09/23	<0.5	4.1	01/09/23	<0.5	<2	01/09/23	<0.5	<2	01/09/23	<0.5	<2	01/09/23	1.7	<2
04/03/23	<0.5	4.3	04/03/23	<0.5	<2	04/03/23	<0.5	<2	04/03/23	<0.5	<2	04/03/23	1	<2
07/10/23	<0.5	3	07/10/23	<0.5	<2	07/10/23	<0.5	<2	07/10/23	<0.5	<2	05/17/23	1.4	na
10/02/23	<0.5	2.5	10/02/23	<0.5	<2	10/02/23	<0.5	<2	10/02/23	<0.5	<2	07/10/23	1	<2
												10/02/23	1	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-5
MONITORING WELL OCWD-M47
1,4-dioxane and NDMA Concentrations
2019 - 2023

M47/1 *Beta-III Aquifer Perforations 355-375 bgs*			**M47/2** *Upper Rho Aquifer Perforations 470-480 ft bgs*			**M47/3** *Lower Rho Aquifer Perforations 580-600 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/22/19	<1	<2	01/22/19	<1	<2	01/22/19	<1	<2
04/16/19	<1	<2	04/16/19	<1	<2	04/16/19	<1	<2
07/23/19	<1	<2	07/23/19	<1	<2	07/23/19	<1	<2
10/22/19	<1	<2	10/22/19	<1	<2	10/22/19	<1	<2
01/21/20	<1	<2	01/21/20	<1	<2	01/21/20	<1	<2
04/21/20	<1	<2	04/21/20	<1	<2	04/21/20	<1	<2
07/21/20	0.6	<2	07/21/20	0.5	<2	07/21/20	<0.5	<2
10/20/20	0.7	<2	10/20/20	0.6	<2	10/20/20	<0.5	<2
01/19/21	0.7	<2	01/19/21	<0.5	<2	01/19/21	<0.5	<2
04/20/21	0.6	<2	04/20/21	<0.5	<2	04/20/21	<0.5	<2
07/20/21	0.5	<2	07/20/21	0.5	<2	07/20/21	<0.5	<2
10/19/21	0.6	<2	10/19/21	0.5	<2	10/19/21	<0.5	<2
01/18/22	0.5	<2	01/18/22	0.6	<2	01/18/22	<0.5	<2
04/26/22	<0.5	<2	04/26/22	<0.5	<2	04/26/22	<0.5	<2
07/19/22	0.5	<2	07/19/22	0.6	<2	07/19/22	<0.5	<2
10/18/22	0.5	<2	10/18/22	<0.5	<2	10/18/22	<0.5	<2
01/23/23	<0.5	<2	01/23/23	<0.5	<2	01/23/23	<0.5	<2
04/18/23	<0.5	<2	04/18/23	<0.5	<2	04/18/23	<0.5	<2
07/25/23	<0.5	<2	07/25/23	<0.5	<2	07/25/23	<0.5	<2
10/17/23	<0.5	<2	10/17/23	<0.5	<2	10/17/23	<0.5	<2

M47/4 *Main Aquifer Perforations 745-765 ft bgs*			**M47/5** *Main Aquifer Perforations 940-960 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
01/22/19	<1	<2	01/22/19	<1	<2
04/16/19	<1	<2	04/16/19	<1	<2
07/23/19	<1	<2	07/23/19	<1	<2
10/22/19	<1	<2	10/22/19	<1	<2
01/21/20	<1	<2	01/21/20	<1	<2
04/21/20	<1	<2	04/21/20	<1	<2
07/21/20	<0.5	<2	07/21/20	<0.5	<2
10/20/20	<0.5	<2	10/20/20	<0.5	<2
01/19/21	<0.5	<2	01/19/21	<0.5	<2
04/20/21	<0.5	<2	04/20/21	<0.5	<2
07/20/21	<0.5	<2	07/20/21	<0.5	<2
10/19/21	<0.5	<2	10/19/21	<0.5	<2
01/18/22	<0.5	<2	01/18/22	<0.5	<2
04/26/22	<0.5	<2	04/26/22	<0.5	<2
07/19/22	<0.5	<2	07/19/22	<0.5	<2
10/18/22	<0.5	<2	10/18/22	<0.5	<2
01/23/23	<0.5	<2	01/23/23	<0.5	<2
04/18/23	<0.5	<2	04/18/23	<0.5	<2
07/25/23	<0.5	<2	07/25/23	<0.5	<2
10/17/23	<0.5	<2	10/17/23	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE H-6
MONITORING WELL OCWD-M10
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M10/1 Talbert, Alpha-III Perforations 80-160 ft bgs	01/21/19	0.167	45.0	354	213	<0.2	0.004	1.14	0.14
	04/15/19	0.210	53.6	414	268	na	na	1.00	0.29
	07/22/19	0.246	61.3	474	288	na	na	1.17	0.39
	10/21/19	0.237	59.4	464	255	na	na	0.89	0.29
	01/20/20	0.299	72.1	562	437	na	na	1.06	0.39
	04/20/20	0.344	79.2	672	408	<0.2	0.004	1.52	0.44
	07/20/20	0.347	78.9	634	424	na	na	1.27	0.42
	10/19/20	0.357	74.3	612	381	na	na	1.10	0.38
	01/18/21	0.372	77.3	641	394	na	na	1.09	0.43
	04/19/21	0.397	81.6	660	422	na	na	1.06	0.45
	07/19/21	0.324	69.6	558	353	<0.2	0.003	0.81	0.39
	10/18/21	0.205	46.5	384	252	na	na	1.03	0.25
	01/17/22	0.337	70.0	620	360	na	na	1.13	0.39
	04/25/22	0.380	81.4	654	431	na	na	1.22	0.45
	07/18/22	0.395	84.6	674	448	na	na	1.06	0.44
	10/05/22	0.370	79.5	650	434	<0.2	<0.002	0.95	0.43
	01/09/23	0.400	83.5	654	444	<0.2	<0.002	1.11	0.47
	04/04/23	na	89.1	726	489	na	na	1.42	na
	05/18/23	na	na	724	na	na	na	na	na
	07/24/23	na	89.1	724	491	na	na	1.16	na
	10/16/23	na	89.9	744	477	na	na	1.12	na
M10/2 Beta-I,II Perforations 175-195 ft bgs	01/21/19	0.108	30.3	238	149	<0.2	0.005	1.47	0.11
	04/15/19	0.320	79.9	580	380	na	na	1.07	0.36
	07/22/19	0.420	99.7	732	490	na	na	1.29	0.53
	10/21/19	0.407	97.5	694	418	na	na	1.05	0.45
	01/20/20	0.415	99.4	714	560	na	na	1.32	0.58
	04/20/20	0.369	86.6	662	430	<0.2	<0.002	1.66	0.46
	07/20/20	0.423	95.0	768	508	na	na	2.20	0.48
	10/19/20	0.474	96.8	778	511	na	na	1.99	0.46
	01/18/21	0.468	97.2	813	487	na	na	1.93	0.49
	04/19/21	0.468	97.3	794	493	na	na	2.02	0.51
	07/19/21	0.473	98.0	792	493	<0.2	<0.002	1.89	0.52
	10/18/21	0.212	46.5	376	248	na	na	1.35	0.23
	01/17/22	0.437	87.0	668	429	na	na	1.59	0.44
	04/25/22	0.436	94.1	746	480	na	na	1.80	0.48
	07/18/22	0.472	98.7	836	524	na	na	1.93	0.50
	10/05/22	0.479	103	762	553	<0.2	<0.002	1.73	0.54
	01/09/23	0.487	103	744	528	<0.2	<0.002	1.75	0.56
	04/04/23	na	99	808	531	na	na	1.89	na
	05/18/23	na	na	792	na	na	na	na	na
	07/24/23	na	96.9	818	529	na	na	2.25	na
	10/16/23	na	103	848	546	na	na	1.95	na

TABLE H-6
MONITORING WELL OCWD-M10
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M10/3 Beta-III Perforations 215-240 ft bgs	01/21/19	0.166	53.4	342	174	<0.2	0.014	0.15	0.20
	04/15/19	0.160	54.6	358	189	na	na	0.16	0.33
	07/22/19	0.140	47.5	326	147	na	na	<0.1	0.34
	10/21/19	0.144	46.2	274	145	na	na	<0.1	0.29
	01/20/20	0.139	46.1	316	177	na	na	<0.1	0.35
	04/20/20	0.137	44.0	326	141	<0.2	0.011	0.17	0.29
	07/20/20	0.136	42.6	320	148	na	na	0.14	0.27
	10/19/20	0.155	43.2	316	141	na	na	0.14	0.27
	01/18/21	0.150	42.3	320	146	na	na	0.2	0.32
	04/19/21	0.151	41.8	324	146	na	na	0.19	0.28
	07/19/21	0.137	40.2	284	133	<0.2	0.009	0.17	0.27
	10/18/21	0.116	35.1	250	115	na	na	<0.1	0.24
	01/17/22	0.144	39.8	285	134	na	na	0.11	0.26
	04/25/22	0.133	39.1	282	132	na	na	0.16	0.25
	07/18/22	0.128	38.0	264	129	na	na	0.12	0.24
	10/05/22	0.120	36.6	248	128	<0.2	0.008	0.10	0.24
	01/09/23	0.117	35.2	250	113	<0.2	0.004	<0.1	0.22
	04/04/23	na	34.4	280	114	na	na	<0.1	na
	05/18/23	na	na	246	na	na	na	na	na
	07/24/23	na	31.4	236	102	na	na	<0.1	na
	10/16/23	na	32.6	244	103	na	na	<0.1	na
M10/4 Lambda, Omicron, Upper Rho Perforations 280-305 ft bgs	01/21/19	0.020	8.1	82	31.3	0.3	0.007	<0.1	0.16
	04/15/19	0.020	8.5	88	34.0	na	na	<0.1	0.19
	07/22/19	0.026	10.7	130	36.5	na	na	<0.1	0.21
	10/21/19	0.029	9.9	96	33.7	na	na	<0.1	0.17
	01/20/20	0.027	11.2	98	43.3	na	na	<0.1	0.20
	04/20/20	0.027	12.0	110	39.6	0.2	0.002	<0.1	0.20
	07/20/20	0.031	12.9	116	43.1	na	na	<0.1	0.20
	10/19/20	0.039	14.3	128	45.6	na	na	<0.1	0.20
	01/18/21	0.040	15.1	131	48.9	na	na	<0.1	0.21
	04/19/21	0.039	15.0	128	51.1	na	na	<0.1	0.21
	07/19/21	0.044	16.9	134	55.7	0.4	0.002	<0.1	0.22
	10/18/21	0.050	19.0	148	69.7	na	na	<0.1	0.21
	01/17/22	0.044	17.1	147	63.8	na	na	<0.1	0.21
	04/25/22	0.036	14.5	164	58.3	na	na	<0.1	0.22
	07/18/22	0.033	13.7	128	55.4	na	na	<0.1	0.22
	10/05/22	0.030	13.4	100	52.4	0.3	<0.002	<0.1	0.23
	01/09/23	0.029	12.0	116	48.8	<0.2	<0.002	<0.1	0.28
	04/04/23	na	11.5	138	48.2	na	na	<0.1	na
	05/18/23	na	na	106	na	na	na	na	na
	07/24/23	na	10.6	116	45.6	na	na	<0.1	na
	10/16/23	na	11.0	118	44.7	na	na	<0.1	na

Note: Monitoring Well OCWD-M10 is located approximately 1,300 feet north of the nearest injection well site (I-19).

TABLE H-7
MONITORING WELL OCWD-M11
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M11/1 Talbert Perforations 70-105 ft bgs	02/07/19	0.091	28.3	226	136	<0.2	0.004	1.2	0.14
	04/17/19	0.096	29.5	232	153	na	na	1.2	0.22
	07/24/19	0.130	40.0	290	185	na	na	1.29	0.19
	11/05/19	0.132	42.4	304	169	na	na	1.24	0.20
	01/22/20	0.170	48.8	368	279	na	na	1.18	0.22
	04/22/20	0.202	54.3	438	317	<0.2	0.003	1.03	0.28
	07/22/20	0.233	60.3	494	329	na	na	1.16	0.26
	10/21/20	0.255	59.5	444	319	na	na	1.08	0.28
	01/20/21	0.261	63.6	501	314	na	na	1.18	0.28
	04/21/21	0.290	65.6	510	340	na	na	1.2	0.32
	07/21/21	0.299	68.3	510	338	<0.2	0.004	1.35	0.31
	10/20/21	0.305	68.3	468	347	na	na	1.32	0.34
	01/19/22	0.324	70.2	576	354	na	na	1.33	0.31
	04/27/22	0.306	69.9	562	370	na	na	1.17	0.33
	07/20/22	0.315	72.5	518	340	na	na	1.28	0.34
	10/17/22	0.315	74.2	578	389	<0.2	0.003	1.29	0.36
	01/25/23	0.325	74.9	550	397	<0.2	0.003	1.15	0.35
	04/19/23	na	79.5	620	410	na	na	1.20	na
	07/26/23	na	73.8	602	395	na	na	1.00	na
	10/18/23	na	78.7	618	414	na	0.003	1.11	na
M11/2 Talbert, Alpha-III Perforations 125-150 ft bgs	02/07/19	0.222	56.3	426	271	<0.2	0.005	1.70	0.27
	04/17/19	0.250	62.7	520	308	na	na	1.37	0.35
	07/24/19	0.252	64.6	500	323	na	na	1.66	0.32
	11/05/19	0.226	61.1	466	315	na	na	1.63	0.46
	01/22/20	0.296	76.0	588	447	na	na	1.78	0.36
	04/22/20	0.295	78.6	618	407	<0.2	0.002	2.06	0.31
	07/22/20	0.306	80.1	602	404	na	na	2.03	0.30
	10/21/20	0.338	80.3	570	397	na	na	2.11	0.31
	01/20/21	0.345	81.9	612	382	na	na	1.85	0.33
	04/21/21	0.346	82.7	604	411	na	na	2.01	0.34
	07/21/21	0.347	81.4	626	394	<0.2	0.007	1.79	0.31
	10/20/21	0.340	80.0	574	399	na	na	1.80	0.36
	01/19/22	0.373	85.2	658	409	na	na	1.78	0.32
	04/27/22	0.352	88.8	652	430	na	na	2.12	0.30
	07/20/22	0.353	88.5	722	416	na	na	1.94	0.32
	10/17/22	0.341	87.8	642	440	<0.2	0.008	1.79	0.36
	01/25/23	0.347	90.5	604	428	<0.2	0.003	2.28	0.30
	04/19/23	na	104.0	674	454	na	na	2.62	na
	07/26/23	na	97.4	676	444	na	na	2.08	na
	10/18/23	na	96.3	662	436	na	0.004	2.73	na

TABLE H-7
MONITORING WELL OCWD-M11
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M11/3 Beta-I, -II, -III Perforations 170-225 ft bgs	02/07/19	0.028	10.3	90	33.9	<0.2	<0.002	2.25	0.07
	04/17/19	0.028	10.7	144	39.8	na	na	2.19	0.14
	07/24/19	0.030	10.7	98	40.8	na	na	2.05	0.10
	11/05/19	0.029	10.0	108	39.3	na	na	1.99	0.09
	01/22/20	0.029	9.8	116	47.7	na	na	1.99	0.09
	04/22/20	0.026	9.5	98	40.3	<0.2	<0.002	1.96	0.07
	07/22/20	0.026	9.9	106	41.2	na	na	1.90	0.07
	10/21/20	0.027	8.3	96	37.8	na	na	1.91	0.07
	01/20/21	0.058	15.8	149	62.2	na	na	1.96	0.09
	04/21/21	0.063	16.8	156	70.9	na	na	1.95	0.10
	07/21/21	0.058	15.7	158	65.6	<0.2	0.004	1.95	0.09
	10/20/21	0.048	12.9	120	56.0	na	na	1.92	0.14
	01/19/22	0.041	11.8	130	51.7	na	na	1.96	0.05
	04/27/22	0.034	10.1	114	48.2	na	na	1.95	<0.05
	07/20/22	0.027	8.9	84	42.8	na	na	2.01	<0.05
	10/17/22	0.023	8.8	128	42.5	<0.2	<0.002	2.07	0.06
	01/25/23	0.019	7.6	76	40.0	<0.2	<0.002	2.01	<0.05
	04/19/23	na	8.2	100	39.9	na	na	2.13	na
	07/26/23	na	6.8	112	35.3	na	na	2.00	na
	10/18/23	na	7.0	88	36.4	na	<0.002	2.08	na
M11/4 Lambda, Omicron Perforations 260-290 ft bgs	02/07/19	0.047	15.6	126	46.5	<0.2	0.006	1.45	0.10
	04/17/19	0.046	16.2	152	58.3	na	na	1.63	0.18
	07/24/19	0.039	14.3	122	53.1	na	na	1.69	0.13
	11/05/19	0.032	12.7	130	50.8	na	na	1.70	0.12
	01/22/20	0.029	11.6	108	55.8	na	na	1.85	0.11
	04/22/20	0.029	12.1	114	49.6	<0.2	<0.002	1.82	0.09
	07/22/20	0.029	12.1	124	48.0	na	na	1.90	0.09
	10/21/20	0.036	12.4	118	45.7	na	na	1.78	0.09
	01/20/21	0.034	12.2	126	47.6	na	na	1.74	0.10
	04/21/21	0.031	11.1	128	45.5	na	na	1.75	0.09
	07/21/21	0.031	11.1	124	43.3	<0.2	0.004	1.81	0.09
	10/20/21	0.032	11.2	104	44.6	na	na	1.71	0.09
	01/19/22	0.033	12.1	138	44.3	na	na	1.58	0.08
	04/27/22	0.036	12.0	136	46.4	na	na	1.57	0.07
	07/20/22	0.030	11.0	126	42.2	na	na	1.61	0.08
	10/17/22	0.027	10.8	144	41.2	<0.2	<0.002	1.65	0.10
	01/25/23	0.028	10.1	96	41.1	<0.2	<0.002	1.57	0.08
	04/19/23	na	10.1	120	40.5	na	na	1.67	na
	07/26/23	na	10.1	128	39.7	na	na	1.57	na
	10/18/23	na	10.1	112	39.1	na	<0.002	1.68	na

Note: OCWD-M11 is located approximately 950 feet north of the nearest injection well site (I-14).

TABLE H-8
MONITORING WELL OCWD-M45
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M45/1 Alpha-III, Beta-I,II Perforations 195-205 ft bgs	01/24/19	0.394	92.2	680	453	0.2	0.117	1.71	0.57
	05/07/19	0.407	92.1	716	473	na	na	2.21	0.44
	07/09/19	0.417	92.8	750	511	na	na	2.34	0.48
	10/08/19	0.409	93.0	758	480	na	na	2.40	0.42
	02/05/20	0.397	92.9	608	510	na	na	2.70	0.47
	05/04/20	0.405	90.8	704	481	<0.2	0.069	2.74	0.44
	08/03/20	0.409	92.5	718	490	na	na	3.23	0.37
	11/02/20	0.425	90.5	766	475	na	na	2.66	0.40
	02/01/21	0.422	90.5	683	469	na	na	2.58	0.40
	05/03/21	0.427	90.9	720	482	na	na	2.59	0.37
	08/09/21	0.441	91.5	736	482	<0.2	0.733	2.65	0.44
	11/01/21	0.428	92.5	702	492	na	na	2.61	0.36
	01/31/22	0.410	92.8	710	459	na	na	2.81	0.37
	05/09/22	0.417	92.7	706	470	na	na	2.72	0.37
	08/01/22	0.418	94.2	726	477	na	na	2.66	0.37
	10/31/22	0.414	94.3	712	520	<0.2	0.152	2.81	0.37
	02/06/23	0.402	92.4	704	491	<0.2	0.144	2.84	0.35
	05/01/23	na	94.3	718	476	na	na	2.81	na
	08/07/23	na	88.9	734	478	na	na	2.69	na
	10/30/23	na	93.6	744	482	na	na	2.78	na
M45/2 Beta-III Perforations 250-260 ft bgs	01/24/19	0.045	14.1	131	60.4	<0.2	0.038	1.9	0.12
	05/07/19	0.053	16.1	142	65.8	na	na	1.87	0.16
	07/09/19	0.048	17.2	156	73.9	na	na	1.77	0.14
	10/08/19	0.049	16.0	154	71.1	na	na	1.66	0.11
	02/05/20	0.049	15.5	154	78.0	na	na	1.61	0.11
	05/04/20	0.054	17.1	154	79.5	<0.2	0.028	1.54	0.13
	08/03/20	0.087	24.7	220	113	na	na	1.72	0.13
	11/02/20	0.095	24.9	242	119	na	na	1.43	0.13
	02/01/21	0.097	25.3	204	117	na	na	1.43	0.14
	05/03/21	0.122	30.2	254	141	na	na	1.46	0.14
	08/09/21	0.155	37.9	278	175	<0.2	0.022	1.44	0.17
	11/01/21	0.152	38.3	246	184	na	na	1.40	0.18
	01/31/22	0.158	38.7	286	175	na	na	1.53	0.19
	05/09/22	0.158	40.2	312	191	na	na	1.50	0.16
	08/01/22	0.166	43.2	376	205	na	na	1.57	0.17
	10/31/22	0.177	45.8	324	221	<0.2	0.034	1.48	0.17
	02/06/23	0.158	40.9	318	207	<0.2	0.036	1.48	0.15
	05/01/23	na	41.9	318	204	na	na	1.60	na
	08/07/23	na	48.9	366	246	na	na	1.42	na
	10/30/23	na	56.0	402	276	na	na	1.37	na

TABLE H-8
MONITORING WELL OCWD-M45
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M45/3 Omicron Perforations 335-345 ft bgs	01/24/19	0.068	24.6	212	75.6	<0.2	<0.002	<0.1	0.18
	05/07/19	0.049	18.7	182	57.7	na	na	<0.1	0.33
	07/09/19	0.095	31.9	246	92.8	na	na	<0.1	0.31
	10/08/19	0.041	18.6	194	56.9	na	na	<0.1	0.22
	02/05/20	0.043	17.7	188	61.2	na	na	<0.1	0.23
	05/04/20	0.093	32.3	236	94.9	<0.2	<0.002	<0.1	0.24
	08/03/20	0.075	26.8	212	73.1	na	na	<0.1	0.24
	11/02/20	0.052	19.1	176	57.8	na	na	<0.1	0.20
	02/01/21	0.044	16.9	152	52.7	na	na	<0.1	0.22
	05/03/21	0.099	31.1	256	88.4	na	na	<0.1	0.22
	08/09/21	0.049	17.6	168	54.2	<0.2	<0.002	<0.1	0.25
	11/01/21	0.117	33.3	158	66.5	na	na	<0.1	0.20
	01/31/22	0.144	38.6	202	70.6	na	na	<0.1	0.20
	05/09/22	0.041	15.6	150	45.2	na	na	<0.1	0.19
	08/01/22	0.055	19.9	190	57.1	na	na	<0.1	0.16
	10/31/22	0.039	15.8	150	48.9	<0.2	<0.002	<0.1	0.17
	02/06/23	0.038	14.4	154	50.3	<0.2	<0.002	<0.1	0.15
	05/01/23	na	25.7	204	79.3	na	na	<0.1	na
	08/07/23	na	18.8	162	61.7	na	na	<0.1	na
	10/30/23	na	12.2	130	41.1	na	na	<0.1	na
M45/4 Upper Rho Perforations 380-390 ft bgs	01/24/19	0.028	10.4	125	44.8	0.5	<0.002	<0.1	0.16
	05/07/19	0.018	8.3	102	40.5	na	na	<0.1	0.86
	07/09/19	0.021	8.7	120	45.3	na	na	<0.1	2.43
	10/08/19	0.020	9.2	114	42.2	na	na	<0.1	0.23
	02/05/20	0.023	10.3	110	52.0	na	na	<0.1	0.21
	05/04/20	0.026	12.0	130	52.4	0.3	<0.002	<0.1	0.33
	08/03/20	0.026	11.3	134	51.0	na	na	<0.1	0.37
	11/02/20	0.025	9.9	122	45.0	na	na	<0.1	0.24
	02/01/21	0.025	9.9	87	45.9	na	na	<0.1	0.20
	05/03/21	0.026	9.2	118	44.7	na	na	<0.1	0.34
	08/09/21	0.027	9.6	110	46.2	0.3	<0.002	<0.1	0.24
	11/01/21	0.035	12.1	96	51.4	na	na	<0.1	0.31
	01/31/22	0.032	10.5	106	45.4	na	na	<0.1	0.15
	05/09/22	0.025	9.6	120	45.7	na	na	<0.1	0.16
	06/23/22	na	na	128	na	na	na	na	na
	06/23/22	na	na	120	na	na	na	na	na
	08/01/22	0.023	9.2	152	45.5	na	na	<0.1	0.19
	10/31/22	0.020	8.7	104	45.1	<0.2	<0.002	<0.1	0.17
	02/06/23	0.024	9.0	118	47.4	<0.2	<0.002	<0.1	0.16
	05/01/23	na	10.3	116	48.4	na	na	<0.1	na
	08/07/23	na	8.7	110	45.8	na	na	<0.1	na
	10/30/23	na	8.8	106	46.2	na	na	<0.1	na

TABLE H-8
MONITORING WELL OCWD-M45
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M45/5 Main Perforations 780-790 ft bgs	01/24/19	0.154	13.7	272	31.1	0.8	0.008	<0.1	7.15
	05/07/19	0.161	15.0	304	37.4	na	na	<0.1	8.90
	07/09/19	0.155	14.1	306	34.8	na	na	<0.1	7.28
	10/08/19	0.157	14.3	316	31.5	na	na	<0.1	7.37
	02/05/20	0.151	14.9	306	34.8	na	na	<0.1	6.52
	05/04/20	0.161	14.0	316	33.4	0.6	0.008	<0.1	6.28
	08/03/20	0.167	14.4	310	31.9	na	na	<0.1	7.54
	11/02/20	0.176	13.9	312	31.8	na	na	<0.1	6.79
	02/01/21	0.181	13.8	290	31.7	na	na	<0.1	7.49
	05/03/21	0.186	13.8	314	32.2	na	na	<0.1	6.23
	08/09/21	0.192	14.0	310	31.9	0.6	<0.002	<0.1	8.07
	11/01/21	0.187	14.2	284	32.2	na	na	<0.1	7.09
	01/31/22	0.191	14.5	326	31.3	na	na	<0.1	7.08
	05/09/22	0.187	14.2	320	32.9	na	na	<0.1	6.96
	08/01/22	0.187	14.7	320	32.0	na	na	<0.1	7.15
	10/31/22	0.188	14.5	298	33.3	0.6	<0.002	<0.1	6.83
	02/06/23	0.185	14.2	324	35.9	0.5	<0.002	<0.1	7.46
	05/01/23	na	14.9	324	35	na	na	<0.1	na
	08/07/23	na	13.8	326	34.3	na	na	<0.1	na
	10/30/23	na	14.4	318	35.7	na	na	<0.1	na

Note: OCWD-M45 is located approximately 2,900 feet north of the nearest injection well site (I-15).

TABLE H-9
MONITORING WELL OCWD-M46
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M46A/1 Lambda/Omicron Perforations 350-370 ft bgs	01/23/19	0.014	6.5	80	44.6	<0.2	<0.002	1.39	0.09
	04/02/19	0.016	5.9	75	41.0	na	na	1.30	0.12
	08/06/19	0.014	5.5	90	43.0	na	na	1.13	0.12
	10/07/19	0.013	6.1	82	40.6	na	<0.002	1.12	0.06
	01/06/20	0.017	5.7	82	41.7	na	na	1.11	0.20
	04/08/20	0.016	5.9	81	41.8	<0.2	<0.002	1.10	0.06
	07/06/20	0.017	5.4	78	43.1	na	na	1.05	<0.05
	10/05/20	0.017	5.6	78	42.0	na	na	0.98	<0.05
	01/04/21	0.019	6	78	41.7	na	na	1.19	<0.05
	04/05/21	0.019	6.2	76	43.1	na	na	1.20	<0.05
	07/06/21	0.015	5.7	120	43.3	<0.2	<0.002	1.17	<0.05
	10/04/21	0.013	5.1	79	42.2	na	na	1.04	0.05
	01/03/22	0.014	5.7	62	40.8	na	na	1.16	0.1
	04/11/22	0.014	5.7	56	41.9	na	na	1.24	0.07
	07/05/22	0.013	5.9	76	44.0	na	na	1.28	<0.05
	10/03/22	0.013	6.2	86	43.3	<0.2	<0.002	1.29	<0.05
	01/09/23	0.012	6.4	77	43.5	<0.2	<0.002	1.39	<0.05
	04/03/23	na	7.2	83	46.7	na	na	1.52	na
	05/17/23	na	na	72	na	na	na	na	na
	07/10/23	na	6.8	72	46.2	na	na	1.52	na
	10/02/23	na	7.6	94	47.4	na	na	1.48	na
M46/2 Upper Rho Perforations 420-430 ft bgs	01/23/19	0.013	5.6	64	32.3	<0.2	<0.002	1.16	<0.05
	04/02/19	0.015	5.4	74	32.1	na	na	1.04	0.08
	08/06/19	0.018	6.1	78	37.0	na	na	1.19	0.09
	10/07/19	0.017	6.9	96	40.0	na	<0.002	1.25	0.06
	01/06/20	0.019	6.5	85	40.8	na	na	1.18	0.12
	04/08/20	0.015	5.7	74	35.3	<0.2	<0.002	1.07	<0.05
	07/06/20	0.018	6.3	82	41.3	na	na	1.14	<0.05
	10/05/20	0.018	6.4	82	39.0	na	na	1.23	<0.05
	01/04/21	0.016	5.6	72	35.4	na	na	1.14	<0.05
	04/05/21	0.016	5.6	60	35.6	na	na	1.13	<0.05
	07/06/21	0.016	6.1	120	40.1	<0.2	<0.002	1.24	0.13
	10/04/21	0.016	6.2	87	41.2	na	na	1.22	0.05
	01/03/22	0.017	7.2	35	41.0	na	na	1.30	<0.05
	04/11/22	0.019	7.6	92	44.6	na	na	1.33	0.26
	07/05/22	0.020	7.7	80	47.0	na	na	1.36	0.06
	10/03/22	0.022	9.4	109	51.7	<0.2	<0.002	1.49	<0.05
	01/09/23	0.030	11.0	110	60.8	<0.2	<0.002	1.50	0.08
	04/03/23	na	12.4	114	68.2	na	na	1.51	na
	05/17/23	na	na	118	na	na	na	na	na
	07/10/23	na	13.5	114	72.0	na	na	1.48	na
	10/02/23	na	14.4	118	72.9	na	na	1.54	na

TABLE H-9
MONITORING WELL OCWD-M46
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M46/3 Lower Rho Perforations 515-535 ft bgs	01/23/19	0.024	11.5	120	37.3	<0.2	0.003	0.26	0.07
	04/02/19	0.023	11	132	34.6	na	na	0.27	0.13
	08/06/19	0.023	10.7	124	33.9	na	na	0.25	0.26
	10/07/19	0.023	11.2	144	32.3	na	<0.002	0.25	0.11
	01/06/20	0.022	10.6	150	29.2	na	na	0.24	0.17
	04/08/20	0.021	10.4	132	32.2	<0.2	<0.002	0.21	0.1
	07/06/20	0.023	10.8	130	34.1	na	na	0.19	0.12
	10/05/20	0.024	10.8	126	33.2	na	na	0.28	0.1
	01/04/21	0.026	10.6	130	33.1	na	na	0.28	0.09
	04/05/21	0.026	10.9	130	33.1	<0.2	<0.002	0.29	0.24
	07/06/21	0.025	11	180	34.4	na	na	0.32	0.09
	10/04/21	0.024	10.6	130	33.9	na	na	0.26	0.12
	01/03/22	0.025	10.7	118	31.8	na	na	0.26	0.09
	04/11/22	0.023	10.4	119	32.2	na	na	0.21	0.11
	07/05/22	0.024	10.3	124	33.0	na	na	0.26	0.09
	10/03/22	0.022	10.7	124	34.5	<0.2	<0.002	0.27	0.1
	01/09/23	0.024	10	112	31.5	<0.2	<0.002	0.24	0.11
	04/03/23	na	10.3	128	33.3	na	na	0.26	na
	05/17/23	na	na	124	na	na	na	na	na
	07/10/23	na	9.7	114	33.3	na	na	0.19	na
	10/02/23	na	9.5	120	32.0	na	na	0.20	na
M46/4 Main Perforations 640-660 ft bgs	01/23/19	0.056	14.6	200	15.8	0.3	0.003	<0.1	0.92
	04/02/19	0.057	14.4	176	16.7	na	na	<0.1	1.11
	08/06/19	0.054	14.4	218	16.3	na	na	<0.1	0.97
	10/07/19	0.052	14.5	234	15.0	na	0.002	<0.1	1.18
	01/06/20	0.049	14.1	230	16.4	na	na	<0.1	1.16
	04/08/20	0.048	13.6	222	16.1	<0.2	<0.002	<0.1	1.03
	07/06/20	0.049	13.6	220	16.2	na	na	<0.1	1.03
	10/05/20	0.05	13.5	226	15.9	na	na	<0.1	0.97
	01/04/21	0.056	13.4	219	15.8	na	na	<0.1	0.95
	04/05/21	0.052	13.6	198	15.9	na	<0.002	<0.1	0.89
	07/06/21	0.053	13.7	266	16.6	0.2	na	<0.1	0.91
	10/04/21	0.05	13.5	206	16.1	na	na	<0.1	1.0
	01/03/22	0.052	13.6	194	15.7	na	na	<0.1	0.93
	04/11/22	0.051	13.5	194	16.2	na	na	<0.1	1.06
	07/05/22	0.05	13.5	206	16.4	na	na	<0.1	1.03
	10/03/22	0.047	13.6	202	16.9	0.2	<0.002	<0.1	0.98
	01/09/23	0.05	13.3	206	15.8	<0.2	<0.002	<0.1	0.96
	04/03/23	na	13.7	220	16.4	na	na	<0.1	na
	05/17/23	na	na	200	na	na	na	na	na
	07/10/23	na	13.1	210	16.6	na	na	<0.1	na
	10/02/23	na	13.3	208	16.5	na	na	<0.1	na

TABLE H-9
MONITORING WELL OCWD-M46
General Water Quality Data
2019 - 2023

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M46/5 Main Perforations 890-910 ft bgs	01/23/19	0.051	16.2	216	13.4	0.5	0.004	<0.1	1.91
	04/02/19	0.056	17.3	200	14.5	na	na	<0.1	1.93
	08/06/19	0.06	18.7	240	14.3	na	na	<0.1	1.64
	10/07/19	0.06	19.1	218	12.7	na	0.003	<0.1	2.05
	01/06/20	0.059	19.0	238	15.3	na	na	<0.1	1.95
	04/08/20	0.062	19.1	242	14.5	0.5	0.003	<0.1	1.98
	07/06/20	0.065	19.4	236	14.7	na	na	<0.1	2.25
	10/05/20	0.068	18.9	242	14.9	na	na	<0.1	2.09
	01/04/21	0.073	19.0	252	15.1	na	na	<0.1	2.02
	04/05/21	0.07	19.0	224	15	na	na	<0.1	1.83
	07/06/21	0.073	18.7	282	15.3	0.5	0.004	<0.1	1.88
	10/04/21	0.068	17.9	230	15	na	na	<0.1	2.50
	01/03/22	0.07	18	210	14.4	na	na	<0.1	2.13
	04/11/22	0.067	17.5	204	14.8	na	na	<0.1	2.5
	07/05/22	0.065	16.6	224	14.7	na	na	<0.1	2.33
	10/03/22	0.062	16	216	14.9	0.4	<0.002	<0.1	3.63
	01/09/23	0.065	15.5	216	13.9	<0.2	<0.002	<0.1	2.64
	04/03/23	na	15.6	214	14.6	na	na	<0.1	na
	05/17/23	na	na	220	na	na	na	na	na
	07/10/23	na	14.5	214	14.4	na	na	<0.1	na
	10/02/23	na	14.1	208	14.7	na	na	<0.1	na

Notes: OCWD-M46 is located approximately 900 feet northeast of the nearest injection well site (I-26).
na = not analyzed

TABLE H-10
MONITORING WELL OCWD-M47
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M47/1 Beta-III Perforations 355-375 ft bgs	01/22/19	0.027	12.4	110	40.3	<0.2	<0.002	<0.1	0.1
	04/16/19	0.025	12.1	106	39.2	na	na	<0.1	0.15
	07/23/19	0.025	11.7	126	39.4	na	na	<0.1	0.15
	10/22/19	0.023	9.3	138	36	na	na	<0.1	0.19
	01/21/20	0.021	9.9	128	43.1	na	na	<0.1	0.15
	04/21/20	0.018	9.4	108	36.2	<0.2	<0.002	<0.1	0.11
	07/21/20	0.018	9.1	108	36.3	na	na	<0.1	0.13
	10/20/20	0.021	8.6	116	34.3	na	na	<0.1	0.11
	01/19/21	0.02	8.2	115	34.2	na	na	<0.1	0.13
	04/20/21	0.021	8.2	118	34.4	<0.2	na	<0.1	0.12
	07/20/21	0.018	7.5	132	34.2	na	0.002	<0.1	0.13
	10/19/21	0.019	7.6	92	34.7	na	na	<0.1	0.12
	01/18/22	0.021	7.5	115	35.2	na	na	<0.1	0.18
	04/26/22	0.021	7.3	112	34.5	na	na	<0.1	0.1
	07/19/22	0.018	7.1	108	34.8	na	na	<0.1	0.1
	10/18/22	0.016	7	100	34	<0.2	<0.002	<0.1	0.11
	01/23/23	0.018	7.1	98	35.7	<0.2	<0.002	<0.1	0.1
	04/18/23	na	7.3	108	36	na	na	<0.1	na
	07/25/23	na	6.6	132	35.2	na	na	<0.1	na
	10/17/23	na	7.6	110	36.8	na	<0.002	<0.1	na
M47/2 Upper Rho Perforations 470-480 ft bgs	01/22/19	0.026	10.7	100	55.9	<0.2	0.006	1.53	0.08
	04/16/19	0.024	10.2	102	55.9	na	na	1.52	0.10
	07/23/19	0.026	10.2	104	56	na	na	1.36	0.13
	10/22/19	0.027	8.8	140	52.6	na	na	1.13	0.12
	01/21/20	0.027	9.5	140	62.9	na	na	1.26	0.12
	04/21/20	0.025	9.7	118	54.7	<0.2	0.003	1.27	0.07
	07/21/20	0.026	9.4	110	55.5	na	na	1.23	0.07
	10/20/20	0.028	8.7	114	52.0	na	na	1.19	0.06
	01/19/21	0.026	8.6	111	50.5	na	na	1.29	0.07
	04/20/21	0.031	9.5	140	53.0	na	na	1.31	0.08
	07/20/21	0.041	12.3	132	61.6	<0.2	0.002	1.34	0.09
	10/19/21	0.049	14.7	136	72.2	na	na	1.34	0.06
	01/18/22	0.054	16.4	153	79.0	na	na	1.42	0.09
	04/26/22	0.042	13.4	134	72.3	na	na	1.45	0.06
	07/19/22	0.043	14.2	142	69.2	na	na	1.48	0.05
	10/18/22	0.031	11.9	118	66.6	<0.2	<0.002	1.52	0.06
	01/23/23	0.020	9.1	98	53.8	<0.2	<0.002	1.58	<0.05
	04/18/23	na	9.2	108	55.9	na	na	1.66	na
	07/25/23	na	9.3	98	55.3	na	na	1.55	na
	10/17/23	na	10.2	112	58.6	na	<0.002	1.53	na

TABLE H-10
MONITORING WELL OCWD-M47
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M47/3 Lower Rho Perforations 580-600 ft bgs	01/22/19	0.038	13.6	184	65.1	0.2	<0.002	<0.1	<0.05
	04/16/19	0.035	13.7	176	66.6	na	na	<0.1	0.1
	07/23/19	0.037	13.7	212	66	na	na	<0.1	0.12
	10/22/19	0.037	12.5	210	63.8	na	na	<0.1	0.07
	01/21/20	0.035	13.1	204	69.2	na	na	<0.1	0.16
	04/21/20	0.033	13.1	206	60.8	<0.2	<0.002	<0.1	0.08
	07/21/20	0.035	13.3	208	63.2	na	na	<0.1	0.06
	10/20/20	0.042	12.9	210	62.2	na	na	<0.1	0.01
	01/19/21	0.041	12.6	214	61.8	na	na	<0.1	0.13
	04/20/21	0.04	12.6	234	61.4	<0.2	na	<0.1	0.09
	07/20/21	0.04	12.6	242	61.4	na	0.002	<0.1	0.06
	10/19/21	0.039	12.3	206	61.7	na	na	<0.1	0.07
	01/18/22	0.038	12.7	194	63	na	na	<0.1	0.06
	04/26/22	0.04	12.5	202	63	na	na	<0.1	<0.05
	07/19/22	0.037	12.5	210	62.3	na	na	<0.1	<0.05
	10/18/22	0.035	12.6	196	65.6	<0.2	<0.002	<0.1	0.05
	01/23/23	0.037	12.3	200	64.7	<0.2	<0.002	<0.1	<0.05
	04/18/23	na	12.7	218	65.8	na	na	<0.1	na
	07/25/23	na	11.8	212	64.6	na	na	<0.1	na
	10/17/23	na	12.2	220	65.1	na	<0.002	<0.1	na
M47/4 Main Perforations 745-765 ft bgs	1/22/19	0.039	12.4	192	23.2	0.2	0.005	<0.1	0.74
	4/16/19	0.038	12.4	194	23.6	na	na	<0.1	0.98
	7/23/19	0.038	12.5	228	23.6	na	na	<0.1	0.91
	10/22/19	0.041	11.3	212	23.7	na	na	<0.1	0.86
	1/21/20	0.038	12.1	206	25.2	na	na	<0.1	0.84
	4/21/20	0.037	12.2	222	22.8	<0.2	0.003	<0.1	0.94
	7/21/20	0.038	12.4	220	23.1	na	na	<0.1	0.82
	10/20/20	0.044	12.3	220	22.7	na	na	<0.1	0.83
	1/19/21	0.043	12.2	223	22.3	na	na	<0.1	0.83
	4/20/21	0.042	12.2	232	22.7	na	na	<0.1	0.77
	7/20/21	0.042	12.3	246	22.6	0.3	0.004	<0.1	0.73
	10/19/21	0.041	12.1	204	22.6	na	na	<0.1	0.73
	1/18/22	0.04	12.3	211	22.5	na	na	<0.1	0.7
	4/26/22	0.041	12.3	214	23.2	na	na	<0.1	0.67
	7/19/22	0.04	12.4	214	22.6	na	na	<0.1	0.72
	10/18/22	0.04	12.5	194	23.8	<0.2	<0.002	<0.1	0.73
	1/23/23	0.04	12.3	194	23.2	<0.2	<0.002	<0.1	0.68
	4/18/23	na	12.8	226	23.6	na	na	<0.1	na
	7/25/23	na	11.8	224	22.7	na	na	<0.1	na
	10/17/23	na	12.1	214	23.4	na	<0.002	<0.1	na

TABLE H-10
MONITORING WELL OCWD-M47
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
M47/5 Main Perforations 940-960 ft bgs	01/22/19	0.058	12.8	202	11.6	0.3	0.008	<0.1	2.89
	04/16/19	0.056	12.8	200	12	na	na	<0.1	3.24
	07/23/19	0.06	12.9	222	11.9	na	na	<0.1	2.91
	10/22/19	0.06	11.5	238	10.6	na	na	<0.1	2.54
	01/21/20	0.056	12.6	218	12.9	na	na	<0.1	2.7
	04/21/20	0.056	12.6	226	11.6	0.4	0.005	<0.1	3.22
	07/21/20	0.057	12.8	232	11.3	na	na	<0.1	3.34
	10/20/20	0.066	12.7	226	11.2	na	na	<0.1	3.25
	01/19/21	0.064	12.6	231	11.5	na	na	<0.1	3.26
	04/20/21	0.064	12.7	244	11.5	na	na	<0.1	3.49
	07/20/21	0.065	12.6	226	11.6	0.5	0.007	<0.1	3.19
	10/19/21	0.064	12.5	214	11.2	na	na	<0.1	3.19
	01/18/22	0.064	12.7	207	11.2	na	na	<0.1	3.56
	04/26/22	0.065	12.6	242	11.4	na	na	<0.1	3.28
	07/19/22	0.062	12.9	232	11.1	na	na	<0.1	3.35
	10/18/22	0.06	12.9	204	12	0.4	0.004	<0.1	3.59
	01/23/23	0.06	12.7	214	11.5	<0.2	0.005	<0.1	3.3
	04/18/23	na	13.2	236	11.4	na	na	<0.1	na
	07/25/23	na	12.1	228	11.6	na	na	<0.1	na
	10/17/23	na	12.5	232	11.7	na	0.005	<0.1	na

Note: OCWD-M47 is located approximately 2,250 feet northeast of the nearest injection well site (I-26).

Appendix I

Groundwater Quality Data at the Anaheim Forebay

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

GWRS 2023 Quarterly Sampling Dates
OCWD Water Quality Department
ANAHEIM FOREBAY - GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
AM-7/1	02/22/2023	05/16/2023	08/23/2023	11/14/2023
AM-8/1	02/22/2023	05/16/2023	08/23/2023	11/14/2023
AM-10/1	02/22/2023	05/16/2023	08/23/2023	11/14/2023
AMD-12/1-5	02/21/2023	05/15/2023	08/21/2023	11/13/2023
OCWD-KB1/1	02/22/2023	05/16/2023	08/23/2023	11/14/2023

Notes for Appendix I Tables:

► Water quality data are summarized for compliance monitoring wells AM-7, AM-8, AM-10, AMD-12, and also a non-compliance monitoring well OCWD-KB1 in the following tables.

► Listed dates (above) are the quarterly compliance monitoring dates; other samples may have been collected during the year. Detections of organic chemicals are reported for all samples collected in 2022 and are not limited to the quarterly compliance samples.

► The annual compliance samples were collected during the first quarter of 2023 per the previously established compliance quarter rotation schedule.

► Results listed in the table for each quarter are the range of the minimum to maximum value detected at the well location, which may consist of one to five well casings. Figures and report text list the well ID (e.g., AMD-10) and casing number (e.g., AMD-12 has five well casings: AMD-12/1, AMD-12/2, AMD-12/3, AMD-12/4 and AMD12/5), as appropriate.

► Appendices B & C contain a list of all methods and reportable detection limits (RDL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at reportable detection limit (RDL)

► NL: SWRCB DDW (formerly CDPH) Notification Level

► NR: Not required

► NS: Not sampled

► RL: Response Level

► TR: Trace

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	AM-7 Qtr 1	AM-7 Qtr 2	AM-7 Qtr 3	AM-7 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	304	388	252	286
Chloride (Cl), mg/L	OCWD	EPA 300.0	88.4	72.1	43	48.8
Sulfate (SO4), mg/L	OCWD	EPA 300.0	164	88.1	38.5	49.7
Sodium (Na), mg/L	OCWD	EPA 200.7	74.1	65.4	51.4	55.8
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	0.7	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	0.65	1.41	1.56	1.51
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	0.005	Not Required	Not Required	0.006
Iron (Fe), ug/L	OCWD	EPA 200.7	580	469	445	689
Manganese (Mn), ug/L	OCWD	EPA 200.8	11.9	10.4	8.8	10.5
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	0.21	0.06	-0.09	-0.01
Turbidity (TURB), NTU	OCWD	SM 2130B	1.2	1.8	1.8	2.4
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	249	174	107	116
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	1.4	1.4	ND	1.1
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	2	2.2	2.8	2.6
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	2.3	1.7	1.5	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	1.3	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	1.3	0.9	0.9	TR
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	Not Required	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.6	3	3	3.2
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	Not Required	Not Required	Not Required

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-7 Qtr 1	AM-7 Qtr 2	AM-7 Qtr 3	AM-7 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	ND	Not Required	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	ND	Not Required	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	Not Required	ND < RL	ND < RL	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required

AM-7/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/22/2023 11:05	Chloroform (CHCl3)	1.3	ug/L	0.5
2/22/2023 11:05	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/22/2023 11:05	Carbamazepine (CBMAZP)	7.066	ng/L	1
2/22/2023 11:05	Primidone (PRIMDN)	9.758	ng/L	1
2/22/2023 11:05	Simazine (SIMAZ)	0.005	ug/L	0.005
2/22/2023 11:05	Sucralose (SUCRAL)	4510	ng/L	100
2/22/2023 11:05	Sulfamethoxazole (SULTHZ)	9.712	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
5/16/2023 11:15	Chloroform (CHCl3)	0.9	ug/L	0.5
5/16/2023 11:15	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

METHOD: 533

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
5/16/2023 11:15	Perfluoro butane sulfonic acid (PFBS)	6	ng/L	2
5/16/2023 11:15	Perfluoro heptanoic acid (PFHpA)	2.6	ng/L	2
5/16/2023 11:15	Perfluoro hexane sulfonic acid (PFHxS)	3.1	ng/L	2
5/16/2023 11:15	Perfluoro octane sulfonic acid (PFOS)	7	ng/L	2
5/16/2023 11:15	Perfluoro octanoic acid (PFOA)	6	ng/L	2
5/16/2023 11:15	Perfluorobutanoic acid (PFBA)	3.9	ng/L	2
5/16/2023 11:15	Perfluorohexanoic acid (PFHxA)	5.3	ng/L	2
5/16/2023 11:15	Perfluoropentanoic acid (PFPeA)	6	ng/L	2

AM-7/1
Organic Detections by Method

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/23/2023	11:15	Chloroform (CHCl3)	0.9	ug/L	0.5
8/23/2023	11:15	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

METHOD: 533

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/23/2023	11:15	Perfluoro butane sulfonic acid (PFBS)	4.9	ng/L	2
8/23/2023	11:15	Perfluoro hexane sulfonic acid (PFHxS)	2.3	ng/L	2
8/23/2023	11:15	Perfluoro octane sulfonic acid (PFOS)	5.4	ng/L	2
8/23/2023	11:15	Perfluoro octanoic acid (PFOA)	2.9	ng/L	2
8/23/2023	11:15	Perfluorobutanoic acid (PFBA)	2.2	ng/L	2
8/23/2023	11:15	Perfluoropentanoic acid (PFPeA)	2.5	ng/L	2

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/14/2023	11:00	Chloroform (CHCl3)	TR	ug/L	0.5
11/14/2023	11:00	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	AM-8 Qtr 1	AM-8 Qtr 2	AM-8 Qtr 3	AM-8 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	494	432	378	334
Chloride (Cl), mg/L	OCWD	EPA 300.0	55.6	75.3	62.4	60.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	82.1	112	82.3	76.8
Sodium (Na), mg/L	OCWD	EPA 200.7	53.5	65.5	64.3	59.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	1.1	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.06	0.92	1.1	1.2
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	0.012	Not Required	Not Required	0.013
Iron (Fe), ug/L	OCWD	EPA 200.7	891	526	295	409
Manganese (Mn), ug/L	OCWD	EPA 200.8	8.3	8.3	6.9	7.2
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.09	0.16	0.12	ND
Turbidity (TURB), NTU	OCWD	SM 2130B	0.45	0.75	0.85	0.65
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	140	208	175	151
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	1.1	1.4	ND	1.1
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.2	1.1	1.4	1.3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	1.4	1.9	2	1.2
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	1	1	1.1	0.9
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	Not Required	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2.1	2	1.9	2.2
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	Not Required	Not Required	Not Required

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-8 Qtr 1	AM-8 Qtr 2	AM-8 Qtr 3	AM-8 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	ND	Not Required	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	ND	Not Required	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	Not Required	ND < RL	ND < RL	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required

AM-8/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	12:05	Chloroform (CHCl3)	1	ug/L	0.5
2/22/2023	12:05	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	12:05	Carbamazepine (CBMAZP)	11.668	ng/L	1
2/22/2023	12:05	Primidone (PRIMDN)	12.623	ng/L	1
2/22/2023	12:05	Simazine (SIMAZ)	0.0106	ug/L	0.005
2/22/2023	12:05	Sucralose (SUCRAL)	3880	ng/L	100
2/22/2023	12:05	Sulfamethoxazole (SULTHZ)	16.325	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/16/2023	10:45	Chloroform (CHCl3)	1	ug/L	0.5
5/16/2023	10:45	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

METHOD: 533

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/16/2023	10:45	Perfluoro butane sulfonic acid (PFBS)	5.4	ng/L	2
5/16/2023	10:45	Perfluoro heptanoic acid (PFHpA)	3.6	ng/L	2
5/16/2023	10:45	Perfluoro hexane sulfonic acid (PFHxS)	3.1	ng/L	2
5/16/2023	10:45	Perfluoro octane sulfonic acid (PFOS)	9.1	ng/L	2
5/16/2023	10:45	Perfluoro octanoic acid (PFOA)	7	ng/L	2
5/16/2023	10:45	Perfluorobutanoic acid (PFBA)	5.3	ng/L	2
5/16/2023	10:45	Perfluorohexanoic acid (PFHxA)	10.2	ng/L	2
5/16/2023	10:45	Perfluoropentanoic acid (PFPeA)	12.5	ng/L	2

AM-8/1
Organic Detections by Method

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
8/23/2023 12:20	Chloroform ($CHCl_3$)	1.1	ug/L	0.5
8/23/2023 12:20	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

METHOD: 533

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
8/23/2023 12:20	Perfluoro butane sulfonic acid (PFBS)	5	ng/L	2
8/23/2023 12:20	Perfluoro heptanoic acid (PFHpA)	2.5	ng/L	2
8/23/2023 12:20	Perfluoro hexane sulfonic acid (PFHxS)	2.5	ng/L	2
8/23/2023 12:20	Perfluoro octane sulfonic acid (PFOS)	7.2	ng/L	2
8/23/2023 12:20	Perfluoro octanoic acid (PFOA)	5	ng/L	2
8/23/2023 12:20	Perfluorobutanoic acid (PFBA)	4.1	ng/L	2
8/23/2023 12:20	Perfluorohexanoic acid (PFHxA)	6.2	ng/L	2
8/23/2023 12:20	Perfluoropentanoic acid (PFPeA)	7.9	ng/L	2

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
11/14/2023 11:50	Chloroform ($CHCl_3$)	0.9	ug/L	0.5
11/14/2023 11:50	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	AM-10 Qtr 1	AM-10 Qtr 2	AM-10 Qtr 3	AM-10 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	74	78	79	78
Chloride (Cl), mg/L	OCWD	EPA 300.0	8.5	9.1	11	7.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	0.8	1.4	1	1
Sodium (Na), mg/L	OCWD	EPA 200.7	7.3	7.2	7.9	7.6
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	1.5	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.51	1.38	1.54	1.41
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	ND
Iron (Fe), ug/L	OCWD	EPA 200.7	44	21.5	20.8	14.5
Manganese (Mn), ug/L	OCWD	EPA 200.8	1.6	1.9	2	1.5
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-1.09	-0.98	-0.94	-1.02
Turbidity (TURB), NTU	OCWD	SM 2130B	0.25	0.15	0.2	0.1
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	39.6	39.8	45.3	38.9
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1.4	1.4	1.2	1.3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	0.7	0.6
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	TR	TR	0.6
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	0.8	1	0.7	1.4
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	Not Required	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	3.4	3.4	2.6	3
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	Not Required	Not Required	Not Required

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AM-10 Qtr 1	AM-10 Qtr 2	AM-10 Qtr 3	AM-10 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	ND	Not Required	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	ND	Not Required	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	Not Required	Not Required	ND	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required

AM-10/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	12:45	Chloroform (CHCl3)	0.8	ug/L	0.5
2/22/2023	12:45	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	12:45	Diuron (DIURON)	0.0056	ug/L	0.005
2/22/2023	12:45	Simazine (SIMAZ)	0.0064	ug/L	0.005

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/16/2023	11:45	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/16/2023	11:45	Chloroform (CHCl3)	1	ug/L	0.5
5/16/2023	11:45	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/23/2023	10:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
8/23/2023	10:20	Chloroform (CHCl3)	0.7	ug/L	0.5
8/23/2023	10:20	Methylene Chloride (CH2Cl2)	0.7	ug/L	0.5
8/23/2023	10:20	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/14/2023	10:20	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
11/14/2023	10:20	Chloroform (CHCl3)	1.4	ug/L	0.5

AM-10/1
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/14/2023	10:20	Methylene Chloride (CH2Cl2)	0.6	ug/L	0.5
11/14/2023	10:20	Total Trihalomethanes (TTHMs)	2	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	AMD-12 Qtr 1	AMD-12 Qtr 2	AMD-12 Qtr 3	AMD-12 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	114 - 536	156 - 542	140 - 524	166 - 556
Chloride (Cl), mg/L	OCWD	EPA 300.0	15.9 - 102	24 - 104	20 - 101	28.2 - 103
Sulfate (SO4), mg/L	OCWD	EPA 300.0	14.5 - 155	26.2 - 131	17.1 - 130	21.1 - 133
Sodium (Na), mg/L	OCWD	EPA 200.7	17.6 - 87.7	21.2 - 86.4	25 - 91.6	27.6 - 92.8
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	0.5 - 1.4	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	0.56 - 1.5	0.91 - 1.5	0.81 - 1.38	0.93 - 1.43
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	ND
Iron (Fe), ug/L	OCWD	EPA 200.7	ND - 20.5	ND - 15.7	ND - 20.5	ND - 17.4
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 1.6	ND - 1.6	ND - 1.6	ND - 1.9
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.92 - 0.22	-0.66 - 0.4	-0.6 - 0.38	-0.54 - 0.44
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.25	ND - 0.1	ND - 0.2	ND - 0.25
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	55.3 - 264	73 - 251	69.5 - 269	76.2 - 280
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND - 1.5	ND - 1.7	ND - 1.5	ND - 2.1
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	ND - 2	ND - 2.4	1 - 3.5	ND - 3.1
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND - 1.5	ND - 1.1	ND - 2
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.22	ND - 0.24	ND - 0.33	ND - 0.24
Nickel (Ni), ug/L	OCWD	EPA 200.8	1.1 - 8.4	1.4 - 9.4	1.4 - 9.9	ND - 7.2
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 1.5	ND - 1.2	ND - 1.3	ND - 1.2
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.5	ND - 0.8	ND - 1	ND - 1
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	Not Required	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2 - 3.4	2.1 - 4	1.9 - 4.8	2.2 - 4.1
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	Not Required	Not Required	Not Required

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	AMD-12 Qtr 1	AMD-12 Qtr 2	AMD-12 Qtr 3	AMD-12 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	ND	Not Required	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	ND	Not Required	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required

AMD-12/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
2/21/2023	9:55	Chloroform (CHCl3)	1.5	ug/L	0.5
2/21/2023	9:55	Total Trihalomethanes (TTHMs)	1.5	ug/L	0.5

METHOD: CEC

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
2/21/2023	9:55	Primidone (PRIMDN)	1.055	ng/L	1
2/21/2023	9:55	Sucralose (SUCRAL)	345.83	ng/L	100
2/21/2023	9:55	Sulfamethoxazole (SULTHZ)	2.451	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
5/15/2023	9:55	Chloroform (CHCl3)	0.8	ug/L	0.5
5/15/2023	9:55	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
8/21/2023	9:55	Chloroform (CHCl3)	1	ug/L	0.5
8/21/2023	9:55	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
11/13/2023	10:45	Chloroform (CHCl3)	0.7	ug/L	0.5
11/13/2023	10:45	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

AMD-12/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/21/2023	11:05	Chloroform (CHCl3)	0.8	ug/L	0.5
2/21/2023	11:05	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/21/2023	11:05	Primidone (PRIMDN)	1.391	ng/L	1
2/21/2023	11:05	Simazine (SIMAZ)	0.0086	ug/L	0.005
2/21/2023	11:05	Sucralose (SUCRAL)	120.702	ng/L	100
2/21/2023	11:05	Sulfamethoxazole (SULTHZ)	2.688	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/15/2023	11:40	Chloroform (CHCl3)	0.8	ug/L	0.5
5/15/2023	11:40	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/21/2023	10:40	Chloroform (CHCl3)	0.8	ug/L	0.5
8/21/2023	10:40	Total Trihalomethanes (TTHMs)	0.8	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/13/2023	12:30	Chloroform (CHCl3)	1	ug/L	0.5
11/13/2023	12:30	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

AMD-12/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/21/2023	12:10	Chloroform (CHCl3)	TR	ug/L	0.5
2/21/2023	12:10	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/21/2023	12:10	Carbamazepine (CBMAZP)	31.174	ng/L	1
2/21/2023	12:10	Dilantin (DILANT)	10.96	ng/L	10
2/21/2023	12:10	Primidone (PRIMDN)	34.102	ng/L	1
2/21/2023	12:10	Simazine (SIMAZ)	0.0183	ug/L	0.005
2/21/2023	12:10	Sucralose (SUCRAL)	7710	ng/L	100
2/21/2023	12:10	Sulfamethoxazole (SULTHZ)	25.999	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/15/2023	11:25	Chloroform (CHCl3)	TR	ug/L	0.5
5/15/2023	11:25	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/21/2023	11:30	Chloroform (CHCl3)	TR	ug/L	0.5
8/21/2023	11:30	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/13/2023	12:20	Chloroform (CHCl3)	0.5	ug/L	0.5

AMD-12/3
Organic Detections by Method

Year 2023, Quarter 4

METHOD: ***524.2***

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
11/13/2023 12:20	Total Trihalomethanes (TTHMs)	0.5	ug/L	0.5

AMD-12/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: CEC

Sample Date & Time	Parameter	Result	Units	Reportable Detection Limit
2/21/2023 11:45	Atrazine (ATRAZ)	0.0013	ug/L	0.001
2/21/2023 11:45	Carbamazepine (CBMAZP)	41.869	ng/L	1
2/21/2023 11:45	Dilantin (DILANT)	14.192	ng/L	10
2/21/2023 11:45	Diuron (DIURON)	0.006	ug/L	0.005
2/21/2023 11:45	Primidone (PRIMDN)	47.273	ng/L	1
2/21/2023 11:45	Simazine (SIMAZ)	0.0273	ug/L	0.005
2/21/2023 11:45	Sucralose (SUCRAL)	12100	ng/L	1000
2/21/2023 11:45	Sulfamethoxazole (SULTHZ)	40.114	ng/L	1

AMD-12/5
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***CEC***

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/21/2023	10:35	Atrazine (ATRAZ)	0.0027	ug/L	0.001
2/21/2023	10:35	Carbamazepine (CBMAZP)	13.083	ng/L	1
2/21/2023	10:35	Primidone (PRIMDN)	17.287	ng/L	1
2/21/2023	10:35	Simazine (SIMAZ)	0.0611	ug/L	0.005
2/21/2023	10:35	Sucralose (SUCRAL)	2240	ng/L	100
2/21/2023	10:35	Sulfamethoxazole (SULTHZ)	24.028	ng/L	1

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	OCWD-KB1 Qtr 1	OCWD-KB1 Qtr 2	OCWD-KB1 Qtr 3	OCWD-KB1 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	250	320	144	304
Chloride (Cl), mg/L	OCWD	EPA 300.0	53	56.7	20	50.6
Sulfate (SO4), mg/L	OCWD	EPA 300.0	44.8	59.5	15.2	49.6
Sodium (Na), mg/L	OCWD	EPA 200.7	53.8	40.6	26.8	51.3
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	1.8	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	1.73	1.49	1.41	0.61
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	ND
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.12	0.12	-0.48	-0.02
Turbidity (TURB), NTU	OCWD	SM 2130B	ND	ND	0.1	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	112	178	64.4	144
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	1.6	1.6	ND	1.9
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Arsenic (As), ug/L	OCWD	EPA 200.8	1	1.1	2.1	1.3
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND	ND	ND	ND
Nickel (Ni), ug/L	OCWD	EPA 200.8	1.3	1.8	ND	1.3
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	1	TR	0.7	TR
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND	Not Required	Not Required	Not Required
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	2	2.1	3.4	3.3
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	Not Required	Not Required	Not Required

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	OCWD-KB1 Qtr 1	OCWD-KB1 Qtr 2	OCWD-KB1 Qtr 3	OCWD-KB1 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required
508.1	Chlorinated Pesticides, Herbicides & Organohalides	Weck Lab	ND	Not Required	Not Required	Not Required
515.4	Chlorinated Herbicides	Weck Lab	ND	Not Required	Not Required	Not Required
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
533	PFAS Compounds	OCWD	Not Required	Not Required	ND < RL	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND - Detections	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND	Not Required	Not Required	Not Required

OCWD-KB1/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	10:25	Chloroform (CHCl3)	1	ug/L	0.5
2/22/2023	10:25	Total Trihalomethanes (TTHMs)	1	ug/L	0.5

METHOD: CEC

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/22/2023	10:25	Carbamazepine (CBMAZP)	29.507	ng/L	1
2/22/2023	10:25	Dilantin (DILANT)	12.355	ng/L	10
2/22/2023	10:25	Diuron (DIURON)	0.0133	ug/L	0.005
2/22/2023	10:25	Primidone (PRIMDN)	27.648	ng/L	1
2/22/2023	10:25	Sucralose (SUCRAL)	12100	ng/L	1000
2/22/2023	10:25	Sulfamethoxazole (SULTHZ)	18.75	ng/L	1

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/16/2023	9:50	Chloroform (CHCl3)	TR	ug/L	0.5
5/16/2023	9:50	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/23/2023	13:10	Chloroform (CHCl3)	0.7	ug/L	0.5
8/23/2023	13:10	Total Trihalomethanes (TTHMs)	0.7	ug/L	0.5

METHOD: 533

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/23/2023	13:10	Perfluoro octane sulfonic acid (PFOS)	7.8	ng/L	2
8/23/2023	13:10	Perfluoro octanoic acid (PFOA)	3.2	ng/L	2
8/23/2023	13:10	Perfluorohexanoic acid (PFHxA)	2.1	ng/L	2
8/23/2023	13:10	Perfluoropentanoic acid (PFPeA)	2.7	ng/L	2

OCWD-KB1/1
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 524.2

Sample Date &	*Time*	*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
11/14/2023	9:40	Chloroform (CHCl3)	TR	ug/L	0.5
11/14/2023	9:40	Total Trihalomethanes (TTHMs)	TR	ug/L	0.5

Appendix J

Anaheim Forebay Compliance Monitoring Well Groundwater Quality

1,4-Dioxane, NDMA and Selected Constituents

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

TABLE J-1
OCWD MONITORING WELL AM-7
1,4-dioxane and NDMA
Concentrations
2019 - 2023

AM-7/1 *Shallow Aquifer* *Perforations: 210-225 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
2/20/2019	<1	<2
1/28/2020	<1	na
3/17/2020	<1	na
6/16/2020	<1	<2
9/15/2021	<0.5	<2
11/29/2022	<0.5	<2
2/22/2023	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-2
OCWD MONITORING WELL AM-8
Concentrations
2019 - 2023

AM-8/1 *Shallow Aquifer* *Perforations: 268-285 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
2/20/2019	<1	<2
3/17/2020	<1	na
6/16/2020	<1	<2
9/15/2021	<0.5	<2
11/29/2022	<0.5	<2
2/22/2023	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-3
OCWD MONITORING WELL AMD-12
1,4-dioxane and NDMA Concentrations
2019 - 2023

AMD-12/1 *Principal Aquifer* *Perforations: 330-350 ft bgs*			**AMD-12/2** *Principal Aquifer* *Perforations: 490-520 ft bgs*			**AMD-12/3** *Principal Aquifer* *Perforations: 595-615 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
02/19/19	<1	<2	02/19/19	<1	<2	02/19/19	<1	<2
05/18/20	<1	<2	05/18/20	<1	<2	05/18/20	<1	<2
08/23/21	<0.5	<2	08/23/21	<0.5	<2	08/23/21	<0.5	<2
11/14/22	<0.5	<2	11/14/22	<0.5	<2	11/14/22	<0.5	<2
02/21/23	<0.5	<2	02/21/23	<0.5	<2	02/21/23	<0.5	<2

AMD-12/4 *Principal Aquifer* *Perforations: 725-745 ft bgs*			**AMD-12/5** *Principal Aquifer* *Perforations: 940-960 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
02/19/19	<1	<2	02/19/19	<1	<2
05/18/20	<1	<2	05/18/20	<1	<2
08/23/21	<0.5	<2	08/23/21	<0.5	<2
11/14/22	<0.5	<2	11/14/22	<0.5	<2
02/21/23	<0.5	<2	02/21/23	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-4
OCWD MONITORING WELL AM-10
1,4-dioxane and NDMA
Concentrations
2019 - 2023

AM-10/1 *Shallow Aquifer* *Perforations: 217-235 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
02/20/19	<1	<2
03/17/20	<1	na
06/16/20	<1	<2
09/15/21	<0.5	<2
11/29/22	<0.5	<2
02/22/23	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-5
OCWD MONITORING WELL AM-7
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AM-7/1 Shallow Perforations 210-225 ft bgs	02/20/19	0.056	75.0	460	252	<0.2	0.005	0.36	0.54
	04/11/19	na	58.7	400	na	na	0.006	0.51	0.45
	05/21/19	0.045	56.4	372	184	na	na	0.57	0.43
	06/11/19	na	36.8	268	na	na	0.004	0.72	0.29
	07/15/19	na	29.3	218	na	na	0.003	0.71	0.25
	08/19/19	0.042	47.2	322	166	na	na	0.7	0.37
	11/26/19	0.019	54.6	328	135	na	na	0.96	0.4
	01/28/20	na	42.2	296	na	na	0.005	0.7	0.36
	03/17/20	0.067	52.8	332	144	na	na	0.63	0.4
	05/20/20	na	67.0	366	na	na	0.004	0.9	0.52
	06/16/20	0.119	71.4	396	174	<0.2	0.004	1.04	0.59
	07/28/20	na	83.4	440	na	na	0.007	1.5	0.8
	09/16/20	0.137	82.6	440	221	na	na	1.62	0.86
	10/27/20	na	69.8	392	na	na	0.007	1.38	0.65
	12/15/20	0.113	66.6	346	158	na	na	1.35	0.66
	03/16/21	0.146	78.0	420	202	na	na	1.46	0.78
	06/22/21	0.131	79.6	408	197	na	na	1.2	0.79
	09/15/21	0.1	64.7	324	175	<0.2	0.007	1.71	0.55
	12/13/21	0.117	80.9	388	215	na	na	1.87	0.61
	03/15/22	0.064	62.9	368	183	na	na	0.87	0.56
	06/21/22	0.055	60.1	360	171	na	na	0.87	0.48
	08/30/22	0.042	43.8	288	130	na	na	1.08	0.34
	11/29/22	0.079	60.8	314	144	<0.2	0.006	1.26	0.57
	02/22/23	0.078	88.4	304	249	<0.2	0.005	0.65	0.69
	05/16/23	na	72.1	388	174	na	na	1.41	na
	08/23/23	na	43.0	252	107	na	na	1.56	na
	11/14/23	na	48.8	286	116	na	0.006	1.51	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-6
OCWD MONITORING WELL AM-8
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AM-8/1 Shallow Perforations 268-285 ft bgs	02/20/19	0.068	64.0	376	219	<0.2	0.016	0.35	0.42
	04/10/19	na	69.0	446	na	na	0.022	0.36	0.52
	05/21/19	0.062	61.4	390	212	na	na	0.41	0.49
	08/19/19	0.073	59.8	356	179	na	na	0.65	0.45
	11/19/19	0.054	50.7	334	156	na	na	0.62	0.32
	03/17/20	0.07	73.0	454	241	na	na	0.46	0.46
	06/16/20	0.101	69.0	434	224	<0.2	0.01	0.53	0.43
	09/16/20	0.106	85.4	478	254	na	na	0.96	0.47
	12/15/20	0.109	70.3	388	201	na	na	1.07	0.48
	03/16/21	0.076	43.4	284	126	na	na	1.15	0.32
	06/22/21	0.119	73.7	362	180	na	na	1.12	0.51
	09/15/21	0.123	77.0	382	202	<0.2	0.022	1.27	0.68
	12/13/21	0.109	68.7	338	177	na	na	1.33	0.5
	03/15/22	0.091	67.0	356	170	na	na	1.05	0.51
	06/21/22	0.101	80.8	438	221	na	na	0.91	0.59
	08/30/22	0.091	69.7	392	190	na	na	1.05	0.56
	11/29/22	0.077	60.8	338	155	<0.2	0.015	1.23	0.47
	02/22/23	0.064	55.6	494	140	<0.2	0.012	1.06	0.46
	05/16/23	na	75.3	432	208	na	na	0.92	na
	08/23/23	na	62.4	378	175	na	na	1.1	na
	11/14/23	na	60.3	334	151	na	0.013	1.2	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-7
OCWD MONITORING WELL AMD-12
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AMD-12/1 Principal Perforations 330-350 ft bgs	02/19/19	0.065	91.2	570	310	<0.2	<0.002	0.26	0.53
	05/20/19	0.019	16	190	61.7	na	na	0.99	0.27
	06/11/19	na	9.9	128	na	na	<0.002	1.01	0.13
	07/15/19	na	7.6	72	na	na	<0.002	0.88	0.11
	08/20/19	0.019	9	120	17.4	na	na	0.97	0.13
	11/18/19	0.024	12.9	112	25	na	na	1.02	0.10
	01/13/20	na	58.6	304	na	na	<0.002	0.53	0.34
	02/18/20	0.051	59.8	424	171	na	na	0.50	0.39
	05/18/20	0.058	38.6	208	74.6	<0.2	<0.002	1.02	0.19
	07/15/20	na	35.4	204	na	na	<0.002	1.24	0.21
	08/17/20	0.054	34.4	206	84.8	na	na	1.33	0.20
	11/02/20	na	39.8	236	na	na	<0.002	1.38	0.29
	11/16/20	0.071	43	246	107	na	na	1.37	0.29
	02/16/21	0.115	67.7	337	176	na	na	1.48	0.34
	05/17/21	0.151	85.3	470	253	na	na	1.31	0.48
	08/23/21	0.067	41.4	260	152	<0.2	<0.002	1.31	0.27
	11/15/21	0.028	15.7	112	59.4	na	na	1.28	0.16
	02/15/22	0.043	38	222	101	na	na	0.95	0.23
	05/23/22	0.038	36.9	256	111	na	na	1.07	0.21
	08/15/22	0.018	14	114	46.5	na	na	1.33	0.08
	11/14/22	0.013	8.7	68	24.8	<0.2	<0.002	1.5	<0.05
	02/21/23	0.062	80.3	416	264	<0.2	<0.002	0.56	0.47
	05/15/23	na	47.4	280	157	na	na	1.5	na
	08/21/23	na	20	140	69.5	na	na	1.38	na
	11/13/23	na	28.2	166	76.2	na	<0.002	1.43	na
AMD-12/2 Principal Perforations 490-520 ft bgs	02/19/19	0.026	25.1	142	75.1	<0.2	<0.002	1.20	0.15
	05/20/19	0.034	39.6	248	129	na	na	0.98	0.31
	06/11/19	na	na	na	na	na	na	na	na
	07/15/19	na	na	na	na	na	na	na	na
	08/20/19	0.036	40.9	296	136	na	na	0.91	0.29
	11/18/19	0.027	26.7	208	118	na	na	0.85	0.17
	02/18/20	0.037	28	206	91.4	na	na	1.02	0.20
	05/18/20	0.036	29.4	194	107	<0.2	<0.002	1.08	0.14
	08/17/20	0.026	16.8	138	74.2	na	na	1.03	0.10
	11/16/20	0.036	21.5	152	74.3	na	na	1.13	0.21
	02/16/21	0.058	33.9	188	105	na	na	1.27	0.15
	05/17/21	0.067	40.6	214	122	<0.2	na	1.27	0.20
	08/23/21	0.131	74.7	376	230	na	<0.002	1.22	0.36
	11/15/21	0.142	85.2	402	271	na	na	1.17	0.46
	02/15/22	0.057	31.0	232	127	na	na	1.14	0.17
	05/23/22	0.025	14.2	134	61	na	na	1.33	0.09
	08/15/22	0.025	15.4	118	58	na	na	1.37	0.08
	11/14/22	0.025	18.6	116	62	<0.2	<0.002	1.35	0.10
	02/21/23	0.023	15.9	114	55	<0.2	<0.002	1.33	0.08
	05/15/23	na	24.0	156	73	na	na	1.44	na
	08/21/23	na	34.1	188	98	na	na	1.26	na
	11/13/23	na	38.9	234	119	na	<0.002	1.33	na

TABLE J-7
OCWD MONITORING WELL AMD-12
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AMD-12/3 Principal Perforations 595-615 ft bgs	02/19/19	0.055	34.4	242	91.2	<0.2	<0.002	0.86	0.26
	05/20/19	0.065	53.1	334	126	na	na	0.85	0.39
	06/11/19	na	na	na	na	na	na	na	na
	07/15/19	na	na	na	na	na	na	na	na
	08/20/19	0.073	68.5	412	163	na	na	0.70	0.52
	11/18/19	0.071	80.5	472	217	na	na	0.41	0.48
	02/18/20	0.073	78.1	544	246	na	na	0.60	0.50
	05/18/20	0.083	77.6	472	229	<0.2	<0.002	0.89	0.45
	08/17/20	0.091	71.9	410	199	na	na	1.17	0.46
	11/16/20	0.089	61.9	378	188	na	na	1.35	0.41
	02/16/21	0.088	54.9	333	145	na	na	1.28	0.34
	05/17/21	0.102	66.9	396	168	na	na	1.14	0.39
	08/23/21	0.128	80.3	438	213	<0.2	<0.002	1.35	0.48
	11/15/21	0.14	86.4	394	232	na	na	1.28	0.61
	02/15/22	0.163	91.6	466	242	na	na	1.26	0.70
	05/23/22	0.153	96.2	480	248	na	na	1.35	0.75
	08/15/22	0.146	95.4	482	252	na	na	1.56	0.73
	11/14/22	0.121	83.2	406	218	<0.2	<0.002	1.55	0.58
	02/21/23	0.106	81.9	424	221	<0.2	<0.002	1.13	0.55
	05/15/23	na	91.6	500	241	na	na	0.91	na
	08/21/23	na	88.2	476	268	na	na	0.81	na
	11/13/23	na	85.3	490	252	na	<0.002	0.93	na
AMD-12/4 Principal Perforations 725-745 ft bgs	02/19/19	0.086	58.9	398	173	<0.2	<0.002	0.84	0.55
	05/20/19	0.076	53.3	340	148	na	na	0.67	0.58
	06/11/19	na	na	na	na	na	na	na	na
	07/15/19	na	na	na	na	na	na	na	na
	08/20/19	0.079	59.1	382	135	na	na	0.62	0.67
	11/18/19	0.078	73	412	170	na	na	0.37	0.57
	02/18/20	0.083	81.2	514	219	na	na	0.44	0.66
	05/18/20	0.087	89.3	550	244	<0.2	<0.002	0.52	0.68
	08/17/20	0.102	91.2	530	247	na	na	0.81	0.66
	11/16/20	0.108	85.8	496	230	na	na	1.07	0.63
	02/16/21	0.12	83	473	212	na	na	1.22	0.61
	05/17/21	0.123	81	480	207	na	na	1.14	0.57
	08/23/21	0.133	86.4	472	215	<0.2	0.002	1.21	0.58
	11/15/21	0.135	88.9	434	214	na	na	1.32	0.59
	02/15/22	0.147	88.7	462	212	na	na	1.30	0.62
	05/23/22	0.148	91.5	478	216	na	na	1.28	0.65
	08/15/22	0.141	95.7	492	230	na	na	1.38	0.73
	11/14/22	0.151	101	464	217	<0.2	<0.002	1.52	0.72
	02/21/23	0.148	102	498	249	<0.2	<0.002	1.50	0.77
	05/15/23	na	104	528	251	na	na	1.34	na
	08/21/23	na	101	524	269	na	na	1.02	na
	11/13/23	na	103	550	280	na	<0.002	1.02	na

TABLE J-7
OCWD MONITORING WELL AMD-12
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AMD-12/5 Principal Perforations 940-960 ft bgs	02/19/19	0.107	97	580	278	<0.2	<0.002	0.61	0.57
	05/20/19	0.1	96.8	592	284	na	na	0.56	0.69
	06/11/19	na	na	na	na	na	na	na	na
	07/15/19	na	na	na	na	na	na	na	na
	08/20/19	0.099	93.5	600	263	na	na	0.63	0.75
	11/18/19	0.091	91.6	578	251	na	na	0.46	0.62
	02/18/20	0.095	84.9	588	244	na	na	0.55	0.64
	05/18/20	0.091	82.9	526	235	<0.2	<0.002	0.48	0.60
	08/17/20	0.094	82.7	504	230	na	na	0.42	0.59
	11/16/20	0.093	83.4	524	249	na	na	0.42	0.61
	02/16/21	0.100	84.2	533	229	na	na	0.49	0.58
	05/17/21	0.102	82.5	542	228	na	na	0.63	0.60
	08/23/21	0.110	81.5	516	223	<0.2	<0.002	0.73	0.57
	11/15/21	0.111	84	432	211	na	na	0.78	0.56
	02/15/22	0.124	86.8	512	223	na	na	0.81	0.55
	05/23/22	0.118	90	522	228	na	na	0.82	0.53
	08/15/22	0.119	92.1	532	243	na	na	0.88	0.55
	11/14/22	0.125	94.9	516	242	0.3	<0.002	0.96	0.51
	02/21/23	0.132	95.7	536	255	<0.2	<0.002	1.08	0.50
	05/15/23	na	97.7	542	248	na	na	1.19	na
	08/21/23	na	97.2	524	265	na	na	1.24	na
	11/13/23	na	102	556	274	na	<0.002	1.41	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE J-8
OCWD MONITORING WELL AM-10
2019 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
AM-10/1 Shallow Perforations 217-235 ft bgs	2/20/2019	0.012	5.3	58	33.1	<0.2	0.004	1.06	<0.05
	5/21/2019	0.014	5.3	55	33.5	na	na	0.95	0.08
	8/19/2019	0.015	5.9	32	36.5	na	na	1.12	0.08
	11/26/2019	0.064	5	73	29.8	na	na	1.18	<0.05
	3/17/2020	0.017	5.5	68	33.1	na	na	0.99	0.11
	6/16/2020	0.014	5.2	66	34.4	<0.2	0.002	1	0.07
	9/16/2020	0.016	6.5	78	39.3	na	na	1.41	<0.05
	12/15/2020	0.017	5.9	70	36.5	na	na	1.2	<0.05
	3/16/2021	0.014	5.1	79	33.3	na	na	1.05	0.12
	6/22/2021	0.012	4.6	69	34	na	na	0.91	<0.05
	9/15/2021	0.02	9.2	83	44.2	<0.2	0.003	1.2	0.09
	12/13/2021	0.043	24.5	149	101	na	na	1.62	0.28
	3/15/2022	0.011	6.5	62	38.3	na	na	1.34	0.3
	6/21/2022	0.01	6.6	60	38.3	na	na	1.47	0.08
	8/30/2022	0.011	6.8	80	38.6	na	na	1.59	0.06
	11/29/2022	0.011	7.3	68	40.4	<0.2	<0.002	1.77	0.07
	2/22/2023	0.024	8.5	74	39.6	<0.2	<0.002	1.51	0.17
	5/16/2023	na	9.1	78	39.8	na	na	1.38	na
	8/23/2023	na	11.0	79	45.3	na	na	1.54	na
	11/14/2023	na	7.3	78	38.9	na	<0.002	1.41	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

Appendix K

Groundwater Quality Data at the Mid-Basin Area

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

GWRS 2023 Quarterly Sampling Dates

OCWD Water Quality Department

MID-BASIN INJECTION (MBI) PROJECT

GROUNDWATER

Monitoring Well	Qtr 1	Qtr 2	Qtr 3	Qtr 4
SAR-12/1-4	02/07/2023	05/02/2023	08/08/2023	10/31/2023
SAR-13/1-4	02/08/2023	05/03/2023	08/09/2023	11/01/2023

Notes for Appendix K Tables:

► The full-scale Mid-Basin (MBI) project operations began in March 2020.

► Listed dates (above) are the 2023 dates of quarterly baseline monitoring activities.

► Results listed in the table for each quarter are the range of the minimum and maximum values detected at the well location, which may consist of one to four well casings. Figures and report text list the well ID (e.g. SAR-12) and casing number (e.g., SAR-12/1, SAR-12/2, SAR-12/3 and SAR-12/4), as appropriate.

► Appendices B & C contain a list of all methods and reportable detection limits (RDL).

► Detailed data reports are available upon request.

► The more stringent value in the range of secondary MCLs is used in the tables (e.g., <MCL) for TDS, electrical conductivity (EC), chloride and sulfate.

► MCL: Maximum Contaminant Level

► N/A: Not applicable

► ND: Not detected at reportable detection limit (RDL)

► NL: SWRCB DDW (formerly CDPH) Notification Level

► NR: Not required

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	SAR-12 Qtr 1	SAR-12 Qtr 2	SAR-12 Qtr 3	SAR-12 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	89.3 - 216	100 - 264	106 - 236	92 - 234
Chloride (Cl), mg/L	OCWD	EPA 300.0	5.8 - 16	6.2 - 15.3	6.7 - 11.4	7.1 - 11.3
Sulfate (SO4), mg/L	OCWD	EPA 300.0	2.2 - 41.8	2.1 - 40.8	1.9 - 32.3	1.8 - 30
Sodium (Na), mg/L	OCWD	EPA 200.7	21.4 - 40.6	20.8 - 39.5	20.9 - 38.2	20.8 - 35.8
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 1.2	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.29	ND - 1.36	ND - 1.54	ND - 1.64
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	7.6 - 33.1	ND - 13	ND - 612	ND - 8.3
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 18.8	ND - 17.8	ND - 22.1	ND - 15
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-1.13	-0.97	-1.12	-1.01
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.2	ND - 0.1	0.15 - 2.5	ND - 0.15
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	27.1 - 141	26.6 - 133	26.9 - 131	28.1 - 129
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND - 2.1	ND
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 12.7	ND - 7	ND - 218	ND - 6.5
Arsenic (As), ug/L	OCWD	EPA 200.8	1 - 3.1	1.1 - 3	1 - 3	1.1 - 3.2
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND - 1.7	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 5.64	ND - 5.39	ND - 5.37	ND - 5.13
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND - 1.6	ND - 1.2	ND - 1.8	ND - 1
Selenium (Se), ug/L	OCWD	EPA 200.8	ND - 1.3	ND - 1.5	ND - 1.4	ND - 1.3
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	ND - TR	ND - TR
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND - 0.5	ND - TR	ND - TR	ND - TR
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.2	ND - 1.2	ND - 1.4	ND - 1.3
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 3.9	ND - 4.4	ND - 4.7	ND - 3.5
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 7.3	ND - 7.2	ND - 7.4	ND - 7.7
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	SAR-12 Qtr 1	SAR-12 Qtr 2	SAR-12 Qtr 3	SAR-12 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

SAR-12/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/7/2023	11:35	Bromodichloromethane (CHBrCl)	0.5	ug/L	0.5
2/7/2023	11:35	Chloroform (CHCl3)	1.2	ug/L	0.5
2/7/2023	11:35	Total Trihalomethanes (TTHMs)	1.7	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/7/2023	11:35	n-Nitrosodimethylamine (NDMA)	3.9	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/2/2023	11:50	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/2/2023	11:50	Chloroform (CHCl3)	1.2	ug/L	0.5
5/2/2023	11:50	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/2/2023	11:50	n-Nitrosodimethylamine (NDMA)	4.4	ng/L	2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/8/2023	11:00	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
8/8/2023	11:00	Chloroform (CHCl3)	1.4	ug/L	0.5
8/8/2023	11:00	Total Trihalomethanes (TTHMs)	1.4	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/8/2023	11:00	n-Nitrosodimethylamine (NDMA)	4.7	ng/L	2

SAR-12/3
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/31/2023	12:25	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
10/31/2023	12:25	Chloroform (CHCl3)	1.3	ug/L	0.5
10/31/2023	12:25	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/31/2023	12:25	n-Nitrosodimethylamine (NDMA)	3.5	ng/L	2

SAR-12/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/7/2023	10:10	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/7/2023	10:10	n-Nitrosodimethylamine (NDMA)	2	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/2/2023	10:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/8/2023	10:15	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
10/31/2023	11:10	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Summary of 2023 Water Quality Monitoring

Parameter	Lab	Method	SAR-13 Qtr 1	SAR-13 Qtr 2	SAR-13 Qtr 3	SAR-13 Qtr 4
Total Dissolved Solids (TDS), mg/L	OCWD	SM 2540C	72 - 133	82 - 132	98 - 136	88 - 136
Chloride (Cl), mg/L	OCWD	EPA 300.0	5.5 - 7.4	6 - 8.4	5.8 - 8	6.2 - 9
Sulfate (SO4), mg/L	OCWD	EPA 300.0	0.9 - 7.8	1.1 - 7.8	1.4 - 8	1.4 - 8.6
Sodium (Na), mg/L	OCWD	EPA 200.7	13.9 - 25.3	13.5 - 26.7	13 - 29.5	13.1 - 29.7
Total Nitrogen (TOT-N), mg/L	OCWD	Calculated	ND - 1.5	Not Required	Not Required	Not Required
Nitrate Nitrogen (NO3-N), mg/L	OCWD	SM 4500NO3F	ND - 1.63	ND - 1.62	ND - 1.66	ND - 1.56
Nitrite Nitrogen (NO2-N), mg/L	OCWD	SM 4500NO3F	ND - 0.003	Not Required	Not Required	Not Required
Iron (Fe), ug/L	OCWD	EPA 200.7	ND	ND	ND - 7.2	ND
Manganese (Mn), ug/L	OCWD	EPA 200.8	ND - 6.9	ND - 6.7	ND - 7	ND - 6.7
Threshold Odor Number (Median) (ODOR), TON	OCWD	SM 2150B	ND	Not Required	Not Required	Not Required
Apparent Color (unfiltered) (APCOLR), UNITS	OCWD	SM 2130B	ND	Not Required	Not Required	Not Required
Corrosivity (CORROS), S.I.	OCWD	SM 2330B	-0.76	-0.76	-0.69	-0.73
Turbidity (TURB), NTU	OCWD	SM 2130B	ND - 0.1	ND	ND - 0.1	ND
Total Hardness (as CaCO3) (TOTHRD), mg/L	OCWD	EPA 200.7	19.5 - 77.9	21.1 - 74.8	17.4 - 74.1	19 - 72.8
Lead (Pb), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Copper (Cu), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND - 3.1
Zinc (Zn), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Aluminum (Al), ug/L	OCWD	EPA 200.8	ND - 7.5	ND - 6.9	ND - 9.3	ND - 8.9
Arsenic (As), ug/L	OCWD	EPA 200.8	2.1 - 3.6	2.2 - 3.5	2.1 - 3.9	2 - 3.9
Beryllium (Be), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Cadmium (Cd), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Chromium (III) trivalent (CrIII), ug/L	OCWD	Calculated	ND	ND	ND	ND
Hexavalent Chromium (CrVI), ug/L	OCWD	EPA 218.7	ND - 0.9	ND - 0.74	ND - 0.62	ND - 0.61
Nickel (Ni), ug/L	OCWD	EPA 200.8	ND	ND	ND - 1.1	ND
Selenium (Se), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Thallium (Tl), ug/L	OCWD	EPA 200.8	ND	ND	ND	ND
Dichloromethane (CH2Cl2), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	ND - TR	ND - TR
Methyl-tert-butyl ether (MTBE), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Bromodichloromethane (CHBrCl), ug/L	OCWD	EPA 524.2	ND - TR	ND - TR	ND - 0.6	ND - 0.6
Chloroform (CHCl3), ug/L	OCWD	EPA 524.2	ND - 1.3	ND - 1.2	ND - 1.5	ND - 1.3
Acrolein (ACROLN), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
Acrylonitrile (ACRYLO), ug/L	OCWD	EPA 524.2	ND	ND	ND	ND
n-Nitrosodimethylamine (NDMA), ng/L	OCWD	NDMA-LOW	ND - 5.2	ND - 5	ND - 3.6	ND - 3.2
Additional Voluntary Monitoring						
Vanadium (V), ug/L	OCWD	EPA 200.8	ND - 15	ND - 14.4	ND - 16.8	ND - 16.5
1,4-Dioxane (14DIOX), ug/L	OCWD	14DIOX	ND	ND	ND	ND

Summary of 2023 Volatile and Semi-Volatile Water Quality Chemicals

Method	Description	Lab	SAR-13 Qtr 1	SAR-13 Qtr 2	SAR-13 Qtr 3	SAR-13 Qtr 4
14DIOX	1,4-Dioxane Analytical Procedure	OCWD	ND	ND	ND	ND
524.2	Volatile Organic Compounds (VOCs)	OCWD	ND < MCL	ND < MCL	ND < MCL	ND < MCL
525.2	Semi-Volatile Organic Compounds (SOCs)	OCWD	ND	Not Required	Not Required	Not Required
551.1	Disinfection Byproducts (DBPs) - Haloacetonitriles	OCWD	ND	Not Required	Not Required	Not Required
CEC	Chemicals of Emerging Concern	OCWD	ND	Not Required	Not Required	Not Required
NDMA-LOW	NDMA-LOW Analytical Procedure	OCWD	ND < NL	ND < NL	ND < NL	ND < NL

SAR-13/1
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/8/2023	9:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/8/2023	9:20	Chloroform (CHCl3)	1.1	ug/L	0.5
2/8/2023	9:20	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	9:35	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/3/2023	9:35	Chloroform (CHCl3)	0.9	ug/L	0.5
5/3/2023	9:35	Total Trihalomethanes (TTHMs)	0.9	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	9:35	n-Nitrosodimethylamine (NDMA)	2.1	ng/L	2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/9/2023	9:50	Bromodichloromethane (CHBrCl)	0.5	ug/L	0.5
8/9/2023	9:50	Chloroform (CHCl3)	1.5	ug/L	0.5
8/9/2023	9:50	Total Trihalomethanes (TTHMs)	2.1	ug/L	0.5

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/1/2023	9:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
11/1/2023	9:55	Chloroform (CHCl3)	1.1	ug/L	0.5
11/1/2023	9:55	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

SAR-13/1
Organic Detections by Method

Year 2023, Quarter 4

METHOD: NDMA-LOW

Sample Date &	Time	Parameter	Result	Units	Reportable Detection Limit
11/1/2023	9:55	n-Nitrosodimethylamine (NDMA)	2.1	ng/L	2

SAR-13/2
Organic Detections by Method

Year 2023, Quarter 1

METHOD: ***524.2***

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
2/8/2023	10:30	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2023, Quarter 2

METHOD: ***524.2***

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
5/3/2023	10:45	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2023, Quarter 3

METHOD: ***524.2***

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
8/9/2023	10:50	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

Year 2023, Quarter 4

METHOD: ***524.2***

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
11/1/2023	11:00	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5

SAR-13/3
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/8/2023	11:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/8/2023	11:20	Chloroform (CHCl3)	1.2	ug/L	0.5
2/8/2023	11:20	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/8/2023	11:20	n-Nitrosodimethylamine (NDMA)	3.3	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	11:25	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/3/2023	11:25	Chloroform (CHCl3)	1.1	ug/L	0.5
5/3/2023	11:25	Total Trihalomethanes (TTHMs)	1.1	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	11:25	n-Nitrosodimethylamine (NDMA)	3.5	ng/L	2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/9/2023	11:30	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
8/9/2023	11:30	Chloroform (CHCl3)	1.4	ug/L	0.5
8/9/2023	11:30	Total Trihalomethanes (TTHMs)	2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/9/2023	11:30	n-Nitrosodimethylamine (NDMA)	3.6	ng/L	2

SAR-13/3
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
11/1/2023	11:40	Bromodichloromethane (CHBrCl)	0.6	ug/L	0.5
11/1/2023	11:40	Chloroform (CHCl3)	1.3	ug/L	0.5
11/1/2023	11:40	Methylene Chloride (CH2Cl2)	TR	ug/L	0.5
11/1/2023	11:40	Total Trihalomethanes (TTHMs)	1.9	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		*Parameter*	*Result*	*Units*	*Reportable Detection Limit*
11/1/2023	11:40	n-Nitrosodimethylamine (NDMA)	2.8	ng/L	2

SAR-13/4
Organic Detections by Method

Year 2023, Quarter 1

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/8/2023	9:55	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
2/8/2023	9:55	Chloroform (CHCl3)	1.3	ug/L	0.5
2/8/2023	9:55	Total Trihalomethanes (TTHMs)	1.3	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
2/8/2023	9:55	n-Nitrosodimethylamine (NDMA)	5.2	ng/L	2

Year 2023, Quarter 2

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	10:05	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
5/3/2023	10:05	Chloroform (CHCl3)	1.2	ug/L	0.5
5/3/2023	10:05	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
5/3/2023	10:05	n-Nitrosodimethylamine (NDMA)	5	ng/L	2

Year 2023, Quarter 3

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/9/2023	10:15	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
8/9/2023	10:15	Chloroform (CHCl3)	1.2	ug/L	0.5
8/9/2023	10:15	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
8/9/2023	10:15	n-Nitrosodimethylamine (NDMA)	3.4	ng/L	2

SAR-13/4
Organic Detections by Method

Year 2023, Quarter 4

METHOD: 524.2

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/1/2023	10:20	Bromodichloromethane (CHBrCl)	TR	ug/L	0.5
11/1/2023	10:20	Chloroform (CHCl3)	1.2	ug/L	0.5
11/1/2023	10:20	Total Trihalomethanes (TTHMs)	1.2	ug/L	0.5

METHOD: NDMA-LOW

Sample Date & Time		Parameter	Result	Units	Reportable Detection Limit
11/1/2023	10:20	n-Nitrosodimethylamine (NDMA)	3.2	ng/L	2

Appendix L

Mid-Basin Injection Area Compliance Monitoring Well Groundwater Quality

1,4-Dioxane, NDMA and Selected Constituents

Orange County Water District
Groundwater Replenishment System
2023 Annual Report

TABLE L-1
OCWD MONITORING WELL SAR-12
1,4-dioxane and NDMA Concentrations
2020 - 2023

SAR-12/1 *Lower Rho Aquifer* *Perforations: 605-625 ft bgs*			**SAR-12/2** *Main 2 Aquifer* *Perforations: 755-775 ft bgs*			**SAR-12/3** *Main 4 Aquifer* *Perforations: 915-930 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2	1/8/2020	na	<2	1/8/2020	na	<2
2/4/2020	<1	<2	2/4/2020	<1	<2	2/4/2020	<1	<2
5/5/2020	<1	<2	5/5/2020	<1	<2	5/5/2020	<1	<2
6/4/2020	na	<2	6/4/2020	na	<2	6/4/2020	na	<2
6/30/2020	na	<2	6/30/2020	na	<2	6/30/2020	na	<2
7/13/2020	na	<2	7/13/2020	na	<2	7/13/2020	na	<2
7/27/2020	na	<2	7/27/2020	na	<2	7/27/2020	na	<2
8/4/2020	<0.5	<2	8/4/2020	<0.5	<2	8/4/2020	<0.5	<2
8/20/2020	na	<2	8/20/2020	na	<2	8/20/2020	na	<2
9/2/2020	na	<2	9/2/2020	na	<2	9/2/2020	na	<2
9/17/2020	na	<2	9/17/2020	na	<2	9/17/2020	na	<2
10/1/2020	na	<2	10/1/2020	na	<2	10/1/2020	na	<2
10/14/2020	na	<2	10/14/2020	na	<2	10/14/2020	na	<2
10/26/2020	na	<2	10/26/2020	na	<2	10/26/2020	na	<2
11/5/2020	<0.5	<2	11/5/2020	<0.5	<2	11/5/2020	<0.5	<2
11/18/2020	na	<2	11/18/2020	na	<2	11/18/2020	na	<2
12/2/2020	na	<2	12/2/2020	na	<2	12/2/2020	na	<2
12/14/2020	na	<2	12/14/2020	na	<2	12/14/2020	na	<2
12/31/2020	na	<2	12/31/2020	na	<2	12/31/2020	na	<2
1/7/2021	na	<2	1/7/2021	na	<2	1/7/2021	na	<2
1/21/2021	na	<2	1/21/2021	na	<2	1/21/2021	na	<2
2/2/2021	<0.5	<2	2/2/2021	<0.5	<2	2/2/2021	<0.5	<2
2/18/2021	na	<2	2/18/2021	na	<2	2/18/2021	na	<2
3/4/2021	na	<2	3/4/2021	na	<2	3/4/2021	na	<2
3/18/2021	na	<2	3/18/2021	na	<2	3/18/2021	na	<2
4/1/2021	na	<2	4/1/2021	na	<2	4/1/2021	na	<2
4/15/2021	na	<2	4/15/2021	na	<2	4/15/2021	na	<2
5/4/2021	<0.5	<2	5/4/2021	<0.5	<2	5/4/2021	<0.5	<2
5/19/2021	na	<2	5/19/2021	na	<2	5/19/2021	na	<2
6/3/2021	na	<2	6/3/2021	na	<2	6/3/2021	na	<2
6/17/2021	na	<2	6/17/2021	na	<2	6/17/2021	na	<2
7/1/2021	na	<2	7/1/2021	na	<2	7/1/2021	na	<2
7/15/2021	na	<2	7/15/2021	na	<2	7/15/2021	na	<2
7/26/2021	na	<2	7/26/2021	na	<2	7/26/2021	na	2.5
8/10/2021	<0.5	<2	8/10/2021	<0.5	<2	8/10/2021	<0.5	2.4
8/25/2021	na	<2	8/25/2021	na	<2	8/25/2021	na	3.0
9/9/2021	na	<2	9/9/2021	na	<2	9/9/2021	na	3.0
9/23/2021	na	<2	9/23/2021	na	<2	9/23/2021	na	2.7
10/7/2021	na	<2	10/7/2021	na	<2	10/7/2021	na	3.5
10/21/2021	na	<2	10/21/2021	na	<2	10/21/2021	na	2.9
11/2/2021	<0.5	<2	11/2/2021	<0.5	<2	11/2/2021	<0.5	2.3
2/1/2022	<0.5	<2	2/1/2022	<0.5	<2	2/1/2022	<0.5	2.5
5/10/2022	<0.5	<2	5/10/2022	<0.5	<2	5/10/2022	<0.5	2.3
8/2/2022	<0.5	<2	8/2/2022	<0.5	<2	8/2/2022	<0.5	2.9
11/1/2022	<0.5	<2	11/1/2022	<0.5	<2	11/1/2022	<0.5	3.7
2/7/2023	<0.5	<2	2/7/2023	<0.5	<2	2/7/2023	<0.5	3.9
5/2/2023	<0.5	<2	5/2/2023	<0.5	<2	5/2/2023	<0.5	4.4
8/8/2023	<0.5	<2	8/8/2023	<0.5	<2	8/8/2023	<0.5	4.7
10/31/2023	<0.5	<2	10/31/2023	<0.5	<2	10/31/2023	<0.5	3.5

TABLE L-1
OCWD MONITORING WELL SAR-12
1,4-dioxane and NDMA Concentrations
2020 - 2023

SAR-12/4 *Main 7 Aquifer* *Perforations: 1,045-1,055 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2
2/4/2020	<1	<2
5/5/2020	<1	<2
6/4/2020	na	<2
6/30/2020	na	<2
7/13/2020	na	<2
7/27/2020	na	<2
8/4/2020	<0.5	<2
8/20/2020	na	<2
9/2/2020	na	<2
9/17/2020	na	<2
10/1/2020	na	<2
10/14/2020	na	<2
10/26/2020	na	<2
11/5/2020	<0.5	<2
11/18/2020	na	<2
12/2/2020	na	<2
12/14/2020	na	<2
12/31/2020	na	<2
1/7/2021	na	<2
1/21/2021	na	<2
2/2/2021	<0.5	<2
2/18/2021	na	<2
3/4/2021	na	<2
3/18/2021	na	<2
4/1/2021	na	<2
4/15/2021	na	<2
5/4/2021	<0.5	<2
5/19/2021	na	<2
6/3/2021	na	<2
6/17/2021	na	<2
7/1/2021	na	<2
7/15/2021	na	<2
7/26/2021	na	<2
8/10/2021	<0.5	<2
8/25/2021	na	<2
9/9/2021	na	<2
9/23/2021	na	<2
10/7/2021	na	5.9
10/21/2021	na	<2
11/2/2021	<0.5	<2
2/1/2022	<0.5	<2
5/10/2022	<0.5	2.4
8/2/2022	<0.5	<2
11/1/2022	<0.5	<2
2/7/2023	<0.5	2
5/2/2023	<0.5	<2
8/8/2023	<0.5	<2
10/31/2023	<0.5	<2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE L-2
OCWD MONITORING WELL SAR-13
1,4-dioxane and NDMA Concentrations
2020 - 2023

SAR-13/1 *Lower Rho Aquifer* *Perforations: 600-620 ft bgs*			**SAR-13/2** *Main 2 Aquifer* *Perforations: 750-770 ft bgs*			**SAR-13/3** *Main 4 Aquifer* *Perforations: 910-930 ft bgs*		
Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)	Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2	1/8/2020	na	<2	1/8/2020	na	<2
2/4/2020	<1	<2	2/4/2020	<1	<2	2/4/2020	<1	<2
4/1/2020	na	<2	4/1/2020	na	<2	4/1/2020	na	<2
4/15/2020	na	<2	4/15/2020	na	<2	4/15/2020	na	<2
4/30/2020	na	<2	4/30/2020	na	<2	4/30/2020	na	<2
5/6/2020	<1	<2	5/6/2020	<1	<2	5/6/2020	<1	<2
5/21/2020	na	<2	5/21/2020	na	<2	5/21/2020	na	<2
6/4/2020	na	<2	6/4/2020	na	<2	6/1/2020	na	<2
6/17/2020	na	<2	6/17/2020	na	<2	6/17/2020	na	<2
6/30/2020	na	<2	6/30/2020	na	<2	6/30/2020	na	<2
7/13/2020	na	<2	7/13/2020	na	<2	7/13/2020	na	<2
7/27/2020	na	<2	7/27/2020	na	<2	7/27/2020	na	<2
8/5/2020	<0.5	<2	8/5/2020	<0.5	<2	8/5/2020	<0.5	<2
8/20/2020	na	<2	8/20/2020	na	<2	8/20/2020	na	<2
9/2/2020	na	<2	9/2/2020	na	<2	9/2/2020	na	<2
9/17/2020	na	<2	9/17/2020	na	<2	9/17/2020	na	<2
10/1/2020	na	<2	10/1/2020	na	<2	10/1/2020	na	<2
10/14/2020	na	<2	10/14/2020	na	<2	10/14/2020	na	2.2
10/26/2020	na	<2	10/26/2020	na	<2	10/26/2020	na	2.4
11/4/2020	<0.5	<2	11/4/2020	<0.5	<2	11/4/2020	<0.5	2.8
11/18/2020	na	<2	11/18/2020	na	<2	11/18/2020	na	3.1
12/2/2020	na	<2	12/2/2020	na	<2	12/2/2020	na	3.2
12/14/2020	na	<2	12/14/2020	na	<2	12/14/2020	na	3.7
12/31/2020	na	<2	12/31/2020	na	<2	12/31/2020	na	3.2
1/7/2021	na	<2	1/7/2021	na	<2	1/7/2021	na	3.1
1/21/2021	na	<2	1/21/2021	na	<2	1/21/2021	na	3.7
2/3/2021	<0.5	<2	2/3/2021	<0.5	<2	2/3/2021	<0.5	4.5
2/18/2021	na	<2	2/18/2021	na	<2	2/18/2021	na	4.4
3/4/2021	na	<2	3/4/2021	na	<2	3/4/2021	na	4.5
3/18/2021	na	<2	3/18/2021	na	<2	3/18/2021	na	4.3
4/1/2021	na	<2	4/1/2021	na	<2	4/1/2021	na	4.4
4/15/2021	na	<2	4/15/2021	na	<2	4/15/2021	na	4.0
5/5/2021	<0.5	<2	5/5/2021	<0.5	<2	5/5/2021	<0.5	3.7
5/19/2021	na	<2	5/19/2021	na	<2	5/19/2021	na	3.3
6/3/2021	na	<2	6/3/2021	na	<2	6/3/2021	na	2.9
6/17/2021	na	<2	6/17/2021	na	<2	6/17/2021	na	3.0
7/1/2021	na	<2	7/1/2021	na	<2	7/1/2021	na	3.0
7/15/2021	na	<2	7/15/2021	na	<2	7/15/2021	na	2.9
7/27/2021	na	<2	7/27/2021	na	<2	7/27/2021	na	3.0
8/11/2021	<0.5	<2	8/11/2021	<0.5	<2	8/11/2021	<0.5	3.6
8/25/2021	na	<2	8/25/2021	na	<2	8/25/2021	na	4.4
9/9/2021	na	<2	9/9/2021	na	<2	9/9/2021	na	3.7
9/23/2021	na	<2	9/23/2021	na	<2	9/23/2021	na	3.6
10/7/2021	na	<2	10/7/2021	na	<2	10/7/2021	na	4.7
10/21/2021	na	<2	10/21/2021	na	<2	10/21/2021	na	3.6
11/3/2021	<0.5	<2	11/3/2021	<0.5	<2	11/3/2021	<0.5	4.0
2/2/2022	<0.5	<2	2/2/2022	<0.5	<2	2/2/2022	<0.5	4.2
5/11/2022	<0.5	<2	5/11/2022	<0.5	<2	5/11/2022	<0.5	4.1
8/3/2022	<0.5	<2	8/3/2022	<0.5	<2	8/3/2022	<0.5	5.1
11/1/2022	<0.5	2.2	11/1/2022	<0.5	<2	11/1/2022	<0.5	4.0
2/8/2023	<0.5	<2	2/8/2023	<0.5	<2	2/8/2023	<0.5	3.3
5/3/2023	<0.5	2.1	5/3/2023	<0.5	<2	5/3/2023	<0.5	3.5
8/9/2023	<0.5	<2	8/9/2023	<0.5	<2	8/9/2023	<0.5	3.6
11/1/2023	<0.5	2.1	11/1/2023	<0.5	<2	11/1/2023	<0.5	2.8

TABLE L-2
OCWD MONITORING WELL SAR-13
1,4-dioxane and NDMA Concentrations
2020 - 2023

SAR-13/4
Main 7 Aquifer
Perforations: 1,045-1,055 ft bgs

Date	1,4-dioxane (ug/L)	NDMA (ng/L)
1/8/2020	na	<2
2/4/2020	<1	<2
4/1/2020	na	<2
4/15/2020	na	<2
4/30/2020	na	<2
5/6/2020	<1	<2
5/21/2020	na	<2
6/1/2020	na	<2
6/17/2020	na	<2
6/30/2020	na	2.6
7/13/2020	na	2.8
7/27/2020	na	3.0
8/5/2020	<0.5	2.8
8/20/2020	na	3.6
9/2/2020	na	3.4
9/17/2020	na	3.5
10/1/2020	na	3.4
10/14/2020	na	3.2
10/26/2020	na	3.3
11/4/2020	<0.5	3.3
11/18/2020	na	3.4
12/2/2020	na	3.0
12/14/2020	na	3.0
12/31/2020	na	2.9
1/7/2021	na	3.0
1/21/2021	na	3.4
2/3/2021	<0.5	4.1
2/18/2021	na	3.4
3/4/2021	na	3.9
3/18/2021	na	3.7
4/1/2021	na	3.8
4/15/2021	na	3.3
5/5/2021	<0.5	3.3
5/19/2021	na	3.3
6/3/2021	na	3.1
6/17/2021	na	3.5
7/1/2021	na	3.6
7/15/2021	na	3.6
7/27/2021	na	3.5
8/11/2021	<0.5	4.2
8/25/2021	na	3.2
9/9/2021	na	2.6
9/23/2021	na	4.0
10/7/2021	na	3.8
10/21/2021	na	3.7
11/3/2021	<0.5	3.4
2/2/2022	<0.5	3.6
5/11/2022	<0.5	4.3
8/3/2022	<0.5	4.9
11/1/2022	<0.5	5.1
2/8/2023	<0.5	5.2
5/3/2023	<0.5	5.0
8/9/2023	<0.5	3.4
11/1/2023	<0.5	3.2

Notes: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE L-3
OCWD MONITORING WELL SAR-12
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-12/1 Lower Rho Perforations 605-625 ft bgs	1/8/2020	na	12	34	274	135	na	<0.002	<0.1	na
	2/4/2020	0.035	12	33.7	250	144	<0.2	<0.002	<0.1	0.08
	5/5/2020	0.034	11.6	33.3	256	132	<0.2	<0.002	<0.1	0.09
	6/4/2020	na	11.6	33.1	234	135	na	<0.002	<0.1	na
	6/30/2020	na	11.8	34.2	236	136	na	<0.002	<0.1	na
	7/13/2020	na	11.9	34.3	246	135	na	<0.002	<0.1	na
	7/27/2020	na	11.5	33.1	232	131	na	<0.002	<0.1	na
	8/4/2020	0.037	11.7	33.9	236	132	<0.2	<0.002	<0.1	<0.05
	8/20/2020	na	11.7	33.3	256	130	na	<0.002	<0.1	na
	9/2/2020	na	11.9	34.2	230	133	na	<0.002	<0.1	na
	9/17/2020	na	11.5	32.8	232	131	na	<0.002	0.13	na
	10/1/2020	na	11.8	33.8	254	130	na	<0.002	0.1	na
	10/14/2020	na	11.6	33.2	248	131	na	<0.002	0.11	na
	10/26/2020	na	11.8	33.6	234	127	na	<0.002	<0.1	na
	11/5/2020	0.037	11.7	33.6	226	127	<0.2	<0.002	0.11	<0.05
	11/18/2020	na	11.6	32.9	260	123	na	<0.002	0.12	<0.05
	12/2/2020	na	11.4	32.5	236	128	na	0.002	0.12	0.06
	12/14/2020	na	11.4	32.7	242	131	na	0.003	0.13	0.12
	12/31/2020	na	11.3	32.7	235	125	na	0.003	0.12	<0.05
	1/7/2021	na	11.4	32.7	228	na	na	0.048	0.13	0.07
	1/21/2021	na	11.4	32.7	235	na	na	<0.002	0.16	<0.05
	2/2/2021	0.04	11.5	32.8	215	125	<0.2	0.002	0.15	0.06
	2/18/2021	na	11.8	34	241	na	na	<0.002	0.16	<0.05
	3/4/2021	na	11.6	32.8	230	na	na	<0.002	0.21	<0.05
	3/18/2021	na	11.3	31.8	213	na	na	<0.002	0.2	<0.05
	4/1/2021	na	11.4	32	234	na	na	<0.002	0.16	<0.05
	4/15/2021	na	11.3	32.1	212	na	na	<0.002	0.17	<0.05
	5/4/2021	0.037	11	31.5	238	129	0.2	<0.002	0.15	<0.05
	5/19/2021	na	11.2	31.6	204	na	na	<0.002	0.17	<0.05
	6/3/2021	na	11.5	32.1	258	na	na	<0.002	0.16	0.06
	6/17/2021	na	11.6	31.9	264	na	na	0.003	0.21	0.07
	7/1/2021	na	11.5	32	240	na	na	0.002	0.17	0.09
	7/15/2021	na	11.2	32	234	na	na	<0.002	0.2	0.07
	7/26/2021	na	11.2	31.6	254	na	na	<0.002	0.19	0.05
	8/10/2021	0.037	11.3	31.9	238	129	<0.2	<0.002	0.17	0.11
	8/25/2021	na	11.6	32.3	242	na	na	<0.002	0.16	<0.05
	9/9/2021	na	11.8	32.2	230	na	na	<0.002	0.26	0.07
	9/23/2021	na	11.8	32.2	228	na	na	<0.002	0.26	<0.05
	10/7/2021	na	11.3	31.3	224	na	na	0.002	0.21	0.06
	10/21/2021	na	11.3	31.6	212	na	na	<0.002	0.2	0.05
	11/2/2021	0.037	11.4	32	214	127	<0.2	<0.002	0.19	<0.05
	12/6/2021	na	11.2	31.6	226	na	na	<0.002	0.18	0.12
	2/1/2022	0.040	11.6	32.7	232	124	<0.2	<0.002	0.19	<0.05
	5/10/2022	0.036	11.4	32.6	218	126	<0.2	<0.002	0.19	<0.05
	8/2/2022	0.035	11.6	31.7	220	128	<0.2	<0.002	0.32	<0.05
	11/1/2022	0.033	11.7	32	222	138	<0.2	<0.002	0.32	<0.05
	2/7/2023	0.033	11	30.1	214	131	<0.2	<0.002	0.37	<0.05
	5/2/2023	na	11.5	30.4	238	127	na	na	0.43	na
	5/22/2023	na	na	na	240	na	na	na	na	na
	8/8/2023	na	10.7	28.8	234	131	na	na	0.4	na
	10/31/2023	na	11.3	30	234	129	na	na	0.39	na

TABLE L-3
OCWD MONITORING WELL SAR-12
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
	1/8/2020	na	12.4	36.3	250	122	na	<0.002	<0.1	na
	2/4/2020	0.035	12.3	35.9	246	132	<0.2	<0.002	<0.1	0.12
	5/5/2020	0.035	12.3	36	266	124	<0.2	<0.002	<0.1	0.13
	6/4/2020	na	12.3	36	254	125	na	<0.002	<0.1	na
	6/30/2020	na	13	37.5	248	137	na	<0.002	<0.1	na
	7/13/2020	na	13.2	37.7	246	130	na	<0.002	<0.1	na
	7/27/2020	na	13.4	37.4	250	130	na	<0.002	<0.1	na
	8/4/2020	0.040	13.9	38.8	250	128	<0.2	<0.002	<0.1	0.12
	8/20/2020	na	14.1	38.3	244	130	na	<0.002	<0.1	na
	9/2/2020	na	14.6	39.6	260	131	na	0.002	<0.1	na
	9/17/2020	na	14.3	38.4	244	133	na	<0.002	<0.1	na
	10/1/2020	na	15.1	40.2	252	132	na	<0.002	<0.1	na
	10/14/2020	na	15.5	40.8	258	132	na	<0.002	<0.1	na
	10/26/2020	na	16.3	42	262	137	na	<0.002	<0.1	na
	11/5/2020	0.050	16.8	43	270	136	<0.2	<0.002	<0.1	0.1
	11/18/2020	na	17.2	43.2	278	na	na	<0.002	<0.1	0.1
	12/2/2020	na	17.1	42.9	266	na	na	<0.002	<0.1	0.1
	12/14/2020	na	17.1	42.5	274	na	na	0.003	<0.1	0.11
	12/31/2020	na	16.8	42	258	na	na	<0.002	<0.1	0.11
	1/7/2021	na	17.2	42.2	259	na	na	0.002	<0.1	0.1
	1/21/2021	na	17.4	42.5	266	na	na	0.003	<0.1	0.1
	2/2/2021	0.053	17.6	43	222	135	<0.2	0.003	<0.1	0.11
SAR-12/2	2/18/2021	na	18.1	44.3	263	na	na	<0.002	<0.1	0.1
Main 2	3/4/2021	na	17.4	42.7	260	na	na	<0.002	<0.1	0.11
Perforations	3/18/2021	na	16.9	41.6	258	na	na	<0.002	<0.1	0.13
755-775 ft bgs	4/1/2021	na	16.8	41.7	262	na	na	<0.002	<0.1	0.11
	4/15/2021	na	16.6	41.9	232	na	na	<0.002	<0.1	0.15
	5/4/2021	0.051	16.5	41.5	280	134	0.2	<0.002	<0.1	0.11
	5/19/2021	na	16.1	40.9	224	na	na	<0.002	<0.1	0.16
	6/3/2021	na	15.8	40.6	276	na	na	<0.002	<0.1	0.11
	6/17/2021	na	15.6	39.9	304	na	na	<0.002	<0.1	0.16
	7/1/2021	na	15.1	39.9	244	na	na	<0.002	<0.1	0.11
	7/15/2021	na	14.3	39	252	na	na	<0.002	<0.1	0.1
	7/26/2021	na	13.6	37.4	244	na	na	<0.002	<0.1	0.1
	8/10/2021	0.043	13.2	37.1	246	127	<0.2	0.002	<0.1	0.1
	8/25/2021	na	13.4	37.6	246	na	na	<0.002	<0.1	0.08
	9/9/2021	na	13.6	37.5	240	na	na	<0.002	<0.1	0.1
	9/23/2021	na	13.6	37.6	250	na	na	<0.002	<0.1	0.09
	10/7/2021	na	13.4	36.8	242	na	na	0.003	<0.1	0.12
	10/21/2021	na	13.5	37.7	226	na	na	<0.002	<0.1	0.1
	11/2/2021	0.043	13.7	37.6	232	128	<0.2	<0.002	<0.1	0.15
	12/6/2021	na	13.6	37.3	238	na	na	<0.002	<0.1	0.14
	2/1/2022	0.043	13.1	37	234	121	<0.2	<0.002	<0.1	0.07
	5/10/2022	0.039	12.4	36.3	232	119	<0.2	<0.002	<0.1	0.09
	8/2/2022	0.038	12.8	36.5	238	121	<0.2	<0.002	<0.1	0.1
	11/1/2022	0.041	16	41.7	242	140	<0.2	<0.002	<0.1	0.12
	2/7/2023	0.047	16	41.8	216	141	<0.2	<0.002	<0.1	0.14
	5/2/2023	na	15.3	40.8	264	133	na	na	<0.1	na
	5/22/2023	na	na	na	248	na	na	na	na	na
	8/8/2023	na	11.4	32.3	236	121	na	na	<0.1	na
	10/31/2023	na	10.3	28.2	230	108	na	na	<0.1	na

TABLE L-3
OCWD MONITORING WELL SAR-12
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-12/3 Main 4 Perforations 915-930 ft bgs	1/8/2020	na	11.5	33.6	238	110	na	<0.002	0.14	na
	2/4/2020	0.033	11.4	33.1	204	113	<0.2	<0.002	0.11	<0.05
	5/5/2020	0.032	11.2	32.9	222	104	<0.2	<0.002	0.14	<0.05
	6/4/2020	na	11.3	33.2	234	104	na	<0.002	0.14	na
	6/30/2020	na	11.5	33.6	224	105	na	<0.002	0.13	na
	7/13/2020	na	11.5	33.8	230	104	na	<0.002	0.13	na
	7/27/2020	na	11.3	32.9	238	102	na	<0.002	0.13	na
	8/4/2020	0.035	11.5	33.8	224	103	<0.2	<0.002	0.12	<0.05
	8/20/2020	na	11.4	33	238	101	na	<0.002	0.13	na
	9/2/2020	na	11.8	34.4	240	103	na	<0.002	0.14	na
	9/17/2020	na	11.2	32.5	210	102	na	<0.002	0.17	na
	10/1/2020	na	11.4	33.5	226	99.9	na	<0.002	0.15	na
	10/14/2020	na	11.4	33.3	234	99.9	na	<0.002	0.14	na
	10/26/2020	na	11.5	33.6	238	101	na	<0.002	0.14	na
	11/5/2020	0.036	11.4	33.3	226	99.8	<0.2	<0.002	0.15	<0.05
	11/18/2020	na	11.3	32.8	246	na	na	<0.002	0.16	<0.05
	12/2/2020	na	11.2	32.7	228	na	na	0.003	0.14	<0.05
	12/14/2020	na	11.2	32.6	232	na	na	0.004	0.15	0.09
	12/31/2020	na	11	32.6	218	na	na	0.003	0.14	<0.05
	1/7/2021	na	11.1	32.5	215	na	na	0.002	0.16	<0.05
	1/21/2021	na	11.2	32.8	225	na	na	0.002	0.17	<0.05
	2/2/2021	0.037	11.4	33.5	197	98.1	<0.2	0.002	0.15	0.1
	2/18/2021	na	11.5	33.9	224	na	na	<0.002	0.17	<0.05
	3/4/2021	na	11.3	32.8	215	na	na	<0.002	0.25	<0.05
	3/18/2021	na	10.8	30.8	212	na	na	<0.002	0.27	<0.05
	4/1/2021	na	10.2	28.8	224	na	na	<0.002	0.3	<0.05
	4/15/2021	na	9.6	26.5	212	na	na	<0.002	0.43	<0.05
	5/4/2021	0.028	8.8	21.8	208	88.1	<0.2	0.003	0.55	<0.05
	5/19/2021	na	8.4	18.9	198	na	na	<0.002	0.7	0.07
	6/3/2021	na	8.2	15.5	206	na	na	<0.002	0.84	0.07
	6/17/2021	na	8.1	13.4	234	na	na	<0.002	0.95	0.07
	7/1/2021	na	7.8	12.3	170	na	na	<0.002	0.97	<0.05
	7/15/2021	na	7.4	10.4	162	na	na	0.002	1.05	<0.05
	7/26/2021	na	7.5	10	134	na	na	<0.002	1.06	<0.05
	8/10/2021	0.021	7.3	9	136	53.5	<0.2	0.003	1.07	<0.05
	8/25/2021	na	7.4	8	142	na	na	<0.002	1.07	<0.05
	9/9/2021	na	7.6	8.3	126	na	na	<0.002	1.15	<0.05
	9/23/2021	na	7.3	7.6	130	na	na	<0.002	1.16	<0.05
	10/7/2021	na	6.8	6.5	124	na	na	0.004	1.11	0.05
	10/21/2021	na	6.6	6.4	112	na	na	<0.002	1.09	<0.05
	11/2/2021	0.019	6.4	6	112	42.5	<0.2	<0.002	1.08	0.08
	12/6/2021	na	5.9	5.6	108	na	na	<0.002	1.01	<0.05
	2/1/2022	0.016	5.7	4.9	126	35.3	<0.2	<0.002	1.01	<0.05
	5/10/2022	0.014	5	3.8	104	33.4	<0.2	<0.002	0.95	<0.05
	8/2/2022	0.014	5.6	3.1	100	31.1	<0.2	<0.002	1.08	<0.05
	11/1/2022	0.012	6.2	2.7	90	31.6	<0.2	<0.002	1.28	<0.05
	2/7/2023	0.012	5.8	2.2	89.3	29.4	<0.2	<0.002	1.29	<0.05
	5/2/2023	na	6.2	2.1	106	28.1	na	na	1.36	na
	5/22/2023	na	na	na	100	na	na	na	na	na
	8/8/2023	na	6.7	1.9	106	27.4	na	na	1.54	na
	10/31/2023	na	7.1	1.8	92	28.1	na	na	1.64	na

TABLE L-3
OCWD MONITORING WELL SAR-12
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-12/4 Main 7 Perforations 1,045-1,055 ft bgs	1/8/2020	na	12.7	35.2	228	70.6	na	<0.002	<0.1	na
	2/4/2020	0.036	12.6	35.4	216	70.7	<0.2	<0.002	<0.1	0.07
	5/5/2020	0.035	12.2	34.7	236	65.5	<0.2	<0.002	<0.1	0.11
	6/4/2020	na	12.5	34.6	214	65.8	na	<0.002	<0.1	na
	6/30/2020	na	12.6	35.9	212	66.4	na	<0.002	<0.1	na
	7/13/2020	na	12.5	35.5	212	66.5	na	<0.002	<0.1	na
	7/27/2020	na	12.3	34.2	206	65	na	<0.002	<0.1	na
	8/4/2020	0.038	12.5	34.8	208	64.8	<0.2	<0.002	<0.1	0.06
	8/20/2020	na	12.1	32.3	196	62.8	na	<0.002	<0.1	na
	9/2/2020	na	12.1	32.0	202	61.8	na	<0.002	<0.1	na
	9/17/2020	na	11.2	28.6	188	57.8	na	<0.002	<0.1	na
	10/1/2020	na	11.1	27.9	186	54.8	na	<0.002	<0.1	na
	10/14/2020	na	10.9	26.7	198	52.8	na	<0.002	<0.1	na
	10/26/2020	na	10.4	23.5	178	47.7	na	<0.002	<0.1	na
	11/5/2020	0.029	9.9	22.0	170	44.8	<0.2	<0.002	<0.1	0.12
	11/18/2020	na	9.3	18.9	172	40.5	na	<0.002	<0.1	0.09
	12/2/2020	na	9.2	19.3	152	40.7	na	0.003	<0.1	0.08
	12/14/2020	na	8.8	17.0	156	37.5	na	0.003	<0.1	0.08
	12/31/2020	na	8.9	17.7	145	37.1	na	0.003	<0.1	0.07
	1/7/2021	na	8.8	17.2	142	na	na	<0.002	<0.1	0.11
	1/21/2021	na	8.6	16.2	149	na	na	0.002	<0.1	0.08
	2/2/2021	0.026	8.7	16.4	136	36.2	<0.2	0.003	<0.1	0.10
	2/18/2021	na	8.9	17.1	152	na	na	<0.002	<0.1	0.07
	3/4/2021	na	8.6	15.8	139	na	na	<0.002	<0.1	0.08
	3/18/2021	na	8.3	14.8	139	na	na	<0.002	<0.1	0.10
	4/1/2021	na	8.0	14.2	142	na	na	<0.002	<0.1	0.09
	4/15/2021	na	7.8	14.4	156	na	na	<0.002	<0.1	0.08
	5/4/2021	0.025	7.9	14.7	152	35.4	0.2	0.004	<0.1	0.12
	5/19/2021	na	7.6	13.3	124	na	na	<0.002	<0.1	0.08
	6/3/2021	na	7.6	13.2	148	na	na	<0.002	<0.1	0.12
	6/17/2021	na	7.7	12.7	116	na	na	<0.002	<0.1	0.15
	7/1/2021	na	7.4	12.7	116	na	na	<0.002	<0.1	0.09
	7/15/2021	na	7.0	11.9	136	na	na	<0.002	<0.1	0.09
	7/26/2021	na	7.0	11.2	112	na	na	<0.002	<0.1	0.11
	8/10/2021	0.021	6.9	10.5	112	31.1	<0.2	0.002	<0.1	0.12
	8/25/2021	na	7.0	9.9	126	na	na	<0.002	<0.1	0.09
	9/9/2021	na	7.1	9.7	128	na	na	<0.002	<0.1	0.10
	9/23/2021	na	6.9	9.2	120	na	na	<0.002	<0.1	0.11
	10/7/2021	na	6.3	7.8	74	na	na	<0.002	<0.1	0.19
	10/21/2021	na	6.1	7.5	70	na	na	<0.002	<0.1	0.11
	11/2/2021	0.017	6.3	7.9	136	26.6	<0.2	<0.002	<0.1	0.13
	12/6/2021	na	6.3	7.8	94	na	na	0.003	<0.1	0.11
	2/1/2022	0.020	6.7	7.3	102	24.4	<0.2	<0.002	<0.1	0.09
	5/10/2022	0.015	6.2	4.9	98	22.8	<0.2	<0.002	<0.1	0.12
	8/2/2022	0.015	6.5	5.8	102	22.4	<0.2	<0.002	<0.1	0.10
	11/1/2022	0.015	7.1	7.8	90	25.9	<0.2	<0.002	<0.1	0.11
	2/7/2023	0.017	7.2	8.5	108	27.1	<0.2	<0.002	<0.1	0.07
	5/2/2023	na	7.9	9.9	114	26.6	na	na	<0.1	na
	5/22/2023	na	na	na	110	na	na	na	na	na
	8/8/2023	na	8.0	10.4	122	26.9	na	na	<0.1	na
	10/31/2023	na	9.0	12.9	120	29.8	na	na	<0.1	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed

TABLE L-4
OCWD MONITORING WELL SAR-13
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
	1/8/2020	na	15.7	39.7	256	151	na	<0.002	0.27	na
	2/4/2020	0.043	16	39.6	250	154	<0.2	<0.002	0.25	0.08
	4/1/2020	na	16	40.1	246	145	na	<0.002	0.26	na
	4/15/2020	na	15.5	39	264	145	na	<0.002	0.26	na
	4/30/2020	na	15.9	40.3	272	148	<0.2	<0.002	0.25	na
	5/6/2020	0.044	15.8	39.9	252	148	<0.2	<0.002	0.26	0.07
	5/21/2020	na	15.8	40.3	260	147	na	<0.002	0.28	na
	6/4/2020	na	15.2	39.4	278	150	na	<0.002	0.25	na
	6/17/2020	na	15	39.2	270	148	na	<0.002	0.23	na
	6/30/2020	na	15.2	40.3	256	146	na	<0.002	0.22	na
	7/13/2020	na	14.7	39.4	254	150	na	<0.002	0.22	na
	7/27/2020	na	14.1	38	268	146	na	<0.002	0.17	na
	8/5/2020	0.041	14	38.1	242	142	<0.2	<0.002	0.19	0.08
	8/20/2020	na	13.1	34.2	242	140	na	<0.002	0.25	na
	9/2/2020	na	12.5	32.4	250	136	na	<0.002	0.3	na
	9/17/2020	na	11.6	28.4	238	133	na	<0.002	0.35	na
	10/1/2020	na	11.7	29.5	228	127	na	<0.002	0.41	na
	10/14/2020	na	12	26.9	240	123	na	<0.002	0.5	na
	10/26/2020	na	12	25.9	226	119	na	<0.002	0.54	na
	11/4/2020	0.035	12.4	26	228	118	<0.2	<0.002	0.64	0.08
	11/18/2020	na	12	25.3	220	114	na	<0.002	0.63	<0.05
	12/2/2020	na	11.7	24.3	210	114	na	0.002	0.63	<0.05
SAR-13/1	12/14/2020	na	11.4	23.5	218	112	na	0.003	0.63	<0.05
Lower Rho	12/31/2020	na	11.1	23.4	207	106	na	0.003	0.63	<0.05
Perforations	1/7/2021	na	10.9	22.6	197	na	na	<0.002	0.62	<0.05
600-620 ft bgs	1/21/2021	na	10.7	22.2	208	na	na	0.005	0.66	<0.05
	2/3/2021	0.032	10.7	22.2	150	103	<0.2	<0.002	0.66	<0.05
	2/18/2021	na	9.9	21	217	na	na	<0.002	0.63	0.06
	3/4/2021	na	9.9	20.9	198	na	na	<0.002	0.68	<0.05
	3/18/2021	na	9.6	19.8	184	na	na	<0.002	0.65	<0.05
	4/1/2021	na	9.2	19	174	na	na	<0.002	0.62	<0.05
	4/15/2021	na	8.9	19	198	na	na	0.002	0.64	<0.05
	5/5/2021	0.028	8.6	17.8	192	93.6	<0.2	<0.002	0.64	0.06
	5/19/2021	na	8.4	17	154	na	na	<0.002	0.7	0.09
	6/3/2021	na	8.4	16.7	190	na	na	<0.002	0.76	0.05
	6/17/2021	na	8.2	15.1	212	na	na	<0.002	0.79	0.06
	7/1/2021	na	8.1	15.1	164	na	na	<0.002	0.76	<0.05
	7/15/2021	na	7.9	14.6	172	na	na	0.002	0.8	<0.05
	7/27/2021	na	8.1	14.9	202	na	na	<0.002	0.8	0.05
	8/11/2021	0.025	8	14.5	202	91	<0.2	0.003	0.76	<0.05
	8/25/2021	na	8.4	14.9	164	na	na	<0.002	0.79	<0.05
	9/9/2021	na	8.8	15.2	168	na	na	<0.002	0.88	0.05
	9/23/2021	na	8.7	15.4	154	na	na	<0.002	0.86	<0.05
	10/7/2021	na	8.6	15.2	152	na	na	0.003	0.81	0.07
	10/21/2021	na	8.6	15.9	140	na	na	<0.002	0.81	<0.05
	11/3/2021	0.024	8.5	15.8	152	89.8	<0.2	<0.002	0.84	0.06
	12/6/2021	na	8.1	14.2	140	na	na	<0.002	0.89	<0.05
	2/2/2022	0.020	7.9	13.7	150	84.2	<0.2	<0.002	1.01	<0.05
	5/11/2022	0.018	6.9	11.3	170	83.5	<0.2	<0.002	1.01	<0.05
	8/3/2022	0.017	7.1	10	148	80.2	<0.2	<0.002	1.12	<0.05
	11/1/2022	0.015	7.3	8.7	134	82.8	<0.2	<0.002	1.27	<0.05
	2/8/2023	0.015	7.4	7.8	133	77.9	<0.2	<0.002	1.41	<0.05
	5/3/2023	na	7.1	7.3	132	74.8	na	na	1.39	na
	8/9/2023	na	7.1	6.2	136	74.1	na	na	1.32	na
	11/1/2023	na	8.5	5.9	136	72.8	na	na	1.43	na

TABLE L-4
OCWD MONITORING WELL SAR-13
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-13/2 Main 2 Perforations 750-770 ft bgs	1/8/2020	na	12.2	36.7	240	112	na	<0.002	<0.1	na
	2/4/2020	0.034	12.2	36.5	242	133	<0.2	<0.002	<0.1	0.1
	4/1/2020	na	12.5	36.8	230	119	na	<0.002	<0.1	na
	4/15/2020	na	11.9	35.7	244	120	na	<0.002	<0.1	na
	4/30/2020	na	12.1	36.3	242	121	<0.2	<0.002	<0.1	na
	5/6/2020	0.034	12	36.2	234	122	<0.2	<0.002	<0.1	0.08
	5/21/2020	na	14.4	36.7	238	121	na	<0.002	<0.1	na
	6/4/2020	na	12	36.3	240	123	na	<0.002	<0.1	na
	6/17/2020	na	12.1	36.3	226	124	na	<0.002	<0.1	na
	6/30/2020	na	12.2	37.1	228	125	na	<0.002	<0.1	na
	7/13/2020	na	12.3	37.1	248	125	na	<0.002	<0.1	na
	7/27/2020	na	12	36.2	232	125	na	<0.002	<0.1	na
	8/5/2020	0.038	12.3	37.3	248	123	<0.2	<0.002	<0.1	0.11
	8/20/2020	na	12.1	36.1	240	122	na	<0.002	<0.1	na
	9/2/2020	na	12.3	37.1	266	123	na	<0.002	<0.1	na
	9/17/2020	na	11.9	35.7	242	125	na	<0.002	<0.1	na
	10/1/2020	na	13	37.1	232	123	na	<0.002	<0.1	na
	10/14/2020	na	12.5	37.7	260	119	na	<0.002	<0.1	na
	10/26/2020	na	12.2	36.7	232	120	na	<0.002	<0.1	na
	11/4/2020	0.038	12.2	36.7	240	120	na	<0.002	<0.1	0.09
	11/18/2020	na	12.1	36.3	270	118	na	<0.002	<0.1	0.07
	12/2/2020	na	12	36.4	232	106	na	0.002	<0.1	0.09
	12/14/2020	na	12	36.3	252	120	na	0.003	<0.1	0.07
	12/31/2020	na	11.9	36.3	244	118	na	0.003	<0.1	0.07
	1/7/2021	na	11.9	35.9	232	na	na	<0.002	<0.1	0.07
	1/21/2021	na	12	36.2	147	na	na	0.003	<0.1	0.07
	2/3/2021	0.100	12.2	37	203	116	<0.2	0.003	<0.1	0.08
	2/18/2021	na	12.3	37.4	234	na	na	<0.002	<0.1	0.08
	3/4/2021	na	12.2	36.6	230	na	na	<0.002	<0.1	0.07
	3/18/2021	na	12	35.7	239	na	na	<0.002	<0.1	0.09
	4/1/2021	na	11.9	35.9	248	na	na	<0.002	<0.1	0.11
	4/15/2021	na	11.8	36.1	232	na	na	<0.002	<0.1	0.09
	5/5/2021	0.200	12.1	36	248	119	<0.2	<0.002	<0.1	0.07
	5/19/2021	na	11.9	35.8	226	na	na	<0.002	<0.1	0.09
	6/3/2021	na	12.2	36.8	258	na	na	<0.002	<0.1	0.2
	6/17/2021	na	11.9	35.1	262	na	na	<0.002	<0.1	0.09
	7/1/2021	na	11	32.3	232	na	na	<0.002	<0.1	0.08
	7/15/2021	na	10.2	28.9	224	na	na	<0.002	<0.1	0.08
	7/27/2021	na	10.4	28.2	196	na	na	<0.002	<0.1	0.1
	8/11/2021	0.010	10	26.6	236	104	<0.2	0.002	<0.1	0.13
	8/25/2021	na	10.3	26.9	212	na	na	<0.002	<0.1	0.07
	9/9/2021	na	10.3	26.3	212	na	na	<0.002	<0.1	0.11
	9/23/2021	na	9.6	24.1	200	na	na	<0.002	<0.1	0.08
	10/7/2021	na	8.5	19.6	206	na	na	<0.002	<0.1	0.13
	10/21/2021	na	7.7	16.9	188	na	na	<0.002	<0.1	0.09
	11/3/2021	0.100	8	15.5	172	83.4	<0.2	<0.002	<0.1	0.18
	12/6/2021	na	7.1	12.9	152	na	na	<0.002	<0.1	0.1
	2/2/2022	0.023	6.5	11.5	150	69.5	<0.2	<0.002	<0.1	0.13
	5/11/2022	0.013	4.9	7.6	158	62	<0.2	<0.002	<0.1	0.11
	8/3/2022	0.012	4.7	7.1	128	55.7	<0.2	<0.002	<0.1	0.1
	11/1/2022	0.012	5.5	7.4	114	54.2	<0.2	<0.002	<0.1	0.17
	2/8/2023	0.011	5.5	7.2	113	50.2	<0.2	<0.002	<0.1	0.1
	5/3/2023	na	6	7.8	112	49.8	na	na	<0.1	na
	8/9/2023	na	5.8	8	120	49.8	na	na	<0.1	na
	11/1/2023	na	6.2	8.6	116	49.5	na	na	<0.1	na

TABLE L-4
OCWD MONITORING WELL SAR-13
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-13/3 Main 4 Perforations 910-930 ft bgs	1/8/2020	na	11.6	33.7	226	124	na	<0.002	0.17	na
	2/4/2020	0.033	11.7	33.6	198	125	<0.2	<0.002	0.15	0.09
	4/1/2020	na	11.7	33.3	228	114	na	<0.002	0.16	na
	4/15/2020	na	11.5	33	230	114	na	<0.002	0.16	na
	4/30/2020	na	11.6	33.3	242	117	<0.2	<0.002	0.15	na
	5/6/2020	0.036	11.4	33.1	254	114	<0.2	<0.002	0.17	0.06
	5/21/2020	na	11.6	33.7	234	116	na	<0.002	0.18	na
	6/1/2020	na	11.3	32.6	232	117	na	<0.002	0.18	na
	6/17/2020	na	11.1	32.5	238	114	na	<0.002	0.16	na
	6/30/2020	na	11.4	33.2	230	115	na	<0.002	0.18	na
	7/13/2020	na	11.3	32.8	240	114	na	<0.002	0.18	na
	7/27/2020	na	11.1	31.7	238	114	na	<0.002	0.18	na
	8/5/2020	0.032	11.3	32.5	232	111	<0.2	<0.002	0.21	<0.05
	8/20/2020	na	10.2	27.8	216	106	na	<0.002	0.32	na
	9/2/2020	na	9.6	24.6	210	95.8	na	<0.002	0.44	na
	9/17/2020	na	8.2	17.7	190	80.2	na	<0.002	0.64	na
	10/1/2020	na	8	14.7	180	67.3	na	<0.002	0.78	na
	10/14/2020	na	7.7	11.7	172	59.8	na	<0.002	0.92	na
	10/26/2020	na	7.4	9.1	164	51	na	<0.002	1.04	na
	11/4/2020	0.019	7.1	7.4	130	45.8	<0.2	<0.002	1.17	<0.05
	11/18/2020	na	6.9	5.5	134	41.2	na	<0.002	1.2	0.09
	12/2/2020	na	6.8	4.6	104	35.7	na	0.003	1.22	<0.05
	12/14/2020	na	6.6	3.7	104	33.1	na	0.003	1.22	0.07
	12/31/2020	na	6.4	3.5	148	31.9	na	0.003	1.21	<0.05
	1/7/2021	na	6.4	3.3	107	na	na	<0.002	1.19	<0.05
	1/21/2021	na	6.5	3	91	na	na	0.005	1.22	<0.05
	2/3/2021	0.019	6.4	2.9	79	29.6	<0.2	0.006	1.22	<0.05
	2/18/2021	na	6.2	2.7	100	na	na	<0.002	1.23	<0.05
	3/4/2021	na	6.2	3	92	na	na	<0.002	1.22	<0.05
	3/18/2021	na	6	2.9	100	na	na	<0.002	1.15	<0.05
	4/1/2021	na	5.8	2.8	74	na	na	<0.002	1.12	<0.05
	4/15/2021	na	5.5	3.2	96.5	na	na	0.002	1.09	<0.05
	5/5/2021	0.016	5	2.5	92	28	<0.2	0.002	0.99	<0.05
	5/19/2021	na	5.1	3.1	87.5	na	na	<0.002	0.99	0.05
	6/3/2021	na	5.5	3.2	90.5	na	na	<0.002	0.99	<0.05
	6/17/2021	na	5.2	2.9	92	na	na	<0.002	0.98	0.07
	7/1/2021	na	4.8	2.9	87	na	na	<0.002	0.92	<0.05
	7/15/2021	na	4.6	2.5	94	na	na	<0.002	0.95	<0.05
	7/27/2021	na	4.8	2.7	116	na	na	<0.002	0.96	<0.05
	8/11/2021	0.013	4.8	2.6	102	24.7	<0.2	0.002	0.95	<0.05
	8/25/2021	na	5	1.4	74	na	na	<0.002	1	<0.05
	9/9/2021	na	5.6	2.1	78	na	na	<0.002	1.09	0.1
	9/23/2021	na	5.5	2.3	90	na	na	0.004	1.1	<0.05
	10/7/2021	na	5.5	2.4	68	na	na	<0.002	1.09	<0.05
	10/21/2021	na	5.4	2.3	66	na	na	<0.002	1.1	<0.05
	11/3/2021	0.013	5.5	1.8	62	24.7	<0.2	<0.002	1.14	0.09
	12/6/2021	na	5.7	2.3	80	na	na	<0.002	1.07	<0.05
	2/2/2022	0.013	6.1	1.9	82	24	<0.2	<0.002	1.32	<0.05
	5/11/2022	0.011	5.8	1.6	71	24.5	<0.2	<0.002	1.28	<0.05
	8/3/2022	0.011	6.2	1.2	96	26	<0.2	<0.002	1.37	<0.05
	11/1/2022	0.011	7.5	0.9	76	29.9	<0.2	<0.002	1.69	<0.05
	2/8/2023	0.011	6.6	0.9	72	31.1	<0.2	<0.002	1.63	<0.05
	5/3/2023	na	8.4	1.1	82	31.7	na	na	1.58	na
	8/9/2023	na	8	1.4	98	32.8	na	na	1.4	na
	11/1/2023	na	9	1.4	88	36.4	na	na	1.46	na

TABLE L-4
OCWD MONITORING WELL SAR-13
2020 - 2023 General Water Quality Data

Aquifer	Date	Bromide (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	TDS (mg/L)	Total Hardness (mg/L)	TKN (mg/L)	Nitrite-N (mg/L)	Nitrate-N (mg/L)	TOC (mg/L)
SAR-13/4 Main 7 Perforations 1,045-1,055 ft bgs	1/8/2020	na	11.9	35.0	224	24.2	na	0.004	<0.1	0.15
	2/4/2020	0.034	11.9	34.8	212	28.6	<0.2	0.006	<0.1	na
	4/1/2020	na	11.9	34.2	198	47.4	na	0.004	0.12	na
	4/15/2020	na	11.5	33.3	212	53.6	na	0.003	0.11	na
	4/30/2020	na	11.3	32.5	208	49.4	<0.2	0.003	<0.1	na
	5/6/2020	0.033	11.3	32.5	194	46.1	<0.2	0.003	0.12	0.11
	5/21/2020	na	10.7	26.1	190	43.7	na	0.013	0.3	na
	6/1/2020	na	8.7	20.4	168	40.6	na	<0.002	0.42	na
	6/17/2020	na	7.4	14.1	154	35.5	na	0.002	0.55	na
	6/30/2020	na	6.6	8.9	128	31.2	na	0.002	0.71	na
	7/13/2020	na	6.6	7.7	130	28.4	na	<0.002	0.78	na
	7/27/2020	na	6.4	5.8	134	26.8	na	0.003	0.84	na
	8/5/2020	0.018	6.7	5.7	130	26	<0.2	0.003	0.93	0.09
	8/20/2020	na	6.6	4.3	122	24.6	na	0.005	0.96	na
	9/2/2020	na	6.7	3.7	114	23.1	na	0.024	0.99	na
	9/17/2020	na	6.4	2.7	106	22.5	na	0.005	1.19	na
	10/1/2020	na	6.6	2.8	102	21.4	na	0.004	1.22	na
	10/14/2020	na	6.7	2.9	104	20.8	na	0.004	1.25	na
	10/26/2020	na	6.7	3.2	112	21.1	na	0.005	1.24	na
	11/4/2020	0.018	6.6	3.4	106	21.6	<0.2	0.004	1.28	0.08
	11/18/2020	na	6.6	3.7	120	23	na	0.005	1.22	0.08
	12/2/2020	na	6.6	3.8	110	22.9	na	0.006	1.2	0.07
	12/14/2020	na	6.5	4.2	118	24	na	0.009	1.16	0.09
	12/31/2020	na	6.5	4.6	126	23.2	na	0.005	1.16	0.08
	1/7/2021	na	6.5	4.5	96	na	na	0.004	1.13	0.09
	1/21/2021	na	6.5	4.3	113	na	na	0.002	1.16	0.10
	2/3/2021	0.02	6.3	3.6	89	22	<0.2	0.005	1.19	0.07
	2/18/2021	na	6.3	3.6	103	na	na	<0.002	1.2	0.12
	3/4/2021	na	6.0	3.4	108	na	na	0.002	1.16	0.08
	3/18/2021	na	5.8	3.1	113	na	na	0.002	1.11	0.08
	4/1/2021	na	5.2	2.4	126	na	na	0.003	1.02	0.09
	4/15/2021	na	4.8	2.4	110	na	na	0.003	1	0.07
	5/5/2021	0.015	4.8	2.1	128	20.3	<0.2	0.004	0.95	0.08
	5/19/2021	na	5.0	2.6	100	na	na	0.010	0.89	0.09
	6/3/2021	na	5.4	2.6	132	na	na	0.002	1.01	0.07
	6/17/2021	na	5.7	2.3	118	na	na	0.003	1.06	0.07
	7/1/2021	na	5.7	2.5	106	na	na	0.007	1.09	0.06
	7/15/2021	na	5.8	3.2	124	na	na	0.003	1.08	0.05
	7/27/2021	na	6.1	2.8	138	na	na	0.008	1.15	0.06
	8/11/2021	0.018	5.9	2.6	122	23	<0.2	0.006	1.13	0.07
	8/25/2021	na	7.6	11.5	136	na	na	<0.002	0.71	0.17
	9/9/2021	na	8.3	13.8	132	na	na	<0.002	0.73	0.12
	9/23/2021	na	5.9	2.8	110	na	na	0.007	1.15	<0.05
	10/7/2021	na	5.5	2.1	84	na	na	0.004	1.09	0.05
	10/21/2021	na	5.1	2.1	74	na	na	<0.002	1.03	<0.05
	11/3/2021	0.014	5.2	2.1	82	19.8	<0.2	<0.002	1.04	0.06
	12/6/2021	na	6.0	1.8	98	na	na	0.002	1.07	0.05
	2/2/2022	0.016	5.9	2.1	110	21.2	<0.2	0.009	1.17	<0.05
	5/11/2022	0.014	5.7	2.6	118	22.5	<0.2	0.003	1.1	<0.05
	8/3/2022	0.015	7.1	6.2	116	17.6	<0.2	<0.002	1.13	<0.05
	11/1/2022	0.011	6.4	2.0	84	16.9	<0.2	<0.002	1.36	<0.05
	2/8/2023	0.012	6.4	1.8	98	19.5	<0.2	0.003	1.4	<0.05
	5/3/2023	na	7.5	1.7	88	21.1	na	na	1.62	na
	8/9/2023	na	7.2	2.0	106	17.4	na	na	1.66	na
	11/1/2023	na	7.7	2.1	106	19	na	na	1.56	na

Note: 1) <"x" signifies result was less than detection limit of "x"
2) na = not analyzed