AGENDA

FOR THE REGULAR MEETING OF THE CARPINTERIA SANITARY DISTRICT GOVERNING BOARD TO BE HELD July 18, 2023

The regular meeting of the Governing Board will be held commencing at 5:30 p.m. The location of the meeting is at 5300 Sixth Street, Carpinteria, CA.

The public is encouraged to participate in one of the following ways:

1. Submitting a Written Comment. If you wish to submit a written comment, please email your comment to the Board Clerk at kimg@carpsan.com by **3:00 P.M. on the day of the meeting.** Every effort will be made to read your comment into the record, but some comments may not be read due to time limitations.
2. Attend the in-person meeting at the Carpinteria Sanitary District Board room.

I. CALL TO ORDER

II. PLEDGE OF ALLEGIANCE

III. BOARD APPROVAL OF AGENDA AS [SUBMITTED] [MODIFIED]

Board President asks the Board, public, staff, and legal counsel if there are any additions and/or modifications to the Agenda.

IV. APPROVAL OF MINUTES

June 20, 2023 AS [SUBMITTED] [MODIFIED]

V. PUBLIC FORUM

The public may address the Governing Board on items of interest to the public which are not already on this evening's agenda and are within the subject matter jurisdiction of the Board. The time allotted for this discussion shall be pursuant to Board Bylaws.

VI. MATTERS BEFORE THE BOARD

A. GENERAL REPORTS:

1. Fourth Public Hearing on Transition to District Based Elections **(Pages 1 - 3)**

Description: Board to review and consider selection of a preferred map of proposed electoral divisions for the transition from at-large to division based elections and conduct a public hearing for the purpose of receiving input on the preferred map.

Staff Recommendation: Staff recommends that the Board conduct a public hearing for the purpose of receiving input on the preferred division map and provide direction to the demographer.

2. **Public Hearing – Ordinance No. 19. Approving Transition from At-Large to Division-Based Elections, Approving Map of Election Divisions, and Establishing Sequence for Elections** **(Pages 4-10)**

Description: The Board to review and consider approving the transition from at-large to division-based elections, and related actions, through the adoption of Ordinance No. 19, including supersession of prior ordinances.

Staff Recommendation: Staff recommends that the Board adopt Ordinance No. 19 as presented.

3. **General Manager's Status Report** **(Pages 11-13)**

Description: General Manager to review his written report regarding the following issues:

- Quarterly Incident Report
- Construction Standards Update
- Lift Station No. 2 Rehabilitation
- Lower Lateral Rehabilitation Project
- Operations Update

4. **CIP Project Authorization – Plant Air Compressor Replacement** **(Pages 14-16)**

Description: The Board to review and consider approving addition of a capital improvement project for the FY 2023/24 CIP Budget for emergency replacement for one plant air compressor not to exceed $15,000.

Staff Recommendation: Staff recommends that the Board approve a CIP addition for procurement of a rotary screw compressor as presented.

5. **Carpinteria Advanced Purification Project (CAPP) Update** **(Pages 17-66)**

Description: The Board will receive an update status report on the Carpinteria Advanced Purification Project being pursued in conjunction with the Carpinteria Valley Water District. Information on current activities and future tasks or milestones will be presented.

Staff Recommendation: None. Information only.

VII. BOARD ITEMS

D. COMMITTEE REPORTS

Description: Verbal reports by the committee chairperson(s) of the following committees:

- Standing Finance Committee
- Standing Personnel Committee
- Standing Public Relations Committee
- Standing Utilities Committee
- Standing Recycled Water Committee
- Ad-Hoc Summerland Sanitary Coordination Committee

E. GENERAL ITEMS

1. SBCSDA (Santa Barbara – California Special Districts Association) Report
2. Board Member Vacation Dates
3. Future Agenda Items

VIII. ADJOURNMENT

FURTHER INFORMATION AVAILABLE

A staff report providing more detailed information is available for most agenda items and may be reviewed in the District office during regular hours (Monday - Friday from 8:00 a.m. to 12:00 p.m. and/or 1:00 p.m. to 5:00 p.m.). Copies of individual reports may be requested at this office. Call (805) 684-7214 extension 110 for more information.

In compliance with the Ralph M. Brown Act and the Americans with Disabilities Act, if you need a disability-related modification, accommodation, or other special assistance to participate in this meeting, please contact the District's Board Secretary at (805) 684-7214, extension 111, at least 48 hours prior to the start of the meeting.

Next Ordinance Available.....#20
Next Resolution Available.....R-367
Posting Date.....7/14/23

MINUTES OF THE REGULAR MEETING OF THE CARPINTERIA SANITARY DISTRICT GOVERNING BOARD
June 20, 2023

These are the **minutes** of the **regular** meeting of the Governing Board of the Carpinteria Sanitary District in the City of Carpinteria, County of Santa Barbara, and State of California.

The Governing Board of the Carpinteria Sanitary District held a regular meeting on **June 20, 2023**, at 5:30 p.m. at its District administrative office located at 5300 Sixth Street, Carpinteria, California.

The agenda notice for this meeting, including instructions for the public to provide comments, was posted in the front window of the administrative office of the Carpinteria Sanitary District and on the District's website at least 72 hours in advance of the meeting.

I. CALL TO ORDER

President Modugno called the meeting to order at 5:30 p.m. and noted that Director Damron was absent and all other Directors were present at tonight's meeting.

Directors Present:	Mike Modugno – President Mike Damron – President Pro-Term Gerald Velasco - Secretary Debbie Murphy – Secretary Pro-Tem Lin Graf - Treasurer
Staff Present:	Craig Murray – General Manager Kim Garcia – Board Clerk
Legal Counsel Present:	Karl H. Berger – Burke, Williams & Sorenson (by Zoom video-conference)
Public Present:	Kristen Parks – National Demographics Corporation (by Zoom video-conference)

II. PLEDGE OF ALLEGIANCE

President Modugno led the Pledge of Allegiance.

III. BOARD APPROVAL OF AGENDA

President Modugno asked if there were any modifications and/or changes to the agenda. Hearing none, the agenda was approved as submitted.

IV. BOARD APPROVAL OF MINUTES OF THE MEETING OF May 16, 2023

Director Murphy made a motion, seconded by Director Damron that the Board approve the minutes of the May 16, 2023 Regular Board meeting as presented. The motion carried by the following vote:

AYES:	5	Murphy, Damron, Velasco, Graf, Modugno
NOES:	0	None
ABSENT:	0	None
ABSTAIN:	0	None

V. PUBLIC FORUM

None.

VI. MATTERS BEFORE THE BOARD

A. GENERAL REPORTS:

1. Third Public Hearing on Transition to District Based Elections

General Manager introduced Kristen Parks from National Demographics Corporation who was participating remotely via Zoom. Ms. Parks reviewed a slide presentation that was attached to the Board packet. Her presentation outlined the by-division election transition process and provided an overview on demographics within the District's service area. The Board provided input to the consultant on division formation.

President Modugno opened the public hearing on the item. No public was present and the Board Clerk said that no public had submitted comment prior to the meeting. President Modugno then declared the hearing on the item closed and thanked Ms. Parks for her presentation.

Director Damron made a motion, seconded by Director Graf that the Board advise NDC to proceed with the Green Map. The motion carried by the following roll call vote:

AYES:	5	Graf, Murphy, Modugno, Velasco, Damron
NOES:	0	None
ABSENT:	0	None
ABSTAIN:	0	None

2. General Manager's Status Report

General Manager reviewed his written report regarding the following items:

- SAMA Meeting Report
- Lift Station No. 2 Rehabilitation
- Summerland Sanitary District Discussions
- Process Stabilization Study
- Operations Update

3. Long Range Capital Improvement Program: 2021 - 2030

General Manager reviewed his staff report related to the District's Long Range Capital Improvement Program for years 2021-2030.

No Board action was taken on this item.

4. PUBLIC HEARING - Resolution No. R-365 – Sewer Service Charges on Assessor Rolls

General Manager said that notice was published twice in the *Coastal View News* about tonight's hearing and that Resolution No. R-365, according to state law, allows the District to place sewer service charges on the tax roll. A procedure summary was provided to the Board President for conducting the hearing.

President Modugno opened the hearing and asked General Manager to call the roll. Answering "present" were Directors Velasco, Damron, Graf, Murphy and President Modugno. General

Manager said there were five Board members present, and that met the 2/3's quorum required by State law to adopt the resolution setting rates on the County Assessor's Rolls.

President Modugno asked General Manager to file the Notice of Hearing and Proof of Publication of the hearing with the Secretary. General Manager delivered Proof of Publishing of the Notice of Hearing to Board Secretary, Director Velasco. President Modugno noted for the record there were no members of the public present who wished to speak on the item and no comments had been submitted electronically prior to the deadline. General Manager said there was no majority protest and President Modugno declared the hearing closed.

Director Velasco made a motion, seconded by Director Murphy that the Board adopt Resolution No. R-365 ordering the filing with the County Auditor of a report of sewer service charges for FY 2023/2024 to be placed on and collected by the County Assessor's Rolls. The motion carried by the following roll call vote:

AYES:	5	Damron, Graf, Velasco, Modugno, Murphy
NOES:	0	None
ABSENT:	0	None
ABSTAIN:	0	None

5. Resolution No. R-366 – Adoption of the FY 2023/24 Annual Budget and Setting the Annual Appropriations Limit

General Manager submitted for Board review and adoption the Fiscal Year 2023/24 Budget for the Carpinteria Sanitary District. General Manager thanked District staff and the Board Finance committee for their input. General Manager reviewed the proposed capital improvement projects for FY 2023/24.and provided the Board with an overview of the Budget document and highlighted key information.

If adopted, Resolution No. R-366 would adopt the Fiscal Year 2023/24 budget and set the annual appropriation limit at $5,195,940.

Director Damron made a motion, seconded by Director Graf, that the Board adopt Resolution No. R-366 adopting the Fiscal Year 2023/24 Budget as submitted with operating and debt service expenditures totaling $6,679,147 and setting the annual appropriations limit at $5,195,940. The motion carried by the following roll call vote:

AYES:	5	Damron, Graf, Velasco, Modugno, Murphy
NOES:	0	None
ABSENT:	0	None
ABSTAIN:	0	None

6. 2024 Presidential Elections – CSD Potential Polling Place

General Manager reviewed his staff report related to a request by the Santa Barbara County Elections Office to use the District Board Room as a polling place for the November 2024 General Presidential Elections.

There was Board consensus to allow the use.

7. CASA Annual Conference

This item was on the agenda to provide the Board with an update of important dates regarding the upcoming CASA Annual Conference.

No Board action was taken on this item.

8. Carpinteria Advanced Purification Project

General Manager provided an update related to the Carpinteria Advanced Purification Project.

No Board action was taken on this item.

VII. BOARD ITEMS

A. COMMITTEE REPORTS

Standing Finance Committee
Director Graf reported on the meeting of June 19, 2023

Standing Personnel Committee
Director Velasco reported on the meeting of May 30, 2023

Standing Public Relations Committee
None.

Standing Utilities Committee
None.

Standing Recycled Water Committee
None.

Ad-Hoc Summerland Sanitary Coordination Ad-Hoc Committee
None.

B. GENERAL ITEMS

SBCSDA (Santa Barbara California Special Districts Association) Report
None.

CSRMA Report
None.

Board Member Vacation Dates
None

Future Agenda Items
None

VIII. ADJOURNMENT

There being no further items to discuss, President Modugno adjourned the meeting at 6:38 p.m.

Mike Modugno
President

Michael Damron
President Pro-Tem

Gerald Velasco
Secretary

Debbie Murphy
Secretary Pro-Tem

Lin Graf
Treasurer

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: Fourth Public Hearing on Transition to Division Based Elections

DATE: July 18, 2023

REQUESTED ACTION: Board to review and consider selection of a preferred map of proposed electoral divisions for the transition from at-large to division based elections and conduct a public hearing for the purpose of receiving input on the preferred map.

BACKGROUND: On June 21, 2022 the Board approved Resolution No. R-355 declaring its intent to transition from an at-large election system to a district or division based election system pursuant to California Elections Code section 10010. Following two preliminary public hearings conducted in May of this year, National Demographics Corporation (NDC) prepared a series of three maps that present options to divide the District's service area into five discrete electoral divisions, or districts. The draft maps were reviewed by the District Board of Directors and a public hearing to receive input was held on June 20, 2023. The Board directed NDC to proceed with the "Green Map" as the preferred choice or division delineation and election sequencing.

This public hearing is the fourth of five required public hearings the District must hold prior to adopting a division map. Notice of the hearing and detailed information on the draft division map review process was provided to the public via the District's website and notice in the local newspaper. The purpose of this fourth public hearing is to review the preferred map, which will be presented in detail by NDC, and to provide a forum for the public and the Board to provide input on division boundaries. Based on input provided, the Board will be requested to select the preferred map and direct any necessary amendments.

The fifth and final public hearing will be held to consider approval of the final division map and adoption of an ordinance approving the transition to division based elections.

RECOMMENDATION: Staff recommends that the Board conduct a public hearing for the purpose of receiving input on the preferred division map and provide direction to the demographer.

SUGGESTED MOTION: None.

M_____ S_____

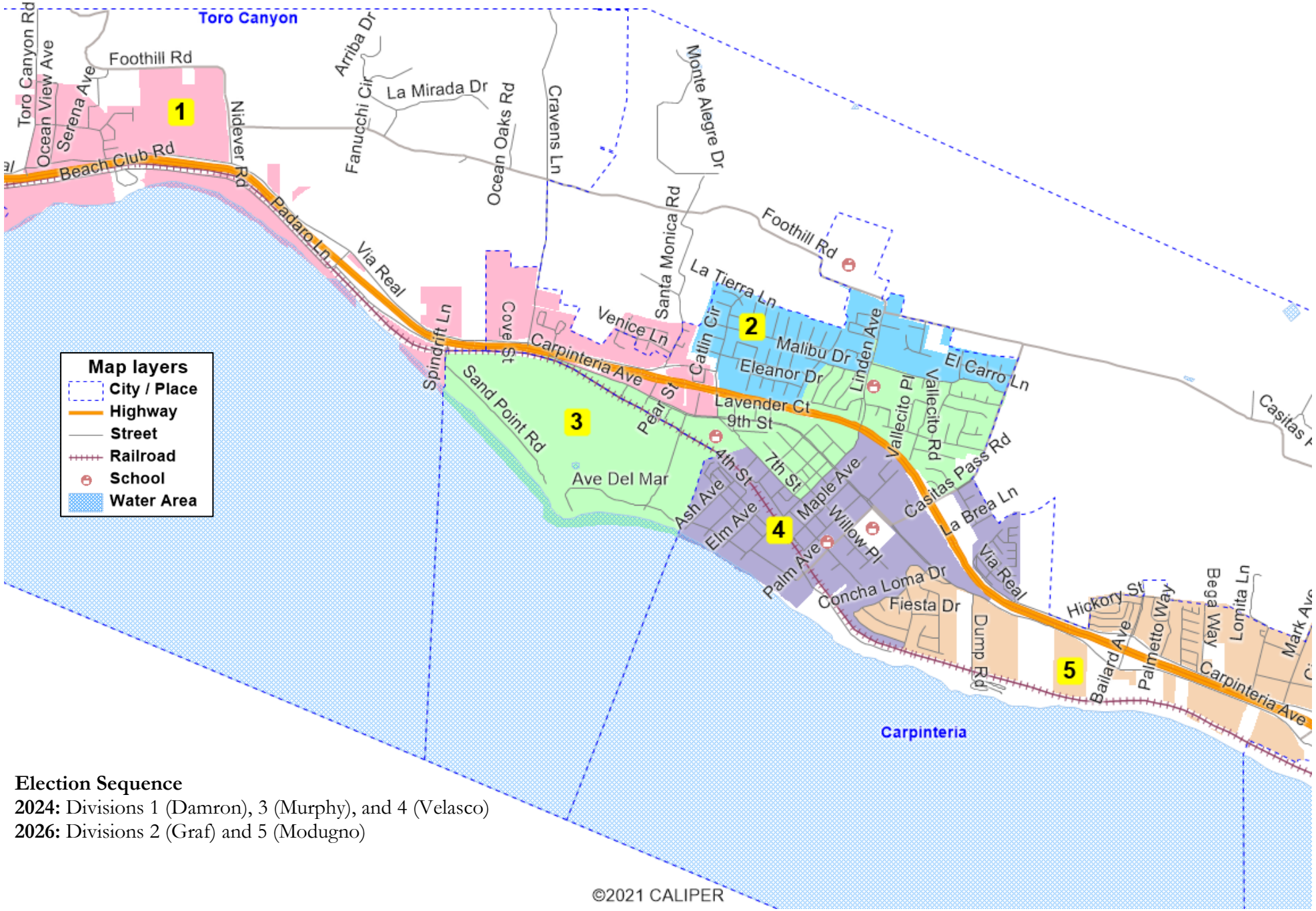
Ayes_____ Nays_____ Abstentions_____

Prepared By: _____
Craig Murray, P.E. - General Manager

Attachments: Draft Preferred Division Map (Green Map)

Carpinteria Sanitary District 2023

GREEN MAP



Election Sequence
2024: Divisions 1 (Damron), 3 (Murphy), and 4 (Velasco)
2026: Divisions 2 (Graf) and 5 (Modugno)

Green							
District		1	2	3	4	5	Total
	Total Pop	2,942	2,917	2,995	3,061	3,010	14,925
	Deviation from ideal	-43	-68	10	76	25	144
	% Deviation	-1.44%	-2.28%	0.34%	2.55%	0.84%	4.82%
Total Pop	% Hisp	47.9%	45%	48%	42%	48%	46%
	% NH White	46%	47%	45%	50%	46%	47%
	% NH Black	1%	1%	1%	1%	1%	1%
	% Asian-American	3%	4%	3%	3%	4%	3%
Citizen Voting Age Pop	Total	2,375	2,265	2,418	2,541	2,369	11,968
	% Hisp	43%	43%	46%	37%	42%	42%
	% NH White	51%	50%	48%	55%	51%	51%
	% NH Black	1%	1%	1%	1%	1%	1%
	% Asian/Pac.Isl.	3%	4%	3%	3%	4%	3%
Voter Registration (Nov 2020)	Total	1,931	1,862	1,940	1,983	1,345	9,061
	% Latino est.	34%	35%	37%	27%	34%	33%
	% Spanish-Surnamed	31%	32%	34%	25%	31%	30%
	% Asian-Surnamed	1%	2%	2%	1%	2%	2%
	% Filipino-Surnamed	1%	1%	0%	0%	1%	1%
	% NH White est.	67%	66%	63%	71%	55%	65%
	% NH Black	0%	0%	0%	1%	11%	2%
Voter Turnout (Nov 2020)	Total	1,701	1,676	1,702	1,778	1,172	8,029
	% Latino est.	31%	32%	34%	25%	31%	31%
	% Spanish-Surnamed	29%	29%	31%	24%	28%	28%
	% Asian-Surnamed	1%	2%	2%	1%	2%	2%
	% Filipino-Surnamed	1%	1%	0%	0%	1%	1%
	% NH White est.	69%	68%	66%	73%	57%	67%
	% NH Black	0%	0%	0%	1%	12%	2%
Voter Turnout (Nov 2018)	Total	1,261	1,279	1,302	1,321	944	6,107
	% Latino est.	25%	27%	30%	18%	26%	25%
	% Spanish-Surnamed	23%	25%	28%	17%	24%	23%
	% Asian-Surnamed	1%	2%	2%	2%	1%	2%
	% Filipino-Surnamed	1%	1%	0%	0%	1%	1%
	% NH White est.	75%	72%	69%	78%	60%	71%
	% NH Black est.	0%	0%	0%	2%	13%	2%
ACS Pop. Est.	Total	2,906	3,194	3,228	2,819	2,953	15,099
Age	age0-19	26%	27%	29%	17%	20%	24%
	age20-60	42%	45%	49%	47%	41%	45%
	age60plus	32%	28%	22%	36%	40%	31%
Immigration	immigrants	20%	23%	21%	23%	26%	22%
	naturalized	38%	36%	33%	31%	36%	35%
Language spoken at home	english	67%	62%	58%	68%	64%	63%
	spanish	30%	36%	38%	26%	30%	32%
	asian-lang	1%	1%	2%	2%	1%	1%
	other lang	3%	1%	2%	4%	5%	3%
Language Fluency	Speaks Eng. "Less than Very Well"	11%	9%	10%	11%	18%	12%
Education (among those age 25+)	hs-grad	46%	41%	44%	52%	50%	47%
	bachelor	26%	26%	28%	26%	24%	26%
	graduatedegree	16%	18%	13%	13%	13%	15%
Child in Household	child-under18	32%	38%	40%	17%	24%	29%
Pct of Pop. Age 16+	employed	59%	60%	69%	72%	64%	65%
Household Income	income 0-25k	11%	13%	12%	11%	7%	11%
	income 25-50k	16%	12%	15%	21%	14%	16%
	income 50-75k	19%	12%	17%	20%	21%	18%
	income 75-200k	37%	35%	37%	36%	34%	36%
	income 200k-plus	18%	27%	19%	13%	25%	20%
Housing Stats	single family	67%	93%	69%	35%	58%	61%
	multi-family	33%	7%	31%	65%	42%	39%
	rented	31%	31%	51%	64%	37%	44%
	owned	69%	69%	49%	36%	63%	56%

Total population data from the 2020 Decennial Census.

Surname-based Voter Registration and Turnout data from the California Statewide Database.

Latino voter registration and turnout data are Spanish-surname counts adjusted using Census Population Department undercount estimates. NH White and NH Black registration and turnout counts estimated by NDC. Citizen Voting Age Pop., Age, Immigration, and other demographics from the 2015-2019 American Community Survey and Special Tabulation 5-year data.

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: PUBLIC HEARING - ORDINANCE No. 19. Approving Transition from At-Large to Division-Based Elections, Approving Map of Election Divisions, and Establishing Sequence for Elections.

DATE: July 18, 2023

REQUESTED ACTION: That the Board consider approving the transition from at-large to division-based elections, and related actions, through the adoption of Ordinance No. 19, including supersession of prior ordinances.

BACKGROUND: On June 21, 2022, the Board adopted Resolution No.R-355 declaring its intent to transition from at-large elections to division-based elections in accordance with the California Voting Rights Act (CVRA) for the November 2024 General Election. The Board engaged National Demographics Corporation (NDC) to provide demographic services, assist with drafting division maps and to guide the transition process in conformance with the CVRA.

Over the past several months, a number of outreach activities have been implemented to inform the public, explain the transition process and solicit input on draft electoral division maps. Outreach included informational updates on the District's website, publications in the local newspaper and posts to the District's social media platforms.

Two public hearings were held, on May 2 and May 16, 2023, to receive input on the division formation process prior to development of any maps. With that input, NDC prepared three distinct maps, each delineating five electoral divisions. A third public hearing was held on June 20, 2023 to review the draft maps and demographic data associated with each, and to receive public input on the maps. At that third hearing, the District Board indicated its preference for the "Green Map".

A fourth public hearing was scheduled for the regular Board meeting on July 18, 2023. At this hearing, the Board will receive public input and may take action to select a preferred map of electoral divisions in essentially final form.

If the Board wishes to move forward with district-based elections and the selection of the chosen voting division map, it is recommended that the Board review and consider adoption of Ordinance No. 19 which (a) changes the system of elections for Board members from an at-large system to a district-based system, (b) approves the Board's preferred map, included as Exhibit "A" to the Ordinance and which describes the voting division boundaries, and (c) identifies the election sequencing for each voting division.

Ordinance No. 19, which was reviewed by NDC and by District legal counsel, provides for the following election sequence:

ELECTION DIVISION	DIRECTOR	FIRST ELECTION DATE
Election Division 1	Damron	November 2024
Election Division 2	Graf	November 2026
Election Division 3	Murphy	November 2024
Election Division 4	Velasco	November 2024
Election Division 5	Modugno	November 2026

After review and discussion of Ordinance No. 19, the Board may make such changes as it deems appropriate, including changes to the election sequence. It is recommended that the Board then adopt the Ordinance, subject to any such changes.

Following the adoption of Ordinance No. 19, District staff will work with NDC to submit the approved map and sequence of elections to the Santa Barbara and Ventura County Office of Elections.

RECOMMENDATION: Staff recommends that the Board review and consider adoption of Ordinance No. 19.

SUGGESTED MOTION: I move that Board adopt District Ordinance No. 19 as presented (modified).

M_____ S_____

Ayes:_____ Nays:_____ Abstentions:_____

Prepared By: _____
Craig Murray, P.E. - General Manager

Attachments: Ordinance No. 19

ORDINANCE NO. 19

ORDINANCE OF THE GOVERNING BOARD OF THE CARPINTERIA SANITARY DISTRICT APPROVING TRANSITION FROM AT-LARGE ELECTIONS TO DIVSION-BASED ELECTIONS, APPROVING MAP OF ELECTION DIVISIONS, AND ESTABLISHING SEQUENCE FOR ELECTIONS

SECTION 1: The Board of Directors (the "Board") finds and determines as follows:

A. The five Directors on the Board governing the Carpinteria Sanitary District (the "District") are currently elected by an at-large election method under which the voters of the District's entire jurisdiction elect the Board members.

B. Elections Code Sections 10508 and 10650 authorize the District to change from its current at-large election method to a district or division-based election method under which each candidate must reside within an election division that is a geographically defined part of the District's jurisdictional boundaries and is elected only by voters residing within that election division. The procedures for changing from at-large elections to a division-based elections are set forth in Elections Code Section 10010.

C. On May 12, 2022, the District received a notice from a perspective plaintiff as contemplated by Elections Code Section 10010(E)(1) alleging violations of the California Voting Rights Act of 2001 ("CVRA") codified at Elections Code Section 14025, *et seq.*;

D. On June 21, 2022, the Board adopted Resolution No. R-355 declaring its intent to transition from an at-large system to a division-based elections system in accordance with Government Code Section 34886 and Elections Code Section 10010 before the next general District election in 2024;

E. The District denied that its current at-large method of election violated the CVRA or any other provision of law and asserted that the District's election system is legal in all respects. Nevertheless, to avoid the costs and uncertainty that litigation involves, the District entered into a Settlement Agreement with the perspective plaintiff on August 16, 2022 and confirmed the District's intent to transition to division-based elections.

F. Pursuant to the Resolution of Intention, the District undertook the following steps to facilitate the transition from at-large elections to division-based elections, as required by Elections Code Section 10010:

1. Before drawing draft maps of the proposed boundaries of the election districts, the District held two public hearings over a period of not more

than 30 days, at which the public was invited to provide input regarding the composition of the election divisions. Before those hearings, the District conducted outreach to the public to explain the division formation process and to encourage public participation.

2. After the draft maps were drawn, the District published and made available for release the draft maps and the potential sequence of elections for the staggered terms of District Board members. The District also held two additional hearings over a period of not more than 45 days, at which time the public was invited to provide input regarding the content of the draft maps and the proposed sequence of elections. The first version of a draft map was published at least seven days before consideration at the first review hearing.

G. This Ordinance is adopted to provide for election of the Directors to the District Board by-divisions in five single-member divisions as reflected in Exhibit A to this Ordinance, which is incorporated by reference, to implement the purposes of the CVRA and protect the guarantees of the California Constitution.

SECTION 2: Election Divisions. The Board approves and adopts the map attached as Exhibit "A," and incorporated by reference, and its five election divisions.

SECTION 3: District-Based Elections. Commencing with the November 2024 regular election, Board members shall be elected using a division-based election method under which the candidate must (i) be a registered voter residing within an election division identified on Exhibit "A", and (ii) be elected only by registered voters residing within that election division.

SECTION 4: Sequence of Elections. The Board members shall serve for staggered terms of four (4) years each. The following sequence shall apply to the first division-based elections following the effective date of this Ordinance:

ELECTION DIVISION	FIRST ELECTION DATE
Election Division 1	November 2024
Election Division 2	November 2026
Election Division 3	November 2024
Election Division 4	November 2024
Election Division 5	November 2026

In determining the sequence of elections, the Board has given special consideration to the purposes of the CVRA, and has taken into account any preferences expressed by members of the election divisions.

SECTION 5: Term and Vacancies

A. Any Board member who in office as of the effective date of this Ordinance shall

continue to hold office until the expiration or earlier termination of the term for which the Board member was elected or appointed, regardless of the election division in which such Board member resides.

B. If the position of a Board member who in office as of the effective date of this Ordinance becomes vacant prior to the expiration or earlier termination of the term for which the Board member was elected or appointed, the person who is appointed or who is elected at a special election to fill the vacancy may reside anywhere within the District's boundaries.

C. If the position of a Board member who is elected or appointed from an election district on or after the applicable first election date identified in Section 3 above becomes vacant prior to the expiration or earlier termination of the term for which the Board member was elected or appointed, the person who is appointed or who is elected at a special election to fill the vacancy must reside it that same election division.

SECTION 6: Processing. The General Manager is authorized to make technical adjustments to the district boundaries that do not substantively affect the populations in the districts, the eligibility of candidates, or the residence of elected officials within any division. The General Manager must consult with the District's legal counsel concerning any technical adjustments deemed necessary and advise the Board of any such adjustments required in the implementation of the divisions. The General Manager is directed to submit a copy of this Ordinance to the Santa Barbara County and Ventura County Elections Offices, to work with the Elections Offices, and to take any additional actions that are necessary to facilitate the completion of the transition to division-based elections in time for the November 2024.

SECTION 7: Future Adjustments. Pursuant to Elections Code Section 22000, Health and Safety Code Section 6592, and such other provisions of law that may amend or replace said code sections in the future, the Board may adjust the boundaries of the election divisions identified on Exhibit "A" after each decennial federal census, commencing with the 2030 federal census, to ensure that the election divisions are in compliance with all applicable law.

SECTION 8: Environmental Assessment. This Ordinance is exempt from review under the California Environmental Quality Act (California Public Resources Code §§ 21000, et seq., "CEQA") and CEQA regulations (14 California Code of Regulations §§ 15000, et seq.; "CEQA Guidelines") in that it is not a "project" for purposes of CEQA (as defined by CEQA Guidelines § 15378). Specifically, this Ordinance proposes an organizational or administrative activity that will not result in a direct or indirect physical change in the environment (CEQA Guidelines § 15378(b)(5)). Further, even if this Ordinance was deemed a "project," and therefore subject to CEQA, the Ordinance adoption would be exempt as it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment (CEQA Guidelines § 15061(b)(3)).

SECTION 9: Publication. The Secretary of the District is authorized and directed to publish this Ordinance, or a summary, once in a newspaper published in the District in accordance with Health and Safety Code Section 6490.

SECTION 10: Severability. If any part of this Ordinance or its application is deemed invalid by a court of competent jurisdiction, the Board of Directors intends that such invalidity will not affect the effectiveness of the remaining provision or application and, to this end, the provisions of this Ordinance are severable.

SECTION 11: Summaries of Information. All summaries of information in the findings, which precede this section, are based on the substantial evidence in the record. The absence of any particular fact from any such summary is not an indication that a particular finding is not based in part on that fact

SECTION 12: Effective Date. This Ordinance takes effect one week after the date of publication.

PASSED AND ADOPTED by the Governing Board of CARPINTERIA SANITARY DISTRICT this 18th day of July 2023 by the following vote:

AYES:

NAYS:

ABSENT:

_____
Mike Modugno, President
Board of Directors
CARPINTERIA SANITARY DISTRICT

ATTEST:

_____
Gerald Velasco, Secretary
Board of Directors
CARPINTERIA SANITARY DISTRICT

CERTIFICATION

I, Gerald Velasco, Secretary of the CARPINTERIA SANITARY DISTRICT, hereby certify that the foregoing is a true copy of Ordinance No. 19 duly and legally adopted by the Governing Board of the District at a legal meeting of said body duly and specially held on July 18, 2023.

DATE CERTIFIED: July 18, 2023

_____

Gerald Velasco, Secretary
Board of Directors
CARPINTERIA SANITARY DISTRICT

Carpinteria Sanitary District

Board of Directors Meeting
General Manager's Status Report

TO: Board of Directors

FROM: Craig Murray, P.E. – General Manager

SUBJECT: General Manager's Status Report

DATE: June 20, 2023

Quarterly Incident Report. Attached is the incident summary report for the second quarter of 2023.

Construction Standards Update. A task order was issued to Phoenix Engineering to update the District's construction standards and associated standard details. These documents, which have not been updated since the mid 1990's, provide specific direction to contractors, plumbers, engineers and others involved in private and public sewer infrastructure within the District. We will implement/update certain requirements of the recently adopted SSS General WDRs.

Lift Station No. 2 Rehabilitation. Following completion of the mechanical improvements and hatch installation, staff requested a proposal from Sancon for the wetwell restoration and coating work that is part of this project. We are negotiating the scope and budget price and expect to bring a contract back to the Board in August.

Lower Lateral Rehabilitation Project. National Plant Services requested a short deferral on issuance of Notice to Proceed for this project. Fabricated wye liners are not currently available in the U.S. and they have been ordered from Trelleborg directly for this project. We expect work to commence in September.

Operations Update

System operations updates are as follows:

- The treatment plant is operating in full compliance with our NPDES permit. Effluent quality has been consistently high.
- The collection system is operating well with no reported problems or SSO events.
- The new grit pumps were shipped by Essco on 7/14 and will be delivered on 7/18. These are exact replacements and will be installed by operations staff.
- The 5-year fire sprinkler test and certification were performed for the WWTP. There were two minor repairs necessary to verify compliance.
- Operations staff completed routine service on clarifier drives, flash mixers, high speed turbo blowers and other plant equipment. Annual inspections of Lift Stations 4 and 7 were performed. The wear liner for the grit classifier was also replaced.
- Our system wide hydroclean and CCTV inspection program is continuing. Upcoming work will be in Holly Avenue, 5th Street and Yucca Lane.
- Two recall updates were completed for the E-Transit CCTV van at Perry Ford.
- The new scrubber fan for OCU-3 was installed and put in service. West Coast Air Conditioning will be fabricating a new stainless adapter between the fan and the odor control vessel.

- Our ELAP on-site laboratory performance evaluation will be conducted during the first week of September. Jacob has scheduled the proficiency study that is required ahead of the State inspection.

CARPINTERIA SANITARY DISTRICT
QUARTERLY SUMMARY INCIDENT REPORT
April 1 - June 30, 2023

Date	Location	Incident/Complaint	Determination/Resolution
4/16/2023	Ave Del Mar	E-One	Collection on-call staff were called out to an E-One high level alarm. Staff found grease and debris. Pump was replaced and tested ok.
4/30/2023	Ave Del Mar	E-One	Collection on-call staff were called out to an E-One alarm. Pump on/off outlet valve broken and failed testing, staff replaced pump and tested okay.
5/28/2023	Ave Del Mar	E-One	Collection on-call staff were called out ot an E-One alarm. Pump sounding a high level alarm, pump replaced and pumped down. Pump tested okay.
6/8/2023	Buena Fortuna	E-One	Collection staff were called out to a E-One alarm. Pump was not functioning, staff replaced pump and tested okay. Homeowners were away, concerned neighbor called in.
6/17/2023	Sandyland	E-One	Collection on-call staff were called out to an E-One high level alarm. Staff found grease and clogged vent. Staff replaced pump and tested okay. Staff also found that pump had been covered by homeowner's landscaper.
6/30/2023	Ave Del Mar	E-One	Collection on-call staff were called out to an E-One high level alarm. Staff returned tank to normal level and tested okay.

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: CIP Project Authorization
Plant Air Compressor Replacement

DATE: July 18, 2023

REQUESTED ACTION: Approve addition of a capital improvement project to the FY 2023/24 CIP Budget for emergency replacement of one plant air compressor.

BACKGROUND: Following Board approval of the District's operating and capital budget for FY 2023/24 on June 20th, we experienced unexpected mechanical failure of one of the Kaeser rotary screw compressors (AC-811) that supplies plant air at the treatment facility. Staff explored repair and replacement options for this critical equipment. In-kind replacement offers the most value based on quotes received from Kaeser Compressors.

A purchase order was issued to Kaeser for $14,375.86 that included freight and applicable sales tax. Board action is requested to authorize a new CIP project for this purchase so that the item can be capitalized and properly accounted for.

RECOMMENDATION: Approve a CIP project for procurement of a rotary screw compressor with a budget total of $15,000 for the current fiscal year.

SUGGESTED MOTION: I move that the Board authorize a CIP project for procurement of a rotary screw compressor with a budget total of $15,000 for FY 2023/24.

M_____ S_____

Ayes:_____ Nays:_____ Abstentions:_____

Prepared By: _____
Craig Murray, P.E. - General Manager

Attachments: Kaeser Invoice No. 916128876

P:\Admin\Board\Staff Reports\2023\07-18-23\CIP_Compressor.doc

KAESER COMPRESSORS

INVOICE

No. 916128876

Carpinteria Sanitary District
5300 Sixth St
Carpinteria CA 93013-2463

Information	
Date of invoice:	07/10/2023
PO number:	Signed quote
PO date:	07/05/2023
KAESER order number:	11368984
Invoice recipient no.:	1128461
Entered by:	Vanessa Astran
Sales contact:	Tatone, L.A., US

Go Paperless! Sign up for e-delivery
Please send recipient name, email address and phone number to accountsreceivable.us@kaeser.com

Sold-to-party 1128461	Shipping address 3045528 (further shipping addresses see delivery note)
Carpinteria Sanitary District 5300 Sixth St Carpinteria CA 93013-2463	Carpinteria Sanitary District 5351 6th St Carpinteria CA 93013-2404

Shipping details		Delivery note
Ship Date:	07/10/2023	8011562092
Delivery(Incoterms®2020):	FCA US Shipping Point	
Carrier	A1 Express Delivery Service, Inc.	

Business note

Ship via: A1 Express, Prepaid

Item	Description	Material	QTY UM	Unit price USD	Total USD
10	**Rotary Screw Compressor SK 15 125psi SC2 TriVolt. US**	101975.01	1.000 PC	12,388.04	12,388.04
	Serial no:	(2075)			
	1 service manuals included with each,English				
	Model	SK 15			
	Electrical connection	208/230/460V / 3 / 60Hz			
	Max. working pressure	125.0 psig			
	Connection to control center	Not applicable			

Invoiced goods remain the property of Kaeser Compressors, Inc. until payment is received. No returns without authorization. Approved returns must be shipped pre-paid and are subject to restocking charges up to 25%. Past due accounts subject to 1 1/2% interest monthly.
Please remit payments to:

Item	Description	Material	QTY UM	Unit price USD	Total USD
	Compressor fluid sort	SIGMA FLUID S-460			
	Wired 460V				
20	**Hose Flex 1"x12"MPT Metal 232psi**	ANVD-1	1.000 PC	81.00	81.00
30	**Shipping and Handling**	US05-FREIGHT	1.000 PC	872.83	872.83
	Subtotal USD				13,341.87
	Sales tax		7.750 %		1,033.99
	FINAL INVOICE AMOUNT IN USD				**14,375.86**

Payment terms (please use always customer number and invoice number for payment)

Up to 08/09/2023

Terms and conditions

This Invoice is effective and expressly conditional on Buyer's assent to all terms and conditions incorporated in this Invoice that are additional to or different from those stated in Buyer's purchase order or other documents. Buyer's assent to this provision will be manifested by ordering, paying for, or receiving any portion of the goods designated herein. Sellers terms and conditions are available on request, and at us.kaeser.com/terms.

Carpinteria Sanitary District

Board of Directors Meeting

STAFF REPORT

TO: Board of Directors

FROM: Craig Murray, P.E. - General Manager

SUBJECT: **Carpinteria Advanced Purification Project (CAPP) Update**

DATE: July 18, 2023

REQUESTED ACTION: None. Information Only.

BACKGROUND: Progress continues to be made on development of an indirect potable reuse (IPR) recycled water project in conjunction with the Carpinteria Valley Water District (CVWD). A brief summary of activities underway is provided below.

Design Activities A copy of the Basis of Design Validation Memorandum prepared by the final design team is attached for reference and review. District staff is providing input on a number of important items, primarily site layout and building configuration. A cost proposal was received for design of a new maintenance/garage building that incorporates staff occupancy (restrooms, lockers, offices, etc.). Due to the magnitude of the design fee, the team is looking at alternative approaches to this concept.

MF/UF Pilot Testing. The skid mounted ultrafiltration pilot plant is scheduled to arrive from Texas on July 19th. District staff is working on ancillary improvements to provide power and feed water to the skid. We have also procured a large tent enclosure to house the equipment. Startup of the pilot is tentatively scheduled for the week of July 31st.

Joint Exercise of Powers Agreement. District legal counsel provided comments on a draft Joint Exercise of Powers Agreement to CVWD counsel. We are currently working on document revisions and drafting an Operating Memorandum intended to be an attachment to the JEPA.

RECOMMENDATION: None. Information Only.

SUGGESTED MOTION: None.

Prepared by: _____

Craig Murray, P.E. - General Manager

CAPP | Replenishing Our Groundwater for the Future

CARPINTERIA ADVANCED PURIFICATION PROJECT

BASIS OF DESIGN VALIDATION TECHNICAL MEMORANDUM

DRAFT

CARPINTERIA Sanitary District

Woodard & Curran

carollo

0012181.00

Carpinteria Valley Water District

June 2023

TABLE OF CONTENTS

SECTION **PAGE NO.**

TABLES

FIGURES

APPENDICES

1. INTRODUCTIONS AND OBJECTIVES

1.1 Introduction

The Carpinteria Valley Water District (CVWD) has partnered with the Carpinteria Sanitary District (CSD) to develop the Carpinteria Advanced Purification Project (CAPP), in which purified recycled water will be produced on-site at the CSD Wastewater Treatment Plant (WWTP) with the proposed Advanced Water Purification Facility (AWPF), conveyed through a Purified Water Conveyance System, then injected into the Carpinteria Groundwater Basin using Injection Wells and extracted from the Groundwater Basin through existing CVWD production wells.

This Basis of Design Validation Technical Memorandum (TM) documents key design decisions and will supplement the CAPP AWPF Preliminary Design Report (PDR) (Woodard & Curran, June 2019) and Conveyance System PDR (Woodard & Curran, October 2019).

1.2 Objectives

The objectives of this Basis of Design Validation TM are to provide the design criteria and elements that will serve as the basis for the final design of the CAPP AWPF and Conveyance Systems. Design criteria that have changed since development of the AWPF PDR (Woodard & Curran, June 2019) and Conveyance System PDR (Woodard & Curran, 2019) are documented herein.

Several preliminary decisions have been made related to (but not limited to):

- AWPF production capacities
- Equalization tank diversion
- Treatment process design criteria
- Purified Water Clearwell and Pump Station design criteria
- Electrical loading requirements
- Site plan and building layout(s)
- Wellhead locations, facilities, and maintenance water discharge

1.3 Organization

Following the same outline and section numbering as the AWPF PDR (Woodard & Curran, June 2019), this TM documents the design criteria changes presented in Sections 1 through 4. If there has been no change to the design criteria in the PDR, that is also documented as *No change from the Preliminary Design Report (2019)*. This memorandum also documents the next steps and activities that will be completed during the 50% design phase. Sections 5 through 7 of the AWPF PDR have not been updated as part of this TM.

Section 5 of this TM has been created to document design changes to offsite facilities for the conveyance piping, the two injection wells, wellhead equipment and backwash disposal method for the injection wells, and the monitoring wells. The design criteria for the below-ground components of injection and monitoring wells are not included in this TM.

Topographic survey, geotechnical investigations, and potholing were not completed at the time of this TM. These field investigations will be completed to support the subsequent AWPF 50% design package and Conveyance Pipeline 75% design package.

2. BASIS FOR FACILITY PLANNING AND DESIGN

2.1 Overview of Conventional Full Advanced Treatment Train

No change from the Preliminary Design Report (2019).

2.2 Source Water Quality and Flows

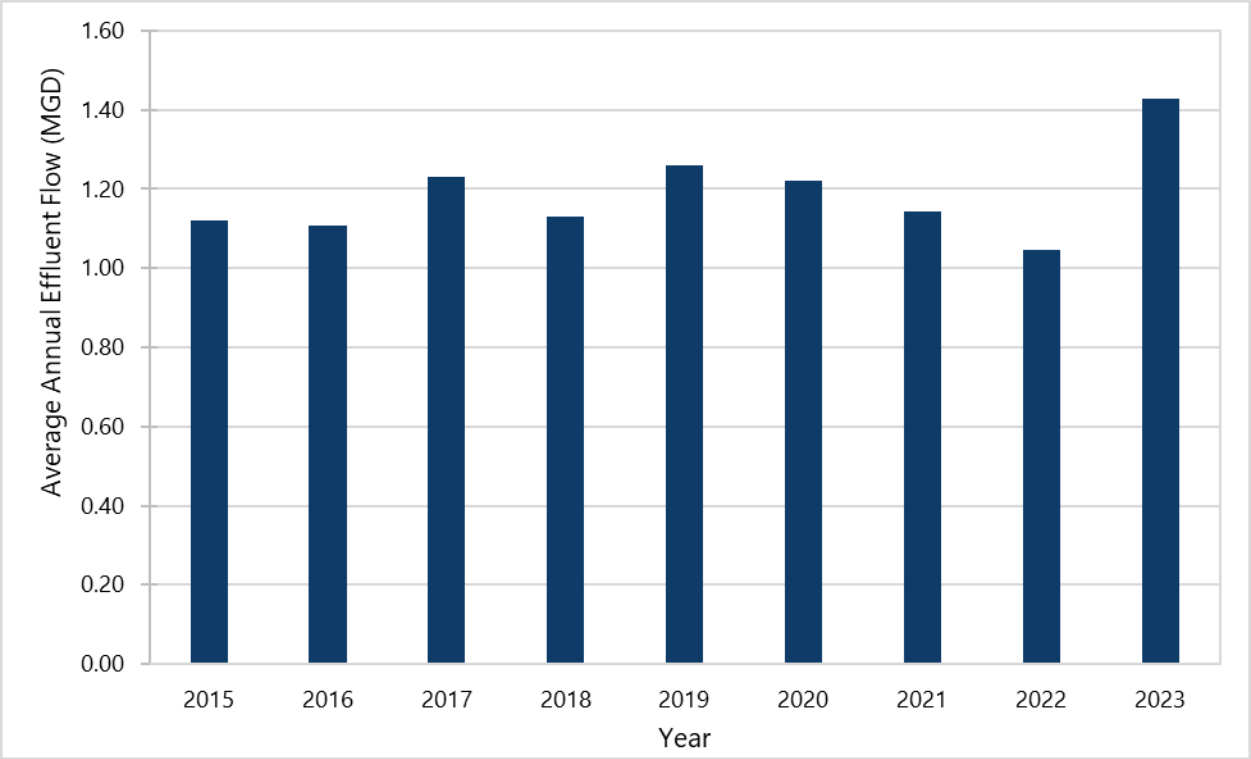
2.2.1 Source Water Quality from Carpinteria WWTP

The AWPF will receive undisinfected secondary effluent from the CSD WWTP as its source water. Secondary effluent will be redirected to the AWPF's Equalization (EQ) Tank upstream of the WWTP's Chlorine Contact Basin (CCB). CSD will be taking grab samples of undisinfected secondary effluent and sending the samples to a third-party laboratory for testing of water quality constituents that are critical to UF/RO/UV-AOP design. Woodard & Curran and Carollo developed a water quality sampling list in April 2023 that included the requested water quality constituents for testing and sampling frequency. In addition to grab samples, the water quality for the AWPF feed will be analyzed as part of the upcoming membrane pilot testing that will occur for a minimum of six months beginning in July and using CSD's NPDES compliance data.

2.2.2 Historical and Current Flow Rates from Carpinteria WWTP

Woodard & Curran and Carollo received WWTP average and peak effluent flow data from December 1, 2018 to May 10, 2023 and diurnal effluent flow data from December 1, 2021 to May 10, 2023 from CSD. The data were incorporated into the previous flow analysis data set from the 2019 PDR. Current WWTP flow rates were characterized using flow data from January 2015 to May 2023. The average annual WWTP effluent flows from January 2015 to May 2023 are presented in Figure 2-1. The average annual effluent flow across this time period is approximately 1.19 MGD. The average annual flow for 2023 is higher than the previous years because the data set was limited to January through May, and Carpinteria experienced significant rainfall in January, February, and March.

Figure 2-1: Summary of Average Annual WWTP Effluent Flows



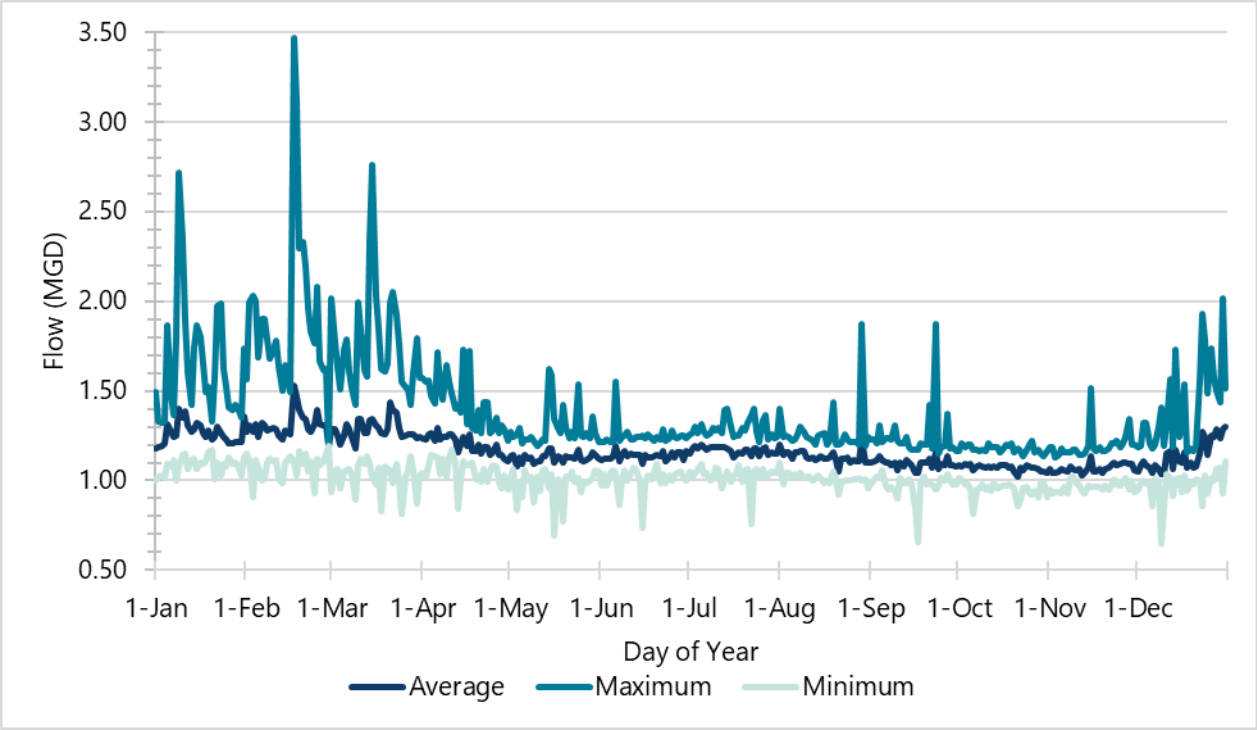
Notes:

1. Flow data represents CSD WWTP effluent flows. Flow monitoring location is the downstream of the WWTP CCB.
2. 2023 flow data provided from January 1 to May 10, 2023.

A summary of average, maximum, and minimum daily WWTP effluent flows from January 2015 to May 2023 is provided in Figure 2-2. The maximum line indicates the highest average flow rate for each calendar day across the data set. The average line is the calculated average of all daily average flow data for each calendar day across the data set. The minimum line indicates the lowest measured average flow rate for each calendar day across the data set. This figure shows the annual variation in flow between minimum, maximum, and average flows recorded over those years.

WWTP flows are generally highest during the wet winter months (January through March) when the City experiences most of its seasonal rainfall. Flows are generally lowest during the dry fall months (September through November) when rainfall is minimal and tourism is significantly less compared to the summer months. This approx. 20-25% season variation in flow affects AWPF production when trying to maximize reuse.

Figure 2-2: Average, Maximum, and Minimum Daily WWTP Effluent Flows from 2015 to 2023



2.2.3 Projected Flow Rates from Carpinteria WWTP

No change from the Preliminary Design Report (2019).

2.3 Purified Water Requirements

No change from the Preliminary Design Report (2019).

2.3.1 Treatment Credits for AWPF

No change from the Preliminary Design Report (2019).

2.3.2 Treatment Credits for Underground Retention

No change from the Preliminary Design Report (2019).

2.3.3 Pathogen Control Summary

No change from the Preliminary Design Report (2019).

2.3.4 Groundwater Anti-Degradation

No change from the Preliminary Design Report (2019).

3. ADVANCED WATER PURIFICATION FACILITY DESIGN CRITERIA

3.1 Overview of Carpinteria AWPF

See **Appendix A** for a detailed process flow diagram for the proposed AWPF system that includes all major processes, instrumentation, and chemical addition points.

3.1.1 Initial and Ultimate Treatment Capacity

The proposed initial and ultimate capacity of the AWPF from the 2019 PDR equaled 1.00 MGD and 1.20 MGD, respectively. These capacities were based on average flow conditions based on the data available at that time. After an analysis of the expanded flow data set ending on May 2023, it is recommended to design the initial capacity of the AWPF towards capturing 95th percentile of flow conditions, which corresponds to a production capacity of 1.27 MGD. Increasing the capacity of the AWPF to 1.27 MGD will maximize yield for groundwater injection during the higher flow winter months by reducing the volume of water that would overflow out of the AWPF EQ Tank into the existing CCB with a 1.00 MGD system.

Table 3-1 quantifies the approx. number of days that WWTP secondary effluent would have overflowed out of the AWPF EQ Tank and into the existing CCB based on WWTP flow data from January 2015 to May 2023. Designing the AWPF around 1.00 mgd production capacity would spill on average 51 acre-feet per year (AFY) versus a 1.27 mgd production capacity will spill only 11 AFY on average. On average, the total volume of additional water that would be treated by a 1.27 MGD AWPF versus a 1.00 MGD system is approximately 40.1 AFY (36,000 GPD).

Table 3-1: AWPF Capacity and Potential Spill Volumes to the Chlorine Contact Basin

Year	Days Overflowing		Spill Volume (MG)		Additional Treated Water (MG)
	1.00 mgd	1.27 mgd	1.00 mgd	1.27 mgd	
2015	75	2	5.6	0.2	5.4
2016	52	4	5.0	0.3	4.7
2017	142	27	31.6	10.3	21.4
2018	53	5	5.6	1.0	4.6
2019	270	23	35.5	4.6	30.9
2020	279	9	20.1	1.6	18.5
2021	139	6	10.0	1.0	9.0
2022	28	3	2.8	0.1	2.7
2023	89	40	32.5	12.2	20.3

Notes:

1. Based on WWTP effluent flow data from January 2015 through May 2023.
2. Based on UF/RO flow rates and recoveries presented in Table 3-2.

Installing the additional membranes at time of construction would require very little additional cost, as the overall size of the facility and equipment would not change, and we would not require remobilization of the suppliers. The UF and UV systems can freely turn down to meet any flow setpoints required of them. The RO System will cycle trains on and off as required to fully treat all the water according to a moving level setpoint in the AWPF EQ Tank. RO train cycling is fully automated and does not require operator involvement to complete. Additionally, since operator involvement is required when the CCB receives

overflow water from the EQ Tank, reducing the number of days the water enters the CCB will reduce O&M requirements. Overflow events into the CCB from the EQ Tank will require that operators manage the water in the basin by either dosing chemicals as required when overflowing, or by draining the tank after each overflow.

Updated production capacities are listed in Table 3-2. The UF system has been upsized to account for recirculation of UF backwash to the WWTP headworks.

Table 3-2: Evaluation of AWPF Proposed Initial Production Capacity

Parameter	Unit	Original Capacity (from PDR)	Proposed Capacity
AWPF Production Capacity	MGD	1.00	1.27
AWPF Influent Flow	MGD	1.29	1.64
UF System			
Feed	MGD	1.29	1.64
Recovery	%	92	92
Backwash Waste	MGD	0.10	0.13
Filtrate	MGD	1.19	1.51
RO System			
Feed	MGD	1.19	1.51
RO Recovery, Maximum	%	84	84
Permeate	MGD	1.00	1.27
UV-AOP Feed	MGD	1.00	1.27

There are several potential additional flows that could come to the CSD, though no agreements or projects have been developed and thus there are speculative at this point. One is for a sewer connection with the Summerland Sanitary District (SSD), with an average flowrate of 67,000 gpd (2022). SSD flow would be partially equalized before connection into CSD. There is also the potential for diversion of urban runoff into the CSD collection system.

Given the uncertainty with potential additional flow sources in the future, the AWPF process building will not have space reserved for future trains. On-skid expansions of UF and RO trains are possible but have limits. For UF trains, on-skid expansions increase the footprint of a train. The current AWPF building layout, as presented in Section 4, does not reserve space for on-skid expansion with additional membrane modules. If membrane modules are to be added in the future, it would reduce the clear area around the skid and restrict working conditions. On-skid expansion of RO trains increases the height of each skid, but not the footprint. Limitations with RO on-skid expansion are typically governed by on-skid pipe sizes and the high-pressure feed pumps. Given the limited space available for on-skid expansion of the UF system, the current layout suggests the ultimate capacity of the AWPF is 1.27 MGD. The sizing and design criteria for the UF trains will be re-evaluated after the completion of the membrane pilot testing. Results of the pilot testing may show less membrane modules are required than what was assumed as part of this TM, thus reducing the footprint of the UF skids and leaving space for on-skid expansion in the future if needed.

3.1.2 Projected Purified Water Quality

No change from the Preliminary Design Report (2019).

3.1.3 Facility Reliability and Redundancy

The Equalization Tank will be bisected by a concrete wall, splitting the tank in half. This will allow for half of the tank to come out of service at a time for cleaning while the other half remains in production. During the April 24, 2023 site walk, it was noted that the existing CCB must be periodically cleaned of solids that carry over from the WWTP final clarifiers. Splitting the EQ Tank in this manner gives more flexibility to the operations team with minimal impacts to storage concerns. The RO Trains may need to cycle more frequently while one half of the tank is being cleaned depending on influent flow rates.

The UF System will be operated as an N+1 system, with a total of three trains. The redundancy allows for one train to be taken out of service for backwashing, cleaning, or maintenance. Typically, all skids will operate at the same time unless they are out of service for maintenance.

The RO Transfer Pumps are removed from the project to save on cost and footprint. Each RO Train will function as a self-sufficient system with N+0 units (two trains, both in service to meet peak production). If one RO train is out of service plant capacity is reduced from 1.27 mgd to 0.64 mgd.

The UV System has not been changed from the Preliminary Design Report (2019).

The Chemical Systems have not been changed from the Preliminary Design Report (2019).

3.1.4 General AWPF Operating Strategy

All WWTP effluent will flow by gravity into the AWPF EQ Tank. Any WWTP effluent that the AWPF cannot treat will passively overflow into the existing CCB.

The RO System has very little flexibility to turn down and will instead rely on cycling the RO Trains on and off, typically once per day. When the EQ Tank reaches a high level setpoint, both RO Trains will be put into service, treating as much water as possible (up to 1.27 MGD). The UF System will produce what is required to feed the RO and the UV System will treat all available RO Permeate. Once the EQ Tank has been drawn down to a low level setpoint, one RO Train will turn off and allow the tank to fill to the high level before restarting the offline RO Train. RO train cycling is fully automated and does not require operator involvement to complete.

3.2 Process Descriptions and Design Criteria

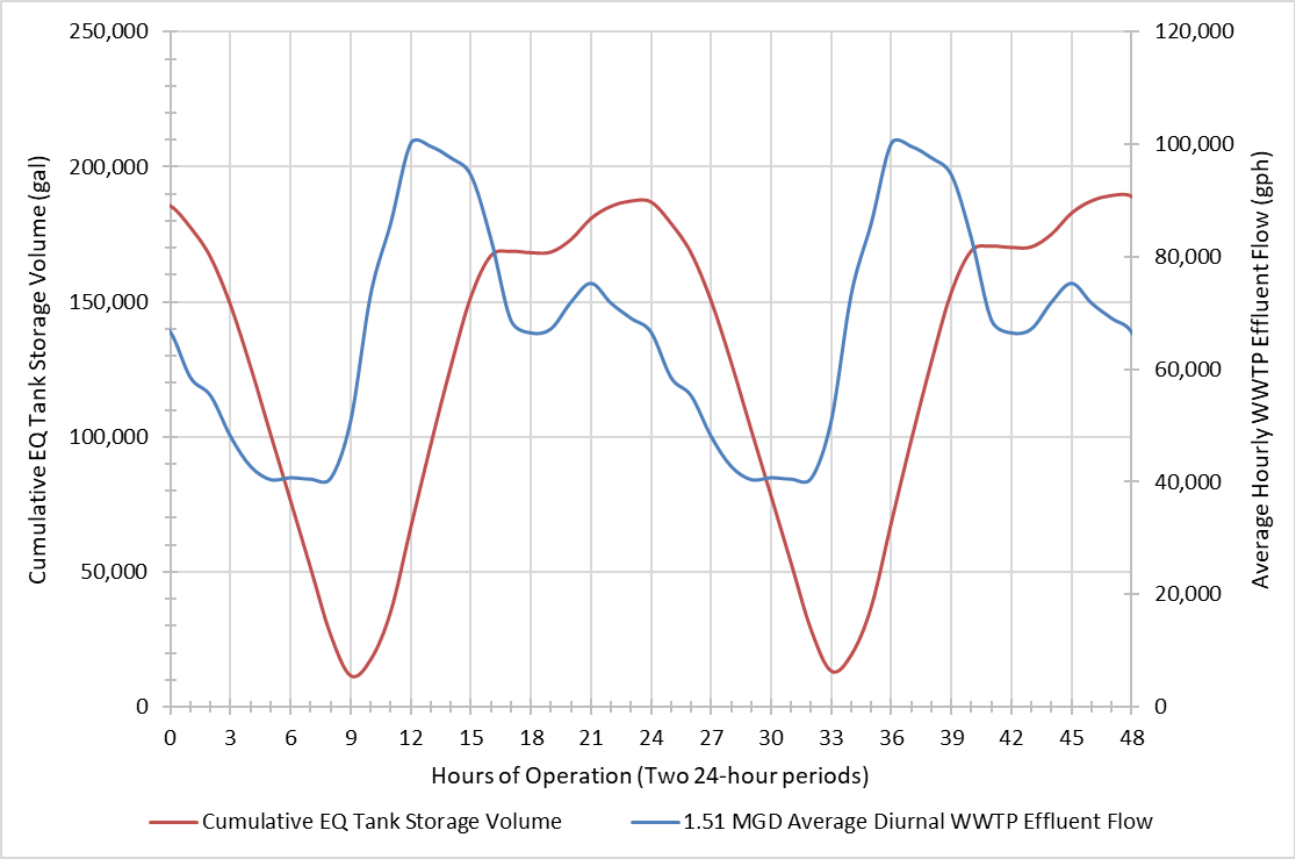
3.2.1 Flow Equalization

UF/RO/UV-AOP systems function best when the source water is fed at a continuous rate with limited fluctuations. Therefore, an EQ Tank will be required upstream of the AWPF to equalize the diurnal secondary effluent flow variance. The EQ tank will be located upstream of the existing CCB and receive WWTP effluent by gravity from a diversion connecting to the existing 24-inch secondary effluent pipeline. As previously mentioned, the EQ Tank will be divided into two halves to allow for cleaning and maintenance of one side at a time without requiring a complete AWPF shutdown, with one UF Feed Pump and one Plant Water Pump located in each half. The EQ Tank will overflow at one end to the existing CCB. Whenever the EQ Tank

receives more flow than the AWPF can treat the excess water will overflow to the CCB where it can be chlorinated and dechlorinated with the existing equipment before being discharged to the ocean outfall.

The AWPF EQ Tank was sized to provide enough operating volume to produce 1.27 MGD of RO permeate, equivalent to approximately 1.64 MGD of secondary effluent fed to the AWPF, as shown in Table 3-2. This 1.64 MGD value includes the UF backwash waste return flow of approximately 0.13 MGD. Therefore, the required WWTP secondary effluent base flow is approximately 1.51 MGD. To size the AWPF EQ Tank, a design diurnal flow curve was developed using hourly flow data from days where the WWTP effluent was approximately 1.51 MGD. The minimum required EQ tank working volume was determined by developing a cumulative storage volume curve over a 24-hour span using the design diurnal curve as the basis to fill the tank and 1.64 MGD (63,329 gph) drawn out of the tank on a constant basis to feed the AWPF. The peak cumulative storage volume over the 24-hour period would be the minimum working volume required for the EQ Tank. The design diurnal and cumulative storage volume curves are shown in **Figure 3-1**.

Figure 3-1: 1.51 MGD WWTP Diurnal Flow and Cumulative EQ Storage Volume



Notes:

1. A constant UF backwash return flow rate of 0.13 MGD (5,417 gph) was included in the cumulative EQ tank storage volume estimates.

As shown in Figure 3-1, the minimum EQ working volume required to produce 1.27 MGD of RO permeate is approximately 190,000 gallons. This was increased to 200,000 gallons for the AWPF basis of design, which approximately matches the working volume identified in the 2019 PDR.

The EQ tank will not utilize its full 200,000 gallon working volume on days where the AWPF is producing less than 1.27 MGD due to WWTP effluent flows below 1.51 MGD. During these days, the RO trains will cycle on/off based on the water level in the EQ as previously discussed.

The EQ Tank design criteria are summarized in **Table 3-3**. A cast-in-place concrete tank constructed below-grade is recommended over an above-ground steel or concrete tank to minimize impacts to WWTP vehicle access in the area. See Appendix B for a site plan of the AWPF with the location of the EQ Tank identified.

Table 3-3: Equalization Tank Design Criteria

Description	Units	Value
In-Service	No.	1
Reliability	No.	0
Total	No.	1
Required Volume for EQ	gal	200,000
Required Volume	ft3	26,736
UF/UF Feed Flowrate	gpm	1,141
Storage Time	min	175
Tank Dimensions		
Length	ft	60
Width	ft	45
Depth	ft	14
Tank Type	--	Buried Cast-in-Place Concrete

3.2.2 Ultrafiltration

The UF Feed Pumps have been changed to a 1+1 arrangement to match the modifications to the UF Feed Tank. Due to the Equalization Tank being located below grade the pumps have been changed to submersible pumps. Pump type will be confirmed during 50% during. Design criteria for the UF Feed Pumps is presented in **Table 3-4**.

Table 3-4: UF Feed Pump Design Criteria

Description	Units	Value
UF Feed Pumps		
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Submersible
Instantaneous Capacity (Total)		
For Trains in Filtration	Gpm	1,343
Capacity (per pump)	Gpm	1,343
Total Dynamic Head Required (TDH)	Ft	135

Description	Units	Value
Motor Size		
Required	Hp	57
Selected	Hp	60
Drive Type	--	VFD

When designing any UF System there are several periods over the course of the day when a train is offline. The UF System has a goal to produce an average flow rate, but it must produce more than that at any given time to make up for when it was not producing water. This flow is known as instantaneous production and is limited by the instantaneous flux that a train can produce in gallons per square foot per day. The instantaneous flux will be determined during pilot testing. All equipment involved with the UF System must accommodate the larger flows.

The Automatic Strainers have not been changed from the Preliminary Design Report (2019).

The UF system design criteria are summarized in **Table 3-5**. The final design of the UF Trains will be finalized after pilot testing has been completed.

Table 3-5: Pressure UF System Design Criteria

Description	Units	Value
UF System		
Type	-	Pressurized, Polymeric Hollow Fiber Ultrafiltration
Overall Recovery	-	92.0%
No. of Trains in Service	No.	2
No. of Redundant Trains	No.	1
No. of Total Trains	No.	3
Installed Modules Per Train	No.	44
Spare Module Slots Per Train	No.	4
Flow Criteria		
System Feed	gpm	1,141
Overall Recovery	%	92.0%
Instantaneous Filtrate Production	gpm	1,343
Module Criteria		
Membrane Area Per Module	sf	775
Instantaneous Flux Rate	gfd	28.4
Backwash Criteria		
Type	-	Reverse Flow Followed By Air Scour and Drain
Backwash Interval Per Train		
Minimum	min	20
Maximum	min	30

Description	Units	Value
Backwash flow ratio	Ratio	1.5
Backwash Flow	gpm	2,015
Backwash Duration	sec	30
Air Scour Flowrate	ACFM	308
Air Scour Duration	sec	30-60
Forward Flush Flowrate	gpm	792
Forward Flush Duration	sec	20

The UF Backwash Pumps design criteria are summarized in **Table 3-6**. The UF Backwash Pumps have been resized to increase the reverse flow flux rate to 45 gfd, or 1.5 times the forward flush rate. This has been shown to remove solids buildup more effectively on open platform systems where multiple styles modules may be installed.

Table 3-6: UF Backwash Pump Design Criteria

Description	Units	Value
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Horizontal Centrifugal
Capacity (per pump)	gpm	2,015
Total Dynamic Head	ft	90
Motor Size		
Required	hp	57
Selected	hp	60
Drive Type	--	VFD

3.2.3 RO System

To control the permeate production of each stage of the RO System the interstage recovery device was moved between the second and third stages, and a permeate throttling valve was added to the first stage permeate. The RO Feed Pump provides the pressure for the first two stages. The differential pressure across the first stage is controlled by the permeate throttling valve. The remaining feed pressure in the second stage will produce the required amount of permeate. The interstage boost pump between the second and third stage will add the remaining pressure needed for the third stage. RO system design criteria are summarized in **Table 3-7**.

Table 3-7: RO System Design Criteria

Description	Units	Value
Feed Flowrate	gpm	1,050
Recovery	%	84%
Permeate Flowrate	gpm	882
Concentrate Flowrate	gpm	168
RO Trains		
Feed Per Train	gpm	525
Permeate Per Train	gpm	441
Concentrate Per Train	gpm	84
In-Service	No.	2
Reliability	No.	0
Total	No.	2
Staging of RO Trains		
1st Stage		
Pressure Vessels per Train	No.	10
Elements per Pressure Vessel	No.	7
2nd Stage		
Pressure Vessels per Train	No.	6
Elements per Pressure Vessel	No.	7
3rd Stage		
Pressure Vessels per Train	No.	3
Elements per Pressure Vessel	No.	7
Average Flux Rate	gfd	11.9

RO Systems perform best when they are operating at constant setpoints. Because of this, the AWPF will essentially run at one of two flow rates at all times: 1 RO Train in production or 2 RO Trains in production. This will be controlled by the level in the EQ Tank. The plant control system will relay to the UF System how much flow is needed based on how many RO Trains are in production. The actual control of the system does not vary from the 2019 PDR and will be fully automated without operator intervention. When the water level in the EQ Tank drops to a low level setpoint one RO Train will shut down, leaving the other in production. While only one train is in operation the water surface in the EQ Tank will rise until the high level setpoint is reached and the other RO Train turns back on. The cycling and flushing of trains are completely automated and will happen as frequently as the system requires.

The RO Cartridge Filters have been moved to coincide with each RO Train. Since each RO Train has its own dedicated cartridge filter, the RO Feed Pump will be used to provide the pressure for that filtration step. As a result, the low-pressure RO booster pumps that were previously used in the 2019 PDR to accommodate the pressure loss associated with the cartridge filters, were removed from the system. RO Cartridge Filter design criteria are summarized in **Table 3-8**.

Table 3-8: RO Cartridge Filter Design Criteria

Description	Units	Criteria
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Capacity (per Filter)	gpm	525
Filter Media Type	-	Meltblown
Filter Material	-	Polypropylene
Filter Length	in	40
Number of Filters	No.	36
Filter Loading Rate	gpm/10" filter	4.2
Filter Rating	microns	5
Clean Pressure Drop	psi	3
Maximum Pressure Drop	psi	15
Housing Design Pressure	psi	150

The RO Feed Pumps have been upsized to account for the increased RO Train sizes. Detailed criteria for the RO Feed Pumps are listed in **Table 3-9**.

Table 3-9: RO Feed Pumps Design Criteria

Description	Units	Criteria
In-Service	No.	2
Reliability	No.	0
Total	No.	2
Type	-	Vertical Centrifugal
Capacity (Per Pump)	gpm	525
Membrane Feed Pressure		
Head Required Maximum	feet	446
TDH	ft	469
Motor Size	hp	100
Drive Type	--	VFD

Detailed criteria for the RO Interstage Pumps are listed in **Table 3-10**.

Table 3-10: RO Interstage Pumps Design Criteria

Description	Units	Criteria
In-Service, per train	No.	2
Reliability, per train	No.	0
Total, per train	No.	2
Type	-	Horizontal Centrifugal
Capacity (Per Pump)	gpm	146
TDH	ft	118
Motor Size	hp	10
Drive	type	VFD

RO Permeate has several uses across the facility as it is required for all chemical cleaning and flushing of the RO Trains when they go out of service. The RO Flush Pumps will provide the motive pressure for both flushing of the RO Trains when they go out of service and for transferring RO Permeate to the CIP Tanks. RO Flush Pump design criteria are summarized in **Table 3-11**.

Table 3-11: RO Flush Pump Design Criteria

Description	Units	Value
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	End Suction Centrifugal
Capacity	gpm	240
Total Dynamic Head Required (TDH)	ft	139
Motor Size		
Required	hp	10
Selected	hp	30
Drive	type	VFD

3.2.4 Ultraviolet Advanced Oxidation Process

No change from the Preliminary Design Report (2019). Any alterations to the design will happen as a part of detailed hydraulic modeling to ensure idea flow conditions are present in the UV-AOP System.

During the 50-percent design, the project team will begin developing UV/AOP procurement documents to pre-select the UV/AOP system. The two primary system suppliers are TrojanUV and WEDECO. The project team will obtain proposals from the suppliers, present the proposals and pricing to CVWD/CSD, and make a recommendation. After the contract has been awarded, the final design of the UV/AOP system will be designed around the selected supplier.

3.2.5 Post-Treatment Stabilization

No change from the Preliminary Design Report (2019).

3.2.6 Purified Water Clearwell and Pump Station

Following the UV-AOP system and post-treatment stabilization, the purified water will flow by residual head to the Purified Water Clearwell and Pump Station for conveyance to the off-site Injection Wells. This subsection presents the updated basis of design for the Purified Water Clearwell structure and Pump Station with an increased AWPF capacity of 1.27 MGD.

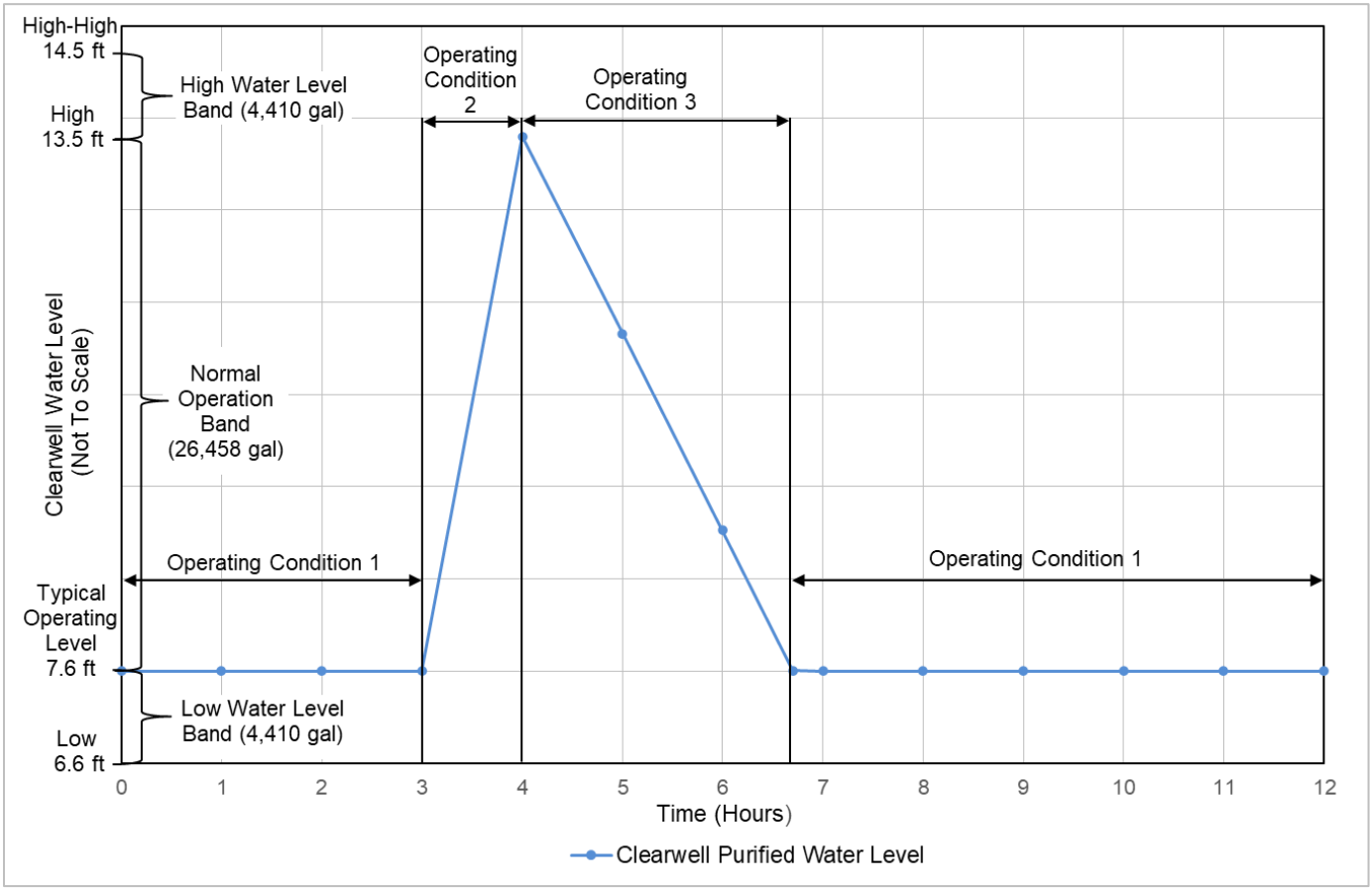
3.2.6.1 Clearwell Sizing

The Clearwell will provide operational storage of purified water for the AWPF and injection well systems. Under normal operating conditions when both injection wells are in operation and receiving water, the Pump Station flow rate will approximately match the AWPF production flow rate, so the water level in the Clearwell remains relatively constant. The operating volume of the Clearwell must allow for storage during periods when the AWPF production flow rate does not match the flow rate conveyed to the injection wells. The basis of design storage volumes during these periods of misbalanced flows are described herein.

Normal Operation Band (includes Injection Well Backflushing)

It is anticipated that under normal operating conditions, each injection well will backflush once a week to remove particulates that have accumulated in and around the well casing and gravel pack. It is assumed that the duration of each backflushing event will be approximately one hour. No water can be injected at the well that is in a backflushing event. Therefore, Purified Water Pump Station must reduce its flow by approximately 50% for approximately one hour until the backflush event has concluded and the well has returned to service. The AWPF production rate will not decrease during an injection well backflush event, so the influent flow into the clearwell will be twice as much as the pump station flow rate during this period. Therefore, the Clearwell has been sized to provide one hour's worth of storage during normal backflush event when the Purified Water Pump Station flow is approximately 50% of the AWPF production rate (441 gpm difference). The resulting storage volume for the normal operation band is equal to 26,460 gallons. See **Figure 3-2** for a graphical representation of the water level in the normal operating band during a well backflush event. If an injection well backflush event occurs while the AWPF is operating at half capacity (i.e., one RO train is online), then this full operating band will not be utilized.

Figure 3-2: Purified Water Clearwell Operation During Typical Injection Well Backflush Event



Notes:

1. Approximate Clearwell water levels shown represent the expected conditions during a typical scheduled one-hour long injection well backflush event. Assumes the AWPF is operating at full capacity of 1.27 MGD. The Clearwell level will not rise as shown in this figure if the injection well backflush event occurs while the AWPF is operating at half capacity.
2. Operating Condition 1 represents the scenario where the Purified Water Pump Station flow rate approximately matches the AWPF production rate (1.27 MGD [882 gpm]) and both injection wells are operational and receiving water. The Clearwell water level stays relatively constant at the typical operating level.
3. Operating Condition 2 represents the scenario when one injection well is in a one hour long backflush event, resulting in a 50% decrease in the Purified Water Pump Station flow rate (441 gpm). The AWPF production rate stays constant at 882 gpm. As a result, the water level in the Clearwell increases during this one-hour well backflush period to at or near the designated high-water level.
4. Operating Condition 3 represents the scenario after the well backflush period has concluded and both injection wells are receiving water. The Purified Water Pump Station pumps run at maximum capacity (approx. 1.50 MGD) to decrease the Clearwell water level until it reaches its typical operating level. At that point the pumps turn down to match the AWPF production capacity and achieve a steady Clearwell level.

High Water Level Band (Unplanned Pump Station Shutdown)

The Clearwell will have operating storage volume to accommodate an event where the pump station unexpectedly shuts down, but the AWPF is operating at full capacity (1.27 MGD). It may take up to approximately three minutes for the AWPF to perform a controlled shutdown after receiving a signal that the pump station pumps are not running. During this time, the Clearwell will continue to receive purified water from the AWPF but will be unable to pump out. The Clearwell will be sized to provide approximately five minutes of storage while receiving 1.27 MGD from the AWPF, which amounts to a storage volume of 4,410 gallons. The five-minute duration provides some buffer in case the AWPF shutdown takes longer than anticipated (approximately three minutes) without having water spill out into the passive overflow. See Figure 3-2 for a graphical representation of the high-water level band.

An emergency passive overflow will be provided to prevent the Clearwell from becoming pressurized in an unlikely event that the AWPF does not automatically shut down, or takes much longer than expected to shut down, while the pumps are offline. The invert elevation of the overflow pipeline will be set to the designated high-high water level. The overflow piping will be routed to the ocean outfall and to the EQ tank. Valves will be provided to direct flow to one discharge point. Directing overflowed purified water to the EQ tank will ensure no water is lost. The final design plans will include provisions to ensure no cross-contamination potential with the WWTP secondary effluent in the EQ tank.

Low Water Level Band (Unplanned AWPF Shutdown)

The Clearwell will also have operating storage volume to accommodate an event where the AWPF has shut down while two duty pumps are running at full speed. The pump station will begin a controlled shutdown after receiving a signal that the AWPF has gone offline to maintain minimum submergence levels for the submersible pumps. The Clearwell will be sized to provide approximately five minutes of storage while the pumps are running at full speed without inflow from the AWPF before the water level drops below minimum allowable for submergence. This volume equates to 4,410 gallons. See Figure 3-2 for a graphical representation of this low water level storage band.

The Clearwell will be a buried cast-in-place concrete structure with the top deck slab at grade. Traffic-rated access hatches will be provided over the submersible pumps (see Section 3.2.6.2 for further discussion on the pumps). The Clearwell will be located along the southern side of the AWPF building; however, this location will be confirmed during 50% design. The top deck slab and access hatches will be traffic-rated to facilitate vehicle access over the structure. The design criteria for the Clearwell are summarized in **Table 3-12**.

Table 3-12: Purified Water Clearwell Design Criteria

Parameter	Units	Value
Minimum Operating Volume	gal	35,280
Normal Operation Storage Band	gal	26,460
High Water Level Storage Band	gal	4,410
Low Water Level Storage Band	gal	4,410
Tank Dimensions (Interior)		
Length	ft	30
Width	ft	20
Working Depth	ft	7.9
Freeboard Depth	ft	2.0
Minimum Submergence	ft	2.0
Total Depth	ft	11.9
Water Level & Structure Elevations (NAVD88)[1]		
Ground Surface Elevation, average	ft	18.0
Underside of Top Slab	ft	16.5
High-High (Emergency Overflow Invert)	ft	14.5
High	ft	13.5
Typical Operating Level	ft	7.6
Low	ft	6.6
Low-Low	ft	5.6
Floor	ft	4.6
Tank Type	--	Buried Cast-in-Place Concrete

Notes:
1. All elevations to be confirmed during 50% design.

3.2.6.2 Pump Station

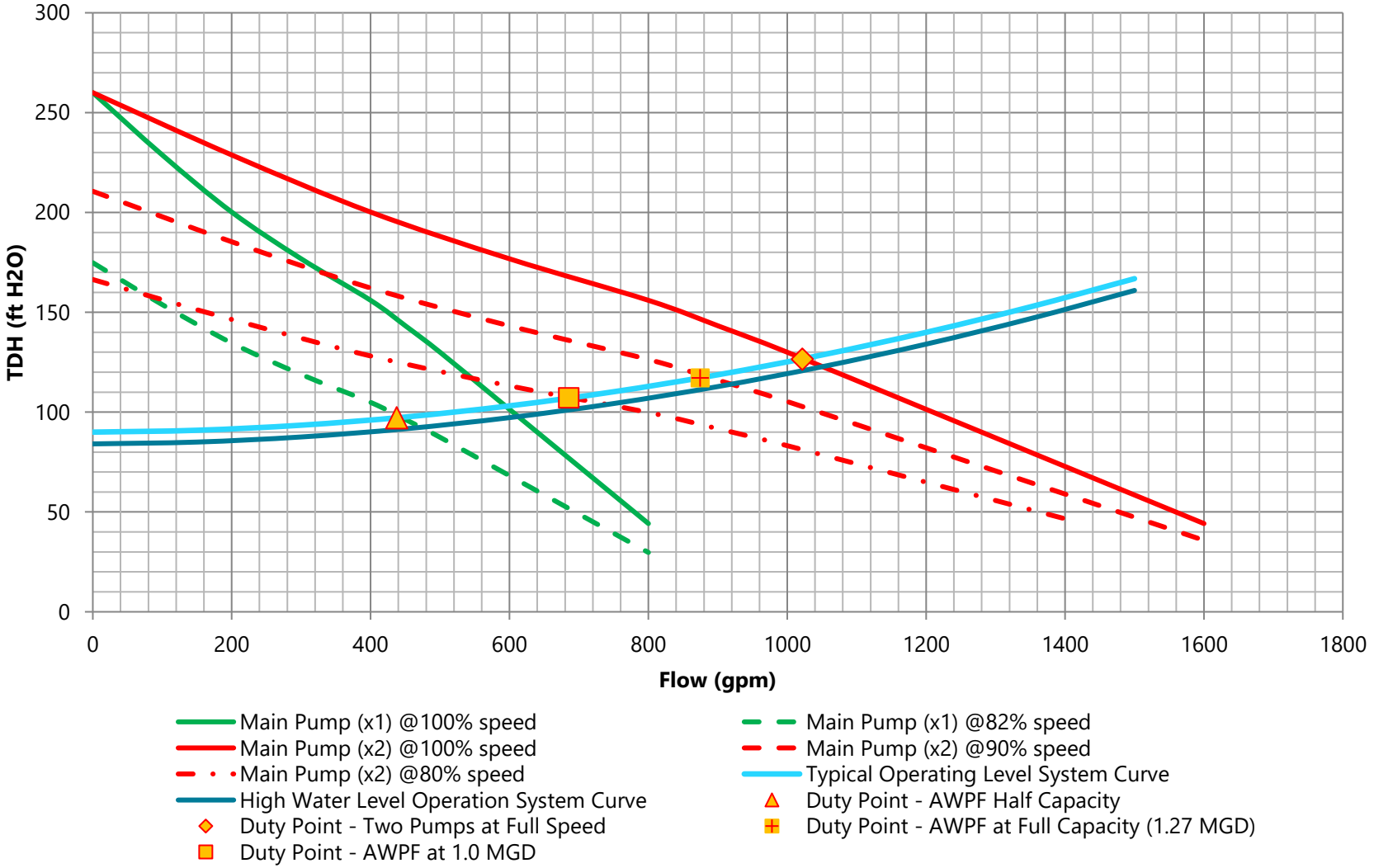
The Purified Water Pump Station will pump purified recycled water from the Clearwell to the two injection wells through the 12-inch conveyance pipeline. The pump station will include three variable-speed submersible pumps that will operate in a two-duty, one-standby operation. The design criteria for the Purified Water Pump Station are summarized in **Table 3-13**. Preliminary pump selections were solicited from Flygt, Mody, and Gorman-Rupp as part of this Basis of Design Validation Memorandum.

Table 3-13: Purified Water Pump Station Design Criteria

Description	Units	Value
Number of Pumps, Total	No.	3
Number of Duty Pumps	No.	2
Number of Standby Pumps	No.	1
Pump Type	--	Submersible
Configuration	--	Parallel
Capacity (per pump)	gpm	640
Total Dynamic Head, each	ft	110
Motor Size, each	hp	40
Drive Type	--	VFD

A system curve for the proposed Purified Water Pump Station and conveyance pipeline to deliver water to the two injection wells was developed based on the preliminary 50% design plans for the Conveyance Pipeline, with modifications based on recent pipeline alignment and injection wellhead piping changes. Variable speed pump curves for the proposed submersible pumps were superimposed onto the system curve to identify the duty points for the operating conditions (see **Figure 3-3**).

Figure 3-3: System Curve and Pump Curves – Purified Water Pump Station



3.2.6.3 Pump Station Electrical Requirements and Controls

Each submersible pump will have a 40 hp, 460 volts, 3 phase, 60 Hz, 3,560 gpm motor with a dedicated VFD. The pump station will be controlled by an ultrasonic level indicator and several float switches (low-low, low, high, high-high) in the Clearwell and signals received from the AWPF and injection wells. Control diagrams, instrumentation details, and a detailed control strategy for the pump station will be developed as part of the final design.

3.2.6.4 Clearwell and Pump Station Structural Requirements

No change from the Preliminary Design Report (2019).

3.2.6.5 Operational Flexibility – Piping and Valving

No change from the Preliminary Design Report (2019).

3.2.6.6 Surge Protection

A surge analysis will be performed during the beginning stages of the 50% design to determine if a surge tank or other surge protection measures are required for the Purified Water Pump Station and conveyance pipeline.

3.2.6.7 Purified Water Pipeline Route within WWTP Site

Each pump will have an individual 6-inch discharge pipe that will penetrate through the Clearwell sidewall and enter a buried valve vault adjacent to the Clearwell. Inside the valve vault, each 6-inch pump discharge line will have an isolation gate valve and check valve, and manifold into a common 12-inch discharge header downstream of the valves. The 12-inch pipeline will exit the valve vault and transverse through the AWPF process building to the north side, then routed below-grade as it exits the north side of the building towards the Central Gallery. A separate flow meter vault will be provided downstream of the valve vault. Alternatively, the flow meter may be located in an above-ground piping segment inside the AWPF building.

The 12-inch conveyance pipeline will traverse north through the Central Gallery and North Gallery, then turn east through the Main Gallery until it exits the WWTP site. Based on site visits and CSD input, there is sufficient space in the galleries for the pipeline. The purified water pipeline route may change based on the final location of the Clearwell; however, it is expected that the pipeline will ultimately traverse through the Central Gallery, North Gallery, and Main Gallery.

3.2.7 Chemical Storage and Feed Facilities

The anti-scalant system criteria have been updated in **Table 3-14**.

Table 3-14: Anti-Scalant System Design Criteria

Description	Units	Value
Chemical Usage Location	-	RO Feed
Process Flow	MGD	1.51

Description	Units	Value
Chemical Dose	mg/L	5.0
Chemical Usage	lb/day	63
Chemical Feed Rate	gpd	6.58
Chemical Feed Rate	gph	0.3
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	5.6
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity (Each)	gal	150
Tank Capacity (Total)	gal	300
Total Usage	gpd	6.6
Storage Time	days	45.6

The ammonium sulfate system criteria have been updated in **Table 3-15**.

Table 3-15: Ammonium Sulfate System Design Criteria

Description	Units	Value
Chemical Usage Location	--	UF Feed
Process Flow	MGD	1.64
Chemical Dose	mg/L	0.4
Chemical Usage	lb/day	5
Chemical Feed Rate	gpd	5
Chemical Feed Rate	gph	0.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	--	Peristaltic
Motor	--	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	5.6
Chemical Usage Location	--	RO Feed
Process Flow	MGD	1.51
Chemical Dose	mg/L	4.2

Description	Units	Value
Chemical Usage	lb/day	53
Chemical Feed Rate	gpd	50
Chemical Feed Rate	gph	2.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	--	Peristaltic
Motor	--	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	5.6
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	2,000
Tank Capacity (Total)	gal	2,000
Total Usage	gpd	55.0
Storage Time	days	36.4

The calcium chloride system criteria have been updated in **Table 3-16**.

Table 3-16: Calcium Chloride System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Post Treatment
Process Flow	MGD	1.27
Chemical Dose	mg/L	100
Chemical Usage	lb/day	1,059
Chemical Feed Rate	gpd	269
Chemical Feed Rate	gph	11.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	33.3
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	8,000
Tank Capacity (Total)	gal	8,000

Description	Units	Value
Total Usage	gpd	269.2
Storage Time	days	29.7

The caustic soda system design criteria have been updated in **Table 3-17**.

Table 3-17: Caustic Soda System Design Criteria

Description	Units	Value
Chemical Usage Location	-	Post Treatment
Process Flow	MGD	1.27
Chemical Dose	mg/L	50
Chemical Usage	lb/day	530
Chemical Feed Rate	gpd	198.8
Chemical Feed Rate	gph	8.3
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location		Chemical Cleans
Average Chemical Use per Day	gpd	10
Transfer Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output at Maximum Motor Speed	gph @ 10 psig	158.5
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	8,000
Tank Capacity (Total)	gal	8,000
Total Usage	gpd	209.3
Storage Time	days	38

The High and Low pH Cleaners will be replaced by a Specialty Cleaning Chemical system that allows for the dosing of a designed chemical formula from totes to both the UF and RO CIP Systems. There will be one pair of metering pumps and room for two totes in the chemical area for this purpose. Design criteria are summarized in **Table 3-18**.

Table 3-18: Specialty Cleaning Chemical System Design Criteria

Parameters	Units	Value
Chemical Usage Location	-	Specialty Cleaning Chemical
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	534
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity (Each)	gal	275
Tank Capacity (Total)	gal	550

The RO CIP System will have the option to be batched with citric acid as another tool for operators to use when cleaning. Citric acid serves as a chelating agent, helping to remove some types of metal scaling. One pair of metering pumps will serve both tanks using automated valves. Citric acid system design criteria are summarized in **Table 3-19**.

Table 3-19: Citric Acid System Design Criteria

Parameters	Units	Value
Chemical Usage Location	-	UF and RO CIP
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	534
Bulk Storage Tank		
Number of Tanks	No.	1
Tank Capacity (Each)	gal	275
Tank Capacity (Total)	gal	275
Total Usage	gpd	7.2
Storage Time	days	38

Typically, UF Systems will include an option for a coagulant to be added before the system to its performance. A small tote system has been included so the operators have another tool to use when operating this system. Coagulant system design criteria are summarized in **Table 3-20**.

Table 3-20: Coagulant System Design Criteria

Description	Units	Value
Chemical Usage Location		UF Feed
Process Flow	MGD	1.64
Chemical Dose	mg/L	5
Chemical Usage	lb/day	69
Chemical Feed Rate	gpd	15
Chemical Feed Rate	gph	0.6
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type		Peristaltic
Motor		AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	33.3
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity, each	gal	275
Tank Capacity, total	gal	550
Total Usage	gpd	14.7
Storage Time	days	37.4

The existing Sodium Bisulfite storage tank will be used to supply the new metering pumps needed for the AWPF. Approximate design criteria for cleaning of UF System and quenching of RO Concentrate are summarized in Table 3-21.

Table 3-21: Sodium Bisulfite System Design Criteria

Parameters	Units	Value
Chemical Usage Location	-	Brine Quenching
Process Flow	MGD	0.24
Chemical Dose	mg/L	5.2
Chemical Usage	lb/day	10
Chemical Feed Rate	gpd	2.5
Chemical Feed Rate	gph	0.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic

Parameters	Units	Value
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Chemical Dosage Maintenance Clean	mg/l	696
Chemical Dosage Recovery Clean	mg/l	1392
Volume Chemical per MC	gallons	4.58
Volume Chemical per RC	gallons	9.0
Monthly Usage per Rack	gallons	146.7
Number of Racks	each	3
Total Monthly Usage for Membrane Cleaning	gallons	440
Total Annual Usage for Membrane Cleaning	gallons	5,280

The existing Sodium Hypochlorite storage tank will be used to supply the new metering pumps needed for the AWPF. Approximate design criteria for additional hypochlorite usage are listed in **Table 3-22**.

Table 3-22: Sodium Hypochlorite System Design Criteria

Parameters	Units	Value
Chemical Usage Location	-	EQ Tank Feed
Process Flow	MGD	1.64
Chemical Dose	mg/L	17.0
Chemical Usage	lb/day	233
Chemical Feed Rate	gpd	186.6
Chemical Feed Rate	gph	7.8
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location	-	UV/AOP Feed
Process Flow	MGD	1.27
Chemical Dose	mg/L	4.0
Chemical Usage	lb/day	42
Chemical Feed Rate	gpd	33.9
Chemical Feed Rate	gph	1.4
Metering Pumps		

Parameters	Units	Value
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Chemical Usage Location	-	Finished Water
Process Flow	MGD	1.27
Chemical Dose	mg/L	3.0
Chemical Usage	lb/day	32
Chemical Feed Rate	gpd	25.4
Chemical Feed Rate	gph	1.1
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	
Motor	-	
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Chemical Dosage Maintenance Clean	mg/l	500
Chemical Dosage Recovery Clean	mg/l	1,000
Volume Chemical per MC	gallons	11.18
Volume Chemical per RC	gallons	22
Monthly Usage per Rack	gallons	357.7
Number of Racks	each	3.0
Total Monthly Usage for Membrane Cleaning	gallons	1,073
Total Annual Usage for Membrane Cleaning	gallons	12,879
Total Monthly Usage	gallons	8,451

The UV-AOP System will have a sulfuric acid dose upstream of the system. The AOP chemistry is pH sensitive, and it is desirable to have an additional small dose at that location to fine tune the pH of the RO permeate. The sulfuric acid system design criteria are summarized in **Table 3-23**.

Table 3-23: Sulfuric Acid System Design Criteria

Parameters	Units	Value
Chemical Usage Location	-	RO Feed
Process Flow	MGD	1.51

Parameters	Units	Value
Chemical Dose	mg/L	15.0
Chemical Usage	lb/day	189
Chemical Feed Rate	gpd	13.3
Chemical Feed Rate	gph	0.6
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	52.6
Chemical Usage Location	-	UV / AOP Feed
Process Flow	MGD	1.27
Chemical Dose	mg/L	5.0
Chemical Usage	lb/day	53
Chemical Feed Rate	gpd	3.7
Chemical Feed Rate	gph	0.2
Metering Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Pump Type	-	Peristaltic
Motor	-	AC w/ VFD
Output @ Maximum Motor Speed	gph @ 50 psig	158.5
Cleaning Requirements		
Volume Chemical per MC	gallons	1.58
Volume Chemical per RC	gallons	1
Monthly Usage per Rack	gallons	7.2
Number of Racks	each	2
Total Monthly Usage for Membrane Cleaning	gallons	14
Total Annual Usage for Membrane Cleaning	gallons	173
Bulk Storage Tank		
Number of Tanks	No.	2
Tank Capacity, each	gal	150
Tank Capacity, total	gal	300
Total Usage	gpd	13.5
Storage Time	days	22.2

3.2.8 Residual Stream Disposal

The RO Concentrate will still have some chloramines present that must be dechlorinated before discharging to the ocean outfall. The RO Concentrate header inside of the AWPF will have a sodium bisulfite injection location to remove any remaining disinfectant before being directed to the existing ocean outfall box on site. The operators will be able to monitor the ORP at the plant and again before discharging to ensure compliance with all permit requirements.

3.2.9 Chlorine Contact Tank Modifications

No structural modifications are required for the CCB. Modifications to the effluent disinfection system will be focused upon chemical dosing and monitoring, as follows:

- The feed water into the CCB will already be chlorinated in the AWPF Equalization Tank, as needed for AWPF pretreatment (membranes need disinfectant to minimize biofouling). The provided level of chloramination may be sufficient to meet effluent discharge requirements. Chlorine dosing into the AWPF EQ Tank will be flow paced.
- The existing CCB chlorination system will be used to provide supplemental chlorination, either flow paced or based upon the measured residual in the effluent of the AWPF EQ Tank and a target dose based upon CSD direction.
- Analyzers will need upgrades as well as methods to keep the sensors wet during periods of no flow periods to the CCB (there will be extended periods where the CCB is dry).

In the 2019 PDR, the RO concentrate was being sent to the CCB, but since it has been repurposed for another use the RO Concentrate will be dechlorinated in the AWPF before being sent to the ocean outfall downstream of the CCB.

3.2.10 Ancillary Facilities

For small UF Systems such as this, it is cost efficient to use a single air system of compressors and receivers to provide the air for valve actuation, membrane integrity tests, and air scour. For large systems it makes more sense to include a dedicated blower system for air scouring, but with spacing being a significant constraint on site it is preferrable to just use the compressors and receivers. Formalized design criteria will come after pilot testing.

The UF CIP System detailed design criteria are subject to small adjustments based on pilot test results but will likely be very similar to the criteria listed in **Table 3-24**.

Table 3-24: UF CIP System Design Criteria

Description	Units	Value
CIP Frequency per Train	per month	1
MC Frequency per Train	per month	30
Cleaning Flux Ratio	-	1.5
Cleaning Flux Rate	gfd	43
Cleaning Flowrate	gpm	1,008

Description	Units	Value
Volume Solution per MC/CIP	gallons	6,693
CIP Solution Tanks		
Number	No.	1
Volume (Each)	gallons	10,200
Diameter	ft	12
Sideshell Height Required	ft	14
CIP Feed Pumps		
In-Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	End Suction Centrifugal
Design	gpm	1,008
Total Dynamic Head	ft	70
Motor Size		
Selected	hp	20
Drive	type	VFD

Most UF CIP solutions are very acidic or very basic and can damage pipes if allowed to pool for long durations. To prevent this a drain pump is installed to fully drain all of the CIP solution from the headers. UF drain pump design criteria are summarized in **Table 3-25**.

Table 3-25: UF Drain Pump Design Criteria

Description	Units	Value
In Service	No.	1
Reliability	No.	1
Total	No.	2
Type	-	Vertical Sump Pump
Capacity (per pump)	gpm	150
Total Dynamic Head Required (TDH)	ft	30
Motor Size		
Selected	hp	2.5
Drive	type	CS

The RO CIP system must be able to provide an adequate amount of flow for each of the stages. To allow for more thorough operator control of flow rate both RO CIP Pumps will operate when cleaning the first stage. This allows the pumps to be sized smaller, saving on cost and providing more control for cleaning the third stage that has much lower flow requirements. If an RO CIP pump is out of service, the first stage may still be cleaned with only a single pump, but it should be expected to take extra time due to the lower feed flow. RO CIP system design criteria are summarized in **Table 3-26**.

Table 3-26: RO CIP System Design Criteria

Description	Units	Design
Flow Per Vessel	gpm	50
Maximum Vessels Cleaned Per Cycle	No.	10
Minimum Vessels Cleaned Stage 1	No.	10
Minimum Vessels Cleaned Stage 2	No.	6
Minimum Vessels Cleaned Stage 3	No.	3
Maximum Cleaning Flowrate	gpm	500
Minimum Cleaning Flowrate Stage 1	gpm	500
Minimum Cleaning Flowrate Stage 2	gpm	300
Minimum Cleaning Flowrate Stage 3	gpm	150
CIP Solution Tanks		
Number	No.	1
Volume CIP Solution Required	Gallons	2,700
Volume (Each)	gallons	6,000
Diameter	Ft	10
Sideshell Height Required	ft	10
RO CIP Pumps		
In Service	No.	2
Reliability	No.	0
Total	No.	2
Type	-	End Suction Centrifugal
Capacity	gpm	300
Total Dynamic Head Required (TDH)	ft	162
Motor Size		
Required	hp	16
Selected	hp	25
Drive	type	VFD
Cartridge Filter		
Vessel Orientation	-	Horizontal
Cartridge Filter Type	-	Melt Blown
Cartridge Filter Material	-	Polypropylene
Cartridge Filter End Connection	-	Single Open End, Double O-Ring
Cartridge Filter Rating	micron	5
Cartridge Filter Length	inches	40
Cartridge Filters per Vessel	No.	42
Cartridge Filter Loading Rate		
Maximum Flowrate	gpm/10-inch	2.98

Description	Units	Design
At Minimum Flowrate	gpm/10-inch	2.98
Maximum Pressure Drop		
Clean Filter	psig	3
Dirty Filter	psig	15

Both the UF and the RO CIP Systems require hot water to properly clean the membranes. To save space and cost the RO CIP Tank will function as the hot water tank. All chemicals that are used for the RO CIP may be introduced into the UF CIP with no harm to the system. However, there must be a guarantee that no UF CIP solution can ever travel back to the RO CIP Tank, since sodium hypochlorite is destructive to RO Membrane. More design criteria for this system will be developed during detailed design as a significant portion of the design must come from the hot water system supplier.

3.3 Electrical, Instrumentation and Controls Requirements and Integration

3.3.1 Estimated Power Demand

Load calculations were completed for the existing plant maximum peak demand load and the new AWPF estimated load value. The total expected demand load of the existing plant and new AWPF is approximately 1,096 kVA, which includes a 25% contingency. This data was requested by SCE representative, Thad Gonzales during a site visit on October 18, 2019 to provide input for a power system analysis done by SCE to determine if there would be any issue with the addition of the new AWPF. CVWD requested a response from SCE regarding the load requirements and the possibility of replacing the existing 500 kVA transformer in order to increase capacity requirements for the new AWPF project. This included confirming if a transformer replacement would be required, transformer pad and location, and having a second feed to the new AWPF switchboard. SCE was able to confirm that adding a 1,500 kVA transformer would be possible with a separate meter for the AWPF switchboard.

A summary of the AWPF electrical loads is provided in **Table 3-27**.

Table 3-27: Estimated Electrical Loads for the AWPF System

Electrical Load Summary				Output Rating, each	Total Connected Load	Drive Type
Item	Duty	Standby	Total	hp	kW	
UF Feed Pumps	1	1	2	60	44.8	VFD
UF Strainers	1	1	2	0.7	0.5	CS
UF Backwash Pumps	1	1	2	60	44.8	VFD
UF Compressors	1	1	2	10	7.5	-
UF CIP Feed Pumps	1	1	2	20	14.9	VFD
RO Flash Mix Pumps	1	1	2	5	3.7	CS
RO Feed Pumps	2	0	2	100	149.2	VFD
RO Interstage Pumps	2	0	2	10	14.9	VFD
RO CIP Pumps	2	0	2	25	37.3	VFD
RO Flush Pumps	1	1	2	15	11.2	VFD
UV Reactors	1	1	2	31	23.1	-
Hot Water Transfer Pumps	1	1	2	2	1.5	CS
Immersion Heaters	2	0	2	94	140	-
Purified Water Pump Station	2	1	3	40	59.6	VFD
Control & Lighting Transformer	1	0	1	-	30	-

3.3.2 Instrumentation and Controls

No change from the Preliminary Design Report (2019).

3.4 Staffing Requirements

A staffing plan being used by the City of Morro Bay for their new 1 mgd AWPF was provided to the CSD as a potential starting point/reference. There are differences between Morro Bay (RO and UV AOP, as Morro Bay has an MBR for wastewater treatment versus the CAPP project (UF, RO, UV AOP) and some adjustment of staffing is needed from the Morro Bay estimates. Further, the upcoming UF pilot testing will help inform the CSD staffing requirements.

The Morro Bay AWPF staffing estimates, simplified, are for 3 FTE operators on a 12 hour per day schedule. Other schedules can be developed, such as 8-hours per day. The total number of staff must consider how existing CSD instrumentation and maintenance staff can be used for AWPF support.

The State of California Division of Drinking Water (DDW) has stated that the CPO for IPR projects must be, at a minimum, AWT3 during initial IPR operation. After 3 years, the CPO must be AWT5. DDW also now requires that the Shift Supervisor must also be AWT3 from the start of initial IPR operation and into the future.

3.5 AWPF Siting Constraints

The goal of siting the AWPF were to limit impacts to the existing WWTP facilities and operations. The AWPF structures will be primarily located in the open paved area of the WWTP, adjacent to the Aeration Basins,

CCB, and Maintenance Building. The siting constraints and WWTP operational considerations that affected the AWPF layout include:

- Structures cannot be constructed can occur within the 50 foot setback from the southern property line along the creek without City approval.
- Chemical delivery truck access to the sodium bisulfite and sodium hypochlorite bulk storage tanks.
- Access to the dewatered cake truck bay in the Dewatering Building and maintenance access to the building.
- Truck-mounted crane access to the central and northern gallery access hatches.

3.6 FEMA Flood Protection

No change from Preliminary Design Report (2019)

3.7 Geotechnical Considerations

No change from the Preliminary Design Report (2019).

Note, a geotechnical investigation will be completed during the 50% design phase with geotechnical report.

3.8 Structural Design Criteria

Structural design was not completed as part of this TM. Structural design details for the EQ Tank, AWPF Building, Clearwell, and other miscellaneous structures will be developed during final design.

3.9 CSD WWTP Plant Water System

The existing plant water pumps will need to be repurposed to facilitate draining the of the CCB after an overflow event. Further, there will be extended periods of time that the CCB is empty. Accordingly, the plant water must be fed from the AWPF Equalization Tank.

New plant water pumps will be installed in the Equalization Tank to provide water to the existing facilities. This tank is treated with chloramines and should maintain similar disinfection standards. The specific criteria will follow in the 50% design as detailed hydraulic modeling ensures adequate pressure to all service areas, including the new AWPF.

The existing plant water pumps will maintain their connections to the water system for added redundancy.

3.10 Ocean Outfall Modifications

Improvements to CSD's Ocean Outfall were completed in accordance with the Preliminary Design Report (2019) recommendations in 2020.

4. AWPF PROCESS BUILDING AND CHEMICAL STORAGE AREA

4.1 AWPF Process Building

The AWPF process building footprint has been increased compared to the 2019 PDR version to include more space for equipment removal and access, and to house the RO Feed Tank, RO Flush Tank, UV Feed Tank, UF and RO CIP systems, and their associated pumps and ancillary equipment. The building also includes an electrical room that has been resized based on the updated loads presented in Section 3.3, a storage/maintenance room, a control room/lab, and restroom. The total footprint of the AWPF building is approximately 10,700 square feet. A preliminary site plan of the AWPF facilities is shown in **Appendix B**.

As shown in the proposed AWPF site plan (Appendix B), a vehicle traffic loop was provided around the AWPF building. The AWPF building is aligned along the 50-foot creek setback but the buried Clearwell and Purified Water Pump Station are located in the setback. The location of the Clearwell and Purified Water Pump Station will be finalized during 50% design. The east side of the AWPF facilities are set back approximately 40 feet from the existing Maintenance and Storage buildings to allow for direct access be vehicles, including CSD's crane truck and vac truck, on a single turn. To provide 40 feet of clearance in front of these existing buildings, the AWPF facilities were shifted west, with approximately 20 feet of clearance from the CCB diversion wetwell to allow for vehicle ingress/egress. There is approximately 18 feet of clearance from the north side of the building to the Central Gallery for vehicle access.

4.2 Chemical Storage Area

Many of the chemicals require very small storage volumes for an AWPF of this size. Wherever possible chemical totes are used for ease of delivery and replacement. Liquid ammonium sulfate, calcium chloride, and caustic soda are stored in permanent tanks due to their demand. For more detailed information on sizing of metering equipment and tanks see Section 3.

The bulk storage tanks are caustic soda, ammonium sulfate, and calcium chloride. To save space the calcium chloride and ammoniums sulfate share a secondary containment area. A maintenance walkway divides the bulk storage tanks from the tote systems. These totes are located along the edge of the facility to allow easy delivery via forklift. Chemical fill stations for the bulk storage tanks will be located along the southern edge of the building to utilize the space in the offset where structures are not allowed and maintain traffic clearance to the east.

Bulk delivery trucks are intended to drive along the east side of the AWPF, pulling into either the existing or the new chemical delivery areas. After a delivery is complete the driver will use the road west of the AWPF to turn the chemical truck around and leave the same way they entered.

Solids handling trucks will follow a similar route around the AWPF, but instead will use the top of the Equalization Tank to turn around in the space available.

5. OFFSITE FACILITIES

5.1 Conveyance Piping

The 2019 PDR recommended widening the existing 20-foot CVWD and CSD easement along the privately owned property between Eugenia Place and Linden Avenue an additional 10 feet to avoid utility congestion within the easement. The easement contains an existing CVWD potable water line, CSD sanitary sewer line and COX telecommunication bank. Supplemental utility mapping was received which indicates a revised alignment which utilizes the existing easement is feasible while avoiding conflict with existing utilities. Potholing of the existing utilities which will occur during the next design phase will help verify feasibility of the revised alignment. A segment of the alignment through the easement will require a waiver from the State Water Resources Control Board Department of Drinking Water for separation from the existing water line being within the waiver zone.

No change to the conveyance pipeline sizing and design criteria presented in the 2019 PDR.

5.2 Injection Wells

Both wellheads, Injection Well #1 and Injection Well #2 are proposed to be above-grade.

Injection Well #1 location has been revised to be in the City right-of-way along Meadow View Lane. The conceptual location is shown **Figure 5-1**. Well shall be located in the paved area along Meadow View Lane with above-grade facilities (valves, MCC) behind a fence where there is no sidewalk.

Injection Well #2 location remains at St Joe's Church and is now proposed to be above-grade as opposed to below-grade in a vault in the PDR. The reason for this change is the site has been fenced in by St Joe's Church and CVWD intends to also fence in the wellhead now; therefore above-grade facilities can be maintained with secure access and minimal visual impact. The conceptual layout is shown **Figure 5-2**.

Figure 5-1: Injection Well #1 Concept

Figure 5-2: Injection Well #2 Concept

Injection Well Site #1 previously considered constructing onsite storage for handling of maintenance water. The new well location does not have adequate space for site storage. The revised maintenance water handling approach is detailed in Section 5.5.

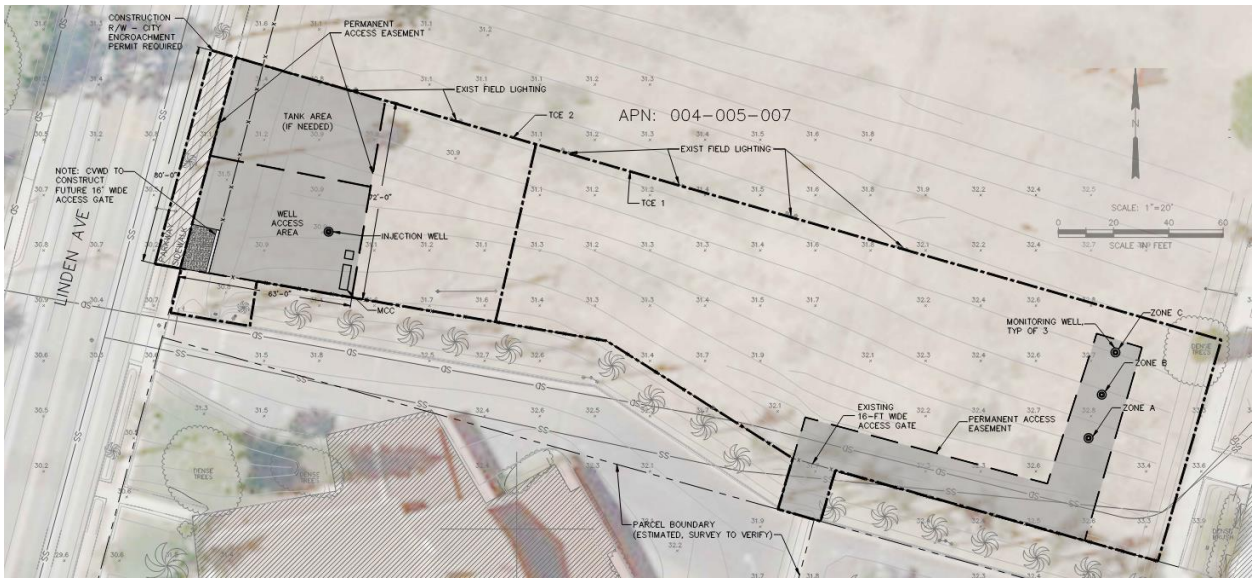
Injection well flowrates will also be increased seasonally from 350-gpm to 450-gpm. As discussed in Section 3.1.1 for the Initial and Ultimate Treatment Capacity, the original design in the PDR produced 1.0 mgd of

finished water, while the fully built-out AWPF will allow for 1.3 mgd for product. PDR assumptions noted that injection well flows can be increased for short durations to accommodate increased flows post-backflush of maintenance water. However, this increased flowrate of 450-gpm per well shall be modeled by M&A as part of the design phase and the injection well design criteria shall be confirmed and updated by PWR after modeling.

5.3 Monitoring Wells

The locations of the three monitoring wells, as shown in **Figure 5-3**, have been revised based on easement discussions with the property owner. Due to the injection well flowrates being increased seasonally from 350-gpm to 450-gpm, as discussed in Section 3.1.1, groundwater modeling shall be modeled by M&A as part of the design phase to confirm travel times.

Figure 5-3: Monitoring Well Locations



5.4 Wellhead Electrical Requirements

A new electrical service is proposed to Injection Well #2 at St Joe's Church. This electrical service will include a transformer that is still to be sized. Transformer will service an electrical meter for both wellheads (IW-2 and IW-1) and a separate electrical meter for St. Joe's Church. The existing electrical service to St. Joe's Church will be underground as part of this project. Coordination with SCE has not been initiated for the wellheads at the time of this memorandum.

The electrical meter and switchboard to the wellheads will require underground conduit and wires from IW-2 along Linden Avenue to IW-1 located on Meadow View Lane. The assumption is the IW-1 MCC will be located within 1,000-LF distance from IW-2 at St. Joe's Church to limit voltage drops.

5.5 Maintenance Water Discharge

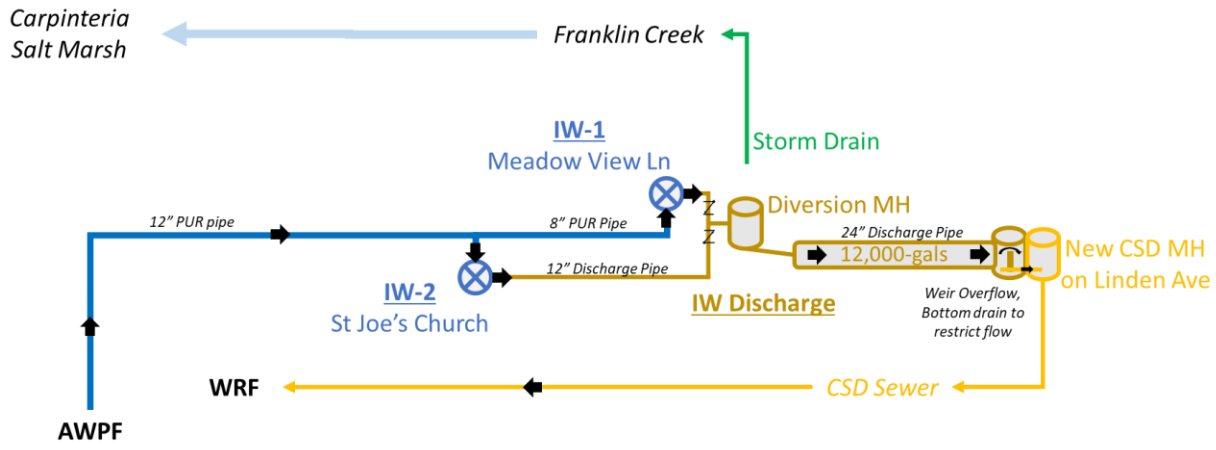
Injection wells will need to be backflushed periodically and 2x the average injection flow rate (2 x 350-gpm = 700-gpm). This maintenance water discharge will occur 1-to-2 times per week initially for approximately

60-minutes. Over time, the frequency of the backflush may likely be reduced. Each well can be backflushed one at a time limiting the daily maintenance water discharge to approximately 42,000 gallons.

A workshop was conducted with the Regional Water Quality Control Board (RWQCB) on May 2, 2023 to discuss the permitting approach for the maintenance water discharge and applicably for coverage under CVWD's Order WQ 2014-0194-DWQ NPDES Permit For Drinking Water System Discharges To Waters Of The United States. The opinion of the RWQCB is this discharge would need to comply with the Carpinteria Salt Marsh TMDL limits that include Total Nitrogen and Phosphorous limits. To avoid water quality limitations, discharge of the injection well maintenance water to the sanitary sewer is preferred. In addition, discharge of maintenance water back to CSD's sewer system would allow for recapture of that flow into the CAPP project for groundwater recharge.

The design concept is to oversize the injection well backflush line from both wellheads to accommodate retention of the backflush water with a reduced flowrate into CSD's sewer system. This can potentially be accomplished with a 24-inch diameter pipeline by 500-LF long providing approximately 12,000-gallons of retention volume in Meadow View Lane. The 24-inch line would connect to CSD's existing 8-inch sewer via a new manhole with flow restricted by a stop gate pinned part of the way up the frame to allow for flow under the gate into the new manhole. Overflow would overtop the gate into the new manhole.

Figure 5-4: Maintenance Water Discharge Approach



CSD's sewer system has been modeled by WSC showing that in the off-hours (12am-5am), discharge into the 8-inch sewer along Linden Avenue at Meadow View Lane can accommodate up to 500-gpm of flow. This flowrate is to be confirmed by CSD and CVWD through flow testing that will be completed during the 50% design phase. The design will need to be adjusted based on flow testing results.

6. REFERENCES

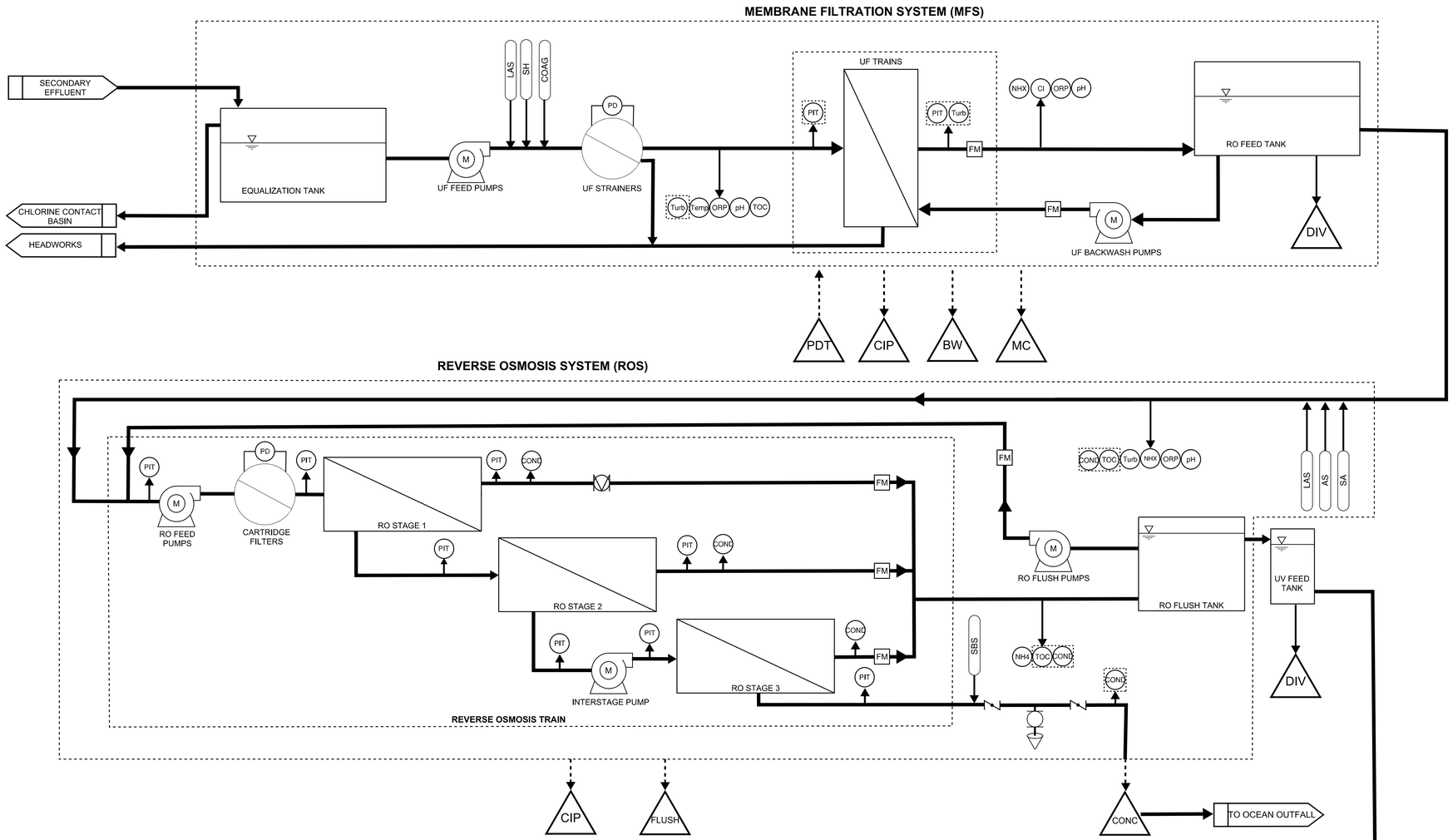
Advanced Water Purification Facility, Preliminary Design Report, Carpinteria Advanced Purification Project (CAPP), FINAL. June 2019 (Woodard & Curran)

Conveyance System, Preliminary Design Report, Carpinteria Advanced Purification Project (CAPP), FINAL. October 2019 (Woodard & Curran)

Environmental Impact Report, Carpinteria Advanced Purification Project (CAPP), SCH# 2019011016, FINAL. November 2019 (Woodard & Curran)

Mitigation Monitoring and Reporting Program, Carpinteria Advanced Purification Project (CAPP), SCH# 2019011016. November 2019 (Woodard & Curran)

APPENDIX A: AWPF PROCESS FLOW DIAGRAM



DIVERSIONS AND WASTE STREAMS

- FLUSH = RO FLUSH FEED AND WASTE
- CIP = CLEAN IN PLACE FEED AND WASTE
- BW = BACKWASH SUPPLY AND WASTE
- MC = MAINTENANCE CLEAN SUPPLY AND WASTE
- DIV = DIVERSION TO BACKWASH WASTE TANK
- PDT = PRESSURE DECAY TEST

INSTRUMENTATION

- Cl = FREE CHLORINE
- COND = CONDUCTIVITY
- NHX = AMMONIA AND MONOCHLORAMINE
- NH4 = AMMONIA
- ORP = OXIDATION REDUCTION POTENTIAL
- MCl = MONOCHLORAMINE
- pH = pH
- TCl = TOTAL CHLORINE
- TOC = TOTAL ORGANIC CARBON
- Turb = TURBIDITY
- UVI = ULTRAVIOLET INTENSITY
- UVT = ULTRAVIOLET TRANSMITTANCE
- = CRITICAL CONTROL POINT (CCP)

CHEMICAL DOSING

- AS = ANTI-SCALANT
- CC = CALCIUM CHLORIDE
- COAG = COAGULANT
- CS = CAUSTIC SODA
- LAS = LIQUID AMMONIUM SULFATE
- SA = SULFURIC ACID
- SBS = SODIUM BISULFITE
- SH = SODIUM HYPOCHLORITE

INTERMEDIATE DESIGN SUBMITTAL
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MONTH YEAR

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CAPP
Replenishing Our Groundwater for the Future

CARPINTERIA ADVANCED PURIFICATION PROJECT
ADVANCED WATER PURIFICATION FACILITY

GENERAL PROCESS FLOW DIAGRAM

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
0 1"
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

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200649-10000
DRAWING NO.
SHEET NO.
OF XX

APPENDIX B: PRELIMINARY AWPF SITE PLAN

PRELIMINARY AWPF SITE PLAN

Aeration Basins

Central Gallery

Ops Building

Aerated Sludge Holding Tanks

Equalization Tank (60' x 45')

Chlorine Contact Basin

Chemical Feed Facility

Clearwell and Purified Water Pump Station (30' x 20')

Compressed Air System

UF System

UF CIP System

RO Feed Tank

RO System

RO CIP System

UV Feed Tank

UV/AOP System

RO Flush Tank

Electrical Room

Control Room, Lab, and Restroom

Storage and Maintenance Room

Caustic Soda

Ammonium Sulfate

Calcium Chloride

Antiscalant

Sulfuric Acid

Coagulant

Citric Acid

Specialty Chem

Maintenance Building

Storage Building

79'-0"

18'-0"

30'-0"

18'-0"

24'-0"

40'-0"

31'-6"

26'-0"

99'-0"

111'-0"

20'-6"

43'-0"

50' Creek Setback

50 ft

N

0'

20'

50'

cvwd.net/capp