Eldridge Renewal LLC - Sonoma Developmental Center Specific Plan

Water and Wastewater Feasibility Study

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Prepared by HydroScience Engineers, Inc.

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HydroScience

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LIST OF ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
Ac	acres
ADD	average day demand
ADWF	average dry weather flow
AF	acre-feet
AFY	acre-feet per year
bgs	below ground surface
BOD	biochemical oxygen demand
CIMIS	California Irrigation Management Information System
cfs	cubic feet per second
DDW	Division of Drinking Water
DGS	State of California Department of General Services
DO	Dissolved Oxygen
DSOD	Division of Safety of Dams
DU	dwelling unit
DWR	Department of Water Resources
EIR	Environmental Impact Report
Eldridge Renewal	Eldridge Renewal, LLC
ESRI	Environmental Systems Research Institute
ET	evapotranspiration rate
FAR	floor area ratio
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
HydroScience	HydroScience Engineers, Inc.
I/I	Inflow and Infiltration
in	inch(es)
MBR	membrane bioreactor
MDD	maximum day demand
MG	million gallons
MGD	million gallons per day
MRP	Monitoring and Reporting Program
MWELO	Model Water Efficient Landscape Ordinance
NMFS	National Marine Fisheries Service
NOV	Notice of Violation
O&M	operational and maintenance

PDWF	peak dry weather flow
PHD	peak hour demand
PLC	programmable logic controller
PS	pump station
PWWF	peak wet weather flow
RTS	return-to-sewer
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCWA	Sonoma County Water Agency
SDC	Sonoma Developmental Center
SF	square feet
SSO	sanitary sewer overflow
SVCSD	Sonoma Valley County Sanitation District
SVFD	Sonoma Valley Fire District
UV	Ultraviolet
UWMP	Urban Water Management Plan
VFD	Variable Frequency Drives
VOMWD	Valley of the Moon Water District
WDR	Waste Discharge Requirements
WMP	Water Master Plan
WRCC	Western Regional Climate Center
WSA	Water Supply Assessment
WTP	water treatment plant
WWTP	wastewater treatment plant

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SECTION 1 – INTRODUCTION

HydroScience Engineers, Inc. (HydroScience) was retained by Eldridge Renewal, LLC (Eldridge Renewal) to prepare a Water and Wastewater Feasibility Study (Study) for the former Sonoma Developmental Center (SDC) located at 15000 Arnold Drive in the community of Eldridge, CA (**Figure 1-1**).

The SDC is currently under the oversight and management of the State of California Department of General Services (DGS). The Sonoma County Board of Supervisors (Board) approved a Specific Plan for the 945-acre SDC campus that includes approximately 1,000 units, 410,000 square feet (SF) of non-residential development, and over 800 acres of open space (Project) to be developed by Eldridge Renewal[1]. The existing facilities in the Project area are shown in **Figure 1-2**. With the new development, water supply, water distribution, wastewater collection, and wastewater treatment options need to be identified and evaluated.

The objectives of this Study are to:

- Estimate the Project's water demands, wastewater generation rates, and potential recycled water demands;
- Describe the facilities that would be necessary to supply the required water, treat the required amount of wastewater, and identify opportunities for utilization of existing infrastructure; and
- Develop a strategy for scalping a portion of the Project's wastewater for treatment and reuse as recycled water within the Project.

1.1 Background

The SDC was established in 1891 to serve individuals with developmental disabilities. At its peak occupancy, SDC was a fully operational and self-sufficient campus, consisting of residences, staff housing, care facilities, treatment centers, clinics, kitchens, laundry facilities and education centers. The property, spanning about 945 acres, included a developed core campus of 180 acres, 755 acres of open space, and the 11-acre Camp Via grounds within Jack London State Historic Park. The campus included all of the infrastructure and services required for operation, including corporation yards, maintenance yards, fire station, police station, paint shops, machine shops, landscape facilities, etc. The core campus featured residential, medical, educational, administrative, and industrial buildings, along with former agricultural areas. Now largely unoccupied since its closing in 2018, with only a few staff on-site to maintain the grounds and a few tenants located in buildings east of Arnold Drive, the SDC is under the oversight and management of DGS.

[1] The County has rescinded the Specific Plan adopted in 2022 pursuant to a 2024 court judgment and writ, but the Board has indicated its intent to process and consider reapproving the Specific Plan, potentially revised, concurrently with this proposed Project. Although the Specific Plan was invalidated by the court ruling in 2024 and subsequently rescinded by the Board, the factual and historical information presented in the Specific Plan remains useful and relevant for the purpose for which it is cited herein. The proposed Project was designed to be largely consistent with the Specific Plan, and the applicant does not have any reason to expect the County's overall vision for the SDC to change substantially in the revised Specific Plan. The analysis in the prior EIR adopted for the Specific Plan is referenced at points in this application because it provides substantial evidence supporting a determination by the County that the Project's impacts are likely consistent with and not substantially more severe that the previous EIR's conclusions. The revised EIR, of course, will fully analyze the impacts of the revisions, if any, to the Specific Plan, as well as the Project-specific impacts of the proposed Project.

Prior to the SDC closing in 2018, the property received water from an independent water distribution system consisting of water supply sources, a raw water conveyance system, an on-site 1.8 million gallon per day (MGD) surface water treatment plant (WTP), and a potable water distribution system, all detailed in **Section 5.1**. When in operation, the system's water supply was provided by surface water from two on-site lakes that were fed by various diversions from local creeks and springs and treated at the WTP. Surface water was further supplemented by four groundwater wells, all of which are currently inactive.

The WTP provided reliable water until the plant was shut down in 2019 due to a lack of certified treatment and distribution operators and the permit to operate as a public water system was revoked. Since that time, portions of the SDC water distribution system have remained in operation to serve remaining users via a service connection to the Sonoma County Water Agency (SCWA) system, though the SDC maintains water rights that govern the quantity of water that can be diverted from each diversion point. DGS performed an inspection of the water supply and treatment facilities in May 2023 and issued the *Sonoma Developmental Center Water System Assessment Report* (Condition Assessment Report) describing the condition of each major water facility and documenting the deficiencies and recommended improvements. The Condition Assessment is included as **Appendix A**.

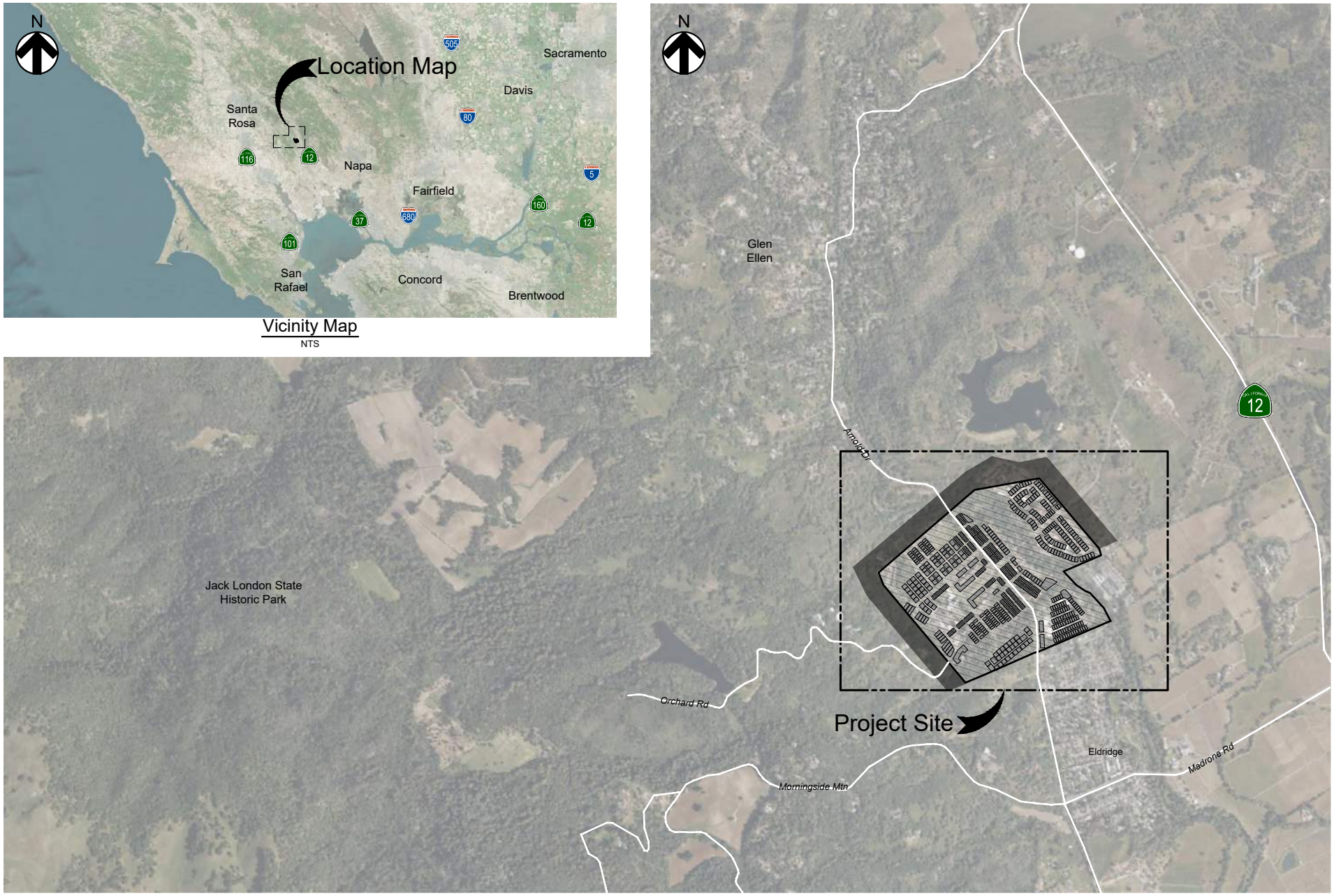
The first common sewer collection and treatment system for the SDC property was built in the 1920s and 1930s. The system featured an independent wastewater treatment plant (WWTP) and a collection system of primarily vitrified clay and cast-iron pipe. The WWTP was abandoned in 1954 and all flow was redirected to the Sonoma Valley County Sanitation District (SVCSD) main sewer line via an outfall.

1.2 Report Organization

This report is divided into seven sections as listed below:

- Section 1 – Introduction
- Section 2 – Proposed Land Use
- Section 3 – Water Demands
- Section 4 – Wastewater Flows
- Section 5 – Potable Water System
- Section 6 – Wastewater System
- Section 7 – References

Vicinity Map
NTS



Location Map
NTS

HydroScience

Figure 1-1
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Project Vicinity and Location Map

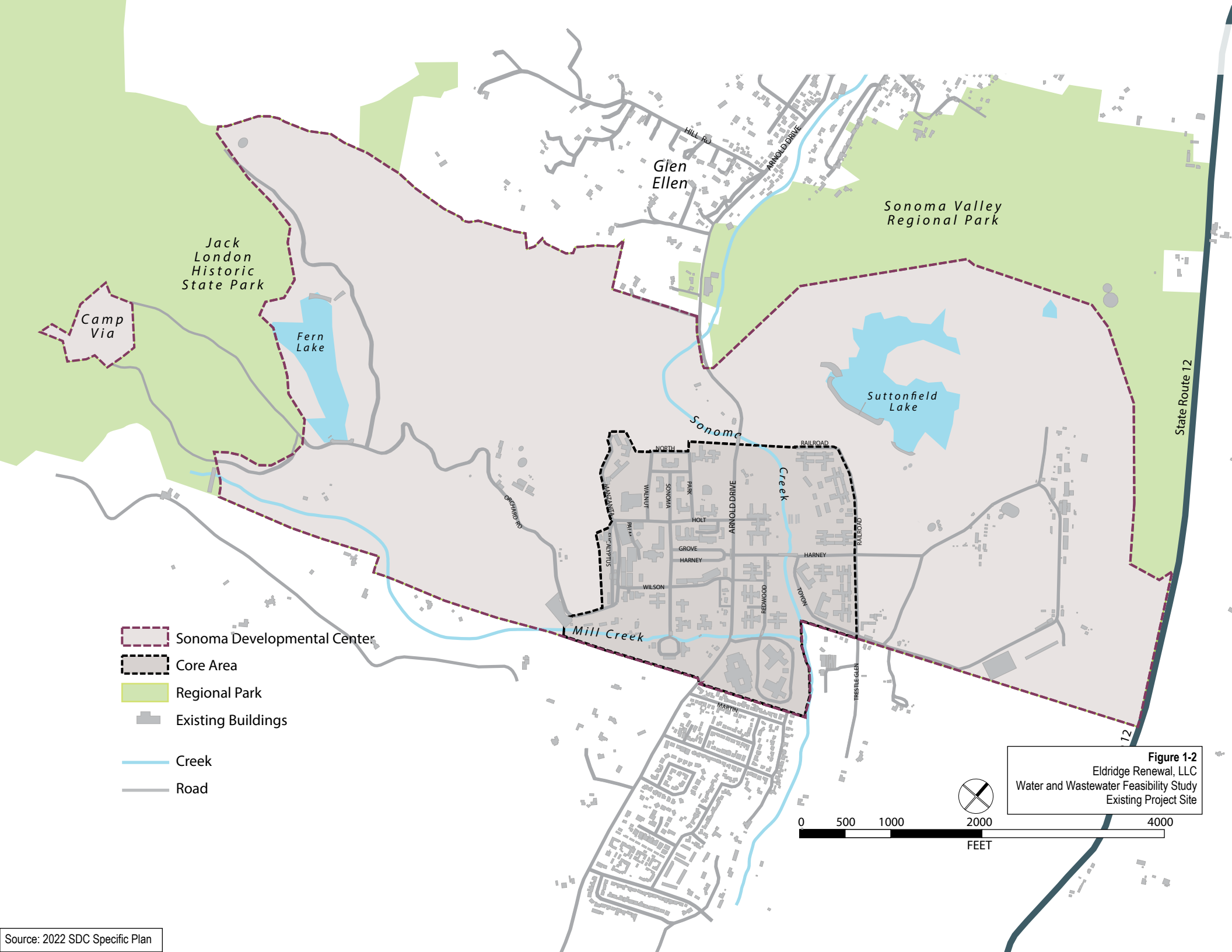


Figure 1-2
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Existing Project Site

Source: 2022 SDC Specific Plan

SECTION 2 – PROPOSED LAND USE

In 2019, the California State Legislature initiated a 3-year planning process in partnership with the County of Sonoma to develop a Specific Plan and accompanying Environmental Impact Report (Final EIR) for the future of the SDC campus. The Specific Plan and Final EIR were adopted by the Sonoma County Board of Supervisors on December 16, 2022.[2]

The Specific Plan outlines the planned land uses within the Project area that will replace the existing SDC campus. The plan also contains density/intensity standards, including assumed average residential densities based on dwelling units (DUs) by lot acreage and assumed average floor area ratios (FAR) for different use types.

A Water Supply Assessment (WSA) prepared by Valley of the Moon Water District (VOMWD) in 2022 was conducted in conjunction with the Specific Plan and is included as **Appendix B**. The WSA presents proposed land uses in terms of total/building square feet and assumed DUs. Land uses and corresponding gross square feet have since been refined in an updated land use plan. A full breakdown of the current planned Project land use areas and proposed DUs is provided in **Table 2-1**, which serves as the basis for estimated water demands and wastewater flows herein.

[2] The County has rescinded the Specific Plan adopted in 2022 pursuant to a 2024 court judgment and writ, but the Board has indicated its intent to process and consider reapproving the Specific Plan, potentially revised, concurrently with this proposed Project. Although the Specific Plan was invalidated by the court ruling in 2024 and subsequently rescinded by the Board, the factual and historical information presented in the Specific Plan remains useful and relevant for the purpose for which it is cited herein. The proposed Project was designed to be largely consistent with the Specific Plan, and the applicant does not have any reason to expect the County's overall vision for the SDC to change substantially in the revised Specific Plan. The analysis in the prior EIR adopted for the Specific Plan is referenced at points in this application because it provides substantial evidence supporting a determination by the County that the Project's impacts are likely consistent with and not substantially more severe that the previous EIR's conclusions. The revised EIR, of course, will fully analyze the impacts of the revisions, if any, to the Specific Plan, as well as the Project-specific impacts of the proposed Project.

Table 2-1: Project Land Uses

Land Use	Land Use Designation	Value	Units
Courtyard Home	Single Family Residential	56	DU
Hillside Home		15	DU
Large Detached Home		124	DU
Small Detached Home		173	DU
Duet		26	DU
Triplet		57	DU
Townhome		254	DU
Independent Living Residences		5	DU
Apartment	Multi-Family Residential	200	DU
Cohousing		6	DU
Mixed Use/Apartment		74	DU
Small Business + Innovation Center	Commercial	38	KSF
Town Center	Mixed Use	73	KSF
Institutional[1]	Public/Institutional	18	KSF
Hotel (Inclusive of 5,000 SF restaurant & 15,000 SF conference area)	Hotel	150	Rooms
Parks	Parks	374	KSF
Other Irrigated Common Space Areas (e.g., landscaped medians)	Other Irrigable Areas	690	KSF
Wildfire Buffer Area	Native Landscape Management	2,100	KSF

Notes:
1. Includes fire station.
2. All areas are represented as gross square feet

SECTION 3 – WATER DEMANDS

This section discusses the existing and proposed water demands as well as recommended fire flow requirements.

3.1 Existing Water Demand

Existing water demand for the SDC property was analyzed as part of the 2022 WSA. The existing site includes the 180-acre SDC core campus, 755 acres of undeveloped open space, and 11 acres of campgrounds. Historically, when the SDC was fully operational (1969-2007), water use averaged 622 AFY and peaked at 1,143 AFY in 1986. After the SDC facilities closed in 2018, water use averaged 142 AFY from July 2019 to July 2021. The proposed water demands presented in **Section 3.2** will replace this existing water demand.

3.2 Proposed Water Demand

The 2022 WSA estimated that SDC would have a buildout water demand of approximately 342 AFY, including both indoor and outdoor water usage. If recycled water is available, outdoor landscaping for land uses other than single family residential would be supplied with recycled water in lieu of potable water. Recycled water could also supply other non-potable demands such as agricultural use. Recycled water is further discussed in **Section 3.3**. This section summarizes the updated estimated water demands per the new land use plan.

3.2.1 Residential Water Demand

<u>Indoor Residential Demand</u>

In 2018, the State enacted Senate Bill (SB) 606 and Assembly Bill (AB) 1668, setting Statewide water efficiency standards for indoor water use per person. These standards establish an indoor water use goal of 50 gallons per capita per day (gpcd) starting in 2030.

Residential unit water demand factors presented in the 2022 WSA are based on factors developed for the 2020 VOMWD Urban Water Management Plan (UWMP), which were calculated using historical residential demands from 2011-2019. The 2020 VOMWD calculated a historical residential per capita water use factor as well as the projected factor through the year 2045 (buildout). This factor was broken down into indoor and outdoor factors assuming approximately 60% indoor and 40% outdoor for all residential land uses. The projected residential indoor water use factor for buildout of the VOMWD service area is estimated to be 40 gpcd to account for State specified indoor water use goals (maximum 50 gpcd), increased water use efficiency in new development, and other various conversation measures.

The proposed Project is expected to be designed and managed to minimize potable water usage by incorporating water conservation measures including low flow fixtures, recirculating fountains or water features (where applicable), high efficiency/water conserving appliances, and recycled water. Indoor plumbing fixtures in all new and retrofitted buildings will meet or exceed CALGreen Tier 2 standards, per Goal #6-15 stated in the Specific Plan. Thus, the Project is expected to meet and exceed the State specified indoor water use goals.

Consistent with the 2020 VOMWD UWMP projections, indoor residential water use factors were calculated by multiplying the 40 gpcd indoor water use factor by the expected occupancy rates of single family and multi-family residential DUs. This factor was multiplied by the proposed DUs for each residential use type (see **Table 2-1**) to obtain the total proposed indoor annual water demand. Residential indoor water use factors and total demands are summarized in **Table 3-1**.

Table 3-1: Proposed Residential Indoor Water Use Factors and Demands

Unit Type	# of DUs[1]	Indoor Water Use Factor (gpcd)	Occupancy Rate (people/DU)	Indoor Water Use Factor (gpd/DU)	Indoor Demand (gpd)	Indoor Demand (AFY)
Single Family Residential	710	40	2.5	100	71,000	80
Multi-Family Residential	280	40	2.0	80	22,400	25
				Total	**93,400**	**105**

Notes:
1. Taken from **Table 2-1**.

Outdoor Residential Demand

Proposed outdoor residential water use was calculated based on the historical percentage of outdoor water use to indoor water use as stated in the 2020 VOMWD UWMP. The average single family outdoor water use percentage from 2017-2019 was 44% (56% indoor) and the average multi-family outdoor water use percentage was 26% (74% indoor). These percentages were used to calculate the proposed residential outdoor water use factors and total demands which are summarized in **Table 3-2**.

Table 3-2: Proposed Residential Outdoor Water Use Factors and Demands

Unit Type	# of DUs[1]	Outdoor Water Use Percentage	Outdoor Water Use Factor (gpd/DU)	Outdoor Demand (gpd)	Outdoor Demand (AFY)
Single Family Residential	710	44%	79	56,090	63
Multi-Family Residential	280	26%	28	7,840	9
			Total	**63,930**	**72**

Notes:
1. Taken from **Table 2-1**.

Summary of Residential Demand

Table 3-2 provides a summary of total residential water use.

Table 3-3: Proposed Residential Water Use Factors and Demands

Unit Type	Total Residential Water Use Factor (gpd/DU)[1]	Total Residential Demand	
		(gpd)	(AFY)
Single Family Residential	179	127,090	142
Multi-Family Residential	108	30,240	34
	Total	**157,330**	**176**

Notes:
1. Total residential demand factor is calculated as indoor water use factor (**Table 3-1**) plus outdoor water use factor (**Table 3-2**).

3.2.2 Non-Residential Water Demand

Representative water use factors for non-residential use types (excluding parks and open space) were calculated as part of the 2020 VOMWD UWMP and referenced in the 2022 WSA. These factors were used herein in conjunction with the estimated gross square feet of building listed in **Table 2-1** to estimate the total (indoor and outdoor) non-residential water use. All non-residential water use factors and total demands are listed in **Table 3-4**.

Table 3-4: Proposed Non-Residential Water Use Factors and Demands

Land Use	# of Units[1]	Water Use Factor	Total Non-Residential Demand	
			(gpd)	(AFY)
Commercial	38 KSF	1.79 AFY/10 KSF	6,070	6.8
Mixed Use	73 KSF	1.79 AFY/10 KSF	11,700	13.1
Public/Institutional	18 KSF	1.79 AFY/10 KSF	2,870	3.2
Hotel	150 Rooms	0.275 AFY/room[2]	36,800	41.2
		Total	**57,440**	**64.4**

Notes:
1. Taken from **Table 2-1**.
2. Hotel water use factor captures hotel rooms, restaurant, and conference area.

3.2.3 Irrigation Demand

Local climatological data was utilized to develop irrigation demands for the Project. It is noted that irrigation with recycled water is limited to application at agronomic rates to prevent excessive runoff of recycled water. Agronomic rates are specific to the local climate and are dependent on evapotranspiration (ET) and precipitation rates. These data are used to estimate the water demands per acre of irrigated area. A description of the data used to estimate total irrigation demand is detailed below.

- **ET Rates:** ET is a measure of water usage by a particular plant or crop, and is a function of the net solar radiation, air temperature, wind speed, and vapor pressure in a particular location. ET rates for a specific crop in a specific location are calculated on a monthly basis by the following equation:

$$ET = ET_o * k_c$$

Where:

ET_o = *Normal year reference crop ET rate for a given geographic location in inches*

k_c = *Crop coefficient for a given crop*

For this analysis, the reference crop is turfgrass and the ET_o rates for the region were obtained from the Department of Water Resources (DWR), California Irrigation Management Information System (CIMIS) database. Though there is currently no CIMIS station located in the service area, DWR has developed a technology called *Spatial* which uses remotely sensed satellite data combined with point measurements from the nearest CIMIS stations to generate spatially distributed ET_o values; *Spatial* data was utilized for this analysis. Crop coefficients for cool weather turf grasses were obtained from the University of California, Division of Agriculture and Natural Resources – Center for Landscape and Urban Horticulture. Calculated ET rates are presented in **Table 3-5**.

- **Precipitation:** Monthly precipitation data for the region was obtained from the Western Regional Climate Center (WRCC). Monthly rainfall values from 1893 through 2016 were averaged to obtain typical annual rainfall values and are presented in **Table 3-5**.
- **Estimated Unit Irrigation Demands:** Typical monthly unit irrigation demands for turf grasses are summarized in **Table 3-5** and were calculated using the following formula:

$$ID = \frac{(ET - Pe_p)l_r}{e_i}$$

Where:

ID = *Monthly irrigation demand or allowable irrigation in inches*

ET = *Evapotranspiration for turf grasses in inches*

P = *Average precipitation in inches*

e_p = *Precipitation irrigation efficiency, 0.85; assumes 15% of rainfall during growing season is lost to evaporation, runoff, etc.*

l_r = *Loss rate or leachate factor, 1.05; assumes approximately 10% of the applied water passes through the grass root zone and is lost*

e_i = *Irrigation efficiency, 0.75 (MWELO); assumes 25% of the applied irrigation water is lost to evaporation*

The allowable irrigation for any month is assumed to never fall below zero, and for months where the calculated irrigation demand is positive, water can be applied. The typical season for irrigation demand is April through October with little to no irrigation demand projected from November through March. As shown in **Table 3-5**, the peak monthly irrigation demand of 7.6 inches (in) occurs in June.

Table 3-5: Estimated Irrigation Demands for Sonoma, California

Month	ET (in) [1]	P (in) [2]	ID (in)
January	0.7	6.1	0.0
February	1.4	5.3	0.0
March	2.4	4.1	0.0
April	4.6	1.8	3.3
May	5.2	0.8	5.6
June	5.8	0.2	7.6
July	5.9	0.0	7.4
August	5.1	0.1	7.0
September	3.6	0.3	5.4
October	2.4	1.7	1.0
November	1.1	3.9	0.0
December	0.6	5.2	0.0
Average	**3.2**	**2.5**	**3.1**
Total	**38.9**	**29.4**	**37.1**

Notes:
1. Source: Average *Spatial* CIMIS daily ET data for 15000 Arnold Drive, Eldridge, CA for 2020-2023 period.
2. Source: WRCC, Sonoma, California (048351) for 1/1893 – 05/2016.

The total lot size for non-residential land uses, excluding Parks, Other Irrigable Areas, and Native Landscape Management, was calculated by applying the assumed Floor Area Ratio (FAR) presented in the SDC Specific Plan to the area (gross SF) listed in **Table 2-1**. The outdoor area was then calculated to be the difference between the lot size and the building footprint. Per guidance provided by the Sonoma County Permit & Resource Management Department in the WSA, irrigated area was estimated to be 50% of outdoor area of each land use with the exception of Parks, for which the entire area was assumed to require irrigation.

The irrigation demand was then calculated by multiplying the irrigable area by the irrigation demand listed in **Table 3-5** to estimate an annual average demand for landscape irrigation. Estimated irrigation demands are presented in **Table 3-6**.

It is noted that the irrigation demands are calculated based on the implementation of turf grass; however, landscaped areas are anticipated to include large areas of mediterranean planting with characteristically lower water use. The irrigation demands calculated using this method represent a conservative estimation of irrigation water demand. Additionally, the assumption of 50% irrigation rate for the wildfire buffer area (Native Landscape Management) is likely a conservative assumption.

Table 3-6: Estimated Irrigation Demands

Land Use	Lot Size (Ac)[1]	Irrigable Area (Ac)	Irrigation Demand[2]	
			(gpd)	(AFY)
Commercial	2.9	1.2	3,280	4
Mixed Use	1.9	0.2	540	0.6
Public/Institutional	1.4	0.6	1,660	2
Hotel	9.2	4.2	11,720	13
Parks	8.6	8.6	23,680	27
Other Irrigable Areas	15.8	7.9	21,860	25
Native Landscape Management	47.9	24.0	66,120	74
Total	**87.7**	**46.7**	**128,860**	**144**

Notes:
1. Lot size was calculated using an assumed FAR of 0.9 for Mixed Use and 0.3 for all other non-residential use types, excluding Parks, Other Irrigable Areas, and Native Landscape Management. FAR values were sourced from the 2022 SDC Specific Plan.
2. Irrigation demand for non-residential uses (excluding Parks, Other Irrigable Areas, and Native Landscape management) is included in the demand estimates in **Table 3-4**.

3.2.4 Water Demand Summary and Peaking Factors

Estimated distribution system water loss is calculated using the VOMWD's fiscal year 2020-2021 DWR Water Audit Report percent non-revenue water (9.5% of Project demands), as referenced in the WSA. The total expected average day demand (ADD) for the Project including losses is presented in **Table 3-7**.

Table 3-7: Total Estimated Demand

Land Use	Average Day Demand (gpd)	Average Annual Demand (AFY)
Single Family Residential	127,090	143
Multi-Family Residential	30,240	34
Commercial	6,070	7
Mixed Use	11,700	13
Public/Institutional	2,870	3
Hotel	36,800	41
Parks	23,680	27
Other Irrigable Areas	21,860	25
Native Landscape Management	66,120	74
Water Losses[1]	31,010	35
Total	**357,440**	**402**

Notes:
1. Water losses calculated as 9.5% of total demand per the validated VOMWD 2020-2021 Water Loss Audit.

Maximum day demand (MDD) and peak hour demand (PHD) were estimated using peaking factors specific to VOMWD Pressure Zone 1B, as developed in the 2019 VOMWD WMP. Average and peak water demands are summarized in **Table 3-8**.

Table 3-8: Estimated Total Demand Summary

Demand Scenario	Peaking Factor to ADD	Demand	Units
ADD	-	357,440	gpd
MDD	1.7	607,650	gpd
PHD	3.4	844	gpm

3.3 Recycled Water Demands

Water supply requirements, including the use of recycled water, were calculated assuming recycled water would be utilized for landscape irrigation for multi-family residential, non-residential, parks, and other irrigated area land uses as approved under Title 22 regulations. Recycled water is not expected to be used for residential single family outdoor demands. The recycled water quality will be designed to produce disinfected tertiary recycled water as defined by Title 22.

The sum of all estimated irrigation demand that can be supplied by recycled water is 136,700 gpd or 153 AFY (irrigation demands in **Table 3-6** plus outdoor multi-family residential demand in **Table 3-2**). Recycled water would offset the potable water demands presented in **Table 3-7** and **Table 3-8**.

The total above only considers using recycled water for landscape irrigation. Additional recycled water opportunities, such as for cooling systems and dual plumbing in new construction, could further reduce potable water demand.

3.4 Fire Flow Requirements

Local authorities establish fire flow requirements (or guidelines) based on a building's use and classification. The existing SDC property is served by the Eldridge Fire Department. It is anticipated that fire protection for the Project area will be provided by either the existing Eldridge Fire Department or by Sonoma Valley Fire District (SVFD). The SVFD has specified that commercial and institutional areas should have a fire flow of 2,500 gallons per minute (gpm), while residential areas require a fire flow of 1,000 gpm (2019 VOMWD WMP). These fire flows must be sustained for at least two hours under MDD conditions, with a minimum residual pressure of 20 psi at all system nodes. These requirements are used to determine supply capacity criteria, pipeline sizing, and storage and supply capacity needs. **Table 3-9** presents the anticipated fire flow criteria for the proposed Project.

Table 3-9: Anticipated Fire Flow Criteria

Land Use	Required Fire Flow (gpm)	Duration (hours)
Single Family Residential	1,000	2
Multi-Family Residential	2,000	2
Public/Schools	2,500	2
Business and Commercial	2,500	2

3.5 Proposed Storage Requirements

The criteria for estimating the minimum recommended storage capacity is determined by the MDD plus fire flow [MDD + FF] condition. The recommended storage capacity considers 24 hours of MDD and two hours of fire flow based on the recommended fire flow criteria in **Table 3-9**. The largest fire flow requirement is 2,500 gpm, and MDD is approximately 422 gpm assuming no recycled water use to provide a conservative estimate of required storage. Thus,

The anticipated recommended storage capacity is approximately 1.1 MGD, summarized in **Table 3-10**. The actual required storage capacity is dependent on the Project's approved fire flow requirements.

Table 3-10: Recommended Potable Water Storage

Parameter	Value	Units
MDD	422	gpm
Fire Flow Demand	2,500	gpm
MDD + FF	2,922	gpm
Total Required Storage[1]	907,650	gallons
Recommended Storage[2]	1,089,000	gallons

Notes:
1. Assumes 24 hours of MDD and 2 hours of fire flow.
2. Accounts for a safety factor of 1.2.

SECTION 4 – WASTEWATER FLOWS

This section discusses the current wastewater discharge rates, the basis for the assumed return-to-sewer (RTS) ratios, and the proposed wastewater generation rates.

4.1 Existing Wastewater Flows

In July 2021, Wood Rodgers conducted a Sewer System Evaluation for the SDC, included as **Appendix C**. The evaluation included a summary of average and maximum daily metered effluent flows into the SVCSD system for 2013-2016 and 2020. Data from 2020 was used to quantify the change in flow after the SDC closed and improvements were made to the existing sewer system.

The calculated peak factor (maximum day/average day) from 2013-2016 was 4.0. The peak wet weather flow (PWWF) during this time (excluding December 2015, which was considered to be an anomaly) was 552,230 gpd in February 2015.

However, 2020 average dry weather flow (ADWF) indicated a significant decrease in flows with an average daily flow of 10,681 gpd and a maximum daily flow of 55,271 gpd. The Sewer System Evaluation noted that current ADWF is below 10,000 gpd, while during wet weather months, the average daily flows increase to approximately 3-5 times that of the dry weather flows, an indication of significant infiltration and inflow (I/I) to the collection system.

4.2 Proposed Wastewater Flows

Wastewater generation rates were derived from the indoor water demands discussed in **Section 3.2**, coupled with typical RTS ratios (i.e. the percentage of water demand that is returned as wastewater) for each water use type. The 2022 Final EIR[3] assumed a 100% RTS ratio of indoor water use for all use types (excluding irrigation use). Assuming 100% return of indoor water use to sewer is conservative, as there is typically some volume lost to consumption.

Using the assumed 100% RTS ratio and the indoor water demands calculated herein, the estimated wastewater flows are presented in **Table 4-1**.

[3] The County has rescinded the Specific Plan adopted in 2022 pursuant to a 2024 court judgment and writ, but the Board has indicated its intent to process and consider reapproving the Specific Plan, potentially revised, concurrently with this proposed Project. Although the Specific Plan was invalidated by the court ruling in 2024 and subsequently rescinded by the, the factual and historical information presented in the Specific Plan remains useful and relevant for the purpose for which it is cited herein. The proposed Project was designed to be largely consistent with the Specific Plan, and the applicant does not have any reason to expect the County's overall vision for the SDC to change substantially in the revised Specific Plan. The analysis in the prior EIR adopted for the Specific Plan is referenced at points in this application because it provides substantial evidence supporting a determination by the County that the Project's impacts are likely consistent with and not substantially more severe that the previous EIR's conclusions. The revised EIR, of course, will fully analyze the impacts of the revisions, if any, to the Specific Plan, as well as the Project-specific impacts of the proposed Project.

Table 4-1: Estimated Average Wastewater Flow

Land Use	Total Demand (gpd)	Indoor Demand (gpd)[1]	RTS Ratio	Wastewater Flow (gpd)
Single Family Residential	127,090	71,000	100%	71,000
Multi-Family Residential	30,240	22,400	100%	22,400
Commercial	6,070	2,790	100%	2,790
Mixed Use	11,700	11,160	100%	11,160
Public/Institutional	2,870	1,210	100%	1,210
Hotel	36,800	25,080	100%	25,080
Parks	23,680	0	0%	0
Other Irrigable Areas	21,860	0	0%	0
Native Landscape Management	66,120	0	0%	0
			Total	**133,640**

Notes:
1. Indoor demands for non-residential land uses, except Parks, Other Irrigable Areas, and Native Landscape Management, is the difference between the irrigation demand in **Table 3-6** and the total demand in **Table 3-4**.

According to Standard 138 of the SCWA Design and Construction Standards for Sanitation Facilities, the allowance for I/I is 800 gallons per day per acre (gpd/ac). Using this allowance, the wet weather I/I within the approximately 160-acre proposed Project is calculated as 128,000 gpd. For a new collection system, this is likely a conservative estimate; however, this takes into account future deterioration of the pipelines to ensure sufficient capacity and prevent sanitary sewer overflows (SSOs).

A summary of the proposed Project's ADWF, peak dry weather flow (PDWF), and PWWF is presented in **Table 4-2** below. The PDWF peaking factor is consistent with the 2022 Final EIR.[4] The Project PWWF is less than the historical PWWF when the SDC was active (552,230 gpd). Additionally, the PWWF will likely be reduced after full buildout due to a lower I/I value with the construction of new distribution pipelines.

Table 4-2: Estimated Peak Wet Weather Flow

Flow Condition	Flow	Units
ADWF	133,640	gpd
PDWF[1]	330,090	gpd
I/I	128,000	gpd
PWWF	458,090	gpd

Notes:
1. PDWF is calculated as ADWF multiplied by 2.47.

[4] The proposed Project was designed to be largely consistent with the 2022 Specific Plan, and the applicant does not have any reason to expect the County's overall vision for the SDC to change substantially in the revised Specific Plan. The analysis in the prior EIR adopted for the Specific Plan is referenced at points in this application because it provides substantial evidence supporting a determination by the County that the Project's impacts are likely consistent with and not substantially more severe that the previous EIR's conclusions. The revised EIR, of course, will fully analyze the impacts of the revisions, if any, to the Specific Plan, as well as the Project-specific impacts of the proposed Project.

SECTION 5 – POTABLE WATER SYSTEM

Until the permit was revoked and the WTP shut down in 2019, SDC operated a fully independent potable water supply, treatment, storage, and distribution system. Today, the active tenants on the property are served via a service connection to the SCWA system. In 2021, a site visit was conducted to evaluate the existing system, and the results were published in the *Sonoma Developmental Center Water System Assessment Report* (Condition Assessment Report) which is included as **Appendix A**.

It is assumed that the primary source of water supply will be surface water and that the existing facilities will be repaired/replaced as needed to reinstate the permit and restore operation of the system. This section provides a summary of the existing system, an assessment of its current condition, and the improvements necessary to restore its operation.

5.1 Existing Water System

SDC's raw water has historically been sourced from four surface water diversions on-site (Asbury Creek, Hill Creek, Roulette Springs, and Sonoma Creek diversions). Raw water is stored in two on-site surface storage reservoirs (Fern Lake and Suttonfield Lake) and is ultimately pumped to the WTP located on the western part of the property. The Sonoma Creek Pump Station (PS), located on the site of the Sonoma Creek Diversion, pumps raw water between the Sonoma Creek Diversion, Suttonfield Lake, and the WTP. There are four existing on-site groundwater wells, but all four are inactive at this time.

There is a transmission main that runs between Fern Lake, the WTP, and Suttonfield Lake (via the Sonoma Creek PS), and there is a breaker tank that reduces hydraulic head between Fern Lake and the Sonoma Creek PS. Each of these facilities are identified in **Figure 5-1** and a flow diagram of the system is shown in **Figure 5-2**. The following sections summarize the major components of the system, and additional details are included in the Condition Assessment Report in **Appendix A**.

5.1.1 Water Supply

This section provides a summary of the two primary water supply sources based on the condition assessment: surface water and groundwater. Further details are provided in the Condition Assessment Report.

<u>Surface Water Diversions</u>

The four on-site surface water diversions are described below:

- **Asbury Creek Diversion:** The Asbury Creek Diversion is the oldest water supply on the property, in use since at least the 1880s. The old diversion structure was damaged in heavy storms in 2006 and was reconstructed in 2011. It is located at the northwestern edge of the system on a small spur of the property that retains the diversion structure within the property at an elevation of approximately 660 ft. SDC maintains the diversion structure and the associated water rights and reports operational data to State regulators.

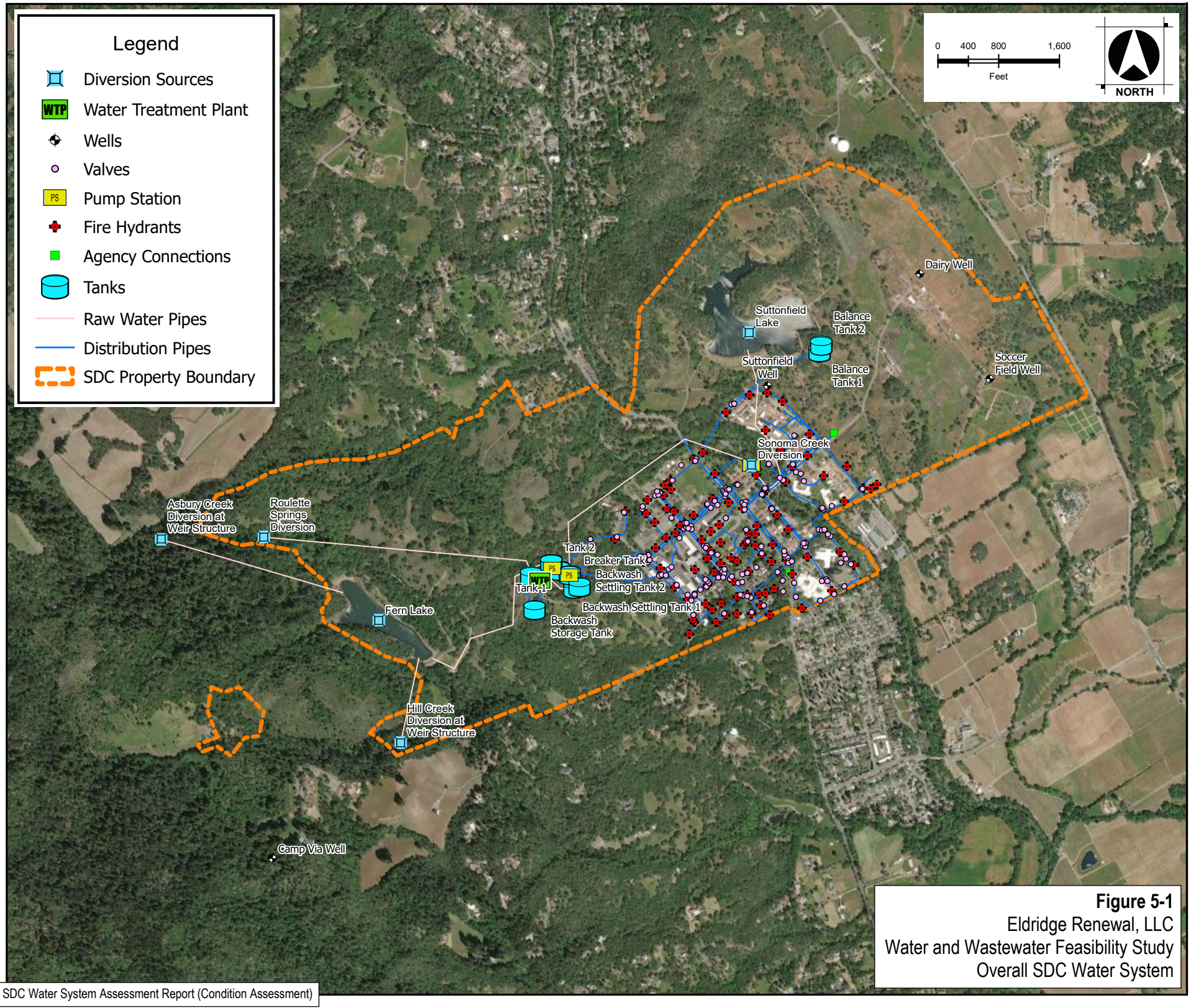


Figure 5-1
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Overall SDC Water System

Source: 2023 SDC Water System Assessment Report (Condition Assessment)

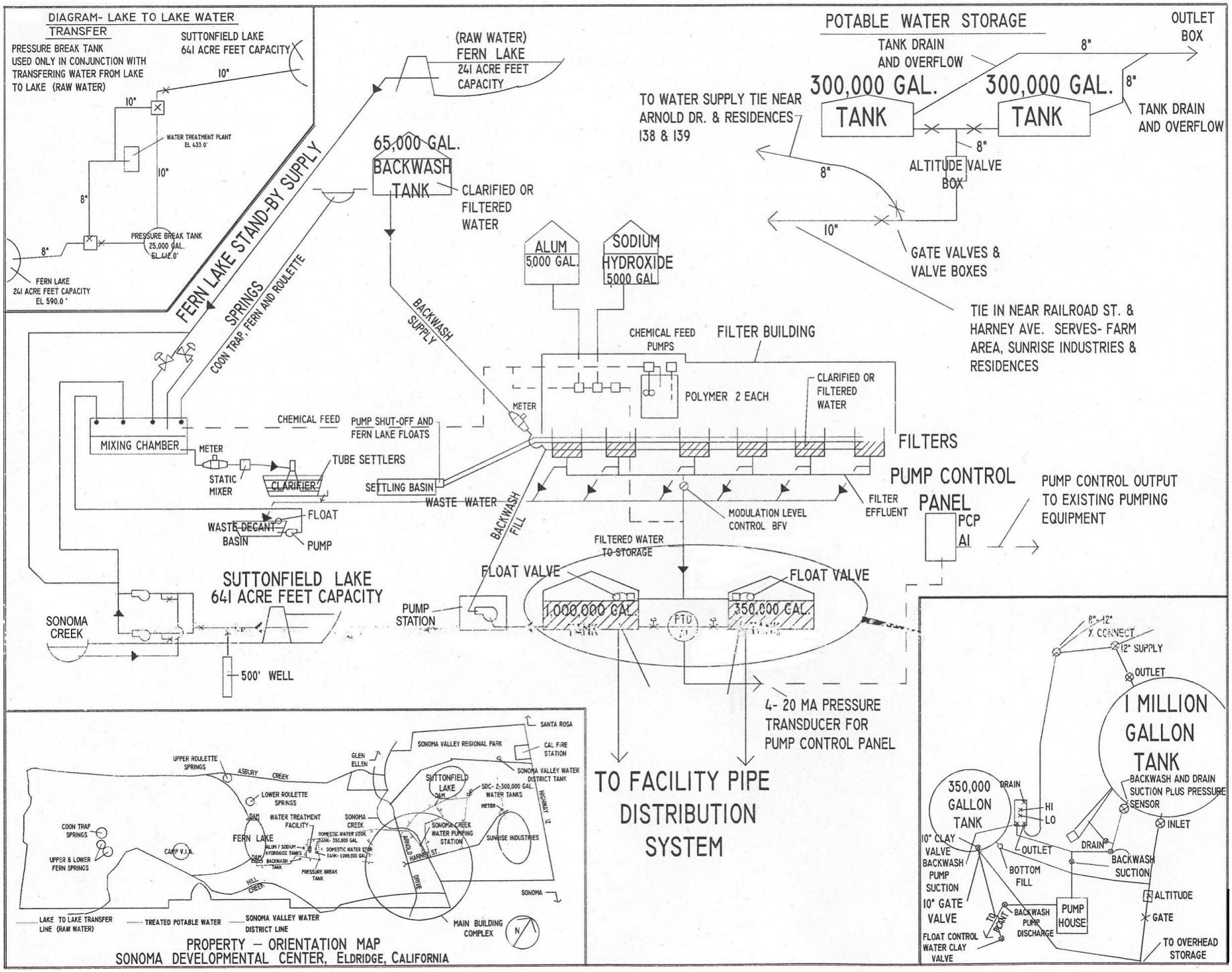


Figure 5-2
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Water Distribution System Flow Diagram

Source: 2023 SDC Water System Assessment Report (Condition Assessment)

The structure consists of a weir built across the creek with an orifice at its base which is sized to maintain 0.9 cubic feet per second (cfs) of flow to the downstream creek before water can be diverted. Diverted water flows to Fern Lake via a 24-in pipeline that transitions to an open channel for the final +/-500 ft. SDC is permitted to withdraw up to 1 cfs of water from the Asbury Creek diversion only after maintaining a minimum flow of 0.9 cfs to the downstream creek. SDC may only operate this diversion during the rainy season (November through May) when there is sufficient streamflow/rainfall; summer flows typically drop to 0.5 cfs or less.

- **Hill Creek Diversion:** The Hill Creek diversion is located along Hill Creek, southwest of Fern Lake, at an elevation of approximately 600 ft. Originally built in 1904, this diversion structure was also severely damaged in the 2006 storms and was reconstructed in 2007. It consists of gabion revetment, cemented riprap. Diverted water flows to Fern Lake through an 18-in steel pipeline on concrete piers across a deep ravine which transitions to an open channel for the final +/-50 ft. SDC is permitted to divert flow from November through May, otherwise there are no restrictions on diversions at this location.
- **Roulette Springs Diversion:** The Roulette Springs collection box was built in 1897 and provides water year-round. It consists of several seeps and springs in a boggy forest area where a simple leaky collection box has been set in a depression with a connected collection pipe. Collected water flows directly to the WTP by a 3-in steel pipe, and flow is metered at the WTP. According to SDC personnel, typical flows from the Roulette Springs Diversion average approximately 80 gpm in the summer and 120 gpm in the winter, providing a potential of approximately 1,200 AFY.
- **Sonoma Creek Diversion:** SDC maintains their rights to draw water from the Sonoma Creek Diversion primarily to ensure that they maintain their storage of raw water through the dry season, drought, and times of high fire threat. The diversion sump is located at the west edge of the creek just below the pump house; however, the dam used to divert water has been removed. When operated, water from the Sonoma Creek Diversion is pumped by the Sonoma Creek PS either to Suttonfield Lake or directly to the WTP.

  In years of average rainfall and normal lake levels, the pumps are run for a month each winter when the creek has high flows, sending approximately 1.0 MGD to Suttonfield Lake to ensure that it is full for fire protection through the summer. The maximum permitted diversion flow rate is 1,657 gpm (2.39 MGD) with a storage limitation of 525 AF.

Groundwater Sources

The four existing groundwater wells within the property are described below. It is noted that none of the wells are active or in service, and it is unknown if they have been properly destroyed.

- **Camp Via Well:** In operation, the Camp Via Well served an 11-acre outdoor recreational facility (Camp Via) for the residents of SDC on a small distribution system independent from the SDC main campus. That system has since been decommissioned. The well was drilled to 195 feet below ground surface (bgs) and draws from depths between 75 ft and 195 ft. Before the system was decommissioned, the yield of this well was 20 gpm with a drawdown of 35 ft. Water from the well was not treated but was disinfected with sodium hypochlorite injection before entering the distribution system. The Well Completion Report for Camp Via Well is included as **Appendix D**.

- **Suttonfield Well:** The Suttonfield Well is located in the field east of Railroad Road and south of Suttonfield Lake. The well is drilled to 890 bgs and draws from depths between 570 ft and 870 ft. At the time of drilling, the yield was recorded as 300 gpm. No record of current yield is available. Water from this well contains elevated levels of arsenic and boron which may be explained by upwelling of highly mineralized water due to its proximity to the Eastside Fault.
- **Dairy Well:** The Dairy Well is located in front of the old dairy on the eastern edge of the property. This well has a brick dome-like cap with a steel lid and appears to have been a hand dug well from which water was drawn with buckets. There is also a well shaft adjacent to the brick dome. No records are available regarding the time of construction, depth, production rates, water quality, or decommissioning of the Dairy Well.
- **Soccer Field Well:** Previous studies reference a shallow water supply well used to water the soccer fields in the eastern part of the property. Field investigations were unable to locate the well, but it is believed to have been located east of former residence 152, adjacent to the creek. Water from this well was piped to two above ground storage tanks. No records are available regarding the production rates or water quality of the Soccer Field Well.

Water Rights

The water rights associated with the SDC property include two appropriative rights and three combined riparian and pre-1914 rights as summarized in **Table 5-1**.[5] Each water right includes specific temporal and/or volumetric restrictions, which govern how much water can be diverted from each diversion, when it can be diverted, and how the water can be beneficially used.

The statements on the Hill Creek, Roulette Springs, and Asbury Creek applications have claims to both riparian and pre-1914 use. The pre-1914 claim is currently being used to divert from Hill Creek and Asbury Creek to Fern Lake for regional fire storage. The Unnamed Stream (see **Section 5.1.2**) and Sonoma Creek diversions are used pursuant to appropriative water rights. By actively managing the on-site water rights, the SDC has historically been able to provide reliable year-round domestic water supply to serve all uses on the SDC site at least up to the recorded peak historical demand of 1,143 AFY.

In 2019, the State enacted Government Code Section 14670.10.5 that outlines the State's goals and objectives for the SDC property, including the language pertaining to the existing water rights. Paragraph (f) states the following:

> *(f) All riparian water rights shall remain with the property. The state owns riparian water rights and pre-1914 and post-1914 appropriative water rights and owns and operates a municipal water supply, treatment, and distribution system on the property. These rights may be held by the state for existing and future domestic uses on the property.*

Based on the legislation, it is assumed that the water rights associated with the SDC property and associated water supply infrastructure will be available to be utilized to serve water demands associated with the Project.

[5] The Water Commission Act was enacted in 1914 and established California's water right permit process.

Table 5-1: SDC Water Rights

Appropriative Rights				
Diversion	**Application**	**Permit**	**License**	**Date of License**
Unnamed Stream (Source A) Sonoma Creek (Source B)	9378	5244	3082	5/11/1948
Sonoma Creek	6944	3829	2451	2/7/1951
Pre-1914 and Riparian Rights				
Diversion	**Application**		**Date of Filing**	
Hill Creek	S019164		6/23/2010	
Roulette Springs	S019167		6/23/2010	
Asbury Creek	S019179		6/23/2010	

5.1.2 Raw Water Storage

Raw water from the four surface water diversions described above is diverted to one of two surface water storage lakes. The raw water storage facilities, including the two lakes as well as a breaker tank, are each identified in **Figure 5-1** and described below.

- **Fern Lake:** Fern Lake is located on the western edge of the property and receives raw water from Asbury Creek and Hill Creek diversions. It was originally constructed along with the south earthen dam in 1910. The south dam was later raised, and a north earthen dam was constructed to increase its capacity to its present-day volume of 240 AF. The spillway is located on the north dam at an elevation of 590 ft. The dam has had a slow (approximately 5 gpm) leak for many years. A monitoring well was installed in recent years to monitor the leak, and no change in leak rate has been observed over time. Each dam is inspected annually by the California Department of Water Resources Division of Safety of Dams (DSOD) and maintained regularly by the SDC staff. The outlet structure for Fern Lake is a 10-in vertical pipe with three screened intakes at different levels.

  SDC historically would fill Fern Lake to four feet below the spillway in the winter and then begin transfers to fill Suttonfield Lake as much as possible. The WTP would be supplied by Fern Lake through the winter and for a few months after the diversion boards are pulled in April. In the summer, supply for the WTP would then switch to primarily Suttonfield Lake.

- **Suttonfield Lake:** Suttonfield Lake is located on the northeastern part of the property and receives water from Fern Lake via a 10-in gravity transmission line, directly from an Unnamed Stream, or Sonoma Creek diversion via the Sonoma Creek PS; it is used in tandem with Fern Lake to provide water to the WTP. Suttonfield Lake is used for domestic water use, irrigation, and fire flow storage requirements. Several maps depict Suttonfield Lake as part of the adjacent Sonoma Valley Regional Park, and it is used for recreational purposes; however, most activities, such as swimming, are prohibited due to water quality, safety, and liability reasons.

  This reservoir was initially constructed in 1938 and was increased to its present volume of 641 AF in the 1950's. The earthen dam, constructed in two segments, is 76 ft high and 965 ft long. The spillway is at the western edge of the lake at an elevation of 291 ft. Like Fern Lake, it is inspected annually by DSOD. The outlet structure is an octagonal concrete tower with two screened inlets at different elevations.

- **Breaker Tank:** A 25,000-gallon breaker tank is located on the site of the WTP. It is a partially buried concrete tank with a concrete domed roof that serves to relieve pressure in the raw water pipeline connecting Fern Lake to the Sonoma Creek PS.

5.1.3 Water Treatment

SDC's WTP, located west of the SDC main campus at an elevation of approximately 434 ft, was originally built in the 1930s. In 1992, chemical systems were added; in 1995, a SCADA system was installed and treated water storage capacity was expanded with the construction of four new rapid sand filters and a 1 MG tank; in 2018, the two original sand filters were re-built. The WTP is supplied with gravity flow from Fern Lake and Roulette Springs diversion or with pumped flow from Sonoma Creek diversion or Suttonfield Lake via Sonoma Creek PS.

On-site, there are two backwash tanks and a 65,000-gallon storage tank for backwash water recirculated into the treatment process.

The WTP is a conventional surface WTP with a rated capacity of 1.8 MGD and minimum flow of 0.14 MGD (100 gpm); before it was shut down in 2019, it operated at about 0.2 MGD. It follows a conventional process with an intake headbox (mixing chamber), alum dosing, upflow clarifier, sedimentation basin, and six rapid sand filter system. The water is disinfected with chlorine and sodium hydroxide for pH balance. Backwash water is pumped from the WTP to a tank uphill and recirculated into the treatment process while the solids settle out at the sludge ponds.

At the WTP intake from Fern Lake, there is an option for the raw water to bypass the WTP and flow to the Sonoma Creek PS where it is pumped to fill Suttonfield Lake; this bypass allows Suttonfield Lake to provide additional raw water storage prior to treatment. It is presumed that the bypass can operate simultaneously with operation of the WTP if necessary.

An overview of the WTP and surrounding facilities is presented in **Figure 5-3**.

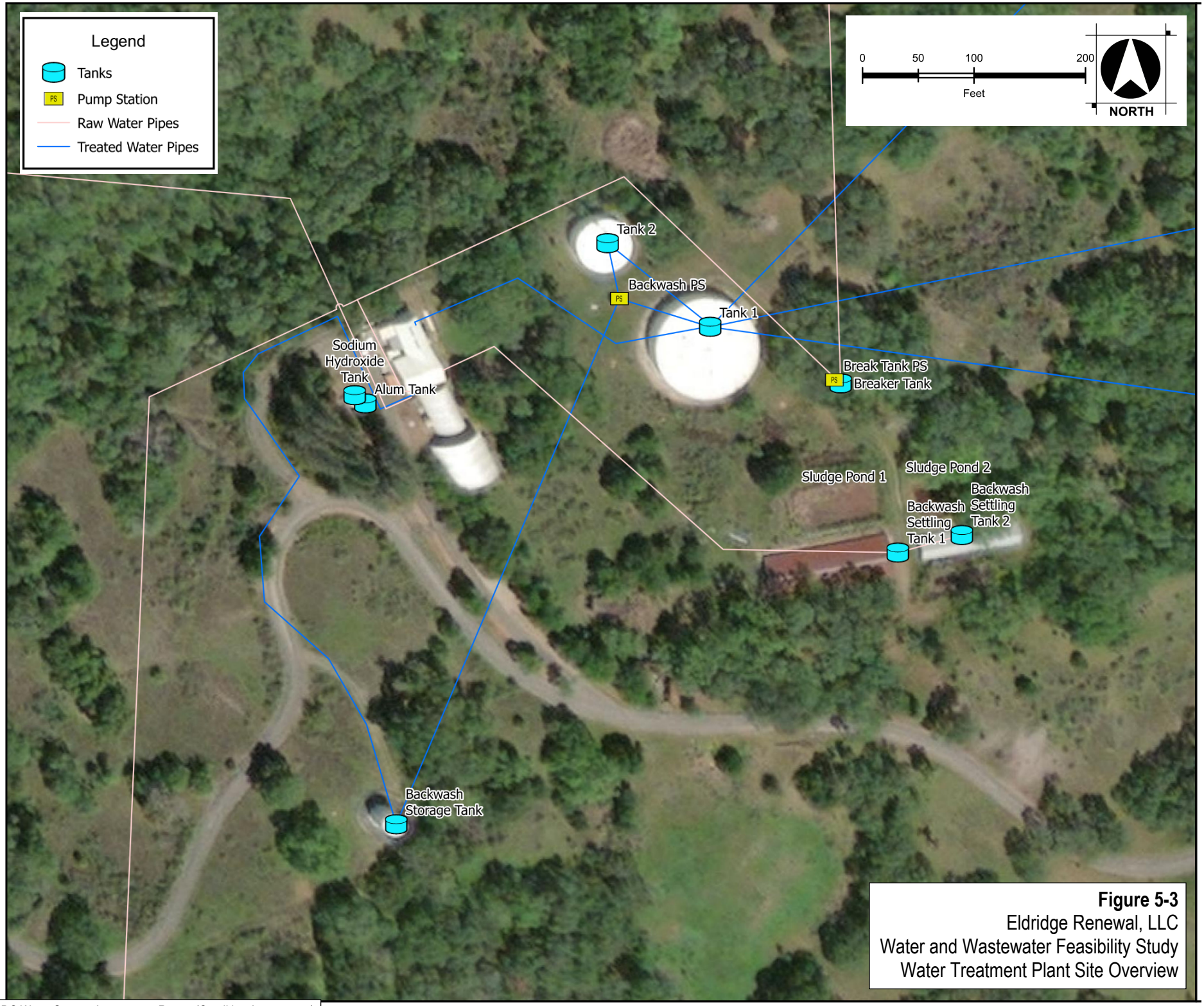


Figure 5-3
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Water Treatment Plant Site Overview

Source: 2023 SDC Water System Assessment Report (Condition Assessment)

5.1.4 Treated Water Storage Tanks

There are two tanks located on the WTP site which store treated water (1 MG and 0.35 MG). Just south of Suttonfield Lake, there are two balance tanks (0.3 MG each), for a total on-site storage capacity of 1.95 MG.

- **Tank 1:** This 1-MG tank is an above-grade welded steel tank built in 1995 on the WTP site at an elevation of approximately 398 ft. Before it was shut down in 2019, this tank was filled with treated water from the WTP; today, it is filled by the SCWA connection and serves the existing SDC tenants. Due to SCWA system pressures, the tank can currently only be filled to a water depth of 6-7 ft versus the 16-ft height of the tank.
- **Tank 2:** This 350,000-gallon tank is an above-grade welded steel tank located adjacent to Tank 1. It was built in 1941 on the WTP site at an elevation of approximately 398 ft. This tank was also filled with treated water from the WTP.
- **Balance Tanks 1 and 2:** Two 300,000-gallon welded steel treated water tanks are located on the knoll south of Suttonfield Lake. These tanks are balance tanks for the gravity-fed SDC water distribution system. They store treated water from the WTP and maintain constant pressure in the distribution network and dampen potential pressure fluctuations. They are both located at an elevation of approximately 370 ft – lower than Tanks 1 and 2 – and they require an altitude valve to shut off the fill cycle. These tanks are currently not in use.
- **Backwash Settling Tanks 1 and 2:** Backwash water from the WTP settles into two tanks located on the WTP site that are estimated to hold 80,000 gallons each – the exact volume is unknown. Clarified backwash water is pumped up to the mixing chamber and recirculated into the WTP.
- **Backwash Storage Tank:** A 65,000-gallon welded steel backwash storage tank receives clarified backwash water from Tanks 1 and 2 via the Backwash Tank PS. The backwash supply water is conveyed to the WTP to backwash the sand filters every 72 hours.

5.1.5 Pump Stations

There are three pump stations within the SDC potable water system, each described below:

- **Sonoma Creek PS:** The raw water PS located on the southwest bank of Sonoma Creek houses five pumps of varying capacity; details of each pump are provided in **Table 5-2**.

Table 5-2: Sonoma Creek PS Pump Details

Pump #	Type	Capacity (gpm)	Power (hp)	Function
1	Horizontal Split-Case	250	40	Pump water from Suttonfield Lake to WTP
2	Horizontal Split-Case	300	50	
3	Vertical Turbine	750	50	Pump water from Sonoma Creek diversion to WTP
4	Vertical Turbine	750	50	
5	Vertical Turbine	500	25	

Pumps #1 and #2 have variable frequency drives (VFDs), however the VFD for Pump #2 is no longer functioning. The controls for Pump #3 and Pump #4 currently do not work.

The Sonoma Creek PS has the following four operating conditions which can be achieved by operating appropriate valves:

1. Receive raw water from the WTP bypass (via Fern Lake) and pump it up to Suttonfield Lake.
2. Receive water from Suttonfield Lake and pump it to the intake of the WTP.
3. Pull water directly from Sonoma Creek Diversion and pump it to Suttonfield Lake.
4. Pull water directly from Sonoma Creek Diversion and pump it to the WTP.

This flexibility in the use of a single PS and transmission pipeline allows operators to manage the system to maximize storage capacity and provide sufficient turnover and circulation in the system to maintain low bacteria levels in the stored raw water.

- **Breaker Tank PS:** Near the Breaker Tank at the WTP, there is a 5-hp booster pump that enables operators to transfer water from the Breaker Tank/WTP area to Fern Lake. The pump is housed in a small wooden structure, and the capacity is unknown.
- **Backwash Tank PS:** Between Tanks 1 and 2, there is a pump house to boost treated water from Tanks 1 and 2 to the backwash storage tank for recirculation into the WTP. The pump house contains one horizontal split-case pump (Paco), and the capacity is unknown.

5.1.6 Transmission and Distribution Pipelines

Raw Water Transmission Lines: A single raw water transmission line connects Fern Lake, the WTP, and Suttonfield Lake. It is a 10-in ductile iron pipe totaling approximately 3,500 ft in length; over the years, some sections of the pipe have been repaired and replaced with PVC.

Treated Water Transmission Lines: There are two 8-in treated water transmission lines and one 12-in treated water transmission line that carry water from the treated water storage tanks at the WTP to the main campus to feed the domestic water distribution system. There is also one treated water transmission line that connects to Balance Tank 1 and Balance Tank 2. Per available records, the total length of these pipes is approximately 1,670 ft. A January 2018 report mentions that the 12-in line was constructed in 1989 to augment the existing transmission system and increase the fire flow capacity of the system; it is connected to the distribution system at Manzanita and Holt Road.

Treated Water Distribution Lines: Currently, treated water from the WTP is distributed throughout the SDC site through a looped network of pipelines ranging in diameter from 3-in to 10-in. The original system was dual plumbed, with raw water parallel to treated water, but due to concerns about potential cross-contamination and concerns over possible resident error, the dual-system was discontinued in the mid-1970s. The original raw water pipes were connected to the treated water distribution system, so there are now many distribution pipes running in parallel. The distribution system is one pressure zone with the system pressure set by the water level in the tanks. The distribution system contains water service connections, isolation valves, and fire hydrants.

The total distribution pipeline length by diameter is summarized in **Table 5-3**.

Table 5-3: Distribution Pipe Length Per Diameter

Diameter	Length (ft)[1]
Unknown	8,361
3-in	277
4-in	1,578
6-in	5,458
8-in	1,071
10-in	655
Total	**17,400**

Notes:
1. Many of these pipes are redundant because SDC consolidated a non-potable distribution system.

5.1.7 Emergency Treated Water Supply

According to the Condition Assessment Report, the SDC water system includes two emergency potable water supply connections with neighboring system pipelines traversing the core campus. Each of these agency connections are identified in **Figure 5-1**. There is a 6-in connection to the SCWA water system located near the intersection of Railroad Street and Harney Avenue. A connection to the VOMWD system is located on Arnold Avenue; here, water can only flow in one direction (from VOMWD to SDC). According to VOMWD staff, it is unclear if the latter emergency connection to the VOMWD system exists. As part of any water system improvements, the existence of this connection should be verified and condition inspected and if it does not exist, a connection between VOMWD and SDC is recommended for mutual benefit. The location for a new emergency supply connection would be determined during the design phase.

The SDC water system has also historically been used as a backup water supply source for Sonoma County during emergencies, such as fire and earthquakes. Recommissioning of the SDC water supply treatment, storage, and distribution system would increase the resiliency of water supplies in the Sonoma Valley.

5.2 Condition Assessment

In March 2023, DGS published the Condition Assessment Report (see **Appendix A)**. The purpose of this report was to document the existing SDC water system including a description of the system and a condition assessment of the major facilities. As part of the Condition Assessment, a site visit was conducted on December 7, 2021 by Wood Rodgers, EKI, VOMWD, DGS, and former SDC operators. During the site visit, the following attributes were recorded for each facility, where available:

- Asset
- Capacity
- Make
- Model
- Year Built
- Year Offline
- Year Rehabilitated
- Year Replaced
- Material
- Condition
- Diameter
- Height
- Length
- Amount
- Other

Photos were taken of each asset and relevant notes were taken as appropriate. A detailed list of each asset and field observations is included in Appendix 1 of the Condition Assessment Report. Additional details on the results of the Condition Assessment can be found in **Appendix A**.

5.3 Supply Analysis

5.3.1 Surface Water

The 2022 WSA developed an analytical model that simulates the yield of each water supply source based on the historical stream flow data, temporal and volumetric constraints on diversions as prescribed in the respective water rights, as well as the infrastructure and operations-based limitations on diversions. The SDC Diversion Model is described in greater detail in the WSA in **Appendix B**.

Using this model, the WSA identified the available surface water diversions assuming the existing infrastructure limitations (i.e. capacity of existing lake storage and diversion structures), assuming no storage or infrastructure limitations, and assuming the most restrictive drought conditions in accordance with DWR methods for assessing multi-year drought conditions for UWMP development. **Table 5-4** summarizes the available supply, according to the SDC Diversion Model, under different conditions analyzed.

Table 5-4: Summary of Available Surface Water Diversions

Condition	Available Supply (AFY)
Normal year, considering existing demand limitation and storage constraints	405
Normal year, without demand limitations or storage constraints	636 (average) 1,164 (maximum)
100% reliable yield during all year types (normal year, single dry year, and five consecutive dry years)[1]	356

Notes:
1. Represents the most conservative condition with the most restrictions.

The 100% reliable yield represents the maximum demand that can be supplied during all year types (normal year, single dry year, and multiple consecutive dry years), at which no supply deficits would occur during the entire period of the analysis. This demand represents the minimum yield from the SDC surface water sources and supply system; this is the most conservative condition with the most restrictions.

5.3.2 Groundwater

Of the four existing wells within the SDC area, the Suttonfield Well is the only candidate for potential rehabilitation (see **Section 5.1.1**).

Water from the Suttonfield Well is known to contain elevated levels of arsenic and boron which would require additional treatment. No recent records are available documenting the yield of the well, but at the time of drilling, its yield was documented at 300 gpm.

Local Hydrogeology

According to the DWR Bulletin 118, California's Groundwater Update 2020 (November 2021), SDC is located in the Sonoma Valley Groundwater Subbasin (DWR number 2-002.02), a subbasin of the Napa-Sonoma Valley Groundwater Basin (DWR number 2-002). The Sonoma Valley Subbasin is designated as a high priority basin under DWR's Phase 2 Basin Prioritization; this designation is based on a number of factors including density of public wells, density of total wells, irrigated acreage per square mile, groundwater reliance, and documented impacts including declining water levels and subsidence. The Subbasin is not currently in a state of critical overdraft. The high priority designation means that they are subject to the requirements of the Sustainable Groundwater Management Act (SGMA) and they must be covered by a Groundwater Sustainability Agency (GSA) and publish a Groundwater Sustainability Plan (GSP) and submit it to DWR. The *Groundwater Sustainability Plan – Sonoma Valley Groundwater Subbasin* was published in December 2021 (2021 GSP).

As stated in the 2021 GSP, the sustainable yield for pumping of groundwater for the entire Subbasin is 5,400 AFY. The estimated historical average groundwater pumping is 4,900 AFY. However, the current average pumping is 5,700 AFY and the projected pumping for the years 2021- 2070 is 6,500 AFY. The 2021 GSP also lists the total Subbasin area as 44,000 acres. This averages to a sustainable yield of 0.12 AFY/ac. When this is applied to the SDC area (945 acres), this equates to a sustainable yield for groundwater pumping by SDC of approximately 116 AFY.

According to the 2021 GSP, multiple studies and reports conducted by various regulatory programs on the Subbasin concluded that groundwater quality is "generally adequate to support existing beneficial uses within most of the watershed." Some localized issues exist within the watershed. Including: 1) brackish waters of San Pablo Bay and associated tidal marshland areas, (2) hydrothermal fluids associated with portions of the Sonoma Volcanics and/or fault zones, (3) deep connate waters associated with ancient seawater entrapped during deposition of Tertiary sedimentary units, and (4) anthropogenic inputs associated with certain land use activities.

Napa-Sonoma Valley Basin: The Napa-Sonoma Valley Basin is part of the North Bay alluvial aquifer system located in the northern portion of the San Francisco Bay Hydrologic Region.

The following description is excerpted from the California's Groundwater Update 2013 (DWR April 2015):

> *The North Bay alluvial aquifer system includes the 10 groundwater basins and subbasins located in Marin, Sonoma, Napa, and Solano counties. In this area, the more heavily utilized groundwater basins include the subbasins of the Napa-Sonoma Valley Groundwater Basin (2-2) and the Petaluma Valley Groundwater Basin (2-1) (California Department of Water Resources 2003). These areas consist of a relatively thin cover of Quaternary alluvium overlying a thick section of Neogene volcanic and sedimentary rocks, Cretaceous sedimentary rocks, Franciscan Complex sedimentary and metamorphic rocks, and Jurassic serpentinite. The main freshwater-bearing geologic unit is the alluvium and the Neogene sedimentary rocks that underlie and form the valley floors (U.S. Geological Survey 2010). The thickness of the freshwater-bearing aquifers ranges from less than 10 feet to more than 300 feet and the system is mostly unconfined. Groundwater in the mountains surrounding the Napa, Sonoma, and Petaluma valleys generally follows the dip of the geologic formations toward the center of the respective valleys, and then flows north to south toward the direction of San Pablo Bay. The Napa River drains the Napa Valley Groundwater Subbasin (2-2.01) and the Napa-Sonoma Lowlands*

Groundwater Subbasin (2-2.03). Sonoma Creek drains the Kenwood Valley Groundwater Basin (2-19) and the Sonoma Valley Groundwater Subbasin (2-2.02). The Petaluma Valley Groundwater Basin (2-1) is drained by the Petaluma River.

The main freshwater-bearing formations in the North Bay area include the Quaternary Alluvial Units, Glen Ellen Formation, Huichica Formation, and Sonoma Volcanics. The Petaluma Formation underlies the Sonoma Volcanics and was deposited under brackish-water conditions (U.S. Geological Survey 2006).

The Quaternary Alluvial Units consist of interbedded cobbles, sand, silt, and clay interlaced with coarse-grained stream channel deposits. Where these deposits are thick and saturated, they are the highest yielding aquifers with well yields of more than 100 gallons per minute (gpm).

The Glen Ellen Formation includes clay-rich stratified deposits of poorly sorted sand, silt, and gravel interbedded with minor beds of conglomerate and volcanic tuffs. The well yields are significantly lower in this formation (generally less than 20 gpm) than in the Quaternary alluvial deposits.

The Huichica Formation consists of thick clay with interbedded lenses of sands, gravels, and tuff beds. The well yields are generally low, typically 2 to 20 gpm, but the lower part of the formation can be higher yielding.

The Sonoma Volcanics range in age from 6 million to 3 million years old and are found throughout Napa and Sonoma counties (U.S. Geological Survey 2003). The Sonoma Volcanics are thick sequences of volcanic rocks interbedded with sedimentary deposits derived from volcanic rocks and lakebeds. This formation has the highest variability in water-bearing properties. Well yields generally range between 10 and 50 gpm, but are occasionally as much as several hundred gpm.

There is limited groundwater information available for the Suisun-Fairfield Valley Groundwater Basin (2-3), located in the northeast portion of the San Francisco Bay region. The Suisun Fairfield Valley Groundwater Basin is composed of low alluvial plains, with surrounding foothills and mountains, located immediately north of Suisun Bay. The foothills of the Coast Ranges, lying west of Green Valley, bound the basin on the west. The southern extent of the Vaca Mountains forms the northern boundary of the basin. The eastern extent of the basin is marked by low ridges of consolidated rock that appear near Vacaville and extend southeast to the Montezuma Hills (City of Vacaville 2011).

Sonoma Valley Area: The proposed development is located in the Sonoma Valley Area. The following is excerpted from the Geohydrological Characterization, Water-Chemistry, and Ground-Water Flow Simulation Model of the Sonoma Valley Area – Scientific Investigations Report 2006-5092 (U.S. Geological Survey, 2006):

Sonoma Valley is a distinctive topographic feature and is one of several narrow northwest trending valleys in the mountainous terrain north of San Francisco Bay. Volcanic and sedimentary rocks on either side of the valley mostly dip toward the valley axis but in places this simple geometry is disrupted by minor folds and faults (Campion and others, 1984). Correlations of rocks on either side of the valley can not be made with confidence because of the discontinuous nature of individual beds or units within the Sonoma Volcanics and the Glen Ellen and Huichica Formations. However, the predominance of

stratification dipping toward the valley axis clearly indicates that the valley is a synform structure rather than a purely erosional feature. The folding took place in at least three episodes over a few million years, between the time of deposition of the oldest units in the Sonoma Volcanics to the deposition of the youngest part of the Glen Ellen Formation (D. Wagner, California Geological Society, unpub. data, 2005). The folding is not uniform, and the synform probably is asymmetric, being steeper on the east side of the valley.

The rocks around the margin of the valley west of Kenwood have been folded into a syncline that strikes northwest. The folding has affected the Glen Ellen Formation which has dips of 25 to 40 degrees toward the valley axis (California Division of Mines and Geology, 1984).

Several faults can be recognized in the Sonoma Mountains along the southwest side of Sonoma Valley (figs. 9 and 10C). Some of the faults are branches or splays of the Tolay Fault or the Rodgers Creek Fault, both of which are northwest- striking large-scale faults. Movement on the Rodgers Creek Fault has been predominantly right-lateral strike-slip, but it also has components of dip-slip. Movement on the Tolay Fault has been predominantly reverse slip. High-angle normal and reverse faults also have been mapped in the Sonoma Mountains (Fox and others, 1973). Some of these faults have a more northerly strike and project into the valley near Glen Ellen. Youngs and others (1983) describe northwest striking high-angle faults on both sides of the northern part of Sonoma Valley. Most of these faults show a vertical component of displacement. In this area the Glen Ellen Formation does not appear to have been affected by faulting. A thrust fault on the northeast side of the valley has displaced a block of Sonoma Volcanics onto rocks of the Franciscan Complex.

In the Mayacmas Mountains, several faults have been mapped (Wagner and others, 2004). Most of the faults strike northwest or north to east of north, but the sense of displacement is not known. Some of these faults probably are right-lateral strike-slip related to the regional pattern of faulting north of San Francisco Bay. No faults have clear surface expression on the valley floor; however, there is a concealed northweststriking high-angle normal fault (fig. 9) This fault was mapped on the basis of the outcrop pattern of Huichica sediments gravity and magnetic geophysical surveys and on speculation that a fault must exist along the eastside of the valley to account for the distribution of thermal waters in Sonoma, Agua Caliente, and Boyes Hot Springs (Youngs and others, 1983; Campion and others, 1984). In this report, this fault is referred to as the "Eastside Fault."

5.3.3 Supply versus Demand

The available surface water supply during a normal year (405 AFY, see **Table 5-4**) is greater than the total estimated water demand of 402 AFY (see **Table 3-7**. Thus, the existing surface water rights and diversions provide sufficient supply to provide potable water for the proposed Project.

During a consecutive year drought, available supply could be reduced to the 100% reliable yield of 356 AFY (see **Table 5-4**). As stated previously, this 100% reliable yield represents the water that can be guaranteed for supply during all year types (normal year, single dry year, and multiple consecutive dry years), at which no supply deficits would occur during the entire period of the analysis. This is the most conservative condition with the most restrictions. The 100% reliable yield during a consecutive year drought falls 46 AFY under the estimated Project demand; this is approximately a 11% deficiency. Water suppliers in California are required to develop a Water

Shortage Contingency Plan (WSCP) to have a plan for dealing with drought conditions when encountered. A WSCP typically includes a combination of both supply enhancement (such as emergency interties) and demand reduction (such as penalties for excessive water use) measures. The 12% deficiency calculated during dry years can be mitigated by implementation of water use restrictions and other measures as part of a WSCP to reduce demands.

As detailed in **Section 3.3**, the 402 AFY of estimated demand includes 153 AFY of irrigation demand which has the potential to be supplied by recycled water. Also, as mentioned in **Section 3.2.3,** the assumption of 50% irrigation for the wildfire buffer area (Native Landscape Management) – accounting for 74 AFY of irrigation demand – is likely a conservative estimate. With the use of recycled water for irrigation, potable demand can be reduced to 249 AFY. Thus, the existing surface water rights and diversions provide sufficient potable water supply for the Project during both normal and consecutive drought years with the implementation of recycled water.

To supplement potable water supply from the surface water diversions, rehabilitation of the Suttonfield Well can be pursued. Additionally, negotiations could be made with SCWA for additional supply through the emergency intertie described in **Section 5.1.7**.

5.4 Potable Water Recommendations

It is recommended that SDC continue to retain and utilize the four existing surface water diversions as the primary potable water supply source to serve the Project. The improvements necessary to improve the four diversions are detailed in the Condition Assessment included as **Appendix A**.

It is recommended that SDC maintain the connection to SCWA to serve as an emergency intertie in the case of an emergency such as extreme drought, equipment failure, earthquake, etc. Maintaining this connection will require negotiations between SDC and SCWA; an agreement will need to be drafted to determine the terms of use for each party. It is also recommended that SDC verify the existence of a connection to the VOMWD system. If it does not exist, a connection between VOMWD and SDC is recommended for emergencies. This connection will also require negotiations with VOMWD to determine the terms of use for each party, and the location for a new emergency supply connection would be determined during design.

Rehabilitation of the Suttonfield Well may be considered to diversify the SDC water supply portfolio. An in-depth study should be conducted to determine the necessary improvements to rehabilitate and reinstate the well, the treatment methods needed to address any water quality issues, and the potential yield upon reinstatement. Otherwise, all existing wells should be destroyed and capped to prevent groundwater contamination in accordance with Sonoma County and DWR standards. Because all four wells are outside of the core campus and are on State property, all wells that are not rehabilitated and recommissioned will be the State's obligation to destroy.

To reinstate the WTP Permit and bring the SDC potable water distribution system back online, there are a number of improvements needed to the facilities and pipelines that are detailed in the Condition Assessment Report. **Appendix A** includes a list of all recommended improvements. The improvements are designated as "urgent" and "mid-tier" priorities in the assessment; however, it is recommended that both the "urgent" and "mid-tier" improvements be implemented together to best serve the members of the new SDC community.

The ultimate owner and operator of the water system has yet to be determined. Opportunities for existing utility ownership (VOMWD) or investor-owned for-profit water utilities will be explored.

5.4.1 Permitting Requirements

It was reported in the Condition Assessment Report that a meeting was held with the assigned Division of Drinking Water (DDW) Associate Sanitary Engineer on the permitting requirements for the SDC water system. To re-start/re-permit the SDC WTP and distribution system as a public water system, the system will need to comply with SB 1263 and the related process. A public water system is defined as: "a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year." SB 1263 requires the preparation of a technical report to be submitted to the State Water Resources Control Board (SWRCB) at least six months prior to construction of any water-related improvement. **Appendix E** contains *Responses to Frequently Asked Questions (FAQs)* provided by the SWRCB regarding SB 1263.

When preparing the technical report, it is expected that further discussions with DDW will occur to discuss the required water treatment and system improvements. If the water system improvements required by DDW are extensive, options to use the existing plant, modify the existing plant, or replace the existing plant will be evaluated and considered for Project implementation.

If there is further consideration of incorporating the SDC water system into the VOMWD system, the permitting process involves amending the existing VOMWD permit to add new water treatment and distribution facilities.

In either case, a 7-00b Water Supply Permit Amendment Application is also required for each facility (i.e. WTP, Fern Lake, and Suttonfield Lake); this form is provided in **Appendix E**.

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SECTION 6 – WASTEWATER SYSTEM

Up until 1954, the SDC treated their sewage on-site at a WWTP located to the east of the core campus. Following the construction of the collection system and the connection to SVCSD, the on-site treatment plant was abandoned. This site currently consists of the remnants of the former treatment facility and is a candidate site for a new scalping plant.

It is assumed that the primary method of wastewater disposal will be through the connection with SVCSD; however, as a supplemental wastewater option, a portion of the wastewater generated at the SDC could be treated and reused as a recycled water supply, which would reduce both potable water demand and wastewater flows to SVCSD. This on-site scalping plant option is further considered in the following discussion.

6.1 Existing Wastewater System

The existing SDC sanitary collection system includes approximately 26,000 ft of gravity pipelines ranging from 4- to 15-inches in diameter. The original collection system was constructed during the 1920s and 1930s, and approximately 10,400 ft of pipelines were replaced in the early 1990s. The system consists of seven tributary areas, five of which terminate at the outfall. **Figure 6-1** shows the existing collection system and **Figure 6-2** delineates the existing tributaries.

In July 2021, a Sewer System Evaluation was conducted for the collection system. That evaluation, included as **Appendix C**, summarized the structural and operational and maintenance (O&M) defects identified by County CCTV inspection from 2019 as well as an approach to rehabilitating portions of the collection system. The development of that study was largely in response to a Notice of Violation (NOV) to SDC for non-compliance with its Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Collections Systems (Order No. 2006-0003-DWQ), and Monitoring and Reporting Program (MRP) (Orders WQ 2008-002-EXEC and WQ 2013-0058-EXEC) issued by the San Francisco Bay Regional Water Quality Control Board (RWQCB). The evaluation provides recommendations for mitigating I/I in the existing system and resolving the NOV.

SDC maintains an existing connection to the SVCSD for wastewater collection and treatment. All sewage generated within the SDC flows to a main collection point on the southeast corner of Redwood Drive and Harney Avenue, where it flows through a bar screen and venturi meter before discharging into the SVCSD system. The existing bar screen and venturi meter are over 40 years old and likely require replacement. Sewage collected by SVCSD is treated at their treatment plant, which is located south of SDC in Sonoma, CA.

It is expected that this connection to the SVCSD system will continue to be the primary method for wastewater collection within SDC. As stated in **Section 4.2**, the estimated wastewater flows for the Project are less than the maximum historical PWWF recorded when the SDC was previously active. Thus, the impacts to the SVCSD should be within the expected range of the agreement between SDC and SVCSD to collect and treat SDC wastewater. However, it is recommended that an updated evaluation be completed to ensure there is adequate capacity in the SVCSD collection system to carry the estimated Project flows and at the treatment plant.

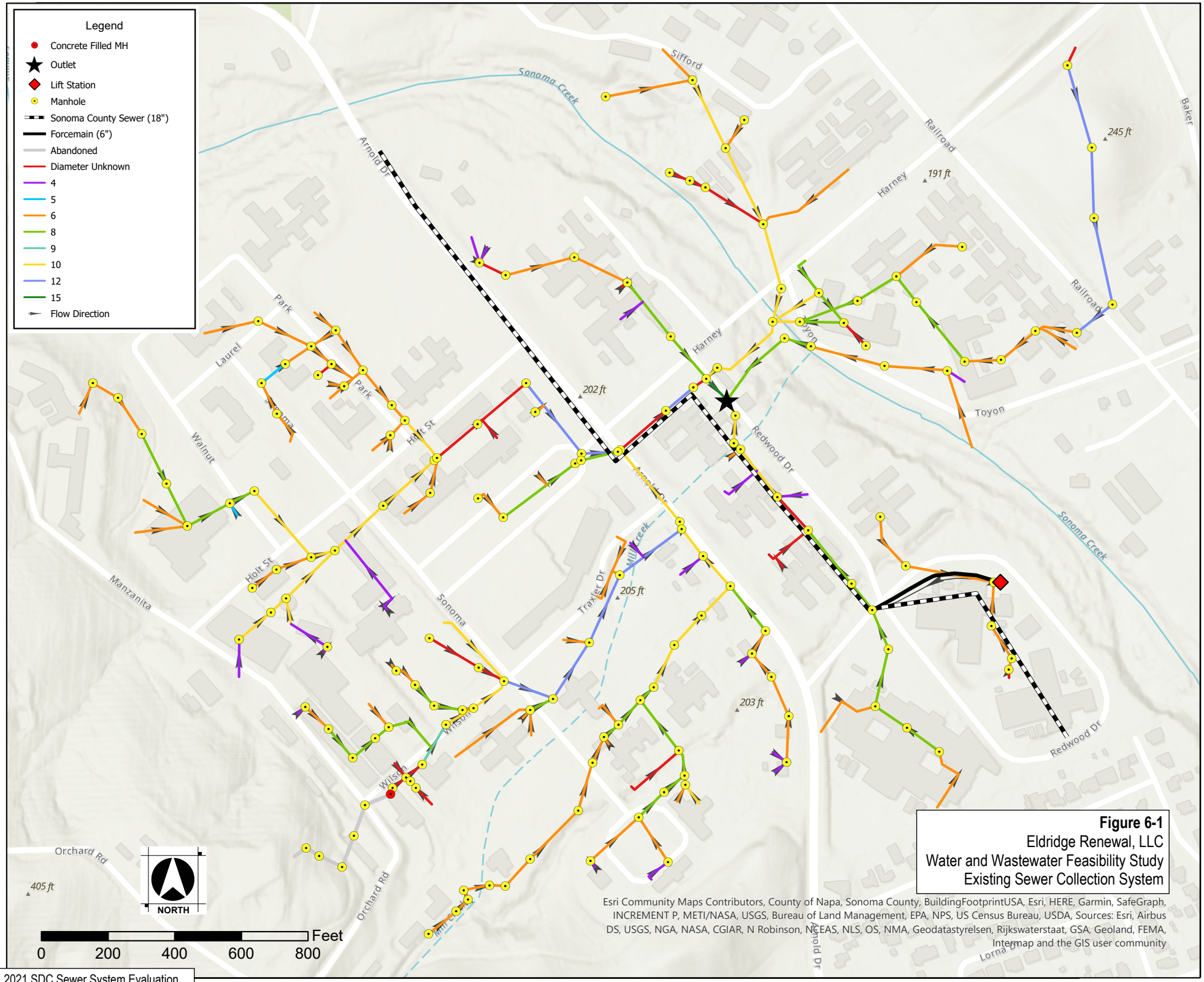


Figure 6-1
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Existing Sewer Collection System

Esri Community Maps Contributors, County of Napa, Sonoma County, BuildingFootprintUSA, Esri, HERE, Garmin, SafeGraph, INCREMENT P, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA, Sources: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N Robinson, NCEAS, NLS, OS, NMA, Geodatastyrelsen, Rijkswaterstaat, GSA, Geoland, FEMA, Intermap and the GIS user community

Source: 2021 SDC Sewer System Evaluation

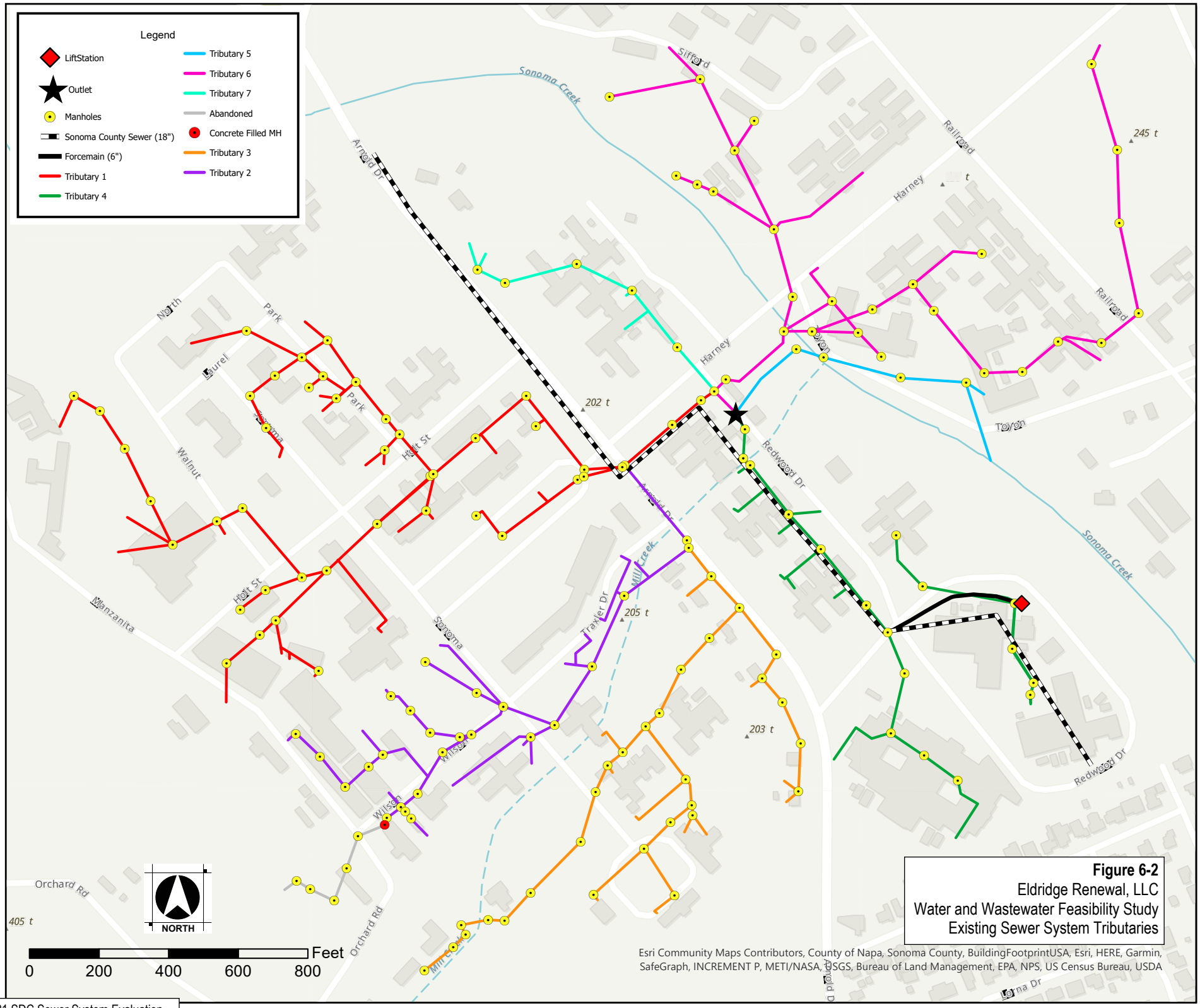


Figure 6-2
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Existing Sewer System Tributaries

Source: 2021 SDC Sewer System Evaluation

6.2 Proposed Wastewater Facilities

This section identifies preliminary wastewater collection, wastewater treatment, and recycled water facilities required to manage wastewater generated by the proposed Project.

The general concepts for the wastewater facilities are to comply with SCWA Design and Construction Standards for Sanitation Facilities as well as all applicable permitting requirements, maximize on-site water reuse, and ensure that the wastewater and recycled water facilities are designed in a manner that does not limit existing uses or future expansion. This section describes the following facilities:

- Collection System
- Scalping Treatment Plant
- Operations and Maintenance
- Recycled Water Facilities

The overall wastewater facilities will be located based on the final design of the Project facilities. All of the recommended wastewater facilities described in this section are preliminary and should be utilized for planning purposes only.

6.2.1 Wastewater Collection System

Wastewater from all Specific Plan area facilities will be gravity fed, where topography allows, to the existing SVCSD outfall. An entirely new collection system will be constructed, including pipelines and all service laterals (new and existing); gravity sewers will be laid along planned roadways within the Specific Plan area to facilitate future maintenance. Construction of new pipelines will ensure minimization of I/I within the SDC collection system and, in turn, discharge to the SVCSD collection system.

One or more crossing(s) of Sonoma Creek will be required to convey wastewater from the east side of the creek to the SVCSD outfall. This may require a siphon (or inverted siphon) along the bridge crossing the creek (or under the creek), depending on the depth of the gravity main relative to the depth of the creek bed. In the existing collection system, there are four Sonoma Creek crossings just south of Harney Avenue. According to the Sewer System Evaluation included as **Appendix C**, three of these four pipelines were identified as having structural and/or O&M defects; there were no defects observed in the fourth. A more detailed review and evaluation should be conducted to determine whether any of these crossings could be rehabilitated and reused as part of the new collection system, and whether a siphon along the bridge or an inverted siphon under the creek is more favorable.

6.2.2 Wastewater Scalping and Treatment

Wastewater Diversion

Two approaches to scalping are considered. The first approach is to divert a controlled volume of flow at the existing outfall. In this case, a new lift station would be constructed at the outfall downstream of the new screening facilities where screened wastewater would be diverted and pumped to the new wastewater scalping facility. Flow diversion would be automated to control the volume of flow to the scalping plant and SVCSD.

The second approach is to site the lift station to capture wastewater flow from an entire tributary area. A new lift station would be located at the trunk of one or more tributary areas and designed to capture the entire tributary flow. Tributary area 6 would be a good candidate as it is located to the east of Sonoma Creek where the former WWTP site is located. An analysis of the available wastewater flow in the tributary area would be conducted to determine if there is adequate flow to meet the recycled water demand. **Figure 6-3** identifies the location of the proposed wastewater diversion facility as well as the proposed WWTP location.

Diverted wastewater will be pumped through a transmission pipeline from the new sewer lift station to the headworks of the Scalping WWTP. The station should be designed to lift the maximum daily flow with one pump out of service. A figure showing a typical sewage lift station layout is shown in **Figure 6-4**.

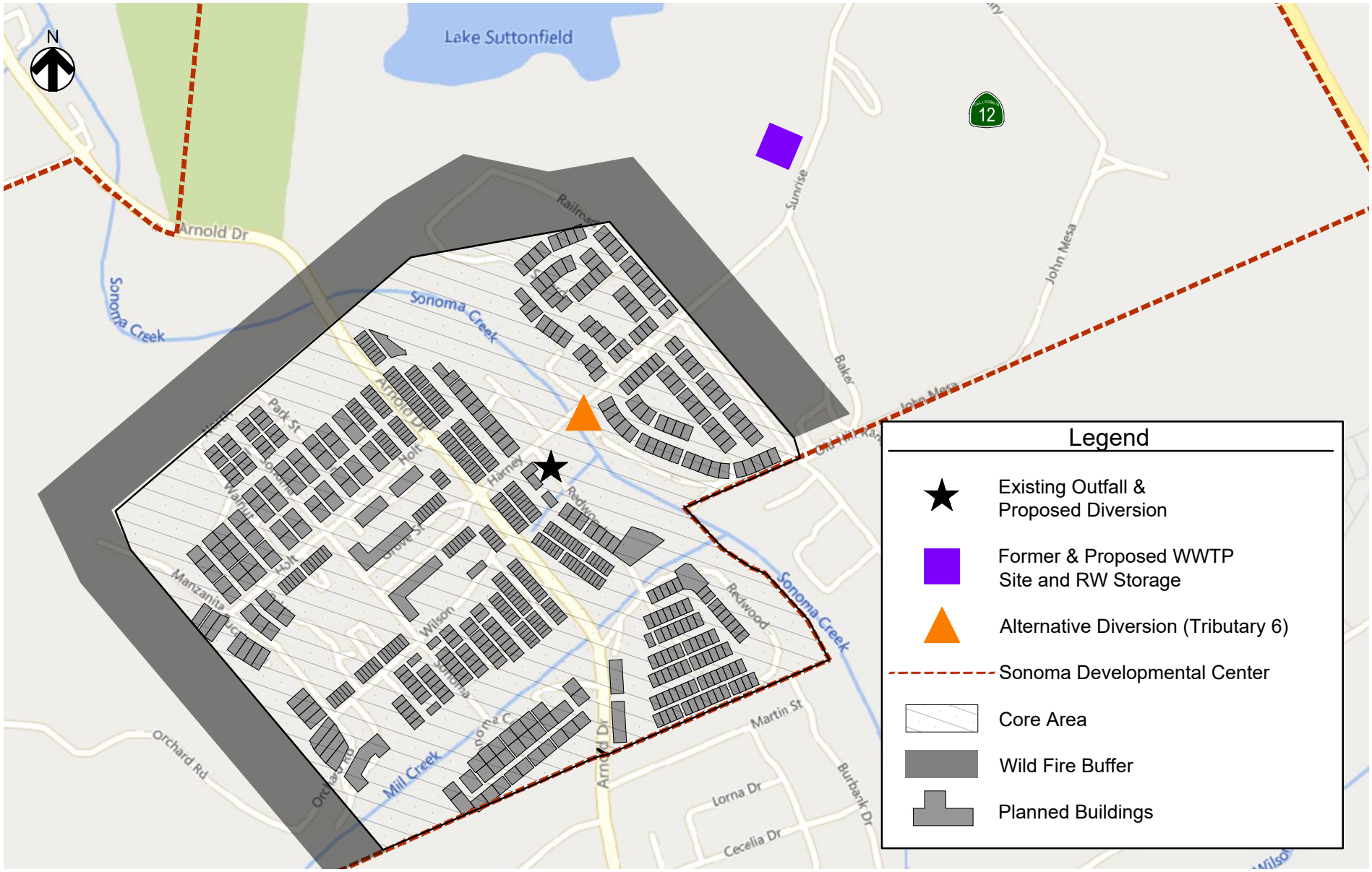
Recommended design criteria for the lift station(s) are shown in **Table 6-1**.

Table 6-1: Recommended Sanitary Sewage Lift Station Design Criteria

Parameter	Value
Purpose	Lift screened raw wastewater to scalping facilities
Type	Submersible non-clog centrifugal
Quantity	Two (lead, lag operation)
Controls	Variable speed, level switch start and shutoff

Notes:
1. Lift station design shall comply with SCWA Design and Construction Standards for Sanitation Facilities, Amended November 10, 2020.

The preferred lift station site would be further evaluated during the planning phase for the infrastructure but it is expected at the existing SVCSD outfall. The lift station would pump sewage to a WWTP sized to provide recycled water to the SDC. The location for the WWTP would be coordinated with the Project land use. For the purpose of this report, we have assumed that the plant would be constructed at the location of the former decommissioned on-site WWTP for the SDC, which is on the east side of the SDC property, east of the SVCSD outfall. It is anticipated that the site of the decommissioned WWTP would be adequate to house the new WWTP and recycled water storage facilities described herein.



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HydroScience

Figure 6-3
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Proposed WWTP and Recycled Water Facilities

Wastewater Treatment Plant

The opportunity to implement a scalping plant is evaluated for the purposes of producing recycled water for on-site reuse to augment the water supply and to reduce the impact to the SVCSD wastewater system downstream of the SDC connection.

The wastewater system will require tertiary treatment and/or advanced treatment plant. A new package immersed membrane bioreactor (MBR) WWTP is considered the most cost-effective option due to its small footprint, ability to handle varied flows and loads, and its ability to produce a high-quality effluent. This treatment process is capable of providing effluent of a quality that will maximize the opportunity to utilize multiple types of effluent disposal.

This section provides a description of the recommended wastewater treatment components required for the Project. Each of the following major process components is described below:

- Coarse Screening Facility;
- Headworks;
- Immersed Membrane Bioreactors;
- Ultraviolet (UV) Disinfection;
- Chlorine Disinfection;

Coarse Screening Facility: The coarse screening facility for the WWTP is typically gravity fed and located upstream of the lift station wet well. The screening facility at the outfall would be designed to meet peak flow requirements for the entire wastewater system (**Table 4-2**). A typical layout for the coarse screening facility is shown as **Figure 6-5**. **Table 6-2** shows some of the design criteria for the coarse screen facility.

Table 6-2: Coarse Screen Design Criteria

Parameter	Value
Coarse screening facilities	Enclosed bar screen, multi-rake style, ¼-in bar spacing, washer/compactor system, and bar screen bypass system
Metering facilities	Magnetic flow meter on influent pipe
Odor control	Corrosion resistant plate covered channels, soil filter
Control	Continuous operation

Headworks: The headworks for the WWTP would typically include influent flow measurement, rotary type fine screens. Fine screens are generally required to protect excessive fouling of the MBR membranes. The fine screens typically include a built-in washer/compactor and 2-mm openings that remove hair, inorganics, and wastes. The 2-mm opening is necessary to protect the integrity of the membrane filters downstream. The washed and compacted screenings collected at the headworks are typically stored in bins on-site to be periodically disposed of at a landfill.

The raw influent would be pumped by the collection system pump station through the headworks facility. After flow measurement, influent would be routed to a covered headworks influent box for distribution to two influent channels. During normal operation, one channel would be in-service, with the other available as a standby. Slide gates would control flow to each channel.

Each headworks channel would be sized to match the hydraulic capacity of the plant. Within the channels would be rotary type fine screens to remove large materials from the raw influent. A map showing a typical layout for the headworks facility is shown as **Figure 6-6**. **Table 6-3** shows some of the design criteria for the headworks facility.

Table 6-3: Headworks Design Criteria

Parameter	Value
Screening facilities	Enclosed cylindrical screen with 2-mm circular perforations, integral shaftless helical scraper/conveyor and compactor, mechanical washer to break up fecal material
Metering facilities	Magnetic flow meter on influent pipe
Odor control	Corrosion resistant plate covered channels, soil filter
Control	Continuous operation

Immersed Membrane Bioreactor System (Packaged): An MBR is recommended because of the ease of permitting the plant due to the high-quality effluent, and the effluent's potential suitability for recycled water production. Wastewater would travel between the headworks and the MBRs within a covered influent distribution force main. The force main would pass through headworks to an influent splitter box that would evenly distribute the flow to two MBR process trains. Sluice gates would be provided to isolate basins for maintenance.

Each MBR process train is divided into three sections: an anoxic section, an aerobic section with mechanical mixers, and an aerobic section containing the immersed membranes. A typical layout for the MBR is shown as **Figure 6-7**. The proposed WWTP would meet the design flow requirements specified in **Section 3.3**. The general configuration of the packaged MBR would be as follows.

- **Anoxic Basin:** Within the anoxic basin, the influent is mixed with mixed liquor in a tank with dissolved oxygen (DO) equal to zero. The mixed liquor is pumped back to the anoxic basin from the immersed membrane section of the MBR. The introduction of new influent wastewater to the basin provides a substrate for the return activated sludge to respire and synthesize. The lack of DO in the basin facilitates nitrification and denitrification. Ammonia compounds are converted to nitrates by nitrifying bacteria. Denitrifying bacteria convert nitrates to nitrogen gas, which volatilize out of the basin. The proportion of recirculated mixed liquor to the volume of influent is approximately 6:1. The anoxic basin has a relatively small retention time compared to the aeration basin or the immersed membrane section, due to its smaller volume.
- **Aeration Basins:** The mixed liquor produced by the anoxic basin would flow by gravity through a short channel to the adjacent aeration basin. The aeration basin differs from the anoxic basin in that this basin contains DO, which is introduced to the tank through a series of fine bubble diffusers, connected by headers and pumped by a series of blowers. The DO is required to convert dissolved organic material into a filterable solid material. In this process, aerobic bacteria utilize the carbon in the wastewater for respiration and cell synthesis. The primary outcome result from this basin is an overall reduction in the biochemical oxygen demand (BOD), and the production of a filterable floc.

- **Immersed Membranes:** The microfiltration membranes are long, hollow, spaghetti-like fibers with a nominal pore size of between 0.1 – 0.4 microns. Each of the individual microfiltration membranes is bundled together into modules, and each module is approximately 6 inches in diameter and 5 feet tall. The modules are grouped into sets, called cassettes, which are immersed into the mixed liquor solution. Each of the membrane modules is attached to headers, which create a suction and force water (permeate) through the membrane into the hollow center and onwards to the disinfection process. The mixed liquor that is not forced through the membrane is recirculated back to the anoxic zone. A portion of this recirculated mixed liquor is wasted to the dewatering system and disposal.

  Each MBR train contains one permeate pump to force water through the membrane, including an additional standby permeate pump for the overall process that can draw from either train. These pumps can also pump permeate to the backpulse tanks, where water is stored in order to backwash the membrane. The permeate pumps also function as backpulse pumps, which pump permeate from the permeate tanks back to the membranes and keeps solids from accumulating on the membrane surface. The membranes are typically backwashed every 15 minutes, and each backwash lasts about two minutes. The entire backwash process is controlled by a programmable logic controller (PLC), which operates automatic control valves and isolates the membranes from the permeate pumping process. Sodium hypochlorite and/or citric acid is typically injected into the backpulse flow to facilitate membrane cleaning and prevent regrowth in the membrane modules.

- **Other facilities:** A number of pumps, blowers, chemical storage, chemical metering, control, and electronic facilities are required in order to operate the MBR process. Some of these facilities are typically located in a building near the MBR process or are included on an equipment pad near the MBR system fully enclosed with sound attenuation provisions. Typically, an operations building is constructed which houses plant controls, the motor control center, maintenance facilities, chemical storage and metering, a laboratory, restroom/ washroom, and offices/space for staff. During design development, these facilities will be further defined. **Figure 6-8** shows a typical electrical, controls, and operations building.

Ultraviolet Disinfection: Disinfection to meet discharge and reclamation virus and coliform water quality standards would be provided by constructing or installing an ultraviolet (UV) disinfection system in the operations building. UV disinfection facilities are typically contained within a long, narrow steel channel tank or pipe channel, with banks of UV lamps situated in a laminar flowing channel. A weir would control the water level in the channel, ensuring that the lamps are always submerged. Each UV lamp emits a light with a specific wavelength that is capable of inactivating bacteria and viruses, preventing them from reproducing. A proposed location for UV facilities is shown in **Figure 6-8** within the operations building floor plan. **Table 6-4** shows a summary of the typical UV disinfection design criteria.

Table 6-4: UV Disinfection Design Criteria

Parameter	Value
Lamp location	In-line
Type of lamps	2020W medium pressure UV lamps
Transmittance	65% through quartz sleeve
Flow metering	Magnetic flow meter

Chlorine Disinfection: Though the UV facilities would be designed to disinfect the treated wastewater, they do not continue to disinfect the wastewater after it leaves the UV channel. In order to prevent regrowth of bacteria in the recycled water distribution system, sodium hypochlorite is typically added in small quantities. The introduction of this chemical creates a residual concentration of chlorine that persists in the recycled water and ensures that it is safe to use after it leaves the WWTP. Typical recycled water distribution systems require at least a positive chlorine residual at the point of use, and the dosing of sodium hypochlorite will be adjusted to meet this goal. It is believed that a dose of between 2-3 mg/L for recycled water used for on-site irrigation, cooling, or toilet/urinal flushing would suffice. Chlorine would be dosed at a location downstream of the UV disinfection facilities, and before recycled water is pumped to the recycled water storage tank.

Chlorine is a very common disinfectant in the treatment and disinfection of wastewater. Sodium hypochlorite is used throughout the wastewater industry for chlorine disinfection, and when used in accordance with that chemical's SDS, is safe for use for this purpose.

Effluent Pump Station: The purpose of the effluent pump station would be to pump treated wastewater to the recycled water storage tank (see **Section 6.3.1**) for storage and distribution. This pump station is expected to be a low head pump station that fills the recycled water tank to provide system storage.

6.2.3 Operation and Maintenance

A detailed description of the O&M program will be prepared following completion of the WWTP design. However, it is expected that the WWTP would be operated and maintained similarly to the standards of other tertiary WWTPs in California and consistent with SCWA O&M standards as outlined in the SCWA Sanitary Sewer Management Plan.

To this effect, this WWTP will be staffed with operators who are qualified to operate the plant safely, effectively, and in compliance with all permit requirements and regulations. It is expected that the operators will have qualifications similar to those required by the SWRCB Operator Certification Program. This program specifies that for tertiary level WWTPs with design capacities of 1.0 MGD or less, the chief plant operator must be at least a Grade III operator. Supervisors and Shift Supervisors must be at least a Grade II.

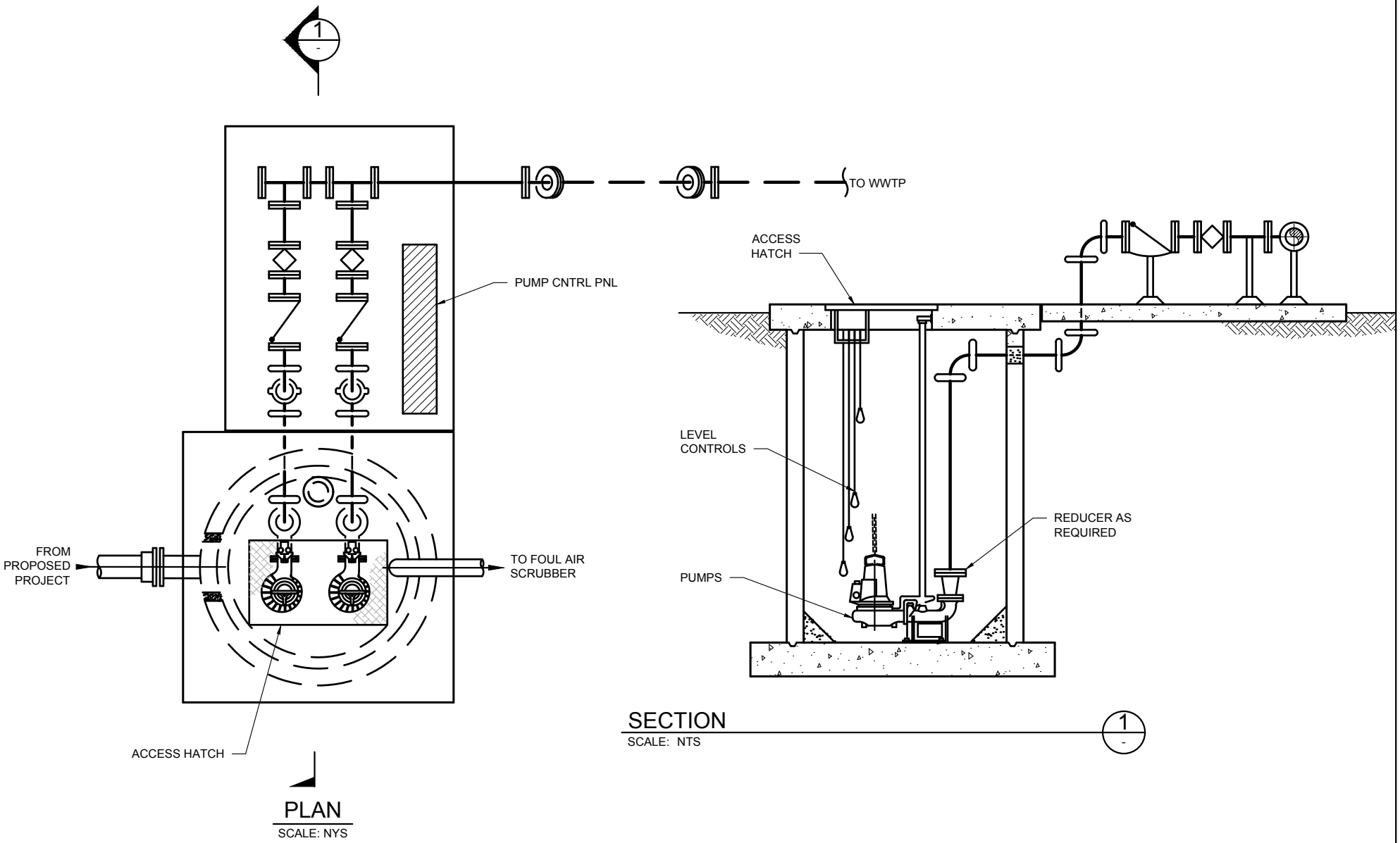
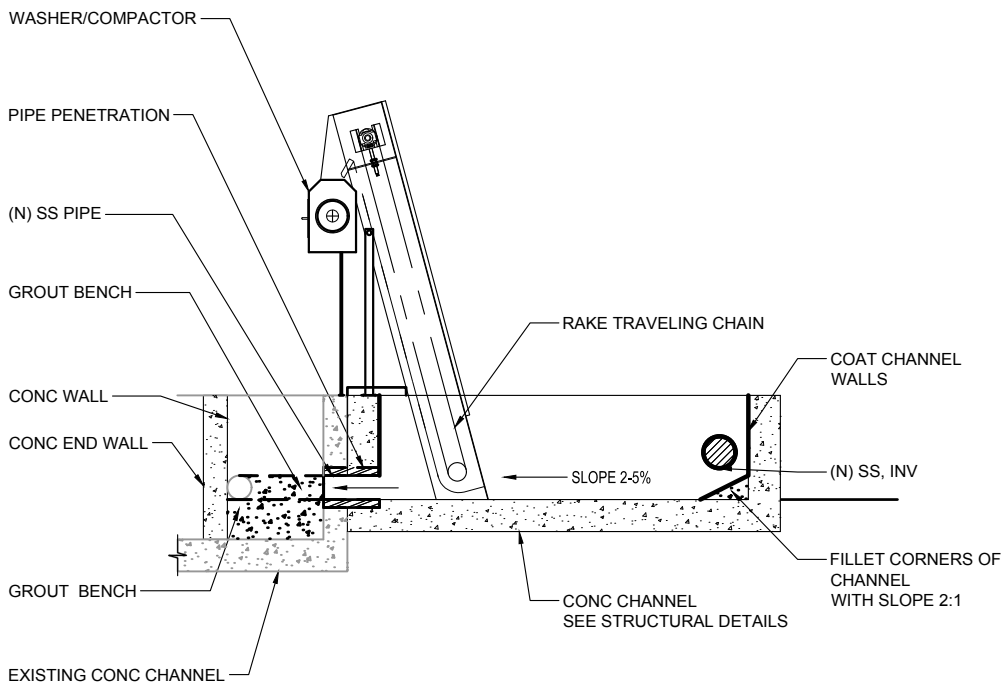


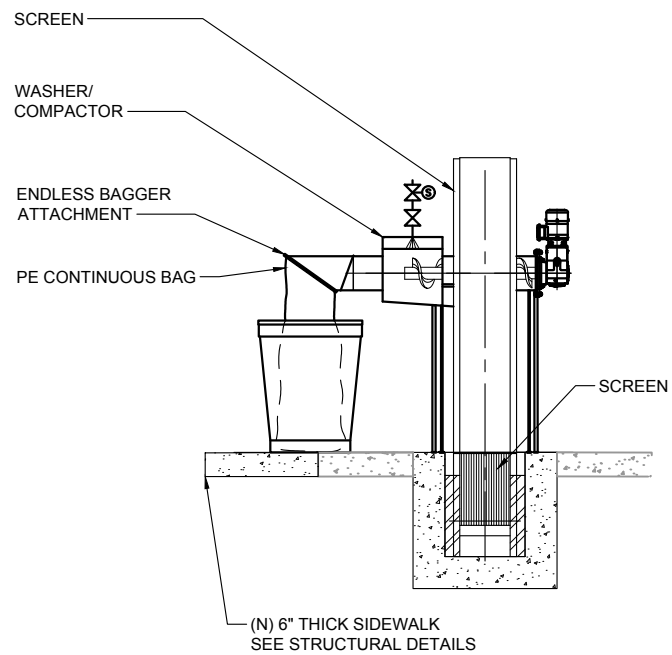
Figure 6-4
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Typical Influent Lift Station

HydroScience



TYPICAL SCREEN SECTION (A)

SCALE: NTS



TYPICAL SCREEN SECTION (B)

SCALE: NTS

HydroScience

Figure 6-5
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Typical Coarse Screening Facility

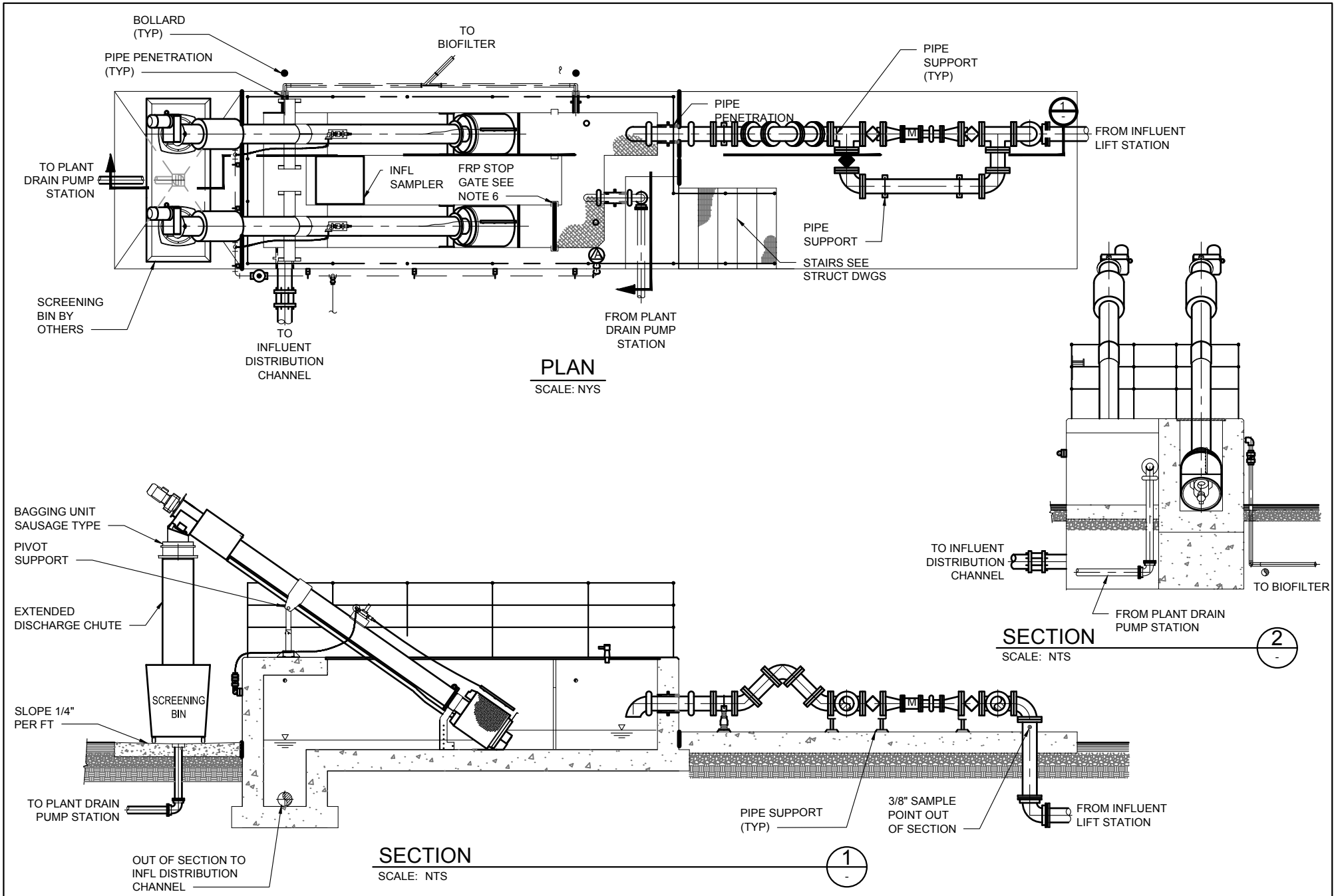


Figure 6-6
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Typical Headworks Facility

HydroScience

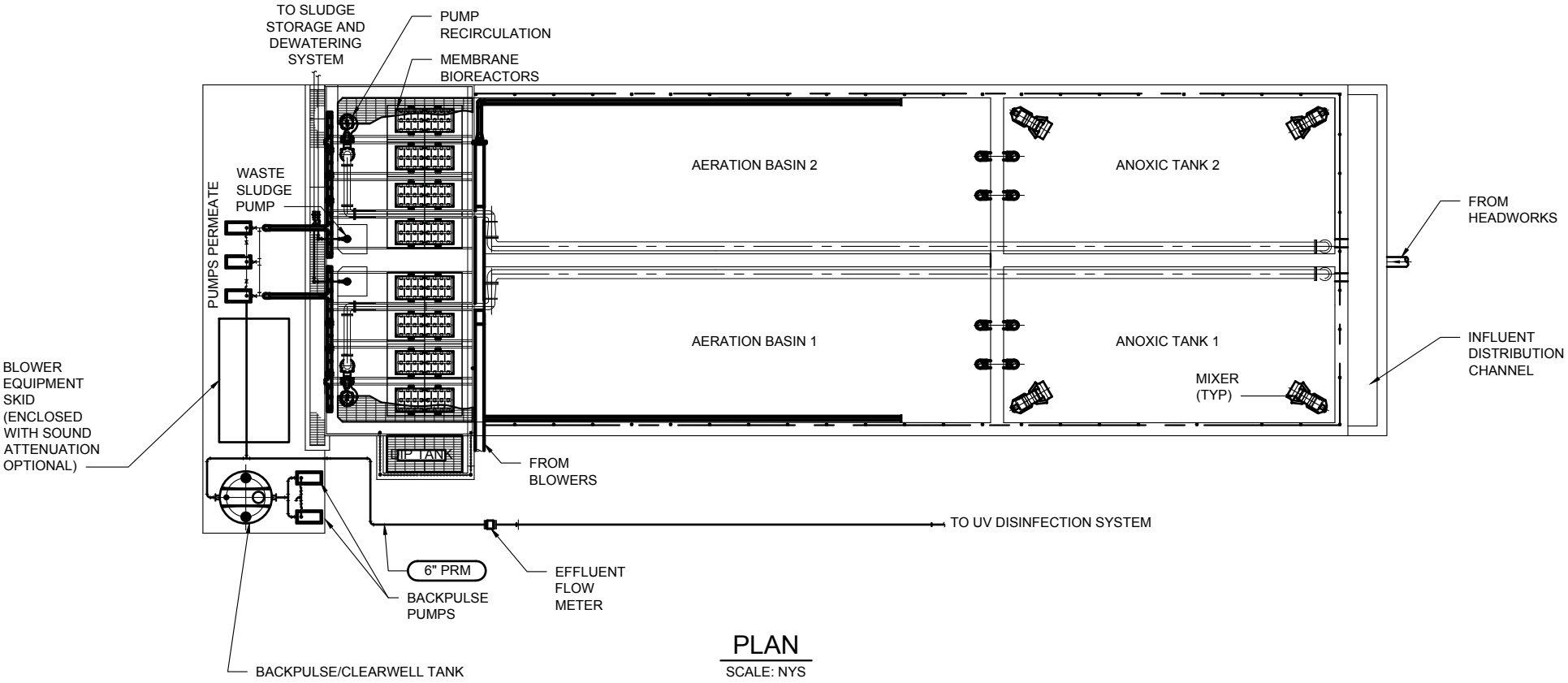
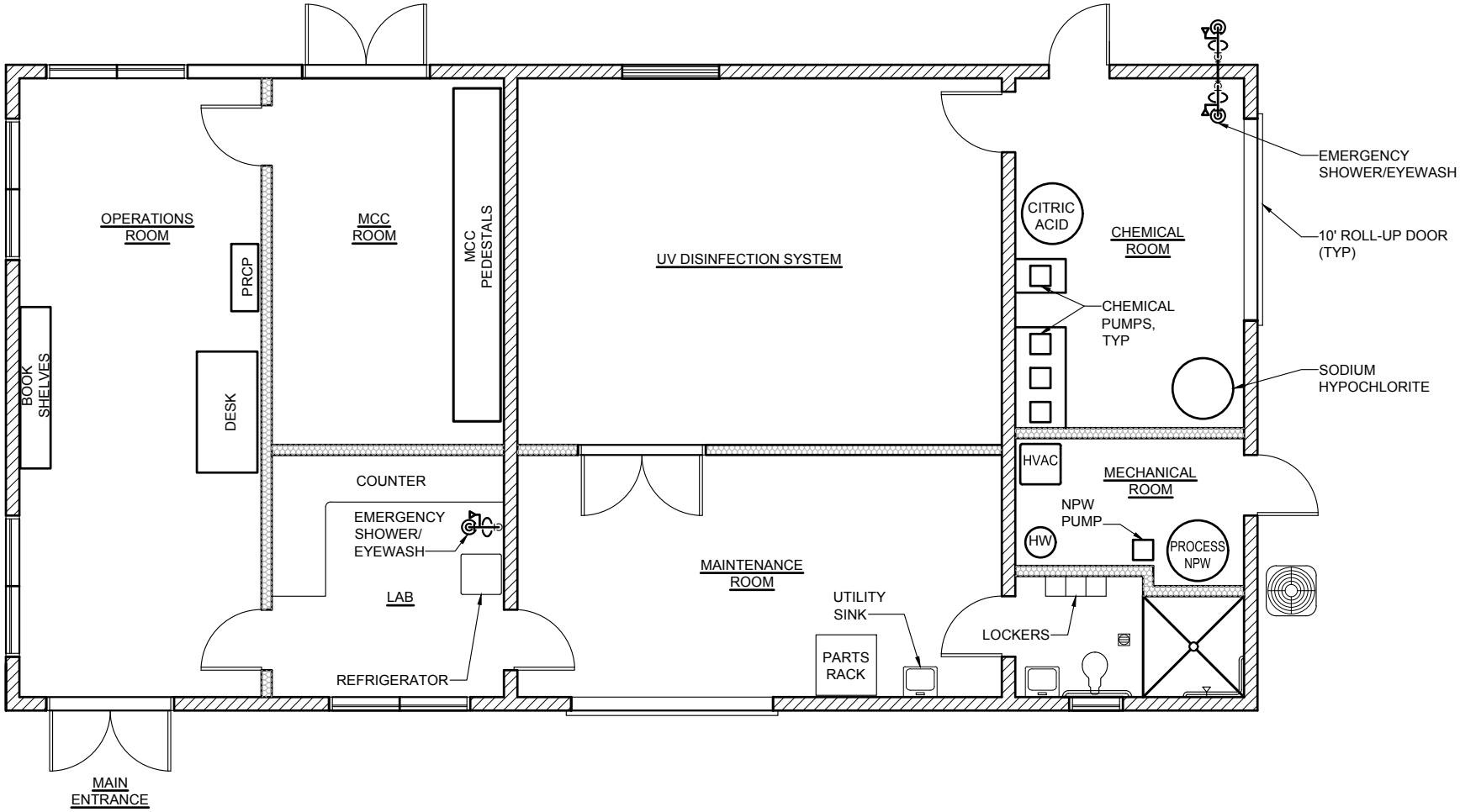


Figure 6-7
Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Preliminary Wastewater Treatment Facility Plan

HydroScience



PLAN

SCALE: NYS

Figure 6-8

Eldridge Renewal, LLC

Water and Wastewater Feasibility Study

Preliminary Operations Building Floor Plan

HydroScience

6.3 Recycled Water

This section discusses the recommended design criteria for the Project's recycled water facilities. The recommended on-site recycled water facilities include a recycled water day tank and pump station for Project area landscape irrigation. Each of the recycled water facilities is described in the following sections. The overall recycled water facilities will be located based on the final design of the Project facilities. All of the recommended facilities described in this section are preliminary and should be utilized for planning purposes only.

6.3.1 Recycled Water Storage and Pump Station

The purpose of a recycled water storage tank would be to provide equalization storage for recycled water used by the Project for on-site landscaping. There may be opportunities to use recycled water for toilet and urinal flushing or cooling tower makeup for any new construction within the Project; however, retrofitting existing facilities for dual plumbing is generally not cost effective. If desired, recycled water could be utilized to supply water for fire protection, such as the sprinkler systems and fire hydrants, in which case storage would be sized for fire flow and peak day recycled water use.

Two analyses are provided: one without a seasonal storage component and one with seasonal storage. The seasonal storage analysis is represented by two consecutive years where an average year rainfall is preceded by a 100-year rainfall. During peak demand months of May, June, July, August, and September there is more recycled water needed than there is wastewater generated by the Project. Without seasonal storage, during those months, recycled water would need to be supplemented with up to 74 AF (20.6 MG) of either raw water or potable water to meet recycled water demands. In this scenario, daily equalization storage would be recommended to accommodate diurnal fluctuations. Details of the monthly wastewater generated and recycled water demanded are provided in the water balance included as **Appendix F**. It is noted that a nominal amount of demand is assumed for cooling purposes in the water balance analysis.

The second analysis includes additional storage, allowing recycled water to accumulate in the off-peak months. The size of storage is designed to optimize and maximize recycled water use such that recycled water can be stored in the months leading up to the peak demand months. Storage volume was determined by maximizing the amount of available excess flow in April, the first month with recycled water demand. During an average year rainfall condition, up to 0.8 MG is available for storage and would reduce make-up water use to 71 AF (23.1 MG); during the 100-year rainfall condition, up to 3.5 MG is available for storage and would reduce make-up water use to 56 AF (18.5 MG). Details of the monthly wastewater generated, recycled water demanded, and potential storage volumes are provided in the water balance included as **Appendix F**. This option would not be cost effective for the marginal benefit.

For diurnal equalization a recycled water storage tank would be constructed within the proposed WWTP site. The WWTP site does not provide sufficient head to maintain pressure in the recycled water distribution system and would require a recycled water pump station. The recycled water storage tank would be sized to store approximately one day of peak recycled water demand (see **Section 3.3**) and provide diurnal storage of recycled water produced at the on-site WWTP. It is expected that a recycled water storage tank with a minimum capacity of 150,000 gallons would be constructed for this purpose. The tank would be outfitted with an air gapped connection to the potable water system or other raw water supply to supplement recycled water demands in the peak months when demands are greater than the wastewater generated; additionally, during

construction of the scalping plant and distribution system, raw water can be used to supplement recycled water until the scalping plant is online and recycled water is available. Recycled water would be pumped from the storage tank via a recycled water pump station to the distribution system. The distribution system would be laid along right-of-way within the Project leading to recycled water users. The sizing of this distribution system is expected to be 8- and 12-in pipelines for the entire extent.

Recycled water for landscape irrigation will be used throughout the Project site. The on-site recycled water reuse facilities will be designed to ensure that they comply with all SWRCB standards. The required on-site facilities will be identified upon completion of a site plan and preliminary engineering. The primary on-site design requirements include:

- Recycled water irrigation facilities marked in a purple color.
- Signage informing the public that recycled water is used.
- Pipelines in separate trenches a minimum distance from other water pipelines.
- Labeling of recycled water valves, boxes, and sprinkler heads.

6.4 Wastewater and Recycled Water Recommendations

It is recommended that the Project develop a recycled water supply to augment the water supply portfolio for the Project and to offset the use of potable water to meet local and County water conservation objectives.

The following improvements are recommended:

- Confirm the optimal location and size of the wastewater diversion facility and construct the diversion and sewer lift station;
- Replace the existing bar screen and venturi meter at the outfall;
- Construct an MBR WWTP designed and sized to scalp wastewater to produce disinfected tertiary recycled water complying with Title 22 requirements for unrestricted reuse, meeting the recycled water needs of the Project;
- Construct a recycled water storage tank with a total capacity of 150,000 gallons to provide adequate peak day storage and maximize the use of recycled water;
- Supplement recycled water with raw water until recycled water becomes available and during peak months when recycled water demand exceeds wastewater flow; and
- Construct a new recycled water pump station and distribution system laid along planned roadways within the Specific Plan area to facilitate future maintenance.

The ultimate owner and operator of the wastewater and recycled water systems has yet to be determined; however, all design, construction, and O&M will be performed consistent with SCWA Design and Construction Standards for Sanitation Facilities as well as all applicable permitting requirements.

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SECTION 7 – REFERENCES

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[6] The County has rescinded the Specific Plan adopted in 2022 pursuant to a 2024 court judgment and writ, but the Board has indicated its intent to process and consider reapproving the Specific Plan, potentially revised, concurrently with this proposed Project. Although the 2022 Specific Plan was invalidated by the court ruling in 2024 and subsequently rescinded by the Board of Supervisors in December 2024, the factual and historical information presented in the 2022 Specific Plan remains useful and relevant for the purpose for which it is cited herein. The proposed Project was designed to be largely consistent with the 2022 Specific Plan, and the applicant does not have any reason to expect the County's overall vision for the SDC to change substantially in the revised Specific Plan. The analysis in the prior EIR adopted for the 2022 Specific Plan is referenced at points in this application because it provides substantial evidence supporting a determination by the County that the Project's impacts are likely consistent with and not substantially more severe that the previous EIR's conclusions. The revised EIR, of course, will fully analyze the impacts of the revisions, if any, to the Specific Plan, as well as the Project-specific impacts of the proposed Project.

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APPENDIX A

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Sonoma Development Center Water System Assessment Report
(Condition Assessment)

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State of California
Department of General Services

Sonoma Development Center
Water System Assessment Report

FINAL

March 2023

Prepared By:

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I. INTRODUCTION

The Sonoma Developmental Center (SDC) was founded in 1891 to serve the needs of individuals with developmental disabilities in the State of California ("State"). A few years after its founding, the California State Legislature purchased approximately 1,640-acres of land in the community of Eldridge in Sonoma County to expand the facility. Over the years, the facility had undergone numerous expansions and upgrades. In 2015, the State announced its plan to close all developmental centers in the State, and in 2018, SDC closed its operations. The State owns the site and has forged a partnership with Sonoma County (County) that allows the County, together with the community, to chart the future role of the SDC property. Sonoma County is currently undertaking a Specific Plan to set a vision for the SDC which will consider land uses, transportation, economic viability, historic preservation, and conservation of the site's important natural resources.

At its peak occupancy, SDC was a fully operational and self-sufficient campus, consisting of residences, staff housing, care facilities, treatment centers, clinics, kitchens, laundry facilities and education centers. The campus also contained and provided all of the infrastructure and services required for operation, including corporation yards, maintenance yards, fire station, police station, paint shops, machine shops, landscape facilities, etc. The campus includes its own utilities and the infrastructure systems required to provide water, sewer, and drainage service.

Today, the SDC property is largely unoccupied, with a few staff on-site to maintain the grounds and a few tenants located in buildings east of Arnold Drive. SDC is currently under the oversight and management of the State of California Department of General Services (DGS).

The purpose of this Water System Assessment Report ("Report") is to document and summarize the existing water system at the SDC, including a description of the system and a condition assessment of the major water facilities. The SDC water distribution system was an independent, stand-alone, permitted public water distribution system that included its own water supply sources, surface water treatment plant and distribution system. The surface water treatment plant (WTP) at the SDC was shut down in 2019 due to a lack of certified treatment and distribution operators and the permit to operate as a public water system was revoked. Since that time, portions of the SDC water distribution system have remained in operation to serve existing users through a service connection to the Sonoma County Water Agency (SCWA) system.

The SDC water system historically has been used as a back-up water supply source for Sonoma County, but in 2019 when the surface water treatment plant at the SDC was shut down, the SDC water system could no longer assist Sonoma County's wholesale and retail

water providers in mitigating water service disruption to retail customers in the Sonoma Valley during emergencies, such as fire and earthquakes. The State wants to add resiliency to water supplies in the Sonoma Valley by resuming the treatment of surface water at the SDC, and this Report is part of the plan to get the water supply system back into operation.

The State is planning to sell the SDC site and planning is underway to redevelop the site. Sonoma County is currently developing the SDC Specific Plan and anticipates identifying the preferred development alternative in 2022. The SDC site is located within the Valley of the Moon Water District's (VOMWD's) sphere of influence. Outside the scope of this Report, the VOMWD is preparing a Water Supply Assessment (WSA) to demonstrate water supply sufficiency for the redevelopment of the SDC site and preparing an engineering evaluation to determine how the existing SDC water system would integrate into the existing VOMWD system. Additionally, VOMWD is interested in incorporating the SDC water system into its system, subject to (1) an evaluation of the condition of the existing SDC infrastructure, and (2) clarity on the permitting pathway and associated requirements. This Report aims to fulfill these two needs.

II. OVERVIEW OF THE EXISTING SDC WATER SYSTEM

A summary of the SDC water distribution system is included herein. An overview of the overall water system is depicted in **Exhibit 1**, and the water distribution system flow diagram is shown in **Exhibit 2**.

Raw Water Supply

Raw water supply for the SDC water system comes from diverting surface water from four different sources on site:

1. Asbury Creek
2. Hill Creek
3. Roulette Springs
4. Sonoma Creek

The raw water is stored in two on-site surface storage reservoirs: Fern Lake and Suttonfield Lake. On the west side of the SDC site are two creek diversions (the Asbury Creek Diversion and Hill Creek Diversion) which flow into Fern Lake. Fern Lake flows into the intake of the WTP. In addition, Roulette Springs is also located on the west side of the SDC site and water diverted from the springs flows directly into the intake of the WTP. The Sonoma Creek diversion is located towards the east of the SDC site and requires a pump station (Sonoma Creek Pump Station) to deliver raw water to the WTP or to Suttonfield Lake.

At the WTP intake there is the option for the raw water to bypass the WTP and flow to the Sonoma Creek Pump Station. The Sonoma Creek Pump Station has four different operating conditions, as follows:

1) It can receive raw water from the WTP bypass (via Fern Lake) and pump it up to Suttonfield Lake.
2) Water from Suttonfield Lake can flow into the Sonoma Creek Pump Station and get pumped up to the intake of the WTP.
3) The Sonoma Creek Pump Station can pull water directly from Sonoma Creek and pump it to Suttonfield Lake.
4) The Sonoma Creek Pump Station can pull water directly from Sonoma Creek and pump it to the WTP.

The raw water transmission system consists of a single 10-inch ductile iron transmission line (repairs have been made with PVC) that runs between Fern Lake, the WTP, and Suttonfield Lake. There is a 25,000-gallon breaker tank that reduces hydraulic head from Fern Lake to the Sonoma Creek Pump Station. There were four (4) groundwater wells, but none are active at this time.

Water Treatment

The WTP is a conventional surface water treatment plant with a rated capacity of 1.7 million gallons per day (MGD). The treatment plant follows a conventional process with an intake headbox, alum dosing, upflow clarifier, sedimentation basin, and rapid sand filter system. The water is disinfected with chlorine and sodium hydroxide for PH balance. Backwash water is pumped to a tank uphill of the water treatment plant, and recirculated into the treatment process, while the solids settle out at the sludge ponds.

At the WTP, there are two (2) 5,000-gallon tanks (one for sodium hydroxide, one for alum), two (2) backwash tanks and a 65,000-gallon storage tank for backwash water recirculated into the water treatment plant. The backwash tank is filled from a pump station located at the WTP.

An overview of the Water Treatment Plant and surrounding facilities is shown in **Exhibits 3A and 3B.** The Water Treatment Plant process facilities are shown in **Exhibit 4**.

Treated Water Storage

At the Water Treatment Plant site, there is a 1-million-gallon (MG) tank and a 0.35 MG tank to store treated water produced by the WTP. Also included in the treated water system are two (2) balance tanks (0.3 MG each) located below Suttonfield Lake, for a total on-site storage capacity of 1.95 MG.

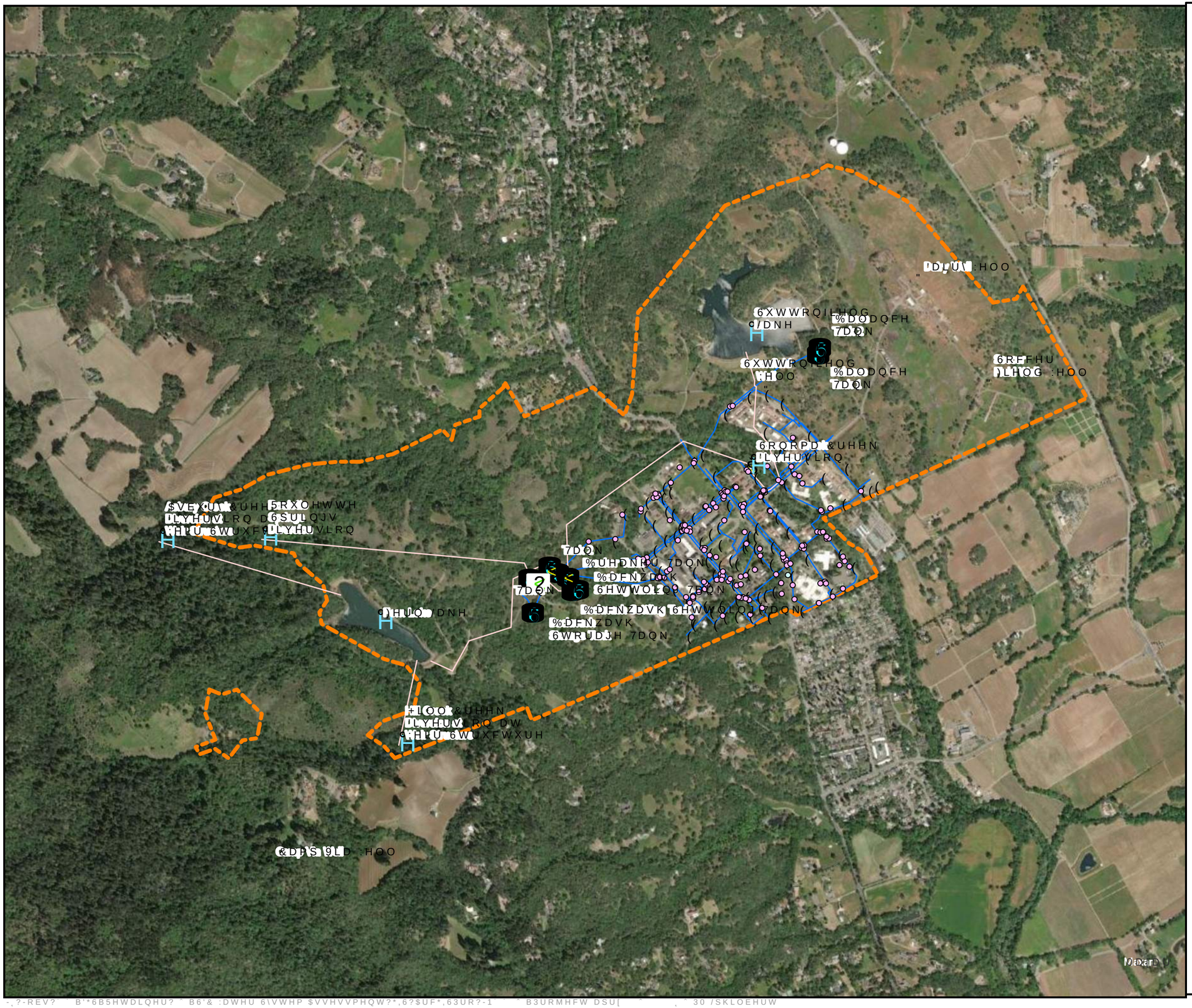
Distribution System

The treated water is distributed throughout the SDC site through a looped network of pipelines, ranging in diameter from 3-inches to 10-inches. The original system was dual plumbed, with raw water parallel to treated water, but due to concerns about potential cross-contamination and concerns over possible resident error, the dual-system was discontinued in the mid-1970s. The original raw water pipes were connected to the treated water distribution system, so there are now many distribution pipes running in parallel. The distribution system is one pressure zone, with the system pressure set by the water level in the tanks. The distribution system contains water service connections, isolation valves and fire hydrants.

Treated Water Supply / Emergency Supply

The SDC water system includes a 6-inch connection to the SCWA water system for an imported potable water supply. The system also includes an emergency connection to the VOMWD system, although water can only flow in one direction (from VOMWD to SDC).

A description of the existing water system facilities is included herein.



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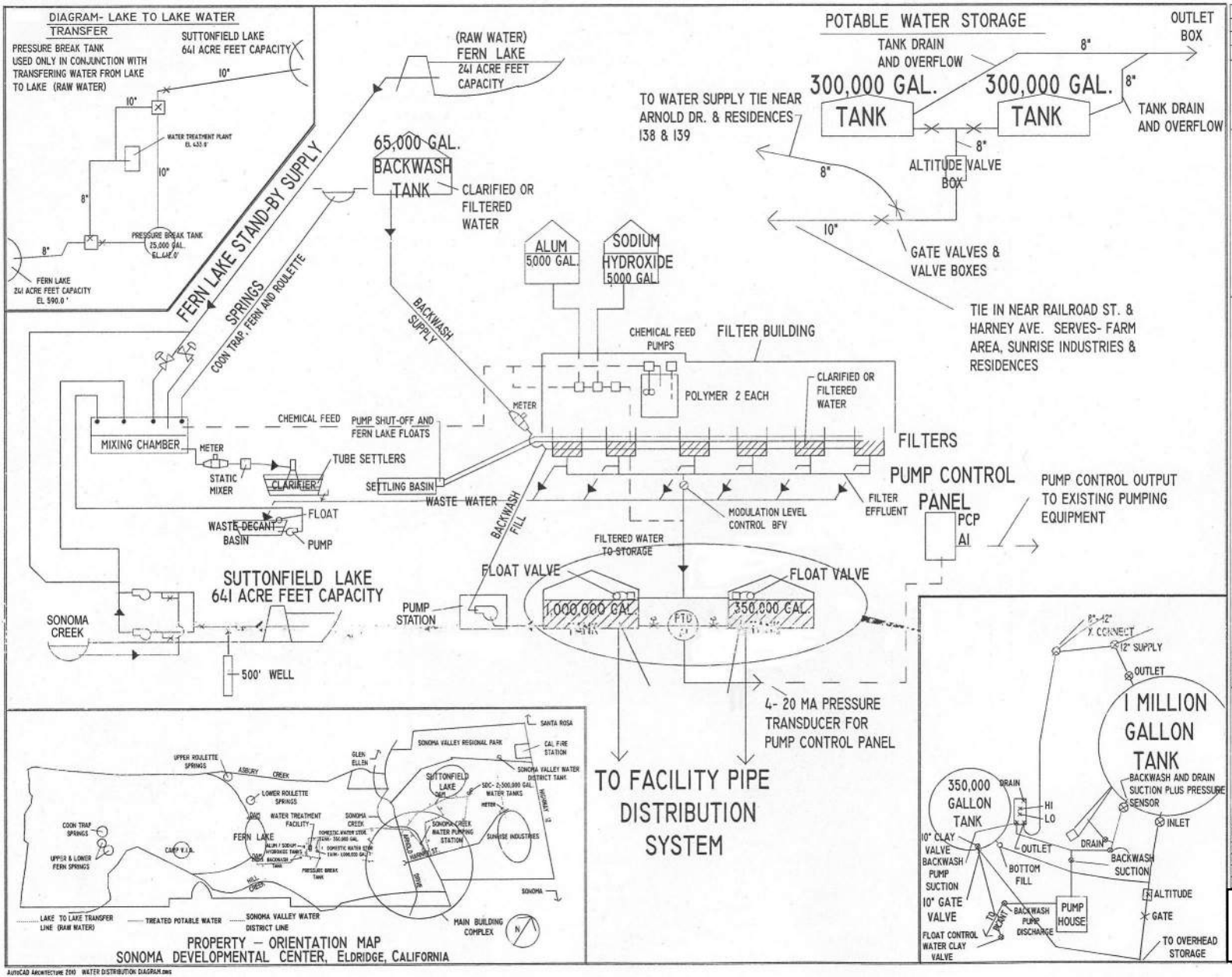
DIAGRAM- LAKE TO LAKE WATER TRANSFER
PRESSURE BREAK TANK USED ONLY IN CONJUNCTION WITH TRANSFERING WATER FROM LAKE TO LAKE (RAW WATER)
SUTTONFIELD LAKE 641 ACRE FEET CAPACITY
WATER TREATMENT PLANT EL 433.6'
PRESSURE BREAK TANK 25,000 GAL. EL 412.0'
FERN LAKE 241 ACRE FEET CAPACITY EL 590.0'
FERN LAKE STAND-BY SUPPLY
SPRINGS
COON TRAP, FERN AND ROULETTE
(RAW WATER) FERN LAKE 241 ACRE FEET CAPACITY
65,000 GAL. BACKWASH TANK
CLARIFIED OR FILTERED WATER
BACKWASH SUPPLY
ALUM 5000 GAL.
SODIUM HYDROXIDE 5000 GAL
POTABLE WATER STORAGE
TANK DRAIN AND OVERFLOW
300,000 GAL. TANK
300,000 GAL. TANK
OUTLET BOX
TANK DRAIN AND OVERFLOW
TO WATER SUPPLY TIE NEAR ARNOLD DR. & RESIDENCES 138 & 139
ALTITUDE VALVE BOX
GATE VALVES & VALVE BOXES
TIE IN NEAR RAILROAD ST. & HARNEY AVE. SERVES- FARM AREA, SUNRISE INDUSTRIES & RESIDENCES
CHEMICAL FEED PUMPS
FILTER BUILDING
POLYMER 2 EACH
CLARIFIED OR FILTERED WATER
METER
CHEMICAL FEED
PUMP SHUT-OFF AND FERN LAKE FLOATS
MIXING CHAMBER
METER
STATIC MIXER
CLARIFIER
TUBE SETTLERS
SETTLING BASIN
WASTE WATER
FILTERS
PUMP CONTROL PANEL
PCP
AI
PUMP CONTROL OUTPUT TO EXISTING PUMPING EQUIPMENT
FILTER EFFLUENT
MODULATION LEVEL CONTROL BFV
FLOAT
WASTE DECANT BASIN
PUMP
BACKWASH FILL
FILTERED WATER TO STORAGE
FLOAT VALVE
FLOAT VALVE
SUTTONFIELD LAKE 641 ACRE FEET CAPACITY
SONOMA CREEK
PUMP STATION
1,000,000 GAL.
FTU
350,000 GAL.
500' WELL
4- 20 MA PRESSURE TRANSDUCER FOR PUMP CONTROL PANEL
TO FACILITY PIPE DISTRIBUTION SYSTEM
SANTA ROSA
SONOMA VALLEY REGIONAL PARK
CAL FIRE STATION
SONOMA VALLEY WATER DISTRICT TANK
UPPER ROULETTE SPRINGS
ASBURY CREEK
GLEN ELLEN
SUTTONFIELD LAKE
SDC- 2-500,000 GAL. WATER TANKS
LOWER ROULETTE SPRINGS
WATER TREATMENT FACILITY
SONOMA CREEK
SONOMA CREEK WATER PUMPING STATION
HARNEY ST
COON TRAP SPRINGS
FERN LAKE
SUNRISE INDUSTRIES
UPPER & LOWER FERN SPRINGS
CAMP V.I.L.
ALUM / SODIUM HYDROXIDE TANKS
BACKWASH TANK
PRESSURE BREAK TANK
HILL CREEK
SONOMA
LAKE TO LAKE TRANSFER LINE (RAW WATER)
TREATED POTABLE WATER
SONOMA VALLEY WATER DISTRICT LINE
MAIN BUILDING COMPLEX
PROPERTY – ORIENTATION MAP
SONOMA DEVELOPMENTAL CENTER, ELDRIDGE, CALIFORNIA
8"-12" X CONNECT
12" SUPPLY
OUTLET
1 MILLION GALLON TANK
BACKWASH AND DRAIN SUCTION PLUS PRESSURE SENSOR
INLET
350,000 GALLON TANK
DRAIN
HI
LO
10" CLAY VALVE BACKWASH PUMP SUCTION
OUTLET
DRAIN
BACKWASH SUCTION
BOTTOM FILL
10" GATE VALVE
ALTITUDE
GATE
BACKWASH PUMP DISCHARGE
PUMP HOUSE
FLOAT CONTROL WATER CLAY VALVE
TO OVERHEAD STORAGE
REVISIONS
SDC
DEPARTMENT OF DEVELOPMENTAL SERVICES
PLANT OPERATIONS
SONOMA DEVELOPMENTAL CENTER
ELDRIDGE, CALIFORNIA 95431
PH: 707 938 6401 FAX: 707 938 6420
"EMBRACING A FUTURE OF POSSIBILITIES"
PROJECT TITLE
WATER DISTRIBUTION DIAGRAM
PROJECT
APPROVAL
DRAWING NO.
DATE: SEPT. 27, 2011
SCALE: NONE
DRAWN: R. McHURRY
EXHIBIT 2
AUTOCAD ARCHITECTURE 2010 WATER DISTRIBUTION DIAGRAM.DWG

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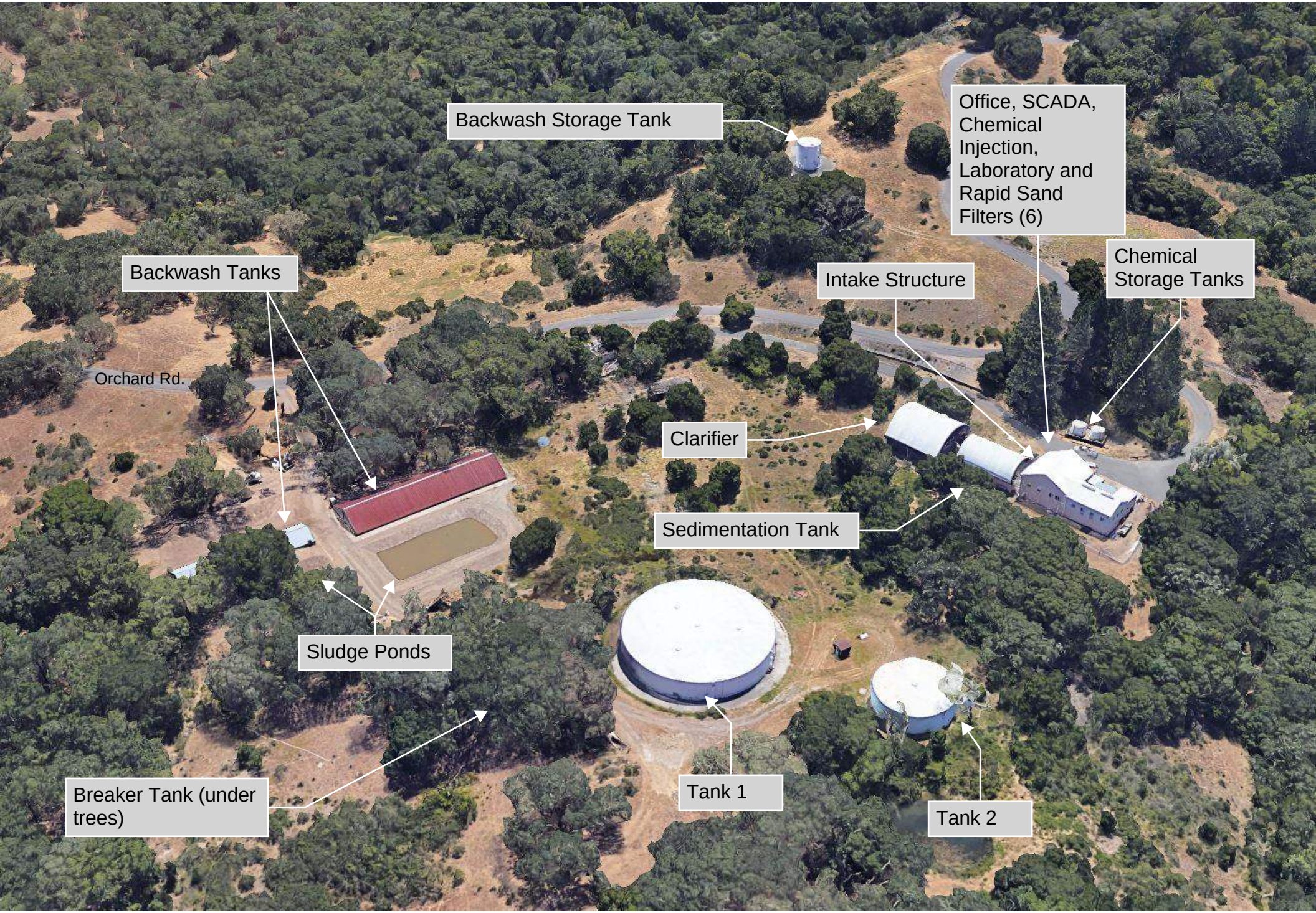

Exhibit 3B - Water Treatment Plant Overview

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- Tanks
- Pump Station
- Raw Water
- Pipes
- Water Treatment Facilities

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A. Surface Water Diversions

1. Asbury Diversion

Figure 1 - Asbury Creek Diversion

The Asbury Creek Diversion (See **Figure 1**) is the oldest developed water supply on the property, having been in use since at least the 1880s. The diversion structure has a weir built across the creek with an orifice at its base, sized to deliver 0.9 cfs through the orifice before water can be diverted first to Fern Lake, then to the WTP. Boards must be placed manually to build the water level to a depth that it can be diverted. Typically, the SDC would allow the first large storm to pass and clear debris before installing the boards. Water can be diverted between November and May of each year. Metering and flow recording equipment is installed at the diversion. There is a data logger that automatically records data, but it does not have telemetry.

The Asbury Creek Diversion is located at the northwestern most edge of the system on a small spur of the property that retains the diversion structure within the SDC property at an approximately 660-foot elevation. SDC maintains the diversion structure and the associated water rights and reports operational data to state regulators.

Figure 2 - Asbury Creek Diversion Weir Structure

The old diversion structure was damaged in heavy storms in 2006 and was reconstructed in 2011 (See **Figure 2**). It includes a low-head dam, adjustable weir, and a bypass flow structure to ensure that water is only diverted once the minimum required 0.9 cfs streamflow passes the structure. It is equipped with a gage and metering equipment.

Diverted water is transmitted to Fern Lake via a 24-inch pipeline that transitions to an open channel for the final +/-500 feet.

2. Hill Creek Diversion

Figure 3 - Hill Creek Diversion

The Hill Creek Diversion (See **Figure 3**) is located at roughly 600-feet elevation along Hill Creek, southwest of Fern Lake. Originally built in 1904, this diversion structure was also severely damaged in the 2006 storms and was reconstructed in 2007. The diversion includes gabion revetment, cemented riprap, and an 18-inch steel pipeline on concrete piers across a deep ravine carrying the diverted flow. The pipeline transitions to an open channel for the last +/-50 feet before entering Fern Lake. Although there are no restrictions on diversions at this location, the flow is metered and SDC maintains records of diverted flows.

3. Roulette Springs Diversion

Figure 4 - Roulette Springs Diversion

The Roulette Springs collection box was developed in 1897 and provides water year-round (See **Figure 4**). Rather than a discrete spring, it consists of several seeps and springs in a boggy forest area where a simple leaky collection box has been set in a depression and a collection pipe connected to it. Water from the diversion is conveyed to the Water Treatment Plant by a 3-inch steel pipe, and flow is metered at the WTP.

4. Sonoma Creek Diversion

SDC maintains their rights to draw water from Sonoma Creek primarily to ensure that they maintain their storage of raw water through the dry season, drought, and times of high fire threat, similar to the Asbury, Hill Creek, and Roulette Springs diversions. The diversion sump, 6 feet x 6 feet x 14 feet deep, is located at the west edge of the creek just below the pump house.

B. Groundwater Sources

It is noted that there are no active groundwater wells still in service at the SDC. It is unknown if the groundwater wells were properly destroyed.

1. Camp Via Well (Inactive)

This well is not connected to the main campus water system. The well served a small distribution system with nine delivery points. When it was active, the water at Camp Via was not treated, but was disinfected with sodium hypochlorite injected into the system as it entered the small distribution system.

2. Suttonfield Well (Inactive)

The Suttonfield Well is located in the field approximately 100 feet east of Railroad Road and 500 feet south of Suttonfield Lake.The proximity of the Eastside Fault appears to impact the water temperature and quality, because upwelling of highly mineralized water would explain the elevated arsenic and boron levels in the well water. The well structure may still be intact, and could potentially be utilized, however the well structure needs to be investigated before a determination can be made.

3. Dairy Well (Inactive)

There appear to be no records of this well with respect to its production rates, water quality, when this well was developed, how deep it is, etc. This well has a brick dome-like cap with a steel lid and appears to have been a hand dug well from which water was drawn with buckets. There is also a well shaft adjacent to the brick dome. It is likely that this well has not been capped or plugged.

4. Soccer Field Well (Inactive)

Previous studies reference a shallow water supply well used to water the soccer fields in the eastern part of the property. Field investigations were unable to precisely locate this well, but it is believed to have been located east of former residence 152, adjacent to the creek. Water from this well was piped to two above ground storage tanks. The well, pump, electrical equipment, and pressure tanks remain intact, however operation of the well would need to be verified.

C. Raw Water Storage

1. Fern Lake

Figure 5 - Fern Lake and Outlet Structure

Fern Lake (See **Figure 5**) is located on the western edge of the property, receives water from Asbury Creek and Hill Creek, and is connected to and used in tandem with Suttonfield Lake to provide water to the WTP (See **Exhibit 2**). It was originally created with the construction of the south earthen dam in 1910. The south dam was later raised, and a north earthen dam was constructed to increase its capacity to its present-day volume of 240 acre-feet. The spillway is located on the north dam at an elevation of 590 feet. The lake is approximately 28 feet deep when full. The dam has had a slow leak for many years (at about 5 gpm). The leak is monitored from a new monitoring well installed recently at the dam and has not been observed to change over time. The dams are inspected annually by the California Department of Water Resources Division of Safety of Dams (DSOD) and maintained regularly by the SDC staff. The main dam is 40 feet high and 300 feet long. The outlet structure for Fern Lake is a 10-inch vertical pipe with three screened intakes at different levels.

Fern Lake can experience algae blooms in the summer. To avoid algae issues, SDC would typically fill Fern Lake to four feet below the spillway in the winter and then begin transfers to fill Suttonfield as much as possible. SDC would supply the WTP from Fern Lake through the winter and for a few months after the diversion boards are pulled in April. When the weather

warms up in the summer, SDC would then switch to Suttonfield Lake in supplying water to the WTP.

2. Suttonfield Lake

Suttonfield Lake is located on the northeastern part of the property receives water from either Fern Lake or Sonoma Creek and is used in tandem with Fern Lake to provide water to the WTP (See **Exhibit 2**). Several maps depict Suttonfield Lake as part of the adjacent Sonoma Valley Regional Park, and it is used for recreational purposes. However, most activities, such as swimming, are prohibited due to water quality, safety, and liability reasons.

This reservoir was initially constructed in 1938 and was increased to its present volume of 600 acre-feet in the 1950's. The earthen dam, constructed in two segments, is 76 feet high and 965 feet long. The spillway is at the western edge of the lake at an elevation of 291 feet. The lake is 62.5 feet deep when full. Like Fern Lake, it is inspected annually by DSOD.

Suttonfield Lake is supplied by gravity from Fern Lake via a 10-inch transmission line. It also receives direct flow from the "unnamed creek," but no flow data is available for this small tributary. Water pumped from Sonoma Creek is stored in Suttonfield Lake. The lake is used as storage for the SDC's domestic water use, irrigation, and fire protection. The outlet structure is an octagonal concrete tower with two screened inlets at different elevations.

D. Water Treatment Plant

The 1.7 MGD Water Treatment Plant, west of the main campus, is located at approximately 434-foot elevation. The facility was originally built in the 1930's. In 1992, chemical systems were added. In 1995 a SCADA system was installed and treated water storage increased with the addition of four (4) new rapid sand filters and the erection of the 1 MG tank. The two (2) original sand filters were re-built in 2018.

The plant is supplied by gravity from Fern Lake and Roulette Springs, or from Sonoma Creek or Suttonfield Lake via a pump station. The conventional surface water treatment plat includes an intake headbox (mixing chamber), alum dosing, upflow clarifier, sedimentation basin, and six (6) rapid sand filter system. The water is disinfected with chlorine and sodium hydroxide for PH balance. Backwash water is pumped to a tank uphill of the water treatment plant, and recirculated into the treatment process, while the solids settle out at the sludge ponds.

At the WTP, there are two (2) backwash tanks and a 65,000-gallon storage tank for backwash water recirculated into the water treatment plant. The backwash tank is filled from a pump station located at the WTP. At the December 2021 site visit, there were also two (2) 5,000-gallon tanks (one for sodium hydroxide, one for alum), but according to SDC, these two tanks have since been removed.

E. Water Tanks

1. Tank 1- Treated Water Storage from Water Treatment Plant

This 1 MG tank (See **Figure 6**) was built in 1995, is an above-grade, A-36 welded steel tank that complies with AWWA D100-84. The diameter is 107 feet, and the shell height is 16 feet. The tank is currently in use. Since the WTP is not in operation, the tank is filled from the SCWA connection, however the SCWA system pressure can only fill the tank to a water height of 6-7 feet. The ground elevation is approximately 398 feet. See **Exhibit 3A** for the tank location.

Figure 6 - Tank 1

2. Tank 2- Treated Water Storage from Water Treatment Plant

This 350,000-gallon tank (See **Figure 7**) is an above-grade welded steel tank built in 1941. The tank diameter is 56-feet and shell height is 16-feet. The ground elevation is approximately 398 feet. It is located adjacent to Tank 1. See **Exhibit 3A** for the tank location.

Figure 7 - Tank 2

3. Balance Tanks 1 and 2 – Treated Water Storage below Suttonfield Lake

Two (2) 300,000-gallon welded-steel treated water tanks are located on the knoll south of Suttonfield Lake (See **Exhibit 1**). These tanks are balance tanks for the gravity-fed water distribution system on the main campus. They function not only to store treated water, but also to maintain a constant pressure in the distribution network and to dampen potential fluctuations in the system pressure. They are located at elevation 370-feet (ground surface), approximately 8-feet lower than Tanks 1 and 2 and require an altitude valve to shut-off the fill cycle. These tanks are currently not in use.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

   Backwash water from the water treatment plant settles in two tanks of that are believed to be 80,000 gallons each (See **Exhibit 3A**). Clear water is pumped up to the mixing chamber and recirculated into the water treatment plant.

5. Backwash Storage Tank – at Water Treatment Plant

   A 65,000-gallon backwash storage tank (See **Exhibit 3A**) receives clear water from Tanks 1 and 2 via a pump station. The backwash supply water is conveyed to the WTP to backwash the sand filters every 72 hours.

6. Breaker Tank

   A 25,000-gallon breaker tank (See **Exhibit 3A** and **Figure 8)** relieves pressure in the pipeline from Fern Lake to the Sonoma Creek Pump Station. The breaker tank is a partially buried concrete tank with concrete domed roof.

Figure 8 - Breaker Tank

F. Pump Stations

1. Sonoma Creek Pump Station

   The raw water pump station located on the southwest bank of Sonoma Creek houses five pumps of varying capacity: two horizontal split-case pumps (Pump #1 - 40-horsepower (hp) and Pump #2 - 50-hp) and three vertical turbine pumps (two 50-hp (Pump #3 and Pump #4) and one 25-hp (Pump #5)). The two horizontal split-case pumps are used to move water from Suttonfield

Lake to the WTP. The pumps have variable frequency drives (VFDs), however the VFD for Pump #2 (50-hp) is dead.

The three vertical turbine pumps are used to pump water from Sonoma Creek to the WTP. The controls for Pump #3 and Pump #4 (750 gpm each) currently do not work. Pump #5 (500 gpm) currently runs. The pumps have soft starts.

By operating appropriate valves, water can be pumped to or from Suttonfield Lake and up to the WTP. This flexibility in the use of a single pump station and transmission pipeline allows operators to manage the system to maximize storage capacity and maintain circulation in the system to maintain low bacteria levels of the stored raw water.

2. Pressure Breaker Tank Pump Station

Near the Pressure Breaker Tank at the WTP, there is a 5-hp booster pump that enables operators to transfer water from the Breaker Tank/WTP area to Fern Lake. The pump is housed in small wooden structure.

3. Backwash Tank Pump Station

Between Tank 1 and Tank 2 there is a pump house to boost treated water from the Tanks 1 and 2 to the backwash storage tank. The pump house contains one horizontal split-case pump (Paco).

Figure 9 - Backwash Pump

G. Piping Systems

1. Raw Water Transmission Lines

The raw water transmission line is approximately 3,500 linear feet of 10-inch ductile iron pipe that runs between Fern Lake, the WTP, and Suttonfield Lake. Over the years, some sections of the pipe have been repaired and replaced with PVC.

2. Treated Water Transmission Lines

There are two (2) 8-inch treated water transmission lines and one (1) 12-inch treated water transmission line that carry water from the treated water storage tanks at the WTP to the main campus to feed the domestic water distribution system. There is also one (1) treated water transmission line that connects to Balance Tank 1 and Balance Tank 2. Per available records, the length of these pipes is approximately 1,670-feet. A January 2018 report[1] mentions that the 12-inch line was constructed in 1989 to augment the existing transmission system to increase the fire flow capacity of the system., The transmission line is connected to the distribution system at Manzanita and Holt Road. The 12-inch pipeline is assumed to be the middle of the three treated water transmission lines supplying the system. The treated water transmission lines are shown in **Exhibit 5**.

3. Treated Water Distribution Lines

The distribution system pipe length per diameter is summarized in **Table II-1**. Distribution pipes, and known pipe diameters, are shown in **Exhibit 5**.

[1] Sonoma Developmental Center – Draft Existing Conditions Report – Site Infrastructure and Hydrology. Sherwood Design Engineers, January 8, 2018

Table II-1 - Distribution Pipe Length Per Diameter	
Diameter	**Length (ft)** (1)
Unknown	8,361
3"	277
4"	1,578
6"	5,458
8"	1,071
10"	655
Total	**17,400**

(1) Many of these pipes are redundant because the SDC consolidated a non-potable distribution system.

4. Fire Hydrants

   Per the GIS records, there are 94 fire hydrants in the system.

5. Valves

   Per the GIS records, there are 163 isolation valves in the system.

EXHIBIT 5

TREATED WATER - TRANSMISSION AND DISTRIBUTION

SDC WATER SYSTEM ASSESSMENT REPORT

ELDRIDGE, CA

MARCH 2022

Legend

Treated Water Pipes

- Distribution
- Transmission
- WTP Piping

0 200 400 800

Feet

NORTH

WOOD RODGERS

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III. SYSTEM CAPACITY

The following provides the physical capacity of the water system facilities, or the contractual limitations of the water supply sources.

A. Surface Water Diversions

1. Asbury Creek Diversion

While a 24-inch pipeline's transmission capacity is 31 cubic feet per second (cfs) at a velocity of 10 feet per second (ft/s), to maintain sustainable riparian habitat, SDC is limited to only withdraw up to 1 cfs of water from the Asbury Creek Diversion only after maintaining a minimum flow of 0.9 cfs to the downstream creek. The SDC water manager maintains logs of the flow conditions and reports back to the National Marine Fisheries Service (NMFS).

Per contractual rights, the diversion is only operable during the rainy season (between November and May) when there is sufficient streamflow/rainfall. Although water is reported to flow in the creek year-round, summer flows typically drop to 0.5 cfs or less.

2. Hill Creek Diversion

The permit for diversions at the Hill Creek Diversion is allowed from November to May, but does not require maintenance of a prescribed minimum stream flow — and the SDC is allowed to take as much water from this location as needed during that time. The 18-inch pipeline's physical capacity is 18 cfs at a velocity of 10 ft/s. The constraint at this location is that although the creek does flow year-round, at low flows, infiltration exceeds streamflow in the area just above the diversion weir leaving no surface water at the diversion itself. Therefore, it is only possible to divert water when flows are above this naturally limiting low flow condition.

3. Roulette Springs Diversion

According to SDC personnel, diversions from Roulette Springs typically flow at about 80 gpm during the summer and at 120 gpm in the winter, providing a potential of about 1,200 acre-feet per year. The 3-inch pipeline's physical capacity is 0.49 cfs at 10 ft/s.

4. Sonoma Creek Diversion

In years of average rainfall and normal lake levels, the pumps are run for a month each winter when the creek has high flow conditions, sending approximately 1 million gallons per day (mgd) of water to Suttonfield Lake to ensure that it is full for fire protection through the summer.

Licensed withdrawal from Sonoma Creek is limited by streamflow, time of year and storage limitations. The withdrawal rate is limited to 1,657 gallons per minute (2.39 mgd) with a storage limitation of 525 acre-feet. For reference, thirty days at 1 mgd with no discharge from the lake would provide 92 acre-feet of stored water. The typical withdrawal is well within licensed limits, and they have the flexibility to increase withdrawals if conditions warrant doing so. However, prior removal of the dam currently limits the ability to divert from Sonoma Creek.

B. Groundwater Sources

1. Camp Via Well (Inactive)

The Camp Via Well has been used to supply water to the Camp Via, a 5-acre outdoor recreational facility for the residents of SDC. This well is developed to 195 feet below ground surface (bgs) and draws from groundwater between 75 and 195 feet deep. Before the system was decommissioned, the yield of this well was 20 gallons per minute (gpm) with a drawdown of 35 feet. This well and its water supply system was designated as a transient noncommunity water system. It was used locally only and not piped to other parts of the property.

2. Suttonfield Well (Inactive)

The Suttonfield Well is a water supply well developed to 890 feet below ground surface and draws from between 570 and 870 feet. At the time of its development, its yield was recorded as 300 gpm. (No drawdown was recorded.) No record of current yield is available; however, as yield tends to decline over time, it is likely the current yield is lower than 300 gpm.

3. Dairy Well (Inactive)

The Dairy Well, located in front of the old dairy, has been closed with a brick dome. No information has been identified with regard to the quantity and quality of the water from this well. It is not known why it was closed.

4. Soccer Field Well (Inactive)

No information has been identified with regard to the quantity and quality of the water from this well.

C. Raw Water Storage

1. Fern Lake

The capacity of Fern Lake is 240 acre-feet. The spillway is located on the north dam at an elevation of 590 feet. The lake is approximately 28 feet deep when full. The main dam is 40 feet high and 300 feet long. The outlet structure for Fern Lake is a 10-inch vertical pipe with three screened intakes at different levels.

2. Suttonfield Lake

Suttonfield Lake has a capacity of 641 acre-feet. The earthen dam, constructed in two segments, is 76 feet high and 965 feet long. The spillway is at the western edge of the lake at an elevation of 291 feet. The lake is 62.5 feet deep when full[2].

D. Water Treatment Plant

The Water Treatment Plant, originally built in the 1930's, and expanded in 1995, was able to treat up to 1.7 million gallons per day (MGD), although it operated at about 0.2 MGD before being shut down in 2019. The plant could operate a minimum flow rate of 100 gpm (0.14 MGD).

E. Water Storage Tanks

1. Tank 1- Treated Water from Water Treatment Plant

This 1.0 MG tank has a diameter of 107 feet and shell height of 16 feet.

2. Tank 2- Treated Water from Water Treatment Plant

This 350,000-gallon tank has a diameter of 56 feet and shell height of 16-feet.

3. Balance Tanks 1 and 2 – Treated Water located below Suttonfield Lake

[2] Sonoma Developmental Center – Draft Existing Conditions Report – Site Infrastructure and Hydrology. Sherwood Design Engineers, January 8, 2018

Two (2) 300,000-gallon welded-steel treated water tanks are located on the knoll south of Suttonfield Lake.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

The backwash water from the water treatment plant settles in two tanks of an unknown size. The operators did not report capacity issues.

5. Backwash Storage Tank – at Water Treatment Plant

The backwash storage tank is a 65,000-gallon welded steel tank.

6. Breaker Tank (Raw Water)

A 25,000-gallon partially buried concrete breaker tank reduces pressure in the raw water pipeline from Fern Lake to the Sonoma Creek Pump Station.

F. Pump Stations

1. Sonoma Creek Pump Station

The raw water pump station on the southwest bank of Sonoma Creek houses five pumps of varying capacity:

1) Pump #1: horizontal pump – 250 gpm – 40 HP

2) Pump #2: horizontal pump – 300 gpm – 50 HP

3) Pump #3: vertical pump – 750 gpm – 50 HP

4) Pump #4: vertical pump – 750 gpm – 50 HP

5) Pump #5: vertical pump – 500 gpm – 25 HP

2. Pressure Break Tank Pump Station

Near the Pressure Break Tank at the WTP, there is a 5-hp booster pump that enables operators to transfer water from the WTP area to Fern Lake. The flow capacity is unknown.

3. Backwash Tank Pump Station

Between Tank 1 and Tank 2 there is a pump house to pump water from Tanks 1 and 2 to the backwash storage tank for recirculation into the water treatment plant. The pump house contains a horizontal split-case pump (Paco). The flow capacity is unknown.

IV. CONDITION ASSESSMENT OF THE EXISTING WATER SYSTEM

On December 7th, 2021, a Site Visit was conducted of the SDC Water System with Wood Rodgers, EKI, VOMWD, DGS, and former SDC operators. Wood Rodgers staff utilized hand-held tablets to document the condition of the water facilities using the Environmental Systems Research Institute (ESRI) ArcGIS Collector App. Each facility was assigned a geospatial location and a field attribute for the following factors, if available:

- Asset
- Capacity
- Make
- Model
- Year Built
- Year Offline
- Year Rehabilitated
- Year Replaced
- Material
- Condition
- Diameter
- Height
- Length
- Amount
- Other

Photos were taken of each asset, and relevant fields were filled out when provided. These fields were imported into ArcGIS Pro as columns in an attribute table, and each asset had corresponding photo attachments. This GIS data can be provided on request. A detailed list of each asset and their field observations is included in Appendix 1.

A. Surface Water Diversions

1. Asbury Creek Diversion

Since replaced in 2011 this diversion structure is in good condition. When in operation, wood boards are inserted to build up the water level behind the structure and allow water to spill into a catch basin and enter the 24-inch

transmission pipeline. This connection appears to be in good condition (See **Figure 10**).

Figure 10 - Asbury Connection to Transmission Pipeline

The above-grade 24-inch ductile iron pipe and pipe supports appear to be in good condition (See **Figure 11**). The data logger for the 24-inch transmission pipeline requires a manual download of the data. The bypass data logger, however, washed out after 1-year in operation and requires replacement.

Figure 11 - Asbury 24-inch Transmission Pipe

2. Hill Creek Diversion

While the SDC operators did not report problems with the Hill Creek Diversion structure, they noted that they did not get continuous data with the data logger. Rocks, logs, and debris can easily build-up behind the diversion structure during large rain events and requires extensive manual maintenance to keep clear. The Point of Diversion (POD) listed in the water rights documentation is at the location of the data logger but the actual POD is approximately 200 feet upstream. Access to the site is primarily by foot. The above-grade 18-inch pipeline, however, has sustained some damage, including a fallen tree that hit the pipeline between a joint and support structure (see **Figure 12**). While slightly bent, there were no signs of leaks. Portions of the pipeline are supported via a cable-stayed support bridge, which has experienced some damage due to erosion.

Figure 12 – Hill Creek Diversion 18-Inch Pipeline

3. Roulette Springs Diversion

The series of collection boxes that feed the 3-inch pipe appear to be functioning and not in need of major repair. The steel lid of the main collection box has been removed and should be replaced. There is overgrowth around the collection boxes and miscellaneous abandoned piping that requires clean-up/removal. The 3-inch steel pipe is in bad condition with many leaks, according to SDC operators. A piece was cut out to keep the water within the springs (See **Figure 13**). This pipe should be replaced in its entirety from the collection box to the WTP.

Figure 13 – Roulette Springs 3-inch steel pipe

4. Sonoma Creek Diversion

The Sonoma Creek diversion structure was not visible due to overgrowth of the creek banks. The dam was recently removed because the fish ladder was damaged and wasn't working. The SDC's ability to divert water from Sonoma Creek is therefore limited to periods with high flows. The SDC was exploring options to replace the dam prior to the shutdown. Per SDC operators, the Sonoma Creek Diversion is in fair condition. The diversion structure is difficult to access and maintain and can easily get clogged by debris or overgrowth from the creek banks (See **Figure 14**). It requires frequent cleanings. Better access to the diversion structure should be provided.

Figure 14 - Sonoma Creek Diversion

B. Groundwater Sources

1. Camp Via Well (Inactive)

   A site visit was not performed. The well is not currently in use, and it is believed this well is abandoned.

2. Suttonfield Well (Inactive)

   A site visit was not performed. The well is not currently in use.

3. Dairy Well (Inactive)

   A site visit was not performed. The well is not currently in use.

4. Soccer Field Well (Inactive)

   A site visit was not performed. The well is not currently in use.

C. Raw Water Storage

1. Fern Lake

   There are two dams that form Fern Lake, a smaller dam on the north side, and the primary dam on the south side where the outlet structure is located. The dams are monitored every year to comply with DSOD requirements. On the

south dam there is a constant slow leak at about 5 gpm from a V notch weir. The SDC operators expressed a desire to add another monitoring well downstream from the south dam. The outlet structure includes a vertical pipe mounted to a concrete pier with three inlet boxes located at varying elevations. The inlet boxes are corroding and in need of replacement.

2. Suttonfield Lake

A site visit was not performed. The SDC operators reported Suttonfield Lake to be in good condition and no major concerns were identified.

D. Water Treatment Plant

1. General

The Water Treatment Plant was decommissioned in 2019 and has not been operated since. The WTP facilities generally appear to be in fair/good structural condition, however the facility has been empty for over two years. Most of the components at the WTP will require significant cleaning and repair before being put back into service. Many of the exposed metal pipes and valves are corroded and beyond their useful life and require replacement. The raw water quality is generally good, having low turbidity and low levels of contaminants of concern, though there is some concern about high organics and that can result in Disinfection Byproducts (DBPs). See **Exhibit 3A and 3B** for overall water treatment facilities.

a. Intake Structure

Figure 15 - Intake Structure

The WTP Intake Structure, also known as the mixing chamber, (**Figure 15**) appears to be in good structural condition, with some slight rust, build-up, and debris. The combination of raw water pipes and valves entering the box is congested. All inlet pipes discharge into the box above-grade from the top. The Intake Structure has one inlet flow meter, from the Roulette Springs source. There is a flow meter on the outlet side of the Intake Structure measuring combined totalized flows into the WTP. The inlet pipelines and valves are corroded and congested. It is recommended to replace the inlet piping and valves, clean-up the configuration for easier operation and maintenance, and install a flow meter on each water source at the Intake Structure.

The SDC operators did not report any problems with the outlet flow meter, however it is recommended to re-calibrate it before putting it back into service.

b. Clarifier

Figure 16 – Clarifier

The Clarifier (**Figure 16**) overall is in fair condition. It is located under a half-domed canopy structure to protect it from the elements and adjacent trees. The domed structure is in good structural condition, and the canopy does not appear to have any tears or rips. The clarifier is a welded steel conical-shaped structure that has some damage (chipping/peeling) to the exterior coatings. The piping and valves at the drain outlet structure are in need of recoating and new pipe supports. There is a 6-inch gate valve that is elevated about 6-feet above ground and difficult to operate. The mechanical arm of the Clarifier may also need replacement. The operators discussed upgrading the motors to VFD with SCADA control (currently it is just constant speed with hand controls). In 1995, the Clarifier received an added weir to increase capacity.

c. Sedimentation Basin

Figure 17 - Sedimentation Basin

The sedimentation basin is in fair condition (See **Figure 17**). There is minor rust on the handrails and all exposed metal. The basin is covered by a half-domed steel frame structure with a canopy. The roof structure appears to be in fair condition. The canopy cover has some minor tears and holes. The concrete basin appears to be in good condition but requires a thorough cleaning. All piping and valves in the basin should be replaced. The chlorine line in the basin is cut and cap. There also appears to be a leak at the inlet into the sedimentation basin.

d. Sand Filtration Units/Basins

Figure 18 – 2011 Filtration Units

There are six (6) rapid sand filter basins at the WTP. The two original filtration units were built in the 1950s and upgraded in 2018, and the four additional units were installed in 2011 (See **Figure 18**). The filtration basins and associated piping are in good condition. The sand media has been removed. These units could be brought back into service after a thorough cleaning and installment of the sand media.

e. Controls System

The SCADA controls equipment and system appeared to be in good condition, with no deficiencies reported from the SDC operators. See below for more detail on the SCADA system.

f. Alum Tank

The 5,000-gallon alum tank was a fiberglass tank located outdoors within a concrete containment area. The concrete containment appears to be adequate in size and condition. An approximate 2-foot by 2-foot square hole was cut in the side wall of the tank to clean out the crystalized alum on the floor (See **Figure 19**). Per conversation with DGS, the sodium hydroxide and alum tank were removed after the December site visit.

Figure 19 - Sodium Hydroxide Tank and Alum Tank (removed after site visit)

g. Sodium Hydroxide Tank

The 5,000-gallon sodium hydroxide tank was a fiberglass tank located outdoors within a concrete containment area. The concrete containment appears to be adequate in size and condition. An approximate 2-foot by 2-foot square hole was cut into the side wall of the tank in order to clean out the crystalized chemical off the floor. Per conversation with DGS, the sodium hydroxide and alum tank were removed after the December site visit.

h. Chemical Dosing

The WTP includes an on-site sodium hypochlorite generation system for chlorine generation and dosing. The system includes two ClorTec generation and pumping units (See **Figure 20**) and a storage tank (See **Figure 21**). The ClorTec systems and pumps appear to be in good condition. The sodium hypochlorite is stored in an on-site tank located within the building. The tank appears to be in good condition, however the concrete slab under the tank is deteriorating and the containment area is compromised. It is recommended to repair the concrete slab below the sodium hypochlorite tank and construct a concrete containment area. It is also recommended to thoroughly clean/flush all of the chemical piping and replace all of the chemical tubing.

Figure 20 - ClorTec Generation Unit

Figure 21 - Sodium Hypochlorite Tank

i. Small Laboratory

Figure 22 - Small Laboratory

The small laboratory (See **Figure 22**) located within the WTP houses the electrical equipment, WTP records and an area to perform water quality testing. The lab generally appeared to be in good condition, with no significant deficiencies reported by the SDC operators. The lab could use some minor clean-up and plumbing repairs.

j. SCADA System

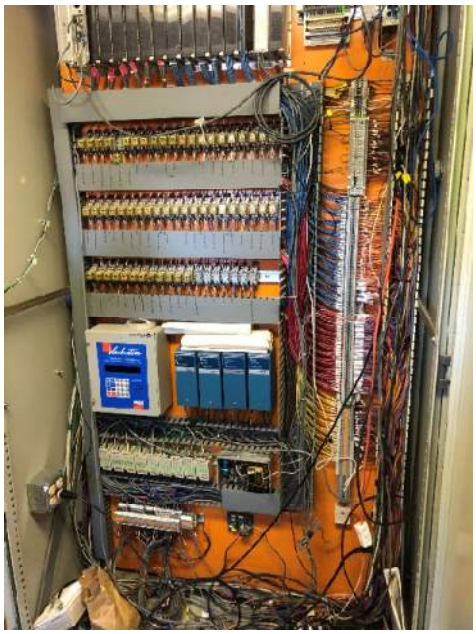

Figure 23 - SCADA Equipment

The SCADA equipment and system (See **Figure 23**) was installed in 1995. While the system is still functional, obtaining parts and/or service for the aging equipment is difficult, and it is recommended to upgrade the equipment and system. The SCADA system utilizes the Wonderwear system. The system monitors storage tank levels, flows, pump operations - on/off only (though a cut phone line prevents this), and individual filter controls. The system can add more modules. The system currently does not have remote control capabilities for the facilities not located at the WTP, for example the operators have to go to the Sonoma Creek Pump Station site to change the VFD speed settings.

k. Sludge Ponds

Figure 24 - Sludge Pond

The sludge ponds were recently drained and cleaned (See **Figure 24**) and appeared to be in good condition, with no deficiencies reported from the SDC operator.

There are two smaller ponds located just downhill from these two sludge ponds. According to staff, the lower ponds have not been used since the new ponds above were built, however, a recent event occurred where a valve located at the older sediment tank failed, resulting in water accumulating the lower sediment ponds.

E. Tanks

1. Tank 1- Treated Water from Water Treatment Plant

This 1.0 MG tank was constructed in 1995 per AWWA D100-84. It likely does not meet the current California structural codes. The tank does not have a roof knuckle and the overflow pipe exits the tank at the top of the wall, just below the roof joint. It is assumed that the sloshing height is deficient. A structural analysis should be performed.

The tank exterior appears to generally be in good condition. There is some dimpling of the steel shells, which may indicate interior structural issues. The tank exterior includes a level board (good condition), overflow pipe (needs repainting), bolted manway (good condition), second bolted manway with a drain valve (good condition), and a ladder with a safety cover and safety climb (good condition). The overflow drain pipe appears to have an inadequate air gap before discharging into the same diameter pipe. It is recommended to install a catch basin for the overflow. The tank has an active cathodic protection system, but it is unknown if it is currently in use. The exterior coatings are in fair condition. There are some minor cracks on the concrete foundation.

The tank interior is overdue for a cleaning and inspection. There is a 10-foot-wide paved access road around the tank that has cracking and weeds growing through it. There are significant amounts of mud and debris collected on the access road around the tank, especially on the west side of the tank. It is recommended to clear the debris, restore the access road, and implement site grading and drainage improvements to prevent future run-off and erosion concerns. (See **Figure 25**).

Figure 25 - Tank 1

2. Tank 2- Treated Water from Water Treatment Plant

This 0.35 MG tank was built in 1941 with upgrades performed around the same time as the Tank 1. It likely does not meet the current California structural codes. It is assumed that the sloshing height is deficient. A structural analysis should be performed.

The tank exterior appears to generally be in good condition. The tank exterior includes an overflow pipe (needs repainting) and a tank manway (needs repainting). The tank has an active cathodic protection system, but it is unknown if it is currently in use. The exterior coatings are in fair condition.

The tank interior is overdue for cleaning and inspection. Access to and around the tank is possible for an off-road vehicle or truck, provided the site is not wet and muddy. A paved or gravel access road to the tank and around the tank at least 10 feet wide is recommended, as well as site grading and drainage improvements to prevent run-off and erosion concerns. The valve box outside of Tank 2 is flooded and should be replaced.

3. Balance Tanks 1 and 2 – Below Suttonfield Lake

The balance tanks are currently drained and out of service. They are also overdue for cleaning and internal inspection. Per the SDC operators, the interior of the tanks has a bitumastic coating, the piping and roof of the tank do not have rust, and the condition is generally considered to be good (no site visit performed at these tanks). The 10-inch Cla-Val altitude valve needs to be replaced, and the operators considered this urgent.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

The backwash settling tanks are hopper bottom CMU block/concrete basins with an A-framed wood roof structure and metal sheeting roof material. The tanks were not operation, however at the time of the site visit they each had about 2-feet of standing water (assumed to be run-off/seepage from recent rain events). Exterior access to the tanks is from a steel staircase, and the interior has a wood platform with metal handrails along the center of the tank. It is recommended to drain tank, recoat the exposed metal surfaces and perform miscellaneous concrete repair. (See **Figure 26**).

Figure 26 - Backwash Settling Tank Interior

5. Backwash Storage Tank – at Water Treatment Plant

   A site visit was not performed. Per the SDC operators, there are no major issues at the backwash storage tank, and it appeared to be in fair condition. The tank should be cleaned and inspected internally. The operators mentioned that the backwash storage tank has cathodic protection.

6. Breaker Tank

   The breaker tank is a partially buried, circular concrete tank with a concrete domed roof (See **Figure 27**). The tank is surrounded by mature trees and covered in leaves and debris. Based on what was visible, the tank appeared to be in fair condition. The tank should be drained, and a structural inspection should be performed internally. It is recommended to perform some clearing, grubbing and tree trimming around the tank to avoid damage from falling branches, trees, or root penetration.

Figure 27 - Breaker Tank

F. Pump Stations

1. Sonoma Creek Pump Station

a. Building Structure

The Sonoma Creek Pump Station is housed in a large wooden building with a steel framed roof. The building has plants and shrubs growing onto the building and needs some general clean-up and maintenance. The building structurally appears to be in fair condition (See **Figure 28**).

Figure 28 - Sonoma Creek Pump House

b. Site Access

Site access is clear to the pump house entrance, but debris and branch removal around the pump house are needed for vehicle access around the building.

c. Building / Pump Access

The pumps and electrical equipment are housed in one large room with sufficient access to maintain the pumps and equipment. Most valves are also easy to access, though a few are located below ground in pipe galleys covered by grating. (See **Figure 35**).

Figure 29 – Pipe and Valve Galley

d. Electrical Equipment / Controls

The Pump #2 (50 hp) VFD does not work and needs replacement. The Pump #3 and Pump #4 controls do not work and need to be replaced. An electrical upgrade was performed at SDC in 2019, including a new transformer installed at the pump station. Electrical Panels are shown in **Figure 31**.

Figure 30 – Electrical Panels

e. Piping / Valves

All interior piping and valves appear to be in fair condition. It is recommended to repaint all the exposed piping and valving.

f. Pumps

There are five pumps at the pump station, three (3) vertical turbine pumps that pull water from Sonoma Creek, and two (2) horizontal split-case pumps that move water from Suttonfield Lake to the WTP. All of the pumps appear to be in fair to good condition. However, the operators reported that the VFD for Pump #2 (50 HP) does not work and needs replacement. Additionally, the controls for Pump #3 and Pump #4 (pumps shown on **Figure 31**). do not work and need to be replaced.

Figure 31 - Pumps 3 and 4

g. Pump Pedestals / Supports

There is some damage to the existing concrete pump pedestals that require repair and patching. While the pipe supports appear to be in good condition, there is a lack of embedment at many pipe supports around the pumps, with some free standing on the concrete (See **Figure 32**). It is recommended to secure all the pipe supports in the floor.

Figure 32 – Pipe Supports (No Embedment)

The concrete pump pedestals also need to be repaired at some locations where concrete spalling was observed (See **Figure 33**).

Figure 33 - Concrete Spalling on Pump Pedestal

2. Pressure Break Tank Pump Station

The breaker tank pump station is located adjacent to the breaker tank. The pump station consists of a small wooden building (See **Figure 34**). The interior showed corrosion on exposed metal (See **Figure 35**), but the operators did not comment on problems with the pump.

Figure 34 - Pressure Break Tank Pump House

Figure 35 - Pressure Tank Pump House Interior

3. Backwash Tank Pump Station

The backwash tank pump station is used to fill the backwash tank with treated water from Tanks 1 and 2. The pump house is a small wooden structure located between Tank 1 and Tank 2 (See **Figure 36**). The structure is in fair condition. The pump (Paco model), piping and valves located within the building appear to be in fair condition (See **Figure 37**). All interior piping and valves need to be repainted.

Figure 36 - Backwash Pump Station – Exterior

Figure 37 - Backwash Pump Station - Interior

G. Piping Systems

1. Raw Water Transmission Lines

The raw water transmission system is in moderate to poor condition and will likely require replacement in the next 10-15 years. Most of the water transmission lines are still the original piping material. As such, the pipelines and valves are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. It is recommended to replace all of the transmission piping in the system over a period of multiple years.

2. Treated Water Transmission Lines

   Most of the water transmission lines are still the original piping material. As such, the pipelines and valves are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. It is recommended to replace all of the transmission piping in the system over a period of multiple years.

3. Treated Water Distribution Lines

   Most of the treated water distribution lines are still the original piping material. As such, the pipelines, valves, and services are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. It is recommended to replace all of the distribution piping in the system over a period of multiple years.

4. Fire Hydrants

   The existing on-site fire hydrants are in fair condition. It is recommended to replace the fire hydrants as the piping gets replaced in the future.

5. Valves

   It is assumed that the existing buried isolation valves are in poor condition due to age and corrosion. It is recommended to replace the valves as the pipelines are replaced.

V. SUMMARY OF EXISTING DEFICIENCIES

A. Surface Water Diversions

1. Asbury Diversion

The bypass data logger needs to be replaced. Information must be accessed onsite (not connected to their SCADA system).

2. Hill Diversion

The 18-inch pipeline is in moderate condition. No leaks were identified, but exposed portions of the pipeline and supports have damage due to falling debris. A large amount of debris and rock gather at the diversion after large rain events, requiring regular maintenance of the diversion. While the pipeline is operable, replacement of certain sections may be needed in the near future.

3. Roulette Springs Diversion

The collector box needs some minor repairs. The 3-inch steel pipe is in bad condition with many leaks. A piece was cut out to keep the water within the springs (See **Figure 13**). Complete replacement of the pipeline is recommended.

4. Sonoma Creek Diversion

The diversion structure is overgrown with vegetation and access is difficult. It is recommended to clear the debris and provide better access to the diversion structure for operation and maintenance.

The SDC's ability to divert water is limited to periods with high flows. An evaluation of alternatives for intake is needed.

B. Groundwater Sources

1. Camp Via Well (Inactive)

A site visit was not performed.

2. Suttonfield Well (Inactive)

A site visit was not performed.

3. Dairy Well (Inactive)

A site visit was not performed.

4. Soccer Field Well (Inactive)

A site visit was not performed.

C. Raw Water Storage

1. Fern Lake

The intake structure boxes are severely corroded and should be replaced. An additional monitoring well should be installed downstream from the south dam. A minor constant slow leak at the south dam needs to be repaired.

2. Suttonfield Lake

N/A

D. Water Treatment Plant

1. General

Individual facilities of the water treatment plant are shown in **Exhibits 3A and 3B**.

a. Intake Structure

The raw water inlet pipelines and valves that fill the intake structure are corroded and congested and difficult to access. It is recommended to replace the above-grade piping and valves, add meters on each water supply source, and clean-up the configuration for better access and operation. The concrete box structure needs to be cleaned and patched.

b. Clarifier

The clarifier has a welded steel conical-shaped structure that has some damage (chipping/peeling) to the exterior coating (See **Figure 38**). The interior coating was in poor to moderate condition. The exposed downstream piping shows signs of rust (See **Figure 39**). There is a 6-inch gate valve that is elevated about 6-feet above ground and difficult to operate. The mechanical arm of the Clarifier may also need replacement. It is recommended to install a VFD with SCADA controls for more efficient operation.

Figure 38 - Clarifier Coating (similar around clarifier)

Figure 39 - Downstream Piping

c. Sedimentation Basin

The chlorine line in the basin is cut and cap.

There appears to be a small leak at the inlet into the Sedimentation Tank that should be sealed (See **Figure 40)**.

Figure 40 - Inlet to Sedimentation Basin

The handrails and all exposed metal have minor rust and need to be recoated.

The fabric cover has some minor rips and tears (See **Figure 41).**

Figure 41 - Sedimentation Basin Cover

The concrete basin appears to be in good condition but requires a thorough cleaning and repair.

All piping and valves in the basin should be replaced.

d. Filtration Units

Each unit needs a thorough cleaning and installment of the sand media.

e. Controls System

The control equipment and system are old, but operable. The equipment and should be replaced and the control system upgraded to the future owner's criteria in time.

f. Alum Tank

The tank and associated piping need to be installed.

g. Sodium Hydroxide Tank

The tank and associated piping need to be installed.

h. Chemical Dosing (Chlorine)

The concrete slab under the sodium hypochlorite tank is deteriorating and the containment area is compromised. The concrete pad needs repair and the construction of a concrete containment area.

All of the chemical tubing needs to be replaced and all of the chemical piping needs to be cleaned and flushed.

i. Small Laboratory

The lab could use some minor clean-up and plumbing repairs.

j. SCADA System

The SCADA system, installed in 1995, is due for an update. The system should be updated based upon the future owner's preference.

A cut phone line prevents remote pump operations with SCADA from the WTP. Communications should be restored.

The system currently does not have remote control capabilities for the facilities not located at the WTP, for example the operators have to go to the Sonoma Creek Pump Station site to change the VFD speed settings.

k. Sludge Ponds

N/A

E. Tanks

1. Tank 1- Treated Water from Water Treatment Plant

The tank does not have a roof knuckle and the overflow pipe exits the tank at the top of the wall, just below the roof joint. It is assumed that the sloshing height is deficient. A structural analysis should be performed.

The overflow pipe needs repainting.

The overflow drain pipe appears to have an inadequate air gap before discharging into the same diameter pipe and should have a catch basin for the overflow.

There are some minor cracks on the concrete foundation.

The tank interior is overdue for a cleaning and inspection.

There is a 10-foot-wide paved access road around the tank that has cracking and weeds growing through it. There are significant amounts of mud and debris collected on the access road around the tank, especially on the west side of the tank. It is recommended to clear the debris, restore the access road, and implement site grading and drainage improvements to prevent future run-off and erosion concerns.

2. Tank 2- Treated Water from Water Treatment Plant

This tank likely does not meet the current California structural codes. It is assumed that the sloshing height is deficient. A structural analysis should be performed.

The tank exterior includes an overflow pipe that needs repainting and a tank manway that needs repainting.

The tank interior is overdue for cleaning and inspection.

Access to and around the tank is possible for an off-road vehicle or truck, provided the site is not wet and muddy. A paved or gravel access road to the tank and around the tank at least 10 feet wide is recommended, as well as site grading and drainage improvements to prevent run-off and erosion concerns.

The valve box outside of Tank 2 is flooded and should be replaced.

3. Balance Tanks 1 and 2 – Below Suttonfield Lake

The interior of balance tanks needs to be cleaned and inspected.

The 10-inch Cla-Val altitude valves need to be replaced.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

Each tank should be drained and cleaned and miscellaneous concrete repair, patching and sealing work should be performed.

Exposed metal surfaces should be recoated.

5. Backwash Storage Tank – at Water Treatment Plant

The tank should be cleaned and inspected internally.

6. Breaker Tank

The tank interior should be cleaned, and the exterior should be cleared of debris and overhanging tree branches.

F. Pump Stations

1. Sonoma Creek Pump Station

Pump #2 VFD needs replacement.

Pump #3 and Pump #4 controls need to be replaced.

All interior piping and valves need to be repainted.

There is a lack of embedment at many pipe supports around the pump station, with some free standing on the concrete, which require anchoring.

The concrete pump pedestals need to be repaired at some locations where concrete spalling was observed.

Site access is clear to the pump house entrance, but debris and branch removal around and on the pump house are needed for vehicle access around the building.

2. Pressure Break Tank Pump Station

   All interior piping, valves, and control panels need to be repainted, and possibly replaced.

3. Backwash Tank Pump Station

   All interior piping, valves, and control panels need to be repainted, and possibly replaced.

G. Piping Systems

1. Raw Water Transmission Lines

   The pipelines and valves are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. The pipelines and appurtenances should be replaced over time, with the older cast-iron pipes being the higher priority. All pipelines should be replaced as the SDC site gets redeveloped.

2. Treated Water Transmission Lines

   The pipelines and valves are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. The pipelines and appurtenances should be replaced over time, with the older cast-iron pipes being the higher priority. All pipelines should be replaced as the SDC site gets redeveloped.

3. Treated Water Distribution Lines

   The pipelines and valves are prone to failure from age, corrosion, and stress on the pipe from earth movement and root intrusion. SDC operators spend significant time, resources and money repairing pipe leaks. The pipelines and appurtenances should be replaced over time, with the older cast-iron pipes being the higher priority. All pipelines should be replaced as the SDC site gets redeveloped. As portions of the distribution system are replaced, the dual plumbing configuration should be eliminated. The piping may need to be upsized to meet modern design standards and fire flow requirements.

4. Fire Hydrants

   The existing on-site fire hydrants are in fair condition, but it is recommended to replace the fire hydrants as the piping gets replaced in the future.

5. Valves

   It is assumed that the existing buried isolation valves are in poor condition due to age and corrosion. It is recommended to replace the valves as the pipelines are replaced.

VI. LIST OF PROPOSED IMPROVEMENTS – URGENT

The proposed improvements identified herein are considered "Urgent," which are improvements considered to be necessary to bring the SDC water system back into full operation.

A. Surface Water Diversions

1. Asbury Diversion

   N/A

2. Hill Diversion

   Clear debris accumulated behind diversion structure.

3. Roulette Springs Diversion

   The 3-inch steel pipe should be fully replaced from Roulette Springs to the WTP Intake Structure.

4. Sonoma Creek Diversion

   Clear vegetation and debris to allow access to the diversion structure. The SDC's ability to divert water is limited to periods with high flows. An evaluation of alternatives for intake is needed. A potential solution is to install a below grade perforated pipe, imbedded in a gravel trench, that can collect water and convey it to a basin to be pumped into the raw water transmission system. The alternatives analysis should include a review of the environmental and permitting requirements.

B. Groundwater Sources

1. Camp Via Well (Inactive)

   N/A

2. Suttonfield Well (Inactive)

   N/A

3. Dairy Well (Inactive)

   N/A

4. Soccer Field Well (Inactive)

N/A

C. Raw Water Storage

1. Fern Lake

Install one additional monitoring well downstream from the south dam.

2. Suttonfield Lake

N/A

D. Water Treatment Plant

1. General

In order to get the water treatment plant back online, each facility needs to be thoroughly cleaned, pressure washed, and disinfected. Patchwork repairs should also be performed.

a. Intake Structure

Though structurally the intake structure appeared to be in good condition, the piping should be reconfigured. The concrete box structure needs cleaning, sandblasting, and recoating. The above grade piping into the structure should be replaced and reconfigured for easier operation and maintenance. A new discharge manifold should be installed, as well as new flow meters for each of the raw water sources. It is also recommended to re-calibrate the outlet flow meter before putting it back into service.

b. Clarifier

The clarifier needs to be cleaned with miscellaneous repair of external coatings. It is recommended to perform an internal coating before the WTP is brought back online. The 6-inch gate valve that is elevated about 6-feet above ground needs to be replaced.

c. Sedimentation Basin

The sedimentation basin needs to be cleaned, with miscellaneous concrete repair patchwork. All piping and valves in the bottom of the basin should be replaced.

The chlorine line in the basin is cut and cap and needs to be replaced and reconnected to allow for mid-treatment chlorination to help manage DBPs.

The leak at the inlet into the Sedimentation tank should be sealed repaired.

d. Filtration Units

The filtration unit piping needs to be tested. The filter beds need new sand filter media installed. Each unit needs a thorough cleaning.

e. Controls System

N/A

f. Alum Tank

The tank and piping need to be installed.

g. Sodium Hydroxide Tank

The tank and piping need to be installed .

h. Chemical Dosing

Repair the concrete slab below the sodium hypochlorite tank and construct a concrete containment area.

Thoroughly clean/flush all of the chemical piping and replace all of the chemical tubing.

i. Small Laboratory

N/A

j. SCADA System

It is assumed that SCADA equipment and software are still operable and can function when the treatment plant is put back online.

k. Sludge Ponds

N/A

E. Tanks

1. Tank 1- Treated Water from Water Treatment Plant

   A structural analysis should be performed.

   The tank interior should be cleaned and inspected. Internal recoating may be needed pending the inspection.

2. Tank 2- Treated Water from Water Treatment Plant

   A structural analysis should be performed.

   The tank interior should be cleaned and inspected. Internal recoating may be needed pending the inspection.

   The valve box outside of Tank 2 is flooded and should be replaced.

3. Balance Tanks 1 and 2 – Below Suttonfield Lake

   The 10-inch Cla-Val altitude valve needs to be replaced.

   The balance tanks are overdue for cleaning and internal inspection before refilling and putting back into service. Internal recoating may be needed pending the inspection.

   A structural analysis is recommended before being put into service.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

   Each tank should be drained, cleaned, have basic inspections, and have miscellaneous concrete repaired.

5. Backwash Storage Tank – at Water Treatment Plant

   The tank should be drained and cleaned and inspected. A structural analysis is recommended before being put into service.

6. Breaker Tank

   The tank should be drained and cleaned and inspected.

F. Pump Stations

1. Sonoma Creek Pump Station

   Pump #2 VFD needs replacement.

Pump #3 and Pump #4 controls need to be replaced.

All interior piping and valves need to be repainted.

Secure the embedment of the pipe supports around the pumps.

The concrete pump pedestals also need to be repaired at some locations where concrete spalling was observed.

2. Pressure Break Tank Pump Station

All interior piping, valves, and control panels need to be repainted.

3. Backwash Tank Pump Station

All interior piping, valves, and control panels need to be repainted.

G. Piping Systems

1. Raw Water Transmission Lines

It is recommended to replace all of the transmission piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced.

2. Treated Water Transmission Lines

It is recommended to replace all of the transmission piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced.

3. Treated Water Distribution Lines

It is recommended to replace all of the distribution piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced. As portions of the distribution system are replaced, the dual plumbing configuration should be eliminated. The piping

may need to be upsized to meet modern design standards and fire flow requirements.

4. Fire Hydrants

   The existing on-site fire hydrants are in fair condition, but it is recommended to replace the fire hydrants as the piping gets replaced in the future.

5. Valves

   It is recommended to replace the valves as the pipelines are replaced.

VII. LIST OF PROPOSED IMPROVEMENTS – MID TIER

Mid-tier items are considered not critical for the facilities to be put back into immediate operation, however these projects should be implemented roughly in the next five-ten years.

A. Surface Water Diversions

1. Asbury Diversion

   Replace the bypass data logger.

2. Hill Diversion

   Repair/replace segments of the 18-inch pipeline and its pipe supports.

3. Roulette Springs Diversion

   Repair the collector box structure.

4. Sonoma Creek Diversion

   N/A

B. Groundwater Sources

1. Camp Via Well (Inactive)

   A video camera inspection of the well structure is recommended. If the well is found to not be adequate for rehabilitation, then the well should be destroyed per Sonoma County and California Division of Drinking Water standards.

2. Suttonfield Well (Inactive)

   A video camera inspection of the well structure is recommended. If the well is found to not be adequate for rehabilitation, the well should be destroyed per Sonoma County and California Division of Drinking Water standards.

3. Dairy Well (Inactive)

   A video camera inspection of the well structure is recommended. If the well is found to not be adequate for rehabilitation, the well should be destroyed per Sonoma County and California Division of Drinking Water standards.

4. Soccer Field Well (Inactive)

A video camera inspection of the well structure is recommended. If the well is found to not be adequate for rehabilitation, the well should be destroyed per Sonoma County and California Division of Drinking Water standards.

C. Raw Water Storage

1. Fern Lake

Replace the intake screens/boxes.

2. Suttonfield Lake

Replace the intake screens/boxes.

D. Water Treatment Plant

1. General

The area around the WTP site could use some general clearing, access grading and drainage improvements. The WTP does not have a sewer connection. Consideration should be made to install a sewer pipeline to the WTP.

a. Intake Structure

N/A

b. Clarifier

Recoat the exterior of the clarifier tank. Replace the canopy/cover. The downstream piping shows signs of rust and should be recoated.

c. Sedimentation Basin

Replace the roof cover.

d. Filtration Units

N/A

e. Controls System

Replace the control equipment and software platform.

f. Alum Tank

N/A

g. Sodium Hydroxide Tank

N/A

h. Chemical Dosing

N/A

i. Small Laboratory

The lab could use some clean-up, updating and plumbing repairs.

j. SCADA System

Repair/install the communications facilities to allow for remote monitoring and control of all of the facilities at the site. Upgrade the SCADA system to match the future owner/operators' standards.

k. Sludge Ponds

N/A

E. Tanks

1. Tank 1- Treated Water from Water Treatment Plant

Install a catch basin at the overflow discharge, ensure sufficient air gap is provided and include a screen on the end of the overflow pipe. Recoat the exterior of the tank. Regrade the exterior around the tank and install a better drainage system to avoid debris run-off from building up on the access road around the tank.

2. Tank 2- Treated Water from Water Treatment Plant

Recoat the exterior of the tank. Install a paved or gravel access road to the tank and around the tank at least 10 feet wide, as well as site grading and drainage improvements to prevent run-off and erosion concerns.

3. Balance Tanks 1 and 2

Recoat the tank exteriors.

4. Backwash Settling Tanks 1 and 2 – at Water Treatment Plant

   Exposed metal surfaces should be recoated.

5. Backwash Storage Tank – at Water Treatment Plant

   Recoat the tank exterior.

6. Breaker Tank

   N/A

F. Pump Stations

1. Sonoma Creek Pump Station

   Replace the pumps and motors. Consider adding a permanent on-site generator for back-up power.

2. Pressure Break Tank Pump Station

   Replace the pump, motor, and controls.

3. Backwash Tank Pump Station

   Replace the pump, motor, and controls.

G. Piping Systems

1. Raw Water Transmission Lines

   It is recommended to replace all of the transmission piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced.

2. Treated Water Transmission Lines

   It is recommended to replace all of the transmission piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced.

3. Treated Water Distribution Lines

   It is recommended to replace all of the distribution piping in the system over a period of multiple years, as the site redevelops. Pipeline replacement is not considered urgent, and should be phased over time as development occurs, however the SDC water system will continue to experience pipe breaks and leaks until the system is replaced. As portions of the distribution system are replaced, the dual plumbing configuration should be eliminated. The piping may need to be upsized to meet modern design standards and fire flow requirements.

4. Fire Hydrants

   The existing on-site fire hydrants are in fair condition, but it is recommended to replace the fire hydrants as the piping gets replaced in the future.

5. Valves

   It is recommended to replace the valves as the pipelines are replaced.

VIII. DISCUSSION OF PERMITTING AND OPERATIONS REQUIREMENTS

The SDC water system previously held a permit to operate as a public water system. The permit was revoked due to the lack of full-time certified personnel to operate the treatment plant. A meeting was held with the assigned Division of Drinking Water (DDW) Associate Sanitary Engineer on the permitting requirements for the SDC water system. To re-start/re-permit the SDC water treatment plant and water system as an independent public water system, a SB 1263 process is required, with a technical report needed, requiring DDW and State Water Resources Control Board (SWRCB) review. In the case of the Sonoma Development Center water system being incorporated into the Valley of the Moon Water District system, a less stringent permitting process is required which includes amending the existing VOMWD permit to add a new water treatment facility, as well as other water facilities.

For either adding a water source or a treatment plant to an existing water system, a **7-00b Water Supply Permit Amendment Application** is required. This form can be found on the board's website.

(https://www.waterboards.ca.gov/drinking_water/programs/districts/docs/sonoma/permit_forms/7_00b_amended_permit_application_request_form_fillable.pdf)

The form is three pages and asks for general information, CEQA and NEPA documents that may apply, reasons for the new water system facilities, and scheduling information. Additional requests from DDW may be implemented based on the size and impact of the project. Separate forms need to be completed for the operation of the water treatment plant, Fern Lake, and Suttonfield Lake.

IX. COST ESTIMATE

This section includes an estimate of probable construction cost to implement the recommended improvements required to get the complete SDC water system back into independent operation (i.e., without the SCWA imported water supply connection operating). The improvements were developed into projects based on the water facility location.

1. Cost Basis

The cost estimates are based on standardized unit costs, as shown in **Table IX-1.** The cost basis includes allocations for soft costs, where applicable, such as survey, environmental documentation, engineering design, administration, construction management and inspection fees. The costs estimate also include a 30% construction contingency. Please note, all costs are based on 2022 estimates and do not include escalation.

2. Prioritization

The projects included in the recommendations and cost estimate are based on only those improvements deemed necessary to get the SDC potable water system back into full operation (i.e., "Urgent" projects). Projects that were identified as mid-tier priority are not included in the cost estimate as it is assumed those costs would be borne by the future system owner.

It is noted that transmission pipeline and distribution system pipeline replacement costs were included in the summary tables, however the cost to replace the piping systems, although critical, is assumed to be constructed as the SDC site improvements are constructed. These costs will likely be allocated to the site developers or the future system owner.

3. Recommended Project Cost Estimate

A summary of the recommended project costs estimates is included as **Table IX-2**, with project detail cost estimates provide in **Appendix 2**. Items that would constitute infrastructure to serve new development and/or redevelopment would be a normal cost of development / redevelopment paid for by the developer.

Table IX-1 – Cost Basis		
New Construction	Unit Cost	
Pipelines		
3-inch	$ 75	/LF
4-inch	$ 90	/LF
6-inch	$ 120	/LF
8-inch	$ 160	/LF
10-inch	$ 200	/LF
12-inch	$ 240	/LF
16-inch	$ 300	/LF
Wells		
Monitoring Well	$ 150,000	/LS
Video Inspection	$ 15,000	/EA
Studies		
Seismic/Structural Study - Tanks	$ 0.04	/GAL
Cleaning and Inspection		
Water Tank - Cleaning, Disinfection, and Inspection	$ 0.10	/GAL
Asset Replacement		
Recoat Tank Interior	$ 0.10	/GAL
Recoat Tank Exterior	$ 0.10	/GAL
VFD Replacement	$ 50,000	/EA
Pump & Motor	$ 150,000	/EA
Generator	$ 75,000	/EA
Electrical & SCADA Equipment	$ 150,000	/LS
Pump Control (Electrical)	$ 50,000	/EA
Fire Hydrant Assembly	$ 10,000	/EA
Valves - General	$ 7,500	/EA
Valves - 10-inch Cla-Val Altitude Valve	$ 25,000	/EA
Valve Vault & Hatch	$ 15,000	/EA
Meters	$ 7,500	/EA
Water Treatment Plant Upgrades		
Intake Structure - Piping Replacement and Reconfiguration	$ 20,000	/LS
Intake Structure - Cleaning, Sandblasting, Recoating	$ 15,000	/LS
Intake Structure - Valve Replacement	$ 2,500	/EA
Intake Structure - New Flow Meter & Meter Box	$ 7,500	/EA
Intake Structure - Flow Meter Calibration	$ 1,500	/LS

Table IX-1 – Cost Basis			
Clarifier - Cleaning	$	15,000	/LS
Clarifier - Misc Repair of External Coatings	$	35,000	/LS
Clarifier - 6-inch gate valve replacement	$	25,000	/LS
Sedimentation Basin - Cleaning	$	30,000	/LS
Sedimentation Basin - Misc. Concrete Repair Patchwork	$	30,000	/LS
Sedimentation Basin - Replacing Piping and Valves	$	20,000	/LS
Sedimentation Basin - Chlorine Line Reconnection	$	5,000	/LS
Sedimentation Basin - Seal Repair at Inlet	$	7,500	/LS
Filtration Units - Cleaning	$	5,000	/BASIN
Filtration Units - Sand Installation	$	15,000	/BASIN
Filtration Units - Pipe Testing	$	2,500	/BASIN
Alum Tank - Replacement of Tank and Piping	$	25,000	/LS
Sodium Hydroxide Tank - Replacement of Tank and Piping	$	25,000	/LS
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	$	15,000	/LS
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	$	7,500	/LS
SCADA Upgrades / Start-up / Commissioning	$	50,000	/LS
Miscellaneous			
Remove Vegetation and Debris	$	2.00	/SF
Sonoma Creek PS - Piping and Valve Recoating	$	15,000	/LS
Sonoma Creek PS - Pipe Support Embedment	$	5,000	/LS
Sonoma Creek PS - Concrete Pump Pedestal Repair	$	20,000	/LS
Pressure Break Tank PS - Piping and Valve Recoating	$	6,000	/LS
Backwash Tank PS - Piping and Valve Recoating	$	8,000	/LS
Miscellaneous Concrete Repair	$	40,000	/LS
Soft Costs & Contingencies			
Survey		5%	
Environmental Documentation		15%	
Engineering Design		12%	
Administration & Legal Fees		5%	
Construction Management & Inspection		10%	
Construction Contingency		30%	
Annual Escalation / Year		3%	

Table IX-2 – Project Summary Table		
Project No.	**Project Name**	**Total Cost**
W01	Asbury Diversion Improvements	$ -
W02	Hill Diversion Improvements	$ 10,000
W03	Roulette Diversion Improvements	$ 201,000
W04	Sonoma Creek Diversion Improvements	$ 460,000
W05	Fern Lake Improvements	$ 287,000
W06	Suttonfield Lake Improvements	$ -
W07	Water Treatment Plant Improvements	$ 803,000
W08	Tank 1 Improvements	$ 200,000
W09	Tank 2 Improvements	$ 155,000
W10	Balance Tanks 1 and 2 Improvements	$ 180,000
W11	Backwash Settling Tanks 1 and 2 Improvements	$ 66,000
W12	Backwash Storage Tank Improvements	$ 14,000
W13	Breaker Tank Improvements	$ 70,170
W14	Sonoma Creek Pump Station Improvements	$ 314,000
W15	Pressure Break Tank Pump Station Improvements	$ 9,000
W16	Backwash Tank Pump Station Improvements	$ 12,000
SUBTOTAL URGENT ITEMS		**$ 2,781,170**
W17	Treated Water Transmission Line Improvements	$ 820,000
W18	Treated Water Distribution Improvements(1)	$ 8,339,000
SUBTOTAL SYSTEM REPLACEMENT		**$ 9,159,000**

(1) The cost estimates for distribution lines are based on replacing in kind. Ultimately the size and layout of distribution piping will be based on the proposed development plan and water modeling studies.

APPENDIX 1

GIS ASSESSMENT FIELDS

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APPENDIX 1 - GIS ASSESSMENT FIELDS

Diversion Sources

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other
Asbury Creek Diversion at Weir Structure	1 cfs when bypassing .9 cfs			1880s	2006		2011	Concrete dam with wood boards.	Good condition since replaced in 2011	24-inch DIP, 6-inch bypass.				Bypass data logger washed out after 1 year.
Hill Creek Diversion at Weir Structure	Data logs will show flow			1904			2007		Good condition					From October to May, can take as much water as possible through an 18" pipe - no restrictions. Need about 14 inches to get flow going. There is a v notch weir similar to asbury
Roulette Springs Diversion	1,200 acre-feet per year (80 gpm summer 120 gpm winter)			1897			<Null>							Series of collection boxes that feeds a 3-inch steel pipe to WTP. Series of small collector pipes from other springs tie together.
Sonoma Creek Diversion	withdrawal rate is limited to 1,657 gallons per minute (2.39 mgd) with a storage limitation of 525 acre-feet						<Null>							<Null>
Fern Lake	240 acre-ft			1910 (South Dam built, North Dam added at unknown date)			<Null>		2 dams, one that would flow into Asbury creek, the other that would flow to SDC (has a constant (20 year) slow leak at about 5 gpm from a V notch weir). The operators want monitoring wells DS from the dam that would affect the population downstream.	3" and 8" to intake structure at WTP	40'	300'	See Capacity	<Null>
Suttonfield Lake	600 acre-ft						<Null>				76'	965'	See Capacity	2 dams

APPENDIX 1 - GIS ASSESSMENT FIELDS

Water Treatment Facilities

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other
Water Treatment Plant	1.7 MGD			1930s		1950 (expanded)	<Null>		MK - WTP in relatively good condition but pipes are beyond their useful life LP - Raw water quality is generally very good, having low turbidity and low levels of contaminants of concern				See Capacity	DWR report on plant decomission. No sewer at WTP. Has a flow meter for flow through the plant, Has a chlorine injection point (disinfection) and sodium hydroxide (pH control). Minimum Flow is about 100 gallons per minute (alum filtration drops)
Filtration Units	30,000 gallons			1954 (1st two)		4 additional in 2011 Upgrades to original in 2018	<Null>						See Capacity	6 rapid sand filters in parallel. Nelson would run 2 filters in the winter, and 3 filters in the summer. Once standards became more strict, ran 6. 72 hour backwash on the filters to remove organics that could cause taste and odor problems
Controls System	2.5 gallon per hour chemical feed pump						<Null>						See Capacity	<Null>
Chemical Dosing (Chemical Bulk Storage)				1992			<Null>							Gutted and no longer connected. Pipes run under road to WTP
Small Laboratory							<Null>							<Null>
Clarifier	90,000 gallons			1954		1995			needs to be recoated | mechanical arms may need replacement | 1995 - added weir to increase capacity				See Capacity	Never had to use any coagulants. | 72 hour backwash so organics don't starting dissolving decreasing the water quality. | 1995 work on clarifier helped prevent alum from leaving the clarifier. | has a manway for cleaning.
Sedimentation Tank	80,0000 gallons						<Null>		Chlorine line in SSD basin is cut and cap				See Capacity	Any alum from the clarifier would settle in the sedimentation tank
SCADA system				1995 (due for an update, but it and all plant controls are maintained through a third-party contract)			<Null>		Fair condition. Can see storage tank levels, flows, pump operations on/off only (cut phone line, needs to be replaced), individual filter controls. Can add more modules. Zytec is the software. Wonderwear runs the server.					Can see storage tank levels, position of outlet valve, and outlet flow. Nelson used to have to go down to pump station to change the VFD speeds. Recommends having it accessed through SCADA at WTP.
Intake Structure							<Null>							Intake from Roulette Springs has a flow meter for DWR. Also takes from Fern Lake, Suttonfield, and WTP return from backwash
Sludge Pond 1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	sludge received from backwash tank
Sludge Pond 2	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	sludge received from backwash tank

APPENDIX 1 - GIS ASSESSMENT FIELDS

Wells

Asset	OBJECTID *	Latitude	Longitude	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other
Camp Via Well	9	38.33611	-122.53812	20 gpm (35 feet drawdown)				2018	Not Active	<Null>				75' to 195' deep		See Capacity	<Null>
Suttonfield Well	10	38.35333	-122.51552	300 gpm (current yield probably lower)					Not Active	<Null>		Nelson - hot water (98 degrees at the wellhead), full of arsenic, boron and bicarbonates		570' to 870' deep		See Capacity	No concrete encasement
Dairy Well	11	38.3574	-122.50856						Not Active	<Null>							<Null>
Soccer Field Well	12	38.35361	-122.50532						Not Active	<Null>		Moderate to poor condition and will likely require replacement in the next 10-15 years					<Null>

APPENDIX 1 - GIS ASSESSMENT FIELDS

Tanks

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other
Alum Tank	5,000 gallon						<Null>		had to cut the tank to clean out the crystalized alum in the bottom				See Capacity	injection pumps located inside of building
Backwash Settling Tank 1	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Nelson - all tanks are overdue to be cleaned | Backwash tank has cathodic protection | drained and out of operation	<Null>	<Null>	<Null>	<Null>	
Backwash Settling Tank 2	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>
Backwash Storage Tank	65,000 gallons						<Null>		Nelson - all tanks are overdue to be cleaned					backwash water for treatment plant. supplies water to the sink at the treatment plant as well.
Balance Tank 1	300,000 gallons						<Null>	Welded steel (bitumastic coating)	Nelson - all tanks are overdue to be cleaned | Piping and roof of tank has no rust | drained and out of operation				See Capacity	Operator (Nelson) says the 10" Cla-Val altitude valve for the balance tanks needs to be replaced. Suttonfield Lake Tanks are 5 feet lower than the WTP tanks. Altitude valve keeps them from overflowing.
Balance Tank 2	300,000 gallons						<Null>	Welded steel (bitumastic coating)	Nelson - all tanks are overdue to be cleaned | Piping and roof of tank has no rust				See Capacity	Operator (Nelson) says the 10" Cla-Val altitude valve for the balance tanks needs to be replaced. Suttonfield Lake Tanks are 5 feet lower than the WTP tanks. Altitude valve keeps them from overflowing.
Breaker Tank	25,000 gallons	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Covered concrete	Nelson - all tanks are overdue to be cleaned	<Null>	<Null>	<Null>	<Null>	Nelson - 10 inch lead joint ductile iron pipeline from Fern Lake to the creek. If the line ran straight from the lake to the creek it would break. So the line is broken by a breaker tank. Used as an alternative to a PRV to maintain flow.
Sodium Hydroxide Tank	5,000 gallon						<Null>		had to cut the tank to clean out the crystalized sodium hydroxide in the bottom				See Capacity	injection pumps located inside of building
Tank 1	1 MG	Spiess Const Co Inc	AWWA D100-84	1995			<Null>	A-36	Repainted recently | Nelson - all tanks are overdue to be cleaned | 1MG tank has cathodic protection	107'	16'		See Capacity	6' to 7' water height
Tank 2	.35 MG			1941			<Null>	Steel	Nelson - all tanks are overdue to be cleaned	56'			See Capacity	<Null>

Pump Station

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other
Sonoma Creek PS	Each winter, sends 1 MGD to Suttonfield Lake					2019 Electrical Upgrades (new transformers) by Shafer Electric	<Null>							2 flow meters, one shows flow from Suttonfield Lake to Treatment Plant, other shows flow pumped out of creek. Gate valve determines if flow goes to Suttonfield Lake or Water Treatment Plant.
Break Tank PS	5 hp booster pump						<Null>							<Null>
Backwash PS	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	pumps water from the backwash tank to the storage tank above the WTP

APPENDIX 1 - GIS ASSESSMENT FIELDS

Pumps

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other	AssetGroup	Shape *
Pump 1 - Pumphouse Near Butler Building	250 gpm 40 HP	horizontal					<Null>		Pumphouse is in fair condition - pumps have been well maintained				See Capacity	<Null>	Pumps	Point
Pump 2 - Pumphouse Near Butler Building	300 gpm 50 HP	horizontal					<Null>		Pumphouse is in fair condition - pumps have been well maintained				See Capacity	<Null>	Pumps	Point
Pump 3 - Pumphouse Near Butler Building	750 gpm 50 HP	vertical					<Null>		Pumphouse is in fair condition - pumps have been well maintained				See Capacity	<Null>	Pumps	Point
Pump 4 - Pumphouse Near Butler Building	750 gpm 50 HP	vertical					<Null>		Pumphouse is in fair condition - pumps have been well maintained				See Capacity	controls don't work	Pumps	Point
Pump 5 - Pumphouse Near Butler Building	500 gpm 25 HP	vertical					<Null>		Pumphouse is in fair condition - pumps have been well maintained				See Capacity	<Null>	Pumps	Point
Portable pump for intertie connection along Arnold Drive							<Null>							<Null>	Pumps	Point

APPENDIX 1 - GIS ASSESSMENT FIELDS

Raw Water Pipes

Asset	Capacity	Make	Model	Year Built	Year Offline	Year Rehabilitated	Year Replaced	Material	Condition	Diameter	Height	Length	Amount	Other	Shape.STLength()
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	301
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	5
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	872
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	230
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	305
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	386
<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Possible Repairs PVC)	<Null>	10"	<Null>	<Null>	<Null>	<Null>	27
Asbury Diversion - 24 inch pipeline	1 cfs	griffin	<Null>	<Null>	2006	<Null>	2011	Ductile Iron	<Null>	24"	<Null>	300 ft	<Null>	Nelson - can measure flow coming through the pipe - v-notch weir	967
Hill Creek Diversion - 18 inch pipeline	<Null>	<Null>	<Null>	Built 1904	<Null>	<Null>	<Null>	steel	<Null>	18	<Null>	<Null>	<Null>	goes from air gap breaker tank to the lake. No bypass, just overtops to woods. Feeds to Fern Lake	444
Raw Water Distribution System	<Null>	<Null>	<Null>	1995 (New Main Line System)	<Null>	<Null>	<Null>	Abestos Cement Pipe or Cast-Iron Pipe with lead packing	10-15 years of useful life left	10"	<Null>	<Null>	<Null>	<Null>	1519
Raw Water Transmission System	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	Ductile Iron (Repairs in PVC)	<Null>	10	<Null>	<Null>	<Null>	<Null>	793
Roulette Springs Diversion	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	<Null>	steel	Nelson - bad condition, many leaks. a piece was cut out	3 in	<Null>	<Null>	<Null>	<Null>	1377

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APPENDIX 2

INDIVIDUAL PROJECT COST TABLES

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Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Asbury Diversion Improvements
Project Number: W01

Project Description: No urgent improvements needed at Asbury Diversion

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ -***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ -
Construction Management & Inspection			10%		$ -
Construction Contingency			30%		$ -
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ -**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Hill Diversion Improvements
Project Number: W02

Project Description: Clear debris.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 5,000	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 15,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 2,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	5,000	/SF	$ 2.00	/SF	$ 10,000
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 10,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ -
Construction Management & Inspection			10%		$ -
Construction Contingency			30%		$ -
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 10,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Roulette Diversion Improvements
Project Number: W03
Project Description: Replace the 3-inch steel pipe from Roulette Springs Collector Box to the WTP Intake Structure. It is assumed the pipeline will be buried to a depth of 1-2 feet of cover.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	1,400	/LF	$ 75.00	/LF	$ 105,000
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 105,000***
Soft Costs & Contingencies					
Survey			5%		$ 5,250
Environmental Documentation			15%		$ 15,750
Engineering Design			12%		$ 12,600
Administration & Legal Fees			5%		$ 5,250
Construction Management & Inspection			10%		$ 10,500
Construction Contingency			30%		$ 46,305
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 201,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Sonoma Creek Diversion Improvements
Project Number: W04
Project Description: Clear vegetation and debris to allow access to the diversion structure for inspection. This projectmay result in additional repairs and improvements once access is avaiable to inspect the structure and diversion valve.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 5,000	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 15,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 2,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	5000	/SF	$ 2.00	/SF	$ 10,000
Sonoma Creek Diversion - Subsurface Perforated Intake	1	/LS	$ 250,000	/LS	$ 250,000
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 260,000***
Soft Costs & Contingencies					
Survey			5%		$ 13,000
Environmental Documentation			15%		$ 39,000
Engineering Design			12%		$ 31,200
Administration & Legal Fees			5%		$ 13,000
Construction Management & Inspection			10%		$ 26,000
Construction Contingency			30%		$ 78,000
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 460,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Fern Lake Improvements
Project Number: W05

Project Description: Install monitoring well downstream from the south dam.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	1	/LS	$ 150,000	/LS	$ 150,000
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 5,000	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 15,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 2,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 150,000***
Soft Costs & Contingencies					
Survey			5%		$ 7,500
Environmental Documentation			15%		$ 22,500
Engineering Design			12%		$ 18,000
Administration & Legal Fees			5%		$ 7,500
Construction Management & Inspection			10%		$ 15,000
Construction Contingency			30%		$ 66,150
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 287,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Suttonfield Lake Improvements
Project Number: W06

Project Description: No urgent improvements needed at Suttonfield Lake

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ -***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ -
Construction Management & Inspection			10%		$ -
Construction Contingency			30%		$ -
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ -**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Water Treatment Plant Improvements
Project Number: W07

Project Description: Improvements recommended to re-start the existing TP, including at the Intake Structure (Mixing Chamber), Clarifier, Sedimentation Basin, Filtration Units, Alum Tank, Sodium Hydroxide Tank, and SCADA System.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	1	/LS	$ 20,000	/LS	$ 20,000
Intake Structure - Cleaning, Sandblasting, Recoating	1	/LS	$ 15,000	/LS	$ 15,000
Intake Structure - Valve Repalcement	1	/EA	$ 2,500	/EA	$ 2,500
Intake Structure - New Flow Meter & Meter Box	3	/EA	$ 7,500	/EA	$ 22,500
Intake Structure - Flow Meter Calibration	1	/LS	$ 1,500	/LS	$ 1,500
Clarifier - Cleaning	1	/LS	$ 15,000	/LS	$ 15,000
Clarifier - Misc Repair of External Coatings	1	/LS	$ 35,000	/LS	$ 35,000
Clarifier - 6-inch gate valve replacement	1	/LS	$ 25,000	/LS	$ 25,000
Sedimentation Basin - Cleaning	1	/LS	$ 30,000	/LS	$ 30,000
Sedimentation Basin - Misc. Concrete Repair Patchwork	1	/LS	$ 30,000	/LS	$ 30,000
Sedimentation Basin - Replacing Piping and Valves	1	/LS	$ 20,000	/LS	$ 20,000
Sedimentation Basin - Chlorine Line Reconnection	1	/LS	$ 5,000	/LS	$ 5,000
Sedimentation Basin - Seal Repair at Inlet	1	/LS	$ 7,500	/LS	$ 7,500
Fitration Units - Cleaning	6	/BASIN	$ 5,000	/BASIN	$ 30,000
Fitration Units - Sand Installation	6	/BASIN	$ 15,000	/BASIN	$ 90,000
Fitration Units - Pipe Testing	6	/BASIN	$ 2,500	/BASIN	$ 15,000
Alum Tank - Replacement of Tank and Piping	1	/LS	$ 25,000	/LS	$ 25,000
Sodium Hydroxide Tank - Replacement of Tank and Piping	1	/LS	$ 25,000	/LS	$ 25,000
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	1	/LS	$ 15,000	/LS	$ 15,000
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	1	/LS	$ 7,500	/LS	$ 7,500
SCADA Upgrades / Start-up / Commissioning	1	/LS	$ 50,000	/LS	$ 50,000
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 486,500***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 58,380
Administration & Legal Fees			5%		$ 24,325
Construction Management & Inspection			10%		$ 48,650
Construction Contingency			30%		$ 185,357
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 803,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Tank 1 Improvements
Project Number: W08

Project Description: A structural analysis, cleaning and inspecting of the interior of Tank 1.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	1,000,000	/GAL	$ 0.04	/GAL	$ 40,000
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	1,000,000	/GAL	$ 0.10	/GAL	$ 100,000
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 140,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ -
Construction Management & Inspection			10%		$ 14,000
Construction Contingency			30%		$ 46,200
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 200,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Tank 2 Improvements
Project Number: W09
Project Description: A structural analysis, cleaning and inspecting of the interior of Tank 2, as well as replacing the outlet valve vault, hatch and valves outside of Tank 2.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	350,000	/GAL	$ 0.04	/GAL	$ 14,000
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	350,000	/GAL	$ 0.10	/GAL	$ 35,000
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	4	/EA	$ 7,500	/EA	$ 30,000
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	1	/EA	$ 15,000	/EA	$ 15,000
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 94,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 11,280
Administration & Legal Fees			5%		$ 4,700
Construction Management & Inspection			10%		$ 9,400
Construction Contingency			30%		$ 35,814
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 155,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Balance Tanks 1 and 2 Improvements
Project Number: W10

Project Description: Cleaning and internal inspection of the balance tanks, structural analysis, and replacing the 10-inch Cla-Val altitude valve

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	600,000	/GAL	$ 0.04	/GAL	$ 24,000
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	600,000	/GAL	$ 0.10	/GAL	$ 60,000
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	1	/EA	$ 25,000	/EA	$ 25,000
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 109,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 13,080
Administration & Legal Fees			5%		$ 5,450
Construction Management & Inspection			10%		$ 10,900
Construction Contingency			30%		$ 41,529
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 180,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Backwash Settling Tanks 1 and 2 Improvements
Project Number: W11

Project Description: Draining and cleaning both backwash settling tanks, perform miscellaneous concrete repairs.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Miscellaneous Concrete Repair	1	/LS	$ 40,000	/LS	$ 40,000
Subtotal					***$ 40,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 4,800
Administration & Legal Fees			5%		$ 2,000
Construction Management & Inspection			10%		$ 4,000
Construction Contingency			30%		$ 15,240
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 66,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Backwash Storage Tank Improvements
Project Number: W12

Project Description: Drain and Clean the interior of the Backwash Storage Tank

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	65,000	/GAL	$ 0.04	/GAL	$ 2,600
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	65,000	/GAL	$ 0.10	/GAL	$ 6,500
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 9,100***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ 455
Construction Management & Inspection			10%		$ 910
Construction Contingency			30%		$ 3,140
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 14,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Breaker Tank Improvements
Project Number: W13

Project Description: Drain and Clean the interior of the Breaker Tank. Assumes miscellaneous concrete repairs will be required on the tank interior.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	25,000	/GAL	$ 0.10	/GAL	$ 2,500
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Miscellaneous Concrete Repair	1	/LS	$ 40,000	/LS	$ 40,000
Subtotal					***$ 42,500***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 5,100
Administration & Legal Fees			5%		$ 2,125
Construction Management & Inspection			10%		$ 4,250
Construction Contingency			30%		$ 16,193
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 70,170**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Sonoma Creek Pump Station Improvements
Project Number: W14

Project Description: Improvements include replacing the Pump #2 VFD, replacing Pump #3 and #4 controls, repainting all interior piping and valves, securing the embedment of pipe supports, and repairing the concrete pump pedestals.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	1	/EA	$ 50,000	/EA	$ 50,000
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	2	/EA	$ 50,000	/EA	$ 100,000
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 5,000	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 15,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 2,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 25,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	1	/LS	$ 15,000	/LS	$ 15,000
Sonoma Creek PS - Pipe Support Embedment	1	/LS	$ 5,000	/LS	$ 5,000
Sonoma Creek PS - Concrete Pump Pedestal Reapir	1	/LS	$ 20,000	/LS	$ 20,000
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 190,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ 22,800
Administration & Legal Fees			5%		$ 9,500
Construction Management & Inspection			10%		$ 19,000
Construction Contingency			30%		$ 72,390
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 314,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Pressure Break Tank Pump Station Improvements
Project Number: W15

Project Description: Repainting all interior piping, valves, and control panels at the Pressure Break Tank Pump Station

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	1	/LS	$ 6,000	/LS	$ 6,000
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 6,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ 300
Construction Management & Inspection			10%		$ 600
Construction Contingency			30%		$ 2,070
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 9,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Backwash Tank Pump Station Improvements
Project Number: W16

Project Description: Repainting all interior piping, valves, and control panels at the Backwash Tank Pump Station

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	-	/LF	$ 160.00	/LF	$ -
10-inch	-	/LF	$ 200.00	/LF	$ -
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	-	/EA	$ 7,500	/EA	$ -
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	1	/LS	$ 8,000	/LS	$ 8,000
Subtotal					***$ 8,000***
Soft Costs & Contingencies					
Survey			5%		$ -
Environmental Documentation			15%		$ -
Engineering Design			12%		$ -
Administration & Legal Fees			5%		$ 400
Construction Management & Inspection			10%		$ 800
Construction Contingency			30%		$ 2,760
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 12,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Treated Water Transmission Lines Improvements
Project Number: W17

Project Description: Replace 2,163 feet of water transmission main and valves.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	-	/LF	$ 75.00	/LF	$ -
4-inch	-	/LF	$ 90.00	/LF	$ -
6-inch	-	/LF	$ 120.00	/LF	$ -
8-inch	1,487	/LF	$ 160.00	/LF	$ 237,920
10-inch	214	/LF	$ 200.00	/LF	$ 42,838
12-inch	462	/LF	$ 240.00	/LF	$ 110,925
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	-	/EA	$ 10,000	/EA	$ -
Valves - General	5	/EA	$ 7,500	/EA	$ 37,500
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 429,183***
Soft Costs & Contingencies					
Survey			5%		$ 21,459
Environmental Documentation			15%		$ 64,377
Engineering Design			12%		$ 51,502
Administration & Legal Fees			5%		$ 21,459
Construction Management & Inspection			10%		$ 42,918
Construction Contingency			30%		$ 189,270
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 820,000**

Sonoma Developmental Center
Project Detail Sheet
Water System Assessment

Project Name: Treated Water Distribution Improvements
Project Number: W18

Project Description: Replace 17,400 feet of water distribution line; replacing valves and fire hydrants.

	Unit		Unit Cost		Subtotal
Pipelines					
3-inch	1,950	/LF	$ 75.00	/LF	$ 146,250
4-inch	3,260	/LF	$ 90.00	/LF	$ 293,400
6-inch	7,130	/LF	$ 120.00	/LF	$ 855,600
8-inch	2,750	/LF	$ 160.00	/LF	$ 440,000
10-inch	2,330	/LF	$ 200.00	/LF	$ 466,000
12-inch	-	/LF	$ 240.00	/LF	$ -
16-inch	-	/LF	$ 300.00	/LF	$ -
Wells					
Monitoring Well	-	/LS	$ 150,000	/LS	$ -
Studies					
Seismic/Structural Study - Tanks	-	/GAL	$ 0.04	/GAL	$ -
Cleaning and Inspection					
Water Tank - Cleaning, Disinfection and Inspection	-	/GAL	$ 0.10	/GAL	$ -
Asset Replacement					
Recoat Tank Interior	-	/GAL	$ 0.10	/GAL	$ -
Recoat Tank Exterior	-	/GAL	$ 0.10	/GAL	$ -
VFD Replacement	-	/EA	$ 50,000	/EA	$ -
Pump & Motor	-	/EA	$ 150,000	/EA	$ -
Generator	-	/EA	$ 75,000	/EA	$ -
Electrical & SCADA Equipment	-	/LS	$ 150,000	/LS	$ -
Pump Control (Electrical)	-	/EA	$ 50,000	/EA	$ -
Fire Hydrant Assembly	94	/EA	$ 10,000	/EA	$ 940,000
Valves - General	163	/EA	$ 7,500	/EA	$ 1,222,500
Valves - 10-inch Cla-Val Altitude Valve	-	/EA	$ 25,000	/EA	$ -
Valve Vault & Hatch	-	/EA	$ 15,000	/EA	$ -
Meters	-	/EA	$ 7,500	/EA	$ -
Water Treatment Plant Upgrades					
Intake Structure - Piping Replacement and Reconfiguration	-	/LS	$ 20,000	/LS	$ -
Intake Structure - Cleaning, Sandblasting, Recoating	-	/LS	$ 15,000	/LS	$ -
Intake Structure - Valve Repalcement	-	/EA	$ 2,500	/EA	$ -
Intake Structure - New Flow Meter & Meter Box	-	/EA	$ 7,500	/EA	$ -
Intake Structure - Flow Meter Calibration	-	/LS	$ 1,500	/LS	$ -
Clarifier - Cleaning	-	/LS	$ 15,000	/LS	$ -
Clarifier - Misc Repair of External Coatings	-	/LS	$ 35,000	/LS	$ -
Clarifier - 6-inch gate valve replacement	-	/LS	$ 25,000	/LS	$ -
Sedimentation Basin - Cleaning	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Misc. Concrete Repair Patchwork	-	/LS	$ 30,000	/LS	$ -
Sedimentation Basin - Replacing Piping and Valves	-	/LS	$ 20,000	/LS	$ -
Sedimentation Basin - Chlorine Line Reconnection	-	/LS	$ 5,000	/LS	$ -
Sedimentation Basin - Seal Repair at Inlet	-	/LS	$ 7,500	/LS	$ -
Fitration Units - Cleaning	-	/BASIN	$ 3,500	/BASIN	$ -
Fitration Units - Sand Installation	-	/BASIN	$ 10,000	/BASIN	$ -
Fitration Units - Pipe Testing	-	/BASIN	$ 1,500	/BASIN	$ -
Alum Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Sodium Hydroxide Tank - Replacement of Tank and Piping	-	/LS	$ 20,000	/LS	$ -
Chemical Dosing - Sodium Hypochlorite Tank Concrete Slab and Containment Area	-	/LS	$ 15,000	/LS	$ -
Chemical Dosing - Chemical Piping Flush / Chemical Tubing Replacement	-	/LS	$ 7,500	/LS	$ -
SCADA Upgrades / Start-up / Commissioning	-	/LS	$ 50,000	/LS	$ -
Miscellaneous					
Remove Vegetation and Debris	-	/SF	$ 2.00	/SF	$ -
Sonoma Creek PS - Piping and Valve Recoating	-	/LS	$ 15,000	/LS	$ -
Sonoma Creek PS - Pipe Support Embedment	-	/LS	$ 5,000	/LS	$ -
Sonoma Creek PS - Concrete Pump Pedestal Reapir	-	/LS	$ 20,000	/LS	$ -
Pressure Break Tank PS - Piping and Valve Recoating	-	/LS	$ 6,000	/LS	$ -
Backwash Tank PS - Piping and Valve Recoating	-	/LS	$ 8,000	/LS	$ -
Subtotal					***$ 4,363,750***
Soft Costs & Contingencies					
Survey			5%		$ 218,188
Environmental Documentation			15%		$ 654,563
Engineering Design			12%		$ 523,650
Administration & Legal Fees			5%		$ 218,188
Construction Management & Inspection			10%		$ 436,375
Construction Contingency			30%		$ 1,924,414
Annual Escalation / Year	0	/YR	3%		$ -
TOTAL					**$ 8,339,000**

APPENDIX B

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Water Supply Assessment for the Sonoma Developmental Center
Specific Plan

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Water Supply Assessment for the Sonoma Developmental Center Specific Plan

Valley of the Moon Water District

Final - July 2022
EKI C10069.00

EKI ENVIRONMENT & WATER, INC.

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Water Supply Assessment

Sonoma Developmental Center Specific Plan
Valley of the Moon Water District

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1 INTRODUCTION

Included herein is a Senate Bill 610-compliant water supply assessment (WSA) in support of the proposed Sonoma Developmental Center (SDC) Specific Plan (Proposed Project), which is currently being prepared by the County of Sonoma (County). The Proposed Project is located in the community of Eldridge in Sonoma County, CA and comprises approximately 945 acres across three parcels with the address 15000 Arnold Drive (SDC Property; **Figure 1** and **Figure 2**). Per the project description provided by Sonoma County (Project Proponent; Sonoma County, 2022), the Proposed Project includes:

- A housing development program ranging from 450 to 1,000 residential units;
- A non-housing development program including institutional, office, research and development, and other creative uses focused on sustainability and climate focused enterprises, organizations, and businesses;
- Parks and community gathering spaces and other green spaces, including areas dedicated to wildlife habitat and movement and areas that serve to buffer the community against future wildfire risks;
- Adaptive reuse and new construction of existing historic contributing buildings such as the Main Building, Sonoma House, and key buildings along view corridors; and
- Open space preservation policies to govern the retention and preservation of the open space surrounding the 180-acre core campus, which encompasses the vast majority of the SDC Property (approximately 765 acres).

The Proposed Project is located within the Valley of the Moon Water District (VOMWD or District) Sphere of Influence (**Figure 1**). The VOMWD's most recent adopted Urban Water Management Plan (i.e., the 2020 UWMP; VOMWD, 2021) acknowledges the District's plans to eventually annex and serve the Proposed Project site (i.e., to increase the extent of the VOMWD service area). However, details of the Proposed Project were not known at the time that the 2020 UWMP was published, and thus the Proposed Project was not included in the 2020 UWMP demand and supply analyses. It is assumed that the Proposed Project will be served by local, on-site surface water sources, and VOMWD will be the water supplier for the Proposed Project.

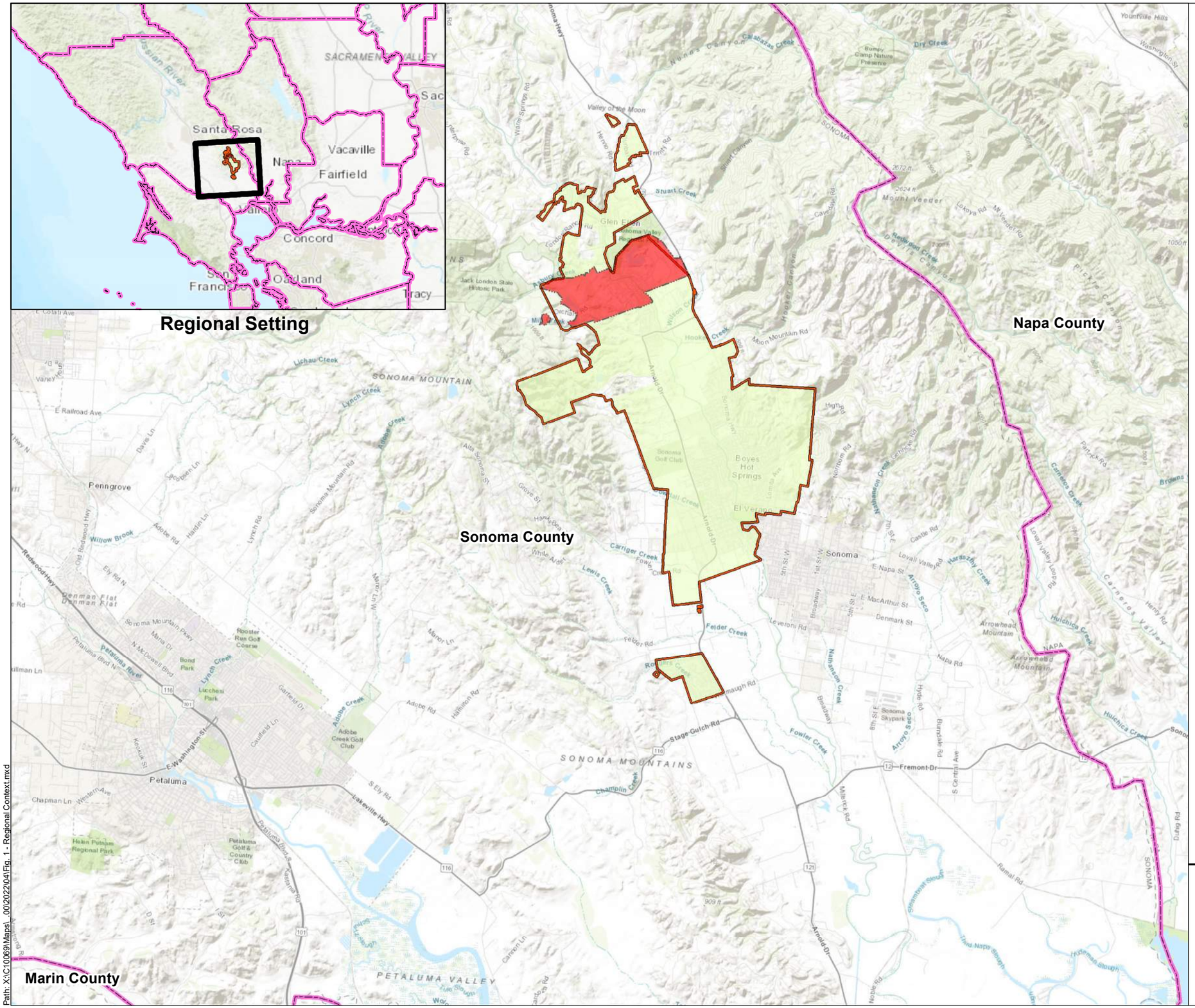
The information provided in this WSA is consistent with California Water Code (CWC or Water Code) §10910-10912 requirements and the California Department of Water Resources' (DWR's) *Guidebook for Implementation of Senate Bill 610 and Senate Bill 221 of 2001: To Assist Water Suppliers, Cities, and Counties in Integrating Water and Land Use Planning*, dated 8 October 2003. The text of specific sub-sections of the Water Code is included as indented and italicized font at the beginning of specific sections of this WSA. The information presented in those respective sections, and the associated tables and figures, respond directly to Water Code requirements.

The purpose of this WSA is to evaluate whether sufficient water supplies are available to meet future demands within the VOMWD service area, including demands associated with the Proposed Project, during normal, single dry, and multiple dry hydrologic years for a 20-year time horizon. More specifically, this WSA includes:

- A summary of the WSA requirements articulated in Water Code §10910-10912 and a description of how they apply to the Proposed Project;
- A description and analysis of the current and projected future water demands of the Proposed Project through the year 2045;
- A description and analysis of the historical, current, and projected future water demands for the VOMWD service area through the year 2045;
- A description and analysis of the current and projected future water supplies for the VOMWD service area through the year 2045; and
- A comparison of the water supplies and demands for the VOMWD service area, including the projected water demands and supplies associated with the Proposed Project.

The information contained in this WSA is based on the 2020 UWMP prepared for the VOMWD, except where updated with relevant water demand and supply reliability and other information from other sources as applicable (e.g., data and information pertinent to the supply sources available at the SDC Property). This WSA has been funded by the State of California, which currently owns the SDC Property.

This WSA concludes that, provided that all surface water rights associated with the SDC Property are available to be utilized by VOMWD to serve the Proposed Project, the Proposed Project will not adversely affect water supply reliability within the VOMWD Service Area. Based on currently available information and conservative estimates of projected demand, the VOMWD expects to be able to meet all future demands within its existing service area, inclusive of the Proposed Project in normal and multiple dry hydrologic years from 2025 through 2045. The shortfalls that are currently projected during single dry years will be addressed through planned implementation of the VOMWD Water Shortage Contingency Plan (WSCP).



Legend

- SDC Property
- County Boundary
- VOMWD Sphere of Influence
- VOMWD Service Area

Abbreviations

SDC = Sonoma Developmental Center
VOMWD = Valley of the Moon Water District
WSA = Water Supply Assessment

Notes

1. All locations are approximate.

Sources

1. Basemap courtesy of Esri.

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Valley of the Moon Water District Service Area and Sphere of Influence and Project Location

Sonoma Developmental Center WSA
Sonoma County, CA
July 2022
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Figure 1

eki environment & water

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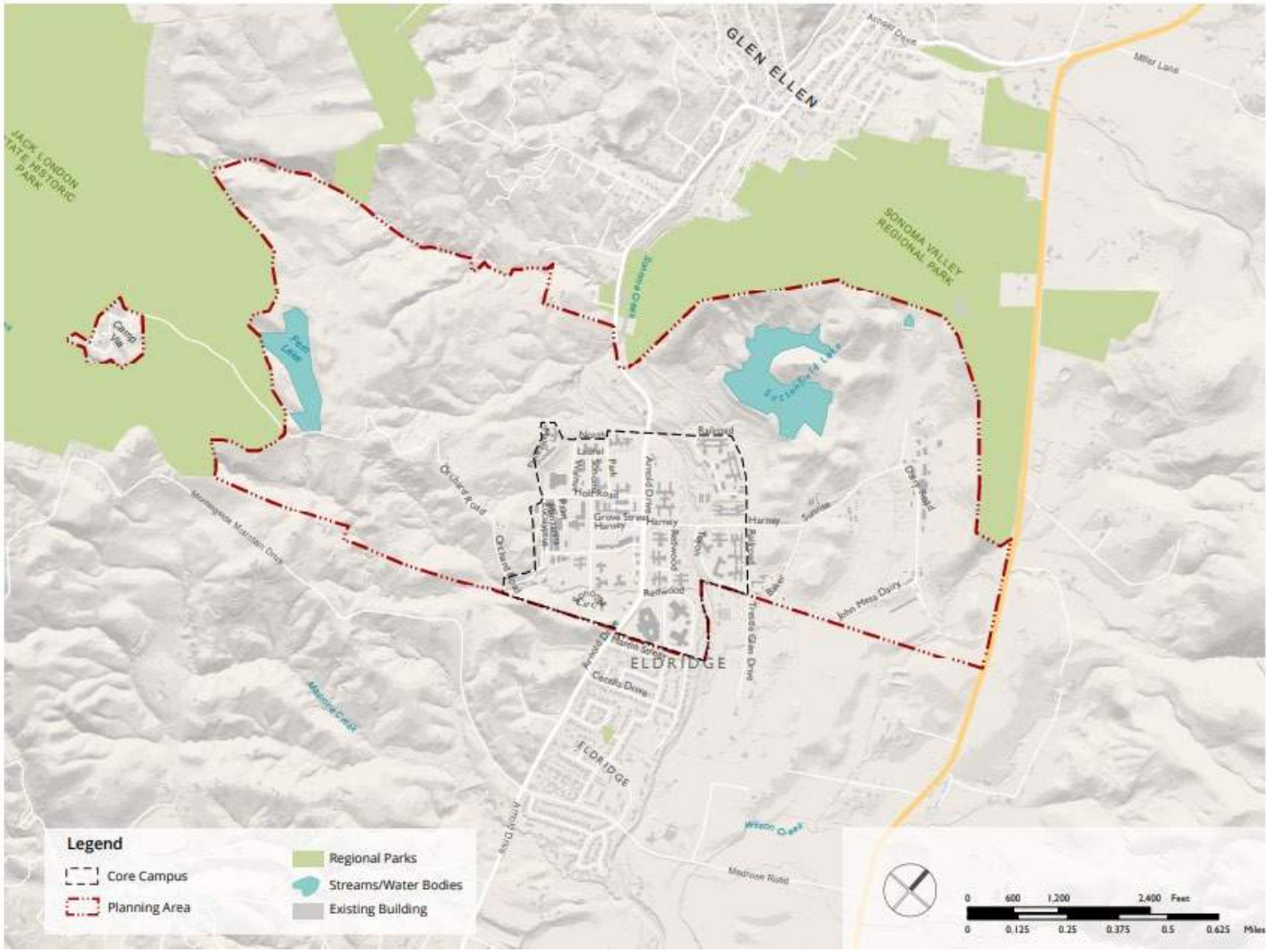
Figure 2. Proposed Project Planning Area



Source: WRT, 2018; Page &Turnbull, 2020; County of Sonoma, 2020; Dyett & Bhatia, 2021

2 GENERAL REQUIREMENTS FOR THE PREPARATION OF A WATER SUPPLY ASSESSMENT

The purpose of this section is to outline what types of projects require the preparation of a WSA, who is responsible for its preparation, and the necessary components of a WSA.

2.1 Applicability of Senate Bill 610 to the Project

Water Code Section 10910

(a) Any city or county that determines that a project, as defined in Section 10912, is subject to the California Environmental Quality Act (Division 13 (commencing with Section 21000) of the Public Resources Code) under Section 21080 of the Public Resources Code shall comply with this part.

Water Code Section 10912

For the purposes of this part, the following terms have the following meanings:

(a) "Project" means any of the following:
- *(1) A proposed residential development of more than 500 dwelling units.*
- *(2) A proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space.*
- *(3) A proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space.*
- *(4) A proposed hotel or motel, or both, having more than 500 rooms.*
- *(5) A proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area.*
- *(6) A mixed-use project that includes one or more of the projects specified in this subdivision.*
- *(7) A project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.*

(b) If a public water system has fewer than 5,000 service connections, then "project" means any proposed residential, business, commercial, hotel or motel, or industrial development that would account for an increase of 10% or more in the number of the public water system's existing service connections, or a mixed-use project that would demand an amount of water equivalent to, or greater than, the amount of water required by residential development that would represent an increase of 10% or more in the number of the public water system's existing service connections.

The Proposed Project is a mixed-use project that includes over 500 residential dwelling units and therefore satisfies the definition of a "project" requiring a WSA pursuant to Senate Bill (SB) 610 (Water Code §10910(a)).

2.2 Responsibility for Preparation of the Water Supply Assessment

Water Code Section 10910

(b) The city or county, at the time that it determines whether an environmental impact report, a negative declaration, or a mitigated negative declaration is required for any project subject to the California Environmental Quality Act pursuant to Section 21080.1 of the Public Resources Code, shall identify any water system that is, or may become as a result of supplying water to the project

identified pursuant to this subdivision, a public water system, as defined in Section 10912, that may supply water for the project. If the city or county is not able to identify any public water system that may supply water for the project, the city or county shall prepare the water assessment required by this part after consulting with any entity serving domestic water supplies whose service area includes the project site, the local agency formation commission, and any public water system adjacent to the project site.

The Proposed Project is located within the VOMWD Sphere of Influence (**Figure 1**) and the District acknowledged its plans to eventually annex and serve the Proposed Project site in the 2020 UWMP (VOMWD, 2021).[1] This WSA assumes that the Proposed Project will be served by on-site surface water sources with VOMWD acting as the water service provider. Therefore, in accordance with Water Code §10910(b), VOMWD is the entity responsible for developing the WSA for the Proposed Project.

2.3 Components of a Water Supply Assessment

Water Code Section 10910

(c) (4) If the city or county is required to comply with this part pursuant to subdivision (b), the water supply assessment for the project shall include a discussion with regard to whether the total projected water supplies, determined to be available by the city or county for the project during normal, single dry, and multiple dry water years during a 20-year projection, will meet the projected water demand associated with the proposed project, in addition to existing and planned future uses, including agricultural and manufacturing uses.

As listed above in Water Code §10910(c)(4), the primary purpose of a WSA is to evaluate whether sufficient water supply is available to meet future demands within the water supplier's service area, including those associated with the Proposed Project, during normal and dry hydrologic years for a 20-year time horizon. Therefore, the following information is included in this WSA:

- A description and analysis of the current and projected future water demands of the Proposed Project through the year 2045;
- A description and analysis of the historical, current, and projected future water demands for the VOMWD service area through the year 2045;
- A description and analysis of the current and projected future water supplies for the VOMWD service area through the year 2045; and
- A comparison of the water supplies and demands for the VOMWD District service area, including the projected water demands and supplies associated with the Proposed Project.

[1] The Proposed Project was not included in the 2020 UWMP demand and supply analyses because details of the Proposed Project were not known when the 2020 UWMP was published.

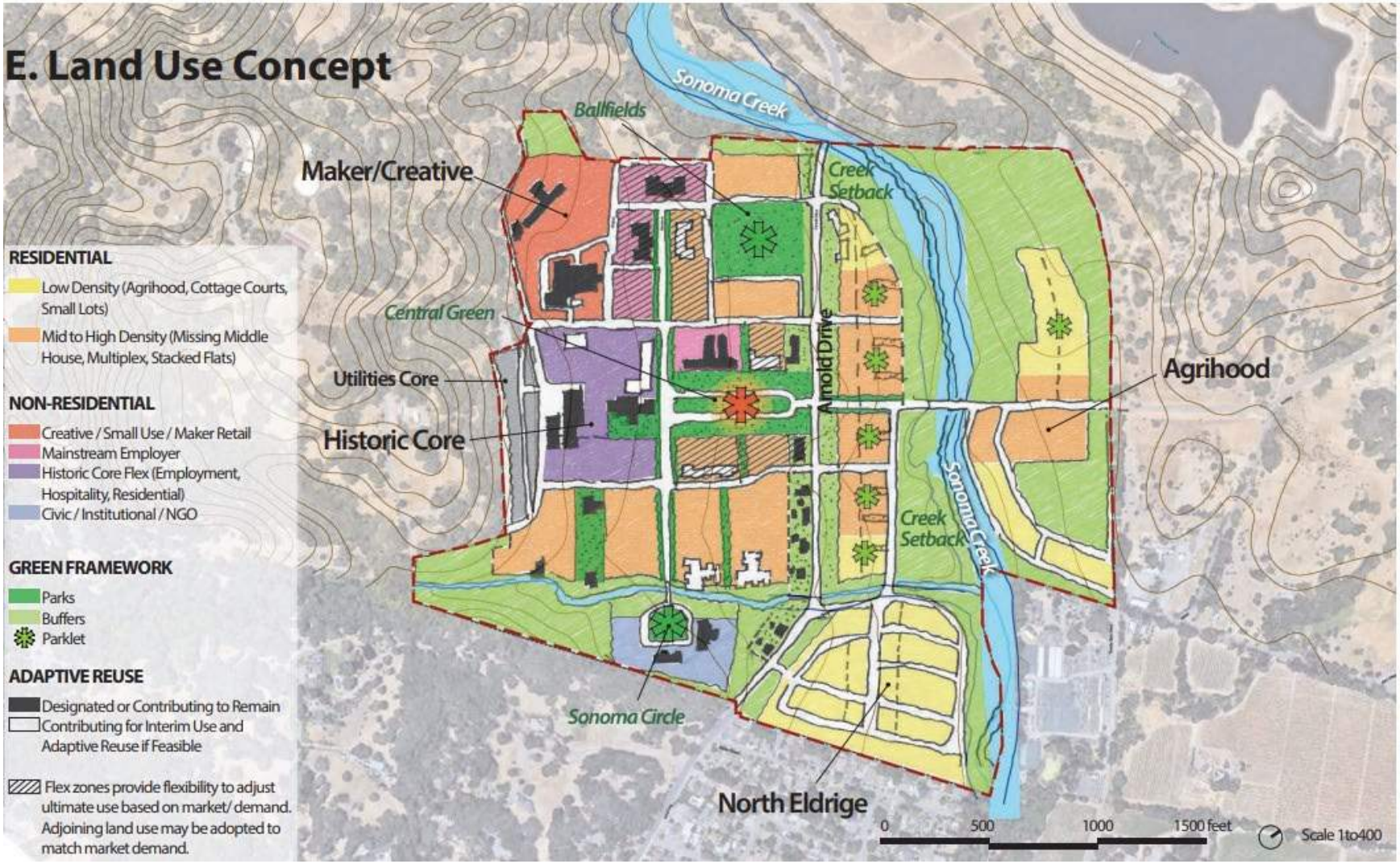
3 PROJECT DESCRIPTION

3.1 Proposed Project Description

The Proposed Project is a mixed-use, multi-building development located in the community of Eldridge in Sonoma County, CA and comprises approximately 945 acres across three parcels with the address 15000 Arnold Drive (see **Figure 2**). Per the project description provided by the Project Proponent (Sonoma County, 2022a) and as shown on **Figure 3**, the Proposed Project includes:

- A housing development program ranging from 450 to 1,000 residential units within the existing 180-acre developed core campus, including market rate and affordable housing, to meet a diversity of community needs. Housing unit types would include small-lot single-family and attached housing, multifamily housing, and "missing middle" housing that reflects the needs of Sonoma County community and workforce, and housing types that support a range of options including family, co-housing, and senior housing, and support services and/or shelter for the unhoused.
- A non-housing development program within the existing 180-acre developed core campus including up to 550,000 square feet (sq ft) of institutional, office, research and development, and other creative uses focused on sustainability and climate focused enterprises, organizations, and businesses.
    - Small-commercial uses—such as restaurants, cafés, and small retail uses—to support neighborhood needs and walkable lifestyles.
    - Visitor and community-serving uses such as a hotel, meeting and event facilities.
    - Public and community uses, such as a museum honoring the legacy of the site, community center or gathering and recreational spaces, emergency command center, fire station, and social support services.
- Parks and community gathering spaces and other green spaces within the existing 180-acre developed core campus, including areas dedicated to wildlife habitat and movement and areas that serve to buffer the community against future wildfire risks.
- Potential creation of a new vehicular route to connect Arnold Drive and Highway 12, either as emergency access or full-time multi-modal access.
- Adaptive reuse and new construction of existing historic contributing buildings such as the Main Building, Sonoma House and key buildings along view corridors. A majority of buildings are likely to be new construction at various heights to ensure efficient use of land and foster compact development, sustainability, and walking and alternative transit use. Climate resilient and multimodal infrastructure may include the development of new streets and bicycle and pedestrian connections, and extensive upgrading of the existing infrastructure as a multi-modal, resilient and sustainable community. Other project components may include but are not limited to development of a microgrid and a recycled water plant/facility, in addition to other utilities and maintenance needs.

Figure 3. Proposed Project Land Use Concept



Source: Sonoma County, Sonoma Developmental Center Vision Plan Frameworks Presentation, 25 January 2022

- Open Space Preservation: The Project will also include policies to govern the retention and preservation of the open space surrounding the 180-acre core campus, which encompasses the vast majority of the SDC Property (approximately 765 acres) and includes two lakes, the Eldridge Cemetery, and Camp Via. Policies will address the use of infrastructure within the open space such as the existing water system infrastructure.

For the purposes of this WSA, it is assumed the first phases of the development will be occupied in 2028 and full buildout of the Proposed Project will be complete by 2045. The Proposed Project buildout schedule is assumed based on information provided by the Project Proponent and is shown in **Table 1**, along with additional land use detail.

3.2 Existing Site Conditions

The SDC Property, encompassing approximately 945 acres, consists of a developed core campus covering approximately 180 acres, approximately 755 acres of contiguous open space, and the 11-acre non-contiguous Camp Via grounds within Jack London State Historic Park (Sonoma County, 2022a). The SDC was established in 1891 to serve the needs of individuals with developmental disabilities and was eventually closed in 2018 by the State of California. The core campus is made up primarily of residential buildings, with other land uses including medical, educational, and administrative buildings interspersed. On the western edge of the core campus, there are several industrial and support buildings. The eastern portion of the campus consists of former agricultural uses and support buildings (County of Sonoma, 2020). Today, the SDC Property is largely unoccupied, with a few staff on-site to maintain the grounds and a few tenants located in buildings east of Arnold Drive. SDC is currently under the oversight and management of the State of California Department of General Services (DGS).

Before the SDC closed in 2018, the SDC water distribution system was an independent, stand-alone, permitted public water distribution system. The system includes water supply sources, a raw water conveyance system, a 1.8-million gallon per day (MGD) surface water treatment plant (WTP), and a potable water distribution system. As shown on **Figure 4**, the SDC water supply system includes a series of lakes, springs, and creeks. There are five existing points of diversion (POD) on the property, (1) Asbury Creek, (2) Hill/Mill Creek, (3) Roulette Springs, (4) Sonoma Creek, and (5) an unnamed stream adjacent to Suttonfield Lake. Asbury Creek and Hill Creek run generally along the north and south borders of the property, respectively. At Asbury Creek and Hill/Mill Creek, there exists a piped POD, weir structure, gages, and monitoring equipment (Sherwood Design Engineers, 2018). The water diverted from these creeks is conveyed via a series of gravity-fed pipes to Fern Lake, located near the western boundary of the property. The POD at Sonoma Creek includes a pump station from which water is pumped to Suttonfield Lake or to the WTP for direct use. Water from the unnamed stream is diverted directly to Suttonfield Lake. Fern Lake and Suttonfield Lake collectively provide 840 acre-feet (AF) of raw water storage. Water diverted from a group of seeps known as Roulette Springs is piped directly to the WTP (Sherwood Design Engineers, 2018). The SDC holds two appropriative rights and three combined riparian rights and pre-1914 rights, which govern how much water can be diverted from each POD on the SDC Property and how the water can be beneficially used. Water rights on the SDC

Property are discussed further in Section 6.2.1. The SDC Property also includes four groundwater supply wells that are all currently inactive.

Based on WTP production data provided by DGS from 1969 to 2007, a period during which the SDC was operating at or near full capacity, water use averaged 622 acre-feet per year (AFY) and peaked at 1,143 AFY in 1986 (**Appendix A**).[2] Through active management of the local surface water sources on the SDC Property and storage capacity in Fern Lake and Suttonfield Lake, the SDC historically provided reliable, year-round domestic water to the entire campus and served as a back-up water supply source for Sonoma County to mitigate water service disruption to retail customers in the Sonoma Valley during emergencies, such as fire and earthquakes.

In 2019 the WTP at the SDC was shut down due to a lack of certified treatment and distribution operators and the permit to operate as a public water system was revoked. Since that time, portions of the SDC water distribution system have remained in operation to serve existing users through a service connection to the Sonoma County Water Agency (SCWA) system. Demands between July 2019 and July 2021 averaged approximately 142 AFY. This WSA assumes that land uses associated with the existing demands will be replaced by the those associated with the Proposed Project (i.e., the Proposed Project demands are not additive to existing demands).

[2] The high historical SDC production including the peak in 1986 was possible because a dam was installed directly downstream of the Sonoma Creek POD. The dam was removed in the late 1980s due to a broken fish ladder. Current Sonoma Creek diversions are limited to periods when the creek stage is high enough to inundate the diversion structure/pump wet well.

Table 1

Proposed Project Land Use Assumptions

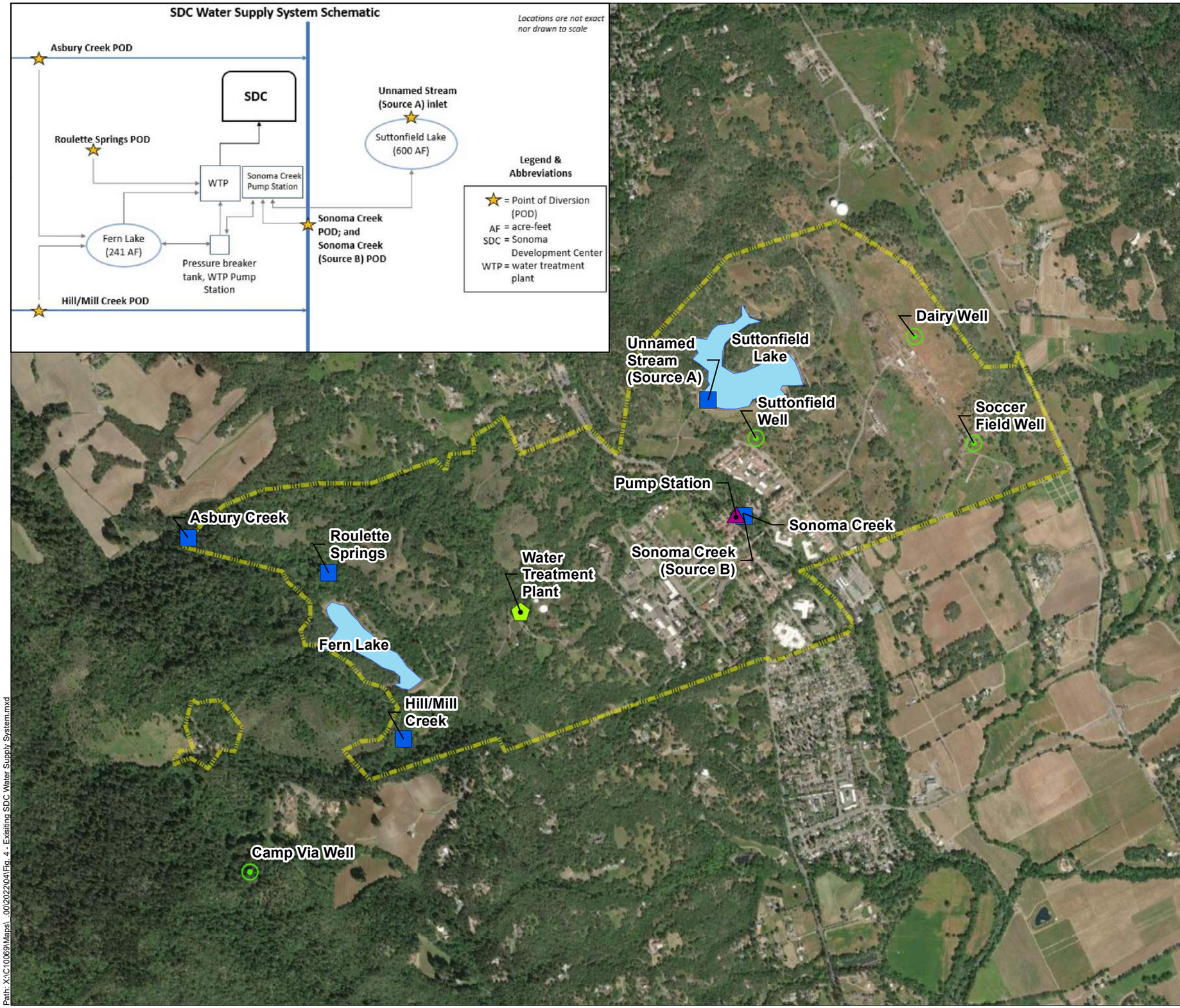
Sonoma Developmental Center Specific Plan, Sonoma County, California

Project	Land Use	Total Land Use (a)	Land Use Units	Cumulative Buildout (a)					Description
				2025	2030	2035	2040	2045	
Sonoma Developmental Center Specific Plan	Single Family Residential	250	du	0	40	90	150	250	A Single Family Residential unit is assumed to have an average living area of 1,650 sf per Reference 1
	Multi-Family Residential	500	du	0	0	80	260	500	--
	"Missing Middle" Residential	250	du	0	40	90	150	250	A "Missing Middle" Residential unit is assumed to have an average living area of 1,300 sf per Reference 1
	Hotel	100,000	sf	0	100,000	100,000	100,000	100,000	It is assumed that the hotel will have 167 employees per Reference 1
	General Commercial	40,000	sf	0	15,000	25,000	30,000	40,000	--
	Office	127,500	sf	0	20,000	40,000	90,000	127,500	--
	Public / Institutional	155,000	sf	0	25,000	75,000	100,000	155,000	--
	Research & Development	127,500	sf	0	0	25,000	100,000	127,500	--
	Total Open Space	3,116,000	sf	0	0	0	0	0	It is assumed that this area is not irrigated.
	Irrigated Park Area	488,000	sf	0	78,710	236,129	314,839	488,000	Area assumed to be built out on the same schedule as the Public/Institutional land use. Area assumed to be 50% irrigated per Reference 1.
	Other Irrigated Common Space Areas (e.g., landscaped medians)	148,000	sf	0	23,871	71,613	95,484	148,000	Area assumed to be built out on the same schedule as the Public/Institutional land use. Area assumed to be 50% irrigated per Reference 1.

Abbreviations:
"du" = dwelling units
"sf" = square feet

Notes:
(a) Land use and buildout estimates are based on information per Reference 1.
(b) Irrigated Park Area and Other Irrigated Common Space Areas cumulative buildout schedule is the same as Pubic / Institutional.

References:
1. Sonoma County Permit & Resource Management Department via email April 2022.



Legend

- Pump Station
- Points of Diversion
- SDC Property
- Reservoir's
- Inactive Wells
- Water Treatment Plant

Abbreviations
SDC = Sonoma Developmental Center
WSA = Water Supply Assessment

Notes
1. All locations are approximate.

Sources
1. Locations of inactive wells recieved by EKI from Wood Rogers, October 2021
2. Basemap courtesy of Esri.

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Existing SDC Water Supply System

Sonoma Developmental Center WSA
Sonoma County, CA
July 2022
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eki environment & water

Figure 4

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4 PROJECT WATER DEMAND

Sonoma County has adopted green building standards and water efficient landscaping ordinances consistent with previous versions of the CalGreen building standards and the California Model Water Efficient Landscape Ordinance (MWELO; California Code of Regulations, Title 23, Division 2, Chapter 2.7). As part of state requirements, all new developments must comply with these efficiency standards. As such, the Proposed Project development is expected to include several water-efficient features, including, but not limited to:

- Use of low-flow lavatory faucets, kitchen faucets, toilets, and urinals in accordance with CalGreen Code; and
- Inclusion of low-water use landscaping and high-efficiency irrigation systems to minimize outdoor water use in accordance with MWELO.

As described below, the average annual residential and commercial/institutional water demand associated with the Proposed Project was estimated based on water demand factors developed in support of the District's 2020 UWMP (VOMWD, 2021). The District evaluated a range of water demand factors for each water use sector using three water use scenarios, based on recent historical average per account water use for selected time periods, representing pre-drought water use rates, post-drought water use rates, and a partial rebound to pre-drought water use rates. Specifically:

1. **Pre-drought demand factors** based on the maximum per account water use by sector for 2011 through 2013, generally representing higher water use before drought restrictions were put in place;
2. **Post-drought demand factors** based on the maximum per account water use by sector for 2017 through 2019, generally representing lower water use than pre-drought conditions but with some amount of rebound; and
3. **Partial rebound demand factors** estimated as the midpoint of the pre-drought and post-drought demand factors, representing an average of the two scenarios.

For the purposes of developing the District's 2020 UWMP demand projections, the District elected to apply the partial rebound demand factors to all sectors. As such, partial rebound demand factors were applied herein to estimate the average annual water demand for the Proposed Project. Water demands associated with the hotel and research and development portions of the Proposed Project were estimated based on literature values, as described in Section 4.4. **Table 2** includes a summary of the water demand factors used to estimate water demand associated with the Proposed Project.

Table 2 includes a summary of the water demand projections associated with the proposed land uses through buildout of the Proposed Project, including assumed distribution system losses. As described in Section 3, for the purpose of this WSA, it is assumed that full Project buildout is achieved by 2045.

Table 2

Proposed Project Water Demand Estimates

Sonoma Developmental Center Specific Plan, Sonoma County, California

Project	Land Use	Water Use Factor (a)	Water Use Factor Units	Estimated Water Use (AFY) (b)				
				2025	2030	2035	2040	2045
Sonoma Developmental Center Specific Plan	Single Family Residential	244	gpd/du	0	11	25	41	68
	Multi-Family Residential	100	gpd/du	0	0	9.0	29	56
	Missing Middle Residential	172	gpd/du	0	7.7	17	29	48
	Hotel	0.16	AFY/employee	0	28	28	28	28
	General Commercial	1.79	AFY/100 sf	0	2.7	4.5	5.4	7.2
	Office	1.79	AFY/100 sf	0	3.6	7.2	16	23
	Public / Institutional	1.79	AFY/100 sf	0	4.5	13	18	28
	Research & Development	2.35	AFY/100 sf	0	0	6	24	30
	Total Open Space	--	--	--	--	--	--	--
	Irrigated Park Area	(c)	--	0	3.5	10	14	21
	Other Irrigated Common Space Areas	(c)	--	0	0	1.4	1.9	2.9
System Water Losses (d)	N/A	9.5%	--	0.0	5.8	12	19	30
			Total (e)	0	67	133	225	342

Abbreviations:

"AFY" = acre-feet per year
"du" = dwelling units
"MAWA" = Maximum Applied Water Allowance
"MWELO" = Model Water Efficient Landscaping Ordinance
"sf" = square feet
"VOMWD" = Valley of the Moon Water District

Notes:

(a) Single Family Residential and Multi-Family Residential, General Commercial, Office, and Public/Institutional water use factors are based on the factors developed for VOMWD in Reference 2. The "Missing Middle" Residential water use factor is assumed to equal the average between Multi-Family and Single Family Residential water use factors. The Hotel water use factor is based on Reference 3 and an assumed 167 employees per Reference 1. The Research and Development Water Use Factor is based on factors developed by Redwood City, California in Reference 4.

(b) Estimated Water Use equals the land use estimates provided in Table 1 (based on Reference 1) multiplied by the water use factors for each land use.

(c) Estimates of landscape irrigation are based on MWELO MAWA calculations per Reference 6. See Table 3 for MWELO

(d) Estimated distribution system water loss is calculated using the VOMWD's fiscal year 2020-2021 DWR Water Audit Report percent non-revenue water (i.e., 9.5% of project demands), per Reference 6 and includes both real and apparent losses and other non-revenue consumption.

(e) Totals may not sum due to rounding.

References:

1. Sonoma County Permit & Resource Management Department via email April 2022.
2. 2020 Urban Water Management Plan, VOMWD, dated June 2021.
3. Pacific Institute, 2003. Waste Not, Want Not: The Potential for Urban Water Conservation in California, November 2003.
4. Redwood City, 2019. Engineering Standards Volume 3. Water Demand Projection Worksheet.
5. DWR, 2021. WUEdata - Water Audit Report Data website, accessed 28 April 2021, (https://wuedata.water.ca.gov/awwa_plans).
6. California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.

4.1 Residential Water Use

As described in Section 3, a total of 1,000 dwelling units are estimated for the Proposed Project, with 250 dwelling units assumed to be single-family residential (SFR), 250 assumed to be "missing middle" housing, and 500 assumed to be multi-family residential (MFR). Consistent with the District's 2020 UWMP, the water demand factors for SFR units and MFR units are estimated to be 244 gallons per dwelling unit (gpd/du) and 100 gpd/du, respectively. The demand factor for the "missing middle" units is assumed to be the average of the SFR and MFR demand factors or 172 gpd/du.

Applying these water demand factors, the residential component of the Proposed Project is expected to use approximately 173 AFY at full Project buildout (excluding the distribution system losses discussed in Section 4.6). It should be noted that a portion of the water used for residential irrigation also returns to the local groundwater basin and thus augments the groundwater supply used elsewhere by VOMWD. However, for purposes of this WSA, all water used for residential purposes is conservatively considered a demand.

4.2 Commercial and Institutional Water Use

Consistent with the District's 2020 UWMP, the water demand factor for Commercial/Institutional uses was calculated on a per acre-foot basis based on the average building area of commercial and institutional accounts within the VOMWD service area.

Based on land use information provided by the County, commercial/institutional development for the Project will include 40,000 sq ft of general commercial, 127,500 sq ft of office, and 155,000 sq ft of public/institutional.

The water demand factor for commercial/institutional land uses of 1.79 AFY/100 sq ft is applied for general commercial, office, and public/institutional uses. The resultant total commercial, office, and public/institutional water use is expected to be 58 AFY at buildout (excluding the distribution system losses discussed in Section 4.6).

4.3 Research and Development Uses

Based on land use information provided by the County, the Project will include 127,500 sq ft of research and development land uses. The water demand associated with the research and development uses planned as part of the Proposed Project is estimated based on a unit demand factor of 2.35 AFY/100 sq ft sourced from published Redwood City, California water demand assumptions (City of Redwood City, 2019). The resultant total research and development water use is expected to be 30 AFY at buildout (excluding the distribution system losses discussed in Section 4.6).

4.4 Hotel Water Use

The water demand associated with the hotel planned as part of the Proposed Project is estimated based on an employee-based demand factor of 0.16 AFY/employee. The selected demand factor

is based on literature values included in *Waste Not, Want: The Potential for Urban Water Conservation in California* (Pacific Institute, 2003). Based on 167 hotel employees assumed by the County, the resultant total hotel water use is expected to be 28 AFY at buildout (excluding the distribution system losses discussed in Section 4.6).

4.5 Community Landscaping Water Use

The projected water demand for the community landscaping included as part of the Proposed Project was estimated based on the Maximum Applied Water Allowance (MAWA) per the MWELO (California Code of Regulations, Title 23, Division 2, Chapter 2.7). The MWELO requires that the annual estimated total water use for landscape irrigation not exceed the MAWA. As shown below, the MAWA is calculated based on the regional reference evapotranspiration rate, an evaporation adjustment factor, the total landscaped area, and the area of "special landscaped area."[3] We have conservatively assumed that water use for the Proposed Project landscaping irrigation will be equal to the MAWA, which is the upper limit of annual applied water for established landscaped areas.

The MAWA is calculated using the following equation:

$$MAWA = ETo \times [(ETAF \times LA) + (1-ETAF) \times SLA]$$

where:

ETo	=	The regional reference evapotranspiration rate[4]
ETAF	=	Evapotranspiration Adjustment Factor For parks (SLAs) = 1.0 For landscape corridors = 0.45
LA	=	Total landscape area (including SLA)
SLA	=	Special Landscape Area

Table 3 summarizes the anticipated land use assumptions for each landscaping type, assuming 50% of the total land use area will be irrigated, based on the Project Description and information provided by the County. Based on the above methodology and information provided by the County, the total annual water use for the community landscaping is estimated to be 24 AFY at full buildout as shown in **Table 3** (excluding the distribution system losses discussed in Section 4.6).

[3] Special Landscaped Area includes landscaping dedicated solely to edible plants, recreational areas, areas irrigated with recycled water, or water features using recycled water.

[4] Location-specific ETo data is required for calculating the MAWA. Reference evapotranspiration data were obtained from Appendix A of the MWELO (California Code of Regulations, Title 23, Division 2, Chapter 2.7) based on values for the Valley of the Moon. The total annual reference evapotranspiration is 46.1 inches as shown in **Table 3**.

Table 3

Proposed Project Landscaping Water Demand Estimates

Sonoma Developmental Center Specific Plan, Sonoma County, California

Landscaping Land Use (a)	[A] Area of Irrigated Land Use at Buildout (ac) (a)	[B] Annual Reference Evapotranspiration Rate (in) (b)	[C] Evapotranspiration Adjustment Factor (ETAF) (c)	[D] Maximum Allowance (AFY) D = A * B * C (d)	Estimated Water Use (AFY)				
					2025	2030	2035	2040	2045
Irrigated Park Area	5.6	46.1	1	21	0.0	3.5	10.4	14	21
Other Irrigated Common Space Areas	1.7	46.1	0.45	2.9	0.0	0.5	1.4	1.9	2.9
Estimated Total Outdoor Water Use (e)				**24**	**0.0**	**3.9**	**11.8**	**16**	**24**

Abbreviations:

"ac" = acre

"AFY" = acre-feet per year

"ETAF" = Evapotranspiration Adjustment Factor

"in" = inches

"MAWA" = Maximum Applied Water Allowance

Notes:

(a) Irrigated area is estimated to be 50% of total area for each land use per Reference 1.

(b) Annual reference evapotranspiration rate for the Valley of the Moon area is from Reference 2.

(c) The ETAF is 1.0 for parks and 0.45 for other non-residential areas per Reference 2.

(d) The MAWA calculations are described in Reference 2.

(e) Totals may not sum due to rounding.

References:

1. Sonoma County Permit & Resource Management Department via email April 2022.
2. California Code of Regulations, Title 23, Division 2, Chapter 2.7, Model Water Efficient Landscape Ordinance.

4.6 Distribution System Losses

Water distribution systems experience a degree of water loss over the course of transmission from the source to the customer. Although losses from the newly-constructed portion of the system's infrastructure associated with the Proposed Project would initially be expected to be minimal, it is conservatively assumed that distribution system losses associated with delivering water to the Proposed Project will ultimately be consistent with the average percentage of non-revenue water (including real, apparent, and other losses) per the validated 2020-2021 Fiscal Year water loss audit submitted to DWR for the VOMWD (i.e., 9.5% of Proposed Project demands; DWR, 2022). It should be noted that while these losses represent a demand on the system, a portion of the water lost through the distribution system returns to the underlying groundwater basin and thus augments the groundwater supply used elsewhere by VOMWD. However, for purposes of this WSA, all water loss is conservatively considered a demand. **Table 2** shows the non-revenue water associated with the Proposed Project, estimated to be 29 AFY at buildout.

4.7 Existing Water Demand on the Proposed Project Site

As described in Section 3.2, the Proposed Project site is currently developed as the SDC core campus which encompasses approximately 180 acres, approximately 755 acres of undeveloped open space areas, and 11 acres of campgrounds in the community of Eldridge in Sonoma County. Water use at the Proposed Project site averaged approximately 142 AFY between July 2019 and July 2021 after the closing of SDC facilities in 2018. These demands are assumed to be replaced by the those associated with the Proposed Project. However, based on historical water production data provided by DGS from 1969 to 2007, a period during which the SDC was operating at or near full capacity, water use averaged 622 AFY and peaked at 1,143 AFY in 1986 (**Appendix A**).

4.8 Total Project Water Demand

Based on the above methodologies and assumptions, the total annual water demand for the Proposed Project at full buildout and occupancy is conservatively estimated to be 342 AFY, as shown in **Table 2**.

5 VALLEY OF THE MOON WATER DISTRICT WATER DEMAND

Water Code Section 10910

(c) (1) The city or county, at the time it makes the determination required under Section 21080.1 of the Public Resources Code, shall request each public water system identified pursuant to subdivision (b) to determine whether the projected water demand associated with a proposed project was included as part of the most recently adopted urban water management plan adopted pursuant to Part 2.6 (commencing with Section 10610).

(c) (2) If the projected water demand associated with the proposed project was accounted for in the most recently adopted urban water management plan, the public water system may incorporate the requested information from the urban water management plan in preparing the elements of the assessment required to comply with subdivisions (d), (e), (f), and (g).

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

Consistent with the UWMP Act (CWC §10610-10656), the 2020 UWMP presents estimates of projected future water demand for the VOMWD service area in five-year increments, between the years 2025 and 2045 (VOMWD, 2021). Projected water demand is subdivided between the following six customer sectors or use types: (1) residential single family, (2) residential multi-family, (3) commercial/institutional, (4) landscape/irrigation, (5) other, and (6) system losses. As discussed further below, the District's 2020 UWMP demand projections account for: (1) demands for the existing service area and accounts, (2) projected growth based on population and employment estimates, and (3) all anticipated new development based on information available to VOMWD at the time of plan preparation.

The number of SFR services and MFR services within the VOMWD service area are projected to increase by approximately 17% and 35%, respectively, between 2025 and 2045.[5] This corresponds to 1,102 new SFR service connections and 167 new MFR service connections within the District's existing service area. Commercial/institutional accounts are projected to increase by approximately 51% between 2025 and 2045, corresponding to 123 new service connections within the District. Despite the significant growth anticipated in the VOMWD service area over the planning horizon and the District's plans to eventually annex and serve the Proposed Project site, the Proposed Project was not explicitly included in the demand projections developed in support of the 2020 UWMP given uncertainties associated with the details of the SDC Property redevelopment. As such, the demand for the Proposed Project is assumed to be incremental to the 2020 UWMP demands.

[5] Service growth projections projected in the 2020 UWMP are tied to census tract level population, housing, and employment projections developed by the Association of Bay Area Governments (ABAG).

5.1 Current and Historical Water Demand Within the VOMWD District Service Area

Historical water demand within the VOMWD from 2011 through 2021 is summarized in **Table 4**. Based on water use data from 2017-2021, the majority of the water demand within the VOMWD is from the SFR sector, which represented 66% of the demand. The remainder of the demand was split between MFR (20% of overall demand), commercial/institutional (10% of overall demand), landscape/irrigation (2.4% of overall demand), and other (2% of overall demand) (VOMWD, 2021).

As shown in **Table 4,** water demand within the VOMWD service area increased from 2011 to 2013, a period that generally corresponds with the recovery from the 2007-2009 drought and economic downturn. Then, a significant drop in water demand occurred in 2015, corresponding with the recent historic drought and mandatory state-wide water use restrictions and water conservation targets. Average water demand from 2015 to 2021 was approximately 2,553 AFY within the VOMWD service area. Total water demand within the VOMWD service area was 2,789 AFY in 2021 based on recent water demand data provided by VOMWD.

5.2 Planned Development Projects within the Valley of the Moon Water District Service Area

Water demands for the VOMWD service area were estimated through 2045 in support of the District's 2020 UWMP (VOMWD, 2021). The 2020 UWMP demand projections incorporate current and historical water usage within the VOMWD service area, which reflect VOMWD's best efforts to include the development and growth that has occurred and is projected to occur within the VOMWD service area to date (VOMWD, 2021). As described above, while the 2020 UWMP water demand projections account for growth within the current VOMWD service area, the Proposed Project is not explicitly included in these projections. Therefore, the VOMWD demands presented in **Table 5** are inclusive of all identified and anticipated development, excluding the Proposed Project water demand. **Table 5** shows the impact of the Proposed Project water demand on the VOMWD demand totals.

5.3 Water Demand Projections

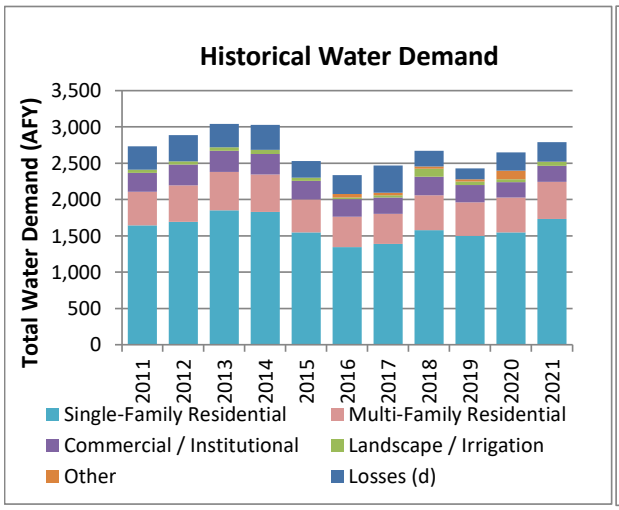
Demand projections for the VOMWD service area are presented in **Table 5** in five-year increments. It is estimated that, inclusive of the Proposed Project, the total annual water demand within the VOMWD service area will be approximately 3,819 AFY in 2045.

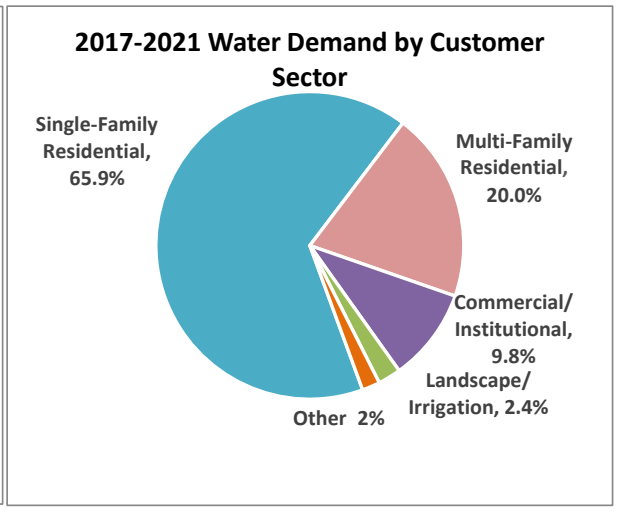
Table 4

Historical Water Demand for Valley of the Moon Water District

Sonoma Developmental Center Specific Plan, Sonoma County, California

Category	Historical Annual Water Demand (a) (AFY)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Single-Family Residential	1,643	1,693	1,853	1,830	1,547	1,344	1,387	1,578	1,497	1,547	1,734
Multi-Family Residential	466	503	529	515	456	420	414	480	465	481	510
Commercial / Institutional	260	287	289	282	255	241	224	258	238	210	221
Landscape / Irrigation (b)	44	43	47	58	41	24	33	108	47	42	51
Other (c)	--	--	--	--	--	46	34	33	32	118	7.0
Losses (d)	320	360	324	344	229	259	378	214	151	251	266
Total Water Demand	**2,733**	**2,886**	**3,042**	**3,029**	**2,528**	**2,334**	**2,470**	**2,670**	**2,430**	**2,649**	**2,789**





Abbreviations:

"AFY" = acre-feet per year

"VOMWD" = Valley of the Moon Water District

Notes:

(a) Historical water supply demand data from 2011-2016 are from Reference 1. Historical water demand data from 2016-2020 are from Reference 2. Water demand data from 2021 are from Reference 3. All data reported in fiscal year.

(b) Landscape / Irrigation is a combination of multi-family irrigation, commercial irrigation, and landscape sectors.

(c) "Other" is a water demand category only between fiscal years 2016 - 2021 and is a combination of unbilled and unmetered consumption such as fire flow, system flushing, etc.

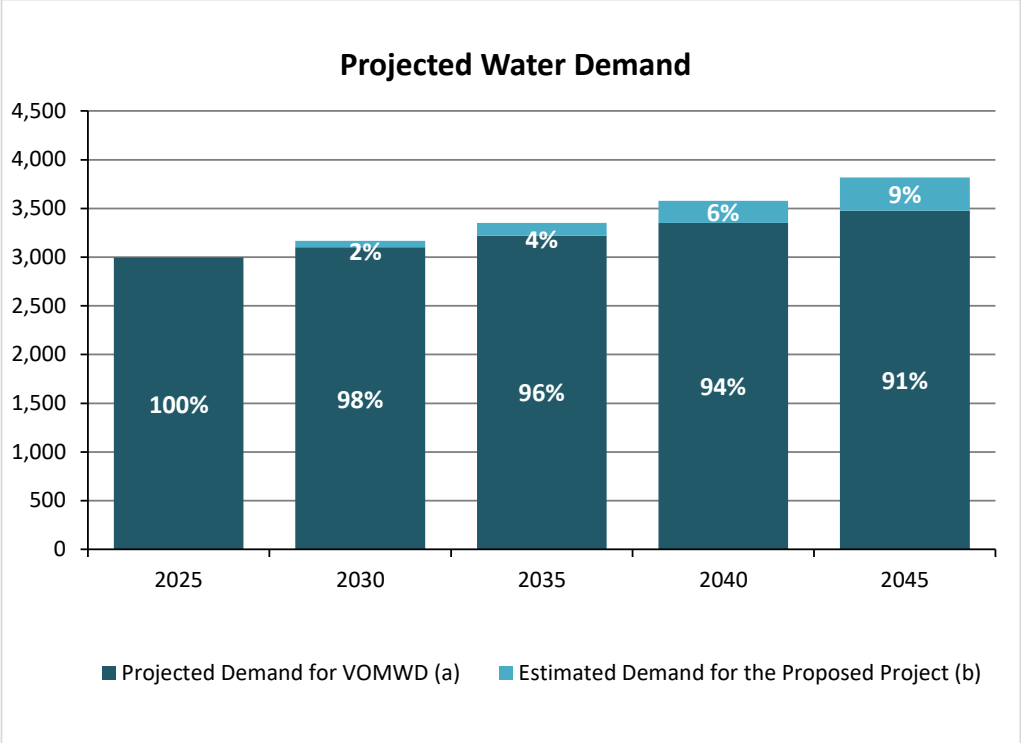
(d) Losses for 2016 - 2020 and 2011 - 2015 per References 1 and 2, respectively. For 2019 where losses data was unavailable, the average percent water loss for 2016 - 2018 was applied. Non-revenue water reports for 2016 - 2018 are in calendar year, and the actual losses in the fiscal year shown here are likely to be slightly different. Losses reported for 2011-2015 include all non-revenue water.

References:

1. VOMWD, 2016. 2016 Urban Water Management Plan, dated June 2016.
2. VOMWD, 2021. 2020 Urban Water Management Plan, dated June 2021.
3. Data provided by VOMWD as part of the 2022 Annual Water Supply and Demand Assessment, shared April 2022.
4. DWR, 2021. WUEdata - Water Audit Report Data website, accessed 28 April 2021, (https://wuedata.water.ca.gov/awwa_plans).

Table 5
Total Projected Water Demand for the Valley of the Moon Water District and the Proposed Project
Sonoma Developmental Center Specific Plan, Sonoma County, California

Water Demand	2025	2030	2035	2040	2045
Projected Demand for VOMWD (a)	2,996	3,101	3,220	3,353	3,477
Estimated Demand for the Proposed Project (b)	0	67	133	225	342
Projected Water Demand Inclusive of Project	***2,996***	***3,168***	***3,353***	***3,578***	***3,819***



Abbreviations:

"AFY" = acre-feet per year
"SDC" = Sonoma Developmental Center
"WSA" = Water Supply Assessment
"VOMWD" = Valley of the Moon Water District

Notes:

(a) Water demand projections for the VOMWD are presented per Reference 1.
(b) Estimated demands for the proposed Project are shown in Table 2.

References:

1. VOMWD, 2021. 2020 Urban Water Management Plan, dated June 2021.

6 VALLEY OF THE MOON WATER DISTRICT WATER SUPPLY

This section identifies the water supplies for the VOMWD and discusses the variability of the different supplies based on drought and other factors affecting water supply reliability. The VOMWD's water supplies presently come from a combination of imported water from Sonoma County Water Agency (SCWA or Sonoma Water) and, to a lesser degree, local groundwater pumped by the District from the Sonoma Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin California Department of Water Resources [DWR] Basin No. 2-2.02 and from areas within the District's service area outside of the Sonoma Valley Subbasin.[6] The VOMWD's historical water supplies from 2011 through 2021 are summarized in **Table 6**.

In addition to the VOMWD's existing water sources, this WSA assumes that the water rights associated with the SDC Property will be available to be utilized by VOMWD to serve water demands associated with the Proposed Project on the occasion that the SDC water system is annexed by the VOMWD. The annexation of the SDC water system in the VOMWD will require a transition process that includes but is not limited to Local Agency Formation Commissions (LAFCO) proceedings, interagency agreements, California Environmental Quality Act Compliance, necessary infrastructure improvements, and State Water Resources Control Board permitting. The exact nature and timing of the transition will depend on the specifics of the Proposed Project development. This WSA assumes that the annexation and ongoing operations of the SDC water system by VOMWD to serve the Proposed Project will be economically feasible.

VOMWD's existing and planned water supplies are described further in the following sections.

6.1 Identification of Water Supply Rights

Water Code Section 10910

(d) (1) The assessment required by this section shall include an identification of any existing water supply entitlements, water rights, or water service contracts relevant to the identified water supply for the proposed project, and a description of the quantities of water received in prior years by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), under the existing water supply entitlements, water rights, or water service contracts.

Pursuant to Water Code §10910(d)(1), a WSA is required to include identification of all water supply entitlements, water rights, and water service contracts relevant to the identified water supply for the Proposed Project. In accordance with these requirements, this WSA includes a summary of each of VOMWD's current and anticipated supply sources in the VOMWD service area, as well as those associated with the SDC Property.

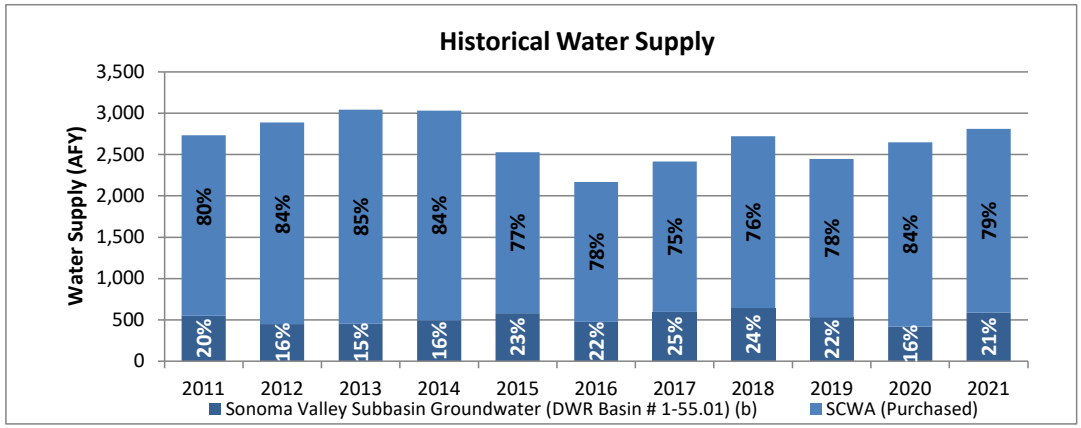
[6] VOMWD also holds water diversion rights for springs located on Sonoma Mountain. These water rights are not currently in use and are assumed to not be used to serve the SDC Property at any point in the future. Thus, these water rights are not discussed further herein.

Table 6

Historical Water Supply for Valley of the Moon Water District

Sonoma Developmental Center Specific Plan, Sonoma County, California

Water Supply Source	Historical Water Supply (a) (AFY)										
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Sonoma Valley Subbasin Groundwater (DWR Basin # 1-55.01) (b)	550	449	453	495	581	477	596	644	526	419	589
SCWA (Purchased)	2,183	2,437	2,589	2,534	1,947	1,691	1,819	2,075	1,919	2,230	2,220
Total Water Supply	**2,733**	**2,886**	**3,042**	**3,029**	**2,528**	**2,168**	**2,415**	**2,719**	**2,445**	**2,649**	**2,809**



Abbreviations:

"AFY" = acre-feet per year

"SCWA" = Sonoma County Water Agenecy

"VOMWD" = Valley of the Moon Water District

Notes:

(a) Historical water supply data from 2016-2020 are from Reference 1. Historical water supply data from 2011-2015 are from Reference 2. Water supply data from 2021 are from Reference 3. All data reported in fiscal year.

(b) Note that a portion of the VOMWD's groundwater production included herein is from groundwater wells located outside of the Sonoma Valley Subbasin boundaries.

References:

1. VOMWD, 2021. 2020 Urban Water Management Plan, dated June 2021.
2. EKI, 2019. Valley of the Moon Water District Water Master Plan, dated April 2019.
3. Provided by VOMWD as part of the 2022 Annual Water Supply and Demand Assessment, shared April 2022.

6.2 Local Surface Water

6.2.1 Valley of the Moon Water District Surface Water Rights

The VOMWD holds water diversion rights for springs located on Sonoma Mountain. These water rights are not currently in use and are assumed to not be used to serve the District or the SDC Property in the future. Thus, these water rights are not discussed further herein.

6.2.2 Surface Water Rights Associated with the SDC Property

The State of California Department of Developmental Services - Sonoma Developmental Center holds several water rights at multiple PODs on the SDC Property. The watercourses and PODs present on the property are identified in **Figure 4**. As summarized in **Table 7**, the water rights associated with the SDC Property include two appropriative rights and three combined riparian rights and pre-1914 rights.[7] Each water right includes specific temporal and/or volumetric restrictions, described further in **Appendix B**, which govern diversions at each respective POD. The restrictions associated with the water rights summarized in **Table 7** govern how much water can be diverted from each POD on the Proposed Project site, when it can be diverted, and how the water can be beneficially used.

The statements on the Hill/Mill Creek, Roulette Springs, and Asbury Creek (Applications #S019164, #S019167, #S019167) have claims to both riparian and pre-1914 use. The pre-1914 claim is currently being used to divert from Hill/Mill Creek and Asbury Creek to Fern Lake for regional fire storage. The other two sources are used pursuant to appropriative water rights (License #3082 and #2451). By actively managing the on-site water rights, the SDC has historically been able to provide reliable year-round domestic water supply to serve all uses on the SDC site at least up to the recorded peak historical demand of 1,143 AFY (**Appendix A**).

In 2019, the State of California enacted Government Code Section 14670.10.5 (SDC Legislation) that outlines the State's goals and objectives for the SDC Property, including the language pertaining to the existing water rights. Paragraph (f) states the following:

> *(f) All riparian water rights shall remain with the property. The state owns riparian water rights and pre-1914 and post-1914 appropriative water rights and owns and operates a municipal water supply, treatment, and distribution system on the property. These rights may be held by the state for existing and future domestic uses on the property.*

Based on the SDC Legislation, this WSA assumes that the water rights associated with the SDC Property and associated water supply infrastructure will be available to be utilized by VOMWD to serve water demands associated with the Proposed Project.

[7] The Water Commission Act was enacted in 1914 and established California's water right permit process.

Table 7. Sonoma Developmental Center Water Rights

Appropriative Rights				
Point of Diversion	**Application**	**Permit**	**License**	**Date of License**
Unnamed Stream (Source A) Sonoma Creek (Source B)	9378	5244	3082	5/11/1948
Sonoma Creek	6944	3829	2451	2/7/1951
Pre-1914 and Riparian Rights				
Point of Diversion	**Application**		**Date of Filing**	
Hill/Mill Creek	S019164		6/23/2010	
Roulette Springs	S019167		6/23/2010	
Asbury Creek	S019179		6/23/2010	

6.2.3 Analysis of SDC Surface Water Supply Availability

Limited historical water supply diversions data exist upon which to base the assessment of water supply availability. To address this data gap and determine the surface water supply availability under normal, single dry, and multiple dry year conditions, an analytical model ("SDC Diversions Model") was developed that simulates the yield of each water supply source based on the temporal and volumetric constraints on diversions, as prescribed in the various water rights, as well as the infrastructure and operations-based limitations on diversions. The SDC Diversions Model is driven by a synthetic hydrologic (streamflow) record for each of the streams/creeks and uses a daily time step. In the model, natural streamflows are routed through a set of rules and constraints (i.e., mathematical expressions) that represent the water rights, diversion and conveyance infrastructure, and feedback loops that control the daily rate of diversions. Output from the model, in the form of simulated daily diversion volumes from each source, is used to determine supply availability for purposes of this WSA. The SDC Diversions Model is described in greater detail in **Appendix C**, and **Table 8** below provides a summary description of the model's main components.

As discussed in **Table 8**, the diversions from Asbury Creek, Hill/Mill Creek, Sonoma Creek, and Unnamed Creek (Source A) are limited at various times during the analysis period by the available storage in the Fern and Suttonfield Lakes. Available storage is a function of supply availability, storage capacity, and water demands. Water demands were increased iteratively in the SDC Diversions Model to estimate the maximum demand at which no supply deficits were observed during the entire period of analysis. This demand, estimated to be 356 AFY, represents the maximum yield from the SDC surface water sources and supply system that is 100% reliable during all year types.[8]

[8] The 100% reliable yield of 356 AFY conservatively assumes that SDC supply system operational efficiencies and other supply infrastructure are not improved.

Table 8. Summary Description of SDC Diversions Model Main Components

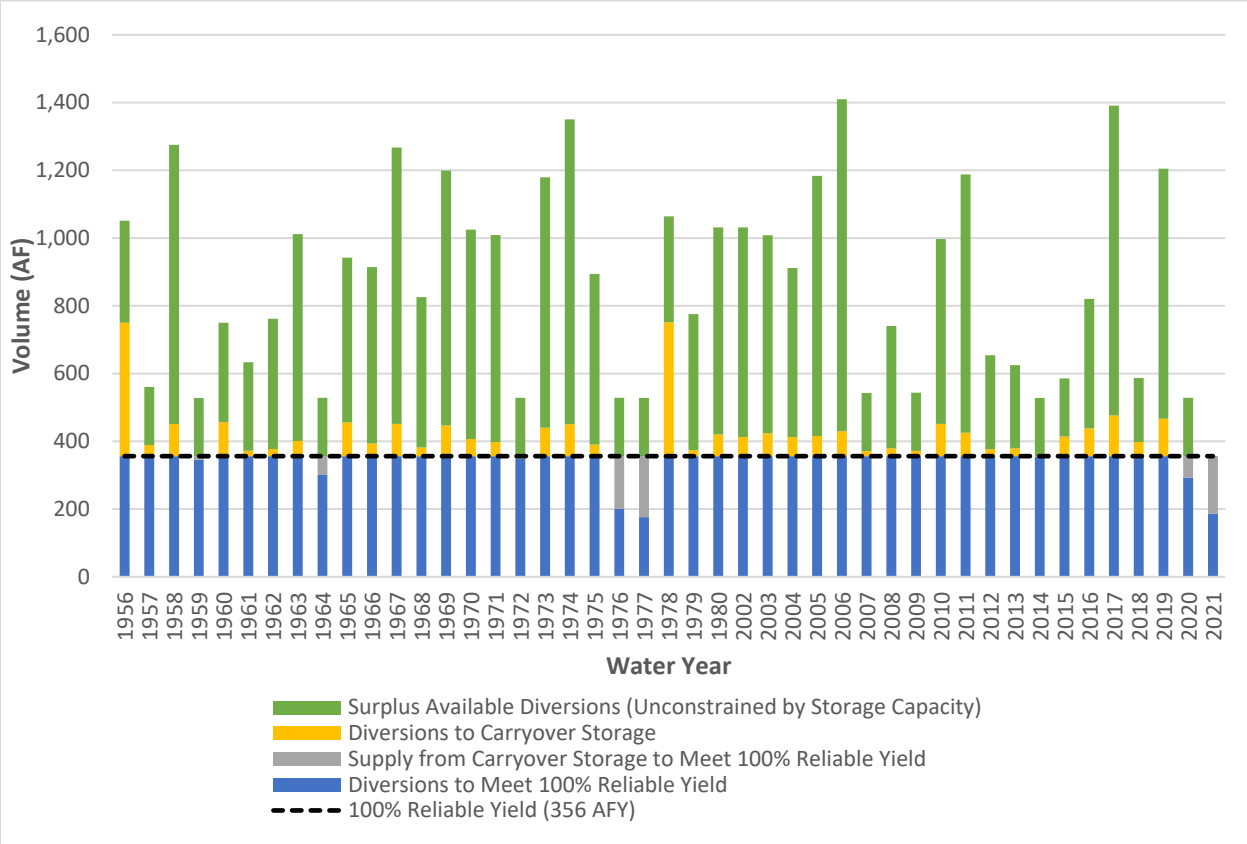
Model Component	Description
Supply sources simulated	Asbury Creek, Hill/Mill Creek, Roulette Springs, Sonoma Creek, and Unnamed Stream (Source A). Sonoma Creek diversions include direct diversions under License 2451 and diversions to storage under Licenses 2451 and 3082.
Synthetic Hydrology	Natural streamflow is estimated for each point of diversion based on area-based scaling factors applied to the long-term gauged record of streamflows at the USGS Agua Caliente gauge on Sonoma Creek. An additional scaling factor was applied to reduce Asbury Creek flows as part of model validation. Monthly production values for Roulette Springs are based on data reported to the SWRCB from January 2012 through June 2014.
Period of Analysis	Synthetic hydrology covers the period 9 February 1955 through 2 February 2022, with a gap from 30 September 1981 through 30 September 2001. Water supply values derived from the model are based on the 45 complete water years within that period (i.e., water years 1956-1980 and 2002-2021)
Infrastructure Constraints	• Reservoir total storage capacity, operational capacity, and spill capacity; (1) • Sonoma Creek pump station capacity, minimum flow for intake operations, and operational efficiency; • Hill/Mill Creek minimum flow for intake operations and pipeline capacity; and • Asbury Creek diversion limit/physical flow constraint.
Water Rights Constraints	Temporal and volumetric diversion limits for the appropriative water rights, as shown in **Table 7** and **Appendix B**.
Flow Routing	• Asbury Creek diversions go to reservoir storage; • Hill/Mill Creek diversions go to reservoir storage; • Roulette Springs flows go directly towards satisfying SDC demands; • Unnamed Creek (Source A) flows (uncontrolled) go to reservoir storage; • Sonoma Creek direct diversions under License 2451 go towards satisfying the remainder of SDC demands; • Sonoma Creek diversions to storage under Licenses 2451 and 3082 go to reservoir storage; • Reservoir storage is increased by diversions to storage (listed above) and by precipitation and local runoff, and is decreased by evaporation, outflows to meet remaining SDC demands, and spilling (when storage exceeds spill capacity); and • SDC demands are satisfied by Roulette Springs, Sonoma Creek direct diversions under License 2451, and outflows as-needed from reservoir storage.
Model Validation	To validate the model, simulated diversions at Asbury Creek, Hill/Mill Creek, and Sonoma Creek were compared to observed diversions for available periods of record including: • Asbury Creek: daily data from February 2012 – October 2018, and monthly data from SWRCB reports from January 2012 – June 2018; • Hill/Mill Creek: daily data from December 2014 – October 2018, and monthly data from SWRCB reports from January 2010 – June 2014; and • Sonoma Creek: monthly data from SWRCB reports from January 2010 – June 2014. • Storage in Combined Reservoir: bi-annual data from 1975 – 2009.

Notes:

(1) While reservoir capacity constraints are built into the SDC Diversions Model, the model also calculates supply availability in the case where diversions are not limited by reservoir capacity limitations.

Results from the SDC Diversions Model are presented in **Figure 5.** For each water year in the period of analysis, **Figure 5** shows the modeled: (1) annual diversions that supply the 100% reliable yield, (2) supplies from carryover storage to supply the 100% reliable yield, (3) diversions to carryover storage to supply the 100% reliable yield, and (4) surplus available supplies that were available, but were not diverted due to demand limitations and storage constraints. **Table 9** further shows the estimated diversions from each supply source and supply used from carried over storage in Fern and Suttonfield Lakes during normal, single dry, and multiple consecutive dry years.

Figure 5. SDC Diversion Model Results



While for the purposes of this WSA the estimated 100% reliable yield is conservatively considered to be the available supply from the surface water sources on the SDC Property during all year types, the SDC Diversions Model suggests that the available supplies and water rights would actually allow additional diversions of approximately 280 AFY on average and as much as 808 AFY above the 100% reliable yield if the diversions were not constrained by storage capacity and Proposed Project demands (**Figure 5**).

Table 9

Estimated Surface Water Supply at the SDC Property

Sonoma Developmental Center Specific Plan, Sonoma County, California

Water Supply Source	Available Supplies by Year Type (2030-2045) (AFY) (a),(b)						
	Normal Year (c)	Single Dry Year (d)	Multiple Dry Years				
			Consecutive Dry Years (e) 1st Year	Consecutive Dry Years (e) 2nd Year	Consecutive Dry Years (e) 3rd Year	Consecutive Dry Years (e) 4th Year	Consecutive Dry Years (e) 5th Year
Roulette Springs	172	172	172	172	172	172	172
Hill/Mill Creek	81	1	79	79	80	12	1
Asbury Creek	14	0	15	12	15	0	0
Sonoma Creek	92	2	98	113	75	14	2
Unnamed Stream (Source A)	46	1	77	75	48	3	1
Total Available Diversions (f)	**405**	**176**	**440**	**451**	**390**	**201**	**176**
Supply from Carried Over Storage	--	180	--	--	--	155	180
100% Reliable Yield (g)	**356**	**356**	**356**	**356**	**356**	**356**	**356**

Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

Notes:

(a) Available supply values for each source are water year totals based on modeled supplies for water years 1956-1980 and 2002-2021.

(b) Modeled supplies include constraints related to reservoir capacity and demands equal to the 100% reliable yield of 356 AFY.

(c) Normal year supply values are based on the average modeled supplies during all complete water years during the period of analysis.

(d) Single dry year supply values are based on the modeled supplies during the driest water year (1977).

(e) Consecutive dry year supply values are based on the modeled supplies over the driest five-water year period (1973-1977).

(f) In years where total diversions are greater than the 100% reliable yield, the surplus water is stored in the reservoirs and carried over to the following year.

(g) The 100% reliable yield of the SDC water supply system was estimated using the SDC Diversion Model by determining the maximum demand at which no supply deficits would occur over the period of record.

As discussed above, this WSA assumes that all existing water rights and water supply infrastructure associated with the SDC Property will be available for use by VOMWD to serve the Proposed Project demands on the occasion that the SDC Property is annexed into VOMWD's service area. Given that the total annual water demand for the Proposed Project at full buildout and occupancy is estimated to be 342 AFY, it is assumed that the local surface water supplies at the SDC Property will be sufficient to meet the demands associated with the Proposed Project under all conditions (i.e., current and projected, and for normal, single dry, and multiple dry years including a five-year drought period) based on the estimated 100% reliable yield of 356 AFY.

6.3 Purchased Water

6.3.1 Sonoma County Water Agency Surface Water Supply

The District receives its primary water supply from SCWA's transmission system, which provides treated water purchased from SCWA's Russian River Project. The Russian River flows are augmented by Pacific Gas and Electric's (PG&E's) Potter Valley Project, which diverts a portion of the Eel River flows to the East Fork of the Russian River. Water is diverted and extracted from the stretch of the Russian River located in the vicinity of Wohler Bridge via six radial wells known as "Ranney collectors." The diverted river water percolates through sand and gravel and only needs the addition of chlorine and caustic soda to meet drinking water quality standards. Although the water extracted via Ranney collectors does percolate through the ground, due to the connection to the surface water source, this diversion is considered and is permitted as a surface water supply under existing surface water rights to the Russian River and Dry Creek water (SCWA, 2016). As discussed further under Section 6.4, the SCWA supply also includes a relatively small amount of groundwater from groundwater supply wells located in the central Santa Rosa Plain Subbasin (SCWA, 2016).

The District, along with other SCWA contractors, signed the Restructured Agreement for Water Supply (Agreement; included in **Appendix D**) in 2006. The Agreement provides for the financing, construction, and operation of diversion facilities, transmission lines, storage tanks, booster pumps, conventional wells, and appurtenant facilities. As described in Section 3.1 of this Agreement, SCWA:

> *…shall deliver to each Water Contractor [i.e., each signatory to the Agreement] at the points of delivery hereinafter set forth such quantities of water as the Water Contractor shall from time to time require at such rates of flow as are necessary to meet its peak day's demand, subject to the following:*

SCWA shall not be obligated to deliver water in excess of the following:

Water Contractor/ Aqueduct	*Average Daily Rate of Flow During Any Month*	*Annual Amount During Fiscal Year (Excluding Surplus Water)*
Valley of the Moon from Sonoma Aqueduct	*8.5 million gallons per day*	*3,200 acre-feet*

6.3.2 Sonoma County Water Agency Surface Water Rights

According to SCWA's 2020 UWMP (SCWA, 2021), four water rights permits (Permits 12947A, 12949, 12950, and 16596) issued by the State Water Resources Control Board (SWRCB) authorize SCWA to store up to 122,500 AFY of water in Lake Mendocino and up to 245,000 AFY of water in Lake Sonoma, and to divert or redivert up to 180 cubic feet per second (cfs) of water from the Russian River with a limit of 75,000 AFY. The permits also establish minimum instream flow requirements for fish and wildlife protection and recreation. These minimum instream flow requirements vary based on the hydrologic classifications of normal, dry, and critical water supply conditions as defined by SCWA's water rights permits and SWRCB Decision 1610, adopted in 1986 (SCWA, 2021). SCWA meets the various instream flow requirements by making releases from Coyote Valley Dam and Warm Springs Dam (SCWA, 2021). The Russian River Biological Opinion requires modification of minimum instream flow requirements on the Russian River and Dry Creek to maintain the Incidental Take Statement provided by the Biological Opinion (SCWA, 2021). SCWA's evaluation of future Russian River supply availability is based upon the assumption that that proposed changes to the minimum instream flow requirements under Decision 1610 set forth in the Biological Opinion are implemented (SCWA, 2021). The SCWA 2020 UWMP assumes the existing overall annual diversion and re-diversion limit of 75,000 AF in SCWA's water rights permits will be adequate to meet future demands through 2045 and that it is no longer necessary for SCWA to make filings with the SWRCB to increase its annual diversion and re-diversion limit of Russian River water by 1,000 AF by 2045, as was assumed in the SCWA 2015 UWMP (SCWA, 2016), due to conservation and the resulting lower demand projections.

6.3.3 Sonoma County Water Agency Groundwater Supply

SCWA pumps a portion of its supply from the Santa Rosa Plain Subbasin of the Santa Rosa Valley Basin (DWR Basin # 1-55.01). Groundwater is used primarily as a drought period supply, or when Russian River supplies are otherwise constrained (SCWA, 2021). In 2020, SCWA did not produce any groundwater; through 2045, groundwater is projected to make up 3% of SCWA's supplies in normal year conditions (SCWA, 2021). It cannot be discerned what specific amount of SCWA supply provided to the District consists of groundwater; however, it is assumed to be proportionate to the overall percentage of groundwater used within SCWA's system. SCWA's groundwater supply is discussed further in Section 6.4.

6.4 Groundwater Supply

Water Code Section 10910

(f) If a water supply for a proposed project includes groundwater, the following additional information shall be included in the water supply assessment:

(1) A review of any information contained in the urban water management plan relevant to the identified water supply for the proposed project.

(2) (A) A description of any groundwater basin or basins from which the proposed project will be supplied.

(B) For those basins for which a court or the board has adjudicated the rights to pump groundwater, a copy of the order or decree adopted by the court or the board and a description of the amount of groundwater the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), has the legal right to pump under the order or decree.

(C) For a basin that has not been adjudicated that is a basin designated as high- or medium-priority pursuant to Section 10722.4, information regarding the following:

(i) Whether the department has identified the basin as being subject to critical conditions of overdraft pursuant to Section 12924.

(ii) If a groundwater sustainability agency has adopted a groundwater sustainability plan or has an approved alternative, a copy of that alternative or plan.

(D) For a basin that has not been adjudicated that is a basin designated as low- or very low priority pursuant to Section 10722.4, information as to whether the department has identified the basin or basins as overdrafted or has projected that the basin will become overdrafted if present management conditions continue, in the most current bulletin of the department that characterizes the condition of the groundwater basin, and a detailed description by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), of the efforts being undertaken in the basin or basins to eliminate the long-term overdraft condition.

(3) A detailed description and analysis of the amount and location of groundwater pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), for the past five years from any groundwater basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(4) A detailed description and analysis of the amount and location of groundwater that is projected to be pumped by the public water system, or the city or county if either is required to comply with this part pursuant to subdivision (b), from any basin from which the proposed project will be supplied. The description and analysis shall be based on information that is reasonably available, including, but not limited to, historic use records.

(5) An analysis of the sufficiency of the groundwater from the basin or basins from which the proposed project will be supplied to meet the projected water demand associated with the proposed project. A water supply assessment shall not be required to include the information required by this paragraph if the public water system determines, as part of the review required by paragraph (1), that the sufficiency of groundwater necessary to meet the initial

and projected water demand associated with the project was addressed in the description and analysis required by paragraph (4) of subdivision (b) of Section 10631.

6.4.1 Basin Description and Status

As described in Section 6.3.3, SCWA pumps a portion of its supply from the Santa Rosa Plain Subbasin, which makes up 3% of total SCWA supplies projections. The District's purchase of SCWA water is supplemented by local groundwater supply wells which overlie the Sonoma Valley Subbasin. In a normal water year, approximately 20-30% of the District's water supply is from local groundwater supply wells.

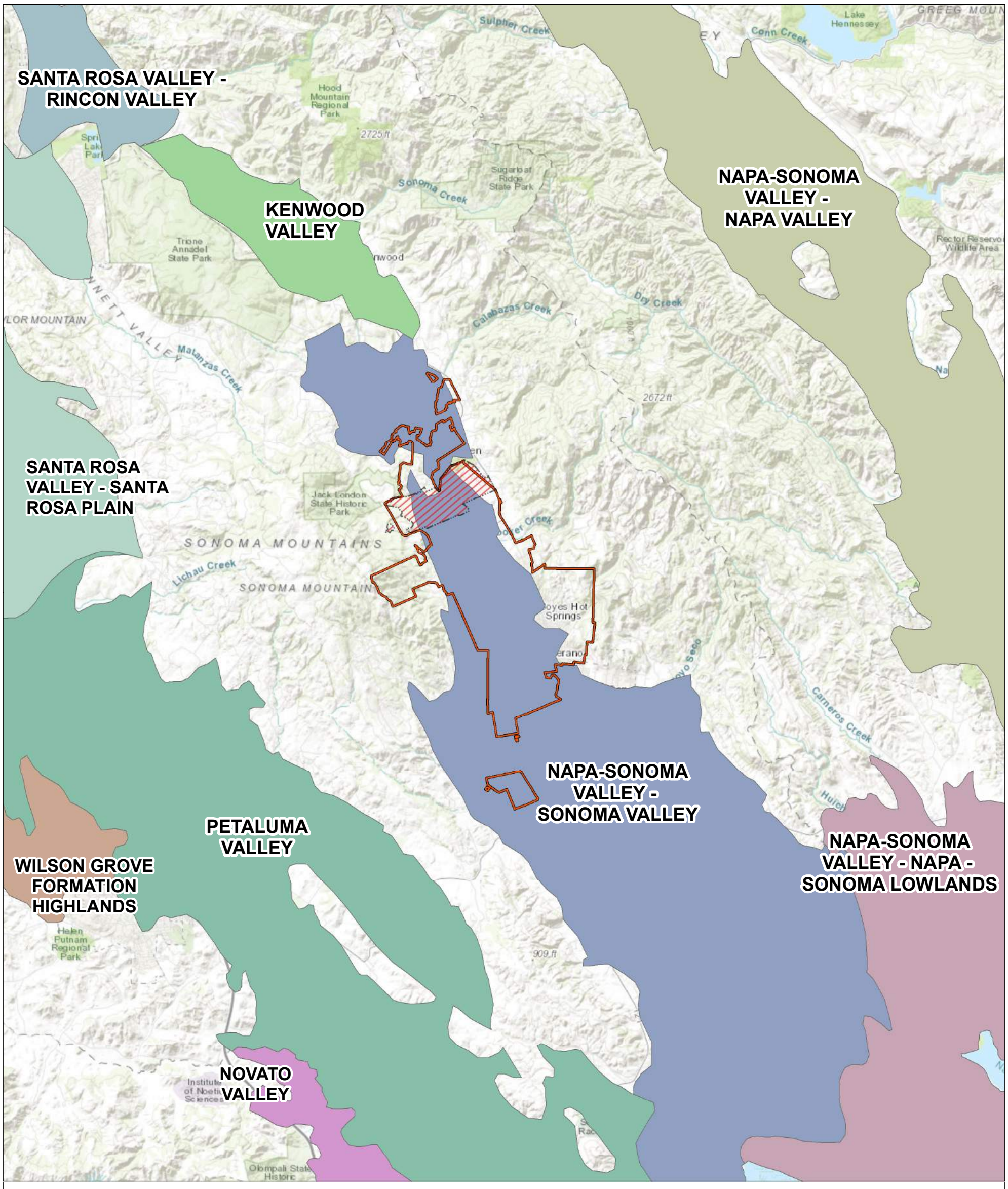
6.4.1.1 Sonoma Valley Subbasin (Local Groundwater Supply)

As shown on **Figure 6**, the Proposed Project site overlies the Sonoma Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin (DWR Basin No. 2-002.02). The Sonoma Valley Groundwater Basin is one of three subbasins that drain south-southeast into San Pablo Bay (DWR, 2003). The Sonoma Valley Subbasin is not adjudicated, and the Basin is not in a condition of critical overdraft.

The Sonoma Valley Subbasin is designated as a high priority basin under DWR's 2019 Phase 2 Basin Prioritization (DWR, 2020). Under this prioritization process, basins are ranked on eight components, and if a basin is assigned more than 21 total points, it is defined as "high priority." The main factors driving the Basin's designation include the density of public supply wells (4 out of 5 possible points), the density of total wells (4 out of 5 possible points), irrigated acreage per square mile (3 out of 5 possible points), groundwater reliance (3 out of 5 possible points), and documented impacts including declining groundwater levels and subsidence (3 out of 5 possible points).[9]

As a DWR-designated high priority basin, the Sonoma Valley Subbasin is subject to the requirements of the Sustainable Groundwater Management Act (SGMA), including the requirement to be covered by one or more GSAs and to prepare and submit to DWR one or more Groundwater Sustainability Plans (GSPs).

[9] DWR's 2019 Phase 2 Basin Prioritization used the basin's total possible ranking points assigned to each of the eight components to determine the priority. A basin is defined as High Priority if it has more than 21 total ranking points.



Legend

- SDC Property
- VOMWD Sphere of Influence

Groundwater Subbasin

- Santa Rosa Valley - Santa Rosa Plain (1-055.01)
- Santa Rosa Valley - Rincon Valley (1-055.03)
- Wilson Grove Formation Highlands (1-059)
- Petaluma Valley (2-001)
- Napa-Sonoma Valley - Napa Valley (2-002.01)
- Napa-Sonoma Valley - Sonoma Valley (2-002.02)
- Napa-Sonoma Valley - Napa-Sonoma Lowlands (2-002.03)
- Kenwood Valley (2-019)
- Novato Valley (2-030)

Abbreviations

SDC = Sonoma Developmental Center
VOMWD = Valley of the Moon Water District

Notes

1. All locations are approximate.

Sources

1. Basemap provided by ESRI.
2. DWR groundwater basins are based on the boundaries defined in California's Groundwater Bulletin 118 - 2018 Update.
3. Proposed project location information provided by Sonoma County Permit and Resource Management Department, received April 2022.

N

0 2 4
(Scale in Miles)

Regional Setting and Groundwater Subbasins

Sonoma Developmental Center WSA
Sonoma County, CA
July 2022
EKI C10069.00

eki environment & water

Figure 6

Path: X:\C10069\Maps\ .00\2022\04\Fig. 5 - Groundwater Subbasins_new.mxd

The Sonoma Valley Subbasin covers an area of approximately 44,626 acres (70 square miles) and occupies a northwest trending structural depression in the coastal mountain ranges immediately north of San Pablo Bay. The Subbasin is one of three subbasins of the Napa-Sonoma Valley Groundwater Basin and is bounded on the west by the Sonoma Mountains and on the east by the Mayacamas Mountains. The Sonoma Valley Subbasin extends from San Pablo Bay northward to about 2 miles south of the Town of Kenwood where the alluvial plain terminates. The principal stream draining the Subbasin is Sonoma Creek, which is tidally influenced from Schellville downstream to its mouth at San Pablo Bay (DWR, 2006).

Further description of the Subbasin is included in the Basin Setting chapter of the GSP for the Subbasin, including the hydrogeologic conceptual model, and current and historical groundwater conditions. The GSP is available on the DWR SGMA portal website:
https://sgma.water.ca.gov/portal/gsp/all

6.4.1.2 Santa Rosa Plain Subbasin (SCWA Groundwater Supply)

As noted in Section 6.3.3, a small portion of the SCWA water supply (i.e., approximately 3%) purchased by VOMWD is comprised of groundwater from the Santa Rosa Plain Subbasin of the Santa Rosa Valley Basin (DWR Basin 1-55.01). Given this, in accordance with CWC § 106319b), characteristics and groundwater management of the Santa Rosa Plain Subbasin are provided below.

The Santa Rosa Subbasin is not adjudicated, and in its recent evaluation of California groundwater basins, DWR determined that the Basin is not in a condition of critical overdraft (DWR, 2020). The Santa Rosa Plain Subbasin is currently categorized by the DWR program as a medium priority basin (DWR, 2020) and is also subject to the requirements of SGMA.

Further description of the Subbasin is included in the Basin Setting chapter of the GSP for the Subbasin, including the hydrogeologic conceptual model, and current and historical groundwater conditions. The GSP is available on the DWR SGMA portal website:
https://sgma.water.ca.gov/portal/gsp/all.

6.4.2 Groundwater Management

Actions related to management of the Sonoma Valley Subbasin and Santa Rosa Plain Subbasin both currently and under SGMA are described in the next sections.

6.4.2.1 Non-SGMA Groundwater Management

6.4.2.1.1 Sonoma Valley Subbasin (Local Groundwater Supply)

Prior to the passage of SGMA, a coalition of local stakeholders participated in the development of a Sonoma Valley Groundwater Management Plan (Sonoma Valley GMP), which was completed in 2007 (SCWA, 2007). This plan was prepared to inform and guide SCWA and other stakeholders in maintaining a sustainable, high-quality groundwater resource for the users of the groundwater

basin underlying the Sonoma Valley. Stakeholders that participated in the development of the Sonoma Valley GMP were SCWA, the District, the City of Sonoma, and the Sonoma Valley County Sanitation District (SVCSD). Guidance for the Sonoma Valley GMP effort was provided by a Basin Advisory Panel (BAP), which included additional stakeholders including agricultural interests, local citizen groups, environmental groups, and business interests. Primary components of the Sonoma Valley GMP were grouped into several categories, including: (1) stakeholder involvement, (2) groundwater monitoring, (3) groundwater quality protection, (4) groundwater sustainability, and (5) planning integration. The Sonoma Valley GMP identified a range of voluntary management actions, including groundwater recharge, groundwater banking, increased water use efficiency, and greater use of recycled water to reduce demand for groundwater. The BAP held its last meeting in August 2016 and the Sonoma Valley GMP has been superseded by the GSP for the Sonoma Valley Subbasin as described in Section 6.4.2.2.1.

6.4.2.1.2 Santa Rosa Plain Subbasin (SCWA Groundwater Supply)

The Santa Rosa Plain Subbasin was previously managed under the Santa Rosa Plain Watershed Groundwater Management Plan (Santa Rosa Plain GMP), developed by the Santa Rosa Plain Advisory Panel (Santa Rosa Plain Advisory Panel, 2014). The stated goal of the Santa Rosa Plain GMP was "to proactively coordinate public and private groundwater management efforts and leverage funding opportunities to maintain a sustainable, locally-managed, high-quality groundwater resource for current and future users, while sustaining natural groundwater and surface water functions." The Santa Rosa Plain GMP outlined 18 Basin Management Objectives and grouped them into seven key management components, including: (1) stakeholder involvement and public awareness, (2) monitoring and modeling program, (3) groundwater protection, (4) increasing water conservation and efficiency, (5) increasing groundwater discharge, (6) increasing water reuse, and (7) integrated groundwater management. The Santa Rosa Plain GMP has been superseded by the GSP for the Santa Rosa Plain Subbasin as described in Section 6.4.2.2.2.

6.4.2.2 <u>SGMA Groundwater Management</u>

6.4.2.2.1 Sonoma Valley Subbasin (Local Groundwater Supply)

As discussed in Section 6.4.1.1, the Sonoma Valley Subbasin is designated by DWR as a high priority basin and is subject to the requirements of SGMA, which include the formation of a one or more GSAs and the development and implementation of one or more GSPs.

The Sonoma Valley Groundwater Sustainability Agency (Sonoma Valley GSA) was formed in June 2017 through a Joint Powers Agreement (JPA) entered into by the County of Sonoma, the City of Sonoma, the District, Sonoma Resource Conservation District, SCWA, and North Bay Water District. The Sonoma Valley GSA is governed by six board members and alternates from the six member organizations. The Board of Directors is advised by an Advisory Committee of 12 members consisting of six at-large members appointed by the six member agencies, and six interest-based members appointed by the Sonoma Valley GSA Board of Directors, representing various other stakeholders.

The GSP for the Santa Rosa Plain Subbasin was completed and submitted to DWR by the statutory deadline of 31 January 2022 and is available for public review on the Sonoma Valley GSA website: http://sonomavalleygroundwater.org/gsp/ and the DWR SGMA portal website: https://sgma.water.ca.gov/portal/gsp/all.

6.4.2.2.2 Santa Rosa Plain Subbasin (SCWA Groundwater Supply)

As discussed in Section 6.4.1.2, the Santa Rosa Plain Subbasin is designated by DWR as a medium priority basin (DWR, 2020) and is subject to the requirements of SGMA, which include the formation of a one or more GSAs and the development and implementation of one or more GSPs.

The Santa Rosa Plain GSA was formed in June 2017 through a JPA entered into by the SCWA, City of Cotati, City of Rohnert Park, City of Santa Rosa, City of Sebastopol, Town of Windsor, County of Sonoma, Gold Ridge Resource Conservation District, Sonoma Resource Conservation District, Branger Mutual Water Company, California American Water, Willowside Mutual Water Company, and Penngrove Water Company, and covers the entire subbasin. The Santa Rosa Plain GSA is governed by a nine-member Board of Directors, which includes a position held by SCWA. The Board of Directors is advised by an Advisory Committee that includes 18 members appointed by the Board of Directors, representing various stakeholders.

The GSP for the Santa Rosa Plain Subbasin was completed and submitted to DWR by the statutory deadline of 31 January 2022 and is available for public review on the Santa Rosa Plain GSA website: https://santarosaplaingroundwater.org/ and the DWR SGMA portal website: https://sgma.water.ca.gov/portal/gsp/all.

6.4.3 Groundwater Use

The District owns and/or operates a total of six active municipal production wells. The District also owns a seventh well, Trinity Oaks Well, which is inactive and is not planned to be reactivated. The capacities of the District's wells range from 90 to 300 gallons per minute (gpm). The District cycles through its wells, and each well typically pumps for nine months and then remains offline for a three-month recovery period. The District's existing total groundwater capacity is approximately 840 gpm.

Table 6 lists the amount of groundwater pumped by the District between 2011 and 2021. The District pumped an average of 555 AFY over the 5-year time period between 2017 and 2021, and a maximum of 644 AF in 2018. The available groundwater supply and the purchased water supply have been sufficient to meet all of the District's demands in the past five years and all prior years.

6.4.4 Analysis of Sufficiency of Groundwater Supply

As noted in Section 6.4.3, the District currently has six active municipal production wells and one inactive well with an existing total capacity of approximately 840 gpm. The total estimated sustainable capacity of the groundwater supply wells was calculated based on a conservative

assumption of 7.5 months per year of operation, which allows for 1.5 months of lost operation time due to mechanical, treatment, and/or power issues, and an assumption that three new groundwater supply wells will be installed prior to 2025. Based on these assumptions, the total estimated capacity of the groundwater supply wells is projected to be 940 AFY.

The District will continue to use its wells to supplement its purchased SCWA water but plans to manage the use of the wells over time as the District implements additional water conservation programs. Groundwater production will be expanded to meet demands in the case of a drought or a decrease in SCWA water supply.

The District's projected use of groundwater was incorporated into the Sonoma Valley GSP, and as a member of the Sonoma Valley GSA, the District will continue to be actively involved in all groundwater management actions and decisions to ensure the long-term sustainability and sufficiency of the groundwater resource.

6.5 Recycled Water

The County is exploring the development of a recycled water use policy for the Proposed Project to encourage use of recycled water for irrigation. The use of recycled water would offset the Proposed Project's potable irrigation water demands presented in **Table 2**. However, given the uncertainties related to the potential use of recycled water it is conservatively assumed for purposes of this WSA that all irrigation uses will be served by potable water.

6.6 Total Projected Potable Supply in Normal, Single Dry, and Multiple Dry Years

Water Code Section 10910

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

As discussed above, the water supply for the VOMWD is a combination of imported water from SCWA and, to a lesser degree, local groundwater pumped by the District from the Sonoma Valley Subbasin of the Napa-Sonoma Valley Groundwater Basin and from areas within the District's service area located outside of the Sonoma Valley Subbasin boundaries. Additionally, the SDC Property includes local surface water sources which have historically served the Proposed Project area. As discussed in Section 6.5, the Proposed Project could potentially use recycled water to serve irrigation uses; however, all irrigation uses are assumed to be met by potable water supplies for purposes of this WSA.

The SCWA 2020 UWMP states that it will be able to serve 100% of projected customer demands in normal years and multiple-dry years. SCWA's water supplies were estimated based on

modeling of the Russian River system consisting of the statistical evaluation of multiple scenarios. For evaluation of single dry years, the model was based on hydrologic conditions in 1977, the driest single year on record. The model outputs indicate that starting in 2030, water demands will exceed water supplies due to Lake Sonoma declining below 100,000 AF before July 15, which triggers a requirement pursuant to SCWA's water rights to decrease diversions by 30% (SCWA, 2021). If such a scenario were to arise, SCWA would work with its customers to reduce water demands as described in SCWA's Water Shortage Contingency Plan (WSCP) and look to utilize local supplies (SCWA, 2021).

Projected groundwater pumping and water purchased from SCWA through 2045 for the District are provided in **Table 10**. In all years, it is assumed that groundwater will be used to meet projected system demands up to the projected groundwater pumping capacity. In normal years, the groundwater pumping capacity is estimated to be of 940 AFY, but only a portion of this capacity is needed to meet demands. During single dry years and multiple dry years, the groundwater pumping capacity is assumed to be 378 AFY.[10]

As described in Section 6.2, the State of California holds multiple water rights to local surface water sources for the SDC Property, including riparian water rights and pre-1914 and post-1914 appropriative water rights; the SDC Legislation states the riparian rights shall remain with the property and all the water rights may be held by the state for future uses on the SDC Property. Thus, this WSA assumes that all existing water rights associated with the SDC will be available to be utilized by the VOMWD to serve the Proposed Project on the occasion that the SDC Property is annexed by the VOMWD. As discussed in Section 6.2.3, the available volume of local surface water is conservatively estimated to be 356 AFY in all year types, which is assumed to be supplemental to the VOMWD's collective supply portfolio for purposes of serving the Proposed Project. VOMWD has no current plans to develop groundwater supplies on the SDC Property.

For the purposes of this WSA, three supply and demand assessment scenarios are analyzed for completeness and clarity. The three scenarios are as follows:

A. **Scenario A** assumes that the Proposed Project is not pursued, or otherwise not served by the VOMWD. Total VOMWD supplies are considered exclusive of local SDC supplies. Total VOMWD demands are considered exclusive of Proposed Project demands.

B. **Scenario B** assumes that the Proposed Project is served by the VOMWD, but the VOMWD does not have access to local SDC surface water supplies. Total VOMWD supplies are considered exclusive of local SDC supplies. Total VOMWD demands are considered inclusive of Proposed Project demands.

C. **Scenario C** assumes that the Proposed Project is served by the VOMWD, and all available local surface water supplies at the SDC Property will become supplemental to the VOMWD's collective supply portfolio for use on the SDC Property. Total VOMWD supplies

[10] The pumping capacity in dry years is based on a production spreadsheet provided by District staff on 3 May 2021, which reflects an assumption of no flow from Verano, New Labre, Pedrocelli, and Park Wells, and a reduced flow of 50 gpm from Mountain Well.

are considered inclusive of local SDC supplies. Total VOMWD demands are considered inclusive of Proposed Project demands.

The total projected potable supplies and demands under each scenario for normal, single dry, and multiple dry years are presented in **Appendix E** (for Scenarios A and B) and **Table 11**, **Table 12**, and **Table 13** for Scenario C, respectively. Further, for purposes of the findings of this WSA, however, only Scenarios B and C are discussed in detail, as Scenario A is fully discussed in the 2020 UWMP.

Table 10

Total Projected Water Supply for the Valley of the Moon Water District and Surface Water Supplies at the SDC Property

Sonoma Developmental Center Specific Plan, Sonoma County, California

Year			Supply Source (AFY)			Total Supply (AFY)
			Sonoma Valley Subbasin Groundwater (DWR Basin # 1-55.01) (a) (b)	SCWA (Purchased) (a)	Sonoma Developmental Center Local Surface Water (c)	
2025	Normal		0	3,200	0	3,200
	SDY		0	3,200	0	3,200
	MDY	Year 1	0	3,200	0	3,200
		Year 2	0	3,200	0	3,200
		Year 3	0	3,200	0	3,200
		Year 4	0	3,200	0	3,200
		Year 5	0	3,200	0	3,200
2030	Normal		0	3,200	356	3,556
	SDY		378	2,691	356	3,425
	MDY	Year 1	0	3,200	356	3,556
		Year 2	0	3,200	356	3,556
		Year 3	0	3,200	356	3,556
		Year 4	0	3,200	356	3,556
		Year 5	0	3,200	356	3,556
2035	Normal		20	3,200	356	3,576
	SDY		378	2,665	356	3,399
	MDY	Year 1	20	3,200	356	3,576
		Year 2	20	3,200	356	3,576
		Year 3	20	3,200	356	3,576
		Year 4	20	3,200	356	3,576
		Year 5	20	3,200	356	3,576
2040	Normal		153	3,200	356	3,709
	SDY		378	2,636	356	3,370
	MDY	Year 1	153	3,200	356	3,709
		Year 2	153	3,200	356	3,709
		Year 3	153	3,200	356	3,709
		Year 4	153	3,200	356	3,709
		Year 5	153	3,200	356	3,709
2045	Normal		277	3,200	356	3,833
	SDY		378	2,604	356	3,338
	MDY	Year 1	277	3,200	356	3,833
		Year 2	277	3,200	356	3,833
		Year 3	277	3,200	356	3,833
		Year 4	277	3,200	356	3,833
		Year 5	277	3,200	356	3,833

Abbreviations:

"AFY" = acre feet per year

"SCWA" = Sonoma County Water Agency

"MDY" = Multiple Dry Year

"SDY" = Single Dry Year

Notes

(a) Groundwater and SCWA supply projections are from Reference 1.

(b) In all years, it is assumed that groundwater will be used to meet projected system demands up to the projected groundwater pumping capacity. In normal years, the groundwater pumping capacity is estimated to be of 940 AFY, but only a portion of this capacity is needed to meet demands. During single dry years and multiple dry years, the groundwater pumping capacity is assumed to be 378 AFY.

(c) Sonoma Developmental Center local surface water supply projections are equal to the estimated 100% reliable yield of presented in Table 9.

Reference

1. VOMWD, 2021. 2020 Urban Water Management Plan, dated June 2021.

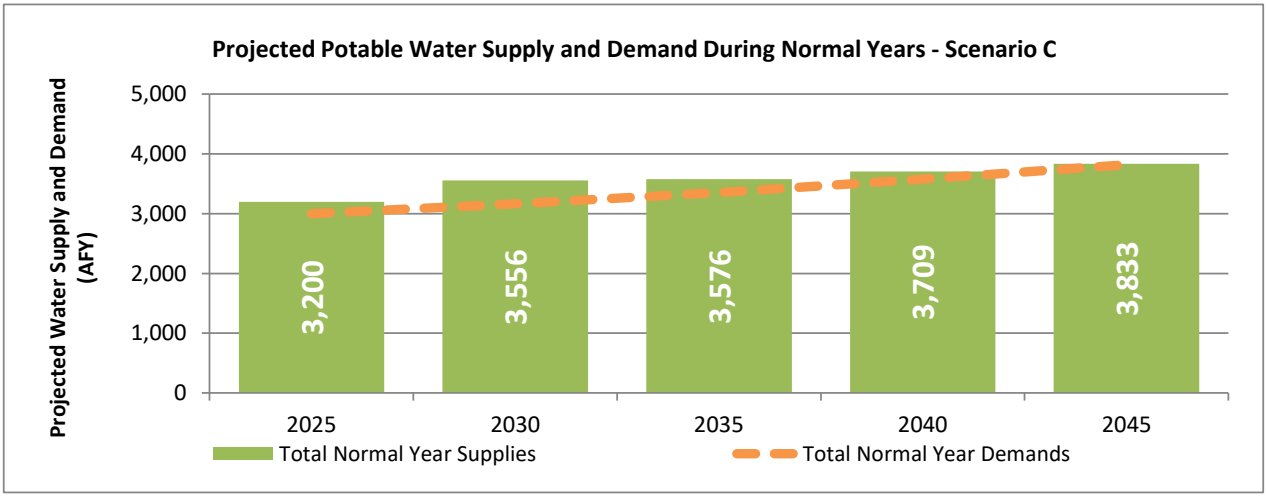
Table 11

Projected Normal Year Water Supply and Demand (Scenario C)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario C: Inclusive of Local SDC Supplies and Proposed Project Demands

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	2030	2035	2040	2045
Total Normal Year Supplies	VOMWD Supply (a)	3,200	3,200	3,220	3,353	3,477
	Surface Water Supply at SDC Property	0	356	356	356	356
Total Normal Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	67	133	225	342
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

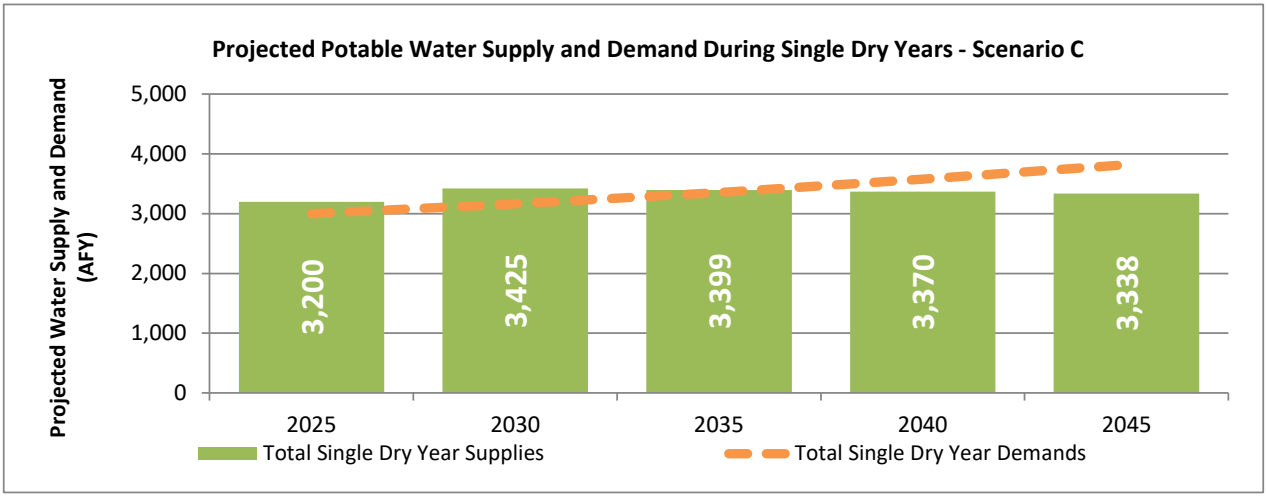
Table 12

Comparison of Single Dry Year Water Supply and Demand (Scenario C)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario C: Inclusive of Local SDC Supplies and Proposed Project Demands

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	2030	2035	2040	2045
Total Single Dry Year Supplies	VOMWD Supply (a)	3,200	3,069	3,043	3,014	2,982
	Surface Water Supply at SDC Property	0	356	356	356	356
Total Single Dry Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	67	133	225	342
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***-6%***	***-14%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

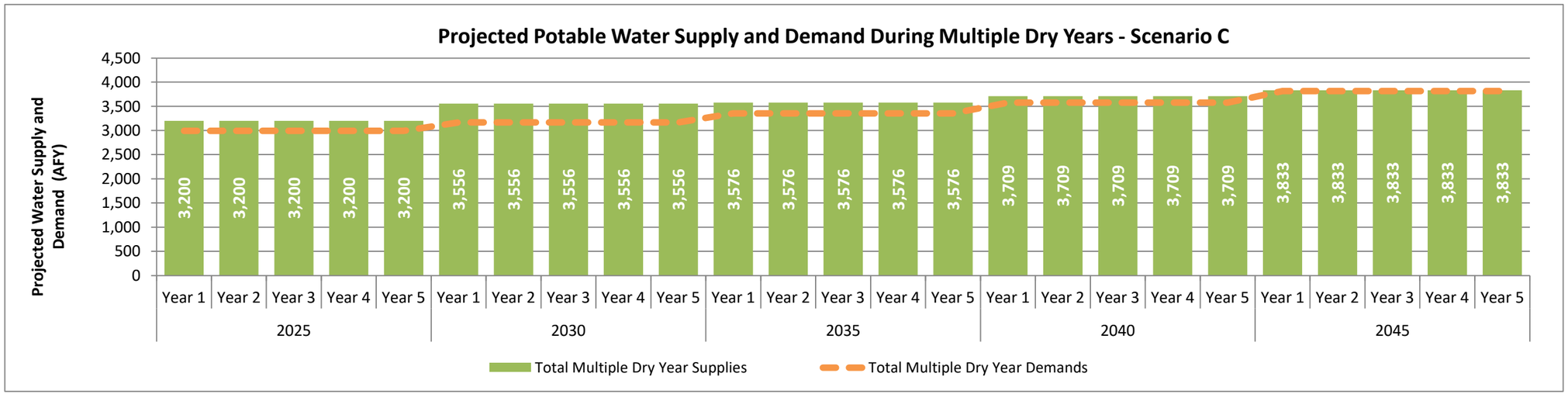
Table 13

Comparison of Multiple Dry Year Water Supply and Demand (Scenario C)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario C: Inclusive of Local SDC Supplies and Proposed Project Demands

		Projected Water Supply and Demand (AFY)																								
		2025					2030					2035					2040					2045				
Water Demand and Supply Source		Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Total Multiple Dry Year Supplies	VOMWD Supply (a)	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,220	3,220	3,220	3,220	3,220	3,353	3,353	3,353	3,353	3,353	3,477	3,477	3,477	3,477	3,477
	Surface Water Supply at SDC Property	0	0	0	0	0	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356	356
Total Multiple Dry Year Demands	VOMWD Demands	2,996	2,996	2,996	2,996	2,996	3,101	3,101	3,101	3,101	3,101	3,220	3,220	3,220	3,220	3,220	3,353	3,353	3,353	3,353	3,353	3,477	3,477	3,477	3,477	3,477
	Proposed Project Demands	0	0	0	0	0	67	67	67	67	67	133	133	133	133	133	225	225	225	225	225	342	342	342	342	342
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre-feet per year "SDC" = Sonoma Developmental Center "SCWA" = Sonoma County Water Agency "VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

7 COMPARISON OF SUPPLY AND DEMAND

Water Code Section 10910

(c) (3) If the projected water demand associated with the proposed project was not accounted for in the most recently adopted urban water management plan, or the public water system has no urban water management plan, the water supply assessment for the project shall include a discussion with regard to whether the public water system's total projected water supplies available during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the public water system's existing and planned future uses, including agricultural and manufacturing uses.

The VOMWD's most recent adopted UWMP (i.e., the 2020 UWMP; VOMWD, 2021) acknowledges the District's plans to eventually annex and serve the Proposed Project site. However, given that details of the SDC redevelopment, including timing and land use, were not known at the time of the 2020 UWMP, the Proposed Project was not explicitly included in the demand projections developed in support of the 2020 UWMP. As such, the demand for the Proposed Project is assumed to be additional to the District's 2020 UWMP demands. Similarly, the surface water supplies associated with the SDC Property are assumed to be additional to the District's supplies presented in the 2020 UWMP.

Pursuant to CWC §10910c(3), this WSA includes an estimate of the projected water supplies available to the District under normal, single dry, and multiple dry years, and a discussion of whether those supplies will meet the projected demand associated with the Proposed Project, in addition to the water system's existing and planned future uses. This assessment is parallel to the multiple-dry year supply reliability analysis required for UWMPs under CWC §10635. In 2018, CWC §10635 was revised to require UWMPs to extend this analysis to consider "a drought lasting five consecutive water years." Although CWC §10910c(3) has not yet been updated to require this for WSAs, a five-year drought scenario is also evaluated herein.

The VOMWD's 2020 UWMP presents an analysis of the reliability of the District's water supply sources, and a comparison of the projected supplies to projected water demands through 2045 (without consideration of the demands and supplies of the Proposed Project; see **Scenario A** in **Appendix E**), under a range of hydrologic conditions ("normal" rainfall to a five-year extended drought period). The UWMP finds that the District is projected to have sufficient supplies to meet projected demands in normal years and multiple dry years through 2045. However, during single dry years, the District is projected to have a shortfall starting in 2030, which increases from a 1% shortfall (32 AF) in 2030 and up to a 17% shortfall (495 AF) in 2045.[11]

[11] It should be noted that under an "extreme drought scenario" that goes beyond the DWR requirements, the VOMWD could experience even larger shortfalls than those included as part of the 2020 UWMP. The VOMWD experienced an extreme drought scenario in 2021, when critically low rainfall resulted in historically low reservoir storage levels for SCWA. Drought emergency conditions were declared for Sonoma County by the Sonoma County Board of Supervisors, Governor Newsom, and the Secretary of the United States Department of Agriculture. The drought emergency conditions faced in 2021 underscore the importance of increasing long-term conservation, supply augmentation in the VOMWD, and the potential value associated with incorporation of the SDC Property.

In **Scenario B** (i.e., if the projected demand of the Proposed Project were added to the projected District demands, but without considering the surface water supplies available at the SDC Property; see **Appendix E**), the District would have sufficient supplies to meet projected demands in normal years through 2045. However, during single dry years, the District is projected to have a shortfall starting in 2030, which increases from a 3% shortfall (99 AF) in 2030 and up to a 28% shortfall (836 AF) in 2045. During multiple dry years, the District is projected to have shortfalls of up to 7% (241 AF) starting in 2045 for each of the consecutive dry years.

However, as shown in **Scenario C** (**Table 11**, **Table 12**, and **Table 13)**, given that the surface water supplies from the SDC Property are sufficient to meet the demands of the Proposed Project in all year types, development of the Proposed Project will not further exacerbate shortage conditions within the District compared to **Scenario A**.

Shortfalls resulting from any cause (e.g., droughts, impacted distribution system infrastructure, regulatory-imposed shortage restrictions, etc.) that could occur in the future would be managed through the implementation of the VOMWD's WSCP. The overall reduction goals in the WSCP are established for six drought stages ranging from 10% to greater than 50% shortfalls. As a customer within the VOMWD District, the Proposed Project would be obligated to comply with the demand reduction efforts imposed by the VOMWD through implementation of the WSCP in any future water shortage conditions.

In 2016, Governor Brown signed Executive Order B-37-16 *Making Water Conservation a California Way of Life* (EO) and subsequently SB 606 and Assembly Bill (AB) 1668 were passed. SB 606/AB 1688 set new requirements for urban water agencies to continue to increase water efficiency beyond the 2020 water use targets developed under the Water Conservation Act of 2009 (Senate Bill X7-7). Beginning in 2023, agencies will be required to report on and comply with "annual water use objectives". The specific standards that will be used to determine an agency's annual water use objectives are currently under development but are expected to result in continued increases in efficiency for all urban water suppliers in the state. In addition, SB 606/AB 1668 add new requirements related to drought planning and WSCPs, including requirements for agencies to: (1) conduct a drought risk assessments part of their future UWMPs to assess water supply reliability for a period of drought lasting five consecutive water years (CWC §10635(b)), and (2) conduct annual water supply and demand assessments to determine its water supply reliability for the current year and one dry year (CWC §10632(a)). These elements are included in the VOMWD's 2020 WSCP.

Additionally, VOMWD is exploring potential supply augmentation projects to increase available supplies to the Proposed Project and the existing VOMWD service area. For example, VOMWD is exploring the option to capture "natural flows" which can be diverted by Sonoma Water from the Russian River in the wintertime without increasing lake releases. VOMWD could capture these flows and pump the available volume to fill the lakes at the SDC Property, allowing for local drought hardening and mitigating demand on the Sonoma Water system later in the year. The

Proposed Project is also considering the use of the recycled water for irrigation, which would offset potable irrigation demands.

As shown in **Table 11**, **Table 12**, and **Table 13**, local surface water supplies at the SDC Property are expected to be sufficient to meet the demands associated with the Proposed Project under all conditions (i.e., current and projected, and for normal, single dry, and multiple dry years including a five-year drought period).

As such, as further shown on **Table 11**, **Table 12**, and **Table 13**, available supplies are sufficient to meet VOMWD demands, inclusive of the Proposed Project, under current and projected conditions for normal and multiple dry years including a five-year drought period. During single dry years, the District is projected to experience small shortfalls starting in 2040 that will be addressed with its WSCP.

Therefore, based on: (1) the assumption that all existing water rights associated with the SDC Property will be available to be utilized by VOMWD to supply the Proposed Project, which is consistent with the SDC Legislation, (2) the projected reliability of the supply sources available to the VOMWD, (3) the increasing efficiency and drought planning requirements from the state, (4) supply augmentation projects being explored by the VOMWD, and (5) the potential use of recycled water to offset the Proposed Project's potable irrigation demands, sufficient water supply is estimated to be available to the VOMWD to meet future demands within its existing service area and the Proposed Project.

8 CONCLUSIONS

As listed in CWC §10910(c)(4), the primary purpose of this WSA is to evaluate whether sufficient water supply is available to meet future water demands within the water supplier's service area, including those associated with the Proposed Project, during normal and multiple dry hydrologic years for a 20-year time horizon.

As described in Section 4, the water demand of the Proposed Project (i.e., 342 AFY at buildout) has been conservatively estimated. It is presently assumed that (1) all existing water rights associated with the SDC Property will be available to be utilized by the VOMWD on the occasion that the SDC Property is annexed by the VOMWD and (2) that annexation and ongoing operations of the SDC water system by VOMWD to serve the Proposed Project will be economically feasible. As discussed in Section 7, local surface water supplies at the SDC Property are expected to be sufficient to meet the demands associated with the Proposed Project under all conditions (i.e., current and projected, and for normal, single dry, and multiple dry years including a five-year drought period). As such, the Proposed Project is not anticipated to adversely affect water supply reliability within the VOWMD service area.

This WSA concludes that, provided that all surface water rights associated with the SDC Property are available to be utilized by VOMWD to serve the Proposed Project, the Proposed Project will not adversely affect water supply reliability within the VOMWD Service Area. Based on currently available information and conservative estimates of projected demand, the VOMWD expects to be able to meet all future demands within its existing service area, inclusive of the Proposed Project in normal and multiple dry hydrologic years from 2025 through 2045. The shortfalls that are currently projected during single dry years will be addressed through planned implementation of the VOMWD WSCP.

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Appendix A

Historical Sonoma Developmental Center Water Treatment Plant Production and Water Purchases (1967-2007)

Year	Gallons Produced			Purchased Water (gallons)
	Total Usage	Max Month	Max Day	
2007	113,093,000	15,235,000	779,000	
2006	126,681,000	20,535,000	908,000	
2005	135,143,000	20,175,000	904,000	
2004	173,518,000	18,446,000	1,027,000	
2003	217,753,000	29,359,000	1,122,000	
2002	193,530,000	21,938,000	919,000	
2001	189,332,000	20,300,000	851,000	
2000	186,458,000	23,263,000	916,000	
1999	182,020,000	24,086,000	924,000	
1998	127,525,000	23,183,000	1,047,000	
1997	149,180,750	22,584,000	915,000	
1996	105,474,000	23,904,000	1,000,400	58,420,000
1995	167,820,000	22,806,000	1,120,000	
1994	152,490,000	20,765,000	852,000	
1993	146,200,000	21,700,000	1,079,000	
1992	151,176,00	17,380,000	869,000	
1991	141,461,000	20,168,000	725,000	13,860,000
1990	164,721,000	19,006,000	857,000	4,167,750
1989	150,269,000	19,888,000	1,066,000	
1988	141,838,000	16,179,000	863,000	
1987	221,883,000	27,244,000	1,161,000	
1986	372,431,000	38,874,000	1,066,000	
1985	339,866,000	33,540,000	1,485,000	
1984	252,358,000	28,299,000	1,515,000	1,875,750
1983	268,545,000	28,170,250	1,677,000	12,997,500
1982	265,158,000	27,394,000	869,000	
1981	238,579,000	27,606,000	769,000	
1980	155,956,000	26,262,000	902,000	
1979	237,471,000	28,774,000	932,000	
1978	236,490,000	30,881,000	988,000	
1977	184,522,000	25,487,000	999,000	
1976	226,544,000	29,551,000	1,401,000	
1975	216,777,000	26,960,000	1,310,000	
1974	222,516,000	27,460,000	1,300,000	
1973	241,731,000	30,800,000	1,399,000	
1972	225,362,000	27,135,000	1,310,000	
1971	235,594,000	29,141,000	1,365,000	
1970	244,454,000	28,751,000	1,133,000	
1969	257,492,000	31,150,000	1,305,000	
1968	259,464,000	30,060,000	1,390,000	
1967	NA	29,490,000	1,470,000	

Appendix B

Water Rights Information for Surface Water Sources located on SDC Property

B1. License of Diversion and Use of Water for Unnamed Stream (Source A) and Sonoma Creek (License 3082, Permit 5244, Application 9378)
B2. Order Allowing Change in Place of Use and License of Diversion and Use of Water for Sonoma Creek (License 2451, Permit 3829, Application 6944)
B3. Initial Statement of Water Diversion and Use for Hill/Mill Creek (Application S019164)
B4. Initial Statement of Water Diversion and Use for Roulette Springs (Application S019167)
B5. Initial Statement of Water Diversion and Use for Asbury Creek (Application S019179)

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
STATE ENGINEER

License for Diversion and Use of Water

APPLICATION 9378 PERMIT 5244 LICENSE 3082

THIS IS TO CERTIFY, *That* State of California - Department of Mental Hygiene (Sonoma State Home) of Sacramento, California Notice of Change (Over)

has made proof as of May 11, 1948,

(the date of inspection) to the satisfaction of the State Engineer of California of a right to the use of the water of (a) an unnamed stream and (b) Sonoma Creek, both in Sonoma County

tributary to (a) Sonoma Creek (b) San Pablo Bay

for the purpose of irrigation and domestic use

under Permit 5244 *of the Department of Public Works and that said right to the use of said water has been perfected in accordance with the laws of California, the Rules and Regulations of the Department of Public Works and the terms of the said permit; that the priority of the right herein confirmed dates from* August 12, 1938;

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed three hundred (300) acre-feet per annum by storage to be collected from about November 1 of each year to about May 1 of the succeeding year. One hundred (100) acre-feet per annum is to be diverted first from source (a) when available and the remainder, but not to exceed two hundred seventy-five (275) acre-feet per annum, is to be diverted from source (b). The rate of diversion to storage from source (b) shall not exceed one thousand four hundred ten (1410) gallons per minute.

The points of diversion of such water are *located* (a) North fifty-one degrees no minutes East (N51° 00' E) one thousand six hundred ten (1610) feet from SW corner of NW¼ of NW¼ of Section 22, T 6 N, R 6 W, M.D.B.&M., being within NW¼ of NW¼ of said Section 22; and (b) North sixty degrees no minutes East (N60° 00'E) fifteen hundred (1500) feet from West quarter corner of Section 22, T 6 N, R 6 W, M.D.B.&M., being within SW¼ of NW¼ of said Section 22.

A description of the lands or the place where such water is put to beneficial use is as follows: Domestic use at the Sonoma State Home and the irrigation of the following approximate areas:

2.0 acres in NE¼ of SW¼ of Sec. 15	2.0 acres in NE¼ of NE¼ of Sec. 22
3.0 acres in SE¼ of SW¼ of Sec. 15	4.0 acres in NW¼ of NE¼ of Sec. 22
1.0 acre in NW¼ of SE¼ of Sec. 15	2.0 acres in NW¼ of SE¼ of Sec. 22
2.0 acres in SW¼ of SE¼ of Sec. 15	22.0 acres in NE¼ of SW¼ of Sec. 22
0.5 acre in SE¼ of NE¼ of Sec. 21	4.0 acres in SE¼ of NW¼ of Sec. 22
0.5 acre in NE¼ of SE¼ of Sec. 21	6.75 acres in SW¼ of NW¼ of Sec. 22
0.25 acre in SW¼ of SW¼ of Sec. 22	11.0 acres in NW¼ of SW¼ of Sec. 22
	61.0 acres total, all within T 6 N,

R 6 W, M.D.B.&M., as shown on the map filed with the State Engineer.

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Department acting through the State Engineer in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the State Engineer.

The right hereby confirmed to the diversion and use of water is restricted to the point or points of diversion herein specified and to the lands or place of use herein described.

This license is granted and licensee accepts all rights herein confirmed subject to the following provisions of the Water Code:

Section 1625. Each license shall be in such form and contain such terms as may be prescribed by the Department.

Section 1626. All licenses shall be under the terms and conditions of this division (of the Water Code).

Section 1627. A license shall be effective for such time as the water actually appropriated under it is used for a useful and beneficial purpose in conformity with this division (of the Water Code) but no longer.

Section 1628. Every license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this article and the statement that any appropriator of water to whom a license is issued takes the license subject to the conditions therein expressed.

Section 1629. Every licensee, if he accepts a license, does so under the conditions precedent that no value whatsoever in excess of the actual amount paid to the State therefor shall at any time be assigned to or claimed for any license granted or issued under the provisions of this division (of the Water Code), or for any rights granted or acquired under the provisions of this division (of the Water Code), in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any licensee or by the holder of any rights granted or acquired under the provisions of this division (of the Water Code) or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the State, of the rights and property of any licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this division (of the Water Code).

Section 1630. At any time after the expiration of twenty years after the granting of a license, the State or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivison of the State shall have the right to purchase the works and property occupied and used under the license and the works built or constructed for the enjoyment of the rights granted under the license.

Section 1631. In the event that the State, or any city, city and county, municipal water district, irrigation district, lighting district, or political subdivision of the State so desiring to purchase and the owner of the works and property can not agree upon the purchase price, the price shall be determined in such manner as is now or may hereafter be provided by law for determining the value of property taken in eminent domain proceedings.

Witness my hand and the seal of the Department of Public Works of the State of California, this 17th day of April, 1950

A. D. Edmonston

A. D. EDMONSTON, State Engineer

12-2-74 Name chgd to Calif. Dept. of Health, Fresno State Hospital

LICENSE 3082

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
STATE ENGINEER

LICENSE
TO APPROPRIATE WATER

ISSUED TO State of California-Department of Mental Hygiene

DATED APR 17 1950

92121 6-46 2M STATE PRINTING OFFICE

2

STATE OF CALIFORNIA—DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES
STATE ENGINEER

ORDER

APPLICATION 6944 PERMIT 3829 LICENSE 2451

ORDER ALLOWING CHANGE IN PLACE OF USE

Licensee having established to the satisfaction of the State Engineer that the change in place of use under Application 6944, Permit 3829, License 2451, for which petition was submitted on December 19, 1950, will not operate to the injury of any other legal user of water, the State Engineer so finds, and

IT IS ORDERED that permission be and the same is hereby granted to change the place of use under said Application 6944, Permit 3829, License 2451 to a place of use described as follows, to wit:

DOMESTIC USE AT THE SONOMA STATE HOME AND IRRIGATION OF 61 ACRES WITHIN SECTIONS 15, 21 AND 22, T 6 N, R 6 W, M.D.B.&M., AS SHOWN ON MAP FILED WITH STATE ENGINEER.

WITNESS my hand and the seal of the Department of Public Works of the State of California this 7th day of February, 1951.

A. D. Edmonston
A. D. Edmonston
State Engineer

FORM 100

FORM 64

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS
DIVISION OF WATER RESOURCES

License for Diversion and Use of Water

LICENSE 2451 PERMIT 3829 APPLICATION 6944

THIS IS TO CERTIFY, *That* Sonoma State Home, Department of Institutions State of California, Eldridge, California

Notice of Change (Over)

has made proof to the satisfaction of the Division of Water Resources of California of a right to the use of the waters of Sonoma Creek in Sonoma County

tributary of San Pablo Bay

for the purpose of irrigation and domestic uses *under Permit* 3829 *of the Division of Water Resources and that said right to the use of said waters has been perfected in accordance with the laws of California, the rules and regulations of the Division of Water Resources and the terms of the said permit; that the priority of the right herein confirmed dates from* April 24, 1931,

that the amount of water to which such right is entitled and hereby confirmed, for the purposes aforesaid, is limited to the amount actually beneficially used for said purposes and shall not exceed fifty-five hundredths (0.55) cubic foot per second by direct diversion for domestic purposes only from about December 1st to about May 1st of each season and two hundred fifty (250) acre feet per annum by storage to be collected from about December 1st to about May 1st of each season.

The point of diversion of such water is *located* North sixty degrees no minutes East (N. 60° 00' E.) fifteen hundred (1500) feet from the quarter section corner common to Sections 21 and 22, T 6 N, R 6 W, M.D.B.&M. and being within the SW¼ of NW¼ of said Section 22.

Fern Lake Storage Dam is located N. 20° 00' W. 943 feet from the S¼ corner of Section 21, T 6 N, R 6 W, M.D.B.&M., being within the SE¼ of SW¼ of said Section 21.

Suttenfield Reservoir Storage Dam is located N. 51° 00' E. 1610 feet from the SW corner of the NW¼ of NW¼ of Section 22, T 6 N, R 6 W, M.D.B.&M., being within the NW¼ of NW¼ of said Section 22.

Amended by order of FEB 7 1951

A description of the lands or the place where such water is put to beneficial use is as follows: Domestic use at the Sonoma State Home and the irrigation of the following area:

24	acres	within	NE¼	SW¼	of Section 22,	T 6 N,	R 6 W,	M.D.B.&M.
11	"	"	NW¼	SW¼	" "	"	"	"
2	"	"	NW¼	SE¼	" "	"	"	"
5	"	"	SE¼	NW¼	" "	"	"	"
19	"	"	SW¼	NW¼	" "	"	"	"
10	"	"	NE¼	NW¼	" "	"	"	"
20	"	"	NE¼	NE¼	" "	"	"	"
20	"	"	NW¼	NE¼	" "	"	"	"
25	"	"	SW¼	SE¼	" Section 15,	"	"	"
3	"	"	NW¼	SE¼	" "	"	"	"
3	"	"	NE¼	SW¼	" "	"	"	"
4	"	"	SE¼	SW¼	" "	"	"	"
146	acres, total.							

All rights and privileges under this license including method of diversion, method of use and quantity of water diverted are subject to the continuing authority of the Division of Water Resources in accordance with law and in the interest of the public welfare to prevent waste, unreasonable use, unreasonable method of use or unreasonable method of diversion of said water.

Reports shall be filed promptly by licensee on appropriate forms which will be provided for the purpose from time to time by the Division of Water Resources.

The right to the diversion and use of the water aforesaid hereby confirmed is restricted to the point of diversion herein specified and to the lands or place of use herein described.

This license is granted and said appropriator takes all rights herein mentioned subject to the terms and conditions set forth in Section 20 of Chapter 586, Statutes of 1913, as amended, which is as follows:

SEC. 20. All permits and licenses for the appropriation of water shall be under the terms and conditions of this act, and shall be effective for such time as the water actually appropriated under such permits and licenses shall actually be used for the useful and beneficial purpose for which said water was appropriated, but no longer; and every such permit or license shall include the enumeration of conditions therein which in substance shall include all of the provisions of this section and likewise the statement that any appropriator of water, to whom said permit or license may be issued, shall take the same subject to such conditions as therein expressed; *provided*, that at any time after the expiration of twenty years after the granting of a license, the state or any city, city and county, municipal water district, irrigation district, lighting district, or any political subdivision of the state shall have the right to purchase the works and property occupied and used under said license and the works built or constructed for the enjoyment of the rights granted under said license; and in the event that the said state, city, city and county, municipal water district, irrigation district, lighting district or political subdivision of the state so desiring to purchase and the said owner of said works and property can not agree upon said purchase price, said price shall be determined in such manner as is now or may hereafter be determined in eminent domain proceedings. If it shall appear to the state water commission at any time after a permit or license is issued as in this act provided that the permittee, or licensee, or the heirs, successors, or assigns, of said permittee or licensee, has not put the water granted under said permit or license to the useful or beneficial purpose for which the permit or license was granted, or that the permittee or licensee, or the heirs, successors, or assigns of said permittee or licensee, has ceased to put said water to such useful or beneficial purpose, or that the permittee or licensee, or the heirs, successors or assigns of said permittee or licensee, has failed to observe any of the terms and conditions in the permit or license as issued, then and in that case the said commission, after due notice to the permittee, licensee, or the heirs, successors or assigns of such permittee or licensee, and a hearing thereon, may revoke said permit or license and declare the water to be unappropriated and open to further appropriation in accordance with the terms of this act. The findings and declaration of said commission shall be deemed to be prima facie correct until modified or set aside by a court of competent jurisdiction; *provided*, that any action brought so to modify or set aside such finding or declaration must be commenced within thirty days after the service of notice of said revocation on said permittee or licensee, his heirs, successors or assigns. And every licensee or permittee under the provisions of this act if he accepts such permit or license shall accept the same under the conditions precedent that no value whatsoever in excess of the actual amount paid to the state therefor shall at any time be assigned to or claimed for any permit or license granted or issued under the provisions of this act, or for any rights granted or acquired under the provisions of this act, in respect to the regulation by any competent public authority of the services or the price of the services to be rendered by any permittee or licensee, his heirs, successors or assigns or by the holder of any rights granted or acquired under the provisions of this act, or in respect to any valuation for purposes of sale to or purchase, whether through condemnation proceedings or otherwise, by the state or any city, city and county, municipal water district, irrigation district, lighting district or any political subdivision of the state, of the rights and property of any permittee or licensee, or the possessor of any rights granted, issued, or acquired under the provisions of this act. The application for a permit by municipalities for the use of water for said municipalities or the inhabitants thereof for domestic purposes shall be considered first in right, irrespective of whether they are first in time; *provided, however*, that such application for a permit or the granting thereafter of permission to any municipality to appropriate waters, shall not authorize the appropriation of any water for other than municipal purposes; *and providing, further*, that where permission to appropriate is granted by the state water commission to any municipality for any quantity of water in excess of the existing municipal needs therefor, that pending the application of the entire appropriation permitted, the state water commission shall have the power to issue permits for the temporary appropriation of the excess of such permitted appropriation over and above the quantity being applied from time to time by such municipality; *and providing, further*, that in lieu of the granting of such temporary permits for appropriation, the state water commission may authorize such municipality to become as to such surplus a public utility, subject to the jurisdiction and control of the railroad commission of the State of California for such period or periods from and after the date of the issuance of such permission to appropriate, as may be allowed for the application to municipal uses of the entire appropriation permitted; *and provided, further*, that when such municipality shall desire to use the additional water granted in its said application it may do so upon making just compensation for the facilities for taking, conveying and storing such additional water rendered valueless for said purposes, to the person, firm or corporation which constructed said facilities for the temporary use of said excess waters, and which compensation, if not agreed upon between the municipality and said person, firm or corporation, may be determined in the manner provided by law for determining the value of property taken by and through eminent domain proceedings.

Witness my hand and the seal of the Department of Public Works of the State of California, this fifteenth *day of* June, 1942.

EDWARD HYATT
State Engineer

By Harold Conkling
Deputy

12-24-41 [illegible]
Dept. of Public Works [illegible]
Hospital

LICENSE 2451

STATE OF CALIFORNIA
DEPARTMENT OF PUBLIC WORKS

DIVISION OF WATER RESOURCES

LICENSE
TO APPROPRIATE WATER

ISSUED TO Sonoma State Home

DATED June 15, 1942

10669 3-42 1500 STATE PRINTING OFFICE

2

55123
1/11/2012

plotted 1/11/13 DCC

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
1001 I Street, 14th Floor, Sacramento, CA 95814
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, Fax: (916) 341-5431, www.waterboards.ca.gov/waterrights

INITIAL STATEMENT OF WATER DIVERSION AND USE
NOTE: A Statement is not a Water Right

This Statement should be typewritten or legibly written in ink and submitted to the address above.
A separate statement must be filed for each point of diversion.

An (*) indicates a required section. Required sections must be completed for the Statement to be accepted.

***A.** Claimant/Agent Information

Claimant/Owner: State of California Department of Developmental Services- Sonoma Developmental Center Hospital Administrator	Agent: Micheal Hall
Mailing Address P.O Box 1493 Eldridge, CA 95431	Mailing Address P.O Box 1493 Eldridge, CA 95431
Phone No. (707) 938-6000	Phone No. (707)938-6401
Fax No. (707) 938-3605	Fax No. (707)938-6420
E-mail Address:	E-mail Address: Micheal.Hall@sonoma.dds.ca.gov

***B.** Water is diverted and used under the claim of: Riparian claim X Pre 1914 claim X Court Decree No _____
Other (explain):

***C.** Name of the body of water at the point of diversion
Hill/Mill Creek [While actual name is *Hill Creek*, USGS maps refer to creek as *Mill Creek*]

Tributary to Sonoma Creek

***D.** Point of diversion is located within Sonoma County on Assessor's Parcel No. 054-090-001

being within the NW 1/4 of NW 1/4 of Section 28, of Township 6N, Range 06W, MD B&M.

Provide the location of the point of diversion using the California Coordinate System (NAD 1983) or Latitude / Longitude measurements.
38° 20' 27.6" N, -122° 31' 55.20" W

Identify the point of diversion and outline the place of use on a United States Geological Survey (USGS) topographic map and submit the map with the Statement.

Name of the diversion works is _____ Related Water Right(s) License numbers 2451 and 3082 Pre-14 and riparian for Asbury Creek and Roulette Springs

E. Do you own the land at the point of diversion? Yes X No ___ If No, please provide the name and address of the land owner at the point of diversion: _____

***F.** Capacity of diversion works _____ (cfs, gpm, or gpd) Capacity of storage tanks or reservoir 846 AF (gallons or acre-feet)

Type of diversion facility: Gravity X Creek Pump _____ Well Pump _____

Method of measurement: Weir _____ Flume _____ In line flow meter _____ Electric Meter _____ Estimate X

NOTE: # Monthly report below is optional until January 1, 2012, at which time the information becomes mandatory.

#Provide the maximum rate of diversion achieved in each month in the table below as measured in: cfs ___, gpm ___, or gpd ___

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec

Additional copies of this form and water right information can be obtained at www.waterboards.ca.gov/waterrights.

S019164

*G. Provide the quantity of water diverted each month in the table below as measured in: Gallons ___ Million gallons ___ Acre-feet ____

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
2009	X	X	X	X	X	0	0	0	0	0	X	X	X

H. Annual water use in recent years: Maximum 814AF* (gallons or acre-feet) Minimum 440AF* (gallons or acre-feet)

*See note below

State the year of first use at diversion site or storage facility 1904 or earlier

*I. Beneficial water use is for: (example, number of acres and type of crop irrigated, average number of persons served, number of stock watered, etc.) Domestic (2800 people), irrigation (lawns and gardens), fire protection

*J. General description and location of the place of use shall be identified using a USGS topographic map, or if assigned, may be provided using the public land description to the nearest 40 acre parcel accompanied by the County Assessor's parcel map.

See accompanying map

K. Please answer only those questions below that are applicable to your project.

1. Conservation of water
   a. Describe any water conservation efforts you have in place Installation of timers for irrigation sprinklers
   Installation of low-flow toilets in high-use buildings, including residences
2. Water quality and wastewater reclamation
   a. Are you now or have you been using reclaimed water from a wastewater treatment facility, desalination facility or water polluted by waste to a degree that unreasonably affects such water for other beneficial uses? YES __ NO X.
3. Conjunctive use of surface water and groundwater
   a. Are you using groundwater in lieu of surface water? YES __ NO X.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

*DATE: 6/23/2010 at Eldridge, California

*SIGNATURE: [signature]

*PRINTED NAME: James (first name) Micheal (middle initial) Hall (last name)

COMPANY NAME: Sonoma Developmental Center

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California. They are riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on his riparian land. Riparian land must be in the same watershed as the water source and must never have been severed form the source of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to 1) store water for later use 2) divert water which originates in a different watershed 3) divert water released from storage, or 4) divert return flows from groundwater use.

An appropriative right is required for use of water on non-riparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. After the formation of the California Water Commission in December 1914, new appropriators have been required to obtain a permit or license from the State.

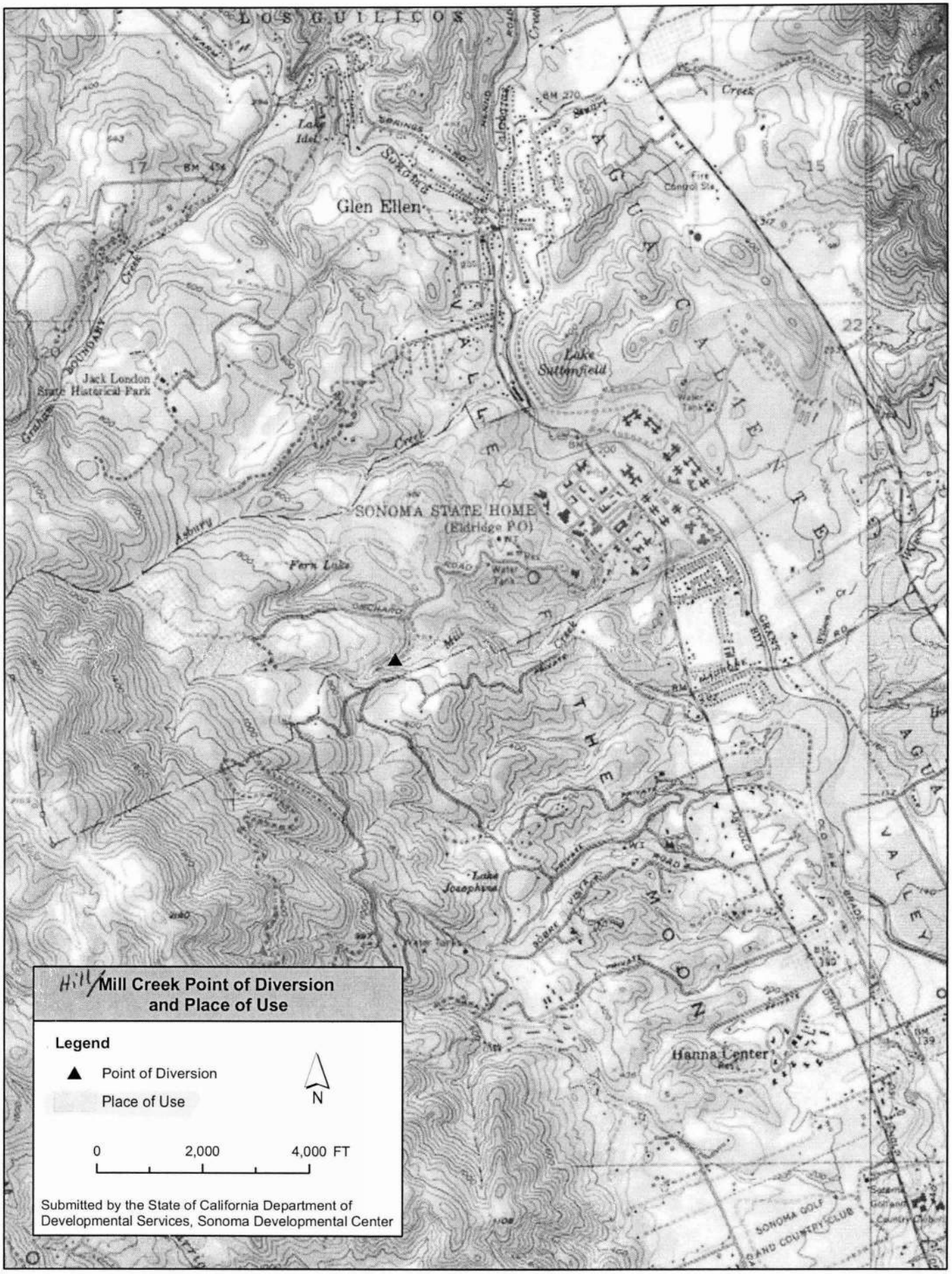
Statements of Water Diversion and Use must be filed by a riparian and/or pre-1914 appropriative water user. The filing of a statement 1) provides a record of water use, 2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversion, and 3) assists the State in determining if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please visit the website http://www.waterboards.ca.gov/waterrights/water_issues/programs/diversion_use/, or write to this office.

*Water being diverted under riparian and pre-14 right for Asbury Creek, Mill/Hill Creek, Roulette Springs, and under License numbers 2451 and 3082 is used to provide a single water supply to the Center.

Additional copies of this form and water right information can be obtained at www.waterboards.ca.gov/waterrights.

S019164


Hill/Mill Creek Point of Diversion and Place of Use
Legend
Point of Diversion
Place of Use
N
0
2,000
4,000 FT
Submitted by the State of California Department of Developmental Services, Sonoma Developmental Center
LOS GUILICOS
Glen Ellen
Lake Idel
Lake Suttonfield
Jack London State Historical Park
SONOMA STATE HOME
(Eldridge P.O.)
Fern Lake
Lake Josephine
Hanna Center
SONOMA GOLF AND COUNTRY CLUB

S019164

S5125 1/11/12

plotted 1/11/13 DCC

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
1001 I Street, 14th Floor, Sacramento, CA 95814
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, Fax: (916) 341-5431, www.waterboards.ca.gov/waterrights

INITIAL STATEMENT OF WATER DIVERSION AND USE
NOTE: A Statement is not a Water Right

This Statement should be typewritten or legibly written in ink and submitted to the address above.
A separate statement must be filed for each point of diversion.

An (*) indicates a required section. Required sections must be completed for the Statement to be accepted.

***A.** Claimant/Agent Information

Claimant/Owner: State of California Department of Developmental Services- Sonoma Developmental Center Hospital Administrator	Agent: Micheal Hall
Mailing Address P.O Box 1493 Eldridge, CA 95431	Mailing Address P.O Box 1493 Eldridge, CA 95431
Phone No. (707) 938-6000	Phone No. (707)938-6401
Fax No. (707) 938-3605	Fax No. (707)938-6420
E-mail Address:	E-mail Address: Micheal.Hall@sonoma.dds.ca.gov

***B.** Water is diverted and used under the claim of: Riparian claim X Pre 1914 claim X Court Decree No _____
Other (explain):

***C.** Name of the body of water at the point of diversion
Roulette Springs

Tributary to Asbury Creek

***D.** Point of diversion is located within Sonoma County on Assessor's Parcel No. 054-090-001

being within the NW 1/4 of SW 1/4 of Section 21, of Township 6N, Range 06W, MD B&M.

Provide the location of the point of diversion using the California Coordinate System (NAD 1983) or Latitude / Longitude measurements.
38° 20' 49.2" N, -122° 32' 9.6" W

Identify the point of diversion and outline the place of use on a United States Geological Survey (USGS) topographic map and submit the map with the Statement.

Name of the diversion works is _____ Related Water Right(s) License numbers 2451 and 3082 Pre-14 and riparian for Asbury Creek and Mill Creek

E. Do you own the land at the point of diversion? Yes X No ___ If No, please provide the name and address of the land owner at the point of diversion: _____

***F.** Capacity of diversion works _____ (cfs, gpm, or gpd) Capacity of storage tanks or reservoir 1.9MG (gallons or acre-feet)

Type of diversion facility: Gravity X Creek Pump _____ Well Pump _____

Method of measurement: Weir _____ Flume _____ In line flow meter _____ Electric Meter _____ Estimate X

NOTE: # Monthly report below is optional until January 1, 2012, at which time the information becomes mandatory.

#Provide the maximum rate of diversion achieved in each month in the table below as measured in: cfs ___, gpm ___, or gpd ___

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec

Additional copies of this form and water right information can be obtained at www.waterboards.ca.gov/waterrights.

S019167

*G. Provide the quantity of water diverted each month in the table below as measured in: Gallons ___ Million gallons ___ Acre-feet ___

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
2009	X	X	X	X	X	X	X	X	X	X	X	X	X

H. Annual water use in recent years: Maximum 814AF* (gallons or acre-feet) Minimum 440AF* (gallons or acre-feet)

*See note below

State the year of first use at diversion site or storage facility 1897 or earlier

*I. Beneficial water use is for: (example, number of acres and type of crop irrigated, average number of persons served, number of stock watered, etc.) Domestic (2800 people), irrigation (lawns and gardens), fire protection

*J. General description and location of the place of use shall be identified using a USGS topographic map, or if assigned, may be provided using the public land description to the nearest 40 acre parcel accompanied by the County Assessor's parcel map.

See accompanying map

K. Please answer only those questions below that are applicable to your project.

1. Conservation of water
   a. Describe any water conservation efforts you have in place Installation of timers for irrigation sprinklers Installation of low-flow toilets in high-use buildings, including residences

2. Water quality and wastewater reclamation
   a. Are you now or have you been using reclaimed water from a wastewater treatment facility, desalination facility or water polluted by waste to a degree that unreasonably affects such water for other beneficial uses? YES __ NO X.

3. Conjunctive use of surface water and groundwater
   a. Are you using groundwater in lieu of surface water? YES __ NO X.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

*DATE: 6/23/2010 at Eldridge, California

*SIGNATURE: [signature]

*PRINTED NAME: James (first name) Michael (middle initial) Hall (last name)

COMPANY NAME: Sonoma Developmental Center

GENERAL INFORMATION PERTAINING TO WATER RIGHTS IN CALIFORNIA

There are two principal types of surface water rights in California. They are riparian and appropriative rights.

A riparian right enables an owner of land bordering a natural lake or stream to take and use water on his riparian land. Riparian land must be in the same watershed as the water source and must never have been severed form the source of supply by an intervening parcel without reservation of the riparian right to the severed parcel. Generally, a riparian water user must share the water supply with other riparian users. Riparian rights may be used to divert the natural flow of a stream but may not be used to 1) store water for later use 2) divert water which originates in a different watershed 3) divert water released from storage, or 4) divert return flows from groundwater use.

An appropriative right is required for use of water on non-riparian land and for storage of water. Generally, appropriative rights may be exercised only when there is a surplus not needed by riparian water users. After the formation of the California Water Commission in December 1914, new appropriators have been required to obtain a permit or license from the State.

Statements of Water Diversion and Use must be filed by a riparian and/or pre-1914 appropriative water user. The filing of a statement 1) provides a record of water use, 2) enables the State to notify such users if someone proposes a new appropriation upstream from their diversion, and 3) assists the State in determining if additional water is available for future appropriators.

The above discussion is provided for general information. For more specific information concerning water rights, please visit the website http://www.waterboards.ca.gov/waterrights/water_issues/programs/diversion_use/, or write to this office.

*Water being diverted under riparian and pre-14 right for Asbury Creek, Mill/Hill Creek, Roulette Springs, and under License numbers 2451 and 3082 is used to provide a single water supply to the Center.

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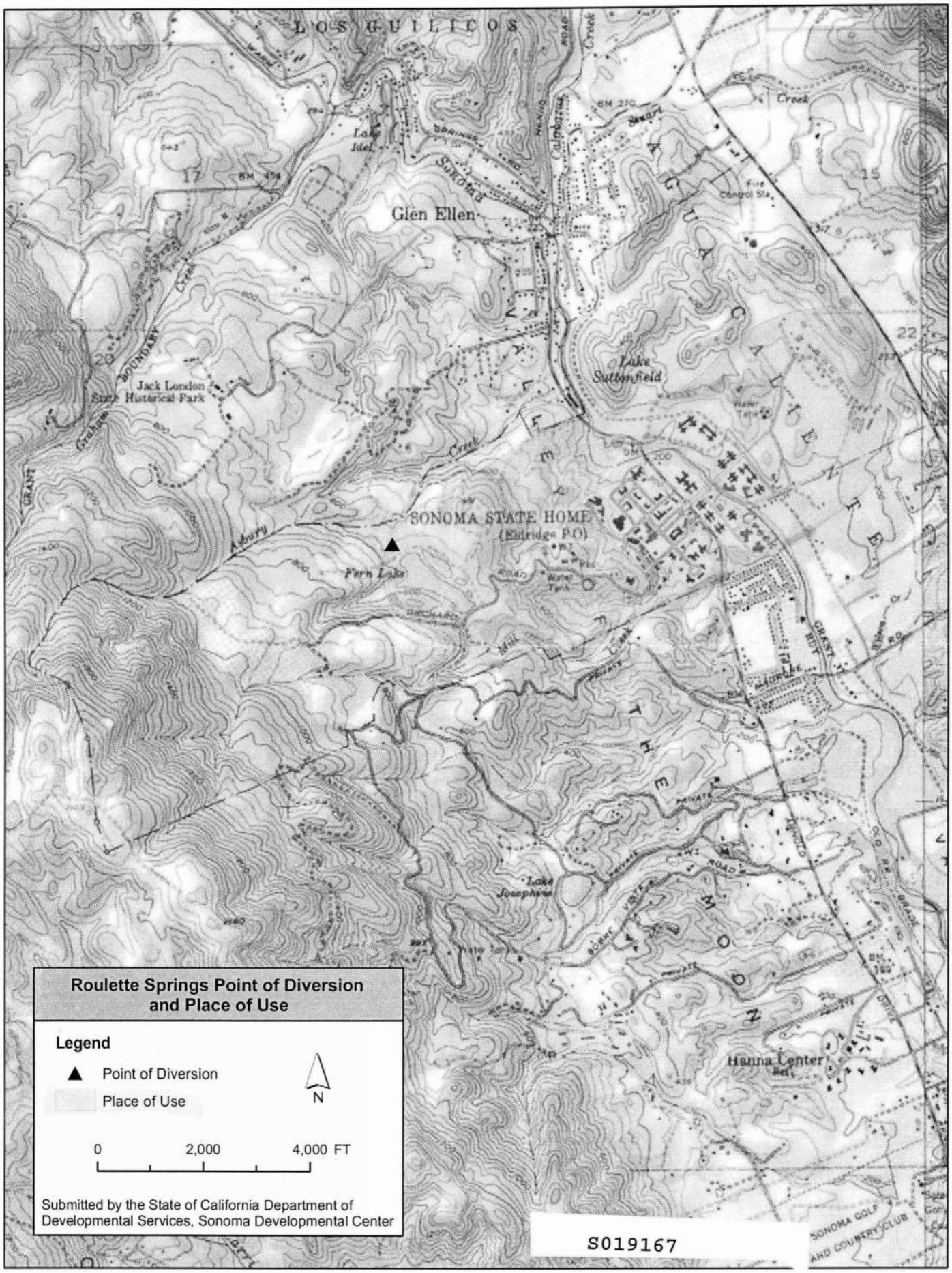
Roulette Springs Point of Diversion and Place of Use
Legend
Point of Diversion
Place of Use
N
0
2,000
4,000 FT
Submitted by the State of California Department of Developmental Services, Sonoma Developmental Center
LOS GUILICOS
Glen Ellen
Lake Idel
Lake Suttonfield
Jack London State Historical Park
SONOMA STATE HOME
(Eldridge PO)
Fern Lake
Lake Josephine
Hanna Center
SONOMA GOLF AND COUNTRY CLUB
S019167

Number of metered agricultural service connections:	
Number of flat rate agricultural service connections:	
Total number of agricultural service connections:	

Source Data

Inactive sources are not approved as sources of supply and must be physically disconnected or otherwise isolated so that only an intentional act by an operator can place the source in service.

Groundwater wells

Number of approved active groundwater (GW) wells:	
Number of groundwater wells added in 2009:	
Number of groundwater wells inactivated in 2009:	1
Number of groundwater wells abandoned or destroyed in 2009:	

Surface water

Number of approved active raw surface water (SW) sources:	4
Number of raw surface water sources added in 2009:	
Number of raw surface water sources inactivated in 2009:	
Number of raw surface water sources abandoned or destroyed in 2009:	

Purchased water connections

Number of active purchased groundwater (GW) connections:	1
Number of purchased groundwater connections added in 2009:	
Number of purchased groundwater connections inactivated in 2009:	
Number of purchased groundwater connections abandoned or destroyed in 2009:	

Surface water connections

Number of approved active purchased surface water connections:	
Number of purchased surface water connections added in 2009:	

Plotted DCC 1/14/13

55131

State of California
State Water Resources Control Board
DIVISION OF WATER RIGHTS
1001 I Street, 14th Floor, Sacramento, CA 95814
P.O. Box 2000, Sacramento, CA 95812-2000
Info: (916) 341-5300, Fax: (916) 341-5431, www.waterboards.ca.gov/waterrights

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Other (explain):

***C.** Name of the body of water at the point of diversion
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Tributary to Sonoma Creek

***D.** Point of diversion is located within Sonoma County on Assessor's Parcel No. 054-090-001

being within the NW 1/4 of SE 1/4 of Section 20, of Township 6N, Range 06W, MD B&M.

Provide the location of the point of diversion using the California Coordinate System (NAD 1983) or Latitude / Longitude measurements.
38° 20' 52.77" N, -122° 32' 33.79" W

Identify the point of diversion and outline the place of use on a United States Geological Survey (USGS) topographic map and submit the map with the Statement.

Name of the diversion works is _____ Related Water Right(s) License numbers 2451 and 3082 Pre-14 and riparian for Roulette Springs and Mill Creek

E. Do you own the land at the point of diversion? Yes X No ___ If No, please provide the name and address of the land owner at the point of diversion: _____

***F.** Capacity of diversion works 6 cfs (cfs, gpm, or gpd) Capacity of storage tanks or reservoir 846 AF (gallons or acre-feet)

Type of diversion facility: Gravity X Creek Pump _____ Well Pump _____

Method of measurement: Weir _____ Flume _____ In line flow meter _____ Electric Meter _____ Estimate X

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Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec

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S019179

*G. Provide the quantity of water diverted each month in the table below as measured in: Gallons ___ Million gallons ___ Acre-feet ____

Year	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Total Annual
2009	X	X	X	X	X	0	0	0	0	0	X	X	X

H. Annual water use in recent years: Maximum 814 AF* (gallons or acre-feet) Minimum 440 AF* (gallons or acre-feet)

*See note below

State the year of first use at diversion site or storage facility 1880's or before

*I. Beneficial water use is for: (example, number of acres and type of crop irrigated, average number of persons served, number of stock watered, etc.) Domestic (2800 people), irrigation (lawns and gardens), fire protection

*J. General description and location of the place of use shall be identified using a USGS topographic map, or if assigned, may be provided using the public land description to the nearest 40 acre parcel accompanied by the County Assessor's parcel map.

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   a. Are you using groundwater in lieu of surface water? YES __ NO X.

I declare under penalty of perjury that the information in this report is true to the best of my knowledge and belief.

*DATE: 6/23/2010 at Eldridge, California

*SIGNATURE: [signature]

*PRINTED NAME: James Michael Hall
(first name) (middle initial) (last name)

COMPANY NAME: Sonoma Developmental Center

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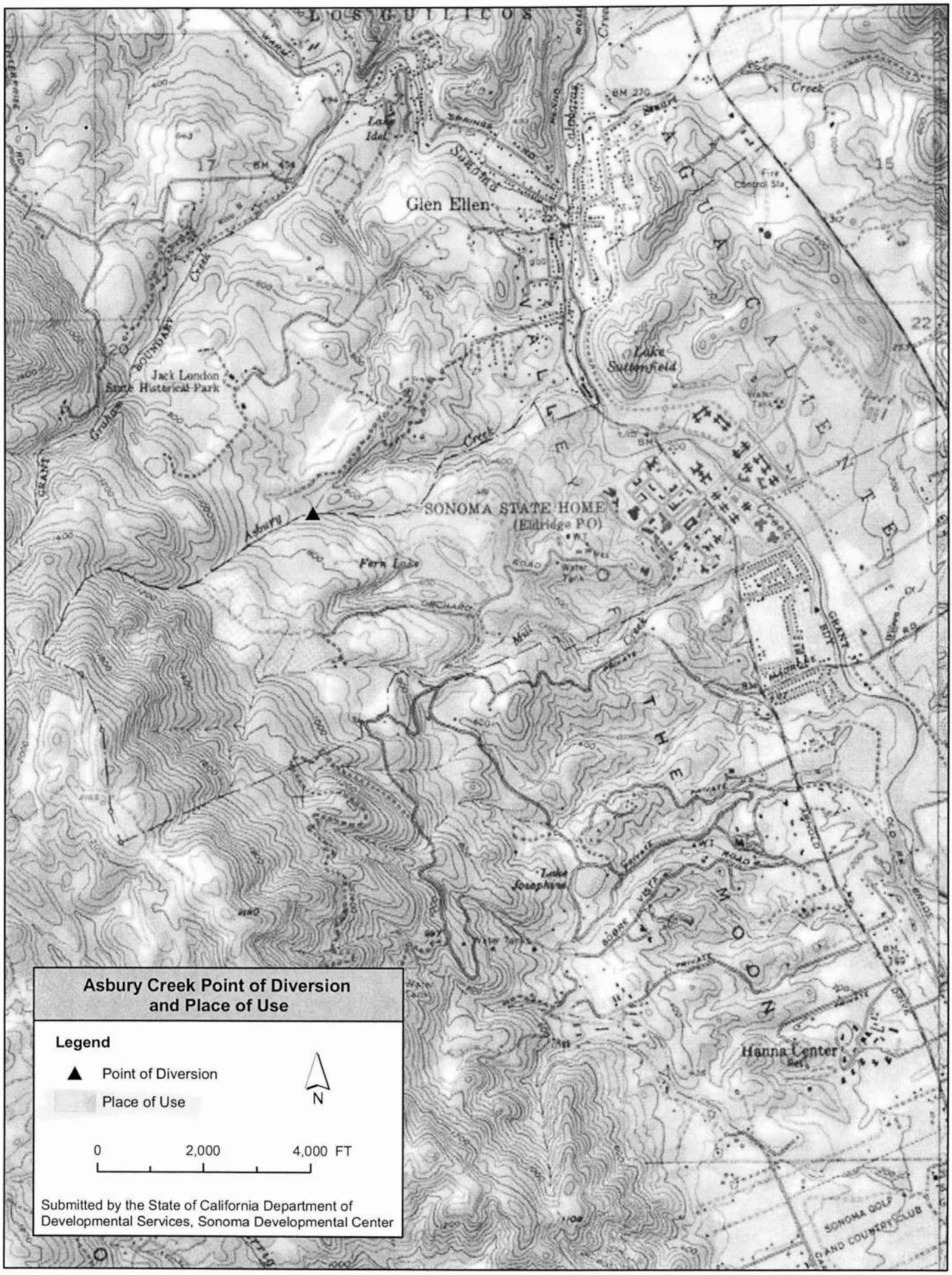

Asbury Creek Point of Diversion
and Place of Use
Legend
Point of Diversion
Place of Use
N
0
2,000
4,000 FT
Submitted by the State of California Department of
Developmental Services, Sonoma Developmental Center
Glen Ellen
Jack London
State Historical Park
SONOMA STATE HOME
(Eldridge P.O.)
Lake Sutherfield
Fern Lake
Lake Josephine
Hanna Center
Asbury
Creek
Mill
Sonoma
Valley
Fire
Control Sta.
Water
Tank
Sonoma Golf
and Country Club

S019179

Appendix C

SDC Diversion Model Documentation

Appendix C

Documentation of SDC Diversions Model

Introduction

This Appendix C of the Water Supply Assessment (WSA) for the Sonoma Developmental Center (SDC) Specific Plan provides a description of the development, validation, and results from the SDC Diversions Model. The SDC Diversions Model is a spreadsheet-based analytical model developed to support the supply component of the WSA. The purpose of the SDC Diversions Model is to quantify the volume of water available from the various surface water sources based on hydrology, water rights and other regulatory constraints, and infrastructure capacity.

Model Structure

The SDC Diversions Model simulates surface water diversions from the following supply sources available to the SDC Property, each of which is governed by various regulatory (i.e., water rights) and/or infrastructure constraints:

- Asbury Creek
- Hill/Mill Creek
- Roulette Springs
- Unnamed Stream (Source A)
- Sonoma Creek

The SDC Diversions Model simulates diversions from these sources, subject to the various constraints, on a daily time step based on a time-series of natural hydrology and then routes these diversions through existing conveyance infrastructure (i.e., pipelines) to the two SDC storage reservoirs, Fern Lake and Suttonfield Lake which, for purposes of this analysis, are considered to function together as a "Combined Reservoir". Project demands are met by a combination of direct diversions from certain sources through the Water Treatment Plant (WTP) and outflows from Combined Reservoir storage through the WTP. For Roulette Springs and Sonoma Creek direct use diversions, demand as a function of month is also a limiting factor. **Table C-1** summarizes the various water diversions permits, licenses and artesian / pre-1914 rights associated with each of these supply sources. **Table C-2** summarizes the SDC Diversions Model parameters associated with infrastructure and operational characteristics for each source.

The sequence of calculations in the SDC Diversions Model is as follows:

1. Asbury Creek diversions to storage, as a function of the estimated natural flows at the Hill/Mill Creek POD, subject to (a) temporal constraints associated with artesian / pre-1914 water rights, (b) downstream flow requirement (DFR), (c) diversion limits, (d) pipeline capacity constraint and (e) storage capacity limitations in the Combined Reservoir;

2. Hill/Mill Creek diversions to storage, as a function of the estimated natural flows at the Hill Mill Creek POD, subject to (a) temporal constraints associated with artesian / pre-1914 water rights, (b) intake box constraint, (c) pipeline capacity constraint, and (d) storage capacity limitations in the Combined Reservoir;
3. Roulette Springs diversions, based on the daily equivalent flow rates associated with average monthly production values from data reported to the State Water Resources Control Board (SWRCB);
4. Unnamed Creek (Source A) inflows to the Combined Reservoir, as a function of the estimated natural flows at the Unnamed Creek (Source A) POD, with no other constraints as this is an uncontrolled inflow to the Combined Reservoir;
5. Sonoma Creek diversions for direct use, as a function of the estimated natural flows at the Sonoma Creek POD, subject to (a) temporal and rate-based constraints associated with License 2451, and (b) limitation based on demand;
6. Sonoma Creek diversions to storage, as a function of the remaining estimated natural flows at the Sonoma Creed POD (after the diversions for direct use under step #5), subject to (a) temporal, rate-based, and volumetric constraints associated with Licenses 2451 and 3082, and (b) storage capacity limitations in the Combined Reservoir;
7. Combined Reservoir storage, based on mass balance calculations including (a) diversion inflows to storage from Asbury Creek (step #1), Hill/Mill Creek (step #2), and Sonoma Creek (step #6), (b) precipitation and local runoff inflows, (c) evaporation outflows, (d) outflows through the Water Treatment Plant (WTP) to meet demands, and (e) outflows over spillway, and subject to reservoir capacity parameters; and
8. Demands, based on the 100% Reliable Yield value which was determined through trial and error as the maximum demand under which no days have unmet demands (see further discussion in Model Results section below), satisfied by Roulette Springs (Step #3), Sonoma Creek direct diversions (Step #5), and diversions from Combined Reservoir storage (Step #7).

Model Input Data

In addition to the constraints on diversions from each source summarized in **Tables C-1** and **C-2**, the primary input to the SDC Diversions Model is hydrologic and climatologic time-series data. For all sources except Roulette Springs, the model calculates diversions as a function of streamflow in the associated creek at the point of diversion (POD). Because records of natural streamflow at the PODs are generally not available, the POD streamflow data were estimated using area-based scaling factors applied to available streamflow data at a nearby United States Geological Survey (USGS) Agua Caliente stream gauge on Sonoma Creek. **Table C-3** summarizes the scaling factors applied to the USGS Agua Caliente stream gauge flow data to estimate streamflow at each of the PODs. An additional scaling factor water was applied during estimation of natural streamflows in Asbury Creek based on initial results from the model validation.

Model Validation

Model validation is the process of evaluating the model output relative to known data and, if necessary, adjusting model parameters to achieve the best possible fit. Validation of the SDC Diversions Model was conducted by comparing modeled diversions to the following available diversions datasets:

- Asbury Creek: daily data from February 2021 – October 2018, and monthly data from SWRCB reports from January 2012 – June 2018;
- Hill/Mill Creek: daily data from December 2014 – October 2018, and monthly data from SWRCB reports from January 2010 – June 2014; and
- Sonoma Creek: monthly data from SWRCB reports from January 2010 – June 2014.
- Storage in Combined Reservoir: bi-annual data from 1975 – 2009.

Because of the way that diversions were historically managed (i.e., by manually opening and closing gates, with no consideration for reservoir capacity limitations), the validation was conducted based on model results for the condition of "no reservoir capacity constraints" and only using data from time periods when observed diversions were non-zero. **Table C-4** provides a summary of model validation for each of the above PODs. In general, diversions estimated with the SDC Diversions Model are lower than the observed diversions for Asbury and Hill/Mill Creeks, and the diversions estimated with the SDC Diversions Model are higher than observed diversions for Sonoma Creek. Based on available data the validation results indicates that the model is conservative for Asbury and Hill/Mill Creek. **Figure C-2** shows the modeled and observed storage in the Combined Reservoir, indicating that the model is capable of replicating changes in reservoir storage with reasonable accuracy.

Model Results

The primary outputs from the SDC Diversions Model are estimated daily diversion rates from each water supply source. For purposes of the WSA, these outputs were compiled into totals by water year (October – September) in order to evaluate normal year supply (based on the long-term average), dry year supply (based on the year with the lowest total diversions), and multiple dry years supply (based on the five-year period with the lowest total diversions).

The SDC Diversions Model was used to estimate two quantities: (1) the maximum demand that could be satisfied 100% of the time, referred to as the "100% Reliable Yield", and (2) the total yield of the system that could be realized if Combined Reservoir capacity were not a limiting factor. The 100% reliable yield was determined by increasing the modeled demands up until the point that the number of days with unmet demand rises to one (1). With this approach, the 100% Reliable Yield was determined to be 356.2 AFY. **Table C-5** presents the annual (water year) totals for modeled diversions for the 45-year period of record (i.e., water years 1956-1980 and 2002-2021). Results from the model indicate that the 100% Reliable Yield is satisfied through a combination of direct diversions and outflows from Combined Storage. The total yield of the system without the Combined Reservoir capacity constraint was determined to be 691 AFY under the 100% Reliable Yield demand scenario. **Table C-6** presents the annual (water year) diversions totals for the 45-year period of record based on the scenario of unconstrained Combined Reservoir capacity and 100% Reliable Yield demands.

Tables

Table C-1. Summary of SDC Water Diversions Permits, Licenses and Artesian / Pre-1914 Rights

Table C-2. SDC Diversion Model Parameters

Table C-3. Scaling Factors Used to Estimate Natural Streamflows at Points of Diversion

Table C-4. Summary of Model Validation Results

Table C-5. Annual Modeled Diversions and Water Supplies with Storage Capacity Constraints

Table C-6. Annual Modeled Diversions and Water Supplies without Storage Capacity Constraints

Figures

Figure C-1. SDC Diversions Model Flow Chart

Figure C-2. Validation Results for Storage in Combined Reservoir

Table C-1
Summary of SDC Water Diversions Permits, License and Artesian / Pre-1914 Rights
Sonoma Developmental Center Specific Plan, Sonoma County, California

Appropriative Rights											
Point of Diversion	**Application**	**Permit**	**License**	**Date of License**	**Constraint**	**Quantity**	**Unit**	**Details**	**Maximum Rate of Diversion**	**Unit**	**Time Period**
Unnamed Stream (Source A)	9378	5244	3082	5/11/1948	Maximum Annual Diversion to Storage	300	AFY	Up to 100 AFY from Source A, remainder up to 275 AFY from Source B	1410	gpm	November 1 - May 1
Sonoma Creek (Source B)					Maximum Diversion Rate from Source B	1410	gpm		--	--	
Sonoma Creek	6944	3829	2451	2/7/1951	Maximum Annual Diversion to Storage	250	AFY	Domestic purposes only	--	--	December 1 - May 1
					Maximum Diversion Rate for Direct Use	0.55	cfs		0.55	cfs	December 1 - May 1
Pre-1914 / Riparian Rights (Claimed)											
Point of Diversion	**Application**	**Date of Last Reporting**		**Date of Original Application**	**Constraint**	**Quantity**	**Unit**	**Details**	**Maximum Rate of Diversion**	**Unit**	**Time Period**
Hill/Mill Creek	S019164	6/18/2018		6/23/2010	--	--	--	A Statement of Diversion and Use is not a confirmed water right. Maximum use in recent years listed as 814 AFY.	--	--	November 1 - May 31
Roulette Springs	S019167	6/12/2018		6/23/2010	--	--	--		--	--	Year Round
Asbury Creek	S019179	6/18/2018		6/23/2010	Maximum Diversion Rate, provided a minimum of 0.9 cfs flows downstream	1.0	cfs		--	--	November 1 - May 31

Abbreviations:
"AFY" = acre-feet per year
"cfs" = cubic feet per second
"gpm" = gallons per minute
"SDC" = Sonoma Developmental Center

Table C-2
SDC Diversion Model Parameters
Sonoma Developmental Center Specific Plan, Sonoma County, California

Parameter	Value	Units	Notes
Storage			
Initial storage volume	350	AF	42% of reservoir capacity
Maximum storage volume	841	AF	241 AF Fern Lake capacity and 600 AF Suttonfield Lake capacity
Storage bottom pool capacity	20	%	Demand is no longer able to be met below this level
Maximum storage capacity	100	%	Assumed
Storage capacity when spillway begins to flow	100	%	Percent of storage when spillway begins to be used
Combined lake surface area	31.63	acres	Approximated using GIS
Combined lake surface area scalar	1.2	--	Scaling direct precipitation contribution to lake surface
Fern Lake catchment surface area	64	acres	Approximated using GIS
Fern lake catchment surface area scalar	0.25	--	Scaling direct precipitation contribution to lake surface
Sonoma Creek			
Sonoma Creek POD flow when sump pump inundates	25	cfs	Assumed
Sonoma Creek pump station capacity	4.46	cfs	3 pumps working in parallel (750+750+500 gpm)
Sonoma pump station efficiency	25	%	Assumed
Agua Caliente to Sonoma Creek POD scaling factor	0.82	--	Ratio of upstream areas between USGS gauge station and Sonoma Creek POD
Maximum monthly diversions	73.29	AF	Maximum observed diversions between January 2010 and June 2014
Hill/Mill Creek			
Hill/Mill Creek intake box minimum diversion	0.1	cfs	Assumed
Hill/Mill Creek pipeline capacity	1.55	cfs	Maximum observed diversion rate between December 2014 and October 2018
Asbury Creek			
Asbury Creek downstream flow requirement	0.9	cfs	Legal limit required by Diversion Permit
Diversion limit	1	cfs	Legal limit required by Diversion Permit

Abbreviations:
"AF" = acre-feet
"cfs" = cubic feet per second
"GIS" = Geographic Information System
"gpm" = gallons per minute
"POD" = Point of Diversion
"SDC" = Sonoma Developmental Center
"USGS" = United Stated Geological Survey

Table C-3
Scaling Factors Used to Estimate Natural Streamflow's at Points of Diversion
Sonoma Developmental Center Specific Plan, Sonoma County, California

Name	Area of Upstream Watershed (acres) (a)	Area Based Scaling Factor	Additional Scaling Factor (b)	Total Scaling Factor
Agua Caliente USGS Station	37,343	--	--	--
Unnamed Stream (Source A) POD	34	0.001	--	0.001
Sonoma Creek POD	30,528	0.818	--	0.818
Hill/Mill Creek POD	345	0.009	--	0.009
Asbury Creek POD	465	0.012	0.250	0.003

Abbreviations:
"POD" = Point of Diversion
"USGS" = United States Geological Survey

Notes:
(a) All areas obtained from USGS StreamStats tool (https://streamstats.usgs.gov/ss/); accessed 13 October 2021.
(b) Additional scaling factor determined from model validation.

Table C-4
Summary of Model Validation Results
Sonoma Developmental Center Specific Plan, Sonoma County, California

Water Year	Modeled Diversions (AF) (a)	Observed Diversions (AF) (b), (c)
Asbury Creek Point of Diversion		
2012	13.5	10.3
2013	13.0	12.9
2014	0.0	0.0
2015	12.5	18.3
2016	15.6	20.8
2017	19.9	27.0
2018	4.4	7.3
Hill/Mill Creek Point of Diversion		
2015	93.3	98.4
2016	96.3	102.2
2017	81.6	35.4
2018	33.0	43.0
Sonoma Creek Point of Diversion		
2011	175.2	122.5
2012	187.7	177.6
2013	127.8	123.2

Abbreviations:
"AF" = acre-feet

Notes:
(a) For purposes of model validation, modeled diversions are only calculated for the same days or months in which observed diversions were recorded, and modeled storage constraints were removed. This approach was intended to eliminate actual storage levels and system demands, for which data do not exist, as variables.
(b) All observed diversions for Asbury and Hill/Mill Creek were recorded by data loggers.
(c) Observed Sonoma Creek diversions are based on monthly diversions reported to the State Water Resources Control Board.

Table C-5
Annual Modeled Diversions and Water Supplies with Storage Capacity Constraints
Sonoma Developmental Center Specific Plan, Sonoma County, California

Modeled Annual Diversions (AF)									
Water Year	Asbury Creek Diversions	Hill/Mill Creek Diversions	Roulette Springs	Unnamed Stream (Source A) Diversions	Sonoma Creek (Source B) Diversions	Sonoma Creek Direct Diversion	Sonoma Creek	Diversions to/from Storage	Total Diversions
1956	56.4	224.7	172.2	103.6	170.8	22.3	0.0	393.8	750.0
1957	5.0	101.9	171.6	17.7	87.4	5.4	0.0	32.9	389.1
1958	5.5	72.2	171.6	95.9	81.2	24.3	0.0	94.6	450.8
1959	9.3	69.0	171.6	17.5	72.2	6.0	0.0	-10.5	345.7
1960	16.1	107.7	172.2	29.6	119.2	11.3	0.0	100.0	456.2
1961	4.5	86.8	171.6	17.2	83.4	8.7	0.0	16.1	372.3
1962	19.8	74.4	171.6	37.8	62.8	11.0	0.0	21.3	377.5
1963	12.2	81.4	171.6	57.0	60.0	18.5	0.0	44.6	400.8
1964	4.9	48.8	172.2	12.0	59.2	3.5	0.0	-55.6	300.6
1965	26.4	102.4	171.6	51.8	84.2	19.3	0.0	99.5	455.7
1966	9.2	77.0	171.6	39.8	78.5	17.7	0.0	37.7	393.9
1967	13.7	77.1	171.6	83.2	79.7	26.1	0.0	95.3	451.5
1968	16.0	73.7	172.2	30.5	76.0	13.8	0.0	26.0	382.2
1969	16.4	80.6	171.6	78.8	74.9	24.4	0.0	90.6	446.8
1970	19.3	67.2	171.6	69.4	58.6	20.6	0.0	50.5	406.7
1971	20.4	78.2	171.6	49.7	52.9	25.4	0.0	42.0	398.2
1972	0.0	58.3	172.2	9.2	98.2	10.5	0.0	-7.8	348.4
1973	14.7	79.0	171.6	76.6	76.5	21.8	0.0	84.0	440.2
1974	11.8	79.4	171.6	74.7	83.1	30.0	0.0	94.3	450.5
1975	15.4	79.8	171.6	48.5	63.1	12.0	0.0	34.2	390.4
1976	0.0	12.0	172.2	3.0	13.3	0.9	0.0	-154.9	201.3
1977	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0
1978	46.9	228.8	171.6	72.9	208.5	22.6	0.0	395.2	751.4
1979	14.5	78.5	171.6	30.4	67.0	11.5	0.0	17.4	373.6
1980	15.2	67.9	172.2	70.9	74.7	19.5	0.0	64.3	420.5
2002	13.5	85.7	171.6	48.9	67.2	25.9	0.0	56.7	412.9
2003	23.2	92.4	171.6	51.7	62.0	22.8	0.0	67.5	423.7
2004	9.4	76.2	172.2	45.5	87.5	22.0	0.0	56.6	412.8
2005	22.7	85.0	171.6	57.9	55.2	23.1	0.0	59.3	415.5
2006	17.4	62.7	171.6	112.1	40.6	25.5	0.0	73.7	429.9
2007	7.7	78.6	171.6	16.5	88.2	8.4	0.0	14.8	371.0
2008	20.5	77.8	172.2	35.4	61.7	11.7	0.0	23.1	379.3
2009	14.8	78.4	171.6	20.4	81.2	5.4	0.0	15.7	371.9
2010	20.0	108.0	171.6	47.2	89.5	15.2	0.0	95.4	451.6
2011	15.1	79.1	171.6	67.7	65.9	25.9	0.0	69.1	425.3
2012	15.5	82.7	172.2	25.4	73.2	7.7	0.0	20.5	376.7
2013	19.6	74.3	171.6	33.2	63.8	16.9	0.0	23.2	379.4
2014	6.7	70.3	171.6	15.6	84.8	5.4	0.0	-1.8	354.4
2015	17.2	93.7	171.6	28.1	88.6	14.9	0.0	57.8	414.0
2016	13.9	99.9	172.2	40.5	98.0	13.9	0.0	82.2	438.4
2017	15.6	75.9	171.6	117.6	67.3	28.5	0.0	120.3	476.5
2018	6.4	87.6	171.6	18.2	106.7	7.8	0.0	42.1	398.3
2019	12.4	94.9	171.6	84.6	81.8	21.0	0.0	110.2	466.4
2020	0.0	39.6	172.2	7.4	62.0	11.7	0.0	-63.2	293.0
2021	0.0	3.5	171.6	2.0	8.1	0.9	0.0	-170.2	186.0
Normal Year (b)	14.3	81.2	171.8	45.7	76.0	15.6	0.0	48.4	404.6
Single Dry Year (c)	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0
Consecutive Dry Years (d) 1st Year	14.7	79.0	171.6	76.6	76.5	21.8	0.0	84.0	440.2
Consecutive Dry Years (d) 2nd Year	11.8	79.4	171.6	74.7	83.1	30.0	0.0	94.3	450.5
Consecutive Dry Years (d) 3rd Year	15.4	79.8	171.6	48.5	63.1	12.0	0.0	34.2	390.4
Consecutive Dry Years (d) 4th Year	0.0	12.0	172.2	3.0	13.3	0.9	0.0	-154.9	201.3
Consecutive Dry Years (d) 5th Year	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0

Abbreviations:
"AF" = acre-feet
"AFY" = acre-feet per year

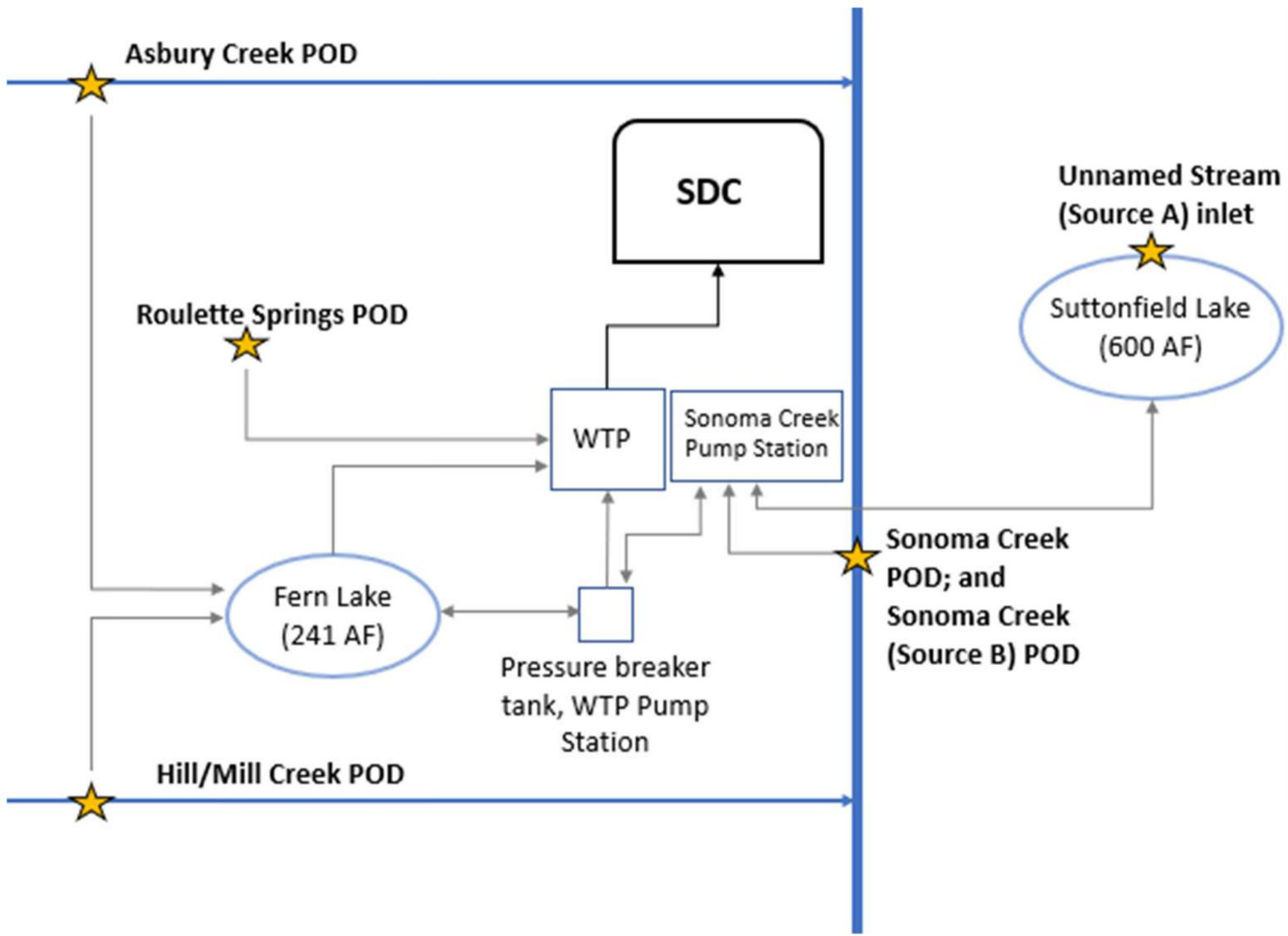
Notes:
(a) Modeled diversions assume historical demands equal to the 100% reliable yield of 356.2 AFY.
(b) Normal year supply values are based on the average modeled supplies during all complete water years during the period of analysis.
(c) Single dry year supply values are based on the modeled supplies during the driest water year (1977).
(d) Consecutive dry year supply values are based on the modeled supplies over the driest five-water year period (1973-1977).

Table C-6
Annual Modeled Diversions and Water Supplies without Storage Capacity Constraints
Sonoma Developmental Center Specific Plan, Sonoma County, California

	Modeled Annual Diversions (AF)								
Water Year	Asbury Creek Diversions	Hill/Mill Creek Diversions	Roulette Springs	Unnamed Stream (Source A) Diversions	Sonoma Creek (Source B) Diversions	Sonoma Creek Direct Diversion	Sonoma Creek	Diversions to/from Storage	Total Diversions
1956	56.4	247.9	172.2	103.6	223.9	22.3	53.1	523.1	879.3
1957	5.0	101.9	171.6	17.7	87.4	5.4	0.0	32.9	389.1
1958	78.4	282.6	171.6	95.9	266.0	24.3	184.8	747.4	1103.6
1959	9.3	69.0	171.6	17.5	72.2	6.0	0.0	-10.5	345.7
1960	16.1	137.6	172.2	29.6	165.1	11.3	45.9	221.6	577.8
1961	4.5	109.4	171.6	17.2	116.9	8.7	33.4	105.6	461.8
1962	24.1	133.4	171.6	37.8	137.5	11.0	74.7	234.0	590.2
1963	24.1	218.3	171.6	57.0	205.1	18.5	145.1	483.6	839.8
1964	4.9	48.8	172.2	12.0	59.2	3.5	0.0	-55.6	300.6
1965	27.2	192.8	171.6	51.8	195.9	19.3	111.7	414.2	770.4
1966	10.9	163.9	171.6	39.8	208.5	17.7	130.0	386.3	742.5
1967	40.6	313.7	171.6	83.2	270.0	26.1	190.3	739.3	1095.5
1968	19.9	144.8	172.2	30.5	174.1	13.8	98.1	297.0	653.2
1969	61.2	264.0	171.6	78.8	251.3	24.4	176.4	671.6	1027.8
1970	43.3	198.4	171.6	69.4	204.3	20.6	145.7	497.1	853.3
1971	24.0	205.0	171.6	49.7	207.1	25.4	154.2	480.9	837.1
1972	0.0	58.3	172.2	9.2	98.2	10.5	0.0	-7.8	348.4
1973	48.9	269.8	171.6	76.6	247.7	21.8	171.2	651.5	1007.7
1974	48.7	333.9	171.6	74.7	275.0	30.0	244.9	822.6	1178.8
1975	31.8	177.2	171.6	48.5	172.3	12.0	109.2	366.5	722.7
1976	0.0	12.0	172.2	3.0	13.3	0.9	0.0	-154.9	201.3
1977	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0
1978	46.9	257.9	171.6	72.9	264.6	22.6	56.1	536.5	892.7
1979	16.8	131.2	171.6	30.4	154.7	11.5	87.7	247.8	604.0
1980	47.6	194.5	172.2	70.9	214.7	19.5	140.0	503.2	859.4
2002	31.5	204.3	171.6	48.9	222.5	25.9	155.3	503.7	859.9
2003	25.2	204.4	171.6	51.7	211.6	22.8	149.5	480.6	836.8
2004	22.2	166.3	172.2	45.5	199.3	22.0	111.8	383.1	739.3
2005	32.9	277.8	171.6	57.9	252.0	23.1	196.8	655.8	1012.0
2006	67.3	352.2	171.6	112.1	275.0	25.5	234.5	881.9	1238.1
2007	7.7	78.6	171.6	16.5	88.2	8.4	0.0	14.8	371.0
2008	22.9	118.3	172.2	35.4	134.8	11.7	73.0	212.1	568.3
2009	14.8	78.4	171.6	20.4	81.2	5.4	0.0	15.7	371.9
2010	27.5	224.0	171.6	47.2	214.5	15.2	125.1	469.1	825.3
2011	47.4	258.7	171.6	67.7	255.3	25.9	189.4	659.9	1016.1
2012	15.6	107.4	172.2	25.4	113.4	7.7	40.2	125.8	482.0
2013	19.6	89.7	171.6	33.2	93.0	16.9	29.1	96.9	453.1
2014	6.7	70.3	171.6	15.6	84.8	5.4	0.0	-1.8	354.4
2015	17.2	93.7	171.6	28.1	88.6	14.9	0.0	57.8	414.0
2016	25.5	164.0	172.2	40.5	165.0	13.9	67.0	292.0	648.2
2017	75.6	324.4	171.6	117.6	275.0	28.5	226.8	863.2	1219.4
2018	6.4	90.4	171.6	18.2	113.8	7.8	7.2	59.2	415.4
2019	44.7	294.2	171.6	84.6	249.5	21.0	167.7	677.1	1033.3
2020	0.0	39.6	172.2	7.4	62.0	11.7	0.0	-63.2	293.0
2021	0.0	3.5	171.6	2.0	8.1	0.9	0.0	-170.2	186.0
Normal Year (b)	26.7	166.8	171.8	45.7	166.1	15.6	91.7	328.2	684.4
Single Dry Year (c)	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0
Consecutive Dry Years (d) 1st Year	31.8	177.2	171.6	48.5	172.3	12.0	109.2	366.5	722.7
Consecutive Dry Years (d) 2nd Year	0.0	12.0	172.2	3.0	13.3	0.9	0.0	-154.9	201.3
Consecutive Dry Years (d) 3rd Year	0.0	1.3	171.6	0.9	2.1	0.1	0.0	-180.2	176.0
Consecutive Dry Years (d) 4th Year	46.9	257.9	171.6	72.9	264.6	22.6	56.1	536.5	892.7
Consecutive Dry Years (d) 5th Year	16.8	131.2	171.6	30.4	154.7	11.5	87.7	247.8	604.0

Abbreviations:
"AF" = acre-feet

Notes:
(a) Annual diversions without storage capacity constraints were modeled to eliminate actual storage levels and system demands, for which data does no exist, as variables.
(b) Normal year supply values are based on the average modeled supplies during all complete water years during the period of analysis.
(c) Single dry year supply values are based on the modeled supplies during the driest water year (1977).
(d) Consecutive dry year supply values are based on the modeled supplies over the driest five-water year period (1975-1979).



Legend:

Point of Diversion

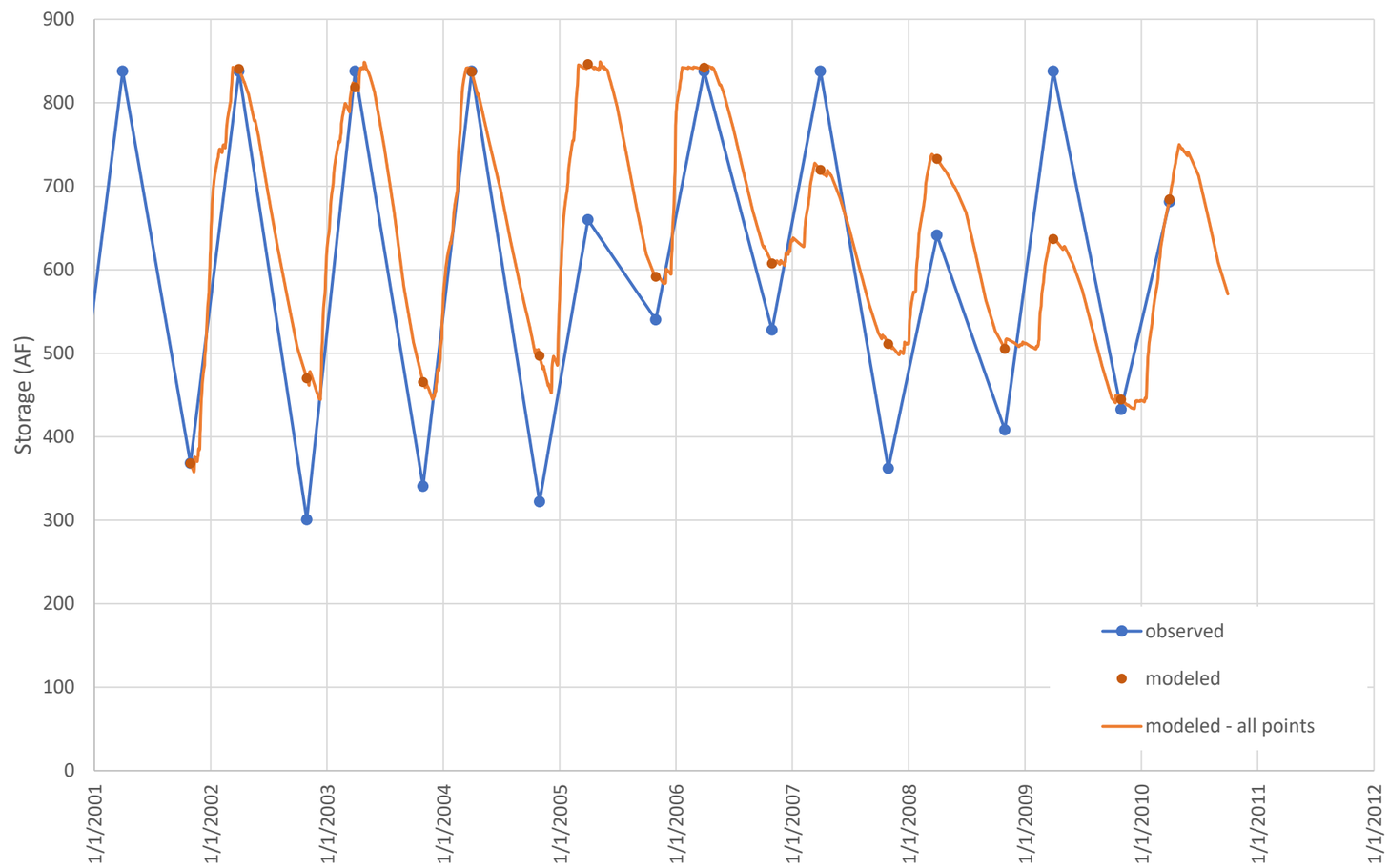
Abbreviations:

AF = acre-feet
POD = Point of Diversion
SDC = Sonoma Developmental Center
WTP = Water Treatment Plan

SDC Diversions Model Flow Chart

Sonoma Development Center Specific Plan
Sonoma County, CA
July 2022
EKI C10069.00
Figure C-1

eki environment & water



Notes:

1. Model results for storage validation assume that the Asbury and Hill Mill diversions were offline between 2006 and 2011 for repairs.
2. The model used historical demands for this time period for validation purposes.

Abbreviations:

AF = acre-feet

Validation Results for Storage in Combined Reservoirs

Sonoma Development Center Specific Plan
Sonoma County, CA
July 2022
EKI C10069.00
Figure C-2

eki environment & water

Appendix D

Restructured Agreement for Water Supply

RESTRUCTURED AGREEMENT FOR WATER SUPPLY

by and between

SONOMA COUNTY WATER AGENCY
CITY OF COTATI
CITY OF PETALUMA
CITY OF ROHNERT PARK
CITY OF SANTA ROSA
CITY OF SONOMA
FORESTVILLE WATER DISTRICT
NORTH MARIN WATER DISTRICT
VALLEY OF THE MOON WATER DISTRICT
TOWN OF WINDSOR

* * * * * * * * * * * * * *

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RESTRUCTURED AGREEMENT FOR WATER SUPPLY

THIS AGREEMENT is made on _____ by and between the following public entities:

SONOMA COUNTY WATER AGENCY, herein called "Agency",
CITY OF COTATI, herein called "Cotati",
CITY OF PETALUMA, herein called "Petaluma",
CITY OF ROHNERT PARK, herein called "Rohnert Park",
CITY OF SANTA ROSA, herein called "Santa Rosa",
CITY OF SONOMA, herein called "Sonoma",
FORESTVILLE WATER DISTRICT, herein called "Forestville",
NORTH MARIN WATER DISTRICT, herein called "North Marin",
VALLEY OF THE MOON WATER DISTRICT, herein called "Valley of the Moon", and
TOWN OF WINDSOR, herein called "Windsor",

The parties hereto hereby mutually covenant and agree as follows:

PART 1 - GENERAL

1.1 Recital of Purposes

Among the purposes of this Agreement are to provide a water supply or a supplemental water supply for each of the Water Contractors, to encourage water conservation and recycled water use that reduces potable water use, to provide environmental improvements and enhancements to allow for sustainable and continued use of Russian River Project water, to encourage the development of local supply projects to offset potable water use, and to provide for payment to the Agency for water delivered hereunder sufficient to enable it to pay the capital costs of major replacements and additions to the Transmission System and to meet its Revenue Bond Obligations and its expenses of operating and maintaining the Transmission System.

1.2 Definitions

When used herein, unless otherwise distinctly expressed or manifestly incompatible with the intent of this Agreement, the terms:

(a) "Acre feet" and "AF" mean one acre-foot or 325,850 gallons of water.

(b) "Additional Facilities" means the additional facilities that must be constructed or acquired after the completion of the Russian River-Cotati Intertie in order for the Agency to be able to make the deliveries authorized by Sections 3.1 and 3.2, including, but not limited to: an aqueduct generally paralleling the Intertie Aqueduct; an aqueduct generally paralleling the south part of the Petaluma Aqueduct from the Intertie Aqueduct to Kastania Reservoir; an aqueduct generally paralleling the Sonoma Aqueduct; an aqueduct connecting the Kawana Springs and Ralphine reservoirs; the transmission line pumping plants necessary to regulate flows to Storage Facilities; 55.5 million gallons of reservoir storage; 56.9 mgd of Russian River water production capacity; water-treatment facilities; and Emergency Wells.

(c) "Aqueduct Facilities" means the pipelines of the Intertie, Petaluma, Santa Rosa and Sonoma Aqueducts, an additional pipeline to be constructed generally paralleling the Intertie Aqueduct, a pipeline to be constructed generally paralleling the south part of the Petaluma Aqueduct from the Intertie Aqueduct to Kastania Reservoir, and a pipeline to be constructed or acquired generally paralleling the Sonoma Aqueduct.

(d) "Capital Cost" means the total funds expended for capital improvements, major replacements, or portions thereof, as context requires, including, but not limited to, planning, engineering, environmental impact analysis, right of way, financial and legal fees, interest during construction, and materials, construction, and replacement costs.

(e) "Common Facilities" means all Transmission System facilities except Storage Facilities and Aqueduct Facilities, but including additional facility aqueduct capacity constructed specifically to make the deliveries that have been authorized by Section 3.12, and including the Potter Valley Project or portion thereof if acquired pursuant to Section 2.4.

(f) "Corporate Territory" means the boundary from time to time existent of a city, agency, district or other governmental entity with powers to accept and distribute water.

(g) "Customer" means any of the following customers of the Agency:

(1) "Water Contractor" means a party signatory to this Agreement except the Agency and Forestville.

(2) "Other Agency Customer" means the Agency, the County of Sonoma, California-American Water Company (with respect to the Larkfield Water District), Forestville Water District, Lawndale Mutual Water Company, Kenwood Village Water Company, Penngrove Water Company, the City of Sebastopol, the State of California, and Santa Rosa Junior College.

(3) "Marin Municipal" means the Marin Municipal Water District.

(4) "Russian River Customer" means any Agency customer within Sonoma County who has or in the future will have contracts with the Agency to divert or redivert water directly from the Russian River or Dry Creek without the use of the Transmission System.

(5) "Regular Customer" means the any of the Water Contractors or the Other Agency Customers.

(h) "Emergency Wells" means auxiliary groundwater production wells that may be utilized to provide additional delivery capacity when necessary due to drought, equipment failure, or other transmission capacity impairment, inability to divert Russian River Project water (for water quality reasons or otherwise), or any other reason beyond the control of the Agency.

(i) "Entitlement" means the quantity of water a Regular Customer shall from time to time require at such rates of flow as are necessary to meet its peak day's demand, subject to the delivery limitations set forth in Sections 2.2, 3.1, 3.2, and 3.5.

(j) "Entitlement Limits" means the maximum amounts of water the Agency is obligated to deliver to any Regular Customer from the Transmission System, as specified in Sections 3.1(a), 3.2(a), 3.2(c), and 3.2(d).

(k) "Fiscal Year" (abbreviated FY) means the period from July 1 through the following June 30.

(l) "Forestville Aqueduct" means the existing pipeline from the Santa Rosa Aqueduct to Forestville, the existing booster pumping plant, the existing 300,000-gallon reservoir, and all other facilities financed with the proceeds of the sale of Series E of the Agency's 1955 Bonds.

(m) "Intertie Aqueduct" means the existing 48-inch inside diameter pipeline extending from the Mirabel Park intake facilities on the Russian River to the Petaluma Aqueduct in the vicinity of Cotati with appurtenances thereto including turnouts to serve Forestville, Santa Rosa, Cotati and Rohnert Park. The Intertie Aqueduct consists of three reaches: "Reach 1" from the Mirabel intake facilities to Forestville, "Reach 2" from Forestville to the extension of Hall Road and "Reach 3" from the extension of Hall Road to the junction with the Petaluma Aqueduct at Cotati. Reach 3 is further divided into "Reach 3a" from the extension of Hall Road to Occidental Road, "Reach 3b" from Occidental Road to the Cotati reservoirs and "Reach 3c" from the Cotati reservoirs to the Petaluma Aqueduct.

(n) "Kawana Pipeline" means the pipeline connecting the Reach 3a of the Intertie Aqueduct with Kawana Springs Reservoirs.

(o) "Local Supply Project" means a water supply project undertaken by one or more Water Contractors, which reduces demand on the Transmission System during the months of June, July, August, or September.

(p) "Marin Municipal" means the Marin Municipal Water District.

(q) "mgd" means a million gallons of water per day.

(r) "Oakmont Pipeline" means that certain pipeline and appurtenances generally parallelling the Sonoma Aqueduct that were constructed by the Agency pursuant to an agreement between the City of Santa Rosa and Agency dated April 29, 1986.

(s) "Operation and Maintenance Costs" means the Agency's costs of operating the Transmission System including its power costs, costs of maintaining the Transmission System in a good state of repair, payments made to the owner of the Potter Valley Project to insure the continued operation of the Potter Valley Project provided they are annually approved by the Water Advisory Committee, regardless of whether or not such payments result in the ultimate transfer of title to all or part of the Potter Valley Project to the Agency, and costs of administering the Transmission System and furnishing the water supplies pursuant to this Agreement; provided, however, that costs relating to the use of Transmission System facilities for public recreation purposes, except (1) costs to permit limited passive public recreation on Transmission System lands not in conflict with operational or water quality requirements, or (2) necessary

costs associated with land ownership, shall not constitute "Operation and Maintenance Costs."

(t) "Ordinance No. 1" means Ordinance No. 1 of the Agency adopted on December 28, 1970, providing for the issuance of the Revenue Bonds, together with any other ordinances of the Agency supplemental thereto or amendatory thereof.

(u) "Other Agency Customer" means the Agency, the County of Sonoma, California-American Water Company (with respect to the Larkfield Water District), Forestville Water District, Lawndale Mutual Water Company, Kenwood Village Water Company, Penngrove Water Company, the City of Sebastopol, the State of California, and Santa Rosa Junior College.

(v) "Petaluma Aqueduct" means the existing pipeline and appurtenances, including turnouts, from the Santa Rosa Aqueduct to Petaluma. The "south part" of the Petaluma Aqueduct means the portion thereof south of the junction thereof with the Intertie Aqueduct and the "north part" means the portion north of said junction to Scenic Avenue.

(w) "Potter Valley Project" means Federal Energy Regulatory Commission Project No. 77.

(x) "Recycled Water" means wastewater treated to applicable standards set forth in Title 22 of the California Code of Regulations, Division 4 Environmental Health, as may be amended from time to time.

(y) "Recycled Water and Local Supply Sub-Charge" and "Recycled Water and Local Supply Fund" mean the sub-charge and fund established by the Agency under Section 4.15.

(z) "Recycled Water Project" means any programs, projects, or facilities that produce or deliver recycled water, provided that the recycled water produced or delivered by such projects or facilities (1) results in a reduction in use of potable water from the Transmission System, (2) reduces the amount of water diverted from the Russian River or its tributaries, (3) provides an environmental benefit which increases or avoids reduction to the water supply or Transmission System capacity available to the Water Contractors, or reduces the cost of providing such supply or capacity, or (4) assists the Agency to comply with the federal or state Endangered Species Act or any other environmental law or regulation, which compliance is required for the Agency to

provide the water supply or Transmission System capacity to the Water Contractors as provided in this Agreement.

(aa) "Regular Customer" means the any of the Water Contractors or the Other Agency Customers.

(bb) "Remaining Facilities" means those portions of the Russian River-Cotati Intertie authorized to be constructed or acquired by the Tenth Amended Agreement For Water Supply and Construction of the Russian River-Cotati Intertie Project, dated November 14, 1997, which have not been constructed or acquired on the effective date of this Agreement, including, but not limited to, 20 mgd of standby pump and collector capacity; the Wohler-Forestville pipeline; the Eldridge-Madrone pipeline; Collector No. 6, and the Oakmont Pipeline.

(cc) "Revenue Bond Obligations" means the payment of principal of and interest on the Revenue Bonds and all other obligations and covenants of the Agency with respect to the Revenue Bonds, including specifically any covenant to establish and maintain rates and charges to provide revenue coverage in excess of a specified amount.

(dd) "Revenue Bonds" means any of the following if issued or entered into for sole purpose of financing the Capital Cost of Transmission System facilities or other facilities authorized to be constructed, acquired, or funded under this Agreement: (1) all series or issues of revenue bonds issued pursuant to ordinances and resolutions of the Agency or of any joint powers authority of which the Agency is a member or (2) any loan agreement, grant agreement, lease-purchase agreement, certificate of participation agreement, note, commercial paper, or other debt or financing agreement entered into by the Agency or by any joint powers authority of which the Agency is a member. As used in this Agreement, the term "issue Revenue Bonds" includes entering into any of the agreements set forth in clause (2) of the preceding sentence, and the term "holders of Revenue Bonds" includes any holders of or counterparties to any such agreements.

(ee) "Russian River Conservation Charge" means the charge established in Subsection (a) of Section 4.18 of this Agreement.

(ff) "Russian River-Cotati Intertie" means the Intertie Aqueduct and associated intake facilities on the Russian River, including the diversion dam, intake works, infiltration ponds, collectors, water treatment facilities, groundwater wells having a minimum production capacity of 7 mgd, a Russian River water quality monitoring system,

pumps, telemetry equipment and related buildings and appurtenances, and associated storage facilities.

(gg) "Russian River Customer" means any Agency customer within Sonoma County who has or in the future will have contracts with the Agency to divert or redivert water directly from the Russian River or Dry Creek without the use of the Transmission System.

(hh) "Russian River Project" means Coyote Valley Dam/Lake Mendocino on the Russian River, Warm Springs Dam/Lake Sonoma on Dry Creek, and related works as contemplated by House Document Number 585, 81st Congress, 2nd Session, House Document Number 547, Eighty-Seventh Congress, Agency Board of Directors Resolutions No. 6847 adopted May 24, 1955, No. 7798 adopted September 27, 1955, No. DR00793-1 adopted September 25, 1961 and Resolution No. DR68485 adopted December 23, 1980, or any agreement between the Agency and the United States related to Coyote Valley Dam or Warm Springs Dam.

(ii) "Russian River Projects Charge" means the charge established in Subsection (b) of Section 4.18.

(jj) "Russian River Projects Fund" means the fund established by the Agency to pay or partially pay for: (1) carrying out the Agency's Coyote Valley Dam Project and Warm Springs Dam Project channel-stabilization works obligations to the United States Government and the State of California under Agency Board of Directors Resolutions No. 6847 adopted May 24, 1955, No. 7798 adopted September 27, 1955, No. DR00793-1 adopted September 25, 1961 and Resolution No. DR68485 adopted December 23, 1980; (2) securing and defending appropriative water rights which are necessary for the realization of the full benefits of the Coyote Valley Dam and Warm Springs Dam Projects; (3) the Agency's share of the United States Government's investment, operation and maintenance, and major replacement costs associated with the Coyote Valley Dam and Warm Springs Dam Projects; (4) the acquisition of all or part of the Potter Valley Project or contributions made to the Project owner to insure the continued operation of all or part of the Project; and (5) fishery mitigation and enhancement projects undertaken by the Agency in the Russian River and Eel River and their tributaries.

(kk) "Santa Rosa Aqueduct" means the existing pipeline and appurtenances, including turnouts, from the collector wells at Wohler to the Ralphine Tank farm on the east extension, and to Scenic Avenue on the south extension.

(ll) "Sonoma Aqueduct" means the existing pipeline and appurtenances, including turnouts, from the Ralphine reservoirs to Sonoma. The Sonoma Aqueduct consists of two reaches: "Reach 1" from the Ralphine reservoirs to Pythian Road and "Reach 2" from Pythian Road to the Sonoma reservoirs.

(mm) "Storage Facilities" means all reservoirs on the Transmission System, the pipeline connecting the Kawana Springs Reservoirs with the Intertie Aqueduct; the pipeline connecting the Kawana Springs and Ralphine reservoirs; the Oakmont Pipeline; the pipeline connecting the Kastania reservoir with the Petaluma Aqueduct; the existing booster pumping plant and the existing 300,000-gallon reservoir components of the Forestville Aqueduct; and transmission line pumping plants necessary to regulate flows to storage facilities.

(nn) "Surplus Customer" means any person or entity who, as of the date of this agreement, was being served Surplus Water by the Agency.

(oo) "Surplus Water" has the meaning defined in subsection (a) of Section 3.4 of this Agreement.

(pp) "Transmission System" means the Agency's water production, storage, treatment and transmission facilities, including but not limited to the Santa Rosa, Petaluma, and Sonoma Aqueducts, the Russian River-Cotati Intertie, Emergency Wells, the Warm Springs Hydroelectric Project, future water production, storage, treatment and transmission facilities to be constructed as set forth in Sections 2.2 and 2.3, and the Potter Valley Project, if acquired by the Agency pursuant to Section 2.4.

(qq) "Trustee" means the Trustee or Trustees for the Agency (or for any joint powers authority of which the Agency is a member) and the holders of the Revenue Bonds appointed pursuant to ordinances or resolutions of the Agency relating to Revenue Bonds, or any successor(s) or assignee(s) thereof.

(rr) "Warm Springs Dam Project" means that certain project authorized for the Russian River, Dry Creek, California, by the Flood Control Act of 1961, enacted October 23, 1962 (Public Law 874, 87th Congress).

(ss) "Warm Springs Hydroelectric Project" means Federal Energy Regulatory Commission Project No. 3351.

(tt) "Water Advisory Committee" means the advisory committee established in Part 5 of this Agreement.

(uu) "Water Conservation Project" means (1) any program, project, or activity that will reduce potable water use within a Regular Customer's service area (including, but not limited to, activities undertaken pursuant to Section 1.12 of this Agreement, but excluding Recycled Water Projects or Local Supply Projects approved after the date of this Agreement), or (2) any materials, supplies, Agency staff time, or contractor services provided by the Agency in support of any Regular Customer's Water Conservation Project.

(vv) "Water Contractor" means a party signatory to this Agreement except the Agency and Forestville.

1.3 Term of Agreement

This Agreement shall become effective upon its execution by all the parties hereto and shall remain in effect until June 30, 2040, or, if any Revenue Bonds are outstanding on June 30, 2040, until such date as all Revenue Bonds shall have been paid in full and all obligations and covenants of the Agency with respect to any Revenue Bonds shall have been discharged. The Agency shall enter into renewal agreements for periods not to exceed forty years each with any or all of the Water Contractors requesting the same for water supplies within the delivery capabilities of the Agency's Transmission System, at a cost no greater than the Agency's Operation and Maintenance Costs and unreimbursed Capital Costs allocated on a proportionate use basis, it being understood that such renewal agreements shall provide for Entitlements and Entitlement Limits for each customer as set forth herein.

1.4 Previous Agreements Terminated or Modified

(a) The Eleventh Amended Agreement for Water Supply, dated January 26, 2001, between the Agency and the Water Contractors is terminated as of the effective date of this Agreement and superseded by this Agreement.

(b) Existing agreements between the Agency and Windsor are terminated and amended as follows, effective as of the effective date of this Agreement:

(1) All prior agreements between the Agency and Windsor for water deliveries from the Transmission System are terminated as of the effective date of this

Agreement, including the Application for Water Service, dated April 1, 1987. All water deliveries to Windsor from the Transmission System shall be made in accordance with this Agreement.

(2) The Agreement for the Sale of Water between the Sonoma County Water Agency and the Windsor Water District, dated June 8, 1991, is amended as follows:

(i) By deleting the text of Section 4 ("Shortage of Water and Apportionment") thereof and replacing it with the following: "In the event of a shortage in the quantity of water available to its customers, including the Town of Windsor, the Agency shall apportion water as provided in the Restructured Agreement for Water Supply, dated _____. In such event, (1) the Town of Windsor shall limit its total diversions and rediversions of water from the Russian River, including both diversion and rediversions pursuant to this agreement and all of its other diversions and rediversions, to the amounts of water that the Agency allocates to the Town of Windsor, and (2) in determining the amount of water available for allocation, the Agency shall include the amount of water available for diversion or rediversion by the Town of Windsor under its water rights in addition to the amount available to the Agency under its own water rights."

(ii) By adding at the end of Section 10 ("Payment") the following: "The Town of Windsor shall also pay any charges required by the Restructured Agreement for Water Supply, dated _____, including the charges required by Section 4.17(b) of that agreement."

1.5 Enforcement

The failure of any Water Contractor to perform its obligations hereunder shall not excuse the remaining Water Contractors from performing their obligations hereunder nor excuse the Agency from performing its obligations hereunder to said remaining Water Contractors. Each and all of the provisions of this Agreement shall be enforceable by action brought by any party hereto for specific performance or any other appropriate action at law for damages or in equity for other appropriate relief to the end that no party hereto shall suffer from the default of any other party. Nothing in this Agreement shall preclude any Water Contractor from seeking unilateral redress under the law from the Agency, or any other party, Customer, or entity. Any owner or holder

of Revenue Bonds may also enforce any provision of this Agreement inuring to the benefit of the holders of the Revenue Bonds.

1.6 Amendments

(a) Except as hereafter provided, this Agreement may be amended only with the consent of all the parties hereto.

(b) Any annual delivery limit contained in Section 3.1 may be modified by written Agreement between the Agency and the Water Contractor to which such annual delivery limit applies without the consent of the other parties to this Agreement for the purpose of conforming such annual delivery limits to a general plan which is applicable to the service area of such Water Contractor. Copies of any such written agreements shall be provided to all the parties to this Agreement.

(c) As of the effective date of this Agreement, Forestville is no longer a Water Contractor, and this Agreement may be amended without the consent of Forestville, provided, however, that Forestville's consent shall only be required for any amendment that impairs or affects any then-existing obligation of the Agency to supply water to Forestville from the Transmission System.

(d) If any amendment to this Agreement reduces the revenues to be received by the Agency or otherwise impairs the ability of the Agency to meet its Revenue Bond Obligations, then such amendment shall be effective only with the consent of the Trustee. The Trustee shall give such consent if the Trustee determines that, following such amendment, the Water Contractors will be obligated under this Agreement to make payments to the Agency sufficient to enable the Agency to pay principal of and interest on the Revenue Bonds and to meet all its other Revenue Bond Obligations. In making such determination, the Trustee may rely upon such certificates or opinions from qualified attorneys, engineers or accountants as the Trustee may deem necessary and obtain from the Agency.

1.7 Pledge of Revenues

Each party hereto acknowledges that anything herein to the contrary notwithstanding, all sums paid to the Agency pursuant to this Agreement are "Revenues of the Transmission System" of the Agency as defined in Ordinance No. 1, except (a) the payments and credits set forth in Section 4.4, (b) the payments of the Russian River Conservation Charge and the Russian River Projects Charge made

pursuant to Section 4.11 and 4.18, (c) the payments of the Water Management Planning Sub-Charge made pursuant to Section 4.13, (d) the payments of the Watershed Planning and Restoration Sub-Charge made pursuant to Section 4.14, (e) the payments of the Recycled Water and Local Supply Sub-Charge made pursuant to Section 4.15, and (f) the payments of the Water Conservation Sub-Charge made pursuant to Section 4.16, and are pledged to the payment of the Agency's Transmission System Revenue Bond Obligations. All said sums shall be received, allocated and paid out pursuant to and consistent with Ordinance No. 1 and other obligations and covenants of the Agency with respect to Revenue Bonds. All references in this Agreement to the accounting for, allocating, paying, and crediting of monies are subject to the priority established by Ordinance No. 1 on all such revenues.

The parties hereto recognize that the Revenue Bonds are to be paid from revenues, as provided herein, and that it is the intention of the parties that the charges set forth herein will be sufficient to pay the Revenue Bonds and to meet the Revenue Bond Obligations not met from other sources of funds. The Water Contractors, therefore, agree to pay promptly such charges notwithstanding any deficiency in the quantity or quality of water to which they or any of them would be entitled pursuant to this Agreement. The provisions of this Agreement are made for the benefit of the owners and holders from time to time of the Revenue Bonds and may be enforced by or on behalf of any such owner or holder.

1.8 Books, Records and Accounts

The Agency shall keep or cause to be kept, proper books, records and accounts in which complete and accurate entries shall be made of all monies received from all entities, including the Agency's Regular Customers, and of the basis for and application of said money, including detailed sub accounts showing expenditures made from Operation and Maintenance Charge revenues for Water Conservation Projects, Recycled Water Projects, Local Supply Projects, water management planning, and watershed planning and restoration. Said books, records and accounts will be available during normal business hours for inspection by the Water Contractors or their authorized representatives. The Agency will transmit to the Water Contractors two reports each year of the receipts and expenditures of the Transmission System. The first report will be issued no later than February 1 and shall be accompanied by a preliminary budget for the following Fiscal Year, and will show expenditures for the first half of the Fiscal Year together with estimated year-end expenditures and estimated expenditures for the following Fiscal Year. The second report will be issued after the end of each Fiscal Year and will contain a budgetary accounting of Transmission System expenditures,

revenues and balances for the Fiscal Year. Each month the Agency shall supply each Water Contractor with a summary showing the amount of water delivered during the preceding month to each Regular Customer and Surplus Customer.

1.9 Water Contractors' Duty to Provide Funds

Each Water Contractor shall use any and all means legally available to it (including, without limitation, the enactment and maintenance in effect of legislation establishing fees, tolls, rates and charges pertaining to the operation of its water distribution system) so as to produce monies sufficient in amount to meet the monetary obligations incurred by it pursuant to this Agreement and to enable it to maintain its water distribution system in good working order.

1.10 Severability

If any one or more sections, provisions, promises, or conditions of this Agreement is declared void or voidable for any reason by a final judgment or order of a court of competent jurisdiction, it is hereby declared to be the intention of each party and agreed that each and all of the other sections, provisions, promises and conditions of this Agreement shall be and remain in full force and effect.

1.11 Third Party Beneficiaries

Except for the holders of the Revenue Bonds, no third party beneficiaries are intended or established by this Agreement.

1.12 Water Conservation Requirements

(a) The Regular Customers of the Agency, and the Agency, shall (1) become members of the California Urban Water Conservation Council ("CUWCC") within six months of the effective date of this Agreement and remain as members in good standing; (2) sign the "Memorandum of Understanding Regarding Urban Water Conservation in California" ("MOU") maintained by the CUWCC and implement the Best Management Practices ("BMPs") of water conservation as are promulgated by CUWCC from time to time, or implement alternative water conservation measures that secure at least the same level of water savings, and shall complete and file the annual CUWCC report form; and (3) implement or use their best efforts to secure the implementation of any water conservation requirements that may be added as terms or conditions of the Agency's appropriative water rights permits or licenses, or with which the Agency must

comply under compulsion of regulation or law. In addition to and notwithstanding the foregoing, all Regular Customers of the Agency shall require metered billing of all customer accounts they serve.

(b) Should the Water Advisory Committee determine and so notify any Water Contractor that its efforts to achieve compliance with the water conservation practices required by this Section 1.12 are unsatisfactory, then such Water Contractor shall bring its water conservation program into compliance within six months after such notice, or within such additional time as may be granted by the Water Advisory Committee. Should such Water Contractor's noncompliance as determined by the Water Advisory Committee continue for six months after such notice of noncompliance, or beyond such additional time as may be granted by the Water Advisory Committee, then the Water Contractor shall thereafter pay a surcharge on all water delivered by the Agency pursuant to this Agreement equal to ten percent of the Operation and Maintenance Charge until the Water Advisory Committee determines that such Water Contractor is in compliance. The proceeds of any surcharge paid pursuant to this section shall be deposited and paid out in the same manner as the proceeds of the Water Conservation Fund.

(c) The Agency shall use its best efforts to modify its rules and regulations and existing contracts with Other Agency Customers to implement the water conservation requirements set forth in Section 1.12(a) and the default provisions set forth in Section 1.12(b). With respect to Russian River Customers, the Agency shall use its best efforts to encourage and, where and when possible, require said customers to sign the "MOU" maintained by the CUWCC and implement the "BMPs" of water conservation as are promulgated by CUWCC from time to time.

(d) Nothing in this section shall limit Regular Customers to implementing only those Water Conservation Projects contemplated by the CUWCC BMPs. Regular Customers are encouraged to implement Water Conservation Projects that go beyond the CUWCC BMPs.

1.13 Recycled Water and Local Supply Project Requirements

Within ten (10) years from the effective date of this Agreement, the Water Contractors shall use their best efforts to carry out or participate in Recycled Water or Local Supply Projects capable of delivering Recycled Water or potable water sufficient to reduce the Water Contractors' collective deliveries from the Transmission System (including, in the case of Windsor, reductions in withdrawals from Windsor's Russian

River wells), by at least 7,500 acre-feet per year, with approximately 50% of such reduction resulting from Recycled Water Projects.

1.14 Transitional Provisions Applicable to Forestville

As of the effective date of this Agreement, the Agency's right, title, and interest in facilities comprising the Forestville Aqueduct shall be transferred as follows:

(a) The existing Forestville pipeline from the Santa Rosa Aqueduct to Forestville and the storage building at the existing booster pumping plant shall be transferred to Forestville.

(b) The existing booster pumping plant and the existing 300,000-gallon reservoir shall become Storage Facilities.

(c) Subject to the limitation in subsection (d) of this section, the Agency shall provide funding to Forestville for the Capital Costs of an 8" pipeline to be constructed by Forestville from the Intertie Aqueduct at the extension of Templeman Road, west on Templeman Road to State Highway 116, then north on State Highway 116 West to Kay Lane. The pipeline shall be funded as a common facility. Forestville shall commence construction on the pipeline within five years of the effective date of this Agreement; provided, however, that if the commencement of construction is delayed due to the application to Forestville of any circumstance specified in the second paragraph of Section 2.2 of this Agreement, then the Agency's General Manager/Chief Engineer may authorize an extension of the commencement date.

(d) The Agency's funding obligation under this section shall be limited to $690,000, increased by the change in the ENR Construction Cost Index between the effective date of this Agreement and the date of commencement of construction of the pipeline.

1.15 Local Production Capacity Goal

In order to mitigate against drought, earthquakes, spills, temporary impairments, and other events impacting the quantity or quality of water available from the Transmission System, and other emergencies that can befall an urban water supply system, it is highly desirable that each Water Contractor achieve and maintain local water production capacity capable of satisfying approximately forty percent (40%) of the Water Contractor's average day of the maximum month demand.

PART 2 - PLANNING, FINANCING, ACQUISITION, CONSTRUCTION, OPERATION AND MAINTENANCE

2.1 Financing Additions to the Existing Transmission System

The Agency will, subject to all applicable limitations specified in this Agreement and all applicable legal and regulatory limitations, finance additions to the Transmission System with cash available pursuant to Sections 3.6, 4.2, 4.6, 4.7, 4.8, 4.12, payments made by Marin Municipal pursuant to Section 4.11, payments made by North Marin pursuant to Section 4.4 and 4.9, any state, federal, or other grants or loans which may become available, and, if the Agency decides to issue new series or issues of Revenue Bonds, proceeds from the sale of Revenue Bonds.

2.2 Scheduling of Additions and Replacements to the Existing Transmission System

Subject to the availability of sufficient cash or proceeds from the sale of Revenue Bonds (if the Agency decides to issue new series or issues of Revenue Bonds) and any state, federal, or other grants or loans which may become available, and subject to all applicable limitations specified in this Agreement, the Agency will (1) construct or acquire additions to the existing Transmission System sufficient to meet the delivery Entitlements set forth in Section 3.1 and 3.2 at such times as may be necessary to enable it to reliably deliver to each of the Water Contractors such Entitlements at the time that each contractor shall require the same and to make the deliveries authorized pursuant to Section 3.12; (2) construct additional Russian River water production facilities (up to a total capacity of 168.9 mgd) so that the total water production capacity available at all times is not less than the average daily delivery to the Regular Customers and Marin Municipal (excluding Surplus Water and water in excess of Entitlement Limits) during the month of highest historical use plus 20 mgd; (3) construct, acquire, or lease Emergency Wells with capacities which are from time to time determined by the Water Advisory Committee; (4) construct Additional Facilities (up to a total capacity of 174.3 million gallons) to the extent necessary to maintain a quantity of water in storage equal to 1.5 times the average daily delivery to the Regular Customers except North Marin during the month of highest historical use; and (5) replace existing facilities and construct Additional Facilities, related buildings and appurtenances as necessary to insure the reliable and efficient operation of the Transmission System and to insure that the quality of the water delivered complies with all applicable state and federal water quality requirements.

The time within which the Agency shall be obligated to construct such additions and replacements to the existing Transmission System shall be extended, however, as a result of any delays caused by fire, earthquake, other acts of God, acts of the public enemy, riots, insurrections, governmental regulations on the sale or transportation of materials or supplies, strikes affecting such construction or transportation of materials or supplies in connection therewith, any State or Federal environmental regulations or restrictions, shortages and/or delay in the obtaining of materials, shortages of or allocations of fuel and other sources of energy, litigation resulting in court orders restraining the construction of such additions and replacements, inability of Agency for any reason to deliver the Revenue Bonds or any series thereof, or any other causes beyond the control of Agency or any contractor constructing any part of such additions and replacements.

2.3 Further Modifications to Transmission System

(a) With the approval of the Water Advisory Committee and subject to the availability of sufficient funds, the Agency may undertake studies, and prepare technical reports, financial plans, and environmental documents for Transmission System facilities in addition to those authorized to be constructed by this Agreement. If such activities are undertaken pursuant to this paragraph, the cost thereof shall be considered to be costs of Common Facilities and shall be paid from funds available pursuant to subsection (c) of Section 4.2, or from the proceeds of Revenue Bonds and payments made by North Marin pursuant to Section 4.4. If the cost is paid from the proceeds of Revenue Bonds and payments made by North Marin, the cost shall be allocated as provided in subsection (b), paragraph 9 of Section 4.3 and Section 4.9.

(b) Except for the facilities described in Section 2.2, the Agency will not construct or acquire additions to the Transmission System that would increase the charges payable by, or diminish or impair the water available to, any of the Water Contractors except on such terms and conditions as may be agreed upon in writing by the Agency and each Water Contractor who would be required to make any additional payment by reason of such construction or whose water supply might be diminished or impaired by such construction. If such addition is a booster pump or any other device, method, or system that would enlarge or increase the capacity of any one customer to the detriment of other users, then such addition or alteration shall not be made by Agency except by amendment to this Agreement. If a question arises as to whether an addition or alteration to the Transmission System requires an amendment of this Agreement pursuant to this section, then such question shall be submitted to the Water Advisory Committee and its decision shall be conclusive.

2.4 Potter Valley Project

(a) All or part of the Potter Valley Project may be acquired upon a determination by the Board of Directors of the Agency that such acquisition is necessary to insure the Agency's continued ability to make the water deliveries authorized by this Agreement and maintain fisheries and other incidental benefits to the Russian River basin, provided, however, that no part nor all of the Potter Valley Project shall be acquired without the affirmative vote of at least six (6) representatives of the Water Contractors on the Water Advisory Committee representing at least two-thirds of the total weighted votes as calculated pursuant to Section 5.3(a). The Agency shall not be liable to any of its Customers for any damage resulting from any Agency decision regarding the acquisition or non-acquisition of any part or all of the Potter Valley Project.

(b) The Agency shall commence a process upon the effective date of this Agreement to evaluate the water supply and fisheries benefits provided by the Potter Valley Project within the Russian River watershed, the economic and operational feasibility of acquiring the Potter Valley Project, and whether alternative actions could reduce the need for the Agency to acquire the Potter Valley Project. Alternative actions to be evaluated may include the increased use of recycled water to reduce agricultural and other diversions from the Russian River and its tributaries; the modification of instream flow requirements in the Russian River; and the completion of state and/or federal recovery plans for salmonid species listed as threatened or endangered in the Russian River watershed. The cost of such evaluations shall be paid from Watershed Planning and Restoration Sub-Charge funds available pursuant to subsection 4.14; however, the Agency shall use its best efforts to obtain the agreement of other interested parties who divert water from the Russian River or its tributaries (including municipal and agricultural diverters) to pay for a portion of such costs and to participate in the implementation of such alternative actions. Before acquiring the Potter Valley Project, the Agency shall conduct an environmental analysis of the acquisition pursuant to CEQA, which analysis may include an evaluation of alternative flow regimes from the Potter Valley Project into the Russian River and the Eel River.

(c) Upon determination by Agency that alternative actions could reduce the need for the Agency to acquire the Potter Valley Project, the Agency and the Water Contractors shall engage in a cooperative process to implement said other actions.

2.5 Water Conservation Projects

Subject to the restrictions set forth in Section 4.16, the Agency may undertake or fund any cost-effective Water Conservation Project that has been approved by the Water Advisory Committee.

2.6 Recycled Water and Local Supply Projects

Subject to the approval of the Water Advisory Committee, the Agency may (a) construct, fund, or partially fund studies or investigations or the Capital Cost of local Recycled Water Projects and Local Supply Projects, or (b) enter into agreements for the acquisition and sale of Recycled Water (or the rights to Recycled Water). The Agency and the Water Contractors shall seek financial contributions for local Recycled Water and Local Supply Projects funded under this section from benefitted wastewater treatment plant owners, sanitation districts, and other benefitted parties. Projects constructed, funded, or partially funded by the Agency under this section shall not be part of the Transmission System, and the operation and maintenance cost of such projects shall be the responsibility of the Water Contractors or other parties carrying out, sponsoring, or participating in such projects. The benefits from any Recycled Water Project shall be apportioned equitably based upon the respective financial contributions to the Recycled Water Project by the parties funding such project. The Capital Costs (including Revenue Bond Obligations, if any) of Local Supply Projects or Recycled Water Projects or of acquiring Recycled Water or the rights thereto shall be paid or partially paid from the Recycled Water and Local Supply Fund.

2.7 Water Management Planning

The Agency shall periodically prepare a draft regional Urban Water Management Plan pursuant to the Water Code for consideration by the Water Contractors. Each Water Contractor shall provide the Agency with all information and data the Agency reasonably determines to be necessary to allow the Agency to prepare the draft regional Urban Water Management Plan. The Agency shall use its best efforts to prepare a draft regional Urban Water Management Plan that meets the requirements of the Water Code. Each Water Contractor shall either adopt the draft regional Urban Water Management Plan prepared by the Agency as its Urban Water Management Plan, or prepare and adopt its own Urban Water Management Plan pursuant to the Water Code. Before adopting the Urban Water Management Plan prepared by the Agency, a Water Contractor shall evaluate the Plan, and adoption of the Plan by a Water

Contractor shall constitute a determination by that Water Contractor that the Plan meets the requirements of the Water Code as to that Water Contractor.

2.8 Watershed Planning and Restoration

(a) The Agency may undertake any action, study, or project approved by the Water Advisory Committee related to (1) the development or implementation of watershed restoration and maintenance plans and projects (including, but not limited to, stream restoration projects, water quality monitoring studies and projects, public education and outreach activities, and funding of third-party studies and projects) or (2) groundwater studies and investigations. Before undertaking any such action, study or project: (1) the Agency shall consider suggestions received from the public, Water Contractors, and interested parties and organizations such as the Russian River Watershed Association as to the actions, studies, and projects to be undertaken by the Agency hereunder; and (2) the Agency and the Water Contractors shall identify and use their best efforts to obtain funding contributions from other parties that would benefit from the actions, studies, or projects authorized hereunder, including but not limited to federal and state loans and grants, municipalities (including Russian River Customers, county and special district governments), and urban and industrial development, gravel mining, agriculture, forest harvesting, recreation, and sport and commercial fishing interests.

(b) The authority granted to the Agency under this Section 2.8 is permissive and not mandatory, and that nothing in this Section 2.8 shall (1) require the Agency to undertake any action or project unless such action or project is approved by the Agency, (2) impair or affect the Agency's right to undertake any action or project not funded under this Agreement, or (3) require the Agency to engage in any regulatory activity.

(c) The Agency may carry out projects and activities within the scope of subsection (a) above that primarily or exclusively benefit one or more Water Contractors, provided (1) each such project and activity is approved by the Water Advisory Committee and the benefitted Water Contractors, and (2) some or all benefitted Water Contractors enter into an agreement with the Agency for such project or activity and agree to pay supplemental charges as approved by the Agency and the Water Advisory Committee to defray all or a portion of the cost of the project or activities.

2.9 Planning Coordination

(a) The parties to this Agreement shall consult with agencies that have planning and zoning powers within their water service territories in the manner set forth in California Government Code Section 65352.5 in order to promote close coordination and consultation between water supply agencies and land use approval agencies to ensure that proper water supply planning occurs in order to accommodate projects that will result in increased demands on water supplies.

(b) The parties to this Agreement shall consult with agencies that have building regulatory powers pursuant to the Government Code and Health and Safety Code to promote use of water conservation equipment, fixtures, appliances, devices and techniques.

2.10 Operation and Maintenance

The Agency shall operate and maintain the Transmission System in a good state of repair.

PART 3 - WATER SUPPLY

3.1 Delivery Entitlements of Water Contractors

Subject to Section 3.5, the Agency shall deliver to each Water Contractor at the points of delivery hereinafter set forth such quantities of water as the Water Contractor shall from time to time require at such rates of flow as are necessary to meet its peak day's demand, subject to the following:

(a) The Agency shall not be obligated to deliver water in excess of the following:

Water Contractor/Aqueduct	Average Daily Rate of Flow During Any Month	Annual Amount During Fiscal Year (excluding Surplus Water)
Santa Rosa		
From Reach 1, 2, and 3a of the Intertie Aqueduct	40.0 mgd	
From the Santa Rosa Aqueduct	40.0 mgd	
From the Sonoma Aqueduct	4.0 mgd	
Maximum combined total from all aqueducts	56.6 mgd	29,100 AF
North Marin		
From Petaluma Aqueduct	19.9 mgd	14,100 AF
Petaluma		
From Petaluma Aqueduct	21.8 mgd	13,400 AF
Rohnert Park		
From Petaluma Aqueduct or Reach 3 of Intertie Aqueduct	15.0 mgd	7,500 AF

Valley of the Moon		
From Sonoma Aqueduct	8.5 mgd	3,200 AF
Sonoma		
From Sonoma Aqueduct	6.3 mgd	3,000 AF
Cotati		
From Petaluma Aqueduct or Reach 3 of Intertie Aqueduct	3.8 mgd	1,520 AF
Windsor		
From Santa Rosa Aqueduct	1.5 mgd	900 AF
From Russian River Diversions	7.2 mgd	4,725 AF

The delivery limits for Windsor include both water delivered by the Agency through the Transmission System and water diverted by Windsor through facilities owned by Windsor under its own water rights and under the Agency's water rights pursuant to the agreement between the Agency and Windsor dated January 8, 1991. Windsor shall not divert any water under the Agency's water rights through its own facilities except and to the extent that water is unavailable for diversion under any of Windsor's available water rights, as such rights currently exist or may exist in the future. Windsor shall act with diligence to take all actions necessary to obtain and retain any water rights to which Windsor may be entitled. For purposes of allocations pursuant to Section 3.5(a), (1) Windsor shall be considered to be a "Russian River Customer" with respect to its direct Russian River diversions, and (2) in determining the amount of water available for allocation under Section 3.5(a), the Agency shall include the amount of water available for diversion by Windsor under Windsor's water rights in addition to the amount available to the Agency under its own water rights. For purposes of allocations pursuant to Section 3.5(b), Windsor's average daily rate of flow during any month Entitlement Limit shall be 1.5 mgd.

(b) North Marin shall not take delivery of water at an instantaneous delivery rate greater than its average delivery rate for such day, if such instantaneous delivery rate would increase the Agency's cost of electrical energy. North Marin shall not take delivery of water at a rate of more than 19.9 mgd during more than 14 days of any month, nor at a rate of more than 20.9 mgd during any day of any month. Irrespective of its delivery Entitlement, North Marin shall nevertheless have the right to a flow rate of 14.8 mgd in the Petaluma Aqueduct.

(c) No Water Contractor shall take delivery of water at an average rate during any month that is greater than 2.0 times the average rate of delivery to that contractor during the preceding 12 months. The Agency also shall adopt this requirement as a service rule applicable to Other Agency Customers. However, if any Regular Customer was during the preceding 12 months subject to a curtailment in deliveries pursuant to Section 3.5, then the limit prescribed by this subsection shall be 2.0 times the average rate of delivery that such customer would have received in the absence of such curtailment. This rule shall not apply to Water Contractors who utilize local sources of supply to reduce demand on the Transmission System during the peak summer period of June 1 through September 30, and whose average production rate for said period from all of the contractor's local sources is equal to at least 2.0 times the average production rate of all of that contractor's local sources during the eight months immediately preceding the peak summer period.

(d) No Water Contractor shall take delivery of water during any month at an average rate that is greater than 1.3 times the average rate of delivery to that contractor during the peak month of the prior three calendar years without the written consent of the Agency. The Agency also shall adopt this requirement as a service rule applicable to Other Agency Customers. Such consent shall be given by the Agency if and only if sufficient transmission capacity exists to make such increased deliveries and the deliveries to the other Water Contractors required to be made pursuant to this section. However, if any Water Contractor was during the preceding three calendar years subject to a curtailment in deliveries pursuant to Section 3.5, then the limit prescribed by this subsection shall be 1.3 times the average rate of delivery that such contractor would have received during the peak month of the prior three calendar years in the absence of such curtailment.

(e) For purposes of determining Santa Rosa's average daily rate of flow during any month Entitlement Limit under this subsection, all water delivered to Santa Rosa from the Kawana Pipeline or from the pipeline connecting the Kawana Springs and Ralphine reservoirs shall be deemed delivered from Reach 3a of the Intertie Aqueduct.

3.2 Conditions on Other Agency Customer Deliveries

The Agency may furnish water from the Transmission System to Other Agency Customers subject, however, to the following conditions:

(a) The total quantity of water delivered to all the Other Agency Customers shall not exceed an average of 2.7 million gallons per day during any month.

(b) The Agency shall not enter into contracts to furnish water to any Other Agency Customer except itself or the County of Sonoma for use on land within two miles of the Corporate Territory of a Water Contractor or Forestville except with the prior written consent of such Water Contractor or Forestville, which consent will be subject to the condition that the Agency shall cease delivering water to such customer whenever a Water Contractor or Forestville is willing and able to furnish water to such customer. Water delivered by the Agency from the Transmission System to the Agency or the County of Sonoma shall not be used for residential, commercial, or private industrial purposes.

(c) The Agency shall not deliver more than an average of 0.5 million gallons per day during any month from the south part of the Petaluma Aqueduct to Other Agency Customers.

(d) The Agency shall not deliver more than an average of 1.5 million gallons per day during any month from Reach 1 of the Intertie Aqueduct to Forestville.

(e) The Agency shall not sell water from the Transmission System except as expressly authorized by this Agreement.

3.3 Deliveries in Excess of Entitlement Limits

(a) No Regular Customer may take delivery of water in excess of its average daily rate of flow during any month Entitlement Limit as set forth in Sections 3.1 or 3.2, except upon the following conditions:

first, that such excess delivery does not impair or delay the delivery to any other Regular Customer of its Entitlements; and

second, that the Regular Customer taking the excess delivery is then proceeding in good faith, with plans and funding to develop a reliable water supply, sufficient to supply its needs in excess of its Entitlement Limits; and

third, that either

(1) all the Water Contractors approve such excess delivery; or

(2) such excess delivery is made during a period when deliveries to another Water Contractor are less than its Entitlement Limits, such excess delivery does not exceed the unused amounts of said contractor's Entitlement Limits, and said contractor has notified the Agency in writing of its consent to said delivery.

(b) Any Water Contractor may transfer any portion of its annual amount during any fiscal year Entitlement Limit to any other Water Contractor for such periods of time and pursuant to such terms as agreed to by the transferor Water Contractor and the transferee Water Contractor, subject to the following:

(1) Such transfer shall not impair or delay the delivery to any other Regular Customer of its Entitlements.

(2) Notice of a proposed transfer, including adequate information to identify any impacts to deliveries of water to other Water Contractors, shall be provided to all the other Water Contractors individually, to the Water Advisory Committee, and to the Agency. Upon request of any other Water Contractor, the transferor and transferee Water Contractors shall promptly meet to identify and resolve any potential impacts of the proposed transfer. If any Water Contractor determines that the proposed transfer will impair or delay the delivery of its Entitlements, such Water Contractor may file a written objection to the proposed transfer with the Water Advisory Committee, with a copy to the Agency. Such objection must be filed no later than 45 days after the Water Contractor receives notice of the proposed transfer. Thereafter, the Water Advisory Committee shall determine whether the proposed transfer will impair or delay the delivery of the objecting Water Contractor's Entitlements, and whether there are measures that will eliminate such impairment or delay. In the absence of an objection to a proposed transfer by any Water Contractor, the approval of the Water Advisory Committee is not required.

(3) The average daily rate of flow during any month Entitlement Limit of the transferee Water Contractor as set forth in Sections 3.1 or 3.2 and the other delivery limitations applicable to the transferee Water Contractor shall not be affected by, and shall remain applicable notwithstanding, any transfer under this subsection.

(4) Payments to the Agency for delivery of the transferred water to the transferee Water Contractor shall be based upon the Aqueduct rate applicable to the transferee Water Contractor pursuant to this Agreement.

(5) The transferor and transferee Water Contractors shall be responsible for all regulatory compliance relating to the transfer, including compliance with the provisions of the California Environmental Quality Act. To the greatest extent permitted by law, the transferor and transferee Water Contractors shall indemnify and defend each of the other Water Contractors and the Agency from any claims, damages, or judicial or administrative proceedings arising out of any actions related to this Subsection 3.3(b), whether or not there is concurrent negligence on the part of the other Water Contractors or the Agency or each of them, but excluding liability due to the sole active negligence or willful misconduct of any of the other Water Contractors, the Agency, or each of them. The latter exclusion shall operate only as to the particular Water Contractor or Agency whose sole active negligence or willful misconduct caused the exclusion.

3.4 Surplus Water

(a) Surplus Water is water that from time to time may be available for delivery from the Transmission System in excess of the amounts required to meet the Agency's contractual obligations and the requirements of all the Agency's Regular Customers for uses other than those described in subdivision (b) of this section.

(b) Surplus Water may be used only for the following purposes:

(1) replenishment of surface water supply reservoirs or recreational lakes, including but not limited to Ralphine, Spring, and Stafford Lakes, or

(2) replenishment of groundwater basins;

provided, however, that Surplus Water also may be provided for use for irrigation of land used for commercial production of food or fiber if such provision of water is required by any agreement in existence on the effective date of this Agreement.

(c) The Agency shall deliver Surplus Water only from separate metered turnouts on the Transmission System or the North Marin Aqueduct.

(d) The Water Contractors shall have first priority on deliveries of Surplus Water.

(e) The Agency desires to transfer all of its Surplus Customers to the Water Contractors. The parties to this Agreement shall cooperate in the voluntary permanent transfer of Surplus Customers from the Agency to the party whose corporate territory encompasses the site of a given Surplus Customer or whose corporate territory boundary is within two miles of the turnout(s) serving said customer. Should a given Surplus Customer lie within two miles of more than one party, the parties shall meet and confer with the Agency and by mutual agreement determine who is best suited to take over said Surplus Customer. Nothing in this subsection shall require a Water Contractor to take over service of any Agency Surplus Customer. Should a given party opt not to take over Surplus Customers who lie within their corporate territory or within two miles of the boundary of same, then any other party to this Agreement whose corporate territory lies within Sonoma County may apply to the Agency to take over said Surplus Customers. Parties who agree to take on such service shall be known as Surplus Water providers.

(f) Surplus Water providers agree to interrupt delivery of Surplus Water upon notification by Agency if Agency determines, in its sole discretion, that there exists an immediate or pending problem involving loss of Transmission System storage, inadequate pumping capacity, a valid complaint from any Regular Customer that they are not receiving their appropriate Entitlement as a result of Surplus Water deliveries, or any other problem impacting the delivery capability of the Transmission System. Surplus Water providers shall notify their customers of Agency's right to require such delivery interruptions. Notwithstanding the right of the Agency to notify and cause the interruption of delivery of Surplus Water, a Surplus Water provider may also interrupt delivery of Surplus Water at any time it determines it is necessary or prudent to do so in order to satisfy the demands of its non-Surplus Customers; or for water system maintenance, repair, or planned or unplanned outage of any nature whatsoever, including but not limited to a perceived, threatened or actual water shortage. Deliveries of Surplus Water shall not be deemed to be included as part of any Regular Customer's Entitlement or Entitlement Limit.

3.5 Shortage of Water and Apportionment

(a) (1) The Agency shall use its best efforts to obtain, perfect, and maintain appropriative water rights in amounts sufficient to be able to make the water deliveries provided for in this Agreement. In its operation of the Russian River Project, the Agency shall use all reasonable means to prevent a deficiency in the

quantity of water that is available to the Agency for diversion and rediversion under the Agency's water rights. However, nothing in the preceding two sentences shall be construed to limit the Agency's discretion to take appropriate actions in good faith to resolve any issue that may arise under the federal Endangered Species Act or any other federal or state law affecting the Agency's water rights or operation of the Russian River Project.

(2) If by reason of drought, environmental laws or regulations, other causes beyond the control of the Agency, or any change in the amounts of water imported by the Potter Valley Project into the Russian River watershed (whether or not such change is caused by any action or inaction of the Agency) a deficiency does occur, the Agency shall not be liable to any of its customers for any damage arising therefrom.

(3) In the event of a deficiency pursuant to subsection 3.5(a)(2), the Agency first shall cease all deliveries of Surplus Water to other than the Water Contractors; second, shall cease deliveries of all Surplus Water; third, shall cease deliveries to Regular Customers in excess of their respective annual Entitlement Limits; and fourth, shall apportion the available supply of water as follows:

(i) first, deliver to each of its Regular Customers, not in excess of their respective Entitlement Limits, authorize Agency's Russian River Customers to divert or redivert not in excess of the amounts for which those customers have contracted to purchase from the Agency, and deliver to Marin Municipal not in excess of the amounts, if any, that are required to be delivered pursuant to the Third Amended Offpeak Water Supply Agreement dated January 25, 1996, the Amended Agreement for the Sale of Water between the Sonoma County Water Agency and the Marin Municipal Water District dated January 25, 1996, amendments to these agreements that have been approved by the Water Advisory Committee, or subsequent agreements between the Agency and Marin Municipal that have been approved by the Water Advisory Committee, the quantities of water required by each such customer for human consumption, sanitation, and fire protection as determined by the Agency after taking into consideration all other sources of potable water then available to said customer, including, for Russian River Customers, water available under their own water rights;

(ii) second, to the extent additional water is available to the Agency, allocate that water proportionately as follows: deliver such water to Agency's Regular Customers based upon their respective average daily rate of flow during any month Entitlement Limits, authorize the Agency's Russian River Customers to divert or redivert such water based upon the delivery limits set forth in the agreements between the Agency and its Russian River Customers, and deliver such water to Marin Municipal pursuant to and to the extent required by the Third Amended Offpeak Water Supply Agreement dated January 25, 1996, the Amended Agreement for the sale of Water between the Sonoma County Water Agency and the Marin Municipal Water District dated January 25, 1996, amendments to these agreements that have been approved by the Water Advisory Committee, or subsequent agreements between the Agency and Marin Municipal that have been approved by the Water Advisory Committee;

(iii) provided, however, that no Customer shall receive under subsections 3.5(a)(3)(i) and 3.5 (a)(3)(ii) a total quantity of water in excess of its reasonable requirements or its said Entitlement Limits or contracted amount, whichever is less.

(b) (1) In the event of a temporary impairment of the capacity of the Transmission System by reason of natural disaster, sabotage or other causes beyond the control of the Agency, the Agency shall not be liable to any of its customers for any damage arising therefrom.

(2) In the event of a Section 3.5(b)(1) impairment, the Agency shall:

(i) first, deliver to each of its Regular Customers the quantity of water, not in excess of the respective average daily rate of flow during any month Entitlement Limit, required by it for human consumption, sanitation, and fire protection as determined by the Agency after taking into consideration all other sources of potable water then available to said customer;

(ii) second, to the extent additional Transmission System capacity is available to the Agency, deliver a quantity of water to the Regular Customers in proportion to their respective average daily rate of flow during any month Entitlement Limits, provided, however, that no Regular

Customer shall receive under subsections 3.5 (b)(2)(i) and (b)(2)(ii) a total quantity of water in excess of its reasonable requirements or its average daily rate of flow Entitlement Limit, whichever is less;

(iii) third, to the extent additional Transmission System capacity is available, deliver water to Regular Customers in excess of their average daily rate of flow Entitlement Limits pursuant to Section 3.3;

(iv) fourth, to the extent additional Transmission System capacity is available, deliver water to Marin Municipal not in excess of the delivery limitations in Section 3.12;

(v) fifth, to the extent additional Transmission System capacity is available, deliver Surplus Water to the Water Contractors;

(vi) sixth, to the extent additional Transmission System capacity is available, deliver Surplus Water to other than the Water Contractors.

(3) However, deliveries to Marin Municipal shall not be reduced or curtailed under this Section 3.5(b) because of inadequate capacity in the new aqueduct to be constructed generally paralleling the portion of the Petaluma Aqueduct that extends from the Ely Pumping Plant to Kastania Reservoir, if such new aqueduct is paid for and dedicated to the Agency pursuant to Section 13 of the Amended Agreement for the Sale of Water between the Sonoma County Water Agency and the Marin Municipal Water District dated January 25, 1996.

(c) (1) In determining "human consumption, sanitation, and fire protection" amounts pursuant to this Section 3.5, the Agency shall take into account the level of water conservation achieved by the Customer and the resulting decrease in end user ability to reduce water use (the hardening of demand) resulting from such conservation. The allocations pursuant to subsection 3.5(a)(3)(i) shall be determined using a methodology which rewards and encourages water conservation; avoids cutbacks based upon a percentage of historic consumption, and, among other things, bases the amounts necessary for "human consumption, sanitation, and fire protection" upon no greater than average indoor per capita water use determined from recent retail billing records for winter water use by all of the Water Contractors; and, if necessary or appropriate for equitable purposes, considers commercial, industrial and institutional water uses separately and determines that element of the subsection 3.5(a)(3)(i) allocation

based on winter water use from recent retail billing records for commercial, industrial, and institutional uses.

(2) The fundamental purpose of the "reasonable requirements" limitation is to ensure that no Customer receives more water during a shortage than that Customer reasonably needs. In determining "reasonable requirements" pursuant to this Section 3.5, the Agency may take into account the hardening of demand resulting from the level of conservation achieved by the Customer; the extent to which the Customer has developed Recycled Water Projects and Local Supply Projects; and the extent to which the Customer has implemented water conservation programs (including conservation required pursuant to the provisions of Section 1.12 of this Agreement). It is the intention of the parties to this Agreement that the Agency make its "reasonable requirements" determinations so as to encourage Customers to implement water conservation, Recycled Water, and Local Supply Projects.

(d) The Agency shall at all times have an adopted water shortage allocation methodology sufficient to inform each Customer of the water that would be available to it pursuant to Section 3.5(a) in the event of reasonably anticipated shortages, which methodology shall be consistent with this Section 3.5 and shall be included in the Urban Water Management Plan prepared pursuant to Section 2.7.

(e) The parties agree that it is extremely difficult and impractical to determine the damage caused to the Agency or other Customers as a result of the taking of water by any Customers in excess of the limitations contained in this Section 3.5. If any Customer takes delivery of water from the Transmission System or otherwise from the Russian River system in violation of this Section 3.5, then it shall pay the Agency, in addition to all other applicable charges, liquidated damages in an amount equal to 50 percent of the applicable Operation and Maintenance Charge (including all sub-charges) times the amount of water taken in violation of the provisions of this Section 3.5. The Agency shall use its best efforts to incorporate this liquidated damages provision into its agreements with Other Agency Customers, Russian River Customers, Marin Municipal Water District, and into the Agency's rules and regulations for the provision of water service, and impose liquidated damages pursuant to this Section 3.5(e). The existence of this liquidated damage provision shall not limit or restrict the Agency from physically limiting the quantity of water taken to the amounts authorized by this Section 3.5 or from pursuing all other available legal and equitable remedies applicable to such violations. By affirmative vote, the Water Advisory Committee may request that the Agency physically limit the quantity of water taken by a Regular

Customer to the amounts authorized by this Section 3.5 or that the Agency pursue all other available legal and equitable remedies applicable to such violations. The proceeds of any liquidated damages assessed pursuant to this subsection shall be deposited and paid out in the same manner as the proceeds of the Operation and Maintenance Charge.

(f) Notwithstanding subsections (a) and (b) above, as an alternative method for allocation under this Section 3.5 during a period of water deficiency or temporary Transmission System impairment, the Water Advisory Committee (or, in the event of a Transmission System temporary impairment affecting fewer than all of the Water Contractors, the Water Advisory Committee representatives of the Water Contractors affected by the temporary impairment) may, by unanimous vote, determine how water shall be allocated among the affected Water Contractors. The Agency shall provide a calculation methodology or other information adequate to enable the determination, in a manner consistent with this Section 3.5, of the volume of water to which (i) the Water Contractors as a group, and (ii) all other Customers would be respectively entitled. Any alternative method for allocation determined by the Water Advisory Committee pursuant to this subsection shall apply only to the volume of water to which the Water Contractors are entitled as a group.

(g) In the event that Transmission System capacity is expanded by the construction of facilities other than those authorized by this Agreement, then notwithstanding anything in this Section 3.5 to the contrary, any allocations made pursuant to this section to Forestville that are based upon the average daily rate of flow during any month Entitlement Limits shall not use a denominator greater than 133.4 mgd.

3.6 Fire Fighting Service

Anything herein to the contrary notwithstanding, the Agency may furnish water for fire fighting from hydrants or standpipes on the Transmission System, provided, however, that such service within two miles of the Corporate Territory of a Water Contractor may be furnished only if and during the period of time said Water Contractor consents thereto in writing. The Agency shall set fees sufficient to recover the full cost of installing and maintaining and supplying water to fire hydrants. All revenue from such fees shall be treated the same as money received from the Operation and Maintenance Charge and shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1. Agency shall adopt service rules limiting hydrant water usage to fire suppression, fire training and limited temporary uses such as providing metered construction water.

3.7 Quality of Water

(a) The Agency warrants that it will use its best efforts to insure that all water delivered hereunder shall be of such purity and quality required to meet minimum standards for human domestic consumption from time to time established by the state and federal governments. The Agency shall not be liable to any of its Customers for any damage arising from the quality of water that it delivers under this Agreement, except for damages based on any breach of the warranty described in the preceding sentence.

(b) The payment obligations of the Water Contractors set forth in Part 4 shall not be affected in any manner by the quality of the water delivered by the Agency hereunder.

3.8 Points of Delivery

All water furnished to each Water Contractor hereunder shall be delivered at the discharge flange of meters at turnouts owned and maintained by the Agency. Turnouts in addition to those now existing shall be constructed from time to time at such locations as shall be agreed upon by the Agency and the Water Contractors involved. Water delivered to Petaluma and North Marin at the McNear meter station shall be delivered at a hydraulic gradient of not less than 175 feet mean sea level. Turnouts installed for Regular Customers shall be not less than 8 inches in diameter. Turnout installation charges shall be determined from time to time by resolution of the Board of Directors of the Agency and shall be payable by the Customer prior to turnout installation by Agency.

3.9 Risk of Loss and Responsibility

Title and risk of loss with respect to all water delivered hereunder shall pass from the Agency to the Water Contractor at the point of delivery thereof as set forth in Section 3.8. The Agency shall not be responsible for the control, transmission, distribution, handling or use of water beyond the point of delivery thereof. Each Water Contractor shall be responsible for installing and maintaining any device it deems necessary to reduce or regulate the pressure under which the water may be delivered hereunder.

3.10 Place of Use of Water Delivered to North Marin

(a) North Marin may exchange water delivered under this Agreement for an equal amount of water delivered to it by Marin Municipal.

(b) Except as provided in subdivision (a) of this section, North Marin shall not permit any water delivered under this Agreement to be used outside of its own distribution system service areas.

3.11 Measurement

All water delivered by the Agency from the Transmission System shall be measured by meters installed and maintained by the Agency. The Agency shall test the accuracy of each meter not less frequently than annually and provide each Water Contractor with a report of such test. Each Water Contractor shall have the right at any time and at its expense to make additional tests of any meter. If a meter is found to be reading 2 percent or more fast or slow, it shall immediately be repaired to bring it within 2 percent accuracy or be replaced by the Agency.

3.12 Marin Municipal Water Deliveries

The Agency, pursuant to the Third Amended Offpeak Water Supply Agreement dated January 25, 1996 and the Amended Agreement For The Sale Of Water Between The Sonoma County Water Agency and the Marin Municipal Water District dated January 25, 1996, amendments to these agreements that have been approved by the Water Advisory Committee, or subsequent agreements between the Agency and Marin Municipal that have been approved by the Water Advisory Committee, may deliver water to Marin Municipal when and to the extent that the Transmission System has capacity in excess of that required by Agency to supply its Regular Customers the Entitlements set forth in Sections 3.1 and 3.2. However, deliveries to Marin Municipal shall not be reduced or curtailed because of inadequate capacity in the new aqueduct to be constructed generally paralleling the portion of the Petaluma Aqueduct that extends from the Ely Pumping Plant to Kastania Reservoir, if such new aqueduct is paid for by Marin Municipal and dedicated to the Agency pursuant to Section 13 of the Amended Agreement for the Sale of Water between the Sonoma County Water Agency and the Marin Municipal Water District dated January 25, 1996.

The maximum delivery rate to Marin Municipal between May 1 and October 31 shall not exceed 12.8 mgd. The total quantity of water delivered to Marin Municipal in any Fiscal Year shall not exceed 14,300 Acre Feet. Deliveries of water to Marin Municipal shall be made either through a separately metered turnout or through North Marin's metered turnout(s). If water is delivered through North Marin's metered turnout(s), then North Marin shall maintain in good repair and calibration metered turnouts at points of delivery from its system into Marin Municipal's system and shall

read such meters on or about the end of each month and provide to Agency an accounting of water delivered during the preceding month to Marin Municipal. In making such accounting, North Marin shall deduct from the total of water delivered to Marin Municipal any exchange water as provided in Section 3.10 of this Agreement and any water produced by North Marin and delivered to Marin Municipal.

3.13 Damages for Peaking on the Transmission System or Taking Water in Excess of Average Daily Rate of Flow Entitlement Limits in Violation of Section 3.3

The parties to this Agreement recognize that the Agency will have increased costs, in amounts that will be difficult to determine, if any Regular Customer takes water in violation of subsection (b), (c) or (d) of Section 3.1 or subsection (a) of Section 3.3. Accordingly, if any Regular Customer takes delivery of water from the Transmission System in violation of subsection (b), (c) or (d) of Section 3.1 or subsection (a) of Section 3.3, then it shall pay the Agency, in addition to all other applicable charges, liquidated damages in an amount equal to twenty-five percent (25%) of the applicable Operation and Maintenance Charge (including all sub-charges) times the amount of water taken in violation of these provisions. The assessment of liquidated damages pursuant to this section for a violation by a Regular Customer of subsection (b), (c) or (d) of Section 3.1 or subsection (a) of Section 3.1 may be waived by the Agency upon a showing by the contractor that the taking of delivery of water in violation thereof resulted from an act of God or other unforeseeable circumstances over which the Regular Customer had no control. The existence of this liquidated-damage provision shall not limit or restrict the Agency from physically limiting the quantity of water taken to the amounts authorized by this Agreement or from pursuing all other available legal and equitable remedies applicable to such violations. The proceeds of any liquidated damages assessed pursuant to this subsection shall be deposited and paid out in the same manner as the proceeds of the Operation and Maintenance Charge.

PART 4 - CHARGES AND PAYMENTS

4.1 Separate Charges and Funds

(a) On or before April 30 preceding each Fiscal Year during which any of the following charges are payable, the Agency will establish the amount of the following charges for the ensuing Fiscal Year:

(1) the Operation and Maintenance Charge, including
  (a) the Water Management Planning Sub-Charge,
  (b) the Watershed Planning and Restoration Sub-Charge,
  (c) the Recycled Water and Local Supply Sub-Charge,
  (d) the Water Conservation Sub-Charge,
(2) the Aqueduct Facilities Capital Charges, including
  (a) the Santa Rosa Aqueduct Capital Sub-Charge,
  (b) the Sonoma Aqueduct Capital Sub-Charge,
  (c) the Petaluma Aqueduct Capital Sub-Charge,
(3) the Storage Facilities Capital Charge,
(4) the Common Facilities Capital Charge, and
(5) the North Marin Capital Charge.

In determining the amount of these charges, the Agency shall include a reasonable allowance for usual contingencies and errors in estimation, and to maintain a prudent reserve in an amount determined from time to time by the Water Advisory Committee.

(b) All monies received in payment of said charges shall be received, allocated, and paid out consistent with the obligations and covenants of the Agency with respect to Revenue Bonds.

(c) In establishing each of said charges, the Agency shall assume that the quantity of water (other than Surplus Water) to be delivered from each aqueduct of the Transmission System shall be the same as the amount of water delivered from said aqueduct during the twelve months preceding such establishment, or the average annual amount of water delivered during the preceding 36 months, whichever is less.

If because of drought or other water-supply reduction, state or federal order, or other similar condition, the Agency anticipates that any such quantities will not be predictive of future usage, the Agency may use a different amount with the prior approval of the Water Advisory Committee.

4.2 Operation and Maintenance Charge

(a) The Operation and Maintenance Charge shall be a uniform annual charge per acre foot and shall be paid by all Regular Customers for all water delivered from the Transmission System.

(b) The aggregate amount of money to be received by the Agency from the Operation and Maintenance Charge for each Fiscal Year shall be sufficient to produce water sale revenues to cover the Agency's estimate of its Operation and Maintenance Costs for such Fiscal Year, to produce water sale revenues as required by Sections 4.13, 4.14, 4.15, and 4.16, and to produce additional revenues in amounts determined from time to time by the Water Advisory Committee to pay the Capital Costs of Common Facilities and Storage Facilities pursuant to subdivision (c) of this section.

(c) All money received by the Agency in payment of the Operation and Maintenance Charge shall be deposited and paid out as set forth in Section 1.7, and subdivision (b) of Section 4.1. After making the payments required by Section 1.7, remaining money received from the Operation and Maintenance Charge may be used to pay the Agency's operation and maintenance expenses, to make the deposits required by Sections 4.13, 4.14(g), 4.15, and 4.16(a), and to fund a prudent reserve for those expenses. Money received from the Operation and Maintenance Charge in excess of that necessary for operation and maintenance expenses, to make the deposits required by Sections 4.13, 4.14(g), 4.15, and 4.16(a), and to maintain a prudent reserve may from time to time be disbursed as provided in Section 4.5 to pay Capital Costs of Common Facilities and Storage Facilities. If money received from the Operation and Maintenance Charge is appropriated for expenditure for Storage Facilities, the funds shall be transferred to the Storage Facilities capital fund referred to in subsection (c) of Section 4.7. At the time of the transfer, an amount shall also be transferred to North Marin's account established pursuant to subsection (c) of Section 4.4, which amount shall bear the same proportion to the amount transferred to the Storage Facilities capital fund that the total amount payable by North Marin for the Operation and Maintenance Charge, exclusive of sub-charges, in the prior Fiscal Year bears to the total operation and maintenance revenue, exclusive of revenue from sub-charges, received by the Agency from sources other than North Marin during the prior Fiscal Year.

4.3 Allocation of Capital Costs to North Marin

(a) The Capital Costs of Remaining Facilities shall be allocated to North Marin in proportion to the following ratios:

	Facility	Ratio
1.	Storage Facilities	-0-
2.	Common Facilities	11.2/90.4

(b) The portions of the Capital Costs of the Additional Facilities, replacement facilities, and the Potter Valley Project, or the portion thereof that is to be acquired pursuant to Section 2.4 hereof, shall be allocated to North Marin are as follows:

Facility	Ratio
1. 2nd pipeline, generally paralleling Intertie Aqueduct Reach 1	8.7/55.8
2. 2nd pipeline, generally paralleling Intertie Aqueduct Reach 2	8.7/55.8
3. 2nd pipeline, generally paralleling Intertie Aqueduct Reach 3a	8.7/55.8
4. 2nd pipeline, generally paralleling Intertie Aqueduct Reach 3b and 3c	8.7/42.4
5. 2nd pipeline, generally paralleling Petaluma Aqueduct from its junction with Intertie Aqueduct to Kastania Reservoir	5.1/38.8
6. 2nd pipeline, generally paralleling Sonoma Aqueduct	-0-
7. Storage Facilities	-0-
8. Russian River Water Production Facilities	8.7/55.8

9. All Common Facilities except Russian River Water Production Facilities, but including the Potter Valley Project 19.9/146.2

4.4 Remaining Facility, Additional Facility and Replacement Facility Capital Cost Payments by North Marin

The portion of the Capital Costs of the facilities allocated to North Marin pursuant to Section 4.3 shall be recovered by the Agency as follows:

(a) Each time the Agency decides to issue further series or issues of Revenue Bonds to finance the Capital Costs of constructing or acquiring any Remaining Facilities, Additional Facilities, or replacement facilities, or acquiring all or part of the Potter Valley Project, the Agency shall, prior to initiating the procedures for the issuance of such Revenue Bonds, notify North Marin of the Agency's estimate of the total cost of the Remaining Facilities, replacement facilities, Additional Facilities, or Potter Valley Project acquisition proposed to be financed by said series or issues of Revenue Bonds and of North Marin's portion of the cost allocated in accordance with Section 4.3. North Marin shall have the right, at its election, to pay North Marin's portion, or any part or parts thereof, of the cost of such Remaining Facilities, replacement facilities, Additional Facilities, or Potter Valley Project acquisition in cash, provided, however, that North Marin shall make its election on or before such date as the Agency shall specify, which date will give the Agency sufficient time to determine the amount of Revenue Bonds to be sold, but shall not be earlier than 30 days after said notification. If North Marin elects to make a cash payment, it shall do so on the date the Revenue Bonds are sold or on such later date as the Agency may agree upon and which will nevertheless enable the Agency to meet its obligations for said construction or acquisition. If North Marin elects to make a cash payment, the amount payable shall exclude interest during construction and financing charges.

(b) Upon completion of the construction or acquisition referred to in subdivision (a) of this section, any deficiency in the amount theretofore paid or credited and the actual amount of North Marin's portion thereof shall be paid by North Marin to the Agency.

(c) All payments made by North Marin pursuant to subdivisions (a) and (b) of this section shall be deposited in a separate account from which the Agency will make disbursements only to make payments that otherwise must be made by revenues received from the North Marin Capital Charge, or for the Agency's expenses in constructing the Remaining Facilities, Additional Facilities, and replacement facilities or

in acquiring all or part of the Potter Valley Project, up to the proportionate amounts allocated to North Marin utilizing the ratios contained in Section 4.3. The balance of the account shall earn interest at the Sonoma County Treasurer's pooled investment fund rate, which interest income shall be credited to the account on June 30 of each year. Any surplus funds in the account shall be paid to North Marin within 30 days of receipt of a written request therefor.

(d) If the Agency decides to levy one or more Aqueduct Capital Charges to produce revenue to fund, without issuing Revenue Bonds, (a) major replacements of portions or all of any aqueduct facility pursuant to Section 4.6(e) of this Agreement or (b) capital improvements to existing Aqueduct Facilities, then North Marin shall pay its portion of the Capital Costs of such replacements or improvements to the Agency in cash at the time such Capital Costs are incurred by the Agency. The Capital Costs of major replacements to the facilities specified in Subsection 4.3(b) shall be allocated to North Marin based upon the ratios set forth in Subsections 4.3(b). The Capital Costs of major replacements to the Intertie Aqueduct shall be allocated to North Marin based on the following cost distribution ratios:

Intertie Aqueduct Reach 1	11.2/70.4
Intertie Aqueduct Reach 2	11.2/68.9
Intertie Aqueduct Reach 3	11.2/58.9

4.5 Payment of Remaining Facilities, Additional Facilities, Replacement Facilities, and Potter Valley Project Capital Costs

(a) The Capital Costs of Remaining Facilities, Additional Facilities, replacement facilities and Potter Valley Project, except the portions thereof paid by North Marin pursuant to Section 4.4, shall be paid by the Agency with cash available pursuant to Sections 4.2, 4.6, 4.7 and 4.8, subdivision (b) of Section 4.11, and, if the Board of Directors of the Agency decides to issue Revenue Bonds, with the proceeds from the sale of Revenue Bonds. The Agency may sell Revenue Bonds to the extent necessary to pay for said Capital Costs, to establish bond reserves and to pay all expenses incurred in the issuance of such bonds.

(b) From time to time the Agency shall determine the percentage of the Revenue Bonds that are attributable to Aqueduct Facilities, Storage Facilities, Common Facilities, and North Marin's Capital Costs. In making these calculations, the Agency shall not include in the portions of the Revenue Bonds that are attributable to Aqueduct Facilities, Storage Facilities and Common Facilities, the portions of the Revenue Bonds, if any, that

are attributable to North Marin's Capital Costs. The Agency shall not include in these calculations any Capital Costs for which North Marin paid cash pursuant to Section 4.4, or the costs of any major replacement facilities financed by the imposition of Aqueduct Facilities Capital Charges without the issuance of Revenue Bonds pursuant to subdivision (e) of Section 4.6.

4.6 Aqueduct Facilities Capital Charges

(a) Aqueduct Facilities Capital Charges consist of the Santa Rosa Aqueduct Capital Sub-Charge, the Sonoma Aqueduct Capital Sub-Charge, and the Petaluma Aqueduct Capital Sub-Charge. The Aqueduct Facilities Capital Charges shall be annual charges per acre foot set for each aqueduct as provided in subdivision (b) of this section and shall be paid by all Regular Customers of the Agency except North Marin for all water delivered from the Transmission System except Surplus Water. All water delivered to Santa Rosa and Windsor shall be deemed to be delivered from the Santa Rosa Aqueduct, all water delivered to Rohnert Park, Cotati, and Petaluma shall be deemed to be delivered from the Petaluma Aqueduct, and all water delivered to Sonoma and Valley of the Moon shall be deemed to be delivered from the Sonoma Aqueduct.

(b) The aggregate amount to be received by the Agency from the various Aqueduct Facilities Capital Charges for each Fiscal Year shall be sufficient to produce water sale revenues to pay the Agency's Revenue Bond Obligations (after crediting any projected payments to be made pursuant to subdivision (e) of Section 4.6) for such Fiscal Year times the percentage for Aqueduct Facilities determined pursuant to subdivision (b) of Section 4.5, and to produce additional revenues in amounts determined from time to time by the Water Advisory Committee to pay the Capital Costs of Aqueduct Facilities pursuant to subdivision (c) of this section. The aggregate amount shall be allocated to the respective aqueducts based on the following cost distribution ratios applied to the estimated, or when known, actual Capital Costs for the various Aqueduct Facilities:

Facility	Ratio
2nd pipeline, generally paralleling Intertie Aqueduct, Reach 1, Reach 2 and Reach 3a	
Santa Rosa Aqueduct	6.6/55.8
Petaluma Aqueduct	20.9/55.8
Sonoma Aqueduct	6.8/55.8

2nd pipeline, generally paralleling Intertie Aqueduct, Reach 3b and 3c

Santa Rosa Aqueduct	-0-
Petaluma Aqueduct	20.9/42.4
Sonoma Aqueduct	-0-

2nd pipeline, generally paralleling Petaluma Aqueduct from its junction with the Intertie Aqueduct to Kastania Reservoir

Santa Rosa Aqueduct	-0-
Petaluma Aqueduct	20.9/38.8
Sonoma Aqueduct	-0-

2nd pipeline, generally paralleling Sonoma Aqueduct

Santa Rosa Aqueduct	-0-
Petaluma Aqueduct	-0-
Sonoma Aqueduct	6.8/6.8

(These ratios are determined with the allocations in Sections 4.3 and 4.4 of Capital Costs to North Marin, and with the following allocations to Common Facilities:

2nd pipeline generally paralleling Reaches 1, 2 and 3a of the Intertie Aqueduct: 12.8/55.8

2nd pipeline generally paralleling Reach 3b and 3c of the Intertie Aqueduct: 12.8/42.4

2nd pipeline generally paralleling the Petaluma Aqueduct from its junction with the Intertie Aqueduct to Kastania Reservoir: 12.8/38.8)

(c) All money received by the Agency in payment of Aqueduct Facilities Capital Charges shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1. After making the payments required to satisfy the Agency obligations and covenants with respect to the Revenue Bonds used to finance the Capital Cost of the Aqueduct Facilities, remaining money received from the Aqueduct Facilities Capital

Charges may be disbursed from time to time to pay pursuant to subdivision (a) of Section 4.5 the portions of the Capital Costs of the Remaining Facilities and Additional Facilities which are also Aqueduct Facilities that are not allocated to North Marin in Section 4.3.

(d) If at the end of any Fiscal Year the balance in the Aqueduct Facilities Capital Charge fund is insufficient to meet said Revenue Bond Obligations for the ensuing Fiscal Year attributed to the Aqueduct Facilities, Agency will determine the deficits in the payment received by it for deliveries from the Santa Rosa, Petaluma, and Sonoma Aqueducts respectively. Before August 1 of the following Fiscal Year:

(1) Additional charges for water delivered in amounts equal to the deficits with respect to the Santa Rosa Aqueduct shall be paid by Santa Rosa and Windsor in the following manner: The share of such additional charge to be paid by each of said Water Contractors shall be proportionate to the difference between the base share component and the sum of the Aqueduct Facilities Capital Charge payments made by said Water Contractor during said Fiscal Year. The base share component allocated to a Water Contractor is the number obtained by multiplying the said total principal and interest payment for said Fiscal Year by said Water Contractor's average daily rate of flow during any month Entitlement Limit set forth in subdivision (a) of Section 3.1 and by dividing by the total of said average daily rate of flow during any month Entitlement Limits for all Water Contractors being served from the Santa Rosa Aqueduct.

(2) Additional charges for water delivered in an amount equal to the deficit with respect to the Sonoma Aqueduct shall be paid by Sonoma and Valley of the Moon in the following manner: The share of such additional charge to be paid by each of said Water Contractors shall be proportionate to the difference between the base share component and the sum of the Aqueduct Facilities Capital Charge payments made by said Water Contractor during said Fiscal Year. The base share component allocated to a Water Contractor is the number obtained by multiplying the said total principal and interest payment for said Fiscal Year by said Water Contractor's average daily rate of flow during any month Entitlement Limit set forth in subdivision (a) of Section 3.1 and by dividing by the total of said average daily rate of flow during any month Entitlement Limits for all Water Contractors being served from the Sonoma Aqueduct.

(3) Additional charges for water delivered in an amount equal to the deficit with respect to the Petaluma Aqueduct shall be paid by Rohnert Park, Cotati and Petaluma in the following manner excluding North Marin and Marin Municipal: The share of such additional charge to be paid by each of said Water Contractors shall be

proportionate to the difference between the base share component and the sum of the Aqueduct Facilities Capital Charge payments made by said Water Contractor during said Fiscal Year. The base share component allocated to a Water Contractor is the number obtained by multiplying said total principal and interest payment for said Fiscal Year by said Water Contractor's average daily rate of flow during any month Entitlement Limit set forth in subdivision (a) of Section 3.1 and by dividing by the total of all said average daily rate of flow during any month Entitlement Limits for all Water Contractors being served from the Petaluma Aqueduct.

(e) If the Agency decides to issue a new series or issue of Revenue Bonds to finance major replacements of portions or all of any aqueduct facility or if, with the approval of the Water Advisory Committee, the Agency decides to levy one or more Aqueduct Facilities Capital Charges to produce revenue to finance major replacements of portions or all of any aqueduct facility, then the aggregate amount to be received by the Agency from the respective Aqueduct Facilities Capital Charges for each Fiscal Year shall be sufficient to produce water sales revenues, in addition to those required by subdivision (b) of this section, in amounts determined from time to time by the Water Advisory Committee to pay the Capital Costs of such major replacements. The Capital Costs of major replacements to the facilities specified in Subsection 4.6(b) above shall be allocated based upon the ratios set forth in Subsection 4.6(b). The Capital Costs of major replacements to the Intertie Aqueduct shall be allocated to the respective aqueducts based on the following cost distribution ratios:

Intertie Aqueduct Reach 1:

Santa Rosa Aqueduct	31.5/70.4
Petaluma Aqueduct	19.7/70.4
Sonoma Aqueduct	8.0/70.4

Intertie Aqueduct Reach 2:

Santa Rosa Aqueduct	30.0/68.9
Petaluma Aqueduct	19.7/68.9
Sonoma Aqueduct	8.0/68.9

Intertie Aqueduct Reach 3:

Santa Rosa Aqueduct	20.0/58.9
Petaluma Aqueduct	19.7/58.9
Sonoma Aqueduct	8.0/58.9

4.7 Storage Facilities Capital Charge

(a) The Storage Facilities Capital Charge shall be a uniform annual charge per acre foot and shall be paid by all Regular Customers of the Agency for all water delivered from the Transmission System except Surplus Water, provided however, that North Marin shall not be obligated to pay any Storage Facilities Capital Charge if North Marin maintains potable storage reservoirs within its system with a total capacity equal to or greater than one and one-half times the average daily volume of water delivered by the Agency to North Marin during the previous July with the highest water delivery to North Marin.

(b) The aggregate amount to be received by the Agency from the Storage Facilities Capital Charge for each Fiscal Year shall be sufficient to produce water sale revenues to pay the Agency's Revenue Bond Obligations for such Fiscal Year (after crediting any projected payments to be made pursuant to subdivision (e) of Section 4.6) times the percentage for Storage Facilities determined pursuant to subdivision (b) of Section 4.5, and to produce additional revenues in amounts determined from time to time by the Water Advisory Committee to pay the Capital Costs of Storage Facilities pursuant to subdivision (c) of this section.

(c) All money received by the Agency in payment of the Storage Facilities Capital Charge shall be deposited and paid out as set forth in Section 1.7, and subdivision (b) of Section 4.1. After making the payments from the Storage Facilities capital fund required by Section 1.7, remaining money in said fund may be disbursed from time to time to pay Capital Costs of Remaining Facilities, Additional Facilities and replacement facilities that also are Storage Facilities, pursuant to Section 4.5.

(d) If at the end of any Fiscal Year the balance in the Storage Facilities capital fund is insufficient to meet said Revenue Bond Obligations for such Fiscal Year attributed to the Storage Facilities, each Water Contractor except North Marin will, before August 1, pay to the Agency an additional charge per acre foot for all water delivered to it during the Fiscal Year which additional charge when multiplied by all Acre Feet sold to Regular Customers except North Marin shall be equal to said deficit.

4.8 Common Facilities Capital Charge

(a) The Common Facilities Capital Charge shall be a uniform annual charge per acre foot and shall be paid by all Regular Customers of the Agency except North Marin for all water delivered from the Transmission System except Surplus Water.

(b) The aggregate amount to be received by the Agency from the Common Facilities Capital Charge for each Fiscal Year shall be sufficient to produce water sale revenues to pay the Agency's Revenue Bond Obligations for such Fiscal Year (after crediting any projected payments to be made pursuant to subdivision (e) of Section 4.6) times the percentage for Common Facilities determined pursuant to subdivision (b) of Section 4.5.

(c) All money received by the Agency in payment of the Common Facilities Capital Charge shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1. After making the payments required by Section 1.7, additional money received from the Common Facilities Capital Charge may be disbursed from time to time pursuant to subdivision (a) of Section 4.5 to pay the portions of the Capital Costs of Remaining Facilities, Additional Facilities, replacement facilities and the Potter Valley Project that also are Common Facilities and that are not allocated to North Marin in Section 4.3, and to satisfy the requirements of Section 6.04 of Ordinance No. 1 if the amount of money received from the charge established by Section 4.2 is insufficient in any Fiscal Year.

(d) If at the end of any Fiscal Year the balance in the Common Facilities capital fund is insufficient to meet the Agency's Revenue Bond Obligations for such Fiscal Year on the Revenue Bonds attributed to Common Facilities, each Water Contractor except North Marin shall, before August 1, pay to the Agency an additional charge per acre foot for water delivered to it during the Fiscal Year, which additional charge when multiplied by all Acre Feet sold to the Water Contractors shall be equal to said deficit.

4.9 North Marin Capital Charge

(a) The North Marin Capital Charge shall be a uniform annual charge per acre foot and shall be paid by North Marin for all water delivered to it from the Transmission System except Surplus Water.

(b) The aggregate amount to be received by the Agency from the North Marin Capital Charge for each Fiscal Year shall be sufficient to produce water sale revenues to pay the Agency's Revenue Bond Obligations for such Fiscal Year (after crediting any projected

payments to be made pursuant to subdivision (e) of Section 4.6) times the percentage for North Marin's Capital Costs determined pursuant to subdivision (b) of Section 4.5.

(c) All money received by the Agency in payment of North Marin Capital Charge shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1. After making any payments required by Section 1.7, additional money received from the North Marin Capital Charge shall be deposited in the separate account described in subdivision (c) of Section 4.4.

(d) If at the end of any Fiscal Year the balance in the separate fund described in subdivision (c) of Section 4.4 is insufficient to meet the portion of the Agency's Revenue Bond Obligations for such Fiscal Year on the Revenue Bonds attributed to North Marin's Capital Costs, North Marin will, before August 1, pay to the Agency an additional charge per acre foot for water delivered to it during the Fiscal Year, which additional charge when multiplied by all Acre Feet sold to North Marin shall be equal to said deficit.

(e) If any money received pursuant to the Common Facilities Capital Charge is used pursuant to subdivision (c) of Section 4.8 to satisfy the requirements of Section 6.04 of Ordinance No. 1, then the North Marin Capital Charge shall be increased by the appropriate amount so that North Marin pays its appropriate share of such requirements.

(f) If North Marin has not maintained storage reservoirs within its system with at least the capacity required by subdivision (a) of Section 4.7, and if, as a result, the Agency constructs additional storage, then the North Marin Capital Charge shall be increased by an amount sufficient to pay for the Capital Costs or Revenue Bonds costs of such additional storage.

4.10 Power; Revenues

All power from the Warm Springs Hydroelectric Project and the Potter Valley Project shall be applied to the operation of the Transmission System or shall be sold, as the Agency shall from time to time determine. All revenues arising from the operation of these projects shall be treated the same as money received from the Operation and Maintenance Charge and shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1.

4.11 Payment for Surplus Water and Water Sold To Marin Municipal

(a) The Agency will sell Surplus Water at a price per acre foot of not less than 120% of the then current Operation and Maintenance Charge. All revenue from the sale of Surplus Water shall be treated the same as money received from the Operation and Maintenance Charge and shall be deposited and paid out as set forth in Section 1.7 and subdivision (b) of Section 4.1.

(b) Water delivered to Marin Municipal shall be sold at a per acre foot price that shall not be less than the sum of the Operation and Maintenance Charge determined pursuant to Section 4.2, the Russian River Conservation and Russian River Projects Charges determined pursuant to Section 4.18, and a capital charge. For the Third Amended Offpeak Water Supply Agreement dated January 25, 1996, or any amendment to that agreement that has been approved by the Water Advisory Committee, the capital charge shall be the total of all charges paid to Agency by Marin Municipal minus the sum of the Operation and Maintenance Charge and the Russian River Conservation and Russian River Projects Charges. For the Amended Agreement For The Sale of Water Between the Sonoma County Water Agency and Marin Municipal Water District dated January 25, 1996, or any amendment to that agreement that has been approved by the Water Advisory Committee, the capital charge shall be the charge established by paragraph b. of Section 10 of that agreement. Any subsequent agreement between the Agency and Marin Municipal for the sale of water to be transported through the Transmission System pursuant to Section 3.12 shall specify the capital charge that applies to this section of this Agreement. All money received by the Agency from the Operation and Maintenance Charge on water sold to Marin Municipal shall be credited to the operation and maintenance fund. All money received by the Agency from the Russian River Conservation and Russian River Projects Charges on water sold to Marin Municipal shall be credited to the Russian River Projects Fund and shall be used only for the purposes set forth in subsection (jj) of Section 1.2. The balance of the money received by the Agency from water sold to Marin Municipal shall be deposited and paid out as set forth in Section 1.7, and subdivision (b) of Section 4.1. After making the payments required by Section 1.7 and Ordinance No. 1, additional money received may be disbursed from time to time to pay the Capital Costs of Storage Facilities or Common Facilities authorized to be constructed in Section 2.2, provided, however, that only the money received from $31.50 per acre foot of the capital charge (which rate is based on the Agency's past and projected future capital investment in Storage Facilities) may be used to pay the Capital Costs of new Storage Facilities.

4.12 Minimum Payments by Other Agency Customers

Anything herein to the contrary notwithstanding, the Agency will not sell any water to be delivered through the Transmission System (other than Surplus Water) to any Other Agency Customer at a total price per acre foot that is less than 120% of the highest price per acre foot then currently being paid by any Water Contractor; provided, however, that this limitation shall not apply to water sold to Forestville. The respective components of said price shall be credited to the appropriate fund referred to in subdivision (a) of Section 4.1 and the excess shall be credited to the aqueduct capital fund for the aqueduct from which service is taken. Forestville's charge shall be the same as the total charge for Water Contractors for water delivered from the Santa Rosa Aqueduct, except that during the first ten (10) full Fiscal Years following execution of this Agreement, Forestville shall not pay the Santa Rosa Aqueduct Capital Sub-Charge.

4.13 Operations and Maintenance Charge – Water Management Planning

The Agency shall calculate and collect as a part of the Operations and Maintenance Charge a Water Management Planning Sub-Charge. The aggregate amount of money to be received by the Agency from the Water Management Planning Sub-Charge in each Fiscal Year shall be sufficient to produce water sale revenues to cover the Agency's reasonable estimate of its costs for such Fiscal Year to carry out the provisions of Section 2.7. All money received by the Agency in payment of the Water Management Planning Sub-Charge shall be deposited by the Agency into a Water Management Planning Fund and used to pay the Agency's costs in carrying out the provisions of Section 2.7.

4.14 Operations and Maintenance Charge – Watershed Planning and Restoration

(a) The Agency shall calculate and collect as a part of the Operations and Maintenance Charge a Watershed Planning and Restoration Sub-Charge.

(b) The aggregate amount of money to be received by the Agency from the Watershed Planning and Restoration Sub-Charge in each Fiscal Year shall be sufficient to produce water sale revenues to cover the Agency's reasonable estimate of costs for such Fiscal Year (net of funding provided by other sources, including the Russian River Projects Fund and the Agency's General Fund) of carrying out: (1) fishery mitigation, enhancement, and environmental compliance activities and projects undertaken by the Agency, including the Agency's costs of complying with the Endangered Species Act or any other applicable federal, state, or local environmental statute or regulation, if such

activities, projects, and costs are reasonably necessary, to enable the Agency to provide water to Regular Customers under this Agreement; (2) the evaluations undertaken pursuant to Section 2.4(b); and (3) actions, studies or projects authorized pursuant to Section 2.8 of this Agreement that are not covered by other funding sources and contributions. The Agency shall not use proceeds from the Watershed Planning and Restoration Sub-Charge to pay for the capital cost or operation and maintenance cost of recreation facilities.

(c) Notwithstanding Subsection 4.14(b) above, during the first five full Fiscal Years following the effective date of this Agreement, the Watershed Planning and Restoration Sub-Charge shall not exceed $35.00 per acre-foot.

(d) To assist in determining the appropriate share of fishery mitigation, enhancement, and environmental compliance activities and projects undertaken by the Agency to be paid by the Water Contractors under the Watershed Planning and Restoration Sub-Charge, the Agency shall, from time to time as reasonably necessary, prepare an analysis that (1) identifies planned fishery mitigation, enhancement, and environmental compliance activities and projects, (2) identifies the costs and beneficiaries of such activities and projects, (3) proposes an allocation of costs among all benefitted parties, and (4) recommends sources of funding for such activities and projects.

(e) The Agency shall use its best efforts to amend its existing contracts with Russian River Customers to require Russian River Customers to pay the Watershed Planning and Restoration Sub-Charge or fund or implement watershed planning and restoration projects at a level equivalent to that funded by the Agency under this Agreement.

(f) In addition to the Watershed Planning and Restoration Sub-Charge, the Agency may assess against the Water Contractors such supplemental charges as are authorized and agreed to under Section 2.8(c). Supplemental charges under this subsection shall not be included in determining the minimum payments by Other Agency Customers pursuant to Section 4.12 or by Windsor pursuant to Section 4.17.

(g) All money received by the Agency in payment of the Watershed Planning and Restoration Sub-Charge shall be deposited by the Agency into a Watershed Planning and Restoration Fund and used for the purposes set forth in Section 4.14(b). All money received by the Agency in payment of any supplemental charges pursuant to Section 4.14(d) shall be deposited into separate account(s) and used to pay the costs of projects authorized and agreed to pursuant to Section 2.8(c).

4.15 Operations and Maintenance Charge – Recycled Water and Local Supply

The Agency shall calculate and collect as a part of the Operations and Maintenance Charge a Recycled Water and Local Supply Sub-Charge. The Recycled Water and Local Supply Sub-Charge shall be a uniform charge per acre-foot and shall be paid by all Regular Customers and Russian River Customers for all water taken from the Transmission System or under the Agency's water rights. The aggregate amount of money to be received by the Agency from the Recycled Water and Local Supply Sub-Charge in each Fiscal Year shall be sufficient to produce water sale revenues to cover the Agency's estimate of its costs for such Fiscal Year to carry out the provisions of Section 2.6; provided, however, that during the first five full Fiscal Years following the effective date of this Agreement, the Recycled Water and Local Supply Sub-Charge shall not exceed $35.00 per acre-foot. The Agency shall use its best efforts to amend its existing contracts with Russian River Customers to require Russian River Customers to pay the Recycled Water and Local Supply Sub-Charge. Monies collected from the Recycled Water and Local Supply Sub-Charge shall be deposited in a Recycled Water and Local Supply Fund created by the Agency. The Recycled Water and Local Supply Fund shall be used only to pay or partially pay for the costs of Recycled Water Projects or the acquisition of Recycled Water or the rights thereto pursuant to Section 2.6 of this Agreement. Notwithstanding the foregoing sentence, revenue from the Recycled Water and Local Supply Sub-Charge collected by the Agency from Windsor pursuant to Section 4.17(b) shall be placed in a separate account and made available to Windsor for funding Windsor's local or regional Recycled Water Projects.

4.16 Operations and Maintenance Charge – Water Conservation

(a) The Agency shall calculate and collect as a part of the Operations and Maintenance Charge a Water Conservation Sub-Charge. Monies collected from the Water Conservation Sub-Charge shall be deposited in a Water Conservation Fund created by the Agency. The Water Conservation Fund shall be used only to pay or partially pay for the cost of Water Conservation Projects. The aggregate amount of money to be received by the Agency from the Water Conservation Sub-Charge for each Fiscal Year shall be sufficient to cover the Agency's estimate of the total cost of all Water Conservation Projects for such Fiscal Year. From and after July 1, 1998, a total of fifteen million dollars ($15,000,000) shall be expended to implement Water Conservation Projects pursuant to the Water Conservation Plan dated June 29, 1998. The $15,000,000 shall be allocated as follows: Cotati 2.10%, Petaluma 18.53%, Rohnert Park 10.37%, Santa Rosa 40.25%, Sonoma 4.15%, Forestville 0.66%, North Marin 19.50%, Valley of the Moon 4.43%. Until the total of $15,000,000 has been expended as set forth above, the

Agency shall not fund Water Conservation Projects for or on behalf of Windsor. The Water Conservation Projects for which said $15,000,000 is to be expended, have been approved by the Water Advisory Committee.

(b) The Agency shall use its best efforts to amend its existing contracts with Russian River Customers to require Russian River Customers to fund or implement Water Conservation Projects at a level equivalent to that funded by the Agency under this Agreement. Notwithstanding the penultimate sentence in Section 4.16(a), revenue from the Water Conservation Sub-Charge collected by the Agency from Windsor pursuant to Section 4.17(b) shall be placed in a separate account and made available to Windsor for funding Windsor's Water Conservation Projects.

4.17 Payments by Town of Windsor

(a) Notwithstanding anything in this Agreement to the contrary, for the first fifteen (15) full Fiscal Years following execution of this Agreement, the amount payable by Windsor for water delivered by the Agency through the Transmission System shall be 120% of the highest price per acre foot then currently being paid by any Water Contractor receiving water from the Santa Rosa Aqueduct. The respective components of said price shall be credited to the appropriate fund referred to in subdivision (a) of Section 4.1 and the excess shall be credited to the aqueduct capital fund for the aqueduct from which service is taken. Beginning with the sixteenth (16th) full Fiscal Year following execution of this Agreement and thereafter, all water delivered to Windsor by Agency through the Transmission System will be deemed delivered from the Santa Rosa Aqueduct and the amount payable by Windsor for said water determined accordingly.

(b) For all water diverted directly by Windsor from the Russian River using its own facilities, whether under the Agency's water rights or Windsor's water rights, Windsor shall pay only the charges set forth in the Agreement for Sale of Water between the Agency and Windsor dated January 8, 1991, as amended, including the sub-charges set forth in Sections 4.13, 4.14, 4.15, and 4.16.

4.18 Payment of Russian River Conservation Charge and Russian River Projects Charge by North Marin

In addition to the other charges provided for in this Part, North Marin shall pay the following additional per-acre-foot charges:

(a) A Russian River Conservation Charge shall be paid in lieu of the property taxes levied by the Agency on property in Sonoma County, to pay the capital, Operation and Maintenance Costs associated with the Warm Springs Dam Project. The Russian River Conservation Charge shall be a charge per acre foot of water delivered to North Marin hereunder, except Surplus Water. The charge shall be determined annually on or before April 30 preceding each Fiscal Year and shall be payable by North Marin during the ensuing Fiscal Year. The Russian River Conservation Charge shall be determined by multiplying the tax rate levied by the Agency in the then current Fiscal Year to pay the costs associated with the Warm Springs Dam Project times the assessed value of secured and unsecured property situated within Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Forestville and Valley of the Moon and dividing the product by the total number of Acre Feet of water delivered to Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Forestville and Valley of the Moon pursuant to Section 3.1 and 3.3 during the twelve month period ending on March 31. All money received by the Agency from the Russian River Conservation Charge on water sold to North Marin shall be credited to the Russian River Projects Fund and shall be used only for the purposes set forth in subsection (jj) of Section 1.2.

(b) A Russian River Projects Charge shall be paid in lieu of the property taxes levied on property in Sonoma County and other Agency general fund monies which are transferred to the Agency's Russian River Projects Fund and expended for the purposes enumerated in subsection (jj) of Section 1.2. The Russian River Projects Charge shall be effective on the first day of the first month following the effective date of this Agreement and shall thereafter be determined annually on or before April 30 preceding each Fiscal Year and shall be payable by North Marin during the ensuing Fiscal Year. The Russian River Projects Charge shall be determined by dividing the total amount of Agency monies expended from the Agency's Russian River Projects Fund in the preceding ten Fiscal Years, exclusive of the funds contributed to the Fund by North Marin and Marin Municipal Water District, and interest earnings attributable to funds contributed by North Marin and Marin Municipal Water District, by the sum of the total acre-feet of water delivered by the Agency to Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Forestville and Valley of the Moon pursuant to Sections 3.1 and 3.3 of this Agreement during the preceding ten Fiscal Years and multiplying the quotient by the ratio that the assessed value of secured and unsecured property situated within Cotati, Petaluma, Rohnert Park, Santa Rosa, Sonoma, Forestville and Valley of the Moon bears to the assessed value of all secured and unsecured property within Sonoma County, provided, however, in no event shall the Russian River Projects Charge exceed $20.00 per acre-foot. The Agency shall keep proper books, records and accounts in which complete and accurate entries shall be made of all Agency general fund monies

transferred to the Agency's Russian River Projects Fund and all expenditures made from the fund for the purposes set forth in subsection (jj) of Section 1.2. The Agency shall maintain a separate account within the Russian River Projects Fund for Russian River Projects Charges paid by North Marin and Marin Municipal Water District. Monies expended from the Russian River Projects Fund shall be deemed to have been expended from the North Marin and Marin Municipal Water District account in the proportion that the balance of that account bears to the total Russian River Projects Fund balance at the end of the Fiscal Year quarter preceding the expenditure. All money received by the Agency from the Russian River Projects Charge on water sold to North Marin shall be credited to the Russian River Projects Fund and shall be used only for the purposes set forth in subsection (jj) of Section 1.2.

4.19 Billing and Time of Payment

Except as otherwise expressly provided herein, all charges payable to the Agency shall be billed each month and paid within 30 days after receipt of bill. Notwithstanding any dispute between the Agency and a Water Contractor, such Water Contractor will pay all its bills when due and shall not withhold all or any part of any payment pending the final resolution of such dispute. If the resolution of the dispute results in a refund to the Water Contractor, the Agency shall make such refund plus any interest earned by investment of the disputed funds as promptly as it is able to do so, consistent with its meeting its Revenue Bond Obligations.

PART 5 - Water Advisory Committee/Technical Advisory Committee

5.1 Purpose

(a) There is hereby created the Water Advisory Committee and the Technical Advisory Committee.

(b) The purpose of the Water Advisory Committee is to perform the functions specified herein and to review all proposals set forth by the Agency which involve a significant capital outlay for the Transmission System or any other project which would significantly change the level of service or add significantly to the operations and maintenance expense of the Transmission System or other expense to be borne by the Water Contractors. The purpose of the Technical Advisory Committee is to advise the Water Advisory Committee.

5.2 Powers

Except as provided herein to the contrary, the power of the Water Advisory Committee is limited to that of collective spokesperson for the Water Contractors and shall be advisory only in nature. Nothing shall preclude a Water Contractor from setting forth a view contrary to that of the majority of the Committee. No action of the Committee limits or impairs any right or power of any Water Contractor. The Technical Advisory Committee shall have no powers other than the power to make recommendations to the Water Advisory Committee.

5.3 Composition and Voting

(a) The Water Advisory Committee shall be composed of one representative and one alternate who shall serve in absence of the representative, to be selected by each Water Contractor. The representative and alternate shall be elected members of and appointed by the governing board of the Water Contractor. The Water Advisory Committee shall generally meet quarterly as it determines necessary, which shall include at least one meeting per calendar year with a liaison from the Board of Directors of the Agency who is a member of and appointed by said Board. Each Water Contractor's representative will be allocated a weighted vote proportional to the average daily rate of flow during any month Entitlement Limit from the Transmission System applicable to such Water Contractor. An affirmative vote of said Committee shall be recorded and require both of the following: (1) the affirmative vote of more than fifty percent (50%) of the total weighted votes as defined above; and (2) the

affirmative vote of at least five (5) representatives. If the Water Advisory Committee does not affirmatively vote to approve any matter before it for a decision, then the matter shall be deemed not approved. A representative or alternate appointed by the Board of Directors of the Marin Municipal Water District, each of which must be members of said board, may attend and participate, debate, express opinions and present information at meetings of the Water Advisory Committee but shall not have a vote. If the approval, determination, or consent of the Water Advisory Committee is authorized or required on any non-advisory matter pursuant to this Agreement, the vote of the Water Advisory Committee on such matter shall be evidenced by a writing, executed by the chairperson or secretary, evidencing (a) the vote of each member, (b) whether the vote of the Committee was in the affirmative, and (c) if the vote was in the affirmative, a description of the approval, determination, or consent given by the Committee.

(b) The Technical Advisory Committee shall be composed of one non-elected representative selected by each Water Contractor. The Technical Advisory Committee shall generally meet monthly as it determines necessary. Each Water Contractor's representative will be allocated the same weighted vote applicable to that Water Contractor under Section 5.3(a). An affirmative vote of said Committee shall require both of the following: (1) the affirmative vote of more than fifty percent (50%) of the total weighted votes as defined above; and (2) the affirmative vote of at least five (5) representatives. A representative or alternate appointed by the Marin Municipal Water District Board of Directors may attend and participate, debate, express opinions and present information at meetings of the Water Advisory Committee but shall not have a vote. The Water Advisory Committee may require the Technical Advisory Committee to create subcommittees and ad hoc committees. Persons serving on such committees shall be elected officials, staff or contract staff of the Water Contractor they represent.

(c) The Technical Advisory Committee shall create a standing Water Conservation Subcommittee. The Water Conservation Subcommittee shall make recommendations to the Technical Advisory Committee with respect to any determination of the Water Advisory Committee contemplated under Section 1.12 of this Agreement, and shall perform other such duties with respect to Water Conservation Projects as may be requested by the Technical Advisory Committee.

(d) Once every two years, on a date selected by the Water Advisory Committee, the Water Advisory Committee shall elect from among its members two officers: a chairperson and vice chairperson. Officers shall serve for the ensuing two Fiscal Years. An officer may serve a second or subsequent consecutive two-year terms only if each

such term is approved by a unanimous vote of the Water Contractors. Furthermore, an officer can be removed and replaced at any meeting called by five Water Advisory Committee members provided all Water Advisory Committee members are notified in writing a minimum of five working days prior to the meeting. In the event an officer either: (1) loses his/her status as a duly elected local official serving on the governing board of the Water Contractor they represent or (2) loses his/her appointment as representative of the Water Contractor on the Water Advisory Committee, the officer position held shall be vacated. The Water Advisory Committee shall elect a new officer who shall fill out the balance of the vacated term. Voting for officers shall be as provided in subsection (a) of this section.

(e) By November of each year, subject to the limitations in Section 4.16(a), the Water Advisory Committee shall review proposed Water Conservation Projects, Recycled Water Projects, and Local Supply Projects and approve and report to the Agency those projects that are to receive funding in the next or later fiscal years. It is the intent of the parties to this Agreement that over the term of the Agreement, Regular Customers shall receive funding support for Water Conservation Projects, Recycled Water Projects, and Local Supply Projects in proportion to the amounts paid by Regular Customers under Sections 4.15 and 4.16.

(f) Commencing with the first Fiscal Year following the effective date of this Agreement, the Agency shall include in its operating budget the amount of $30,000 which the Agency shall expend as the Water Advisory Committee directs for purposes associated with the orderly implementation and operation of the provisions of this Agreement and other associated purposes deemed appropriate by the Committee. The annual amount may be fixed at a higher or lower amount in subsequent Fiscal Years as determined by vote of the Committee pursuant to subsection (a) of this section. The Water Advisory Committee shall decide which, if any, consultant or consultants, firm or firms shall be hired to carry out this work.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date first above written.

SONOMA COUNTY WATER AGENCY

By: Paul L. Kelley Date: 6/23/06

ATTEST:

Eve T. Lewis

CITY OF COTATI

By: Janet Orchard Date: 5.9.06
Mayor

ATTEST:

Lauri L. Hubbard Date: 5-10-06
City Clerk

CITY OF PETALUMA

By: David A. Glass Date: 5-15-06
Mayor

ATTEST:

Katie Crump
Deputy City Clerk

CITY OF ROHNERT PARK

By: Date: 06-05-06
Tim Smith Mayor

ATTEST:

Judy Hauff
City Clerk

CITY OF SANTA ROSA

By: Jane Bender
Mayor

Date: 5/31/06

ATTEST:

Deborah Anderson
Deputy City Clerk

CITY OF SONOMA

By: [illegible]
Mayor

Date: 4-19-06

ATTEST:

Gay Rainsberger
City Clerk

FORESTVILLE COUNTY WATER DISTRICT

Date: 5/12/06

By: [illegible]
President

ATTEST:

Secretary

NORTH MARIN WATER DISTRICT

Date: 5/22/06

By: _____
President

ATTEST:

_____ Acting Secretary

TOWN OF WINDSOR

Date: 5-17-06

_____
Mayor

ATTEST:

_____
Deputy Town Clerk

VALLEY OF THE MOON WATER DISTRICT

Date: 5-25-06

By: _____
President

ATTEST:

_____
Deputy Secretary

Appendix E

Normal, Single Dry, and Multiple Dry Year Supply and Demand Comparisons for Scenarios A and B

Table E-1 Projected Normal Year Water Supply and Demand (Scenario A)
Table E-2 Comparison of Single Dry Year Water Supply and Demand (Scenario A)
Table E-3 Comparison of Multiple Dry Year Water Supply and Demand (Scenario A)
Table E-4 Projected Normal Year Water Supply and Demand (Scenario B)
Table E-5 Comparison of Single Dry Year Water Supply and Demand (Scenario B)
Table E-6 Comparison of Multiple Dry Year Water Supply and Demand (Scenario B)

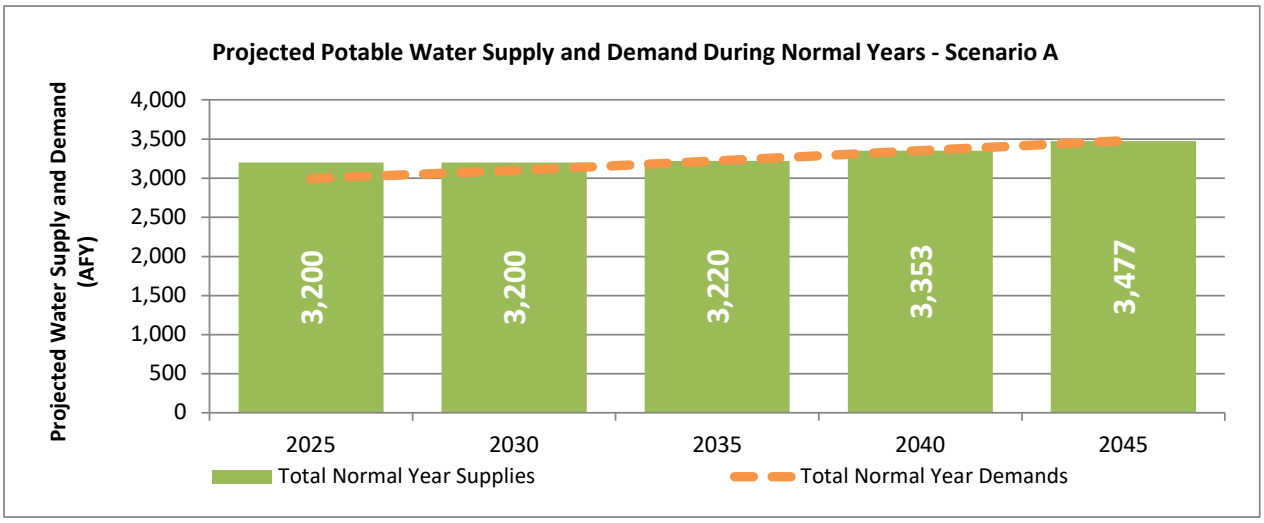
Table E-1

Projected Normal Year Water Supply and Demand (Scenario A)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario A: Exclusive of Local SDC Supplies and Proposed Project Demands (i.e., No Project Scenario)

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	2030	2035	2040	2045
Total Normal Year Supplies	VOMWD Supply (a)	3,200	3,200	3,220	3,353	3,477
	Surface Water Supply at SDC Property	0	0	0	0	0
Total Normal Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	0	0	0	0
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

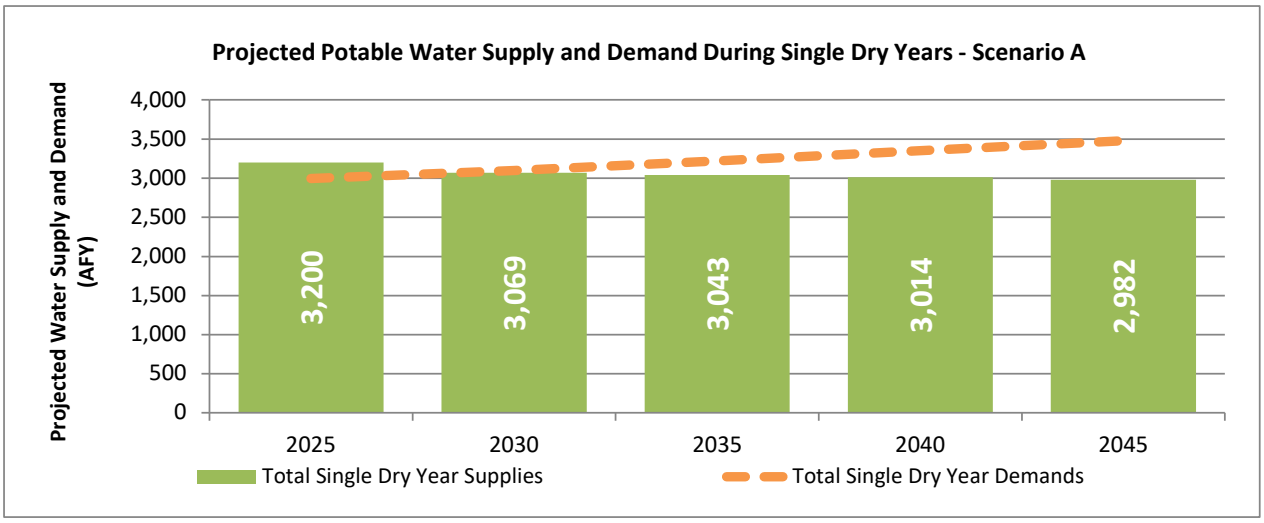
Table E-2

Comparison of Single Dry Year Water Supply and Demand (Scenario A)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario A: Exclusive of Local SDC Supplies and Proposed Project Demands (i.e., No Project Scenario)

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	**2030**	**2035**	**2040**	**2045**
Total Single Dry Year Supplies	VOMWD Supply (a)	3,200	3,069	3,043	3,014	2,982
	Surface Water Supply at SDC Property	0	0	0	0	0
Total Single Dry Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	0	0	0	0
Supply Shortfall (% demand)		***0%***	***-1%***	***-6%***	***-11%***	***-17%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

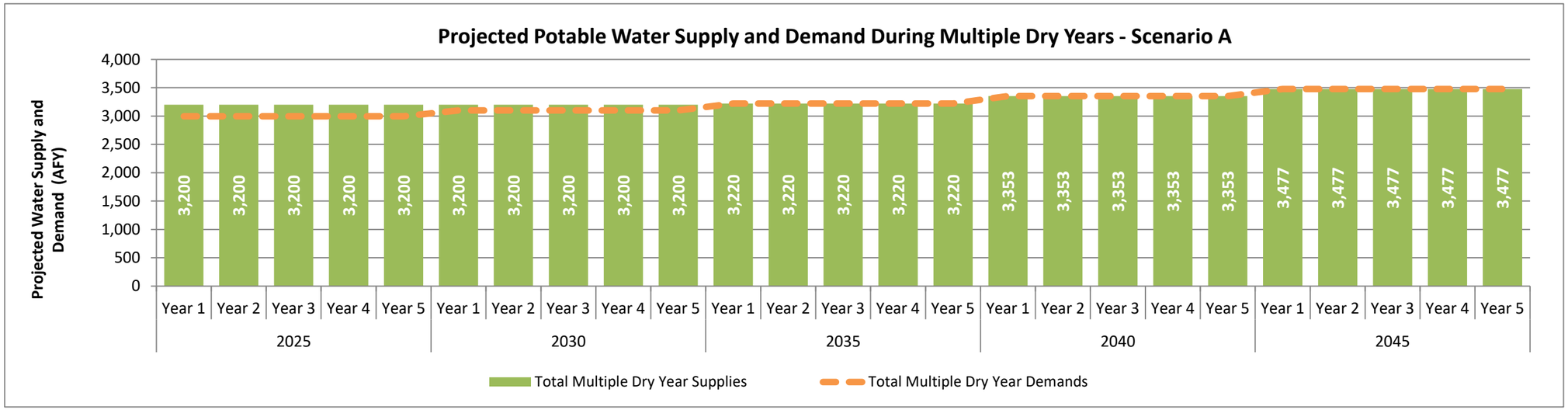
Table E-3

Comparison of Multiple Dry Year Water Supply and Demand (Scenario A)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario A: Exclusive of Local SDC Supplies and Proposed Project Demands (i.e., No Project Scenario)

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)																								
		2025					2030					2035					2040					2045				
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Total Multiple Dry Year Supplies	VOMWD Supply (a)	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,220	3,220	3,220	3,220	3,220	3,353	3,353	3,353	3,353	3,353	3,477	3,477	3,477	3,477	3,477
	Surface Water Supply at SDC Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Multiple Dry Year Demands	VOMWD Demands	2,996	2,996	2,996	2,996	2,996	3,101	3,101	3,101	3,101	3,101	3,220	3,220	3,220	3,220	3,220	3,353	3,353	3,353	3,353	3,353	3,477	3,477	3,477	3,477	3,477
	Proposed Project Demands	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre-feet per year "SDC" = Sonoma Developmental Center "SCWA" = Sonoma County Water Agency "VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected groundwater and water purchased from Sonoma County Water Agency shown on Table 10.

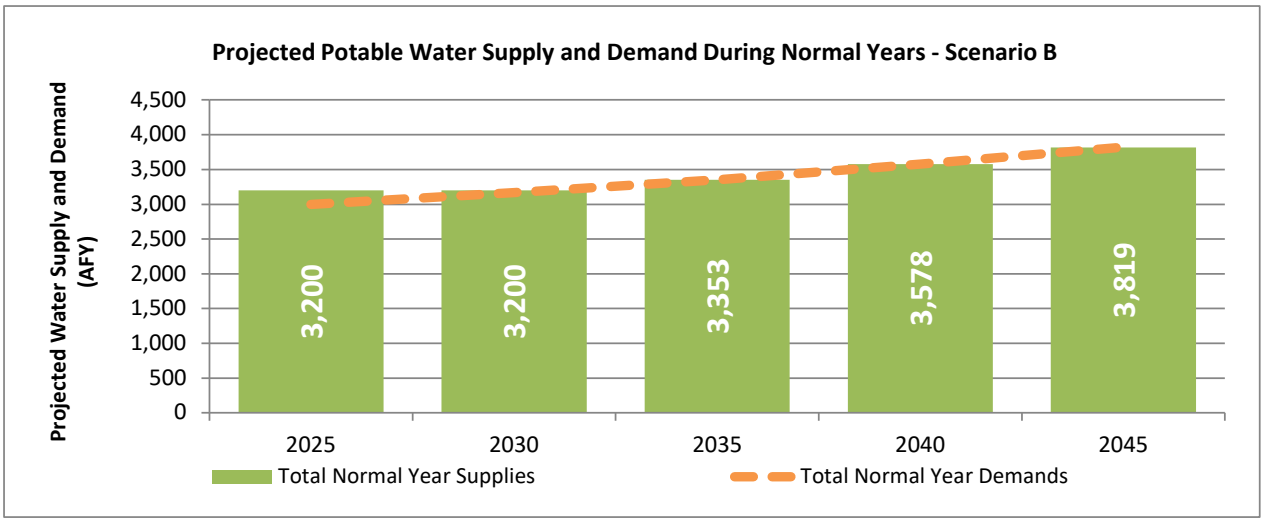
Table E-4

Projected Normal Year Water Supply and Demand (Scenario B)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario B: Exclusive of Local SDC Supplies and Inclusive of Proposed Project Demands

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	**2030**	**2035**	**2040**	**2045**
Total Normal Year Supplies	VOMWD Supply (a)	3,200	3,200	3,353	3,578	3,819
	Surface Water Supply at SDC Property	0	0	0	0	0
Total Normal Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	67	133	225	342
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected water purchased from Sonoma County Water Agency shown on Table 10 plus the amount of groundwater needed to meet total demands up to the maximum normal year groundwater yield of 940 AFY.

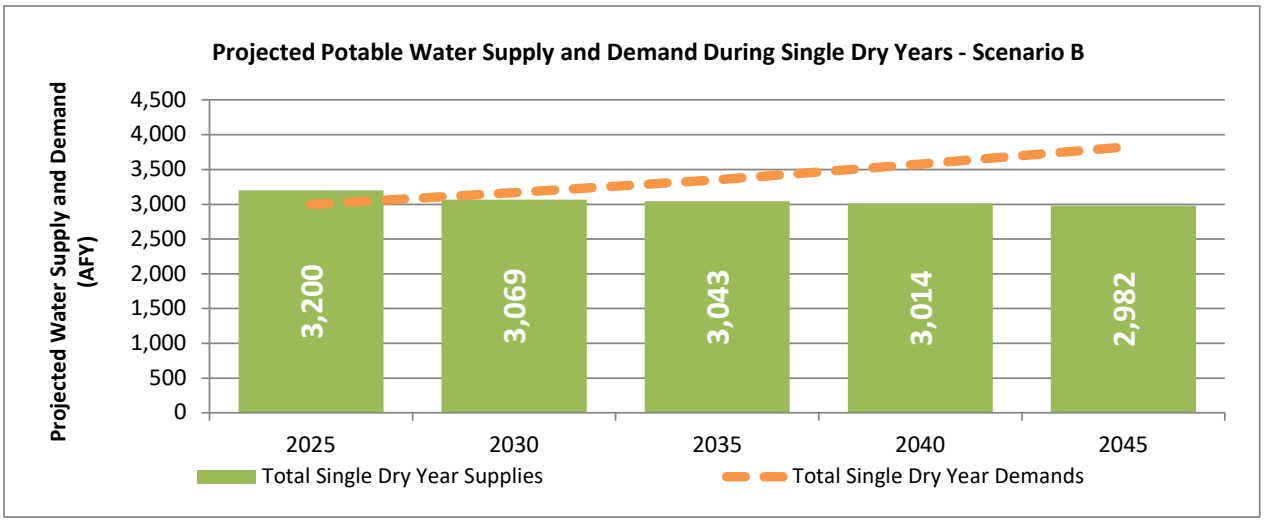
Table E-5

Comparison of Single Dry Year Water Supply and Demand (Scenario B)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario B: Exclusive of Local SDC Supplies and Inclusive of Proposed Project Demands

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)				
		2025	**2030**	**2035**	**2040**	**2045**
Total Single Dry Year Supplies	VOMWD Supply (a)	3,200	3,069	3,043	3,014	2,982
	Surface Water Supply at SDC Property	0	0	0	0	0
Total Single Dry Year Demands	VOMWD Demands	2,996	3,101	3,220	3,353	3,477
	Proposed Project Demands	0	67	133	225	342
Supply Shortfall (% demand)		***0%***	***-3%***	***-10%***	***-19%***	***-28%***



Abbreviations:

"AFY" = acre-feet per year

"SDC" = Sonoma Developmental Center

"VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected water purchased from Sonoma County Water Agency shown on Table 10 plus the amount of groundwater needed to meet total demands up to the maximum dry year groundwater yield of 378 AFY.

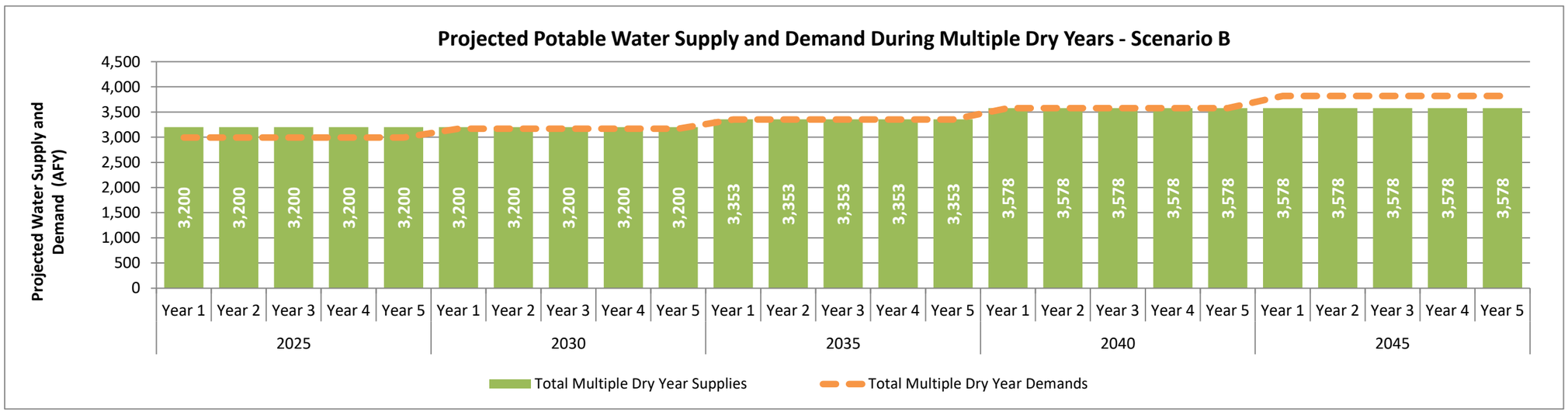
Table E-6

Comparison of Multiple Dry Year Water Supply and Demand (Scenario B)

Sonoma Developmental Center Specific Plan, Sonoma County, California

Scenario B: Exclusive of Local SDC Supplies and Inclusive of Proposed Project Demands

Water Demand and Supply Source		Projected Water Supply and Demand (AFY)																								
		2025					2030					2035					2040					2045				
		Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
Total Multiple Dry Year Supplies	VOMWD Supply (a)	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,200	3,353	3,353	3,353	3,353	3,353	3,578	3,578	3,578	3,578	3,578	3,578	3,578	3,578	3,578	3,578
	Surface Water Supply at SDC Property	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Multiple Dry Year Demands	VOMWD Demands	2,996	2,996	2,996	2,996	2,996	3,101	3,101	3,101	3,101	3,101	3,220	3,220	3,220	3,220	3,220	3,353	3,353	3,353	3,353	3,353	3,477	3,477	3,477	3,477	3,477
	Proposed Project Demands	0	0	0	0	0	67	67	67	67	67	133	133	133	133	133	225	225	225	225	225	342	342	342	342	342
Supply Shortfall (% demand)		***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***0%***	***-7%***	***-7%***	***-7%***	***-7%***	***-7%***



Abbreviations:

"AFY" = acre-feet per year "SDC" = Sonoma Developmental Center "SCWA" = Sonoma County Water Agency "VOMWD" = Valley of the Moon Water District

Notes:

(a) VOMWD Normal Year Supply includes the sum of projected water purchased from Sonoma County Water Agency shown on Table 10 plus the amount of groundwater needed to meet total demands up to the maximum dry year groundwater yield of 378 AFY.

APPENDIX C

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Sonoma Developmental Center Sewer System Evaluation

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MEMORANDUM

TO: Mr. James DiGiorgio, PE
Supervising Civil Engineer, California Department of General Services

FROM: Mr. Kevin Gustorf, PE
Ms. Megan Kurtz, EIT

DATE: July 29, 2021

SUBJECT: Sonoma Developmental Center Sewer System Evaluation

INTRODUCTION

The Sonoma Developmental Center (SDC) was founded in 1891 to serve the needs of individuals with developmental disabilities. A few years after its founding, the California State Legislature purchased approximately 1,640-acres of land in the community of Eldridge in Sonoma County to expand the facility. Over the years, the facility had undergone numerous expansions and upgrades. In 2015, the State of California announced its plan to close all developmental centers in the state, and in 2018, SDC closed its operations. The State of California owns the site and has forged a partnership with Sonoma County (County) that allows the County, together with the community, to chart the future role of the SDC property. Sonoma County is currently undertaking a Specific Plan to set a vision for the SDC which will consider land uses, transportation, economic viability, historic preservation, and conservation of the site's important natural resources.

At its peak occupancy, SDC was a fully-operational and self-sufficient campus, consisting of residences, staff housing, care facilities, treatment centers, clinics, kitchens, laundry facilities and education centers. The campus also contained and provided all of the infrastructure and services required for operation, including corporation yards, maintenance yards, fire station, police station, paint shops, machine shops, landscape facilities, etc. The campus includes its own utilities and the infrastructure systems required to provide water, sewer and drainage service.

Today, the SDC property is largely unoccupied, with a few staff on-site to maintain the grounds and a few tenants located in buildings east of Arnold Drive. The SDC property includes roughly 4.9 miles of gravity sewer collection and conveyance facilities and one lift station to serve the campus. In recent years, the sewer system has experienced a large amount of inflow and infiltration (I/I). It is believed that the I/I is a result of direct cross connections from storm drains, and groundwater and surface water infiltration through damaged pipes and manholes. The I/I impacts the capacity of the downstream sewer conveyance system operated by Sonoma Valley County Sanitation District (SVCSD) and could result in sanitary sewer overflows (SSOs).

In 2017, the SDC sewer system was inspected by the San Francisco Bay Regional Water Quality Control Board (RWQCB). Subsequently, the RWQCB issued a Notice of Violation to SDC for non-compliance with its Statewide General Waste Discharge Requirements (WDR) for Sanitary Sewer Collections Systems (Order No. 2006-0003-DWQ), and Monitoring and Reporting Program (MRP) (Orders WQ 2008-002-EXEC

and WQ 2013-0058-EXEC). The RWQCB Inspection Report, dated March 27, 2017, identified several findings and violations related to the SDC WDR Order and MRP. Most of the violations were related to the absence of the required documentation and record keeping.

SDC was requested by the RWQCB to provide a Sanitary Sewer Management Plan (SMMP), which describes the methods and procedures that should be implemented to prevent SSOs, and the reporting of any SSO events. SDC must also take some corrective action to mitigate the I/I concern in the system and the downstream impacts to the conveyance system. A few of the options identified are:

1. SDC will need to formally abandon and properly disconnect the facility's entire system, or
2. Partially disconnect sewer main pipelines to reduce the lines to below one mile, or
3. Construct improvements to reduce the I/I to an acceptable level.

Options 1 and 2 noted above re not feasible alternatives at this time. As such, the Department of General Service (DGS) has contracted Wood Rodgers, Inc. (Wood Rodgers) to investigate the sewer collection system and make recommendations for how to proceed to mitigate the I/I issue, resolve the RWQCB Notice of Violation and prepare for the next phase of use at the SDC.

SEWER SYSTEM DESCRIPTION

An Existing Conditions Report (prepared by Sherwood Design Engineers, 2018), identified that the existing sewer collection system is primarily composed of vitrified clay pipe (VCP) and cast-iron pipe (CIP) with diameters ranging from 4 inches to 15 inches. Most of the system was built in the 1920s and 1930s and has had numerous failures over the years, primarily due to root intrusion. Approximately 10,400 linear feet of sewer pipe, and 26 manholes, were replaced in the early 1990's using polyvinyl chloride (PVC) pipe. The PVC portions of the system are the only portion of the system deemed to be in good condition. **Table 1**, below, shows the length of the existing sewer pipe by diameter. The lengths in Table 1 are derived from ArcGIS Pro shape lengths as the actual lengths (per as-builts) are not provided.

Table 1. Sewer Pipe Lengths by Diameter

Diameter (inches)	Length (feet)
4	1,448
5	136
6	9,555
8	5,045
9	141
10	4,470
12	2,195
15	91
Unknown	2,379
Abandoned	447
TOTAL	**25,906**

It is noted that the SDC sewer system map identified one pipe segment (along Wilson Drive) with a diameter of 9-inches, and one pipe segment near Sonoma and Laurel with a diameter of 5-inches. Both diameters are not a standard pipe size for gravity sewer.

Exhibit 1 provides a representation of the approximate location of the sewer pipes and their diameters, the direction of flow, manholes (approximately 158 in total), lift stations and force mains and the location of the outlet to the SVCSD system. There is one (1) operational lift station (LS) at SDC (the Johnson Ordahl LS), located southwest of the Sonoma Creek along Redwood Drive, that pumps sewage from a few buildings at lower elevations through a 6-inch force main to SDC's sanitary sewer manhole number 3.2-4 in Traxler Drive. In the fire that took place in October of 2017 (Nuns Fire), the lift station was severely damaged and subsequently refurbished. A second lift station previously existed on-site, however it was destroyed in the 2017 Nuns Fire and not returned to service.

There was a wastewater treatment plant (WWTP) on-site, located along Harvey Avenue east of Railroad, that was shut down and abandoned in 1954. Buildings in the area of the WWTP have been demolished but some sewer pipes remain and are believed to be uncapped. Sewage has been conveyed to, and treated by, the County since the shutdown of the on-site WWTP.

All sewage generated within the SDC flows to a main collection point on the southeast corner of Redwood Drive and Harney Avenue, where it flows through a bar screen and venturi meter before discharging into the SVCSD system.

The SDC sewer collection system has been divided into seven distinct tributary areas as shown on **Exhibit 2**. The individual tributary areas are shown on **Exhibit 3** through **Exhibit 9,** with pipe diameters and manhole IDs labeled. Manhole IDs were assigned to be consistent with previous IDs, when available, per the system map provided in **Appendix A**. It should be noted that there are manholes that do not have IDs due to missing or unclear labels. Furthermore, there are two manholes labeled "1M" per the system map.

Table 2, below, shows the breakdown of pipe length by diameter as well as the number of manholes in each tributary area (the SVCSD outlet manhole is not included in the manhole count).

Table 2. Manholes and Pipe Length by Tributary Area

Tributary Area	Pipe Length (feet) per Diameter (in)									Number of Manholes
	4	5	6	8	9	10	12	15	Unk[1]	
1	528	136	2,875	942	0	1,365	489	0	708	44
2	90	0	1,032	675	141	763	835	0	540	25
3	336	0	1,860	839	0	679	0	0	191	29
4	215	0	1,205	847	0	342	0	0	354	17
5	63	0	661	339	0	0	0	0	0	4
6	0	0	1,532	1,030	0	1,313	871	91	497	27
7	216	0	390	373	0	8	0	0	109	6
Abandoned	0	0	364	0	0	0	0	0	83	6
TOTAL	**1,448**	**136**	**9,919**	**5,045**	**141**	**4,470**	**2,195**	**91**	**2,482**	**158**

[1] Unknown

EXISTING SEWER FLOWS

Effluent flows into the SVCSD system are metered and recorded daily to determine total daily discharges, and are monitored for levels of biochemical oxygen demand (BOD), total suspended solids (TSS), and pH. Wastewater flow records were provided for the complete Years of 2013 through 2016. The average daily effluent flow generated within SDSC, per month, from 2013 through 2016 is summarized in **Table 3**.

Table 3. Average Daily Flow (GPD) into SVCSD System (2013 – 2016)

Month	2013	2014	2015	2016
January	35,420	85,990	87,863	157,430
February	58,130	168,079	152,818	88,827
March	77,102	167,995	111,591	184,150
April	103,139	140,657	111,304	67,310
May	120,614	118,929	94,343	68,187
June	123,819	120,156	114,775	71,191
July	99,268	127,151	115,993	79,831
August	101,781	133,484	104,670	78,880
September	116,598	127,858	111,949	70,876
October	101,177	105,458	138,474	70,481
November	100,230	93,364	79,041	73,211
December	96,867	155,701	125,449	108,449
Yearly Average	**94,631**	**128,502**	**112,112**	**93,506**

The daily maximum flow measured for each month during years 2013 through 2016 is shown in **Table 4**.

Table 4. Maximum Daily Flow (GPD) into SVCSD System (2013 – 2016)

Month	2013	2014	2015	2016
January	65,040	148,410	170,840	320,940
February	95,680	526,720	552,230	188,130
March	110,920	505,460	158,820	544,610
April	164,480	362,220	211,660	100,170
May	150,340	160,940	147,190	99,520
June	166,390	155,930	163,830	116,670
July	172,010	161,800	144,070	107,980
August	140,130	176,800	147,450	129,000
September	235,020	226,150	171,900	120,770
October	205,900	140,210	303,330	178,330
November	144,210	173,510	104,050	293,840
December	165,120	342,160	1,141,670	303,800
Yearly Average	**151,270**	**256,693**	**284,753**	**208,647**

Excluding the data from December 2015 (which is assumed to be an anomaly or misread), the peak factor (max day / monthly average) for years 2013 through 2016 is 4.0. It is assumed that the peak I/I factor is 4.0 times higher than the average daily flow. During the same period, the highest amount of daily flow that entered the SVCSD system above the monthly average was 399,412 gallons (February 2015). This indicates that there was potential for approximately 400,00 gallons of I/I to enter the wastewater collection system during that time.

However, since 2018 when SDC ended operations, wastewater flows have decreased significantly. In addition, several improvements were made to eliminate the cross-connection of storm drain pipes (from basement) to the sewer system. **Table 5**, summarizes the flow in gallons per day (gpd) into the SVCSD system for a seven-month period in 2020. It is noted that flows for May and June were not available.

Table 5. Average Daily Flow (GPD) into SVCSD System in 2020

Month	Flow (gpd)
February	15,478
March	13,175
April	13,415
May	n/a
June	n/a
July	3,452
August	7,883
TOTAL	**10,681**

The maximum daily flow measured for each month during year 2020 (where data was available) and the peak factor are shown in **Table 6**.

Table 6. Maximum Daily Flow (GPD) into SVCSD System in 2020

Month	Flow (gpd)	Peak Factor
February	55,271	3.6
March	43,900	3.3
April	41,274	3.1
May	n/a	n/a
June	n/a	n/a
July	9,450	2.7
August	42,350	5.4
TOTAL	**38,449**	**3.6**

It is noted that, based on limited data, the current average dry-weather daily flows are below 10,000 gpd, and during wet-weather months the average daily flows are approximately 3-5 times higher than the dry-weather flows. It is also noted that the improvements made to eliminate storm drain cross-connections at SDC have significantly reduced the I/I volumes.

RECENT STUDIES

In recent years, both DGS and the County have initiated studies and activities on-site in order to assess the condition of the current sewer system, and attempt to mitigate I/I issues. The following work activities have been performed in the past three years:

1. CCTV testing of 16,500 linear feet of sewer pipe (2019)
2. Smoke testing to locate cross connections and leaking mains
3. Visual inspections
4. Photo documentation
5. Flow monitoring (2019)
6. Existing Conditions Report (2018)

SYSTEM EVALUATION

The purpose of this project was to conduct an analysis of the wastewater system at SDC in order to provide recommended steps/actions to comply with the RWQCB Notice of violation. The first step in this analysis was to meet with the system operators at SDC to understand the existing system, condition of the system and recent improvements or modifications. A site visit was conducted as well. The following notes and observations were recorded during the site visit and meeting with SDC system operators:

- Most of the existing buildings on-site are not active. It is yet to be determined which buildings will remain or which will be demolished.
- Many existing buildings had basement sump pumps that pumped collected water into the sewer system. Most of these sumps were disconnected from the sewer system and piped to discharge into the street gutters in recent years.
- Sewer flows generated on-site have significantly decreased.
- The sewer collection system is old, with the exception of improvements constructed in the 1990s.
- There are no records of recent sewer spills or overflows.
- The County recently plugged a manhole by filling it with concrete (on Wilson east of Manzanita).
- There is one sewer lift station on site. The buildings tributary to the lift station are not occupied. The only time the lift station operates is during wet-weather.
- The staff and resources on-site at SDC have been significantly reduced and they are not able to perform regular inspections and cleanings.
- The existing bar screen and venturi meter at the SVCSD connection are over 40 years old and are outdated. It is recommended to replace these items.

Sonoma County has recently conducted some site investigations, and some data collected by the County was provided for review. A list of the documentation provided and used in the evaluation and development of this report can be found in **Appendix B**.

CCTV Findings

CCTV inspections performed by the County in 2019 provided additional data for the locations of existing defects. The CCTV inspection results utilized the Nassco defect code system and included a report with

videos, pictures, and observations. The report identifies the number of defects there are related to structural integrity and how many are operation and maintenance (O&M) related. The report further breaks down the defects into grade 1 through 5 which are defined below in **Table 7**. **Exhibit 10** shows the location and number of both structural and O&M defects, as well as locations of pipes with no defects. Generally, pipes with O&M defects could be resolved by jetting, cleaning and flushing the lines. Pipes with structural defects will likely need to be rehabilitated or replaced. Pipes with O&M defects have the number of defects shown above the line and pipes with structural defects have the number of defects shown below the line.

Table 7. Nassco Grade Classification Definitions

Grade	Definition
5	Collapsed/Collapse Eminent
4	Collapse Likely in Foreseeable Future
3	Collapse Unlikely in Near Future
2	Minimal collapse risk
1	Acceptable Structural Condition

Table 8, below, provides the number of the defects in each tributary by Nassco grade classification as determined by CCTV inspection performed on March 4, 2019. **Appendix C** provides a detailed list of all pipe defects with their respective Nassco grade including six (6) pipes where the tributary could not be identified due to a lack of clarity in the information provided. The sections to follow will provide a more detailed list of the defects present in each pipe and tributary. It should be noted that the information provided foes not include the entire system as there are sections that could not be inspected due to blockages and/or crushed pipe.

Table 8. List of Defects for Each Tributary by Nassco Grade

Tributary	Structural Defects		O&M Defects	
	Grade	Number	Grade	Number
1	1	0	1	11
	2	6	2	44
	3	3	3	9
	4	12	4	0
	5	30	5	0
2	1	1	1	3
	2	30	2	0
	3	15	3	0
	4	4	4	0
	5	10	5	0
3	1	2	1	2
	2	0	2	4
	3	0	3	0
	4	0	4	4
	5	0	5	0

Tributary	Structural Defects		O&M Defects	
	Grade	Number	Grade	Number
4	1	0	1	14
	2	4	2	4
	3	3	3	9
	4	0	4	4
	5	5	5	0
5	1	6	1	6
	2	14	2	30
	3	168	3	57
	4	8	4	12
	5	15	5	0
6	1	0	1	5
	2	6	2	4
	3	9	3	9
	4	32	4	24
	5	10	5	0
7	1	2	1	68
	2	4	2	14
	3	12	3	3
	4	4	4	4
	5	10	5	0
Unk	1	2	1	7
	2	14	2	16
	3	6	3	0
	4	4	4	0
	5	15	5	0
TOTAL		**425**		**344**

The following sections will describe the defects within each tributary area in the system per the available CCTV data. Where multiple CCTV reports were available for a single pipe, the worst-case condition was used.

Tributary 1

Per the CCTV investigation, there are three distinct areas in tributary 1 with issues needing to be addressed. Each of these areas have abandoned pipelines and multiple connected lines running in parallel. There are crushed sewer pipes in multiple locations that could not be CCTV inspected, many of the manholes have custom sheet metal lids that cannot be sealed, and one of the areas requires total replacement.

The most extreme defects are located in the pipes from manhole 1Q to 1.0-4 and 1T to 1R. Pipe segment 1Q to 1.O-4 conveys the vast majority of the tributary 1 system. This pipe has multiple Nassco grade 4 fractures and should be replaced. Pipe 1T to 1R has multiple cracks, but it only has 3 upstream pipes so it could potentially be abandoned; however, both the structural and O&M related defects are grade 2 so there is a high likelihood of being able to rehabilitate this pipe segment.

The other defect pipes within the tributary are located in the upstream reaches and could potentially be abandoned, depending upon which buildings will remain in service. The defective upstream pipes will require maintenance (cleaning) to clear out settled debris, with the exception of 1I to 1F and 1.6-2 to 1.6-1, which have structural defects and should be replaced or rehabilitated.

Tributary 2

From the CCTV data, four pipes of concern have been identified within tributary 2. The most concerning pipe is 2.1.2-1 to 2.1-4 as noted that pipe collapse is imminent. This pipe segment may be able to be abandoned.

Pipe 2.0-1A to 1.0-4 is the furthest downstream pipe in tributary 2 and has a joint offset; however, the defect is grade 1 so it is not an immediate priority. There are concerns that the joint offset may be causing I/I to the system.

The remaining two pipes (2.1-3 to 2.1-2 and 2.1-2 to 2.1-1) noted in this tributary both have separated joints. The defects are classified as Nassco grade 2 so they are not an immediate concern; however, the separate joints are likely causing I/I. It is noted that manhole 2.1-10 has been filled with concrete and thus all pipes upstream of the manhole are disconnected from the system.

Tributary 3

Tributary 3 has very few defect cases identified, but it should be noted that the CCTV evaluation identified two areas with abandoned pipes full of mud. It is unclear exactly which pipelines these are.

The main issue in tributary 3 is roots and settled fines blocking the pipes, resulting in grade 1 and 2 deficiencies. There are two pipes identified with medium joint offsets, both classified as grade 1 defects that likely contribute to I/I.

Tributary 4

Tributary 4 includes the existing Johnson-Ordahl Lift Station. While the lift station was rehabilitated after the 2017 Nuns Fire, it will need to be completely rebuilt if it is to continue serving the surrounding area. The lift station currently is only called on during wet-weather events, indicating that there are no connected sewer loads, only I/I inflows.

The pipe going from manhole 4.0-3A to 4.0-3 has holes in it and has either failed or is close to failing. Furthermore, the pipe connecting manholes 4.0-3 to 4.0-1 has multiple structural and O&M defects. Both of these pipe segments are tributary to the lift station, which is likely a cause of the I/I at the lift station.

The pipe segment that crosses Mill Creek (from manhole 3.2-2 to 3.2-1A), on the downstream end of the tributary, is unsupported and has holes on the top. This segment will need to replaced. The other defect pipes in this tributary have various blockage issues, possibly due to flat or adverse slopes, causing settlement in the pipelines and the pipes and manholes to be remain filled with wastewater. Depending on which buildings can be abandoned, these pipe segments might be able to be abandoned as well.

Tributary 5

Based on the CCTV data, the pipe from manhole 3.1-3 to 3.1-2 is heavily corroded CIP. The next pipe upstream, from manhole 3.1-4 to 3.1-3, has holes in it rating it as a class 5 defect. These pipes could possibly be abandoned, however if it is determined that they need to remain they will need to be replaced. The pipe segment from manhole 3.1-1 to 3.1-2 requires cleaning.

Tributary 6

Tributary 6 has many structural and O&M related defect pipes that likely contribute significant I/I. The CCTV evaluation mentions that the manholes in this area act as drain inlets during heavy storm events and will need to be raised if they are to remain in service. This tributary area also consists of several newer buildings that are currently occupied. The severity of the pipe damage in the area, coupled with the occupied buildings, requires significant improvements to maintain service and reduce I/I.

The pipe from manhole 1.2.2-1A to 1.2.2-1 has multiple cracks, fractures, breaks, and blockages. This pipe can be abandoned and disconnected from the system without disrupting collection because it is part of a loop providing system redundancy.

The pipe from manhole 1.2-4 to 1.2-3 also has extensive structural defects contributing to the I/I. The pipe also collects sewage from the area where the old lift station burned down in the 2017 Nuns Fire. The pipe from manhole 1.2-6 to 1.2-5A has fractures and large joint offset, requiring replacement if it is kept in service. It should be noted that pipes upstream of manhole 1.2-6 have unknown condition due to the path being undriveable for the camera.

Other pipes in the tributary have grade 3 defects, or less, and are candidates for rehabilitation; however, this will need to be further assessed as each pipe has multiple defects. Furthermore, the age of the system creates uncertainty in the remaining useful life for all pipes with defects in the system.

Tributary 7

Upon reviewing the CCTV data for Tributary 7, it was noted that every pipe in the tributary with CCTV data available has defects except for one. Defects range from grade 1 to grade 5 and consist of cracks, fractures, joint separations, and blockages. Based upon this data, it is likely that the pipes within this tributary area contribute significant I/I to the system. The pipelines in this area likely require replacement if they are to be kept in service.

Unknown Tributary

There were six (6) pipes that could not be placed into a specific tributary due to manhole ID information being unknown. Of these pipes, four (4) of them have defects of varying degrees. It is recommended that the County provide clarification for the location of these pipes in order to better recommend solutions for the system. While the locations of these pipes are unclear, it is suspected that they are in Tributary 1 based on the naming pattern of the surrounding manholes.

REHABILITATION METHODS

The CCTV investigation identified a number of pipe segments in the system with defects. Generally, pipes with O&M defects (such as roots and blockages) could be resolved by jetting, cleaning and flushing the lines. Pipes with structural defects (such as cracks, holes, off-set joints and sags) will likely need to be rehabilitated or replaced. Section 500 of the Greenbook covers the various methods to rehabilitate pipeline systems and structures (manholes). An overview of a few of the more common rehabilitation methodologies is provided herein.

Pipelines

Recommendations as a result of the condition assessment may include open-trench replacement and trenchless technology methods. Trenchless technologies provide techniques for the installation or renewal of underground utilities with a minimum disturbance of the surface, typically requiring only a "launching" and "receiving" pit to install the equipment and pipe material. Utilizing trenchless technologies usually represents a significant cost and time savings when compared with open trench methods. There are a number of trenchless and semi-trenchless methods in practice today for pipeline rehabilitation. The technologies currently in use which were considered for structural and semi-structural pipe rehabilitation and/or replacement include:

Cured-in-place Pipe (CIPP) – The CIPP lining process involves inserting and inverting a resin-saturated felt tube into the existing pipe (like a very large inside-out sock). The tube is inflated to conform to the host pipe and hot air or water is circulated throughout the tube to cure (harden) the resin. When the curing process is complete, a new pipe is created that no longer has the joints, cracks, and holes that allowed infiltration and roots to enter the pipe causing operational problems such as blockages and overflows. The finished product has a 50-year design life. This method can also be used to make spot repairs, or sectional spot repairs.

Folded Pipe (fold and form, deformed/reformed) – A pre-fabricated HDPE (high density polyethylene) pipe or PVC pipe, that has been collapsed in upon itself so that it is U-shaped, is pulled through an upstream manhole by a cable from the downstream manhole. Heat and pressure are applied to the U-shaped pipe causing it to revert to its original round profile.

Machine Spiral Wound PVC Pipe Liner – Panels of PVC are spirally wound into the existing pipe. This can be performed on pipe diameters from 6-inch to 30-inch. The advantage to this method is no bypassing of sewer is needed during lower flow conditions.

Pipe Bursting – Pipe bursting is the process of replacing a buried pipe by pulling a new pipe through the existing pipe and either cutting, expanding or bursting the existing pipe as the new pipe is pulled through. Pipe bursting is typically considered when the existing pipeline capacity needs to restored completely. It is also a viable method if the existing pipeline has extensive sags. Pipe bursting can install a new pipe at the same diameter as the existing, or perhaps go up a size in some cases. Soil conditions and the depth of the pipeline must be considered to avoid any heaving at the surface.

Slip lining – Slip lining is a process used to repair leaks or restore structural stability to an existing pipeline. Slip lining is completed by installing a smaller "carrier pipe" into a larger "host pipe," grouting the annular space between the two pipes, and sealing the ends. The most common material

used to slip line an existing pipe is HDPE, but fiberglass-reinforced pipe (FRP) and PVC are also common. Slip lining can be used to stop I/I and restore structural integrity to an existing pipe.

Laterals
Whenever main lines are rehabilitated, the sewer lateral connection will need to be re-established. Often times, the point of connection between a lateral and the main line can be a significant source of I/I and/or root intrusion due to a poorly sealed connection, especially if it is anew lateral that has been installed after construction of the main line. Methods to restore the lateral connection and repair the lateral connection are described herein.

Sewer Lateral/Main Connection Re-Establishment – After a sewer line is rehabilitated with a trenchless liner the laterals are restored with robotically controlled cutting devices. These robots cut out a round coupon from the new liner at the lateral connections to allow flow into the pipe.

Sewer Lateral/Main Connection (SLC) – This uses a specially shaped liner, which looks like a top hat (without the top of the hat) or inverted 'T.' The stem of the top hat forms the section of liner that is placed into the lateral pipe while the top hat crossbar sits against the inner wall of the main. Resin impregnation of the liner material allows it to be positioned using a specially designed remote control robotic installer and held in position for curing of the resin. Once cured, the robot and retention system are removed leaving the 'T' – shaped liner forming a seal across the lateral/main joint. The top hat stem can be installed as deep into the lateral as necessary.

Spot Repairs
CCTV inspection videos often show a pipe segment to be in overall good condition, with the exception of one location where there is a large fracture or other failure in the pipe. For locations such as this, it is often recommended to perform a spot repair on the failure location. Methods for performing spot repairs include open trench replacement as well as trenchless technologies. The trenchless technologies most commonly in use today for performing spot repairs include:

Cured-in-place Pipe (CIPP) – Spot repair CIPP involves the same steps as a CIPP of a full pipe segment. Spot repair CIPP can range from 3 feet to 30 feet.

Trenchless Sleeve – This method involves inserting a prefabricated stainless-steel sleeve into the host pipe. The sleeve is located over the failure and expanded outward to provide a structurally sound and sealed pipe section.

Manholes
If manholes are in severely poor condition due to structural failure, complete replacement is necessary. If the structure of the manhole is in moderate condition and rehabilitation is an option, there are a few rehabilitation methods to be considered:

PVC Liner – PVC lining provides a monolithic cured resin lining for a manhole for sealing infiltration and root penetration. Prior to installation, the structure must be thoroughly cleaned and grouted. On site, a prefabricated liner is fully saturated with an epoxy resin that will bond to wet or dry surfaces. The liner is lowered into the structure and inflated and cured with a removable bladder filled with hot steam and high pressures. The bladder is removed and pipe openings are restored.

Polyurethane or Epoxy Liner – Polyurethane or epoxy lining systems provide protection for the structure against caustic gases that arise from the sewer that attack concrete and mortar. The structure is cleaned and pressure blasted to achieve a clean structure surface. Some polyurethane products are applied directly to the cleaned concrete, while some products require an epoxy base coat prior to the polyurethane application. Epoxy systems are comprised of a resin and a hardener component that harden when mixed together.

Chemical Grouting – Chemical grouts are usually injected under pressure as a liquid resin into, or in the vicinity, of the cracks/fractures/leak. Once the resin contacts water, a chemical reaction occurs. Depending on the material formulation, the grout/water combination forms either a closed-cell foam or a non-cellular gel. The foam created can be flexible and resilient (hydrophilic) or rigid, meaning the cell structure of the foam crushes when compressed (hydrophobic).

Construction Considerations

There are a number of factors to consider when determining the preferred method of construction and construction materials to repair, rehabilitate or replace an existing sewer pipeline or manhole. Each factor has its own impact on the cost, schedule and community impact of a project. A few of the primary factors to consider include:

- Dewatering – If perched groundwater persists at a depth that will be encountered during construction, the project will require significant effort and costs to dewater the trench or pit. The existence of groundwater may steer the construction methodology to a trenchless solution.
- Soil Parameters – an understanding of the existing soil conditions can be a critical factor in determining the cost to provide shoring, or if trenchless rehab methods, like pipe bursting, are a feasible solution.
- Shoring – Deep excavation or poor soil conditions requires extensive, and possibly expensive, shoring methods to be implemented in order to provide a safe working environment.
- Traffic/Community Impacts – All construction projects must consider the impact to the local community, such as traffic control measures, duration of construction activities, access to driveways and sidewalks, odor and noise. Trenchless rehab methods typically have a smaller footprint at the surface and are there fore less impactful to the community.
- Bypass Operations – Depending upon the construction methodology, sewer bypass operations may be required. Bypass operations can be expensive to set-up, maintain and operate safely, and they can also increase the risk of the spills.
- Permitting – With trenchless solutions, there are typically more opportunities to avoid permitting requirements by being able to avoid or minimize the location of construction activities in sensitive areas, within other jurisdictions or on private property.
- Environmental Constraints – Trenchless methods also allow for avoiding construction activities within sensitive environmental areas, such as waterways or habitat.
- Utility Conflicts – The rehabilitation of existing facilities helps to minimize the potential for utility conflicts by staying within an alignment and vertical envelope that is established.
- Capacity – The preferred solution must consider the ultimate capacity that is required. If the existing capacity must be maintained or increase, then the rehabilitation options become more limited.

RECOMMENDATIONS

Based on a review of the available data, and discussions with SDC staff, we are able to conclude the following:

- Existing wastewater flows generated on-site and significantly lower than when the SDC facility was in operation.
- The existing collection system is aging, and has numerous structural and operational defects, likely contributing large amounts of I/I.
- I/I, from a volumetric stand point, has been significantly reduced due to the disconnection of many building basement sumps.
- I/I from fractured pipes and off-set joints is still high.
- There are still occupied buildings scattered throughout the campus that require a connection to the sewer system.
- It is not possible to reduce the size of the collection system to below 1 mile of sewer pipe in order to no longer be subject to the RWQCB WDRs.
- Manhole 2.1-10 was filled with concrete and the upstream system disconnected.

There are several items that affect the sewer collection system that still require further information or decisions, including:

- A determination of which existing buildings will remain and be occupied, and which buildings will be abandoned and demolished.
- CCTV inspection of the sewer pipes and manholes that have not yet been inspected that could remain in service.
- Flow monitoring at multiple locations within the system to quantify the volume and identify the areas of I/I.

Before plugging, disconnecting or abandoning any sewer facilities, the upstream connected building must be properly abandoned, sealed and disconnected from the sewer system to avoid any septic conditions. This includes disconnecting water supply and sealing off the building from occupants. It is recommended to take a measured and step by step approach to improving the wastewater collection system at the SDC, in preparation for the changes in site use and the transition of ownership and operation. The recommended actions / next steps include:

Step 1 – Determine Buildings to Abandon/Disconnect: It is recommended that DGS, SDC and Sonoma County staff collaborate to determine which of the existing buildings at the SDC campus should be formally abandoned and disconnected from the infrastructure systems (water, sewer, fire, power, etc.)

Step 2 – Abandon/Plug Portions of Sewer System: Based on the results of Step 1, portions of the existing sewer collection system can be formally abandoned and disconnected from the sewer collection system. This process should include properly plugging manholes, removing manhole covers and filling pipes with grout. This recommendation includes the system upstream of manhole 2.1-10, which has already been filled with concrete. The upstream pipe and manholes should be properly abandoned (if they weren't already).

Step 3 – Abandon Lift Station: If the buildings that are tributary to the Johnson-Ordahl Lift Station are determined to be abandoned, then the lift station should be formally abandoned and demolished.

Step 4 – Conduct Flow Monitoring: Install a temporary flow monitor on the downstream reach of each of the seven tributary areas for a period of 8 weeks in the wet-weather season to quantify and identify the areas of I/I.

Step 5 – Survey Manholes to Remain: All manholes to remain in the system should be surveyed to obtain rim and invert elevations on the same datum.

Step 6 – Clean/Flush Pipes to Remain: All pipes and manholes to remain in service should be flushed and cleaned to remove debris, roots and sediment.

Step 7 – CCTV Pipes / Inspect Manholes to Remain: All pipes and manholes to remain in service, that were not inspected by the County in 2019, should be inspected to determine if structural defects exist, and quantify the severity of the defect.

Step 8 – Rehabilitate or Replace Pipes and Manholes to Remain: Based on the CCTV data, recommendations should be made to either replace or rehabilitate the pipes and manholes with defects based upon the nature of the defect.

Step 9 – Improve Bar Screen / Flow Meter at SVCAS Connection: The existing bar screen and meter facility at the connection to the SVCSD system are aging and outdated, and should be replaced with modern equipment, and remote monitoring and recording capabilities. Improvements include a new bar screen, new meter, power and telemetry upgrades, and miscellaneous piping improvements.

Based upon discussions with SDC staff, a preliminary assessment of which existing pipelines could possibly be abandoned based upon expected building abandonment. Please note, this is only a preliminary recommendation and requires additional investigation and analysis per the steps described above. **Exhibit 11** shows the recommended flow monitor locations and preliminary abandonment of portions the system.

CONCEPTUAL COST ESTIMATE

Additional analysis is required to further refine and develop the potential projects to implement. This section includes high-level budge estimates to implement the recommendations. It is noted that the recommended projects and associated budgets are preliminary and based on assumptions. The unit cost basis to develop the budget numbers is included in **Table 9.** A summary of the recommended project budges is included in **Table 10.**

Table 9. Cost Basis

New Construction	**Unit Cost**	
6-inch	$ 120	/LF
8-inch	$ 160	/LF
10-inch	$ 200	/LF
12-inch	$ 240	/LF
15-inch	$ 300	/LF
18-inch	$ 360	/LF
Manhole (<10 feet deep)	$ 10,000	/EA
Manhole (10+ feet deep)	$ 15,000	/EA
Rehabilitation	**Unit Cost**	
CCTV Inspection	$ 10	/LF
Manhole Inspection	$ 250	/EA
Cleaning/Jetting/Root Removal	$ 5	/LF
Re-lining (4-inch)	$ 20	/LF
Re-lining (6-inch)	$ 30	/LF
Re-lining (8-inch)	$ 40	/LF
Re-lining (10-inch)	$ 50	/LF
Re-lining (12-inch)	$ 60	/LF
Re-lining (15-inch)	$ 75	/LF
Re-lining (18-inch)	$ 90	/LF
Manhole (<10 feet deep)	$ 2,500	/EA
Manhole (10+ feet deep)	$ 3,500	/EA
Lateral Connection Repair (i.e., Top Hat)	$ 1,500	/EA
Field Survey	$ 2,400	/DY
Flow Monitoring	**Unit Cost**	
Install Cost	$ 3,000	/EA
Monthly Charge (FM only)	$ 800	/mo
Monthly Charge (FM and Sampling)	$ 1,200	/mo
Contingencies	**Unit Cost**	
Construction	25	%
Engineering	10	%
Administration & Legal	5	%
Construction Management & Inspection	10	%
Annual Escalation	3	%

Table 10. Recommended Project Budgets

Project No.	Project Name	Project Description	Total Cost
SS01	Abandon Lift Station	Abandon and demolish existing Johnson-Ordahl LS	$ 63,000
SS02	Flow Monitoring	Perform 8 weeks of flow monitoring at 7 sites	$ 39,000
SS03	System-wide Survey	Measure Rim & Invert of all 158 Manholes	$ 19,000
SS04	Clean/Flush System	Assumed 9,400 LF of system needs to be cleaned	$ 73,000
SS05	CCTV Remainder of System	Assumed 9,400 LF of system remains to CCTV'd	$ 147,000
SS06	Rehabilitate Pipes and Manholes	CCTV data found 18% of system has structural defect. Assumes 18% of pipe system and MHs need rehab. Assume all MH are less than 10 feet deep.	$ 474,000
SS07	Improve Bar Screen / Flow Meter	Includes demo, new bar screen, new mag meter, power and SCADA improvements and misc. piping. Assumes existing vault is adequate.	$ 164,000
	TOTAL		**$ 979,000**

ATTACHMENTS

Exhibit 1 – Existing Sanitary Sewer System
Exhibit 2 – Defined Tributary Areas
Exhibit 3 – Tributary 1
Exhibit 4 – Tributary 2
Exhibit 5 – Tributary 3
Exhibit 6 – Tributary 4
Exhibit 7 – Tributary 5
Exhibit 8 – Tributary 6
Exhibit 9 – Tributary 7
Exhibit 10 – Locations of Structural and Operation and Maintenance Defects
Exhibit 11 – Preliminary Recommendations
Appendix A – Sewer System Map (Provided by SDC) to Assign Manhole IDs
Appendix B – Reference Documents
Appendix C – Detailed List of all Structural and O&M Defects Derived from CCTV Data

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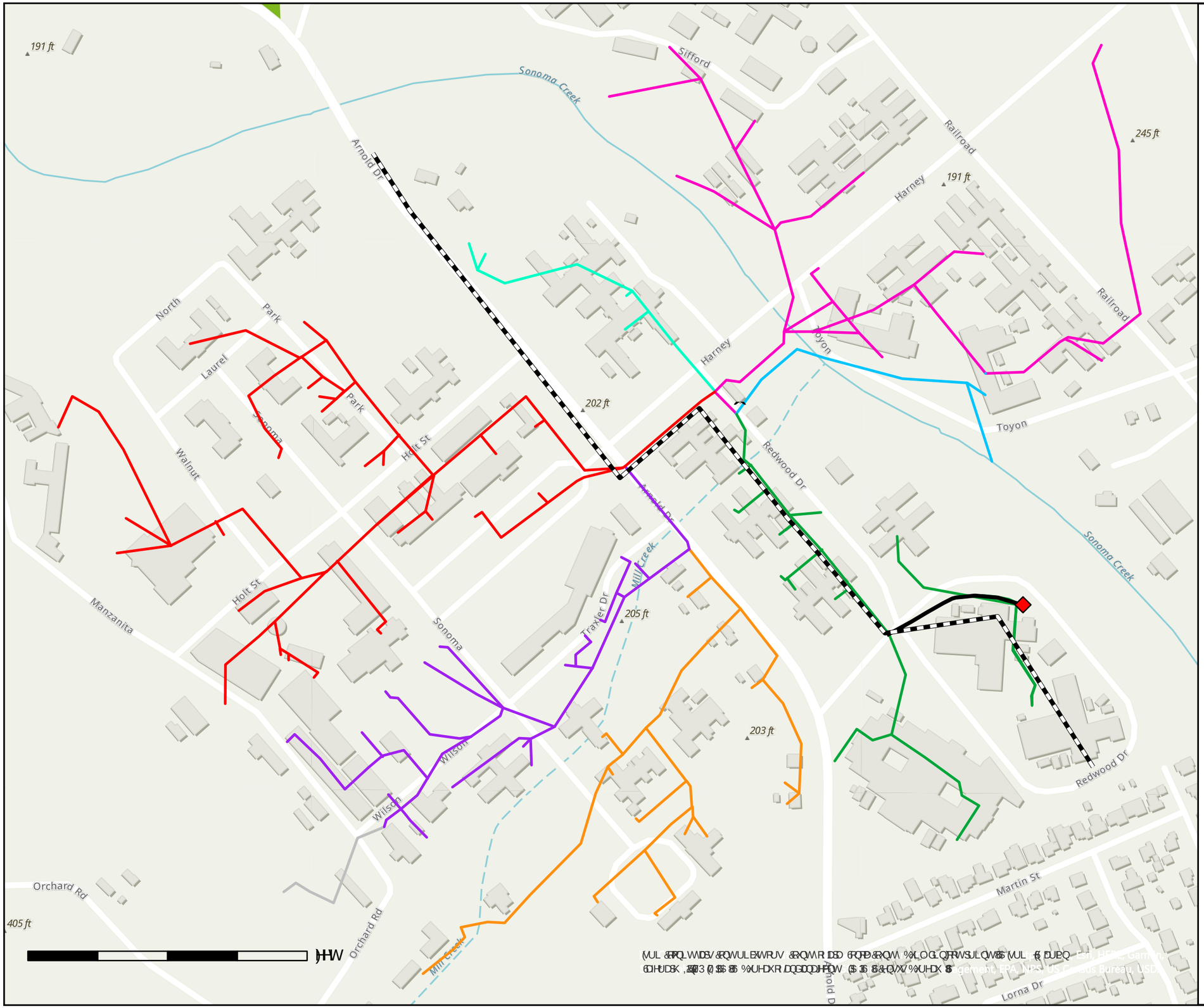
WOOD RODGERS



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Redwood Dr
Redwood Dr
Traxler Dr
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Traxler Dr
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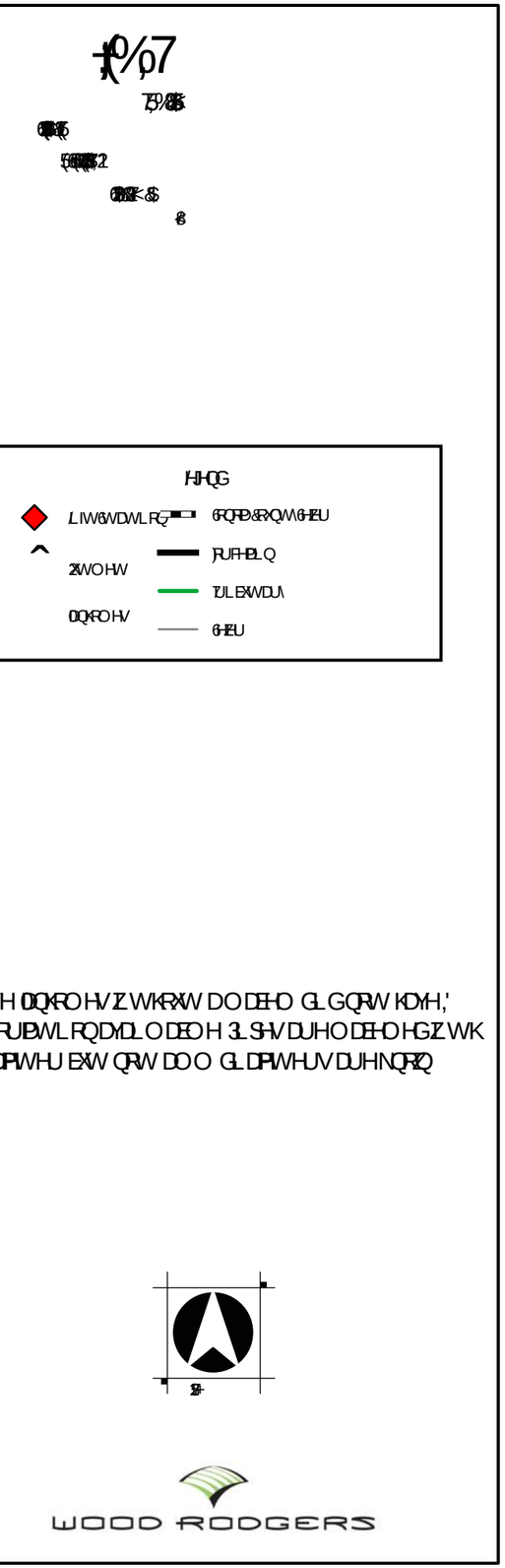
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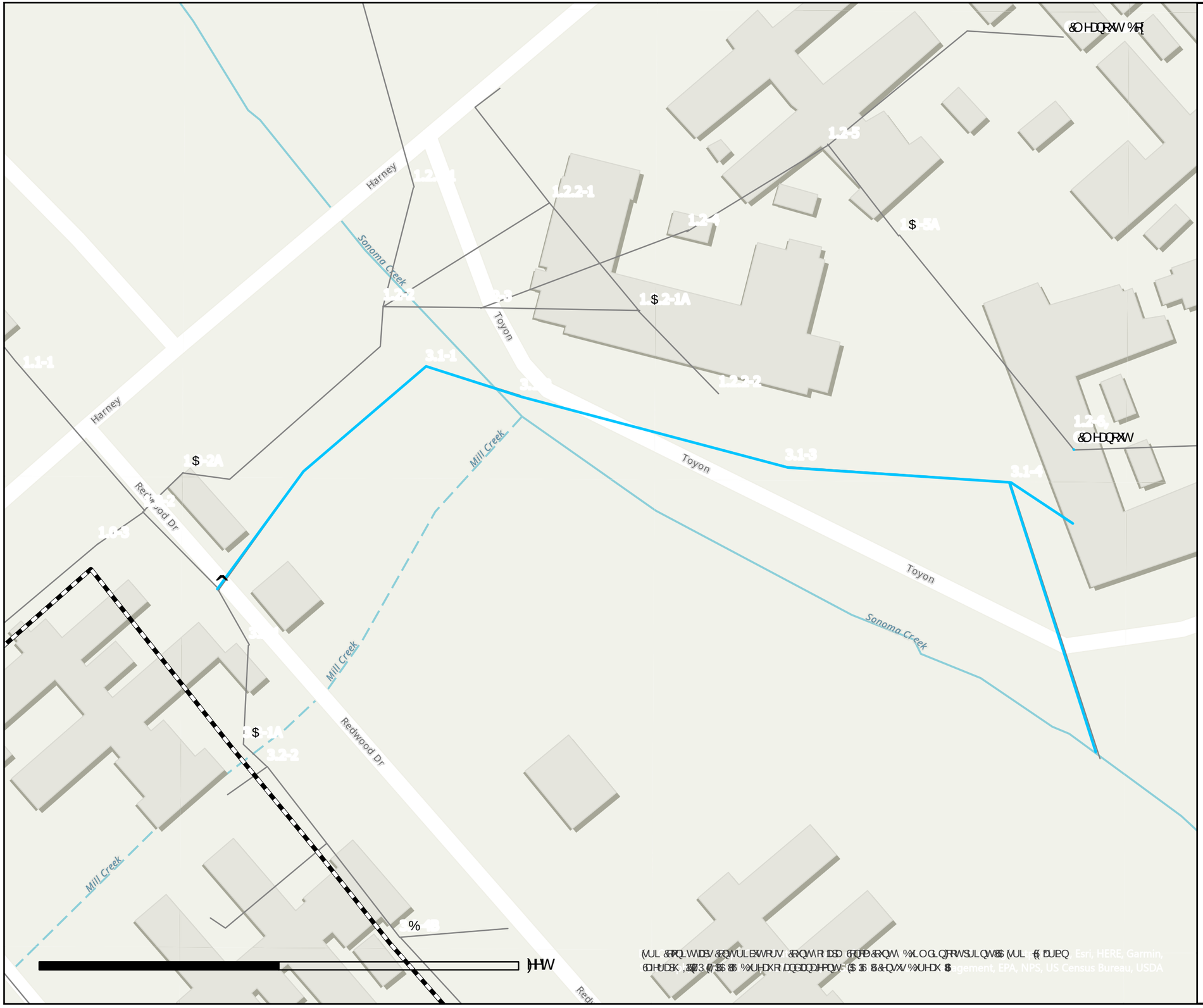

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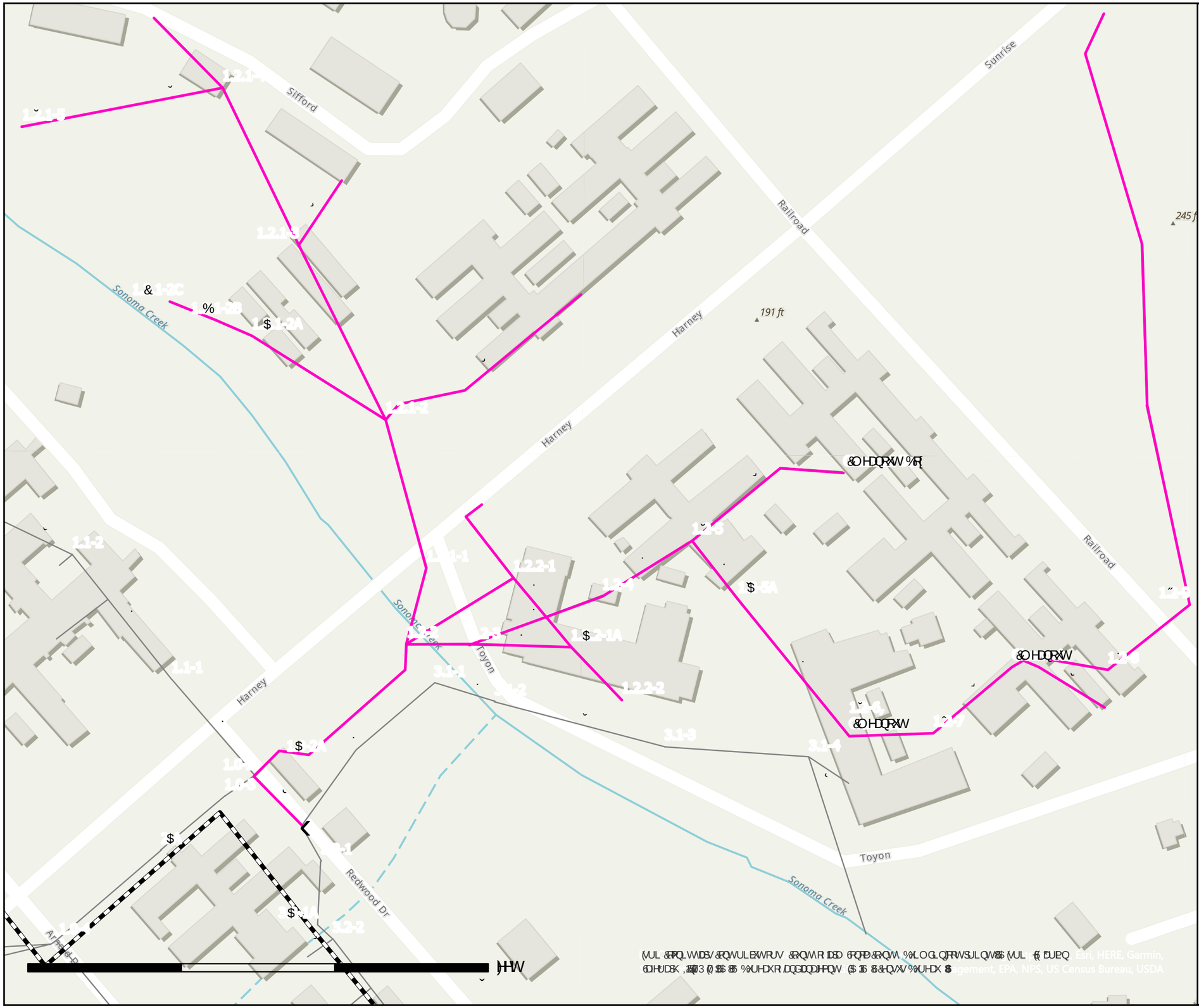

WOOD RODGERS

1.1-3
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1.1-2
1.1-1
1.1-2A
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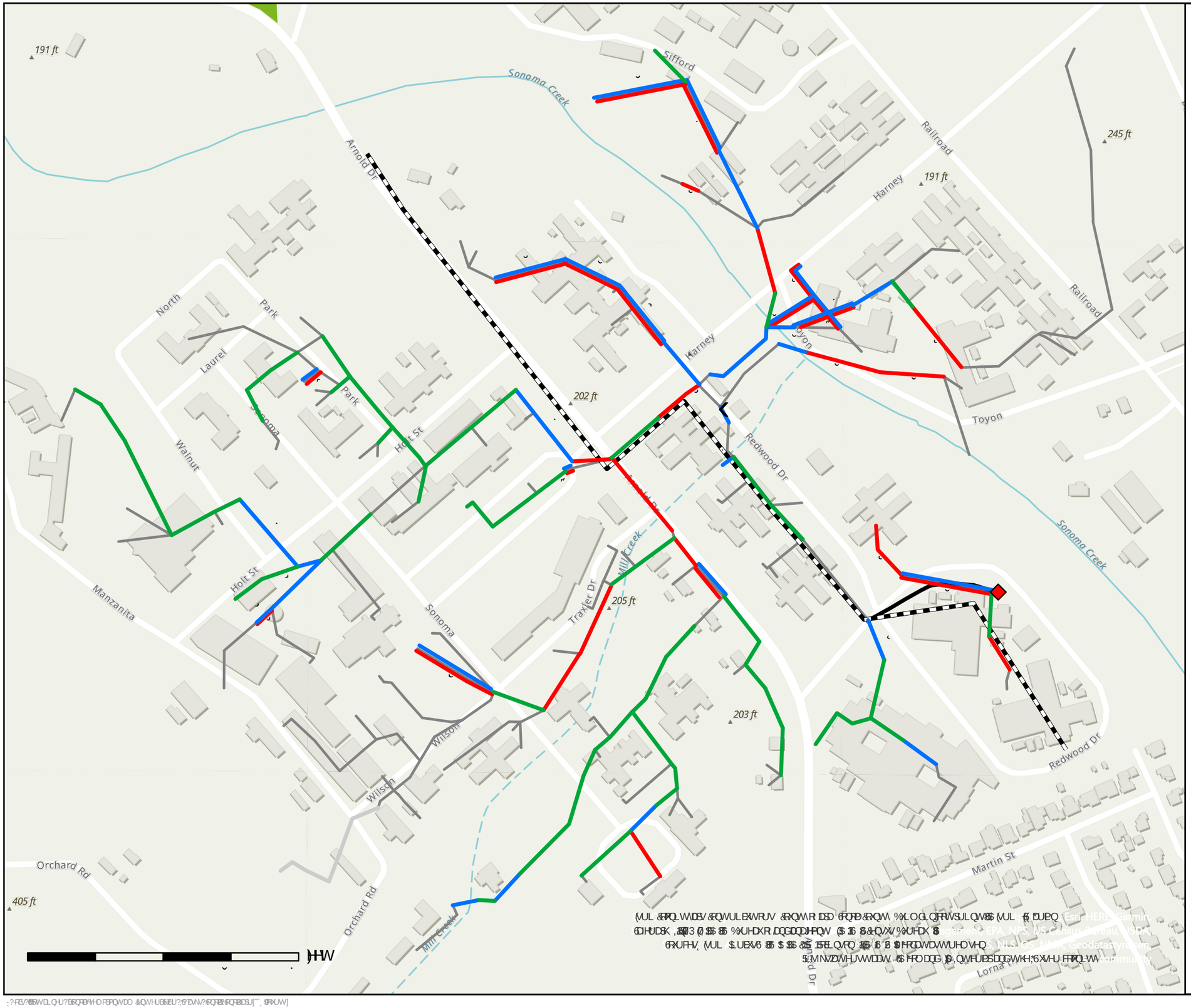
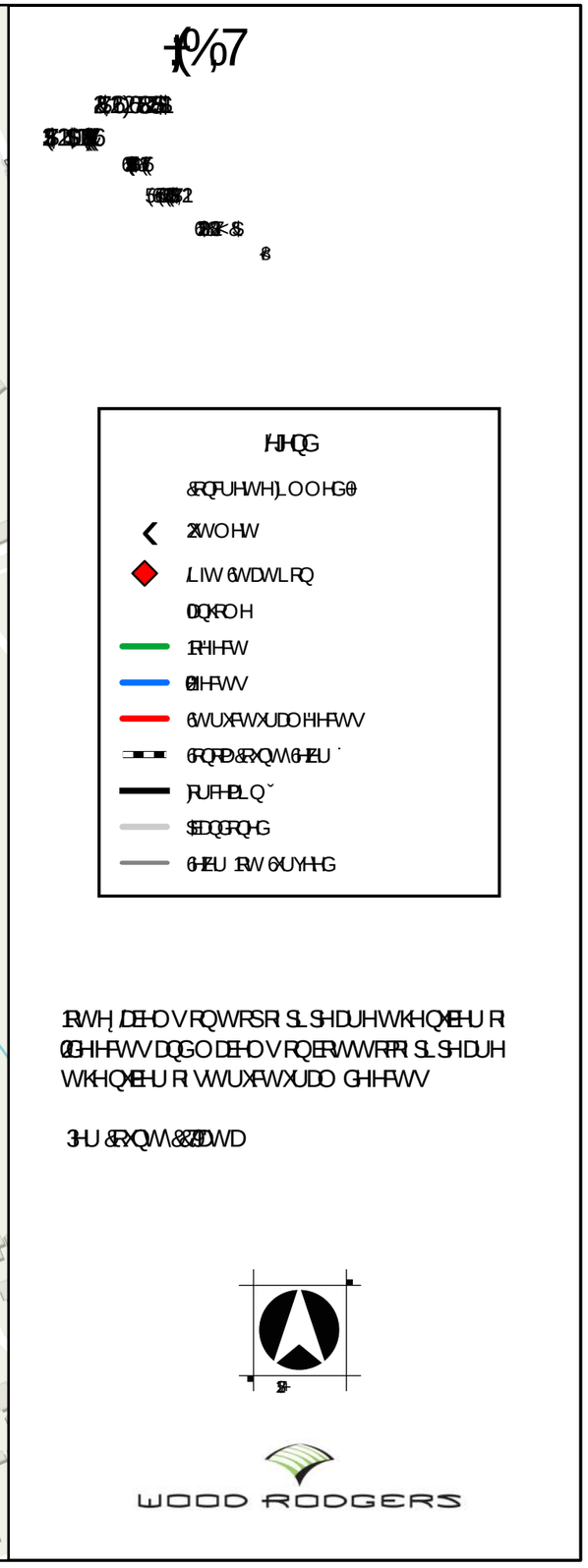
Holt St
Harney
Harney
Harney


191 ft
Sonoma Creek
Sifford
Arnold Dr
Railroad
Harney
191 ft
245 ft
North
Park
Laurel
Park
Sonoma
Walnut
Holt St
Holt St
Manzanita
Sonoma
Harney
202 ft
Toyon
Toyon
Railroad
Redwood Dr
Sonoma Creek
Traxler Dr
Mill Creek
205 ft
203 ft
Wilson
Wilson
Redwood Dr
Orchard Rd
Orchard Rd
Mill Creek
Martin St
405 ft
Lorna
)HHW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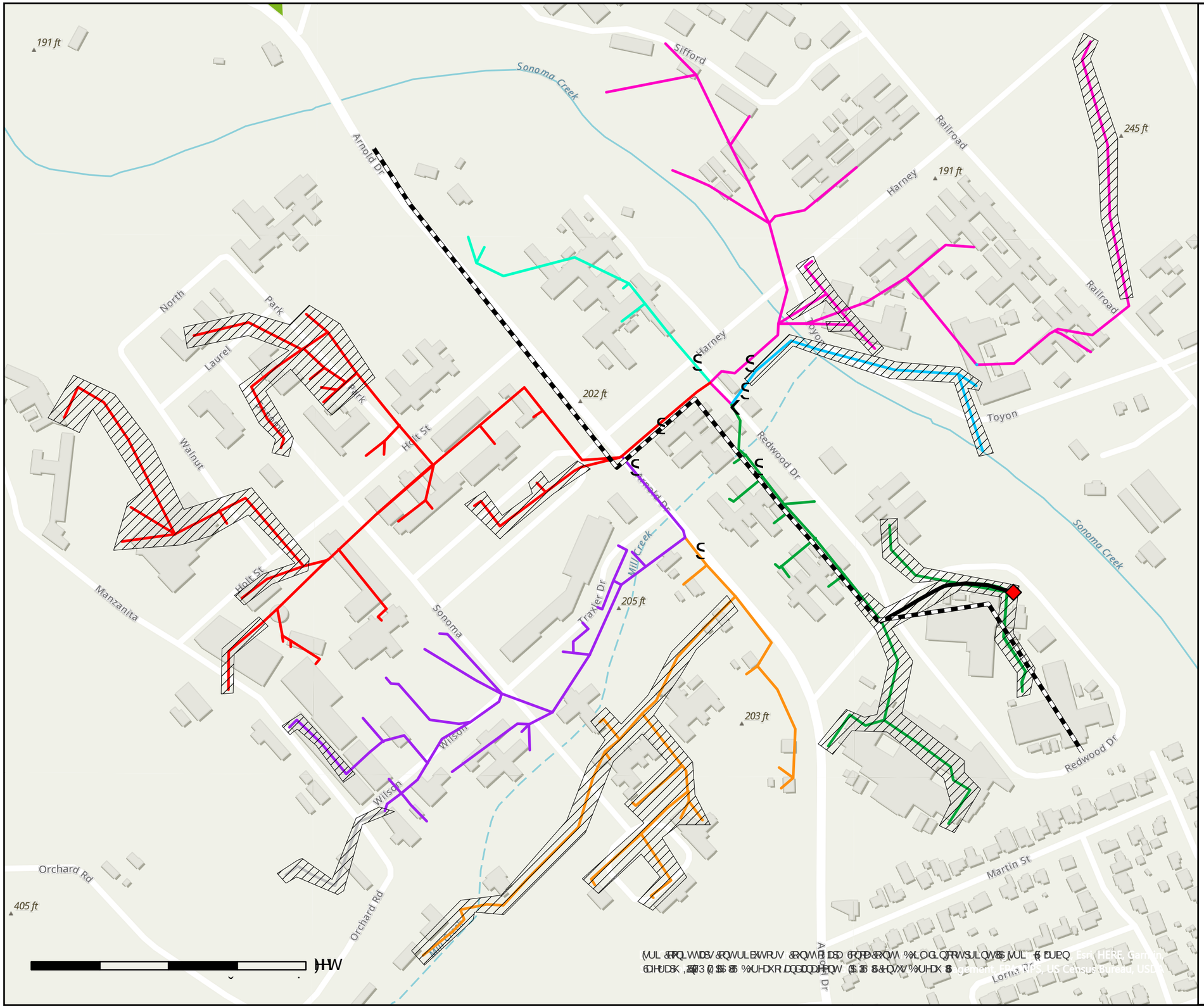

LEGEND

- Existing Water Facilities
- Fire Hydrant
- Valve
- Shutoff
- Proposed Connection
- 6" DIP
- 12" DIP
- 12" Diameter
- 10" Diameter
- 8" Diameter
- 6" Diameter
- 4" Diameter
- 3" Diameter
- 2" Diameter
- Abandoned

WOOD RODGERS

APPENDIX A - SEWER SYSTEM MAP (PROVIDED BY SDC) TO ASSIGN MANHOLE IDs

APPENDIX B - REFERENCE DOCUMENTS

Document	Source
SDC Collection System Evaluation	Sonoma County
SDC Collection System Compliance Evaluation	San Francisco Regional Water Quality Control Board
Flow Data for 2019	Alpha Analytical Laboratories, Inc.
Sanitary Sewer System Map	DGS/SDC
Sanitary Sewer System Key Map	DGS/SDC
SDC Existing Conditions Report - Hydrology and Site Infrastructure Draft	Sherwood Design Engineers
Flow Data for 2020	Brelje and Race Laboratories, Inc.
CCTV Data	Sonoma County

APPENDIX C - DETAILED LIST OF ALL STRUCTURAL AND O&M DEFECTS DERIVED FROM CCTV DATA

USMH	DSMH	Tributary	Structural Defects						O&M Defects						Notes
			1	2	3	4	5	TOTAL	1	2	3	4	5	TOTAL	
1.7-2	2B		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.6-2	1.6-1		0	0	3	0	0	**3**	5	0	0	0	0	**5**	Roots fine joint, hole, could not proceed - abandoned survey
1.6-1	1.0-9		0	0	0	0	0	**0**	5	2	9	0	0	**16**	Material change, roots medium joint, roots fine joint, alignment up
1.0-9	1M		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1Q	1.0-4		0	0	0	12	0	**12**	0	0	0	0	0	**0**	Multiple fractures, material change
1B	1C		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1A	1C		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1G	1A		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1I	1F		0	2	0	0	5	**7**	1	0	0	0	0	**1**	Spiral crack, roots fine joint, crushed pipe with roots
2A	2B		0	0	0	0	0	**0**	0	28	0	0	0	**28**	Deposits attached to grease
2C	2B		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2C	2A		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2D	2C		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2F	2E		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2E	2G		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2G	2H		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2H	2D	1	0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2B	1.0-9		0	0	0	0	0	**0**	0	4	0	0	0	**4**	Settled gravel
1E	1J		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1H	1J		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1J	1K		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1K	1L		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1M	1K		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1N	1L		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1P	1O		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1L	1P		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1O	1Q		0	0	0	0	0	**0**	0	8	0	0	0	**8**	Deposited gravel, deposited fines
1R	1Q		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1S	1T		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1T	1R		0	4	0	0	25	**29**	0	2	0	0	0	**2**	Longitudinal crack (4), roots tap joint, longitudinal hinge cracks
MH	1S		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1A	1B		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1M	1N		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.1-5	2.1-4		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.1.2-1	2.1-4		0	26	15	4	10	**55**	3	0	0	0	0	**3**	Multiple fractures, roots fine joint, longitudinal crack, longitudinal fracture, multiple cracks, broken, camera won't continue
2.1-4	2.1-3		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.1-3	2.1-2	2	0	2	0	0	0	**2**	0	0	0	0	0	**0**	Large separated joint
2.1-2	2.1-1		0	2	0	0	0	**2**	0	0	0	0	0	**0**	Large separated joint
2.1-1	2.0-1		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-1A	1.0-4		1	0	0	0	0	**1**	0	0	0	0	0	**0**	Medium joint offset
2.0-8	2.0-7		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-7	2.0-6		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-6	2.0-5		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-5	2.0-4		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-4	2.0-3		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.0-3	2.0-2		1	0	0	0	0	**1**	1	0	0	0	0	**1**	Medium joint offset
2.2.1-5	2.2.1-4		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2.1.2-1	2.2.1-4		1	0	0	0	0	**1**	0	0	0	0	0	**0**	Medium joint offset, material change, survey abandoned
2.2.1-4	2.2.1-3		0	0	0	0	0	**0**	0	2	0	0	0	**2**	Fine deposits settled
2.2.1-3	2.2.1-2		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2.1-2	2.2.1-1		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2.1-1	2.2-4	3	0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-4	2.2-3		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-3	2.2-2		0	0	0	0	0	**0**	1	0	0	0	0	**1**	Roots fine joint
2.2-2	2.2-1		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-14	2.2-12		0	0	0	0	0	**0**	0	0	0	4	0	**4**	Alignment right caused survey to be abandoned
2.2-12	2.2-11		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-11	2.2-10		0	0	0	0	0	**0**	0	2	0	0	0	**2**	Fine deposits settled, material change
2.2-10	2.2-9		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-9	2.2-7		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-7	2.2-6		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-6	2.2-5		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2.2-5	2.2-4		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-8	3.2-7		0	0	0	0	0	**0**	0	0	3	0	0	**3**	Roots medium joint - survey abandoned
3.2-7	3.2-6		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
CO	3.2-6		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-6	3.2-5		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-5	3.2-4		0	0	0	0	0	**0**	0	2	0	4	0	**6**	Grease deposits
4.0-2A	4.0-2		0	2	0	0	0	**2**	0	0	0	0	0	**0**	Large joint offset, material change, survey abandoned due to offset
4.0-2	4.0-1	4	0	0	0	0	0	**0**	0	0	0	0	0	**0**	
4.0-3	4.0-1		0	2	3	0	0	**5**	9	2	0	0	0	**11**	Roots fine joint, deposited gravel, spiral fracture, longitudinal crack
4.0-3A	4.0-3		0	0	0	0	5	**5**	0	0	0	0	0	**0**	Hole void visible
3.2-4A	3.2-4B		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-4B	3.2-2		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
CO	3.2-2		0	0	0	0	0	**0**	5	0	3	0	0	**8**	Roots fine joint, material change, abandoned survey because camera won't go

APPENDIX C - DETAILED LIST OF ALL STRUCTURAL AND O&M DEFECTS DERIVED FROM CCTV DATA

3.2-1	3.2-1A		0	0	0	0	0	**0**	0	0	3	0	0	**3**	Settled gravel deposits
CO	1.2.2-1		0	0	6	0	0	**6**	2	0	0	0	0	**2**	Multiple cracks, roots fine joint
1.2.2-1	1.2-2		0	0	3	0	0	**3**	0	22	0	0	0	**22**	fines deposited
1.2-2	1.0-2A		0	0	0	0	0	**0**	0	0	3	8	0	**11**	Settled deposits (gravel + random debris), alignment right abandoned survey
1.2.2-1A	1.2.2-1		4	8	6	4	10	**32**	2	2	0	4	0	**8**	Large joint offset, broken, spiral fracture, medium joint offset, circumferential fracture, spiral crack, roots fine joint, longitudinal fracture, obstacle intruding, circumferential crack
3.1-4	3.1-3		0	0	0	0	5	**5**	0	0	0	0	0	**0**	Deformed, camera cannot go past deformation
3.1-3	3.1-2		0	0	150	0	0	**150**	0	0	0	0	0	**0**	Surface corrosion metal pipe
3.1-2	3.1-1	5	0	0	0	0	0	**0**	0	0	54	0	0	**54**	Settled gravel deposits, material change
1.2-5A	1.2-5		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2-5	1.2-4		0	0	0	0	0	**0**	1	0	0	0	0	**1**	Roots fine joint
1.2-4	1.2-3		2	4	3	0	0	**9**	1	0	0	0	0	**1**	Joint offset, roots fine joint, material change, spiral fracture, longitudinal crack, circumferential fracture, medium joint offset
1.2-3	1.2-2		0	0	0	0	0	**0**	0	6	0	0	0	**6**	fines and gravel deposits
1.2-6	1.2-5A		0	2	0	4	0	**6**	0	0	0	0	0	**0**	Multiple fractures, large joint offset (undriveable)
COB	1.2-7		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2-7	1		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2.1-5	1.2.1-4		0	2	3	4	5	**14**	2	0	3	0	0	**5**	Roots fine joint, large joint offset, spiral fracture, hole void visible, broken
1.2.1-4	1.2.1-3		0	0	3	0	5	**8**	3	4	6	0	0	**13**	Broken void visible, fine deposits settled, roots fine joint, construction debris obstacle, spiral fracture
1.2.1-3	1.2.1-2		0	0	0	0	0	**0**	0	0	0	4	0	**4**	Rock obstacle
1.2.1-2	1.2.1-1		0	0	0	24	0	**24**	0	0	0	0	0	**0**	Deformed
1.2.1-1	1.2-2		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2.1-2A	1.2.1-2	6	0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2.1-2B	1.2.1-2A		0	2	3	0	0	**5**	0	0	0	0	0	**0**	Spiral fracture
1.2.1-2C	1.2.1-2B		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
1.2.1-5	1.2.1-5A		0	2	0	0	0	**2**	0	0	0	0	0	**0**	Large joint offset, undriveable
3.2-2	3.2-1A		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-4C	3.2-4A		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
3.2-4	3.2-4C		0	0	0	4	0	**4**	0	0	0	20	0	**20**	Deformed
1.1-4	1.1-3		0	4	9	0	0	**13**	48	0	3	0	0	**51**	Circumferential fractures, spiral fractures, roots fine joint
1.1-3	1.1-2		1	0	0	0	0	**1**	5	0	0	0	0	**5**	Circumferential crack, roots fine joint
1.1-2	1.1-1		0	0	3	4	5	**12**	7	6	0	4	0	**17**	Roots fine joints, spiral fracture, lots of fines, broken (soil visible), deposits attached encrustation, water level sag
1.1-1	1.0-2	7	0	0	0	0	0	**0**	8	8	0	0	0	**16**	Obstacle, roots fine joints, deposits settles
1.0-4	2-A		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
2-A	1.0-3		1	0	0	0	0	**1**	0	0	0	0	0	**0**	Material change, joint separated medium - apparently grout is behind and could only need a pipe patch
1.0-3	1.0-2		0	0	0	0	5	**5**	0	0	0	0	0	**0**	Smaller pipe seems to be inserted into a smaller one, broken
CO 1D	1D		0	0	0	0	10	**10**	0	4	0	0	0	**4**	Broken soil visible, tap break in capped
1D	1H		0	0	0	0	5	**5**	0	8	0	0	0	**8**	Settled gravel, pipe collapse, soil visible
	1K	U	0	0	0	0	0	**0**	0	0	0	0	0	**0**	
A	B		2	14	6	4	0	**26**	6	4	0	0	0	**10**	Longitudinal crack, roots fine joint, multiple cracks, circumferential crack, deposited gravel, spiral crack, broken
C	D		0	0	0	0	0	**0**	0	0	0	0	0	**0**	
D	E		0	0	0	0	0	**0**	1	0	0	0	0	**1**	Roots fine joint

APPENDIX D

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Well Completion Reports

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STATE OF CALIFORNIA

WELL COMPLETION REPORT

No. e0190230

OWNER'S WELL No. 8099

Date Work Began 10/29/1 Ended 11/7/13

Local Permit Agency SONOMA

Permit No. wel13-0375 Permit Date 10-17-2013

DWR USE ONLY — DO NOT FILL IN

96N/06W/29

STATE WELL NO. STATION NO.

38 20 13 122 32 14

LATITUDE LONGITUDE

APN / TRS / OTHER

GEOLOGIC LOG

ORIENTATION Vertical Degree of Angle ____

DEPTH TO FIRST WATER ____ (ft.) BELOW SURFACE

DEPTH FROM SURFACE Ft.	Ft.	DESCRIPTION
0	1	top soil
1	10	brown clay
10	60	brown clay with weathered volcanic rock
60	90	brown clay w/multicolored volcanic rock
90	250	multicolored volcanic rock
250	260	multicolored volc rock w/red brown ash
260	270	multicolored volcanic rock
270	282	brown red grey ash
282	320	fractured basalt
320	330	purple ash and volcanic rock
330	345	basalt
345	360	mostly red brown ash
	lat	38 degrees 20' 13.3728"
	long	-122 degrees 32' 14.0928"
		set pump at 260' for up to 40 gpm

TOTAL DEPTH OF BORING long (Feet)

TOTAL DEPTH OF COMPLETED WELL 360 (Feet)

WELL OWNER

WELL LOCATION

Address 2700 Morningside Mt. Rd

City GLEN ELLEN County SONOMA

Apn Book 054 Page 110 Parcel 01

or Township ____ Range ____ Section ____ 1/4 ____ 1/4

or Latitude ____ Deg. ____ Min. ____ Sec. NORTH Longitude ____ Deg. ____ Min. ____ Sec. WEST

LOCATION SKETCH

ACTIVITY NEW WELL PLANNED USE(S) Domestic Water

DRILLING METHOD ROTARY AIR FLUID

DEPTH OF STATIC WATER LEVEL 100 (Ft.) & DATE MEASURED Nov 4, 2013

ESTIMATED YIELD * 40 (G.P.M.) & TEST TYPE Airlift

TEST LENGTH. 2 (Hrs.) TOTAL DRAWDOWN ____ (FT.)

*May not be representative of a well's long-term yield.

CASING

DEPTH FROM SURFACE Ft.	To Ft.	BORE-HOLE DIA.	TYPE	Material / Grade	Dia.	Gauge	Slot size
0	60	10	Blank	F480 PVC	5	200	
60	150	8 3/4	Blank	F480 PVC	5	200	
150	250	8 3/4	Perfs	F480 PVC	5	200	.032
250	270	8 3/4	Blank	F480 PVC	5	200	
270	350	8 3/4	Perfs	F480 PVC	5	200	.032
350	360	8 3/4	Blank	F480 PVC	5	200	

ANNULAR MATERIAL

DEPTH FROM SURFACE Ft.	To Ft.	Seal Material	Filter Pack (Type / Size)
0	50	BENTONITE	
50	360	sand	8 X 16

Attachments

- no Geologic Log
- no Well Construction Diagram
- no Geophysical Logs
- no Soil Water Chemical Analyses
- no Other

CERTIFICATION STATEMENT

I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and belief.

NAME Fisch Bros. Drilling, Inc.

(PERSON, FIRM, OR CORPORATION) (TYPED OR PRINTED)

5001 Gravenstein Hwy No. Sebastopol CA 95472

Signed Scot Unterseher 399226

WELL DRILLER / AUTHORIZED REPRESENTATIVE DATE SIGNED C-57 LICENSE NUMBER

APPENDIX E

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
SB 1263 Response to FAQs and
Form 7-00b Water Supply Permit Amendment Application

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Senate Bill 1263
Responses to Frequently Asked Questions (FAQ)

In January 2017, the State Water Resources Control Board (State Board), Division of Drinking Water (DDW) sent out a summary of Senate Bill 1263 (SB 1263), effective January 1, 2017, to planning departments, environmental health departments and local area formation commissions in each California County. SB 1263 amended section 116540 and added section 116527 to the California Health and Safety Code (CHSC) and added section 106.4 to the Water Code. The full text of SB 1263 may be found at the following website link:

http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160SB1263.

In response to that correspondence, DDW received questions about the implementation of the bill. The following is a summary of responses to the most commonly received questions.

Question 1—How will this regulation impact state small water systems as they grow? Will they be subject to the new requirements of SB 1263 when they meet the definition of a public water system?

Response 1—Yes, the legislation applies to all new public water systems. The definition of a public water system has *not* been changed by SB 1263. A public water system is defined in CHSC Section 116275 (h) as: "a system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year." Human consumption is defined in Section 116275 (e) as “the use of water for drinking, bathing or showering, hand washing, oral hygiene, or cooking, including, but not limited to, preparing food and washing dishes.”

Question 2—How will counties communicate the requirements placed into the CHSC Sections 116527 and 116540 by SB 1263 to potential water systems for well permits? Well permits are typically ministerial.

Response 2—Section 116527 requires a person submitting an application for a proposed new public water system to first submit a technical report to the State Board. Subdivision (b) (2) of Section 116527 states: "In order to assist in expediting the permitting process, a person that is considering submitting an application for a permit for a proposed new public water system is encouraged, but is not required, to submit the preliminary technical report no later than seven days after submission of an application to the city or county for a building permit for any water-related improvement." Counties that are not local primacy agencies should consult their county counsel in order to determine the scope of their responsibilities under Section 116527.

Question 3—It can often take many years for the building permitting process to go to completion. How will potential water systems that are currently still within the county planning agencies pipeline be addressed?

Response 3—Section 116527 does not apply to "an application for a permit for a new public water system that was deemed complete prior to January 1, 2017." If a potential water system applicant has not submitted a complete domestic water supply permit application prior to January 1, 2017, they will need to fulfill the requirements of CHSC Sections 116527 and 116540 by submitting the specified preliminary technical report and waiting six months after submission of the report before initiating construction of any water related facilities.

Question 4—Will the six month waiting period be necessary for a rural water system where it is readily apparent that there is no option of consolidation?

Response 4—In addition to the consolidation aspect of the preliminary technical report, Section 116527 of the CHSC contains other required information as specified in Subsections (4), (5), (7), and (8). These subsections require the following:

(4) All sources of domestic water supply for the proposed new public water system.

(5) The estimated cost to construct, operate, and maintain the proposed new public water system, including long-term operation and maintenance costs and a potential rate structure.

(7) A discussion of all actions taken by the applicant to pursue a contract for managerial or operational oversight from an existing public water system.

(8) An analysis of whether a proposed new public water system's total projected water supplies available during normal, single dry, or multiple dry water years during a 20-year projection will meet the projected water demand for the service area.

These requirements apply to new public water systems regardless of whether a consolidation possibility exists or not. Therefore, the preliminary technical report will still be required.

The only exemptions to the preliminary technical report requirements, which are in Subdivision (h) of Section 116527 are for applications deemed complete prior to January 1, 2017, "an extension of, or annexation to, an existing public water system" and "a service area where an applicant certifies in writing to the state board that the applicant will not rely on the establishment of a new public water system for its water supply." In addition, subdivision (i) provides that a person can apply for an exemption for a "proposed new public water system that ... consolidates two or more existing public water systems, existing state small water systems, or other existing water systems, which results in the creation of a new public water system ... or provides water service in lieu of individual domestic wells."

Section 116527 provides: “Before a person submits an application for a permit for a proposed new public water system, the person shall first submit a preliminary technical report to the state board at least six months before initiating construction of any water- related improvement." Thus, while the State Board may approve the preliminary technical report prior to the end of the 6-month period, section 116527 (b) (1), provides that construction not be initiated until six months after the report is submitted.

Question 5—How will the six month window of time impact the Permit Streamlining Act on the part of the County and State?

Response 5—Operational permits are not included in the Permit Streamlining Act. The State Board recommends that Counties discuss any questions regarding the Permit Streamlining Act with their legal counsel.

Question 6—General concern was raised about the inability of hauled or bottled water as a source and what that may do to some rural communities, particularly for seasonal homes.

Response 6—SB 1263 added section 106.4 to the Water Code, which states that, with certain exceptions: "A city, including a charter city, or a county shall not issue a building permit for the construction of a new residential development where a source of water supply is water transported by a water hauler, bottled water, a water-vending machine, or a retail water facility." The latter terms are defined in section 106.4 Again, the definition of a public water system has not been changed and is still as defined in Section 116275 (h) of the Health and Safety Code.

For any questions with respect to the status of a particular public water system applicant, please contact the State Board's District Engineer in the applicable county for verification. A map of contact information is provided at the website listed below:

http://www.waterboards.ca.gov/drinking_water/programs/documents/ddwem/DDWdistrictofficesmap.pdf

State Water Resources Control Board
Division of Drinking Water
50 D Street, Suite 200
Santa Rosa, CA 95404-3752
(707) 576-2145 Fax: (707) 576-2722

7-00b

REQUEST A WATER SUPPLY PERMIT AMENDMENT APPLICATION

Water System Name: System No.:

Site Address:

Water System Owner (Property Owner):

Address:

Phone No.: Email:

Person Completing This Form:

Title:

Address:

Phone No.: Email:

What is the general purpose for your permit application request? Check all that apply:

- ☐ Change of ownership
- ☐ Change in source of supply:
  - ☐ Add (Submit State of California Well Completion Report(s), if applicable
  - ☐ Remove
  - ☐ Status change
- ☐ Addition of storage tank >100,000 gallons
- ☐ Distribution system increase by >20%
- ☐ Change in treatment (describe below):
  - ☐ Add
  - ☐ Remove
  - ☐ Other change

Are CEQA or NEPA documents required? ☐ Yes ☐ No ☐ Unknown

Are CEQA or NEPA documents available? ☐ Yes ☐ No

☐ Attach CEQA documentation. Include if applicable:

- Notice of Exemption (NOE)
- Notice of Determination (NOD)
- If project is non-exempt provide the final conditions of either the Negative Declaration (ND), Mitigated Negative Declaration (MND), or Environmental Impact Report (EIR)

If proposing new water system facilities, please describe the *reason* for such facilities:

Please describe the *proposed* water system facilities (source[s], treatment [including purpose], storage, service area):

Will the *proposed* changes to the water system components and/or infrastructure require changes to the existing building footprint(s) or increased capacity? ☐ Yes ☐ No If yes, please describe:
(e.g. construction of a new treatment shed, expansion of service area to newly constructed facilities):

Will the proposed changes to the water system components and/or infrastructure require any ground disturbing actions? ☐ Yes ☐ No If yes, please describe:

Will there be increased or new discharges from the proposed changes to the water system?
☐ Yes ☐ No If yes, please describe:
(e.g. increased backwash discharge, new treatment with backwashing, disposal of brine)

Consolidation Potential: Is your system located within one (1) mile of a public water system?
If yes, list the system name(s) and approximate distance?

☐ Attach any County permitting documents (Use/Planning Permit application and Conditions of Approval)

Please describe the project timeline:

Construction start date:

Construction completion date:

Comments:

☐ Change of Ownership System Contact Information: Please complete and attached Water System Contact Form 7-18. ☐ Attached ☐ Not Applicable

Section 116525 (a) of the California Health and Safety code: No person shall operate a public water system unless he or she first submits an application to the department and receives a permit as provided in this chapter. A change in ownership of a public water system shall require the submission of a new application.
Section 116550 (a) of the California Health and Safety code: No person operating a public water system shall modify, add to or change his or her source of supply or method of treatment of, or change his or her distribution system as authorized by a valid existing permit issued to him or her by the department unless the person first submits an application to the department and receives an amended permit as provided in this chapter authorizing the modification, addition, or change in his or her source of supply or method of treatment.

For Division Use Only **Date Stamp Below**

☐ For new well amended permit copy RWQCB staff when emailing checklist to applicant

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APPENDIX F

Eldridge Renewal, LLC
Water and Wastewater Feasibility Study
Water Balance

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Eldridge Renewal - Sonoma Development Center

Scenario: No Recycled Water Storage

February 2025 By: Angela Singer, HydroScience

INPUT
INPUT-Adjust as necessary
OUTPUT-Potable Water Make-Up

WASTEWATER INFLUENT FLOW			***STORAGE DATA***		***OTHER INPUTS***			***RECYCLED WATER DISTRIBUTION ALTERNATIVES[1]***		
Daily Average Wastewater Influent Flow	133,640	gpd	Tank(s) Total Volume	0.0 MG	100-YR Multiplier	1.97	unitless	Landscape Irrigation	50.2	acres
I/I (PWWF-PDWF)	128,000	gpd			Pan Evap Coefficient	0.75	unitless	Dual Plumbing	0.0	MG

100-YEAR ANNUAL PRECIPITATION RETURN PERIOD

	Units	October	November	December	January	February	March	April	May	June	July	August	September	Water Year
	No. Days	31	30	31	31	28	31	30	31	30	31	31	30	
CLIMATE INPUTS														
Precipitation	in	3.29	7.59	10.21	12.10	10.39	7.98	3.49	1.62	0.45	0.06	0.16	0.65	58.00
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57
WASTEWATER GENERATION														
Facility Wastewater Influent (ADWF)	MG	4.1	4.0	4.1	4.1	3.7	4.1	4.0	4.1	4.0	4.1	4.1	4.0	48.8
I/I Contributions	MG	1.4	3.0	4.2	4.5	3.9	3.3	1.4	0.7	0.2	0.0	0.1	0.3	22.7
TOTAL Wastewater Influent	ac-ft	16.9	21.6	25.6	26.4	23.3	22.8	16.6	14.8	12.9	12.8	12.9	13.1	219.5
WWTP CONTRIBUTIONS														
Site Run-off[2]	ac-ft	0.2	0.5	0.7	0.9	0.7	0.6	0.2	0.1	0.0	0.0	0.0	0.0	4.1
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[3]	ac-ft	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.1
RECYCLED WATER DISTRIBUTION														
Dual Plumbing	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooling Tower[4]	ac-ft	-0.5	-0.4	-0.4	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.5	-0.5	-0.4	-4.9
Landscape Irrigation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-5.6	-19.6	-30.6	-30.8	-28.7	-21.2	-136.7
Municipal Sewer Discharge	ac-ft	-16.6	-21.7	-25.9	-26.9	-23.7	-23.0	-10.7	0.0	0.0	0.0	0.0	0.0	-148.7
RECYCLED WATER MAKE-UP														
Blend Potable or Raw Water[5]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.2	18.2	18.5	16.3	8.5	66.7

Maximum Seasonal Storage (ac-ft) **0.0**
mg **0.0**

AVERAGE ANNUAL PRECIPITATION RETURN PERIOD

	Units	October	November	December	January	February	March	April	May	June	July	August	September	Water Year
	No. Days	31	30	31	31	28	31	30	31	30	31	31	30	
CLIMATE INPUTS														
Precipitation	in	1.67	3.85	5.18	6.14	5.27	4.05	1.77	0.82	0.23	0.03	0.08	0.33	29.42
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION														
Facility Wastewater Influent (ADWF)	MG	4.1	4.0	4.1	4.1	3.7	4.1	4.0	4.1	4.0	4.1	4.1	4.0	48.8
I/I Contributions	MG	1.4	3.0	4.2	4.5	3.9	3.3	1.4	0.7	0.2	0.0	0.1	0.3	22.7
TOTAL Wastewater Influent	ac-ft	16.9	21.6	25.6	26.4	23.3	22.8	16.6	14.8	12.9	12.8	12.9	13.1	219.5
WWTP CONTRIBUTIONS														
Site Run-off[2]	ac-ft	0.1	0.3	0.4	0.4	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	2.1
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[3]	ac-ft	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.1
RECYCLED WATER DISTRIBUTION														
Dual Plumbing	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooling Tower[4]	ac-ft	-0.5	-0.4	-0.4	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.5	-0.5	-0.4	-4.9
Landscape Irrigation	ac-ft	-4.0	0.0	0.0	0.0	0.0	0.0	-13.7	-23.3	-31.7	-31.0	-29.1	-22.7	-155.5
Municipal Sewer Discharge	ac-ft	-12.5	-21.5	-25.6	-26.5	-23.4	-22.7	-2.6	0.0	0.0	0.0	0.0	0.0	-134.7
RECYCLED WATER MAKE-UP														
Blend Potable or Raw Water[5]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.0	19.2	18.7	16.7	10.0	73.6

Maximum Seasonal Storage (ac-ft) **0.0**
mg **0.0**

Note:
1. Total available landscape area is approximately 50.2 acres.
2. Assumed all equipment open basin/tankage would include covers and will not contribute to wastewater flows.
3. Cooling tower evaporation loss estimated at 1.5% of monthly cooling tower demand.
4. Cooling tower demand estimated as 0.04 gpd/SF for "hotel" category only based on 120,000 SF.
5. Blend Raw Water is the deficit in wastewater flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.

Eldridge Renewal - Sonoma Development Center

Scenario: Maximize Recycled Water Use with Storage

February 2025 By: Angela Singer, HydroScience

INPUT
INPUT-Adjust as necessary
OUTPUT-Max Elevation

WASTEWATER INFLUENT FLOW			***STORAGE DATA***		***OTHER INPUTS***		***RECYCLED WATER DISTRIBUTION ALTERNATIVES[1]***		
Daily Average Wastewater Influent Flow	133,640	gpd	Tank(s) Total Volume	3.5 MG	100-YR Multiplier	1.97 unitless	Landscape Irrigation	50.2	acres
I/I (PWWF-PDWF)	128,000	gpd			Pan Evap Coefficient	0.75 unitless	Dual Plumbing	0.0	MG

100-YEAR ANNUAL PRECIPITATION RETURN PERIOD

	Units	October	November	December	January	February	March	April	May	June	July	August	September	Water Year
	No. Days	31	30	31	31	28	31	30	31	30	31	31	30	
CLIMATE INPUTS														
Precipitation	in	3.29	7.59	10.21	12.10	10.39	7.98	3.49	1.62	0.45	0.06	0.16	0.65	58.00
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.40	0.93	0.86	1.21	2.13	4.37	6.68	8.25	9.92	9.05	6.50	55.57
WASTEWATER GENERATION														
Facility Wastewater Influent (ADWF)	MG	4.1	4.0	4.1	4.1	3.7	4.1	4.0	4.1	4.0	4.1	4.1	4.0	48.8
I/I Contributions	MG	1.4	3.0	4.2	4.5	3.9	3.3	1.4	0.7	0.2	0.0	0.1	0.3	22.7
TOTAL Wastewater Influent	ac-ft	16.9	21.6	25.6	26.4	23.3	22.8	16.6	14.8	12.9	12.8	12.9	13.1	219.5
WWTP CONTRIBUTIONS														
Site Run-off[2]	ac-ft	0.2	0.5	0.7	0.9	0.7	0.6	0.2	0.1	0.0	0.0	0.0	0.0	4.1
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[3]	ac-ft	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.1
RECYCLED WATER DISTRIBUTION														
Dual Plumbing	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooling Tower[4]	ac-ft	-0.5	-0.4	-0.4	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.5	-0.5	-0.4	-4.9
Landscape Irrigation	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	-5.6	-19.6	-30.6	-30.8	-28.7	-21.2	-136.7
Municipal Sewer Discharge	ac-ft	-16.6	-21.7	-25.9	-26.9	-23.7	-23.0	0.0	0.0	0.0	0.0	0.0	0.0	-137.9
RAW WATER MAKE-UP														
Blend Potable or Raw Water[5]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	12.7	18.5	16.3	8.5	56.0
MONTHLY STORAGE BALANCE														
Beginning Storage Volume	ac-ft	**0.0**	0.0	0.0	0.0	0.0	0.0	0.0	10.7	5.5	0.0	0.0	0.0	
Change in Water Volume[4]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	10.7	-5.2	-5.5	0.0	0.0	0.0	
Final Storage Volume	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	10.7	5.5	0.0	0.0	0.0	0.0	

Maximum Seasonal Storage (ac-ft) **10.7**
mg **3.5**

AVERAGE ANNUAL PRECIPITATION RETURN PERIOD

	Units	October	November	December	January	February	March	April	May	June	July	August	September	Water Year
	No. Days	31	30	31	31	28	31	30	31	30	31	31	30	
CLIMATE INPUTS														
Precipitation	in	1.67	3.85	5.18	6.14	5.27	4.05	1.77	0.82	0.23	0.03	0.08	0.33	29.42
Pan Evaporation	in	5.72	2.48	1.66	1.53	2.15	3.79	5.82	8.90	11.00	13.22	12.06	8.67	77.00
Effective Water Surface Evaporation	in	4.29	1.86	1.25	1.15	1.61	2.84	4.37	6.68	8.25	9.92	9.05	6.50	57.75
WASTEWATER GENERATION														
Facility Wastewater Influent (ADWF)	MG	4.1	4.0	4.1	4.1	3.7	4.1	4.0	4.1	4.0	4.1	4.1	4.0	48.8
I/I Contributions	MG	1.4	3.0	4.2	4.5	3.9	3.3	1.4	0.7	0.2	0.0	0.1	0.3	22.7
TOTAL Wastewater Influent	ac-ft	16.9	21.6	25.6	26.4	23.3	22.8	16.6	14.8	12.9	12.8	12.9	13.1	219.5
WWTP CONTRIBUTIONS														
Site Run-off[2]	ac-ft	0.1	0.3	0.4	0.4	0.4	0.3	0.1	0.1	0.0	0.0	0.0	0.0	2.1
Open Storage Basin	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Total Water Surface Area	acre	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Cooling Tower Evaporation/Drift Loss[3]	ac-ft	-0.01	-0.01	-0.01	-0.01	0.00	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.01	-0.1
RECYCLED WATER DISTRIBUTION														
Dual Plumbing	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cooling Tower[4]	ac-ft	-0.5	-0.4	-0.4	-0.4	-0.3	-0.4	-0.4	-0.5	-0.4	-0.5	-0.5	-0.4	-4.9
Landscape Irrigation	ac-ft	-4.0	0.0	0.0	0.0	0.0	0.0	-13.7	-23.3	-31.7	-31.0	-29.1	-22.7	-155.5
Municipal Sewer Discharge	ac-ft	-12.5	-21.5	-25.6	-26.5	-23.4	-22.7	0.0	0.0	0.0	0.0	0.0	0.0	-132.1
RAW WATER MAKE-UP														
Blend Potable or Raw Water[5]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	6.4	19.2	18.7	16.7	10.0	71.0
MONTHLY STORAGE BALANCE														
Beginning Storage Volume	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	
Change in Water Volume[4]	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	2.6	-2.6	0.0	0.0	0.0	0.0	
Final Storage Volume	ac-ft	0.0	0.0	0.0	0.0	0.0	0.0	2.6	0.0	0.0	0.0	0.0	0.0	

Maximum Seasonal Storage (ac-ft) **2.6**
mg **0.8**

Note:
1. Total available landscape area is approximately 50.2 acres.
2. Assumed all equipment open basin/tankage would include covers and will not contribute to wastewater flows.
3. Cooling tower evaporation loss estimated at 1.5% of monthly cooling tower demand.
4. Cooling tower demand estimated as 0.04 gpd/sq ft for "hotel" category only based on 120,000 sq ft.
5. Blend Raw Water is the deficit in wastewater flow generated to meet recycled water demands, to resolve then less water would be discharged for irrigation or surface water.
6. Positive change in volume represents filling and negative change in volume represents a drawdown/consumption from storage.