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25-Year Demand Forecast and Capacity Analysis

Prepared for:
San Juan Water District

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CHAPTER 1. INTRODUCTION

The San Juan Water District's ("District") mission is to "*ensure the delivery of a reliable water supply of the highest quality at the lowest reasonable price*." To accomplish this mission requires continuous assessments of all the factors associated with securing, diverting, treating, and delivering water to customers 365 days a year. This study focuses on a few of these factors:

- Forecasting annual water demands for the next 25 years for the District's retail and wholesale customer agencies ("WCAs"),
- Translating these demands to estimated monthly quantities and assessing the effect on the District's water treatment and wholesale transmission system capacities, and
- Quantifying potential unused water treatment and/or wholesale transmission capacity that could be offered to serve potential treatment, transfer and/or delivery opportunities beyond the District's wholesale customer needs.

In addition to these study objectives, the demand forecasts herein, have been prepared in a manner to allow them to be readily incorporated into the relevant analysis in the District's upcoming 2020 Urban Water Management Plan (UWMP), due by July 1, 2021.

This remainder of this report is organized as follows:

- Chapter 2 – Water Demand Forecast
- Chapter 3 – Water Treatment Plant and Conveyance System
- Chapter 4 – Available Capacity Analysis

CHAPTER 2. WATER DEMAND FORECAST

This section presents the water demand forecasts for the San Juan Water District's ("District") retail service area and wholesale customer agencies ("WCAs"). To assess the treatment and conveyance infrastructure needed to continue to serve these customers, the District must credibly forecast the future monthly and annual demands over the next few decades. Furthermore, by understanding the demands of these customers on existing treatment and conveyance infrastructure, the District can assess whether and to what extent opportunities to utilize unused capacity in the future may exist.

Forecasting future water demands begins with an understanding and assessment of existing customer demands and their trends, evaluating the potential for additional customers through growth, and consideration of the factors that will influence both existing and new customer use well into the future. The basis for and results of this forecast are presented in the following sections, organized as follows:

- Current Water Demands – This subsection presents data reflecting the current monthly and annual water demand conditions for the District's retail customers and WCAs.
- Water Demand Forecasting Factors – Forecasting future demand requires assessing several factors: future water use habits of existing customers that will alter their existing use (usually downward); land use plans demonstrating types of anticipated growth or redevelopment; the effects of a changing climate, particularly on landscape water demands; and, various laws and regulations governing future water use demand factors such as water-efficient fixtures, appliances, and landscaping. This subsection discusses these various factors and how they influence demand projections.
- Forecast Water Demands – This subsection presents the derivation of future annual water demands, reflecting both the continued evolution of existing customer demands and the potential incremental addition of new customers associated with growth. This subsection also discusses trends in monthly demand patterns that can affect treatment and delivery infrastructure and operations, which in turn impact the availability of potential excess capacity on a monthly and annualized basis.
- Summary of Water Demands – This subsection presents a summary of the projected current and future retail and WCA water demands in five-year increments. These estimated regional demands will ultimately have to be met with a combination of District wholesale and individual WCA water supply assets such as groundwater.

2.1 Current Water Demands

The District serves as a retail and wholesale water service provider to the area shown in Figure 2-1 – providing potable water to 30,000 customers in its retail area, and an additional 120,000 WCA customers. Utilizing water purchased through contracts with the District, WCAs provide retail service to customers within their own boundaries and include: Citrus Heights Water District (CHWD), the City of Folsom north of the American River (Folsom), Fair Oaks Water District (FOWD), and Orange Vale Water Company (OVWC).[1] Under normal operations, all of the water supplied by the District to its retail customers and the WCAs is drawn from Folsom Lake, treated at the District's water treatment plant, and delivered through an array of pipelines and turnouts (detailed in Section 3). FOWD and CHWD have also routinely met part of their own customer water demand with their own groundwater wells.

Data used to approximate current water demands was obtained from annual reports submitted to the State Water Resources Control Board, Division of Drinking Water by the District for its RSA and each WCA. These reports are referred to as the 'electronic Annual Report' or eAR, formerly referred to as the Public Water System Statistics (PWSS) reports.

2.1.1 Current Retail Demands

Figure 2-1 displays the District's retail service area. According to the District's eAR reports for 2016, 2017 and 2018, the District served water to more than 10,600 metered customers, with 94% or over 10,000 of these customers being individual single-family homes (see Table 2-1). The volume of water deliveries to these customers is presented in Table 2-2.

From this information, an estimate of the 'current water demand' of existing retail customers has been developed. Knowing that actual demand for existing customers varies slightly year-to-year based on a variety of factors (e.g. total rainfall and the timing of spring rain events), the recent data provides a basis for estimating current retail demands. For purposes of estimating the current water demand, an average of the 2017 and 2018 metered volume was set as a target annual demand used to derive a 'current water demand' using unit demand factors discussed below. The target 'current water demand' was then estimated using customer-type demand factors and total connection data to generate a comparable estimate.

[1] The District also contracts with Sacramento Suburban Water District (SSWD) to provide water treatment and conveyance on an as-available basis, and therefore, is not considered a wholesale customer agency for the purposes of this study.

Figure 2-1: San Juan Water District Wholesale Service Area

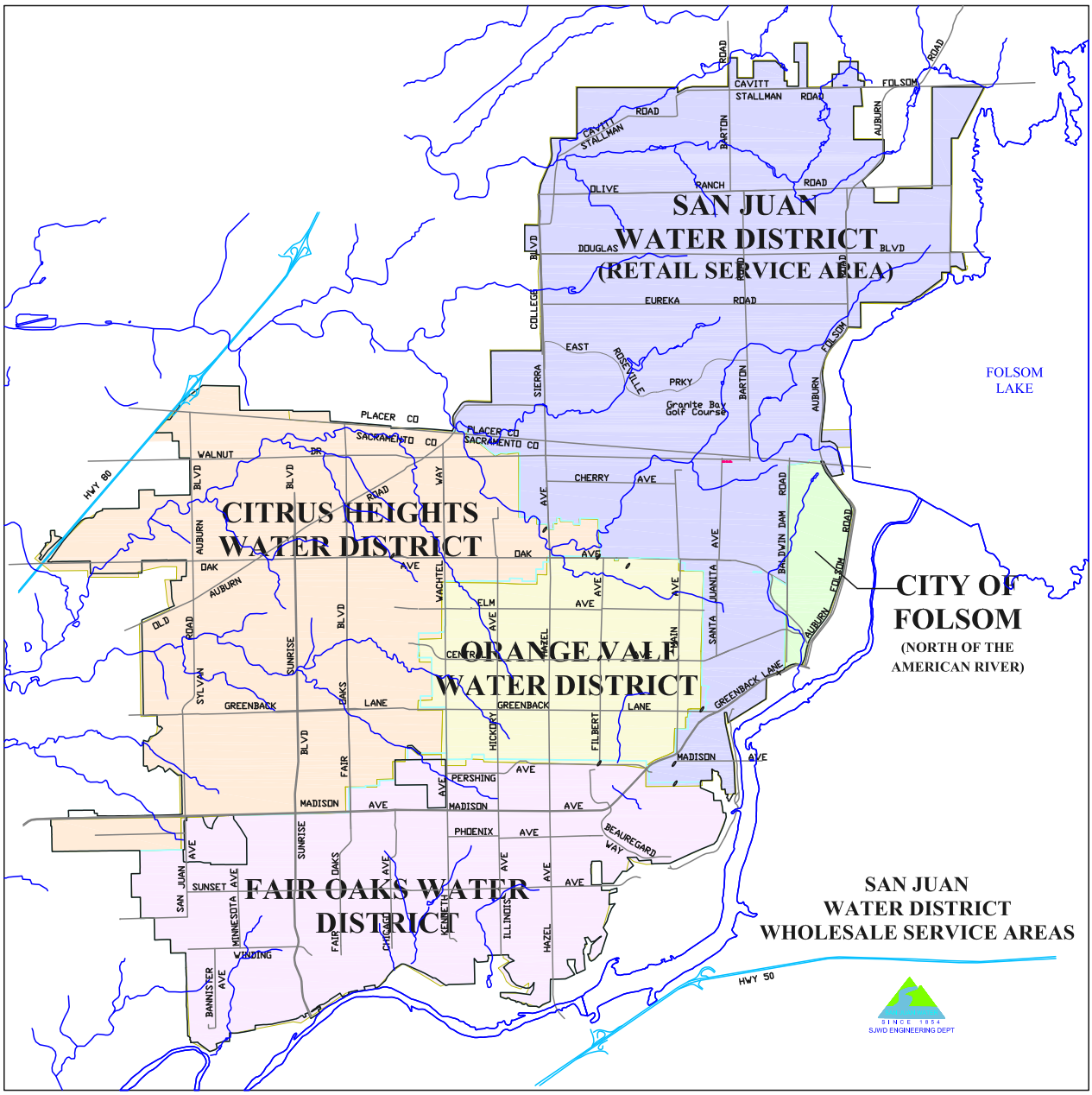


Table 2-1: SJWD Retail Connections by Type

User Type	Metered Connections			
	2016	2017	2018	avg '17-'18
Single Family	10,009	10,031	10,046	10,039
Multi-Family	119	119	119	119
Comm./Inst.	256	262	263	263
Industrial	0	0	0	0
Landscape	211	213	213	213
Agriculture	5	7	8	8
Total	10,600	10,632	10,649	10,641

Table 2-2: SWJD Retail Delivery by Type

User Type	Metered Delivery Volume (af)			
	2016	2017	2018	avg '17-'18
Single Family	8,061	8,914	9,135	9,025
Multi-Family	136	136	149	143
Comm./Inst.	497	405	570	488
Industrial	0	0	0	0
Landscape	679	184	798	491
Agriculture	23	790	64	427
Total	9,396	10,429	10,716	10,573

Customer-type demand factors for existing customers can be estimated using the monthly data reported in the eAR reports. For instance:

- Per-connection single-family indoor water use can be estimated using January and February data where most water use is presumed to be for indoor purposes as outdoor irrigation is usually halted or minimized during those months. According to the District's eAR, January and February data for 2017 was 211 acre-feet and 190 acre-feet respectively, with 2018 use reported as 270 acre-feet and 257 acre-feet respectively. Averaging these values results in 232 acre-feet per month, which would be approximately 2,784 acre-feet for all 12 months of the year. For these years, the District averaged 10,039 active single-family accounts. Dividing the estimated annual amount by the number of connections provides an estimated per-connection indoor use estimate of 0.28 acre-feet/year.

- Per-connection single-family outdoor use can be estimated by subtracting the indoor use from the annual total and dividing by the same number of connections. As shown in Table 2-2, total annual use for single-family customers averaged 9,025 acre-feet. The

calculation, subtracting the average indoor use, results in an outdoor per-connection demand factor of 0.62 acre-feet per year.[2]

- Per-connection estimates for the other customer types can similarly be estimated by dividing the number of connections into the annual use.

The resulting estimated current water demand for existing retail customers is shown in Table 2-3. While the single-family residential classification in Table 2-3 presents separate estimates for indoor and outdoor uses, water use for the multiple family and commercial classifications is classified as "indoor" only. This study acknowledges that each of these classifications also have outdoor uses. However, because the number of actual customers per connection for multi-family locations can vary, outdoor use at a commercial location may separately be included under the landscape classification, and increased demand for commercial customers in the summer may be due to factors such as increased HVAC use or increases in other indoor demands (e.g. seasonal services, outdoor misters), separating the indoor and outdoor cannot easily be accomplished.[3] This simplified approach of only separating indoor from outdoor use for residential use was consistently applied for the District's retail service area as well as the WCA service areas discussed in later subsections.

[2] Single-family demands within the District's retail service area are generally higher than most communities as a high percentage of the District's retail customers reside on larger lots of over an acre in size, with some including small agricultural operations and others being luxury estates.

[3] In contrast to the challenges separating indoor and outdoor use for multiple family and commercial classification, indoor use in single family residences generally is consistent throughout the year, thus can more readily be separated from total water use.

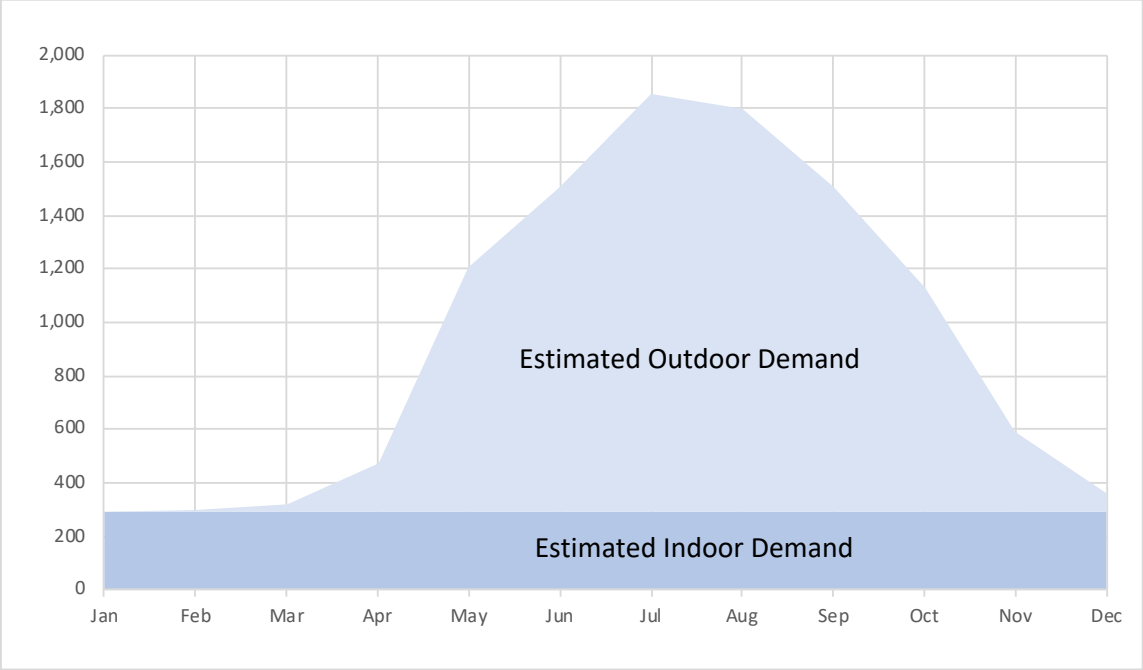
Table 2-3: Estimated Current Retail Customer Water Demand (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	10,039	0.28	(indoor)	2,811
		0.62	(outdoor)	6,224
Multi-Family	119	1.15	(indoor)	137
			(outdoor)	0
			Res. Indoor Subtotal	2,948
			Res. Outdoor Subtotal	6,224
			Residential Total	9,172
Non-Residential				
Comm/Inst	263	1.50	(indoor)	395
Landscape	213	4.00	(outdoor)	852
Agriculture	8	5.00	(outdoor)	40
			Non-Res. Indoor Subtotal	395
			Non-Res. Outdoor Subtotal	892
			Non-Res. Total	1,287
			Indoor Estimated Total	3,342
			Outdoor Estimated Total	7,116
			Total Estimated Customer Demand	10,458
			Estimated Non-Revenue Water 8%	868
			Total Estimated Supply Demand	11,300

Annual demand is useful for understanding the magnitude of supplies needed and is useful in projecting into the future. But, understanding the monthly distribution of this demand is also informative. Figure 2-2 presents the estimated retail customer annual demand in a monthly pattern, as discerned by the monthly reporting in the District's eAR reporting. The figure further approximates the distribution between indoor and outdoor demands – where indoor reflects residential indoor as well as the steady commercial and institutional demands that occur throughout the year. While not exact, this separation illustrates the significant effect on total demand and the timing of that demand that accompanies irrigated landscapes (residential and public). As reflected in Table 2-3, 55% of the District's annual retail demand is estimated to meet residential outdoor needs. However, during summer months, outdoor use represents over 80% of the monthly demand. Over time, and as explained later in this section, this outdoor residential demand likely will be the focus of future demand reduction efforts, whether through voluntary and passive measures, or through District programs or ordinances in order to comply with and meet future State-mandated water budget constraints.[4]

[4] Recently enacted Water Code Section 10609 et seq will establish 'urban water use objectives' for each urban retail water supplier that will be enforceable as soon as 2025.

Figure 2-2: Retail Customer's Monthly Demand Pattern (acre-feet/month)



2.1.3 Current Wholesale Customer Agency Demands

Using the same methodology described for the District's retail service area, the current water demands for the existing customers within each WCAs' service area can be estimated. Estimates for each WCA are presented in the following tables.

2.1.3.1 Citrus Heights Water District

As shown in Figure 2-1, CHWD serves a sizeable suburban area within Sacramento County and a small portion of Placer County. With over 20,000 connections, CHWD has nearly twice the number of connections as the District's retail service area and is the District's largest wholesale customer (see Table 2-4). Similar to the District's retail area, about 93% of CHWD's customers are residential users, though there is a much higher number of multi-family connections. The water delivered to CHWD customers is presented in Table 2-5.

Table 2-4: CHWD Connections by Type

	Metered Connections			
User Type	2016	2017	2018	avg '17-'18
Single Family	16,407	16,508	16,518	16,513
Multi-Family	2,191	2,186	2,187	2,187
Comm./Inst.	741	753	699	726
Industrial	56	56	56	56
Landscape	388	393	395	394
Other		209	213	211
Total	19,783	20,105	20,068	20,087

Table 2-5: CHWD Deliveries by Type

User Type	Metered Delivery Volume (af)			
	2016	2017	2018	avg '17-'18
Single Family	6,384	6,966	6,946	6,956
Multi-Family	1,920	1,976	1,967	1,971
Comm./Inst.	828	861	887	874
Industrial	281	323	321	322
Landscape	684	858	849	853
Other	12	12	12	12
Total	10,108	10,996	10,982	10,989

As with the District's retail customers, an estimate of 'current water demand' of existing customers can be developed from this information. As explained for the District's retail customers in the prior subsection, data from the CHWD eAR reports was used to develop an estimate of existing customer water demand.[5] The resulting estimated current water demand for existing CHWD customers is shown in Table 2-6.

Table 2-6: Estimated Current CHWD Customer Water Demand (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	16,513	0.20	(indoor)	3,303
		0.23	(outdoor)	3,798
Multi-Family	2,187	0.89	(indoor)	1,946
			(outdoor)	0
			Res. Indoor Subtotal	5,249
			Res. Outdoor Subtotal	3,798
			Residential Total	9,047
Non-Residential				
Comm/Inst	726	1.20	(indoor)	871
Industrial	56	5.75	(indoor)	322
Landscape	394	2.15	(outdoor)	847
Other	211	0.10	(outdoor)	21
			Non-Res. Indoor Subtotal	1,193
			Non-Res. Outdoor Subtotal	868
			Non-Res. Total	2,061
			Indoor Estimated Total	6,442
			Outdoor Estimated Total	4,666
			Total Estimated Customer Demand	11,108
			Estimated Non-Revenue Water 5%	555
			Total Estimated Supply Demand	11,700

[5] Multiple family, commercial and industrial classifications are listed as "indoor" for reasons described for the Retail customers in Section 2.1.1.

2.1.3.2 City of Folsom

As shown in Figure 2-1, the City of Folsom (City) serves a small suburban area within its City limits just north of the American River, with District wholesale supplies. This area is referred to by the City as the Ashland service area. In contrast, a neighboring area, referred to as American River Canyon, is also within the City limits, but is serviced by the District and is part of the District's retail customer base. With an estimated population of about 5,500, the Ashland area has less than 1,000 connections compared to the connections in the District's retail service area. This area of the City is 93% residences (see Table 2-7). The water delivered to these customers is presented in Table 2-8.

Table 2-7: Folsom Ashland Service Area Connections by Type

	Metered Connections			
User Type	2016	2017	2018	avg '17-'18
Single Family	965	967	967	967
Multi-Family	29	30	30	30
Comm./Inst.	41	44	43	44
Landscape	30	31	31	31
Total	1,065	1,072	1,071	1,072

Table 2-8: Folsom Ashland Deliveries by Type

	Metered Delivery Volume (af)			
User Type	2016	2017	2018	avg '17-'18
Single Family	538	588	600	594
Multi-Family	150	224	245	235
Comm./Inst.	75	74	84	79
Landscape	52	55	84	70
Total	815	941	1,013	977

As with the District's retail customers, an estimate of 'current water demand' of existing customers can be developed from this information. As explained for the District's retail customers in the prior subsection, data from the City's eAR reports for the Ashland area were used to develop an estimate of existing customer water demand.[6] The resulting estimated current water demand for existing Ashland customers is shown in Table 2-9.

[6] Multiple family, commercial and industrial classifications are listed as "indoor" for reasons described for the Retail customers in Section 2.1.1.

Table 2-9: Estimated Current Folsom (Ashland) Customer Water Demand (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	967	0.21	(indoor)	203
		0.40	(outdoor)	387
Multi-Family	30	7.80	(indoor)	234
			(outdoor)	0
			Res. Indoor Subtotal	437
			Res. Outdoor Subtotal	387
			Residential Total	824
Non-Residential				
Comm/Inst	44	1.80	(indoor)	78
Landscape	31	2.25	(outdoor)	70
			Non-Res. Indoor Subtotal	78
			Non-Res. Outdoor Subtotal	70
			Non-Res. Total	148
			Indoor Estimated Total	515
			Outdoor Estimated Total	457
			Total Estimated Customer Demand	972
			Estimated Non-Revenue Water 15%	146
			Total Estimated Supply Demand	1,100

2.1.3.3 Fair Oaks Water District

As shown in Figure 2-1, FOWD also serves a sizeable suburban area within Sacramento County, similar to CHWD. With an estimated population of about 35,000, FOWD has only slightly more connections compared to the District's retail service area (see Table 2-10). Similar to the District's retail area, about 95% of FOWD's customers are residential users, mostly single-family homes. The water delivered to these customers is presented in Table 2-11.

Following the same process, an estimate of 'current water demand' of existing customers can be developed from this information. Data from the FOWD eAR reports was used to develop an estimate of existing customer water demand.[7] The resulting estimated current water demand for existing FOWD customers is shown in Table 2-12.

[7] Multiple family, commercial and industrial classifications are listed as "indoor" for reasons described for the Retail customers in Section 2.1.1.

Table 2-10: FOWD Connections by Type

User Type	Metered Connections			
	2016	2017	2018	avg '17-'18
Single Family	12,650	12,631	12,666	12,649
Multi-Family	616	618	618	618
Comm./Inst.	394	395	396	396
Landscape	245	248	251	250
Other		94	96	95
Total	13,905	13,986	14,027	14,007

Table 2-11: FOWD Deliveries by Type

User Type	Metered Delivery Volume (af)			
	2016	2017	2018	avg '17-'18
Single Family	6,546	7,225	7,366	7,296
Multi-Family	639	637	660	649
Comm./Inst.	473	524	529	527
Landscape	514	549	573	561
Other				0
Total	8,172	8,935	9,128	9,032

Table 2-12: Estimated Current FOWD Customer Water Demand (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	12,649	0.24	(indoor)	3,036
		0.33	(outdoor)	4,174
Multi-Family	618	1.05	(indoor)	649
			(outdoor)	0
			Res. Indoor Subtotal	3,685
			Res. Outdoor Subtotal	4,174
			Residential Total	7,859
Non-Residential				
Comm/Inst	396	1.35	(indoor)	534
Landscape	250	2.25	(outdoor)	561
Other	95	0.00	(outdoor)	0
			Non-Res. Indoor Subtotal	534
			Non-Res. Outdoor Subtotal	561
			Non-Res. Total	1,095
			Indoor Estimated Total	4,218
			Outdoor Estimated Total	4,735
			Total Estimated Customer Demand	8,954
			Estimated Non-Revenue Water 7%	627
			Total Estimated Supply Demand	9,600

2.1.3.4 Orange Vale Water Company

As shown in Figure 2-1, OVWC serves a smaller suburban and rural area within Sacramento County than either CHWD or FOWD. With an estimated population of about 16,700, OVWC has only about half of the connections compared to the District's retail service area (see Table 2-13). Similar to the District's retail area, about 95% of OVWD's customers are residential users, mostly single-family homes. The water delivered to these customers is presented in Table 2-14.

Table 2-13: OVWC Connections by Type

	Metered Connections			
User Type	2016	2017	2018	avg '17-'18
Single Family	5,228	5,223		5,223
Multi-Family	162	32		32
Comm./Inst.	167	179		179
Industrial	55	55		55
Landscape	47	39		39
Agriculture	6	3		3
Total	5,665	5,531	0	5,531

Table 2-14: OVWC Deliveries by Type

	Metered Delivery Volume (af)			
User Type	2016	2017	2018	avg '17-'18
Single Family	2,520	2,757		2,757
Multi-Family	289	294		294
Comm./Inst.	153	165		165
Industrial	159	180		180
Landscape	30	34		34
Agriculture	96	101		101
Total	3,247	3,530	0	3,530

Following the same process, an estimate of 'current water demand' of existing customers can be developed from this information. Data from the OVWC eAR reports was used to develop an estimate of existing customer water demand.[8] The resulting estimated current water demand for existing OVWC customers is shown in Table 2-15.

[8] Multiple family, commercial and industrial classifications are listed as "indoor" for reasons described for the Retail customers in Section 2.1.1.

Table 2-15: Estimated Current OVWC Customer Water Demand (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	5,223	0.22	(indoor)	1,149
		0.30	(outdoor)	1,588
Multi-Family	32	9.20	(indoor)	294
			(outdoor)	0
			Res. Indoor Subtotal	1,443
			Res. Outdoor Subtotal	1,588
			Residential Total	3,031
Non-Residential				
Comm/Inst	179	0.92	(indoor)	165
Industrial	55	3.28	(indoor)	180
Landscape	39	0.88	(outdoor)	34
Agriculture	3	33.50	(outdoor)	101
			Non-Res. Indoor Subtotal	345
			Non-Res. Outdoor Subtotal	135
			Non-Res. Total	480
			Indoor Estimated Total	1,789
			Outdoor Estimated Total	1,723
			Total Estimated Customer Demand	3,511
			Estimated Non-Revenue Water 5%	176
			Total Estimated Supply Demand	3,700

2.1.3.5 Summary of Current Wholesale Demands

Together, the current water demands for the existing customers in the WCA service areas, as represented in the prior tables, is about 26,400 acre-feet annually (see Table 2-16).

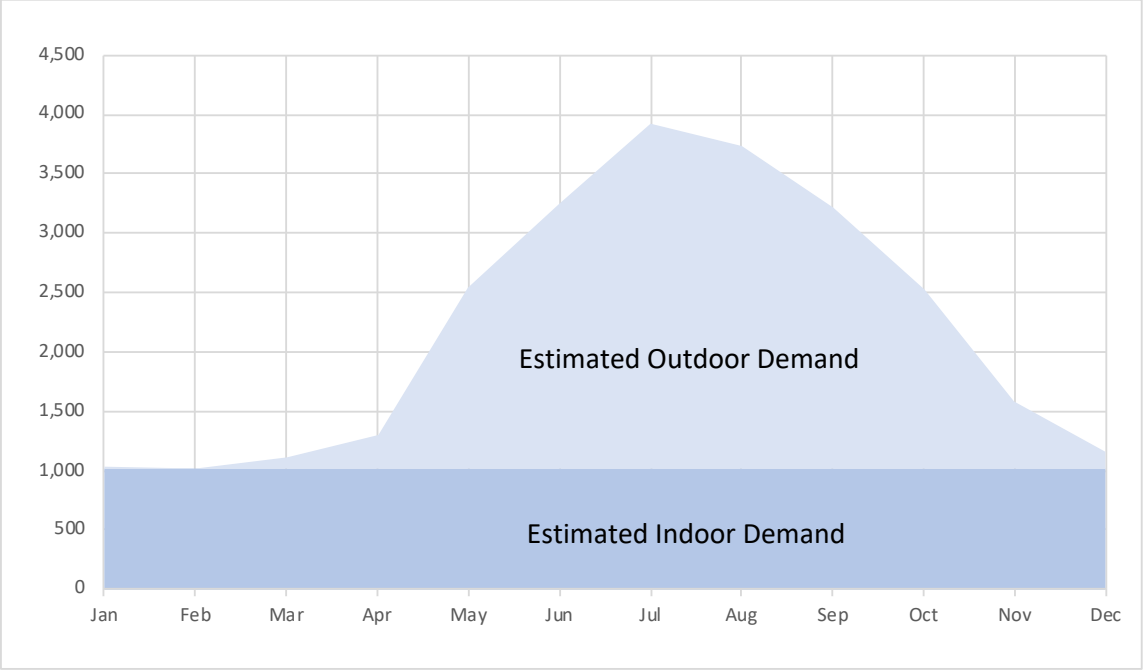
Table 2-16: Summary of Estimated Current SJWD Wholesale Customer Demands (acre-feet/year)

Metered Connections		Demand Factor (af/connection)		Demand
Residential				
Single Family	35,352	varies	(indoor)	7,690
		varies	(outdoor)	9,947
Multi-Family	2,867	varies	(indoor)	3,124
			(outdoor)	0
			Res. Indoor Subtotal	10,814
			Res. Outdoor Subtotal	9,947
			Residential Total	20,761
Non-Residential				
Comm/Inst	1,344	varies	(indoor)	1,648
Industrial	111	varies	(indoor)	502
Landscape	714	varies	(outdoor)	1,513
Ag/Other	214	varies	(outdoor)	122
			Non-Res. Indoor Subtotal	2,151
			Non-Res. Outdoor Subtotal	1,634
			Non-Res. Total	3,785
			Indoor Estimated Total	12,965
			Outdoor Estimated Total	11,581
			Total Estimated Customer Demand	24,545
			Estimated Non-Revenue Water	1,504
			Total Estimated Supply Demand	26,000

As with the District's retail demands, estimating annual WCA demands is a critical component in understanding the magnitude of supplies and treatment needed to meet total projected demands into the future. Understanding the monthly distribution of this demand is important to assess potential treatment and transmission capacity that might be available for use by non-wholesale customers on an annualized basis.

Figure 2-3 presents the cumulative estimated WCA annual demand in a monthly pattern. This figure was derived from a combination of monthly District delivery records to each WCA, combined with CHWD's and FOWD's groundwater pumping records for 2017 and 2018.

Figure 2-3: WCA Monthly Demand Pattern (acre-feet/month)



The figure further approximates the distribution between indoor and outdoor WCA customer demands – where indoor reflects residential indoor as well as the steady commercial and institutional demands that occur throughout the year.[9] While not exact, this separation illustrates the significant effect on total demand and the timing of that demand that accompanies irrigated landscapes (residential and public). As reflected in Table 2-16, 38% of the annual WCA demand is estimated to serve residential outdoor needs. However, during summer months, outdoor use represents about 70% of WCA monthly demand.

2.1.4 Demand Trends

The current surface and groundwater supplies needed to meet the District's retail and WCAs' existing customer demands totals about 37,300 acre-feet annually (11,300 acre-feet (SJWD retail) plus 26,000 acre-feet (WCAs)). This is significantly less than the amount of water the District delivered a decade ago, and prior to the significant 2013-2016 drought which resulted in reduced water use that has not recovered – and is not expected to recover fully – from those pre-drought levels. Based upon District metered delivery data to its retail and wholesale service areas, along with groundwater pumped by CHWD and FOWD, the average demand for 2011 through 2013 was over 45,000 acre-feet per year, ranging from about 42,300 acre-feet in 2011 (a

[9] Multiple family, commercial and industrial classifications are listed as "indoor" for reasons described for the Retail customers in Section 2.1.1.

very wet year) to 48,700 acre-feet in 2013 (a dry year and the beginning of an extended drought).[10]

In 2015, the State mandated emergency reductions in municipal water use, based on per-capita allowance calculations, which had a significant effect on the District's demand. The District's wholesale deliveries dropped to slightly more than 31,000 acre-feet. The estimated current demand presented above – 37,300 acre-feet – represents a post-drought return to a higher use, but also reflects a conservation "shadow" that appears to indicate current customers have permanently adopted water use habits that will likely result in deliveries not returning to pre-drought levels. In fact, the District's 2019 retail and wholesale deliveries, combined with WCA groundwater deliveries, totaled only about 37,500 acre-feet in what was an "average" water year.[11]

2.2 Demand Forecast Factors

Estimating future demands is subdivided into two categories: (1) changes to the per-connection water demand factors of existing customers expected over the next 25 years, and (2) the per-connection water demand factors for estimated new construction (e.g. new customers).

There are several factors that affect the development of unit water demand use, ranging from the types of replacement and new water-using fixtures and appliances, to State and local landscape restrictions, to State regulations (see below), to water-waste ordinances, to changes in the types of housing products being offered. These factors are incorporated into calculations used to determine adjustments to existing and new customer unit water demand factors discussed in this section. Characteristics of the factors relevant to projecting the District's retail and the WCA demands are described below.

2.2.1 State Imposed Water Conservation Objectives

In 2009, Governor Arnold Schwarzenegger signed Senate Bill No. 7 (SBX7-7), which established a statewide goal of achieving a 20 percent reduction in urban per capita water use by 2020 for urban retail water suppliers.[12] As reflected under the 'compliance per-capita use' reporting in the 2015 UWMPs, the District and each WCA are actively reducing current customer use through conservation efforts in order to demonstrate compliance with the 20 percent reduction target by the end of this year (2020) to be documented in the urban supplier's 2020 UWMP.

[10] During 2011-2013, water treated and delivered by San Juan to its retail customers and WCAs was all but about 1,000 acre-feet of groundwater. From 2001 through 2008, San Juan's deliveries averaged over 53,000 acre-feet.
[11] The District's WTP delivered about 34,000 acre-feet to retail and WCA customers. FOWD and CHWD pumped approximately 3,500 acre-feet.
[12] California Water Code § 10608.20.

Efforts undertaken by urban retail suppliers to comply with this statute, and their customers' resulting change in water use behaviors, have affected existing customer purchases of replacement appliances and fixtures, caused landscapes to alter, and generally created a continuing "conservation ethic."

In response to multi-year drought conditions starting in 2013, Governor Brown issued Executive Order B-37-16 in May 2016 entitled "*Making Water Conservation a California Way of Life*." In May 2018, Governor Brown signed into law SB 606 and AB 1668, which imposed additional statutory requirements above and beyond the 20 percent by 2020 target and resulted in ongoing requirements to establish retail water budgets based on standards for residential indoor and outdoor use and landscape use, along with loss control standards. The residential indoor use standard will decrease in 2030. These State mandates, in addition to setting standards for increasing water use efficiency, may serve to further reduce water demands of existing and future customers.

2.2.2 CALGreen Requirements

Beginning in January 2010, the California Building Standards Commission adopted the statewide mandatory Green Building Standards Code (hereafter the "CALGreen Code") requiring the installation of water-efficient indoor and outdoor infrastructure for all new projects after January 1, 2011. The CALGreen Code was incorporated as Part 11 into Title 24 of the California Code of Regulations and was revised in 2013 and in 2016 to address changes to the State's Model Water Efficient Landscape Ordinance ("MWELO") adopted during the drought. Revisions to CALGreen Code in 2019 modified sections to direct users to MWELO regulations already included elsewhere in the Code of Regulations.

The CAL Green Code applies to the planning, design, operation, construction, use and occupancy of every newly constructed or remodeled building or structure. All new residential and non-residential customers added to the District's and WCA's retail service areas since 2016 must meet the CALGreen Code as well as the outdoor requirements described by MWELO. Generally, remodels and new construction will satisfy these indoor requirements through the use of appliances and fixtures such as high-efficiency toilets, faucet aerators, on-demand water heaters, or other fixtures, as well as Energy Star and California Energy Commission-approved appliances. Outdoor requirements are discussed in the following subsection.

2.2.3 California Model Water Efficient Landscape Ordinance and County Ordinances

The Water Conservation in Landscaping Act was enacted in 2006, and has since been revised and expanded multiple times by the Department of Water Resources (DWR) resulting in today's Model Water Efficient Landscape Ordinance (MWELO).[13] In response to Governor Brown's executive order dated April 1, 2015, (EO B-29-15), DWR updated the MWELO and the

[13]Gov. Code §§ 65591-65599

California Water Commission approved the adoption and incorporation of the updated State standards for MWELO on July 15, 2015. MWELO requires a retail water supplier or a county to adopt the provisions of the MWELO or to enact its own provisions equal to or more restrictive than the MWELO provisions.[14] The changes included a reduction from 70 percent to 55 percent of the reference evapotranspiration (ETo) for the maximum amount of water that may be applied to a landscape for residential projects, and non-residential projects to 45 percent, which effectively reduces the landscape area that can be planted with high water use plants, such a turf. For residential projects, the allowable maximum coverage of high-water use plants is reduced to 25% of the landscaped area (down from 33%). The newly updated MWELO also now applies to new construction with a landscape area greater than 500 square feet (the prior MWELO only applied to landscapes greater than 2,500 square feet).[15]

2.2.4 Metering, Volumetric Pricing, and Water Budgets

California Water Code Section 525 required water purveyors to install meters on all new service connections after January 1, 1992. California Water Code Section 527 required water purveyors to charge for water based upon the actual volume of water delivered if a meter has been installed. Retail customers served by the District and WCAs are fully metered and billed in part based upon volume, which has had a substantial effect on water use and is reflected in the current water demand of existing customers.

2.2.5 Adjustment to Future Demands of Existing Customers

Existing customers' future unit demand factors are assumed to change mostly from drivers such as general homeowner fixture replacements and upgrades, increased awareness and management by homeowners of landscape irrigation scheduling, the District's and WCAs' water efficiency awareness and incentive programs, and other factors contributing to an increased awareness and ethic of water conservation.

For purposes of this analysis, the future demand of only the existing customers is estimated by applying a reduction to the outdoor residential demand factor for existing customers, though the reductions may actually occur within the existing residences and by other existing users such as commercial landscaping, commercial indoor use and public landscapes. This conservative reduction is estimated by applying a one-time, 5 percent reduction from the baseline per-connection residential outdoor factor in year 15, then maintaining the revised outdoor factor for the remaining years in this study. The following formulas present this conservative assumption:

- 5+ and 10+ years = 100% of baseline outdoor demand factor

[14] Placer County has a water efficient landscape ordinance under County Code Chapter 15, Article 15.75, and is consistent with the State's requirements. Sacramento County defers to the State's MWELO requirements.
[15] CCR Tit. 23, Div. 2, Ch. 27, Sec. 490.1.

- 15+ through 25+ years = 95% of baseline outdoor demand factor

Resulting values for the effect of these projected reductions on existing customer use in the retail service area and each WCA's service area are provided later in this section.

2.2.6 New Customer Demand Factors

Using the same factors previously described that effect per-connection water use, demand factors can be developed to apply to all new construction anticipated over the 25-year planning period.

2.2.6.1 Future Residential Per-Connection Demand Factors

Estimating the future demands of new residential customers requires a per-connection (per-dwelling) estimate of indoor and outdoor annual use. These factors can be determined using guidance in the State statutes and mandates discussed previously.

Residential Indoor Demand Factors for New Construction

For purposes of this analysis, the new residential indoor demand factors are:

- 0.18 acre-feet per year for all single-family houses on standard lots (e.g. RD-6; 6,500 sq. ft.; 0.15 ac). This is based upon an assumed occupancy of 3 people per unit and an assumed value of 55 gallons per person per day (gpcd).[16]

- 0.22 acre-feet per year for all single-family lots on residential estate lots (e.g. large lots). This assumes a slightly higher per-capita use of 65 gpcd, reflecting the generally higher indoor uses already occurring in rural estate housing in the District and OVWC. While not necessarily having more people per house, this higher value can reflect additional appliances, modified fixtures, and other water use factors that may not be in standard single-family homes.

- 0.12 acre-feet per year for multi-family dwellings, which assumes an average occupancy of 2 people per unit and an assumed value of 55 gallons per person per day (gpcd).

Residential Outdoor Demand Factors for New Construction

Outdoor demands for new construction are calculated based on regulations defined under the MWELO. The MWELO provides for determining the Maximum Applied Water Allowance (MAWA) where the maximum is determined as 55 percent of the reference evapotranspiration rate for the specific geographic area for every square foot of landscaped area, resulting in the following equation:

[16] The assumed per-person rate of 55 gallons per day is derived from California Water Code Section 10608.20(b)(2)(A), which states a value of 55 gallons per capita (i.e., per person) per day (gpcd) be used for estimating indoor residential use targets. In 2019, additional statutory language under CWC Section 10609.4(a) was adopted that establishes the indoor residential water use 'standard' to be 52.5 gpcd beginning in 2025 and as low as 50 gpcd by 2030. For purposes of this analysis, the higher value of 55 gpcd is assumed. If lower standards result, the demand would be expected to be lower than estimated in this study.

MAWA = (ETo)(0.62)(0.55 x LA), where ETo is the reference evapotranspiration in inches per year, and LA is the landscape area. 0.62 is a conversion factor to gallons. The resulting value is in "gallons per year."

A primary factor in this calculation is evapotranspiration (ET). The methodology directs the use of ET from a reference crop, such as maintained grass – a value referred to as ETo. The ETo value for the District's wholesale area is assumed to be 51 inches of water per year based on weather parameters recorded from the Fair Oaks CIMIS Weather Station.

The landscape area is the other primary factor. To be consistent with the residential indoor factors, three new construction lot-types are assumed with associated landscape areas as follows:

- A standard single-family lot, assumed as 6,500 square-feet (0.15 acres net), is estimated to have about 3,400 square-feet of landscape area.[17] This is derived by subtracting 2,100 square-feet for the home footprint and 1,000 square-feet for hardscape areas (e.g. driveway, walkways, patio). Using the MAWA equation, the landscape area would have an annual demand of 0.18 acre-feet per new home.

- For a rural estate lot, assumed at 40,000 square-feet (approximately 1 acre), a more significant portion is assumed to be landscaped. For this analysis, approximately 15,000 square-feet is assumed to be landscaped, reflecting about 1/3 of a lot, with the rest covered by the home and hardscape or non-irrigated areas. Using the MAWA equation, the landscape area would have an annual demand of 0.80 acre-feet per new home.

- For multi-family dwelling units, landscape areas typically are common, enjoyed by all the residents. However, a very conservative assumption is 500 square-feet of landscape area per unit. Using the MAWA equation, the landscape area would have an annual demand of 0.03 acre-feet per new unit.

As an example of the sensitivity of the outdoor demand factor in response to the single-family lot size, consider that a residential lot that has 3,400 square-feet of landscape at the maximum allowable use has a factor of 0.18 acre-feet per year, or about 180 acre-feet per 1,000 new houses. If the landscape area increases by 1,000 square-feet, the outdoor factor increases to 0.22 acre-feet per year – or about 230 acre-feet per 1,000 new houses. This is an increase in demand of approximately 50 acre-feet for every 1,000 new houses. Considering the limited growth expected in the District's retail and WCA areas – likely fewer than 5,000 new units combined – these assumptions could vary demand estimates by 200 to 300 acre-feet. With current demands

[17] A 6,500 square-foot lot equates to a lot density of about 6 units per acre. This is a conservative assumption given that many new developments are using higher densities with more of the lot being the home's footprint and other hardscape.

of over 35,000 acre-feet, estimated new development will likely not be a significant factor in future demand scenarios and estimates.

Note that each of these factors represents an estimated average for all new construction collectively – individual constructed units may vary higher or lower.

Non-Residential Demand Factors

The non-residential factors described below are based upon recent water use trends for similar types of land classifications found in other documents such as the District's and WCAs' 2015 UWMP, 2016 and 2017 eARs, or from analyzed meter data for other water agencies in the region.

- Commercial/Institutional use is estimated on a per-acre basis. For this analysis a conservative value of 1.25 acre-feet per gross acre per year is assumed.[18] Given the additional MWELO limits on non-residential landscaping (e.g. limits demand to only 45% of ETo), continued efforts to implement water efficient best management practices in commercial, retail and office installations, and a general expanding conservation ethic, this estimate can apply to the average new acreage established during the time horizon in this analysis.

- Public landscaping water use is also estimated on a per acre basis. Similar to the residential outdoor demand factor, this demand is based primarily on the MWELO's MAWA. However, for public park spaces, the MWELO allows for 100 percent of ETo, rather than limiting to 55 percent as required for residential landscapes or 45 percent for non-residential landscapes. As presented earlier, the ETo for the District's wholesale service area is estimated at 51 inches of water per year, resulting in an annual demand factor of 4.25 acre-feet per gross acre of park. This likely is conservatively high, given that new parks likely will have less turf and more hardscaped areas such as sport courts, non-irrigated play areas, pathways and rest areas.

Summary of Demand Factors for New Construction

Table 2-17 summarizes the demand factors for the various land-use types that are anticipated under the forecast of future new customers for the District and the WCAs.

[18] Tully & Young reviewed a number of water systems individual customer meter data from throughout northern California, including adjacent water systems, and has developed demand factors for a number of customer classes on both a per acre and per connection basis as is most appropriate. The water demand numbers used in this and other sections were derived by Tully & Young using largely non-public data. Sample work includes meter analysis for El Dorado Irrigation District, the City of Lincoln and the City of Folsom. The results of these analyses show annual commercial demand ranging from greater than 2 af/ac for restaurants, etc., and less than 1 af/ac for shops and stores with only an employee/customer restroom. These values are based on gross acres, including landscape, parking and delivery areas typically associated with commercial establishments.

Table 2-17: Future Growth Demand Factors

Category	Demand Factor (af/du or af/ac)	
Residential		
Future Single-family	0.18	(indoor)
	0.18	(outdoor)
Future Rural Estate	0.22	(indoor)
	0.80	(outdoor)
Future Multi-family	0.12	(indoor)
	0.03	(outdoor)
Non-residential		
Future Commercial	1.25	(indoor)
Future Public Landscape	4.25	(outdoor)

2.3 Forecast Water Demands

With 'current water demands' for the retail area as well as each of the WCAs as a baseline, future demands for both the existing customers and anticipated new customers can be estimated and added to the current demands to estimate the overall future needs for the District.

2.3.1 Future Retail Demands

Future water demand in the District's retail service area will be a combination of the continued water demand of existing customers plus the addition of new customers resulting from ongoing growth.

2.3.1.1 Existing Retail Customers

As discussed previously, the District's existing retail customers' overall demands are anticipated to slightly reduce from the current baseline. Using the reduction formula presented previously, the per-connection outdoor water demand factors for existing single-family customers are adjusted 5 percent lower than the baseline starting at year +15, as shown in Table 2-18 (note the single-family residential indoor factor is not modified).

Table 2-18: Per-connection Outdoor Demand Factor for District Retail Customers

User Type	Demand Factor (af/connection)				
	Current	+5 yrs	+10 yrs	+15 yrs	
Single Family	0.28	0.28	0.28	0.28	(indoor)
	0.62	0.62	0.62	0.59	(outdoor)

Because the District's retail service area already has a fairly high per-connection single-family outdoor demand factor as a baseline, the phased conservation and reduction in this value over the next fifteen years has a fairly modest impact on the future demand estimates for the District's existing retail customers. Table 2-19 presents the forecast demand for the District's existing retail customers over the next 25 years.

Table 2-19: Existing Retail Customer Future Water Demand

Metered Connections			Existing Customer Estimated Demand (af/yr)					
			Current	2025	2030	2035	2040	2045
Residential								
Single Family	10,039	(indoor)	2,811	2,811	2,811	2,811	2,811	2,811
		(outdoor)	6,224	6,224	6,224	5,913	5,913	5,913
Multi-Family	119	(indoor)	137	137	137	137	137	137
		(outdoor)	0	0	0	0	0	0
Res. Indoor Subtotal			2,948	2,948	2,948	2,948	2,948	2,948
Res. Outdoor Subtotal			6,224	6,224	6,224	5,913	5,913	5,913
Residential Total			9,172	9,172	9,172	8,861	8,861	8,861
Non-Residential								
Comm/Inst	263	(indoor)	395	395	395	395	395	395
Landscape	213	(outdoor)	852	852	852	852	852	852
Agriculture	8	(outdoor)	40	40	40	40	40	40
Non-Res. Indoor Subtotal			395	395	395	395	395	395
Non-Res. Outdoor Subtotal			892	892	892	892	892	892
Non-Res. Total			1,287	1,287	1,287	1,287	1,287	1,287
Indoor Estimated Total			3,342	3,342	3,342	3,342	3,342	3,342
Outdoor Estimated Total			7,116	7,116	7,116	6,805	6,805	6,805
Total Estimated Customer Demand			10,458	10,458	10,458	10,147	10,147	10,147
Est. Non-Revenue Water		8%	868	868	868	842	842	842
Total Estimated Supply Demand			11,300	11,300	11,300	11,000	11,000	11,000

2.3.1.2 New Customers

Covering a large area adjacent to Folsom Reservoir including parts of Granite Bay, known for large lots with extensive landscaping, the District's retail service area demands still have room for limited growth. In addition, using projections from the Sacramento Area Council of Governments (SACOG) among other sources, the District's 2015 UWMP projected approximately 3,300 additional residents would be added to the District's retail service area by 2040.[19] Estimates are continually being refined as SACOG introduces updates to various plans and documents. The latest growth projections are included in modeling results associated with the SACOG 2016 and 2020 MTP/SCS.[20] The modeling broke down the area into small multi-block sections, referred to as Traffic Analysis Zones (TAZs), to increase the accuracy of projections.[21] The 2016 MTP/SCS included modeled population and dwelling unit projections that have been used to develop approximate growth baselines and trends.

[19] Table 3-1a, p. 3-5. *Final, 2015 Urban Water Management Plan*, San Juan Water District, June 2016.
[20] Metropolitan Transportation Plan (MTP) and Sustainable Community Strategy (SCS). The 2020 MTP/SCS was adopted in November of 2019 and provides more recent analysis however the data was not broken down to the same detail as the 2016 Model. As such, the 2020 data is considered and used to modify the more detailed 2016 data.
[21] The Traffic Analysis Zones (TAZs) are the most detailed sections, at approximately 400-acre for each TAZ. Regional Analysis Districts (RADs), Census Designated Places (CDPs), and Zip Code Tabulation Areas (ZCTAs) are all larger.

For TAZs that approximately cover the District's retail service area, the 2016 MTP/SCS projects a growth rate of approximately 0.4 % and approximately 600 new residential units by 2036.[22] Extending this to 2045 would add another 500 units for a total of approximately 1,100 new units by 2045. This estimated additional number of residential customers is reasonable and is consistent with the previous analysis completed as part of the 2015 UWMP.[23]

For this analysis new residential connections are conservatively allocated as 950 new single-family homes, 25 new rural estate homes, and 125 new multi-family homes. Nominal additional commercial and public landscaping are assumed to also be in place by 2045 to support the additional housing, represented as 30 acres of new commercial development and 15 acres of new public landscaped areas. Table 2-20 details these assumptions, phased over the 25-year period.

Table 2-20: Estimated Future New Retail Customer Demand (acre-feet/year)

Land-class	Total New Units or Acres					Demand Factor (af/du or af/ac)		Approximate Year				
	2025	2030	2035	2040	2045			2025	2030	2035	2040	2045
Residential												
Future Single-family	50	210	425	650	950	0.18	(indoor)	9	38	77	117	171
						0.18	(outdoor)	9	38	77	117	171
Future Rural Estate	5	10	15	20	25	0.22	(indoor)	1	2	3	4	6
						0.80	(outdoor)	4	8	12	16	20
Future Multi-family	0	20	50	75	125	0.12	(indoor)	0	2	6	9	15
						0.03	(outdoor)	0	1	2	2	4
Residential Indoor Subtotal								10	42	86	130	192
Residential Outdoor Subtotal								13	46	90	135	195
Residential Total								23	89	176	266	386
Non-Residential												
Future Commercial	5	10	15	25	30	1.25	(indoor)	6	13	19	31	38
Future Public Landscape	0	5	10	15	15	4.25	(outdoor)	0	21	43	64	64
Non-residential Total								6	34	61	95	101
Indoor Estimated Total								16	55	105	162	229
Outdoor Estimated Total								13	68	133	199	259
Total Estimated Future Customer Demand								29	123	237	361	488
Estimated Non-Revenue Water						7%		2	9	17	25	34
Total Estimated Future Supply Demand								31	131	254	386	522

2.3.1.3 Summary of Future Retail Demand

While new customers will be added to the retail service area, increased water use efficiency and some additional conservation efforts expected of existing customers will offset a portion of this growth by 300 acre-feet and result in a nominal gain of about 200 acre-feet per year by 2045. Table 2-21 presents the overall expected change in the District's retail service area demands from current to 2045; combining the forecasts for existing and new customers. Additionally, it is

[22] Note that the 2016 Model starts with a population and housing count that exceeds the actual District population by about 10% so these estimates are already high without consideration of actual growth area.

[23] The 2015 UWMP projected about 3,300 new people by 2040. The District's eAR reports a current population of about 29,500, equivalent to the 2015 population presented in the 2015 UWMP. The District's eAR also indicates an occupancy rate of 2.9 people per dwelling unit thus 3,300 additional people would need approximately 1,100 new dwelling units.

likely that conservation savings will mostly be through reduced summer irrigation of landscaping as a result of reduced landscape acreage, which will also result in a slight flattening of the monthly demand pattern that the District currently experiences.[24] This is discussed further in a separate section of this analysis.

Table 2-21: Total Forecast Future Retail Water Demands

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	9,035	9,035	9,035	8,724	8,724	8,724
	Multi-family	137	137	137	137	137	137
	Commercial	395	395	395	395	395	395
	Landscape	852	852	852	852	852	852
	Agriculture	40	40	40	40	40	40
	Subtotal	10,458	10,458	10,458	10,147	10,147	10,147
	Non-revenue water	868	868	868	842	842	842
	Total Existing Customers	11,300	11,300	11,300	11,000	11,000	11,000
New Customers	Single Family	--	18	76	154	234	342
	Rural Estate	--	5	10	15	20	26
	Multi-family	--	0	3	8	11	19
	Commercial/Inst.	--	6	13	19	31	38
	Public Landscape	--	0	21	43	64	64
	Agriculture	--	--	--	--	--	--
	Subtotal	--	29	123	239	360	489
	Non-revenue water	--	2	9	17	25	34
	Total Future Customers	--	31	132	256	385	523
Total Water Demand		11,300	11,300	11,400	11,300	11,400	11,500

2.3.2 Future Wholesale Customer Agency Demands

Similar to the District's retail service area, the WCAs future water demands will be affected by a combination of changes to existing customer demands as well as the addition of new customers as regional growth and in-fill continues. This section details the expected future conditions of both these customers – existing and new – for each of the WCAs.

2.3.2.1 CHWD Future Demands

Future water demand in CHWD's service area will be a combination of the continued water demand of existing customers plus the addition of new customers resulting from ongoing growth, including the unique potential for a large-scale, mixed use redevelopment at the current Sunrise Mall property. An estimate for this future demand is provided as an addition to other expected growth in the CHWD service area.

[24] Reduced summer irrigation is a predicted outcome resulting from the District's efforts to satisfy 'water use objectives' set forth in California Water Code Section 10609.20 et seq. Even if changing climatic conditions result in higher average summer temperatures, potentially increasing the ET needs of landscaping during summer months, the management of overall water use for landscaping may be the most appropriate method for the District to comply with these new statutory provisions. However, the District will assess this more thoroughly as the State process for determining each supplier's 'water use objective' is further developed.

Existing CHWD Customers

As discussed previously, existing customers are anticipated to slightly reduce overall demand from the current baseline. Using the reduction formula presented previously, the per-connection outdoor water demand factors for existing single-family customers are adjusted 5 percent lower than the baseline at year +15, as shown in Table 2-22 (note the single-family residential indoor factor is not modified).

Table 2-22: Per-connection Outdoor Demand Factor for CHWD Customers

User Type	Demand Factor (af/connection)				
	Current	+5 yrs	+10 yrs	+15 yrs	
Single Family	0.20	0.20	0.20	0.20	(indoor)
	0.23	0.23	0.23	0.22	(outdoor)

Because the CHWD service area already has a fairly low per-connection single-family outdoor demand factor as a baseline, the phased conservation and reduction in this value over the next fifteen years has a fairly minor impact on the future demands of CHWD's existing retail customers. Table 2-23 presents the forecast demand for CHWD's existing retail customers over the next 25 years.

Table 2-23: Existing CHWD Customer Future Water Demand

Metered Connections			Existing Customer Estimated Demand (af/yr)					
			Current	2025	2030	2035	2040	2045
Residential								
Single Family	16,513	(indoor)	3,303	3,303	3,303	3,303	3,303	3,303
		(outdoor)	3,798	3,798	3,798	3,608	3,608	3,608
Multi-Family	2,187	(indoor)	1,946	1,946	1,946	1,946	1,946	1,946
		(outdoor)	0	0	0	0	0	0
Res. Indoor Subtotal			5,249	5,249	5,249	5,249	5,249	5,249
Res. Outdoor Subtotal			3,798	3,798	3,798	3,608	3,608	3,608
Residential Total			9,047	9,047	9,047	8,857	8,857	8,857
Non-Residential								
Comm/Inst	726	(indoor)	871	871	871	871	871	871
Industrial	56	(indoor)	322	322	322	322	322	322
Landscape	394	(outdoor)	847	847	847	847	847	847
Other	211	(outdoor)	21	21	21	21	21	21
Non-Res. Indoor Subtotal			1,193	1,193	1,193	1,193	1,193	1,193
Non-Res. Outdoor Subtotal			868	868	868	868	868	868
Non-Res. Total			2,061	2,061	2,061	2,061	2,061	2,061
Indoor Estimated Total			6,442	6,442	6,442	6,442	6,442	6,442
Outdoor Estimated Total			4,666	4,666	4,666	4,476	4,476	4,476
Total Estimated Customer Demand			11,108	11,108	11,108	10,919	10,919	10,919
Est. Non-Revenue Water		5%	555	555	555	546	546	546
Total Estimated Supply Demand			11,700	11,700	11,700	11,500	11,500	11,500

New CHWD Customers

The City of Citrus Heights and CHWD do not share boundaries, however a significant portion of the City is served by CHWD. Like the other WCAs, new customers will reflect only a scattering of infill projects, including some corridor developments. The 2016 MTP/SCS projects a growth rate of approximately 0.4% from current conditions to 2036 which translates to approximately 2,500 new residential units by 2036.[25] When compared to the previous 2015 UWMP, this growth is consistent.[26] The SACOG projections were revised for the 2020 MTP/SCS update and maintain the previous projections but add approximately 100 units per year after 2036 – or approximately another 1,000 new units for a total of 3,500 new units. This range of development was discussed with CHWD staff and was accepted as a reasonable assumption for planning purposes.[27] For this analysis, the new residential connections are split as 2,000 new single-family homes and 1,500 new multi-family homes. Nominal additional commercial and public landscaping are assumed to be in place by 2045 to support the additional housing, represented as 50 acres of new commercial development and 30 acres of new public landscaped areas. Table 2-23 details these assumptions, phased over the 25-year period.

In addition to anticipated growth, the large Sunrise Mall property is likely going to be redeveloped during the time horizon of this analysis. This has not been factored into the SACOG projections and therefore a separate potential suite of associated new customers as part of such a large redevelopment project has been incorporated into the projections discussed herein. The parcel totals about 100 acres. Large, mixed-use redevelopments that include single-family and multi-family homes, supporting retail and commercial space, and public spaces can include 500 to 1,000 new homes, depending on densities. Because this project is in the early stages, estimating water demand and phasing is difficult.[28] For purposes of this analysis, a future water demand equivalent to 800 new single-family homes and 10 acres of commercial and 5 acres of public landscaping is assumed. Using the prior demand factors for each, such a mixed-use project could demand approximately 300 to 350 acre-feet annually. The higher value is assumed and phased between 2030 and 2045 and is included as a line-item in Table 2-24.

[25] Note that the 2016 Model starts with a population and housing count that exceeds the actual District population by about 10% so these estimates are already high without consideration of actual growth area.
[26] The CHWD 2015 UWMP projected approximately 6,500 more people by 2035 which is less than the SACOG projection of 9,415.
[27] Meeting with CHWD staff on 9/17/2019.
[28] In July 2019, the City of Citrus Heights approved actions that allow the planning process for a mixed-use redevelopment of Sunrise Mall to move forward. Because the difference between the water use demands for a new development and that of the existing Sunrise Mall cannot be determined at this time, the new development's demand is assumed to be additive to any existing demand reflected in the CHWD eAR reports used to establish 'current customer demands.'

Table 2-24: Estimated Future New CHWD Customer Demand (acre-feet/year)

Land-class	Total New Units or Acres					Demand Factor (af/du or af/ac)		Approximate Year				
	2025	2030	2035	2040	2045			2025	2030	2035	2040	2045
Residential												
Future Single-family	400	800	1,200	1,600	2,000	0.18	(indoor)	72	144	216	288	360
						0.18	(outdoor)	72	144	216	288	360
Future Multi-family	100	300	700	1,100	1,500	0.12	(indoor)	12	36	84	132	180
						0.03	(outdoor)	3	9	21	33	45
Residential Indoor Subtotal								84	180	300	420	540
Residential Outdoor Subtotal								75	153	237	321	405
Residential Total								159	333	537	741	945
Non-Residential												
Future Commercial	5	15	30	40	50	1.25	(indoor)	6	19	38	50	63
Future Public Landscape	2	8	15	25	30	4.25	(outdoor)	9	34	64	106	128
Non-residential Total								15	53	101	156	190
Indoor Estimated Total								90	199	338	470	603
Outdoor Estimated Total								84	187	301	427	533
Sunrise Mall Mixed Use Redevelopment Project (placeholder)								--	50	150	250	350
Total Estimated Future Customer Demand								174	436	788	1,147	1,485
Estimated Non-Revenue Water						7%		12	31	55	80	104
Total Estimated Future Supply Demand								186	466	843	1,228	1,589

Summary of Future CHWD Demands

CHWD will likely see the greatest increase in demand of any WCA, with a forecasted increase of about 1,400 acre-feet annually by 2045. While existing customers are projected to decrease their annual demand, likely as a result of continued water use efficiency and conservation efforts, CHWD's service area is expected to see modest growth, primarily as a consequence of the expected redevelopment of the Sunrise Mall parcel. Though the overall demand will increase, the monthly pattern may likely flatten due to lower peak demands for summer irrigation as existing customers reduce this need, and new customers irrigate reduced landscape areas consistent with updated MWELO requirements. Table 2-25 presents the forecast of future CHWD water demands through 2045.

Table 2-25: Total Forecast Future CHWD Water Demands

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	7,101	7,101	7,101	6,911	6,911	6,911
	Multi-family	1,946	1,946	1,946	1,946	1,946	1,946
	Commercial	871	871	871	871	871	871
	Industrial	322	322	322	322	322	322
	Landscape	847	847	847	847	847	847
	Other	21	21	21	21	21	21
	Subtotal	11,108	11,108	11,108	10,919	10,919	10,919
	Non-revenue water	555	555	555	546	546	546
	Total Existing Customers	11,700	11,700	11,700	11,500	11,500	11,500
New Customers	Single Family	--	144	288	432	576	720
	Multi-family	--	15	45	105	165	225
	Commercial/Inst.	--	6	19	38	50	63
	Public Landscape	--	9	34	64	106	128
	Sunrise Mall Redev.	--	--	50	150	250	350
	Subtotal	--	174	436	788	1,147	1,485
	Non-revenue water	--	12	31	55	80	104
	Total Future Customers	--	186	466	843	1,228	1,589
Total Water Demand		**11,700**	**11,900**	**12,200**	**12,300**	**12,700**	**13,100**

2.3.2.2 City of Folsom Future Demands

Future water demand within the City's Ashland service area will be a combination of the continued water demand of existing customers plus the addition of new customers resulting from ongoing growth. Because this area is nearly built-out, the overall change from current conditions is minor.

Existing City of Folsom Customers

As discussed previously, existing customers' future demands are anticipated to be slightly reduced from the current baseline. Using the reduction formula presented previously, the per-connection outdoor water demand factors for existing single-family customers are adjusted 5 percent lower than the baseline at year +15, as shown in Table 2-26 (note the single-family residential indoor factor is not modified).

Table 2-26: Per-connection Outdoor Demand Factor for Folsom Customers

User Type	Demand Factor (af/connection)				
	Current	+5 yrs	+10 yrs	+15 yrs	
Single Family	0.21	0.21	0.21	0.21	(indoor)
	0.40	0.40	0.40	0.38	(outdoor)

Because there are relatively few single-family residential units in the City's Ashland service area, a reduction in the per-connection single-family outdoor demand factor over the next fifteen years has a barely notable impact on future demands for the City's existing Ashland retail customers. Table 2-27 presents the forecast demand for the City's existing Ashland retail

customers over the next 25 years, which essentially stands unchanged (due to rounding of the last row's values to reflect the approximation of the estimates).

Table 2-27: Existing Folsom Ashland Customer Future Water Demand

Metered Connections			Existing Customer Estimated Demand (af/yr)					
			Current	2025	2030	2035	2040	2045
Residential								
Single Family	967	(indoor)	203	203	203	203	203	203
		(outdoor)	387	387	387	367	367	367
Multi-Family	30	(indoor)	234	234	234	234	234	234
		(outdoor)	0	0	0	0	0	0
Res. Indoor Subtotal			437	437	437	437	437	437
Res. Outdoor Subtotal			387	387	387	367	367	367
Residential Total			824	824	824	805	805	805
Non-Residential								
Comm/Inst	44	(indoor)	78	78	78	78	78	78
Landscape	31	(outdoor)	70	70	70	70	70	70
Non-Res. Indoor Subtotal			78	78	78	78	78	78
Non-Res. Outdoor Subtotal			70	70	70	70	70	70
Non-Res. Total			148	148	148	148	148	148
Indoor Estimated Total			515	515	515	515	515	515
Outdoor Estimated Total			457	457	457	437	437	437
Total Estimated Customer Demand			972	972	972	953	953	953
Est. Non-Revenue Water		15%	146	146	146	143	143	143
Total Estimated Supply Demand			1,100	1,100	1,100	1,100	1,100	1,100

New City of Folsom Customers

City's water service area that receives wholesale water from the District – i.e. the Ashland service area – is predominantly built-out. A few remaining buildable lots do exist, however, and are expected to be constructed upon during the 25-year period of this analysis. Specifically, there are less than 10 acres of commercially zoned properties and 9 acres of residentially zoned land still vacant.[29] No new parks are expected as the developments are mostly on small lot-splits that likely will rely on existing public park space. The residentially zoned land includes both single-family and multi-family zoning. For purposes of this analysis, 5 acres is assumed single-family, with a density of 6 house per acre. The remaining 4 acres are assumed to house multi-family dwellings at 15 units per acre. This results in 30 single family homes and 60 multi-family units. Table 2-28 details these assumptions, phased over the 25-year period.

[29] Based on a City of Folsom Vacant Land shapefile received 9/18/2019 from Information Systems GIS Specialist Kate Cassera at the City.

Table 2-28: Estimated Future New Folsom Customer Demand (acre-feet/year)

Land-class	Total New Units or Acres					Demand Factor (af/du or af/ac)		Approximate Year				
	2025	2030	2035	2040	2045			2025	2030	2035	2040	2045
Residential												
Future Single-family	5	10	15	20	30	0.18	(indoor)	1	2	3	4	5
						0.18	(outdoor)	1	2	3	4	5
Future Multi-family	15	30	45	60	60	0.12	(indoor)	2	4	5	7	7
						0.03	(outdoor)	0	1	1	2	2
Residential Indoor Subtotal								3	5	8	11	13
Residential Outdoor Subtotal								1	3	4	5	7
Residential Total								4	8	12	16	20
Non-Residential												
Future Commercial	0	0	0	0	0	1.25	(indoor)	0	0	0	0	0
Future Public Landscape	0	0	0	0	0	4.25	(outdoor)	0	0	0	0	0
Non-residential Total								0	0	0	0	0
Indoor Estimated Total								3	5	8	11	13
Outdoor Estimated Total								1	3	4	5	7
Total Estimated Future Customer Demand								4	8	12	16	20
Estimated Non-Revenue Water						7%		0	1	1	1	1
Total Estimated Future Supply Demand								4	9	13	17	21

Summary of Future City of Folsom Ashland Area Demands

The City's Ashland service area will likely experience minimal change in future customer demands. Even with some conservation from existing customers and some new customers, the overall demand is minor and the additions negligible. Table 2-29 presents the summary of forecasted existing and new customer demands through 2045.

Table 2-29: Total Forecast Future City of Folsom (Ashland) Water Demands

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	590	590	590	571	571	571
	Multi-family	234	234	234	234	234	234
	Commercial	78	78	78	78	78	78
	Landscape	70	70	70	70	70	70
	Subtotal	972	972	972	953	953	953
	Non-revenue water	146	146	146	143	143	143
	Total Existing Customers	1,100	1,100	1,100	1,100	1,100	1,100
New Customers	Single Family	--	2	4	5	7	11
	Multi-family	--	2	5	7	9	9
	Subtotal	--	4	8	12	16	20
	Non-revenue water	--	1	1	1	1	1
	Total Future Customers	--	5	9	13	17	21
Total Water Demand		1,100	1,100	1,100	1,100	1,100	1,100

2.3.2.3 FOWD Future Demands

Future water demand within the FOWD service area will be a combination of the continued water demand of existing customers plus the addition of new customers resulting from ongoing growth.

Existing FOWD Customers

As discussed previously, existing customers' future demands are anticipated to be slightly reduced from the current baseline. Using the reduction formula presented previously, the per-connection outdoor water demand factors for existing single-family customers are adjusted 5 percent lower than the baseline at year +15, as shown in Table 2-30 (note the single-family residential indoor factor is not modified).

Table 2-30: Per-connection Outdoor Demand Factor for FOWD Customers

User Type	Demand Factor (af/connection)				
	Current	+5 yrs	+10 yrs	+15 yrs	
Single Family	0.24	0.24	0.24	0.24	(indoor)
	0.33	0.33	0.33	0.31	(outdoor)

Although the FOWD service area has a fairly modest per-connection single-family outdoor demand factor as a baseline, the phased conservation and reduction in this value over the next fifteen years has only a minor impact on future demand for FOWD's existing retail customers – reducing demand by approximately 200 acre-feet annually. Table 2-31 presents the forecast demand for the FOWD existing retail customers over the next 25 years.

Table 2-31: Existing FOWD Customer Future Water Demand

Metered Connections			Existing Customer Estimated Demand (af/yr)					
			Current	2025	2030	2035	2040	2045
Residential								
Single Family	12,649	(indoor)	3,036	3,036	3,036	3,036	3,036	3,036
		(outdoor)	4,174	4,174	4,174	3,965	3,965	3,965
Multi-Family	618	(indoor)	649	649	649	649	649	649
		(outdoor)	0	0	0	0	0	0
Res. Indoor Subtotal			3,685	3,685	3,685	3,685	3,685	3,685
Res. Outdoor Subtotal			4,174	4,174	4,174	3,965	3,965	3,965
Residential Total			7,859	7,859	7,859	7,650	7,650	7,650
Non-Residential								
Comm/Inst	396	(indoor)	534	534	534	534	534	534
Landscape	250	(outdoor)	561	561	561	561	561	561
Non-Res. Indoor Subtotal			534	534	534	534	534	534
Non-Res. Outdoor Subtotal			561	561	561	561	561	561
Non-Res. Total			1,095	1,095	1,095	1,095	1,095	1,095
Indoor Estimated Total			4,218	4,218	4,218	4,218	4,218	4,218
Outdoor Estimated Total			4,735	4,735	4,735	4,527	4,527	4,527
Total Estimated Customer Demand			8,954	8,954	8,954	8,745	8,745	8,745
Est. Non-Revenue Water		7%	627	627	627	612	612	612
Total Estimated Supply Demand			9,600	9,600	9,600	9,400	9,400	9,400

New FOWD Customers

The FOWD service area covers a portion of Sacramento County which consists of mostly moderate and large-lot single family homes. The community covers a range of housing ages but is largely considered to be built-out. Infill developments have occurred and are expected to continue (e.g. larger legacy properties are subdivided, and multiple single-family homes are constructed). Based on the 2016 MTP/SCS, the FOWD area was projected to experience a growth rate of approximately 0.4% from current conditions until 2036, which translates to approximately 75 new residences per year. If extending this rate for 25 years, this would result in 1,875 new housing units (single-family and multi-family). When compared to the current 13,200 residential connections (see Table 2-8), and actual vacant developable land, this projection appears excessive. Following discussions with FOWD staff, a more reasonable growth estimate was determined to be approximately 500 new dwelling units within the 25-year planning horizon.[30] The primary growth in FOWD is from the Gum Ranch Subdivisions, approximately 100 units in other identified smaller subdivisions, and 5-10 smaller lot split projects per year. For this analysis the new residential connections are split as 400 new single-family homes and 100 new multi-family homes. Nominal additional commercial and public landscaping are assumed to be in place by 2035 to support the additional housing, represented as 10 acres of new commercial development and 6 acres of new public landscaped areas. Table 2-32 details these assumptions, phased over the 25-year period.

Table 2-32: Estimated Future New FOWD Customer Demand (acre-feet/year)

	Total New Units or Acres					Demand Factor		Approximate Year				
Land-class	2025	2030	2035	2040	2045	(af/du or af/ac)		2025	2030	2035	2040	2045
Residential												
Future Single-family	50	100	200	400	400	0.18	(indoor)	9	18	36	72	72
						0.18	(outdoor)	9	18	36	72	72
Future Multi-family	12	25	50	100	100	0.12	(indoor)	1	3	6	12	12
						0.03	(outdoor)	0	1	2	3	3
Residential Indoor Subtotal								10	21	42	84	84
Residential Outdoor Subtotal								9	19	38	75	75
Residential Total								20	40	80	159	159
Non-Residential												
Future Commercial	2	5	10	10	10	1.25	(indoor)	3	6	13	13	13
Future Public Landscape	2	4	6	6	6	4.25	(outdoor)	9	17	26	26	26
Non-residential Total								11	23	38	38	38
Indoor Estimated Total								13	27	55	97	97
Outdoor Estimated Total								18	36	63	101	101
Total Estimated Future Customer Demand								31	63	118	197	197
Estimated Non-Revenue Water						7%		2	4	8	14	14
Total Estimated Future Supply Demand								33	67	126	211	211

Summary of Future FOWD Demands

FOWD will unlikely see continued reduction in overall water demand, even with the addition of some new customers. This is primarily driven by only minor expected savings from ongoing

[30] Meeting with FOWD staff on 10/31/2019.

existing customer conservation efforts. In addition to overall demand decreasing, the monthly use pattern may likely flatten due to lower peak demands for summer irrigation as existing customers reduce this need, and the few new customers begin with landscapes consistent with updated MWELO requirements. Table 2-33 presents the summary of forecast existing and new customer demands through 2045.

Table 2-33: Total Forecast Future FOWD Water Demands

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	7,210	7,210	7,210	7,001	7,001	7,001
	Multi-family	649	649	649	649	649	649
	Commercial	535	535	535	535	535	535
	Landscape	563	563	563	563	563	563
	Subtotal	8,956	8,956	8,956	8,747	8,747	8,747
	Non-revenue water	627	627	627	612	612	612
	Total Existing Customers	9,600	9,600	9,600	9,400	9,400	9,400
New Customers	Single Family	--	18	36	72	144	144
	Multi-family	--	2	4	8	15	15
	Commercial/Inst.	--	3	6	13	13	13
	Public Landscape	--	9	17	26	26	26
	Subtotal	--	31	63	118	197	197
	Non-revenue water	--	2	4	8	14	14
	Total Future Customers	--	33	67	126	211	211
Total Water Demand		**9,600**	**9,600**	**9,700**	**9,500**	**9,600**	**9,600**

2.3.2.4 OVWC Future Demands

Future water demand within the OVWC service area will be a combination of the continued water demand of existing customers plus the addition of new customers resulting from ongoing growth.

Existing OVWC Customers

As discussed previously, existing customers' future demands are anticipated to be slightly reduced from the current baseline. Using the reduction formula presented previously, the per-connection outdoor water demand factors for existing single-family customers are adjusted 5 percent lower than the baseline at year +15, as shown in Table 2-34 (note the single-family residential indoor factor is not modified).

Table 2-34: Per-connection Outdoor Demand Factor for OVWC Customers

User Type	Demand Factor (af/connection)				
	Current	+5 yrs	+10 yrs	+15 yrs	
Single Family	0.22	0.22	0.22	0.22	(indoor)
	0.30	0.30	0.30	0.29	(outdoor)

Although the OVWC service area has a fairly modest per-connection single-family outdoor demand factor as a baseline, the phased conservation and reduction in this value over the next

fifteen years has little effect on future demand for OVWC's existing retail customers – reducing demand by only about 100 acre-feet annually. Table 2-35 presents the forecast demand for the District's existing retail customers over the next 25 years.

Table 2-35: Existing OVWC Customer Future Water Demand

Metered Connections			Existing Customer Estimated Demand (af/yr)					
			Current	2025	2030	2035	2040	2045
Residential								
Single Family	5,223	(indoor)	1,149	1,149	1,149	1,149	1,149	1,149
		(outdoor)	1,588	1,588	1,588	1,508	1,508	1,508
Multi-Family	32	(indoor)	294	294	294	294	294	294
		(outdoor)	0	0	0	0	0	0
Res. Indoor Subtotal			1,443	1,443	1,443	1,443	1,443	1,443
Res. Outdoor Subtotal			1,588	1,588	1,588	1,508	1,508	1,508
Residential Total			3,031	3,031	3,031	2,952	2,952	2,952
Non-Residential								
Comm/Inst	179	(indoor)	165	165	165	165	165	165
Industrial	55	(indoor)	180	180	180	180	180	180
Landscape	39	(outdoor)	34	34	34	34	34	34
Agriculture	3	(outdoor)	101	101	101	101	101	101
Non-Res. Indoor Subtotal			345	345	345	345	345	345
Non-Res. Outdoor Subtotal			135	135	135	135	135	135
Non-Res. Total			480	480	480	480	480	480
Indoor Estimated Total			1,789	1,789	1,789	1,789	1,789	1,789
Outdoor Estimated Total			1,723	1,723	1,723	1,643	1,643	1,643
Total Estimated Customer Demand			3,511	3,511	3,511	3,432	3,432	3,432
Est. Non-Revenue Water		5%	176	176	176	172	172	172
Total Estimated Supply Demand			3,700	3,700	3,700	3,600	3,600	3,600

New OVWC Customers

The OVWC service area covers a portion of Sacramento County which consists of mostly moderate and large-lot single family homes. Similar to parts of FOWD and the District's retail area, the community covers a range of housing ages but is largely considered to be built-out. Infill developments have occurred and are expected to continue (e.g. larger legacy properties are subdivided, and multiple single-family homes are constructed on the lots), with very few of these larger parcels expected to remain vacant.

Based on the 2016 MTP/SCS, the OVWC area was projected to experience a growth rate of approximately 0.6% from current conditions until 2036, which translates to approximately 35 new housing units per year. If extending this rate for 25 years, this would result in 875 new housing units (single-family and multi-family) by 2045. Following discussions with OVWC staff, the assumptions seem appropriate for this analysis.[31] For this analysis the new residential connections are split as 650 new single-family homes and 225 new multi-family homes.

[31] Meeting with OVWC staff on 11/26/2019.

Nominal additional commercial and public landscaping are assumed to be in place by 2035 to support the additional housing, represented as 10 acres of new commercial development and 6 acres of new public landscaped areas. Table 2-36 details these assumptions, phased over the 25-year period.

Table 2-36: Estimated Future New OVWC Customer Demand (acre-feet/year)

Land-class	Total New Units or Acres					Demand Factor (af/du or af/ac)		Approximate Year				
	2025	2030	2035	2040	2045			2025	2030	2035	2040	2045
Residential												
Future Single-family	50	150	275	475	650	0.18	(indoor)	9	27	50	86	117
						0.18	(outdoor)	9	27	50	86	117
Future Multi-family	25	50	125	150	225	0.12	(indoor)	3	6	15	18	27
						0.03	(outdoor)	1	2	4	5	7
Residential Indoor Subtotal								12	33	65	104	144
Residential Outdoor Subtotal								10	29	53	90	124
Residential Total								22	62	118	194	268
Non-Residential												
Future Commercial	2	5	10	10	10	1.25	(indoor)	3	6	13	13	13
Future Public Landscape	2	4	6	6	6	4.25	(outdoor)	9	17	26	26	26
Non-residential Total								11	23	38	38	38
Indoor Estimated Total								15	39	77	116	157
Outdoor Estimated Total								18	46	79	116	149
Total Estimated Future Customer Demand								33	85	156	232	306
Estimated Non-Revenue Water						7%		2	6	11	16	21
Total Estimated Future Supply Demand								35	91	167	248	327

Summary of Future OVWC Demands

Combining the projected demands of existing customers and the additional needs of new customers, future OVWC water demands are anticipated to grow slightly. This is primarily driven by expected savings from ongoing existing customer conservation efforts of 100 acre-feet that will offset some of the new customer demands. In addition to overall demand decreasing, the monthly use pattern may likely flatten due to lower peak demands for summer irrigation as existing customers reduce this need, and the few new customers begin with landscapes consistent with updated MWELO requirements. Table 2-37 presents the summary of forecast existing and new customer demands through 2045.

Table 2-37: Forecast Water Demands for OVWC (acre-feet/year)

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	2,737	2,737	2,737	2,657	2,657	2,657
	Multi-family	294	294	294	294	294	294
	Commercial	165	165	165	165	165	165
	Industrial	180	180	180	180	180	180
	Landscape	34	34	34	34	34	34
	Agriculture	101	101	101	101	101	101
	Subtotal	3,511	3,511	3,511	3,432	3,432	3,432
	Non-revenue water	176	176	176	172	172	172
	Total Existing Customers	3,700	3,700	3,700	3,600	3,600	3,600
New Customers	Single Family	--	18	54	99	171	234
	Multi-family	--	4	8	19	23	34
	Commercial/Inst.	--	3	6	13	13	13
	Public Landscape	--	9	17	26	26	26
	Subtotal	--	33	85	156	232	306
	Non-revenue water	--	2	6	11	16	21
	Total Future Customers	--	35	91	167	248	327
Total Water Demand		**3,700**	**3,700**	**3,800**	**3,800**	**3,800**	**3,900**

2.3.2.5 Summary of Wholesale Agency Customer Water Demands

While the individual forecasts for each WCA are useful for the WCAs, the District is interested in the total WCA demand anticipated over the next few decades. Table 2-38 combines each WCA's summary table into a total projected existing and new customer WCA demand profile over the next 25 years. It is notable that the various increases and decreases specific to each WCA offset themselves, resulting in a forecast total future demand only about 5% greater than current conditions – and, still less than the District served to the WCAs as recently as 2012 and 2013 where deliveries were approximately 29,750 acre-feet and 31,950 acre-feet, respectively.

2.3.3. Summary of Future Water Demands

Adding the District's forecast retail demands to the roll-up of WCA demands generates a forecast for total District wholesale demands. Currently, and assumed to continue in the future, a portion of these demands are and will be met with local groundwater pumped by CHWD and FOWD. Recent efforts by OVWC may also result in a return to groundwater production capability to serve a portion of their own customer needs.

Table 2-39 provides the overall summary for total forecast water demand in the District's wholesale service area, which is expected to increase only slightly from current conditions and, again, less than total demands met as recently as 2012 and 2013 which were approximately 44,200 acre-feet and 47,800 acre-feet, respectively.

Table 2-38: Summary of WCA Forecast Future Demand

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	17,637	17,637	17,637	17,140	17,140	17,140
	Multi-family	3,124	3,124	3,124	3,124	3,124	3,124
	Commercial	1,649	1,649	1,649	1,649	1,649	1,649
	Industrial	502	502	502	502	502	502
	Landscape	1,514	1,514	1,514	1,514	1,514	1,514
	Agriculture/Other	122	122	122	122	122	122
	Subtotal	24,547	24,547	24,547	24,050	24,050	24,050
	Non-revenue water	1,504	1,504	1,504	1,473	1,473	1,473
	Total Existing Customers	26,100	26,100	26,100	25,500	25,500	25,500
New Customers	Single Family	--	182	382	608	898	1,109
	Multi-family	--	23	61	138	212	283
	Commercial/Inst.	--	11	31	63	75	88
	Public Landscape	--	26	68	115	157	179
	Sunrise Mall Redev.	--	--	50	150	250	350
	Subtotal	--	241	592	1,074	1,592	2,008
	Non-revenue water	--	18	42	75	111	140
	Total Future Customers	--	259	633	1,149	1,703	2,148
Total Water Demand		**26,100**	**26,400**	**26,700**	**26,600**	**27,200**	**27,600**

Table 2-39: Total Forecast Demand within the District's Wholesale Service Area

Land Class		Forecast Demand (acre-feet/year)					
		Current	2025	2030	2035	2040	2045
Existing Customers	Single Family	26,672	26,672	26,672	25,864	25,864	25,864
	Multi-family	3,261	3,261	3,261	3,261	3,261	3,261
	Commercial	2,043	2,043	2,043	2,043	2,043	2,043
	Industrial	502	502	502	502	502	502
	Landscape	2,366	2,366	2,366	2,366	2,366	2,366
	Agriculture/Other	162	162	162	162	162	162
	Subtotal	35,006	35,006	35,006	34,197	34,197	34,197
	Non-revenue water	2,372	2,372	2,372	2,315	2,315	2,315
	Total Existing Customers	37,400	37,400	37,400	36,500	36,500	36,500
New Customers	Single Family	--	200	458	762	1,132	1,451
	Rural Estate	--	5	10	15	20	26
	Multi-family	--	23	64	146	223	302
	Commercial/Inst.	--	17	44	82	106	126
	Public Landscape	--	26	89	157	221	243
	Sunrise Mall Redev.	--	--	50	150	250	350
	Subtotal	--	270	715	1,312	1,952	2,496
	Non-revenue water	--	20	50	92	136	174
	Total Future Customers	--	290	765	1,405	2,088	2,670
Total Water Demand		**37,400**	**37,700**	**38,200**	**37,900**	**38,600**	**39,200**

2.3.3.1 Water Demands during Single- and Multiple-Dry Year Conditions

To credibly forecast potential maximum future demands, the forecasted normal-year water demands shown in Table 2-39 must be modified to reflect anticipated increases in demand during drier conditions. Conservative modifications to the forecasted normal year water demands to more likely reflect demand conditions during drier and dry years are discussed below and shown in Table 2-40:

Single dry year: Landscape irrigation demands would increase to reflect the generalized earlier start of the landscape irrigation season due to limited rainfall in the single driest year. Since this increase only applies to the outdoor portion of a customer's demand, an adjustment factor of 5 percent is applied to the total normal-year water demand values to conservatively reflect the expected increase in demand for water.[32]

Multiple dry years: During multiple dry years, demands are also expected to increase during the first in a series of dry years – as discussed above for the single dry year condition. However, during the second, third or more consecutive dry years, demands also are expected to reflect water shortage contingency plans implemented by the District and the WCAs.[33] Because this Study is assessing the maximum demand to understand plausible capacity in the District's treatment and distribution systems, the impact of shortage programs to reduce demand is not further described in this document as it would result in demands less than those anticipated during the single dry year scenario, and under such conditions, treatment and distribution capacity would not be expected to be constrained.

Table 2-40: Estimated Future Total Demand in Single-Dry Year

Hydrologic Condition	Forecast Demand (acre-feet/year)					
	Current	2025	2030	2035	2040	2045
Normal Year (see Table 2-38)	37,400	37,700	38,200	37,900	38,600	39,200
Dry Year (5% increase)	39,270	39,585	40,110	39,795	40,530	41,160

[32] Based on meter studies and work with DWR on "weather normalization" of per capita water use values, Tully & Young has demonstrated that urban water use increases during low rainfall months. Based on conversations with urban water purveyors, DWR and landscape water professionals, it appears common for landscape irrigation timers to be turned on "early" when February and March are unusually dry.

[33] The District and each WCA's water shortage contingency plans are described in each agency's respective UWMP.

CHAPTER 3. TREATMENT PLANT AND CONVEYANCE SYSTEM

Using future District retail and WCA demand forecasts from Section 2, we turn to evaluating whether sufficient treatment and conveyance capacity exists to meet those future demands within the District's water treatment and primary distribution system components. Anticipating ample capacity, we will also assess the potential excess capacity that may exist for use to meet other potential opportunities.

The evaluation will (1) characterize the physical attributes of the District's treatment and primary wholesale distribution system, (2) present the historical and current use of these facilities, (3) evaluate the potential changes in use when accommodating future demands, and (4) identify the current and estimated future unused capacity. This section is organized to separately present each of these analyses for both the District's water treatment facility and its primary wholesale distribution system.

3.1 Sidney N. Peterson Water Treatment Plant

The District operates the Sidney N. Peterson Water Treatment Plant ("WTP"), a modern multi-step water treatment facility that treats water diverted from Folsom Reservoir and discharges into Hinkle Reservoir for distribution to the District's retail and wholesale customers. Located next to Folsom Reservoir, this plant was designed in the 1970s and built in three phases – culminating in its present 150 million gallon per day (mgd) maximum capacity (see Figure 3-1).[34]

[34] Although the water treatment plant has a maximum capacity of 150 mgd, the average operating capacity during the summer months is 120 mgd. The difference provides instantaneous or diurnal capacity to handle periodic peak conditions.

Figure 3-1: Sidney N. Peterson WTP

The original WTP was completed in 1983. It was subsequently expanded to incorporate process improvements to continue to cost-effectively meet water quality standards and increasing real-time demands. In the late 1990's and early 2000's the District initiated several studies to forecast demands and perform advance-planning to assure the WTP could adequately meet expected future needs. The District's 2007 Phase II Master Plan anticipated a future demand of nearly 70,000 acre-feet annually with a necessary peak WTP capacity of about 190 mgd. Figure 3-2 includes two tables from that 2007 Master Plan showing the anticipated growth in demands. As forecast in the prior section, future demand for the District retail and WCA customers is now anticipated to be approximately 37,300 acre-feet per year, significantly less than the projected 2020 demand of about 67,000 acre-feet included in the 2007 Master Plan.

Figure 3-2: 2007 Phase II Wholesale Master Plan Estimated Annual Demand

In

Table ES–3

Summary of Projected Flows (mgd)

Family Agency	Max Day Factor	Peak Hour Factor	Average Demand	Max Day Flow	Peak Hour Flow
Citrus Heights	2.1	2.9	21.0	44.0	61.1
Fair Oaks	2.0	3.0	14.7	29.4	44.0
Folsom	2.0	3.6	1.3	2.5	4.5
Orange Vale	2.0	3.6	5.0	10.1	18.1
SJWD Retail	1.8	3.1	19.6	35.3	60.8
		Total Flow	**61.6**	**121.3**	**188.5**

Table ES–2

Summary of Projected Average Demand (acre-ft / year)

Year	Citrus Heights	Fair Oaks	Folsom	Orange Vale	SJWD Retail	Total Demand
2005	20,036	14,611	1,382	4,982	18,691	59,702
2010	23,108	15,525	1,413	5,205	19,196	64,447
2015	23,258	16,438	1,413	5,381	19,700	66,190
2020	23,527	16,438	1,413	5,511	20,204	67,093
2025	23,577	16,438	1,413	5,592	20,708	67,728
2030	23,577	16,438	1,413	5,624	21,970	69,022

addition to treating water to meet the District's retail and WCA customers, the WTP also treats water for Sacramento Suburban Water District (SSWD) when SSWD is able to access contracted for wetter and wet year supplies from Placer County Water Agency.[35] This service to SSWD began in the early 1990's. Treatment quantities have ranged from a high of 16,900 in 2002 to zero in years when SSWD is unable to access the PCWA water. SSWD's "take-or-pay" obligation to PCWA in water accessible years has recently been reduced to 12,000 acre-feet, and this amount could be reduced further in the near future. **Figure 3-3** presents the historic WTP annual production from 1983 to present. **Figure 3-4** presents peak WTP production during this same period. Notably, the WTP operated near its capacity during much of the 2000's,[36] dropping significantly during the extended drought period of 2013 through 2015, and more recently plateauing at a new normal. This recent average peak production reflects the trend of reduced customer demand described in prior sections of this report.

[35] SSWD can only receive water from Placer County Water Agency when the calculated unimpaired inflow into Folsom Reservoir is determined to meet or exceed 1.6 million acre-feet.

[36] The WTP instantaneous capacity is 150 mgd, while the monthly average operating capacity is 120 mgd.

Figure 3-3: Historic Annual WTP Production

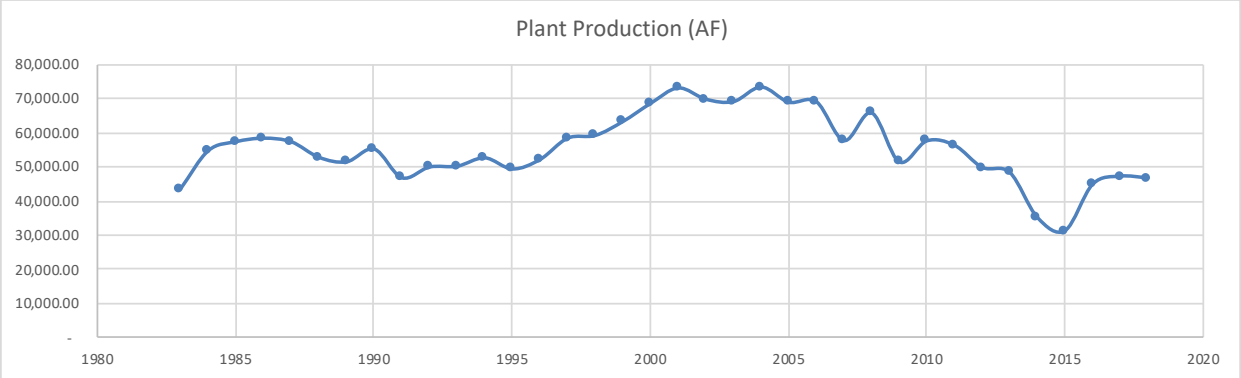
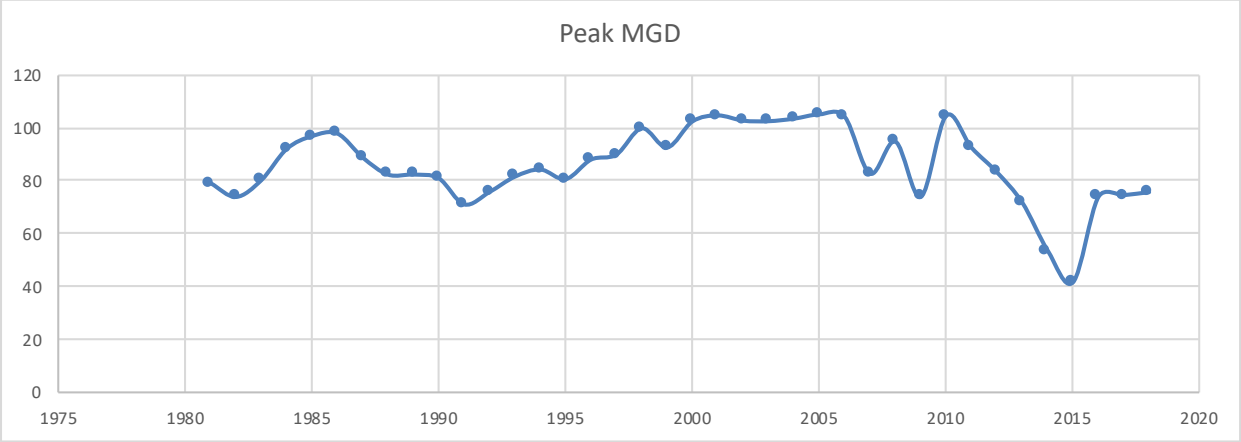


Figure 3-4: Historic Peak WTP Production



3.1.1 Sydney N. Peterson WTP Use vs. Capacity

Analyzing production data provided by the District demonstrates the highest WTP production occurred in the early 2000's with maximum values around 2004 and 2005 for the retail and WCA customers. **Figure 3-5** presents a comparison of the monthly average production – averaging each of the days in the month - for 2004 and current monthly demands by customer class.[37] The figure also presents the practical and theoretical WTP capacity limits for differing times of the year (driven by various operational considerations and constraints).

Figure 3-5 illustrates the significant reduction in current monthly average production compared to the 2004 peak period. With the exception of November, all months see a lower demand, with summer months reflecting a greater reduction compared to winter months. This variation reflects the increase in indoor demand that accompanies increased population, and dominates production

[37] 2004 was chosen over 2005 due to wholesale customer demands being closer to the average for the period than 2005.

needs in winter months, while summer month reductions likely reflect ongoing reductions to outdoor use, especially after the recent prolonged drought.

Compared to average monthly demands in 2004, which often approached the WTP's peak capacity, with daily peak demand in the middle of summer often requiring it, current monthly demands are well below the WTP's capabilities. Based on recent operations, the District is treating approximately 48,000 acre-feet of water annually (when SSWD has access to PCWA supplies), using about 75 mgd of WTP capacity in mid-summer months and as low as 12 mgd during the winter (**Figure 3-6**).

Figure 3-5: Historic v Current WTP Production Comparison by Month

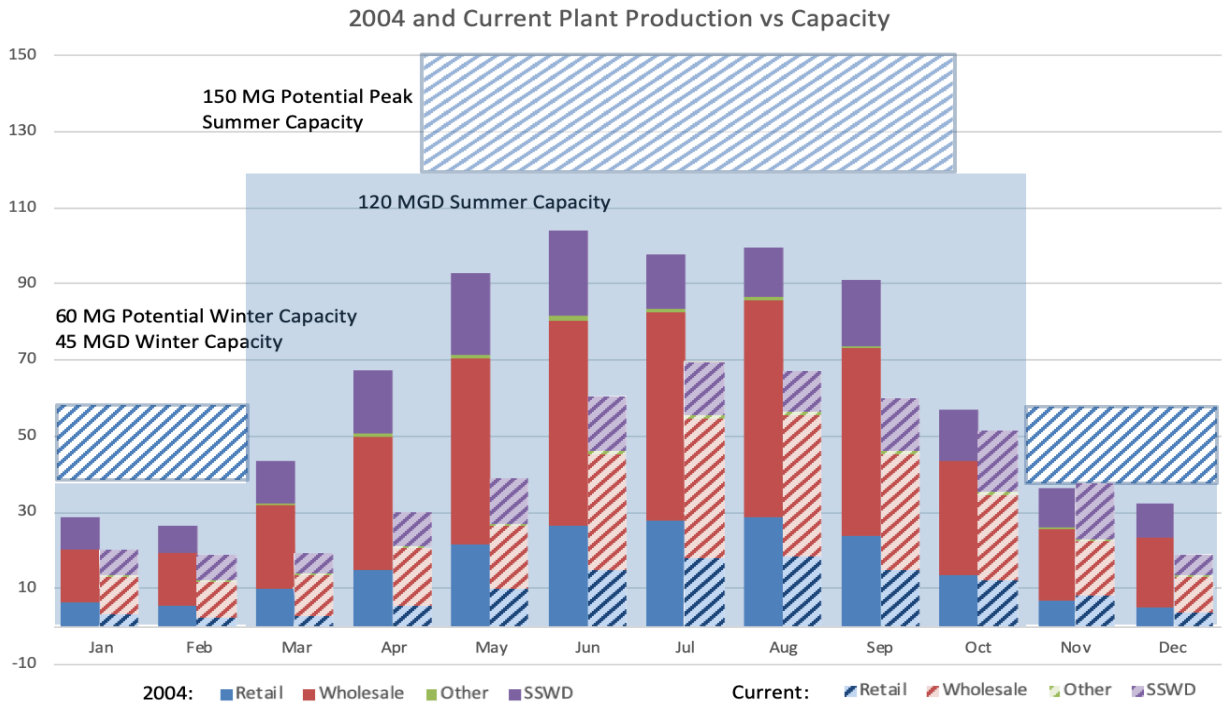
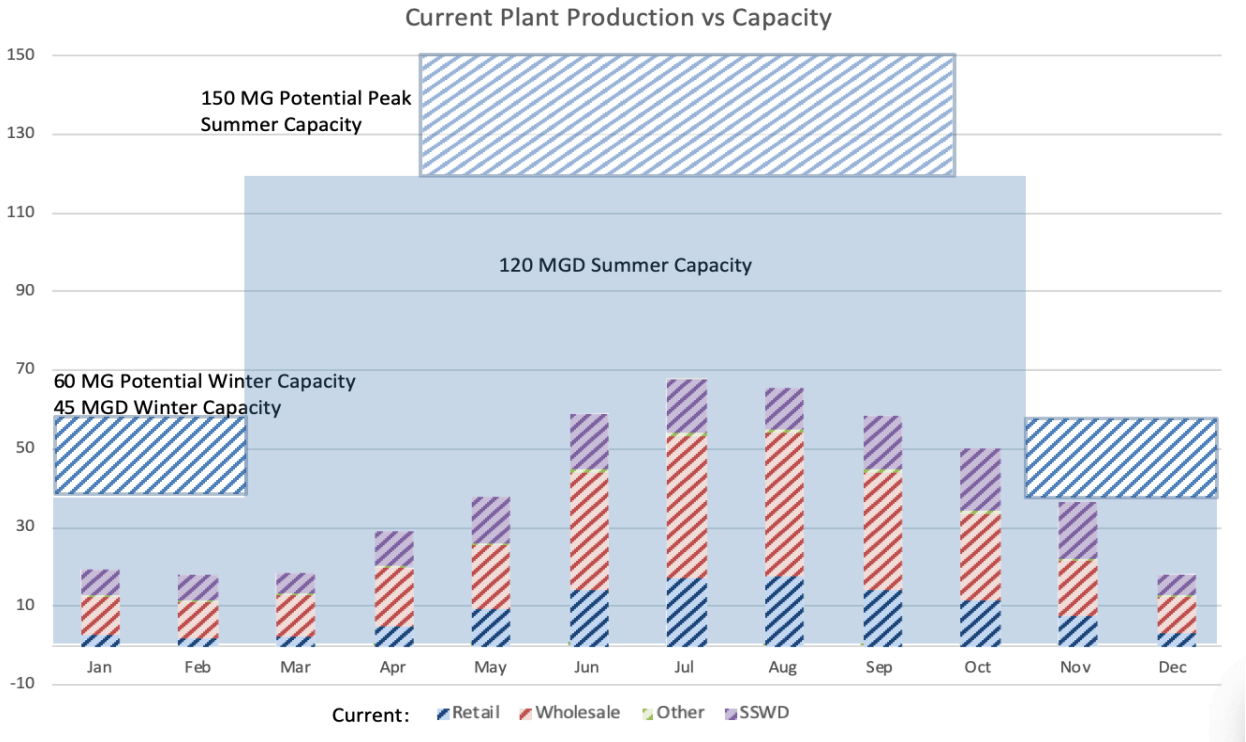


Figure 3-6: Current WTP Production by Month



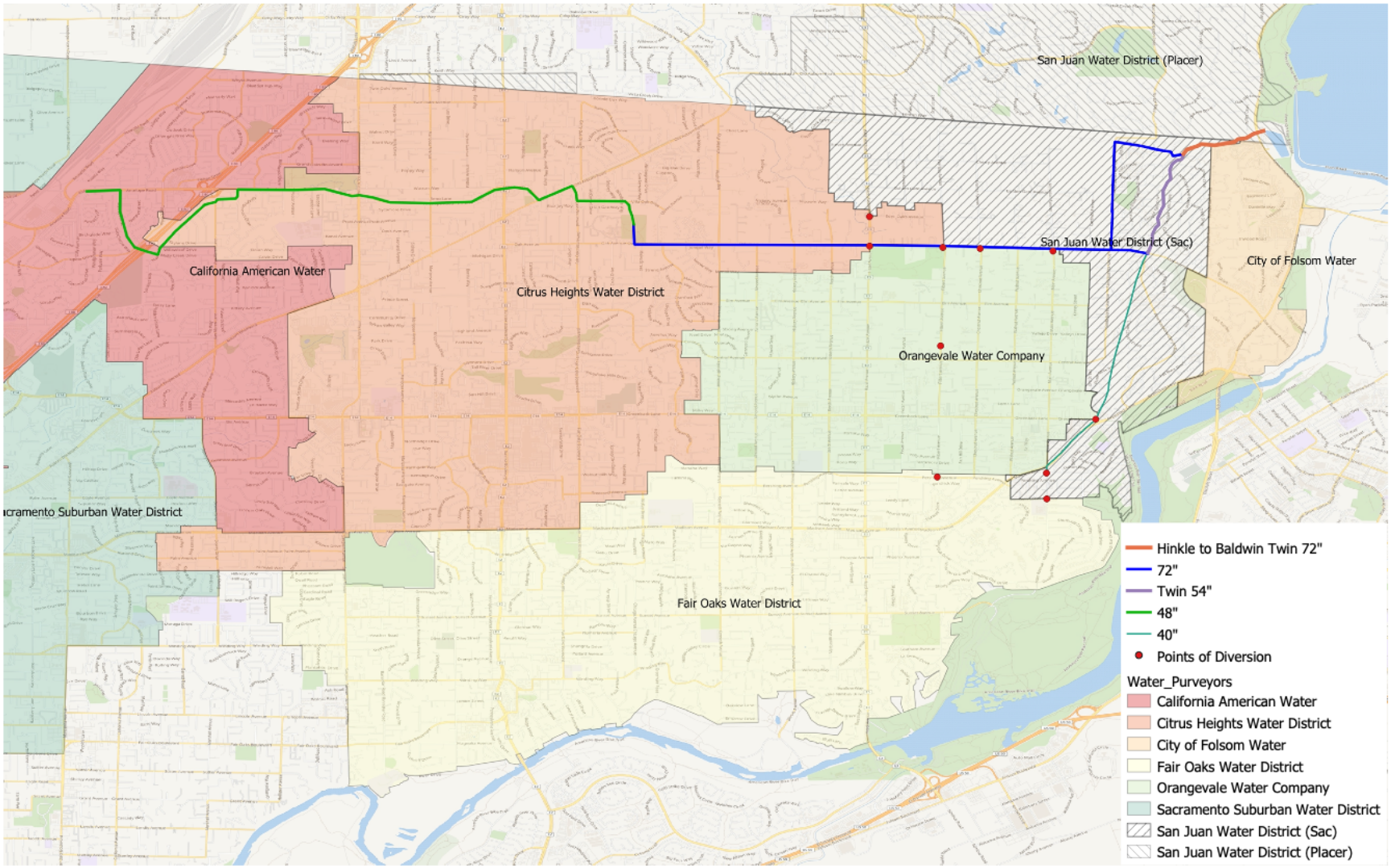
3.2 Primary Conveyance System

The District's conveyance system consists of several large transmission pipelines to serve various retail and WCA customer pressure zones. Treated water is delivered from Hinkle Reservoir, located adjacent to the WTP, to the transmission mains through a 72" pipeline which connects to twin 54" pipelines at the Bacon Pump Station. These 54" pipelines then connect to a penstock manifold where the pipeline is split to serve retail and wholesale service areas. The WCAs receive treated District water via the 72" Cooperative Transmission Pipeline (CTP) and from other primary distribution pipelines such as the Fair Oaks 40" through a variety of metered connections.[38] FOWD and CHWD also operate groundwater wells to supplement their deliveries of District surface water and to provide groundwater as backup supply during drought periods or when the treatment plant or transmission system is not available (e.g. during temporary maintenance).

The District's primary distribution system is illustrated in **Figure 3-7**: Physical Representation of Primary Distribution Pipelines. This figure displays the physical location of several of the primary transmission pipelines in relation to the District's retail service area, the WCA's service area, and the CTP's relation to other water suppliers in the region, including California American Water and Sacramento Suburban Water District.

[38] SSWD also receives its Placer County Water Agency supplies treated by the District via the CTP.

Figure 3-7: Physical Representation of Primary Pipelines



3.2.1 CTP Capacity

In 1998, the District signed a contract with FOWD, CHWD, OVWC, and SSWD (Northridge Water District at the time) for the construction, operation, and maintenance of the Cooperative Transmission Pipeline Project ("CTP"). The capacity design of the CTP was modeled as part of the development of that agreement, defining the capacity assigned to each signatory. These capacity assignments were provided in agreement appendices and are summarized in **Table 3-1**. While the agreement has since been amended to address funding changes, the contract revisions have not modified the capacities modeled as part of the 1998 contract.

As shown in **Table 3-1**, capacities are shown for the District and each signatory, starting from CTP pipeline segment #3, which is downstream of the Bacon pump station. From Bacon, the CTP is aligned south before turning west and ultimately terminating at C-Bar-C Park where it connects with a SSWD-owned pipeline (see **Figure 3-7**). Notably, the SSWD capacity of 59.04 mgd is maintained through the entirety of the CTP, which is important to the District's considerations of available capacity. As documented in the discussion about WTP capacity, the District, the WCAs and likely even SSWD have lower customer demands than existed or were forecast when the CTP was constructed, though each party's contracted capacity may not be available to others without subsequent agreements.

Table 3-1: CTP Capacity Summary Table (mgd)

Pipe Segment	CHWD	FOWD	SSWD	OVWC	SJWD
3	14.02	10.1	59.04	10.92	1.03
4	14.02	10.1	59.04	10.92	1.03
5	14.02	10.1	59.04	10.92	1.03
6	14.02	10.1	59.04	10.92	1.03
8	14.02	10.1	59.04	10.92	0
11	27.9	20.1	59.04	21.75	0
14	27.9	20.1	59.04	9.79	0
15	27.9	0	59.04	0	0
17	27.88	0	59.04	0	0
18	27.88	0	59.04	0	0
19	27.88	0	59.04	0	0
21	25.51	0	59.04	0	0
22	25.51	0	59.04	0	0
23	25.51	0	59.04	0	0
24	0	0	59.04	0	0

CHAPTER 4. AVAILABLE CAPACITY ANALYSIS

NOTE: The analysis of available capacity in the District's Sidney N. Peterson water treatment plant and in the District's and regional primary transmission pipelines provided in this report is based upon the graphical representation and numerical comparisons. Before offering specific potential transfers and/or delivery opportunities to others, the District should undertake hydraulic system modeling.

4.1 Potential Available WTP Capacity to Offer

The District recognizes that water quantities treated and delivered in 2017 through 2019 are well below the capacity of the WTP (see **Figure 3-6**). With forecasted 2045 water demands estimated to be similar to current conditions (see **Table 2-38**), future capacity demands on the WTP would be expected to be similar. While diurnal peaking factors may also be changing, the general shape of monthly water demands should still mimic the current monthly pattern seen in **Figure 3-6** and in **Figure 2-2** and **Figure 2-3**. A slight flattening of monthly summer outdoor demands is anticipated as residential customers modify existing landscapes and respond to water supplier programs (e.g. incentive programs, public outreach). A slightly growing population will add to baseline indoor demands year-round. The upward shift in percentage of the total of each month's demand necessary to serve indoor uses is unlikely to change the total demand pattern presented in **Figure 2-2** and **Figure 2-3** as it is expected to be offset by the forecasted drop in outdoor use monthly totals.

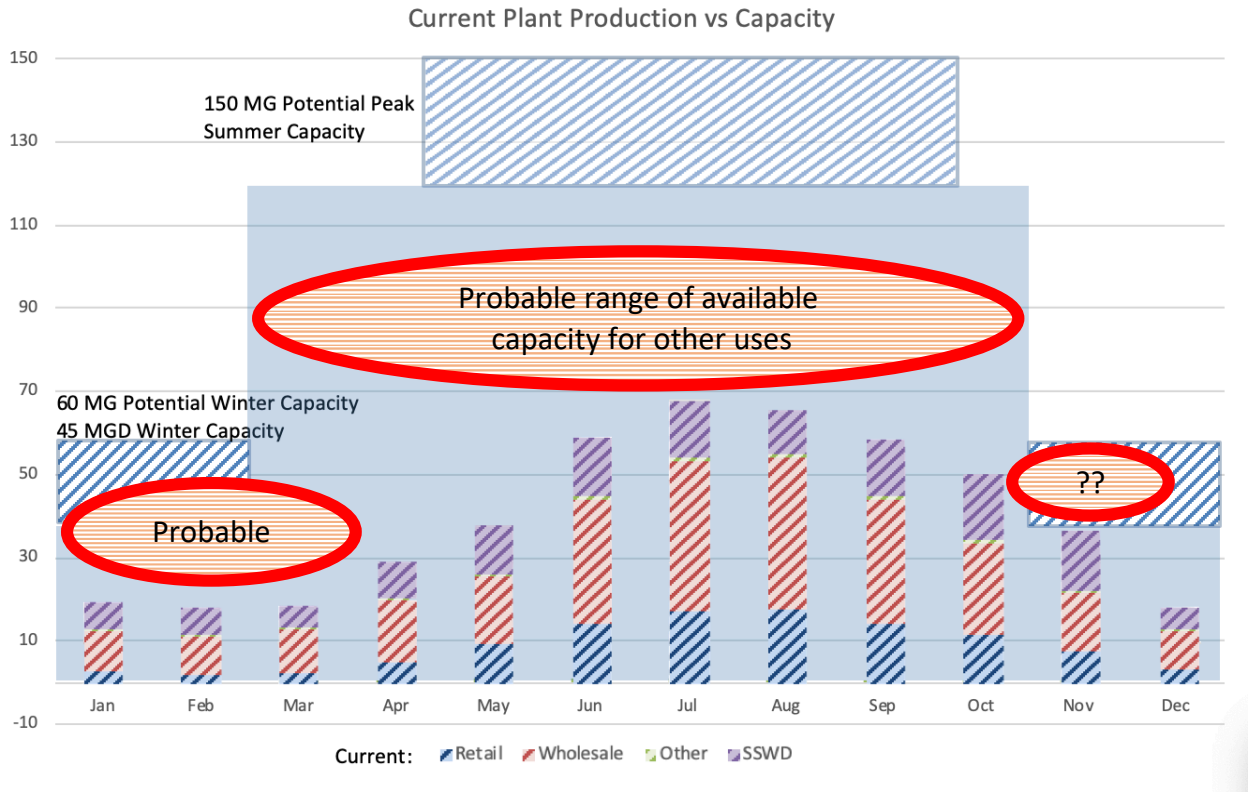
Within this context of the 2045 future demands being similar in quantity and annual/ monthly distribution to the current demands served by the District, **Figure 3-6** can be used to graphically represent potential WTP capacity the District could confidently offer to others. This figure includes continued treatment of SSWD supplies in addition to the forecast 2045 District retail and WCA demands detailed in Chapter 2. **Figure 4-1** provides this representation. Most notable is the 20 to 40 mgd of treatment capacity readily available during the summer months while providing additional buffer within the practical operation capacity of 120 mgd.[39]

One potential concern could occur in the fall months, when the WTP transitions from a capacity of 120 mgd to a practical operational capacity of 45 mgd during the winter months. Currently, depending on the timing of when rains begin in the fall and trigger customers to reduce landscape irrigation, the District will shift from 120 mgd operational capacity to 45 mgd operational capacity. If additional demands on WTP capacity are included, the timing of this step may vary but could be accommodated. Additionally, as shown in the figure, the WTP has a theoretical capacity during winter operations of up to 60 mgd. Although current operators generally run the WTP within its 45 mgd capacity, there is physical capacity that can be utilized

[39] The WTP instantaneous capacity is 150 mgd, while the monthly average operating capacity is 120 mgd.

to help manage the timing of any transition between summer-to-winter and winter-to-summer operations. The physical and operational thresholds relate to whether particular treatment pathways and related equipment are operating, which is subject to a variety of operational factors managed by the District's WTP operators.

Figure 4-1: Representative Range of WTP Capacity Available



As current average monthly treatment has been around 70 mgd, the WTP has significant excess capacity within its practical operating range of 120 mgd. Daily and hourly peak demands may be different, however, and will need to be assessed in more detail prior to making any future commitment of treatment capacity.

Using a maximum average month peaking factor of about 2.25,[40] the availability of 20 to 40 mgd during summer operations would translate to about 9 to 18 mgd throughout the year, or about 10,000 to 20,000 acre-feet, if demands followed typical monthly patterns currently processed by the WTP.

[40] The peaking factor represents the approximate multiplier between an annual average capacity and likely peak capacity needs during the traditional summer, high-demand period. In other words, having 40 mgd available in the summer translates to an average capacity need of about 18 mgd. If the delivery pattern follows similar patterns experienced by the WTP (e.g. low winter demand and high summer demand), the average capacity can translate to an annual volume of water that could be treated.

4.2 Potential Available Conveyance System Capacity

As displayed in **Figure 3-4** and **Figure 3-6**, several primary transmission pipelines within the District's retail service area deliver water from Hinkle Reservoir to the main 72" CTP transmission pipeline shown in **Figure 3-5**. Because of the various flow paths, these primary pipelines are assumed to have adequate capacity to deliver the design capacities shared by the signatories to the 1998 CTP agreement – especially the 59 mgd owned by SSWD that provides for capacity from Hinkle Reservoir to C-Bar-C Park. Therefore, the potential transmission capacity constraint, if any, would be within the CTP itself.

4.2.1 CTP Capacity

In November 2019, SSWD's Board of Directors received an informational item from SSWD management that stated SSWD and Placer County Water Agency ("PCWA") were considering proposed amendments to an existing agreement between SSWD and PCWA. One provision being considered was for PCWA to enter into a long-term lease or purchase of approximately 15 mgd of the 59 mgd capacity SSWD owns in the CTP. SSWD's current take-or-pay commitment to PCWA is 12,000 acre-feet in years when unimpaired inflows to Folsom Reservoir are 1.6 MAF or more. During those years, historically, SSWD demands have peaked at about 2,200 acre-feet in any given month, or about 24 mgd. **In Figure 4-1**, SSWD deliveries are reflected at the top of each monthly stacked bar. The figure shows SSWD currently uses less than 50 percent of the 59 mgd capacity it owns in the CTP. Assuming the transmission system was designed to deliver the full 59 mgd reserved, the addition of 15 mgd for PCWA on top of continued use by SSWD of 24 mgd would still be short of SSWD's 59 mgd share of CTP capacity. Further, assuming the District's retail and WCA customer demands remain similar to current demands (as is forecast in Chapter 2), adding 15 mgd to current flows in the CTP should not adversely affect the District's or the WCAs' operations.[41]

4.3 Summary of Analysis

The following summarizes the determinations of this study:

- 2045 forecast water demand: As reflected in the detailed demand forecast presented in Chapter 2, the District can anticipate its retail and WCA demands to remain relatively steady over the next twenty-five years as those currently being treated and delivered. The forecast demand at 2045 is 37,300 acre-feet annually. This value may vary over time, depending on growth patterns, conservation measures implemented, and year-to-year hydrologic conditions.

- The Sidney N. Peterson WTP has a practical winter capacity of 45 mgd and summer capacity of 120 mgd. The current and forecast water demands will continue to be well

[41] This would need to be confirmed with hydraulic modeling of various operational scenarios.

under these practical capacity limits. Furthermore, winter operations can theoretically be pushed to 60 mgd, and summer operations can expand capacity to 150 mgd, providing additional flexibility for peak demands and operational transition periods.

The resulting available capacity per month can be estimated by subtracting the monthly treatment quantities (represented as the maximum average for each month from 2017 through 2019, expressed as mgd) from the operational and theoretic WTP capacities. Table 4-1 provides the resulting values that are illustrated in Figure 4-1. Because of the operational flexibility, several months show an available capacity value under 45 mgd, 60 mgd and 120 mgd operational scenarios (150 mgd is not shown as it is reserved for handling peak daily demands as may be warranted). The table also indicates typical current WTP operations at either winter or summer capacities, though operators can expand to the summer operation capacities during any month.

Table 4-1: Estimated Available Treatment Capacity per Month
(values are expressed as the average mgd in each month)

<table>
<tr><th rowspan="2"></th><th rowspan="2">Max WTP Use for Current Demands (2017-2019)</th><th colspan="2">Available Capacity during Winter WTP Operations</th><th colspan="2">Available Capacity during Summer WTP Operations</th></tr>
<tr><th>at 45 mgd</th><th>at 60 mgd</th><th>at 120 mgd</th><th>at 150 mgd</th></tr>
<tr><td>Jan</td><td>21</td><td>24</td><td>39</td><td colspan="2" rowspan="3">[WTP normally operating at winter capacity]</td></tr>
<tr><td>Feb</td><td>21</td><td>24</td><td>39</td></tr>
<tr><td>Mar</td><td>22</td><td>23</td><td>38</td></tr>
<tr><td>Apr</td><td>33</td><td>12</td><td>27</td><td>87</td><td>117</td></tr>
<tr><td>May</td><td>53</td><td colspan="2" rowspan="5">[WTP normally operating at summer capacity]</td><td>67</td><td>97</td></tr>
<tr><td>Jun</td><td>73</td><td>47</td><td>77</td></tr>
<tr><td>Jul</td><td>76</td><td>44</td><td>74</td></tr>
<tr><td>Aug</td><td>74</td><td>46</td><td>76</td></tr>
<tr><td>Sep</td><td>65</td><td>55</td><td>85</td></tr>
<tr><td>Oct</td><td>54</td><td>0</td><td>6</td><td>66</td><td>96</td></tr>
<tr><td>Nov</td><td>40</td><td>5</td><td>20</td><td>80</td><td>110</td></tr>
<tr><td>Dec</td><td>23</td><td>22</td><td>37</td><td colspan="2">[winter capacity]</td></tr>
</table>

- The District and Regional primary distribution pipelines have significant available capacity. With consideration that delivery of treated water to an outside party would likely utilize SSWD's capacity of 59 mgd in the CTP to deliver water to C-Bar-C Park, and that SSWD currently uses less than 50 percent of CTP capacity, ample capacity exists in the CTP. And, because the transmission pipelines within the District's retail service area that feed water from Hinkle Reservoir to the CTP were designed to handle delivery of up to 59 mgd to SSWD all the way to C-Bar-C Park, there would be adequate capacity in the existing District transmission pipelines also.