VALLEJO

FLOOD & WASTEWATER DISTRICT

Wastewater Cost of Service and Rate Study Report

March 2018

RAFTELIS

This page is intentionally left blank for double-sided printing.

RAFTELIS

March 1, 2018

Ms. Mary Morris
Finance Director and Treasurer
Vallejo Flood and Wastewater District
450 Ryder Street
Vallejo, CA 94590

Subject: Wastewater Cost of Service Study Report

Dear Ms. Morris:

Raftelis Financial Consultants, Inc. (Raftelis) is pleased to present this wastewater cost of service study to the Vallejo Flood and Wastewater District (District). This study involved a comprehensive review of the District's wastewater rate structure and long-range financial plan, and the calculation of cost of service-based wastewater rates and connection fees.

We are confident that the calculated rates are fair and equitable for the District's customers, and compliant with Proposition 218 requirements. This report includes an Executive Summary, a detailed presentation of the six-year financial plan, cost of service analysis, rate derivation, and connection fee derivation for the wastewater utility.

It was a pleasure working with you and we wish to express our thanks for the support you and other District staff members provided during the study. If you have any questions, please do not hesitate to call me at (626) 583-1894.

Sincerely,
RAFTELIS FINANCIAL CONSULTANTS, INC.

Sudhir Pardiwala, P.E.	**Hannah Phan**	**Nancy Phan**
Executive Vice President	Manager	Consultant

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 EXECUTIVE SUMMARY

The Vallejo Flood and Wastewater District (District) engaged Raftelis Financial Consultants, Inc. (Raftelis) to develop a comprehensive financial plan and cost of service rate study for the wastewater utility for implementation in fiscal year (FY) 2019 through FY 2023. This report documents the assumptions, methodologies, analyses, and proposed rates and connection fees developed in the study.

The mission of the District is make Vallejo a healthy place to live and work by keeping the City's wastewater and stormwater free from pollution. To ensure that the District can fulfill its mission effectively the District wants to achieve the following major objectives in this study.

1. Ensure revenue sufficiency to meet the operation and maintenance (O&M) and capital needs of the District's wastewater utility.
2. Ensure that rates are fair and equitable, in accordance with cost of service guidelines used in the industry.
3. Plan for rate and revenue stability to prevent rate spikes, preserve the overall financial health of the utility, and maintain adequate operating and capital reserves under varying demand conditions.

The executive summary provides an overview of the study, including recommendations for wastewater rates beginning in July 1, 2018. In this report, FY 2018 signifies the year starting July 1, 2017 and ending June 30, 2018.

1.1 BACKGROUND

The District is an independent special district that collects, treats, and disposes of approximately 6 billion gallons of wastewater per year for the greater Vallejo area. The service area covers 36 square miles and includes one wastewater treatment plant, 36 pump stations, and 436 miles of sewer mains.

The District serves a population of more than 120,000. The District serves predominantly residential customers and low strength commercial users with a few medium and high strength customers. There are no large industrial users in the District, although there are some significant dischargers and high-density residential areas.

The District's mission is to ensure the public's health, safety, and environment while promoting financial resilience, environmental sensitivity, and innovation.

1.2 FINANCIAL PLAN

To determine the revenue requirements needed to fund the District's ongoing expenses, Raftelis projected the O&M costs, capital improvement costs, debt service payments, reserve requirements, etc. for the study period between FY 2018 to FY 2023.

O&M expenses include salaries and benefits, materials, services, supplies, utilities, and general administrative costs. The District plans to spend approximately $63.9 million on capital expenditures from FY 2018 to FY 2023. The District plans to fund its capital projects through grants, reimbursements, and rates. Approximately $8.5 million in grant and reimbursement funding is available; the remaining capital project costs are funded through rates. The District has five existing debts totaling approximately $3.9 million to $6.5 million per year in debt service payments over the planning period.

Figure 1-1 shows the District's operating financial plan over the planning period. The red line represents the District's existing revenue, and the dark blue line represents the District's proposed revenue with the revenue adjustments shown in **Figure 1-2**. The blue bars represent O&M expenses, the orange bars represent debt service payments, and the green bars represent rate funded capital project costs. The red bars represent the District's annual net income. If the red bars are negative, then the District is drawing from reserves; if the bars are positive, then the District is replenishing reserves.

Figure 1-1: Projected Financial Plan

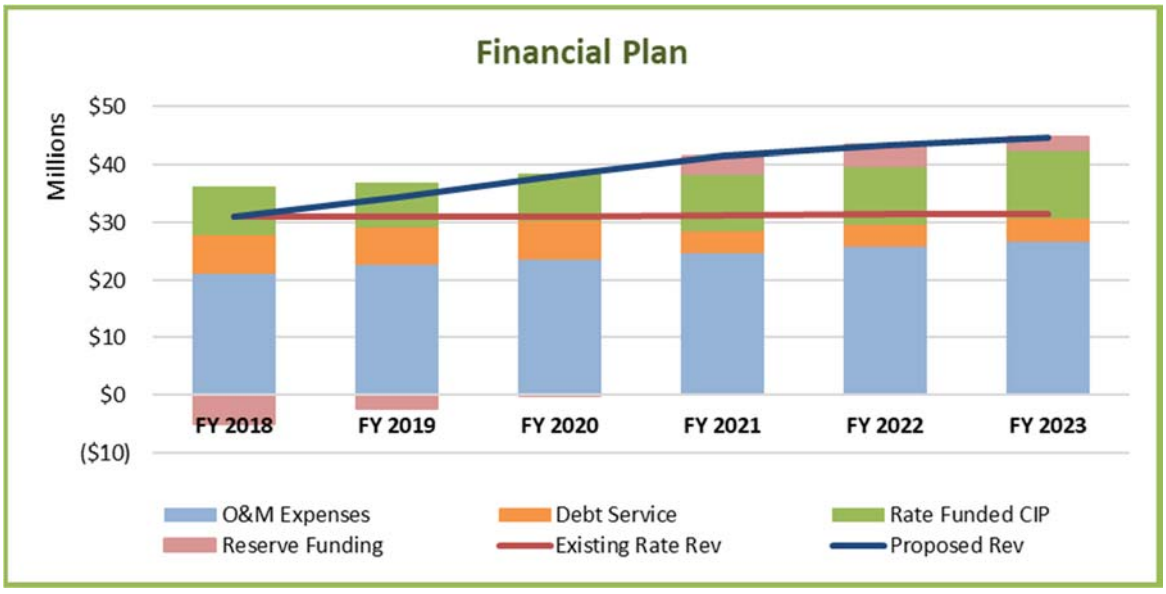


Figure 1-2 shows the proposed revenue adjustments for FY 2018 to FY 2023. The first revenue adjustment will be effective in July 2018 in FY 2019. Each subsequent revenue adjustment will be effective in July of the corresponding fiscal year. Although the graph shows anticipated revenue adjustments for the entire study period, the District will review and confirm the necessary revenue adjustments each year.

The main factors that determine the District's wastewater revenue adjustments are O&M expenses, capital projects, and reserve funding. Overall, O&M expenses are expected to increase by approximately 4.0 percent to 6.8 percent each year. The District has $55.4 million in planned rate funded capital projects over the planning period.

The left axis of the graph (**Figure 1-2**) shows the proposed revenue adjustments. The right axis of the graph shows the calculated and required coverage ratios for the District's existing debt. Over the six-year planning period, the District maintains a higher debt coverage ratio than the required 110 percent coverage ratio.

Figure 1-2: Proposed Revenue Adjustments and Debt Coverage

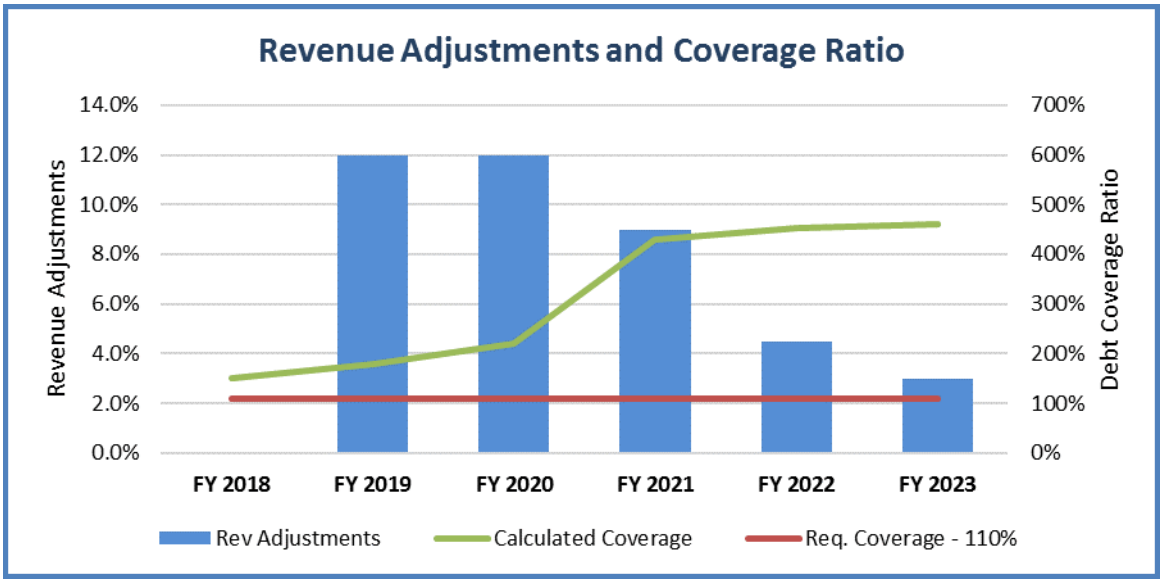


Figure 1-3 shows the total amount of wastewater capital projects and their funding sources. The District is expected to spend $63.9 million on the capital improvement plan (CIP) from FY 2018 to FY 2023. Approximately $8.5 million of these projects are funded through grants and reimbursements, as shown by the turquoise bars. The remaining $55.4 million in capital project costs are funded through wastewater rates, as shown by the orange bars.

Figure 1-3: Proposed Capital Financing Plan

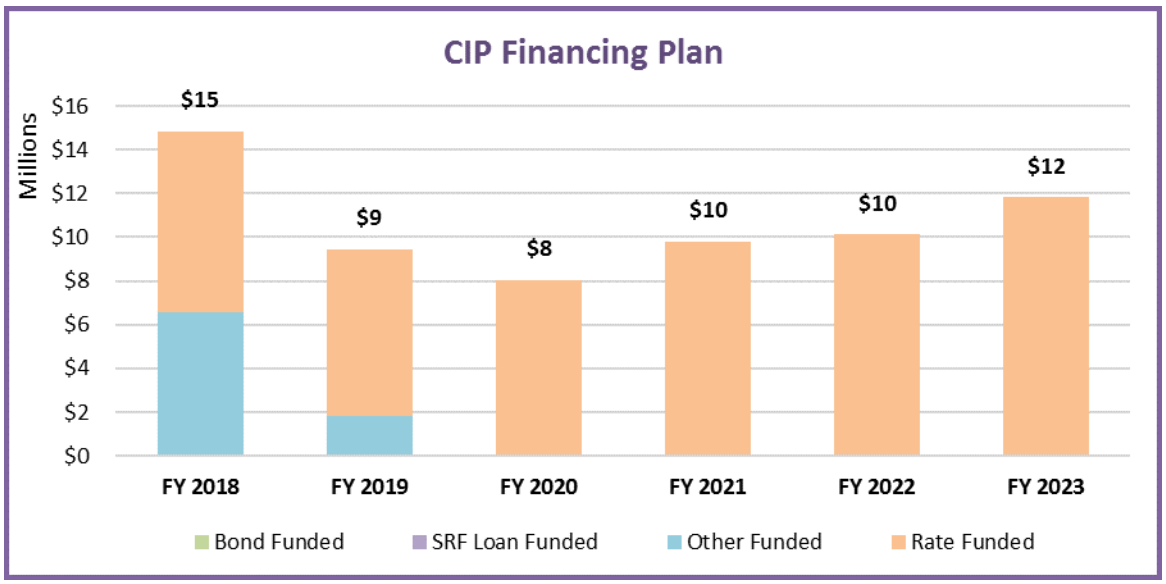
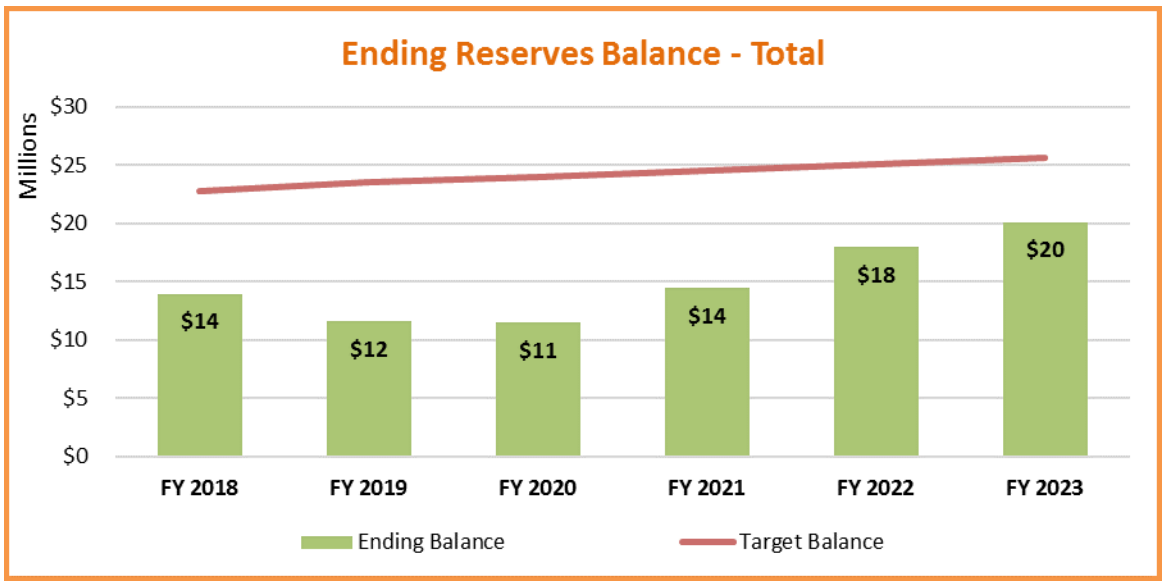


Figure 1-4 shows the District's wastewater reserve ending balances. The proposed revenue adjustments offset the depletion of reserves due to increasing O&M expenses and capital project costs. The reserve policy to calculate the reserve target levels shown in the graph is equal to 50 percent of annual O&M expenses and 2 percent of replacement cost asset value. The operating reserve target of 50 percent of annual O&M costs helps to mitigate against cash flow risks and unexpected O&M costs. The capital reserve target of 2 percent of the replacement cost asset value is recommended to reduce financial risk in case of capital asset failure. Even though the District does not reach the reserve target for the planning period, the District is projected to reach the target balance in future years not shown in this graph to minimize rate impacts to customers.

Figure 1-4: Projected Ending Balances



1.3 PROPOSED RATES

The proposed wastewater rates retain the District's current rate structure and consist of a monthly service charge for residential and commercial/industrial customers, a water usage charge per hundred cubic feet (ccf or hcf) for commercial/industrial customers, and unit wastewater charge rates for significant named dischargers/other customers. The unit wastewater charge rates include a special service charge for commercial customers, and a charge for flow, biochemical oxygen demand (BOD), and total suspended solids (TSS). The current rates also include a charge per average daily attendance (ADA) per student for schools.

The Commercial customers were reclassified in the study to better reflect cost of service principles and align with industry standards. The structure remains the same, with Commercial I, Commercial II, and Commercial III customers. Commercial IV customers are significant users and are monitored individually and are their own class. The classifications are based on combined BOD and TSS strength in milligrams per liter (mg/L). Schools are in a class by themselves and are charged based on average daily attendance. **Table 1-1** shows the current and proposed classifications for Commercial customers.

Table 1-1: Commercial Classifications

	Current Classification	Proposed Classification
Commercial Ⅰ - Low strength	0-400 mg/L	0-400 mg/L
Commercial Ⅱ - Medium strength	401-2,000 mg/L	401-800 mg/L
Commercial Ⅲ - High strength	2,001-4,000 mg/L	801-1,600 mg/L

Table 1-2 shows the current and proposed wastewater rates over the planning period from FY 2019 to FY 2023.

Table 1-2: Proposed Wastewater Rates

	Current	July 2018	July 2019	July 2020	July 2021	July 2022
Residential						
SF Residential, monthly service charge per EDU	$43.35	$48.78	$54.64	$59.56	$62.25	$64.12
MF Residential, monthly service charge per EDU	$43.35	$48.78	$54.64	$59.56	$62.25	$64.12
Commercial/Industrial						
Monthly service charge per acct, plus	$29.30	$38.65	$43.29	$47.19	$49.32	$50.80
*Water usage charge ($ per ccf WQA)						
Commercial I - Low strength	$2.11	$2.47	$2.77	$3.02	$3.16	$3.26
Commercial II - Medium strength	$2.82	$2.73	$3.06	$3.34	$3.50	$3.61
Commercial III - High strength	$7.45	$4.42	$4.96	$5.41	$5.66	$5.83
Unit Wastewater Charge Rates For Significant Named Dischargers/Others						
Commercial Special Service Charge per acct, plus	$28.88	$38.65	$43.29	$47.19	$49.32	$50.80
Flow ($/million gallons), or	$1,862.16	$2,633.69	$2,949.74	$3,215.22	$3,359.91	$3,460.71
Flow ($/Ccf)	$1.38	$1.97	$2.21	$2.41	$2.52	$2.60
BOD ($/lb)	$0.59	$0.26	$0.30	$0.33	$0.35	$0.37
TSS ($/lb)	$0.41	$0.29	$0.33	$0.36	$0.38	$0.40
School Charge ($ per ADA - year)	$0.48	$4.58	$5.13	$5.60	$5.86	$6.04

1.4 CUSTOMER IMPACTS

Residential customers will see a 12.5 percent increase in the fixed monthly charge from $43.35 to $48.78 per month per equivalent dwelling unit (EDU).

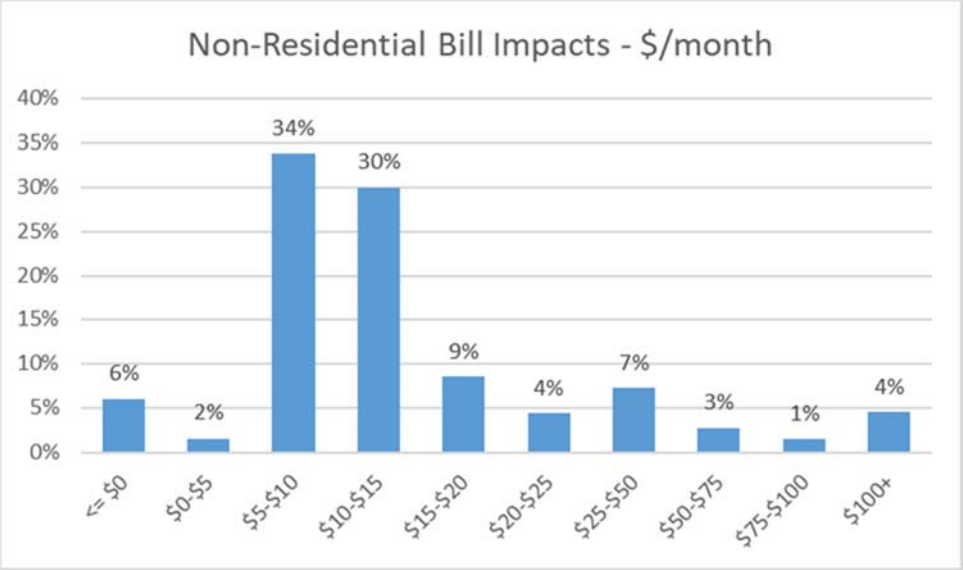
There will be a significant impact on schools in terms of costs per student even though the total impacts are less than $60,000 per year. The District may consider phasing school rates over five years by using a portion of its property taxes to offset school costs. This would result in a small reduction in reserves. For example, if the rates per ADA increase as shown below in **Table 1-3** then there would be a net reduction of approximately $112,000 in reserves.

Table 1-3: Five-Year Phase-in Option for Schools

	Current	July 2018	July 2019	July 2020	July 2021	July 2022
Phase in Option for Schools - 5 years						
School Charge ($ per ADA - year)	$0.48	$1.59	$2.70	$3.81	$4.92	$6.04

Figure 1-5 shows the non-residential bill impacts. Individual customers will experience different bill impacts due to the changes in the commercial categories. In aggregate, approximately 6 percent of all non-residential bills will see a reduction in their bills. Approximately 34 percent of all non-residential bills will see a $5 to $10 impact. Approximately 4 percent of all bills will see an increase of more than $100 per month.

Figure 1-5: Non-Residential Bill Impacts



1.5 CONNECTION FEES

As part of the wastewater rate study, Raftelis calculated connection fees based on the buy-in methodology. **Table 1-4** shows the proposed connection fees for Residential and Schools customers, as well as the unit cost per gallons per day (gpd) of wastewater flow for other customers.

Table 1-4: Proposed Connection Fees

Connection Fees	
Connection Fee per gpd	$24.69
Residential Fee per EDU	$3,704
Schools Fee per student	$198

Fees for other types of customers are shown below in **Table 1-5**.

Table 1-5: Proposed Connection Fees (Various Customer Types)

Customer Type	Billing Unit	Current	Proposed
Car Wash	/ 1000 sq ft	$41,995	$52,818
Church/Assembly Hall	/ 1000 sq ft	$580	$729
Commercial	/ 1000 sq ft	$2,275	$2,861
Historical Public Building	/ 1000 sq ft	$2,275	$2,861
Hospital	/ bed	$995	$1,251
Hotel with Kitchen	/ EDU	$2,945	$3,704
Hotel without Kitchen	/ EDU	$1,150	$1,446
Laundry	/ 1000 sq ft	$33,280	$41,857
Laundromat	/ machine	$640	$805
Multiple Family Dwelling with Kitchen	/ EDU	$2,945	$3,704
Multiple Family Dwelling without Kitchen	/ EDU	$1,150	$1,446
Recreation Facility	/ structure per toilet	$1,150	$1,446
Restaurant	/ space	$8,290	$10,427
School	/ student	$530	$667
Senior Living Center	/ EDU	$1,150	$1,446
Senior Living Center with Private Kitchen	/ EDU	$2,945	$3,704
Single Family Dwelling	/ EDU	$2,945	$3,704
Warehouse	/ 1000 sq ft	$325	$409

2 FINANCIAL PLAN

This section describes the District's long-range financial plan, including wastewater flow and account projections, operating and capital expenses, non-rate revenues, and capital financing options. The financial plan determines the overall revenue adjustments needed to maintain the District's financial stability.

2.1 CUSTOMER DATA AND GROWTH

The District provided customer account and usage data for FY 2017. **Table 2-1** shows the customer growth factors that were used to project customer accounts and water usage for the remaining years of the planning period.

Table 2-1: Customer Growth Rates

Customer Growth Rates	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Residential	0.1%	0.1%	0.1%	0.1%	0.1%	0.1%
Non-residential	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%

Table 2-2 shows the projected residential and non-residential wastewater accounts. **Table 2-3** shows the projected commercial usage data, which includes the monthly winter water usage data in hcf for Commercial I, II, and III customers and the flow and strength data for Commercial IV customers. The usage, flow, and strength data are projected using the non-residential customer growth factor in **Table 2-1**.

Table 2-2: Projected Customer Account Data

Accounts Data	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
SFR, EDU	35,498	35,533	35,569	35,605	35,640	35,676	35,712
MFR, EDU	11,637	11,649	11,660	11,672	11,684	11,695	11,707
Fairgrounds Mobile Estates	231	231	231	232	232	232	232
Commercial I - Low Strength	1,373	1,373	1,373	1,373	1,373	1,373	1,373
Commercial II - Medium Strength	196	196	196	196	196	196	196
Commercial III - High Strength	82	82	82	82	82	82	82
Commercial IV - Special Dischargers	6	6	6	6	6	6	6
Total Customer Accounts	**49,023**	**49,070**	**49,118**	**49,165**	**49,213**	**49,260**	**49,308**
Schools, ADA	13,680	13,680	13,680	13,680	13,680	13,680	13,680
Schools, account	31	31	31	31	31	31	31

Table 2-3: Projected Commercial Usage, Flow, and Strength Data

Usage, Flow, and Strength Data	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Commercial I - Low Strength	38,718	38,718	38,718	38,718	38,718	38,718	38,718
Commercial II - Medium Strength	9,042	9,042	9,042	9,042	9,042	9,042	9,042
Commercial III - High Strength	7,839	7,839	7,839	7,839	7,839	7,839	7,839
Total Commercial Winter Water Usage Data	**55,599**	**55,599**	**55,599**	**55,599**	**55,599**	**55,599**	**55,599**
Commercial IV - Flow, mg	0	0	0	0	0	0	0
Commercial IV - Flow, hcf	119,359	119,359	119,359	119,359	119,359	119,359	119,359
Commercial IV - BOD, lbs	268,237	268,237	268,237	268,237	268,237	268,237	268,237
Commercial IV - TSS, lbs	130,210	130,210	130,210	130,210	130,210	130,210	130,210

2.2 REVENUES

Table 2-4 shows the total revenues for the District from FY 2018 to FY 2023. The rate revenues, shown in Lines 2-3, are derived from the District's budget for FY 2018 and FY 2019. From FY 2020 onward, the rate revenues are calculated based on the customer data and current wastewater rates. The District's non-rate revenues are not projected to increase from year to year during the planning period.

Table 2-4: Projected Revenues

			FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
1	**Object**	**Description**						
2	4101	UB Service Charges	$27,087,246	$27,087,246	$27,160,879	$27,185,472	$27,210,090	$27,234,732
3	4201	UB Special Agreements	$592,119	$592,119	$546,409	$546,560	$546,711	$546,862
4	4202	Connection Fees	$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
5	4208	Septic Dump Fees	$299,049	$331,944	$331,944	$331,944	$331,944	$331,944
6	3007	Plan Check Fees	$1,050	$3,849	$3,849	$3,849	$3,849	$3,849
7	3013	Field Inspections	$3,849	$8,498	$8,498	$8,498	$8,498	$8,498
8	3601	Septic Dumping Permits	$8,498	$9,432	$9,432	$9,432	$9,432	$9,432
9	3610	Connection Permit	$4,988	$4,988	$4,988	$4,988	$4,988	$4,988
10	3630	IVR Processing Fee	$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
11	6601	Late Payment Penalties	$0	$0	$0	$0	$0	$0
12	6644	UB Penalties & Interest	$483,281	$483,281	$483,281	$483,281	$483,281	$483,281
13	6918	Misc Leases & Rentals	$396,000	$396,000	$396,000	$396,000	$396,000	$396,000
14	8805	Misc Revenues	$805,000	$805,000	$805,000	$805,000	$805,000	$805,000
15	8806	Payoff Demand Fees	$98,920	$98,920	$98,920	$98,920	$98,920	$98,920
16	0101	Property Taxes	$892,500	$892,500	$892,500	$892,500	$892,500	$892,500
17	7501	Investment Income	$276,000	$276,000	$202,057	$319,609	$478,928	$549,262
18	**TOTAL REVENUE**		**$31,107,500**	**$31,148,777**	**$31,102,757**	**$31,245,053**	**$31,429,140**	**$31,524,268**

Table 2-5 shows the current wastewater rates that are used to calculate the wastewater rate revenue, which became effective in FY 2017. The current structure consists of a monthly fixed charge per EDU for residential customers, including Single Family and Multi-Family residential. Low income residential customers have a 10 percent discount from the Residential rates.

Commercial and Industrial customers have a monthly fixed charge per account and a water usage charge based on winter quarter average (January-April) for the three Commercial classes outlined in **Table 1-1**. Commercial IV customers have a monthly fixed charge per account and variable charges based on strength and flow. Schools are charged based on average daily attendance per student per year.

Table 2-5: Current Wastewater Rates

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Residential						
SF Residential, monthly service charge per EDU	$43.35	$43.35	$43.35	$43.35	$43.35	$43.35
MF Residential, monthly service charge per EDU	$43.35	$43.35	$43.35	$43.35	$43.35	$43.35
Commercial/Industrial						
Monthly service charge per acct, plus	$29.30	$29.30	$29.30	$29.30	$29.30	$29.30
*Water usage charge ($ per ccf WQA)						
Commercial I - Low strength	$2.11	$2.11	$2.11	$2.11	$2.11	$2.11
Commercial II - Medium strength	$2.82	$2.82	$2.82	$2.82	$2.82	$2.82
Commercial III - High strength	$7.45	$7.45	$7.45	$7.45	$7.45	$7.45
Unit Wastewater Charge Rates For Significant Named Dischargers/Others						
Commercial Special Service Charge per acct, plus	$28.88	$28.88	$28.88	$28.88	$28.88	$28.88
Flow ($/million gallons), or	$1,862.16	$1,862.16	$1,862.16	$1,862.16	$1,862.16	$1,862.16
Flow ($/Ccf)	$1.38	$1.38	$1.38	$1.38	$1.38	$1.38
BOD ($/lb)	$0.59	$0.59	$0.59	$0.59	$0.59	$0.59
TSS ($/lb)	$0.41	$0.41	$0.41	$0.41	$0.41	$0.41
School Charge ($ per ADA - year)	$0.48	$0.48	$0.48	$0.48	$0.48	$0.48
Residential Low Income Discount	10%	10%	10%	10%	10%	10%

The current rates are multiplied by the customer accounts, usage, and flow data to determine the total calculated rate revenue, which is shown in **Table 2-6**.

For example, to calculate the single family residential (SFR) rate revenues, the number of SFR EDUs are multiplied by the SFR monthly service charge per EDU for 12 months. (For FY 2018: 35,533 EDUs x $43.35 per EDU per month x 12 months = $18,484,526)

To calculate Commercial I – Low Strength rate revenues, the number of Commercial I accounts is multiplied by the monthly service charge per account for commercial customers, and the amount of water usage in hcf is multiplied by the water usage charge in hcf per month for Commercial I customers. (For FY 2018: 1,373 accounts x $29.30 per account per month x 12 months + 38,718 hcf of water usage x $2.11 per hcf per month x 12 months = $1,463,087)

Table 2-6: Calculated Wastewater Rate Revenues

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
SFR	$18,484,526	$18,503,010	$18,521,513	$18,540,035	$18,558,575	$18,577,133
MFR	$6,059,621	$6,065,681	$6,071,746	$6,077,818	$6,083,896	$6,089,980
Fairgrounds Mobile Estates	$150,358	$150,508	$150,659	$150,809	$150,960	$151,111
Commercial I - Low Strength	$1,463,087	$1,463,087	$1,463,087	$1,463,087	$1,463,087	$1,463,087
Commercial II - Medium Strength	$374,895	$374,895	$374,895	$374,895	$374,895	$374,895
Commercial III - High Strength	$729,638	$729,638	$729,638	$729,638	$729,638	$729,638
Commercial IV - Special Dischargers	$378,441	$378,441	$378,441	$378,441	$378,441	$378,441
Schools	$17,310	$17,310	$17,310	$17,310	$17,310	$17,310
TOTAL CALCULATED REVENUE	**$27,657,874**	**$27,682,569**	**$27,707,288**	**$27,732,032**	**$27,756,801**	**$27,781,594**
UB Service Charges	$27,111,766	$27,136,310	$27,160,879	$27,185,472	$27,210,090	$27,234,732
UB Special Agreements	$546,109	$546,259	$546,409	$546,560	$546,711	$546,862

The rate revenues shown in **Table 2-4**, Lines 2-3, use the District's budget for FY 2018 and FY 2019. The difference between the calculated rate revenues and the budgeted rate revenues is less than 0.1 percent for both years which validated the data used in the model. Therefore, the District's budgeted revenues are reasonable to use as an estimate.

2.3 O&M EXPENSES

Inflationary assumptions are utilized to reasonably project future expenses. District staff provided the FY 2018 and FY 2019 budgets, and the remaining years are projected using the following inflationary assumptions shown in **Table 2-7**. District staff provided input to reasonably estimate the inflationary assumptions from year to year.

Table 2-7: Inflationary Assumptions

	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
General	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Salaries	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%
Benefits	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
PERS	11.7%	19.2%	14.8%	12.9%	9.9%	8.1%
Utilities	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Energy	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Chemicals	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Capital	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%

The District's wastewater O&M budget is shown in **Table 2-8**, which incorporates the inflationary assumptions in **Table 2-7** to project expenses for FY 2020 and beyond.

Table 2-8: Projected O&M Expenses

	Budgeted FY 2018	Budgeted FY 2019	Projected FY 2020	Projected FY 2021	Projected FY 2022	Projected FY 2023
Salaries and Benefits	$13,613,685	$15,176,841	$15,920,659	$16,679,732	$17,411,671	$18,130,840
Operations Materials, Services & Supplies	$3,224,848	$3,297,908	$3,411,565	$3,529,368	$3,651,478	$3,778,063
Utilities	$1,384,055	$1,427,755	$1,499,143	$1,574,100	$1,652,805	$1,735,445
General & Administrative	$3,090,926	$2,858,902	$2,944,669	$3,033,009	$3,123,999	$3,217,719
TOTAL O&M EXPENSES	**$21,313,514**	**$22,761,406**	**$23,776,036**	**$24,816,210**	**$25,839,954**	**$26,862,068**

2.4 CAPITAL IMPROVEMENT PLAN

Table 2-9 shows the District's six-year wastewater CIP. District staff provided capital project costs in current dollars from FY 2018 to FY 2023. Starting in FY 2020, capital project expenditures are inflated for future dollars using the capital escalation factor in **Table 2-7**.

Table 2-9: Inflated Capital Project Costs

Capital Improvement Projects		FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
01 51	Capital Replace	$1,144,500	$1,963,300	$0	$0	$0	$0
01 56	Capital Projects	$13,676,000	$7,436,300	$8,010,310	$9,770,889	$10,088,602	$11,784,077
TOTAL CIP		**$14,820,500**	**$9,399,600**	**$8,010,310**	**$9,770,889**	**$10,088,602**	**$11,784,077**

Table 2-10 shows the proposed capital financing plan for the CIP shown in **Table 2-9**. The District will have approximately $8.5 million in grants and reimbursements from the City of Vallejo for a cooperative project from FY 2018 to FY 2019. This amount is shown in **Table 2-10** as Other Funded. The projects that are eligible for debt funding are Capital Projects and NRCP Major Projects. The District does not plan to incur any additional debt and will fund the CIP through grants, reimbursements, and rates.

Table 2-10: Proposed Capital Financing Plan

Capital Financing Plan	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Total CIP	$14,820,500	$9,399,600	$8,010,310	$9,770,889	$10,088,602	$11,784,077
CIP Eligible for Debt Funding	$7,076,000	$5,564,300	$8,010,310	$9,770,889	$10,088,602	$11,784,077
Bond Funded	$0	$0	$0	$0	$0	$0
SRF Loan Funded	$0	$0	$0	$0	$0	$0
Other Funded	$6,600,000	$1,872,000	$0	$0	$0	$0
Rate Funded	$8,220,500	$7,527,600	$8,010,310	$9,770,889	$10,088,602	$11,784,077

2.5 DEBT SERVICE

The District currently has five existing debt service payments, which total to approximately $3.9 million to $6.5 million a year for the planning period. The existing debt service schedule is shown in **Table 2-11**. The District does not plan to incur any additional debt during the planning period.

Table 2-11: Existing Debt Service

Existing Debt Service	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
1993 Certificates of Participation	$2,652,750	$2,647,000	$2,640,000	$0	$0	$0
2004 SFR Loan	$907,072	$907,072	$907,072	$907,072	$907,072	$907,072
2008 SFR Loan	$317,450	$317,450	$317,450	$317,450	$317,450	$317,450
2011 Revenue Bonds	$327,275	$338,075	$328,475	$328,475	$327,750	$324,250
2014 Revenue Bonds	$2,312,275	$2,311,675	$2,310,425	$2,311,925	$2,310,925	$2,307,425
TOTAL EXISTING DEBT SERVICE	**$6,516,822**	**$6,521,272**	**$6,503,422**	**$3,864,922**	**$3,863,197**	**$3,856,197**

2.6 PROPOSED FINANCIAL PLAN

The following revenue adjustments ensure adequate revenue to fund operating expenses, debt service, and capital projects. They do not, however, fully fund reserve requirements for the planning period. The District's reserve balance is projected to increase over time, following FY 2023. The financial planning model assumes the revenue adjustments occur in July 2018 in FY 2019 and in July of each subsequent year. **Table 2-12** shows the proposed revenue adjustments for FY 2018 through FY 2022.

Table 2-12: Proposed Revenue Adjustments

Year	Revenue Adjustment
FY 2019	12.0%
FY 2020	12.0%
FY 2021	9.0%
FY 2022	4.5%
FY 2023	3.0%

Table 2-13 shows the operating cash flow detail for the study period, including the proposed revenue adjustments. Lines 31-32 of the table show the Net Operating Cash Flow and Net Cash Flow, the latter of which includes rate funded capital project costs. With the proposed revenue adjustments, the District will recover all operating expenses and debt service over the planning period. Starting in FY 2021, the District will recover all expenses, including capital.

Table 2-13: Proposed Financial Plan

				FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
1	Revenue at Existing Rates			$27,679,365	$27,679,365	$27,707,288	$27,732,032	$27,756,801	$27,781,594
2	Additional Revenue Needs								
		Revenue	Effective						
3	Fiscal Year	Adjustments	Month						
4	FY 2019	12.0%	July		$3,321,524	$3,324,875	$3,327,844	$3,330,816	$3,333,791
5	FY 2020	12.0%	July			$3,723,860	$3,727,185	$3,730,514	$3,733,846
6	FY 2021	9.0%	July				$3,130,835	$3,133,632	$3,136,431
7	FY 2022	4.5%	July					$1,707,829	$1,709,355
8	FY 2023	3.0%	July						$1,190,851
9	Total Additional Rate Revenue			$0	$3,321,524	$7,048,734	$10,185,864	$11,902,791	$13,104,274
10	**Total Rate Revenue**			**$27,679,365**	**$31,000,889**	**$34,756,022**	**$37,917,897**	**$39,659,592**	**$40,885,868**
11	Connection Fees			$150,000	$150,000	$150,000	$150,000	$150,000	$150,000
12	Septic Dump Fees			$299,049	$331,944	$331,944	$331,944	$331,944	$331,944
13	Plan Check Fees			$1,050	$3,849	$3,849	$3,849	$3,849	$3,849
14	Field Inspections			$3,849	$8,498	$8,498	$8,498	$8,498	$8,498
15	Septic Dumping Permits			$8,498	$9,432	$9,432	$9,432	$9,432	$9,432
16	Connection Permit			$4,988	$4,988	$4,988	$4,988	$4,988	$4,988
17	IVR Processing Fee			$9,000	$9,000	$9,000	$9,000	$9,000	$9,000
18	Late Payment Penalties			$0	$0	$0	$0	$0	$0
19	UB Penalties & Interest			$483,281	$483,281	$483,281	$483,281	$483,281	$483,281
20	Misc Leases & Rentals			$396,000	$396,000	$396,000	$396,000	$396,000	$396,000
21	Misc Revenues			$805,000	$805,000	$805,000	$805,000	$805,000	$805,000
22	Payoff Demand Fees			$98,920	$98,920	$98,920	$98,920	$98,920	$98,920
23	Property Taxes			$892,500	$892,500	$892,500	$892,500	$892,500	$892,500
24	Investment Income			$276,000	$276,000	$202,057	$319,609	$478,928	$549,262
25	**Total Revenue**			**$31,107,500**	**$34,470,301**	**$38,151,491**	**$41,430,918**	**$43,331,932**	**$44,628,542**
26	O&M Expenses			$21,313,514	$22,761,406	$23,776,036	$24,816,210	$25,839,954	$26,862,068
27	Existing Debt Service			$6,516,822	$6,521,272	$6,503,422	$3,864,922	$3,863,197	$3,856,197
28	Proposed Debt Service			$0	$0	$0	$0	$0	$0
29	Rate Funded CIP			$8,220,500	$7,527,600	$8,010,310	$9,770,889	$10,088,602	$11,784,077
30	**Total Expenses**			**$36,050,836**	**$36,810,278**	**$38,289,768**	**$38,452,021**	**$39,791,753**	**$42,502,342**
31	Net Operating Cash Flow			$3,277,164	$5,187,623	$7,872,033	$12,749,786	$13,628,781	$13,910,277
32	**Net Cash Flow**			**($4,943,336)**	**($2,339,977)**	**($138,277)**	**$2,978,897**	**$3,540,179**	**$2,126,200**
33	Calculated Debt Coverage			150%	180%	221%	430%	453%	461%
34	Required Debt Coverage			110%	110%	110%	110%	110%	110%

Table 2-14 shows the District's projected fund balances over the study period. The reserve target for Unrestricted reserves consists of an operating and a capital reserve target. The operating reserve target is equal to 50 percent of O&M expenses to mitigate against any potential cash flow risks or unexpected O&M costs. The capital reserve target is equal to 2 percent of the replacement cost asset value in case of unexpected asset failure. The District's fund balance will not meet the reserve target in the planning period to minimize rate impacts to customers, but the reserves will begin to increase in the following years.

Table 2-14: Projected Fund Balances

Reserves Balance	FY 2018	FY 2019	FY 2020	FY 2021	FY 2022	FY 2023
Unrestricted						
Beginning Balance	$6,725,401	$4,782,065	$3,442,088	$5,943,811	$8,922,708	$12,462,887
Net Operating Cash Flow	$3,277,164	$5,187,623	$7,872,033	$12,749,786	$13,628,781	$13,910,277
Bonds Proceeds	$0	$0	$0	$0	$0	$0
SRF Loan Proceeds	$0	$0	$0	$0	$0	$0
Other Financing Sources	$6,600,000	$1,872,000	$0	$0	$0	$0
Total CIP	($14,820,500)	($9,399,600)	($8,010,310)	($9,770,889)	($10,088,602)	($11,784,077)
Transfer from/(to) Connection Fees Reserve	$3,000,000	$1,000,000	$0	$0	$0	$0
Transfer from/(to) Debt Service Reserve	$0	$0	$2,640,000	$0	$0	$907,072
Ending Balance	**$4,782,065**	**$3,442,088**	**$5,943,811**	**$8,922,708**	**$12,462,887**	**$15,496,159**
Interest Income	$41,157	$52,111	$65,438	$181,836	$313,600	$397,541
Target Reserve						
Operating	$10,656,757	$11,380,703	$11,888,018	$12,408,105	$12,919,977	$13,431,034
Capital	$12,140,670	$12,140,670	$12,140,670	$12,140,670	$12,140,670	$12,140,670
Connection Fees						
Beginning Balance	$4,686,183	$1,686,183	$686,183	$686,183	$686,183	$686,183
Transfer from/(to) Unrestricted Reserve	($3,000,000)	($1,000,000)	$0	$0	$0	$0
Ending Balance	**$1,686,183**	**$686,183**	**$686,183**	**$686,183**	**$686,183**	**$686,183**
Interest Income	$31,862	$17,793	$13,724	$17,155	$20,585	$20,585
Debt Service						
Beginning Balance	$7,464,736	$7,464,736	$7,464,736	$4,824,736	$4,824,736	$4,824,736
Transfer from/(to) Unrestricted Reserve			($2,640,000)			($907,072)
Ending Balance	**$7,464,736**	**$7,464,736**	**$4,824,736**	**$4,824,736**	**$4,824,736**	**$3,917,664**
Interest Income	$74,647	$111,971	$122,895	$120,618	$144,742	$131,136

3 COST OF SERVICE ANALYSIS

This section describes the cost of service analysis portion of the study. This analysis is conducted to proportionally allocate the District's revenue requirements, or costs, to the corresponding customer classes to later determine the proposed wastewater rates.

3.1 COMMERCIAL CLASSIFICATION

As part of the study, the classification of commercial customers was changed to better align with cost of service principles and industry standards. The structure remains the same with three classes of Commercial customers (I, II, and III) and a fourth class that are monitored individually. The Commercial IV classification has not been changed and are customers that need to be monitored because of their significant strength and/or flow.

The current classification for Commercial I customers, or low strength customers, is a combined strength of up to 400 mg/L of BOD and TSS. The proposed classification for low strength remains the same and includes customers such as car washes, office buildings, schools, laundromats, and other miscellaneous commercial uses.

Commercial II, or medium strength, customers are currently classified with a combined strength of up to 2,000 mg/L. The proposed classification for Commercial II customers is up to 800 mg/L of combined BOD and TSS. These customers include bars, hotels and motels without dining, repair shops, and commercial laundry or dry cleaners.

High strength customers, or Commercial III customers, are currently classified by a combined strength of up to 4,000 mg/L. Normal commercial customers typically have combined strength of no more than 1600 mg/l. Therefore, the proposed classification is a combined strength of higher than 800 mg/L up to 1,600 mg/l. The high strength customers include shopping centers and malls, hotels and motels with dining, industrial use, grocery stores, restaurants and bakeries, and mortuaries.

The proposed reclassification of Commercial cusotmers represents more accurately what may be considered low, medium, and high strength users. Ultimately, a more equitable classification of customer classes will allow the cost of service to result in a fairer allocation of costs between all customer classes.

3.2 MASS BALANCE

A cost of service analysis requires that costs are assigned to customers in proportion to their loadings. Customers are divided into different classes as shown above. Since measurement of wastewater flow is expansive and prone to errors, wastewater flow is not measured for most customers.

To determine this, a mass balance analysis is done by taking the total flow and strength of the wastewater influent into the plant and reducing that by the wastewater loadings of the District's non-residential customers and inflow and infiltration (I&I). A significant quantity of wastewater results from I&I, which is

water that enters the collection system during rain-related events, run-off, etc. I&I is determined based on the District's dry weather flows compared to wet weather flows. Wet weather flows are from December to April; dry weather flows are from May to November. I&I is estimated to be about 31% of the total influent.

Non-residential customers' wastewater flow is estimated by assuming 12 months of monthly average winter water usage. Wastewater flow for schools is estimated by assuming 8 gpd per student for 180 school days. 8 gpd is the weighted average of elementary, middle and high school flows per student. Residential flow can be estimated after reducing the total wastewater influent by I&I and estimated non-residential wastewater flow.

Table 3-1 shows the total annual units of flow and strength for each customer class based on the results of the mass balance analysis. The estimated residential wastewater flow is 5.9 hcf per month per EDU, or 57 gallons per capita per day (gpcd). 55 gpcd of wastewater flow is the provisional standard for domestic use in the state of California[1]. The results for estimated residential wastewater flow falls within an acceptable range based on the provisional standard of 55 gpcd. The residential strength of 293 and 279 mg/l of BOD and TSS, respectively is also reasonable based on the residential wastewater flow.

[1] California Senate Bill No. 7, Chapter 4

Table 3-1: Mass Balance Analysis

FY 2017 Data	Flow (MGD)	BOD (lbs/yr)	TSS (lbs/yr)	Flow (hcf/yr)	BOD (mg/L)	TSS (mg/L)
Total Plant Influent	12.46	9,702,664	9,034,201	6,080,080	256	238
Less: I&I	3.86	1,706,034	1,882,521	1,884,825	145	160
Net Plant Influent	**8.60**	**7,996,629**	**7,151,681**	**4,195,255**	**305**	**273**
Commercial I						
Car Wash/Soft Water Service	0.02	927	6,955	7,428	20	150
Office Buildings/Professional Office/Warehouse	0.14	54,769	33,704	67,491	130	80
Laundromats	0.02	10,551	7,737	11,268	150	110
Hospital	0.15	117,569	47,027	75,336	250	100
All Other Commercial	0.47	215,640	215,640	230,298	150	150
Commercial II						
Bars	0.01	8,000	8,000	6,408	200	200
Hotel/Motel w/o Dining	0.11	102,806	39,796	53,126	310	120
Repair Shop/Service Station	0.06	31,894	49,613	28,385	180	280
Commercial Laundry	0.01	12,101	6,454	4,308	450	240
Commercial III						
Shopping Center/Regional Mall	0.07	134,430	89,620	35,892	600	400
Hotel/Motel w/ Dining	0.02	28,961	34,754	9,279	500	600
Industrial/Manufacturing	0.01	33,469	16,735	6,702	800	400
Grocery Store w/ Meat Dept.	0.10	237,489	237,489	47,556	800	800
Restaurant	0.17	527,504	316,503	84,504	1,000	600
Bakery	0.00	4,195	2,517	672	1,000	600
Mortuary	0.00	2,936	2,936	588	800	800
Commercial IV	0.24	268,237	130,210	119,359	360	175
Schools	0.05	21,372	18,084	26,336	130	110
Total Commercial	**1.67**	**1,812,853**	**1,263,775**	**814,936**	**356**	**248**
Residential	**6.93**	**6,183,777**	**5,887,906**	**3,380,319**	**293**	**279**

3.3 FUNCTIONALIZATION OF REVENUE REQUIREMENTS

A cost of service analysis distributes a utility's revenue requirements, or costs, to each customer class. After determining a utility's revenue requirements, the next step in a cost of service analysis is to functionalize its operating and capital costs, based on the District's current O&M expense and assets classification. The District provided a breakdown of the budget, which includes the following classifications.

The District's current O&M classification/function includes:

- Administration
- Safety & Risk Management
- Finance – a portion of these costs are for billing and customer service
- Engineering – costs related to upkeep of assets
- Field Operations – collection system costs

- Operations – treatment related costs
- Environmental Services – strength related costs
- Facilities Maintenance – treatment and technology costs

The District's current asset classifications include:

- Land & Improvements
- Building & Improvements
- Pump Stations
- Plant & Facilities
- Collection Systems
- Plant Capital
- Collections Capital
- Machinery & Equipment

These current O&M expense and asset classifications, also known as functionalized costs, are further allocated into cost causation components. The cost causation components include:

- Flow
- BOD
- TSS
- Customer
- General

Table 3-2 shows the O&M expense allocation for each cost causation component. Raftelis allocated each of these costs based on their functions, based on discussion with District staff regarding the costs related to each of the cost causation component. Administration costs are allocated fully to General. Safety & Risk Management and Finance costs are split evenly between Customer and General. Finance costs include billing and customer service costs. Engineering costs are allocated based on the assets allocation shown in

Table 3-3 since they are related to upkeep of the total assets of the District. Field Operations costs are allocated fully to Flow. Operations costs are split evenly between Flow and Strength (a quarter for each strength cost component). Environmental Services costs, which are strength related costs, are split between BOD and TSS. Facilities Maintenance costs, which include treatment and IT costs, are allocated to General at 10 percent first, then proportionally to the Operations costs allocations for the remaining 90 percent of costs. These allocations are based on industry standards and the District's specific functionalized costs.

The second half of **Table 3-2** shows the dollar amounts of cost causation component based on the allocation percentages shown in the first half of the table. The total percent allocation, shown in the second last line, is the proportion of each cost causation component based on total O&M expenses. When the general costs are reallocated to the other costs propositionally, the allocations to each cost causation component are shown in the last line.

Table 3-2: O&M Expenses Allocation

O&M Allocations	Flow	BOD	TSS	Customer	General	TOTAL
Admin					100%	**100%**
Safety & Risk Management				50%	50%	**100%**
Finance				50%	50%	**100%**
Engineering	76%	11%	11%	0%	2%	**100%**
Field Operations	100%					**100%**
Operations	50%	25%	25%			**100%**
Environmental Services		50%	50%			**100%**
Facilities Maintenance	45%	23%	23%		10%	**100%**

O&M Allocations	Flow	BOD	TSS	Customer	General	TOTAL
Admin	$0	$0	$0	$0	$1,385,935	**$1,385,935**
Safety & Risk Management	$0	$0	$0	$622,321	$622,321	**$1,244,642**
Finance	$0	$0	$0	$958,483	$958,483	**$1,916,966**
Engineering	$569,099	$80,055	$80,055	$2,924	$16,116	**$748,250**
Field Operations	$5,366,526	$0	$0	$0	$0	**$5,366,526**
Operations	$2,581,024	$1,290,512	$1,290,512	$0	$0	**$5,162,049**
Environmental Services	$0	$1,441,217	$1,441,217	$0	$0	**$2,882,434**
Facilities Maintenance	$1,824,572	$912,286	$912,286	$0	$405,460	**$4,054,604**
TOTAL O&M EXPENSES	**$10,341,221**	**$3,724,071**	**$3,724,071**	**$1,583,728**	**$3,388,316**	**$22,761,406**
% Allocation	45%	16%	16%	7%	15%	100%

Similar to the O&M expenses, capital expenses are allocated to cost causation components based on asset value. Pump stations and collections systems costs are allocated to flow because they are designed to handle wastewater flow. Plant costs are allocated between flow and strength. In the absence of detailed description of assets, the allocation for secondary treatment plant is reasonably close to 50 percent, 25 percent, and 25 percent, respectively, to flow, BOD and TSS. Half of the Building costs are allocated to Customers because a portion of the buildings are used for customer service. The remaining Building costs and Land and Machinery costs are allocated to General.

Table 3-3 shows the allocation of asset value into each cost causation component to determine the final percent allocation in the last line.

Table 3-3: Asset Value Allocation

Assets Allocations	Flow	BOD	TSS	Customer	General	TOTAL
SS: LAND & IMPROVEMENTS					100%	**100%**
SS: BLDGS & IMPROVEMENTS				50%	50%	**100%**
SS: PUMP STATIONS	100%					**100%**
SS: PLANT & FACILITIES	50%	25%	25%			**100%**
SS: COLLECTION SYSTEMS	100%					**100%**
SS: CONTR. CAPITAL - COLL	100%					**100%**
SS: CONTR. CAPITAL - PLNT	50%	25%	25%			**100%**
SS: MACHINERY & EQUIPMENT					100%	**100%**

Assets Allocations	Flow	BOD	TSS	Customer	General	TOTAL
SS: LAND & IMPROVEMENTS	$0	$0	$0	$0	$7,267	**$7,267**
SS: BLDGS & IMPROVEMENTS	$0	$0	$0	$928,819	$928,819	**$1,857,638**
SS: PUMP STATIONS	$24,333,831	$0	$0	$0	$0	**$24,333,831**
SS: PLANT & FACILITIES	$49,871,835	$24,935,917	$24,935,917	$0	$0	**$99,743,670**
SS: COLLECTION SYSTEMS	$90,406,426	$0	$0	$0	$0	**$90,406,426**
SS: CONTR. CAPITAL - COLL	$15,191,956	$0	$0	$0	$0	**$15,191,956**
SS: CONTR. CAPITAL - PLNT	$994,012	$497,006	$497,006	$0	$0	**$1,988,024**
SS: MACHINERY & EQUIPMENT	$0	$0	$0	$0	$4,183,897	**$4,183,897**
TOTAL ASSETS	**$180,798,059**	**$25,432,924**	**$25,432,924**	**$928,819**	**$5,119,982**	**$237,712,707**
% Allocation	76%	11%	11%	0%	2%	100%

3.4 REVENUE REQUIREMENT

Table 3-4 shows the District's total revenue to be recovered from rates. This figure is calculated by subtracting revenue offsets (or miscellaneous, non-rate revenues) and adjustments from the revenue requirements, which includes O&M expenses, rate funded capital costs, and debt service payments. The Cash from Reserves adjustment is equal to the Net Cash Flow in FY 2019 in **Table 2-13**. There are no mid-year rate increase adjustments because the proposed revenue adjustment will take place in July and will be effective for the full fiscal year. The District's total revenue requirement is allocated into Operating and Capital costs, which will later be allocated into each cost causation component.

Table 3-4: Revenue Requirement

FY 2019	Operating	Capital	Total
Revenue Requirements			
O&M Expenses	$22,761,406		$22,761,406
Existing Debt Service		$6,521,272	$6,521,272
Proposed Debt Service		$0	$0
Rate Funded CIP		$7,527,600	$7,527,600
Total Revenue Requirements	**$22,761,406**	**$14,048,872**	**$36,810,278**
Revenue Offsets			
Connection Fees		$150,000	$150,000
Septic Dump Fees	$331,944		$331,944
Plan Check Fees	$3,849		$3,849
Field Inspections	$8,498		$8,498
Septic Dumping Permits	$9,432		$9,432
Connection Permit	$4,988		$4,988
IVR Processing Fee	$9,000		$9,000
Late Payment Penalties	$0		$0
UB Penalties & Interest	$483,281		$483,281
Misc Leases & Rentals	$396,000		$396,000
Misc Revenues	$805,000		$805,000
Payoff Demand Fees	$98,920		$98,920
Property Taxes	$892,500		$892,500
Investment Income	$276,000		$276,000
Total Revenue Offsets	**$3,319,412**	**$150,000**	**$3,469,412**
Adjustments			
Cash from Reserves		$2,339,977	$2,339,977
Midyear Increase	$0		$0
Total Adjustments	**$0**	**$2,339,977**	**$2,339,977**
Cost of Service to be Recovered from Rates	**$19,441,994**	**$11,558,895**	**$31,000,889**

3.5 UNIT COST DERIVATION

Table 3-5 shows the flow, strength, and accounts data for all customer classes. These data are used to calculate the unit cost for each cost causation component. The Flow, BOD, and TSS data is derived from the mass balance in **Table 3-1**. The Residential, Commercial IV, and Schools units and accounts are from **Table 2-2** for FY 2019. The number of accounts for Multi-Family Residential customers are from the budget data provided by the District. The number of Commercial I, Commercial II, and Commercial III customers are from an analysis of the reclassification of Commercial customers, shown in **Table 1-1**.

Table 3-5: Customer Class Data

Customer Class	Flow (hcf/yr)	BOD (lbs/yr)	TSS (lbs/yr)	Units	Accounts
Residential	**3,380,319**	**6,183,777**	**5,887,906**	**47,461**	**38,416**
SFR				35,569	35,569
MFR				11,892	2,847
Commercial I	**391,821**	**399,457**	**311,065**	**1,250**	**1,250**
Car Wash/Soft Water Service	7,428	927	6,955		
Office Buildings/Professional Office/Warehouse	67,491	54,769	33,704		
Laundromats	11,268	10,551	7,737		
Hospital	75,336	117,569	47,027		
All Other Commercial	230,298	215,640	215,640		
Commercial II	**92,227**	**154,802**	**103,863**	**197**	**197**
Bars	6,408	8,000	8,000		
Hotel/Motel w/o Dining	53,126	102,806	39,796		
Repair Shop/Service Station	28,385	31,894	49,613		
Commercial Laundry	4,308	12,101	6,454		
Commercial III	**185,193**	**968,986**	**700,554**	**206**	**206**
Shopping Center/Regional Mall	35,892	134,430	89,620		
Hotel/Motel w/ Dining	9,279	28,961	34,754		
Industrial/Manufacturing	6,702	33,469	16,735		
Grocery Store w/ Meat Dept.	47,556	237,489	237,489		
Restaurant	84,504	527,504	316,503		
Bakery	672	4,195	2,517		
Mortuary	588	2,936	2,936		
Commercial IV	119,359	268,237	130,210	6	6
Schools	26,336	21,372	18,084	13,680	31
TOTAL	**4,195,255**	**7,996,629**	**7,151,681**	**62,800**	**40,106**

Table 3-6 shows the unit cost derivation for all cost causation components. Operating expenses, which total approximately $19.4 million (from **Table 3-4**), are allocated based on the O&M expense allocation shown in **Table 3-2**. The total cost is multiplied by each cost causation component's allocation percentage to determine the dollar amount. A similar process is used to calculate the capital expenses for each cost causation component. The asset allocation percentage in

Table 3-3 is used to allocate the capital costs.

The General costs are reallocated to each cost causation component based on their relative proportion of the total cost of service. For example, the total cost of service for Flow is $17.6 million, which is 63 percent of the total cost of $31.0 million less the General costs of $3.1 million. The portion of General costs allocated to Flow will then be $3.1 million multiplied by 63 percent to get approximately $2 million.

Most wastewater costs are fixed. Collection systems are designed for flow but the majority of the collectors are designed for ease of maintenance. Therefore, the costs of the collection system are fixed along with customer costs. These costs represent about 60 percent of the operating costs shown in the last line of **Table 3-2**. Collecting 60 percent of the total costs from fixed charges is reasonable and will help maintain financial stability. Flow and strength costs are reallocated to Customer to maintain this percentage.

The final adjusted cost of service, after reallocating General costs and costs related to the fixed charge, is divided by each unit of service to determine the unit cost for each cost causation component. The units of service are derived from **Table 3-5**.

Table 3-6: Unit Cost Derivation

	Flow	BOD	TSS	Customer	General	TOTAL
Operating Expenses	$8,833,108	$3,180,970	$3,180,970	$1,352,765	$2,894,180	$19,441,994
Capital Expenses	$8,791,393	$1,236,688	$1,236,688	$45,164	$248,962	$11,558,895
Total Cost of Service	**$17,624,501**	**$4,417,659**	**$4,417,659**	**$1,397,929**	**$3,143,142**	**$31,000,889**
Allocation of General Cost	$1,988,542	$498,437	$498,437	$157,726	($3,143,142)	$0
Allocated Cost of Service	**$19,613,043**	**$4,916,095**	**$4,916,095**	**$1,555,655**	**$0**	**$31,000,889**
Adjustment to Fixed Charges	($11,353,346)	($2,845,766)	($2,845,766)	$17,044,879		
Adjusted Cost of Service	**$8,259,697**	**$2,070,329**	**$2,070,329**	**$18,600,533**	**$0**	**$31,000,889**
Unit of Service	4,195,255	7,996,629	7,151,681	40,106		
Units	hcf	lbs/yr	lbs/yr	bills/yr		
Unit Cost	$1.97	$0.26	$0.29	$38.65		
	$/hcf	$/lb	$/lb	$/month		

3.6 ALLOCATION OF COSTS TO CUSTOMER CLASSES

The next step in the cost of service analysis is to proportionately allocate costs to the different customer classes. The unit cost derived in **Table 3-6** is multiplied by each customer class's flow, strength, and accounts data shown in **Table 3-5** to determine the cost allocation for each class. For example, to determine the Residential Flow costs, the Residential flow of 3,380,319 hcf is multiplied by the Flow unit cost of $1.97 per hcf to get $6,655,235.

Table 3-7 shows the allocation of costs to each customer class and a comparison between the total proposed cost of service amount and the current revenue. Note that the difference between total costs based on cost of service and current revenue is equal to the revenue adjustment for FY 2019. Commercial Group III and Schools are the most impacted under the cost of service analysis.

Table 3-7: Allocation of Costs to Customer Classes

Customer Class	Flow	BOD	TSS	Customer	TOTAL	Current
Residential	$6,655,235	$1,600,981	$1,704,481	$17,816,738	**$27,777,436**	$24,719,199
Commercial I	$771,425	$103,419	$90,050	$579,730	**$1,544,624**	$1,463,087
Commercial II	$181,578	$40,078	$30,067	$91,365	**$343,089**	$374,895
Commercial III	$364,611	$250,871	$202,802	$95,539	**$913,824**	$729,638
Commercial IV	$234,997	$69,447	$37,694	$2,783	**$344,920**	$378,441
Schools	$51,850	$5,533	$5,235	$14,377	**$76,996**	$17,310
TOTAL	**$8,259,697**	**$2,070,329**	**$2,070,329**	**$18,600,533**	**$31,000,889**	**$27,682,569**

4 RATE DERIVATION

This section describes the derivation of the proposed wastewater rates based on the cost of service analysis. All calculated rates are rounded up to the nearest penny.

4.1 RESIDENTIAL RATES

Residential customers are fairly homogenous, and many agencies charge a fixed charge to residential customers for simplicity and ease of understanding. We propose to retain the current fixed rate structure for residential customers. **Table 4-1** shows the calculation of the proposed Residential wastewater rate and a comparison to the current rate. The total cost of service (COS) is the same total for Residential customers shown in **Table 3-7**.

Table 4-1: Residential Rate Derivation

	Total COS	Monthly Units	Fixed Charge ($/month)	Current Charge	Difference
Residential	$27,777,436	47,461	**$48.78**	$43.35	12.5%

4.2 NON-RESIDENTIAL RATES

Commercial customers are not very homogenous in that their flow and strength can vary significantly. We propose to retain the current fixed plus variable rate structure for these customers. Commercial I, Commercial II, and Commercial III customers are charged a monthly fixed charge and a variable charge based on average winter water usage in hcf. The Commercial customer classifications are outlined in **Table 1-1**. **Table 4-2** shows the calculation of the proposed Commercial I, Commercial II, and Commercial III wastewater rates and a comparison to the current rates. The variable cost for each customer class is equal to the Flow, BOD, and TSS amounts for each class as shown in **Table 3-7**. The fixed charge amount is equal to the unit cost shown in **Table 3-6**.

Table 4-2: Commercial (I, II, and III) Rate Derivation

	Variable Cost	Total Flow (hcf)	Variable Charge ($/hcf)	Fixed Charge ($/month)	Current Variable	Current Fixed	Difference Variable	Difference Fixed
Commercial I	$964,894	391,821	**$2.47**	**$38.65**	$2.11	$29.30	17%	32%
Commercial II	$251,724	92,227	**$2.73**	**$38.65**	$2.82	$29.30	-3%	32%
Commercial III	$818,284	185,193	**$4.42**	**$38.65**	$7.45	$29.30	-41%	32%

Commercial IV customers are charged a monthly fixed charge and three variable charges based on flow, BOD, and TSS. **Table 4-3** shows the derivation of the proposed Commercial IV wastewater rates, which is equal to the unit cost for each cost causation component in **Table 3-6**.

Table 4-3: Commercial (IV) Rate Derivation

	Fixed Charge ($/month)	Flow Charge ($/hcf)	BOD Charge ($/lb)	TSS Charge ($/lb)	Current Fixed	Current Flow	Current BOD	Current TSS
Commercial IV	**$38.65**	**$1.97**	**$0.26**	**$0.29**	$28.88	$1.38	$0.59	$0.41

Schools are charged a monthly fixed charge and a variable charge based on ADA. **Table 4-4** shows the calculation of the proposed Schools wastewater rates and a comparison to the current rates. The variable cost is equal to all Flow, BOD, and TSS costs in **Table 3-7** for Schools. This number is divided by the number of ADA to determine the variable charge per ADA. The fixed charge amount is equal to the unit cost shown in **Table 3-6**. There is a large increase in the variable charge per ADA from $0.48 to $4.58 per year based on cost of service.

Table 4-4: Schools Rate Derivation

	Variable Cost	Total ADA	Variable Charge ($/ADA/yr)	Fixed Charge ($/month)	Current Variable ($/ADA/yr)	Current Fixed	Difference Variable	Difference Fixed
Schools	$62,619	13,680	**$4.58**	**$38.65**	$0.48	$28.88	854%	34%

4.3 PROPOSED WASTEWATER RATES

Table 4-5 shows the proposed wastewater rate schedule for the study period. The first year of rates in July 2018 are based on the previous cost of service analysis. All subsequent years' rates are increased across the board based on the proposed revenue adjustments shown in **Table 2-12**.

Table 4-5: Proposed Wastewater Rates

	July 2018	July 2019	July 2020	July 2021	July 2022
Residential					
SF Residential, monthly service charge per EDU	$48.78	$54.64	$59.56	$62.25	$64.12
MF Residential, monthly service charge per EDU	$48.78	$54.64	$59.56	$62.25	$64.12
Commercial/Industrial					
Monthly service charge per acct, plus	$38.65	$43.29	$47.19	$49.32	$50.80
*Water usage charge ($ per ccf WQA)					
Commercial I - Low strength	$2.47	$2.77	$3.02	$3.16	$3.26
Commercial II - Medium strength	$2.73	$3.06	$3.34	$3.50	$3.61
Commercial III - High strength	$4.42	$4.96	$5.41	$5.66	$5.83
Unit Wastewater Charge Rates For Significant Named Dischargers/Others					
Commercial Special Service Charge per acct, plus	$38.65	$43.29	$47.19	$49.32	$50.80
Flow ($/million gallons), or	$2,633.69	$2,949.74	$3,215.22	$3,359.91	$3,460.71
Flow ($/Ccf)	$1.97	$2.21	$2.41	$2.52	$2.60
BOD ($/lb)	$0.26	$0.30	$0.33	$0.35	$0.37
TSS ($/lb)	$0.29	$0.33	$0.36	$0.38	$0.40
School Charge ($ per ADA - year)	$4.58	$5.13	$5.60	$5.86	$6.04

4.4 CUSTOMER IMPACTS

Based on the cost of service analysis in which the District's costs are allocated proportionately to each customer class based on each class's loadings, Schools will have a high rate impact. **Table 4-6** shows the proposed customer impacts to each of the schools in the District's service area.

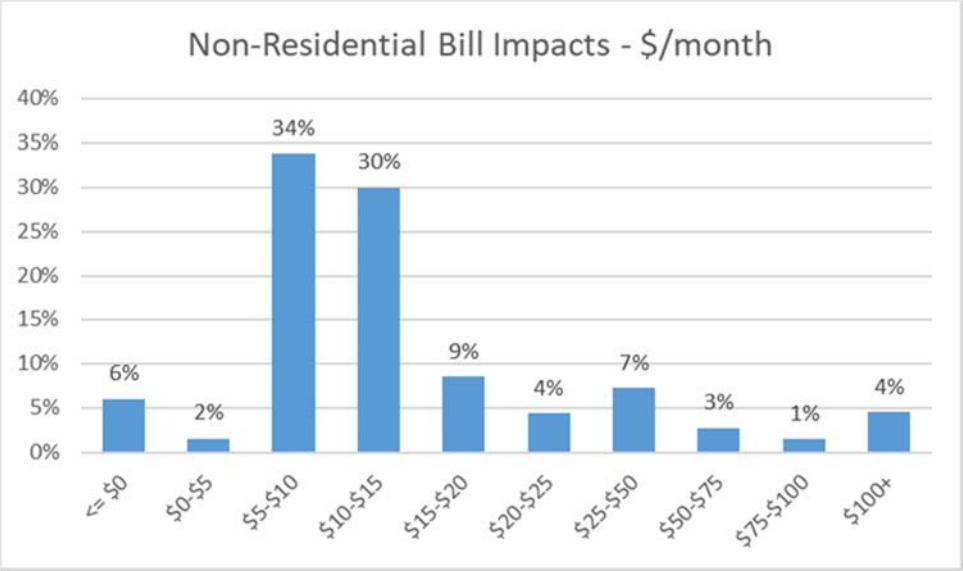
Table 4-6: Schools Customer Impacts

Schools	ADA	Current Annual Bill	Proposed Annual Bill	Difference
Vallejo City Unified School District	12,144	$14,840	$67,678	$52,839
St. Vincent Ferrer School	264	$473	$1,673	$1,200
St. Patrick-St. Vincent High School	475	$575	$2,639	$2,065
St. Basil's School	230	$457	$1,517	$1,060
North Hills Christian School	242	$463	$1,572	$1,109
St. Catherine of Sienna School	325	$503	$1,952	$1,450
TOTAL	**13,680**	**$17,310**	**$77,032**	**$59,722**

Residential customers will see a 12.5 percent increase in the fixed monthly charge from $43.35 to $48.78 per month per equivalent dwelling unit (EDU).

Non-residential customers will have a moderate bill impact. **Figure 4-1** shows the impacts on each customer bill for non-residential customers based on the proposed rates. Approximately 34 percent of non-residential bills will see a moderate impact of $5 to $10.

Figure 4-1: Non-Residential Bill Impacts



4.5 SCHOOLS PHASE-IN OPTIONS

Schools will see the highest customer impacts based on the proposed rates. **Table 4-7** shows the two potential phase-in options for Schools, with one option phasing in over five years and another over three years, to mitigate the impacts they experience. The revenue loss for each option is also shown. The District plans on funding the revenue loss through discretionary income, such as rental and leases revenue and/or late fees and penalties.

The five-year phase-in option will reach the proposed rates in **Table 4-5** in FY 2023, or July 2022. The three-year phase-in option will reach the proposed rates in FY 2021, or July 2020.

Table 4-7: Schools Phase-In Options

		Current	July 2018	July 2019	July 2020	July 2021	July 2022
Phase in Option for Schools - 5 years							
School Charge ($ per ADA - year)	% Option	$0.48	$0.73	$1.12	$1.71	$2.62	$6.04
	$ Option	$0.48	$1.59	$2.70	$3.81	$4.92	$6.04
Phase in Option for Schools - 3 years							
School Charge ($ per ADA - year)	% Option	$0.48	$1.17	$2.86	$5.60	$5.86	$6.04
	$ Option	$0.48	$2.19	$3.90	$5.60	$5.86	$6.04

Raftelis recommends a five-year phase-in option as shown below in **Table**. This phase-in option will reduce reserves by approximately $112,000 over five years.

Table 4-8: Five-Year Phase-in Option for Schools

	Current	July 2018	July 2019	July 2020	July 2021	July 2022
Phase in Option for Schools - 5 years						
School Charge ($ per ADA - year)	$0.48	$1.59	$2.70	$3.81	$4.92	$6.04

5 CONNECTION FEES

As part of the wastewater rate study, Raftelis developed connection fees for the District's wastewater system. The methodology used to calculate the proposed connection fees is described in the section below.

5.1 ECONOMIC FRAMEWORK

For publicly owned wastewater systems, most of the assets are typically paid for by the contributions of existing customers through rates and charges. In service areas that incorporate new customers, the infrastructure developed by previous customers are generally extended toward the service of new customers. Existing customers' investment in the system capacity allows newly connecting customers to take advantage of unused surplus capacity.

To further economic equality among new and existing customers, new customers will typically refund the value of the existing system capacity to existing customers, effectively putting them on par with existing customers. In other words, the new customers are buying into the existing system through a refund to the existing customers for the portion of the system that has already been invested in.

The basic economic philosophy behind connection fees is that the cost of providing wastewater service should be paid for by those that receive utility from the product. This philosophy is often referred to as "growth should pay for growth." To effect fair distribution of the value of the system, the fee should reflect a reasonable estimate of the cost of providing capacity to new users and not unduly burden existing customers. This principle is summarized in the *American Water Works Association (AWWA) Manual M1, Principles of Water Rates and Charges* (Manual M1).

5.2 LEGAL FRAMEWORK[2]

The District reserves broad authority over the pricing of wastewater connection fees. The most salient limitation on this authority is the requirement that recovery costs on new development bear a reasonable relationship to the needs and benefits to the development. Courts have long used a standard of reasonableness to evaluate the legality of connection fees. The basic statutory standards governing wastewater connection fees are embodied by Government Code Sections 66013, 66016, 66022, and 66023. Government Code Section 66013 contains requirements specific to pricing wastewater connection fees:

> *"Notwithstanding any other provision of law, when a local agency imposes fees for water connections or sewer connections, or imposes capacity charges, those fees or charges shall not exceed the estimated reasonable cost of providing the service for which the fee or charge is*

[2] Raftelis does not practice law nor does it provide legal service. The above discussion is to provide a general review of apparent state institutional constraints and is labeled "legal framework" for literary convenience only. The District should consult with its counsel for clarification and/or specific review of any of the above or other matters.

imposed, unless a question regarding the amount the fee or charge in excess of the estimated reasonable cost of providing the services or materials is submitted to, and approved by, a popular vote of two-thirds of those electors voting on the issue."

Section 66013 also includes the following general requirements:

- Local agencies must follow a process set forth in the law, making certain determinations regarding the purpose and use of the fee; they must establish a nexus or relationship between a development project and the public improvement being financed with the fee.
- The connection fee revenue must be segregated from the General Fund to avoid commingling of connection fees and the General Fund.

5.3 APPROACH

There are several available methodologies for calculating connection fees. The various approaches have evolved largely around the basis of changing public policy, legal requirements, and the unique circumstances of every local agency. However, there are three general approaches that are widely accepted and appropriate for wastewater connection fees. They are the "buy-in," "incremental cost," and "hybrid" approaches.

Buy-In Approach

The buy-in approach rests on the premise that new customers are entitled to service at the same price as existing customers. However, existing customers have already developed the facilities that will serve new customers, including the costs associated with financing those services. Under this approach, new customers pay only an amount equal to the net investment already made by existing users, based on replacement cost less depreciation. This net equity investment figure divided by the current demand of the system – the amount of wastewater flow – determines the new user's fee.

For instance, if an existing system has 100 units of average usage and the new connector uses one equivalent unit, then the new customer would pay 1/100th of the total value of the existing system. By contributing this connection fee, the new user has bought into the existing system. The user has effectively acquired a financial position on par with existing customers and will face future capital challenges on equal financial footing with those customers. This approach is best suited for agencies that have capacity in their system and are essentially close to full build-out.

Incremental Cost Approach

When new users connect to a wastewater system, they either use surplus capacity from the existing system, which must then be replaced, or they require new capacity that must be added to the system to accommodate their needs. Under the incremental cost approach, new customers pay for additional capacity requirements regardless of the value of past investments made by existing customers.

For instance, if it costs $100 to provide 100 additional units of capacity for average usage and a new connector uses one of those equivalent units, then the new user would pay $1 ($100/100 units = $1/unit) to connect to the system. In other words, new customers pay the incremental cost of capacity. As with

the equity buy-in approach, new connectors will effectively acquire a financial position that is on par with existing customers. This approach is best suited for growing communities where additional facilities are needed to accommodate growth.

Hybrid Approach

In addition to the above two connection fee calculation methodologies, there is also a hybrid approach which entails using aspects of both the incremental cost and buy-in approaches. This is appropriate when agencies are in a position where they have already built out their delivery substantially yet are also in the process of planning for or building additional capacity. The hybrid approach recognizes that new customers benefit from both existing infrastructure and planned capital improvements, and therefore, the charge is calculated to reflect this fact.

5.4 CONNECTION FEE CALCULATION

The most appropriate approach to calculate connection fees for the District is the buy-in approach. Since the District's wastewater structure is substantially built-out, new customers will largely be served by existing infrastructure into which existing customers have invested a considerable amount of economic resources through wastewater rates.

The basic methodology for the buy-in approach is to take the total current value of the District's wastewater system and divide by the system's current demands represented by the amount of wastewater flow in gpd.

Raftelis determined the Replacement Cost Less Depreciation (RCLD) as the most appropriate method to determine the current value of the wastewater system. RCLD is a commonly used method, and it is often preferred to alternative methods (Original Cost, Original Cost Less Depreciation, Replacement Cost) because of its defensibility. In most cases, barring, for example, instances of wastewater systems that have depreciated significantly due to lack of replacement and repair, RCLD is most defensible. RCLD is inflation-adjusted and therefore recovers the cost of replacing that capacity in current dollars and accounts for depreciation, which addresses the fact the system is not new and has been used by existing customers.

The total asset value for connection fees is the net assets in RCLD less outstanding principal and plus cash reserves as of the end of FY 2017. The total asset value is then divided by the net influent flow (less I&I) in FY 2017 to determine the unit cost. The net influent flow is equal to the Net Plant Influent shown in **Table 3-1** in gpd.

The unit cost is calculated by dividing the net assets value by total gpd of net wastewater influent flow (less I&I). The unit cost is equal to $24.69 per gpd. This calculation is shown in **Table 5-1**.

Table 5-1: Wastewater Connection Fee Calculation

Net Assets	
Land & Improvements	$7,267
Buildings & Improvements	$1,857,638
Pump Stations	$24,333,831
Plant & Facilities	$99,743,670
Collection System	$90,406,426
Contributed Capital - Collection System	$15,191,956
Contributed Capital - Plant & Facilities	$1,988,024
Machinery & Equipment	$4,183,897
Total Net Assets	**$237,712,707**
Less Outstanding Principal	
1993 Certificates of Participation	$7,750,000
2004 SFR Loan	$4,996,264
2008 SFR Loan	$2,285,895
2011 Revenue Bonds	$2,135,000
2014 Revenue Bonds	$27,160,000
Total Outstanding Principal	**$44,327,159**
Plus Reserves	**$18,876,320**
Total Assets for Connection Fees	**$212,261,868**
Net Influent Flow Less I&I (gpd)	8,597,400
Unit Cost - $/gpd	**$24.69**
Residential EDU in gpd	150
Residential Connection Fees per EDU	**$3,704**
Schools gpd per student	8
Schools Connection Fees per student	**$198**

The connection fees for Residential and School customers are calculated by multiplying the unit cost of $24.69 per gpd by the estimated gpd for residential EDUs and student, respectively. The proposed connection fees are shown in **Table 5-2**.

Table 5-2: Proposed Connection Fees

Connection Fees	
Connection Fee per gpd	$24.69
Residential Fee per EDU	$3,704
Schools Fee per student	$198

The connection fees for other customers is based on the estimated wastewater flow and strength from that customer and shown in **Table 5-3**.

Table 5-3: Proposed Connection Fees (Various Customer Types)

Customer Type	Billing Unit	Current	Proposed
Car Wash	/ 1000 sq ft	$41,995	$52,818
Church/Assembly Hall	/ 1000 sq ft	$580	$729
Commercial	/ 1000 sq ft	$2,275	$2,861
Historical Public Building	/ 1000 sq ft	$2,275	$2,861
Hospital	/ bed	$995	$1,251
Hotel with Kitchen	/ EDU	$2,945	$3,704
Hotel without Kitchen	/ EDU	$1,150	$1,446
Laundry	/ 1000 sq ft	$33,280	$41,857
Laundromat	/ machine	$640	$805
Multiple Family Dwelling with Kitchen	/ EDU	$2,945	$3,704
Multiple Family Dwelling without Kitchen	/ EDU	$1,150	$1,446
Recreation Facility	/ structure per toilet	$1,150	$1,446
Restaurant	/ space	$8,290	$10,427
School	/ student	$530	$198
Senior Living Center	/ EDU	$1,150	$1,446
Senior Living Center with Private Kitchen	/ EDU	$2,945	$3,704
Single Family Dwelling	/ EDU	$2,945	$3,704
Warehouse	/ 1000 sq ft	$325	$409