

CITY OF TACOMA

Wastewater, Surface Water, and Solid Waste Cost of Service Rate Study

December 31, 2018



TABLE OF CONTENTS

SECTION ES – EXECUTIVE SUMMARY	1
BACKGROUND.....	1
Objectives	1
Rate Development Process.....	1
Assumptions	2
WASTEWATER UTILITY	2
SURFACE WATER UTILITY	7
SOLID WASTE UTILITY	11
OVERALL CUSTOMER IMPACTS	14
AFFORDABILITY	15
SECTION 1 – WASTEWATER MANAGEMENT	16
WASTEWATER SYSTEM.....	16
Current Wastewater Rates	16
Customer Accounts	19
FINANCIAL PLAN.....	20
Wastewater System Revenues.....	20
Wastewater System Expenditures.....	20
Debt Service Requirements.....	23
Reserves	23
Revenue Adjustments	25
Debt Service Coverage	26
COST OF SERVICE ANALYSIS	27
Costs of Service to be Allocated	28
Mass Balance	29
Unit Cost of Service	30
Allocations of Cost to Customer Class	32
RATE DESIGN	33
Wastewater Rates.....	33
Customer Impacts.....	34
SECTION 2 – SURFACE WATER MANAGEMENT.....	36

SURFACE WATER SYSTEM	36
Current Surface Water Rates	36
Customer Accounts	37
FINANCIAL PLAN	38
Surface Water System Revenues	38
Surface Water System Expenditures	39
Debt Service Requirements	41
Reserves	42
Revenue Adjustments	44
Debt Service Coverage	46
COST OF SERVICE ANALYSIS	46
Costs of Service to be Allocated	47
Unit Cost of Service	48
Allocations of Cost to Customer Class	49
RATE DESIGN	50
Surface Water Rates	50
Customer Impacts	51
SECTION 3 – SOLID WASTE MANAGEMENT	52
SOLID WASTE SYSTEM	52
Current Solid Waste Rates	52
Customer Information	55
FINANCIAL PLAN	55
Solid Waste System Revenues	55
Solid Waste System Expenditures	56
Debt Service Requirements	58
Reserves	59
Revenue Adjustments	61
Debt Service Coverage	63
COST OF SERVICE ANALYSIS	63
RATE DESIGN	64
Solid Waste Rates	64
Impacts	66

SECTION ES – EXECUTIVE SUMMARY

BACKGROUND

The wastewater utility collects and treats wastewater from 76,790 customers through 699 miles of pipelines, two wastewater treatment plants – the Central Wastewater Treatment Plant and the North End Wastewater Treatment Plant, and 48 pump stations. The surface water utility serves 71,057 surface water customers and maintains 521 miles of public stormwater pipe; 19,000 catch basins; three major regional detention basins; three major pump stations; and an extensive network of ditches (200 miles), culverts, other natural drainage courses, and 456 acres of “open space” land. The solid waste utility provides garbage, recycling, food and yard waste collection and disposal services for 61,242 residential and commercial customers. Additionally, the solid waste utility operates a recycling center, a hazardous waste facility, and Call-2-Haul programs for residential and commercial customers for bulk-items collection.

Objectives

The objectives of the rate development process:

- » Ensure that rates are based on *Cost of Service* guidelines used in the industry
- » Plan for *Revenue Stability* to provide for adequate operating and capital reserves and the overall financial health of all three utilities under varying conditions
- » Plan for *Rate Stability* to prevent rate spikes
- » Ensure *Affordability* of wastewater, surface water, and solid waste services for low income elderly/disabled customers and households in need
- » Provide for *Fairness and Equitability* in the development of a system of user charges

Rate Development Process

The three major processes involved in the comprehensive cost of service and rate design are as follows:

- » **Financial Planning:** Financial planning involves estimation of annual O&M and capital expenditures, annual debt service and reserve requirements, operating and capital revenue sources, and the determination of required annual user revenues from rates and charges. User and usage data from the most recent calendar year is the basis for calculating revenues from each customer class. Revenue requirements are projected for a six-year period from 2019 through 2024 using the 2019-2020 biennium budgets for operating and capital costs and inflation assumptions to estimate 2021-2024.
- » **Cost of Service Analysis:** Cost of Service Analysis involves identifying and apportioning annual revenue requirements to the different cost centers and defining unit costs so that costs can be allocated to the different user classes proportionate to their demand on each utility system.
- » **Rate Design:** Rate Design involves the development of a fixed and variable schedule of rates for each of the different user classes to proportionately recover the costs associated with each user class. This is also, where policy objectives such as increased water conservation can be achieved.

The rate models have been developed to incorporate these processes and allow the Department to update and revise rates and review alternative rate structures and their impacts on customers. The rate plans cover a period of six years from calendar year 2019 through 2024. However, rates are only approved by City Council for the 2019-2020 biennium.

Assumptions

The following assumptions are used in this rate development process:

1. Annual O&M, capital expenditures, other revenue sources, reserve requirements, and O&M inflation factors are all based on the Department's 2019 and 2020 adopted budgets and projections.
2. Annual customer accounts and volume data used in the study are based on prior year billing data from SAP and BW systems.
3. This report does not address recent changes in the global recycling markets. China implemented policy changes in late 2017 that impacted the import of recyclable materials to China. The global recycling market's adjustment to these changes have resulted in a worldwide reduction in capacity for processing recyclable materials. The remaining markets for recyclable materials have become much more competitive, resulting in increased costs. The direct impact to the City is a significant increase in the cost of processing, sorting, marketing, and shipping recyclables. Materials collected through the comingled curbside collection system are impacted the most because of the higher potential for contamination in comingled materials. To address these impacts, staff will study the options, conduct a community engagement effort to gather customer feedback, and bring recommendations to the City Council in 2019 for how to address the changes in this industry.

WASTEWATER UTILITY

The revenue adjustments for the wastewater utility for 2019 and 2020 are 4.0 percent per year. All customers will experience approximately the same increase in 2019 and 2020 as rates are increased equally across the board.

Residential customers are charged a monthly fixed charge and variable rate based on their average winter water usage (WQA). The WQA is measured from December through March of the previous year to remove the impacts of irrigation usage. Eligible low-income disabled, elderly (LID/LIE) customers receive a 30 percent discount. Commercial customers are also charged a monthly fixed charge and a variable rate based on water usage and strength factors. The rates are based on the cost of service analysis and rate design process to ensure that the rates meet the stated objectives of the Department.

Table ES-1 shows the wastewater rates for the next two years, effective January 1, 2019 and 2020.

Table ES-1
Wastewater Rates

Proposed Rates	2019	2020
Residential		
Monthly Fixed Charge	\$25.87	\$26.91
Flow Charge (\$/hcf)	\$4.87	\$5.07
LID/LIE customers receive 30% discount		
Commercial		
Monthly Fixed Charge	\$12.50	\$13.00
Flow Charge (\$/hcf of water usage)		
Category 1	\$6.75	\$7.02
Category 2	\$7.02	\$7.31
Category 3	\$8.84	\$9.20
Category 4	\$10.38	\$10.80
Category 5	\$10.55	\$10.98
Category 6	\$12.09	\$12.58
Category 7	\$13.67	\$14.22
Category 8	\$14.13	\$14.70
Commercial, Various		
Flow (\$/hcf)	\$4.67	\$4.86
BOD (\$/lb)	\$1.10	\$1.15
SS (\$/lb)	\$0.83	\$0.87
Septic Tank Wastes (\$/100 gal)	\$14.67	\$15.26

Table ES-2 shows the impacts on average residential and commercial customers within the Department's service area.

Table ES-2
Customer Impacts

Residential Customers	Winter			
	Usage	Current Bill	2019 Bill	2020 Bill
Very low volume	2	\$34.32	\$35.61	\$37.05
Low volume	4	\$43.68	\$45.35	\$47.19
Average volume	6	\$53.04	\$55.09	\$57.33
High volume	9	\$67.08	\$69.70	\$72.54
Very high volume	18	\$109.20	\$113.53	\$118.17

Commercial Customer	Average Water Usage	Current Bill	2019 Bill	2020 Bill
Category 1	120	\$791.92	\$822.50	\$855.40
Category 2	36	\$256.00	\$265.22	\$276.16
Category 3	65	\$566.37	\$587.10	\$611.00
Category 4	1,041	\$10,432.33	\$10,818.08	\$11,255.80
Category 5	23	\$244.91	\$255.15	\$265.54
Category 6	69	\$815.08	\$846.71	\$881.02
Category 7	129	\$1,709.56	\$1,775.93	\$1,847.38
Category 8	61	\$841.52	\$874.43	\$909.70

The following figures show the summary of the financial plan for the wastewater utility. It is projected that the Department will have to implement additional revenue increases of 3.5 percent to 3.0 percent per year from 2021 through 2024, as shown in **Figure ES-1**, to meet its operating and capital expenses as well as reserves targets. **Figure ES-1** also shows the projected debt coverage ratio, given the projected revenue increases. The red line represents the required debt coverage ratio of 125 percent and the blue line represents the desired coverage ratio of 170 percent. The purple line represents the calculated debt coverage ratio on parity debt and the green line represents the calculated coverage ratio on all existing debt service, including state loans. It is projected that the Department will meet the desired debt coverage.

Figure ES-1
Projected Wastewater Revenue Adjustments and Debt Coverage

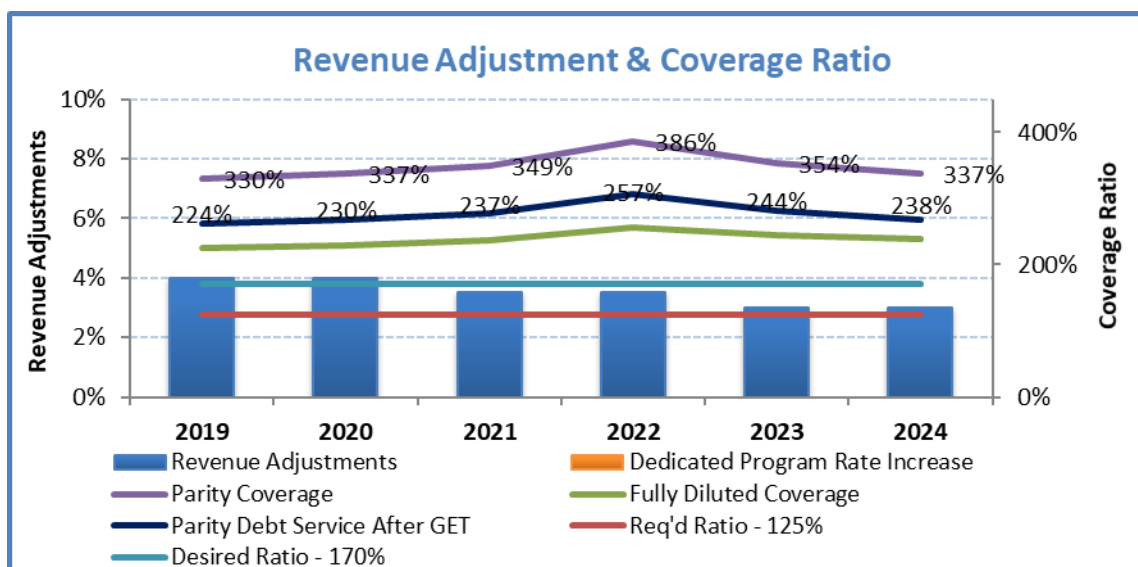


Figure ES-2 shows the operating financial plan of the wastewater utility. The stacked columns represent the different expenses such as operating expenses, debt service, and capital projects funded by rates. The red bars represent the net income based on the revenues with the projected revenue increases shown in **Figure ES-1**, represented by the green line. The blue line represents revenues at the existing rates.

Figure ES-2
Wastewater Operating Financial Plan

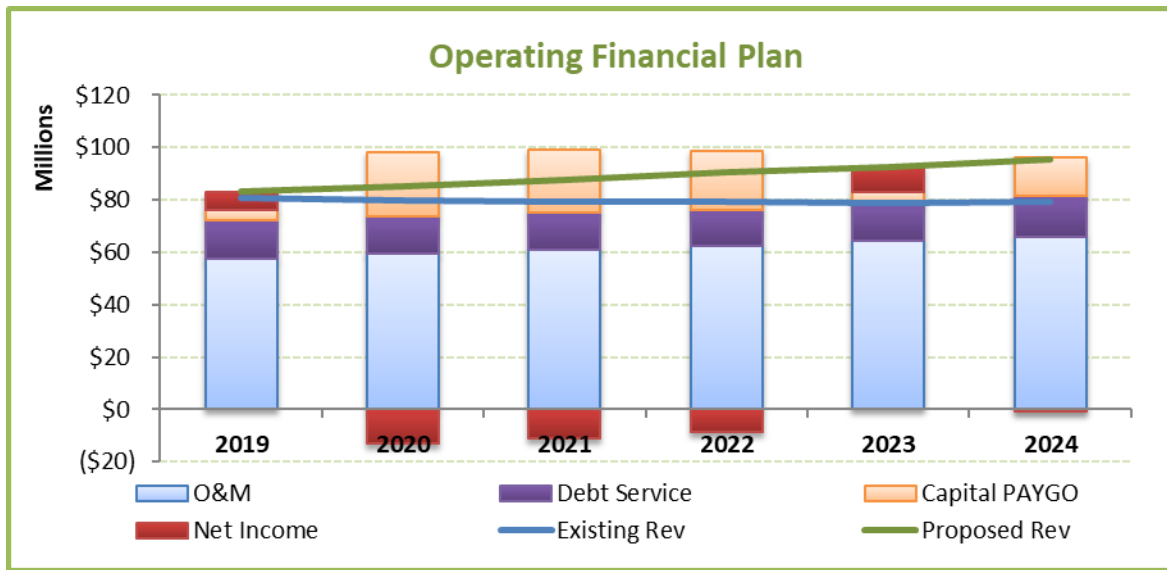
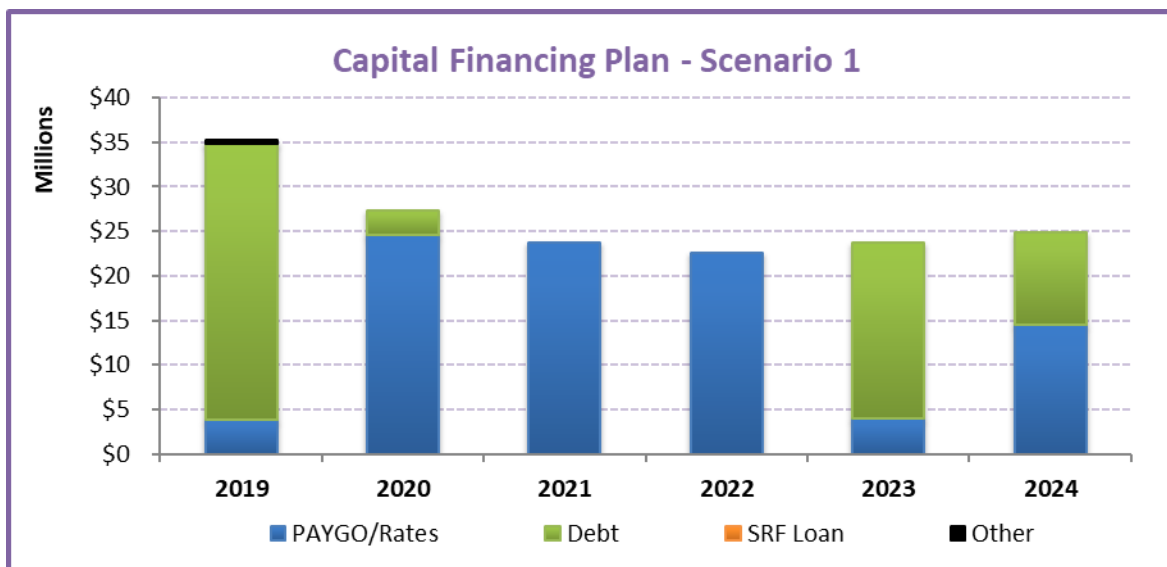


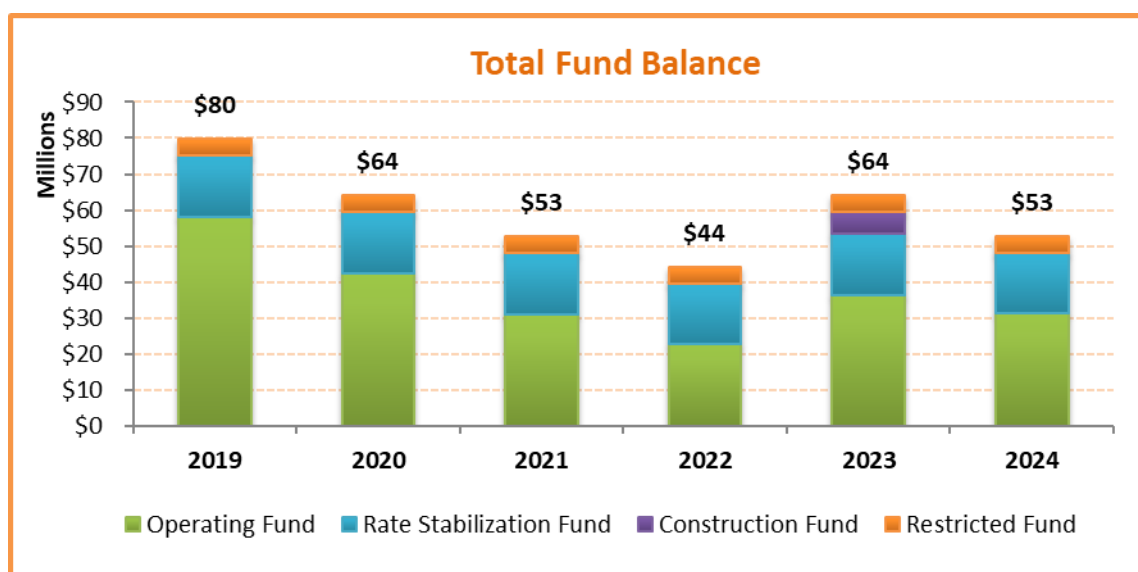
Figure ES-3 shows the capital improvement plan (CIP) expenditures over the next six years. The Department issued bonds in 2018 to fund the 2019-2020 capital as shown by the green bars. The Department also plans to issue additional debt in 2023 to fund its CIP in 2023-2024. The remaining capital projects are projected to be funded by rates, represented by the blue bars.

Figure ES-3
Wastewater Capital Financing Plan



Based on the projected revenue increases and debt issue, the following figure, **Figure ES-4**, shows the total funds balance of the wastewater utility. The total reserve levels are projected to meet the minimum required target levels in each of the six years.

Figure ES-4
Wastewater Total Funds Balance



SURFACE WATER UTILITY

The revenue adjustments for the surface water utility for 2019 and 2020 are 3.5 percent per year. Customers will experience slightly different increases in each year because of the phase-in of changes to runoff factors.

Customers are charged a monthly fixed charge and variable-rate charge based on the size of parcels and the degree of development, which indicates the ability of surface water to be absorbed by the earth. Waterfront parcels are charged lower rates than non-waterfront parcels since they discharge directly into the bay. Residential customers are considered within the moderate development category. Eligible LID/LIE customers will continue to receive 30 percent off the surface water rates. The rates are based on the cost of service analysis and rate design process to ensure that the rates meet the stated objectives of the Department.

Table ES-3 shows the surface water rates for the next two years, effective January 1, 2019 and 2020.

Table ES-3
Surface Water Rates

Development Categories	2019		2020	
	Monthly Fixed	Area Charge per 500 sqft	Monthly Fixed	Area Charge per 500 sqft
Undeveloped area <= than 1 acre	\$8.10	\$0.2899	\$8.36	\$0.2921
Undeveloped area in excess of 1 acre	\$8.10	\$0.0616	\$8.36	\$0.0614
Light development	\$8.10	\$0.9015	\$8.36	\$0.9324
Moderate development	\$8.10	\$1.2393	\$8.36	\$1.2886
Heavy development	\$8.10	\$1.8224	\$8.36	\$1.8824
Very heavy development	\$8.10	\$2.4394	\$8.36	\$2.5216
Waterfront Properties				
Undeveloped area <= than 1 acre	\$8.10	\$0.1463	\$8.36	\$0.1493
Undeveloped area in excess of 1 acre	\$8.10	\$0.0616	\$8.36	\$0.0614
Light development	\$8.10	\$0.4505	\$8.36	\$0.4770
Moderate development	\$8.10	\$0.6300	\$8.36	\$0.6693
Heavy development	\$8.10	\$0.9118	\$8.36	\$0.9572
Very heavy development	\$8.10	\$1.2210	\$8.36	\$1.2819

Table ES-4 shows the impacts on average residential and commercial customers within the Department's service area. Each customer class will experience different increases, ranging from 3.3 percent to 4.9 percent depending on their development category and parcel size.

Table ES-4
Customer Impacts

	Billable Area	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
Residential Average Lot	7,000	\$24.53	\$25.45	\$26.40	3.8%	3.7%
Residential Waterfront (WF) Lot	7,000	\$16.15	\$16.92	\$17.73	4.8%	4.8%
Light development	10,000	\$25.27	\$26.13	\$27.01	3.4%	3.4%
Heavy development	25,000	\$96.07	\$99.22	\$102.48	3.3%	3.3%
Very heavy development	50,000	\$243.84	\$252.04	\$260.52	3.4%	3.4%
Light development - WF	10,000	\$16.35	\$17.11	\$17.90	4.6%	4.6%
Heavy development - WF	25,000	\$51.27	\$53.69	\$56.22	4.7%	4.7%
Very heavy development - WF	50,000	\$124.15	\$130.20	\$136.55	4.9%	4.9%

The following figures show the summary of the financial plan for the surface water utility. It is projected that the Department will have to implement additional revenue increases of 3.0 percent to 2.5 percent in 2021 through 2024, as shown in **Figure ES-5**, to meet its operating and capital expenses as well as reserves targets. **Figure ES-5** also shows the projected debt coverage ratio, given the projected revenue increases. The red line represents the required debt coverage ratio of 125 percent and the blue line represents the desired coverage ratio of 170 percent per Department policy. The purple line, which in this case overlaps the green line, represents the calculated debt coverage ratio on parity debts and the green line represents the calculated coverage ratio on all existing debt service, including state revolving fund (SRF) loans. It is projected that the Department will meet the desired debt coverage in each of the years.

Figure ES-5
Projected Surface Water Revenue Adjustments and Debt Coverage

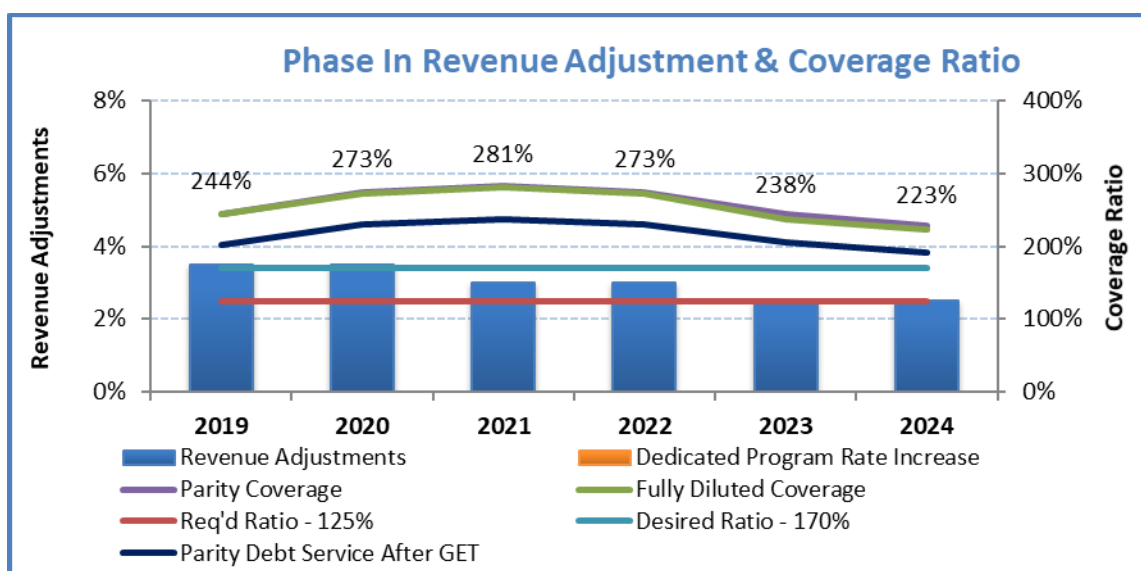
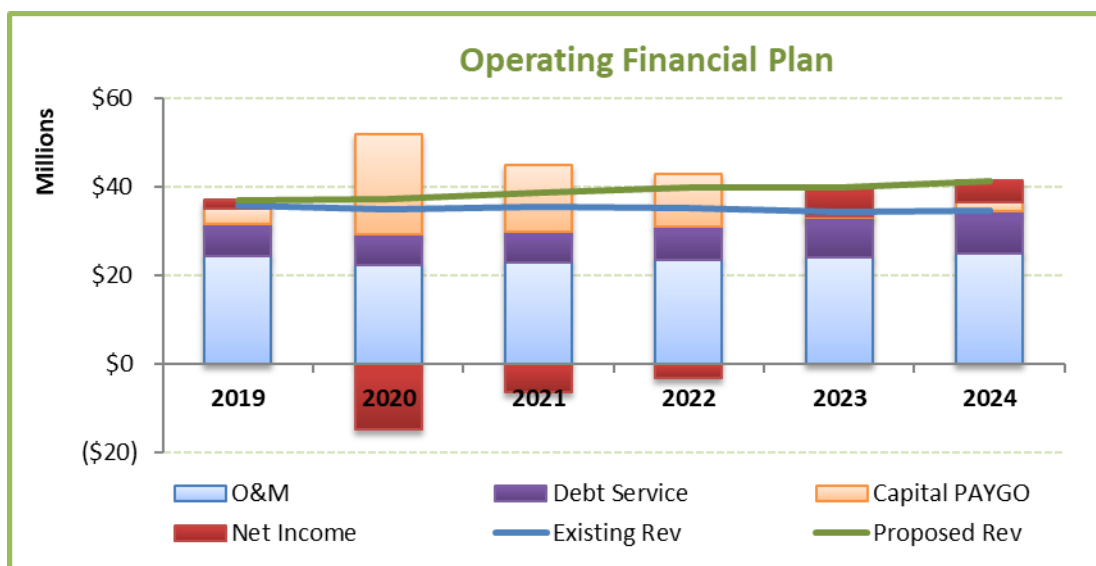


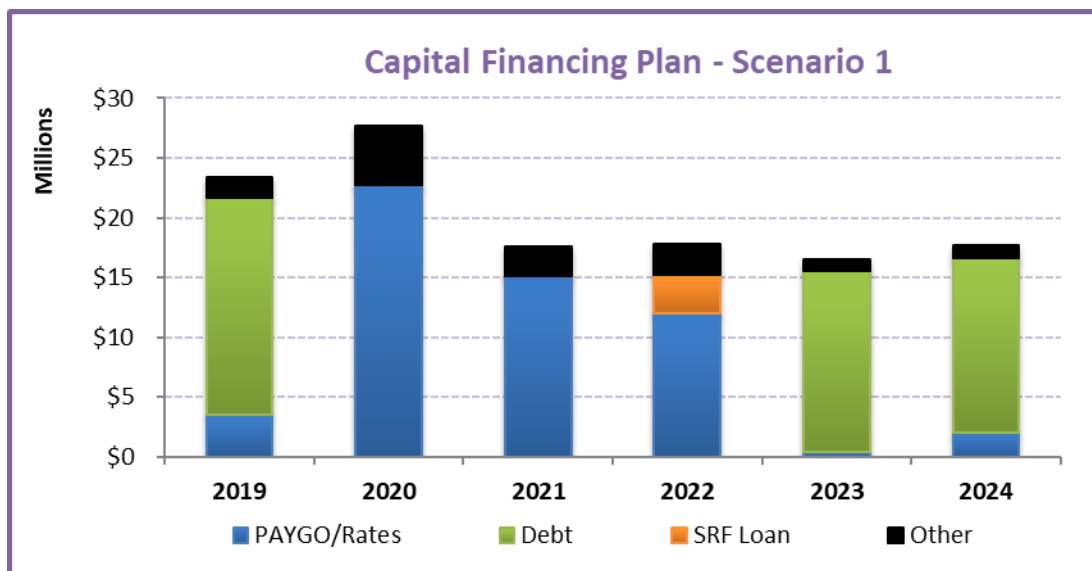
Figure ES-6 shows the operating financial plan of the surface water utility. The stacked columns represent the different expenses such as operating expenses, debt service, and capital projects funded by rates. The red bars represent the net income based on the projected revenues with the revenue increases shown in **Figure ES-5**, represented by the green line. The blue line represents revenues at the existing rates.

Figure ES-6
Surface Water Operating Financial Plan



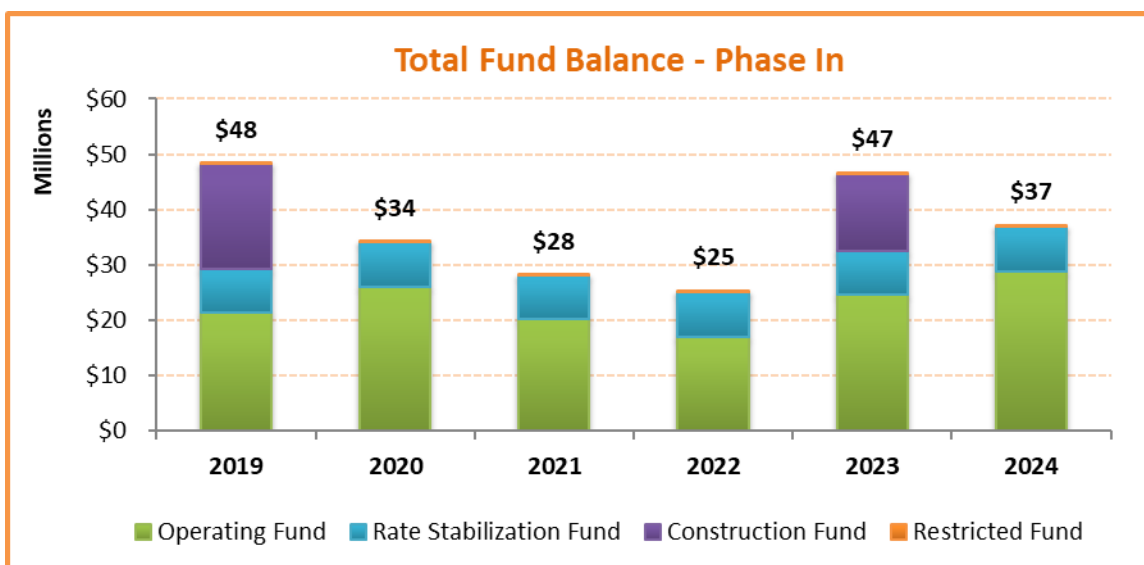
The CIP expenditures over the next six years are shown in **Figure ES-7**. The Department issued bond in 2018 and the bond construction funds will be used to fund capital in 2019 as shown by the green bar. The Department is also projected to issue additional debt in 2023 to fund its CIP in 2023 and 2024. The Department receives grant revenues to fund specific qualifying projects, shown by the black bar. The remaining capital projects are projected to be funded by rates and/or reserves, represented by the blue bars.

Figure ES-7
Surface Water Capital Financing Plan



Based on the projected revenue increases and debt issue, the following figure, **Figure ES-8**, shows the total funds balance of the surface water utility. The total reserve levels are projected to meet the minimum required target level in each of the six years.

Figure ES-8
Surface Water Total Funds Balance



SOLID WASTE UTILITY

The impact of the changes in the marketability of recyclables is not included in the rates for 2019-2020 as noted in the “Assumptions” found on page 2 of this report. Cost of service rate adjustments will continue to be phased in which have an impact on some rates. The resultant financial plan and rates reflect the rate phased approach.

Residential customers are charged a monthly fixed charge for all garbage, recycling, food / yard waste, and bulk collection services. Eligible LID/LIE customers receive a 30 percent discount. Commercial customers are charged either a monthly rate or a per haul rate, depending on the size of the containers. Additionally, large containers are charged a monthly rental fee. Commercial customers also have a choice of services such as yard waste, food waste, recycling, and bulk collection programs.

Table ES-5 shows the residential solid waste rates for each of the next two years, effective January of each year.

Table ES-5
Residential Solid Waste Rates

Container Size	2019	2020
Monthly Charge		
30 gal	\$22.79	\$23.69
45 gal	\$34.18	\$35.53
60 gal	\$45.58	\$47.38
90 gal	\$68.37	\$71.06
2X60 gal	\$91.14	\$94.73
60+90 gal	\$113.94	\$118.42
2X90 gal	\$136.75	\$142.13

Table ES-6 shows the impacts of 3.9 percent on average residential customers within the Department’s service area.

Table ES-6
Residential Customer Impacts

Container Size	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
30 gal	\$21.93	\$22.79	\$23.69	3.9%	3.9%
45 gal	\$32.89	\$34.18	\$35.53	3.9%	3.9%
60 gal	\$43.85	\$45.58	\$47.38	3.9%	3.9%
90 gal	\$65.78	\$68.37	\$71.06	3.9%	3.9%
2X60 gal	\$87.69	\$91.14	\$94.73	3.9%	3.9%
60+90 gal	\$109.63	\$113.94	\$118.42	3.9%	3.9%
2X90 gal	\$131.57	\$136.75	\$142.13	3.9%	3.9%

The following figures show the summary of the financial plan for the solid waste utility. The overall revenue increase is 3.0 percent for 2019 and 2020. These rate increases do not consider the impact of the worldwide changing environment for recycling which will be addressed in 2019 by the City Council. It is projected that the Department will have to implement revenue increases of 3.0 percent per year in 2021 through 2024, as shown in **Figure ES-9**, to meet its operating and capital expenses as well as reserves targets. **Figure ES-9** also shows the projected debt coverage ratio, given the projected revenue increases. The red line represents the required debt coverage ratio of 125 percent, the purple line represents the calculated debt coverage ratio, and the blue line represents the desired coverage ratio of 170 percent per Department policy. It is projected that the Department will meet the desired debt coverage in each of the years.

Figure ES-9
Projected Solid Waste Revenue Adjustments and Debt Coverage

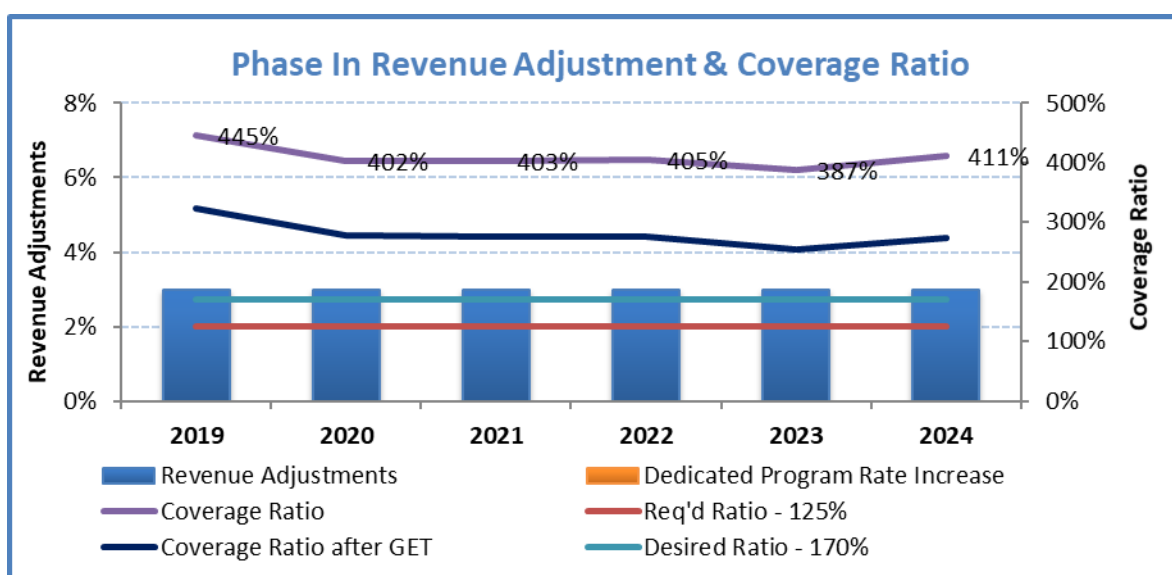
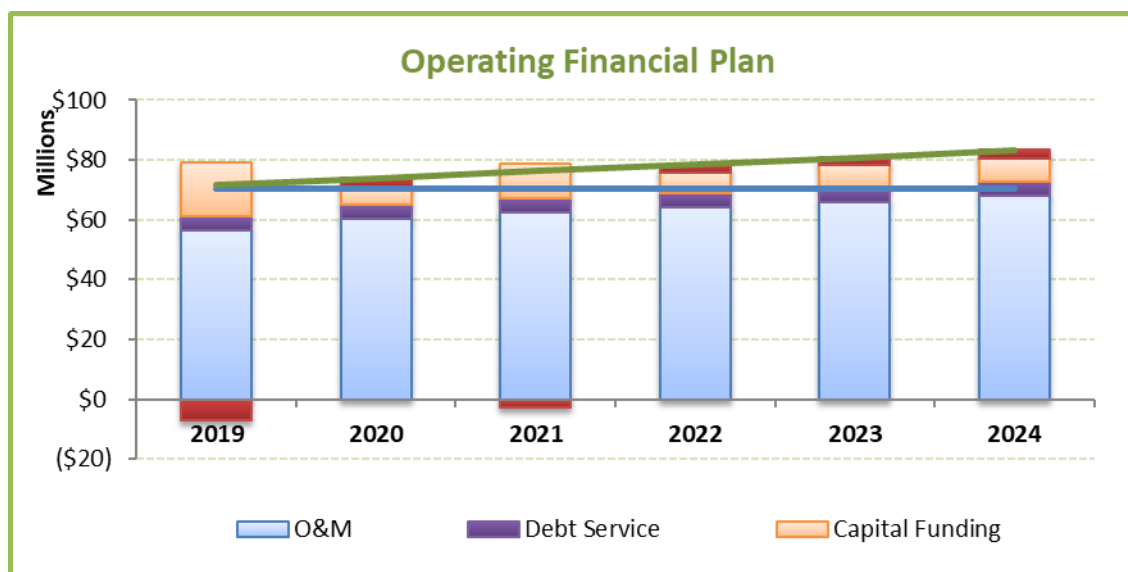


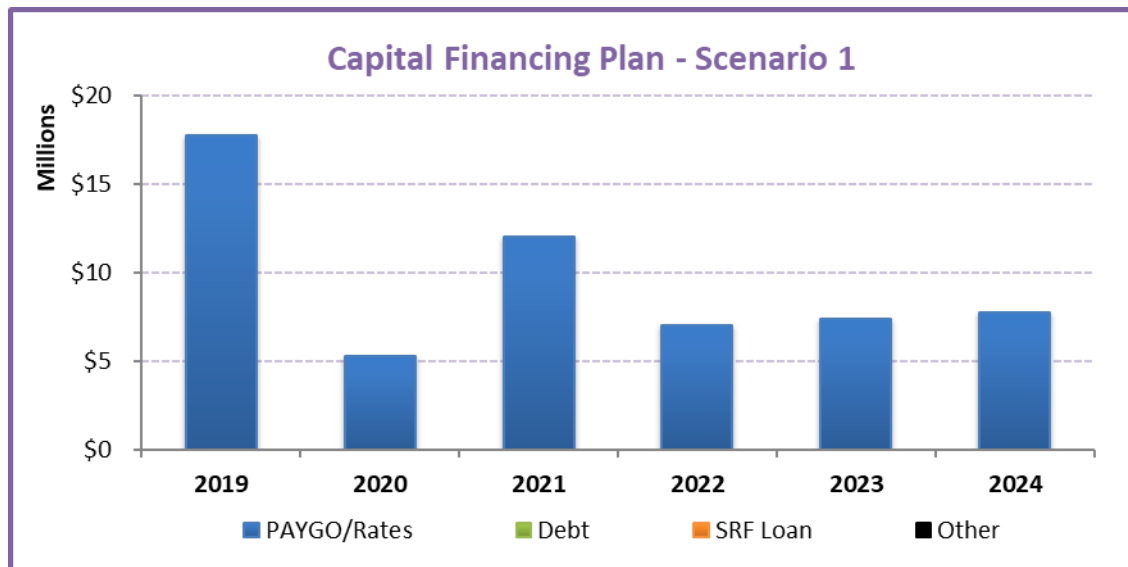
Figure ES-10 shows the operating financial plan of the solid waste utility. The stacked columns represent the different expenses such as operating expenses, debt service, and capital projects funded by rates. The red bars represent the net income based on the projected revenues with the revenue increases shown in **Figure ES-9** represented by the green line. The blue line represents revenues at the existing rates.

Figure ES-10
Solid Waste Operating Financial Plan



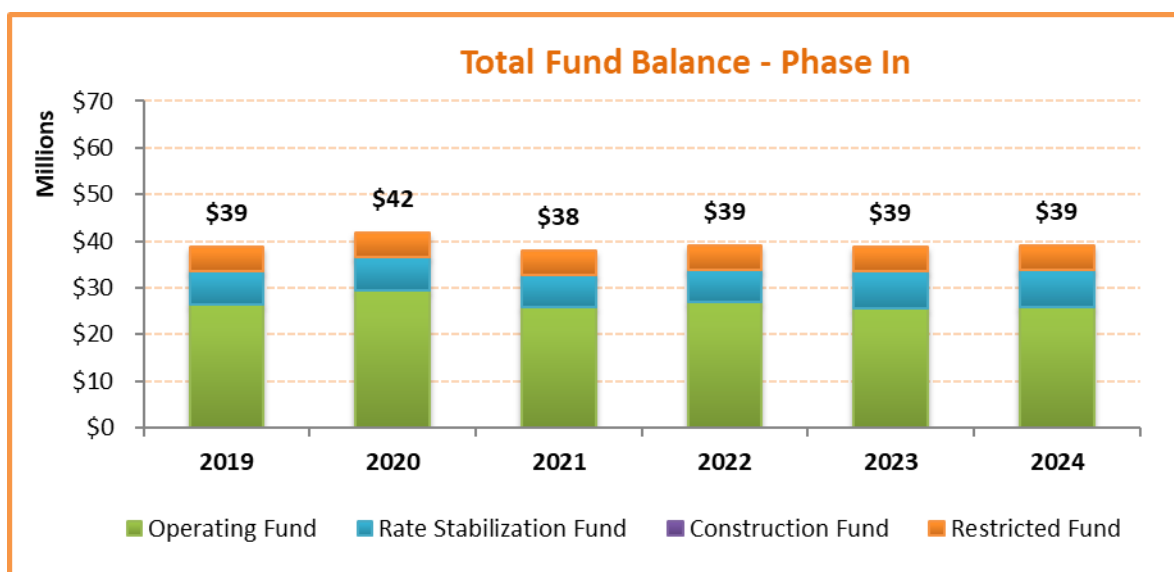
The financing plan for capital over the next six years is shown in **Figure ES-11**. The Department is projected to finance the CIP through rates.

Figure ES-11
Solid Waste Capital Financing Plan



Based on the projected revenue increases, the following figure, **Figure ES-12**, shows the total funds balance of the solid waste utility along with the target balances. The total reserve levels are projected to meet the minimum required target level in each of the six years.

Figure ES-12
Solid Waste Total Funds Balance



OVERALL CUSTOMER IMPACTS

Table ES-7 shows the wastewater, surface water, and solid waste monthly bills for an average residential customer who discharges 6 hundred cubic feet of wastewater every month, has a 60-gallon container solid waste service, and a 7,000 square foot lot. The total Environmental Services utility bill increases by \$4.66 in 2017 and \$5.17 in 2018 for an average residential customer.

Table ES-7
Average Residential Utility Bills

	Current Bill	2019 Bill	2020 Bill
Wastewater	\$53.04	\$55.09	\$57.33
Surface Water	\$24.53	\$25.45	\$26.40
Solid Waste	\$43.85	\$45.58	\$47.38
Average Residential Bill	\$121.42	\$126.12	\$131.11

AFFORDABILITY

To assist its customers with their utility bills, the Department offers two payment assistance programs:

- Discount Rate Program – Available to customers 62 years or older OR customers receiving qualifying disability income.
- Bill Credit Assistance Plan – Available to all customers with eligible household income.

Both programs are for households with income up to 150 percent of the federal poverty guidelines. Eligible households may only be enrolled in one program at a time. The Discount Rate Program (LIE/LID) provides a discount of 30 percent on all residential utility rates. The Bill Credit Assistance Plan (BCAP) provides a maximum annual bill credit for all five utility services of \$564 with the Environmental Services utilities' portion of \$228. The BCAP provides a monthly credit for paid-up households and a one-time credit up to \$160 for completion of a "Key to Change" financial education course and personalized, one-on-one financial coaching.

Table ES-8 presents the total average residential utility bills as a percentage of the household income to determine whether utility rates are affordable. The total average residential bill for all three Environmental Services utilities represents approximately 2.6 percent of the median household income in 2019 and 2020. For customers who qualify for the assistance programs, without those discounts, the total average residential bill would represent approximately 4.0 and 4.2 percent of their household income in 2019 and 2020 respectively. However, with the discounts, the percentages decrease to 3.2 percent in 2019 and 3.3 percent in 2018.

Table ES-8
Total Utility Bills as Percentage of Income

Year	Surface Water	Wastewater	Solid Waste	Without Discount	With Discount
Tacoma median income - \$61,468 per year					
Current	0.5%	1.0%	0.9%	2.3%	
2019	0.5%	1.1%	0.9%	2.6%	
2020	0.5%	1.1%	0.9%	2.6%	
LIE/LID assistance for 4 people - \$37,650 per year					
Current	0.8%	1.7%	1.4%	3.8%	3.1%
2019	0.8%	1.8%	1.5%	4.0%	3.2%
2020	0.8%	1.8%	1.5%	4.2%	3.3%
Bill Credit assistance for 4 people - \$37,650 per year					
Current	0.5%	1.2%	1.0%	3.8%	3.1%
2019	0.6%	1.2%	1.0%	4.0%	3.2%
2020	0.6%	1.3%	1.1%	4.2%	3.3%
EPA Guideline is 2% for each utility					

SECTION 1 – WASTEWATER MANAGEMENT

WASTEWATER SYSTEM

The wastewater utility collects more than 9,215 million gallons annually of wastewater from residents and businesses through more than 699 miles of pipelines and 48 pump stations. Wastewater is treated at two state-of-the-art wastewater treatment plants – the Central Wastewater Treatment Plant (CTP) and the North End Wastewater Treatment Plant (NETP). The CTP, upgraded in 2008, uses high purity oxygen and good bacteria to remove organics from wastewater. The NETP, on the other hand, uses chemicals to remove the organics and a filter with good bacteria to treat the wastewater before it enters Puget Sound; it was last upgraded in 1997. Biosolid materials generated at the plants are processed into Tagro, a gardening mix and potting soil.

Current Wastewater Rates

Residential customers are charged a monthly fixed charge and variable-rate charge based on “winter quarterly average” (WQA) from December through March of the previous year, as shown in **Table 1-1** below. WQA is used as a proxy to estimate wastewater generation since during the winter there is less need for irrigation usage, which does not enter the wastewater system. Eligible low-income disabled, elderly (LID/LIE) customers receive 30 percent discount. Commercial customers are categorized by the strength of the wastewater. The variable rate is based on water usage and strength categories since different commercial customers discharge different strength wastewater into the system. The fixed rate is a flat monthly rate for all categories. The examples of commercial establishments included in each category are shown in **Table 1-2**.

Table 1-1
Current Wastewater Rates

Current -2018	
Residential	
Monthly Fixed Charge	\$24.96
Flow Charge (\$/hcf)	\$4.68
LID/LIE customers receive 30% discount	
Commercial	
Monthly Fixed Charge	\$11.92
Flow Charge (\$/hcf of water usage)	
Category 1	\$6.50
Category 2	\$6.78
Category 3	\$8.53
Category 4	\$10.01
Category 5	\$10.13
Category 6	\$11.64
Category 7	\$13.16
Category 8	\$13.60
Commercial, Various	
Flow (\$/hcf)	\$4.52
BOD (\$/lb)	\$1.06
SS (\$/lb)	\$0.80
Septic Tank Wastes (\$/100 gal	\$14.08

Table 1-2
Commercial Customers Classification

Category	Business Type	BOD (mg/L)	TSS (mg/L)
1	Nursing Homes Photo Finish Labs Taverns- No Food Preparation Commercial Printers Business Form Printers Laundromats Photo Studios Car Washes Lime Manufacturers	200	150
2	Domestic Strength (1) Hotels & Motels - No Restaurant Hospitals Auto Dealers Top & Body Repair Shops Repair & Paint Shops Auto Repair Shops Asphalt Felts & Coating	200	225
3	Canned and Cured Fish Fresh or Frozen Fish Grocery Stores - Others Bowling Alleys - No Restaurant	400	300
4	Hotels & Motels - With Restaurant Correctional Institutions	500	450
5	Commercial Laundries Bakeries (Manufacturers)	600	400
6	Bakery Stores - On-Site Baking Restaurants Category I (2) Taverns- Food Preparation Cat. I (2) Bowling Alleys - With Restaurant Cat. I (2)	800	400
7	Grocery Stores - Full Service Funeral Services - With Embalming	800	700
8	Restaurants Category II (3) Taverns- Food Preparation Cat. II (3) Bowling Alleys - With Restaurant Cat. II (3)	950	600

(1) Applies to all other business types not listed.

(2) Category I - Customers with approved grease retention devices.

(3) Category II - Customers without approved grease retention devices.

Customer Accounts

Customer accounts and water usage information for 2017 are used as the basis for projecting wastewater revenues. The Department does not expect any growth to occur during the six-year period as the service area is essentially built out. As shown in **Table 1-3**, the Department also provides wastewater services to neighboring agencies, including Pierce County, Fife, Ruston, and Fircrest, on a contract basis. The flows from these contract agencies are based on either rate agreements, which specify a residential equivalent flow, or actual metered water consumption. Within the service area, residential customers account for 95.6 percent of the total customer accounts and 71.4 percent of the total billable water usage or wastewater generation.

Table 1-3
Wastewater Accounts and Water Usage

Customer Class	Water Usage	Accounts
Residential		
Single Family	3,606,334	55,976
Multi Family	1,490,896	32,020
Subtotal Residential	5,097,230	87,996
Commercial		
Category 1	93,515	65
Category 2	1,392,086	3,298
Category 3	74,166	96
Category 4	137,366	11
Category 5	1,628	6
Category 6	26,470	32
Category 7	30,827	20
Category 8	229,516	316
Category 9	48,286	8
Subtotal Commercial	2,033,860	3,852
Contract Agencies		
Pierce County	545,201	6,766
Fife	277,507	4,053
Fircrest	166,620	3,055
Ruston	17,081	362
Total Contract Agencies	1,006,409	14,236
TOTAL	8,137,499	106,084

FINANCIAL PLAN

A review of a utility's revenue requirements is a key first step in the rate development process. The review involves an analysis of annual operating revenues under the current rates, non-operating revenues, operation and maintenance (O&M) expenses, capital expenditures, transfers between funds, and reserve requirements. This subsection of the report provides a discussion of the projected revenues, O&M and capital expenditures, capital improvement financing plan, debt service requirements, and the revenue adjustments required to ensure the financial stability of the wastewater utility.

Wastewater System Revenues

The Department's wastewater utility derives its required annual operating and non-operating revenues from a number of sources. The principal source of operating revenues from rates are the wastewater service charges from the Department's users, which are expected to remain at approximately \$67 million per year; while the Department is not expecting any growth to occur, it is projected to see about a 0.6 percent decrease per year in water used due to conservation. Other operating revenue includes service revenues, Tagro sales, and customer fee revenues. Non-operating revenue sources include investment earnings, rental income, other miscellaneous non-operating income, etc.

Table 1-4 presents the details of the operating revenues at existing rates and non-operating revenues.

Table 1-4
Wastewater Revenue at Existing Rates

Revenue at Existing Rates	2019	2020	2021	2022	2023	2024
Operating Revenues						
ENV-4270 Customer Fee Revenue	\$82,000	\$84,050	\$86,151	\$88,305	\$90,513	\$92,775
ENV-4550 Sales Revenue	\$747,000	\$1,301,500	\$1,334,038	\$1,367,388	\$1,401,573	\$1,436,612
ENV-4560 Service Revenue	\$2,300,000	\$2,300,000	\$2,357,500	\$2,416,438	\$2,476,848	\$2,538,770
ENV-4660 Wastewater Revenue-Commercial	\$24,434,382	\$24,434,382	\$24,337,743	\$24,241,705	\$24,146,216	\$24,051,317
ENV-4670 Wastewater Revenue-Residential	\$49,798,776	\$49,798,776	\$49,656,895	\$49,515,864	\$49,375,681	\$49,236,335
ENV-4695 Discount-Aid to Families in Need	(\$77,000)	(\$79,000)	(\$80,975)	(\$82,999)	(\$85,074)	(\$87,201)
Total Operating Revenues	\$77,285,158	\$77,839,708	\$77,691,351	\$77,546,700	\$77,405,757	\$77,268,608
Non-Operating Revenues/(Expenses)						
ENV-6100 Investment Income	\$975,906	\$768,545	\$630,001	\$533,203	\$569,668	\$655,900
ENV-6300 Rental and Lease Income	\$1,584,000	\$1,625,000	\$1,625,000	\$1,625,000	\$1,625,000	\$1,625,000
ENV-6560 Other Debt Service Costs	\$0	\$0	\$0	\$0	(\$300,000)	\$0
ENV-6700 Capitalized Interest Expense	\$0	\$0	\$0	\$0	\$0	\$0
ENV-7800 Misc Nonoperating Inc and Expense	\$16,000	\$17,000	\$17,425	\$17,861	\$18,307	\$18,765
Total Non-Operating Revenues/(Expenses)	\$3,383,456	\$1,897,995	\$1,759,876	\$1,663,513	\$1,400,425	\$1,787,115
TOTAL REVENUES	\$80,668,615	\$79,737,703	\$79,451,227	\$79,210,214	\$78,806,182	\$79,055,724

Wastewater System Expenditures

For sound financial operation of the Department's wastewater system, revenues generated must be sufficient to meet the revenue requirements or cash obligations of the system. Revenue requirements include O&M expenses, CIP expenditures, principal and interest payments on existing debt, and other obligations.

Operations and Maintenance Expenses

O&M expenditures include the cost of operating and maintaining treatment, collection, and disposal facilities. O&M expenses also include the costs of providing technical services such as laboratory services, and other administrative costs of the wastewater system such as customer service and billing. These costs are a normal obligation of the system, and are met from operating revenues as they are incurred. The comprehensive forecasted annual O&M expenditures are based upon the Department's budgeted 2019 and 2020 expenditures and the effect of inflation in future years. The CPI assumption for labor and general expenditures is 2.5 percent, for utilities the inflation factor is 4 percent, and for benefits and assessments it is 5 percent. Inflated calculations start in 2021. Projected O&M expenditures by cost centers are summarized in **Table 1-5**.

The rate model provides for segregation between cash and non-cash expenses, such as depreciation, which are excluded when revenue requirements are calculated to determine wastewater rates.

Table 1-5
Wastewater O&M Expenses

O&M Expenses by Cost Center		2019	2020	2021	2022	2023	2024
523200	ES Wastewater Pumping	\$1,676,417	\$1,726,556	\$1,774,824	\$1,824,504	\$1,875,638	\$1,928,272
523400	ES Wastewater Engineering	\$3,808,673	\$3,957,975	\$4,024,080	\$4,090,183	\$4,156,198	\$4,222,037
523410	ES Wastewater Construction Support	\$1,047,076	\$1,039,973	\$1,043,354	\$1,045,689	\$1,046,893	\$1,046,880
523500	ES Wastewater Laboratory	\$1,507,786	\$1,551,101	\$1,589,878	\$1,629,625	\$1,670,366	\$1,712,125
523600	ES Wastewater Environmental Compliance	\$1,403,503	\$1,452,989	\$1,489,313	\$1,526,546	\$1,564,710	\$1,603,827
523700	ES Wastewater Customer Service	\$1,089,751	\$1,122,699	\$1,150,766	\$1,179,535	\$1,209,024	\$1,239,250
523900	ES Wastewater Revenues and Accounting	\$19,335,834	\$20,659,850	\$21,167,530	\$21,684,474	\$22,187,429	\$22,700,371
523905	ES Wastewater Public Info-Comm Rel	\$188,628	\$194,696	\$199,601	\$204,630	\$209,786	\$215,073
523915	ES Wastewater Assessments	\$7,053,918	\$7,173,925	\$7,532,621	\$7,909,252	\$8,304,715	\$8,719,950
523925	ES Wastewater Business Operations	\$1,421,202	\$1,517,591	\$1,555,428	\$1,594,210	\$1,633,963	\$1,674,709
524200	ES Wastewater Transmission	\$6,579,641	\$6,761,353	\$6,931,727	\$7,106,415	\$7,285,527	\$7,469,176
524800	ES Wastewater Expense Construct Proj	\$1,387,250	\$527,750	\$540,944	\$554,467	\$568,329	\$582,537
525100	ES Wastewater Plant #1 Oper	\$8,690,780	\$9,070,624	\$9,368,514	\$9,677,207	\$9,997,134	\$10,328,742
525200	ES Wastewater Treatment by Other	\$3,073,571	\$3,165,777	\$3,244,935	\$3,326,073	\$3,409,240	\$3,494,486
525300	ES Wastewater Plant #3 Oper	\$1,213,255	\$1,249,369	\$1,282,952	\$1,317,469	\$1,352,947	\$1,389,413
526100	ES Wastewater Plant #1 Maint	\$6,255,247	\$6,470,097	\$6,619,688	\$6,772,408	\$6,928,305	\$7,087,426
526101	ES Wastewater Maintenance Parts Room	\$367,090	\$374,980	\$381,708	\$388,605	\$395,674	\$402,920
526102	ES Wastewater Maintenance Administration	\$461,783	\$478,015	\$489,965	\$502,215	\$514,770	\$527,639
526300	ES Wastewater Plant #3 Maint	\$531,373	\$552,034	\$565,914	\$580,145	\$594,736	\$609,696
527000	ES Wastewater Biosolids Oper	\$614,000	\$629,000	\$589,968	\$547,222	\$500,531	\$449,653
527500	ES Wastewater Biosolids Maint	\$52,309	\$53,880	\$55,235	\$56,624	\$58,048	\$59,509
523420	ES WW Site Development	\$128,937	\$132,714	\$136,032	\$139,433	\$142,918	\$146,491
523430	ES WW Asset Management	\$2,207,711	\$2,275,752	\$2,332,645	\$2,390,962	\$2,450,736	\$2,512,004
523740	ES Wastewater Business Administration	\$892,673	\$918,464	\$941,425	\$964,961	\$989,085	\$1,013,812
523930	ES Wastewater Environ Policy and Sustain	\$300,794	\$310,645	\$318,411	\$326,372	\$334,531	\$342,894
TOTAL O&M EXPENSES		\$71,289,199	\$73,367,805	\$75,327,461	\$77,339,225	\$79,381,233	\$81,478,893

Taxes

The wastewater utility pays three types of taxes on the revenues for wastewater services:

1. a gross earnings tax (GET) tax of 8 percent, assessed by the City;
2. a public utility tax of 3.852 percent on revenues received for wastewater collection;

3. a business and occupation (B&O) tax of 1.5 percent on revenues received for wastewater transmission and treatment and 0.484 percent on Tagro sales.

Expenses for wastewater collection and transmission and treatment have been adjusted for a combined tax rate of 11.852 percent and 9.5 percent, respectively.

Capital Improvement Program (CIP)

The Department has developed a comprehensive wastewater CIP to address current wastewater system needs. As **Table 1-6** indicates, the total estimated wastewater CIP from 2019 to 2024 is \$157.3 million. These projected costs include a five percent annual inflation factor for projects after 2020 due to anticipated increases in construction costs over time. This inflation rate is based on the Engineering News Record (ENR) to ensure the Department has adequate resources reserved to complete the necessary projects.

Table 1-6
Wastewater Capital Improvement Program

Capital Improvement Program	2019	2020	2021	2022	2023	2024
Collections Systems	\$18,636,213	\$11,490,446	\$9,416,059	\$14,171,739	\$14,439,740	\$14,616,057
CTP Facility Improvements	\$10,628,443	\$9,529,340	\$10,200,814	\$3,280,107	\$3,385,890	\$3,447,694
NETP Facility Improvements	\$1,058,358	\$2,431,240	\$407,493	\$722,025	\$761,115	\$805,033
Pump Stations Improvements	\$992,459	\$1,014,381	\$645,199	\$944,416	\$1,141,674	\$1,207,551
Equipment	\$3,661,650	\$2,744,950	\$2,914,643	\$3,276,134	\$3,785,723	\$4,613,515
Special Projects (SC)	\$211,035	\$126,347	\$129,780	\$136,269	\$143,082	\$150,237
TOTAL CIP - INFLATED	\$35,188,158	\$27,336,704	\$23,713,988	\$22,530,690	\$23,657,225	\$24,840,086

Major Capital Improvement Financing Plan

Typical CIP funding sources include the following:

System Revenues

Pay-as-you-go revenues
Interest earnings

Capital Financing

Bond proceeds
Grant receipts
State revolving loans

Table 1-6 presents the financing plan to finance major CIP projects over the six-year period from 2019 to 2024. The Department issued \$50 million in bonds in 2018 to fund the capital improvement program since revenues from rates are insufficient to cover the costs. When bonds or loans are issued, it is assumed that debt proceeds are used up first before revenues from rates and other sources are considered for financing the capital expenses.

Table 1-7
Wastewater Capital Financing Plan

Capital Financing Plan	2019	2020	2021	2022	2023	2024
Total Capital Projects	\$35,188,158	\$27,336,704	\$23,713,988	\$22,530,690	\$23,657,225	\$24,840,086
Total Capital Projects - PAYGO only	\$3,872,685	\$2,871,297	\$3,044,423	\$3,412,403	\$3,928,806	\$4,763,751
Total Capital Projects - Other funding sources	\$31,315,473	\$24,465,407	\$20,669,565	\$19,118,287	\$19,728,419	\$20,076,334
Sources of Funding:						
Debt	\$30,965,473	\$1,171,339	\$0	\$0	\$19,728,419	\$10,271,581
SRF Loans	\$0	\$0	\$0	\$0	\$0	\$0
Grants	\$350,000	\$0	\$0	\$0	\$0	\$0
Other	\$0	\$0	\$0	\$0	\$0	\$0
Total Sources	\$31,315,473	\$1,171,339	\$0	\$0	\$19,728,419	\$10,271,581
Projects Funded by Rates	\$3,872,685	\$26,165,365	\$23,713,988	\$22,530,690	\$3,928,806	\$14,568,505

Debt Service Requirements

Debt service requirements consist of principal and interest payments on existing debt. The required debt service coverage on outstanding bonds is 125 percent. The Department currently has debt service obligations associated with its outstanding 2015, 2016 and 2018 Revenue and Refunding Bonds, and two SRF loans. A thirty million dollar bond is planned for 2023 on the "Proposed Debt" line. Existing and proposed debt service consists of annual payments in the range of \$13.8 million to \$15.8 million as shown in **Table 1-8**.

Table 1-8
Wastewater Debt Service

Debt Service	2019	2020	2021	2022	2023	2024
Wastewater Loan #1	\$3,195,493	\$3,195,493	\$3,195,493	\$3,195,493	\$3,195,493	\$3,195,493
Wastewater Loan #2	\$1,442,301	\$1,442,301	\$1,442,301	\$1,442,301	\$1,442,301	\$1,442,301
2015 REVENUE BONDS	\$2,744,138	\$2,744,541	\$2,744,038	\$2,744,440	\$2,742,931	\$2,743,870
2015 REF 06 BONDS	\$888,479	\$888,731	\$888,626	\$871,322	\$873,212	\$870,608
2016 A REF TES BONDS	\$2,093,125	\$2,090,875	\$2,097,075	\$2,097,038	\$2,093,738	\$2,091,338
2016 B REF 2006 BONDS	\$1,147,650	\$1,150,590	\$1,148,805	\$0	\$0	\$0
2018 Revenue Bonds	\$2,993,900	\$2,991,500	\$2,996,000	\$3,498,500	\$3,499,000	\$3,496,250
TOTAL EXISTING DEBT SERVICE	\$14,505,086	\$14,504,030	\$14,512,337	\$13,849,093	\$13,846,673	\$13,839,859
Proposed Debt	\$0	\$0	\$0	\$0	\$1,138,400	\$1,951,543
TOTAL PROPOSED DEBT SERVICE	\$0	\$0	\$0	\$0	\$1,138,400	\$1,951,543
TOTAL DEBT SERVICE	\$14,505,086	\$14,504,030	\$14,512,337	\$13,849,093	\$14,985,073	\$15,791,402

Reserves

The Department requires adequate cash reserves to meet operating, capital, and debt service requirements. Operating reserves may be used to meet ongoing cash flow requirements, as well as emergency requirements. An operating cash balance of 90 days of operating expenses is the target in the ESD Financial Policy. This represents three months of working capital. The operating reserve balances and the 60-day minimum and 120-day maximum operating reserve targets are shown in **Table 1-9**.

In addition to the operating reserves, the Department also maintains an RSF, which is used to mitigate spikes in rate increases and better match revenues and expenses. The Department has a target reserve level equal to 10 percent of the total annual rate revenue for the RSF. Interest from reserve funds may be used to finance operations. The reserve levels are projected to meet the minimum required level in all six years of the study period, as shown in **Figure 1-1**.

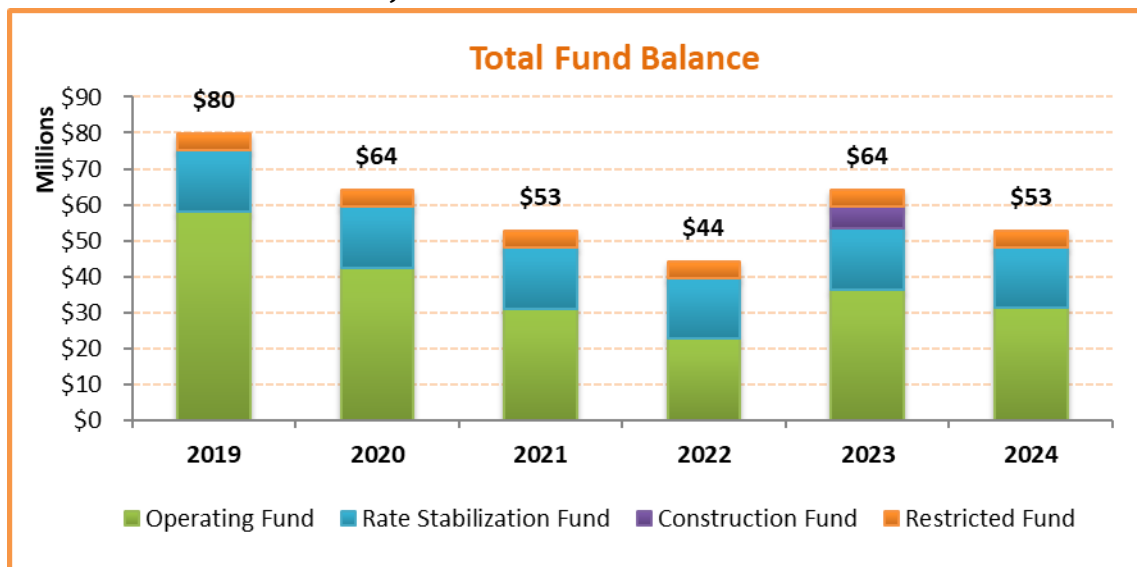
Based on the terms of the debt issued, debt reserves provide protection to bond buyers for one year of debt service payments in times of financial difficulty. These are restricted reserves used only for meeting debt service payments and are shown in the Restricted Fund in **Table 1-9**. Effective with the 2016 bond ordinance, the Department may elect a required reserve of zero for the 2016 and future parity bonds. The 2015 bonds are still covered under a surety policy. Therefore, the bond reserves reflect this change.

Table 1-9
Wastewater Funds/Reserves Balance

Wastewater Funds/Reserves Balance	2019	2020	2021	2022	2023	2024
Operating Fund						
Beginning Balance	\$53,352,512	\$58,039,710	\$42,360,074	\$31,086,564	\$22,611,641	\$36,296,781
Net Cash Flow	\$7,036,000	(\$14,651,381)	(\$11,274,225)	(\$8,474,927)	\$9,456,335	(\$893,897)
Transfer from Construction Fund	(\$2,348,802)	(\$1,028,256)	\$715	\$4	\$4,228,806	(\$4,198,592)
Ending Balance	\$58,039,710	\$42,360,074	\$31,086,564	\$22,611,641	\$36,296,781	\$31,204,293
Interest Income	\$616,423	\$551,429	\$413,598	\$316,802	\$323,054	\$409,135
Target Balance - Min - 60 days of O&M	\$9,466,225	\$9,741,652	\$10,006,253	\$10,277,981	\$10,553,207	\$10,836,069
Target Balance - Max - 120 days of O&M	\$18,932,449	\$19,483,304	\$20,012,506	\$20,555,962	\$21,106,413	\$21,672,139
Days of O&M - Calculated	407	428	329	264	205	277
Rate Stabilization Fund						
Beginning Balance	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000
Transfer From/(To) Operating Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000	\$17,000,000
Interest Income	\$170,000	\$170,000	\$170,000	\$170,000	\$170,000	\$170,000
Target Balance - 10% of revenue	\$7,663,060	\$7,969,690	\$8,228,591	\$8,489,360	\$8,722,974	\$8,956,052
Construction Fund						
Beginning Balance	\$28,616,671	\$143,083	\$715	\$4	\$0	\$6,072,989
Total Bonds Proceeds / Cash Flows	\$0	\$0	\$0	\$0	\$30,000,000	\$0
Other Sources of Funding	\$350,000	\$0	\$0	\$0	\$0	\$0
Bonds Used for Capital Projects	(\$30,965,473)	(\$1,171,339)	\$0	\$0	(\$19,728,419)	(\$10,271,581)
Other Sources Used for Capital Projects	(\$350,000)	\$0	\$0	\$0	\$0	\$0
Transfer to fund PAYGO	\$2,348,802	\$1,028,256	(\$715)	(\$4)	(\$3,928,806)	\$4,198,592
Transfer from / to Operating Fund	\$0	\$0	\$0	\$0	(\$300,000)	\$0
Ending Balance	\$0	\$0	\$0	\$0	\$6,042,776	\$0
Ending Balance Interest Income	\$143,083	\$715	\$4	\$0	\$30,214	\$30,365
Restricted Fund						
Beginning Balance	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000
Ending Balance	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000	\$4,640,000
Interest Income	\$46,400	\$46,400	\$46,400	\$46,400	\$46,400	\$46,400

Figure 1-1 shows the total funds balance and total targets in a graphical format.

Figure 1-1
Projected Total Wastewater Funds Balance



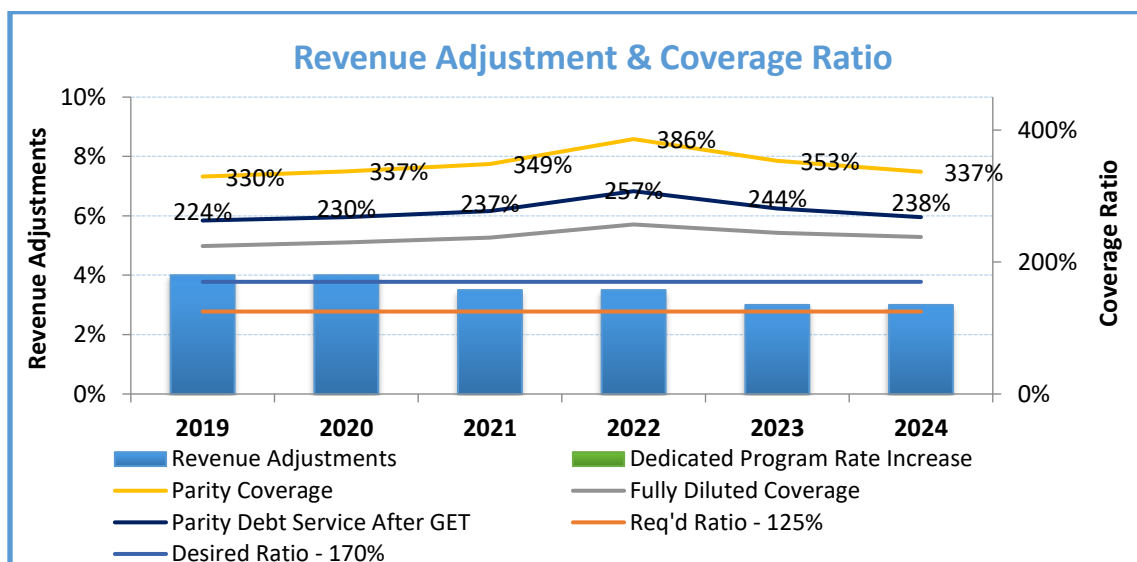
Revenue Adjustments

In order to meet projected revenue requirements, to achieve desired operating and capital reserve fund balances, and to minimize customer impacts, the following revenue adjustments have been approved to meet long-term rate stability:

Effective Date	Increases
January 1, 2019	4.0 percent
January 1, 2020	4.0 percent

Figure 1-2 shows the projected revenue adjustments for the wastewater utility over the next six years. However, only the first two years are implemented in this rate cycle.

Figure 1-2
Projected Wastewater Revenue Adjustments and Debt Coverage



The operating financial plan presented in **Table 1-10** shows the revenues from rates based on the projected revenue adjustment schedule shown above. The Wastewater utility will need 3-4 percent rate increases as shown in **Figure 1-2**.

Table 1-10
Wastewater Operating Financial Plan

Operating Financial Plan	2019	2020	2021	2022	2023	2024
Revenue at Existing Rates	\$74,233,158	\$74,233,158	\$73,994,637	\$73,757,569	\$73,521,897	\$73,287,652
Total Additional Revenue	\$2,397,439	\$5,463,742	\$8,291,272	\$11,136,028	\$13,707,846	\$16,272,872
Total Rate Revenue	\$76,630,597	\$79,696,901	\$82,285,909	\$84,893,597	\$87,229,743	\$89,560,524
Other Operating Revenue	\$3,129,000	\$3,685,550	\$3,777,689	\$3,872,131	\$3,968,934	\$4,068,158
Investment Earnings	\$832,823	\$767,829	\$629,998	\$533,202	\$539,454	\$625,535
Other Non-Operating Revenue	\$2,407,550	\$1,129,450	\$1,129,875	\$1,130,311	\$830,757	\$1,131,215
TOTAL REVENUES	\$82,999,970	\$85,279,730	\$87,823,470	\$90,429,241	\$92,568,888	\$95,385,432
EXPENDITURES						
O&M Expenses	\$57,586,199	\$59,261,715	\$60,871,371	\$62,524,385	\$64,198,674	\$65,919,423
Existing Debt Service	\$14,505,086	\$14,504,030	\$14,512,337	\$13,849,093	\$13,846,673	\$13,839,859
Proposed Debt Service	\$0	\$0	\$0	\$0	\$1,138,400	\$1,951,543
Capital PAYGO (funded by rates)	\$3,872,685	\$26,165,365	\$23,713,988	\$22,530,690	\$3,928,806	\$14,568,505
TOTAL EXPENDITURES	\$75,963,970	\$99,931,110	\$99,097,696	\$98,904,168	\$83,112,553	\$96,279,329
NET CASH FLOW	\$7,036,000	(\$14,651,381)	(\$11,274,225)	(\$8,474,927)	\$9,456,335	(\$893,897)

Debt Service Coverage

The Department must meet debt coverage requirements on its outstanding bond issues. Coverage requirements typically vary between 100 percent and 160 percent or higher. The Department has a required debt coverage is 125 percent, which means that the Department's adjusted net system revenues shall amount to at least 125 percent of the annual debt service. The system revenues include funds

derived from the ownership and operation of the system including wastewater service charges from the Department's users, miscellaneous service charges, revenue received from contracts, interest income, and some other non-operating revenues. Annual debt service includes annual principal and interest payments on outstanding debt. With the projected revenue adjustments, the Department exceeds the coverage requirement during all six years for both the parity debt service, which excludes debt service for SRF loans. These and additional coverage calculations are shown below in **Table 1-11**, and in **Figure 1-2** above.

Table 1-11
Wastewater Coverage Ratio Calculation

Debt Coverage Calculation	2019	2020	2021	2022	2023	2024
Revenues						
Operating Revenue	\$79,759,597	\$83,382,451	\$86,063,598	\$88,765,728	\$91,198,677	\$93,628,682
Non-Operating Revenue	\$3,875,906	\$2,410,545	\$2,272,426	\$2,176,063	\$2,212,975	\$2,299,665
Total Revenues	\$83,635,503	\$85,792,995	\$88,336,024	\$90,941,791	\$93,411,652	\$95,928,347
Expenses						
O&M Expenses	\$51,113,806	\$52,504,423	\$53,910,579	\$55,355,132	\$56,834,249	\$58,353,674
Total Expenses	\$51,113,806	\$52,504,423	\$53,910,579	\$55,355,132	\$56,834,249	\$58,353,674
Net Revenue	\$32,521,697	\$33,288,572	\$34,425,445	\$35,586,659	\$36,577,403	\$37,574,673
Parity Debt Service	\$9,867,292	\$9,866,236	\$9,874,543	\$9,211,299	\$10,347,280	\$11,153,608
Fully Diluted Debt Service	\$14,505,086	\$14,504,030	\$14,512,337	\$13,849,093	\$14,985,073	\$15,791,402
Coverage Ratio						
Parity Debt Service	330%	337%	349%	386%	353%	337%
Fully Diluted Debt Service	224%	230%	237%	257%	244%	238%
Parity Debt Service After GET	263%	268%	277%	307%	281%	268%
Parity Debt Service Before Rate Stabilization	330%	337%	349%	386%	353%	337%
Required Coverage Ratio	125%	125%	125%	125%	125%	125%
Desired Coverage Ratio	170%	170%	170%	170%	170%	170%

COST OF SERVICE ANALYSIS

The determination of the Department's user-class flows and loadings and the revenue requirements reviewed and finalized through the operating and capital cash flow analysis provide the basis for performing the cost of service analysis. This section of the report discusses the allocation of operating costs and the determination of unit rates, and the calculation of user class cost responsibility.

The total revenue requirement net of miscellaneous revenue credits, by definition, is the net cost of providing service. This cost of service is then used as the basis to develop unit rates for the wastewater parameters and to allocate costs to the various user classes in proportion to the wastewater services rendered. The wastewater rates were based on the cost of service performed in 2017, and updated for 2019 and 2020 budgeted costs.

Costs of Service to be Allocated

The annual revenue requirement or cost of service to be recovered from wastewater charges includes operation and maintenance expenses and other non-operating costs. O&M expenses include costs directly related to the collection, treatment, and disposal of wastewater and maintenance of system facilities.

The total net cost of service to be recovered from the Department's wastewater users, as shown in **Table 1-12**, is estimated at approximately \$77.1 million, of which approximately \$54.1 million is operating costs and the remaining \$23.0 million is capital costs, which consists of existing debt service and capital projects funded by rates. The cost of service analysis is based upon the need to generate annual revenues adequate to meet the estimated annual revenue requirement. As part of the cost of service analysis, revenues from other sources except wastewater rates and charges are deducted from the appropriate cost elements. Additional deductions are made to reflect interest income and other non-operating income during the year. Adjustments are also made to account for cash balances to ensure adequate collection of revenue and to determine annual revenues needed from rates.

Table 1-12
Wastewater Revenue Requirements from Rates

	2019		
	Operating	Capital	Total
Revenue Requirements			
O&M Expenses	\$57,586,199		\$57,586,199
Existing Debt Service		\$14,505,086	\$14,505,086
Proposed Debt Service		\$0	\$0
Proposed SRF Loan		\$0	\$0
Capital PAYGO		\$3,872,685	\$3,872,685
Total Revenue Requirements	\$57,586,199	\$18,377,771	\$75,963,970
Revenue from Other Sources			
Other Operating Revenue	\$3,129,000		\$3,129,000
Investment Earnings	\$832,823		\$832,823
Other Non-Operating Revenue		\$2,407,550	\$2,407,550
Interfund Transfers	\$0		\$0
Total Revenue from Other Sources	\$3,961,823	\$2,407,550	\$6,369,373
Adjustments			
Adjustments for Cash Balance		(\$7,036,000)	(\$7,036,000)
Adjustments to Annualize Rate Increase	(\$494,888)		(\$494,888)
Total Adjustments	(\$494,888)	(\$7,036,000)	(\$7,530,888)
Revenue to be Collected from Rates	\$54,119,264	\$23,006,220	\$77,125,484

Mass Balance

Cost of service analysis requires that costs be assigned to customers in proportion to their loadings. Customers are divided into classes based on their strength. Since measurement of wastewater flow is expensive and prone to errors, most customers' wastewater flows are not metered. The flow from customers can be estimated based on their winter water usage (WQA). The WQA provides a good proxy for wastewater generated by residential customers. For commercial customers, actual water use serves as the proxy for wastewater generated. Commercial customers' strengths are defined in **Table 1-2**. Contract agencies' flows are based either on agreements or on actual metered usage. These agencies are assigned the same strengths as other Department customers.

A significant quantity of wastewater results from infiltration and inflow (I&I), which is water that enters the collection system during rain-related events, run-off, or through other ways. 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 all the Department's customers. Based on this analysis, the calculated infiltration and inflow, is estimated to be approximately 33.1 percent of the total flow entering the treatment plant. Discussions with the Department's wastewater staff show that this number is reasonable given the amount of rain the Department receives during the year. The strength of I&I is higher than would be expected. Since the anomaly cannot be explained, the costs related to I&I are allocated to loadings as well as accounts to ensure equitable recovery of I&I related costs.

Table 1-13 shows the total annual units of flow and strength for each customer class based on the result of the mass balance analysis.

Table 1-13
Wastewater Mass Balance

2015	Flow	BOD	TSS
	(MG)	(klbs/yr)	(klbs/yr)
Total Plant	9,437	23,887	23,761
Contract Agencies			
Pierce County	408	1,011	986
Fife	208	488	482
Fircrest	125	199	229
Ruston	13	31	31
Total Contract Agencies	753	1,729	1,727
Commercial			
Commercial Category 1	55	92	69
Commercial Category 2	1,057	1,764	1,985
Commercial Category 3	55	185	138
Commercial Category 4	105	436	393
Commercial Category 5	1	6	4
Commercial Category 6	25	164	82
Commercial Category 7	23	156	137
Commercial Category 8	165	1,310	827
Commercial, Various	32	79	79
Total Commercial	1,518	4,193	3,715
Residential	4,043	11,449	11,804
Estimated I&I -	33.1%	3,123	6,516

Unit Cost of Service

In order to allocate costs of service to the different user classes, unit costs of service are developed consistent with the guidelines for allocating costs detailed in the Manual of Practice titled Financing and Charges for Wastewater Systems published by the Water Environment Federation (WEF). Operating and capital costs are functionalized as collection, treatment, billing, administrative, etc. These costs are then allocated to the flow, biochemical oxygen demand (BOD) and suspended solids (SS) parameters based on the design of each facility. Collection costs are allocated entirely to flow. Treatment plants are designed to treat flow, BOD, and SS so treatment costs are allocated to those three parameters based on the design of each component of the system. For example, the equipment in the primary clarifiers is designed to remove suspended solids. Along with suspended solids there is also some removal of BOD, therefore the equipment is allocated to SS and BOD based on the removal of those two parameters. Additionally, the primary tank structure is designed for flow; therefore, the structure is allocated to flow. Similarly, other components of the treatment plant are analyzed to determine the appropriate allocation to flow, BOD and SS. The allocation of the operating treatment costs is estimated to be 45 percent to flow, 30 percent

to BOD, and 25 percent to SS. Administrative costs are assigned to “general” and spread amongst the costs centers proportionately. Capital costs are assigned based on the asset values as described above. The unit costs of service are developed by dividing the total annual costs by the appropriate service units, such as flow, BOD and SS generated in the system and accounts for billing costs, as shown in **Table 1-14**.

Table 1-14
Wastewater Units of Service

Customer Class	Flow (hcf/yr)	BOD (lbs/yr)	TSS (lbs/yr)	Accounts
Residential				
Single Family	3,606,334	7,638,912	7,875,315	55,976
Multi Family	1,490,896	3,158,006	3,255,737	32,020
Subtotal Residential	5,097,230	10,796,918	11,131,052	87,996
Commercial				
Commercial Category 1	93,515	116,751	87,563	65
Commercial Category 2	1,392,086	1,737,981	1,955,229	3,298
Commercial Category 3	74,166	185,188	138,891	96
Commercial Category 4	137,366	428,744	385,870	11
Commercial Category 5	1,628	6,098	4,065	6
Commercial Category 6	26,470	132,188	66,094	32
Commercial Category 7	30,827	153,947	134,703	20
Commercial Category 8	229,516	1,361,086	859,633	316
Commercial, Monitored	48,286	90,426	90,426	8
Subtotal Commercial	2,033,860	4,212,409	3,722,474	3,852
Contract Agencies				
Pierce County	545,201	1,010,855	985,501	6,766
Fife	277,507	488,113	481,690	4,053
Fircrest	166,620	198,660	228,823	3,055
Ruston	17,081	31,494	30,893	362
Total Contract Agencies	1,006,409	1,729,123	1,726,907	14,236
TOTAL	8,137,499	16,738,450	16,580,434	106,084

Table 1-15 shows the development of the unit costs for each of the wastewater expense categories using the revenue requirements from rates (**Table 1-12**). Unit costs are determined for each cost category by dividing by the total number of service units in that category. The total number of bills per year excludes contract agencies since the Department does not bill individual customers within the contract agencies. I&I costs are calculated after the total system unit cost is calculated. I&I costs may be entirely assigned to customers equally or be spread in proportion to the loadings from each customer. A portion of I&I costs

are allocated to billing to be shared equally by all customers and the remainder to the loadings from customers because it may not be fair to charge all I&I costs to loadings.

Table 1-15
Wastewater Unit Cost Calculation

	Flow	BOD	TSS	Billing	General	Total
Operating Cost	\$18,386,666	\$7,918,620	\$6,301,888	\$866,540	\$23,213,517	\$56,687,231
Capital Cost	\$9,000,905	\$5,124,236	\$3,437,446	\$687,775	\$2,187,891	\$20,438,253
Total Cost of Service	\$27,387,571	\$13,042,856	\$9,739,334	\$1,554,315	\$25,401,408	\$77,125,484
Allocation of General Cost	\$13,449,885	\$6,405,275	\$4,782,933	\$763,315	(\$25,401,408)	
True Cost of Service	\$40,837,456	\$19,448,131	\$14,522,267	\$2,317,630	\$0	\$77,125,484
Adjustment from Flow to Bi	\$0			\$0		
Net Cost of Service	\$40,837,456	\$19,448,131	\$14,522,267	\$2,317,630	\$0	\$77,125,484
Unit of Service	8,137,499	16,738,450	16,580,434	1,102,176		
Unit	hcf	lbs/yr	lbs/yr	billings/yr		
I&I Cost Calculation						
Unit of Service (Total plant)	12,616,310	23,887,321	23,760,706	1,102,176		
Unit Cost	\$3.24	\$0.81	\$0.61			
I&I Cost	\$14,497,365	\$5,820,334	\$4,388,499			
Allocation of I&I Cost	\$11,597,892	\$4,656,267	\$3,510,799	\$4,941,240		
Allocated I&I Unit Cost	\$1.43	\$0.28	\$0.21	\$4.48		
Total Unit Cost	\$4.66	\$1.09	\$0.82	\$6.59		
Unit	hcf	lbs/yr	lbs/yr	billings/mo		

Allocations of Cost to Customer Class

After the unit costs are determined, they are allocated to each customer class based on the respective units of service from each customer class (shown in **Table 1-14**) to determine the total revenue required from each customer class. Cost of service principles require that the rates be designed so that there are no subsidies among customer classes. **Table 1-16** shows the total revenue required from each customer class by cost category.

Table 1-16
Wastewater Costs by Customer Class

Customer Class	Flow \$/yr	BOD \$/yr	TSS \$/yr	Billing \$/yr	Total \$/yr
Residential					
Single Family	\$16,813,156	\$8,344,283	\$6,480,848	\$4,423,858	\$36,062,145
Multi Family	\$6,950,734	\$3,449,613	\$2,679,250	\$2,530,583	\$15,610,180
Subtotal Residential	\$23,763,889	\$11,793,896	\$9,160,098	\$6,954,441	\$51,672,325
Commercial					
Commercial Category 1	\$435,978	\$127,532	\$72,059	\$5,137	\$640,705
Commercial Category 2	\$6,490,070	\$1,898,465	\$1,609,020	\$260,645	\$10,258,200
Commercial Category 3	\$345,771	\$202,289	\$114,298	\$7,587	\$669,944
Commercial Category 4	\$640,417	\$468,334	\$317,545	\$869	\$1,427,164
Commercial Category 5	\$7,590	\$6,661	\$3,345	\$474	\$18,070
Commercial Category 6	\$123,406	\$144,394	\$54,391	\$2,529	\$324,721
Commercial Category 7	\$143,719	\$168,162	\$110,852	\$1,581	\$424,313
Commercial Category 8	\$1,070,031	\$1,486,768	\$707,420	\$24,974	\$3,289,192
Commercial, Monitored	\$225,115	\$98,775	\$74,414	\$632	\$398,937
Subtotal Commercial	\$9,482,096	\$4,601,379	\$3,063,343	\$304,429	\$17,451,246
Contract Agencies					
Pierce County	\$2,541,792	\$1,104,196	\$811,000	\$0	\$4,456,988
Fife	\$1,293,770	\$533,185	\$396,398	\$0	\$2,223,353
Fircrest	\$776,804	\$217,004	\$188,306	\$0	\$1,182,114
Ruston	\$79,632	\$34,403	\$25,423	\$0	\$139,458
Total Contract Agencies	\$4,691,998	\$1,888,789	\$1,421,127	\$0	\$8,001,913
TOTAL	\$37,937,983	\$18,284,064	\$13,644,568	\$7,258,870	\$77,125,484

RATE DESIGN

The revenue requirements and cost of service analyses described in the preceding sections of this report provide a basis for the design of wastewater rates. Rate design involves the development of a rate schedule for each user class to recover the annual cost of service determined for each user class, shown in **Table 1-16**. This subsection of the report presents a schedule of rates for the Department's user classes and analyzes the impact of the proposed changes in cost allocation and rate design on the user classes.

Wastewater Rates

The Department will retain the current wastewater rate structure as it has a fixed charge component that ensures revenue stability to the utility and a variable rate component that is equitable and encourages

conservation. **Table 1-17** shows the wastewater rates for 2019 and 2020. The fixed charge for residential customers was developed to recover approximately 52 percent of the revenue requirements allocated to the residential customer class to provide revenue stability and reduce customer impacts. Similarly, the fixed charge for commercial customers was developed to recover approximately 3 percent of the total revenue requirements allocated to the commercial class, in keeping with the current rate structure. The residential rates also reflect the LIE/LID discount costs since only residential customers benefit from the assistance program.

Table 1-17
Wastewater Rates

Proposed Rates	2019	2020
Residential		
Monthly Fixed Charge	\$25.87	\$26.91
Flow Charge (\$/hcf)	\$4.87	\$5.07
LID/LIE customers receive 30% discount		
Commercial		
Monthly Fixed Charge	\$12.50	\$13.00
Flow Charge (\$/hcf of water usage)		
Category 1	\$6.75	\$7.02
Category 2	\$7.02	\$7.31
Category 3	\$8.84	\$9.20
Category 4	\$10.38	\$10.80
Category 5	\$10.55	\$10.98
Category 6	\$12.09	\$12.58
Category 7	\$13.67	\$14.22
Category 8	\$14.13	\$14.70
Commercial, Various		
Flow (\$/hcf)	\$4.67	\$4.86
BOD (\$/lb)	\$1.10	\$1.15
SS (\$/lb)	\$0.83	\$0.87
Septic Tank Wastes (\$/100 gal)	\$14.67	\$15.26

Customer Impacts

Since there are changes in the cost allocations to different parameters, it is expected that individual customers as well as customer classes will experience different impacts based on their water usage and their strength categories. This realigns the rates with the cost of service analysis. **Table 1-18** below shows the difference between the bills in 2019 and 2020 and the current bill for residential customers at varying levels of water usage. Most residential customers will experience an increase of 3.8 to 4.1 percent in their wastewater bill in 2019 and in 2020.

Table 1-18
Residential Customers Impacts

Residential Customers	Winter Usage	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
Very low volume	2	\$34.32	\$35.61	\$37.05	3.76%	4.04%
Low volume	4	\$43.68	\$45.35	\$47.19	3.82%	4.06%
Average volume	6	\$53.04	\$55.09	\$57.33	3.87%	4.07%
High volume	9	\$67.08	\$69.70	\$72.54	3.91%	4.07%
Very high volume	18	\$109.20	\$113.53	\$118.17	3.97%	4.09%

Table 1-19 shows the difference between the bills in 2019 and 2020 and the current bill for the average commercial customer in each category. Commercial customers will experience rate increases of between a 3.6 percent and 4.2 percent increase in their wastewater bills. Each customer will experience different impacts based on their water usage.

Table 1-19
Commercial Customers Impacts

Commercial Customer	Average Water Usage	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
Category 1	120	\$791.92	\$822.50	\$855.40	3.9%	4.0%
Category 2	36	\$256.00	\$265.22	\$276.16	3.6%	4.1%
Category 3	65	\$566.37	\$587.10	\$611.00	3.7%	4.1%
Category 4	1,041	\$10,432.33	\$10,818.08	\$11,255.80	3.7%	4.0%
Category 5	23	\$244.91	\$255.15	\$265.54	4.2%	4.1%
Category 6	69	\$815.08	\$846.71	\$881.02	3.9%	4.1%
Category 7	129	\$1,709.56	\$1,775.93	\$1,847.38	3.9%	4.0%
Category 8	61	\$841.52	\$874.43	\$909.70	3.9%	4.0%

SECTION 2 – SURFACE WATER MANAGEMENT

SURFACE WATER SYSTEM

The Department's surface water system consists of over 521 miles of pipelines, 19,000-plus catch basins, three pump stations and numerous detention ponds/structures. The catch basin is the storm water's first stop past the storm drains designed to "catch" the big pieces of debris such as garbage and leaves that wash into the storm drain. Once through a catch basin, the water is carried by miles of pipelines, sometimes with the help of pump stations to move water in lower areas, to the local waterways. To help prevent flooding, the Department has holding basins, or detention ponds, that collect and hold water during heavy rain episodes. Four main areas with holding basins include the Northshore Golf Course in Northeast Tacoma, Flett Creek, Hosmer, and Leach Creek.

Current Surface Water Rates

The Department currently charges surface water customers a monthly fixed charge and variable rate per 500 square footage of area or fraction thereof. The area charge, as shown in **Table 2-1**, varies based on the development categories of each parcel. The development categories are defined as follows:

- » Undeveloped (undeveloped land that soaks up much of the rainfall)
- » Light development (land with very limited impervious surface)
- » Moderate development (single-family homes with yards to soak up some of the runoff)
- » Heavy development (most commercial property with parking and some vegetation)
- » Very heavy development (industrial with mostly impervious surface and lots of runoff)

In addition, waterfront parcels, defined as properties abutting the Puget Sound with at least 50 feet of frontage or discharging all or most of their surface water directly into the Puget Sound, are charged lower rates than non-waterfront parcels since they are direct dischargers. Residential customers are considered within the moderate development category. Eligible LID/LIE customers receive 30 percent off the surface water rates.

Table 2-1
Current Surface Water Rates

Development Categories	Fixed (\$/parcel)	Variable (\$/500 sqft)
Undeveloped area <= than 1 acre	\$7.65	\$0.2865
Undeveloped area in excess of 1 acre	\$7.65	\$0.0616
Light development	\$7.65	\$0.8812
Moderate development	\$7.65	\$1.2054
Heavy development	\$7.65	\$1.7684
Very heavy development	\$7.65	\$2.3619
Waterfront Properties		
Undeveloped area <= than 1 acre	\$7.65	\$0.1422
Undeveloped area in excess of 1 acre	\$7.65	\$0.0616
Light development	\$7.65	\$0.4350
Moderate development	\$7.65	\$0.6071
Heavy development	\$7.65	\$0.8724
Very heavy development	\$7.65	\$1.1650

Customer Accounts

The customer accounts and billable units for 2017 information is used as the basis for projecting surface water revenues during the Study period. The Department does not expect any growth to occur during the six-year period as the Department since the City is essentially built out. As shown in **Table 2-2**, approximately 76 percent of the surface water accounts are non-waterfront parcels in the moderate development category, which represents most of the residential customers as they are considered to be in the moderate development category. Waterfront properties account for less than one percent of the total surface water accounts.

Table 2-2
Current Surface Water Customer Accounts

Development Categories	Regular Parcel	Billable Units
Undeveloped area <= than 1 acre	4,255	174,450
Undeveloped area in excess of 1 acre	1,757	145,883
Light development	790	91,119
Moderate development	51,915	813,857
Heavy development	5,687	248,688
Very heavy development	3,774	285,034
Waterfront Properties		
Undeveloped area <= than 1 acre	18	10,504
Undeveloped area in excess of 1 acre	141	3,606
Light development	0	9,693
Moderate development	31	2,205
Heavy development	95	15,158
Very heavy development	55	112,597
TOTAL	68,518	1,912,794

FINANCIAL PLAN

A review of a utility's revenue requirements is a key first step in the rate design process. The review involves an analysis of annual operating revenues under the current rates, capital revenues, O&M expenses, capital expenditures, transfers between funds, and reserve requirements. This subsection of the report provides a discussion of the projected revenues, O&M and capital expenditures, capital improvement financing plan, debt service requirements, and the revenue adjustments required to ensure the financial stability of the surface water utility.

Surface Water System Revenues

The Department's surface water utility derives its required annual operating and non-operating revenues from a number of sources. The principal source of operating revenues is the surface water service charges from the Department's users. Another source of operating revenue is other operating revenues, which includes customer fees and other miscellaneous revenues. Non-operating revenue sources include investment earnings, rental income, etc.

Table 2-3 presents the details of the operating and non-operating revenues.

Table 2-3
Surface Water Revenue at Existing Rates

Revenue at Existing Rates	2019	2020	2021	2022	2023	2024
Operating Revenues						
ENV-4270 Customer Fee Revenue	\$7,000	\$7,000	\$7,175	\$7,354	\$7,538	\$7,727
ENV-4411 Other Misc Oper Rev	\$31,000	\$32,000	\$32,800	\$33,620	\$34,461	\$35,322
ENV-4550 Sales Revenue	\$0	\$0	\$0	\$0	\$0	\$0
ENV-4560 Service Revenue	\$154,000	\$158,000	\$161,950	\$165,999	\$170,149	\$174,402
ENV-4640 Surface Water Revenue-Residential	\$17,092,423	\$17,092,423	\$17,092,423	\$17,092,423	\$17,092,423	\$17,092,423
ENV-4645 Surface Water Revenue-Commercial	\$18,256,410	\$18,256,410	\$18,256,410	\$18,256,410	\$18,256,410	\$18,256,410
ENV-4695 Discount-Aid to Families in Need	(\$36,000)	(\$37,000)	(\$37,925)	(\$38,873)	(\$39,845)	(\$40,841)
Total Operating Revenues	\$35,504,833	\$35,508,833	\$35,512,833	\$35,516,933	\$35,521,135	\$35,525,443
Non-Operating Revenues/(Expenses)						
ENV-6100 Investment Income	\$566,074	\$321,086	\$327,041	\$283,043	\$369,327	\$434,437
ENV-6400 Operating Grant Revenue	\$1,300,000	\$0	\$0	\$0	\$0	\$0
ENV-6560 Other Debt Service Costs	\$0	\$0	\$0	\$0	(\$300,000)	\$0
ENV-8420 Transfers In / Out - Capital - Cash	\$0	\$525,000	\$750,000	\$750,000	\$0	\$0
ENV-8440 Transfers In / Out - Operating Related	(\$1,149,050)	(\$1,195,950)	(\$1,195,950)	(\$1,195,950)	(\$1,195,950)	(\$1,195,950)
Total Non-Operating Revenues/(Expenses)	\$717,024	(\$349,864)	(\$118,909)	(\$162,907)	(\$1,126,623)	(\$761,513)
TOTAL REVENUES	\$36,221,857	\$35,158,969	\$35,393,923	\$35,354,026	\$34,394,512	\$34,763,930

Surface Water System Expenditures

For sound financial operation of the Department's surface water system, revenues generated must be sufficient to meet the revenue requirements or cash obligations of the system. Revenue requirements include O&M expenses, CIP expenditures, principal and interest payments on existing debt, and other obligations.

Operations and Maintenance Expenses

O&M expenditures include the cost of operating and maintaining treatment, collection, and disposal facilities. O&M expenses also include the costs of providing technical services such as laboratory services and other administrative costs of the surface water system such as customer service and billing. These costs are a normal obligation of the system and are met from operating revenues as they are incurred. The comprehensive forecasted annual O&M expenditures are based upon the Department's budgeted 2019 and 2020 expenditures and adjusted for anticipated changes in operations and the effect of inflation in future years. The Department uses the estimated CPI for the Puget Sound area as the standard inflation factor to project all future O&M expenditures, except utilities and assessments. The CPI assumption for labor and general expenditures is 2.5 percent, for utilities the inflation factor is 4 percent, and for benefits and assessments, 5 percent. Inflated calculations start in 2021. Projected O&M expenditures are summarized by functions in **Table 2-4**.

The rate model provides for segregation between cash and non-cash expenses, such as depreciation, which is excluded when revenue requirements are calculated to determine surface water rates.

Table 2-4
Surface Water O&M Expenses

O&M Expenses by Cost Center		2019	2020	2021	2022	2023	2024
521100	ES Surface Water Transmission	\$3,463,707	\$3,550,114	\$3,641,779	\$3,735,851	\$3,832,397	\$3,931,482
521200	ES Surface Water Pumping	\$172,301	\$177,412	\$183,727	\$190,276	\$197,066	\$204,108
521300	ES Surface Water Hold Basins	\$276,022	\$285,921	\$293,084	\$300,428	\$307,955	\$315,672
521400	ES Surface Water Environmental Compl	\$1,252,104	\$1,300,073	\$1,332,575	\$1,365,889	\$1,400,036	\$1,435,037
521600	ES Surface Water Environmental Programs	\$3,274,793	\$3,373,198	\$3,456,447	\$3,541,723	\$3,629,073	\$3,718,545
521610	ES Surface Water Construction Support	\$616,704	\$628,701	\$632,895	\$636,617	\$639,826	\$642,480
521620	ES Surface Water Private Development	\$144,006	\$154,962	\$158,836	\$162,807	\$166,877	\$171,049
521900	ES Surface Water Revenues and Accounting	\$6,119,723	\$5,931,162	\$6,050,167	\$6,160,432	\$6,261,373	\$6,366,134
521905	ES Surface Water Public InfoComRelations	\$94,676	\$97,629	\$100,070	\$102,572	\$105,136	\$107,764
521915	ES Surface Water Assessments	\$4,586,975	\$4,651,817	\$4,884,408	\$5,128,628	\$5,385,059	\$5,654,312
521920	ES Surface Water ES Customer Service	\$141,627	\$145,696	\$149,338	\$153,072	\$156,899	\$160,821
521925	ES Surface Water Business Operations	\$1,700,950	\$1,775,844	\$1,820,240	\$1,865,746	\$1,912,389	\$1,960,199
529500	ES Surface Water Laboratory	\$606,458	\$621,181	\$636,711	\$652,629	\$668,945	\$685,668
529900	ES Surface Water Expense Construct Proj	\$2,856,000	\$146,000	\$149,650	\$153,391	\$157,226	\$161,157
521700	ES Surface Water Open Space	\$838,288	\$1,036,672	\$1,062,923	\$1,089,843	\$1,117,450	\$1,145,762
521630	ES Surface Water Asset Management	\$1,175,584	\$1,232,960	\$1,263,783	\$1,295,378	\$1,327,763	\$1,360,957
521640	ES Surface Water Project Delivery	\$590,215	\$603,017	\$600,761	\$597,583	\$593,415	\$588,187
521930	ES Surface Water Environ Policy and Sustain	\$633,771	\$651,123	\$667,402	\$684,087	\$701,189	\$718,718
TOTAL O&M EXPENSES		\$28,543,903	\$26,363,482	\$27,084,796	\$27,816,950	\$28,560,074	\$29,328,053

Taxes

The surface water utility is subject to two taxes: a Gross Earning Tax (GET) tax of 8 percent assessed by the City of Tacoma and a B&O tax of 1.5 percent assessed by the State of Washington. The GET tax is assessed on all revenues collected and the B&O tax is assessed on all operating revenues. Surface water expenses have been adjusted for both taxes.

Capital Improvement Program

The Department has developed a comprehensive surface-water CIP to address current surface-water system needs. As **Table 2-5** indicates, the total estimated surface water CIP from 2019 to 2024 is \$120.7 million. These projected costs include a five percent annual inflation factor for projects after 2020 due to anticipated increases in construction costs over time. This inflation rate is based on the ENR to ensure the Department has adequate resources reserved to complete the necessary projects.

Table 2-5
Surface Water Capital Improvement Program

Capital Improvement Program	2019	2020	2021	2022	2023	2024
Collection Systems	\$20,551,625	\$18,969,559	\$12,564,034	\$12,760,959	\$14,309,456	\$15,024,929
Equipment	\$209,000	\$721,050	\$800,993	\$535,732	\$247,992	\$590,645
Facilities Improvements	\$0	\$1,946,752	\$0	\$0	\$0	\$0
Treatment and Low Impact Developmen	\$2,467,973	\$5,947,900	\$4,075,549	\$4,291,929	\$1,763,854	\$1,852,046
Special Projects (SC)	\$214,160	\$130,767	\$164,588	\$172,817	\$181,458	\$190,531
Capital Labor Credit	\$0	\$0	\$0	\$0	\$0	\$0
Capitalized A&G	\$0	\$0	\$0	\$0	\$0	\$0
Capitalized Interest	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL CIP - INFLATED	\$23,442,758	\$27,716,028	\$17,605,163	\$17,761,437	\$16,502,759	\$17,658,150

Major Capital Improvement Financing Plan

Typical CIP funding sources include the following:

System Revenues

Pay-as-you-go revenues

Interest earnings

Capital Financing

Bond proceeds

Grant receipts

State revolving loans

Table 2-6 presents the financing plan to finance major CIP projects over the six-year period from 2019 to 2024. As of 2018, the Department expects to receive \$13.8 million in grants over the next six years to surface water projects. The Department issued debt contributing \$30.5 million in construction funds in 2018. This will adequately fund the capital improvement program since revenues from rates are insufficient to cover the costs. Generally, bond proceeds are used before revenues from rates.

Table 2-6
Surface Water Capital Financing Plan

Capital Financing Plan	2019	2020	2021	2022	2023	2024
Total Capital Projects	\$23,442,758	\$27,716,028	\$17,605,163	\$17,761,437	\$16,502,759	\$17,658,150
Total Capital Projects - PAYGO only	\$423,160	\$851,817	\$965,580	\$708,549	\$429,450	\$781,175
Total Capital Projects - Other funding sources	\$23,019,598	\$26,864,211	\$16,639,583	\$17,052,888	\$16,073,309	\$16,876,975
Sources of Funding:						
Debt	\$18,155,317	\$0	\$0	\$0	\$15,073,309	\$14,626,691
SRF Loans	\$0	\$0	\$0	\$3,247,000	\$0	\$0
Grants	\$1,819,406	\$5,000,000	\$2,500,000	\$2,500,000	\$1,000,000	\$1,000,000
Other	\$0	\$0	\$0	\$0	\$0	\$0
Total Sources	\$19,974,723	\$5,000,000	\$2,500,000	\$5,747,000	\$16,073,309	\$15,626,691
Projects Funded by Rates	\$3,468,035	\$22,716,028	\$15,105,163	\$12,014,437	\$429,450	\$2,031,460

Debt Service Requirements

Debt service requirements consist of principal and interest payments on existing debt. The Department currently has debt service obligations associated with its outstanding 2015, 2016, and 2018 Revenue and Revenue Refunding Bonds, and an SRF loan. Existing and proposed debt service consists of annual payments in the range of \$7 to \$9.6 million over the six years. **Table 2-7** shows the existing and proposed debt service of the surface water utility.

Table 2-7
Surface Water Existing and Proposed Debt Service

Debt Service	2019	2020	2021	2022	2023	2024
Surface Water Loan #1	\$32,034	\$32,034	\$32,034	\$32,034	\$32,034	\$32,034
2015 REVENUE BONDS	\$1,345,487	\$1,345,684	\$1,345,437	\$1,345,635	\$1,344,894	\$1,345,355
2015 REF 06 BONDS	\$1,226,947	\$1,227,295	\$1,227,150	\$1,203,254	\$1,205,864	\$1,202,268
2016 B REF 2006 BONDS	\$1,584,850	\$1,588,910	\$1,586,445	\$0	\$0	\$0
2018 REVENUE BONDS	\$2,819,750	\$2,818,750	\$2,818,000	\$4,831,250	\$4,832,750	\$4,838,000
TOTAL EXISTING DEBT SERVICE	\$7,009,067	\$7,012,672	\$7,009,065	\$7,412,172	\$7,415,541	\$7,417,656
Proposed Bonds	\$0	\$0	\$0	\$0	\$1,138,400	\$1,951,543
Proposed SRF Loans	\$0	\$0	\$0	\$0	\$189,124	\$189,124
TOTAL PROPOSED DEBT SERVICE	\$0	\$0	\$0	\$0	\$1,327,524	\$2,140,667
TOTAL DEBT SERVICE	\$7,009,067	\$7,012,672	\$7,009,065	\$7,412,172	\$8,743,066	\$9,558,323

Reserves

The Department requires adequate cash reserves to meet operating, capital, and debt service requirements. Operating reserves may be used to meet ongoing cash flow requirements, as well as emergency requirements. An operating cash balance of 90 days of operating expenses is the target in the ESD Financial Policy. This represents three months of working capital. The operating reserve balances and the 60-day minimum and 120-day maximum operating reserve targets are shown in **Table 2-8**.

In addition to the operating reserves, the Department also maintains an RSF, which is used to mitigate spikes in rate increases and better match revenues and expenses. The Department has a target reserve level equal to 10 percent of the total annual rate revenue for the RSF. Interest from reserve funds may be used to finance operations. The reserve levels are projected to meet the minimum required level in all six years of the study period, as shown in **Figure 2-1**.

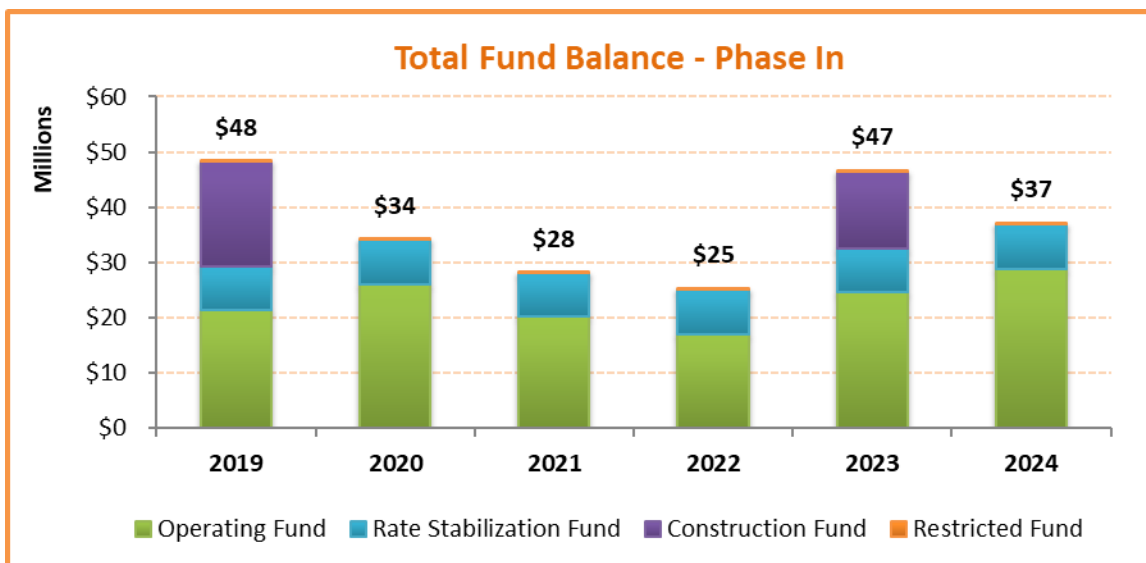
Based on the terms of the debt issued, debt reserves provide protection to bond buyers for one year of debt service payments in times of financial difficulty. These are restricted reserves used only for meeting debt service payments and are shown in the Restricted Fund in **Table 2-8**. Effective with the 2016 bond ordinance, the Department may elect a required reserve of zero for the 2016 and future parity bonds. The 2015 bonds are still covered under a surety policy. Therefore, the bond reserves reflect this change.

Table 2-8
Surface Water Fund/Reserves Balance

Surface Water Fund/Reserves Balance	2019	2020	2021	2022	2023	2024
Operating Fund						
Beginning Balance	\$15,652,109	\$21,318,635	\$26,131,544	\$20,190,643	\$17,076,584	\$24,529,996
Net Cash Flow	\$2,198,491	(\$14,427,754)	(\$6,037,105)	(\$2,874,540)	\$6,723,962	\$5,047,126
Balance Sheet Cash Impacts - Balancing	\$0	\$0	\$0	\$0	\$0	\$0
Transfer from/(to) Rate Stabilization Fund	\$0	\$0	\$0	\$0	\$0	\$0
Transfer from Construction Fund	\$3,468,035	\$19,240,664	\$96,203	\$481	\$729,450	(\$659,961)
Transfer From/(To) Restricted Fund	\$0	\$0	\$0	(\$240,000)	\$0	\$0
Ending Balance	\$21,318,635	\$26,131,544	\$20,190,643	\$17,076,584	\$24,529,996	\$28,917,160
<i>Interest Income</i>	<i>\$188,206</i>	<i>\$144,562</i>	<i>\$246,239</i>	<i>\$201,520</i>	<i>\$217,120</i>	<i>\$281,883</i>
Target Balance - min - 60 days of O&M	\$4,034,614	\$3,676,189	\$3,778,323	\$3,881,827	\$3,986,714	\$4,095,255
Target Balance - max - 120 days of O&M	\$8,069,228	\$7,352,378	\$7,556,645	\$7,763,655	\$7,973,428	\$8,190,510
Days of O&M - Calculated	316	477	550	438	351	447
Rate Stabilization Fund						
Beginning Balance	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000
Transfer From/(To) Operating Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000	\$8,000,000
<i>Interest Income</i>	<i>\$80,000</i>	<i>\$80,000</i>	<i>\$80,000</i>	<i>\$80,000</i>	<i>\$80,000</i>	<i>\$80,000</i>
Target Balance - 10% of revenue	\$3,655,004	\$3,761,613	\$3,877,529	\$3,993,874	\$4,096,971	\$4,199,395
Construction Fund						
Beginning Balance	\$40,566,468	\$19,240,664	\$96,203	\$481	\$2	\$13,966,729
Total Bonds Proceeds / Cash Flows	\$0	\$0	\$0	\$0	\$29,700,000	\$0
CIP Balancing	\$0	\$0	\$0	\$0	\$0	\$0
SRF Loan Proceeds	\$0	\$0	\$0	\$3,247,000	\$0	\$0
Other Sources of Funding	\$1,819,406	\$5,000,000	\$2,500,000	\$2,500,000	\$1,000,000	\$1,000,000
Bonds Used for Capital Projects	(\$18,155,317)	\$0	\$0	\$0	(\$15,073,309)	(\$14,626,691)
SRF Loan Used for Capital Projects	\$0	\$0	\$0	(\$3,247,000)	\$0	\$0
Other Sources Used for Capital Projects	(\$1,819,406)	(\$5,000,000)	(\$2,500,000)	(\$2,500,000)	(\$1,000,000)	(\$1,000,000)
Transfer to fund PAYGO	(\$3,468,035)	(\$19,240,664)	(\$96,203)	(\$481)	(\$429,450)	\$659,961
Transfer to Operating Fund	\$0	\$0	\$0	\$0	(\$300,000)	\$0
Transfer From/(To) Restricted Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$18,943,116	\$0	\$0	\$0	\$13,897,243	\$0
Ending Balance Interest Income	\$297,548	\$96,203	\$481	\$2	\$69,486	\$69,834
Restricted Fund						
Beginning Balance	\$32,034	\$32,034	\$32,034	\$32,034	\$272,034	\$272,034
Reserves from New Bonds	\$0	\$0	\$0	\$0	\$0	\$0
Transfer From/(To) Operating Fund	\$0	\$0	\$0	\$240,000	\$0	\$0
Transfer From/(To) Construction Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$32,034	\$32,034	\$32,034	\$272,034	\$272,034	\$272,034
<i>Interest Income</i>	<i>\$320</i>	<i>\$320</i>	<i>\$320</i>	<i>\$1,520</i>	<i>\$2,720</i>	<i>\$12,478</i>

Figure 2-1 shows the total funds balance and total targets in a graphical format.

Figure 2-1
Projected Total Surface Water Funds Balance



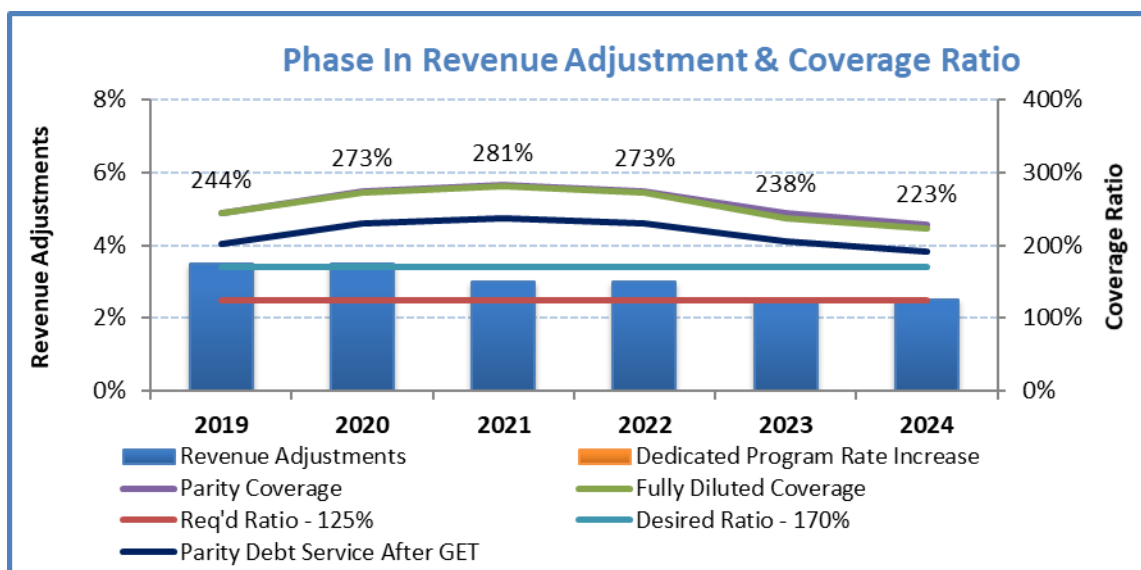
Revenue Adjustments

In order to meet projected revenue requirements, to achieve desired operating and capital reserve fund balances, and to minimize customer impacts, the following revenue adjustments were approved to meet long-term rate stability:

Effective Date	Increases
January 1, 2019	3.5 percent
January 1, 2020	3.5 percent

Figure 2-2 shows the projected revenue adjustments for the surface water utility over the next six years. However, only the first two years are implemented in this rate cycle.

Figure 2-2
Projected Surface Water Revenue Adjustments and Debt Coverage



The operating financial plan presented in **Table 2-9** shows the revenues from rates based on the projected revenue adjustment schedule shown above. The financial plan shows that the surface water utility will need to generate additional revenues, estimated to be 3.0 percent in years 2021 to 2022 and 2.5 percent in years 2023 to 2024, as shown in **Figure 2-2**, to meet its revenue requirements in those years.

Table 2-9
Surface Water Operating Financial Plan

Operating Financial Plan	2019	2020	2021	2022	2023	2024
Revenue at Existing Rates	\$35,348,833	\$35,348,833	\$35,348,833	\$35,348,833	\$35,348,833	\$35,348,833
Total Additional Revenue	\$1,201,209	\$2,267,302	\$3,426,459	\$4,589,908	\$5,620,879	\$6,645,121
Total Rate Revenue	\$36,550,042	\$37,616,135	\$38,775,292	\$39,938,741	\$40,969,711	\$41,993,954
Other Operating Revenue	\$192,000	\$197,000	\$201,925	\$206,973	\$212,147	\$217,451
Investment Earnings	\$268,526	\$224,882	\$326,559	\$283,040	\$299,840	\$364,604
Other Non-Operating Revenue	\$150,950	(\$670,950)	(\$445,950)	(\$445,950)	(\$1,495,950)	(\$1,195,950)
TOTAL REVENUES	\$37,161,518	\$37,367,067	\$38,857,827	\$39,982,804	\$39,985,749	\$41,380,059
EXPENDITURES						
O&M Expenses	\$24,543,903	\$22,363,482	\$22,984,796	\$23,614,450	\$24,252,511	\$24,912,802
Existing Debt Service	\$7,009,067	\$7,012,672	\$7,009,065	\$7,412,172	\$7,415,541	\$7,417,656
Proposed Debt Service	\$0	\$0	\$0	\$0	\$1,138,400	\$1,951,543
Proposed SRF Loan	\$0	\$0	\$0	\$0	\$189,124	\$189,124
Capital PAYGO (funded by rates)	\$3,468,035	\$22,716,028	\$15,105,163	\$12,014,437	\$429,450	\$2,031,460
TOTAL EXPENDITURES	\$35,021,005	\$52,092,182	\$45,099,025	\$43,041,059	\$33,425,027	\$36,502,584
NET CASH FLOW	\$2,140,513	(\$14,725,115)	(\$6,241,198)	(\$3,058,255)	\$6,560,723	\$4,877,475

Debt Service Coverage

The Department must meet debt coverage requirements on its outstanding bond issues. Coverage requirements typically vary between 100 percent and 160 percent or higher. The Department has a required debt coverage of 125 percent, which means that the Department's adjusted net system revenues shall amount to at least 125 percent of the annual debt service. The system revenues include funds derived from the ownership and operation of the system including surface water service charges from the Department's users, miscellaneous service charges, revenue received from contracts, interest income, and other non-operating revenues. Annual debt service includes annual principal and interest payments on outstanding debt. With the projected revenue adjustments, the Department exceeds the coverage requirement during all six years of the study for both the parity debt service, which excludes debt service for SRF loans, and the fully diluted debt service, which includes all debt service expenses, as shown below in **Table 2-10**, and in **Figure 2-2** above.

Table 2-10
Surface Water Debt Coverage Calculation

Debt Coverage Calculation	2019	2020	2021	2022	2023	2024
Revenues						
Operating Revenue	\$36,800,020	\$38,110,495	\$39,181,311	\$40,329,428	\$41,345,098	\$42,381,056
Non-Operating Revenue	\$1,866,074	\$321,086	\$327,041	\$283,043	\$369,327	\$434,437
Transfer from/(to) Rate Stabilization	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenues	\$38,666,093	\$38,431,581	\$39,508,351	\$40,612,471	\$41,714,425	\$42,815,494
Expenses						
O&M Expenses	\$21,578,420	\$19,296,652	\$19,824,167	\$20,365,453	\$20,920,916	\$21,493,149
Dedicated Program Cost	\$0	\$0	\$0	\$0	\$0	\$0
Non-Operating Expenses	\$0	\$0	\$0	\$0	\$0	\$0
Total Expenses	\$21,578,420	\$19,296,652	\$19,824,167	\$20,365,453	\$20,920,916	\$21,493,149
Net Revenue	\$17,087,674	\$19,134,929	\$19,684,185	\$20,247,019	\$20,793,509	\$21,322,345
Parity Debt Service	\$6,977,033	\$6,980,639	\$6,977,032	\$7,380,138	\$8,521,908	\$9,337,166
Fully Diluted Debt Service	\$7,009,067	\$7,012,672	\$7,009,065	\$7,412,172	\$8,743,066	\$9,558,323
Coverage Ratio						
Parity Debt Service	245%	274%	282%	274%	244%	228%
Fully Diluted Debt Service	244%	273%	281%	273%	238%	223%
Parity Debt Service After GET	202%	230%	237%	230%	205%	192%
Parity Debt Service Before Rate Stabiliz	245%	274%	282%	274%	244%	228%
Required Coverage Ratio	125%	125%	125%	125%	125%	125%
Desired Coverage Ratio	170%	170%	170%	170%	170%	170%

COST OF SERVICE ANALYSIS

The Department's parcels, quantity, and quality units for each user class, and the revenue requirements reviewed and finalized through the operating and capital cash flow analysis provide the basis for performing the cost of service analysis. This section of the report discusses the allocation of operating costs and the determination of unit rates, and the calculation of user class cost responsibility.

The total revenue requirement net of miscellaneous revenue credits, by definition, is the net cost of providing service. This cost of service is then used as the basis to develop unit rates for the surface water parameters and to allocate costs to the various user classes in proportion to the surface water services rendered. The surface water rates were based on the cost of service performed in 2017, and updated for 2019 and 2020 budgeted costs. After a review of individual rates, the Department chose to implement changes over time to smooth changes in rates.

Costs of Service to be Allocated

The annual revenue requirement or cost of service to be recovered from surface water charges includes operation and maintenance expenses and other non-operating expenses and capital costs. O&M expenses include costs directly related to the collection and disposal of surface water and maintenance of system facilities.

The total 2017 net cost of service to be recovered from the Department's surface water users, as shown in **Table 2-11**, is estimated at approximately \$36.6 million, of which approximately \$20.5 million is operating costs and the remaining \$16.1 million is capital costs, which consists of existing debt service and capital projects funded through rates. Note that an adjustment was made to allocate the revenue requirement between operating and capital because to normalize the relationship. The cost of service analysis is based upon the need to generate annual revenues adequate to meet the estimated annual revenue requirement. As part of the cost of service analysis, revenues from other sources except surface water rates and charges are deducted from the appropriate cost elements. Additional deductions are made to reflect interest income and other non-operating income during 2017. Adjustments are also made to account for cash balances to ensure adequate collection of revenue and to determine annual revenues needed from rates.

Table 2-11
Surface Water Revenue Requirements from Rates

	2019		
	Operating	Capital	Total
Revenue Requirements			
O&M Expenses	\$24,543,903		\$24,543,903
Open Space Program Cost	\$0		\$0
Existing Debt Service		\$7,009,067	\$7,009,067
Proposed Debt Service		\$0	\$0
Proposed SRF Loan		\$0	\$0
Capital PAYGO		\$3,468,035	\$3,468,035
Total Revenue Requirements	\$24,543,903	\$10,477,102	\$35,021,005
Revenue from Other Sources			
Other Operating Revenue	\$192,000		\$192,000
Investment Earnings	\$268,526		\$268,526
Other Non-Operating Revenue		\$150,950	\$150,950
Interfund Transfers	\$0		\$0
Total Revenue from Other Sources	\$460,526	\$150,950	\$611,476
Adjustments			
Adjustments for Cash Balance	(\$2,140,513)		(\$2,140,513)
Adjustments to Annualize Rate Increase	\$0		\$0
Total Adjustments	(\$2,140,513)	\$0	(\$2,140,513)
Revenue to be Collected from Rates	\$26,223,890	\$10,326,152	\$36,550,042
Average capital allocation			44.0%
Revenue to be Collected from Rates - Adjusted	\$20,468,024	\$16,082,019	\$36,550,042

Unit Cost of Service

In order to allocate costs of service to the different user classes, unit costs of service are developed consistent with industry guidelines. Operating and capital costs are functionalized as collection, pumping, billing, administrative, etc. These costs are then allocated to the quantity, quality, parcel, and streets parameters based on the design of each facility. Transmission costs are allocated to quantity, quality, and streets. Pumping costs are allocated solely to quantity as pump stations are designed to move water. Environmental compliance costs are allocated mainly to quality. Administrative costs are assigned to general and are spread amongst the other costs centers proportionately. The unit costs of service are developed by dividing the total annual costs by the appropriate service units generated in the system and accounts for billing costs. **Table 2-12** shows the units of service in each cost category and for each development category.

Table 2-12
Surface Water Unit of Service

Development Categories	Parcels	Billable Units	Runoff Units	Quantity RU	Quality RU	Streets RU
Non-waterfront Parcels						
Undeveloped area <= than 1 acre	4,316	175,260	38,947	38,947	38,947	38,947
Undeveloped area in excess of 1 acre	1,762	146,818	32,626	0	0	32,626
Light development	790	91,119	66,821	66,821	66,821	66,821
Moderate development	54,086	843,780	843,780	843,780	843,780	843,780
Heavy development	5,747	248,992	370,721	370,721	370,721	370,721
Very heavy development	3,774	285,034	570,068	570,068	570,068	570,068
Waterfront Parcels						
Undeveloped area <= than 1 acre	18	10,504	2,334	0	2,334	2,334
Undeveloped area in excess of 1 acre	141	3,606	801	0	0	801
Light development	0	9,693	7,108	0	7,108	7,108
Moderate development	33	2,224	2,224	0	2,224	2,224
Heavy development	95	15,158	22,569	0	22,569	22,569
Very heavy development	55	112,597	225,194	0	225,194	225,194
Streets	0	237,600	517,440	517,440	517,440	517,440
TOTAL	70,817	2,182,385	2,700,633	2,407,777	2,667,206	2,700,633

Table 2-13 shows the development of the 2019 surface water unit costs for each of the surface water cost categories by dividing the total revenue requirements from **Table 2-11** by the number of service units in **Table 2-12**. Streets costs are reallocated to each development category, so all customers share the cost.

Table 2-13
Surface Water Unit Cost Calculation

	Quantity	Quality	Parcel	Streets	General	Total
Operating Cost	\$4,543,985	\$5,086,851	\$4,715,663	\$339,943	\$5,781,582	\$20,468,024
Capital Cost	\$9,547,684	\$4,855,602	\$676,170	\$73,031	\$929,532	\$16,082,019
Total Cost of Service	\$14,091,668	\$9,942,454	\$5,391,833	\$412,974	\$6,711,113	\$36,550,042
Allocation of General Cost	\$3,169,376	\$2,236,171	\$1,212,684	\$92,883	(\$6,711,113)	\$0
Cost of Service	\$17,261,044	\$12,178,624	\$6,604,517	\$505,857	\$0	\$36,550,042
Unit of Service	2,407,777	2,667,206	70,817	2,700,633		
Unit	quantity units	quality units	parcels	street units		
Unit Cost	\$0.5974	\$0.3805	\$7.7718	\$0.0156		
	per unit	per unit	per month	per unit		

Allocations of Cost to Customer Class

After the unit costs are determined, these costs are then allocated to each customer class based on the respective units of service from each customer class (shown in **Table 2-12**) to determine the total revenue required from each customer class. Cost of service principles require that the rates be designed so that there are no subsidies between customer classes. **Table 2-14** shows the total revenue required from each customer class by cost category.

Table 2-14
Surface Water Costs by Customer Class

Development Categories	Quantity	Quality	Streets	Parcel	Total	Streets Reallocated	Final Total
Non-waterfront Parcels							
Undeveloped area <= than 1 acre	\$279,204	\$177,833	\$7,295	\$402,518	\$866,849	\$110,052	\$976,901
Undeveloped area in excess of 1 acre	\$0	\$0	\$6,111	\$164,327	\$170,438	\$92,192	\$262,630
Light development	\$479,028	\$305,107	\$12,516	\$73,677	\$870,328	\$188,815	\$1,059,143
Moderate development	\$6,048,951	\$3,852,751	\$158,049	\$5,044,155	\$15,103,906	\$2,384,268	\$17,488,174
Heavy development	\$2,657,655	\$1,692,737	\$69,440	\$535,975	\$4,955,807	\$1,047,547	\$6,003,353
Very heavy development	\$4,086,745	\$2,602,965	\$106,780	\$351,970	\$7,148,460	\$1,610,840	\$8,759,300
Waterfront Parcels							
Undeveloped area <= than 1 acre	\$0	\$10,658	\$437	\$1,679	\$12,774	\$6,596	\$19,370
Undeveloped area in excess of 1 acre	\$0	\$0	\$150	\$13,150	\$13,300	\$2,264	\$15,564
Light development	\$0	\$32,456	\$1,331	\$0	\$33,788	\$20,086	\$53,874
Moderate development	\$0	\$10,155	\$417	\$3,078	\$13,649	\$6,284	\$19,933
Heavy development	\$0	\$103,050	\$4,227	\$8,860	\$116,137	\$63,772	\$179,909
Very heavy development	\$0	\$1,028,250	\$42,181	\$5,129	\$1,075,560	\$636,330	\$1,711,890
Streets	\$3,709,461	\$2,362,663	\$96,922	\$0	\$6,169,046	(\$6,169,046)	\$0
TOTAL	\$17,261,044	\$12,178,624	\$505,857	\$6,604,517	\$36,550,042	\$0	\$36,550,042

RATE DESIGN

The revenue requirements and cost of service analyses described in the preceding sections of this report provide a basis for the design of surface water rates. Rate design involves the development of a rate schedule for each user class to recover the annual cost of service determined for each user class. This subsection of the report presents a schedule of rates for the Department's user classes, and analyzes the impact of the proposed changes in cost allocation and rate design on the user classes.

Surface Water Rates

Table 2-15 shows the surface water rates for 2019 and 2020. Cost of service rates will be phased in over time. The area charge for the moderate development category includes the LIE/LID discount costs since only residential customers benefit from the assistance program.

Table 2-15
Surface Water Rates

Development Categories	2019		2020	
	Monthly Fixed	Area Charge per 500 sqft	Monthly Fixed	Area Charge per 500 sqft
Undeveloped area <= than 1 acre	\$8.10	\$0.2899	\$8.36	\$0.2921
Undeveloped area in excess of 1 acre	\$8.10	\$0.0616	\$8.36	\$0.0614
Light development	\$8.10	\$0.9015	\$8.36	\$0.9324
Moderate development	\$8.10	\$1.2393	\$8.36	\$1.2886
Heavy development	\$8.10	\$1.8224	\$8.36	\$1.8824
Very heavy development	\$8.10	\$2.4394	\$8.36	\$2.5216
Waterfront Properties				
Undeveloped area <= than 1 acre	\$8.10	\$0.1463	\$8.36	\$0.1493
Undeveloped area in excess of 1 acre	\$8.10	\$0.0616	\$8.36	\$0.0614
Light development	\$8.10	\$0.4505	\$8.36	\$0.4770
Moderate development	\$8.10	\$0.6300	\$8.36	\$0.6693
Heavy development	\$8.10	\$0.9118	\$8.36	\$0.9572
Very heavy development	\$8.10	\$1.2210	\$8.36	\$1.2819

Customer Impacts

Consistent with the cost of service analysis, there are changes in the cost allocations to different parameters, and it is expected that individual customers as well as customer classes will experience different impacts based on their water usage and their strength categories. **Table 2-16** below shows the difference between the bills in 2019 and 2020 with the current bills for the average residential customer with an average parcel size of 7,000 square feet for both non-waterfront and waterfront properties. The table also shows the impacts at various parcel sizes and development categories to illustrate the range of impacts of the surface water rates. As **Table 2-16** illustrates, the impacts for 2019 and 2020 range from 3.3 percent to 4.9 percent.

Table 2-16
Customer Impacts

	Billable Area	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
Residential Average Lot	7,000	\$24.53	\$25.45	\$26.40	3.8%	3.7%
Residential Waterfront (WF) Lot	7,000	\$16.15	\$16.92	\$17.73	4.8%	4.8%
Light development	10,000	\$25.27	\$26.13	\$27.01	3.4%	3.4%
Heavy development	25,000	\$96.07	\$99.22	\$102.48	3.3%	3.3%
Very heavy development	50,000	\$243.84	\$252.04	\$260.52	3.4%	3.4%
Light development - WF	10,000	\$16.35	\$17.11	\$17.90	4.6%	4.6%
Heavy development - WF	25,000	\$51.27	\$53.69	\$56.22	4.7%	4.7%
Very heavy development - WF	50,000	\$124.15	\$130.20	\$136.55	4.9%	4.9%

SECTION 3 – SOLID WASTE MANAGEMENT

SOLID WASTE SYSTEM

The solid waste utility provides garbage, recycling, and yard waste services for residential and commercial customers. In addition, the utility provides a recycling center, a hazardous waste facility, and a Call-2-Haul program.

Current Solid Waste Rates

Residential customers are currently charged a monthly fixed charge for all garbage, recycling, and yard waste services, depending on the size of the garbage containers. The impact of the changes in the marketability of recyclables is not included in the rates for 2019-2020 as noted in the “Assumptions” found on page 2 of this report. The Department offers four container sizes: 30 gallons, 60 gallons and 90 gallons in addition to combinations of can sizes: 60x2 gallons, 60+90 gallons, and 90x2 gallons. The monthly rate includes EOW pickups; additional pickups are charged a \$10 fee per pickup. Eligible LID/LIE customers receive 30 percent off the residential solid waste rates.

Commercial customers are charged either a monthly rate or a per haul rate, depending on the size of the containers. Additionally, large containers are charged a monthly rental fee. Commercial customers with a monthly charge include weekly pickups. Fees for additional pickups vary based on the size of the container. Additional services such as Call-2-Haul, yard waste and food recycling are charged additional fees. **Table 3-1** shows the current solid waste rates for residential and commercial customers.

Table 3-1
Current Solid Waste Rates

Residential	2018
Container Size	
30-gallon	\$21.93
45-gallon	\$32.89
60-gallon	\$43.85
90-gallon	\$65.78
2 60-gallon	\$87.69
60-gallon and 90-gallon	\$109.63
2 90-gallon	\$131.57

Table 3-1
Current Solid Waste Rates (continued)

Commercial Barrel		2018
Container Size	Monthly Rate	Rent*
20-gallon	\$28.36	\$0.00
30-gallon	\$37.35	\$0.00
60-gallon	\$56.90	\$0.00
90-gallon	\$77.70	\$0.00
300-gallon	\$166.05	\$4.00

* plus sales tax on container rent

Front-Load Containers		2018
Box Size	Monthly Rate	Rent*
1 cubic yard	\$170.52	\$4.85
2 cubic yard	\$228.24	\$7.80
3 cubic yard	\$290.17	\$8.90
4 cubic yard	\$352.52	\$10.60
6 cubic yard	\$475.78	\$13.85
8 cubic yard	\$600.26	\$15.30

* plus sales tax on container rent

Drop-Off Box Containers		2018
Box Size	Monthly Rate	Rent*
15 cubic yard	\$547.08	\$38.90
20 cubic yard	\$638.77	\$42.45
25 cubic yard	\$731.34	\$43.25
30 cubic yard	\$826.40	\$46.05
40 cubic yard	\$1,012.79	\$52.15

* plus sales tax on container rent

2018	
Commercial Recycling	
Mixed - up to 90gal	
Bi-weekly	\$6.50
Weekly	\$13.00
2 hauls/week	\$26.00
3 hauls/week	\$39.00
4 hauls/week	\$52.00
Daily	\$65.00

Table 3-1
Current Solid Waste Rates (continued)

	2018
Mixed - 2 YD	
Bi-weekly	\$39.00
Weekly	\$65.00
2 hauls/week	\$130.00
Glass	
Bi-weekly	\$25.00
Weekly	\$45.00
2 hauls/week	\$90.00
3 hauls/week	\$135.00
Cardboard	
Bi-weekly	\$20.00
Weekly	\$40.00
2 hauls/week	\$80.00
3 hauls/week	\$120.00
4 hauls/week	\$160.00
Yard Waste - 90 gal	
Bi-weekly	\$8.00
Weekly	\$16.00
Food Waste - 90 gal	
Weekly	\$16.00
2 hauls/week	\$32.00
Food Waste - 2 YD	
Weekly	\$71.82
2 hauls/week	\$143.64
Yard Waste - 2 YD	
Hauls/Pick ups	\$50.00
Self-Haul Garbage Services	2018
Up to 400 lbs/Minimum	
Tacoma Residents	\$20.00
Non-Residents	\$20.00
Commercial	\$20.00
Non-Profit	\$20.00
Charge per 100-lbs	
Tacoma Residents	\$7.25
Non-Residents	\$7.25
Commercial	\$7.25
Non-Profit	\$3.63

Customer Information

Solid waste customer accounts and pickups information for 2017 are used as the basis for projecting revenues. The Department does not expect any growth to occur during the six-year period as the Department is essentially built out. As shown in **Table 3-2**, approximate 78.4 percent of the customer accounts are residential customers, accounting for approximately 68.7 percent of the total pickups during the year. Within the commercial accounts, barrel containers account for 7.0 percent of the total accounts and 14.8 percent of the total pickups.

Table 3-2
Current Solid Waste Customer Accounts and Pickups

Customer Class	Accounts	Annual Pickups
Residential	54,472	1,434,706
Commercial		
Barrel Containers	4,892	307,991
Front-load containers	1,097	63,724
Drop-off box containers	483	4,971
Front-load compactor containers	68	4,113
Drop-off box compactor containers	244	4,067
Commercial Recycling	8,240	267,386
TOTAL	69,496	2,086,958

FINANCIAL PLAN

A review of a utility's revenue requirements is a key first step in the rate design process. The review involves an analysis of annual operating revenues under the current rates, capital revenues, operation and maintenance (O&M) expenses, capital expenditures, transfers between funds, and reserve requirements. This subsection of the report provides a discussion of the projected revenues, O&M expenditures, CIP, debt service requirements, and the revenue adjustments required to ensure the financial stability of the solid waste utility.

Solid Waste System Revenues

The Department's solid waste utility derives its required annual operating and non-operating revenues from a number of sources. The principal source of operating revenues is the solid waste service charges from the Department's users. Other operating revenue includes customer fees, salvage revenue, and other miscellaneous revenues. Non-operating revenue sources include investment earnings, rental income, etc.

Table 3-3 presents the details of the operating and non-operating revenues.

Table 3-3
Solid Waste Revenue at Existing Rates

Revenue at Existing Rates	2019	2020	2021	2022	2023	2024
Operating Revenues						
ENV-4270 Customer Fee Revenue	\$200,000	\$200,000	\$205,000	\$210,125	\$215,378	\$220,763
ENV-4560 Service Revenue	\$185,000	\$189,000	\$193,725	\$198,568	\$203,532	\$208,621
ENV-4590 Solid Wst Commercial Recycl Revenue	\$1,636,000	\$1,636,000	\$1,636,000	\$1,636,000	\$1,636,000	\$1,636,000
ENV-4600 Solid Wst Container Rental Revenue	\$456,971	\$456,971	\$456,971	\$456,971	\$456,971	\$456,971
ENV-4610 Solid Waste Disposal Revenue	\$9,765,880	\$9,765,880	\$9,765,880	\$9,765,880	\$9,765,880	\$9,765,880
ENV-4621 Solid Wst Commercial Collection	\$28,683,521	\$28,683,521	\$28,683,521	\$28,683,521	\$28,683,521	\$28,683,521
ENV-4630 Solid Waste Residential Collec Revenue	\$28,241,641	\$28,241,641	\$28,241,641	\$28,241,641	\$28,241,641	\$28,241,641
ENV-4695 Discount-Aid to Families in Need	(\$97,000)	(\$100,000)	(\$102,500)	(\$105,063)	(\$107,689)	(\$110,381)
ENV-4700 Salvage Revenue	\$500,000	\$500,000	\$512,500	\$525,313	\$538,445	\$551,906
Total Operating Revenues	\$69,572,013	\$69,573,013	\$69,592,738	\$69,612,956	\$69,633,679	\$69,654,921
Non-Operating Revenues/(Expenses)						
ENV-6100 Investment Income	\$531,312	\$528,632	\$523,410	\$523,998	\$556,431	\$579,443
ENV-6300 Rental and Lease Income	\$9,099	\$63,843	\$63,843	\$63,843	\$63,843	\$63,843
Total Non-Operating Revenues/(Expenses)	\$540,411	\$592,475	\$587,253	\$587,841	\$620,274	\$643,286
TOTAL REVENUES	\$70,112,424	\$70,165,488	\$70,179,990	\$70,200,796	\$70,253,954	\$70,298,207

Solid Waste System Expenditures

For sound financial operation of the Department's solid waste system, revenues generated must be sufficient to meet the revenue requirements or cash obligations of the system. Revenue requirements include O&M expenses, CIP expenditures, principal and interest payments on existing debt, and other obligations.

Operations and Maintenance Expenses

O&M expenditures include the cost of operating and maintaining treatment, collection, and disposal facilities. O&M expenses also include the costs of providing technical services such as laboratory services and other administrative costs of the solid waste system such as customer service and billing. These costs are a normal obligation of the system, and are met from operating revenues as they are incurred. The comprehensive forecasted annual O&M expenditures are based upon the Department's budgeted 2019 and 2020 expenditures, adjusted for anticipated changes in operations and the effect of inflation in future years. The CPI assumption for labor and general expenditures is 2.5 percent, for utilities the inflation factor is 4 percent, and for benefits and assessments it is 5 percent. Inflated calculations start in 2021. Projected O&M expenditures for the study period are summarized by functions in **Table 3-4**.

The rate model provides for segregation between cash and non-cash expenses, such as depreciation, which is excluded when revenue requirements are calculated to determine solid waste rates.

Table 3-4
Solid Waste O&M Expenses

O&M Expenses by Cost Center		2019	2020	2021	2022	2023	2024
512000	ES Solid Waste Revenues and Accounting	\$12,044,786	\$12,576,751	\$12,917,044	\$13,267,041	\$13,629,071	\$14,000,088
512005	ES Solid Waste Community Relations	\$266,313	\$276,181	\$283,085	\$290,162	\$297,416	\$304,852
512007	ES Solid Waste Engineering Svcs	\$465,452	\$480,143	\$491,842	\$503,818	\$516,077	\$528,626
512010	ES Solid Waste Billing & Tech Services	\$1,218,282	\$1,253,418	\$1,291,771	\$1,331,433	\$1,372,456	\$1,414,891
512015	ES Solid Waste Assessments	\$5,721,155	\$5,856,766	\$6,149,605	\$6,457,085	\$6,779,939	\$7,118,936
512020	ES Solid Waste Facility Maintenance	\$1,712,598	\$1,767,578	\$1,819,043	\$1,872,156	\$1,926,976	\$1,983,565
512025	ES Solid Waste General Administration	\$3,518,138	\$3,685,458	\$3,791,719	\$3,901,321	\$4,014,381	\$4,131,021
513000	ES Solid Waste Residential Waste	\$2,789,574	\$2,844,334	\$2,924,725	\$3,007,591	\$3,093,015	\$3,181,087
513010	ES Solid Waste Commercial Barrel	\$1,314,876	\$1,343,042	\$1,383,615	\$1,425,525	\$1,468,820	\$1,513,551
513020	ES Solid Waste Commercial Front Load	\$891,506	\$911,591	\$937,176	\$963,541	\$990,712	\$1,018,717
513030	ES Solid Waste Commercial DOB	\$1,409,339	\$1,443,445	\$1,484,919	\$1,527,699	\$1,571,830	\$1,617,362
514010	ES Solid Waste Public Receiving	\$4,156,598	\$4,278,813	\$4,407,392	\$4,540,214	\$4,677,432	\$4,819,210
514050	ES Solid Waste Environmental Systems	\$794,702	\$820,250	\$843,485	\$867,432	\$892,114	\$917,557
514300	ES Solid Waste Res Commingle Recycle	\$3,378,712	\$3,448,850	\$3,547,766	\$3,649,790	\$3,755,031	\$3,863,603
514310	ES Solid Waste Commercial Recycle	\$1,003,289	\$1,028,056	\$1,058,665	\$1,090,285	\$1,122,954	\$1,156,709
514340	ES Solid Waste Recycling Center	\$703,185	\$722,497	\$744,150	\$766,523	\$789,641	\$813,534
514350	ES Solid Waste Yard Waste Diversion	\$3,548,240	\$3,660,208	\$3,758,701	\$3,860,006	\$3,964,210	\$4,071,405
514360	ES Solid Waste Enviro Program Developr	\$685,509	\$716,574	\$735,131	\$754,185	\$773,749	\$793,838
514380	ES Sol Waste Comm Food Waste Recyclir	\$160,556	\$165,304	\$170,310	\$175,486	\$180,837	\$186,370
514500	ES Solid Waste Call-2-Haul	\$477,421	\$491,082	\$506,130	\$521,692	\$537,789	\$554,441
514510	ES Solid Waste Tacoma CARES	\$516,027	\$529,970	\$552,562	\$576,182	\$600,877	\$626,699
514520	ES Solid Waste Hazardous Waste	\$899,341	\$930,276	\$957,305	\$985,196	\$1,013,982	\$1,043,694
515010	ES Solid Waste Off-site Transport	\$9,878,602	\$12,114,818	\$12,426,257	\$12,745,912	\$13,074,007	\$13,410,777
516200	ES Solid Waste NCE Abatement	\$1,535,660	\$1,598,340	\$1,638,299	\$1,679,256	\$1,721,237	\$1,764,268
516210	ES Solid Waste Neighborhood Clean Up	\$96,089	\$100,011	\$102,703	\$105,469	\$108,313	\$111,236
519000	ES Solid Waste Collection Clearing	\$1,029,106	\$1,052,237	\$1,081,550	\$1,111,743	\$1,142,849	\$1,174,895
519010	ES Solid Waste Container Services	\$1,170,394	\$1,198,922	\$1,235,506	\$1,273,335	\$1,312,457	\$1,352,922
TOTAL O&M EXPENSES		\$62,145,591	\$66,075,463	\$68,044,198	\$70,077,775	\$72,180,619	\$74,351,866

Taxes

The solid waste utility is subject to two main types of taxes: a Gross Earnings Tax (GET) assessed by the City of Tacoma and B&O taxes assessed by the State of Washington. The GET tax of 8 percent is assessed on all revenues collected. The B&O wholesale tax of 0.484 percent is assessed on any wholesale revenues. The B&O retail tax of 0.471 percent is assessed on rental revenues. The B&O service tax of 1.5 percent is assessed on all service revenues. Solid waste expenses have been adjusted for the GET and B&O taxes.

Additionally, there are two taxes on customers. The refuse collection tax of 3.6 percent is assessed on all collection and disposal revenues and there is a retail sales tax of 10.1 percent on all container rentals. The refuse collection tax and sales tax are taxes on the customer so these are collected and passed through to the State and deducted from the revenues of the utility.

Capital Improvement Program

The Department has developed a comprehensive solid waste CIP to address current solid waste system needs. As **Table 3-5** indicates, the total estimated solid waste CIP from 2019 to 2024 is \$57.2 million. These projected costs include a five percent annual inflation factor for projects after 2020 due to anticipated increases in construction costs over time. This inflation rate is based on the ENR to ensure the Department has adequate resources reserved to complete the necessary projects.

Table 3-5
Solid Waste Capital Improvement Program

Capital Improvement Plan	2019	2020	2021	2022	2023	2024
Environmental Remediation	\$28,000	\$88,000	\$92,400	\$97,020	\$101,871	\$106,965
Equipment	\$7,328,028	\$2,921,207	\$3,295,163	\$3,459,921	\$3,632,917	\$3,814,562
Containers	\$2,092,324	\$2,161,371	\$2,310,000	\$2,425,500	\$2,546,775	\$2,674,114
Facilities Improvements	\$8,128,991	\$0	\$6,162,450	\$915,075	\$960,829	\$1,008,870
Special Projects (SC)	\$199,678	\$119,876	\$126,000	\$132,300	\$138,915	\$145,861
TOTAL CIP - INFLATED	\$17,777,021	\$5,290,454	\$11,986,013	\$7,029,816	\$7,381,306	\$7,750,372

Major Capital Improvement Financing Plan

Typical CIP funding sources include the following:

System Revenues

Pay-as-you-go revenues

Interest earnings

Capital Financing

Bond proceeds

Grant receipts and contributions

Table 3-6 presents the financing plan to finance the CIP projects over the six-year period from 2019 to 2024.

Table 3-6
Solid Waste Capital Financing Plan

Capital Financing Plan	2019	2020	2021	2022	2023	2024
Total Capital Projects	\$17,777,021	\$5,290,454	\$11,986,013	\$7,029,816	\$7,381,306	\$7,750,372
Total Capital Projects - PAYGO only	\$2,292,002	\$2,281,247	\$2,436,000	\$2,557,800	\$2,685,690	\$2,819,975
Total Capital Projects - Other funding sources	\$15,485,019	\$3,009,207	\$9,550,013	\$4,472,016	\$4,695,616	\$4,930,397
<u>Sources of Funding:</u>						
Debt	\$0	\$0	\$0	\$0	\$0	\$0
Total Sources	\$0	\$0	\$0	\$0	\$0	\$0
Projects Funded by Rates	\$17,777,021	\$5,290,454	\$11,986,013	\$7,029,816	\$7,381,306	\$7,750,372

Debt Service Requirements

Debt service requirements consist of principal and interest payments on existing debt. The Department currently has debt service obligations associated with its outstanding 2015 and 2016 Revenue and Refunding Bonds. **Table 3-7** shows the existing debt service of the solid waste utility.

Table 3-7
Solid Waste Debt Service Schedule

Debt Service	2019	2020	2021	2022	2023	2024
2015 10 YR BONDS	\$2,897,200	\$2,899,200	\$2,898,800	\$2,901,200	\$2,900,700	\$2,899,500
2016 A REF BONDS	\$1,070,700	\$1,070,700	\$1,070,700	\$1,070,700	\$1,070,700	\$1,070,700
2016 B REF BONDS	\$751,250	\$751,250	\$751,250	\$751,250	\$751,250	\$751,250
TOTAL EXISTING DEBT SERVICE	\$4,719,150	\$4,721,150	\$4,720,750	\$4,723,150	\$4,722,650	\$4,721,450
Proposed Debt	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL PROPOSED DEBT SERVICE	\$0	\$0	\$0	\$0	\$0	\$0
TOTAL DEBT SERVICE	\$4,719,150	\$4,721,150	\$4,720,750	\$4,723,150	\$4,722,650	\$4,721,450

Reserves

The Department requires adequate cash reserves to meet operating, capital, and debt service requirements. Operating reserves may be used to meet ongoing cash flow requirements, as well as emergency requirements. An operating cash balance of 90 days of operating expenses is the target in the ESD Financial Policy. This represents three months of working capital. The operating reserve balances and the 60-day minimum and 120-day maximum operating reserve targets are shown in **Table 3-8**. The Department's desired operating reserve level is 90 days of operating expenses.

In addition to the operating reserves, the Department also maintains an RSF, which is used to mitigate spikes in rate increases and better match revenues and expenses. The Department has a target reserve level equal to 10 percent of the total annual rate revenue for the RSF. Interest from reserve funds may be used to finance operations. The reserve levels are projected to meet the minimum required level in all six years of the study period, as shown in **Figure 3-1**.

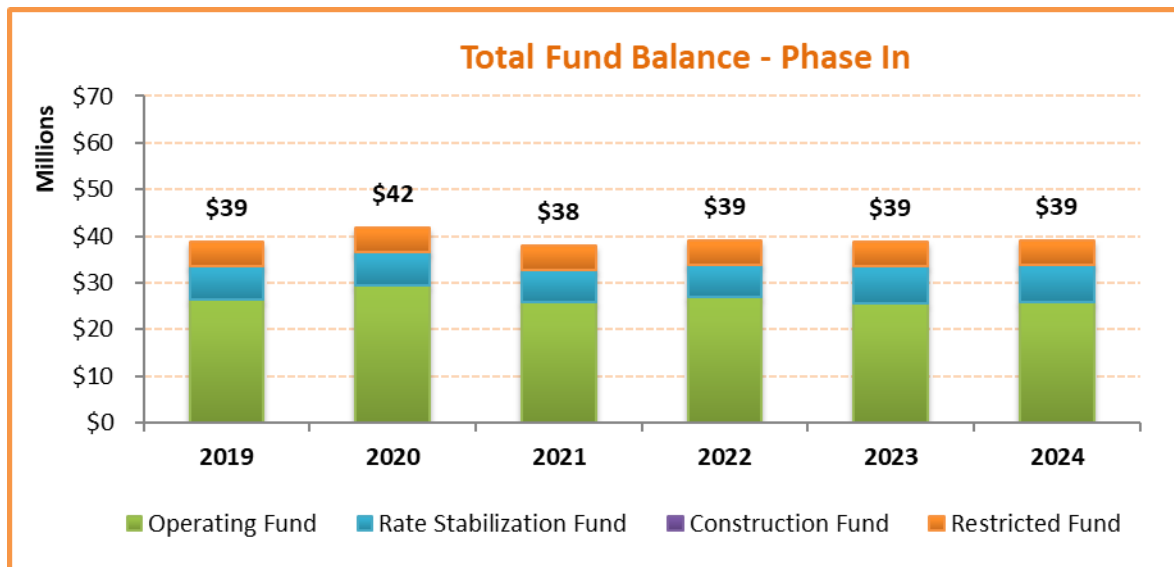
Based on the terms of the debt issued, debt reserves provide protection to bond buyers for one year of debt service payments in times of financial difficulty. These are restricted reserves used only for meeting debt service payments and are shown in the Restricted Fund in **Table 3-8**. Effective with the 2016 bond ordinance, the Department may elect a required reserve of zero for the 2016 and future parity bonds. In 2019, the 2016A&B bond reserves will be available for debt service for a decrease of \$2.6 million.

Table 3-8
Solid Waste Fund/Reserves Balance

Solid Waste Fund/Reserves Balance	2019	2020	2021	2022	2023	2024
Operating Fund						
Beginning Balance	\$33,669,989	\$26,460,167	\$29,492,134	\$25,736,822	\$26,854,274	\$25,574,193
Net Cash Flow	(\$7,232,027)	\$3,031,856	(\$3,755,312)	\$1,117,452	(\$280,080)	\$293,658
Balance Sheet Cash Impacts Other Fund	\$0	\$0	\$0	\$0	\$0	\$0
Transfer from/(to) Rate Stabilization Fund	\$0	\$0	\$0	\$0	(\$1,000,000)	\$0
Transfer from Construction Fund	\$22,204	\$111	\$1	\$0	\$0	\$0
Transfer From/(To) Restricted Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$26,460,167	\$29,492,134	\$25,736,822	\$26,854,274	\$25,574,193	\$25,867,851
<i>Interest Income</i>	<i>\$337,121</i>	<i>\$333,888</i>	<i>\$327,996</i>	<i>\$327,907</i>	<i>\$354,659</i>	<i>\$361,981</i>
Target Balance - Min - 60 days of O&M	\$9,281,888	\$9,927,885	\$10,228,182	\$10,538,555	\$10,859,716	\$11,191,378
Target Balance - Max - 120 days of O&M	\$18,563,775	\$19,855,771	\$20,456,365	\$21,077,110	\$21,719,433	\$22,382,756
Days of O&M	286	210	221	193	182	180
Rate Stabilization Fund						
Beginning Balance	\$7,000,000	\$7,000,000	\$7,000,000	\$7,000,000	\$7,000,000	\$8,000,000
Transfer From/(To) Operating Fund	\$0	\$0	\$0	\$0	\$1,000,000	\$0
Ending Balance	\$7,000,000	\$7,000,000	\$7,000,000	\$7,000,000	\$8,000,000	\$8,000,000
<i>Interest Income</i>	<i>\$70,000</i>	<i>\$70,000</i>	<i>\$70,000</i>	<i>\$70,000</i>	<i>\$75,000</i>	<i>\$80,000</i>
Target Balance - 10% of revenue	\$7,040,661	\$7,251,872	\$7,469,478	\$7,693,614	\$7,924,475	\$8,162,263
Construction Fund						
Beginning Balance	\$22,204	\$111	\$1	\$0	\$0	\$0
Bonds Proceeds	\$0	\$0	\$0	\$0	\$0	\$0
Bonds Used for Capital Projects	\$0	\$0	\$0	\$0	\$0	\$0
Transfer to fund PAYGO	(\$22,204)	(\$111)	(\$1)	(\$0)	(\$0)	(\$0)
Ending Balance	\$0	\$0	\$0	\$0	\$0	\$0
<i>Include Int Income</i>	<i>\$111</i>	<i>\$1</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>	<i>\$0</i>
Restricted Fund						
Beginning Balance	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869
Reserves from New Bonds	\$0	\$0	\$0	\$0	\$0	\$0
Transfer From/(To) Operating Fund	\$0	\$0	\$0	\$0	\$0	\$0
Transfer From/(To) Construction Fund	\$0	\$0	\$0	\$0	\$0	\$0
Ending Balance	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869	\$5,189,869
<i>Interest Income</i>	<i>\$51,899</i>	<i>\$51,899</i>	<i>\$51,899</i>	<i>\$51,899</i>	<i>\$51,899</i>	<i>\$51,899</i>

Figure 3-1 shows the total funds balance and total targets in a graphical format.

Figure 3-1
Projected Total Solid Waste Funds Balance

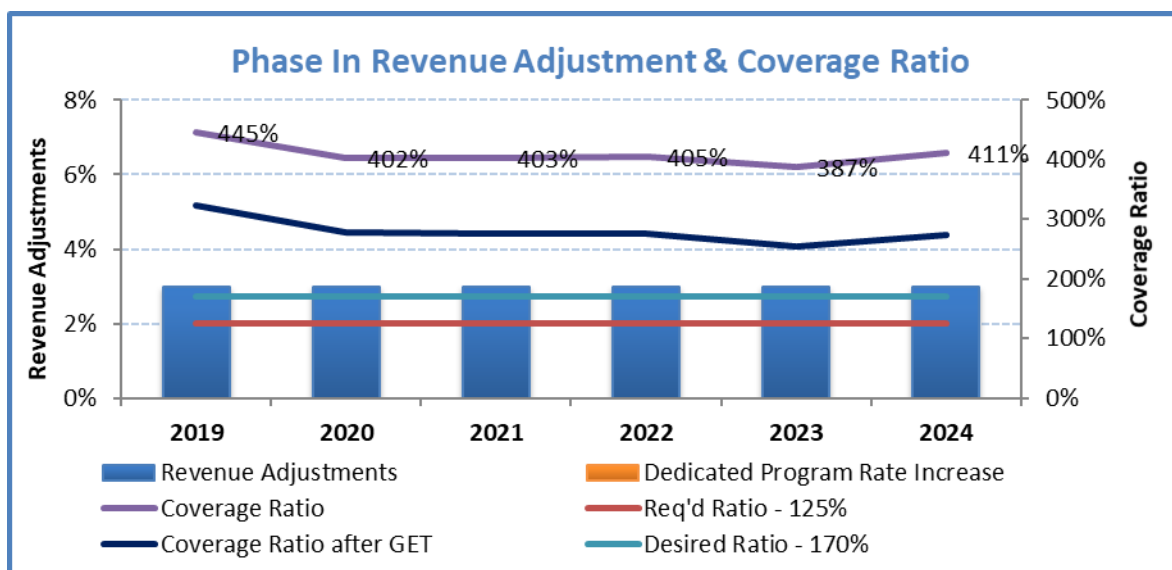


Revenue Adjustments

In order to meet projected revenue requirements, to achieve desired operating and capital reserve fund balances, and to minimize customer impacts, the following revenue adjustments were approved to meet long-term rate stability:

Effective Date	Increases
January 1, 2019	3.0 percent
January 1, 2020	3.0 percent

Figure 3-2
Projected Solid Waste Revenue Adjustments and Debt Coverage



The operating financial plan presented in **Table 3-9** shows the revenues from rates projected over the next six years. The financial plan shows that the solid waste utility will need 3.0 percent per year in additional revenues in years 2021 through 2024 as shown in **Figure 3-2** to meet its revenue requirements in those years.

Table 3-9
Solid Waste Operating Financial Plan

Operating Financial Plan	2019	2020	2021	2022	2023	2024
Revenue at Existing Rates	\$68,784,013	\$68,784,013	\$68,784,013	\$68,784,013	\$68,784,013	\$68,784,013
Total Additional Revenue	\$1,622,600	\$3,734,709	\$5,910,770	\$8,152,126	\$10,460,736	\$12,838,617
Total Rate Revenue	\$70,406,613	\$72,518,721	\$74,694,783	\$76,936,139	\$79,244,748	\$81,622,629
Other Operating Revenue	\$885,000	\$889,000	\$911,225	\$934,006	\$957,356	\$981,290
Record Rate Stabilization	\$0	\$0	\$0	\$0	(\$1,000,000)	\$0
Investment Earnings	\$459,020	\$455,787	\$449,894	\$449,806	\$481,557	\$493,880
Other Non-Operating Revenue	\$9,099	\$63,843	\$63,843	\$63,843	\$63,843	\$63,843
TOTAL REVENUES	\$71,759,732	\$73,927,351	\$76,119,745	\$78,383,794	\$79,747,504	\$83,161,642
EXPENDITURES						
O&M Expenses	\$56,464,816	\$60,394,635	\$62,221,442	\$64,109,543	\$66,063,275	\$68,080,883
Dedicated Program Cost	\$0	\$0	\$0	\$0	\$0	\$0
Existing Debt Service	\$4,719,150	\$4,721,150	\$4,720,750	\$4,723,150	\$4,722,650	\$4,721,450
Proposed Debt Service	\$0	\$0	\$0	\$0	\$0	\$0
Proposed SRF Loan	\$0	\$0	\$0	\$0	\$0	\$0
Capital PAYGO (funded by rates)	\$17,777,021	\$5,290,454	\$11,986,013	\$7,029,816	\$7,381,306	\$7,750,372
TOTAL EXPENDITURES	\$78,960,987	\$70,406,239	\$78,928,205	\$75,862,509	\$78,167,232	\$80,552,705
NET CASH FLOW	(\$7,201,255)	\$3,521,111	(\$2,808,459)	\$2,521,285	\$1,580,273	\$2,608,937

Debt Service Coverage

The Department must meet debt coverage requirements on its outstanding bond issues. Coverage requirements typically vary between 100 percent and 160 percent or higher. The Department has a required debt coverage is 125 percent, which means that the Department's adjusted net system revenues shall amount to at least 125 percent of the annual debt service. The system revenues include funds derived from the ownership and operation of the system including solid waste service charges from the Department's users, miscellaneous service charges, revenue received from contracts, interest income, and other non-operating revenues. Annual debt service includes annual principal and interest payments on outstanding debt. With the projected revenue adjustments and refunding schedule, the Department expects to meet the coverage requirement during all six years, as shown in **Table 3-10**, and in **Figure 3-2** above.

Table 3-10
Solid Waste Debt Service Coverage Calculation

Debt Coverage Calculation	2019	2020	2021	2022	2023	2024
Revenues						
Operating Revenue	\$71,260,841	\$72,918,466	\$74,659,155	\$76,466,311	\$78,341,751	\$80,288,640
Non-Operating Revenue (Excl. Cash Flc	\$468,230	\$519,630	\$513,737	\$513,649	\$545,400	\$557,723
Transfer from/(to) Rate Stabilization	\$0	\$0	\$0	\$0	(\$1,000,000)	\$0
Total Revenues	\$71,729,072	\$73,438,096	\$75,172,892	\$76,979,960	\$77,887,151	\$80,846,363
Expenses						
O&M Expenses	\$50,724,038	\$54,480,447	\$56,131,862	\$57,838,840	\$59,603,475	\$61,427,952
Dedicated Program Cost	\$0	\$0	\$0	\$0	\$0	\$0
Non-Operating Expenses	\$0	\$0	\$0	\$0	\$0	\$0
Total Expenses	\$50,724,038	\$54,480,447	\$56,131,862	\$57,838,840	\$59,603,475	\$61,427,952
Net Revenue	\$21,005,034	\$18,957,649	\$19,041,030	\$19,141,120	\$18,283,677	\$19,418,411
Total Debt Service	\$4,719,150	\$4,721,150	\$4,720,750	\$4,723,150	\$4,722,650	\$4,721,450
Coverage Ratio After Rate Stabilization	445%	402%	403%	405%	387%	411%
Coverage Ratio Before Rate Stabilization	445%	402%	403%	405%	408%	411%
Coverage After Rate Stabilization and GE	324%	277%	276%	275%	254%	274%
Required Coverage	125%	125%	125%	125%	125%	125%
Desired Coverage Ratio	170%	170%	170%	170%	170%	170%

COST OF SERVICE ANALYSIS

The process for cost of service analysis for solid waste is similar to that for wastewater and surface water. First, the revenue requirements from rates are determined. Expenses are then allocated to different cost functions such as collection, disposal, recycling and yard waste, user, and general. After conducting the cost of service analysis, the department found that the results would cause a significant change to the allocation of costs among customer classes. After a thorough review of the cost allocation process, the

Department determined that rate adjustments would be implemented over time to smooth changes in rates.

RATE DESIGN

Solid Waste Rates

The Department has completed both the move to residential volume based garbage collection rates and the EOW collection schedule. Cost of service rate adjustments will be implemented over time. **Table 3-11** shows the approved rates for 2019 and 2020.

Table 3-11
Solid Waste Rates

Residential		2019	2020	
Container Size				
30-gallon		\$22.79	\$23.69	
45-gallon		\$34.18	\$35.53	
60-gallon		\$45.58	\$47.38	
90-gallon		\$68.37	\$71.06	
2 60-gallon		\$91.14	\$94.73	
60-gallon and 90-gallon		\$113.94	\$118.42	
2 90-gallon		\$136.75	\$142.13	
Commercial Barrel		2019	2020	
Container Size	Monthly Rate	Rent*	Monthly Rate	Rent*
20-gallon	\$28.71	\$0.00	\$29.06	\$0.00
30-gallon	\$37.71	\$0.00	\$38.08	\$0.00
60-gallon	\$58.19	\$0.00	\$59.51	\$0.00
90-gallon	\$79.76	\$0.00	\$81.88	\$0.00
300-gallon	\$166.05	\$4.00	\$166.05	\$4.00
* plus sales tax on container rent				
Front-Load Containers		2019	2020	
Box Size	Monthly Rate	Rent*	Monthly Rate	Rent*
1 cubic yard	\$171.62	\$4.85	\$172.72	\$4.85
2 cubic yard	\$229.24	\$7.80	\$230.25	\$7.80
3 cubic yard	\$290.67	\$8.90	\$291.17	\$8.90
4 cubic yard	\$352.96	\$10.60	\$353.40	\$10.60
6 cubic yard	\$475.78	\$13.85	\$475.78	\$13.85
8 cubic yard	\$600.26	\$15.30	\$600.26	\$15.30
* plus sales tax on container rent				

Table 3-11
Solid Waste Rates (continued)

Drop-Off Box Containers	2019		2020	
Box Size	Monthly Rate	Rent*	Monthly Rate	Rent*
15 cubic yard	\$558.67	\$38.90	\$570.51	\$38.90
20 cubic yard	\$645.46	\$42.45	\$652.22	\$42.45
25 cubic yard	\$737.59	\$43.25	\$743.90	\$43.25
30 cubic yard	\$834.80	\$46.05	\$843.29	\$46.05
40 cubic yard	\$1,023.63	\$52.15	\$1,034.58	\$52.15

* plus sales tax on container rent

	2019	2020
Commercial Recycling		
Mixed - up to 90gal		
Bi-weekly	\$6.70	\$6.95
Weekly	\$13.40	\$13.85
2 hauls/week	\$26.80	\$27.65
3 hauls/week	\$40.20	\$41.45
4 hauls/week	\$53.60	\$55.25
Daily	\$66.95	\$69.00
Mixed - 2 YD		
Bi-weekly	\$40.20	\$41.45
Weekly	\$66.95	\$69.00
2 hauls/week	\$133.90	\$137.95
Glass		
Bi-weekly	\$25.00	\$25.00
Weekly	\$45.00	\$45.00
2 hauls/week	\$90.00	\$90.00
3 hauls/week	\$135.00	\$135.00
Cardboard		
Bi-weekly	\$20.00	\$20.00
Weekly	\$40.00	\$40.00
2 hauls/week	\$80.00	\$80.00
3 hauls/week	\$120.00	\$120.00
4 hauls/week	\$160.00	\$160.00
Yard Waste - 90 gal		
Bi-weekly	\$8.00	\$8.00
Weekly	\$16.00	\$16.00

Table 3-11
Solid Waste Rates (continued)

	2019	2020
Commercial Recycling		
Food Waste - 90 gal		
Weekly	\$16.00	\$16.00
2 hauls/week	\$32.00	\$32.00
Food Waste - 2 YD		
Weekly	\$71.82	\$71.82
2 hauls/week	\$143.64	\$143.64
Yard Waste - 2 YD		
Hauls/Pick ups	\$50.00	\$50.00
Self-Haul Garbage Services		
	2019	2020
Up to 400 lbs/Minimum		
Tacoma Residents	\$20.00	\$20.00
Non-Residents	\$20.00	\$20.00
Commercial	\$20.00	\$20.00
Non-Profit	\$20.00	\$20.00
Charge per 100-lbs		
Tacoma Residents	\$7.25	\$7.25
Non-Residents	\$7.25	\$7.25
Commercial	\$7.25	\$7.25
Non-Profit	\$3.63	\$3.63

Impacts

Table 3-12 shows the impacts of the 3.0 percent annual increase on residential customers with different bin sizes within the Department's service area.

Table 3-12
Residential Customer Impacts

Container Size	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
30 gal	\$21.93	\$22.79	\$23.69	3.9%	3.9%
45 gal	\$32.89	\$34.18	\$35.53	3.9%	3.9%
60 gal	\$43.85	\$45.58	\$47.38	3.9%	3.9%
90 gal	\$65.78	\$68.37	\$71.06	3.9%	3.9%
2X60 gal	\$87.69	\$91.14	\$94.73	3.9%	3.9%
60+90 gal	\$109.63	\$113.94	\$118.42	3.9%	3.9%
2X90 gal	\$131.57	\$136.75	\$142.13	3.9%	3.9%

Table 3-12
Commercial Customer Impacts

Container Size	Current Bill	2019 Bill	2020 Bill	Δ from Prior Year	Δ from Prior Year
90-gal	\$77.70	\$79.76	\$81.88	2.7%	2.7%
300-gal	\$170.05	\$170.05	\$170.05	0.0%	0.0%
4 cubic yard	\$363.12	\$363.56	\$364.00	0.1%	0.1%
8 cubic yard	\$615.56	\$615.56	\$615.56	0.0%	0.0%
20 cubic yard	\$681.22	\$687.91	\$694.67	1.0%	1.0%
30 cubic yard	\$872.45	\$880.85	\$889.34	1.0%	1.0%