Skagit PUD

Rate Study and System Development Fee Update

FINAL REPORT
November 2019

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Section I. INTRODUCTION

In 2018 and 2019, Public Utility District No. 1 of Skagit County (the PUD) engaged FCS GROUP to perform a comprehensive rate study and system development fee update. The goal of this study was to establish a blueprint for achieving strong financial performance in the future and ensuring that the structure of the PUD rates is fair and reasonable. The scope of the project included the following key elements:

- Review fiscal policies.
- Project long-term capital needs and incorporate these needs into a long-term funding strategy.
- Assess revenue needs for a multi-year period that includes adequate funding for operations and maintenance, system reinvestment, and other program activities.
- Use industry standard methodologies to establish a defensible basis for assigning an equitable share of the rate burden to classes of utility customers.
- Develop and recommend rate structures that generate sufficient revenue to meet the utility's financial obligations on a stand-alone basis.
- Review and update the system development fee for connection to the PUD system.

The methodology, key factors, conclusions and recommendations for each area of the study are summarized in this executive level report. The full rate study worksheets can be found in the Excel model provided to the PUD.

Section II. RATE STUDY METHODOLOGY

II.A. RATE SETTING PRINCIPLES AND METHODOLOGY

The methods used to establish user rates are based on principles that are generally accepted and widely followed throughout the water industry. These principles are designed to produce rates that equitably recover costs from each class of customer by setting the appropriate level of revenue to be generated from ratepayers and establishing a rate structure to equitably collect those revenues.

The primary tasks of the rate study are listed below:

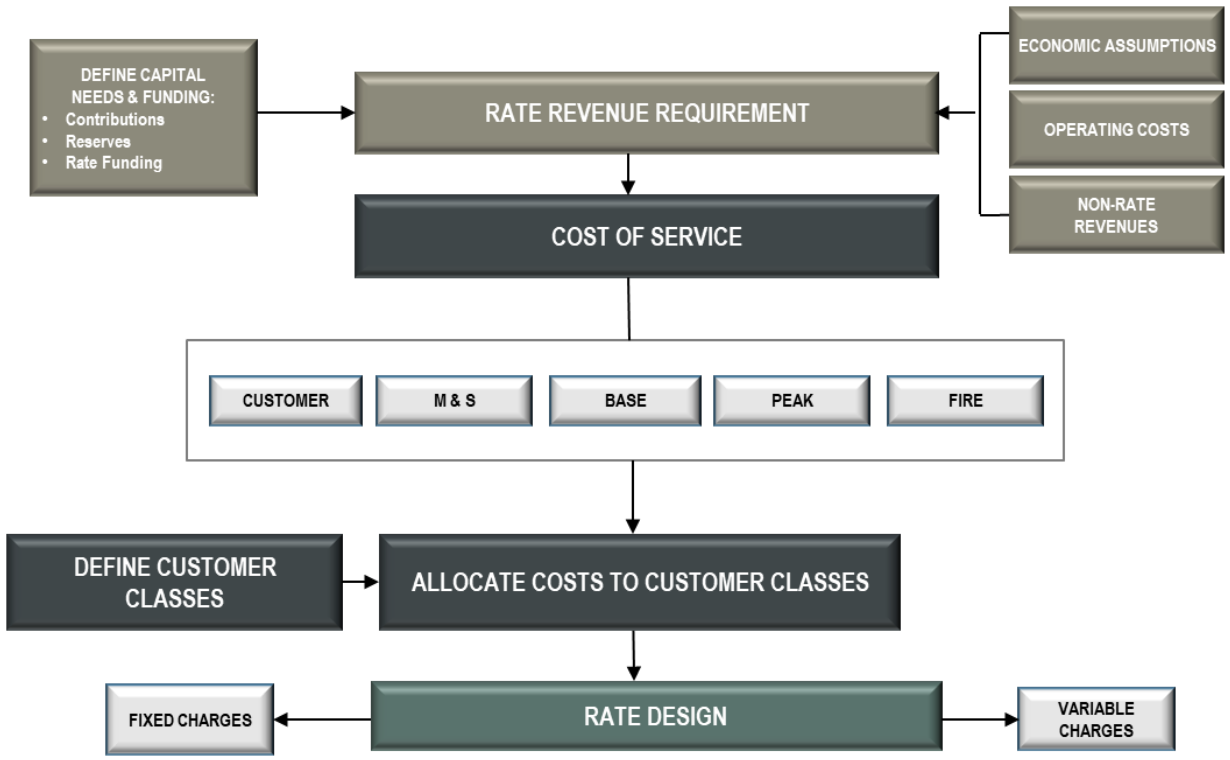
Revenue Requirement Analysis. This analysis identifies the total revenue requirement to fully fund the system on a stand-alone basis, considering operating and maintenance expenditures, capital funding needs, debt requirements and fiscal policy objectives.

Cost of Service Analysis. This analysis equitably distributes costs to customer classes based on their proportional demand and use of the system.

Rate Design Analysis. This analysis includes the development of rates that generate sufficient revenue to meet the system forecast needs and also address PUD policy objectives such as conservation or revenue stability.

Exhibit 1 illustrates the entire rate study process.

Exhibit 1: Overview of the Rate Study Process



II.B. REVENUE REQUIREMENT

A revenue requirement analysis forms the basis for a long-range financial plan and multi-year rate management strategy. It also enables the PUD to set utility rates that fully recover the cost of operating the system: capital improvement and replacement, operations, maintenance, general administration, fiscal policy attainment, cash reserve management, and debt repayment. Linking rates to a financial plan helps to ensure not only sound financial performance for PUD funds but also a reasonable relationship between the costs imposed on utility customers and the costs incurred to provide the service.

A revenue requirement analysis includes the following elements:

Fiscal Policy Analysis. Identifies formal and informal fiscal policies of the PUD, with particular focus on policies that affect the revenue requirement: reserves, rate-funded capital replacement funding, and debt policies.

Capital Funding Strategy. Defines a strategy for funding the PUD's capital improvement program, including an analysis of available resources from rate revenues, debt financing, and any special resources that may be readily available (e.g., grants, outside contributions, etc.).

Operating Forecast. Identifies future annual non-capital costs associated with the operation, maintenance, and administration of the system.

Sufficiency Testing. Evaluates the sufficiency of existing rate revenues in meeting all financial obligations, including any coverage requirements associated with long-term debt.

Strategy Development. Designs a forward-looking strategy for adjusting rates to fully fund all financial obligations over the projection period.

II.C. COST OF SERVICE

The purpose of a cost of service analysis is to provide a rational basis for distributing the full costs of the utility service to each class of customers in proportion to the demands they place on the system. Detailed cost allocations, along with appropriate customer class designations, help to sharpen the degree of equity that can be achieved in the resulting rate structure design. The key analytical steps of the cost of service analysis are as follows:

Functional Cost Allocation. Apportions the annual revenue requirement to the major functions of the water system:

- Base (average use),
- Peak (highest use),
- Meters & services (reading and servicing meters),
- Fire protection (fire specific costs), and
- Customer (general customer costs).

Customer Class Designation. Identifies the customer classes that will be evaluated as part of the study. Existing as well as new or revised customer classes or class definitions may be considered. It is appropriate to group customers that exhibit similar usage characteristics and service requirements.

Cost Allocation. Allocates the costs from the functional cost allocation to different customer classes based on their unique demands for each service as reflected in system planning documents and customer billing data. The results identify recommended shifts in cost recovery by customer class from that experienced under the existing rate structure.

II.D. RATE DESIGN

The principal consideration of rate design is that the rate structure generates sufficient revenue for the system in a manner that is reasonably commensurate with the cost of providing service to individual customers. The pricing structure is largely dictated by the objectives of the system. Most rate designs consist of some combination of fixed and variable charges. Fixed charges are often based on meter size, which is an indicator of a particular customer's potential demand for water service. Variable charges based on metered water usage often reflect other policy objectives such as water conservation or providing a basic amount of water each month to single family residential customers at a reduced "lifeline" rate.

Section III. Revenue Requirement

III.A. Introduction

Skagit PUD owns, operates and maintains domestic water supply, treatment, storage and transmission/distribution systems that provide potable water to its customer base of approximately 26,000 connections. As the largest water system in Skagit County, the PUD maintains over 600 miles of pipelines providing approximately nine million gallons of water to about 65,000 people every day. The PUD ensures that the water provided meets state and federal standards.

The revenue requirement analysis has two parts: a capital funding strategy that describes how planned capital improvements will be financed over time; and an annual forecast that focuses on future ongoing costs, including debt service that results from the capital funding strategy.

III.B. Capital Funding Strategy

The PUD is anticipating $278.1 million in capital costs from 2019 through 2038. The projects include: two new transmission lines for the Judy system (Mount Vernon and Sedro Woolley), distribution pipeline projects, annual fiber installation program, water treatment plant and campus facility upgrades, meter replacements and annual pipe replacements. Capital funding sources include cash balances (including interest), system development fee revenues, remaining Public Works Trust Fund (PWTF) loan proceeds, annual cash-funded capital reinvestment funding, excess cash flow above the operating reserve target, and revenue bond proceeds.

In order to fund the capital program of $278.1 million (in escalated dollars) over the twenty-year study period, two revenue bonds with bond proceeds totaling $52.3 million are assumed ($37.1 million in 2020 and $15.2 million in 2022).

Exhibit 2 is a summary of capital funding sources. A detailed capital plan can be found in the Excel model provided to the PUD.

Exhibit 2: Capital Funding Summary

Funding Summary	2019	2020	2021	2022	2023	2024	2025-2038	Total
Total Capital Costs	**$ 17,724,336**	**$ 22,913,608**	**$ 34,031,660**	**$ 22,151,962**	**$ 13,193,333**	**$ 8,730,844**	**$ 159,322,706**	**$ 278,068,449**
Funding Sources								
System Reinvestment	$ 3,474,336	$ 3,041,608	$ 2,339,468	$ 2,610,810	$ 2,693,497	$ 3,089,334	$ 74,358,041	**$ 91,607,094**
System Development Fee Revenues	2,050,000	1,700,000	1,700,000	1,700,000	1,700,000	1,700,000	23,800,000	**34,350,000**
Additional Rate/Reserve Funded Capital	12,139,670	2,896,148	7,731,205	4,814,929	6,576,896	3,933,361	53,417,880	**91,510,088**
Interest Earnings	60,330	54,331	382,508	8,217	40,947	8,149	7,746,785	**8,301,266**
Use of Revenue Bond Proceeds*	-	15,221,521	21,878,479	13,018,007	2,181,993	-	-	**52,300,000**
Total Capital Funding	**$ 17,724,336**	**$ 22,913,608**	**$ 34,031,660**	**$ 22,151,962**	**$ 13,193,333**	**$ 8,730,844**	**$ 159,322,706**	**$ 278,068,449**

*Revenue bond issues are projected for 2020 and 2022, with proceeds of $37.1 million and $15.2 million, respectively. This table shows the drawdown of those proceeds.

III.C. Annual Forecast

The purpose of the annual forecast is to determine whether the existing rates and charges are sufficient to recover the costs the PUD incurs to operate and maintain the system. The 2019 budget formed the baseline for this forecast. The annual forecast was developed for the 2019 through 2038 time period. The following list highlights some of the key assumptions in the annual forecast.

III.C.1. Reserves

Operating Reserve. A minimum of 25%, or 90 days, of operating and maintenance (O&M) expenses, per discussion with PUD staff and in line with industry standards. The minimum operating reserve is $3.6 million in 2019 dollars, growing to $6.5 million by 2038.

Capital Contingency Reserve. A minimum of $500,000, meant to represent an emergency repair of system infrastructure, per discussion with PUD staff and in line with industry standards. Capital reserves have two functions. They serve as a type of risk reserve, and they are also a capital funding tool, used to save in advance for future capital project costs. The capital contingency is the risk reserve—the minimum forecast balance. In most years the Major Capital Fund balance will be far higher than the minimum, as the reserve balance fluctuates in order to avoid over-reliance on debt.

III.C.2. Operating Revenue

Retail Rate Revenue. Based on actual detailed customer account and usage statistics from the PUD's billing system. Usage data from 2018 was used to project 2019.

Non-Rate Revenue. Non rate revenue consists of services revenues, work order deposits, rental revenue, investment interest, and other miscellaneous fees (based on budget provided by PUD).

Customer Growth. Throughout the study period, customer growth is forecast at 1.00% annually for the residential and multi-family classes with no growth projected in other classes (based on recent experience at the PUD).

Demand Growth. Throughout the study period, demand growth is forecast at 1.00% annually for the residential and multi-family classes with no growth projected in other classes (based on recent experience at the PUD). When demand is growing at the same rate as customer accounts, the assumption is that user profiles will remain constant and no conservation-based declines in use per account are forecast.

Interest Earnings. A rate of 1.50% per year was used for all years of the forecast period (based on the 2018 Washington Local Government Investment Pool rate).

Services Growth. An inflationary factor of 2.00% annually was used to escalate non-rate revenues associated with services income (based on recent experience of PUD staff).

III.C.3. O&M Expenses

General Cost Inflation. General cost inflation is set at the rounded 2018 Consumer Price Index of 2.50%.

Construction Cost Inflation. Construction costs inflation is set at the rounded three-year average Engineering News Record construction cost index of 3.50%.

Labor Cost Inflation. Labor cost inflation is assumed to be 3.50% for the duration of the study period (based on recent experience of PUD staff).

Benefit Cost Inflation. 8.00% per year for all years throughout the study period (based on recent experience of PUD staff).

Anacortes Rate Inflation. An inflationary factor of 5.00% per year was used to inflate costs associated with water purchased from the City of Anacortes (based on recent experience of PUD).

III.C.4. Debt Service

Existing Debt Service. The utility currently has three outstanding revenue bonds reaching maturity between 2030 and 2037. In addition to revenue bonds the utility also has four public works trust fund loans as well as seven other Department of Ecology and Drinking Water State Revolving Fund loans with repayment occurring between 2022 and 2038. Total existing debt service payments range from $3.3 million in 2019 to $135,000 by 2038.

New Debt Service. The loan repayment schedules for the two planned bond issues are based on a twenty-year term with an interest rate of 5.0% and an issuance cost of 1.5%. New debt service payments range from $3.3 million in 2020, increasing to $4.6 million annually once the second revenue bond is issued in 2022.

III.C.5. System Reinvestment

The concept of system reinvestment funding entails funding long-term infrastructure replacement through a regular commitment of rate revenue. Together with the commitment of excess operating reserves to capital projects, this policy ensures that the PUD is not too reliant on debt as a way of funding capital investment—particularly for routine, predictable capital projects.

Without a formal asset management plan, the most common approach to system reinvestment funding is a provision based on depreciation expense (historical original cost) as the basis for a reasonable level of reinvestment in the system. This strategy and level of funding satisfies several standards for reasonable rates:

- It avoids decline in system asset value (financial integrity);
- It charges customers commensurate with their consumption of facility useful lives and avoids charging customers more than the current cost to provide service (rate equity); and
- It provides a source of funding for replacement (capital funding adequacy).

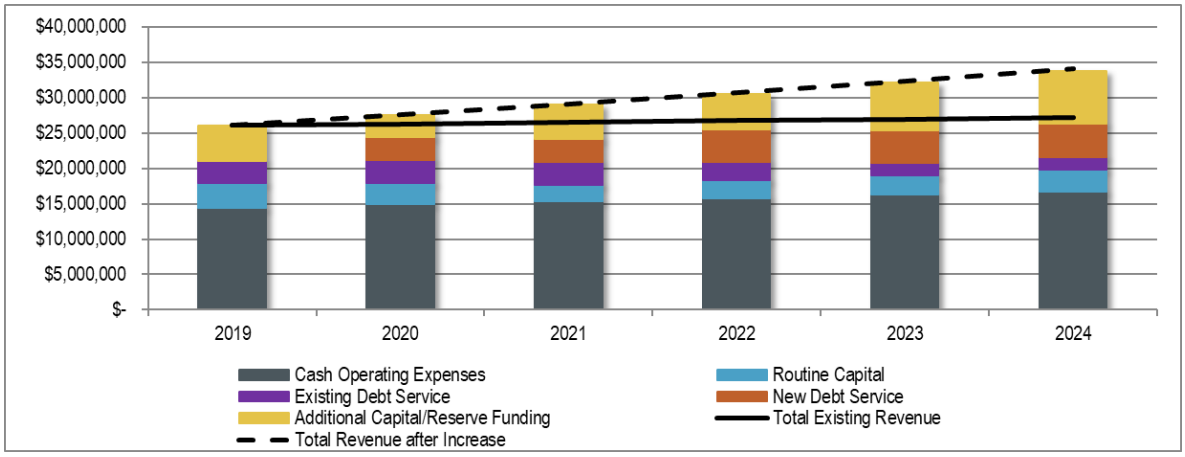
It is important to recognize that because of cost inflation over time, funding system reinvestment based on original cost depreciation will not fully meet future replacement needs (especially for mature systems that are just beginning to address or fund those needs). In order to more closely meet future replacement needs, the level of rate funded capital can be based on assumed replacement costs of original assets. While this method would provide additional rate funded capital, the ideal system reinvestment benchmark is tied to a detailed asset management plan. True replacement costs are generally higher than book values, increasing over time with the cost of labor and materials. Useful lives of assets should be based on condition assessments rather than accounting values. A replacement schedule combined with estimated replacement costs enables jurisdictions to be more informed when setting a level of funding from rates.

This study aligns the system reinvestment target with the annual pipe replacement and routine capital costs as outlined in the PUD capital plan. These costs equate to approximately 50% of annual depreciation funding levels throughout the forecast period and range from a low of $1.7 million to a peak of $7.4 million annually. In addition to the dedicated system reinvestment levels, any cash flow over and above the 90-day operating target is also available for capital projects. When this additional revenue is considered, the PUD is forecast to fund system reinvestment at full depreciation levels in all years of the forecast period.

III.D. REVENUE REQUIREMENT FORECAST RESULTS

The annual forecast components come together to form the multi-year revenue requirement. The revenue requirement compares the overall revenue available to the system to the expenses to evaluate the sufficiency of rates on an annual basis. **Exhibit 3** provides a summary of the revenue requirement findings. The columns represent different types of costs; the lines represent different levels of revenue.

Exhibit 3: Revenue Requirement Summary



Summary of revenue requirement:

- While current rate revenue levels are sufficient to meet existing annual financial obligations, if rates do not increase over the study period, the utility will be faced with the need to delay capital expenditures or issue additional debt to cover these capital expenses.
- The financial plan is completed for a twenty-year time horizon; however, the rate strategy focuses on a shorter five-year window, from 2020 – 2024. To meet the total projected financial obligations of the utility, rate increases are proposed at 5% annually for the five-year time frame.
- The operating fund balance is at the target 90-day level in all years.
- The minimum capital reserve of $500,000 is met or exceeded in all years of the forecast period.
- With 5% annual rate increases, the utility will require $52.3 million in new revenue bond proceeds (from 2022-2024) to fund the $278.1 million capital program.

Section IV. Cost of Service Analysis

A cost of service analysis determines the equitable recovery of costs from customers according to unique demands each class places on the system. There are three main steps to allocate the revenue requirement to customer classes and develop the final rates: 1) allocate utility costs by function, 2) develop allocation factors for customer classes, and 3) allocate costs to customer classes. The methodology used conforms to industry standards as identified by the American Water Works Association (AWWA) Principles of Water Rates, Fees and Charges, M1 Manual.

IV.A. Functional Allocation—Assets

The first step in the cost-of-service analysis is to review and classify PUD plant in service. Assets are assigned to functional categories according to assumed cost causation. The functions of service to which the PUD's assets were allocated are discussed below.

Customer. These are costs associated with serving individual water customers, such as administrative, billing, and customer service costs. These costs are generally uniform by customer regardless of their meter size or demand placed on the water system.

Meters and Services. These costs are associated with the installation, maintenance, and repairs of meters and service lines. These costs are allocated based on number of connections and meter size.

Base Demand. These costs relate to average service provided on demand and are correlated with year-round water consumption.

Peak Demand. These costs relate to providing additional capacity to meet incremental water demand during peak demand periods, which usually occur during the summer months.

Fire Protection. These are costs required to meet minimum fire safety standards. These are mostly incremental costs related to providing storage, transmission capacity, and hydrants for fire protection.

Exhibit 4: Functional Plant (Assets) in Service

Plant in Service	Total Costs	FUNCTIONS OF WATER SERVICE								TOTAL	ALLOCATION BASIS
		CUSTOMER	METERS & SERVICES	BASE	PEAK	FIRE	DIRECT ASSIGNMENT	TAXES	AS ALL OTHERS		
Supply/Treatment	$ 32,157,977	0.00%	0.00%	57.47%	42.53%	0.00%	0.00%	0.00%	0.00%	100.00%	Peak Demand Ratio
Pumping	16,800,673	0.00%	0.00%	57.47%	42.53%	0.00%	0.00%	0.00%	0.00%	100.00%	Pumping
Storage	34,354,983	0.00%	0.00%	53.18%	44.49%	2.33%	0.00%	0.00%	0.00%	100.00%	Storage
Transmission	20,736,596	0.00%	0.00%	57.47%	42.53%	0.00%	0.00%	0.00%	0.00%	100.00%	Transmission
Distribution	108,908,546	0.00%	0.00%	36.85%	27.27%	35.88%	0.00%	0.00%	0.00%	100.00%	Distribution
Meters & Services	26,769,477	0.00%	100.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	Meters & Services
Hydrants	3,245,933	0.00%	0.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%	100.00%	Hydrants
General Plant	19,356,130	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	General Plant
Total Utility Plant	$262,330,314	$ -	$ 26,769,477	$ 98,459,403	$ 74,623,116	$ 43,122,188	$ -	$ -	$ 19,356,130	$262,330,314	
Water Service Functions		0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%		100.00%	
Allocation of "As All Others"		$ -	$ 2,132,545	$ 7,843,603	$ 5,944,725	$ 3,435,257	$ -		$ (19,356,130)	$ -	
TOTAL	**$262,330,314**	**$ -**	**$ 28,902,023**	**$106,303,006**	**$ 80,567,841**	**$ 46,557,445**	**$ -**	**$ -**	**$ -**	**$262,330,314**	
Allocation Percentages		**0.00%**	**11.02%**	**40.52%**	**30.71%**	**17.75%**	**0.00%**	**0.00%**	**0.00%**	**100.00%**	

The functional categories assumed for the major asset classes are as follows:

- **Supply and treatment assets** are allocated based on the ratio of maximum day to average day for the PUD water system (1.74 based on a staff engineer's 2019 analysis). Assets are allocated 57.47% to base demand and 42.53% to peak demand.
- **Pumping assets** are allocated based on a pumping analysis that evaluated each pump in the system and identified the purpose of the pump as meeting average, peak, fire requirements or a combination. The analysis is based on system planning documents and discussions with PUD staff. Assets are allocated 57.47% to base demand and 42.53% to peak demand.
- **Storage assets** are allocated based on a storage analysis that categorized storage into operating, equalizing, emergency/standby, and fire suppression storage. Similar to the pumping analysis, the storage analysis is based on system planning documents and discussion with PUD engineering staff to determine how each storage facility meets the different types of demand. Assets are allocated to 53.18% to base demand, 44.49% to peak demand, and 2.33% to fire.
- **Transmission assets** are allocated based on the ratio of maximum day to average day for the PUD water system (1.74 based on a staff engineer's 2019 analysis). Assets are allocated 57.47% to base demand and 42.53% to peak demand.
- **Distribution assets** are allocated based on an analysis of the transmission and distribution pipe network. Based on discussions with PUD staff, an incremental approach to allocating distribution assets was decided upon as best fitting the purpose of the system. The incremental approach allocates costs to fire protection by assuming that pipes between 6" and 12" have been upsized to meet fire flow standards. Under this approach, the fire increment is considered to be the next largest pipe size. For example, for an 8" pipe, the allocation assumes that 6" is domestic water purposes and the additional 2" is allocated to fire. Similarly, for a 10" pipe, the allocation for domestic is 8" and the remainder allocated for fire. The portion related to this one size increment is calculated by multiplying the length of pipe by the differential in cost between the actual replacement cost and the replacement cost of the next smallest pipe. Under this approach 28.98% of distribution assets are allocated to fire and the remainder is allocated based on the peak demand ratio, resulting in 40.82% to base demand and 30.20% to peak demand.
- **Meters and Service assets** are allocated 100% to the meters and service function.
- **Hydrants** are allocated 100% to fire.
- **General assets** are allocated in proportion to all other plant assets.

The result of the asset allocation is 11.02% allocated to meters & services, 40.52% to base demand, 30.71% to peak demand, and 17.75% to fire. The resulting asset allocation is referred to as the "plant in service" allocation, which is used to allocate many of the annual costs.

IV.B. FUNCTIONAL ALLOCATION—ANNUAL COSTS

The annual test period costs (2019 budget escalated to 2020 dollars) were also grouped by function. The process required assigning each budget line item account to a functional category. The initial allocation applied industry standard approaches, and it was further refined by PUD engineering and

finance staff to ensure that the approach is aligned with PUD system operations. The following summarizes the key allocation assumptions for annual costs:

- **Customer –** The majority of customer service expenses including salaries, materials and supplies, advertising, community relations and postage and shipping are allocated 100% to customer.
- **Meters & Services –** Salaries for meter reading staff are allocated 100% to meters and services.
- **Transmission & Distribution –** Costs associated with transmission and distribution (T&D) maintenance (including salaries, materials and permits) are allocated based on the T&D asset percentages previously developed: 40.82% base, 30.20% peak and 29.98% fire.
- **Supply & Treatment –** Costs associated with supply and treatment (including salaries, power purchased for pumping, chemicals, materials and water purchased from others) are allocated based on the ratio of maximum day to average day for the PUD water system (1.74 based on staff engineer's 2019 analysis). Assets are allocated 57.47% to base and 42.53% to peak.
- **Expenditure Offsets and Developer-Related Costs –** Expenditure offsets for transportation overhead and administrative overhead—as well as expenses related to services, meters, and developer projects—are allocated based on the plant-in-service allocation factor, since these expenses and offsets were deemed to be in support of the system as a whole. Resulting allocations for these line items are 11.02% to meters and services, 40.52% to base, 30.71% to peak and 17.75% to fire.
- **Administration** – All salaries, professional services, insurance, education and related expenses within the administration budget category, as well as the administrative expense overhead offset are assumed to support all operational components of the system and therefore allocated in proportion to all other expenses – 21.75% customer, 9.33% meters and services, 36.87% base, 27.26% peak and 4.79% fire.
- **Taxes –** Allocated in proportion to all other expenses.
- **Existing and New Debt Service –** Allocated as plant in service – 11.02% meters and services, 40.52% base, 30.71% peak and 17.75% fire.
- **Rate Funded System Reinvestment –** Allocated as plant in service – 11.02% meters and services, 40.52% base, 30.71% peak and 17.75% fire.
- **Non-Rate Revenue/Cash Flow Adjustments –** Non-rate revenues consisting of pipe replacement fees, services, work order deposits, and all LUD revenues are allocated as plant in service – 11.02% meters and services, 40.52% base, 30.71% peak and 17.75% fire. The remainder of the non-rate revenues as well as the cash flow adjustments are allocated in proportion to all other revenues/expenses.

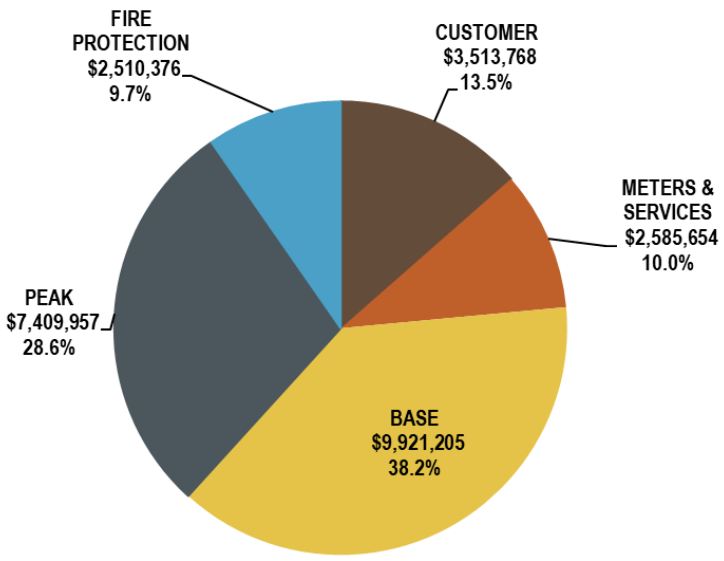
The total rate revenue requirement is calculated by taking the total expenses, deducting non-rate revenue and adding net cash flow resulting from the proposed annual rate increase. A summary of the line-by-line allocation to functional cost pools is shown in **Exhibit 5**.

Exhibit 5: Summary of 2020 Functional Cost Allocation

REVENUE REQUIREMENT	Total Costs	FUNCTIONS OF WATER SERVICE								TOTAL	ALLOCATION BASIS
		CUSTOMER	METERS & SERVICES	BASE	PEAK	FIRE	DIRECT ASSIGNMENT	TAXES	AS ALL OTHERS		
OPERATING AND CAPITAL EXPENSES											
Cash Operating Expenses	$14,883,907	19.94%	8.55%	33.79%	24.99%	4.39%	0.00%	8.34%	0.00%	100.00%	As O&M Expenses
Existing Debt Service	3,244,750	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
New Debt Service	3,290,385	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Rate Funded System Reinvestment	3,041,608	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Total Expenses	**$24,460,649**	**12.13%**	**9.52%**	**36.43%**	**27.23%**	**9.62%**	**0.00%**	**5.07%**	**0.00%**	**100.00%**	
OTHER REVENUES AND ADJUSTMENTS											
Less:											
SDF Revenue Towards Debt Service	$ -	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Interest Earnings: Operating & Debt Reserve Funds	(75,404)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Pipe Replacement Fee	(625,387)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Services	(428,400)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Misc. Operating Revenues	(180,000)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Late Fees	-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Testing	-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Broadband	-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Work Order Deposits (Non-Donated Plant)	(255,000)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Merchandising & Jobbing	-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Rental Revenue	(21,774)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Misc Non-Operating Income	(10,000)	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
LUD Interest Income	(33,000)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
LUD Penalty Income	(5,000)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
LUD Assessments	(127,000)	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Less LUD prior Lien Assessments, Int, Penalties	165,000	0.00%	11.02%	40.52%	30.71%	17.75%	0.00%	0.00%	0.00%	100.00%	As Plant in Service
Plus:											
Additional Taxes Due to Rate Increases	62,122	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Net Cash Flow After Rate Increase	3,014,154	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Adjustment for Partial Year Increase	-	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	100.00%	100.00%	As All Others
Rate Revenue Requirement	$25,940,960	$ 2,967,911	$ 2,183,978	$ 8,379,966	$ 6,258,835	$ 2,120,394	$ -	$ 1,240,778	$ 2,789,098	$25,940,960	
Water Service Functions		13.55%	9.97%	38.25%	28.56%	9.68%	0.00%			100.00%	
Allocation of "As All Other" & "Taxes"		$ 545,857	$ 401,676	$ 1,541,239	$ 1,151,122	$ 389,982	$ -	$ (1,240,778)	$ (2,789,098)	$ -	
Rate Revenue Requirement	**$25,940,960**	**$ 3,513,768**	**$ 2,585,654**	**$ 9,921,205**	**$ 7,409,957**	**$ 2,510,376**	**$ -**	**$ -**	**$ -**	**$25,940,960**	
Allocation Percentages		**13.55%**	**9.97%**	**38.25%**	**28.56%**	**9.68%**	**0.00%**	**0.00%**	**0.00%**	**100.00%**	

The cost allocation indicates that the largest portion of costs, 38.2%, is related to meeting base (average) water demands, followed by 28.6% related to meeting peak water demands. The relative shares are shown in **Exhibit 6.**

Exhibit 6: Functional Cost Allocation Summary



IV.C. CUSTOMER CLASS DISTINCTIONS

Current customer classes in the PUD billing system consist of a residential class (single family and duplex with individual meters), a multifamily class, a commercial class, a government class, a farm class, an irrigation class, a resale class and a fire protection/sprinkler systems class. However, customer classes in billing systems are often aggregated for rate-making purposes, and the PUD is no exception. For the PUD, there is currently rate differentiation only for residential, non-residential, and fire sprinkler customers.

In the cost of service analysis, we looked at allocation factors for the detailed categories defined in the billing system, but when it came to recommending shifts in the relative rate burden, we focus on the three aggregated categories.

IV.D. ALLOCATION FACTORS

Once the customer classes were defined, the functional cost pools from **Exhibit 6** were allocated to these customer classes based on the demand each class places on the system. In order to complete this task, the analysis consisted of first developing allocation factors that identified customer characteristics including number of accounts, consumption levels, peak demand patterns, and fire flow requirements. The allocation factors are intended to equitably allocate total costs to those benefitting from the service. For this study, costs were allocated based on the following:

Customer. Based on the number of customer accounts.

Meters & Services Costs. Based on the number of meter service equivalents (MSE). Because the cost to maintain and replace a meter generally scales up with meter size, a meter service equivalent factor is applied to meters larger than the smallest meter size to represent the increased cost to service the larger meter. Applying the MSE factor allows for equitable cost allocation – customers with larger meters are allocated proportionately more costs. (Note that the MSE factor is different from the meter capacity equivalent factors (MCEs) that are often used to scale up fixed charges or System Development Charges. MCEs are based on the volume of water that can flow through a meter, and it is a steeper curve than MSEs.)

Base Costs. Based on total annual water use.

Peak Costs. Based on the overall system peak bi-month period, which was July/August 2018 from actual usage data for all classes except fire protection/sprinkler systems. The fire protection/sprinkler systems peak cost were allocated based on a maximum fire event of 5,000 gallons per minute for an hour in duration as a portion of the overall peak day production of 15.83 million gallons as reported in Table 4-4 of the 2013 water system plan (WSP). The maximum fire event calculation results in a 1.90% allocation of cost to this class. Peak costs are the only costs allocated to the fire protection/sprinkler system class.

Fire Protection. Based on fire flow gallons per minute (GPM) and duration requirements identified in Table 6-1 of the 2013 WSP. Residential customers require 1,000 GPM for a duration of one hour; most other classes require 1,500 GPM for a duration of one hour. There are no fire flow requirements for the irrigation class. For the fire protection/sprinkler system class, the fire flow requirement is implied by the type of building the sprinklers are located in.

Exhibit 7 summarizes the allocation factors used for the customer classes. Note that the column heading for fire flow requirement is an allocation of *public* fire protection costs—the hydrants, extra pipe capacity, and extra storage capacity need to ensure that the system can deliver water to fight fires. The row heading "fire protection/sprinkler service" is a customer class (sometimes referred to as *private* fire protection) consisting of buildings with sprinkler systems.

Exhibit 7: Customer Allocation Factors

Customer Class	Customer	Meters & Services	Base Total Use (kgals)	System Peak to Average Month	Fire Flow Allocation	
					Accounts	Total kgal per min
Residential	21,934	21,995	1,588,529	2,129,481	21,934	1,316,028
Multifamily	1,253	1,712	477,790	494,250	1,253	112,806
Commercial	1,822	2,668	910,655	1,007,792	1,822	163,945
Farm	116	137	185,737	237,941	116	10,445
Government	190	682	88,161	143,737	190	17,107
Irrigation	315	550	303,177	660,506	315	-
Resale	2	27	47,806	81,640	2	172
Fire Protection / Sprinkler Services	-	-	-	*Max Fire Event*	-	-
Total	**25,632**	**27,770**	**3,601,855**	**4,755,348**	**25,632**	**1,620,503**

Customer Class	Customer	Meters & Services	Base Total Use (kgals)	System Peak to Average Month	Fire Flow Requirement
Residential	85.57%	79.20%	44.10%	43.93%	81.21%
Multifamily	4.89%	6.17%	13.27%	10.20%	6.96%
Commercial	7.11%	9.61%	25.28%	20.79%	10.12%
Farm	0.45%	0.49%	5.16%	4.91%	0.64%
Government	0.74%	2.46%	2.45%	2.97%	1.06%
Irrigation	1.23%	1.98%	8.42%	13.63%	0.00%
Resale	0.01%	0.10%	1.33%	1.68%	0.01%
Fire Protection / Sprinkler Services	0.00%	0.00%	0.00%	1.90%	0.00%
Total	**100.00%**	**100.00%**	**100.00%**	**100.00%**	**100.00%**

The cost of service by class was calculated by multiplying the functional cost pools by the allocation factor distribution percentages. Ultimately, this element of the analysis defines the total annual revenue that should be generated from each class to achieve cost-based recovery from rates.

IV.E. COST OF SERVICE RESULTS

As we noted above, the existing PUD rate structure differentiates only between residential, non-residential, and fire sprinkler customer classes. The non-residential class incorporates the subcategories for multifamily, commercial, farm, government, irrigation and resale customers. The cost-of-service analysis (COSA) results shown below assume this same level of aggregation in defining customer classes for ratemaking purposes. Later we will discuss the potential to separate agricultural customers, but at this point, they are still included with other non-residential customers.

Exhibit 8 compares the distribution of 2020 rate revenue assuming an across-the-board (ATB) increase with the revenue share called for by the cost-of-service allocation (COSA). The rightmost column in this table shows us the relative percentage shift in rate burden that should take place in order to best match the cost of serving these three broad customer classes.

Exhibit 8: Comparison of Current Revenue Distribution to Cost-of-Service Distribution

Class	ATB 2020 *	COSA 2020 **	Difference $	Difference %
Residential	$ 15,189,583	$ 14,649,207	$ (540,376)	-3.56%
Non-Residential	10,462,834	11,019,790	556,956	5.32%
Fire Protection/Sprinkler Systems	156,292	139,713	(16,579)	-10.61%
Total	**$ 25,808,710**	**$ 25,808,710**	**$ 0**	**0.00%**

* ATB = Across-the-Board ** COSA = Cost of Service Analysis

This table shows that in order to reflect the cost of serving each class, residential and fire sprinkler customers should be paying relatively less and non-residential customers should be paying more.

Now, any cost-of-service analysis is a snapshot in time, based on a variety of assumptions that are not exact measures of the relative burden on the system. We sometimes suggest a margin of error of 3-5%, within which a cost-of-service adjustment is a judgment call. This finding for Skagit PUD is not extreme. However, it does indicate the direction of the shift that would be appropriate. If the PUD is considering changes to its rate design (which will be discussed in the next section), the effect of those changes should be to increase the relative rate burden for non-residential customers and decrease it for residential customers.

This finding also indicates that fire sprinkler charges should be frozen for two years before resuming annual increases of 5% per year. This customer class is small enough that freezing their rates will have a minimal effect on overall system revenues, and it will bring the fire sprinkler rates more in line with the estimated cost of serving this group.

How can the relative rate burden between residential and non-residential be shifted, given the fact that the rate design mostly does not distinguish between customer classes? Right now, the rates are the same for all classes except for the usage rate between 0 and 3 ccf/month—the discounted "lifeline" rate that applies only to residential customers. The PUD could have separate rate tables for residential and non-residential, but that does not seem warranted given the relatively small cost-of-service adjustment implied by **Exhibit 8**. The answer has to do with how the usage rates are structured, which is discussed in the next section.

Section V. Rate Design

Rate design refers to how the bills are calculated. Every rate has a numerator and a denominator. The numerator is the total cost that must be recovered for the system to be able to fund its revenue requirement. The denominator is the unit basis, the "per what?" Per month, per ccf, per ccf above a certain threshold? Rate design has to do with the unit basis for the charges.

In designing a structure for the rates, there are competing policy considerations, such as revenue stability, conservation incentives, or the protection of certain vulnerable customer classes (such as the PUD's current practice of providing discounted "lifeline" rates for the first 3 ccf/month of water to residential customers). State law gives utilities a lot of discretion in determining rate classes and designing rates, as long as the rates are not arbitrary and capricious.

As part of this rate study, we reviewed the existing PUD rate design and brought alternatives to the Board for consideration. The option recommended here is the one approved by the Board.

V.A. EXISTING RATES

The existing rates are composed of a fixed monthly charge that varies by meter size but is consistent by class, and a variable tiered usage charge per hundred cubic foot (ccf) that varies by class. Currently the residential class has one tier for usage up to 3 ccf/month, a second tier for usage between 3 and 100 ccf/month and a third tier for usage in excess of 100 ccf. The non-residential class has only two tiers, one for usage up to 100 ccf/month and the second for usage in excess of 100 ccf/month.

There is no reduced rate program through which qualifying low-income customers pay a certain percentage of the fixed charge. However, the lowest usage rate tier for residential customers is designed as a "lifeline rate," through which a discounted usage rate is charged for a basic quantity of water (3 ccf/month is about half the average residential monthly usage).

Other than the lifeline rate for residential customers, the usage rates are currently designed in a "declining block" structure, or reverse conservation rate. In other words, water in excess of 100 ccf/month is charged a lower rate than water consumed at lower levels. A tier threshold of 100 ccf/month is very high. Very few single-family residential customers use that much water; for the most part, that third tier is only reached by a group of larger commercial and agricultural customers. So even though the stated rate schedule above 3 ccf/month is the same for residential and non-residential, in practical reality the third block applies to non-residential customers. Therefore, when it comes to shifting the relative rate burden so that commercial customers pay more, one tool is the third-tier rate and the difference between it and the second-tier rate.

In addition to the fixed and variable charges, all accounts are charged a $2.00 per month capital improvement surcharge. This charge is equal per account, not adjusted for meter size.

Fire sprinklers are charged a fixed monthly rate.

Exhibit 9 provides a summary of existing 2019 monthly rates, including fire sprinkler rates.

Exhibit 9: Existing Monthly Rates

Description	2019 Existing Per Month	Per ccf*
Meter Size (all classes):		
5/8"	$29.15	
3/4"	$29.15	
1"	$48.55	
1 1/2"	$96.80	
2"	$154.60	
3"	$289.85	
4"	$482.65	
6"	$965.35	
8"	$1,544.30	
Capital Improvement Surcharge:		
	$2.00	
Single Family & Duplex w/ Individual Meters		
Block 1 (0-3 ccf)		$3.21
Block 2 (4-100 ccf)		$5.06
Block 3 (101+ ccf)		$2.95
All Others		
Block 1 (0-3 ccf)		$5.06
Block 2 (4-100 ccf)		$5.06
Block 3 (101+ ccf)		$2.95

Private Fire Systems	Per Month
With Automatic Sprinklers:	
1"	$4.95
2"	$9.75
3"	$14.75
4"	$19.55
6"	$29.35
8"	$39.15
10"	$49.05
12"	$58.70
Not Automatic Sprinklers	$48.95

*** 1 ccf = 100 cubic feet**

V.B. PROPOSED WATER RATES

The rate design restructuring proposed for Skagit PUD can be looked at in two parts. The first change is to roll the capital surcharge into the fixed charge. By doing this, the charge will become scaled with the size of the meter and will more closely align the revenue collected with the larger peak demand of customers with large capacity meters.

Exhibit 10 shows what the 2020 rate table would look like if it only made this one change to the fixed rate, without changing the usage rates. The exhibit compares a 5% across-the-board rate increase to a 5% increase with the CIP surcharge rolled into the fixed rates.

By making the CIP surcharge scalable, this change would shift more of the rate burden to customers with larger meters. However, the impact on the total bill paid by the largest customers is limited by the fact that the majority of their total monthly bill comes from the usage charge, not the fixed charge. For residential customers and small commercial customers, the fixed charge is a noticeable component in the total bill, but for large commercial customers, the total amount they pay is driven mainly by usage charges.

Exhibit 10: Monthly Water Rates if CIP Surcharge is Rolled into Fixed Rate, No Change to Usage Rates

2020 Across the Board 5% Increase		
Description	**Per Month**	**Per ccf***
Meter Size (all classes):		
5/8"	$30.61	
3/4"	$30.61	
1"	$50.98	
1 1/2"	$101.64	
2"	$162.33	
3"	$304.34	
4"	$506.78	
6"	$1,013.62	
8"	$1,621.52	
Capital Improvement Surcharge:		
	$2.00	
Single Family & Duplex w/ Individual Meters		
Block 1 (0-3 ccf)		$3.37
Block 2 (4-100 ccf)		$5.28
Block 3 (101+ ccf)		$3.10
All Others		
Block 1 (0-3 ccf)		$5.28
Block 2 (4-100 ccf)		$5.28
Block 3 (101+ ccf)		$3.10

2020 CIP Surcharge Rolled into Fixed Rates		
Description	**Per Month**	**Per ccf***
Meter Size (all classes):		
5/8"	$32.38	
3/4"	$32.38	
1"	$53.93	
1 1/2"	$107.52	
2"	$171.72	
3"	$321.96	
4"	$536.11	
6"	$1,072.28	
8"	$1,715.36	
Capital Improvement Surcharge:		
Single Family & Duplex w/ Individual Meters		
Block 1 (0-3 ccf)		$3.37
Block 2 (4-100 ccf)		$5.28
Block 3 (101+ ccf)		$3.10
All Others		
Block 1 (0-3 ccf)		$5.28
Block 2 (4-100 ccf)		$5.28
Block 3 (101+ ccf)		$3.10

While the rate schedule shown in **Exhibit 10** would collect the target revenue in 2020, discussions with PUD staff and board members acknowledged the desire to eliminate the existing reverse conservation tier structure and respond to the cost of service outcomes identified in **Exhibit 8.** This would mean adjusting the usage rates, not just the fixed rates.

Blending the Tier 2 and Tier 3 usage rate would have a negative impact on the largest customers, who now benefit from the fact that the Tier 3 rate is lower than the Tier 2 rate. In order to soften the impact on the largest customers, a long-term phase-in plan was developed to make that transition gradual. With this phase-in plan, the Tier 3 rate increases by more than 5% per year while Tiers 1 and 2 rates increase by only 5% per year, until the rates are aligned. This approach is not revenue-neutral; it generates a small revenue cushion that can be used for additional rate-funded capital investment.

The Board also expressed interest in separating agricultural rates from other non-residential rates and having agricultural rates be lower than Tier 2 rates, beginning in 2021. Among businesses, agricultural customers are particularly vulnerable to the impact of water rates, since they are water-intensive and the income they rely on to pay the water bill is generated from the land itself. As a policy matter, allowing agricultural customers to continue at the proposed 2020 Tier 3 level of rates for all usage (plus the overall 5% annual rate increases thereafter) is analogous to offering lifeline rates to residential customers. In both cases, a vulnerable segment of the customer base is acknowledged in the way the rates are structured.

The recommended rate schedule through 2024 is shown in **Exhibit 11**. This table assumes that the CIP surcharge is rolled into the fixed rates, after which the fixed rates increase by 5% per year.

For usage rates, it assumes a 2020 agricultural rate set at the current Tier 3 level plus 8.5%, followed by 5.0% annual increases thereafter. (Ag customers currently pay the higher Tier 2 rate for the first 100 ccf/month, and in the new rate table, they would be charged the Ag rate for all usage. So this rate design benefits Ag customers even with the 2020 Ag rate set at 8.5% above the 2019 Tier 3 rate.)

For other customers, the Tier 3 usage rate would rise 8.5% annually through 2024 when it would be $4.43 per ccf. Tier 1 and Tier 2 rates would increase by 5.0% annually through 2024. Increasing the Tier 3 rate above the system average increase begins to close the reverse conservation gap. With this long-term phase-in strategy, the differential between the Tier 2 and Tier 3 rates is expected to be eliminated by 2036.

Exhibit 11: Proposed Monthly Water Rates – Conservation & COSA Phase-In

Description	Fixed Rates					
	2019	2020	2021	2022	2023	2024
	Existing	Proposed				
Meter Size (all classes):						
5/8"	$ 31.15	$ 32.38	$ 34.00	$ 35.70	$ 37.48	$ 39.36
		3.9%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
3/4"	$ 31.15	$ 32.38	$ 34.00	$ 35.70	$ 37.48	$ 39.36
		3.9%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
1"	$ 50.55	$ 53.93	$ 56.62	$ 59.46	$ 62.43	$ 65.55
		6.7%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
1 1/2"	$ 98.80	$ 107.52	$ 112.90	$ 118.54	$ 124.47	$ 130.69
		8.8%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
2"	$ 156.60	$ 171.72	$ 180.31	$ 189.33	$ 198.79	$ 208.73
		9.7%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
3"	$ 291.85	$ 321.96	$ 338.05	$ 354.96	$ 372.70	$ 391.34
		10.3%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
4"	$ 484.65	$ 536.11	$ 562.92	$ 591.06	$ 620.62	$ 651.65
		10.6%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
6"	$ 967.35	$ 1,072.28	$ 1,125.89	$ 1,182.19	$ 1,241.30	$ 1,303.36
		10.8%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
8"	$ 1,546.30	$ 1,715.36	$ 1,801.13	$ 1,891.18	$ 1,985.74	$ 2,085.03
		10.9%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
Capital Improvement Surcharge:	$2.00 (surcharge included in existing rates for comparison)					

Description	Variable Rates (per ccf)					
Single Family & Duplex w/ Individual Meters						
Block 1 (0-3 ccf)	$ 3.21	$ 3.37	$ 3.54	$ 3.72	$ 3.91	$ 4.11
		5.0%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
Block 2 (4-100 ccf)	$ 5.06	$ 5.31	$ 5.58	$ 5.86	$ 6.15	$ 6.46
		5.0%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
Block 3 (101+ ccf)	$ 2.95	$ 3.20	$ 3.47	$ 3.76	$ 4.08	$ 4.43
		8.5%	*8.5%*	*8.5%*	*8.5%*	*8.5%*
All Others (except Ag)						
Block 1 (0-3 ccf)	$ 5.06	$ 5.31	$ 5.58	$ 5.86	$ 6.15	$ 6.46
		5.0%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
Block 2 (4-100 ccf)	$ 5.06	$ 5.31	$ 5.58	$ 5.86	$ 6.15	$ 6.46
		5.0%	*5.0%*	*5.0%*	*5.0%*	*5.0%*
Block 3 (101+ ccf)	$ 2.95	$ 3.20	$ 3.47	$ 3.76	$ 4.08	$ 4.43
		8.5%	*8.5%*	*8.5%*	*8.5%*	*8.5%*
Agriculture		$ 3.20	$ 3.36	$ 3.53	$ 3.71	$ 3.90
			5.0%	*5.0%*	*5.0%*	*5.0%*

V.C. IMPACT ON CUSTOMERS

With any rate structure change there will be varying impacts across the customer base. In a block rate design, a stated usage rate only applies to the usage within that range. For instance, if a non-residential customer uses 110 ccf in a given month, the usage rate for the first 100 ccf will be growing by about 5.0% per year, while only the last 10 ccf/month would be charged at rates that are increasing by 8.5% per year. So even though this hypothetical customer reaches the Tier 3 range, its bill would be increasing by just slightly more than 5.0%.

Exhibit 12 shows sample non-residential monthly bills for various usage levels (assuming a 5/8" x 3/4" meter), as well as the number of customers affected, based on their average historical usage. The breakeven usage is about 120 ccf/month. Customers who use less than 120 ccf/month will benefit slightly from this change, because rolling the CIP surcharge into the fixed charge reduces the bill for the smaller meters. Customers who use 120 ccf/month or more will see their bills go up by more than 5% per year. About 89% of non-residential customers average 120 ccf/month or less.

Exhibit 12: Sample Non-Residential Bill Comparisons

Monthly ccf	# of Customers	Existing Bill	2020 Bill	Annual Increase (%)	2024 Bill	Cumulative Increase (%)
20	1,909	$132.35	$138.64	4.75%	$168.52	27.33%
40	756	$233.55	$244.90	4.86%	$297.68	27.46%
60	302	$334.75	$351.16	4.90%	$426.84	27.51%
80	167	$435.95	$457.42	4.92%	$556.00	27.54%
100	100	$537.15	$563.68	4.94%	$685.16	27.55%
120	63	$596.15	$627.69	5.29%	$773.87	29.81%
140	59	$655.15	$691.71	5.58%	$862.59	31.66%
160	41	$714.15	$755.72	5.82%	$951.30	33.21%
180	47	$773.15	$819.74	6.03%	$1,040.02	34.52%
200	26	$832.15	$883.75	6.20%	$1,128.73	35.64%
300	65	$1,127.15	$1,203.83	6.80%	$1,572.31	39.49%
400	47	$1,422.15	$1,523.90	7.15%	$2,015.89	41.75%
500	22	$1,717.15	$1,843.98	7.39%	$2,459.47	43.23%
600	19	$2,012.15	$2,164.05	7.55%	$2,903.05	44.28%
700	17	$2,307.15	$2,484.13	7.67%	$3,346.63	45.05%
800	10	$2,602.15	$2,804.20	7.76%	$3,790.21	45.66%
900	5	$2,897.15	$3,124.28	7.84%	$4,233.78	46.14%
1,000	7	$3,192.15	$3,444.35	7.90%	$4,677.36	46.53%
1,100	1	$3,487.15	$3,764.43	7.95%	$5,120.94	46.85%
1,200	3	$3,782.15	$4,084.50	7.99%	$5,564.52	47.13%
1,300	4	$4,077.15	$4,404.58	8.03%	$6,008.10	47.36%
1,400	2	$4,372.15	$4,724.65	8.06%	$6,451.68	47.56%
1,500	2	$4,667.15	$5,044.73	8.09%	$6,895.26	47.74%
1,600	0	$4,962.15	$5,364.80	8.11%	$7,338.84	47.90%
1,700	2	$5,257.15	$5,684.88	8.14%	$7,782.41	48.03%
1,800	1	$5,552.15	$6,004.95	8.16%	$8,225.99	48.16%
1,900	2	$5,847.15	$6,325.03	8.17%	$8,669.57	48.27%
2,000	1	$6,142.15	$6,645.10	8.19%	$9,113.15	48.37%
5,000	5	$14,992.15	$16,247.35	8.37%	$22,420.51	49.55%
10,000	2	$29,742.15	$32,251.10	8.44%	$44,599.45	49.95%
Total customers	3,687					
Total <=120 ccf	3,297			5%/year cumulative through 2024:		27.6%
% <=120 ccf	89%					

Because nearly all of the Tier 3 usage comes from non-residential customers, gradually blending Tier 2 and Tier 3 usage rates begins to address the findings of the cost-of-service analysis. It progressively shifts the relative rate burden from residential to non-residential, as indicated earlier in **Exhibit 8**.

Section VI. System Development Fee

In addition to the rate study update, the PUD requested an update to their System Development Fee (SDF). The following section discusses the various aspects of the process used to update the SDF. The full technical tables can be found in the Excel model provided to the PUD staff.

VI.A. METHODOLOGY

SDFs are imposed as a condition of service on new customers connecting to the system. It is in addition to the recovery of the cost of physically connecting a customer to the system, such as meter installation. The SDF is typically based on a blend of historical and planned future capital investments in system infrastructure – its underlying premise is that future customers should pay an equitable share of capital costs that the utility has incurred or will incur to provide system capacity.

The purpose of the SDF is two-fold: 1) to provide a source for capital financing and 2) to equitably recover a proportionate share of utility plant-in-service costs from new customers. In the absence of SDFs, the cost of capital capacity would be borne primarily by existing customers. Costs to be recovered by SDFs can be defined in two parts:

1. Existing cost basis, based on historical investments in existing infrastructure, and
2. Future cost basis, which recovers costs related to planned capital projects.

Revenues generated from the SDFs can be used to fund capital projects or debt service but not operating and maintenance costs.

Section 54.16.030 of the Revised Code of Washington (RCW) grants authority to Public Utilities Districts to fix rates and charges for connecting to water and sewer systems; however, it does not outline a specific methodology for calculating them. The PUD has some latitude in choosing from a variety of legally defensible approaches used in the industry, but it is important that the SDF is based on an equitable allocation of system costs to system capacity. Since the calculated charges represent the maximum allowable charge, the PUD may choose to implement a charge at any level up to the calculated charge. This study uses an "average integrated" approach to compute the SDFs, which is summarized in **Exhibit 13.**

Exhibit 13: SDF Methodology

$$\frac{\text{EXISTING COST} + \text{FUTURE COST}}{\text{CURRENT \& FUTURE CUSTOMERS}} = \text{SDF}$$

The average integrated approach does not create a cost advantage between existing and new customers. Compared with other approaches, this approach provides stability in the calculated SDF, and it works well for mature systems such as the PUD.

VI.B. EXISTING COST BASIS

The existing cost basis is intended to recognize the current ratepayers' net investment in the original cost of the system assets. The existing cost basis includes the following components:

- ***Utility Capital Assets:*** The PUD's financial records indicate that as of the end of 2018, the utility had $262.3M in fixed assets.

- ***Less: Meters and Services*** – The total plant in service cost is reduced by the original cost and accrued interest on any assets related to meters and services. The adjustment is made to recognize that the costs associated with this function of the utility are generally recouped through other fees. The total reduction in costs related to meters and services is $26.8M.

- ***Less: Contributed Assets*** – The total original cost is reduced to recognize known third-party contributions. The outside contributions provide a source of capital at no new cost to the PUD's ratepayers. Since the SDF is necessarily cost based, the net investment by the PUD excludes those contributions. This results in an $26.2M reduction to the cost basis.

- ***Plus: Interest on Non-Contributed Plant in Service*** – The PUD governing statute (RCW Chapter 54) is silent in regard to adding interest on utility funded assets. However, the RCW chapters governing both cities and water and sewer special districts, along with subsequent legal interpretations, provide guidelines for connection charges. Based on that legal framework, we believe that these charges can include interest on an asset for up to ten years at the rate applicable during the time of construction. We use the historical Bond Buyer Index to determine applicable interest rates. The interest addition cannot exceed the original cost of the asset, and the rate cannot exceed 10% per year. Conceptually, this interest provision accounts for opportunity costs that the PUD customers incurred by supporting investments in infrastructure rather than having it available for other uses. Calculated interest for the utility results in an addition of $91.5M to the cost basis.

- ***Less: Debt Principal Outstanding*** – Another adjustment to the existing system cost basis is a deduction for net outstanding debt principal. Outstanding debt principal represents system assets that today's ratepayers have not paid for yet. Future ratepayers (including newly connecting customers who are being charged the SDF) will be paying off that principal, so it should be excluded from the SDF cost basis. At the same time, cash on hand represents resources that today's ratepayers have paid for, which in theory could be used to reduce the outstanding indebtedness. So, in calculating the existing cost basis, we subtract outstanding debt principal net of cash on hand. If cash on hand exceeds outstanding debt, the deduction is zero. The result is this case is a reduction of $15.3 million.

After factoring in the above adjustments, the existing cost basis will be spread across the total future capacity of the system (existing and future planned capacity), since all existing infrastructure will continue to benefit all customers. The existing cost basis for Skagit PUD is shown below in **Exhibit 14**.

Exhibit 14: Existing Cost Basis

Existing Cost Basis		
Utility Capital Assets	$	262,330,314
less: Meters and Services		(26,769,477)
plus: Construction Work in Progress		-
plus: Net interest accrued on Utility Funded Assets		91,538,935
less: Contributed assets (net of M&S)		(26,233,031)
less: Net debt principal outstanding		(15,301,089)
TOTAL EXISTING COST BASIS	**$**	**285,565,651**

VI.C. FUTURE COST BASIS

The future cost basis portion of the system development fee is intended to recover a share of the costs associated with planned future capital projects. Future facilities planned for construction can be included in the connection charge if they are included in an adopted capital improvement plan. Consistent with the legal requirement that the costs be borne by the PUD, funding by developers or special property assessments are not included in the calculation. There are two main types of capital projects, described below.

- ***Less: Repair and Replacement Projects*** –These are projects related to the repair or replacement of existing infrastructure and are most often needed because existing facilities have deteriorated due to use by existing customers. The approach used here removes these projects from the future cost basis because they are assumed to be fully attributable to existing customers.
- ***Plus: Upgrade/Expansion Projects*** – Upgrade/expansion projects generally involve upgrades to meet current regulatory requirements or serve additional customers.

The PUD 2019 through 2038 capital plan identifies $218.5M (current dollars) in capital project costs. PUD staff allocated 69.8% ($152.6M) of the total cost to repair and replacement projects, which are deducted from the future cost basis. **Exhibit 15** provides a summary of the future cost basis.

Exhibit 15: Future Cost Basis

Future Cost Basis		
Total Capital Improvement Program (2019$)	$	218,474,299
less: Repair and Replacement Projects		(152,574,299)
TOTAL FUTURE SYSTEM CAPACITY COSTS	**$**	**65,900,000**

VI.D. CUSTOMER BASE

The next step in calculating the system development fee is to determine the number of users the system is designed to support after completion of the CIP. PUD staff engineers performed a system capacity analysis that resulted in an estimate of capacity with their existing system as well as the additional capacity that will be added after the twenty-year capital program is completed. The PUD determined that in addition to the existing production of 14.82 MGD, the system could support an

additional 6.18 MGD before having to expand portions of the system. The total current capacity is therefore 21.0 MGD, a 41.7% increase over current production. In addition, PUD engineers estimated that capacity would increase by 9.0 MGD after the twenty-year capital program is completed. The additional future capacity of 9.0 MGD represents an additional 42.9% increase over the existing system capacity. Given that PUD customers vary in size and demand on the system, the SDF calculation uses the concept of Meter Capacity Equivalents (MCEs) to "standardize" the customer base. An MCE is a multiple applied to meter sizes above the smallest meter, which is a 5/8" x 3/4" meter. The smallest meter is typically used for new single-family homes and small commercial buildings.

The PUD's existing summary customer data by class of service and meter size was used to calculate the existing customer base represented in MCEs. Converting existing connections to MCEs results in 31,746 existing MCEs.

In order to derive the existing and future system capacity in terms of MCEs, the same percentage increases—41.7% for existing capacity and 42.9% for future capacity—was applied to the current number of MCEs. This resulted in additional capacity of 32,517 MCEs, for a total future system capacity of 64,262 MCEs.

VI.E. SYSTEM DEVELOPMENT FEE CALCULATION

As described previously, the sum of the existing and future cost basis is divided by the total existing and future capacity of the system. The result of this calculation is the maximum allowable system development fee. **Exhibit 16** provides a summary of the SDF calculation for the PUD's system.

Exhibit 16: System Development Fee Calculation

System Development Fee (SDF)		
Existing Cost Basis	$	285,565,651
Total System Capacity		64,262
Existing System SDF per MCE	**$**	**4,444**
Future Cost Basis	$	65,900,000
Total System Capacity		64,262
Future System SDF per MCE	**$**	**1,025**
Total SDF per MCE	**$**	**5,469**

The resulting calculated SDF is $5,469 per MCE, which can be rounded to $5,470. The PUD may choose to implement a charge at any level up to the calculated charge. Revenues generated from the charge will vary depending on whether or not the full charge is implemented. Delaying or otherwise limiting system development charges will generally reduce the amount of revenue available, which would mean that ratepayers would have to pay more for capital projects.

Based on Board input, a five-year phase-in schedule was developed to gradually increase the existing SDF towards the calculated maximum by 2024. A schedule of proposed system development fees can be seen in **Exhibit 17.** The SDF amounts are rounded to the nearest $5.

Exhibit 17: Proposed System Development Fee Schedule

Meter Size	System Development Fee					
	Existing	2020	2021	2022	2023	2024
5/8"	$4,905	$5,020	$5,130	$5,245	$5,355	$5,470
3/4"	$7,358	$7,530	$7,695	$7,868	$8,033	$8,205
1"	$12,263	$12,550	$12,825	$13,113	$13,388	$13,675
1 1/2"	$24,525	$25,100	$25,650	$26,225	$26,775	$27,350
2"	$39,240	$40,160	$41,040	$41,960	$42,840	$43,760
3"	$78,480	$80,320	$82,080	$83,920	$85,680	$87,520
4"	$122,625	$125,500	$128,250	$131,125	$133,875	$136,750
6"	$245,250	$251,000	$256,500	$262,250	$267,750	$273,500
8"	$392,400	$401,600	$410,400	$419,600	$428,400	$437,600
10"	$564,075	$577,300	$589,950	$603,175	$615,825	$629,050

In order to avoid getting too far behind with its SDF, the PUD should plan to include an SDF update along with its next rate study, four or five years from now.

Section VII. Summary

Following are our findings and recommendations, which reflect discussions with the Board.

- In order to fund operating and capital costs, the overall level of rates should be increased by 5% per year through 2024. A five-year rate schedule should be adopted, providing rates from 2020 through 2024.
- Because much of the CIP is scheduled in the early years of the forecast, the PUD should plan to borrow in 2020 and 2022, with net proceeds of approximately $37.1 million and $15.2 million, respectively.
- Based on the cost-of-service analysis, we suggest that fire sprinkler fees be frozen for two years before being increased by 5% per year from 2022 through 2024.
- The cost-of-service analysis also suggested that residential rates are currently higher and non-residential rates currently lower than would be implied by the cost of serving those groups of customers. A shift in the relative rate burden from residential to non-residential would be appropriate.
- After reviewing the current rate design, we recommend that the PUD incorporate the CIP surcharge into the fixed rates.
- We suggest that the current lifeline rates for the first 3 ccf/month of residential usage be continued.
- The current rates have a "reverse conservation" structure, in which Tier 3 usage rates are lower than Tier 2 rates. We recommend that Tier 2 and 3 rates be blended over a long-term phase-in period. This will also have the effect of shifting the rate burden in the direction suggested by the cost-of-service analysis. To accomplish this rate blending, Tier 2 rates will increase by the system average 5.0% annually, and Tier 3 rates applicable to usage above 100 ccf/month will increase by 8.5% annually. Following this rate path into the future, it is expected that the Tier 2 and Tier 3 rates would converge in 2036.
- In order to avoid a particularly negative impact to agricultural customers, we recommend that agriculture become a new rate class, with usage rates that are based on the current Tier 3 rate escalated by 8.5% in 2020 and 5.0% per year through 2024. This rate would be charged uniformly for all usage levels.
- We recommend that the SDF be phased in over five years to $5,470 per meter capacity equivalent.