

Sewer Rate Cost Structure

August 2021



King County

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II. Proviso Text

Ordinance 19210, Section 112, Proviso P3¹

Of this appropriation, \$200,000 shall not be expended or encumbered until the executive transmits a report on the shift of the sewer rate cost burden to the single-family sector from the commercial/industrial/multifamily sector, and a motion that acknowledges receipt of the report and a motion acknowledging receipt of the report is passed by the council. The motion should reference the subject matter, the proviso's ordinance number, ordinance section and proviso number in both the title and body of the motion.

The report shall include, but not be limited to, the following:

- A. A discussion of the history of, and rationale for, the sewer rate cost structure that has resulted in the shifting of the cost burden from commercial/industrial/multifamily housing sectors to single-family homeowners;
- B. Options for alternative cost structures that would distinguish multifamily ratepayers from commercial and industrial ratepayers; and
- C. A discussion of the appropriate balance of costs between the residential sector and the commercial/industrial sector in sewer rate revenues, and the criteria impacting that balance.

The executive should electronically file the report and motion required by this proviso no later than August 1, 2021, with the clerk of the council, who shall retain the electronic copy and provide an electronic copy to all councilmembers, the council chief of staff and the lead staff for the regional water quality committee and the budget and fiscal management committee, or their successors.

III. Executive Summary

King County is a provider of wholesale wastewater treatment and regional conveyance. The Local Sewer Agencies (LSAs), made up of cities, special purpose districts, and the Muckleshoot Tribe, provide local sewer collection service and the billing and customer service for individual homes and business accounts.

King County charges LSAs for wholesale treatment based on the number of residential customer equivalent (RCE) billing units, which they report quarterly to the County's Wastewater Treatment Division (WTD). A single-family residential property is billed as one RCE. For all other customer classes, including commercial, industrial, and multifamily, reported quarterly metered water use is converted to residential equivalents by dividing by an estimated single-family monthly flow volume. King County's monthly sewer rate is charged on a per RCE basis, meaning that the total reported single-family accounts and converted volume-based RCEs for each LSA are multiplied by the monthly sewer rate to arrive at the amount billed to each LSA.

The RCE conversion factor (750 cf / month) is the primary rate structure element that determines equity among the single-family class and the volume-based classes. The single-family equivalent flow assumption is based on data collected in 1989, before significant conservation trends in water use. While conservation efforts are reflected in the volume-based class billings through converted water use, the single-family assumed flow (750 cf) is fixed and did not change as single-family average use declined with conservation outcomes. The current conversion factor is overstating the single-family equivalent flow contribution, resulting in the single-family class subsidizing the volume-based class.

¹ [Ordinance 19210](#)

The conversion factor is fixed in the sewage disposal contracts with the LSAs. Though King County Code directs that the factor be reviewed periodically to ensure that accounts pay their fair share of the cost of the system, any change based on review would require revising sewage disposal contracts with all 34 agencies.

Alternative cost structures that would distinguish multifamily ratepayers from commercial and industrial ratepayers should be evaluated based on industry guidance that includes considerations of equitable cost allocation, revenue stability, and administrative feasibility.

Multifamily properties are typically not submetered for water or sewer service.² The account and billing relationship resides between the LSA and the property owner, often a landlord, who determines how utility costs will be passed on to residents. The existing multifamily rate structure based on metered water use is more equitable than fixed charge rate structure alternatives.

While the current volume-based cost structure maximizes equity, visibility of the multifamily class could be improved if the LSAs were able and agreeable to separate reporting of multifamily metered water use. The quarterly reported water use and RCE conversion do not distinguish the flow attributable to each class (see Exhibit H – sample LSA reporting).

While the multifamily class is the focus of Proviso Section B, the customer classes share total utility costs, so that inequity in one class impacts all other classes. While the multifamily class is charged based on an equitable cost structure, the single-family cost structure provides opportunities for revisions that would improve equity to all classes. The greatest opportunity for improved equity among customer classes would be by updating the single-family flow assumption used to calculate RCE billing units to the commercial, industrial, and multifamily classes, which would require changing all 34 LSA contracts. Each LSA has a varying distribution of customer classes. Any cost shift among customer classes will have varying impacts to each agency's billing. Therefore, significant engagement with the Metropolitan Water Pollution Abatement Advisory Committee ([MWPAAC](#)) on this topic is recommended to gather feedback and create a collaborative path forward.³

IV. Background

Department Overview:

The Department of Natural Resources and Parks (DNRP) works in support of sustainable and livable communities and a clean and healthy natural environment. Its mission is to foster environmental stewardship and strengthen communities by providing regional parks; protecting the region's water, air, land, and natural habitats; and reducing, safely disposing of, and creating resources from wastewater and solid waste.

The Wastewater Treatment Division (WTD) of DNRP protects public health and enhances the environment by collecting and treating wastewater while recycling valuable resources for the Puget Sound region.

Distributed over a 424-square-mile service area, the King County (County) sewer system collects and treats an average of 175 million gallons a day of sewage from approximately two million residents. King

² Submetered refers to water use that is metered at the building level. Individual water meters are not installed for each multifamily unit

³ RCW 35.58.210 authorizes the formation of the Metropolitan Water Pollution Abatement Advisory Committee to advise the King County Council in matters relating to the performance of the water pollution abatement function.

County's WTD is responsible for the construction, operation, and maintenance of the regional wastewater conveyance and treatment system, which includes three major secondary treatment plants (West Point in Seattle, South Plant in Renton, and Brightwater in south Snohomish County), 397 miles of conveyance lines, 48 pump stations, and 25 regulator stations. Other WTD facilities include four combined sewer overflow (CSO) treatment plants, four CSO storage facilities, 39 CSO outfall locations, and secondary treatment plants on Vashon Island and in Carnation.⁴⁵

Key Historical Context:

Due to the wholesale nature of King County's wastewater treatment service, there is no direct customer relationship in the charging of the sewer service rate between the County and the customer. The retail relationship resides with the LSAs, who build and maintain the local collection systems (sewer pipelines that collect wastewater flows from homes and businesses) and provide billing and customer service to the individual sewer account holders. The LSAs contract with and pay WTD for regional conveyance and treatment of flows delivered to the regional system.

The sewage disposal contracts with each of the LSAs are one of three authorities that govern how wholesale wastewater treatment charges are determined. The other two authorities are the Revised Code of Washington (RCW) and King County Code (KCC).

Revised Code of Washington (RCW)

In 1992, voters approved an amendment to the County's charter that authorized the merger of King County with the Municipality of Metropolitan Seattle (Metro), with the phased merger effective in 1994.^{6, 7} As successor to Metro, the County assumed Metro's rights and obligations, maintaining those under RCW chapter [35.58](#) Metropolitan Municipal Corporations, and adding chapter [36.94](#) County Sewerage, Water, and Drainage Systems.

Metro authority under [RCW 35.58.200](#) includes the power "To fix rates and charges for the use of metropolitan water pollution abatement facilities, and to expend the moneys so collected for authorized water pollution abatement activities."

County authority under [RCW 36.94.140](#) states:

*(2) The rates for availability of service and facilities, and connection charges so charged must be uniform for the same class of customers or service and facility. **In classifying customers served**⁸, service furnished or made available by such system of sewerage and/or water, or the connection charges, the county legislative authority may consider any or all of the following factors:*

(a) The difference in cost of service to the various customers within or without the area;

⁴ Secondary treatment includes aeration, settling, disinfection, and discharge through an outfall. Secondary treatment in conjunction with primary treatment removes about 85 to 90 percent of suspended solids in wastewater.

⁵ Combined sewer overflows (CSOs) are relief points in older sewer systems that carry sewage and stormwater in the same pipe. When heavy rains fill the pipes, CSOs release sewage and stormwater into rivers, lakes, or Puget Sound.

⁶ History of the King County Charter can be found on the King County [website](#).

⁷ [The history of King County's Wastewater Treatment Division can be found on the King County website.](#)

⁸ Bold added to highlight customer class section.

- (b) The difference in cost of maintenance, operation, repair and replacement of the various parts of the systems;
- (c) The different character of the service and facilities furnished various customers;
- (d) The quantity and quality of the sewage and/or water delivered and the time of its delivery;
- (e) Capital contributions made to the system or systems, including, but not limited to, assessments;
- (f) The cost of acquiring the system or portions of the system in making system improvements necessary for the public health and safety;
- (g) The nonprofit public benefit status, as defined in RCW [24.03.490](#), of the land user; and
- (h) Any other matters which present a reasonable difference as a ground for distinction.”

RCW 36.94 includes criteria specific to customer classes, which is central to the proviso discussion of cost shift among customer classes, options to distinguish a multifamily customer class, and analyzing the appropriate balance between customer classes.

King County Code (KCC)

KCC [28.86.160 Financial Policy 15](#) states:

“2. Sewer rate. King County shall maintain a uniform monthly sewer rate expressed as charges per residential customer equivalent for all customers.”

And:

*“4. Based on an analysis of residential water consumption, as of December 13, 1999, King County uses **a factor of seven hundred fifty cubic feet per month to convert water consumption of volume-based customers to residential customer equivalents for billing purposes.** King County shall periodically review the appropriateness of this factor to ensure that all accounts pay their fair share of the cost of the wastewater system.”⁹*

The sewer rate section of the KCC reflects elements of the sewer service contracts. The sewer rate is set so that a single-family residence pays one unit charge, and volume-based customers are converted to units equivalent to a single-family residence unit of flow as noted in Financial Policy 15, Section 2, above.¹⁰ Financial Policy 15, Section 4 includes a definition of the unit conversion factor that determines the distribution of costs among the two customer classes: single-family residential and volume-based customers. This rate structure feature is used to ensure “fair share of the cost of the wastewater system.” The LSA-reported water use for the volume-based customer class is converted to billing units (RCEs) by converting the reported water use to units of 750 cubic feet. A larger factor would result in fewer billing units and a smaller factor would result in more billing units for the same reported flow.

Wholesale Sewage Disposal Contracts

WTD maintains individual sewage disposal contracts with each of the LSAs that include uniform language pertaining to setting and billing sewage disposal charges (the sewer rate). The conversion

⁹ Bold added to highlight RCE conversion factor definition.

¹⁰ Volume-based customers include multifamily, commercial, and industrial properties.

factor is defined in the sewage disposal contracts with each of the 34 LSAs. The County and the 34 LSAs would have to agree on a new conversion factor and amend all 34 sewage disposal contracts with King County Council approval. The conversion factor in the contracts has not changed since the 1992 amendment that implemented recommendations from a Rate Structure Advisory Committee that was created to support development of the [Regional Wastewater Service Plan](#).

The contracts include the following recital, *“Whereas the Rate Structure Advisory Committee, following extensive research, study and deliberations, has recommended certain changes in the structure of Metro’s charges to its participants and implementation of said charges requires amendment of the Basic Agreement;”*

One of the changes relates to the single-family residential equivalent flow assumption, covered in the Residential Equivalent section below.

The contracts also specify LSA reporting requirements for purposes of the sewer rate billing:

“For the quarterly periods ending March 31, June 30, September 30, and December 31 of each year every Participant shall submit a written report to Metro setting forth:

- (a) The number of Residential Customers billed by such Participant for local sewerage charges as of the last day of the quarter,*
- (b) The total number of all customers billed for local sewerage charges by such Participant as of such day, and*
- (c) The total water consumption during such quarter for all customers billed for local sewerage charges by such Participant other than Residential Customers.”*

When the contract refers to “Residential Customers,” the term is limited to single-family residential, according to the definition of a Residential Customer equivalent in the contract. Multifamily residential are part of the “other than Residential Customers” class. It should be noted that utilities commonly have account relationships with a landlord since submetering water use for multifamily is generally considered cost prohibitive and billing collection procedures, such as property liens go back to the property owner. For example, SPU confirmed that all multifamily properties billed for water and sewer are landlord accounts.

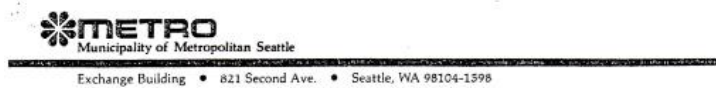
[Residential Customer Equivalent](#)

The RCE provides the distinction for two customer classes: single-family residences and all other customers.

The contracts state “The total quarterly water consumption report in cubic feet shall be divided by 2,250 to determine the number of Residential Customer equivalents represented by each Participant’s customer other than single family residences.”

The monthly equivalent of a quarterly 2,250 cubic feet (cf) is 750 cf per month. The 750 cf feet can be sourced to a June 1989 Rate Structure Advisory Committee report based on 1982 water survey data, which is attached as Appendix A. The recommendation was validated as an average single-family residence monthly water use in 1989 by Metro staff according to a letter dated October 16, 1989 attached as Appendix B.

Exhibit A: Metro Letter Introduction – Single-family Residential Water Consumption



October 16, 1989

To: Jean Baker
From: Dennis Barnes
Subject: 1989 Avg. Single-Family Residential Water Consumption

One of the recommendations made by the Rate Structure Advisory Committee to the Metro Water Quality Committee in its June, 1989 report "Findings and Recommendations On Structure of Metro Charges to Component Agencies" was that, "the residential customer equivalency value of 900 cubic feet metered water consumption, used to charge non-residential customers, should be lowered to 750 cubic feet". The recommended 750 cubic feet was based on an analysis of actual single-family residential water consumption data provided in 1982 by several sewer service agencies for which Metro provides disposal services. Due to the amount of time that has passed since the 1982 analysis was performed it was decided that a current survey and analysis of the actual single-family residential customer water consumption should be performed. The purpose of this memo is to summarize the steps performed in conducting this survey and the results of the analysis.

The study concluded with the 1989 data validation of the 750 cf recommendation and an added recommendation to review the average periodically to ensure it remains a reasonable approximation. Periodic review is required by the KCC, though it would take an amendment to the sewage disposal contract for each of the 34 LSAs to update the 750 cf conversation factor.

Exhibit B: Metro Letter – 1989 Data Validation

Conclusion:

Based on the analysis performed of survey data for 1988 & 1989 it appears that the 750 cubic feet recommended by the Rate Structure Advisory Committee to the Metro Water Quality Committee is a reasonable approximation of system wide average monthly consumption. I would recommend that the average be reviewed periodically to ensure that the 750 remains a reasonable approximation.

cc: Hanford Choate 82
Bob Hirsch 82

Most of the sewage disposal contracts extend to July 1, 2036, though nine extend to July 1, 2056. Beginning in 2014, the County began negotiating extensions of the service agreements with the agencies. These negotiations are currently on hold pending until further developments, including completion of the [Clean Water Plan](#).

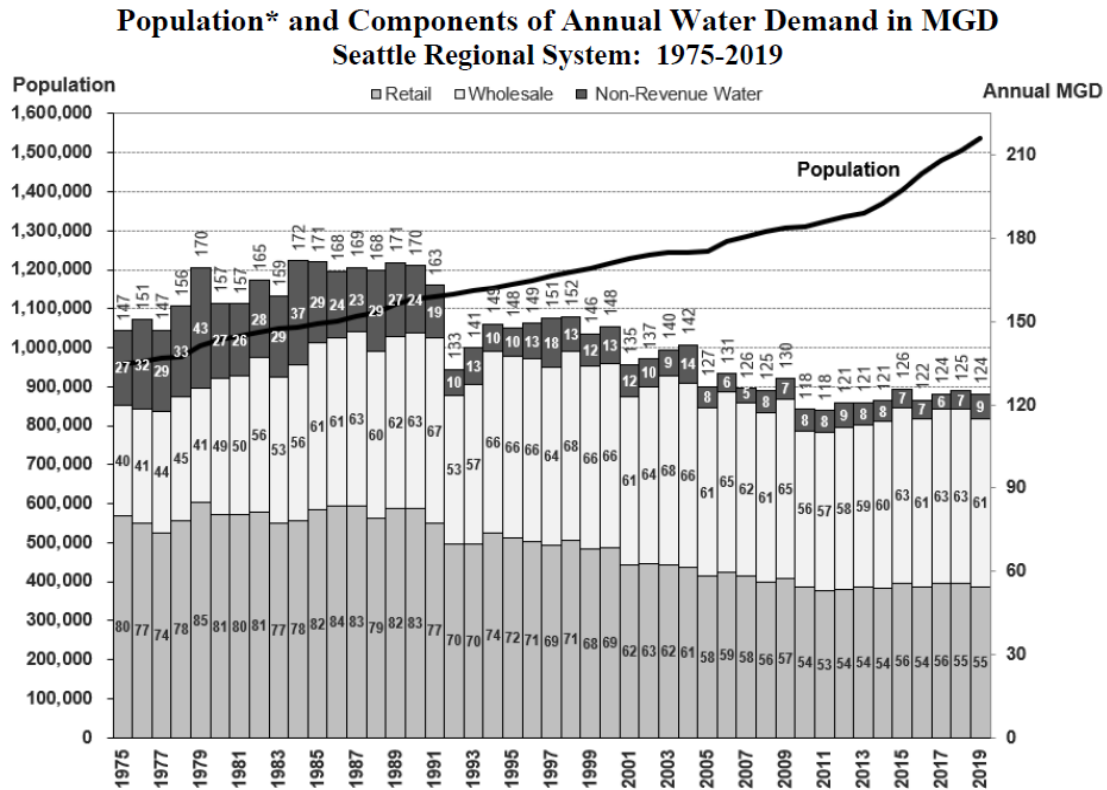
Key Current Conditions:

A comprehensive review and update of the RCE methodology's underlying data would reflect the significant conservation impacts to water demand in the region based on the water consumption trends provided below in this section.

Much of WTD's service area is shared with the region's largest water purveyor, SPU. To ensure sufficient water supply for the growing region, SPU conducts water demand forecasts and is in the 27th year of conducting a survey of wholesale customer water use.

The [2020 Annual Survey of Wholesale Customers](#) reports that, "In percentage terms, total Seattle system water consumption has declined 27% since 1990 while population has increased 37%. As a result, total consumption per capita is 47% less than it was in 1990."

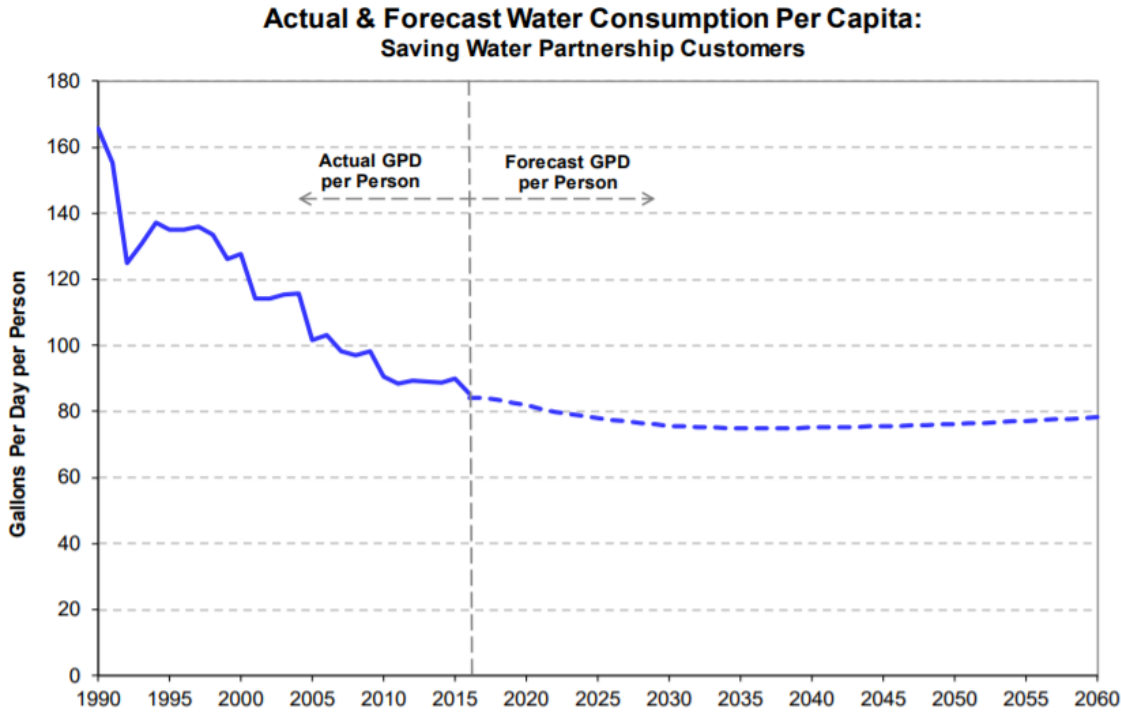
Exhibit C: SPU 2020 Survey of Water Customers – Demand vs. Population Trends



* Population has been adjusted downwards to reflect that some wholesale customers have other sources of supply in addition to what they purchase from SPU.

SPU updates its official water supply yield estimate (a water supply capacity analysis) and long-range water demand forecast when its [Water System Plan](#) is updated or when significant new information becomes available. The [official forecast](#) was most recently updated for the 2019 Water System Plan. The yield estimate shows declining per capita demand from 1990 through data year 2015.¹¹

¹¹ [Seattle Public Utilities Official Yield Estimate and Long-Range Water Demand Forecast.](#)



The [Energy Policy Act of 1992](#), which became law in 1994, mandates a maximum flush volume of 1.6 gallons for toilets manufactured and installed after this date. Prior to enactment of the Energy Policy Act, toilets used from 3.5 to 5 gallons per flush.¹² Considering nearly 30 percent of the average household’s indoor water consumption is used for toilets, improvements to water efficiency of toilets have significantly reduced water consumption.¹³¹⁴

WTD-specific data demonstrating conservation impacts will be provided in Section A of this report.

Report Methodology:

WTD staff performed the research and analysis and prepared the report. An early outline and approach was shared with MWPAAC at their June 2021 [Rates & Finance Subcommittee](#) meeting. Staff communicated that any findings or next steps identified by the report would initiate a process of engagement and feedback with stakeholders.

V. Report Requirements

The following sections of the report are organized to align with the proviso requirements.

¹² SF Gate HomeGuide article on [Federal Regulations on Toilet Gallons](#).

¹³ [EPA information](#) on residential toilets.

¹⁴ [Alliance to Save Energy information on the 1992 toilet standards](#).

- A. A discussion of the history of, and rationale for, the sewer rate cost structure that has resulted in the shifting of the cost burden from commercial/industrial/multifamily housing sectors to single-family homeowners;*
- B. Options for alternative cost structures that would distinguish multifamily ratepayers from commercial and industrial ratepayers; and*
- C. A discussion of the appropriate balance of costs between the residential sector and the commercial/industrial sector in sewer rate revenues, and the criteria impacting that balance.*

A. A discussion of the history of, and rationale for, the sewer rate cost structure that has resulted in the shifting of the cost burden from commercial/industrial/multifamily housing sectors to single-family homeowners

The history and rationale for the sewer rate cost structure, and related historical cost burden shift are specifically related to how an RCE is measured for billing purposes.

The RCE billing unit calculation is based on a 1989 data analysis that does not reflect significant conservation impacts since that time. A barrier to updating the factor for current data is that the factor is specified in all 34 LSA contracts.

According to internal WTD historical data, the single-family share of total RCEs and revenue climbed steadily from 45 percent in 1996 to over 57 percent in 2020. RCE totals for each customer class determines the share of revenue generated from each class. Every RCE is charged one sewer rate; for example, every RCE in 2021 is charged the 2021 sewer rate of \$47.37. The equivalency assumed in the RCE calculation is where the historical cost shift can be evaluated.

The rationale for the sewer rate cost structure relates to a customer classes' cost of service, or the relative burden one classification of customer places on the system relative to other classes. Sewer systems are built to handle two primary demand elements: flows and loadings. Loading relates to the strength of the sewage flows and WTD maintains an industrial surcharge assessed to organizations or industries that generate higher strength sewage.¹⁵ The industrial class represents commercial customers with higher than domestic (typical residential) strength sewage flows. All other classes are assumed to have similar domestic strength sewage discharge. That leaves flow as the demand factor to be measured as a differential for determining capacity demand placed on the system, and therefore a reasonable way to apportion proportionate cost shares.

With few exceptions, sewer flows are not metered in the same way as water use. The relationship between what comes out of the tap and goes down the drain has been established as a proxy for sewer flows. The exception to this is water that does not enter the sewer system, such as irrigation water or water used to wash a car in the driveway and enters the storm drain.

This is the historical context for the fixed RCE per single-family account. When evaluating water use by class of customer, it is the single-family class that typically exhibits the largest seasonal peak due to the addition of activities, such as irrigation and car washing, and a water use-based sewer rate would charge that class for significant capacity that does not enter the sewer system. Multifamily and commercial

¹⁵ [Industrial Surcharge - King County Wastewater Treatment Division](#)

classes tend to fluctuate less with seasonal use (e.g., summer water use is similar in scale to winter water use).

Historically, single-family has been based on a single unit fixed charge that assumes a level of indoor water use based on winter water use levels. When billing systems became software-based, options to increase equity and distinguish single-family customers became available. Many systems now establish a customer-specific winter average and use that measure as the volume basis to charge each customer for the following year. This allows greater equity among the variety of usage patterns within the single-family class, ranging from an individual to a large family.

The King County equivalency of 750 cf does not specify the basis as winter average or annual average. Records from the time of the 1989 analysis include discussion of winter average for certain systems, but do not indicate winter average was the targeted statistic or the basis for the recommended equivalency. It is possible that a current review and revision to the equivalency after thirty years would include revisions both for conservation effects as well as adjusting to a winter average rather than annual average basis.

In January 2021, WTD implemented a new capacity charge rate structure for single-family that created new customer classes based on people per household and structured based on home square footage. The capacity charge is the customer connection charge assessed to new development and paid over 15 years. The County has flexibility to make updates to the structure since it is not defined by the contracts.¹⁶ Winter average data for homes of varying sized new development was surveyed and analyzed. The study found that the winter average for all surveyed single-family was 581 cf (5.81 ccf unit highlighted in table) per month, over 20 percent lower than the 750 cf equivalency currently in use to convert a volume-based customer to a single-family equivalency.

¹⁶ Updates to the capacity charge rate structure require King County Council approval.

Exhibit E: Capacity Charge Rate Structure Study – Winter Average

Residential Data by Unit Size	Number of Buildings	Avg Units per Building	Total Units	Avg Usage per Building	Avg Usage Per Unit	Multiple of Medium Single Family	Living Area Square Feet per Unit	Total Living Area (square feet)	Avg Usage/1,000 s.f. Living Area
Single Family:									
Large SF (>3,000 s.f.)	4,599	1.0	4,599	6.8 ccf/mo	6.79 ccf/mo	1.24	3,645	16,763,355	1.86 ccf/mo
Medium SF (1,501-3,000 s.f.):									
2,801-3,000 s.f.	1,213	1.0	1,213	5.9 ccf/mo	5.88 ccf/mo	1.08	2,908	3,526,918	2.02 ccf/mo
2,601-2,800 s.f.	1,279	1.0	1,279	5.8 ccf/mo	5.76 ccf/mo	1.05	2,702	3,456,013	2.13 ccf/mo
2,401-2,600 s.f.	1,803	1.0	1,803	5.9 ccf/mo	5.86 ccf/mo	1.07	2,509	4,522,523	2.34 ccf/mo
1,501-2,400 s.f.	6,128	1.0	6,128	5.2 ccf/mo	5.21 ccf/mo	0.95	2,007	12,298,394	2.60 ccf/mo
Total Medium SF	10,422	1.0	10,422	5.47 ccf/mo	5.47 ccf/mo	1.00	2,284	23,803,848	2.39 ccf/mo
<i>Grouping Options - Medium SF:</i>									
2,401-3,000 s.f.	4,294	1.0	4,294	5.8 ccf/mo	5.84 ccf/mo	1.07	2,679	11,505,454	2.18 ccf/mo
1,501-2,800 s.f.	9,209	1.0	9,209	5.4 ccf/mo	5.41 ccf/mo	0.99	2,202	20,276,930	2.46 ccf/mo
1,501-2,600 s.f.	7,930	1.0	7,930	5.4 ccf/mo	5.36 ccf/mo	0.98	2,121	16,820,917	2.53 ccf/mo
<i>Small SF (<=1,500 s.f.):</i>									
1,001-1,500 s.f.	918	1.0	918	5.0 ccf/mo	5.0 ccf/mo	0.91	1,294	1,187,892	3.84 ccf/mo
<=1,000 s.f.	131	1.0	131	4.4 ccf/mo	4.4 ccf/mo	0.80	868	113,708	5.01 ccf/mo
Total Small SF	1,049	1.0	1,049	4.9 ccf/mo	4.9 ccf/mo	0.89	1,241	1,301,600	3.94 ccf/mo
<i>Grouping Options - Small & Medium SF:</i>									
Total Medium/Small SF									
<=2,800 SF	10,258	1.0	10,258	5.4 ccf/mo	5.36 ccf/mo	0.98	2,104	21,578,530	2.55 ccf/mo
<=2,600 SF	8,979	1.0	8,979	5.3 ccf/mo	5.30 ccf/mo	0.97	2,018	18,122,517	2.63 ccf/mo
<=2,400 SF	7,177	1.0	7,177	5.2 ccf/mo	5.16 ccf/mo	0.94	1,895	13,599,994	2.72 ccf/mo
<i>All Single Family:</i>									
Large SF	4,599	1.0	4,599	6.79 ccf/mo	6.79 ccf/mo	1.24	3,645	16,763,355	1.86 ccf/mo
Medium SF	10,422	1.0	10,422	5.47 ccf/mo	5.47 ccf/mo	1.00	2,284	23,803,848	2.39 ccf/mo
Small SF	1,049	1.0	1,049	4.89 ccf/mo	4.89 ccf/mo	0.89	1,241	1,301,600	3.94 ccf/mo
Total Single Family	16,070	1.0	16,070	5.81 ccf/mo	5.81 ccf/mo	1.06	2,605	41,868,803	2.23 ccf/mo
<i>All Residential:</i>									
Micro-units	14	67.1	939	91.9 ccf/mo	1.37 ccf/mo	0.25	321	301,547	4.27 ccf/mo
Multi-family excl. micro-units	178	22.3	3,962	99.7 ccf/mo	4.48 ccf/mo	0.82	1,007	3,989,462	4.45 ccf/mo
Single Family	16,070	1.0	16,070	5.8 ccf/mo	5.81 ccf/mo	1.06	2,605	41,868,803	2.23 ccf/mo
Total Residential	16,262	1.3	20,971	6.9 ccf/mo	5.36 ccf/mo	0.98	2,201	46,159,812	2.43 ccf/mo



The [SPU 2020 Summary of Annual Wholesale Customers](#) identifies a range of single-family monthly averages for purposes of calculating sample water bills. The text that follows cites lowered consumption assumptions as of the 2016 report. The medium customer winter average was reduced from 800 cf (8 ccf table) to 600 cf (6 ccf table) citing significant decline since the mid-1990s. The updated 600 cf assumption is in line with the winter average finding from the capacity charge study.

Exhibit F: SPU Household Consumption – 2020 Annual Survey

Monthly Consumption Levels Used in Calculating Bills

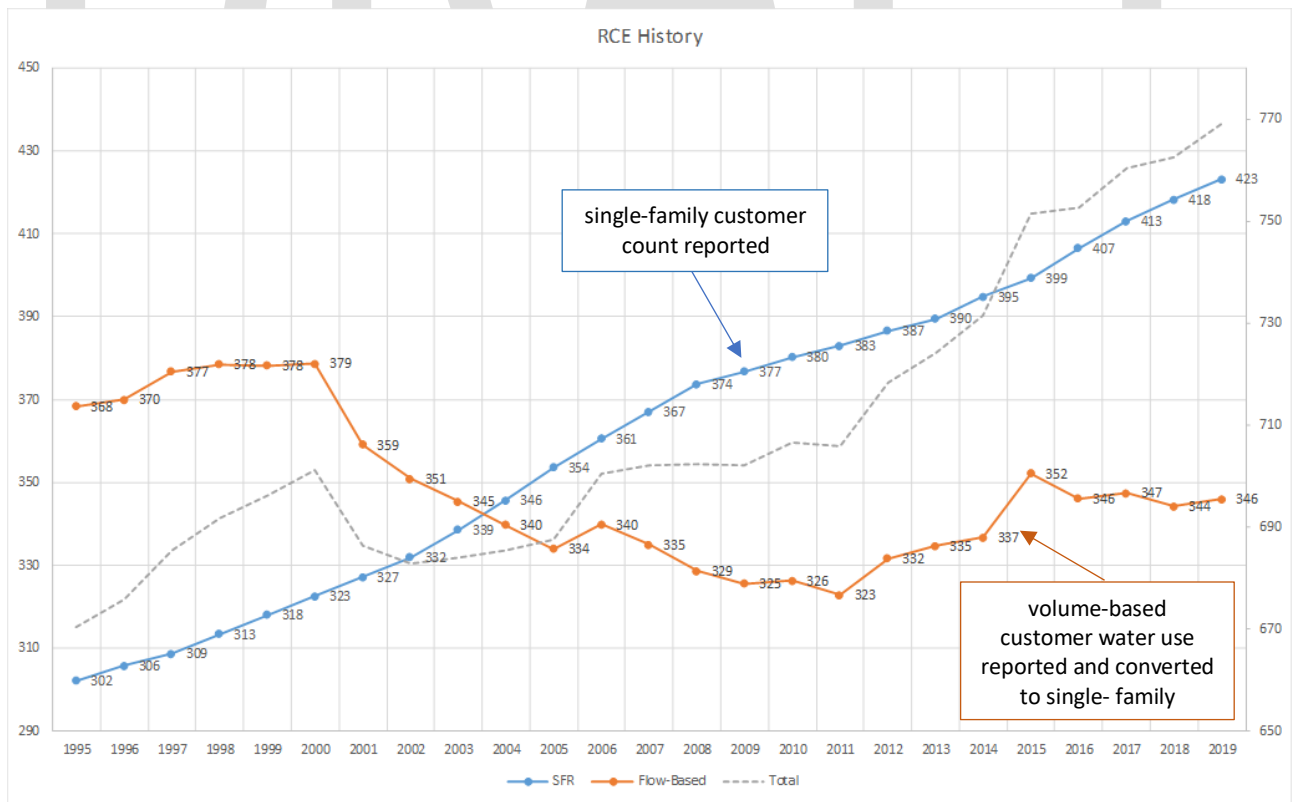
Level of Household Consumption	Winter	Summer	Average Annual
Low	3.5 ccf/mo	5 ccf/mo	4 ccf/mo
Medium	6 ccf/mo	9 ccf/mo	7 ccf/mo
High	12 ccf/mo	21 ccf/mo	15 ccf/mo

Note that as of the 2016 survey, these consumption levels have been lowered from what had been used in all previous survey reports. Medium consumption had been defined as 8 ccf/mo in the winter and 12/ccf/mo or 9.33 ccf/mo on an average annual basis. This reflected typical residential consumption in the mid-1990s for wholesale customers. However, average consumption has declined significantly since then and appears to have leveled off at about 7 ccf/mo (see Table 2-4). The new low, medium, and high consumption levels used for bill comparisons are more representative of current consumption patterns.

King County’s history of RCEs demonstrates that the population growth from Exhibit C is reflected in the growth in single-family RCEs, since they are based on customer count rather than the 750 cf conversion factor.

The volume-based RCE history demonstrates that in the rapid growth of the 1990s, the RCE growth did not generate a steep increase slope due to significant conservation impacts related to the [Energy Policy Act of 1992](#). Even in a growing commercial economy and multifamily housing market, the net effect from 2000 through 2011 was a decline in the RCEs converted from water use.

Exhibit G: WTD RCE History Plot



The sewer rate is set on a per RCE basis so that as a class grows in relative RCEs, it takes on more of the cost recovery through sewer rate charges. The shift in cost burden to single-family residential from the volume-based class is a result of the contracting RCE total in the volume-based class, and growing RCE total in the single-family residential class. The RCE distribution shift is primarily related to the significant impacts of conservation being reflected in the billing basis for the volume-based class, and fixed nature of the single-family residential RCE.

B. Options for alternative cost structures that would distinguish multifamily ratepayers from commercial and industrial ratepayers

Options for alternative cost structures that would distinguish multifamily ratepayers from commercial and industrial ratepayers would be evaluated based on industry guidance that includes considerations of equitable cost allocation, revenue stability, and administrative feasibility.

The volume-based customer class includes the metered water use from all customer classes except single-family residential; therefore, multifamily residential billing data is included in the volume-based class.

This section describes ways to distinguish the multifamily customer class, as well as summarize alternative industry cost structures used to charge the multifamily customer class.

Distinguishing the multifamily class from other classes, such as commercial and industrial, would require working with LSAs to determine the feasibility of reporting multifamily water use as a separate data field in their quarterly reports to the County to distinguish this class from the aggregated reported water use.

The WTD billing system would require modification to incorporate the additional data fields for multifamily meter readings, deductions, and resulting RCEs.

Exhibit H shows a sample of the WTD online reporting system for agency billing data.

Exhibit H: Billing Data Portal – Volume-based Customer Reporting

Residential Customer Equivalents		
7.	Total water consumption (cu. ft.) based upon meter readings during quarter for customers billed other than single-family residential	251,670
Deductions		
8.	Water consumption where sewerage is metered (cu. ft.)	<input type="text"/>
9.	Water not entering sanitary facilities of customers (cu. ft.)	<input type="text"/>
10.	Water consumption for customers whose sewerage is disposed of outside King County area by a government agency not under contract with King County (cu. ft.)	<input type="text"/>
11.	Other deductions Explain by attachments if necessary	<input type="text"/>
12.	Total deductions Sum of Lines 8-11	
13.	Adjusted water consumption (cu. ft.) Line 7 minus Line 12	251,670
14.	Metered sewerage flow (cu. ft.)	
15.	Total consumption for sewer charge purposes (cu. ft.) Line 13 plus Line 14	251,670
16.	Residential customer equivalents Line 15 divided by 2,250	112

Rate structures are evaluated by utilities for rate setting based on a variety of measures. [The American Water Works Association \(AWWA\) Manual 1 \(M1\) Principles of Water Rates, Fees, and Charges](#) is typically referred to as the preeminent industry source for utility rate setting guidance. Regarding guidance for evaluating rate structure alternatives M1 states,

“Rate objectives common to many utilities and their customers include

- *Yielding necessary revenue in a stable and predictable manner*
- *Minimizing unexpected changes to customer bills*
- *Discouraging wasteful use and promoting justified uses*
- *Promoting fairness and equity*
- *Avoiding discrimination*

- *Maintaining simplicity, certainty, convenience, feasibility, and freedom from controversy*
- *Compliance with all applicable laws”*

These objectives are generally addressed by evaluating a stable revenue forecast versus equity across all members of a rate class. There is an inverse relationship between rate stability and equity, meaning that improving one often results in reducing the other.

The indirect nature of charges to multifamily residents must be a consideration in reviewing alternative cost/rate structures. While WTD as a wholesale service provider has an indirect relationship to all of the end users of the sewer system who are directly billed by the LSAs, there is an additional indirect layer for multifamily due to the LSAs typically maintaining a customer account at the landlord level and not on a per unit level for multifamily properties. For example, the SPU water rate classes distinguish separately Residential for individually metered residential customers and Master Meter Residential for multiunit residential, such as apartment buildings or duplexes that share a single meter. SPU bills all multifamily through landlord accounts in the Master Meter Residential Class.

SPU water and sewer low-income customer assistance programs are facilitated through Seattle City Light accounts, which are metered and billed at the per unit level. Water and sewer bill low-income discounts are credited to qualifying multifamily customers through their Seattle City Light bill. This SPU program represents one of the innovative ways the industry is approaching customer assistance for what is referred to as a Hard to Reach (H2R) customer subset.¹⁷

Given that LSAs are in an indirect and wholesale-like relationship with the individual multifamily unit residents, it is then the landlord that determines how the cost of water and sewer service are charged to residents in their buildings. Any cost impact to the class may not have a direct impact on an individual multifamily household.

There are three available data points to consider when determining multifamily retail rate structures: (1) the number of billed accounts, (2) the metered water use from a multifamily building, and (3) the number of units served by the billed account.

As with all customer class structures, multifamily rate structures are varying combinations of fixed charges and volume (flow) charges. Multifamily has the added fixed charge data point of number of units.

While fixed charges accomplish a key rate-setting objective well, yielding necessary revenue in a stable and predictable manner, they are not as effective at promoting fairness and equity. Equity is more tailored under a volume-based structure that ties the size of the charges to the customer-specific and time-specific demands on the system. Using metered water use as a proxy for sewage flows allows the capacity needs of the system to tie cost recovery to relative demands placed on the system. The existing volume-based structure applied to the multifamily class is the most equitable industry approach.

Alternatives include instituting a structure that in part or in total bases the multifamily sewer rate charges on a fixed measure, such as the number of units served, which is typically a standard fraction of a single-family equivalent. King County’s capacity charge utilizes the industry approach of sizing multifamily as a fraction of single-family. Though the upfront assignment of an RCE before a service relationship is established with metered water use billing history requires estimating customer capacity needs to assign an RCE. While the capacity charge must be set before customer billing data can indicate

¹⁷ Information on Hard to Reach customers is available [here](#).

capacity demand, ongoing sewer service rate billing does not have to rely on estimates once metered water use is reported.

Sewer systems are primarily fixed cost systems, meaning service requires significant investment in infrastructure and annual costs vary minimally based on actual current use of the system. This is one justification for moving toward more fixed-charge based sewer billing structures.

A fixed charge for multifamily, similar to single-family as an equivalent unit though smaller, would increase revenue stability to WTD, but would not increase measured equity in charging the multifamily class. Even if the water use assumption assumed in the per unit RCE assignment had a high degree of accuracy, the variation of multifamily unit sizes among multifamily landlord accounts would reduce equity in cost recovery when compared to the volume-based structure in place.

The evolving capability of software billing systems has allowed the sewer industry to move away from predominately fixed charge systems in implementing water use-based structures, including for single-family. The Municipal Research and Services Center ([MRSC](#)) 2017 posting, [Sewer Rate Structures for Utilities](#) highlights this topic.

“Volumetric rates have historically been more commonly used for commercial and multifamily customers (when treated similarly to commercial customers for ratemaking purposes). Volumetric rates are applied to usage over any amount built into the base rates.

Single-family customers are less likely to be separately metered for fire flow or irrigation water and, as a result, their water demand less accurately represents their sewer flows. For this reason, flat sewer rates have historically been most common for these customers.

In recent years, an increasing number of utilities have been moving away from flat, single-family sewer rates and shifting to (or at least considering) volume-based rates. This shift is prompted by a number of reported upsides, including improved equity in cost recovery, reinforcement of conservation-oriented price signals embedded in water rates, and enhanced affordability for low users.”

The MRSC posting further identifies the most common structure applied, relating back to the winter average measures for single family residential.

***“Tailored Fixed Rate:** This is the most common approach. In it, a utility calculates winter-average usage for each customer on an annual basis and uses that calculated volume to determine the fixed rate to apply to the customer for the following year. The winter-average usage is usage that occurs during a defined “winter” period when a customer is unlikely to use irrigation. Utilities that use this approach typically update a customer’s winter-average volume on an annual basis and will use a system-average volume for new customers that have yet to establish a demand history.*

Highlighting single-family rate structure alternatives informs the discussion of multifamily customer class equity since equity is a relative measure. While the existing multifamily class rate structure includes a high degree of equity, if another class is not as equitably measured, cost shifts can occur that are not based on equitable cost sharing.

C. A discussion of the appropriate balance of costs between the residential sector and the commercial/industrial sector in sewer rate revenues, and the criteria impacting that balance

The appropriate balance of costs between the residential sector and the commercial/industrial sector in sewer rate revenues could be assessed based on updating the RCE flow assumption to reflect current single-family water use data for the WTD service area.

While volume-based customer classes are charged based on a structure that prioritizes equity, utilizing metered water use to generate a pro rata share of use of system capacity, the single-family residential class assumed flow assumption may no longer create the intended equivalency as it uses a data point that predates significant conservation changes to water use.¹⁸ This section will summarize what the appropriate balance of costs could look like and potential outcomes if the equivalency were updated. Any changes would require significant stakeholder engagement and revisions to the sewage disposal contracts, so the content of this section will be limited to analysis and summary of potential impacts.

The historical shift of cost to the single-family class relates to the fixed nature of the way that RCEs in the system are calculated. While the flow-based classes have seen their billing basis contract with conservation, the single-family billing basis assumes a fixed usage level that predates conservation in sizing their equitable share of systems costs.

In order to test potential impacts, a placeholder of 600 cubic feet is utilized to calculate key outcomes, including total system RCEs, the sewer rate, and customer impacts.

The sewer rate is a function of two data points: 1) the total annual revenue requirement of the sewer system (\$) divided by 2) the total RCEs that will be billed. A revision downward to the conversion factor from 750 cf to 600 cf increases the denominator (total RCEs), lowering the cost per RCE (the sewer rate). For a commercial establishment, or multifamily building with metered water use of 3,000 cubic feet in a month, King County would bill the LSA for four RCEs under the current conversion of 750 cf per month. If the conversion were revised to 600 cf, the LSA would be billed for five RCEs. Applying the RCE impacts to system-wide reported water use, using rounded estimates of 2020 RCEs, Exhibit I shows the distribution of RCEs and costs based on the sample updated measure of a single-family flow unit. The sewer rate is based on collecting the same total revenue, i.e. it is determined based on a revenue neutral change to the RCE conversion. The balance of costs to the single-family class shifts from 57 percent to 51 percent.

Exhibit I: Sample RCE Conversion Revision – Total RCEs and Sewer Rate Impact

Sample Conversion Update Impact	RCEs @ 750 cf	Rate	RCEs @ 600 cf	Rate	change
2020 RCEs and Rate	740,000	\$45.33	819,550	\$40.93	-\$4.40 -10%
Single Family Residential	57% 421,800	\$45.33	51% 421,800	\$40.93	
Flow-based	43% 318,200	\$45.33	49% 397,750	\$40.93	

Under this sample conversion factor correction, the sewer rate goes down by ten percent. Since single-family customers are one RCE and pay one sewer rate, this sample would indicate that single-family customers are currently subsidizing the volume-based class at a ten percent payment over their equitable share. While volume-based customers would also be charged a lower sewer rate, it would be applied to a larger converted RCE measure. For example, a 3,000 cf reported water use would be converted to four (3,000/750 cf) RCEs times the 2020 sewer rate of \$45.33 with a billing equal to \$181.

¹⁸ Pro rata is a term used to describe a proportionate allocation. It essentially translates to "in proportion," which means a process where whatever is being allocated will be distributed in equal portions.

The updated conversion factor would result in conversion to five RCEs (3,000/600 cf) times the lower sewer rate of \$40.93 with a billing equal to \$205. This change represents a 13 percent bill increase to begin paying their equitable share and correct the subsidy from the single-family class. Of note, not all LSAs pass-through the WTD sewer rate structure. Some LSAs, including SPU, treat the WTD billing as a line item in the total utility costs, and set sewer rates for their customer classes based on the agency's evaluation of equitable cost allocation to their own customer classes. Any rebalancing among WTD classes would not have a direct impact to an SPU commercial customer.

Each LSA has a varying distribution of customer classes. Any cost shift among customer classes will have varying impacts to each agency's billing. Exhibit J compares the Quarter 4, 2020 year-end RCE totals for each agency at 750 cf, to the equivalent RCEs under a 600 cf factor.¹⁹ It also includes the estimated LSA bill impact reflecting the lower sewer rate per RCE. Potential shifts among agencies vary by share of single-family versus volume-based RCEs.

The largest percentage increases include Cross Valley Water District with all volume-based RCEs and Tukwila with 84 percent volume-based RCEs. The largest decreases include multiple Districts and the City of Black Diamond. While Exhibit J provides an estimated impact, volume-based customers are billed based on average RCEs reported over the previous year, meaning any impacts from a change to the factor would phase in over a year. Additional policy-based phase-in strategies would likely be considered as well.

¹⁹ RCEs are reported by LSAs and billed by WTD quarterly.

Exhibit J: LSA Cost Shifts under Sample Conversion Factor Revision

Sample Conversion Factor Revision Agency Cost Shift	2020 RCEs 750 cf	% of RCEs & Revenue	2020 RCEs 600 cf	% of RCEs & Revenue	Net LSA Bill Change %
Local Sewer Agencies - Cities					
Algona	1,421	0.2%	1,514	0.2%	-3.7%
Auburn	30,056	4.1%	34,246	4.2%	3.0%
Bellevue	60,345	8.2%	67,299	8.2%	0.8%
Black Diamond	1,329	0.2%	1,345	0.2%	-8.5%
Bothell	7,833	1.1%	8,594	1.1%	-0.8%
Brier	1,814	0.2%	1,877	0.2%	-6.5%
Carnation	1,168	0.2%	1,239	0.2%	-4.1%
Issaquah	12,945	1.8%	14,466	1.8%	1.1%
Kent	37,130	5.0%	43,106	5.3%	5.0%
Kirkland	15,237	2.1%	16,531	2.0%	-1.9%
Lake Forest Park	4,048	0.5%	4,161	0.5%	-7.1%
Mercer Island	8,696	1.2%	9,078	1.1%	-5.6%
Pacific	2,710	0.4%	3,001	0.4%	0.1%
Redmond	30,112	4.1%	33,830	4.1%	1.6%
Renton	30,106	4.1%	33,589	4.1%	0.9%
Seattle	284,918	38.5%	317,776	38.9%	0.9%
Tukwila	6,719	0.9%	8,138	1.0%	9.5%
Subtotal	536,587	72.6%	599,787	73.3%	1.1%
Local Sewer Agencies - Sewer Districts and Tribe					
Alderwood Water & Wastewater District	50,649	6.8%	54,637	6.7%	-2.5%
Cedar River Water & Sewer District	5,489	0.7%	5,832	0.7%	-3.9%
Coal Creek Utility District	4,371	0.6%	4,673	0.6%	-3.3%
Cross Valley Water District	384	0.1%	480	0.1%	13.0%
Highlands Sewer District	106	0.0%	106	0.0%	-9.4%
Lakehaven Utility District	1,053	0.1%	1,054	0.1%	-9.5%
Muckleshoot Indian Tribe	366	0.0%	378	0.0%	-6.5%
NE Sammamish Sewer & Water District	4,822	0.7%	4,846	0.6%	-9.1%
Northshore Utility District	29,834	4.0%	32,293	3.9%	-2.1%
Olympic View Water & Sewer District	207	0.0%	207	0.0%	-9.6%
Ronald Wastewater District	19,674	2.7%	20,792	2.5%	-4.4%
Sammamish Plateau Water & Sewer District	16,364	2.2%	17,530	2.1%	-3.1%
Skyway Water & Sewer District	5,375	0.7%	5,736	0.7%	-3.5%
Soos Creek Water & Sewer District	38,472	5.2%	39,915	4.9%	-6.2%
Valley View Sewer District	14,909	2.0%	16,858	2.1%	2.2%
Vashon Sewer District	913	0.1%	1,036	0.1%	2.6%
Woodinville Water District	5,701	0.8%	6,408	0.8%	1.6%
Subtotal	198,689	26.9%	212,781	26.0%	-3.2%
Non-Municipal Participants and Other Customers					
Total	739,482	100.0%	817,825	100.0%	0.0%

VI. Conclusion/Next Steps

The RCE conversion factor is the primary rate structure element that determines equity among customer classes. It is based on data collected in 1989 before significant conservation trends in water use.

The conversion factor is fixed in the sewage disposal contracts with the agencies and despite KCC language directing that it be reviewed periodically to ensure that accounts pay their fair share of the cost of the system, any change based on review would require revising sewage disposal contracts with all 34 agencies.

The conversion factor is potentially overstating the single-family equivalent flow contribution, and therefore likely requiring single-family customers to bear a portion of the costs of the system attributable to other customer classes' system capacity demands.

The multifamily class is not submetered for water or sewer service. The account and billing relationship resides with the property owner/landlord, who then determines how utility costs will be passed on to residents. The existing multifamily cost/rate structure based on metered water use is more equitable than the fixed charge rate structure alternatives. However, the multifamily class could be distinguished from the other volume-based classes if the LSAs agreed to separately reporting multifamily metered water use.

There are opportunities to improve equity within the single-family rate structure, in particular a study of the current single-family winter average water use in the WTD service area to evaluate a current equitable conversion factor, and pursuing a contract amendment to revise the conversion factor when sewer contract negotiations resume pending completion of the Clean Water Plan. A significant engagement effort with MWPAAC on this topic is recommended to gather feedback and input and develop a collaborative path forward.

VII. Appendices

Appendix A: Findings and Recommendations on Structure of Metro Charges to Component Agencies – Rate Structure Advisory Committee, June 1989

Appendix B: October 1989 Metro Letter – 1989 Avg. Single-Family Residential Water Consumption