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SPU Drainage Rates SUM Ex A
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Version #1

Seattle Public Utilities
2016-2018
Drainage and Wastewater
Rate Study

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PREFACE - STRATEGIC BUSINESS PLAN COMPARISON

Seattle City Council Resolution 31534, passed August 11, 2014, adopted a six-year Strategic Business Plan ("SBP") for Seattle Public Utilities ("SPU") which guides utility investments, service levels, and rate paths through 2020. While not a formal rate package, the SBP does give guidance and create accountability for the rate setting process. **Table P-1** compares the overall wastewater and drainage rate increases for 2016-2018 with those in the SBP.

Table P-1

Comparison of Overall Wastewater and Drainage Rate Increases

	2016	2017	2018
Wastewater			
Strategic Business Plan	*3.9%*	*1.8%*	*2.8%*
Ordinance	**3.6%**	**0.1%**	**1.2%**
Estimated Passthrough	*0.0%*	*4.5%*	*0.8%*
Increase with Passthroughs	*3.6%*	*4.6%*	*2.0%*
Drainage			
Strategic Business Plan	*10.1%*	*8.1%*	*7.8%*
Ordinance	**9.9%**	**8.4%**	**5.9%**
Estimated Passthrough	*0.0%*	*1.6%*	*1.7%*
Increase with Passthroughs	*9.9%*	*10.0%*	*7.6%*

The increases with passthroughs assume projected King County treatment rate increases of 0.0% in 2016, 6.5% in 2017 and 1.8% in 2018, which are higher than the 1.9%, 4.2% and 1.5%, respectively, in the SBP. Since the adoption of the SBP, several other factors for the Drainage and Wastewater Fund ("DWF") have changed, which result in the lower increases for 2016 and 2018, and higher rate increases for 2017. **Tables P-2** and **P-3** highlight changes from the SBP and the impact of those changes on proposed rate increases for 2016, 2017 and 2018.

Table P-2
Rate Impacts of Changes Since SBP on Proposed Rate Increases
Wastewater
($ in millions)

	2016 $ Change from SBP	% Change in RevReq	2017 $ Change from SBP	% Change in RevReq	2018 $ Change from SBP	% Change in RevReq
Expenditure						
Operations and Maintenance (O&M) & Taxes	($4.0)	(1.6%)	$0.0	0.0%	$0.4	0.2%
Capital Financing	$3.5	1.4%	($0.2)	(0.1%)	$5.2	2.0%
Other Financial Policy Requirements	$3.2	1.3%	$9.6	3.8%	$0.3	0.1%
Total Expenditure Requirement	**$2.7**	**1.1%**	**$9.4**	**3.7%**	**$5.9**	**2.3%**
Other Funding Sources	($1.1)	(0.4%)	($0.9)	(0.4%)	($0.8)	(0.3%)
Change in Revenue Requirement		**0.6%**		**3.4%**		**2.0%**
Strategic Business Plan Rate Increases		**3.9%**		**1.8%**		**2.8%**
Change in Revenue Requirement		0.6%		3.4%		2.0%
Treatment Cost, Consumption Change, & Low Income Credit		(0.9%)		(0.6%)		(2.8%)
Proposed Increases with Estimated Passthroughs		**3.6%**		**4.6%**		**2.0%**

Table P-3
Rate Impacts of Changes Since SBP on Proposed Rate Increases
Drainage
($ in millions)

	2016 $ Change from SBP	% Change in RevReq	2017 $ Change from SBP	% Change in RevReq	2018 $ Change from SBP	% Change in RevReq
Expenditure						
Operations and Maintenance (O&M) & Taxes	($1.9)	(1.7%)	($1.0)	(0.9%)	($1.7)	(1.4%)
Capital Financing	($5.2)	(4.7%)	$3.1	2.7%	$2.3	1.8%
Other Financial Policy Requirements	$4.8	4.4%	($2.7)	(2.3%)	($1.2)	(0.9%)
Total Expenditure Requirement	**($2.3)**	**(2.1%)**	**($0.6)**	**(0.5%)**	**($0.7)**	**(0.5%)**
Other Funding Sources	($0.4)	(0.3%)	($0.3)	(0.3%)	$0.3	0.3%
Change in Revenue Requirement		**(2.4%)**		**(0.8%)**		**(0.3%)**
Strategic Business Plan Rate Increases		**10.1%**		**8.1%**		**7.8%**
Change in Revenue Requirement		(2.4%)		(0.8%)		(0.3%)
Treatment Cost, Consumption Change, & Low Income Credit		(1.8%)		2.7%		0.1%
Port Leaving		4.0%		0.0%		0.0%
Proposed Increases with Estimated Passthroughs		**9.9%**		**10.0%**		**7.6%**

The resultant higher treatment costs are reflected in the proposed rate increases and one of the reasons the 2016 rate change is lower and the 2017 rate change is higher than the SBP. The most significant change is higher assumed year-end cash balances due to the spreading of the current cash balance over more years. At the end of 2015, SPU projects a year-end cash balance that is $6 million higher compared to the SBP due to increased consumption and reimbursements from other City Departments. SPU proposes using available operating cash balances for two primary purposes. The first is to offset the impact of the Port of Seattle no longer paying drainage fees beginning in 2016. The Port is the only entity in the City limits with the legal statutory authority to form a separate utility. In 2015, the Port of Seattle formed its own stormwater utility, resulting in an estimated loss of over $4 million in drainage fees to the DWF beginning in 2016. For the second use of cash reserves, SPU proposes maintaining higher year-end cash balances, equivalent to 45 days of operating expense ($30.9 million in 2016) compared with SBP estimates assuming the policy of one month of treatment costs ($12.9 million in 2016). This higher cash balance allows SPU to maintain a higher debt service coverage ratio of 2.0 or higher (compared with 1.80 per the financial policy) and will increase the likelihood of the DWF maintaining its strong bond ratings. As the DWF embarks on a substantial capital program due to required Federal and State regulations, it is important to maintain SPU's current strong bond rating, which will enable debt financing at favorable interest rates. Finally, higher 2014 actual consumption, and an improved forecast for 2015-2018, enables SPU to use available cash to finance capital in 2015, both reducing and delaying the nextbond issue compared to the SBP.

Total Operations and Maintenance (O&M) and taxes has decreased from the SBP. The majority of the decrease ($3 million per year) is related to shifting rehabilitation-related funding expenditures to CIP. An additional $500k O&M reduction was primarily due to bringing certain bodies of work in house. Offsetting part of the decreases are some O&M increases driven mostly labor forecasts, an apprentice class and additional expenditures related to increase IT maintenance costs. These costs were unknown at the time of the SBP adoption.

While generally not *revenue requirement drivers*, changing demand for sewer and utility discount program participation are significant *rate drivers*. As the economy continues to recover from the recession at the beginning of the decade, the decline in water consumption, and hence sewer, has slowed. As new data has become available, sewer consumption forecasts have been adjusted upward, which allows the revenue requirement to be spread over more units and lowers rates. **Table P-4** compares the sewer consumption forecast used in the SBP and the current projection.

Table P-4
Sewer Consumption Forecast
(ccf in thousands)

	2016	2017	2018
Strategic Business Plan Consumption	20,507	20,367	20,203
Rate Study Consumption	20,780	20,796	20,801
Consumption Forecast Increase	273	429	598
Percentage Increase	1.3%	2.1%	3.0%

Both the SBP and this rate proposal include impacts of the Mayor's initiative to double the participation in the Utility Discount Program (UDP) by 2018. UDP participation has increased 16 percent over the year ending 12/31/14. As a result, there is no significant update to the UDP growth assumption from the SBP.

1. EXECUTIVE SUMMARY

The Drainage and Wastewater Utility provides wastewater and stormwater management services to residences and businesses in the City of Seattle. It is supported almost entirely by utility fee revenue. For wastewater, SPU collects charges based on metered water usage via the SPU combined utility bill. For drainage, SPU charges City of Seattle property owners fees based on property characteristics contributing to stormwater runoff. The drainage fee appears as a line item on King County property tax bills. Wastewater and drainage rates consist of a system component, set to recover SPU expenses, and a treatment component, set to recover payments to King County and Southwest Suburban Sewer District, whose facilities treat the wastewater conveyed by SPU's system.

Wastewater and drainage rates were last increased on January 1, 2015, when wastewater rates were increased by 0.8 percent and drainage rates were increased by 9.8 percent.

Since 2008, a percentage of the costs associated with the combined stormwater and wastewater system ("Combined System"), previously assigned solely to wastewater, have been recovered through drainage rates in order to recognize that a portion of these costs support the drainage system.

Rate increases for both drainage and wastewater will be necessary in 2016, 2017, *and* 2018 for the DWF to cover increasing operating and capital expenses, which are required to address significant needs for both systems. Cash and debt financing of new capital projects is a major driver of rates for both drainage and wastewater. Some of the major capital programs proposed for 2016-2018 are:

- Flooding Control and Sanitary Sewer Capacity
- Green Stormwater Infrastructure
- Pump Station and Sewer Pipe Rehabilitation
- Protecting Seattle's Waterways

Per Seattle Municipal Code, 21.28.040, the King County treatment rate is adopted via the "pass-through mechanism." As a result, legislation adjusting City of Seattle rates for the King County treatment rate will be submitted separately. In 2017 and 2018, treatment rate increases of 6.5% and 1.8%, respectively, are assumed in the rate presentation. The County last increased the treatment rate in 2015, but SPU chose to absorb the increase with excess cash on hand.

The total projected DWF direct service rate revenue requirement is $358.1 million in 2016, $379.6 in 2017, and $392.9 million in 2018. In order to satisfy these revenue requirements, the typical monthly residential wastewater bill, including estimated passthroughs, will require an increase of $1.85 in 2016, $2.45 in 2017, and $1.12 in 2018. Also, the typical monthly residential drainage fee will need to increase by $3.30 in 2016, $3.43 in 2017, and $2.92 in 2018.

The proposed rate increases will allow the DWF to meet or exceed all financial policy targets in 2016, 2017, and 2018. Table 1-1 presents the annual revenue requirements and the monthly impact of the proposed fees for different drainage customers and the typical residential wastewater customer. Note

Table 1-1 includes the estimated King County treatment rate increases for 2017 and 2018 where noted. These increases have not been adopted by County Council and are subject to change.

Table 1-1

Proposed Drainage & Wastewater Revenue Requirement and Bill Impacts with Proposed King County Treatment Rate Increase

	2015 Projected	2016 Proposed		2017 Proposed		2018 Proposed	
			Change from 2015		Change from 2016		Change from 2017
Revenue Requirement ($M)[1]							
Wastewater[2]	$241.4	$250.9	$9.5	$261.9	$11.0	$266.6	$4.6
Drainage	$101.7	$107.2	$5.4	$117.7	$10.5	$126.3	$8.7
Total DWF	**$343.1**	**$358.1**	**$15.0**	**$379.6**	**$21.5**	**$392.9**	**$13.3**
Wastewater							
Rate per CCF							
Treatment	$7.69	$7.69	$0.00	$7.69	$0.00	$7.69	$0.00
System	$4.15	$4.58	$0.43	$4.59	$0.01	$4.74	$0.15
Total Before Passthrough	**$11.84**	**$12.27**	**$0.43**	**$12.28**	**$0.01**	**$12.43**	**$0.15**
Estimated Impact of	*$0.00*	*$0.00*	*$0.00*	*$0.56*	*$0.56*	*$0.67*	*$0.11*
Total After Passthrough	*$11.84*	*$12.27*	*$0.43*	*$12.84*	*$0.57*	*$13.10*	*$0.26*
Typical Monthly Residential Bill[1,4]	**$50.91**	**$52.76**	**$1.85**	**$55.21**	**$2.45**	**$56.33**	**$1.12**
Typical Monthly Drainage Bills with							
Typical Residential (5,000-6,999 sq ft)	$29.20	$32.50	$3.30	$35.93	$3.43	$38.86	$2.92
Convenience Store (8,700 sq. ft.)	$73.10	$81.59	$8.49	$88.99	$7.40	$94.94	$5.95
Supermarket (125,000 sq. ft.)	$1,049.00	$1,170.79	$121.79	$1,277.05	$106.26	$1,362.37	$85.32

Table I-1 Notes:

1) Wastewater and drainage revenue requirements, rates, and bill impacts assume rate changes in the King County treatment rate of 6.5% in 2017 and 1.8% in 2018; it is expected that King County will approve rate increases for 2017 and 2018 in mid-2016 and mid-2017.

2) Wastewater revenue excludes industrial surcharge.

3) "CCF" is an industry acronym for 'one hundred cubic feet' and is equivalent to 748 gallons.

4) The typical monthly residential wastewater bill is based on 4.3 ccf per month.

2. FINANCIAL POLICY OVERVIEW

The City of Seattle operates an integrated storm and sanitary sewerage system. Although funded through separate rate structures, the City's stormwater ("drainage") and sanitary sewer ("wastewater") systems share common infrastructure, administrative and maintenance services, debt financing, and financial budgeting and reporting systems.

SPU finances the acquisition, operation, and maintenance of Seattle's drainage and wastewater system through the Drainage & Wastewater Fund. An enterprise fund functions like a self-supporting business that must generate operating revenues, predominantly through user charges (or "rates"), which are sufficient to cover all operating costs and meet financial policy targets. Separate drainage and wastewater service charges, or rates, are the source of most revenues. Non-rate revenues include permit fee revenue**,** operating grants, capital grants, and contributions in aid of construction ("CIAC"). These non-rate revenues reduce the amount of revenue that must be recovered through rates.

Financial policies provide a guiding framework for DWF finances. The policies help determine how much revenue DWF must collect from its customers each year to remain financially healthy while meeting its financial obligations. In addition, financial policies:

- Shape the financial profile that DWF presents to lenders and other members of the financial community;
- Establish DWF's exposure to financial risk; and
- Allocate DWF's costs between current and future ratepayers.

DWF financial policies were adopted by City Council in 2003 by Resolution 30612. The policies and associated targets, as well as their importance are as follows:

Debt Service Coverage Ratio

Debt service coverage should be at least 1.8 times debt service cost in each year on a planning basis. A higher debt service coverage ratio means that more revenue is available after debt payments are made. This reduces financial risk and provides more flexibility to respond to revenue shortfalls.

SPU rates assume maintaining a higher debt service coverage ratio of 2.0 times debt service cost, as part of an ongoing effort to best manage and maintain its strong bond ratings with Moody's and Standard & Poor's rating agencies. A growing Capital Improvement Program necessitates the issuance of debt and maintaining a strong bond rating will enable debt financing at continued favorable interest rates.

Projected coverage, including coverage for a new bond issue in 2016, is well above both the legal bond covenant requirement (1.25) and the policy target (1.80).

Operating Cash Balance

The year-end operating cash balance should be at least equal to one month's contract expenses. The purpose of the cash balance target is to have sufficient cash on hand to pay operating expenses, taking into account the lag between cash disbursements and cash receipts, and to provide a reserve against projection variances. Contract costs for treatment of sewage and stormwater by King County is the DWF's largest expense, thus it is used as a proxy for the DWF cash balance target. In 2015, one month of treatment expenses is $12.2 million.

SPU's rate proposal assumes maintaining higher year-end cash balances, equivalent to 45 days of operating expense ($30.9 million). This higher cash balance in addition to maintaining a debt service coverage ratio as described above, will enable the DWF to better manage its bond rating.

Net Income

Net income should be generally positive. Positive net income is a contingency against projection variances and uncertainties regarding revenues. It is also a signal to bond rating agencies that the City is committed to establishing fees that cover costs.

Net income is projected to be positive for 2016, 2017, and 2018.

Cash Contribution to the Capital Improvement Program (CIP)

The cash contribution to the CIP should be at least 25% of total CIP expenses based on a four-year average. This policy 1) helps to prevent a rapid increase in debt levels and 2) limits the escalation in the debt-to-asset ratio.

The four-year rolling average of cash contribution to the CIP is expected to be at least 25% for 2016, 2017, and 2018.

Debt to Asset Ratio

The ratio of debt to assets should not exceed 70%. This ratio is an indicator of reliance on debt for infrastructure financing. A high ratio suggests less flexibility, as a greater portion of each year's revenues is used to repay debt.

Over the rate period, the debt-to-asset ratio is expected to remain below the 70% threshold.

Variable Rate Debt

No more than 15% of total debt should be variable rate debt. A cap on variable rate debt balances the advantages of lower interest costs with the risk of unexpected increases in interest rates.

The DWF currently does not have any variable rate debt and does not have any plans to issue any variable rate debt.

Table 2-1 presents DWF actual and projected performance of financial policy targets from 2014 to 2020.

Table 2-1

DWF Financial Policy Performance 2014-2020

($ in millions)

Policy	Target	2014 Actual	2015 Projected	2016 Proposed	2017 Proposed	2018 Proposed	2019 Estimated	2020 Estimated
Net Income	Generally Positive	$22.0	$13.5	$16.5	$13.9	$13.4	$27.9	$40.2
Debt Service Coverage	1.8x	2.67	2.24	2.31	2.12	2.02	2.04	2.23
Cash Balance Year End		$99.0	$66.0	$52.5	$49.0	$37.5	$35.0	$36.0
	45 Days Operating Expense	*$28.2*	*$29.9*	*$30.9*	*$31.9*	*$32.9*	*$34.1*	*$35.2*
Cash Financing of CIP	25% (4 year avg)	32%	35%	27.1%	27.1%	27.1%	25%	25%
Debt-to-Asset Ratio	Less than or equal to 70%	59%	57%	60%	64%	67%	65%	66%
Variable Rate Debt	Less than or equal to 15%	0%	0%	0%	0%	0%	0%	0%

3. REVENUE REQUIREMENT

Financial policies provide a guiding framework for drainage and wastewater finances. The policies help determine how much revenue DWF must collect from its customers each year to remain financially healthy. In any year (on a planning basis), the desired revenue requirement is the lowest amount of money necessary to simultaneously satisfy all financial policies in that year. At this desired revenue, some financial policies may be exceeded, but none will be missed – the financial target that is met last is known as the "binding constraint." For this 2016-2018 rate proposal, the binding constraint is the sum of cash required to meet year-end cash balance and CIP cash financing targets. The rates revenue requirement is equal to the total revenue requirement necessary to meet the binding constraint, less any non-rates revenues. Drainage and wastewater service fees (or "rates revenues") typically account for over 95 percent of drainage and wastewater revenues. Non-rate revenues include permit fees, miscellaneous operating revenues, interest income, operating grants, capital grants, and CIAC.

Tables 3-1 and 3-2 summarize the components of change in the drainage and wastewater revenue requirement for 2016, 2017, and 2018. These tables include the estimated impact of the projected King County treatment increases for 2017 and 2018. The top sections of these tables present the components of expense which make up the total revenue requirement. The bottom section of the table presents other sources of funding which reduce the amount of expense which must be recovered through direct service rates. Following the tables below is a more detailed description of the components of change in the revenue requirement.

Table 3-1

Components of the Change in the Wastewater Revenue Requirement

($ in millions)

	2015 Rate Study	2016	$ Change in Rev Req	% Change in Rev Req	2017	$ Change in Rev Req	% Change in Rev Req	2018	$ Change in Rev Req	% Change in Rev Req
Expense										
O&M										
Base O&M	$43.2	$47.1	$3.9	1.8%	$48.6	$1.5	0.6%	$49.7	$1.1	0.4%
Taxes	$29.7	$33.5	$3.8	1.7%	$34.9	$0.4	0.2%	$35.5	$0.4	0.1%
Total	$72.9	$80.7	$7.8	3.5%	$83.5	$2.8	1.1%	$85.2	$1.7	0.7%
Treatment										
King County Treatment	$126.4	$138.3	$11.9	5.3%	$148.0	$9.7	3.9%	$151.1	$3.1	1.2%
Capital Financing										
Cash	$11.1	$26.0	$14.9	6.7%	$15.9	($10.1)	-4.0%	$21.1	$5.2	2.0%
Debt Financing	$17.9	$18.9	$1.0	0.4%	$21.6	$2.7	1.1%	$23.6	$2.0	0.8%
Total	$29.0	$44.9	$15.9	7.1%	$37.5	($7.4)	-2.9%	$44.7	$7.2	2.7%
Total Revenue Requirement	**$228.3**	**$263.9**	**$35.6**	**16.0%**	**$269.0**	**$5.1**	**2.0%**	**$281.0**	**$12.0**	**4.6%**
Other Funding Sources										
Non-Rates Revenue	($5.7)	($5.7)	$0.0	0.0%	($5.6)	$0.1	0.0%	($5.4)	$0.2	0.1%
Cash Balance	$0.4	($7.2)	($7.6)	-3.4%	($1.5)	$5.8	2.3%	($9.1)	($7.6)	-2.9%
Total	($5.3)	($12.9)	($7.6)	-3.4%	($7.1)	$5.9	2.3%	($14.4)	($7.4)	-2.8%
Net Rates Revenue Requirement	**$223.0**	**$250.9**	**$27.9**	**12.5%**	**$261.9**	**$11.0**	**4.4%**	**$266.6**	**$4.6**	**1.8%**
Impact of UDP/Demand				-8.9%			0.2%			0.2%
Effective Change in Rate				**3.6%**			**4.6%**			**2.0%**

Table III-1 Notes:

1) Total Net Rates revenue requirement does not include industrial surcharge.

Table 3-2

Components of the Change in the Drainage Revenue Requirement

($ in millions)

	2015 Rate Study	2016	$ Change in Rev Req	% Change in Rev Req	2017	$ Change in Rev Req	% Change in Rev Req	2018	$ Change in Rev Req	% Change in Rev Req
Expense										
O&M										
Base O&M	$46.7	$53.6	$6.9	7.1%	$56.9	$3.2	3.0%	$59.6	$2.7	2.3%
Taxes	$12.7	$13.9	$1.2	1.3%	$15.3	($0.2)	-0.2%	$16.4	$0.1	0.1%
Total	$59.4	$67.6	$8.2	8.4%	$72.2	$4.6	4.3%	$76.0	$3.8	3.3%
Treatment										
King County Treatment	$8.1	$8.9	$0.8	0.8%	$8.9	$0.0	0.0%	$9.5	$0.6	0.5%
Capital Financing										
Cash	$1.1	$6.7	$5.6	5.8%	$3.3	($3.4)	-3.2%	$5.2	$1.9	1.7%
Debt Financing	$31.0	$32.7	$1.7	1.8%	$37.4	$4.7	4.4%	$40.9	$3.4	2.9%
Total	$32.1	$39.4	$7.3	7.5%	$40.7	$1.3	1.2%	$46.1	$5.4	4.6%
Total Revenue Requirement	**$99.6**	**$115.9**	**$16.3**	**16.7%**	**$121.8**	**$5.9**	**5.5%**	**$131.6**	**$9.8**	**8.4%**
Other Funding Sources										
Non-Rates Revenue	($4.2)	($3.2)	$1.0	1.0%	($3.2)	$0.1	0.1%	($3.3)	($0.1)	-0.1%
Cash Balance	$1.9	($5.5)	($7.4)	-7.6%	($0.9)	$4.5	4.2%	($2.0)	($1.0)	-0.9%
Total	($2.3)	($8.7)	($6.4)	-6.6%	($4.1)	$4.6	4.3%	($5.3)	($1.2)	-1.0%
Net Rates Revenue Requirement	**$97.3**	**$107.2**	**$9.9**	**10.1%**	**$117.7**	**$10.5**	**9.8%**	**$126.3**	**$8.7**	**7.4%**
Impact of UDP/Demand				-0.2%			0.2%			0.2%
Effective Change in Rate				**9.9%**			**10.0%**			**7.6%**

3.1. Operations and Maintenance (O&M)

The drainage and wastewater O&M revenue requirement includes direct operating expense associated with managing sanitary sewer and stormwater programs (i.e., regulatory oversight, community outreach and education) and aggressively maintaining the system infrastructure, as well as a portion of DWF shared administrative expense. As operating expenses are budgeted for the DWF as a whole and not by line of business (wastewater or drainage), operating expenses must be assigned to each line of business in order to establish separate revenue requirements for rate-setting purposes. The factors used to assign expense between the two lines of business are periodically updated, which can result in changes in the share of expense paid by either wastewater or drainage.

The O&M enables SPU to continue to provide core services to our customers, invest in critical capital assets, and meet our federal mandates. The large majority of SPU's increases since the 2015 rate study are related to updated inflation assumptions and new expenses identified in the SBP. These include increased sewer pipe cleaning, inspection, rehabilitation to reduce sewer backups and overflows, and improvements to the quality of drainage and sewer services through accelerated mapping, modeling, planning, and policy development.

Allocation Revision in Detail

Operating expenses are budgeted for the DWF as a whole and not by line of business (wastewater or drainage). Consequently, operating expenses must be assigned to each line of business in order to establish separate revenue requirements for rate-setting purposes. SPU has developed a series of factors to assign cost, by budget activity, to wastewater and to drainage.

The DWF budgeted O&M expenses include both line-of-business-specific expenses (e.g., water quality monitoring or wastewater treatment), as well as shared administrative and business support expense. Shared expenses are assigned to each line of business based on prior period actual direct labor expense or on management estimates (where labor expense is not appropriate).

As part of the current rate study, SPU reviewed the existing labor-based cost assignment factors and adjusted the allocation based on 2014 actual spending. While some branches saw increases in the wastewater share, the net cost shift as a result of this update was from wastewater to drainage.

Table 3-4 presents a summary of 2014 cost assignment changes by branch. The change in allocation based on 2014 actual data only shifts $13,500 from wastewater to drainage in base operations and maintenance spending.

Table 3-4

Change in Drainage Share of DWF Base O&M Spending

($ in millions)

		2014 Drainage		
Program	**Total DWF**	**2011 Base**	**2014 Base**	**Change**
Customer Service	$6.0	$1.5	$1.9	$0.4
Director's Office	$2.2	$1.1	$1.3	$0.1
Project Delivery	$6.0	$3.8	$3.5	($0.3)
Pre-Capital Planning & Development	$1.8	$1.0	$0.9	$0.2
Field Operations	$26.3	$13.6	$12.3	($1.2)
Finance & Administration/HR & Service Equity	$9.6	$4.9	$5.0	$0.1
Utility Systems Management	$9.6	$4.9	$6.6	$1.8
SPU General Expenses	$16.1	$9.6	$8.8	($0.8)
Total Drainage	**$77.7**	**$40.4**	**$40.4**	**$0.0**

Appendix D provides more detailed information on the cost assignment process.

3.2. Capital Financing Expense

The DWF funds capital projects through a combination of cash (from direct service and non-rates revenue) and debt financing (revenue bonds).

3.2.1. Debt Service

SPU is projected to issue approximately $90 million in new DWF revenue bonds in January 2016, $122 million in January 2017, and $150 million in July 2019. These bonds are expected to fund a majority of drainage and wastewater capital improvements between January 2016 and January 2020. The 2016 and 2017 bond issues will increase debt service beginning in their respective years of issuance, which impacts 2016 and 2017 wastewater and drainage rates. The 2018 bond issue will only have an interest payment due in 2018 with the first principal payment in 2019, thus having a smaller-than-expected impact to debt service and rates in 2018.

Annual debt service is proportioned between drainage and wastewater based on the net book value of current fixed assets ("asset basis"). This methodology, which is similar to that used by SPU's Water and Solid Waste funds, correlates financing expense with the assets actually financed.

3.2.2. Cash Financing

Financial policy targets are directed toward the financial performance of the total DWF. No formal, separate policy targets have been adopted for the drainage program or for the wastewater program. SPU meets financial targets by balancing revenue requirements and rate changes between wastewater and drainage.

Wastewater

In 2014 and 2015, SPU opted to use excess cash to fund the CIP beyond the 25% requirement. As such, the additional cash contribution helps lower the contribution needed to meet the 25% four-year rolling average over period of the rate study. As a result, the proposed 2016 wastewater rate assume a $14.9 million increase in cash financing of the CIP. The 2017 rate assumes a $10.1 million decrease, primarily due to a smaller CIP compared with 2016, and 2018 proposed rates assume a $5.2 million increase as a result of increasing CIP.

Drainage

The proposed 2016 drainage rate increase assumes a $5.6 million increase in cash financing of the CIP due to an larger cash contribution.

For 2017 and 2018, the proposed drainage rates assume a $3.4 million decrease and $1.9 million increase, respectively, in the drainage cash financing of the CIP due to a lower cash contribution in 2017 and increased contributed to cash in 2018.

Table 3-5 summarizes the drivers underlying these changes.

Table 3-5

Change in Cash Financing of the CIP

($ in millions)

	Wastewater			Drainage		
	2016	**2017**	**2018**	**2016**	**2017**	**2018**
Change in Cash Financing due to:						
Increase in CIP	$11.66	($8.5)	$4.8	$0.4	($0.18)	($0.01)
Change in % Cash Contribution	$3.24	($1.6)	$0.4	$5.2	($3.27)	$1.95
Total Change from Previous Year	**$14.9**	**($10.1)**	**$5.2**	**$5.6**	**($3.4)**	**$1.9**

3.3. Use of Cash Balances

Revenue generated by rates is used to fund current operating expenses, maintain a cash balance as a safeguard against unexpected expense, and fund a portion of the current capital program. Net cash revenue is equal to total cash revenue less total cash expense and for a given year net cash revenue may be positive or negative. This differs from net income which includes non-cash items such as depreciation and amortization and excludes cash expenses such as debt service principal payments. A change in net cash revenue from one rate period to the next will impact the revenue requirement. An increase in total net cash revenue will drive a revenue requirement increase while a decrease will reduce the revenue requirement.

Wastewater

Extra cash in 2015 will be used to fund 2016 expenses associated with the Consent Decree, a mandate between the Environmental Protection Agency and the City to reduce combined sewer outfalls. The remainder will be used to reduce and smooth rates over the 2016-2018 period. As a result of the smoothing, the wastewater revenue requirement will decrease $7.2 million in 2016, $1.5 million in 2017, and $9.1 million in 2018 as the fund spends down existing cash.

Drainage

Extra cash in 2015 will be used to fund expenses and smooth rates in 2016 through 2018. As a result of smoothing rates over the three year path, the drainage revenue requirement will decrease by $5.5 million in 2016, $0.9 million in 2017, and $2.0 million in 2018 to offset a larger-than currently projected rate increase.

3.4. Non-Rate Revenue

Non-rate revenue includes permit fees, operating and capital grants, contributions in aid of construction (CIAC), interest income and other miscellaneous revenues and capital contributions. An increase in non-rate revenues has the effect of reducing the revenue requirement that must be recovered through rates. Non-rate revenue for both wastewater and drainage are expected to remain relatively flat during the 2016-2018 rate period.

4. PROPOSED WASTEWATER RATE

4.1. Overview

City of Seattle residents pay a single fee per one hundred cubic feet (ccf) of wastewater based on water consumption. This single fee is composed of two components, a system rate and a treatment rate, which are adopted through two distinct processes. The system rate is proposed by the Executive and formally adopted by Council. In contrast, the treatment rate, which is adopted by King County, is presented to Council in the form of a memorandum and adopted outside of the formal rate study process as a 'pass-through'.

4.2. Proposed 2016-2018 Wastewater Rates

Table 4-1 presents the proposed 2016 through 2018 wastewater rates, and the impact of the estimated King County treatment rate increases for 2017 and 2018.

Table 4-1

Proposed 2016-2018 Wastewater Rate (per CCF)

	2015 Adopted	2016 Proposed	2017 Proposed	2018 Proposed
System Rate (SPU)	$4.15	$4.58	$4.59	$4.74
Treatment Rate (KC)	$7.69	$7.69	$7.69	$7.69
Total Before Passthrough	**$11.84**	**$12.27**	**$12.28**	**$12.43**
Estimated Impact of Passthrough[1]	*$0.00*	*$0.00*	*$0.56*	*$0.67*
Total After Passthrough	*$11.84*	*$12.27*	*$12.84*	*$13.10*

1) King County treatment rates increased 5.6% in 2015, however SPU did not require a rate passthrough due to a higher sewer consumption forecast. 2017 and 2018 wastewater rates assume rate changes in the King County treatment rate of 6.5% in 2017 and 1.8% in 2018; it is expected that King County will approve rate increases for 2017 and 2018 in mid-2016 and mid-2017.

4.3. Treatment Rate

Payments to King County[1] for wastewater treatment are the single largest component of both wastewater and total DWF operating expense. The inability to fully recover this expense through rates could seriously impact DWF financial performance. To mitigate this risk the Council adopted Ordinance 122292, providing for an annual adjustment to the treatment rate when there is a change in the underlying cost drivers. The formula for this adjustment is defined in the ordinance, allowing for the treatment rate to be adopted outside of a normal rates process. The formula is as follows:

[1] King County treats over 99 percent of the City's sewage. The Southwest Suburban Sewer District treats the remainder.

Projected wastewater treatment expense / Projected annual wastewater volumes

X

A 16.9 percent multiplier (to recover revenue reductions and revenue taxes)

Projected treatment expense includes an adjustment for cash lags in the full recovery of treatment expense in years in which there is a rate increase. For the purposes of this calculation, treatment expense excludes the portion of budgeted treatment expense associated with King County's High Strength Industrial and Contaminated Stormwater Surcharges. These expenses are recovered directly from applicable customers and not through the wastewater direct service rate.

The City recovers wastewater expense exclusively through a volume-based fee. However, the County charges a fixed rate per residential premise, while commercial water volumes are converted to a "Residential Equivalent Unit" (REU) and charged accordingly based on flow treated. Residential flows account for about 37 percent of total sewer volumes (and therefore total City revenues). Charges for residential premises account for about 40 percent of total treatment expense paid to the County. Consequently, if the County treatment rate is held constant but Seattle billed wastewater volumes decline, the resulting decline in treatment expense will be less than the decrease in the City's wastewater revenues.

4.4. SPU System Rate

The system component of the SPU wastewater rate is proposed by the Executive via rate studies and adopted through a normal Council process. The system rate recovers all other operating expense, including operations and maintenance expense, capital financing expense (debt service and cash), and related revenue taxes. This component of the rate is also set to ensure that financial policy targets are met in the case that the revenue required to meet the targets exceeds the revenue required to recover operating expense (see Section II of this proposal for more detail).

The current proposal assumes a wastewater system rate of $4.58 per ccf in 2016, a $0.33 per ccf increase compared with 2015, an increase of $0.01 per ccf in 2017, and an increase of $0.15 in 2018. The components of these increases are presented in Table 4-2.

Table 4-2

2016-2018 Wastewater System Expense

($ in millions)

	2016	2017	2018
Net Revenue Requirement	$250.9	$250.7	$253.2
Revenue lags/leads	$2.2	$3.5	$4.7
Less Unadjusted Treatment Expense	$136.9	$137.6	$138.0
Less Tax	$21.1	$21.2	$21.3
Total Expense Increase	$95.2	$95.4	$98.6
Projected Volumes (100 ccf in 000's)	20.8	20.8	20.8
System Rate per ccf	$4.58	$4.59	$4.74

Tables 4-3, 4-4 and 4-5 present the 2016 through 2018 Sources and Uses of system and treatment revenue/expense, assuming proposed rates and spending.

Table 4-3

2016 Change in Wastewater System & Treatment Expense

($ in millions)

	System	Treatment	Total Wastewater
SOURCES			
Direct Service			
Gross Revenue	$95.8	$159.6	$255.4
Less: Credit/Non Payment	($2.2)	($2.2)	($4.4)
Net Revenue	$93.5	$157.4	$250.9
Less: leads/lags	$0.0	$0.0	$0.0
Net Direct Service Cash Revenue	$93.5	$157.4	$250.9
Other Revenue			
Other Operating	$4.2		$4.2
Other Non-Operating	$3.0		$3.0
SCL Reimbursement	$1.8		$1.8
Total Sources	**$102.4**	**$157.4**	**$259.8**
USES			
O&M	$55.7	$147.2	$202.9
Taxes	$14.1	$19.4	$33.5
Debt Service	$10.8		$10.8
Cash Financing of CIP	$25.2		$25.2
Total Uses	**$105.8**	**$166.6**	**$272.4**
SOURCES NET OF USES	**($3.4)**	**($9.2)**	**($12.6)**

Table IV-4 Notes:

Assumes treatment rate of $7.69 and system rate of $4.58 in 2016 multiplied by projected volumes.

Table 4-4

2017 Change in Wastewater System & Treatment Expense

($ in millions)

	System	Treatment	Total Wastewater
SOURCES			
Direct Service			
Gross Revenue	$95.3	$164.6	$259.9
Less: Credit/Non Payment	($2.2)	($2.8)	($5.1)
Net Revenue	$93.1	$161.7	$261.9
Less: leads/lags	$1.0	$1.0	$2.1
Net Direct Service Cash Revenue	$94.2	$162.8	$264.0
Other Revenue			
Other Operating	$4.3		$4.3
Other Non-Operating	$3.1		$3.1
SCL Reimbursement	$1.8		$1.8
Total Sources	**$103.3**	**$162.8**	**$273.2**
USES			
O&M	$57.0	$157.5	$214.5
Taxes	$14.9	$20.0	$34.9
Debt Service	$13.2		$13.2
Cash Financing of CIP	$14.8		$14.8
Total Uses	**$99.8**	**$177.6**	**$277.3**
SOURCES NET OF USES	**$3.6**	**($14.8)**	**($11.2)**

Table IV-4 Notes:

Assumes treatment rate of $8.32 and system rate of $4.52 in 2017 multiplied by projected volumes.

Table 4-5

2018 Change in Wastewater System & Treatment Expense

($ in millions)

	System	Treatment	Total Wastewater
SOURCES			
Direct Service			
Gross Revenue	$100.7	$168.3	$269.0
Less: Credit/Non Payment	($2.5)	($3.2)	($5.8)
Net Revenue	$98.2	$165.1	$266.6
Less: leads/lags	$0.3	$0.3	$0.6
Net Direct Service Cash Revenue	$98.5	$165.4	$267.2
Other Revenue			
Other Operating	$4.3		$4.3
Other Non-Operating	$2.6		$2.6
SCL Reimbursement	$1.9		$1.9
Total Sources	**$107.3**	**$165.4**	**$276.0**
USES			
O&M	$58.2	$160.9	$219.1
Taxes	$15.0	$20.5	$35.5
Debt Service	$14.5		$14.5
Cash Financing of CIP	$20.2		$20.2
Total Uses	**$108.0**	**$181.3**	**$289.3**
SOURCES NET OF USES	**($0.7)**	**($15.9)**	**($16.6)**

Table IV-5 Notes:

Assumes treatment rate of $8.47 and system rate of $4.63 in 2018 multiplied by projected volumes.

4.5. Wastewater Demand

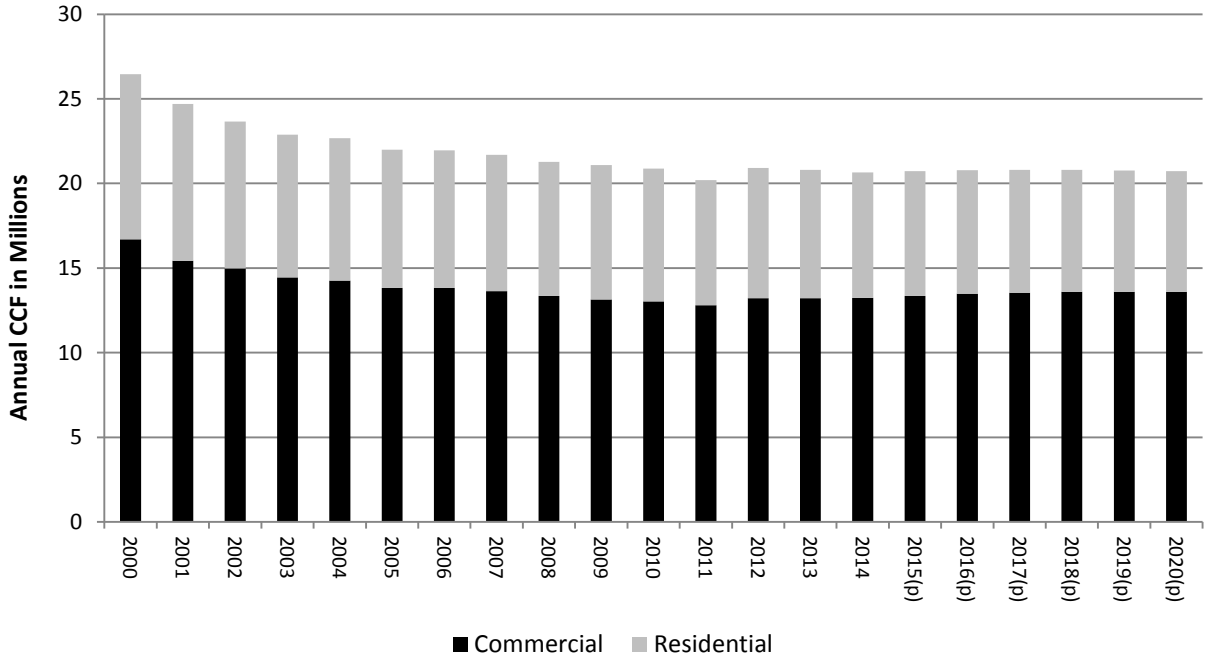
Over the past five years, annual average wastewater volumes of commercial customers have been flat (0.1%), while residential customer volumes have been declining on average 1.4% per year. The decline can be attributed to continued conservation and increase in multi-family housing, which is included in commercial volume.

The volume of wastewater conveyed from commercial customers is expected to increase at an average annual rate of 0.4% between 2015 and 2020. This increase is reflective of expectations of continued growth in commercial development and multi-family housing. Meanwhile, residential consumption is expected to continue its downward trajectory with average declines of 0.6% per year through 2020. The slight decline is in line with continued conservation efforts and water consumption forecasts. Figure 4-1

below presents commercial and residential annual Seattle wastewater volumes (in ccf) between 2000 and 2020.

Figure 4-1

Historical and Projected Wastewater Volumes (2000-2020)



The residential forecasting model utilizes trend for forecasting volumes. The trend captures impacts of the drivers of residential wastewater volumes such as overall decreasing water use (which is used to calculate sewer volumes) and shifts between peak and off-peak period water use. The commercial model utilizes employment to capture economic fluctuations and an underlying trend in consumption associated with increased efficiency in water use.

The demand model also takes into account expected water conservation impacts on peak-period wastewater volumes. Because a significant quantity of water is used for irrigation purposes during the summer, fluctuations in water volumes depend on summer weather. Although the effect on wastewater volumes is moderated by use of average winter sewer bills for determining residential volumes, there is some impact from early or late summer weather on commercial volumes since they are based on actual year-round water consumption. The model used to forecast demand for this rate study assumes the weather of a "normal" year in which summer weather is not particularly wet or dry, hot or cool. Actual demand will vary from forecast partly because summer weather varies.

In order to obtain required revenues, sewer rates have to rise to offset this reduction in demand since many costs do not vary with volume. There is very little expense elasticity relative to changes in wastewater volumes for several reasons, including:

- SPU system operating expenses are typically not capacity-driven, with maintenance focused on the existing network;
- SPU customer service expense is account, not demand driven;
- A large component of the rate base, existing debt service, is entirely fixed (with the exception of re-financing opportunities);
- New capital investment are typically not capacity-driven, with the exception of combined sewer overall expense which is driven more by stormwater than wastewater volumes; and
- The King County treatment bill is volume-based for commercial customers but premise-based for residential customers. Therefore, only about 51 percent of the total treatment bill (commercial portion) is volume-based.

5. DRAINAGE COST ALLOCATION / RATE DESIGN

Once the **rates revenue requirement** is set, it is assigned to different customer classes. A customer class is a group of customers that places a unique cost on the utility or is administratively easier to serve as a group. In the case of drainage, there is a unique cost of service associated with the management of stormwater runoff from different types of land cover found on customer properties. These land cover types essentially act as customer classes for drainage cost allocation purposes.

The steps required to allocate drainage system costs to land surface types and then to drainage customer rates can be summarized as follows:

- Drainage costs are grouped into two broad classifications, account-allocated expense and flow-allocated expense
- Flow-related costs are further allocated between four surface type categories based on cost weighted average run-off
- A unit rate for account costs and for each surface type is developed based on the total number of accounts and square footage of land surface by type city wide
- Rates are developed for each customer class by applying the surface type unit rates to the typical surface type composition for each tier

5.1. Drainage Allocation Classifications

Drainage rates are composed of four distinct components: account rate, impervious surface rate, managed grass rate, unmanaged grass rate, and good forest rate.

The account rate recovers costs related to customer billing and customer service, including King County Charges for Drainage Billing System administration, SPU customer property data management expense and SPU customer service support. These expenses are driven by the number of customers served rather than by property characteristics.

The four surface type rates recover all other drainage system expense contained in the drainage rate revenue requirement, as further described in Chapter 3 of this rate study. Total flow-related expense is allocated based on the cost of managing the run-off from any given surface type, as further described in Section 5.2.

Table 5-1 below present the account and flow allocated components of the rates revenue requirement by year.

Table 5-1

Drainage Rates Revenue Requirement by Allocation Classification

($ in thousands)

	2016	2017	2018
Flow-allocated expense	$108,978	$118,981	$127,061
Account-allocated expense	$282	$1,216	$2,282
Total	$109,260	$120,197	$129,343

5.2. Flow-related Expense Allocation

The amount of run-off from any given parcel depends on the type of surface it contains. Impervious surface absorbs less runoff than pervious, or porous surface, and therefore generates more stormwater runoff during a given storm event. Likewise, pervious surface with significant ground and tree cover will generate less runoff than a highly managed pervious surface such as a lawn. The more intense the storm, the greater the runoff for all surface types.

Four surface types are considered in setting Seattle drainage rates:

- Impervious
- Pervious-managed grass
- Pervious-unmanaged grass, and
- Pervious-good forest.

Impervious surface is hard or compacted surface from which most water runs off when exposed to rainwater. Common impervious surfaces include roof tops, concrete or asphalt paving, compact gravel and packed earth. **Pervious managed grass** is the most common type of pervious area in the City and includes such surfaces as lawns, landscaped parks, and golf courses. Managed grass absorbs nearly all rainwater during average storms but produces increasing amounts of run-off with more intense storm events due to its greater soil compaction. The last two types of pervious area, **woods and unmanaged grass and good forest**, are vegetated surfaces of a specific types such as forests or non-forested land that are in the natural progression back to a forested state. This category includes large undeveloped areas in places such as Seward Park, Carkeek Park, and various greenbelts throughout the City. These surface types perform similarly to managed grass during average storm events but infiltrate significantly more rainwater during more intense storms.

To determine the cost of managing the run-off from any given surface type, SPU looked at two factors:

- The expected **volume** of runoff from each surface type during differing intensities of storms, and

- The **cost** of O&M and infrastructure oriented towards the management of the run-off during each of these storm event

The resultant cost weighted runoff percentages, as presented in Table 5-2 below, represent the percentage of the flow-allocated revenue requirement assigned to each surface type. See Appendix E for the step by step calculation underlying these cost shares.

Table 5-2

Flow-Based Cost Shares by Surface Type

	2016	2017	2018
Impervious	83.1%	82.9%	82.6%
Pervious - Managed Grass	15.0%	15.3%	15.5%
Pervious - Woods and Unmanaged Grass	1.4%	1.4%	1.4%
Pervious - Good Forest	0.5%	0.5%	0.5%

5.3. Revenue Requirement Allocation

Table 5-3 presents the revenue requirement allocation for account and surface type rates. The surface type rate allocations are calculated by applying the flow-based cost share percentages found in Table 5-2 to total flow-allocated expense. These cost class allocations are then used in the development of drainage rates for each customer tier, as further described in Section 5.4

Table 5-3

Revenue Requirement Allocation by Type

($ in thousands)

	2016	2017	2018
Account	$282	$1,216	$2,282
Impervious	$90,576	$98,596	$104,976
Pervious - Managed Grass	$16,378	$18,166	$19,704
Pervious - Woods and Unmanaged Grass	$1,506	$1,654	$1,777
Pervious - Good Forest	$518	$566	$604
	$109,260	$120,197	$129,343

5.4. Drainage Rate Design

Drainage customer bills are intended to recover the cost of service associated with managing the stormwater runoff from individual parcels. In the first part of this chapter, we define the cost of service associated with managing the run-off from different land surface types and with account-related services. The following steps are required to develop drainage rates which assign these costs to individual customer parcels:

- Define customer classes and rate tiers for parcels with similar surface type characteristics (and therefore similar costs of service)
- Develop unit rates for each surface type and account classification
- Determine an average customer land composition profile for each rate tier
- Apply the surface type and account unit rates to applicable profile factors for each tier.

5.4.1. Customer Classes and Tiers

Small Residential

Small residential customers with billable areas less than 10,000 square feet are fairly homogeneous in terms of surface cover, which makes property size the key determinant of parcel stormwater flow contribution. Small residential customers are assigned to one of five size-based categories, each representing a range of total area (e.g., 3,000 to 4,999 square feet). Beginning in 2016, SPU is proposing that small residential properties less than 3,000 square feet be broken into two tiers instead of one. The new square foot range minimizes the variance between properties in each group in terms of lot size and percent impervious. This results in customer bills more accurately reflecting the actual property characteristics as compared to the prior tier structure.

Large Residential and General Service

Large single family and duplex parcels 10,000 square feet or greater ("large residential") and general service parcels (all sizes), pay a unit rate (per 1,000 square feet of billable area) based on their actual property characteristics (percent impervious and parcel size) rather than category averages. There is too much variation between these properties in terms of parcel size and surface characteristics to be fairly captured by a flat rate structure like that applied to small residential customers. SPU has five impervious surface-based rate categories. Each category represents a range of impervious surface (e.g., 66-85% impervious).

General service and large residential parcels which contain significant amounts of highly pervious (absorbent) area, such as forested land or other unmanaged vegetated areas such as pasturelands and meadows, and which are composed of no more than 65% impervious area, may also qualify for discounted low impact rates. Parcels with these surface types generate significantly less stormwater run-off than parcels with similar amounts of impervious surface but whose pervious area is less absorbent (e.g., a highly managed lawn).

5.4.2. Account and Surface Type Unit Rates

Unit rates for each surface type and for account-allocated expense are calculated as described below.

Surface Type Rates

Unit rates are calculated by dividing the expense allocated to each surface type by the total citywide area for that surface type (as expressed in thousands of square feet). Area by surface type is collected from aerial photos in the City's Geographic Informatin System (GIS). This same data source is used to identify the area of each surface time for each city parcel, used for drainage billing purposes.

Table 5-4 presents the area units and calculated unit rates for each surface type.

Table 5-4

Surface Type Unit Rates (per 1,000 square feet) & Area by Type Citywide

	Thousands of sq ft	2016	2017	2018
Impervious	779,035	$116.27	$126.56	$134.75
Pervious - Managed Grass	671,403	$24.39	$27.06	$29.35
Pervious - Woods and Unmanaged Grass	109,057	$13.81	$15.17	$16.29
Pervious - Good Forest	55,765	$9.28	$10.14	$10.84

Account Rates

Account expense is driven by the number of customers rather than by the volume of runoff. To determine these rates, the account-allocated component of the revenue requirement is first assigned to small residential and general service/large residential customer groups based on the number of customers in each group. Small residential parcels (139,200) account for 78 percent of the total and general service and large residential parcels (38,700) 22 percent of the total.

The account costs assigned to each group are then broken into a flat rate per customer parcel for small residential customers and a rate per 1,000 square feet for general service and large residential customers. The units used vary due to the drainage rate structure for each type of customer, as further described in Section 5.4.4.

Table 5-5

Account Unit Rates

	# of Units		Rate Type	2016	2017	2018
General Service/Large Res	897,883	sq ft (1,000s)	per 1,000 sq ft	$0.07	$0.29	$0.55
Small Res	139,214	parcels	flat	$1.59	$6.84	$12.83

5.4.3. Surface Type Profile by Tier

Drainage bills for each customer are intended to reflect the cost of managing the runoff from that parcel. Each tier rate is composed of a flow and an account component. Both of these

components reflect the average cost for a tier composed of properties with similar characteristics.

The flow component of each tier rate is based the average percentage of total area attributable to each surface type, as calculated using GIS data for individual parcels assigned to a given tier. For small residential customers, averages are based on a random sample of properties assigned to each flat rate tier. For general service and large residential customers, the percentages are based on citywide GIS data for all parcels assigned to a given tier.

Table 5-6 presents the average land cover profile by tier used to calculate the flow component of the tier drainage rate.

Table 5-6

Surface Type Average Profile by Tier (sq. ft)

		Impervious	Pervious - Managed Grass	Pervious - Woods and Unmanaged Grass	Pervious - Good Forest	Total Area
Small Residential						
Under 2000 sq. ft.		979	344	-	-	1,323
2000-2999		1,565	959	-	-	2,524
3000-4999 sq. ft		2,026	2,026	-	-	4,053
5000-7999 sq. ft		2,704	3,023	20	6	5,753
8000-9999 sq. ft.		3,212	4,706	113	0	8,030
General Service/Large Residential						
Undeveloped	(0-15% impervious)					
	Regular	83	845	53	18	1,000
	Low Impact	38	207	451	304	1,000
Light	(16-35% impervious)					
	Regular	270	659	64	6	1,000
	Low Impact	209	329	351	110	
Moderate	(36-65% impervious)					
	Regular	509	441	43	8	1,000
	Low Impact	392	310	268	30	1,000
Heavy	(66-85% impervious)	753	239	7	0	1,000
Very Heavy	(86-100% impervious)	957	42	1	-	1,000

5.4.4. Rate Calculation by Tier

The rate assigned to each customer tier is equal to the sum of a flow component and an account component

For all customers, the **flow component** of the rate is calculated by multiplying the surface type rates (Table V-4) by the average area assumptions for the tier found in Table V-6. The formula for this calculation is as follows:

Flow component =(IA/1,000 * I$) + (MGA/1,000 * MG$) + (UMGA/1,000 * UMG$) +(GF/1,000 * GF$)

Where

IA=Tier average impervious area
I$=Impervious surface rate per 1,000 sq ft.
MGA=Tier average managed grass area
MG$=Managed grass surface rate per 1,000 sq ft
UMGA=Tier average unmanaged grass area
UMG$=Unmanaged grass surface rate per 1,000 sq ft
GF=Tier average good forest area
GF$=Good Forest surface rate per 1,000 sq ft

The **account component** for small residential customers is the same flat rate per customer. For general service and large residential customers, the account rate is multiplied by parcel area.

The proposed rates presented in Tables 5-7, 5-8 and 5-9 below are equal to the sum of the flow component and the account component for each tier.

Table 5-7

2016 Proposed Drainage Rates

		Billing Unit	*Treatment* Rate	*System* Rate	*Total* Rate	*Estimated Impact of Passthrough*	*Total Rate w/ Estimated Passthrough*
Small Residential							
	Under 2000 sq. ft.	per parcel	$12.37	$111.44	**$123.81**	*$0.00*	*$123.81*
	2000-2999 sq. ft	per parcel	$18.90	$188.03	**$206.93**	*$0.00*	*$206.93*
	3000-4999 sq. ft	per parcel	$24.79	$261.84	**$286.63**	*$0.00*	*$286.63*
	5000-7999 sq. ft	per parcel	$33.73	$356.30	**$390.03**	*$0.00*	*$390.03*
	8000-9999 sq. ft.	per parcel	$42.65	$448.75	**$491.40**	*$0.00*	*$491.40*
General Service/Large Residential							
Undeveloped	(0-15% impervious)						
	Regular	per 1000 Sq Ft	$2.85	$28.39	**$31.24**	$0.00	$31.24
	Low Impact	per 1000 Sq Ft	$1.66	$16.91	**$18.57**	$0.00	$18.57
Light	(16-35% impervious)						
	Regular	per 1000 Sq Ft	$4.27	$44.25	**$48.52**	$0.00	$48.52
	Low Impact	per 1000 Sq Ft	$3.35	$34.96	**$38.31**	$0.00	$38.31
Moderate	(36-65% impervious)						
	Regular	per 1000 Sq Ft	$6.09	$64.58	**$70.67**	$0.00	$70.67
	Low Impact	per 1000 Sq Ft	$4.92	$52.29	**$57.21**	$0.00	$57.21
Heavy	(66-85% impervious)	per 1000 Sq Ft	$8.10	$85.46	**$93.56**	$0.00	$93.56
Very Heavy	(86-100% impervious)	per 1000 Sq Ft	$9.53	$102.85	**$112.38**	$0.00	$112.38

Table 5-8

2017 Proposed Drainage Rates

		Billing Unit	*Treatment* Rate	*System* Rate	*Total* Rate	*Estimated Impact of Passthrough*	*Total Rate w/ Estimated Passthrough*
Small Residential							
	Under 2000 sq. ft.	per parcel	$12.37	$126.78	**$139.15**	*$0.90*	*$140.05*
	2000-2999 sq. ft	per parcel	$18.90	$210.68	**$229.58**	*$1.26*	*$230.84*
	3000-4999 sq. ft	per parcel	$24.79	$288.84	**$313.63**	*$4.51*	*$318.14*
	5000-7999 sq. ft	per parcel	$33.73	$391.25	**$424.98**	*$6.22*	*$431.20*
	8000-9999 sq. ft.	per parcel	$42.65	$491.94	**$534.59**	*$7.81*	*$542.40*
General Service/Large Residential							
Undeveloped	(0-15% impervious)						
	Regular	per 1000 Sq Ft	$2.85	$31.39	**$34.24**	*$0.41*	*$34.65*
	Low Impact	per 1000 Sq Ft	$1.66	$18.69	**$20.35**	*$0.26*	*$20.61*
Light	(16-35% impervious)						
	Regular	per 1000 Sq Ft	$4.27	$48.37	**$52.64**	*$0.74*	*$53.38*
	Low Impact	per 1000 Sq Ft	$3.35	$38.19	**$41.54**	*$0.59*	*$42.13*
Moderate	(36-65% impervious)						
	Regular	per 1000 Sq Ft	$6.09	$70.12	**$76.21**	*$1.16*	*$77.37*
	Low Impact	per 1000 Sq Ft	$4.92	$56.81	**$61.73**	*$0.95*	*$62.68*
Heavy	(66-85% impervious)	per 1000 Sq Ft	$8.10	$92.61	**$100.71**	*$1.47*	*$102.18*
Very Heavy	(86-100% impervious)	per 1000 Sq Ft	$9.53	$111.11	**$120.64**	*$1.94*	*$122.58*

Table 5-9

2018 Proposed Drainage Rates

		Billing Unit	*Treatment* Rate	*System* Rate	*Total* Rate	*Estimated Impact of Passthrough*	*Total Rate w/ Estimated Passthrough*
Small Residential							
	Under 2000 sq. ft.	per parcel	$12.37	$141.28	**$153.65**	*$1.20*	*$154.85*
	2000-2999 sq. ft	per parcel	$18.90	$231.22	**$250.12**	*$1.73*	*$251.85*
	3000-4999 sq. ft	per parcel	$24.79	$315.40	**$340.19**	*$5.18*	*$345.37*
	5000-7999 sq. ft	per parcel	$33.73	$425.42	**$459.15**	*$7.14*	*$466.29*
	8000-9999 sq. ft.	per parcel	$42.65	$533.98	**$576.63**	*$8.98*	*$585.61*
General Service/Large Residential							
Undeveloped	(0-15% impervious)						
	Regular	per 1000 Sq Ft	$2.85	$34.26	**$37.11**	*$0.49*	*$37.60*
	Low Impact	per 1000 Sq Ft	$1.66	$20.40	**$22.06**	*$0.31*	*$22.37*
Light	(16-35% impervious)						
	Regular	per 1000 Sq Ft	$4.27	$52.31	**$56.58**	*$0.86*	*$57.44*
	Low Impact	per 1000 Sq Ft	$3.35	$41.29	**$44.64**	*$0.69*	*$45.33*
Moderate	(36-65% impervious)						
	Regular	per 1000 Sq Ft	$6.09	$75.44	**$81.53**	*$1.33*	*$82.86*
	Low Impact	per 1000 Sq Ft	$4.92	$61.17	**$66.09**	*$1.09*	*$67.18*
Heavy	(66-85% impervious)	per 1000 Sq Ft	$8.10	$99.37	**$107.47**	*$1.69*	*$109.16*
Very Heavy	(86-100% impervious)	per 1000 Sq Ft	$9.53	$119.03	**$128.56**	*$2.21*	*$130.77*

As discussed in Section 5.4.1, tier rates for small residential customers are flat rates which assume the same average total area for each customer in the tier. Consequently, the tier rate is equal to the drainage bill. Due to the wide variance in lot areas, tier rates for general service and large residential customers are expressed in units of 1,000 square feet. The drainage bill is calculated by multiplying the tier rate by the total area of each property (in 1,000 square feet).

5.5. Other Drainage Credits and Discounts

Drainage bill discounts are available for property owners that help reduce the impact of stormwater on the City's system. Billing exemptions which reduce the overall drainage bill are also available for large natural areas that offer systemic benefits greater than those offered by other types of undeveloped lands or which clearly do not benefit from or impact the stormwater system.

A. Low Impact Rates

Discounts[2] of 19 to 41 percent are applied to the rate for undeveloped natural areas of 0.5 acres or greater containing sufficient amounts qualifying "highly infiltrative" surface (i.e. forested areas, unmanaged grasslands, etc.). Certain athletic facilities with engineered designs that mimic the stormwater retention benefits of these large natural areas are also eligible for low impact rates.

B. Stormwater Facility Credit Program (SFCP)

This program offers credits of up to 50 percent privately-owned systems that slow down stormwater flow and/or provide water quality treatment for run-off from impervious area, thus lessening the impact to the City's stormwater system, creeks, lakes or Puget Sound. Stormwater systems are structures such as vaults, rain gardens, permeable pavements and filtration systems. SPU offers a 10 percent discount for any new or remodeled commercial building that utilizes a rainwater harvesting system meeting credit requirements. Those systems that involve indoor uses of rainwater must be permitted by Seattle-King County Department of Health in order to qualify for the rate reduction. Systems must meet the applicable stormwater and drainage code requirements for the building and site.

C. Rainwater Harvest Credit

SPU offers a 10 percent discount for any new or remodeled commercial building that utilizes a rainwater harvesting system meeting credit requirements. Those systems that involve indoor uses of rainwater must be permitted by Seattle-King County Department of Health in order to qualify for the rate reduction. Systems must meet the applicable stormwater and drainage code requirements for the building and site.

D. Undeveloped Riparian Corridor Exemption

Developed riparian corridors[3] with small buffers and bank armoring increase the risk of flooding and downstream property damage. In contrast, undeveloped riparian corridors with a sufficient

[2] Relative to the rates for non-qualifying properties with like amounts of impervious surface

[3] Riparian corridor is defined SMC 25.09.020.B.5.A.

buffer act as floodplains which allow creeks to expand during peak period, mitigating downstream flood damage.

The discount assumes exemption of the entire 100 foot qualifying creek buffer from the parcel's billable area. Qualifying criteria for this exemption is found in SPU Director's Rule FIN-211.2.

E. Wetlands Exemption

Wetlands act like natural drainage systems, protecting and improving water quality and storing floodwaters which are slowly released over time. In addition wetlands also serve as an important habitat for fish and wildlife. Only wetlands at least 1,000 square feet and area and with no development within the wetland area will be considered for this exemption.

An application is required in order to qualify for this exemption, including the provision of supporting documentation which demonstrates that the wetland meets all required criteria, as defined in SPU Director's Rule FIN-211.3

F. Undeveloped Islands Exemption

This credit applies to undeveloped islands with less than ten percent impervious area. These islands do not benefit from nor impact the drainage system or surrounding receiving waters.

5. LOW INCOME UTILITY CREDIT

The City subsidizes qualified low-income customers by giving them discounts on their utility services. Low income assistance customers may receive their discount in one of three ways: 1) as a credit to their SPU wastewater bill; or 2) where no wastewater bill is received, as a credit to the customer's City Light Bill; or 3) in the form of a credit voucher. The latter two options are typically applicable to renters who pay drainage, wastewater, and water utility fees indirectly as part of their rental payment.

For customers who do not receive a wastewater bill, a fixed credit is calculated which is equal to 50 percent of a typical residential bill for the class of customer receiving the credit[4]. The discounts adopted by SPU for 2016 through 2018 are shown in Tables 6-1 and 6-2.

Table 6-1

Wastewater Low Income Utility Credit

Customer Type	2016 Proposed	2017 Proposed	2018 Proposed
Receives SPU Bill	50% discount	50% discount	50% discount
Does not receive sewer bill			
Single family & duplex	$26.38 per month	$26.40 per month	$26.72 per month
Multi-family	$18.41 per month	$18.42 per month	$18.65 per month

Note: 2017 and 2018 rates do not include projected changes in the King County treatment rate.

Table 6-2

Drainage Low Income Utility Credit (Monthly)

	2016 Proposed	2017 Proposed	2018 Proposed
Single Family	$16.25	$17.71	$19.13
Duplex	$8.13	$8.85	$9.57
Multi-Family	$1.74	$1.89	$2.05

Note: 2017 and 2018 rates do not include projected changes in the King County treatment rate.

[4] The typical residential bill is calculated by multiplying the rate per ccf by average monthly consumption. The discounts assume an average monthly usage of 4.3 ccf for a single family and 3.0 ccf for multi-family.

APPENDIX A — FINANCIAL SUMMARY

Table A-1

Drainage and Wastewater Fund Financial Summary

($ in millions)

	2014 Actual	2015 Projected	2016 Estimated	2017 Estimated	2018 Estimated	2019 Estimated	2020 Estimated
Operating Revenue							
Wastewater Service							
Wastewater Rates Revenue	$237.8	$241.4	$250.9	$261.9	$266.6	$286.2	$303.1
High Strength Industrial Surcharge	$1.8	$1.9	$2.0	$2.1	$2.1	$2.2	$2.2
Drainage Rates Revenue	$93.6	$101.7	$107.2	$117.7	$126.3	$140.0	$151.5
Other Charges							
Permit Fees	$1.3	$1.3	$1.3	$1.3	$1.3	$1.3	$1.3
Other	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2
Total Operating Revenue	**$336.7**	**$348.5**	**$363.5**	**$385.2**	**$398.6**	**$431.9**	**$460.3**
Operating Expenses							
Operating and Maintenance Expenses							
Wastewater Treatment	$138.7	$146.6	$147.2	$157.5	$160.9	$164.3	$167.5
Other Operating Expenses	$89.0	$98.2	$102.6	$106.8	$111.1	$117.1	$121.7
Taxes Other Than City Taxes	$4.4	$4.4	$4.8	$5.0	$5.1	$5.8	$6.4
Other Expenses							
City Taxes	$39.5	$40.9	$42.7	$45.2	$46.8	$50.7	$54.1
Depreciation	$22.7	$23.4	$23.9	$24.4	$24.9	$25.4	$25.9
Total Operating Expenses	**$294.4**	**$313.6**	**$321.2**	**$338.9**	**$348.8**	**$363.4**	**$375.6**
Net Operating Income	**$42.4**	**$35.0**	**$42.3**	**$46.2**	**$49.8**	**$68.5**	**$84.8**
Other Income (Expenses)							
Investment and Interest Income	$3.9	$3.1	$2.1	$1.8	$1.3	$0.9	$2.3
Interest Expenses and Amortization of Debt Issue Costs and Net Discount	($27.2)	($27.5)	($31.1)	($37.7)	($41.3)	($44.8)	($50.2)
Gain on sale Cap Assets/Other	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0	$0.0
Total Other Income (Expenses)	**($23.3)**	**($24.4)**	**($29.0)**	**($35.9)**	**($39.9)**	**($43.9)**	**($47.9)**
Capital and Operating fees, Contributions, and Grants	$2.9	$3.0	$3.1	$3.5	$3.6	$3.3	$3.3
Net Income (Loss)	**$22.0**	**$13.5**	**$16.5**	**$13.9**	**$13.4**	**$27.9**	**$40.2**
Revenue Available for Debt Service	$112.2	$106.1	$114.8	$121.4	$126.5	$149.3	$170.8
Annual Debt Service	$42.1	$47.4	$49.7	$57.1	$62.6	$73.2	$76.5
Debt Service Coverage	$2.7	$2.2	$2.3	$2.1	$2.0	$2.0	$2.2

APPENDIX B — DATA TABLES

Table B-1

Drainage and Wastewater Fund

Historical and Forecast Revenues

($ in millions)

	2013	2014	2015	2016	2017	2018
Forecast Revenue[1]						
Capital/Operating Grants	$2.7	$2.7	$3.0	$3.1	$3.5	$3.6
Wastewater Service Rates	$226.3	$223.5	$241.4	$250.9	$261.9	$266.6
Drainage Service Rates	$80.4	$88.6	$101.7	$107.2	$117.7	$126.3
Side Sewer Permit Fees	$1.0	$1.0	$1.0	$1.0	$1.0	$1.0
Drainage Permit Fees	$0.2	$0.2	$0.3	$0.3	$0.3	$0.3
SCL Call Center Service	$1.7	$1.7	$1.8	$1.8	$1.9	$2.0
Interest Earnings	$2.5	$2.2	$3.1	$2.1	$1.8	$1.3
Other Misc. Revenues	$2.2	$2.2	$2.2	$2.2	$2.2	$2.2
Use of Bond Proceeds	$72.5	$75.4	$93.4	$91.8	$83.0	$81.8
Total	$389.4	$397.5	$447.9	$460.5	$473.3	$485.1
Actual Revenue						
Capital/Operating Grants	$3.9	$2.9				
Wastewater Service Rates	$236.9	$237.8				
Drainage Service Rates	$84.2	$93.6				
Side Sewer Permit Fees	$1.0	$1.0				
Drainage Permit Fees	$0.3	$0.3				
SCL Call Center Service	$1.7	$1.8				
Interest Earnings	$1.7	$1.8				
Unreald Gns/Losses	$3.9	$3.9				
Other Misc. Revenues	$2.2	$2.2				
Use of Bond Proceeds	$65.1	$70.4				
Total	$399.3	$414.0				

Table C-1 Notes:

1) Historical Revenue Forecast = Adopted Revenue for years in which rates were proposed.

Table B-2

Drainage and Wastewater Fund

Historical and Forecast O&M

($ in millions)

		2013	2014	2015	2016	2017	2018
Forecast O&M[1]							
	Drainage	$43.1	$44.7	$47.1	$55.7	$58.4	$61.6
	Treatment	$135.8	$135.2	$149.5	$147.2	$157.5	$160.9
	Wastewater	$41.8	$43.0	$44.8	$51.0	$52.6	$53.9
	Total	$220.7	$222.9	$241.4	$253.9	$268.5	$276.3
Actual O&M							
	Drainage	$39.2	$46.1				
	Treatment	$139.7	$138.7				
	Wastewater	$37.6	$44.4				
	Total	$216.5	$229.1				

Table B-2 Notes:

1) This forecast data was used as a basis for rate studies in the applicable years. Forecast O&M does not include revenue-based taxes (city and state utility) or debt service which is reported separately in the rates model. Non-revenue based taxes, such as property assessments, are included in forecast O&M figures. The table does include certain non-cash expenses which are not included in the budget but are considered part of O&M expense on Financial Statements. The O&M data is net of the SCL revenue presented under forecast revenue above. For financial reporting purposes, this "revenue" is treated as an offset to expense. For budgeting purposes it is presented as revenue.

2) Non-treatment actual O&M is allocated between lines of business by the SPU rates group.

APPENDIX C— DWF COST ASSIGNMENT DETAIL

Drainage and Wastewater Cost Assignment Methodology

SPU conducted its last review of DWF cost assignment factors in 2015, using 2014 actual data. Those factors were used to determine the 2016 drainage and wastewater system cost of service.

The 2016-2018 rate study uses the methodology described below for assigning operating expenses between drainage and wastewater lines of business. The cost assignment methodology is consistent with that of the 2004 through 2015 rate studies. The current rate study uses 2014 actual labor expense as the basis for labor related cost splits. Consistent use of actual expense over time helps to minimize errors in cost assignment resulting from variations between actual and budgeted spending.

DWF Operating Expenses are grouped into three categories:

1) Direct Operating Expense;
2) Branch and Division Administration; and
3) General and Administrative Expense.

Direct Operating Expense

Some expenses are assigned 100 percent to the applicable line of business (e.g., drainage billing administration). The majority of shared direct operating expenses are assigned based on actual direct labor expenses of an identified proxy. For example, most regulatory direct operating expense is related to water quality and combined sewer overflow (CSO) issues. Therefore, these activities are assigned based on actual direct labor expense for a subset of water quality and CSO-related capital and operating activities. The use of a programmatic proxy is useful in capturing any shifts in the focus of regulatory support over time.

Management estimates are used to identify the cost assignment factors for a limited number of activities. The bulk of activities using management estimates are related to billing and customer service activities. SPU is responsible for wastewater billing and for drainage and wastewater customer service.[5] Management estimates are used to identify labor effort associated with the support of each line of business for a targeted subset of customer service budgeted activities.

Branch and Division Administration

With the exception of the Project Delivery Branch, the cost assignment of all division general management expense is based on the sum of actual direct labor expenses for direct operating activities which charge to the division budget. The assignment of branch management expense is based on the sum of actual direct labor charged to direct operating and division administration activities rolling up to the branch budget.

[5] King County administers billing for drainage.

Administrative expense for project delivery is assigned based on actual direct labor expense charged to capital projects by each division. Project delivery branch management expense is assigned based on the sum of actual direct labor expense charged to capital projects by all project delivery branch divisions.

This methodology creates a direct link between administrative functions and the activities they support. In addition, this methodology provides a consistent mechanism for updating administration cost assignment from year to year in the event that the programmatic focus of a particular branch or division changes.

General and Administrative Expense

Finance and Administration Branch expense is assigned based on the sum of actual direct labor expense for all direct operating and branch/division administrative activities which charge to the DWF budget.

Cost Assignment Factor

The DWF total operating budget for each operating activity is divided between the wastewater and drainage lines of business using cost assignment factors These factors represent the typical amount of support provided to each line of business in carrying out a specific type of activity. Therefore, drainage and wastewater each receive their proportional shares of activities.

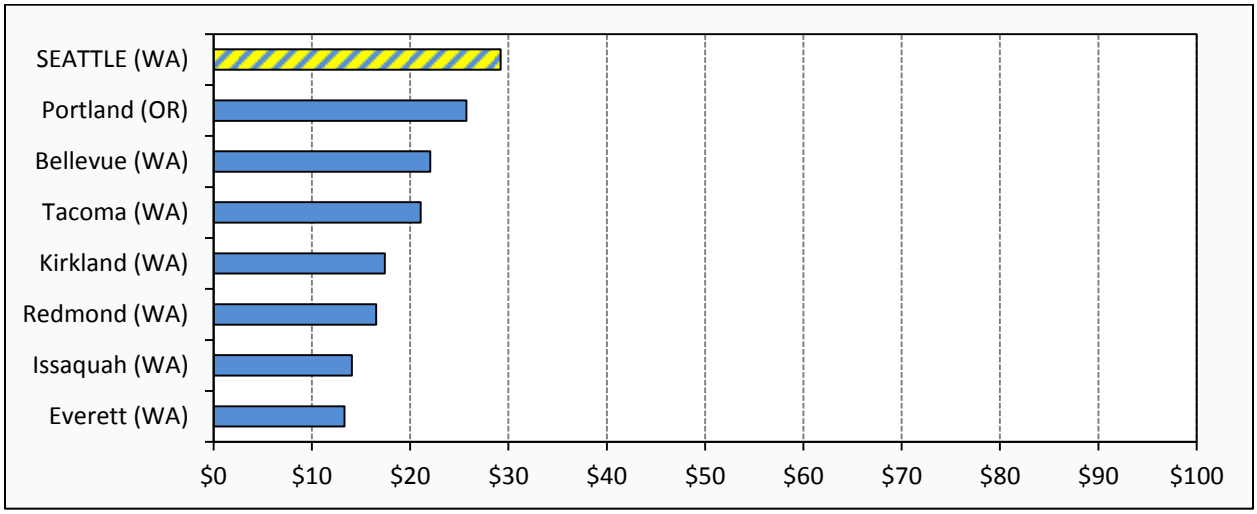
APPENDIX D— COMPARATIVE RATES

The following tables compare 2015 City of Seattle drainage and wastewater fees to those of other regional utilities.

Figure D-1

2015 Monthly Drainage Bill Comparison

Typical Single Family Residence

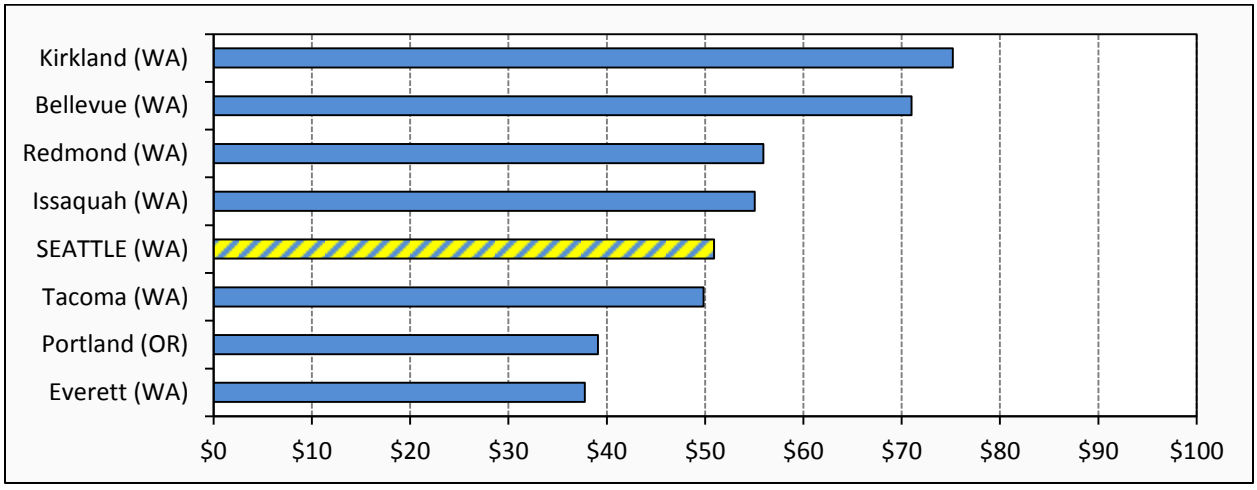


Note: Based on actual bills from respective cities, except Issaquah and Kirkland are estimated.

Figure D-2

2015 Monthly Wastewater Bill Comparison

Typical Single Family Residence

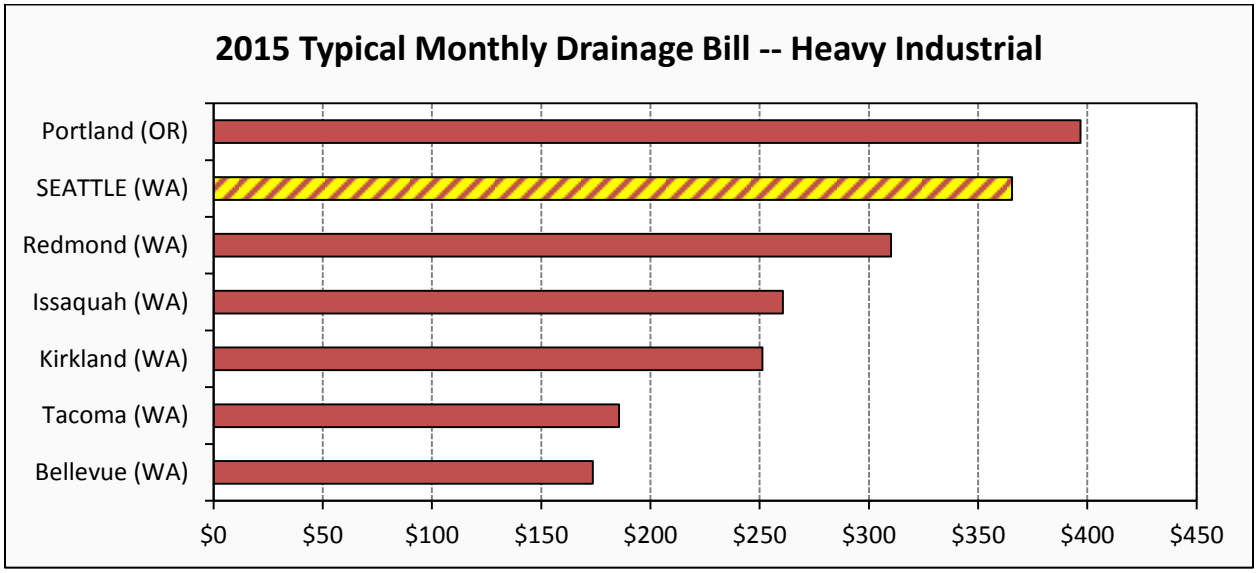


Note: Based on actual bills from respective cities, except Issaquah and Kirkland are estimated.

Figure D-3

Monthly Drainage Bill Comparison

Commercial

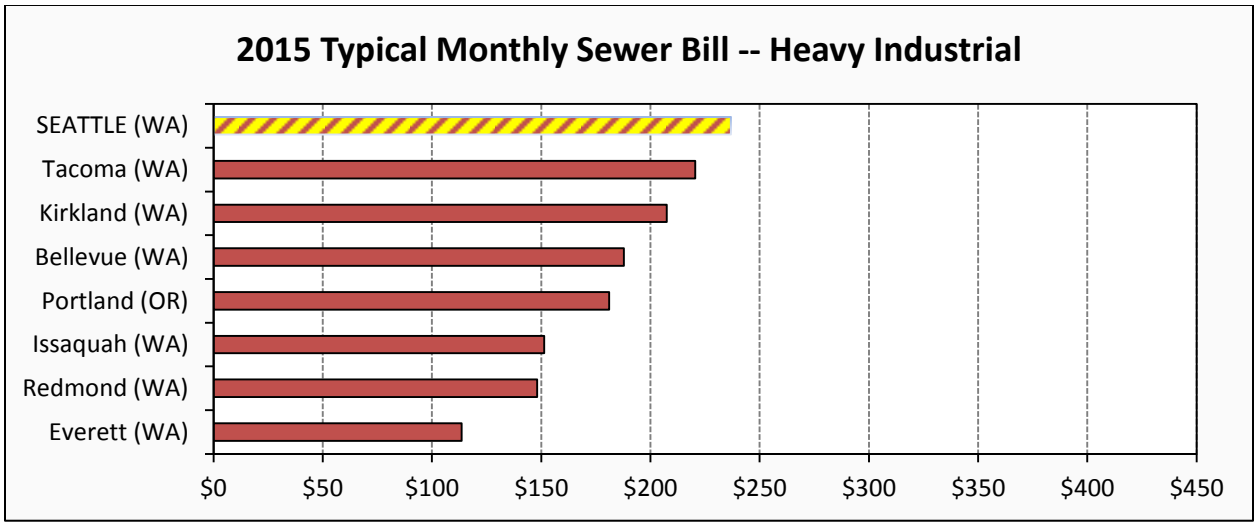


Note: Actual bills from respective cities, except Issaquah and Kirkland are estimated.

Figure D-4

Monthly Wastewater Bill Comparison

Commercial



Note: Actual bills from respective cities, except Issaquah and Kirkland are estimated.

APPENDIX E— DRAINAGE COST ALLOCATION DETAIL

E.1. Background

Run-off is a factor of area and run-off coefficients. Run-off co-efficients, or flow factors, represent a mathematical calculation of the portion of rainfall that becomes direct runoff during a storm event. So, a 0.35 co-efficient means that 35 percent of the rain falling on a particular surface ends up as runoff, while 65 percent is infiltrated.

Flow factors for a particular a particular surface type will vary depending on the underlying design storm assumptions. Storms are classified by intensity (how many inches of rain fall in a given time), duration (how long the storm lasts), and recurrence interval. Design storms which occur more frequently (i.e. once 2 years) are considered to be less severe than storms with higher recurrence intervals (i.e. a 25 year storm).

The infrastructure and operation & maintenance expenses of the drainage system are oriented to the frequency of storm events, as noted below.

- **25-year events.** The flood management service goal is to prevent flooding of private property in 25-year storm events, defined as the maximum rainfall received in 24 hours for the largest storm expected over a 25-year period. This means that pipes and some other portions of the drainage system designed for peak storm events must be sized to manage these 25-year volumes.
- **2-year events.** The regulatory goal for combined sewer overflows is an average of not more than one overflow per site per year. In practice, this means controlling CSOs in a 2-year event, defined as the rainfall that would be received in a recurrence of the second-largest storm in one year during the period of record. Both the King County treatment system and Seattle's Drainage and Wastewater Utility have incurred substantial CSO control costs, and expect to continue to incur them in the future.
- **6-month events.** Water quality infrastructure focuses on high-frequency events, defined as storms that occur on average twice per year. These investments are an increasingly significant portion of infrastructure costs as water quality regulations become more stringent and Seattle moves to reduce impacts on creeks and other receiving waters.
- **Average storm events.** A variety of the remaining SPU drainage assets and activities, ranging from Customer Service to general operations, are not associated with any of the preceding significant storm events, but are designed to serve the overall needs of the drainage system and its customers. These are assigned based on average storm events, defined as the average of all storm events over the course of a year.

E.2. Surface Type Cost Share Definition Methodology

The following steps are used to determine the percentage of total flow related expense to be allocated to each surface area type.

Step 1: Identify run-off coefficients and area for each surface type city wide

Run-off coefficients and surface type area are the inputs used to calculate total runoff by surface type for each storm event.

Table E-1 presents the run-off coefficients assumed for the four storm events underlying surface type flow calculation.

Table E-1

Run-off Coefficients by Surface Type and Storm Event

Surface Type	25-Year Storm	2-Year Storm	6-Month Storm	Average Storm
Impervious	0.925	0.890	0.848	0.613
Pervious - Managed Grass	0.564	0.433	0.314	0.022
Pervious - Woods and Unmanaged Grass	0.349	0.214	0.114	0.021
Pervious - Good Forest	0.249	0.127	0.048	0.020

Run-off coefficients represent the percentage of rainfall which results in stormwater runoff. So a run off coefficient of 0.56 means that 56 percent of the rainfall landing on a surface ends up as run-off while the remaining 44 percent is infiltrated into the ground or cracks. The table above demonstrates that impervious surface has the most amount of runoff under all storm events but that runoff increases for ALL surface types with an increase in the intensity of the storm.

Table E-2 provides a summary of area by surface type of for the City of Seattle. These area calculations were derived from aerial photos present in the City's GIS system.

Table E-2

Square Footage by Surface Type (City of Seattle)

Surface Type	Sq. Ft	% of Total
Impervious	779,034,746	48%
Pervious - Managed Grass	671,402,616	42%
Pervious - Woods and Unmanaged Grass	109,057,083	7%
Pervious - Good Forest	55,764,955	3%
Total	1,615,259,400	100%

Step 2: Calculate run-off for each surface type for each storm event

In Table E-3, the run-off co-efficients found in Table E-1 are multiplied by the applicable surface type square footage to calculate total runoff by surface type and stormevent. Table E-3 presents this data in both flow-units and as a percentage of total flow for each storm event.

Table E-3

Run-off Volumes by Surface Type

	25-Year Storm		2-Year Storm		6-Month Storm		Average Storm	
Surface Type	Flow Units	% of Total Flow	Flow Units	% of Total Flow	Flow Units	% of Total Flow	Flow Units	% of Total Flow
Impervious	720,607,140	63%	693,340,924	68%	660,621,465	75%	477,548,299	96%
Pervious - Managed Grass	378,671,075	33%	290,717,333	29%	210,820,421	24%	14,770,858	3%
Pervious - Woods and Unmanaged Grass	38,060,922	3%	23,338,216	2%	12,432,508	1%	2,290,199	0%
Pervious - Good Forest	13,885,474	1%	7,082,149	1%	2,676,718	0%	1,115,299	0%
Total	1,151,224,611	100%	1,014,478,622	100%	886,551,111	100%	495,724,655	100%

Step 3: Determine Cost Weights for each Storm Event

In order to develop a single percentage of total cost represented by each stormevent, the total flow percentages for each storm event found in Table E-3 are weighted by the percent of total drainage system expense associated with managing each storm event.

The first step in determining cost weights by storm event is to assign pre-tax flow expense to storm event categories. Most capital expense and O&M infrastructure maintenance expense is allocated to the storm event(s) which the associated infrastructure is designed to manage, with the exception of pipe expense which is allocated between storm events using an incremental cost approach. Flow allocated expenses not directly related to a specific type of infrastructure are typically assigned to the Average Storm event.

Table E-4 presents actual 2014 pre-tax flow expense by category. The cost weights by storm event found at the bottom of the table represent the percent of total expense associated with each stormevent

Table E-4

Pre-Tax Flow Expense by Storm Event

($ in thousands)

	25 Year	2 Year	6 Month	Avg Storm	Total
Category					
SPU CSOs Assets	$0	$6,051	$0	$0	$6,051
Pipe Assets	$31,817	$0	$31,817	$0	$63,633
WQ Assets	$0	$0	$330	$0	$330
Other Assets	$9,948	$7,233	$5,221	$10,769	$33,170
TOTAL CAPITAL	**$41,764**	**$13,284**	**$37,367**	**$10,769**	**$103,184**
O&M-Treatment	$0	$28,170	$0	$0	$28,170
O&M Other	$12,997	$8,143	$12,126	$140,038	$173,305
TOTAL O&M	**$12,997**	**$36,313**	**$12,126**	**$140,038**	**$201,475**
TOTAL PRE-TAX EXPENSE	**$54,762**	**$49,597**	**$49,493**	**$150,807**	**$304,659**
Cost Weight by Storm Event	18.0%	16.3%	16.2%	49.5%	100.0%

Step 4: Determine Flow Based Cost Shares by Surface Type

By applying the applicable storm event cost weight from Table E-4 to the percentage of flow represented by each surface type under each design storm scenario (found in Table E-3), we can calculate a cost weighted runoff share for each surface type. These shares are used to allocate the flow-based revenue requirement between different surface types in the development of surface type rates, as further described in chapter 5.

Table E-5

Flow-Based Cost Share by Surface Type

	Cost Share
Impervious	82.7%
Pervious - Managed Grass	15.4%
Pervious - Woods and Unmanaged Grass	1.4%
Pervious - Good Forest	0.5%

The cost shares presented in the table above represent shares based on 2014 costs and area data by surface type. The 2011 inputs used in the calculation of 2015 cost shares for the 2013-2015 rate study varied somewhat from this. These differences can cause significant variations in rate increases between customer classes during the first year of the rate study. To better smooth the rate increases between customer tiers in 2016, 2015 cost shares are used in that year, gradually shifting to the current allocation in Table E-5 by 2018. The flow based cost shares presented in Table 5-2 of the rate study reflect this gradual shift to the current allocation.