TECHNICAL MEMORANDUM #1

Utility Benchmarking

CITY OF PORTLAND, BUREAU OF ENVIRONMENTAL SERVICES | **SANITARY SEWER & STORMWATER COMPREHENSIVE RATE STUDY**

PREPARED FOR: Ken Bartocci, Portland Bureau of Environmental Services

PREPARED BY: Deb Galardi, Galardi Rothstein Group

Eric Rothstein, Galardi Rothstein Group

Andrew Reese, Andrew Reese LLC

SUBJECT: Utility Benchmarking

DATE: December 6, 2019

Table of Contents

Tables

Commonly Used Abbreviations and Acronyms

Utilities

ADWM	Atlanta Department of Watershed Management
BES	Bureau of Environmental Services (Portland)
DCW	DC Water (Washington DC)
DWSD	Detroit Water & Sewerage Department
GLWA	Great Lakes Water Authority (Detroit)
MWS	Metro Water Services (Nashville)
NYDEP	New York Department of Environmental Protection
NEORSD	Northeast Ohio Regional Sewer District (Cleveland)
PWD	Philadelphia Water Department
SFPUC	San Francisco Public Utilities
SPU	Seattle Public Utilities

Terms

A	Ammonia
BOD	Biochemical Oxygen Demand
CCF	Hundred Cubic Feet
CIP	Capital Improvement Plan
COD	Chemical Oxygen Demand
CSO	Combined Sewer Overflow
EPA	United States Environmental Protection Agency
EDU	Equivalent Dwelling Unit
ERU	Equivalent Residential Unit
FOG	Fats, Oils, and Grease
FY	Fiscal Year
GI	Green Infrastructure
GA	Gross Area
IA	Impervious Area
I/I	Infiltration/Inflow
LB	Pound
MHI	Median Household Income
MG/L	Milligrams/Liter
NPDES	National Pollutant Discharge Elimination System
P	Phosphorus
SF	Square Feet
SSO	Sanitary Sewer Overflow
TKN	Total Kjeldahl Nitrogen
TN	Total Nitrogen
TP	Total Phosphorus
TSS	Total Suspended Solids

Executive Summary

In June 2019, the City of Portland Bureau of Environmental Services (BES) authorized Galardi Rothstein Group to conduct a comprehensive rate study (Rate Study) to assess the methodologies and structures that form the basis of its sanitary sewer and stormwater rate program.

The Rate Study comprises three phases of work: Phase 1 (due diligence and environmental scan) includes review of BES's own rate practices and metrics, and those of a limited number of benchmark utilities. Future phases of the Rate Study include study preparation and development of recommendations (Phase 2) and public engagement (Phase 3).

Scope of Review

This memorandum summarizes the results of the Rate Study utility benchmarking exercise (a component of Phase 1). Specifically, the rate setting practices and current rates of nine (9) benchmark utilities are reviewed and compared against BES's practices and rates. Information on rate practices from broader published utility surveys are also provided for additional perspective.

The scope of this review was limited to accessing readily available information from utility websites and other available reports (e.g., rate studies, bond reports, and financial statements), and published rate survey reports.

The following comparative information were examined:

- Rate levels – unit rates for residential and nonresidential rate structure components, and typical residential customer monthly bills for wastewater and stormwater.
- Special cost allocation issues – basis for recovery of wet weather-related costs and consideration of on-site and off-site stormwater management cost components.
- Rate structures – rate components and basis for assessment of charges to residential and nonresidential customers.
- Stormwater credit program – key program activities, eligibility criteria, and maximum bill discount percentages.
- System Development Charges (SDCs) – base structure and methods for assessing charges on new development.

Conclusions

The current rates of BES are among the highest of utilities surveyed; however, the projected rate increases of most other utilities reviewed are significantly higher than those of BES, suggesting some future realignment. Direct comparisons of rate levels are complicated by the fact that some agencies recover a portion of annual utility costs through other fees that are not included in this memorandum because they are not specific to wastewater and stormwater service.

Overall, BES's rate setting practices meet or exceed industry standards with respect to alignment of individual system rates with cost of service and financial planning principles. The degree to

which BES's individual rate structures and cost allocation approaches align with the benchmark utilities varies:

- Highly Aligned – wastewater rate structure and SDC methodology.
- Moderately Aligned – stormwater rate structure and credit program; allocation of CSO-related costs.
- Not Aligned – allocation of stormwater management costs to on-site and off-site charge components.

Stormwater rate practices have evolved since BES implemented its current rate and credit program almost two decades ago. The Rate Study provides an opportunity for BES to consider emerging practices like those implemented by some of the benchmark utilities.

Benchmark Utilities

In selecting agencies for benchmarking, key characteristics included systems where a portion of the service area is served by CSO systems, large service area populations (0.5 million to 8 million), and use of rate forms or credit features designed to address similar rate objectives—most notably financial integrity, environmental sustainability, affordability, and equity.

Service Characteristics

Table 1 summarizes key service characteristics for the benchmark utilities. Supplemental information on scale of facilities (e.g., miles of pipe and treatment capacity) is provided for each utility in the Appendix (organized alphabetically). Over the course of the review, attempts were made to collect similar information and statistics for each utility; however, reporting protocols differ across sources, and the level of detail varies. For example, many sources reported water and wastewater information together, as opposed to providing information for individual systems. Where information for a specific utility could not be provided on a comparable basis with the other utilities—as in the case of inclusion of water system information or other issues—the metric is reported (in Table 1 and elsewhere in the memorandum) as "not reported" (NR).

Some of the agencies listed in Table 1 provide regional treatment services. In such cases, rates charged individual wholesale or partner cities may vary. Therefore, Table 1 also indicates the primary city for which rate and rate structures are reported in this memorandum. For example, the Great Lakes Water Authority (GLWA) provides wastewater treatment and stormwater services to the City of Detroit, as well as 18 suburban wholesale customers. The information presented in Table 1 is representative of GLWA as a whole; however, rate and bill information provided in subsequent tables of this memorandum represent charges paid by retail customers of the Detroit Water & Sewerage Department (DWSD), inclusive of regional treatment costs. Similarly, for the Northeast Ohio Regional Sewer District (NEORSD), reported rate information is for customers in Sub-district 1, which serves most of the City of Cleveland.

While similarities exist across the utilities reviewed, there are also important differences that make direct comparison difficult. As already noted, cost sharing among regional partners is a potential difference. Other factors include system age, climate, topography, and other geographical and geological characteristics that impact system costs. Furthermore, rate setting practices may reflect local policy priorities, legal frameworks, and data constraints.

Table 1
Summary of Benchmark Utilities Service Characteristics

			Agency Information							
Primary Agency	**Reported City[1]**	**Agency Notes**	Service Area Population (M)	Volume Treated Annually (B Gals.)	Total Assets[2] ($M)	Annual Rate Revenue ($M)	Projected Avg. CIP ($M)	Avg. CIP as % of Assets	Outstanding Debt ($M)	% of System Combined Sewers
Atlanta Department of Watershed Management	Atlanta	(1)	0.5	51	NR	$265	$150	NR	NR	15%
Bureau of Environmental Services	Portland		0.7	30	$3,393	$357	$156	5%	$1,453	39%
DC Water	Washington	(2)	1.6	110	$4,221	$395	$295	7%	NR	33%
Great Lakes Water Authority	Detroit		2.9	232	$3,083	$565	$143	5%	$3,230	60%
Metro Water Services	Nashville		0.7	61.5	NR	$166	$193	NR	NR	NR
New York Department of Environmental Protection	New York		8.5	450	NR	$2,140	$1,374	NR	NR	60%
North East Ohio Regional Sewer District	Cleveland		1.0	92	$2,835	$369	$245	9%	$1,668	40%
Philadelphia Water Department	Philadelphia		1.5	163	NR	$429	$236	NR	NR	60%
San Francisco Public Utilities	San Francisco		0.8	40	$2,526	$362	$560	22%	$1,070	92%
Seattle Public Utilities	Seattle	(3)	0.7	68	$1,161	$465	$245	21%	$796	33%

NR = Not Reported; Information is not reported in a manner that allows for direct comparison due to inclusion of water system information.

[1]If Primary Agency a regional authority, the primary city for which rates are reported in this document.

[2]Net of accumulated depreciation and amortization; wastewater and stormwater only.

Utility Notes:

(1) Rate revenue is limited to wastewater rates; stormwater funding provided through Municipal Option Sales Tax.

(2) Assets do not include work in progress which is not broken out between water and wastewater systems.

(3) Treatment provided by King County; treated volume reflects total volume, inclusive of SPU and other customers; other data for SPU only.

Level of Service

For additional context, Table 2 provides a relative comparison of the benchmark utilities based on nine (9) system service level characteristics that align with BES's rate setting objectives (financial integrity, affordability, and sustainability). Utilities are scored (1, 2 or 3) for each characteristic, and then a total score developed based on the weighting scheme identified in the matrix.

While attempts were made to score each category based on measurable data (as defined in the matrix), scoring remains somewhat of a subjective process. Furthermore, the weighting scheme used to create a total score of each utility places a heavy emphasis on credit rating and recent and projected rate increases and practices, and does not reflect broader system evaluation.

From the total scores, the utilities are organized into three tiers, and then are displayed alphabetically within each tier in Table 2. Given the high level nature of this review, further ranking within tiers is not necessary (or appropriate) for establishing context or understanding utility-specific rate setting practices and fee levels presented in subsequent sections of this memorandum. For example, utilities that have significant non-rate funding sources may have lower rate levels overall and different rate setting practices (e.g., less frequent rate updates). Furthermore, rate affordability may be addressed primarily through the rate structure or, alternatively, through specialized low-income assistance programs (or a combination of the two).

Even with the inherent limitations of benchmarking generally, and the limited scope of this task in the Rate Study specifically, a scan of current industry practices provides an opportunity to identify other approaches used in the industry, as BES considers options for further development in Phase 2 of the Rate Study.

General Rate Setting Framework

Most of the benchmark utilities establish rates for one or both systems (wastewater and stormwater) based on cost-of-service principles. Of the utilities reviewed, only Atlanta Department of Watershed Management (ADWM) did not use a cost-of-service framework for rate setting specifically. ADWM also relies more heavily on non-rate revenue sources than the other utilities reviewed[1].

The level and frequency of rate reviews vary across utilities, ranging from detailed analyses conducted annually (Great Lakes Water Authority) to more standard cost-of-service updating every 3 to 5 years (e.g., Seattle Public Utilities, DC Water, and Northeast Ohio Regional Sewer District). While BES updates rates annually based on system revenue requirements and customer data, the annual updates are more limited in scope than some of the other utilities; it has been over a decade since BES conducted a comprehensive cost-of-service analysis. However, through the practice of adjusting rates annually, BES has been able to keep its average annual rate increases—both historically (over the last 10 years) and projected—among the lowest of the utilities surveyed.

[1] The City of Atlanta implemented a 1 percent Municipal Option Sales Tax in 2005 as a dedicated supplemental funding source for the Clean Water Atlanta program. Proceeds from the sales tax are now projected to generate $130M - $150M in system funding per annum, 10 percent of which may be dedicated to stormwater management.

Table 2
Summary of Benchmark Utilities (Level of Service)

		Financial Integrity				Availability of Other Funding		Affordability	Sustainability	
Agency Abbreviation	Score Tier[1]	Credit Rating	Level of Prior Rate Increases	Level of Projected Rate Increases	Rate Setting/ Updating Practices	Revenue from Regional Partners	Non-rate Revenue Sources	Complexity of Low Income Program	Extent of Green Infrastructure Practices	Stormwater Credit Program Eligibility
BES	1									
DCW	1									
NEORSD	1									
SPU	1									
ADWM	2									
GLWA	2									
NYDEP	2									
PWD	2									
MWS	3									
SFPUC	3									

Scoring Matrix

Weight	Metric	Score = 3	Score = 2	Score = 1
35%	Credit Rating	Moody's (Aaa,Aa1) or S&P (AAA, AA+)	Moody's (Aa2,Aa3), S&P (AA, AA-)	Moody's (A1, A2), S&P (A+)
15%	Level of Prior Recent Rate Increases	Smooth, <5%/year	Smooth, 5-9%/year	Variable, >10%
15%	Level of Projected Annual Rate Increases	<4%	4-8%	9%+
5%	Rate Setting/ Updating Practices	Frequent COS updates; system-specific charges	COS w/in 10 years; combined system charges	No COS; combined system charges
5%	Revenue from Regional Partners	>15%	5%-15%	<5%
5%	Non-rate Revenue Sources[2]	>15%	5%-15%	<5%
10%	Complexity of Low Income Program[3]	Tiered assistance program; caps relative to income level	Tiered assistance program; uniform discounts within tiers	Uniform discount and income qualifier
5%	Extent of Green Infrastructure	Significant	Moderate	Limited
5%	Stormwater Credit Program Eligibility	Residential + Nonresidential; max >50%	Res +Nonresidential; max 30%-50%	No residential; max credit <30%

[1]Total score = sum of individual criteria scores X category weight. Tiers assigned based on total score as follows: Tier 1: >2.2; Tier 2: 1.8-2.2; Tier 3 <1.8

[2]Includes system development charges, taxes, and other funding sources.

[3]Does not reflect program cost or other effectiveness measures.

Three of the benchmark utilities (San Francisco Public Utilities Commission, ADWM, and New York Department of Environmental Protection) recover stormwater-related costs through the wastewater charges or other revenue sources (as is the case with ADWM). Inclusion (or not) of stormwater costs in the wastewater rate structure is an important factor in understanding system-specific rate and bill levels across the utilities.

Wastewater Rates and Structures

Cost-of-Service Framework

Generally, the cost-of-service framework for the wastewater systems reviewed includes allocation of costs to one or more flow parameters (sometimes differentiating between dry weather and wet weather flows), as well as multiple strength parameters (most commonly BOD and TSS), and a customer service category. The allocation of costs to strength components supports the development of industrial wastewater program charges which vary across utilities, reflecting individual permit and treatment requirements.

Residential Rates and Structures

Table 3 provides a summary of residential wastewater rates, rate structures, and average monthly bills for each benchmark utility. Utilities are listed in ascending order based on the average wastewater bill. Table 3 also includes the annual bill as a percent of Median Household Income (MHI). Wastewater rate schedules for each utility are provided in the Appendix.

Base Charges

As shown in Table 3, about half of the benchmark utilities have fixed (base) charges specific to the wastewater system. However, in some of these cases, the base charges recover billing and customer service costs only. For BES, customer and billing costs are recovered through a base charge included on the collective water, wastewater, and stormwater bill; however, the charge is not specific to wastewater service.

For some benchmark utilities, wastewater base charges recover costs beyond just customer services and billing. For example, it is somewhat common practice for wastewater base charges to include a portion of wet-weather flow related costs[2]. This is the case for Philadelphia Water Department (PWD), which recovers 30 percent of infiltration and inflow (I/I) costs through base charges that are assessed to customers based on their water meter size. Base charges for Metro Water Services (MWS) also vary by meter size and include the first 2 hundred cubic feet (ccf) of billed sewer volumes.

[2] The Water Environment Federation manual of practice for wastewater rate setting (Financing and Charges for Wastewater Systems) includes the number of customers as a common basis for recovery of wet-weather flow related costs, in addition to customer sewer volumes.

Table 3
Wastewater Rates and Bills – Residential[1]

		Base Charge	Volume Charge		Avg. Bill[3]	Annual Bill
Utility	**Utility Notes**	$/Month	$/Ccf	Structure[2]	$/Month	**% MHI**
SFPUC	(1) (2)	$2.19	$13.88	Uniform	$75.75	0.8%
SPU	(3)	None	$14.48	Uniform	$72.40	0.9%
ADWM	(1) (4)	$6.56	$9.74 - $15.69	Block	$63.06	1.2%
BES	(5)	(6)	$11.17	Uniform	$55.85	0.9%
NEORSD	(7)	$6.35	$9.42	Uniform	$53.43	2.1%
DCW	(8)	None	$8.89	Uniform	$44.45	0.6%
GLWA	(9)	$6.41	$5.59	Uniform	$34.36	1.3%
NYDEP	(10)	None	$6.34	Uniform	$31.72	0.6%
MWS	(11)	$7.62-$272.29	$ 4.74	Uniform	$24.02	0.5%
PWD	(12)	$7.01-$887.22	$3.24	Uniform	$23.22	0.6%

[1]Rates in effect as of October 2019

[2]Based on 5 ccf usage and 5/8" meter

[3]Based on 2018 US Census data, adjusted to 2019 based on Consumer Price Index.

(1) Wastewater rates recover stormwater system costs for metered customers.

(2) Base charge is 2nd year of 4-year phase-in.

(3) Monthly minimum charge based on 1 ccf.

(4) 3-tier inclining block rate structure.

(5) Includes Portland Harbor Superfund Charge sanitary volume portion.

(6) Base charge included on the utility bill, but not specific to wastewater.

(7) Rates for Cleveland City (Subdistrict 1).

(8) Excludes District of Columbia right of way and payment in lieu of taxes charges.

(9) Rates for customers served by DWSD.

(10) Bills subject to a minimum charge of $0.78/day ($23.70 avg. month)

(11) All rates subject to 10 percent surcharge (included in bill); base charges vary by meter size; volume charge applies to use over 2 Ccf.

(12) Base charge varies by meter size; volume rate Includes tiered assistance program rider.

The 2019 Water and Wastewater Rate Survey published biennially by the American Water Works Association (AWWA Rate Survey)[3] indicates that the majority of surveyed utilities assess base charges for wastewater services. In a limited number of surveyed utilities, base charges also included a minimum quantity of billed wastewater volume. The application of minimum charges for wastewater services is less common in modern industry rate setting, reflecting heightened concerns about affordability, equity, and water conservation.

Volume Charges

As shown in Table 3, all utilities, with the exception of ADWM, charge wastewater volume rates that are based on a uniform volume structure (i.e., each unit of volume is charged at the same

[3] American Water Works Association and Raftelis Financial Consultants, Inc., April 2019.

rate). ADWM's rate structure is based on a 3-tier inclining block rate, where usage in each block is charged at a progressively higher rate. Implementation of an inclining block rate structure by ADWM was part of a broad effort to mitigate bill impacts—particularly for smaller residential customers—as the utility faced the need to increase rates by about 144 percent over an eight-year period.

The high incidence across benchmark utilities of uniform volume rate structures reflects historically accepted rate practice. The 2019 AWWA Rate Survey found about 82 percent of large[4] utilities surveyed use a uniform volume rate form.

Nonresidential Rates and Charges

Table 4 provides a summary of fixed and volume wastewater rates for nonresidential customers, exclusive of monitored industrial customers.

Base Charges

Wastewater base charges that recover customer service and billing costs, and even all or a portion of I/I costs (as in the case of PWD), are generally the same for residential and nonresidential customers alike. MWS assesses base charges that differ for residential and nonresidential customers, and within the nonresidential class there are three different tiers of base charges, where the tiers reflect customer volumes (small, medium, and large). The MWS base charges also vary by meter size (within each tier) and include the first 2 ccf of billed sewer volume (as for residential).

Volume Charges

As for residential, all benchmark utilities, with the exception of ADWM, charge wastewater volume rates that are based on a uniform volume structure. Because ADWM's inclining block rate structure is based on relatively low tier thresholds (block 1 applies to use up to 3 ccf, block 2 applies to use between 4 and 6 ccf, and block 3 applies to all use over 6 ccf), many nonresidential customers pay higher rates, since a greater portion of their use is subject to the highest tier rates.

Like BES, San Francisco Public Utility Commission's (SFPUC) rate structure includes higher volume charges for customers with standard BOD and TSS concentrations that exceed domestic limits. Unlike monitored or measured industrial customers, these "class average" rates are based on average loadings instead of customer-specific sampling results. Like BES, SFPUC has 11 average strength classes; BES's program further differentiates rates within the primary strength classes in order to provide discounts for customers using approved best management practices (e.g., installation of grease traps or interceptors). Additional information on SFPUC's class average rates is provided in the Appendix.

[4] Class A Systems (over 75 mgd treated).

Table 4
Wastewater Rates - Nonresidential (Exclusive of Monitored Industrial Customers)[1]

Utility	Utility Notes	Base Charge $/Month	WW Volume Charge $/ccf	WW Volume Charge Structure[2]
SFPUC	(1) (2)	$2.19	$10.01-$51.06	Uniform - Class Average
SPU	(3)	None	14.48	Uniform
ADWM	(1) (4)	$6.56	$9.74 - $15.69	Block
BES	(5)	(6)	$10.99-$25.13	Uniform - Class Average
NEORSD	(7)	$6.35	9.415	Uniform
DCW	(8)	None	8.89	Uniform
GLWA	(9)	$6.41	5.59	Uniform
NYDEP	(10)	None	6.3441	Uniform
MWS	(11)	$8.51-$1,361.43	$3.26-$5.30	Uniform - By Tier
PWD	(12)	$7.01-$887.22	3.241	Uniform

[1]Rates in effect as of October 2019.

[2]Class average strength indicates that nonresidential customers are grouped into different subclasses and rates are based on the assigned average strength loadings for each subclass.

(1) Wastewater rates recover stormwater system costs for metered customers.

(2) Base charge is 2nd year of 4-year phase-in.

(3) Monthly minimum charge based on 1 ccf.

(4) 3-tier inclining block rate structure.

(5) Includes Portland Harbor Superfund Charge sanitary volume portion.

(6) Base charge included on the utility bill, but not specific to wastewater.

(7) Rates for Cleveland City (Subdistrict 1).

(8) Excludes District of Columbia right of way and payment in lieu of taxes charges.

(9) Rates for customers served by DWSD.

(10) Bills subject to a minimum charge of $0.78/day ($23.70 avg. month)

(11) All rates subject to 10 percent surcharge (included in bill); base charges vary by meter size; volume charge applies to use over 2 Ccf.

(12) Base charge varies by meter size; volume rate Includes tiered assistance program rider.

As with residential volume rates, the 2019 AWWA Rate Survey found that over 80 percent of large utilities surveyed use a uniform volume rate form for nonresidential customers.

Extra-Strength Charges

It is standard industry practice for utilities to charge monitored industrial customers for discharges that exceed typical domestic limits, based on customer-specific wastewater sampling data. For BES, extra-strength charges apply to wastewater concentrations that exceed 300 milligrams per liter (mg/l) for BOD, and 350 mg/l for TSS (within the typical range used by the other benchmark utilities). As shown in Table 5, the specific strength parameters subject to extra-strength charges differ across the benchmark utilities.

Table 5
Wastewater Rates - Extra-Strength Charges[1]

	Extra-Strength Unit Charges ($/lb.)						
Utility	**BOD**	**COD**	**TSS**	**FOG**	**A**	**TKN**	**TP**
NYDEP	na	na	na	na		na	na
SFPUC		$0.555	$1.412	$1.424			
BES	$0.831		$1.096				
GLWA	$0.491		$0.499	$0.473			$7.354
SPU	$0.350		$0.428				
PWD	$0.397		$0.388				
NEORSD	$0.272		$0.287				
DCW	$0.135		$0.263	(a)		$1.471	$4.524
MWS	$0.326		$0.166	$0.166	$0.441		
ADWM		$0.135	$0.140			$0.585	
Typical Limits (mg/l)	228-300	500-532	266-350	100	30	25	12
2019 AWWA Rate Survey[2]	$0.3404		$0.3346				

[1]Rates in effect as of October 2019.

[2]Average of Group A systems (over 75 mgd treated).

(a) FOG charge is a flat fee per month ($13.70).

Average BOD and TSS surcharges for large utilities from the 2019 AWWA Rate Survey are also shown in Table 5. Variances in extra-strength charges across utilities may reflect differences in overall revenue requirements, as well as different permit and treatment requirements, and cost allocation practices.

Stormwater Rates and Structures

General Framework

For many of the benchmark utilities, the basis of the stormwater rate setting framework is focused on volume, and the rate structure reflects an indirect measure of stormwater discharge typically including impervious area and sometimes other factors such as gross area or type of land use. In some cases, stormwater rates further distribute stormwater system costs on the basis of storm events (SPU), with allocations to customers based on different surface types. While the basic rate structures used by the benchmark utilities focus on volume of runoff, credit programs generally include incentives for managing water quality also.

Allocation of Combined Sewer Overflow Costs

The approaches to allocating combined sanitary and stormwater costs to utility customers vary across the benchmark utilities. Some of the agencies (GLWA, SFPUC, NEORSD) allocate CSO-related costs in proportion to wastewater volumes, as is the case in BES's current rate setting framework. Others (DCW and SPU) allocate CSO-related costs primarily to stormwater. PWD's rate setting process uses a combination of factors to allocate combined system costs between sanitary and storm systems:

- Conveyance (capital) = 64 percent stormwater and 36 percent sanitary sewer (based on pipe length and diameter and trenching cost differences).
- Conveyance (operation and maintenance) = 60 percent stormwater and 40 percent sanitary sewer (ratio of system-wide peak wet weather flows to peak dry weather flows).
- Pumping & Treatment (both O&M and capital) – I/I portion = 70 percent sanitary and 30 percent stormwater (ratio of average dry weather flow to average wet weather flow).

Allocation of Stormwater Costs to Customer Types

Many of the benchmark utilities allocate costs to customer types based on two factors: (1) number of accounts (for fixed-per-account customer and billing-related costs), and (2) impervious area (for all other costs).

Two of the utilities (PWD and SPU) use multiple surface types as the basis for rate assessment. PWD uses both impervious area (80 percent) and gross area (20 percent). SPU allocates costs to four surface type categories: (1) impervious area, (2) managed grass, (3) unmanaged grass, and (4) good forest. For SPU, cost allocations to each surface type reflect the allocation of revenue requirements to each storm event (25-year, 2-year, 6-month, and average), and the relative run-off volumes for each surface type.

None of the benchmark utilities explicitly allocate costs between on-site and off-site flows, as is the current practice of BES. In most cases, impervious area that is roadway-related (and in some cases airport public travel ways) is either exempted within the ordinance or is not recognized because charges are defined to be limited to areas within parcels. Other types of public impervious area (municipal buildings, parks, etc.) are typically charged a stormwater fee like any privately owned parcel.

Residential Rates and Bills

Table 6 provides a summary of residential stormwater rates and bills for each utility. Supplemental information is provided in the Appendix for each utility.

Key findings related to residential rate structures include:

- **Base Charges** – Only one utility (PWD) explicitly charges a base fee for stormwater. PWD assesses a higher base fee to nonresidential accounts owing to the relatively greater billing and customer service efforts associated with measured properties and credits. SPU includes calculation of account-related stormwater costs, but they are not shown separately on the bills.
- **Uniform vs. Customer-Specific Charges** – All of the utilities, with the exception of GLWA, charge uniform rates to customers within established residential subclasses or tiers. GLWA's charge is based on parcel-specific area.
- **Single Class vs. Subclasses** – BES and PWD are the only two utilities out of the seven with separate stormwater rate structures that do not have tiers or property-specific measured area.

- **Number of Tiers** – The number of tiers for the single family residential class varies between 3 (MWS and NEORSD) and 6 (DCW). SPU uses a 5-tier structure for small residential (<10,000 sf parcel area).
- **Small customer exemptions** – Both MWS and DWSD have exemptions for small customers.

Table 6

Stormwater Rates and Bills - Residential[1]

Utility	Utility Notes	Charge/Month	Structure	Avg. Bill $/Mo.	Annual Bill % of MHI[2]
SPU	(1)	$14.15 - $54.38	Tier	$43.06	0.6%
GLWA	(2)	$608.00	Measured	$30.40	1.2%
BES	(3)	$29.90	Uniform	$29.90	0.5%
DCW	(4)	$12.86-$282.59	Tier	$23.61	0.3%
PWD	(5)	$14.03	Uniform	$15.80	0.4%
MWS	(6)	$1.50-$11.00	Tier	$6.00	0.1%
NEORSD	(7)	$3.09-$9.27	Tier	$5.15	0.2%
SFPUC	(8)	na	na	na	0.0%
ADWM	(9)	na	na	na	0.0%
NYDEP	(8)	na	na	na	0.0%

[1]Rates in effect as of October 2019.

[2]Based on 2018 US Census data, adjusted to 2019 based on Consumer Price Index

(1) 5-tier parcel area structure; bill based on 5,000 - 6,999 sf; billed on property tax statement; large residential customers charged based on nonresidential rate structure.

(2) Rates for DWSD per impervious acre; bill based on 0.05 acres; excludes downspout disconnect credit (25%); customers <0.02 acres exempt.

(3) Includes Portland Harbor Superfund Charge impervious area portion.

(4) 6-tier impervious area structure; bill based on Tier 2 - 1 ERU (700-2099 sf) and includes District of Columbia charge per ERU of $2.67.

(5) Bill includes a base charge of $1.77 per account.

(6) 3-tier impervious area structure; bill based on Tier 2 (2,001 - 6,000 sf); customers <400 sf impervious area exempt from charge.

(7) Rates for Cleveland; structure is based on 3-tier impervious area structure; bill assumes Tier 2 (2,000-3,999 sf).

(8) Wastewater rates recover stormwater system costs.

(9) Up to $14 m stormwater costs funded through Municipal Option Sales Tax.

For a broader industry perspective, the 2018 Stormwater Utility Survey Report published by Black & Veatch (2018 Stormwater Utility Survey) [5] found that 54 percent of the 75 utilities surveyed charge uniform rates for residential customers and 30 percent charged based on a tiered rate structure. For those utilities with tiers, about two-thirds use 3 to 4 tiers, and almost 20 percent use 5-tier structures. Impervious area is the basis for 73 percent of the utilities using a tier structure, with the remainder based on gross area and assumptions about impervious cover.

[5] 2018 Stormwater Utility Survey Report, Black & Veatch Management Consulting, LLC.

Nonresidential Rates and Structure

Table 7 provides a summary of nonresidential stormwater rates for each utility. For nonresidential customers, all of the benchmark utilities, with the exception of MWS, charge based on measured area. MWS uses a 7-tier rate structure, where customers within each tier are charged a uniform rate. NEORSD uses a declining block rate structure, where equivalent residential units (ERUs) over 10 are discounted between 5 and 20 percent.

Table 7

Stormwater Rates - Nonresidential[1]

Utility	Utility Notes	$/Month	Structure/Basis
SPU	(1)	$2.11-$11.93	1,000 sf GA/ Type of Surface
GLWA	(2)	$608.00	Impervious Acre
DCW	(3)	$23.61	ERU 1,000 sf IA
BES	(4)	$13.02	1,000 sf IA
PWD	(5)	$1.43/$10.82	1,000 sf GA /1,000 sf IA
MWS	(6)	$10.00-$1,300	/Tier
NEORSD	(7)	$5.15	ERU (3,000 sf IA)
SFPUC	(8)	na	na
ADWM	(9)	na	na
NYDEP	(8)	na	na

[1]Rates in effect as of October 2019.

(1) Rates vary by intensity of development (% impervious area) and type of pervious area

(2) Rates for DWSD per impervious acre

(3) Includes District of Columbia charge per ERU of $2.67.

(4) Includes Portland Harbor Superfund Charge impervious area portion; minimum charge = $13.02.

(5) Base charge of $2.30 per account included in bill; minimum charge = $16.06.

(6) 7-tier impervious area structure; customers <400 sf impervious area exempt from charge.

(7) Declining block rate structure with discounts for ERUs over 10: 5% discount for ERUs between 10 and 50; 10% discount for ERUs between 50 and 100; 15% discount for ERUs between 100 and 250; 20% discount for ERUs over 250.Declining block

(8) Wastewater rates recover stormwater system costs.

(9) Up to $14 m stormwater costs funded through Municipal Option Sales Tax.

Impervious area is a factor in all of the stormwater rate structures of the agencies surveyed; however, it is not the only factor. PWD uses both impervious area and gross area. SPU has the most complex rate structure, with four categories of surface types considered, including impervious area (see Appendix for details).

The 2018 Stormwater Utility Survey found a similarly high incidence of utilities using impervious area as a factor in stormwater rate assessment. Other factors include gross area (18 percent) and unspecified other factors (3 percent). Further, the survey indicates that 87 percent of utilities rely on a single factor for bill determination, while 13 percent use two methods (like PWD and SPU).

Units of measure (billing units) vary among stormwater utilities as well. Many use an ERU basis, which is typically either the median or average of a sample of the impervious area on residential properties. Some bill on a per-unit of measured area basis (e.g., 1,000 sf impervious area). Thus comparisons of monthly billing rates can be deceptive based on the billing unit employed. Table 7 has not been converted to equivalent billing units.

Credit Programs

Table 8 provides a summary of nonresidential stormwater credits for each utility. Supplemental information for each utility is provided in the Appendix.

Residential

Credit practices vary widely across utilities. For those agencies with stormwater rates, two (MWS and PWD) do not provide any bill discounts for single family residential customers (though they do provide credits for multi-family units). Other programs provide a range of credits from 20 percent (DCW) to 100 percent (NEORSD), with others in between. SPU does not provide credits for small and average residential customers; large customers may qualify for up to 50 percent credit for eligible stormwater management practices.

Nonresidential

While stormwater credits for residential customers are not the norm[6], all of the benchmark utilities provide credit options for nonresidential customers, and the maximum credit amounts are generally 50 percent or higher. Most of the benchmark utilities' credit programs have multiple components, with opportunities for credit for management practices that address:

- Runoff quantity (peak flow or volume)
- Water quality
- Other (education or NPDES permit requirements)

Among benchmark utilities, PWD and GLWA provide some credits on a basis other than reduction of an owned site's peak flow, runoff volume or water quality. PWD has a de facto program in that it constructs facilities on donated private property and then allows a credit for such facilities to be paid to the property.

In general, as seen with other utilities, the reasoning for these types of credit is that a non-utility entity is providing goods or services that reduce the utility's stormwater costs. For example, the rationale behind education credits for schools or other public facilities is that public education is a regulatory requirement and schools that provide relevant course curricula in fact reduce the local compliance costs by providing education to local citizens. Similarly, GLWA offers credits to churches, schools, and other community organizations for hosting water resource management education events.

Over-detention or private property storage donation is another form of credit wherein a private entity provides space for stormwater storage and/or treatment for a public good.

[6] Typically, the applicable credit amount would be too small to motivate private investment and / or individual parcel water quality measures do not exist to address runoff treatment requirements.

Table 8
Stormwater Credit Programs[1]

	Residential Credit		Nonresidential Credit	
Utility	**Max Amount**	**Activities**	**Max Amount**	**Basis**
ADWM	NA	NA	NA	NA
BES	35%	Retained roof drainage (35%), on-site WQ management (23%), size credit <1,000 SF IA (8.8%), trees (2.8%)	35%	Discount based on extent and effectiveness of water quality, flow rate, and disposal; equal weights for each factor; effectiveness based on sizing standards.
DCW	20% DCW; 55% District of Columbia charge	Discounts for customers who use green infrastructure to retain stormwater runoff from property's impervious surfaces.	20% DCW; 55% District of Columbia charge	Discounts for customers who use green infrastructure to retain stormwater runoff from property's impervious surfaces.
GLWA	25%	Discounts for assumption of use of downspout disconnection with redirect to lawn or rain barrel.	80%	Credits for stormwater management practices that reduce peak flow (40%), volume (40%).
MWS	None	None	75% Low Impact Dev. / 50% Other	Other credits for on-site detention (20%), water quality (20%), and education (20%).
NEORSD	100%	Use of one or more rain garden, onsite storage, impervious surface reduction, pervious pavement, and vegetated filter strips.	100%	Quantity Credits (75%) include Peak Flow Credit for control within design standards; Runoff Volume Credit for maintaining or reducing runoff volume; Water Quality Credit (25%) for stormwater management practices.
NYDEP	None	None	100% (parking lots only)	Exemptions for parking lots that pay a separate stormwater charge and manage on-site stormwater flows.
PWD	None	"Rain Check" rebate program	Up to minimum charge	3 types: (1) IA Credit (up to 80% IA charge), (2) GA Credit (up to 80% GA charge), and (3) NPDES Credit (up to 7%).
SFPUC	None	Partnership with Friends of the Urban Forest to install permeable sidewalk gardens to reduce burden on SW system.	None	Floodwater management grants and urban watershed stewardship grants for removing impervious surface, and implementing permeable pavements & rain gardens by nonprofits.
SPU	0 / 50%	All residential potentially eligible for "RainWise" rebate program (for rain gardens and cisterns); only large residential eligible for stormwater facility credits (up to 50%).	50%	Calculated based on type of control and assumed performance factors; controls include water quality and 5 types of flow control.

[1] Discounts on bills only; see Appendix for more details on individual utilities.

Some programs offer credits for exceeding (but not meeting) development requirements, especially if nearly all developments were constructed using those stricter standards (e.g., detention). The reasoning is that system size and construction costs, and thus utility fees, are lowered generally through the flow limitations realized by the stricter standards—and thus a further credit is not warranted.

Credit programs may have different eligibility requirements for customers in combined sewer and separated sewer areas. For example, PWD's program has the following restrictions:

- Customers in separate sewer areas are not eligible for credit for detention and slow release or blue roof[7].
- Customers in combined areas are not eligible for credits by routing the first inch of runoff through an approved pollutant-reducing practice.

Other forms of private property incentives include:

- Rebates – See for example SPU's RainWise rebate program, which is also limited to combined sewer areas.
- Grant programs – Cover the costs of design and construction of an approved stormwater management feature up to a maximum amount. See for example SFPUC and NYDEP Green Infrastructure Grant programs, and DWSD Capital Partnership Program.
- Private property retrofits – Installation of green infrastructure assets on private property that manage a stormwater volume. See for example the NYDEP and PWD programs.

Some agencies (e.g., PWD) allow for payment of a fee in lieu of on-site stormwater management programs as an option when on-site stormwater management is not feasible, and where exercise of the off-site option will not adversely affect flooding, stream protection, or other aspects of the stormwater program or permit requirements.

Reported findings in the 2018 Stormwater Utility Survey were similar to the benchmark utilities, with respect to credit eligibility, maximum credits, and components. Key findings include:

- Forty-six percent of utilities provide credits only to nonresidential customers (including multi-family customers).
- The majority of utilities cap credits for individual program components (volume reduction, peak flow reduction, and water quality control at 50 percent or below) and NPDES compliance at less than 25 percent.
- More than half of utilities surveyed offered maximum credits combined of over 50 percent, with 21 percent providing a total combined credit over 75 percent.

System Development Charges

Capital charges are sometime referred to as SDCs, System Availability Fees, Capacity Charges, and Impact Fees. Information on new development charges for benchmark utilities was limited.

[7] Blue roofs are non-vegetated systems that help control stormwater drainage through wires installed along the roof and drain that create temporary ponding and control a gradual release of stormwater.

Wastewater

Table 9 shows available information on new development capital charges for BES and three of the benchmark utilities. Of the surveyed utilities, the most common methodology structure is a buy-in structure, where charges are based on the value (usually replacement cost) of the existing system. The basis for assessment of charges to nonresidential customers is either fixture units or meter size. SFPUC also includes a wastewater strength component, consistent with its sewer rates.

Table 9
Wastewater Capital Charges[1]

Utility	Methodology	Nonresidential Basis	Residential Dwelling
BES	Buy-In	Plumbing Fixture Units	$6,917
DCW	Buy-In	Meter Size	$2,809
SFPUC	Buy-In	Meter Size and SIC Group	$4,925
SPU[2]	NA	Plumbing Fixture Units	$11,610

SIC = Standard Industrial Classification

[1]Rates in effect as of October 2019

[2]Based on King County

Stormwater

SDCs for stormwater are common in Oregon; however, they are far less common elsewhere in the country primarily because few cities have yet to determine the full extent of current system costs and conditions, and facilities needed to expand system capacity based on new development. Another factor is that local policies generally require new developments to manage their stormwater on-site or pay through in-lieu-of fees for system impacts related to on-site runoff.

Conclusions

The Rate Study will include a comprehensive review and update of BES's wastewater and stormwater rate setting practices. Even within the existing framework, there will likely be shifts in cost recovery between systems (sanitary and storm) and among rate components (wastewater flows and loading charges, and stormwater off-site and on-site charges), as the cost structure and customer characteristics have changed since the prior study conducted over a decade ago. A comprehensive update provides the opportunity to evaluate alternative approaches—to cost allocations, rate design and credit programs—in order to balance current rate setting objectives.

The benchmarking exercise provides insights into how other utilities—particularly those facing significant capital expenditures related to addressing mandated CSO programs—are balancing affordability concerns with equity, defensibility, and sustainability objectives. It also provides a relative comparison of rate levels.

In terms of rate levels, BES's current rates among the highest of utilities surveyed; however, the projected rate increases of most other utilities reviewed are significantly higher than those of BES (which are projected to average 3 percent), suggesting some future realignment. Also, direct comparisons of rate levels are complicated by the fact that some utilities recover a portion of annual utility costs through other fees that are not included in this memorandum because they are

not specific to wastewater and stormwater service (e.g., DCW's fees for right of way and payment in lieu of taxes).

Overall, BES's rate setting practices meet or exceed industry standards with respect to alignment of individual system rates with cost of service and financial planning principles. With respect to alignment of rate structure and key cost allocation approaches to the benchmark utilities, findings include the following:

- **Wastewater rate structure (highly aligned):** BES's existing uniform volume rate structure for residential and nonresidential alike is consistent with the benchmark utilities and broader published survey information.
- **Wet weather flow cost recovery (moderately aligned):** Approaches to recovery of CSO-related costs and wastewater system I/I costs vary among utilities, with at least a couple agencies recovering all or a portion of CSO-related costs through stormwater rates and I/I costs recovery through the fixed base charges, and other utilities (like BES) recovering costs through wastewater volume rates.
- **Extra-strength charges (highly aligned):** BES's program is among the most expansive of the utilities surveyed, as it includes class-average extra-strength customers in addition to the more traditional measured industrial customers. The cost-of-service analysis will consider the appropriateness of existing surcharge levels, and whether additional classes are needed to reflect the current customer base.
- **Off- vs. on-site stormwater charges (not aligned):** None of the benchmark utilities explicitly allocate costs between on-site and off-site charges, as is the current practice of BES. In most cases roadway or other public travel way related impervious area costs are not recognized because stormwater charges are assessed on the basis of parcel area only, and stormwater credit eligibility reflects other cost factors.
- **Residential stormwater rate structure (moderately aligned):** One of the most notable findings of the benchmarking review relates to the high incidence of tiered stormwater rates for residential customers. BES is one of only two agencies that charge a uniform single family residential rate. Consideration of a tiered rate system will need to be evaluated in the context of data and billing system constraints.
- **Nonresidential stormwater rate structure (moderately aligned):** BES's practice of using measured impervious area as a basis for stormwater rates is consistent with the majority of benchmark utilities and is consistent with broader industry practice. A couple of the agencies use more complex structures that consider other surface types. As with the residential rate structure, any potential modifications to the existing approach will need to balance gains in equity or sustainability against administrative considerations.
- **Stormwater credit programs (moderately aligned):** When compared to benchmark utilities, BES's current maximum credits are on the lower end for nonresidential customers. Any expansion of the program to further incent on-site stormwater management practices will need to be considered in the context of overall rate impacts, and potential effectiveness of specific practices. In addition, many of the benchmark communities offer credits for education efforts, which are seen to offset the local stormwater program's MS4 education requirements.

- **System development charges (highly aligned)**: For those utilities charging SDCs, BES's practice of basing fees on a buy-in approach is consistent with the benchmark utilities and industry practices. While the basis for SDC assessment varies across the utilities, use of an EDU-based approach to scale fees is consistent with industry practices.

Appendix

Supplemental Utility Information

Atlanta Department of Watershed Management

Overview

Atlanta Department of Watershed Management (ADWM) provides collection and treatment of wastewater to a service area that includes the City of Atlanta, Northwest DeKalb County, a small portion of Clayton County, and parts of North and South Fulton County. ADWM provides stormwater services within the City of Atlanta.

Key Statistics

- Number of accounts served = 93,617
- Portion of system served by combined sanitary & storm sewers: approx. 15 percent combined, 85 percent separated
- System facilities
    - Miles of sewers = 2,150
    - Number of storm drains = 500 miles of pipe, 50,000+ inlets and outfall structures
    - Number of pump stations = 16
- System treatment capacity
    - Average day design = 220 mgd
- Average sewer flows = 140 mgd
- Historical average annual rate increases – 2004 – 2012 Highly variable, cumulative increase of over 250 percent
- Projected average annual rate increases – Rate increases projected at 3 percent in FY 2023 and 2 percent in FY 2024
- Current annual rate revenue = Approx. $265M

Key Challenges/Strategies

ADWM was created in 2001 to unify water resource management departments and address challenges related to a failed water system privatization, and the city's compliance with two major wastewater system consent decrees contemplating in excess of $3.2 billion of wastewater system investment over a 14 year compliance period. ADWM implemented two 4-year rate increase programs in 2004 and in FY 2008 that resulted in Atlanta's rates becoming the highest water and wastewater rates in the United States. A typical 8 Ccf wastewater bill increased 144 percent from about $44 in 2004 to over $108 in FY 2012.

To mitigate further rate increases, the city implemented a 1 percent Municipal Option Sales Tax (MOST) in 2005 as a dedicated supplemental funding source for the Clean Water Atlanta program[8]. MOST proceeds are now projected to generate $130M - $150M in system funding per

[8] The Clean Water Atlanta initiative is responsible for planning, design, and construction of improvements to the city's drinking water and wastewater systems, as well as environmental compliance reporting, to comply with the city's consent decrees and administrative orders.

annum, 10 percent of which may be dedicated to stormwater management. After successful completion of the first of its consent decrees related to CSOs, in 2010 the city requested and ultimately received a consent decree schedule extension.

Atlanta has not increased its rates since FY 2012. Recent bond issues, including a small $13.5 million Environmental Impact Bond to fund stormwater management projects, contemplate modest increases of 2-3 percent per annum beginning in FY 2023. Given that Atlanta's service rate levels remain among the highest in the country and that ADWM is further supported by MOST, further increases to funding levels will be limited. Water affordability, addressed in part through a utility revenue funded Care & Conserve Customer Assistance Program, is a continuing concern as are stormwater management challenges including flooding problems that disproportionately impact low-income sections of the city's service area. ADWM's emphasis on wastewater consent decree compliance over the last 2 decades has resulted in an imbalance of system reinvestment and acute further reinvestment needs in the city's wastewater plants, stormwater infrastructure (and water system).

Rate Information

General Framework

ADWM's rates are not based on a cost-of-service analysis, nor are there separate stormwater rates. Rate increases have been applied system wide across water and wastewater and all rate components since 2004. ADWM is considering introducing legislation to the Atlanta City Council to authorize a separate stormwater utility and fee based on impervious area. At such time a stormwater fee is created, a credit program will also be developed.

Wastewater Rate Structure

ADWM's rates include a base charge and a volumetric structure based on inclining blocks, as shown in Table A-1. Implementation of the inclining block structure, which is applied across all customer types, was part of a broad strategy to provide rate relief for residential customers (particularly small customers) as overall rates increased by about 144 percent over an 8-year period.

Table A-1
ADWM Regular Sewer Charges[1]

Component	$/Unit
Base Charge ($/month)	$6.56
Volume Charge ($/Ccf)	
Block 1: 1-3 Ccf	$9.74
Block 2: 4-6	$13.64
Block 3: over 6	$15.69

[1]Effective July 1, 2012

For monitored industrial customers, ADWM assesses extra-strength charges, based on the schedule provided in Table A-2.

Table A-2
ADWM Extra-Strength Surcharge Fees

Component	$/lb.
BOD	$0.14
TSS	$0.14
TKN	$0.59

Stormwater Rate Structure

Stormwater services are funded through wastewater rates and up to 10 percent (approximately $13 million per year) Municipal Option Sales Tax proceeds. At some point in the future ADWM plans to implement a separate stormwater utility and fee.

Stormwater Credits/Incentives

None at this time.

Bureau of Environmental Services (Portland)

Overview[9]

The City of Portland Bureau of Environmental Services (BES) provides wastewater and stormwater services to a service area population of almost 0.7 million, with over 180,000 customer accounts. BES also provides contract wastewater services to six wholesale customers.

Key Statistics

- Population served = 0.7 million
- Portion of system served by combined sanitary & storm sewers: 39 percent
- System facilities
    - Number of pump stations = 98
    - Miles of pipes = approximately 2,500 (including separate sanitary and storm, and combined system)
    - Miles of open stream channels = 280
- Wastewater treatment capacity = 450 mgd (peak)
- Annual sewage flow = 30 billion gallons
- Historical average annual typical single family bill increases – 3 percent (since FY 2015)
- Projected average annual typical single family bill increases = approximately 3 percent (through FY 2024)
- Current annual rate revenue = $357 million

Key Challenges/Strategies

In the last decade, BES completed a major 20-year construction effort to control CSOs into the Willamette River. As BES faces a rapidly growing population, continued urban development and impacts from climate change, development of innovative, cost-effective and green solutions are key to service delivery strategy going forward. BES currently captures and filters about 2.3 billion gallons of stormwater runoff through green infrastructure, including more than 2,000 green streets.

Prior focus in investment on the CSO control program has resulted in a backlog in system maintenance and repairs. More than 30 percent of pipes in the systems are at or beyond their expected useful life. BES estimates that addressing asset replacement and system replacement will require annual investment of more than $150 million by FY2022-23.

[9] City of Portland Bureau of Environmental Services 10-Year Strategic Plan 2018-2027.

Rate Information

General Framework

BES reviews and updates sanitary sewer and stormwater rates, charges, and fees annually based on a three-step financial planning process. The first two steps establish annual requirements for the system – first in the form of a rolling five-year financial plan, and then as the basis for the next fiscal year budget submittal. The third step establishes a schedule of rates and charges designed to generate budgeted annual revenue in a manner that conforms to BES's cost-of-service framework and broader social and environmental policy objectives.

While BES annually updates rates and charges to reflect current revenue requirements and system demands, the last comprehensive review was conducted in 2005. BES is currently conducting a comprehensive assessment of the methodologies and structures that form the basis of its sanitary sewer and stormwater rates, SDCs and other fees, and stormwater discount program.

Wastewater Rate Structure

BES's current sanitary sewer rates are shown in Table A-3. Sanitary sewer volume rates are higher for residential customers compared to nonresidential customers, as the residential rate includes the additional costs of the low income program. Bill discounts are provided to qualifying low income customers in two tiers based on median family income.

Special meter charges are assessed only on nonresidential customers with flow monitoring meters. All sanitary sewer customers also pay a volumetric charge for a portion of costs associated with the Portland Harbor Superfund program; the remainder of the program costs are recovered through impervious area charges (discussed under stormwater rates).

Table A-3

BES Sanitary Sewer Charges[1]

	$/Month	$/Unit
Residential		
Sanitary Volume Rate ($/Ccf)		$11.08
Low Income Bill Discount	-$37.37	
Extremely Low Income Bill Discount	-$59.80	
Nonresidential		
Sanitary Volume Rate ($/Ccf)		$10.90
Clean Water Discharge		$1.15
Publicly-Owned Drinking Fountain or Single-Pass Waste Fountain		$0.56
Special Meter Charge	$40.00	$1.41
Portland Harbor Superfund Sanitary Charge ($/Ccf)		$0.09

[1]Effective 7/1/2019

Commercial and industrial customers discharging wastewater in excess of 300 mg/l BOD and 350 mg/l TSS are assessed extra-strength charges for each additional pound discharged, above the standard strength limits. Extra-strength customers include "measured" customers whose charges are based on individual sampling results monitored by BES, and "class average" customers whose wastewater concentrations are estimated from local sampling data.

Table A-4

BES Extra-Strength Surcharges[1]

Component	$/lb	Threshold (mg/l)
BOD	$0.831	300
TSS	$1.096	350

[1] Effective July 2019

Stormwater Rate Structure

BES's stormwater rates are shown in Table A-5, and include on-site and offsite stormwater management components. Single family residential and small multifamily customers (less than five units) are charged uniform rates based on estimated impervious area. Rates for nonresidential and large multifamily customers are based on measured impervious area for each customer.

Table A-5

BES Stormwater Charges[1]

Customer Type	$/Month	Total $/Month
Stormwater User Charges		
Residential and Duplex[2]	$19.27 offsite $10.39 onsite	$29.68 per Account
Multifamily (3- and 4-Plex)[3]	$8.03 offsite $4.33 onsite	$12.36 per Dwelling
Multifamily (5 or more units)	$8.03 offsite $4.33 onsite	$12.36 per 1,000 sq. ft. IA
Nonresidential	$8.46 offsite $4.56 onsite	$13.02 per 1,000 sq. ft. IA
Portland Harbor Superfund Impervious Area Charge		0.24 per 1,000 sq. ft. IA

[1]Effective 7/1/2019

[2]Based on 2,400 sf impervious area per parcel

[3]Based on 1,000 sf impervious area per dwelling

Stormwater bills for all stormwater customers also include a charge associated with the Portland Harbor Superfund program.

Stormwater Credits/Incentives

BES provides stormwater credits (up to 35 percent of a customer's bill) through its Clean River Rewards Program. Under the program, incentives and discounts are available to all eligible Portland ratepayers regardless of property class, use, or location.

Credit options for residential customers include:

- Full discount when all roof drainage is fully retained on the property.
- Partial discount (67 percent of the full potential discount) when private onsite stormwater management detains or partially retains stormwater discharges from roof areas.
- Supplemental discount (25 percent of the full potential discount) when the total developed area is less than 1,000 square feet.
- Supplemental discount (8 percent) of the full potential discount when there are four or more trees on the property taller than 15 feet. This supplemental discount does not include street trees such as trees planted in an adjacent public right-of-way.

Commercial, Industrial, Institutional and Multifamily Properties

For nonresidential and multifamily properties, BES calculates discounts based on the extent and effectiveness of private on-site systems to control the pollution, flow rate and disposal of stormwater runoff from all developed areas. Equal weight is given to each of these three components of stormwater management. The effectiveness of each stormwater facility is based on separate sizing standards for pollution reduction, flow rate and disposal control as determined by BES.

Ratepayers are required to provide the size or capacity of the onsite stormwater management facilities and the amount of developed areas served by each facility type.

System Development Charges

BES charges sanitary sewer and stormwater SDCs, as shown in Table A-6. The SDCs are designed to recover existing system capacity costs associated with major facilities (including sewer lines 12-inch diameter and larger).

Table A-6

BES System Development Charges[1]

	$/Unit	Unit
Sanitary Sewer		
Single Family or Duplex	$6,917	Parcel
Multifamily	$5,534	Dwelling Unit
Nonresidential[2]	$6,917	EDU
Stormwater		
Single Family or Duplex	$1,159	Parcel
Residential 3-Plex	$1,338	Parcel
Residential 4-Plex	$1,835	Parcel
All Other Development[3]		
Impervious area component	$242	1,000 sf IA
Frontage component	$7.69	linear foot frontage
Trip generation component	$4.21	daily vehicle trip

[1]Effective July 1, 2019

[2]Equivalent dwelling units (EDUs) determined based on number of plumbing fixture units and type of use.

[3]SDC is the sum of the three components.

Sanitary sewer SDCs are assessed based on an Equivalent Dwelling Unit (EDU) structure. Residential developments are assessed SDCs based at a rate of one EDU per dwelling unit (single family), and 0.8 EDU per unit (multifamily).The number of EDUs for nonresidential developments are determined based on the number and type of plumbing fixtures installed and the estimated intensity of use, as determined based on the type of development (e.g., office, restaurant, etc.).

Stormwater SDCs are assessed to new single family and small multifamily development (less than five units) on a parcel basis. The SDCs for all other development are the sum of three components: 1) impervious area, 2) frontage, and 3) trip generation (based on land use type).

SDC exemptions are provided for qualified affordable housing and accessory dwelling units.

DC Water

Overview

DC Water provides more than 681,000 residents and 21.3 million annual visitors in the District of Columbia with retail water and wastewater service. With a total service area of approximately 725 square miles, DC Water also treats wastewater for approximately 1.6 million people in neighboring jurisdictions, including Montgomery and Prince George's counties in Maryland and Fairfax and Loudoun counties in Virginia.

Key Statistics

- Percent of system served by combined sanitary & storm sewers: 33 percent
- Average annual wastewater flow = 300 mgd
- System facilities
    - Miles of sanitary and combined sewers = 1,900
    - Stormwater stations = 16
    - Number of catch basins and manholes = 75,000
    - Number of CSO outfalls = 53
    - Number of wastewater pump stations = 9
- System treatment capacity
    - Average day design = 384 mgd
    - Peak capacity = 1,000 mgd
- Historical annual rate increases – Sewer rates 10 percent; stormwater 15 percent.
- Projected average annual rate increases = 4-6 percent through 2027
- Annual revenue = $121 million CRIAC only; $274 million estimated wastewater

Key Challenges/Strategies

A 2005 consent decree mandates a $2.7 billion Clean Rivers program. The plan will reduce the discharge of 96 percent of CSOs into local waterways from DC Water's combined sewer system by building a system of underground tunnels and GI to contain and capture overflows so they can be directed to the treatment facility. The Clean Rivers program requires significant construction work over 25 years (until 2030).

DC Water is also under strict requirements to significantly reduce the amount of nitrogen and phosphorous in the treated water discharged into the Potomac.

Rate Information[10]

General Framework

DC Water conducts a cost-of-service study every three years. The most recent study (2018) resulted in 37 percent reallocation of costs from stormwater to wastewater which will be phased in over three years. The cost-of-service framework includes allocation of combined utility capital costs between the wastewater and stormwater system based on actual CIP expenditures (for existing debt service) and planned future CIP costs (for future debt service). Generally, DC Water recovers CSO-related capital costs through the stormwater rates. The recent reallocation of a portion of stormwater costs to wastewater reflects relatively higher capital investment for wastewater (including allocation of a portion of new tunnel capacity costs to wastewater), compared to the prior study.

Wastewater Rate Structure

All metered customers pay a uniform volume charge for sewer ($8.89/ccf) only (there is no fixed service charge specifically for the wastewater system).

Table A-7
DC Water Regular Sewer Charges[1]

	$/ccf
All Customers	$8.89

[1]Effective 10/1/2019

DC Water implemented a Fats Oils and Grease Facility Monthly fee in August 2019. The fee ($13.70 per month) applies to all food service establishments. High strength customers are also subject to charges shown in Table A-8.

Table A-8
DC Water High Strength Sewer Charges

Component	Rate
High Strength ($/lb.)[1]	
Biochemical Oxygen Demand	$0.14
Total Suspended Solids	$0.26
Total Nitrogen	$1.47
Total Phosphorus	$4.52
FOG ($/month)[2]	$13.70

[1]Effective 1/18/2019

[2]Effective 8/1/2019

[10]DC Water FY 2020 Budgets, Adopted April 4, 2019.

Stormwater Rate Structure

DC Water bills two stormwater charges: 1) Clean Rivers Impervious Area Charge (CRIAC), and 2) District of Columbia Department of Energy and Environment (DOEE) Stormwater Charge. For the CRIAC, residential customers are charged based on a 6-tier impervious area structure (since 2011), as shown in Table A-9. Nonresidential customers are charged based on measured impervious area at a rate of $20.94 per ERU (where an ERU is equal to 1,000 sf IA).

Table A-9
Clean Rivers Impervious Area Residential Charge[1]

Impervious Area Tier	ERU	ERU Rate	Monthly Cost
100-699	0.6	$20.94	$12.56
700-2,099	1.0	$20.94	$20.94
2,100-3,099	2.4	$20.94	$50.26
3,100-7,099	3.8	$20.94	$79.57
7,100-11,099	8.6	$20.94	$180.08
11,100 and more	13.5	$20.94	$282.69

[1]Effective 10/1/2019

The DOEE stormwater charge is $2.67 per month per equivalent residential unit (ERU), and is not included in the rates shown in Table A-5.

Recent expansion of low income program, include a 50 percent reduction to the CRIAC to customers who are eligible for assistance under income guidelines set under the Low Income Home Energy Assistance Program ("LIHEAP") administered through the DOEE.

Stormwater Credits/Incentives

Residents, businesses, and property owners may be eligible for discounts on stormwater fees under two programs:

1. River Smart Rewards (DOEE) - discount up to 55 percent off the DOEE Stormwater Fee.
2. CRIAC (DC Water) - discount up to 20 percent (effective October 1, 2019[11]).

Eligible Green Infrastructure practices are those identified in DOEE's Stormwater Management Guidebook as stormwater retention BMPs, including:

- Green roofs
- Rainwater harvesting (rain barrels, cisterns)
- Impervious surface disconnection to compacted cover, natural cover, or other green infrastructure
- Permeable pavement systems
- Bioretention (rain gardens)

[11] Prior to October 1, 2019, the maximum discount was 4 percent.

- Other practices in DOEE's Stormwater Management Guidebook (SMG)*

DOEE is in the process of updating its SMG which was established in 2013.

Customers submit a single application for both programs; credits apply for three years (then eligible for renewal). There are two types of credit applications:

1. Simple Application (used for residential properties with up to 2,000 sf IA) – does not require inspection; however, DOEE has right to inspect at any time.
2. Regular Application (all other customers) – inspection and design details required.

System Availability Fee

DC Water's System Availability Fee is designed to recover the proportionate share of system costs for new developments or redevelopments that require additional system capacity. The fee is based on the replacement value of current "trunk and treatment" assets less accumulated depreciation and outstanding debt principal. The fees for nonresidential customers are assessed based on the estimated gallons per day (gpd) of water use by meter size (net of fire flow), as shown in Table A-10. Single family residential is charged based on a flat fee per dwelling unit.

Revenue from the System Availability Fee is applied to pay-as-you-go capital to reduce future debt issuance.

Table A-10
DC Water System Availability Fee[1]

	Est. GPD	Charge
Residential >1", Multifamily, and Nonresidential		
1" or smaller	233	$3,173
1" X 1.25"	372	$5,066
1.5"	998	$13,591
2"	2,022	$27,536
3"	5,907	$80,442
4"	15,156	$206,394
6" or larger	41,666	$567,408
Residential	206	$2,809

[1]Effective 1/18/2019

Great Lakes Water Authority

Overview

Since 2016 with the bifurcation of the Detroit Water and Sewerage Department (DWSD) into the newly created regional Great Lakes Water Authority (GLWA) and retail focused DWSD, GLWA has provided regional water and wastewater treatment and transmission services. The GLWA wastewater system serves 2.9 million retail customers, and operates one of the largest single site water resource recovery facilities in the world. GLWA is also responsible for operation of CSO management facilities and over 185 miles of wastewater transmission pipelines.

DWSD provides water distribution, wastewater conveyance and stormwater services to customers in Detroit. GLWA leases its facilities from the City of Detroit under lease agreements executed in June 2015. Regional funding of the Water Residential Assistance Program at 0.5 percent of system revenues is provided for under the GLWA originating documents.

Key Statistics

- Number of retail accounts served = 225,000 (DWSD)
- Number of wholesale contract customers: 18 (GLWA)
- Portion of system served by combined sanitary & storm sewers: 20 percent wholesale; nearly 100 percent DWSD
- System facilities
  - Miles of sewers pipes = 185 (GLWA); 3,000 (DWSD)
- System treatment capacity
  - Average day design = 930 mgd
  - Peak capacity = 1700 mgd
- Average annual flows = 635 mgd
- Historical average annual rate increases – Less than 4 percent (since 2017)
- Projected average annual rate increases = Less than 4 percent (through FY 2025)[12]
- Current annual rate revenue = $565 million (retail and wholesale combined)

Key Challenges/Strategies

GLWA's 5-year CIP averages about $105 million through FY 2023 for improvements to the wastewater resource recovery facility and wastewater collection. In addition, DWSD's local system CIP includes projected average annual costs of $37 million.

DWSD is using Green Infrastructure (GI) to partially meet permit requirements and reduce future investment. Specifically, DWSD's NPDES permit requires implementation of a GI plan for 17 specific outfalls. DWSD's approved GI plan included investment of $15 million in GI

[12] The regional system lease limits the annual revenue requirement increase to no more than 4 percent through 2025. Projections through FY 2023 range from 3.6 percent to 4 percent.

between 2013 and 2017 in order to reduce 2.8 mg of stormwater flow during the two-year design storm. DWSD plans to invest $50 million in GI by 2029. The permit language identifies a number of specific GI project types, including downspout disconnections, demolition and removal of vacant structures, bioswales along roadways and parking lots, tree planting and other projects.

Rate Information

General Framework

GLWA conducts an extensive and highly detailed cost of service study every year to determine cost shares for each wholesale customer and DWSD retail customers. Cost allocations are based on wholesale customer flows (dry weather inflow and infiltration, storm water from CSO systems, and sanitary flows), and pollutant loads. DWSD establishes sewer and drainage rates for retail customers. The water and sewer rate setting process is monitored through an extensive customer outreach process including multiple technical review committees.

Wastewater Rate Structure

All DWSD customers pay a volumetric rate of $5.59 per ccf, and a monthly charge of $6.41 per account, as shown in Table A-11. The fixed monthly charge recovers the costs of day-to-day customer service and maintenance operations, as well as capital costs associated with meters, customer service centers and equipment.

Table A-11
DWSD Wastewater Rate Structure[1]

	Fixed Charge ($/month)	$/Ccf
All customers	$6.41	$5.59

[1]Effective July 1, 2019

GLWA establishes industrial-specific retail sewer charges which are comprised of industrial waste control charges and pollutant surcharges, as shown in Tables A-12 and A-13.

Table A-12
GLWA Extra-Strength Surcharge Fees[1]

Component	$/lb	Threshold (mg/l)
BOD	$0.491	275
TSS	$0.499	350
FOG	$0.473	100
P	$7.354	12

[1]Effective March 13, 2019

Table A-13
GLWA Industrial Waste Control Charges[1]

Meter Size	$/Month	Meter Size	$/Month
5/8"	$3.38	12"	$270.40
3/4"	$5.07	14"	$338.00
1"	$8.45	16"	$405.60
1.5"	$18.59	18"	$473.20
2"	$27.04	20"	$540.80
3"	$49.01	24"	$608.40
4"	$67.60	30"	$676.00
6"	$101.40	36"	$743.60
8"	$169.00	48"	$811.20
10"	$236.60		

[1]Effective March 13, 2019

Stormwater Rate Structure

DWSD's stormwater rates are $608 per impervious acre (or $13.96 per 1,000 sf of IA for comparison purposes). As shown in Table A-14, small residential parcels less than 0.02 acres are exempt from the fee.

Table A-14
DWSD Stormwater Rate Structure[1]

Category	$/Impervious Acre	$/Impervious 1,000 sf
< 0.02 acres	$0.00	$0.00
All other customers	$608.00	$13.96

[1]Effective July 1, 2019

For purposes of charging residential parcels, impervious area estimates are rounded down to the nearest hundredth of an acre to allow for a margin of error (i.e., an estimated impervious area of 0.047 acres would be charged based on 0.04 acres).

Stormwater Credits/Incentives

Customers receive a 25 percent credit under an assumption of disconnected downspouts that have been or are to be routed to flow onto lawns or into rain barrels.

Nonresidential customers are eligible for up to 80 percent credit for Stormwater Management Practices that result in a reduction of peak flow (40 percent maximum credit) and annual stormwater volume (40 percent maximum credits). Potential credits for commonly used stormwater management practices are shown in table A-15.

In cases where a Stormwater Management Practice is located on a parcel that is separate from where the stormwater runoff is generated, due to a single parcel owner with multiple parcels or multiple parcel owners construct a Shared Stormwater Management Practice, the credit can be shared among the parcel owners participating. DWSD will assess the practice performance and

if credit requirements are achieved by a shared practice, each property owner will be granted a credit for their agreed allocated share.

Table A-15
DWSD Credits for Commonly Used Stormwater Management Practices[1]

Practice Type	Volume Credit	Peak Flow Credit	Potential Credit for Area Managed (%)
Downspout disconnection	X		0-40
Disconnected impervious area	X		0-40
Bioretention	X	X	0-80
Detention basins		X	0-40
Subsurface detention storage		X	0-40
Permeable pavement	X	X	0-80
Green roof	X		0-40
Water harvesting*	X	X	0-80

*Evaluated on a case-by-case basis

[1]Drainage Program Guide (February 2019)

In addition, DWSD provides private property stormwater incentives through the following program:

Capital Partnership Program – DWSD allocates $5 million per year to fund installation of eligible GI projects for nonresidential property owners. Up to 50 percent of design, installation and capital costs will be reimbursed, up to a maximum $50,000 (subject to DWSD discretion).

Metro Water Services

Overview

Metro Water Services (MWS) is a department of the Metropolitan Government of Nashville and Davidson County. MWS provides water, wastewater and stormwater services to over 250,000 customers. In 2009, the metropolitan government established the Stormwater Division as a stand-alone enterprise fund with its own set of service fees, which are now an itemized part of the water bill.

Key Statistics

- Number of accounts served = over 250,000
- System facilities
    - Miles of sewers = 3,150
    - Number of pump stations = 112
- System treatment capacity
    - Peak capacity = 500 mg
- Average sewer flows = 186 mgd
- Historical average annual rate increases – Stormwater rates doubled in 2017
- Projected average annual rate increases – Currently under consideration
- Current annual rate revenue = $34 million stormwater; $132 million wastewater

Key Challenges/Strategies

MWS has been operating under a consent decree since March 2009 which identifies the following goals:

- Full compliance with NPDES permits, the Clean Water Act, the Tennessee Water Quality Control Act, and their regulations.
- Addressing the conditions contributing to sanitary sewer overflows (SSOs), with the goal of eliminating the 27 overflows listed in the Consent Decree.
- Compliance with EPA's CSO Control Policy

In August 2017, the U.S. EPA, in conjunction with the Tennessee Department of Environment and Conservation (TDEC), approved MWS's Corrective Action Plan / Engineering Report for Sanitary Sewer Overflows (CAP/ER). The CAP/ER outlines the plan to address SSOs in Davidson County and is one of two key components of the Clean Water Nashville Overflow Abatement Program. The other component, the Long Term Control Plan (LTCP) remains under review by EPA and TDEC and describes the combined sewer system and recommended improvements.

The program includes approximately $1.2 to $1.5 billion in project costs which MWS is required to complete within 11 years from the approval date or August 2028.

MWS is currently developing a GI Integration Plan to provide a defensible and realistic plan for the integration of GI as a component of the LTCP, building on the previous research and initiatives developed in its GI Master Plan and Low Impact Development Manual.

Rate Information

General Framework

In addition to the sewer rates described in this section, system operating expenses and debt serviced is funded in part from a 10 percent sewer surcharge that had previously been levied on the rates to repay specific debt service. Revenue from the surcharge has been included in system revenues since 2010. Sewer rates have not been increased since 2011; however, MWS is currently conducting a rate update, and is considering potential rate increase options.

Wastewater Rate Structure

All MWS customers pay a monthly service charge based on water meter size and type of customer, and a volumetric charge for use over 2 ccf as shown in Table A-16.

Table A-16
MWS Sewer Rate Structure[1]

		Commercial		
Meter Size (Inches)	**Residential**	Small[2]	Medium[3]	Large[4]
5/8"	$ 7.62	$ 8.51	$ 27.89	$ 1,076.37
3/4"	$ 21.63	$ 24.22	$ 39.55	$ 1,088.01
1"	$ 26.05	$ 29.17	$ 43.33	$ 1,091.79
1 1/2"	$ 38.29	$ 42.89	$ 53.81	$ 1,102.25
2"	$ 51.57	$ 57.75	$ 65.73	$ 1,114.18
3"	$ 68.04	$ 76.21	$ 82.26	$ 1,124.65
4"	$ 110.88	$ 124.18	$130.22	$ 1,172.65
6"	$ 174.12	$ 195.01	$201.05	$ 1,243.48
8"	$ 272.29	$ 304.96	$312.96	$ 1,361.43
10"	$ 272.29	$ 304.96	$312.96	$ 1,361.43
Usage Over 2 Ccf	$ 4.74	$ 5.30	$ 4.32	$ 3.26

[1]Effective May 1, 2011
[2]Up to 1,600 cf per month
[3]1,600-200,000 cf per month
[4]Over 200,000 cf per month

Nonresidential customers that discharge high-strength wastewater pay surcharge fees as shown in Table A-17.

Table A-17
MWS Extra-Strength Surcharge Fees[1]

Component	$/lb
BOD	$0.326
TSS	$0.166
Oil and Grease	$0.166
Ammonia	$0.441

[1]Effective September 1, 2014

Stormwater Rate Structure

MWS's stormwater rate structure is based on a flat rate for each impervious area tier as shown in Table A-18. Small parcels less than 400 sf are exempt from the fee. Tiers differ for residential and nonresidential. Residential rates apply to single family and duplex only.

Table A-18
MWS Stormwater Rate Structure[1]

Property Type/ Impervious Area Tier (SF)	$/Month
Residential (per Unit)	
< 400	-
Tier 1: 400 – 2,000	$1.50
Tier 2: 2,001 – 6,000	$6.00
Tier 3: more than 6,000	$11.00
Condo	$3.00
Nonresidential	
< 400	-
Tier 1: 400-6,000	$10.00
Tier 2: 6,001 – 12,800	$30.00
Tier 3: 12,801 – 25,600	$70.00
Tier 4: 25,601 – 51,200	$150.00
Tier 5: 51,201 – 300,000	$300.00
Tier 6: 300,001 – 1,000,000	$650.00
Tier 7: more than 1,000,000	$1,300.00
Non-Residential Condo (per unit)	$10.00

[1]Effective July 1, 2017

Properties exempt from stormwater charges include:

- Properties from which no stormwater is discharged into or through the public system.
- Properties having no impervious area.
- Properties wholly within corporate boundaries that have not contracted for stormwater services.

Stormwater Credits/Incentives

Nonresidential customers may receive credit for mitigating stormwater runoff impacts through education or source controls for water quantity or quality as follows:

- Detention credit up to 20 percent
- Quality credit up to 20 percent
- Education credit up to 20 percent
- Low impact development (LID) credit up to 75 percent

The maximum credit for detention, quality and education combined is 50 percent of the stormwater user fee. Current low impact development incentives offered by MWS are summarized in Table A-19.

Table A-19

MWS Stormwater Incentives for Low Impact Development

Incentive Type	Requirement/Benefit
LID User Fee Credit	Sites designed in accordance with the LID Manual (80 percent runoff reduction) can receive a 75% credit against stormwater user fees. Partial credits are not provided for the LID credit.
Redevelopment Credit	Certain previously developed sites can meet a Runoff Reduction goal of 60% instead of 80%. A site must have a current, pre-development runoff coefficient (Rv) greater than 0.4 to qualify.
Green Roof Rebate	Credit of up to $10 per sf of green roof installed within the combined sewer system. The credit is applied to the site's sewer bill for up to five years.
Reduced Detention Requirement	Certain sites designed in accordance with the LID Manual can reduce their required stormwater detention quantity.

* Sites cannot receive both the 75% Stormwater User Fee reduction and redevelopment incentives. Sites receiving the redevelopment incentives may still receive up to a 50% Stormwater User Fee reduction

New York Department of Environmental Protection

Overview

The New York Department of Environmental Protection (NYDEP) provides water, wastewater and stormwater services to customers in the New York City area.

Key Statistics

- Number of accounts served = 834,000
- Portion of system served by combined sanitary & storm sewers: 60 percent
- System facilities
    - Miles of sewers = 7,500
    - Number of treatment plants = 14
    - Number of pump stations = 96
    - Number of catch basins = over 148,000
- System treatment capacity = 1,800 mgd
- Average annual flows = 1,230 mgd
- Historical annual rate increases – Averaged 4.8 percent (2010-2018)
- Projected rate increases – 3.8 percent – 4.8 percent (through 2023)
- Current annual rate revenue = $2,140 million

Key Challenges/Strategies[13]

In 2012 NYDEP entered into an agreement with the New York State Department of Environmental Conservation to reduce CSOs using a combined green and gray infrastructure approach. As part of this agreement, NYDEP will develop 10 waterbody-specific Long Term Control Plans (LTCP) plus a citywide LTCP to reduce CSOs and improve water quality in New York City's waterbodies and waterways. The projected 10-year CIP includes $1.9 billion for LTCP projects related to CSOs.

Through 2030, NYDEP has committed $1.5 billion to GI, including right-of-way infrastructure (plan for 9,000 rain gardens along streets and sidewalks), retrofits of New York City-owned properties with green roofs, permeable pavements and other GI techniques, and private property incentives.

NYDEP is conducting an ongoing review of the effects of climate change on system facilities from rising sea levels and extreme precipitation events, and is in the process of implementing climate resiliency projects including improvement to wastewater treatment assets to protect against flooding.

---

[13] Improving New York City's Waterways, Reducing the Impacts of Combined Sewer Overflows (NYC Environmental Protection, December 2018)

Rate Information

General Framework

NYDEP's current rate structure combines wastewater and stormwater costs into a charge that is calculated as a percent of a customer's water bill. NYDEP is undertaking a rate restructuring project that is estimated to take three years to complete. One of the goals of the study is to evaluate development of separate wastewater and stormwater rate structures.

Wastewater Rate Structure

Wastewater charges for metered and flat rate customers are assessed at 159 percent of water charges for the property. For commercial and industrial customers, the wastewater charges are net of any wastewater allowances for metered process water that is not discharged entirely into the wastewater system[14]. Table A-20 shows the current water and wastewater rates, which are subject to a minimum charge.

Table A-20

NYDEP Water and Wastewater Charges[1]

Component	Amount
Water Rate ($/ccf)	$3.99
Minimum charge ($/day)	$0.49
Avg. Minimum charge ($/mo)	$14.90
Wastewater Percent of Water	159%
Wastewater Rate ($/ccf)	$6.34
Avg. Minimum charge ($/mo)	$23.70

[1]Effective July 1, 2019

Stormwater Rate Structure

Wastewater rates recover stormwater costs for metered water customers. Additional stormwater-specific rates include:

- Charges for stormwater, for parking lots not supplied or ancillary to an adjacent use that is supplied by water system: annual charge of $67.80 per 1,000 sf ($5.65 per 1,00 sf per month).
- Wastewater treated by private system and discharged to storm sewer, culvert or water body: 38 percent of water charges.

Stormwater Credits/Incentives

Currently, stormwater bill credits are limited to parking lots that pay a separate stormwater charge. Charges may be exempt for parking lot parcels where implementation of stormwater management practices manage the rate of flow as not to exceed the greater of 0.25 cubic feet per second or 10 percent of the allowable flow.

[14] See NYDEP Water and Wastewater Rate Schedule for a list of standard allowances by type of business or use.

NPDEP provides the following private property stormwater incentive programs:

- **GI grants** – provides funding for design and construction for green roofs (minimum 1.5" soil depth and 3,500 sf) and infiltration projects (manage 1" of rainfall from contributing impervious surface, and are greater than $35,000).
- **Private property retrofits** - NYDEP is also implementing a new private property retrofit incentive program to install GI on private property that manage a stormwater volume equivalent to 200 greened acres. The program targets large parcels, 50,000 sf or greater, in the combined sewer areas. NYDEP will be working with a third-party program administrator to implement the program. During the administrator selection and procurement process, NYDEP will conduct strategic outreach to large property owners.

Northeast Ohio Regional Sewer District

Overview

The Northeast Ohio Regional Sewer District (NEORSD) Provides combined wastewater and stormwater for most of the City of Cleveland and suburbs. The stormwater management program is in its third full year of operation.

Key Statistics

- Percent of system served by combined sanitary & storm sewers: 40
- Average annual wastewater flow = 92 billion gallons
- System facilities
  - Miles of sanitary and combined sewers = 326 (District), 3,107 (Local)
  - Treatment Plants: 3
  - Number of wastewater pump stations = 11
- System treatment capacity
  - Average day design = 365 mgd
  - Peak capacity = 900 mgd
- Historical average annual rate increases – approximately 9.5 percent (since 2008)
- Projected average annual rate increases = 6.5 percent for sewer rates through 2021; no increase in stormwater rates through 2021.
- Current annual rate revenue = $326 million (sewer); $40 million (stormwater)

Key Challenges/Strategies

In July 2010, NEORSD launched Project Clean Lake a $3 billion, 25-year plan to address CSOs through construction of large-scale storage tunnels and treatment plant enhancements, as well as smart green infrastructure. Project Clean Lake is planned to reduce the total volume of raw sewage discharges from 4.5 billion gallons to 494 million gallons annually. The plan includes a minimum of $42 million in green infrastructure projects to store, infiltrate, and evapotranspirate stormwater before it even makes its way to the combined sewer system.

Rate Information

General Framework

NEORSD conducts cost of service study every five years. The most recent study was conducted in 2016 and included a detailed review of district demographics to better assess rate affordability. The cost allocation process includes assignment of capital costs based on net fixed assets to functional categories. Treatment-related capital cost allocations reflect system design for different facility types, while operation and maintenance (O&M) cost allocations reflect services performed. Both capital and O&M cost allocations include assignment of costs to a separate CSO category.

Wastewater Rate Structure

NEORSD's sewer rate structure is comprised and fixed and volume charges, as shown in Table A-21. The fixed charge recovers costs associated with customer service and billing, as well as administration costs (approximately 20 percent of O&M costs). The volumetric charges recover flow (including I/I costs) and domestic strength loadings costs.

Table A-21
NEORSD Sewer Charges[1]

	Rate	
Monthly base charge	$6.35	
Homestead[2]	$3.80	
Volume Charge	**$/mcf**	**$/ccf**
Cleveland Regular	$94.15	$9.42
Cleveland Affordability / Homestead	$56.50	$5.65

[1]Effective 1/1/2019

[2]Low income or disabled customers 65 and older

Some customers (single family and some multifamily) pay the volumetric charge based on actual water use October through April, and winter average use May through September (through the Summer Residential Sprinkling User Charge Program). Other large customers are billed based on actual use.

Industrial customers who discharge above domestic strength wastewater (defined as 228 mg/l BOD and 266 mg/l TSS) are charged based on measured flows and loads according to the schedule in Table A-22.

Table A-22
NEORSD Industrial Sewer Charges[1]

	$/Month	$/Unit
Base Charge	$6.35	
Volume Charge		
Nonresidential		
Flow ($/Ccf)		$8.55
BOD/COD ($/lb)		$0.27
TSS ($/lb)		$0.29

[1]Effective 1/1/2019

Stormwater Rate Structure

NEORSD's stormwater rate structure for residential customers is based on a 3-tier IA structure, as shown in Table A-23. Nonresidential customers are charged based on measured IA, and customers with more than 10 ERUs (30,000 sf of IA on a single parcel), receive discounts for progressively more ERUs.

Table A-23
NEORSD Stormwater Charges[1]

Customer Type	$/Month
Residential (IA Tiers)	
Less than 2,000	$3.09
2,000 – 3,999	$5.15
4,000 or more	$9.27
Homestead (any size)[2]	$2.07
Nonresidential	
Per ERU[3] (up to 10)	$5.15
Additional ERUs ($/ERU)	
10-50	$4.89
50-100	$4.64
100-250	$4.38
Over 250	$4.12

[1]Effective 1/1/2019

[2]Low income or disabled customers 65 and older

[3]ERU = 3,000 square feet IA

The following parcels are exempt from stormwater charges: public roads and highways, public airport runways and taxiways, railroad rights-of-way, many city-owned properties, and cemeteries.

Stormwater Credits/Incentives

Residents, businesses, and property owners may be eligible for discounts on stormwater fees under two programs:

1. Residential customers, who institute one of the district-approved stormwater control measures, can apply to receive a flat reduction of 25 percent of the stormwater fee.
2. Residential and non-residential customers can apply for the stormwater quality credit which is up to 25 percent reduction and/or the stormwater quantity credit which is up to 75 percent reduction. Schools can also apply for the education credit which is a 25 percent reduction.

The total credit any customer could receive is 100 percent.

Philadelphia Water

Overview[15]

The City of Philadelphia's Water Department (PWD) provides water, wastewater and stormwater services to customers within the City of Philadelphia and 10 wholesale wastewater customers.

Key Statistics

- Number of accounts served = 545,000
- Revenue from wholesale contract customers: 9 percent
- Portion of system served by combined sanitary & storm sewers: 48 percent (64 sq. miles)
- System facilities:
    - Miles of sewers = 1,850 combined; 760 separated
    - Number of pump stations = 19
    - Number of CSO outfalls = 164
- System treatment capacity:
    - Average day design = 522 mgd
    - Peak capacity = 1,059 mgd
- Total annual flows = 163 billion gallons
- Historical annual rate increases – 4.5-5.8 percent (2010-2017)
- Projected average annual rate increases = 5 percent (2020-2025)
- Current annual rate revenue = $429 million

Key Challenges/Strategies[16]

PWD's combined 6-year capital program anticipates expenditures totaling $2.3 billion through FY 2024, including 27 percent ($621 million) funding for CSO Consent Order and Agreement (COA)-related improvements. The COA -- which was signed in 2012 – is based on PWD's stormwater management approach known as "*Green City, Clean Waters"* which includes both GI and traditional improvements to manage stormwater in PWD's watersheds.

The COA includes a target of 9,600 greened acres and 85 percent capture within the 25-year period. Within the first five years of the program PWD had greened 837 acres (a reduction in IA of 3 percent), and has a target of 2,150 greened acres by year 10 (8 percent) IA reduction. The initial focus is on implementation of GI on publically-owned properties, streets and rights-of-way (45 percent of city-wide IA).

---

[15] Philadelphia Water Department Investor Presentation (2018).

[16] Green Solutions (June 2011)

Over the 25 year period, the total investment in GI is projected to be $1.7 billion. Additional CSO-related spending includes $345 million for upgrades to treatment plant wet weather capacity, and $420 million in other spending (likely to include both green and gray infrastructure.)

PWD has one of the most progressive utility assistance programs in the country, with tiered rates designed to cap monthly bills at a fixed percent of monthly income for customers between 0 percent and 250 percent of the federal poverty line. Bill caps range between two and four percent of monthly income. Program costs have been substantial and program participation below initial projections. The ultimate structure and outcomes of the PWD program are still evolving.

Rate Information

General Framework[17]

PWD's rate structure is based on a detailed cost-of-service analysis and rate approval process that involves a (pseudo) administrative law process complete with ratepayer advocates, filing of testimony, and hearings. Key methodological approaches include:

- Revenue requirements are allocated to multiple flow components: volume (base sanitary, infiltration & inflow, and stormwater), and capacity (peak rates of flow).
- Combined system costs allocated between storm and sanitary systems are as follows:
    - Conveyance (capital) = 64 percent stormwater and 36 percent sanitary sewer (based on pipe length and diameter and trenching costs differences)
    - Conveyance (O&M) – 60 percent stormwater and 40 percent sanitary sewer (ratio of system-wide peak wet weather flows to peak dry weather flows).
    - Pumping & Treatment (O&M and Capital) - Infiltration and inflow portion = 70 percent sanitary and 30 percent stormwater (ratio of average dry weather flow to average wet weather flow).
- Pumping & Treatment Infiltration and inflow costs are further allocated
    - 30 percent meter equivalents (recovered through the service charge) and 70 percent sanitary flows (recovered through the quantity charge.)

Wastewater Rate Structure

Regular PWD wastewater rates are a combination of fixed charge that varies by meter size and quantity charge that is uniform for all usage levels and customers. As shown in Table A-24, the quantity rate includes a rider designed to recover the costs of the customer assistance program (estimated to be about $2.9 million in 2018).

[17] PWD Statement No. 9A – Direct Testimony and Schedules of Black and Veatch.

Table A-24
PWD Regular Sewer Charges[1]

Meter Size	$/Month	Component	$/ ccf
Service Charge		**Quantity Charge**	
5/8"	$7.01	Base	$3.13
3/4"	$8.93	TAP-R[2]	$0.12
1"	$13.07	Total	$3.24
1.5"	$22.97		
2"	$35.42		
3"	$63.82		
4"	$108.49		
6"	$213.81		
8"	$338.27		
10"	$488.25		
12"	$887.22		

[1]Effective 9/1/2019

[2]Tiered Assistance Program Rider

Customers whose wastewater exceeds normal strength limits (250 mg/l for BOD and 350 mg/l TSS) are also subject to extra-strength surcharge shown in Table A-25. The extra-strength surcharges are based wastewater samples or values obtained from similar discharges or technical literature.

Table A-25
PWD Extra-Strength Surcharges[1]

Component	$/lb
BOD	$0.40
TSS	$0.39

[1] Effective Sep 2019

Stormwater Rate Structure

PWD's stormwater rate structure includes three components: 1) billing and collection charge, 2) IA charge, and 3) Gross Area (GA) charge. Parcel area based revenue requirements are allocated 80 percent to the IA component and 20 percent to the GA component. Billing charges for residential and commercial customers vary as shown in Table A-26.

Residential rates are uniform monthly charges based on a mean GA of 2,110 sf. and mean IA of 1,050 sf. Nonresidential properties are measured individually; however, IA is estimated for customers with less than 5,000 sf. GA, as follows:

- Undeveloped properties – IA is 25 percent of GA
- Other properties – IA is 85 percent of GA

Table A-26
PWD Stormwater Service Charges[1]

Class/Component	Charge
Residential ($/month)[2]	
Stormwater Management	$14.03
Billing and Collection	$1.77
Nonresidential [3]	
Stormwater Management ($/ 500 sq. ft./month)	
IA	$5.41
GA	$0.72
Billing & Collection ($/account/month)	$2.30

[1]Effective 9/1/2019

[2]Residential properties include properties with up to 4 dwelling units

[3]Includes condominiums; minimum monthly charge = $16.33

Stormwater Credits/Incentives

Policies

New development/redevelopment projects within the city limits with an area of disturbance greater than 15,000 sf. must manage the first inch of runoff from the site (consistent with target for PWD's greened acres concept.)

Payment of a fee in-lieu of on-site stormwater management may be granted in cases where a developer conclusively demonstrates that meeting the requirements for on-site stormwater management is not feasible, and PWD determines not meeting the requirements for on-site management will not adversely affect flooding, stream protection, or other aspects of the stormwater program or permit requirements. The current fee in lieu is $15.00 per sf. of earth disturbance.

PWD also began a program following implementation of "parcel based billing" that targets heavily impacted customers with a program aimed at evaluating potential achievement of stormwater credits resulting from retrofits on the property to manage the first inch of runoff. This program involves the offer of free design assistance and site evaluation by a PWD contractor in order to identify potential stormwater management opportunities that might exist on the site—and to perform a cost-benefit analysis in order to help the property owner to weigh the cost of the retrofit against the annual savings on the water bill.

Nonresidential Credits

Nonresidential and condominium properties are eligible for the following credit types:

- Impervious Area Credit
- Gross Area Credit
- NPDES Credit

Credits are subject to renewal four years from the effective date, and discussed below.

Impervious Area Credits

Reductions up to 80 percent of the IA charge may result from: IA reductions or IA management. IA reductions include:

- Rooftop disconnection
- Pavement disconnection
- Tree canopy coverage

IA management may be through:

1. Stormwater Management Practices (SMPs), where a customer demonstrates management of the first inch of stormwater runoff through infiltration, detention and slow release, or pollutant reduction and filtration, or installs a green roof, blue roof or porous pavement. (Maximum credit = 80 percent IA charge).
2. Direct discharge to a surface water body (maximum credit = 90 percent IA charge).

Eligibility for credit through SMPs differ for customers in combined sewer and separated sewer areas. Customers in separate sewer areas are not eligible for credit for detention and slow release or blue roof; customers in combined areas are not eligible for credits by routing the first inch of runoff through an approved pollutant-reducing practice.

Gross Area Credits

PWD provides two options for GA credits:

1. Natural Resource Conservation Service Curve Number (NRCS-CN) open space credit – applies to open space area only (GA-AI). A percent reduction is applied for each whole number below a NRCS-CN of 75. A NRCS-CN of 55 may yield the maximum applicable GA Credit. The percent reduction that is applied varies depending on a property's discharge characteristics and the existence of a NPDES permit for industrial stormwater discharge activities.
2. Management of at least the first inch of runoff – The area that receives IA credit will also receive an equivalent amount of GA credit for the land area underneath the IA.

NPDES Credits

Customers that are subject to and in compliance with a NPDES permit for industrial stormwater discharge activities are eligible for a 7 percent credit.

Community Gardens Discount

Community gardens on non-residential parcels, operated for public benefit may receive a 100 percent credit on stormwater service charge if at least 80 percent of the parcel's gross area is pervious and other eligibility criteria are met.

San Francisco Public Utilities

Overview[18]

The San Francisco Public Utilities Commission (SFPUC) wastewater enterprise includes facilities that collect, convey and treat wastewater and urban stormwater flows. In addition to serving retail customers in San Francisco, SFPUC provides treatment services for Brisbane, Bay Shore and North San Mateo County Sanitation Districts.

Key Statistics

- Percent of system served by combined sanitary & storm sewers: 92%
- System facilities
  - Miles of sewers = 2,000
  - Number of catch basins = 25,000
  - Number of pump stations = 27
- System capacity
  - Collection system storage = over 200 mg
  - Treatment system = 575 mgd (combined wastewater and stormwater)
- Total annual flows = 40 billion gallons
- Rain gardens
  - Number adopted = 40
  - Stormwater captured = over 10 mg
- Projected average annual rate increases = 7.7 percent (through 2022); 8-10 percent (2023-2028)
- Current annual rate revenue = $362 million

Key Challenges/Strategies

SFPUC initiated a Sewer System Improvement Program (SSIP) to guide system improvement efforts over a 20-year period. Key challenges to be addressed by the program include replacement of aging infrastructure, addressing seismic deficiencies, managing stormwater in eight urban watersheds, safeguarding natural and human environments, and compliance with SFPUC's environmental justice and community benefits policy.

Total program costs = $7 billion; Phase 1(through 2025) = $2.9 billion

Key program goals:

- Integrate green and grey infrastructure to manage stormwater and minimize flooding.
- Modify the system to adapt to climate change.

---

[18] Quarterly Report Wastewater Enterprise Program (January 2019 – March 2019), published 5/31/2019, San Francisco Public Utilities Commission.

- Achieve economic and environmental sustainability.
- Maintain ratepayer affordability.

The SFPUC has identified additional improvements (outside the SSIP) related to system upgrades to aging infrastructure. Additional projects identified in the wastewater facilities and infrastructure program total $450 million over the next 20-30 years.

Green Infrastructure Demonstration Projects[19]

The SSIP includes eight early implementation stormwater management projects. These projects – one in each of SFPUC's urban watersheds – will assist SFPUC in evaluating the performance of various green technologies in removing stormwater from the combined sewer system. The lessons learned from their implementation (expected by 2021) will also help streamline project planning, design, and construction processes for future GI projects.

Rate Information

General Framework

SFPUC develops rates based on a comprehensive cost-of-service framework. The most recent rate study was conducted in 2018, and establishes rates for a 4-year period (FY 2019 through FY 2022.) The cost allocation process includes assignment of costs to dry weather and wet weather flows (the latter includes stormwater related costs), and allocation of a portion of collection system costs to a Fats, Oils and Grease (FOG) parameter. Both dry and wet weather flow (i.e., I/I and stormwater) costs are recovered from customers in proportion to wastewater flows. SFPUC does assess a separate stormwater charge for those customers without an active water or sewer account (e.g., vacant lots, parks, parking lots, freeways & train tracks).

Drought surcharges of 10-25 percent may be applied to wastewater volumetric rates (in addition to the more traditional practice of surcharges drought surcharges applying to water rates) in cases where the need for a retail water shortage allocation plan is declared.

Wastewater & Stormwater Rate Structure

Metered residential customers pay rates that are comprised of fixed and volumetric charges, as shown in Table A-27. The fixed charge component is new as of FY 2019, and is being phased in over a 4-year period. Fixed charges recover only billing and customer service costs. Residential volumetric charges recover flow and strength costs, and are uniform for all billable volumes.

The rates for nonresidential customers include the fixed base charge, a uniform rate for volume, plus loading charges for TSS, COD and oils and grease. The loading charges are assessed to customers based on periodic sampling for monitored industrial customers or standard concentrations by business type as determined by Standard Industrial Classification (SIC) code.

[19] Green Infrastructure Stormwater Management Projects Overview (December 2018)

Table A-27
SFPUC Sewer Charges[1]

	$/Month	$/Unit
Base Charge	$2.19	
Volume Charge		
Residential ($/Ccf)		$13.88
Nonresidential		
Flow ($/Ccf)		$8.29
COD ($/lb)		$0.56
TSS ($/lb)		$1.41
Oil and Grease ($/lb)		$1.42

[1]Effective 7/1/2019

SFPUC has established loading profiles for 11 subclasses of nonresidential customers, as shown in Table A-28.

Table A-28
SFPUC Wastewater Concentrations by Parameter and SIC Group

SIC Group	FOG (mg/L)	TSS (mg/L)	COD (mg/L)
SIC Group 2	26	56	194
SIC Group 3	63	239	640
SIC Group 4	85	279	684
SIC Group 5	86	224	641
SIC Group 6	100	59	396
SIC Group 7	112	171	1,387
SIC Group 8	125	181	1,539
SIC Group 9	137	284	1,616
SIC Group 10	251	303	1,153
SIC Group 11	559	1,371	4,921
SIC Group 12	100	303	715

Table A-29 shows typical customer types that fall into each SIC group. When the loading charges are added to the volumetric rates, based on the estimated pounds per ccf, the total volumetric charges range from $10.01 per ccf for SIC Group 2, to $51.06 per ccf for Group 11.

Table A-29

SFPUC SIC Code Reference Table

SIC Group	SIC Code	Description	SIC Group	SIC Code	Description
2	7012	Hotel without Eating	4	5541	Gasoline Stations
2	7014	Residential Hotel No Eating	4	5810	Cafe/Sandwich Shops
3	8050	Nursing Facility	4	5813	Drinking Places
4	8600	Memberships/Religious Org	4	6800	Office Buildings
4	9900	Vacant/Under Construction	4	7000	Services
4	0000	SF IC Not Assigned Yet	4	7212	Laundry Agents
4	0100	Agricultural - Crops	4	7218	Industrial Laundries
4	0200	Agricultural - Livestock	4	7230	Beauty Shops
4	0742	Veterinary Services	4	7374	Prepress/Desktop Publishing
4	0910	Commercial Fishing	4	7384	Photo Laboratory
4	1500	Building Construction	4	7538	Auto Repair Shops
4	2000	Manufacturing	4	7542	Car Washes
4	2011	Meat Packing	4	7830	Movie Theaters
4	2015	Poultry Processing	4	7991	Physical Fitness
4	2020	Dairy Product Process	4	8010	Medical Offices
4	2030	Fruit and Vegetable	4	8021	Offices of Dentists
4	2052	Cookies and Crackers	4	8060	Hospitals & Clinics
4	2053	Bread Bakery	4	8210	Schools
4	2077	Oil/Fats Rendering	4	8220	College/Vocational
4	2080	Beverage & Bottling	4	8400	Museum/Art Gallery
4	2091	Can/Cure Fish & Seafood	4	8810	Single Family Residence
4	2092	Prepared Fish & Seafood	4	8811	Multiple Family Residence
4	2200	Textile, Apparel, Fabric	4	8812	Mix Use 50%+ Residential
4	2400	Lumber and Wood Product	4	8813	General Use in Common Area
4	2500	Furniture & Fixtures	4	9000	Government/Civic Service
4	2600	Pulp & Paper Product	4	9003	Collection System Sampling
4	2700	Printing & Publishing	4	9004	Wet Weather Sampling
4	2840	Soap and Sanitation	4	9993	Mix Use 50%+ Non Residential
4	2850	Paint Manufacturing	4	9994	Live/Work/Lofts
4	2870	Agricultural Chemical	4	9997	No Sewer/ Septic
4	2893	Printing Inks	4	9998	Out of SF Border
4	2900	Petroleum Refining	4	2800	Chemicals & Products
4	3000	Rubber and Plastics	4	7213	Linen Supply
4	3100	Leather and Products	5	7041	Lodging Houses with Eating
74	3200	Gravel/Stone/Glass	5	7011	Hotel with Eating
4	3470	Metal Coatings	5	7013	Residential Hotel with Eating
4	3500	Machinery/Computers	6	5146	Fish and Seafood
4	3600	Electronic Equipment	7	7215	Coin-Op Laundries
4	4000	Transport &Utility	8	7211	Commercial/Power Laundry
4	5000	Wholesale Trade	9	2013	Sausage Manufacturing
4	5143	Dairy Product Distribution	10	5812	Restaurant/Kitchen
4	5144	Poultry Products	10	5814	FSE with HGI
4	5147	Meat Products	11	2051	Wholesale Bakery
4	5200	Retail Trade	12	5815	FSE with GRD
4	5460	Retail Bakeries	12	5816	FSE with GGI

Stormwater Charge for Unmetered Properties

The unmetered property stormwater charge is calculated annually based on the portion of the wastewater expenses attributable to management of stormwater flows in the combined sewer system. Rates are assessed to properties based on a customer's Effective Impermeable Area (EIA). The EIA is estimated based on aerial imagery and defined as:

*EIA = Impermeable Area + 10 percent of Permeable Area**

**Includes vegetation, grass and unpacked dirt*

Customers are classified into one of three tiers based on their EIA and charged a flat monthly rate by tier as follows (based on FY2020 rates):

- Low Runoff: 500 sf - 1,300 sf ($20.47)
- Standard Runoff: > 1,300 sf ($33.56)
- Minimal Runoff: <500 sf (no charge)

Stormwater Credits/Incentives

Residential

No discounts are available for residential customers on the bill; however, a partnership with Friends of the Urban Forest provides support for installation of permeable sidewalk gardens to reduce burden on stormwater system.

Nonresidential[20]

The SFPUC does not offer bill discounts related to stormwater management for nonresidential customers. However, projects that exceed stormwater management requirements by incorporating the use of rainwater harvesting to meet on-site non-potable demands, may be eligible for grant assistance through the Large Alternate Water Source Projects program. Another funding option is the Watershed Stewardship grant program, but this is only available to nonprofits and community groups for impervious surface removal and rainwater harvesting at schools, parks, and civic places.

New programs

Rain Guardians – encourage customers to become "guardians" of new rain gardens by keeping free of trash and debris.

Green Infrastructure Grant program – designed to facilitate design and construction of stormwater management features on private property. The grant will cover the costs of design and construction of an approved stormwater management feature, such as rain gardens, permeable pavement, cisterns, and vegetated roofs. The maximum grant award is $765,000 per acre of impervious surface managed, up to $2 million in funding.

---

[20] Stormwater Management Requirements Frequently Asked Questions (SFPUC, 2016).

To receive funding under the grant program an applicant must demonstrate that the project:

- Is located on a parcel that is connected to an SFPUC-owned and operated sewer system service area.
- Manages stormwater runoff from a minimum impervious area of 0.5 acres.
- Captures the 90th percentile storm (0.75-inch depth) with the proposed GI features.
- Provides at least two (2) of the identified co-benefits from the program list.
- Has a grant team that collectively demonstrates a history of successful project implementation and has previous experience constructing or maintaining GI.

Wastewater Capacity Charges

Table A-30 shows the wastewater capacity charges effective July 1, 2019. Residential customers are included in SIC Group 4.

Table A-30

SFPUC FY 2019-20 Wastewater Capacity Charges, SIC Groups 2-11[1]

Meter Size	SIC Group 2	SIC Group 3	SIC Group 4	SIC Group 5	SIC Group 6
5/8 in	$4,020	$4,719	$4,925	$4,859	$4,652
3/4 in	$6,031	$7,078	$7,387	$7,288	$6,977
1 in	$10,052	$11,796	$12,313	$12,147	$11,629
1-1/2 in	$20,103	$23,593	$24,625	$24,295	$23,257
2 in	$32,165	$37,748	$39,401	$38,871	$37,213
3 in	$64,331	$75,496	$78,802	$77,743	$74,424
4 in	$100,518	$117,963	$123,128	$121,473	$116,288
6 in	$201,036	$235,926	$246,256	$242,947	$232,577
8 in	$321,657	$377,481	$394,009	$388,716	$372,123
10 in	$502,590	$589,815	$615,639	$607,368	$581,441
12 in	$864,454	$1,014,481	$1,058,899	$1,044,672	$1,000,078
16 in	$1,507,768	$1,769,445	$1,846,917	$1,822,104	$1,744,324
Meter Size	**SIC Group 7**	**SIC Group 8**	**SIC Group 9**	**SIC Group 10**	**SIC Group 11**
5/8 in	$5,512	$5,712	$5,924	$6,364	$11,860
3/4 in	$8,267	$8,567	$8,886	$9,547	$17,789
1 in	$13,779	$14,279	$14,811	$15,912	$29,648
1-1/2 in	$27,559	$28,558	$29,621	$31,823	$59,297
2 in	$44,094	$45,692	$47,394	$50,918	$94,875
3 in	$88,187	$91,384	$94,788	$101,835	$189,750
4 in	$137,792	$142,788	$148,107	$159,117	$296,485
6 in	$275,586	$285,576	$296,213	$318,235	$592,969
8 in	$440,937	$456,922	$473,941	$509,174	$948,750
10 in	$688,964	$713,940	$740,532	$795,586	$1,482,424
12 in	$1,185,019	$1,227,977	$1,273,715	$1,368,408	$2,549,768
16 in	$2,066,894	$2,141,821	$2,221,596	$2,386,757	$4,447,270

[1]Effective 7/1/2019

The wastewater capacity charges are based on a “buy-in” fee structure, where existing ratepayer equity is divided by the total system capacity to determine an average cost per unit of capacity. Existing ratepayer equity is defined by replacement value less outstanding debt principal, accumulated depreciation, grant-funded facilities, and developer contributions, plus cash reserves. Charges are assessed based on the type of customer (reflecting the same SIC code groupings used for wastewater rates) and the size of the water meter.

Capacity charges are adjusted for inflation annually based on the Engineering News Record Construction Cost Index (20-city average).

Seattle Public Utilities

Overview

Seattle Public Utilities (PWD) provides water, wastewater conveyance and stormwater services to customers in Seattle. SPU operates transport facilities, and treatment is provided by King County (County) and Southwest Suburban Sewer District. The County's regional treatment facility serves 37 entities, including SPU.

Key Statistics[21]

- Population served = 0.7 million (SPU); 1.7 million (County)
- SPU's share of regional treatment system: 40 percent
- Portion of system served by combined sanitary & storm sewers: 33 percent fully combined and 33 percent partially separated
- System facilities (SPU)
    - Miles of sewers/drainage pipes = 1,428
    - Number of storm drains = 85,000
- System treatment capacity (County)
    - Average flow (max month) = 400 mgd
    - Peak capacity = 865 mgd
- Average annual flow = 176.7 mgd (County)
- Historical average annual rate increases – Combined SPU/County wastewater: 3.5 percent (annual rate increases range from about 1 percent to 14.5 percent); drainage: annual rate increases have ranged from 7.9 percent to 11.4 percent since 2012.
- Projected average annual rate increases = sewer 5.8 percent/drainage 8.7 percent (2018–2023)
- Current annual rate revenue = $435 million

Key Challenges/Strategies

SPU and King County face significant investment over the next eight years to control CSOs using a combination of traditional solutions (constructing big pipes and storage tanks) and GI solutions. The improvements are mandated by U.S. EPA and Washington State Department of Ecology through consent decrees. A major driver of the capital program is a 2.7 mile drainage and wastewater tunnel project that will prevent more than 50 mg of CSOs.

Currently SPU manages almost 100 mg of runoff annually with GI; the goal by 2025 is to increase this figure to 700 mg. SPU has a Climate Resiliency Group whose charge includes assessing exposure of SPU facilities to sea level rise and extreme precipitation events.

---

[21] Strategic Business Plan Update 2018-2023, Seattle Public Utilities.

Rate Information

General Framework

SPU has a policy to review rates every three years. The last update was completed in 2018 and follows cost-of-service principles. The wastewater and stormwater systems are supported by system-specific fees, but are integrated in terms of facility use, administration, financing and reporting. Therefore, the cost-of-service framework first includes allocation of the combined Drainage and Wastewater Fund revenue requirement to individual systems based on a variety of factors, including: direct allocation of business line-specific expenses, labor allocations, and management estimates.

The most recent cost-of-service study resulted in some shift in revenue requirements from wastewater to stormwater, driven largely by additional capital investments. Stormwater costs account for almost 54 percent of operating costs, and about 40 percent of capital costs (including CSO-related costs).

Wastewater Rate Structure

Wastewater rates are designed to recover both SPU and County treatment costs. As shown in Table A-31 all SPU customers pay a volumetric rate of $14.48 per ccf, and the minimum monthly charge is based on 1 ccf ($14.48). The wastewater rate is comprised of a system (SPU) rate of $5.64 per ccf, and a treatment rate (County) of $8.84 per ccf.

Table A-31
SPU Wastewater Rate Structure[1]

Class	$/ccf	Minimum ($/Month)
All customers	$14.48	$14.48

[1]Effective January 1, 2019

Residential customers are billed based on actual consumption during the months of November through April, and the lesser of the winter average water or actual use in other months. Nonresidential customers are billed based on actual use (less any measured flow from submeters).

Industrial customers that discharge high-strength wastewater pay surcharge fees, in addition to compliance monitoring and administration fees The surcharges which are administered by the County were reviewed in 2016, and updated based on a revised operating cost allocation as follows: 37 percent BOD removal, 39 percent TSS removal, 24 percent flow. Current surcharges are shown in Table A-32. The fees are set to increase again in January 2020, reflecting a phase-in period. Cost allocations will be updated in the future every five years.

Table A-32
SPU Extra-Strength Surcharge Fees[1]

Component	$/lb
BOD	$0.35
TSS	$0.43

[1]Adopted by King County; effective July 1, 2019

In addition, all food service establishments are required to install a grease trip or interceptor if they are: 1) a new or remodeled restaurant, 2) an existing customer found to be discharging grease into the sewer system.

Stormwater Rate Structure

Drainage costs are classified as either account-based or flow-based for allocation to customer classes. Flow costs are further allocated to four surface type categories: 1) impervious area, 2) managed grass, 3) unmanaged grass, and 4) good forest. Costs allocations to each flow category are based on cost weighted run-off percentages (reflecting surface type run-off coefficients by storm event, and the portion of system costs associated with managing each storm event type). Run-off coefficients by surface type and storm event are shown in Table A-33.

Table A-33
SPU Run-off Coefficients by Surface Type and Storm Events[1]

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

[1]SPU Wastewater Rates FISC Exh A, August 14, 2018, Vas Duggirala

SPU's stormwater rate structure is based on property area as shown in Table A-34. Small residential parcels less than 10,000 sf pay a uniform rate within each tier. SPU used sample data collected city-wide from aerial photographs for small residential parcels to estimate the typical surface types for each parcel size range. This surface type information combined with the parcel sizes within each category was used to develop the respective flat rate by category.

All other customers pay a rate per 1,000 sf of GA, where the rates vary based on the percent IA, with discounted rates for low impact (highly pervious surface) parcels. Examples of highly pervious surface include forested land, unmanaged vegetated areas such as pasturelands and meadows and athletic fields designed with specific drainage characteristics. To be eligible for the low impact rate, the highly pervious surface must cover a continuous area of at least one-half an acre.

Table A-34
SPU Stormwater Rate Structure[1]

Class	Annual Rate	Monthly Rate
Small Residential Parcel Tier (Flat Rate)		
Under 2000 sf	$169.81	$14.15
2000-2999 sf	$276.51	$23.04
3000-4999 sf	$383.43	$31.95
5000-6999 sf	$516.72	$43.06
7000-9999 sf	$652.61	$54.38
All other Properties ($/1,000 sf)		
Undeveloped (0-15% Impervious)		
Regular	$42.62	$3.55
Low Impact [2]	$25.36	$2.11
Light (16-35% Impervious)		
Regular	$63.64	$5.30
Low Impact [2]	$49.85	$4.15
Medium (36-65% Impervious)		
Regular	$90.58	$7.55
Low Impact [2]	$73.31	$6.11
Heavy (66-85% Impervious)	$119.86	$9.99
Very Heavy (86-100% Impervious)	$143.10	$11.93

[1]Effective January 1, 2019; stormwater rates are billed on property tax statement

[2]Properties with significant amount of highly pervious surface

SPU's drainage fees are charged on a parcel's annual property tax statement, as opposed to the utility services bill. Properties exempt from stormwater charges include:

- submerged land,
- houseboats,
- piers,
- city streets, State of Washington highways, and other streets that provide drainage services in the same manner as city streets,
- islands that contain highly infiltrative pervious surface and less than ten percent impervious surface area,
- riparian corridors that contain highly infiltrative pervious surface and meet certain qualification criteria
- wetlands that meet certain qualification criteria

Stormwater Credits/Incentives

RainWise Residential Rebate Program

Residential customers who live in targeted sewer overflow basins may be eligible for rebates to install a rain garden or cistern. The rebates are based on the amount of runoff being directed, and will generally cover 50 to 100 percent of the project costs, depending on site conditions and customer choices.

Depending on the size of the property, customers may also be eligible for the Stormwater Facility Credit Program (discussed below).

Other Credit Programs

Stormwater bill credits are available for both natural areas whose characteristics enhance retention of stormwater runoff (through the low impact rates shown in Table A-30), and for engineered system that provide flow control or water quality treatment of run-off from impervious areas through the Stormwater Facility Credit Program. The maximum credit available for installation of privately-owned systems like vaults, rain gardens, permeable pavements and filtration systems is 50 percent.

SPU also offers a 10 percent discount for any new or remodeled commercial buildings that utilizes a rainwater harvesting system meeting credit requirements.

Development Charges

Treatment Capacity Charge

The County charges a capacity charge on new development for wastewater treatment. The charge is assessed monthly over a 15-year period. Based on 2019 charges, if paid in full over 15-years, the charge would total $11,610 per residential equivalent; with an early payment discount the charge would be $9,520. Fees are currently assessed to nonresidential customers based on plumbing fixtures, and to residential developments based on the type of unit. The County is currently reviewing fee assessment methods, and has developed two single family residential options for consideration:

1. Current uniform fee for single family residential
2. 3-tiered charge based on house size

New categories of housing are also being introduced, including accessory dwelling units and micro-housing.

Modifications were also considered for the nonresidential SDCs, including a change to meter size. Preliminary technical analysis indicated for commercial development, water meter size was a slightly better predictor than fixture counts; however, the current recommendation is to stay with fixture counts since the administrative framework is already in place, and fire flows can drive water meter sizing.

As of June 29, 2019, new low-income housing in multi-family structures, single detached dwelling units, owner-occupied dwelling units, and shelter housing may qualify to receive a discounted capacity charge. Eligible new units will be assigned 0.32 residential customer equivalents, which in most cases is a 50 percent discount.

SPU System Development Charge

SPU is currently evaluating a potential SDC for wastewater and stormwater.