ERRATA SHEET

BEFORE THE
PHILADELPHIA WATER, SEWER AND STORM WATER RATE BOARD

In the Matter of the Philadelphia Water Department's Proposed Change in Water, Wastewater and Stormwater Rates and Charges	Fiscal Years 2024-2025

Errata to
Schedule BV-2

Reference	Reads:	Should Read:
Page 1-12	Table 1-3 Historical Usage per Account for General Service Customers (5/8" Meters)	Table 1-3 Historical Usage per Account for General Service Customers – Residential (5/8" Meters)
Page 2-2	… application of the billing collection factors presented in Table 1-3 to gross billings, …	… application of the billing collection factors presented in Table 1-4 to gross billings, …
Page 3-6	Table 1-3 in Section 1.4.1 presents the historical collection factors …	Table 1-4 in Section 1.4.1 presents the historical collection factors …
Page 4-9	Table 4-3 Equivalent Meter and Bill Rations	Table 4-3 Equivalent Meter and Bill Ratios

PWD is attaching a clean copy of the Schedule BV-2 for the record in this proceeding.

In the Matter of the Philadelphia Water Department's Proposed Change in Water, Wastewater and Stormwater Rates and Related Charges

Fiscal Years 2024-2025

Philadelphia Water Department

Black & Veatch Management Consulting, LLC

Schedule BV-2

Dated: January 2023

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Schedule BV-2: Water & Wastewater Cost of Service Report

Philadelphia Water Department

January 2023

BLACK & VEATCH

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ACRONYM OR TERM	DEFINITION
90% Test	General Bond Ordinance requirements that specifies Net Revenues, excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year, must equal to at least 90% of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) payable in such fiscal year.
ACFR	Annual Comprehensive Financial Report
ADD	Average daily demand
AMI	Advanced Metering Infrastructure
Aqua PA	Aqua Pennsylvania, Inc., an Essentials Utility Company
ARPA	The American Rescue Plan Act of 2021
AWWA	American Water Works Association
Base Rates	Rate revenues that exclude revenue losses associated with providing TAP discounts and the TAP-R surcharge revenues.
Base-Extra Capacity Method	A cost allocation method that considers base costs (O&M expenses and capital costs that vary with the quantity of water at average load operations), extra capacity costs (additional costs above base costs for maximum day and maximum hour demands), customer costs (customer service, meter maintenance and reading, billing, collection, accounting), and fire protection costs (hydrants, water towers, oversized mains, pumps) to determine rates for various customer types.
Billing Year Collections	All payments associated with a given fiscal year's billing and received within the 12 months following the beginning of the fiscal year.
Billing Year Plus 1 Collections	All payments associated with a given fiscal year's billing and received within 13-24 months following the beginning of the fiscal year. For this Study, the billing database reflects available data from FY 2012 to FY 2022.
Billing Year Plus 2 and Beyond Collections	All payments associated with a given fiscal year's billing and received after 24 months following the beginning of the fiscal year. For this Study, the billing database reflects available data from FY 2012 to FY 2022.
Black & Veatch	Black & Veatch Management Consulting, LLC
BOD	Biological oxygen demand
CAP	Customer Assistance Program

ACRONYM OR TERM	DEFINITION
CARES Act	The Coronavirus Aid, Relief, and Economic Security Act of 2020
CCF	Hundred cubic feet
cfs	Cubic feet per second
CIP	Capital Improvement Program
City	The City of Philadelphia
City Charter	Philadelphia Home Rule Charter
COA	Consent Order Agreement
Collection Factors	Represent the multi-year payment pattern for Billing Year, Billing Year Plus 1, and Billing Year Plus 2 and Beyond. For this Study, the billing database reflects available data from FY 2012 to FY 2022.
Combined System	The City of Philadelphia's Water and Wastewater Systems
Community Gardens	Parcels, as defined by, Section 19-1603, which receive a 100 percent discount on all stormwater management service charges once approved.
COS	Cost of Service
COVID 19	Coronavirus 19
CP	Commercial Paper
CPI	Consumer Price Index
CPI-U	Consumer Price Index for All Urban Customers
DC33	American Federation of State County and Municipal Employees District Council 33
DC37	American Federation of State County and Municipal Employees District Council 37
DELCORA	Delaware County Regional Water Authority
ENR	Engineering News Record
FPL	Federal Poverty Level
FY	Fiscal Year ending June 30
GA	Gross Area
General Bond Ordinance	The Restated General Water and Wastewater Revenue Bond Ordinance of 1989, approved by the Mayor on June 24, 1993, as supplemented and amended.
gpm	Gallons per minute
GSI	Green Stormwater Infrastructure

ACRONYM OR TERM	DEFINITION
Hand Bill	Hand-billed accounts are "H"-coded customers in the Basis2 billing system that receive surcharge and/or sewer credits. The adjustments to these accounts are made manually.
I/I	Infiltration/Inflow
IA	Impervious Area
IAR	Impervious Area Reduction
Lag Factor	Factor that recognizes the fact that there will be a proration of billings between the existing and proposed rates during the first month following the effective date of the rate increase, as well as the fact that the fiscal year billings will not be fully collected within that fiscal year.
L&I	License and Inspection
lb	Pound
LTCPU	Long-Term Control Plan Update
M1 Manual	AWWA's Principles of Water Rates, Fees, and Charges" Manual of Water Supply Practices M1, 7th Edition. The M1 Manual is the utility industry's guidance manual for water rate-making
Mcf	Thousand cubic feet
mg/l	Milligrams per liter
MGD	Million gallons per day
MoP 27	WEF's Financing and Charges for Wastewater Systems Manual of Practice 27, 4th Edition. This is the wastewater industry's manual for sewer rate-making.
MOU	Memorandum of Understanding
MS-4	Municipal Separate Storm Sewer System
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
PENNVEST	Pennsylvania Infrastructure Investment Authority
PHA	Philadelphia Housing Authority
PHDC	Philadelphia Housing Development Corporation
PPI	Producer Price Index
PWD	The City of Philadelphia Water Department
Rate Board	The Philadelphia Water, Sewer, and Storm Water Rate Board

ACRONYM OR TERM	DEFINITION
Rate Compression Factor	Factor that recognizes impact of not receiving a full year's worth of revenues due to an effective rate implementation date that is not on the first day of the fiscal year.
Rate Ordinance	Water Rate Board Ordinance, refers to Section 13-101(4)(a) of the Philadelphia Code
R&R	Renewal and Replacement
RSF	The Rate Stabilization Fund
SMIP/GARP	Stormwater Management Incentive Program/Greened Acre Retrofit Program
sq	Square feet
SS	Suspended solids
SWMS	Stormwater management service charge
TAP	Tiered Assistance Program
TAP-R	TAP Rate Rider Surcharge Rate included with the water and sewer quantity charges
The System	The City of Philadelphia's Water and Wastewater Systems
TY	Test Year
UESF	Utility Emergency Services Fund
US	United States
Utility-Basis	Restatement of annual revenue requirements in terms of O&M, depreciation, and return on rate base.
Water Department	The City of Philadelphia Water Department
Water Fund	An accounting convention established pursuant to the Charter for accounting for the assets, liabilities, revenues, expenses, and Rate Covenant compliance for the City's water and wastewater systems. The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City.
WEF	Water Environment Federation
WIFIA	Water Infrastructure Finance and Innovation Act
WRB	Water Revenue Bureau
WRP	PWD's Water Revitalization Plan

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Executive Summary

Black & Veatch Management Consulting, LLC ("Black & Veatch") has prepared this Water and Wastewater Cost of Service Report (the "Report") on behalf of the City of Philadelphia (the "City") Water Department (the "Water Department") in connection with its application to increase rates and charges for water, sanitary sewer, and stormwater service for fiscal year ("FY") 2024 and FY 2025 (the "Rate Period"). The analyses presented herein include projected revenue and revenue requirements for fiscal year 2023 through fiscal year 2028 (the "Study Period") and the proposed rate schedules for water, sanitary sewer, and stormwater services for the Rate Period, as determined from the cost-of-service analysis.

Specifically, Black & Veatch's scope of work addresses the following elements:

- Assesses the Water and Wastewater Systems' (together, the "System" or "Combined System") ability to meet current and future anticipated financial obligations, and
- Develops a financial plan and proposes water, sanitary sewer, and stormwater rates for FY 2024 and FY 2025 sufficient to fund the Combined System's fund operations and capital financing needs.

The forecast consists of implementing annual revenue increases and leveraging available funds from the Water Department's Rate Stabilization Fund through the Rate Period. The forecast for the remainder of the Study Period consists of implementing annual revenue increases to maintain system reserves at a level to support the system's revenue requirements. Based on the assumptions detailed herein, the financing plan requires annual Combined System Service Revenue increases from Base Rates[1] ranging from 8.00% to 12.75% during the Study Period.

As noted above, this Report includes a cost-of-service analysis, conducted using causative cost approaches endorsed by industry-recognized manuals of practices, which produce cost of service allocations recognizing the projected customer service requirements. The proposed rates designed by Black & Veatch follow the allocated cost of service results and local policy considerations. For the analyses defined and presented herein, FY 2024 and FY 2025 serve as the fully projected test years for allocating costs to customer types and for designing the Base Rate schedules.

The Need for Rate Relief

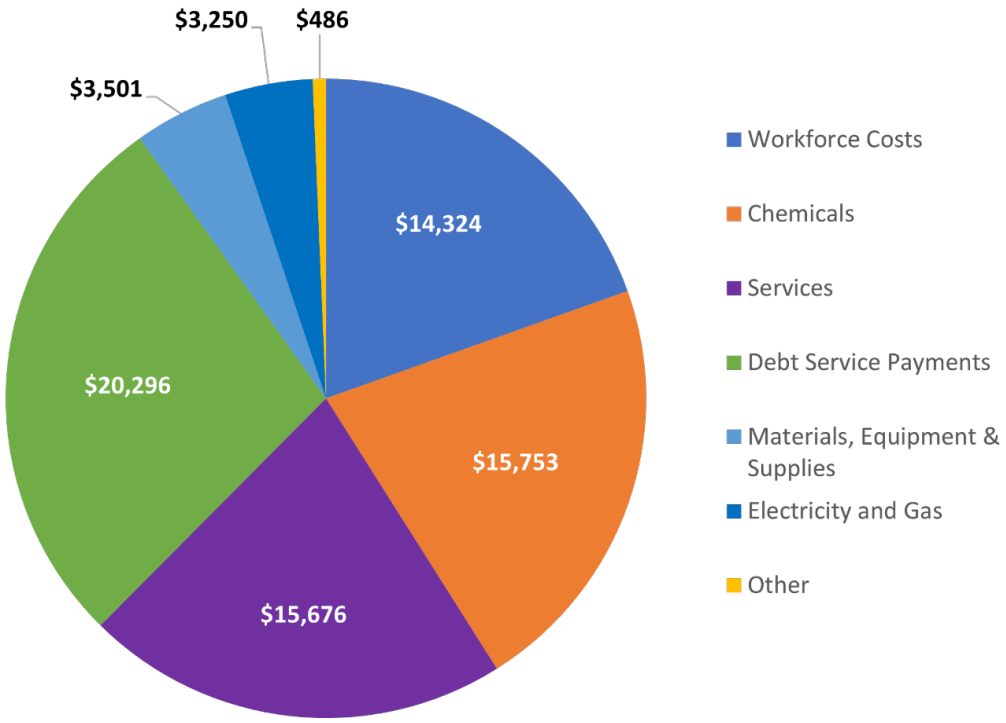
The Department is requesting rate relief because it will face an operating deficit in FY 2024 and FY 2025. Additional revenues are needed to meet significantly increasing costs in FY 2024 and FY 2025 related to the operation of the water and wastewater systems. As we all are becoming increasingly aware, inflation is widespread throughout the economy and is anticipated to continue during the coming years. PWD needs additional resources to pay increasing costs for operations, for upgrades, repairs, improvements and for maintenance activities (among other things). These increasing costs are driving the Water Department's application for increased rates.

[1] Excludes Tiered Assistance Program Rate Rider Surcharges.

Currently, the country is emerging from the pandemic and facing new economic realities. Pent-up demand, supply-chain disruptions, and worker shortages have prompted a climate of significantly higher inflation levels than seen in the recent past. Cost increases for operations, upgrades, repairs, maintenance, and capital improvements are the key drivers behind the Water Department's need for rate relief. Moreover, based upon the Water Department's recent experience, FY 2023 costs are expected to be approximately $9 Million higher than previous projections made in January 2022. These price increases are in non-discretionary areas and directly related to the delivery of safe drinking water and achieving wastewater compliance and are expected to continue into FY 2024 and FY 2025.

The impact of these key drivers and changes in the Water Department's customer base are described in further detail in this Report, summarized below, and shown in Figure ES-1.

Figure ES-1 FY 2024 Projected Increases



All figures are in $000s

Rising Costs

Non-discretionary operating costs include categories such as chemicals, energy, personnel, and materials and supplies. These costs are unavoidable and represent approximately 90% of operation and maintenance ("O&M") expenses for the water system, and over 40% for the wastewater system. The Water Department's FY 2023 budget including the approved mid-year transfer request reflects recent experience with contract and purchase price increases seen from vendors and suppliers.

Chemicals

Both the water and wastewater system operations require the use of chemicals in treatment processes. Most chemical usage falls within water operations to ensure the safety of drinking water; use in wastewater processes tend to be limited to pH modifications and preventing pollutant releases.

The Water Department reported that FY 2023 cost-per-ton bids received from vendors for a wide range of chemicals has increased 26.7% to 141.8% over FY 2022 levels. For FY 2024, an additional $16 Million increase is projected. In total, the cost of chemicals are estimated to increase from almost $36.9 Million in FY 2023 to $90.3 Million in FY 2028.

Power and Gas

Whereas water treatment operations use a lot of chemicals, wastewater treatment process are energy intensive. Approximately 50% of the Water Department's power needs and 90% of gas needs are required for wastewater treatment.

Like chemicals, the Water Department's power and gas costs reflect received pricing increases from their suppliers. For electricity, the FY 2024 estimate of $19.9 Million is a 10.7% increase over FY 2023. For gas, the $8.3 Million FY 2024 estimate is a 19.0% increase compared to FY 2023. By the end of the Study Period, total energy costs are estimated to be about $20.8 Million for power and $8.6 Million for gas.

Personnel

Four main areas are impacting increased personnel costs. First, the City has negotiated wage labor increases of 3.25% that will go into effect in FY 2024 per labor agreements with District Council 33 ("DC33") and District Council 47 ("DC47"), which account for the majority of Water Department staff. Second, as required by City policy, the Water Department is continuing to transition staff salaries from capital-funded to O&M-funded positions. In FY 2024, approximately $1.2 Million of salary costs are expected to shift from capital to O&M. By FY 2028, the total salary expense moving from capital to O&M is projected to be about $6.5 Million. The full transition from capital-funded to O&M-funded is expected to take over 10 years.

Additionally, to support activities in Construction & Engineering, Planning & Environmental Services, Operations, Public Affairs, and Human Resources, the Water Department is increasing staffing levels over the Study Period. Over the Study Period, additional staffing costs increase from $1.7 Million in FY 2024 to $12.5 Million in FY 2028.

Finally, pension, pension obligations, and benefits are estimated to increase from $144 Million in FY 2023 to $174 Million in FY 2028. The increase seen in this personnel-related category reflect the Water Department's continued growing proportionate share of the City's pension program. For FY 2023, total pension-related costs for the Water Department equal about 8.6% of its annual total obligations.

Materials and Supplies

Materials pricing has increased throughout the country. The Water Department received FY 2023 price increase notices from its suppliers for contract items that averaged almost 43% higher than FY 2022 levels. Examples of increases for standard materials and supplies used in ongoing maintenance and

repairs include all sizes of meters (0% to 80%), valves of all sizes (62% to 103%), and all diameters of ductile iron pipe (49%).

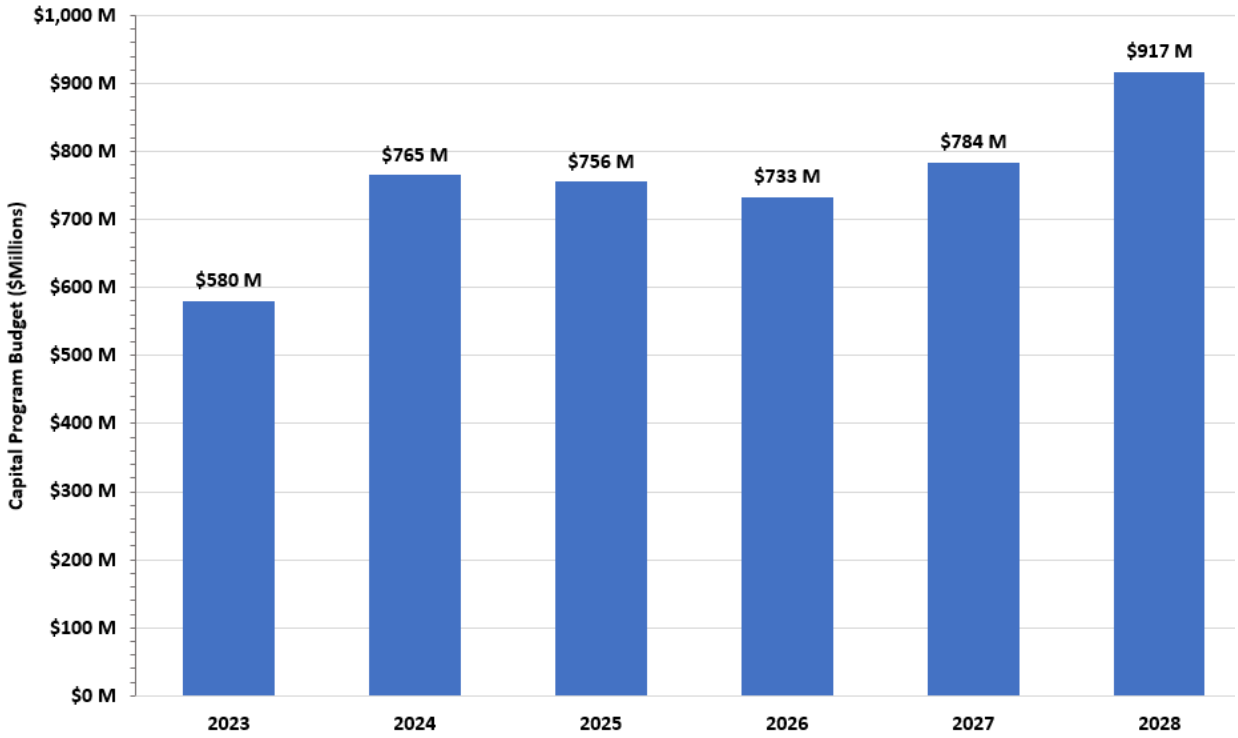
Over the Study Period, costs in this category are estimated to increase from $25.1 Million in FY 2023 to $33.1 Million in FY 2028.

Pressing Capital Improvements

Similar to operating expenses, the Water Department's Capital Improvement Program ("CIP") budget for FY 2023 to FY 2028 has grown to accommodate inflationary pressures and represents a move from primarily rehabilitation-related efforts to (i) substantial system replacement and upgrades to major facilities to create resiliency and redundancy together with (ii) continued expansion of green infrastructure facilities to meet the City's stormwater management requirements. The current $4.53 Billion CIP budget for FY 2023 to FY 2028, presented in Figure ES-2 below, represents an approximate 14% increase from prior estimates of $3.98 Billion.

The growth of the CIP also means that the Water Department's long-term debt obligations will increase. The Water Department continues to pursue low-cost options for funding capital projects utilizing revenue bonds, Pennsylvania Infrastructure Investment Authority ("PENNVEST") and Water Infrastructure Finance and Innovation Act ("WIFIA") loans, and the Commercial Paper program. The Water Department's total debt service payments for the Combined System are estimated to increase from $199.6 Million in FY 2023 to $390.9 Million in FY 2028.

Figure ES-2 Capital Improvement Program Budget



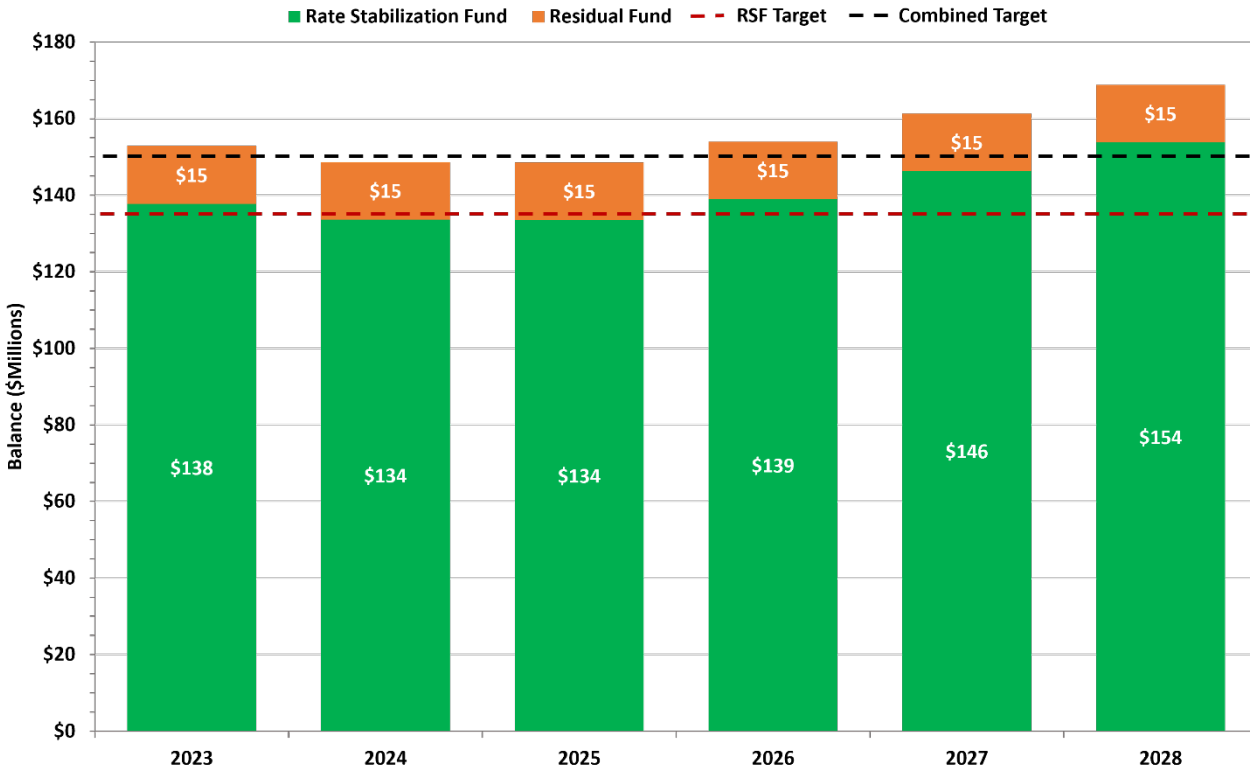
Reduced Liquidity

PWD cannot meet working capital operational needs and address emergencies without replenishing and maintaining adequate reserves. The Water Department uses the Rate Stabilization Fund ("RSF") as a source of short-term liquidity and for addressing emergencies, such as Hurricane Ida. With water treatment plants over 100 years old and water pollution control facilities over 70 years old, a failure at any of these plants could use a large portion of the RSF. While the Water Department did experience a shutdown at the Belmont Water Treatment Plant during Hurricane Ida, it was able to step up production at the remaining two facilities so that residents did not have to experience the same level of service disruption seen in Aqua Pennsylvania's ("Aqua PA") service territory. Had the City experienced a more severe service disruption, or a long period of boil water orders, the lack of adequate RSF funds would stress the Water Department's short-term liquidity and impact day-to-day operations.

Historically, the Water Department has also used the RSF to mitigate rate impacts. While this practice is reasonable on a limited basis, it is not a sustainable solution for needed revenue increases. Use of the RSF in this manner is subject to the 90% Test, meaning that the maximum withdrawal from the RSF is 30% of that year's Debt Service Requirement based on the minimum senior debt service coverage of 1.20. This practice is in line with best management practices which indicate that enterprise fund utilities (like PWD) should be self-supporting, and revenues should, at the very least, be managed to meet the 90% Test.

The Water Department has used RSF monies where possible to help mitigate the impact of revenue adjustments on customers in the past (when RSF balances were higher). However, based upon the current available RSF balances and withdrawals projected during the Rate Period, RSF reserves remain below the previously approved targeted levels during the Rate Period. Figure ES-3 depicts the overall fund balance performance against the combined RSF and Residual Fund target balance of $150 Million, in accordance with the Rate Board's decision dated July 12, 2018 (the "2018 Rate Determination").

Figure ES-3 Combined Rate Stabilization and Residual Fund Balance Performance



Changing Customer Base

Since the 2022 Special Rate Proceeding, the Water Department has been notified of changes to its customer base. Specifically, Vicinity Energy Philadelphia ("Vicinity") is building its own water treatment facility for its steam plant operations. Vicinity is a top 10 largest water user and accounts for about 1% of the Water Department's total revenues. Though Vicinity will be reducing its overall water usage, it still plans on receiving limited water service, along with sewer and stormwater services for its facilities. Beginning in FY 2024, the projected commercial customer annual billed water volume reflects a reduction of 90,000 thousand cubic feet ("Mcf"), the historical three-year average for this customer at the steam plant site.

The Water Department has also been notified by the Delaware County Regional Water Authority ("DELCORA") of its intention to leave the Wastewater System as a wholesale customer beginning in FY 2028. DELCORA is building its own wastewater treatment facility and expects it to be operational by the time its contract with the Water Department expires in FY 2028. The estimated revenue loss associated with this customer is $9 Million per year based on current contract rates.

No More Federal COVID-19 Help

The Coronavirus Aid, Relief, and Economic Security ("CARES") Act of 2020 and the American Rescue Plan Act ("ARPA") of 2021 provided emergency funding for COVID-19 relief. While there is still some monies left, the amounts allocated to directly help disadvantaged customers with utilities bills in Pennsylvania is

exhausted. Without any more relief funding, especially Low-Income Household Water Assistance Program ("LIHWAP") funding, it is crucial that the Water Department maintains rates that cover all necessary expenses. At this time, it is unclear how future revenues or customer payment patterns may be influenced by the sunsetting of these programs. For example, the Water Department's FY 2022 revenues included $6.7 Million in payments funded by LIWHAP and $1.5 Million funded by the Philadelphia Housing Development Corporation ("PHDC"). With no immediate additional federal funding on the horizon, customers may no longer have access to these support programs on a routine basis. This may lead to lower revenues for the Water Department in the future.

Proposed Combined System Adjustments

Table ES-1 summarizes the overall annual revenue increases required from Base Rates during the Study Period. The rates proposed for the Water System are based on an increase of 18.9% and 9.00% in FY 2024 and FY 2025, respectively. The rates proposed for the Wastewater System are based on an increase of 8.92% in FY 2024 and 8.66% in FY 2025. The aggregate increase for the Combined System is 12.75% in FY 2024 and 8.80% in FY 2025. As discussed below, the proposed increases are needed to meet future revenue requirements, maintain/improve System infrastructure, meet targeted debt service coverage ratios, maintain fund balances and other relevant financial metrics and ordinance obligations.

Table ES-1 Required Base Rate Service Revenue Adjustments

ADDITIONAL BASE RATE REVENUE REQUIRED			
FISCAL YEAR	WATER	WASTEWATER	COMBINED
2024	18.90%	8.92%	12.75%
2025	9.00%	8.66%	8.80%
2026	12.51%	12.83%	12.70%
2027	9.37%	7.04%	8.00%
2028	11.62%	7.13%	9.00%

Table ES-2 summarizes the additional service revenue required for the Combined System during the Study Period in the context of overall system revenues including both Base Rates and Tiered Assistance Program ("TAP") Rate Rider ("TAP-R") rates[2]. This table summarizes the overall level of total service revenue adjustments required to meet operating and capital financing needs of the Combined System as well as all other legal and financial requirements discussed herein.

[2] Overall Additional Service Revenue Required reflects estimated impact of proposed FY 2024 TAP-R revenues and estimated FY 2024 TAP discounts as presented in the 2023 TAP-R Annual Adjustment Proceeding. A reduction in TAP-R rates is anticipated in FY 2024.

Table ES-2 Required Total Service Revenue Adjustments

ADDITIONAL SERVICE REVENUE REQUIRED	
FISCAL YEAR	COMBINED
2024	11.02%
2025	8.77%
2026	12.66%
2027	7.98%
2028	8.98%

Water, Sanitary Sewer, and Stormwater Typical Bills Under Proposed Rates

The cost-of-service analysis provides the basis for the design of the water and wastewater rate schedules to recover the allocated cost of service from each respective system and service (including stormwater). The proposed rates are consistent with the existing rate structure and no rate structure changes are proposed at this time.

The proposed rates will result in increased bills for most customers. The Typical Bill impacts for Residential, Senior Citizen, and Small Business Customers are shown in Table ES-3 based on the analyses conducted, the adoption of the increased water, sewer, and stormwater rates for FY 2024 and FY 2025 is recommended, as discussed further herein.

This Report does not address the development of the updated Tiered Assistance Program Reconciliation (TAP-R) rates as they are subject to a separate proceeding before the Rate Board. However, this Report does reference the estimated impacts related to TAP discounts and TAP-R revenues, to present overall performance of metrics against the General Bond Ordinance (defined below) , the Rate Ordinance (Section 13-101, Philadelphia Code) and approved financial targets.

Table ES-3 Typical Bill Impacts[3]

RESIDENTIAL CUSTOMER[4]

CURRENT		PROPOSED FY2024		PROPOSED FY2025	
Water	$22.50	Water	$27.61	Water	$29.98
Wastewater	$16.29	Wastewater	$17.98	Wastewater	$19.54
Stormwater	$18.05	Stormwater	$19.04	Stormwater	$21.00
Service	$12.47	Service	$12.84	Service	$13.40
	$69.31		**$77.47**		**$83.92**
			11.8% increase		*8.3% increase*

SENIOR CITIZEN WITH DISCOUNT[5]

CURRENT		PROPOSED FY2024		PROPOSED FY2025	
Water	$15.00	Water	$18.41	Water	$19.99
Wastewater	$10.86	Wastewater	$11.99	Wastewater	$13.03
Stormwater	$18.05	Stormwater	$19.04	Stormwater	$21.00
Service	$12.47	Service	$12.84	Service	$13.40
Senior Discount	(-$14.10)	Senior Discount	(-$15.57)	Senior Discount	(-$16.86)
	$42.28		**$46.71**		**$50.56**
			10.5% increase		*8.3% increase*

SMALL BUSINESS CUSTOMER[6]

CURRENT		PROPOSED FY2024		PROPOSED FY2025	
Water	$29.99	Water	$36.81	Water	$39.98
Wastewater	$21.72	Wastewater	$23.97	Wastewater	$26.06
Stormwater	$54.93	Stormwater	$58.06	Stormwater	$64.17
Service	$12.47	Service	$12.84	Service	$13.40
	$119.11		**$131.68**		**$143.61**
			10.5% increase		*9.1% increase*

[3] FY 2023 figures reflect the existing base and current TAP-R rates, of $1.03/Mcf for water and $1.63/Mcf for sewer. FY 2024 and FY 2025 figures reflect the proposed base rates for each respective fiscal year and the proposed TAP-R rates, of $0.21/Mcf for water and $0.34/Mcf for sewer. The TAP-R Rates are subject to annual reconciliation under a separate parallel proceeding filed before the Rate Board.

[4] "Typical" residential account with 5/8" meter using 4.5 hundred cubic feet of water monthly.

[5] "Typical" senior citizen discounted bill account with 5/8" meter using 3 hundred cubic feet of water monthly. Bill amounts reflect a 25% discount on all fees and charges.

[6] "Typical" small business account with 5/8" meter using 6 hundred cubic feet of water monthly and a parcel with a gross area of 5,500 square feet and impervious area of 4,000 square feet.

The Combined System Operating Results

Table ES-4,Table ES-5, and Table ES-6 illustrate the Combined System Projected Revenue and Revenue Requirements during the Study Period for the Base Rates excluding TAP-R Surcharge Rates, just the TAP-R Surcharge Rates, and Base Rates with TAP-R Surcharge Rates, respectively. The proposed rates, coupled with planned use of the available RSF balance in FY 2024 and FY 2025, presented in this Report allows the Combined System to meet projected revenue requirements, fulfill the bond coverage and other ordinance requirements, and maintain the target fund balance for the Residual Fund. For this analysis, an effective increase date of September 1st for each fiscal year is assumed.

Table ES-7 summarizes the Combined System performance with respect to the General Bond Ordinance Covenants and presents the projected RSF balances over the Study Period. This table also summarizes performance with respect to the Rate Ordinance requirements. The proposed rates presented in this Report are necessary (i) to meet the Combined System's projected revenue requirements, (ii) transition to targeted metrics for debt service coverage, pay-go funding and RSF balances, and (iii) meet other legal/regulatory requirements.

For the Rate Period, the Water Department is proposing revenue adjustments that will allow meeting interim senior debt coverage targets to help address customer affordability impacts.

[*This spacing is intentional*]

Table ES-4 Projected Revenue and Revenue Requirements: Base Rates Only [Schedule BV-1: Table C-1A]

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
	Combined System ($000s)								
	Operating Revenues								
1	Water Service - Existing Rates			294,038	296,093	298,680	301,466	301,071	300,328
2	Wastewater Service - Existing Rates			472,292	476,637	478,997	480,829	480,147	470,259
3	**Total Service Revenue - Existing Rates**			**766,330**	**772,731**	**777,677**	**782,295**	**781,218**	**770,587**
	Additional Service Revenue Required								
		Year	Percent Increase	Months Effective					
4		FY 2024	12.75%	10		80,412	99,154	99,743	99,605	98,250
5		FY 2025	8.80%	10			62,977	77,619	77,512	76,458
6		FY 2026	12.70%	10				99,472	121,709	120,052
7		FY 2027	8.00%	10					70,520	85,228
8		FY 2028	9.00%	10						84,516
9	**Total Additional Service Revenue Required**				**-**	**80,412**	**162,131**	**276,834**	**369,346**	**464,504**
10	**Total Water & Wastewater Service Revenue**				**766,330**	**853,142**	**939,807**	**1,059,129**	**1,150,564**	**1,235,091**
	Other Income (a)									
11	Other Operating Revenue				29,601	29,664	29,713	29,771	29,746	29,720
12	Debt Reserve Account Interest Income				-	-	-	-	-	-
13	Operating Fund Interest Income				1,882	1,982	2,023	2,192	2,271	2,331
14	Rate Stabilization Interest Income				1,365	1,339	1,336	1,360	1,423	1,497
15	**Total Revenues**				**799,178**	**886,128**	**972,880**	**1,092,452**	**1,184,004**	**1,268,639**
	Operating Expenses									
16	**Total Operating Expenses**				**(564,671)**	**(611,326)**	**(654,537)**	**(690,172)**	**(720,118)**	**(752,972)**
	Net Revenues									
17	Transfer From/(To) Rate Stabilization Fund				5,000	100	600	(5,400)	(7,300)	(7,500)
18	**NET REVENUES AFTER OPERATIONS**				**239,507**	**274,902**	**318,943**	**396,880**	**456,586**	**508,167**
	Debt Service									
	Senior Debt Service									
19	Outstanding Bonds				(187,747)	(185,847)	(183,090)	(183,088)	(183,091)	(166,318)
20	PENNVEST Loans				(10,935)	(12,031)	(16,329)	(23,721)	(29,283)	(32,313)
21	Projected Future Bonds				-	(21,083)	(53,880)	(92,771)	(129,341)	(175,213)
22	Commercial Paper				(900)	(900)	(900)	(900)	(900)	(900)
23	WIFIA				-	(17)	(956)	(4,812)	(8,532)	(16,153)
24	**Total Senior Debt Service**				**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**				**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service				-	-	-	-	-	-
27	Transfer to Escrow				-	-	-	-	-	-
28	**Total Debt Service on Bonds**				**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
29	**CAPITAL ACCOUNT DEPOSIT**				**(23,383)**	**(24,295)**	**(25,242)**	**(26,226)**	**(27,249)**	**(28,312)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**				**1.07 x**	**1.12 x**	**1.13 x**	**1.19 x**	**1.20 x**	**1.21 x**
31	End of Year Revenue Fund Balance				16,542	30,729	38,547	65,361	78,191	88,958

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

Table ES-5 Projected Revenue and Revenue Requirements: TAP-R Rates Only [Schedule BV-1: Table C-1B])

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
	Combined System ($000s)								
	Operating Revenues								
1	Water Service - Existing Rates			5,130	5,579	5,686	5,744	5,735	5,719
2	Wastewater Service - Existing Rates			7,995	8,843	9,030	9,124	9,110	9,085
3	**Total Service Revenue - Existing Rates**			**13,125**	**14,422**	**14,716**	**14,868**	**14,846**	**14,804**
	Additional Service Revenue Required								
		Year	Percent Increase	Months Effective					
4		FY 2024	-79.32%	10	(8,020)	(11,188)	(11,743)	(11,776)	(11,743)
5		FY 2025	0.00%	10		-	-	-	-
6		FY 2026	0.00%	10			-	-	-
7		FY 2027	0.00%	10				-	-
8		FY 2028	0.00%	10					-
9	**Total Additional Service Revenue Required**				**-**	**(8,020)**	**(11,188)**	**(11,743)**	**(11,776)**	**(11,743)**
10	**Total Water & Wastewater Service Revenue**				**13,125**	**6,402**	**3,528**	**3,125**	**3,070**	**3,061**
	Other Income								
11	Other Operating Revenue (a)				(9,354)	(10,438)	(3,052)	(3,052)	(3,052)	(3,052)
12	Debt Reserve Account Interest Income				-	-	-	-	-	-
13	Operating Fund Interest Income				-	-	-	-	-	-
14	Rate Stabilization Interest Income				-	-	-	-	-	-
15	**Total Revenues**				**3,771**	**(4,036)**	**476**	**73**	**18**	**9**
	Operating Expenses								
16	**Total Operating Expenses**				**-**	**-**	**-**	**-**	**-**	**-**
	Net Revenues								
17	Transfer From/(To) Rate Stabilization Fund (b)				(3,771)	4,036	(476)	(73)	(18)	(9)
18	**NET REVENUES AFTER OPERATIONS**				**-**	**-**	**-**	**-**	**-**	**-**
	Debt Service								
	Senior Debt Service								
19	Outstanding Bonds				-	-	-	-	-	-
20	PENNVEST Loans				-	-	-	-	-	-
21	Projected Future Bonds				-	-	-	-	-	-
22	Commercial Paper				-	-	-	-	-	-
23	WIFIA				-	-	-	-	-	-
24	**Total Senior Debt Service**				**-**	**-**	**-**	**-**	**-**	**-**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**				**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
26	Subordinate Debt Service				-	-	-	-	-	-
27	Transfer to Escrow				-	-	-	-	-	-
28	**Total Debt Service on Bonds**				**-**	**-**	**-**	**-**	**-**	**-**
29	**CAPITAL ACCOUNT DEPOSIT**				**-**	**-**	**-**	**-**	**-**	**-**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**				**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
31	End of Year Revenue Fund Balance				-	-	-	-	-	-

(a) FY 2023 and FY 2024 reflect TAP Credits based on the proposed 2023 Annual Adjustment. FY 2025 to FY 2028 reflect proposed TAP-R revenue requirement based on the proposed 2023 Annual Adjustment.

(b) Rate Stabilization Fund transfers necessary to meet over or under recovery of TAP costs until recovery is reconciled via TAP-R reconciliation.

Table ES-6 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates [Schedule BV-1: Table C-1]

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)									
Operating Revenues									
1	Water Service - Existing Rates			299,168	301,672	304,366	307,210	306,806	306,047
2	Wastewater Service - Existing Rates			480,288	485,480	488,027	489,953	489,257	479,344
3	**Total Service Revenue - Existing Rates**			**779,455**	**787,152**	**792,393**	**797,163**	**796,063**	**785,392**
	Additional Service Revenue Required								
	Year	Percent Increase	Months Effective						
4	FY 2024	11.02%	10		72,392	87,966	88,000	87,829	86,507
5	FY 2025	8.77%	10			62,977	77,619	77,512	76,458
6	FY 2026	12.66%	10				99,472	121,709	120,052
7	FY 2027	7.98%	10					70,520	85,228
8	FY 2028	8.98%	10						84,516
9	**Total Additional Service Revenue Required**			**-**	**72,392**	**150,942**	**265,091**	**357,570**	**452,760**
10	**Total Water & Wastewater Service Revenue**			**779,455**	**859,544**	**943,335**	**1,062,254**	**1,153,634**	**1,238,152**
	Other Income (a)								
11	Other Operating Revenue			20,247	19,226	26,661	26,719	26,694	26,668
12	Debt Reserve Account Interest Income			-	-	-	-	-	-
13	Operating Fund Interest Income			1,882	1,982	2,023	2,192	2,271	2,331
14	Rate Stabilization Interest Income			1,365	1,339	1,336	1,360	1,423	1,497
15	**Total Revenues**			**802,949**	**882,092**	**973,356**	**1,092,525**	**1,184,022**	**1,268,648**
Operating Expenses									
16	**Total Operating Expenses**			**(564,671)**	**(611,326)**	**(654,537)**	**(690,172)**	**(720,118)**	**(752,972)**
Net Revenues									
17	Transfer From/(To) Rate Stabilization Fund			1,229	4,136	124	(5,473)	(7,318)	(7,509)
18	**NET REVENUES AFTER OPERATIONS**			**239,507**	**274,902**	**318,943**	**396,880**	**456,586**	**508,167**
Debt Service									
	Senior Debt Service								
	Revenue Bonds								
19	Outstanding Bonds			(187,747)	(185,847)	(183,090)	(183,088)	(183,091)	(166,318)
20	PENNVEST Loans			(10,935)	(12,031)	(16,329)	(23,721)	(29,283)	(32,313)
21	Projected Future Bonds			-	(21,083)	(53,880)	(92,771)	(129,341)	(175,213)
22	Commercial Paper			(900)	(900)	(900)	(900)	(900)	(900)
23	WIFIA			-	(17)	(956)	(4,812)	(8,532)	(16,153)
24	**Total Senior Debt Service**			**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**			**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	**Total Debt Service on Bonds**			**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
29	**CAPITAL ACCOUNT DEPOSIT**			**(23,383)**	**(24,295)**	**(25,242)**	**(26,226)**	**(27,249)**	**(28,312)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**			**1.07 x**	**1.12 x**	**1.13 x**	**1.19 x**	**1.20 x**	**1.21 x**
31	**End of Year Revenue Fund Balance**			**16,542**	**30,729**	**38,547**	**65,361**	**78,191**	**88,958**

Table ES-6 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates (continued)

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
Residual Fund							
32	Beginning of Year Balance	16,102	15,095	15,079	15,078	15,047	15,025
33	Interest Income	155	150	150	150	150	149
	Plus:						
34	End of Year Revenue Fund Balance	16,542	30,729	38,547	65,361	78,191	88,958
35	Deposit for Transfer to City General Fund (b)	1,945	1,999	2,026	2,084	2,149	2,192
	Less:						
36	Transfer to Construction Fund	(16,600)	(29,800)	(34,400)	(58,150)	(72,800)	(86,100)
37	Transfer to City General Fund	(1,945)	(1,999)	(2,026)	(2,084)	(2,149)	(2,192)
38	Transfer to Debt Reserve Account	(1,105)	(1,096)	(4,298)	(7,392)	(5,562)	(3,030)
39	**End of Year Balance**	**15,095**	**15,079**	**15,078**	**15,047**	**15,025**	**15,002**
Rate Stabilization Fund							
40	Beginning of Year Balance (c)	138,989	137,760	133,625	133,501	138,974	146,291
41	Deposit From/(To) Revenue Fund	(1,229)	(4,136)	(124)	5,473	7,318	7,509
42	**End of Year Balance**	**137,760**	**133,625**	**133,501**	**138,974**	**146,291**	**153,800**

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund and reflects projected contra revenue credits for Affordability Program Discounts (TAP Costs).

(b) Transfer of interest earnings from the Debt Reserve Account to the Residual Fund as shown in Line 35 to satisfy the requirements for the transfer to the City General Fund shown on Line 37.

(c) FY 2023 beginning balance is estimated based on preliminary FY 2022 results.

[*This spacing is intentional*]

Table ES-7 Projected Rate Stabilization Fund and Covenants Metrics Performance: Base Rates and TAP-R Rates [Schedule BV-1: Table C-2])

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Rate Stabilization Fund							
1	Beginning Balance: Rate Stabilization Fund (a)	$ 138,989	$ 137,760	$ 133,625	$ 133,501	$ 138,974	$ 146,291
2	Transfers From (To) Revenue Fund (b)	(1,229)	(4,136)	(124)	5,473	7,318	7,509
3	Year-End Rate Stabilization Fund Balance (Line 1 + Line 2)	137,760	133,625	133,501	138,974	146,291	153,800
General Bond Ordinance Covenants							
4	Senior Debt Coverage (c)	1.20	1.25	1.25	1.30	1.30	1.30
5	Total Debt Coverage (d)	1.07	1.12	1.13	1.19	1.20	1.21
6	90% Test - Senior Debt Coverage from Current Revenues (e)	1.19	1.23	1.24	1.30	1.30	1.30
O&M Actual to Budget Ratio							
7	Projected O&M Budget (f)	659,216	715,819	766,086	807,071	842,689	881,564
8	O&M Actual to Budget Ratio	90.8%	91.0%	91.1%	91.3%	91.3%	91.3%
Rate Ordinance Requirements							
9	Projected Total Revenues	802,949	882,092	973,356	1,092,525	1,184,022	1,268,648
10	Projected Total Appropriations (g)	898,723	990,721	1,085,029	1,209,350	1,306,575	1,397,230
11	Rate Ordinance Requirement Compliance (h)	Yes	Yes	Yes	Yes	Yes	Yes
Cash Funding							
12	Cash Funded Capital (i)	39,983	54,095	59,642	84,376	100,049	114,412
13	Capital Improvement Program Annual Expenses	$ 337,627	$ 513,964	$ 606,056	$ 757,393	$ 791,263	$ 865,518
14	Cash Funded Capital Ratio (j)	11.8%	10.5%	9.8%	11.1%	12.6%	13.2%

(a) FY 2023 beginning balance is estimated based on FY 2022 preliminary financial results.

(b) See Line 17 in Table ES-6.

(c) Senior Debt Coverage = (Total Revenues - Operating Expenses + Transfer From (to) Rate Stabilization) divided by Senior Debt. The General Bond Ordinance requires the minimum Senior Debt Service Coverage of 1.20.

(d) Total Debt Coverage = (Total Revenues - Operating Expenses + Rate Stabilization Transfer) divided by (Senior Debt + Subordinate Debt + Capital Account Deposit). The 1989 General Ordinance requires the minimum Total Debt Service Coverage of 1.00.

(e) Senior Debt Coverage from Current Revenues = (Total Revenues - Operating Expenses - Transfer to Rate Stabilization Fund) divided by Senior Debt. Transfers from Rate Stabilization are excluded from the Total Revenues. The General Bond Ordinance requires a minimum Senior Debt Service Coverage of 0.90 from Current Revenues.

(f) FY 2023 budget reflects the PWD adopted budget; FY 2024 through FY 2028 budget reflects annual cost escalation factors.

(g) Total Appropriation = Total O&M Budget + Senior Debt + Subordinate Debt + Transfer to Escrow + Capital Account Deposit + Transfer to Rate Stabilization Fund + Transfer to Residual Fund. Costs to service the City included as required by the General Bond Ordinance rate covenants.

(h) Rate Ordinance requires that Total Revenues not exceed Total Appropriations.

(i) Cash Funded Capital = Capital Account Deposit + Residual Transfer to Construction Fund

(j) Cash Funded Capital Ratio = Cash Funded Capital divided by Capital Improvement Program annual expenses.

Managing Bill Impacts

To help manage customer bill impacts and still meet financial obligations, the Water Department has proposed the following actions for the Rate Period:

1. Temporarily reduce the Stormwater Management Incentive Program/Greened Acre Retrofit Program budget by $5 Million annually in FY 2024 and FY 2025,
2. Set rates to meet the interim senior debt service coverage requirement of 1.25x, instead of the target 1.30x approved in the 2018 Rate Determination,
3. Maintain the Rate Stabilization Fund slightly below the $135 Million target approved in the 2018 Rate Determination, and
4. Defer the 20% cash funding target for capital projects.

Consequences of Inadequate Rate Relief

The above discussions highlight the Water Department's current conditions. Should the proposed levels of revenue adjustments not be approved, then the Water Department will experience financial deficits in FY 2024 and FY 2025, which would impact PWD's ability to pay its bills and sustain utility services. Additionally, approval of revenue increases that are less than those proposed in this Report will necessitate cost reductions that would adversely impact service levels and the ability to meet regulatory requirements. At a minimum, reduced rate relief will result in further deferred O&M and capital activities.

The following is a list of potential risks that the Water Department may face should the proposed revenue increases not be fully approved.

1. PWD will have insufficient resources to sustain operations and to meet rising costs because post-pandemic conditions and supply chain disruptions have increased FY 2023 costs by more than $9 Million compared to prior projections. Projected total operating costs[7] are $73.3 Million higher in FY 2024 compared to FY 2023.
    a. Vendor and supplier pricing increases in critical areas such as chemicals, power and gas, and materials and supplies are projected to grow $21.0 Million in FY 2024 over FY 2023 levels.
    b. FY 2023 personnel-related costs are 9.5% higher than FY 2022. FY 2024 personnel-related costs are 4.5% higher than FY 2023. These increases reflect the following:
        i. Continued transition of capital-funded staffing to operations reflects an increase of $1.2 Million in FY 2024 to $6.5 Million in FY 2028.
        ii. Additional staffing needed to support Consent Order Agreement ("COA") requirements, manage the operational and capital activities imposed by the Lead and Copper Rule, and address maintenance activities. Over the Study Period, additional staffing costs increase from $1.7 Million in FY 2024 to $12.5 Million in FY 2028.
        iii. Continued growth of the Water Department's proportionate share of the City's pension program. Pension, pension obligations, and benefits are estimated to increase from $144 Million in FY 2023 to $174 Million in FY 2028.
2. PWD will have insufficient resources to fund capital improvements. The proposed CIP represents an increase of 14% over prior estimates.
    a. Extending the CIP schedule out further runs the risk of increasing the occurrence of infrastructure failures and not being able to meet regulatory requirements, including those in the COA.

[7] Prior to liquidated encumbrances.

b. The Water Department continues to find low-cost financing options to fund the CIP. However, the growing CIP means that debt obligations will increase from $199.6 Million in FY 2023 to $390.9 Million in FY 2028.

3. The RSF would be fully depleted by the end of FY 2025 absent rate relief. There would be no financial reserves in the event of an emergency or severe weather event.
4. Also, without additional revenues and in accord of our current projections, the Water Department's performance against financial metrics and targets will likely result in the following:
    a. The 90% Test would not be met beginning in FY 2024.
    b. Senior Debt Service Coverage would not be met in FY 2025; and
    c. The RSF would be well below the $120 million minimum RSF threshold set by S&P Global Ratings in FY 2024 and FY 2025.

Faced with the required revenue increases, the Water Department along with the City have been working to expand access to customer assistance programs. TAP offers qualifying customers shelter from rate increases, as their bills are based upon their income-levels. The Water Department has been working with the Pennsylvania State government to enter into a data sharing agreement that is intended to help identify potential low-income customers and aid them in gaining access to TAP. In addition, the Water Department is proposing to increase the Senior Discount Income Threshold, which will hopefully increase access to reduced bills for eligible seniors.

In July 2022, to further protect vulnerable customers, the City:

- Raised the minimum threshold eligible for shutoff from $150 to $1,000;
- Removed all TAP customers and TAP applicants from eligibility for shutoff;
- Removed all customers receiving the Senior Citizen Discount from eligibility for shutoff; and
- Removed all customers the City could determine received Medicaid and/or homelessness prevention services from eligibility for shutoff.

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1.0 Introduction

The City of Philadelphia ("City") owns, operates, maintains, repairs, and improves the water system ("Water System") and wastewater system ("Wastewater System") serving the City and 10 wholesale wastewater contract customers and one wholesale water contract customer, as a self-supporting enterprise fund utility. Collectively, the Water System and the Wastewater System are known as the "Water and Wastewater Systems," "the System," or the "Combined System."

On April 17, 1951, the Philadelphia Home Rule Charter (the "Charter") established the Philadelphia Water Department ("PWD" or the "Water Department") as one of the City's ten operating departments. The Water Department is responsible for the planning, construction, operation, and maintenance of the Water and Wastewater Systems; for complying with regulatory requirements; for rate setting and stakeholder engagement; budgeting and detailed cost accounting; and preparation of financial statements for the System. The City's combined Annual Comprehensive Financial Report ("ACFR") includes the data from the Water Department's annual financial statements.

Section 5-800 of the Charter conveys the authority to the Water Department to operate the Water and Wastewater System. In addition, Section 5-801 authorizes the regulation of rates and charges for utility services. In November 2012, Philadelphia voters approved an amendment to the Charter to allow Philadelphia City Council ("City Council") to establish, by ordinance, an independent ratemaking board responsible for fixing and regulating rates and charges for water, sanitary sewer, and stormwater services. Consistent with the foregoing, City Council enacted, effective January 20, 2014, Ordinance 130251-A (the "Rate Ordinance") which created the Rate Board and prescribed certain rate-making standards.

The Water Revenue Bureau ("WRB"), which is a division within the City's Revenue Department, is responsible for billing, collection, and customer accounting for the Water and Wastewater Systems. Functions such as customer care and delinquent enforcement are joint responsibilities of the Water Department and the WRB. The City's Revenue Commissioner oversees the activities of the WRB. The City's Finance Director has the ultimate oversight of the WRB.

The Water Commissioner, who is appointed by the City's Managing Director with approval of the Mayor, leads the Water Department. In June 2019, the City appointed Mr. Randy Hayman as Water Commissioner. Mr. Hayman is an environmental attorney and prior to his appointment as Commissioner, he served as a partner at Beveridge & Diamond, and as an attorney for the District of Columbia Water and Sewer Authority and the Metropolitan St. Louis Sewer District.

Under Ordinance No. 130251-A, known as the Rate Ordinance, an amendment to the Philadelphia Code established an independent rate-making body, the Philadelphia Water, Sewer, and Storm Water Rate Board (the "Rate Board"). The Rate Board is responsible for setting and regulating rates and charges for supplying water, sewer, and stormwater services.

1.1 Purpose

At the direction of the Water Department, Black & Veatch Management Consulting, LLC ("Black & Veatch") conducted a comprehensive rates, fees, and charges cost of service ("COS") study (the "Report"). The purpose of this Report is (1) to project and examine the future operating and capital financing requirements of the utilities and the ability of existing rates to recover the requirements, and (2) to develop rates and charges to recover these revenue requirements.

In conducting these analyses and in forming an opinion of the projection of future financial operations summarized in this Report, Black & Veatch made certain assumptions on the conditions, events, and circumstances that may occur in the future. The methodology utilized in performing the analyses follows generally accepted practices for such projections. Such assumptions and methodologies are reasonable and appropriate for the purpose for which they are used. While we believe the assumptions are reasonable and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that occur. Such factors may include the utilities' ability to execute the capital improvement program as scheduled and within budget, regional climate and weather conditions affecting the demand for water, discharge of wastewater flow and adverse legislative, regulatory, or legal decisions (including environmental laws and regulations) affecting the utilities' ability to manage the system and meet water quality requirements.

1.2 Scope of Work

This Report presents the results of a comprehensive study of projected revenue requirements, cost of service, and proposed rates and charges for water, sanitary sewer, and stormwater service. Revenue and revenue requirements cover the Study Period beginning July 1, 2022 and ending June 30, 2028 (the "Study Period"). The analyses recognize growth patterns and water consumption patterns throughout the Water Department's service territory. The Water Department authorized the comprehensive study to assess the Water and Wastewater Systems' ability to meet current and future anticipated financial obligations and to develop a financing plan and proposed rates sufficient to fund operations and support capital financing needs.

The cost-of-service analysis conducted herein utilizes a cost-causative approach endorsed by the American Water Works Association's ("AWWA") Principles of Water Rates, Fees, and Charges Manual of Water Supply Practices M1, 7th Edition ("M1 Manual") and Water Environment Federation's ("WEF") Financing and Charges for Wastewater Systems, 4th Edition, Manual of Practice ("MoP") No. 27; as well as WEF's User Fee Funded Stormwater Programs manual. These allocation methodologies produce cost of service allocations recognizing the projected customer service requirements for the City. Proposed rates are designed in accordance with allocated cost of service and local policy considerations.

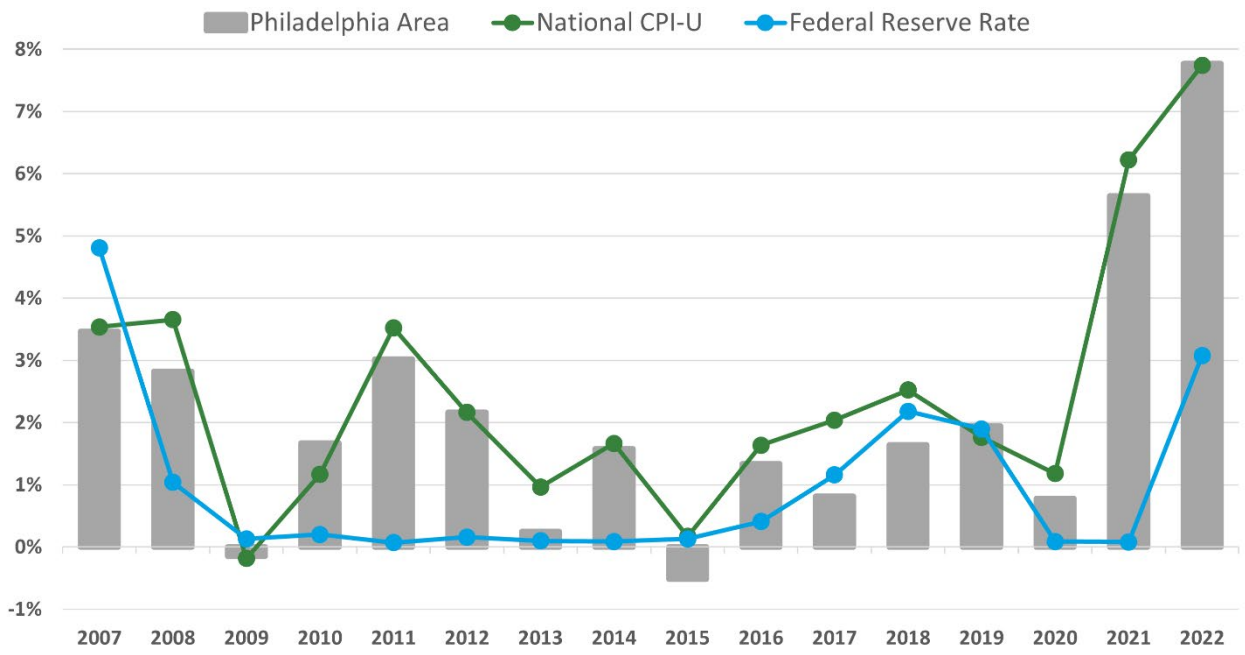
As part of the Water Department's 2023 Rate Filing ("Rate Filing"), the Water Department, Black & Veatch, and others produced several documents included as schedules and exhibits supporting the Rate Filing. This Report reflects a compilation of these documents, and cross-references to the appropriate testimony, schedules, and exhibits are noted to facilitate the review of the Rate Filing and this Report.

1.3 The Pandemic, Supply Chain Disruptions, and Inflation

COVID-19 was an unexpected global event whose persistence has created a tsunami of issues. Like other major disruptors (World War II and the 2008 Financial Crisis), post-COVID, the US economy is experiencing pent-up demand and a supply shortfall.

As has been documented extensively in the media and experienced by everyone, COVID impacted daily lives. Post-COVID, the US is struggling with a tight labor market, supply-chain issues, and sustained higher than historic levels of inflation. Instead of being transitory, inflation rates hit a 40-year high in June 2022. The Federal Reserve raised its benchmark interest rate seven times in 2022, with more increases expected for 2023 to curb inflation. As of the date of this Report, the Federal Rate interest rate is at its highest level in 15 years. There is significant evidence that tightening monetary policy generally leads to recessions in the US. In November 2022, Fitch predicted that it expects the US to be in a mild recession by mid-2023[8]. Figure 1-1 illustrates the trending history between the Consumer Price Index ("CPI") for All Urban Customers ("CPI-U"), the Philadelphia Area CPI-U, and the Federal Reserve interest rate. Figure 1-1 reflects October-to-October changes.

Figure 1-1 15-Year Trend for Consumer Price Index and Federal Reserve Rate



In economics, inflation is known as a "lagging" indicator, which means that it reflects changes after the macroeconomic conditions have occurred. Municipal entities, such as the Water Department, see the impacts of inflation on a delayed schedule. Anecdotal evidence indicates that this delay runs up to 18 to 24 months, which parallels the vendor bid cycle. The Water Department does not purchase chemicals or materials and supplies on the spot market. Instead, purchases in these key areas are via a bidding

[8] Stiffer Inflation Test Awaits U.S. Water and Sewer Utilities in 2023 - Water Finance & Management (waterfm.com)

processing that awards contracts for a set period. Consequently, pricing increases are seen annually. For capital improvement projects, the time between development of planning estimates as reflected in the CIP and received bids may be several years. Increases in the Federal Reserve lending rate is felt by the Water Department as increased borrowing costs to finance the CIP.

Throughout this Report, the projections presented reflect the fact that the COVID pandemic has significantly impacted the nation's economy and the Water Department. Quarantines, business closures, work-from-home restrictions, and health and safety requirements have stretched the Water Department's ability to maintain existing customer levels of service. The pandemic has put further pressure on the Water Department's revenues particularly in the areas of consumption, revenue collections, and shutoffs.

The following sections provide additional context on how the pandemic is still impacting the Water Department. The assumptions presented herein reflect both the observed trends and the Water Department's response to post-COVID conditions.

1.3.1 Changes in the Customer Base

A reduced customer base and continued declining per account usage adds pressure on customer affordability. With the changes to a major top 10 water customer and the potential loss of a wholesale wastewater customer, the Water Department is facing reduced revenues under existing rates over the study period.

Since the 2022 Special Rate Proceeding, the Water Department has been notified of changes to its customer base. Specifically, Vicinity Energy Philadelphia ("Vicinity") is building its own water treatment facility for its steam plant operations. Vicinity is a top 10 largest water user and accounts for about 1% of the Water Department's total revenues. Though Vicinity will be reducing its overall water usage, it still plans on receiving limited water service, along with sewer and stormwater services for its other facilities. Beginning in FY 2024, the projected commercial customer annual billed water volume reflects a reduction of 90,000 thousand cubic feet ("Mcf"), the historical three-year average for this customer at the steam plant site.

Additionally, the Water Department has also been notified by the Delaware County Regional Water Authority ("DELCORA") of its intention to leave the Wastewater System as a wholesale customer beginning in FY 2028. DELCORA is building its own wastewater treatment facility and expects it to be operational by the time its contract with the Water Department expires in FY 2028. The estimated revenue loss associated with this customer is $9 Million per year based on current contract rates.

1.3.2 Rising Costs

Non-discretionary operating costs include categories such as chemicals, energy, personnel, and materials and supplies. These costs are unavoidable and represent approximately 90% of operation and maintenance ("O&M") expenses for the water system, and over 40% for the wastewater system. The Water Department's FY 2023 budget reflects recent experience with contract and purchase price increases seen from vendors and suppliers.

1.3.2.1 Chemicals

Both the water and wastewater system operations require the use of chemicals in treatment processes. Most chemical usage falls within water operations to ensure the safety of drinking water; use in wastewater processes tend to be limited to pH modifications and preventing pollutant releases.

The Water Department reported that FY 2023 cost-per-ton bids received from vendors for a wide range of chemicals has increased 26.7% to 141.8% over FY 2022 levels. For FY 2024, an additional $16 Million increase is projected.

1.3.2.2 Power and Gas

Whereas water treatment operations use a lot of chemicals, wastewater treatment process are energy-intensive. Approximately 50% of the Water Department's power needs and 90% of gas needs are used by wastewater treatment.

Like chemicals, the Water Department's power and gas costs reflect received pricing increases from their suppliers. For electricity, the FY 2024 estimate of $19.9 Million is a 10.7% increase over FY 2023. For gas, the $8.3 Million FY 2024 estimate is a 19.0% increase compared to FY 2023.

1.3.2.3 Personnel

The Water Department has agreed upon wage increases of 3.25% that will go into effect in FY 2024 per labor agreements with District Council 33 ("DC33") and District Council 47 ("DC47").

As required by City policy, the Water Department is continuing to transition staff salaries from capital-funded to O&M-funded positions. In FY 2024, approximately $1.2 Million of salary costs are expected to shift from capital to O&M.

To support activities in Construction & Engineering, Planning & Environmental Services, Operations, Public Affairs, and Human Resources, the Water Department is increasing staffing levels over the Study Period. Over the Study Period, additional staffing costs increase from $1.7 Million in FY 2024 to $12.5 Million in FY 2028 (including the ongoing ramp-up in Green Stormwater Infrastructure ["GSI"] maintenance support).

1.3.2.4 Materials and Supplies

Materials pricing has increased throughout the country. The Water Department received FY 2023 price increase notices from its suppliers for contract items that averaged almost 43% higher than FY 2022 levels. Examples of increases for standard materials used in ongoing maintenance and repairs include valves of all sizes (62% to 100%) and all diameters of ductile iron pipe (49%).

1.3.3 Capital Program Needs

Similar to operating expenses, the Water Department's Capital Improvement Program ("CIP") budget for FY 2023 to FY 2028 has grown to accommodate inflationary pressures and represents a move from primarily rehabilitation-related efforts to substantial system replacement and upgrades to major facilities to create resiliency and redundancy as well as the continued expansion of green infrastructure facilities to meet the City's water, sewer and stormwater needs from both a regulatory and service perspective. The

current $4.53 billion CIP budget for FY 2023 to FY 2028, represents an approximate 14% increase from prior estimates of $3.98 billion.

The growth of the CIP also means that the Water Department's long-term debt obligations will increase. The Water Department continues to seek out low-cost options for funding projects and funding sources include revenue bonds, Pennsylvania Infrastructure Investment Authority ("PENNVEST") and Water Infrastructure Finance and Innovation Act ("WIFIA") loans, and the Commercial Paper ("CP") program. The Water Department's total debt service payments for the Combined System are estimated to increase from $199.6 Million in FY 2023 to $390.9 Million in FY 2028.

1.3.4 Declining Reserve Balances

PWD cannot meet working capital operational needs and address emergencies without replenishing and maintaining adequate reserves. The Water Department uses the Rate Stabilization Fund ("RSF") as a source of short-term liquidity and for addressing emergencies, such as Hurricane Ida. With water treatment plants over 100 years old and water pollution control facilities over 70 years old, a failure at any of these plants could use a large portion of the RSF. While the Water Department did experience a shutdown at the Belmont Water Treatment Plant during Hurricane Ida, it was able to step up production at the remaining two facilities so that residents did not have to experience the same level of service disruption seen in Aqua Pennsylvania's ("Aqua PA") service territory. Had the City experienced a more severe service disruption, or a long period of boil water orders, the lack of adequate RSF funds would stress the Water Department's short-term liquidity and impact day-to-day operations.

Historically, the Water Department has also used the RSF to mitigate rate impacts. While this practice is reasonable on a limited basis, it is not a sustainable solution for needed revenue increases. Use of the RSF in this manner is subject to the 90% Test, meaning that the maximum withdrawal from the RSF is 30% of that year's Debt Service Requirement based on the minimum senior debt service coverage of 1.20. This practice is in line with best management practices which indicate that enterprise fund utilities (like PWD) should be self-supporting, and revenues should, at the very least, be managed to meet the 90% Test.

The Water Department has used RSF monies where possible to help mitigate the impact of revenue adjustments on customers in the past (when RSF balances were higher). However, based upon the current available RSF balances and withdrawals projected during the Rate Period, RSF reserves remain below previously approved targeted levels during the Rate Period.

1.3.5 No More Federal COVID-19 Help

The Coronavirus Aid, Relief, and Economic Security ("CARES") Act of 2020 and the American Rescue Plan Act ("ARPA") of 2021 provided emergency funding for COVID-19 relief. While there is still some monies left, the amounts allocated to directly help disadvantaged customers with utilities bills in Pennsylvania is exhausted. Without any more relief funding, especially Low-Income Household Water Assistance Program ("LIHWAP") funding, it is crucial that the Water Department maintains rates that cover all necessary expenses. At this time, it is unclear how future revenues or customer payment patterns may be influenced by the sunsetting of these programs. For example, the Water Department's FY 2022 revenues included $6.7 Million in payments funded by LIWHAP and $1.5 Million funded by the Philadelphia Housing Development Corporation ("PHDC"). With no immediate additional federal funding on the horizon,

customers may no longer have access to these support programs on a routine basis. This may lead to lower revenues for the Water Department in the future.

1.3.6 Post-COVID Concerns and Mitigating Actions

The level of rate relief proposed in this Report reflects the Water Department's efforts to navigate customer affordability concerns under post-pandemic conditions in the near term and working towards regaining financial stability over the longer term. The need for continued investment into the Combined System to update aging infrastructure, meet regulatory requirements, and providing the resources necessary to maintain the system also require additional revenues to meet the Water Department's mission. As discussed above, most of the Water Department's cost increases are non-discretionary in nature and critical to the operation and maintenance of the Combined System.

1.3.6.1 Continuing Risks

Approval of revenue increases that are less than those proposed in this Report will necessitate cost reductions that may impact service levels and the ability to meet regulatory requirements. At a minimum, reduced rate relief will result in further deferred O&M and capital activities. The following is a list of potential risks that the Water Department may face should the proposed revenue increases not be fully approved.

- Loss of Key Customers. Large customers and wholesalers always present an ownership risk to the Water Department. That is, these customers are more likely to have the resources to build their own facilities and leave the System.
- Continued Inflationary Pressures. Rising costs because of post-pandemic conditions and supply chain disruptions have increased FY 2023 costs by more than $9 Million compared to prior projections. Projected total operating costs[9] are $73.3 Million higher in FY 2024 compared to FY 2023.
- Workforce Cost Pressures. The need to address workforce needs (more people) and living-wage increase will continue to be a factor into the future. It should be noted that the Water Department is one of the few Departments within the City, that is still experiencing growth in terms of the number of personnel. With this increase in headcount comes the potential for additional costs related to pension and benefits as the Water Department's allocable portion of those costs grows. The performance of the pension fund itself may require additional contributions now and in the future. These impacts are not fully captured in the projections presented herein and present a potential risk to the Water Department as actual expenses may be higher.
- Outside COVID-19 Help is Gone. As discussed above, LIHWAP funding is not anticipated to continue, which impacts the Water Department's revenues and requires potentially more support of the Tiered Assistance Program ("TAP").
- Continued Reliance on Reserves. The continued use of the RSF to reduce revenue impacts is not a sustainable rate mitigation strategy. Based upon the current available RSF balances, minimal withdrawals are projected during the Rate Period. Further, increasing the RSF target, which was

[9] Prior to liquidated encumbrances.

adopted following the 2018 Rate Determination, may be necessary in future years to help provide necessary reserves in context of current costs.

1.3.6.2 Mitigating Measures

To help manage customer bill impacts and still meet financial obligations, the Water Department has proposed the following actions for the Rate Period:

1. Temporarily reducing the Stormwater Management Incentive Program/Greened Acre Retrofit Program budget by $5 Million in FY 2024 and FY 2025,
2. Setting rates to meet the interim senior debt service coverage requirement of 1.25x, instead of the target 1.30x set forth under the 2018 Rate Determination,
3. Leaving the Rate Stabilization Fund slightly below the $135 Million target under the 2018 Rate Determination, and
4. Deferring the 20% cash funding target for capital projects.

Approval of revenue increases that are less than those proposed in this Report will necessitate cost reductions that may impact service levels and the ability to meet regulatory requirements. At a minimum, reduced rate relief will result in further deferred O&M and capital activities.

Even in the face of required revenue increases, the Water Department along with the City have been working to expand access to customer assistance programs. TAP offers qualifying customers shelter from rate increases, as their bills are based upon their income-levels. The Water Department has been working with the Pennsylvania State government to enter into a data sharing agreement that is intended to help identify potential low-income customers and aid them in gaining access to TAP. In addition, the Water Department is proposing to increase the Senior Discount Income Threshold, which will hopefully increase access to reduced bills for eligible seniors.

In July 2022, to further protect vulnerable customers, the City:

- Raised the minimum threshold eligible for shutoff from $150 to $1,000
- Removed all TAP customers and TAP applicants from eligibility for shutoff
- Removed all customers receiving the Senior Citizen Discount from eligibility for shutoff
- Removed all customers the City could determine received Medicaid and/or homelessness prevention services from eligibility for shutoff

1.4 General Assumptions

The following discussion summarizes the general assumptions used to analyze projected revenues and revenue requirements for the Study Period. The assumptions presented below apply only to the development of revenue and revenue requirements related to PWD's base rates ("Base Rates"). The Base Rates exclude the TAP revenue loss and TAP Rate Rider Surcharge Rate ("TAP-R") revenues.

1.4.1 Revenues

- Projected FY 2023 service revenues under existing rates reflect the FY 2022 rates (effective September 1, 2021) and the current FY 2023 rates (effective September 1, 2022). Projected FY 2024 to FY 2028 service revenues reflect the current FY 2023 rates.
- From FY 2020 to FY 2022, the Water Department saw an average annual increase in retail water accounts of 0.86% while experiencing an average annual decrease in overall billed water volume of 0.48%. Customer accounts and usage are projected as follows:
  - The FY 2022 number of accounts and usage per account serve as the initial basis of projections for all customer types.
  - For FY 2023 to FY 2026, account escalation for all customer types is based upon 3-year average annual growth in the number of accounts per type for FY 2020 to FY 2022. Accounts are assumed to remain stable for the remainder of the Study Period from FY 2027 to FY 2028.
  - For FY 2023 to FY 2026, demand escalation factors for all customer types are based upon the 3-year average annual change in consumption per account for FY 2020 to FY 2022.
  - To approximate anticipated ongoing reductions in residential billed water volume, a 0.68% reduction is applied to the 5/8-inch residential customers usage per account during FY 2027 to FY 2028[10]; and
  - No change in demand is applied to the remaining customer types during FY 2027 to FY 2028.
- Vicinity Energy Philadelphia ("Vicinity"), consistently a top 10 customer for PWD, is currently working towards building their own facility to provide process water for their steam plant operations. In FY 2021, Vicinity amounted to $7.5 Million in combined water, sewer, and stormwater revenue (0.99% of the Water Operating Fund's total revenue). When Vicinity reduces its overall water usage, they will still receive some level of water service along with sewer and stormwater services associated with their facilities. Vicinity purchased an average of 1,196,135 hundred cubic feet ("CCF") of water and an average of 1,284,116 CCF of sewer service from PWD during FY 2020 to FY 2022. To address the pending change in consumption from one of PWD's top 10 customers, the projected FY 2024 commercial customer billed volume reflects a reduction of 90,000 Mcf and the projected FY 2024 Sewer Only billed volume is increased by 90,000 Mcf.

Table 1-1 provides the baseline number of accounts and summarizes the associated account growth escalation factors for the Study Period.

Table 1-2 provides the baseline usage per account and summarizes the associated escalation factors for the Study Period.

Table 1-3 summarizes these assumptions and reflect Black & Veatch's review of the historical 3-Year Average change.

[10] The 5/8-inch meter Residential customers have historically exhibited an annual decrease in billed usage per account since 2015. Black & Veatch assumes this trend will continue through the Study Period.

Table 1-1 Account Growth Escalation Factors by Customer Type

CUSTOMER TYPE	FY 2022 ACCOUNTS [1]	FY 2023 TO FY 2026 [2]	FY 2027 TO FY 2028 [3]
Senior Discount			
Senior Discount 5/8"	22,052	(2.04%)	0.0%
Senior Discount >5/8"	11	6.92%	0.0%
Residential			
Residential 5/8"	422,630	0.73%	0.0%
Residential >5/8"	12,542	12.18%	0.0%
Commercial			
Commercial 5/8"	28,028	(0.14%)	0.0%
Commercial > 5/8"	9,729	4.18%	0.0%
Industrial			
Industrial 5/8"	501	(0.85%)	0.0%
Industrial > 5/8"	556	0.36%	0.0%
Public Utilities			
Public Utilities 5/8"	79	2.20%	0.0%
Public Utilities >5/8"	119	6.33%	0.0%
PHA	5,666	(1.21%)	0.0%
Charities & Schools	1,834	(5.35%)	0.0%
Hospitals and Universities	138	(30.21%)	0.0%
Hand Billed	232	(1.26%)	0.0%
Scheduled	6	25.99%	0.0%
Fire Service	6,837	7.28%	0.0%

Notes:

1. Initial number of accounts are based upon FY 2022, as presented in Appendix A.
2. Account Growth Escalation Factor based upon 3-year average change in accounts for FY 2020 to FY 2022, as presented in Appendix A.
3. For projection purposes, PWD's customer base is assumed to be stable during FY 2027 to FY 2028.

Table 1-2 Demand Escalation Factors by Customer Type

CUSTOMER TYPE	USAGE PER ACCOUNT (MCF) [1]	FY 2023 TO FY 2026 [2]	FY 2027 TO FY 2028 [3]
Senior Discount			
Senior Discount 5/8"	5.62	0.48%	0.0%
Senior Discount >5/8"	6.94	6.72%	0.0%
Residential			
Residential 5/8"	6.29	(0.68%)	(0.68%)
Residential >5/8"	31.48	(7.90%)	0.0%
Commercial			
Commercial 5/8"	10.36	(0.60%)	0.0%
Commercial > 5/8"	141.17	(1.25%) (10.25%) – FY 2024 [4]	0.0%
Industrial			
Industrial 5/8"	12.67	(0.88%)	0.0%
Industrial > 5/8"	147.03	(18.27%)	0.0%
Public Utilities			
Public Utilities 5/8"	5.27	(14.34%)	0.0%
Public Utilities >5/8"	79.27	(1.88%)	0.0%
PHA	27.30	0.66%	0.0%
Charities & Schools	74.98	0.95%	0.0%
Hospitals and Universities	755.76	2.32%	0.0%
Hand Billed	2,087.95	5.49%	0.0%
Scheduled	5.30	8.32%	0.0%
Fire Service	0.03	(73.03%)	0.0%

Notes:

1. Baseline Usage per Account uses the 1-year average usage per account for FY 2022, as presented in Appendix A.
2. Demand Escalation Factor based upon 3-year average change in usage per account for FY 2020 to FY 2022, as presented in Appendix A.
3. Demand Escalation Factor applied to reflect the ongoing reduction in overall billed volume based upon the overall long-term reduction in billed water volume.
4. Commercial > 5/8" billed volume is adjusted in FY 2024 to reflect the anticipated decrease in billed volume from Vicinity (see discussion above). A demand escalation factor of (1.25%) is applied in FY 2023, FY 2025, and FY 2026.

Table 1-3 Historical Usage per Account for General Service Customers – Residential (5/8" Meters)

Description	Historical (Fiscal Year) 2018	2019	2020	2021	2022
Annual Billed Volume Per Account (Mcf/Account)	6.54	6.42	6.42	6.40	6.29
Annual Change	(2.82%)	(1.83%)	0.00%	(0.31%)	(1.72%)
3 Year Average Change		(1.90%)	(1.56%)	(0.72%)	(0.68%)

- The wholesale water and wastewater billed volumes, and wastewater loading are estimated based on the three-year average of historical service levels.
  - Revenues for wastewater wholesale customers reflect a planned update to the allocation of Long-Term Control Plan Update ("LTCPU") Consent Order and Agreement ("COA") costs based upon PWD's updated hydraulic and hydrologic ("H&H") modeling. Under the updated calculations, wholesale customers, whose current contracts include an allocation of LTCPU costs, will be apportioned approximately 1.9% of LTCPU costs, based upon each community's respective share. The updated calculation methodology is estimated to result in a reduction of wholesale wastewater revenues under existing rates of approximately $2.9 Million. For projection purposes, this change is assumed to go into effect in FY 2024.
  - Beyond anticipated changes to wholesale wastewater allocations related to the COA, DELCORA is working towards building their own treatment facility and will no longer be a wastewater customer beginning in FY 2028 when their agreement with the City expires. The loss of this wholesale customer will lead to an estimated $9 Million loss in revenue for the City.
- Revenue projections are based upon estimated stormwater billable Impervious Area ("IA") and Gross Area ("GA") square footage developed as follows:
  - Initial IA and GA stormwater billing data for the Study Period is based upon the end of FY 2022 stormwater billing data set.
  - Billing units for FY 2023 to FY 2028 are adjusted to reflect stormwater credits, resulting in reduction in billable IA and GA square footage. This reduction in square footage is primarily due to:
    1. Projected increase in IA, GA, and National Pollutant Discharge Elimination System ("NPDES") Credits based upon the average 5-year growth in the number of parcels receiving credit and the associated average credit per parcel.
    2. IA and GA Credits resulting from Stormwater Management Incentive Program/Greened Acre Retrofit Program (SMIP/GARP) grants:
       a. Based upon the overall annual program budget of $25 Million for FY 2023, $20 Million for FY 2024 – FY 2025, and $25 Million for FY 2026 – FY 2028; and
       b. The average grant award per drainage acre, anticipated cost escalation, and average project completion time.

i. Average Grant Award per Drainage Acre: $350,000

ii. Anticipated Cost Escalation: 4.0%

iii. Average Project Completion Time: 24 Months

- Reductions are also anticipated due to appeals and other adjustments, such as community gardens discounts.
  - Projected decreases due to appeals adjustments are based recent 5-year trends.
  - Projected community garden discounts are based upon the most recent fiscal year (FY 2022) approvals.

  Appendix B presents the historical stormwater credit program information. Further explanation of the Stormwater Units of Service Projections is provided in Schedule BV-4: WP-2 "*Stormwater Units of Service.*"

- Projected revenues under existing rates reflect the anticipated cumulative receipts for the water, sanitary sewer, and stormwater services (including retail and wholesale receipts) each fiscal year. The receipts for each fiscal year are estimated based on the projected system billings and the associated projected collection factors.
  - Projected collection factors for retail Non-Stormwater Only and Stormwater Only Customers are based historical collections data for FY 2012 through FY 202211. The collection factors represent the multi-year payment pattern for the following periods:
    - Billing Year – All payments associated with a given fiscal year's billing and received within the 12 months following the beginning of the fiscal year.
    - Billing Year Plus 1 – All payments associated with a given fiscal year's billing and received within 13-24 months following the beginning of the fiscal year.
    - Billing Year Plus 2 and Beyond – All payments associated with a given fiscal year's billing and received after 24 months following the beginning of the fiscal year.
  - Collection factors used in the financial plan analysis reflect the average collection factors for these periods based upon the historical fiscal years and represent the multi-year payment pattern[12].
    - As presented in Appendix C, the FY 2020 to FY 2022 Billing Year collection factors are an average of 1.20% lower the long-term historical average, while Billing Year Plus 1 collections are 0.76% higher. Recent year collection factors experience reflects current economic conditions, updated collections, and enforcement, among other factors.
    - To reflect changes to collection patterns, Black & Veatch utilizes the following adjustments to the projected collection factors:

[11] As provided by Raftelis. See Appendix C. Refer to Raftelis Report 4 (from PWD Statement 6: Schedule RFC-7)for additional background data regarding historic billing and collections.

[12] The application of collection factors to projected billings results in estimated receipts used to develop projections of anticipated fiscal year revenues.

- **Billing Year - Non-Stormwater Only Collection Factors** – Reduce by 1.2% to align with FY 2020 to FY 2022 average experience.
- **Billing Year Plus 1 - Non-Stormwater Only Collection Factors** - Increase by 0.76% to align with FY 2020 to FY 2022 average experience.

Table 1-4 presents the collection factors utilized in the financial plan analysis for FY 2023 and beyond.

Table 1-4 Projected Collection Factors

	Billing Year	Billing Year Plus 1	Billing Year Plus 2 and Beyond
Non-Stormwater Only	84.65%	10.29%	2.04%
Stormwater Only	64.20%	8.99%	7.23%

- Operating Fund and Rate Stabilization Fund interest earnings are estimated based on projected fund balances and 1.0% annual interest earnings rate.
- Miscellaneous and contra revenues are projected based on historical and budgeted levels as summarized in Table 1-5.

Table 1-5 Projected Miscellaneous and Contra Revenues

Description	Fiscal Years	Projection
Penalties [1]	2023 – 2028	$9.6 Million / Year to $9.7 Million / Year
Other Miscellaneous Revenue [2]	2023 – 2028	$11.6 Million / Year
State and Federal Grants [2]	2023 – 2028	$0.57 Million / Year
License and Inspection Permits [2]	2023 – 2028	$7.6 Million / Year
UESF Grants [3]	2023 – 2028	$0.3 Million / Year
Stormwater Customer Assistance Program (CAP) [4]	2023 – 2028	($1.0) Million / Year

Notes:
1. Reflects 1.30% of billings under existing rates based upon the average of actual penalties as a percentage of billings for FY 2020 and FY 2022.
2. FY 2023 to FY 2028 reflects the 2-year average for FY 2021 and FY 2022. Other Miscellaneous Revenue includes Miscellaneous City Revenues, Other Revenue, and Miscellaneous Revenue (Employee Benefit + Procurement).
3. Reflects FY 2023 Budget amount.
4. Stormwater CAP revenue loss is anticipated to remain constant due to the recent transition to updated stormwater billing data for non-residential customers.

- Additional service revenues reflect projected revenue increases associated with projected rate increases in FY 2024 to 2028 as necessary to meet senior debt service coverage targets and maintain the rate stabilization fund balance (see Section 1.4.5 Bond Covenants, Transfers, and Fund Balances).

1.4.3 Operating Expenses

For FY 2023, projected operating expenses are based:

- The Water Department's approved FY 2023 budget (as of December 2023) and the Mid-Year transfer request; and
- Reflect the application of the actual-to-budget factors to estimate anticipated expenses.
- Actual-to-Budget factors by cost classification for each Water Department Division and City Department (whose budget costs are funded by the Water Fund) are based upon the three-year historical average of the actual-to-budget ratio from FY 2020 to FY 2022 (see Appendix D), with the following exceptions noted in Table 1-6:

Table 1-6 Actual-to-Budget Factor Exceptions

Department	Class(es)	Description	Actual to Budget Factor
Finance	200	Services	100%[1]
Finance	2XX	SMIP/GARP	100%[1]
Finance	800	Transfers	79.12%[2]
Operations	307	Chemicals	100%[1]
City Finance	100	Pension, Pension Obligations, and Benefits	100%[3]
City Finance	500	Indemnities	68.42%[2]

Notes:
1. Historical actual to budget factors show greater than 100% spending compared to the historical budgets, 100% actual to budget factor applied for FY 2023.
2. Adjusted spend factor to account for the changes in the budget levels during FY 2020 to FY 2022. The applied actual to budget is based upon the average spend over the past 3 years for FY 2020 to FY 2022 compared to the FY 2023 budget.
3. Reflects actual to budget factor adjustment to reflect estimated FY 2023 expense provided by City Finance.

- For FY 2024 through FY 2028, projected operating expenses are based on escalation of the FY 2023 projected operating expenses and inclusion of additional adjustments for planned increases in operating expenses.
  - Operating Expenses for FY 2024 through FY 2028 are projected by applying the annual escalation factors to the projected FY 2023 operating expenses by category as presented in Table 1-7.

Table 1-7 Annual Escalation Factors

Class	Description	Annual Escalation Factor				
		FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
100	Labor Costs	3.25%	3.00%	3.00%	3.00%	3.00%
191	Pension	0.20%	0.16%	0.66%	0.34%	0.34%
190	Pension Obligations	12.97%	0.00%	0.00%	0.78%	0.00%
1xx	Benefits	3.96%	4.51%	4.51%	4.33%	4.33%
220	Power	0.00%	0.00%	1.50%	1.50%	1.50%
221	Gas	0.00%	0.00%	1.50%	1.50%	1.50%
200	Services	7.77%	6.70%	4.69%	4.69%	4.69%
200	Public Property - Leases	2.79%	2.54%	1.72%	1.72%	1.72%
307	Chemical Costs	0.00%	23.82%	11.43%	11.43%	11.43%
300	Materials and Supplies	7.77%	6.70%	4.69%	4.69%	4.69%
400	Equipment	10.12%	9.41%	6.63%	6.63%	6.63%
500	Indemnities	0.00%	0.00%	0.00%	0.00%	0.00%
800	Transfers	7.77%	6.70%	4.69%	4.69%	4.69%

- The above escalation factors are based on the following:
  - **Labor Cost:** FY 2024 is based upon the recent labor agreement with District Council 33 ("DC33"). FY 2025 and thereafter is based upon the average annual increases for FY 2022 to FY 2024 as included in the DC33 labor agreement.
  - **Pension and Benefits:** The pension and benefits cost escalation factors incorporate the City's current projected cost increases.
  - **Power and Gas Cost**: FY 2024 costs are not escalated as a planned budget increase is needed to cover additional expenses (See Section 1.4.3 for further information). FY 2026 to FY 2028 escalation factors are based upon discussions with the Water Department.
  - **Services:** FY 2024 is based upon the most recent 12-month period CPI for the Philadelphia Area. FY 2025 is based upon the 24-month annual CPI for the Philadelphia Area. FY 2026 to FY 2028 is based upon the 36-month annual CPI for the Philadelphia Area.
  - **Chemicals:** FY 2024 costs are not escalated as a planned budget adjustment is needed to cover additional expenses per recent contract bids and correspondence with suppliers (See Section 2(e) for further information). FY 2025 is based upon the 24-month period Producer Price Index ("PPI") for Industrial Chemicals. FY 2025 to FY 2028 is based upon the 36-month annual PPI for PPI for Industrial Chemicals.
  - **Public Property – Leases:** FY 2024 is based upon PWD's 1-year annual experience in FY 2022. FY 2025 is based upon the 2-year average annual increase per PWD's recent experience. FY 2026 and thereafter uses the 3-year average annual increase per PWD's recent experience.

- **Materials and Supplies:** FY 2024 is based upon the most recent 12-month period CPI for the Philadelphia Area. FY 2025 is based upon the 24-month annual period for CPI for the Philadelphia Area. FY 2026 to FY 2028 is based upon the 36-month annual CPI for the Philadelphia Area.
- **Equipment:** FY 2024 is based upon the most recent 12-month period PPI for Construction Equipment and Machinery. FY 2025 is based upon the 24-month annual PPI for Construction Equipment and Machinery. FY 2026 to FY 2028 is based upon the 36-month annual PPI for Construction Equipment and Machinery.
- **Indemnities:** No escalation factor is applied for FY 2024 through FY 2028.
- **Transfers:** FY 2024 is based upon the most recent 12-month period CPI for the Philadelphia Area. FY 2025 is based upon the 24-month annual period for CPI for the Philadelphia Area. FY 2026 to FY 2028 is based upon the 36-month annual CPI for the Philadelphia Area.

Appendix E presents the Water Department's long-term historical O&M costs.

Appendix F provides the relevant O&M cost industry indices discussed above.

1.4.4 Other Adjustments and Expenditures

Projected Operating Expenses also include adjustments as presented in Table 1-8. These adjustments reflect the application of the actual-to-budget and escalation factors associated with each expense based on the department division and class of costs.

Table 1-8 Additional Adjustments for Projected Operating Expenses

Class	Description	Fiscal Year(s)	Adjustment Amount	Purpose
100	Salaries & Wages	2024 to 2028	$1.2 Million to $6.5 Million	Shift in staffing from Capital to Operating Budget. [1]
100	Salaries & Wages	2024 to 2028	$1.7 Million to $10.1 Million	Planned FY 2024 additions of 70 new staff positions in Construction & Engineering, Planning & Environmental Services, Operations, Public Affairs, and Human Resources. Planned FY 2025 additions of 22 new staff positions in Operations.
100	Salaries & Wages	2026 to 2028	$0.1 Million to $2.4 Million	Continued addition of Regulatory Compliance staff costs related to GSI.
200	Services	2024 to 2028	$8.9 Million to $9.7 Million	Increased contract services and maintenance costs.
220 & 221	Power & Gas	2024 to 2028	$3.2 Million to $3.4 Million	Increased electricity and gas costs.
2xx	SMIP/GARP	2024 to 2025	($5.0 Million)	Temporary reduction in SMIP/GARP budget for the Rate Period of FY 2024 to FY 2025.
307	Chemicals	2024 to 2028	$15.8 Million to $27.0 Million	Increased chemical contract costs.

Class	Description	Fiscal Year(s)	Adjustment Amount	Purpose
400	Equipment	2024 to 2028	$1.1 Million to $1.5 Million	Increased equipment expenses.
1xx, 190, & 191	Benefits, Pension & Pension Obligations	2024 to 2028	$1.5 Million to $10.8 Million	Additional pension and benefits costs associated with additional staff noted above. Costs are estimated based upon the City's estimated fringe costs as a percentage of salaries (as provided).

Notes:
1. Per City Policy, Capital related staff salaries may no longer be paid using capital funds (including debt financing). PWD is transitioning capital funded positions to operations over the next 10 years.

- Liquidated encumbrances for FY 2023 thru FY 2028 are estimated as 16.11% of projected Services (Class 200) and Materials and Supplies (Class 300) expenses excluding SMIP/GARP. The projection is based on the average of the actual ratio of liquidated encumbrances to expenses for Services (Class 200) and Materials and Supplies (Class 300) experienced in FY 2020 to FY 2022. SMIP/GARP is excluded from this ratio as the budget has been fully expended.

1.4.5 Debt Service

- Existing debt service reflects the actual debt service schedules for the following issuances:
  - All Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2022; and
  - Water and Wastewater Revenue Bonds Series 2022C (issued during FY 2023 in August 2022).
- Projected debt service reflects anticipated bond issues for each fiscal year of the Study Period and assumed interest rates of 5.5% in FY 2024 and FY 2025 and 6.0% thereafter; all issuances are assumed to have a 30-year tenure. Anticipated revenue bond issues are shown in Table 1-9.

Table 1-9 Anticipated Revenue Bond Issues

Fiscal Year	Anticipated Bond Issue	Interest Rate
2024	$460 Million	5.5%
2025	$485 Million	5.5%
2026	$555 Million	6.0%
2027	$480 Million	6.0%
2028	$700 Million	6.0%

- Projected debt service for the anticipated revenue bond issues in FY 2024 to 2028 reflect:
  - Bond issuance in August of each fiscal year;
  - Level debt service payments with interest-only payments during the first year of the bond amortization;
  - Bond issuance cost of 0.61% in FY 2024 and FY 2025, and 1.00% each year thereafter; and

- No debt service reserve requirement[13].

- Projected debt service also includes estimated debt service projections associated anticipated WIFIA loans, and associated matching fund requirements, as provided by the Water Department's Financial Advisors[14].
  - As of the writing of this report, the Water Department is currently negotiating with the USEPA to secure a WIFIA loan to further support the implementation of the Water Revitalization Plan ("WRP").
- Projected debt service also includes using the Water Department's CP Program[15] as authorized by City Council on November 19, 2020, and corresponding PENNVEST loans.
  - Beginning in FY 2022, the Water Department began to utilize the CP Program to aid in paying PENNVEST-funded projects. CP Program funding is utilized to pay contractor invoices while PENNVEST reimbursement is sought.
  - Use of the CP in conjunction with PENNVEST Project, and the resulting debt service schedules, including both CP interest and PENNVEST debt service reflect projections provided by the Water Department.
  - As PENNVEST loans require a 1:1 pledge of revenues, the CP program is limited to use for designated projects. Therefore, it is unavailable to support other capital improvements until such time that the CP funding has been repaid.

1.4.6 Bond Covenants, Transfers, and Fund Balances

- The General Bond Ordinance rate covenant requires the following:
  - Minimum senior debt service coverage of 1.20.
  - Per the General Bond Ordinance, interest due on the CP program is considered on par with senior debt and included in senior debt service coverage determination.
  - WIFA loans, if awarded, will also be parity debt.
  - Net Revenues, excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year, must equal to at least 90% of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) payable in such fiscal year (this is referred to herein as the "90% Test").
  - Minimum total debt coverage of 1.00.

[13] With the issuance of the 2022C Revenue Bonds, a series of certain amendments, referred to as "Springing Amendments," as contained in the Twenty-First Supplemental amendment to the General Ordinance became effective. As detailed in the Water and Wastewater Revenue Bonds, Series 2022C Official Statement dated August 9, 2022, one of the Springing Amendments allows the Water Department to issue revenue bonds without making deposits to the Debt Reserve Account and without having to establish series specific debt reserve subaccount. As such, no deposits to the Debt Reserve Account are assumed following the issuance of the 2022C Revenue Bonds.

[14] PFM Financial Advisors, LLC provided the debt service projections for the future WIFIA funding, and WIFIA Match Funding.

[15] The Commercial Paper Program provides the Water Department the ability to temporarily fund obligations on a revolving basis, in an aggregate principal amount no greater than $400 million at any time. All Commercial Paper Program capacity is associated with a specific PENNVEST loan, and no additional CP issue is assumed at this time.

- In accordance with the 2018 Rate Determination, the Water Department has adopted target senior debt service coverage ratio of 1.30.
  - However, during FY 2023 the Water Department is projected to maintain minimum senior debt service coverage.
  - During FY 2024 and FY 2025, the Water Department is proposing senior debt service coverage of 1.25 and 1.30 for the remainder of the Study Period.
  - This reflects the Water Department's intent to increase coverage, generating more cash funding for capital while helping to mitigate revenue adjustments in the short term.
- Projected FY 2023 to FY 2028 Capital Account Deposits are based on the following assumptions:
  - Inflated net plant investment of 3.9% per year based on the average annual increase in net plant investment during FY 2019 and FY 2022; and
  - Annual Capital Account Deposit is based on 1.0% of the prior year projected net plant investment (original cost less depreciation).
- In accordance with the 2018 Rate Determination, the Water Department has a Rate Stabilization Fund balance target of approximately $135 Million.
  - In FY 2027 to FY 2028 the RSF balance target is projected to grow in alignment with the annual increase in operating expenses.
- Residual Fund to Construction Fund transfers are made as available.
  - The end-of-year Residual Fund balance is maintained at $15.0 Million for the Study Period.
- The FY 2023 beginning fund balances are based on the preliminary FY 2022 financial results.

1.4.7 Capital Improvement Program

- The projected capital program is based on the Water Department's adopted FY 2023 CIP Budget and proposed FY 2024 through FY 2028 CIP budget.
- The Water Department's CIP budget is an appropriation-based budget and reflects the following:
  - The budget for each respective fiscal year represents the total cost of the capital improvements expected to be let in that fiscal year;
  - The total CIP Budget does not represent expected project duration or anticipated cashflows;
  - The Water Department's CIP budget includes projects associated with the WRP;
  - The CIP Budget includes contingencies; and
  - The CIP Budget does not include inflation.
- Based upon the City's funding policy for capital projects, the Water Department will only contract fully funded CIP projects and must provide sufficient CIP funding so that estimated outstanding encumbrances (or project commitments) will not exceed available funding in any given fiscal year. Overall CIP funding sources, including revenue from current year rates, system revenue bond proceeds, WIFIA Loans, WIFIA matching funding (cash, PENNVEST or System Revenue Bonds),

PENNVEST loans and accumulated interest, are compared against overall project commitments less estimated capital spending.

- To evaluate CIP program funding, Black & Veatch estimated the expected encumbrances for each fiscal year of the Study Period, based upon the Water Department's CIP Budget and adjusted to reflect the following:
  - The anticipated rollforward of annual budget appropriations;
  - The shift in positions from the Capital Fund to Operating (as previously noted in Section 1.4.3);
  - 2022 Annual inflation of 4.0% based on industry construction cost indices for FY 2025 to FY 2028 capital program costs (relevant capital cost industry indices are provided in Appendix G); and
  - Removal of contingencies by applying an adjustment factor of 85% to planned improvements for FY 2023 to FY 2028, excluding Engineering and Administration, Vehicles, WRP (including WIFIA projects) as well as PENNVEST related projects.
- To assess the overall drawdown of available CIP Funding, Black & Veatch estimated the Water Department's CIP Funds' drawdown based upon a projection of overall spending over the Study Period. Black & Veatch's estimates reflect the following:
  - Anticipated project durations of WRP (including planned WIFIA funded projects) and PENNVEST Projects as provided by the Water Department.
  - Anticipated program-level project durations for the remaining improvement projects, as follows:
    - Water Conveyance – 2 years.
    - Sewer Collection – 3 years; and
    - Facilities Improvements – 5 years.

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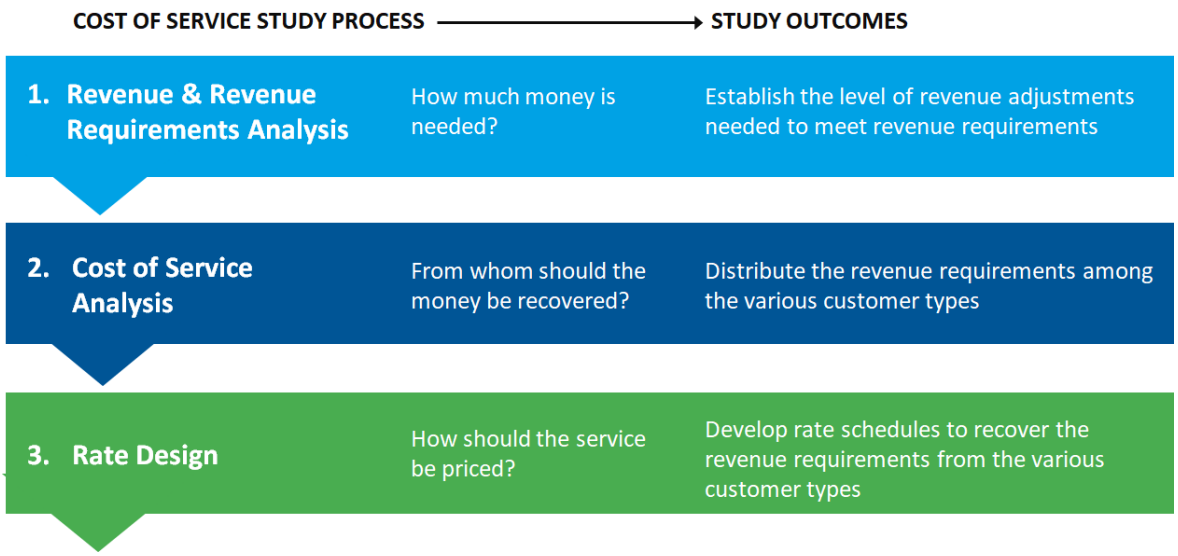
2.0 Combined System Summary

The Water Department is a self-supporting enterprise fund dedicated to providing high-quality water and wastewater services (which includes stormwater services) to the City's residents and businesses. Water operations provide potable water for its residential, commercial, and industrial water demands. Wastewater operations provide sanitary sewer treatment and collection services to its residential, commercial, and industrial customers. The Water Department performs many of the City's stormwater activities, including maintenance of the City's 757 miles of separate storm sewers, 1,852 miles of combined sewers, and 71,825 stormwater inlets. Service to customers located outside the City is on a wholesale basis through contracts with various entities. The respective contracts for service to each wholesale customer set forth the present bases for charges.

2.1 Cost of Service Study

To provide these services and fulfill all its regulatory obligations, the Water Department fully funds its operations through its rates and charges imposed on its retail and wholesale customer base. Thus, the Water Department not only performs a multi-year financial plan that supports revenue sufficiency, but it also conducts retail and wholesale COS studies and goes through a rate case process which concludes with the determination by the Rate Board. A COS study serves as the foundation for establishing rates and charges. Figure 2-1 illustrates the three parts of such a study. This section presents the results for the Combined System. Specifically, it summarizes the proposed financial plan for the Combined System during the Study Period and presents the FY 2024 and FY 2025 proposed schedule of rates for water, sanitary sewer, and stormwater services.

Figure 2-1 Elements of a COS Study



To assist the reader with understanding potential impacts customer impacts associated with the proposed rates, typical monthly bills for select customer types are included using a range of volumes at the recommended FY 2024 and FY 2025 rates. Details regarding the COS study for the Water System and Wastewater System are presented in subsequent sections of this Report. PWD Exhibit 6 includes the full model workpapers for FY 2024 in support of the Rate Filing.

2.2 Revenue

Using the assumptions discussed in Section 1.4 and the details derived for the Water System and the Wastewater System presented later in this Report, Table 2-1 presents the Projected Revenues (receipts) for the Combined System. These revenues reflect the application of the billing collection factors presented in Table 1-4 to gross billings, which are the result of applying the existing rate schedules to projections of customer accounts, consumption, billed volume, and impervious and gross areas. Specifics regarding the projection of gross billings is described later in this Report.

Table 2-1 Projected Receipts Under Existing Rates [Schedule BV-1: Table C-3]

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
1	Water Sales Receipts	294,038	296,093	298,680	301,466	301,071	300,328
	Wastewater Sales Receipts						
2	Sanitary Sewer	283,305	284,667	287,015	289,265	289,037	279,644
3	Stormwater	188,987	191,970	191,982	191,564	191,109	190,615
4	Subtotal Wastewater Service Receipts	**472,292**	**476,637**	**478,997**	**480,829**	**480,147**	**470,259**
5	**Total Water & Wastewater Receipts**	**766,330**	**772,731**	**777,677**	**782,295**	**781,218**	**770,587**
	Other Income						
6	Penalties	9,588	9,651	9,700	9,758	9,733	9,707
7	Miscellaneous City Revenue	2,160	2,160	2,160	2,160	2,160	2,160
8	Other	9,059	9,059	9,059	9,059	9,059	9,059
9	State & Federal Grants	567	567	567	567	567	567
10	Permits Issued by L&I	7,592	7,592	7,592	7,592	7,592	7,592
11	Miscellaneous (Procurement)	335	335	335	335	335	335
12	City & UESF Grants	300	300	300	300	300	300
13	Affordability Program Discount Cost (a)	-	-	-	-	-	-
14	Release from Debt Reserve Account (b)	-	-	-	-	-	-
15	**Other Operating Revenues**	**29,601**	**29,664**	**29,713**	**29,771**	**29,746**	**29,720**
	Interest Income						
16	Interest Income on Debt Reserve Account (c)	-	-	-	-	-	-
17	Operating Fund	1,882	1,982	2,023	2,192	2,271	2,331
18	Rate Stabilization Fund	1,365	1,339	1,336	1,360	1,423	1,497
19	**Total Nonoperating Income**	**3,247**	**3,321**	**3,359**	**3,552**	**3,694**	**3,828**
20	**Total Receipts**	**799,178**	**805,716**	**810,749**	**815,618**	**814,658**	**804,135**

(a) Affordability Program Discounts represent anticipated lost revenue due to the Tiered Assistance Program (TAP). Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(b) Projected Release from Debt Reserve Account based on outstanding and proposed debt service payments.

(c) Excludes deposit into Residual Fund for Transfer to City General Fund.

In addition to rates and charges, the Water Department also has wholesale service contracts for water and wastewater service, provides private fire protection to certain customers who maintain private fire systems, and assesses surcharges for customers with high strength wastewater.

2.2.1 Other Operating Income

The Water Department has several sources of other revenues including miscellaneous fees, City and Utility Emergency Services Fund ("UESF") grants, License and Inspection ("L&I") permits, penalties, and releases from the Debt Service Reserve Fund, if available. These revenues are shown on Lines 6 through 15 of Table 2-1.

2.2.2 Non-Operating Income

The Water Department's non-operating income consists primarily of interest earnings on the amounts within certain funds and accounts. In accordance with the authorizing revenue bond ordinance, the analysis credits interest earnings in the Debt Reserve Fund, Revenue Fund, and the Rate Stabilization Fund as revenue to the Revenue Fund. Interest Earnings in the Debt Reserve Fund are first credited to the extent that they are needed to fulfill the Debt Service Reserve Requirement. Once the Debt Service Reserve Requirement is met, any remaining monies, up to a maximum of $4,994,000 is permitted to be transferred to the City's General Fund.

Actual annual fund valuations and interest earnings are based on a mark-to-market valuation which the City performs at the end of the fiscal year. The differential between mark-to-market and the Debt Reserve Fund requirement results in:

- Either a transfer from the Operating Fund of the Water Department to the Debt Reserve Fund, if there is a deficiency in the Debt Reserve Fund, or
- A transfer from the Debt Reserve Fund to the Operating Fund of the Water Department if there is an excess in the Debt Reserve Fund.

Projected transfers from the Debt Reserve Fund to the Operating Fund are included as Other Operating Revenue.

2.2.3 Tiered Assistance Program Rate Rider Surcharge

Revenue figures for the Study Period exclude current (effective as of September 1, 2022) TAP-R surcharge rates of $1.03 per Mcf for water and $1.63/Mcf for sanitary sewer. The Water Department established TAP in 2017 to assist low-income households at or below 150% of the Federal Poverty Level ("FPL") and those experiencing special hardship. As part of the 2018 Rate Determination, the Rate Board approved the implementation of a TAP Rate Rider. This rider provides a mechanism to (i) timely reconcile actual TAP costs with estimated TAP-R revenues and (ii) update projected TAP costs for the next rate period. The TAP-R currently recovers the cost of providing discounts to TAP customers from Non-TAP customers and is subject to an annual reconciliation.

Reconciliation of TAP discounts and TAP-R billings is handled via a separate annual adjustment proceeding before the Rate Board. Consequently, the revenues developed in this COS study are referred to as the "Base Rate Revenues" because they do not include the impact of providing discounts to TAP customers and associated TAP-R surcharge revenues.

2.3 Revenue Requirements

Projections for the Water Department's revenue requirements for the Combined System make use of the assumptions discussed in Section 1.4.

2.3.1 Operation and Maintenance Expenses

The O&M expenses incurred by the Water Department are necessary for the effective operation of the Combined System. Not performing timely O&M activities may result in System inefficiencies, affects the level of service provided to customers, and puts the Water Department at risk of not meeting regulatory requirements. Table 2-2 summarizes the general O&M expense categories used by the Water Department for budgeting and reporting purposes.

Table 2-2 O&M Expense Categories

Class	Category	Description
100	Personal Services	Expenses related to salaries, fringe benefits, pension costs, overtime, and other employee-related costs
200	Purchase of Services	Expenses related to contracts or services from outside entities, including electricity and natural gas service
300	Materials and Supplies	Miscellaneous materials and supplies, including water treatment chemicals
400	Equipment	Costs of heavy equipment, trucks, vehicles, boats, trailers, and other related items.
500	Contributions, Indemnities, and Taxes	Includes payments made by the Law Department on behalf of the Water Department for liabilities, claims and property damages. This category also includes taxes and other contributions.
800	Payments to Other Funds	O&M payment to the General Fund associated with the direct interdepartmental services provided to the Water Department by other City Departments

Estimated future O&M expenses include the additional adjustments to items identified on Table 1-8.

Table 2-3 shows the operating expenses for the Combined System incorporating the adjustments to the budgeted O&M, application of the actual-to-budget spend factors, inclusion of additional operating expenses, and adjustments for escalation as discussed in Sections 1.4.2 and 1.4.3.

To help manage required revenue adjustments from FY 2024 to FY 2025, the Water Department has temporarily reduced the Stormwater Management Incentive Program/Greened Acre Retrofit Program ("SMIP/GARP") budget from $25 Million to $20 Million. The budget is anticipated to be restored in FY 2026. Given the importance of this program in supporting long-term compliance under the COA, Black & Veatch understands that the Water Department will shift available funds from other activities when available.

Table 2-3 Projected Operation and Maintenance Expense [Schedule BV-1: Table C-6]

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
1	Personal Services	172,675	181,131	193,552	202,480	210,588	219,669
2	Pension and Benefits	143,762	149,631	158,182	163,929	168,640	174,021
3	**Subtotal**	**316,437**	**330,761**	**351,735**	**366,409**	**379,229**	**393,690**
	Purchase of Services						
4	Power	17,993	19,927	19,927	20,225	20,529	20,837
5	Gas	6,934	8,250	8,250	8,374	8,500	8,627
6	SMIP/GARP	25,000	20,000	20,000	25,000	25,000	25,000
7	Other	154,813	175,489	186,030	194,610	203,591	212,990
8	**Subtotal**	**204,740**	**223,665**	**234,207**	**248,210**	**257,619**	**267,454**
	Materials and Supplies						
9	Chemicals	36,926	52,679	65,227	72,682	80,990	90,247
10	Other	25,108	27,058	28,871	30,225	31,643	33,127
11	**Subtotal**	**62,033**	**79,737**	**94,098**	**102,908**	**112,633**	**123,374**
12	Equipment	4,292	5,842	6,392	6,816	7,268	7,749
13	Indemnities and Transfers	10,854	11,340	11,791	12,128	12,481	12,851
14	**Subtotal Expenses**	**598,357**	**651,346**	**698,222**	**736,470**	**769,230**	**805,118**
15	Liquidated Encumbrances	(33,686)	(40,020)	(43,686)	(46,298)	(49,112)	(52,145)
16	**Total Expenses**	**564,671**	**611,326**	**654,537**	**690,172**	**720,118**	**752,972**

2.3.2 Bond Covenants, Transfers, and Fund Balances

The Water Department primarily uses debt financing to pay for necessary capital improvement projects. The Water Department's flow of funds is dictated by the requirements of the General Bond Ordinance. The Water System and the Wastewater System are treated as one combined utility for the purpose of revenue bond financing, pursuant to the General Bond Ordinance.

The General Bond Ordinance establishes the funds and accounts shown in Table 2-4, which are collectively known as the "Water and Wastewater Funds" or the "Water Fund."[16]

Table 2-4 Water and Wastewater Funds

Funds and Accounts	
Revenue Fund	Rate Stabilization Fund
Sinking Fund • Debt Service Account • Debt Reserve Account • Charges Account	Construction Fund • Existing Project Account • Bond Proceeds Account • Capital Account
Subordinated Bond Fund	Residual Fund ▪ Special Water Infrastructure Account

[16] The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City. The Water Fund is an accounting convention established for the purposes of accounting for the assets, liabilities, revenues, expenses of and to measure Rate Covenant compliance for, the Water and Wastewater Systems.

Revenues collected by the Water Department cascade through the Revenue Fund in the priority order shown in Figure 2-2.

Figure 2-2 General Flow of Funds

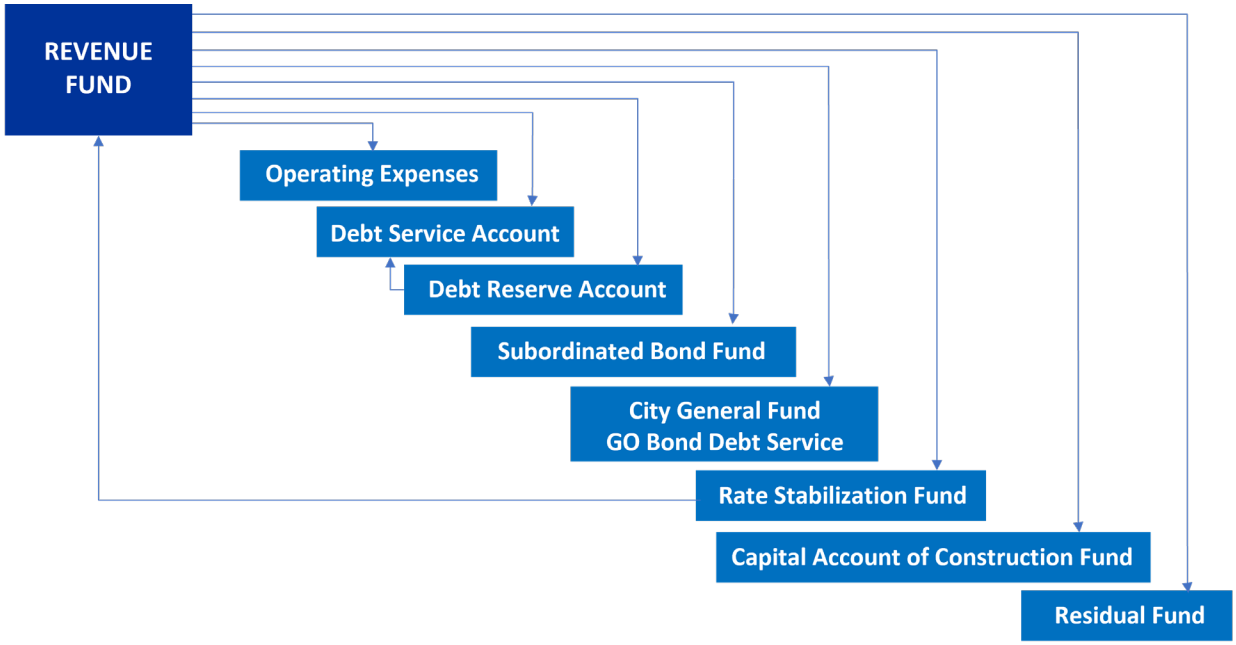


Table 2-5 summarizes the performance targets of the General Bond Ordinance and the 2018 Rate Determination described in Section 1.4.

Table 2-5 Combined System Performance Targets

Description	Performance Target
GENERAL BOND ORDINANCE PERFORMANCE TARGETS	
Debt Coverage	Minimum Senior Debt Coverage: 1.20 Senior Debt Coverage from Current Revenues: 0.90x Minimum Total Debt Coverage: 1.00x
Capital Account Deposit	1.0% of prior year net plant investment
2018 RATE DETERMINATION PERFORMANCE TARGETS	
Debt Coverage	Senior Debt Service Coverage 1.30x
Cash Funded Capital	20% of Annual Capital Expenditures
Rate Stabilization Fund Balance	Target of $135 Million
Residual Fund Balance	Annual target of $15 Million

2.3.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Combined System required to meet regulatory requirements and maintain existing levels of service. The CIP includes water treatment and wastewater treatment facility improvements, distribution system rehabilitation, large meter replacement including the implementation of Advanced Metering Infrastructure ("AMI"), new billing system, storm flood relief, reconstruction of the sewer collection system, and green stormwater infrastructure.

As discussed in Section 1.4.6, the Water Department's CIP is an appropriations-based projection that is not inflation-adjusted and contains contingencies (for projects other than WRP related, including those proposed as part of an application currently being considered by WIFIA as well as those which are funded by PENNVEST). An appropriation-based budget means that the Water Department budgets the full amount of a proposed project in the year in which it is expected to be contracted. This type of budgeting does not reflect the actual cash expenditures as the project is executed nor does it reflect the City's capital funding policy, as previously noted. As such, the overall annual CIP encumbrances must be estimated along with project expenses and evaluated against available monies in the Construction Fund, which is discussed in Section 2.4.

The overall resulting CIP Encumbrances adjusted for inflation, carryforward, and removal of contingencies as well as the resulting project expenses, which account for program level project durations, are reflected in Table 2-6.

Table 2-6 Projected Capital Program Budget and Annual Expenditures [Schedule BV-1: Table C-7]

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
1	Engineering and Administration (a)	14,321	12,806	11,587	10,367	9,148	7,929
2	Plant Improvements	255,000	393,000	295,000	262,000	315,000	450,000
3	Distribution System Rehabilitation	123,060	157,100	240,100	135,100	128,100	120,100
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Billing System	-	-	-	30,000	30,000	30,000
6	Storm Flood Relief	15,000	15,000	15,000	15,000	15,000	15,000
7	Reconstruction of Sewers	72,860	80,000	86,000	91,000	96,000	102,000
8	Green Infrastructure	83,000	90,000	90,000	170,000	170,000	170,000
9	Vehicles	12,000	12,000	12,000	12,000	12,000	12,000
10	**Total Improvements**	**580,241**	**764,906**	**754,687**	**730,467**	**780,248**	**912,029**
11	Inflation Adjustment (b)	-	-	30,188	59,239	97,425	154,916
12	**Inflated Total**	**580,241**	**764,906**	**784,874**	**789,707**	**877,673**	**1,066,945**
13	Rollforward Adjustments	(100,885)	82,940	56,614	36,983	(17,674)	(37,949)
14	**Total Inflated Adjusted CIP Budget**	**479,356**	**847,846**	**841,488**	**826,690**	**859,999**	**1,028,995**
15	Contingency Adjustment	(49,261)	(72,342)	(72,589)	(101,842)	(76,131)	(78,151)
16	**Annual Encumbrances**	**430,095**	**775,504**	**768,900**	**724,848**	**783,868**	**950,844**
17	Project Expenses (c)	337,627	513,964	606,056	757,393	791,263	865,518
18	Annual Net Encumbrances	92,469	261,541	162,844	(32,545)	(7,396)	85,326

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 4.0 percent per year after fiscal year 2024.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

2.3.4 Debt Service

Table 2-7 summarizes the existing and proposed debt service payments during the Study Period and reflects the assumptions outlined in Section 1.4.4. For the analyses conducted herein, Black & Veatch worked with the Water Department, and the City's financial advisors ("Financial Advisors") to estimate anticipated bond issue sizes, interest rates for a 30-year term, and issuance costs.

The Water Department has a goal of continuing to pursue the lowest-cost financing options for the CIP. As part of this effort, the Water Department includes PENNVEST loans as a funding source. PENNVEST provides low-interest loans and grants for new construction or improvements to publicly or privately-owned drinking water, stormwater, or sewerage treatment facilities. PENNVEST loans are considered parity debt. To cover contractor costs between the time of the invoice(s) and the PENNVEST reimbursement, the Water Department leverages its CP program along with available cash funding to pay these invoices in the interim. Debt Service also includes interest on the Water Department's CP program, which is considered part of senior debt in accordance with the General Bond Ordinance.

In addition to pursuing PENNVEST loans, the Water Department is currently negotiating with the USEPA to secure a WIFIA loan to further support the implementation of the WRP. WIFIA loans, if awarded, will be parity debt. The Water Department has proposed a master agreement that will support projects over the next several fiscal years. If approved, the WIFIA loan will provide low-interest financing for approximately 49% of select WRP-related construction costs. The Water Department expects to close the first tranche of financing in early calendar year 2023. Debt service projections associated with the pending WIFIA loans, including the matching funding requirements, were provided by the Financial Advisors.

Existing debt service requirements include all Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2022, the Water and Wastewater Revenue Bond Series 2022C (issued during FY 2023 in August 2022), PENNVEST and CP.

As of the date of this Report, the Water Department has no subordinate debt.

Table 2-7 Summary of Existing and Proposed Debt Service [Schedule BV-1: Table C-9]

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
Revenue Bonds							
1	Existing (a)	187,747	185,847	183,090	183,088	183,091	166,318
	Proposed						
2	Fiscal Year 2023 (b)	-	-	-	-	-	-
3	Fiscal Year 2024 (c)		21,083	31,650	31,650	31,650	31,650
4	Fiscal Year 2025 (c)			22,229	33,371	33,371	33,371
5	Fiscal Year 2026 (d)				27,750	40,320	40,320
6	Fiscal Year 2027 (d)					24,000	34,871
7	Fiscal Year 2028 (d)						35,000
8	**Total Proposed**	**-**	**21,083**	**53,880**	**92,771**	**129,341**	**175,213**
9	**Total Revenue Bonds**	**187,747**	**206,930**	**236,970**	**275,860**	**312,432**	**341,531**
PENNVEST Loans							
10	PENNVEST Loans (e)	10,935	12,031	16,329	23,721	29,283	32,313
Commercial Paper							
11	Commercial Paper	900	900	900	900	900	900
WIFIA							
12	WIFIA	-	17	956	4,812	8,532	16,153
13	**Total Senior Debt Service**	**199,582**	**219,878**	**255,154**	**305,292**	**351,146**	**390,897**

(a) Projected debt service amounts include debt service for all Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2022 and the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022).

(b) Projected debt service for the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022) included with Existing Bonds.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.50% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 6.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(e) Includes projected PENNVEST Loans.

2.4 Sources and Uses of Funds

Table 2-8 summarizes the sources and uses of funds for financing of the Combined System CIP. Line 1 of the table shows the projected total revenue bond principal amounts projected to be issued FY 2023 through FY 2028 to finance the proposed capital improvements of the Combined Water and Wastewater Systems.

As shown in Lines 2 through 4, in addition to funding capital construction costs, the bond issuance proceeds in FY 2023 are also used to fund deposits into the Debt Reserve Account as required and pay the costs of bond issuance. With the issuance of the 2022C Revenue Bonds, a series of certain amendments, referred to as “Springing Amendments,” as contained in the Twenty-First Supplemental amendment to the General Ordinance became effective. As detailed in the Water and Wastewater Revenue Bonds, Series 2022C Official Statement dated August 9, 2022, one of the Springing Amendments allows the Water Department to issue revenue bonds without making deposits to the Debt Reserve Account and without having to establish series specific debt reserve subaccount. As such, no deposits to

the Debt Reserve Account are assumed following the issuance of the 2022C Revenue Bonds. As discussed previously, the projected bond issuances are consistent with the stated issuance assumptions. Proposed bonds issued during FY 2024 to FY 2028 assume no debt service reserve requirement.

Table 2-8 Projected Flow of Funds – Construction Fund & Debt Reserve Account [Schedule BV-1: Table C-8]

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	338,465	460,000	485,000	555,000	480,000	700,000
	Transfers:	-	-	-	-	-	-
2	Debt Reserve Account (a)	8,500	-	-	-	-	-
3	Cost of Bond Issuance (b)	1,965	2,806	2,959	3,386	4,800	7,000
4	Construction Fund (c)	328,000	457,194	482,042	551,615	475,200	693,000
5	**Total Issue**	338,465	460,000	485,000	555,000	480,000	700,000
Construction Fund							
6	Beginning Balance	523,680	614,573	720,294	783,571	841,574	802,171
7	Transfer From Revenue Bond Proceeds	328,000	457,194	482,042	551,615	475,200	693,000
8	WIFIA Proceeds	-	9,063	20,772	47,939	58,563	59,127
9	WIFIA Match Funding Proceeds	-	9,338	20,958	47,915	58,497	59,246
10	PENNVEST Loan Proceeds	54,874	83,354	78,438	75,465	51,373	30,493
11	Capital Account Deposit	23,383	24,295	25,242	26,226	27,249	28,312
12	Transfer from Residual Fund	16,600	29,800	34,400	58,150	72,800	86,100
13	Interest Income on Construction Fund	5,663	6,641	7,482	8,085	8,178	8,476
14	**Total Available**	952,200	1,234,258	1,389,627	1,598,967	1,593,435	1,766,925
15	Net Cash Financing Required	337,627	513,964	606,056	757,393	791,263	865,518
16	**Ending Balance**	614,573	720,294	783,571	841,574	802,171	901,407
Capital Program Net Encumbrances							
17	Beginning Balance	454,669	507,672	614,431	649,351	730,403	641,195
18	Annual Encumbrances (d)	390,629	577,611	575,956	720,354	564,519	823,998
19	Project Expenses (d)	(337,627)	(470,851)	(541,037)	(639,302)	(653,728)	(728,817)
20	**Ending Balance**	507,672	614,431	649,351	730,403	641,195	736,375
21	Allowance Commitments Prior to Bond Issue	96,268	95,993	120,059	94,087	137,333	134,146
22	Target Balance	603,940	710,424	769,410	824,489	778,528	870,521
Debt Reserve Account							
23	Beginning Balance	189,723	199,328	200,423	204,721	212,113	217,676
24	Transfer From Bond Proceeds	8,500	-	-	-	-	-
25	Transfer From Residual Fund (e)	1,105	1,096	4,298	7,392	5,562	3,030
26	Debt Reserve Account Release	-	-	-	-	-	-
27	**Ending Balance**	199,328	200,423	204,721	212,113	217,676	220,706
28	Interest Income on Debt Reserve Account	1,945	1,999	2,026	2,084	2,149	2,192

(a) Amount of Debt Reserve Account estimated based on outstanding and proposed debt service payments.
(b) Cost of bonds issuance reflects actual cost in FY 2023, assumed 0.61 percent of issue amount in FY 2024 to 2025, and assumed 1.0% of issuance in FY 2026 to FY 2028.
(c) Deposits equal proceeds from sale of bonds less transfers to Debt Reserve Account and Costs of Issuance.
(d) Excluding PENNVEST and WIFIA.
(e) Transfer from Residual Fund to provide PENNVEST share of Debt Reserve Account requirement.

The Construction Fund is summarized on Lines 6 through 16, with proceeds from revenue bonds presented on Line 7, with WIFIA loan and related matching funding presented on Lines 8 and 9. PENNVEST Loan proceeds are presented on Line 10. The Capital Account Deposit and Transfer from the

Residual Fund account for most of the Water Department's cash-funded capital and are presented on Lines 11 and 12.

Under the General Ordinance, as amended by Springing Amendments contained in the Twenty-First Supplemental Ordinance, which came into effect upon the issuance of the 2022C Bonds, the annual Debt Reserve Account balance must equal the maximum future annual debt service for outstanding bonds of a series for which a Debt Reserve Requirement was specified, as well as any outstanding interest associated with the CP program. The Debt Reserve Requirement associated with PENNVEST loans is funded from the Residual Fund, as reflected on Line 25. As noted earlier, no Debt Reserve Requirements are assumed for any future revenue bond issuances at this time.

Per City funding policy, the Water Department needs to maintain sufficient funds (including revenue sources from current year rates, bond proceeds, other loans, and accumulated interest) in the Construction Fund such that outstanding project encumbrances do not exceed available funding. This is best illustrated by comparing the ending balance for the Construction Fund, as presented on Line 16, against the Target Balance shown on Line 22, which accounts for new CIP Encumbrances and Project Expenses for each fiscal year excluding PENNVEST and WIFIA funded projects. Black & Veatch projects that the Water Department will adhere to the City funding policy for the Study Period, assuming requested revenue adjustments are granted by the Rate Board.

The projected bond issuances are as discussed above and consistent with the general assumptions outlined in Section 1.4.

The General Bond Ordinance provides for two transfers: Interest Earnings Payment, which is transferred as a Deposit to the City General Fund, and the Capital Account Deposit. The Capital Account Deposit is shown on Line 11, and the Residual Fund Transfer is found on Line 12. Both the Interest Earnings Payment to the City General Fund Deposit and Capital Account Deposit are further discussed below.

The City covenants under the General Ordinance require the Water Department to make one deposit to the Capital Account as of June 20th of each fiscal year in an amount not less than one percent of the total net plant investment in water and wastewater facilities (the "Capital Account Deposit Amount"). As discussed in Section 1.4, the projected level of the annual Capital Account Deposit Amount reflects 1.0% of the projected net plant investment in water and wastewater facilities in the prior year. Black & Veatch started with the FY 2022 net plant investment and inflated it by 3.9% per year to project the FY 2023 to FY 2027 net plant investment.

Under the General Ordinance, the Water Department may make an annual payment to the City General Fund from the Residual Fund in an amount not to exceed the lower of $4,994,000 and annual interest earnings on the Debt Reserve Account. Accordingly, the Water Department annually transfers applicable interest earnings to the Residual Fund.

Interest income on annual average balances in the Construction Fund and the Debt Reserve Account is shown in Lines 13 and 28. The interest earnings in the Construction Fund, which primarily consists of bond proceeds, are not available to the Revenue Fund as a part of the overall project revenues available for meeting the annual revenue requirements of the Water Department. An assumed interest rate of 1.0% is used to determine the interest income for FY 2023 through FY 2028.

2.5 Summary of Revenue and Revenue Requirements

In this section, three tables are presented to provide the statement of financial operations for the Combined System. The first, Table 2-9, is the Water Department's financial plan reflecting only Base Rates. That is, TAP discounts and TAP-R revenues are not included. Table 2-10 presents the cashflows for the TAP discounts and TAP-R revenues[17]. Finally, Table 2-11, combines Table 2-9 and Table 2-10 to show a cashflow for the Combined System accounting for all revenues and revenue requirements. Compliance with the requirements of the General Bond Ordinance and metrics set by the Rate Board is based on Table 2-11. For all three tables, the proposed revenue increases do not reflect any rate compression.

As indicated on Lines 4 through 9 of Table 2-9 and Table 2-11, annual increases in revenue are required beginning in FY 2024. Revenue increases presented on Lines 4 to 9 of Table 2-9 reflect the overall needed increase to the Base Rates. The resulting percentage increases on Table 2-11 are lower because the additional revenue is relative to the total service revenue including TAP-R revenues.

[This spacing is intentional]

[17] Black & Veatch is presenting the existing FY 2023 TAP-R revenues and associated TAP discounts in alignment with calculations submitted with the 2023 TAP-R Annual Adjustment Proceeding. Table 2-10 illustrates the anticipated decrease in TAP-R rates in FY 2024. TAP-R Revenues and TAP Discounts for FY 2025 and thereafter presented the estimated TAP-R revenue requirements per the TAP-R reconciliation calculations, as FY 2025 and beyond are subject to an annual adjustment proceeding (and only FY 2024 TAP-R rates are proposed at this time).

Table 2-9 Projected Revenue and Revenue Requirements: Base Rates Only [Schedule BV-1: Table C-1A]

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)									
Operating Revenues									
1	Water Service - Existing Rates			294,038	296,093	298,680	301,466	301,071	300,328
2	Wastewater Service - Existing Rates			472,292	476,637	478,997	480,829	480,147	470,259
3	**Total Service Revenue - Existing Rates**			**766,330**	**772,731**	**777,677**	**782,295**	**781,218**	**770,587**
	Additional Service Revenue Required								
		Year	Percent Increase	Months Effective					
4		FY 2024	12.75%	10		80,412	99,154	99,743	99,605	98,250
5		FY 2025	8.80%	10			62,977	77,619	77,512	76,458
6		FY 2026	12.70%	10				99,472	121,709	120,052
7		FY 2027	8.00%	10					70,520	85,228
8		FY 2028	9.00%	10						84,516
9	**Total Additional Service Revenue Required**				**-**	**80,412**	**162,131**	**276,834**	**369,346**	**464,504**
10	**Total Water & Wastewater Service Revenue**				**766,330**	**853,142**	**939,807**	**1,059,129**	**1,150,564**	**1,235,091**
	Other Income (a)									
11	Other Operating Revenue				29,601	29,664	29,713	29,771	29,746	29,720
12	Debt Reserve Account Interest Income				-	-	-	-	-	-
13	Operating Fund Interest Income				1,882	1,982	2,023	2,192	2,271	2,331
14	Rate Stabilization Interest Income				1,365	1,339	1,336	1,360	1,423	1,497
15	**Total Revenues**				**799,178**	**886,128**	**972,880**	**1,092,452**	**1,184,004**	**1,268,639**
Operating Expenses									
16	**Total Operating Expenses**				**(564,671)**	**(611,326)**	**(654,537)**	**(690,172)**	**(720,118)**	**(752,972)**
Net Revenues									
17	Transfer From/(To) Rate Stabilization Fund				5,000	100	600	(5,400)	(7,300)	(7,500)
18	**NET REVENUES AFTER OPERATIONS**				**239,507**	**274,902**	**318,943**	**396,880**	**456,586**	**508,167**
Debt Service									
	Senior Debt Service									
19	Outstanding Bonds				(187,747)	(185,847)	(183,090)	(183,088)	(183,091)	(166,318)
20	PENNVEST Loans				(10,935)	(12,031)	(16,329)	(23,721)	(29,283)	(32,313)
21	Projected Future Bonds				-	(21,083)	(53,880)	(92,771)	(129,341)	(175,213)
22	Commercial Paper				(900)	(900)	(900)	(900)	(900)	(900)
23	WIFIA				-	(17)	(956)	(4,812)	(8,532)	(16,153)
24	**Total Senior Debt Service**				**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**				**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service				-	-	-	-	-	-
27	Transfer to Escrow				-	-	-	-	-	-
28	**Total Debt Service on Bonds**				**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
29	**CAPITAL ACCOUNT DEPOSIT**				**(23,383)**	**(24,295)**	**(25,242)**	**(26,226)**	**(27,249)**	**(28,312)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**				**1.07 x**	**1.12 x**	**1.13 x**	**1.19 x**	**1.20 x**	**1.21 x**
31	End of Year Revenue Fund Balance				16,542	30,729	38,547	65,361	78,191	88,958

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

Table 2-10 Projected Revenue and Revenue Requirements: TAP-R Rates Only [Schedule BV-1: Table C-1B]

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)									
Operating Revenues									
1	Water Service - Existing Rates			5,130	5,579	5,686	5,744	5,735	5,719
2	Wastewater Service - Existing Rates			7,995	8,843	9,030	9,124	9,110	9,085
3	**Total Service Revenue - Existing Rates**			**13,125**	**14,422**	**14,716**	**14,868**	**14,846**	**14,804**
	Additional Service Revenue Required								
	Year	Percent Increase	Months Effective						
4	FY 2024	-79.32%	10		(8,020)	(11,188)	(11,743)	(11,776)	(11,743)
5	FY 2025	0.00%	10			-	-	-	-
6	FY 2026	0.00%	10				-	-	-
7	FY 2027	0.00%	10					-	-
8	FY 2028	0.00%	10						-
9	**Total Additional Service Revenue Required**			**-**	**(8,020)**	**(11,188)**	**(11,743)**	**(11,776)**	**(11,743)**
10	**Total Water & Wastewater Service Revenue**			**13,125**	**6,402**	**3,528**	**3,125**	**3,070**	**3,061**
	Other Income								
11	Other Operating Revenue (a)			(9,354)	(10,438)	(3,052)	(3,052)	(3,052)	(3,052)
12	Debt Reserve Account Interest Income			-	-	-	-	-	-
13	Operating Fund Interest Income			-	-	-	-	-	-
14	Rate Stabilization Interest Income			-	-	-	-	-	-
15	**Total Revenues**			**3,771**	**(4,036)**	**476**	**73**	**18**	**9**
Operating Expenses									
16	**Total Operating Expenses**			**-**	**-**	**-**	**-**	**-**	**-**
Net Revenues									
17	Transfer From/(To) Rate Stabilization Fund (b)			(3,771)	4,036	(476)	(73)	(18)	(9)
18	**NET REVENUES AFTER OPERATIONS**			**-**	**-**	**-**	**-**	**-**	**-**
Debt Service									
	Senior Debt Service								
19	Outstanding Bonds			-	-	-	-	-	-
20	PENNVEST Loans			-	-	-	-	-	-
21	Projected Future Bonds			-	-	-	-	-	-
22	Commercial Paper			-	-	-	-	-	-
23	WIFIA			-	-	-	-	-	-
24	**Total Senior Debt Service**			**-**	**-**	**-**	**-**	**-**	**-**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**			**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	**Total Debt Service on Bonds**			**-**	**-**	**-**	**-**	**-**	**-**
29	**CAPITAL ACCOUNT DEPOSIT**			**-**	**-**	**-**	**-**	**-**	**-**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**			**NA**	**NA**	**NA**	**NA**	**NA**	**NA**
31	End of Year Revenue Fund Balance			-	-	-	-	-	-

(a) FY 2023 and FY 2024 reflect TAP Credits based on the proposed 2023 Annual Adjustment. FY 2025 to FY 2028 reflect proposed TAP-R revenue requirement based on the proposed 2023 Annual Adjustment.

(b) Rate Stabilization Fund transfers necessary to meet over or under recovery of TAP costs until recovery is reconciled via TAP-R reconciliation.

Table 2-11 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates [Schedule BV-1: Table C-1]

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)									
Operating Revenues									
1	Water Service - Existing Rates			299,168	301,672	304,366	307,210	306,806	306,047
2	Wastewater Service - Existing Rates			480,288	485,480	488,027	489,953	489,257	479,344
3	**Total Service Revenue - Existing Rates**			**779,455**	**787,152**	**792,393**	**797,163**	**796,063**	**785,392**
	Additional Service Revenue Required								
		Year	Percent Increase	Months Effective					
4		FY 2024	11.02%	10	72,392	87,966	88,000	87,829	86,507
5		FY 2025	8.77%	10		62,977	77,619	77,512	76,458
6		FY 2026	12.66%	10			99,472	121,709	120,052
7		FY 2027	7.98%	10				70,520	85,228
8		FY 2028	8.98%	10					84,516
9	**Total Additional Service Revenue Required**			**-**	**72,392**	**150,942**	**265,091**	**357,570**	**452,760**
10	**Total Water & Wastewater Service Revenue**			**779,455**	**859,544**	**943,335**	**1,062,254**	**1,153,634**	**1,238,152**
	Other Income (a)								
11	Other Operating Revenue			20,247	19,226	26,661	26,719	26,694	26,668
12	Debt Reserve Account Interest Income			-	-	-	-	-	-
13	Operating Fund Interest Income			1,882	1,982	2,023	2,192	2,271	2,331
14	Rate Stabilization Interest Income			1,365	1,339	1,336	1,360	1,423	1,497
15	**Total Revenues**			**802,949**	**882,092**	**973,356**	**1,092,525**	**1,184,022**	**1,268,648**
Operating Expenses									
16	**Total Operating Expenses**			**(564,671)**	**(611,326)**	**(654,537)**	**(690,172)**	**(720,118)**	**(752,972)**
Net Revenues									
17	Transfer From/(To) Rate Stabilization Fund			1,229	4,136	124	(5,473)	(7,318)	(7,509)
18	**NET REVENUES AFTER OPERATIONS**			**239,507**	**274,902**	**318,943**	**396,880**	**456,586**	**508,167**
Debt Service									
	Senior Debt Service								
	Revenue Bonds								
19	Outstanding Bonds			(187,747)	(185,847)	(183,090)	(183,088)	(183,091)	(166,318)
20	PENNVEST Loans			(10,935)	(12,031)	(16,329)	(23,721)	(29,283)	(32,313)
21	Projected Future Bonds			-	(21,083)	(53,880)	(92,771)	(129,341)	(175,213)
22	Commercial Paper			(900)	(900)	(900)	(900)	(900)	(900)
23	WIFIA			-	(17)	(956)	(4,812)	(8,532)	(16,153)
24	**Total Senior Debt Service**			**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**			**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	**Total Debt Service on Bonds**			**(199,582)**	**(219,878)**	**(255,154)**	**(305,292)**	**(351,146)**	**(390,897)**
29	**CAPITAL ACCOUNT DEPOSIT**			**(23,383)**	**(24,295)**	**(25,242)**	**(26,226)**	**(27,249)**	**(28,312)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**			**1.07 x**	**1.12 x**	**1.13 x**	**1.19 x**	**1.20 x**	**1.21 x**
31	**End of Year Revenue Fund Balance**			**16,542**	**30,729**	**38,547**	**65,361**	**78,191**	**88,958**

Table 2-11 Projected Revenue and Revenue Requirements: Base Rates and TAP-R Rates (continued)

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Combined System ($000s)							
Residual Fund							
32	Beginning of Year Balance	16,102	15,095	15,079	15,078	15,047	15,025
33	Interest Income	155	150	150	150	150	149
	Plus:						
34	End of Year Revenue Fund Balance	16,542	30,729	38,547	65,361	78,191	88,958
35	Deposit for Transfer to City General Fund (b)	1,945	1,999	2,026	2,084	2,149	2,192
	Less:						
36	Transfer to Construction Fund	(16,600)	(29,800)	(34,400)	(58,150)	(72,800)	(86,100)
37	Transfer to City General Fund	(1,945)	(1,999)	(2,026)	(2,084)	(2,149)	(2,192)
38	Transfer to Debt Reserve Account	(1,105)	(1,096)	(4,298)	(7,392)	(5,562)	(3,030)
39	**End of Year Balance**	**15,095**	**15,079**	**15,078**	**15,047**	**15,025**	**15,002**
Rate Stabilization Fund							
40	Beginning of Year Balance (c)	138,989	137,760	133,625	133,501	138,974	146,291
41	Deposit From/(To) Revenue Fund	(1,229)	(4,136)	(124)	5,473	7,318	7,509
42	**End of Year Balance**	**137,760**	**133,625**	**133,501**	**138,974**	**146,291**	**153,800**

(a) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund and reflects projected contra revenue credits for Affordability Program Discounts (TAP Costs).

(b) Transfer of interest earnings from the Debt Reserve Account to the Residual Fund as shown in Line 35 to satisfy the requirements for the transfer to the City General Fund shown on Line 37.

(c) FY 2023 beginning balance is estimated based on preliminary FY 2022 results.

For this analysis, an effective increase date of September 1 for each fiscal year is assumed. As indicated in Lines 25 and 30 on Table 2-11, the debt service coverage requirements discussed previously would be met with these overall levels of increase in revenues. Annual cash requirements for the Combined System would also be met with the proposed levels of increase, as shown on Line 31 of Table 2-9 and Table 2-11.

2.6 Compliance with General Bond Ordinance and Rate Ordinance Requirements

As stated in the assumptions utilized for these analyses, the Water Department must establish rates and charges to meet the financial management requirements of the General Bond Ordinance with respect to, among other things, (1) maintaining the Rate Stabilization Fund at target levels; (2) financing a portion of major annual capital improvement requirements directly from annual system revenues; (3) fulfilling rate covenant requirements; and (4) making required deposits into the Residual Fund of any monies remaining after payment of all current cash obligations to further support the Water Department's goal towards 20% capital funding from system revenues.

The 2018 Rate Determination identified the following financial policy goals: a target Rate Stabilization Fund balance of approximately $135 Million, a 1.30 senior debt service coverage ratio, 20% cash financing of capital improvements, and maintaining a target Residual Fund balance of $15 Million.

To help mitigate short term rate impacts, the Water Department has decided to temporarily defer meeting the Rate Stabilization Fund, senior debt service coverage, and cash-funded capital targets. The proposed rates and charges are derived to meet interim senior debt service coverage targets and adhere to the 90% Test.

In addition to the General Bond Ordinance, under Section 13-101(4)(a) of the Philadelphia Code, the Water Rate Board Ordinance ("Rate Ordinance") sets forth the floor for the amounts that rates and charges must generate to support the Combined System. The rates and charges must yield to the City at least an amount equal to the sum of:

1. Operating expenses of the City in respect of the Water and Wastewater Systems.
2. Debt service on all obligations of the City in respect of the Water and Wastewater Systems.
3. With respect to the water, sewer and stormwater revenue obligations of the City, such additional amounts as will be required to comply with any rate covenant and sinking fund reserve requirements approved by ordinance of the City Council in connection with the authorization or issuance of water, sewer, and stormwater revenue bonds; and
4. Proportionate charges for all services performed for the Water Department by all officers, departments, boards, or commissions of the City.

Moreover, Section 13-101(4)(b) of the Philadelphia Code states that the rates and charges must not exceed ("ceiling") the total appropriations from the Water Fund and provides considerations of the elements that are to be included in the calculation of the ceiling. The rates and charges projected for FY 2024 and FY 2025 do not exceed the Water Fund's projected appropriations for the above years.

Lines 4 through 6 on Table 2-12 show the calculation for compliance with the General Bond Ordinance Rate Covenant. As shown on Line 25 of Table 2-11, senior debt service coverage is projected to be 1.25 in FY 2024 and FY 2025 and 1.30 for the remainder of the Study Period. This reflects the Water Department's intent to increase coverage, generating more cash funding for capital while helping to mitigate revenue adjustments in the short term.

Line 11 in Table 2-12 reflects the compliance with the Rate Ordinance requirement over the Study Period.

While the Water Department has decided to defer the approved financial policy goals on an interim basis, a return to these metrics in future years will be necessary to improve the Water Department's financial position, provide adequate reserves, and help manage through future emergencies and strains on the System. As shown on Line 3 of Table 2-12, while FY 2023 is projected to have an end of fiscal year balance above the target level of $135 Million, the RSF is projected to remain below the target level in FY 2024 and FY 2025. The projected balance in FY 2023 is largely attributable to TAP-R revenues, which will in turn be reduced in the subsequent fiscal year based upon the proposed TAP-R rates.

The RSF serves as the Water Department's primary source of short-term liquidity and reserves. The Water Department has historically leveraged available RSF balances to help cover costs and mitigate rate impacts. However, balances are essentially at or projected to be slightly below target levels for FY 2023 to

FY 2025 and the Water Department does not have the flexibility to rely upon the RSF to further mitigate any near-term revenue needs. Without the proposed revenue increases, the projected RSF balances would fall further below the target balance.

Lack of available Rate Stabilization Fund balance will limit the Water Department's ability to: 1) address emergencies, 2) mitigate other system risks, and 3) manage future revenue adjustments. Further, the RSF target balance may need to be increased in the future. The current RSF target balance was established with the 2018 Rate Determination, which was prior to recent inflationary pressures and based upon the operating needs of the Water Fund at the time of the corresponding rate proceeding.

The Water Department will need to closely monitor all aspects of financial performance, including the receipt of revenues, operation and maintenance expenses, capital program expenses and associated financing to meet the requirements of the General Bond Ordinance.

Without proposed increased revenues, and if all other factors remain unchanged, the RSF will be depleted by the end of FY 2025. Further, the 90% Test would not be met beginning in FY 2024. In addition, the senior debt service coverage requirements would not be met in FY 2025.

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Table 2-12 Projected Rate Stabilization Fund and Covenants Metrics Performance: Base Rates and TAP-R Rates [Schedule BV-1: Table C-2])

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Rate Stabilization Fund							
1	Beginning Balance: Rate Stabilization Fund (a)	$ 138,989	$ 137,760	$ 133,625	$ 133,501	$ 138,974	$ 146,291
2	Transfers From (To) Revenue Fund (b)	(1,229)	(4,136)	(124)	5,473	7,318	7,509
3	Year-End Rate Stabilization Fund Balance (Line 1 + Line 2)	137,760	133,625	133,501	138,974	146,291	153,800
General Bond Ordinance Covenants							
4	Senior Debt Coverage (c)	1.20	1.25	1.25	1.30	1.30	1.30
5	Total Debt Coverage (d)	1.07	1.12	1.13	1.19	1.20	1.21
6	90% Test - Senior Debt Coverage from Current Revenues (e)	1.19	1.23	1.24	1.30	1.30	1.30
O&M Actual to Budget Ratio							
7	Projected O&M Budget (f)	659,216	715,819	766,086	807,071	842,689	881,564
8	O&M Actual to Budget Ratio	90.8%	91.0%	91.1%	91.3%	91.3%	91.3%
Rate Ordinance Requirements							
9	Projected Total Revenues	802,949	882,092	973,356	1,092,525	1,184,022	1,268,648
10	Projected Total Appropriations (g)	898,723	990,721	1,085,029	1,209,350	1,306,575	1,397,230
11	Rate Ordinance Requirement Compliance (h)	Yes	Yes	Yes	Yes	Yes	Yes
Cash Funding							
12	Cash Funded Capital (i)	39,983	54,095	59,642	84,376	100,049	114,412
13	Capital Improvement Program Annual Expenses	$ 337,627	$ 513,964	$ 606,056	$ 757,393	$ 791,263	$ 865,518
14	Cash Funded Capital Ratio (j)	11.8%	10.5%	9.8%	11.1%	12.6%	13.2%

(a) FY 2023 beginning balance is estimated based on FY 2022 preliminary financial results.
(b) See Line 17 in Table 2-11.
(c) Senior Debt Coverage = (Total Revenues - Operating Expenses + Transfer From (to) Rate Stabilization) divided by Senior Debt. The General Bond Ordinance requires the minimum Senior Debt Service Coverage of 1.20.
(d) Total Debt Coverage = (Total Revenues - Operating Expenses + Rate Stabilization Transfer) divided by (Senior Debt + Subordinate Debt + Capital Account Deposit). The 1989 General Ordinance requires the minimum Total Debt Service Coverage of 1.00.
(e) Senior Debt Coverage from Current Revenues = (Total Revenues - Operating Expenses - Transfer to Rate Stabilization Fund) divided by Senior Debt. Transfers from Rate Stabilization are excluded from the Total Revenues. The General Bond Ordinance requires a minimum Senior Debt Service Coverage of 0.90 from Current Revenues.
(f) FY 2023 budget reflects the PWD adopted budget; FY 2024 through FY 2028 budget reflects annual cost escalation factors.
(g) Total Appropriation = Total O&M Budget + Senior Debt + Subordinate Debt + Transfer to Escrow + Capital Account Deposit + Transfer to Rate Stabilization Fund + Transfer to Residual Fund. Costs to service the City included as required by the General Bond Ordinance rate covenants.
(h) Rate Ordinance requires that Total Revenues not exceed Total Appropriations.
(i) Cash Funded Capital = Capital Account Deposit + Residual Transfer to Construction Fund
(j) Cash Funded Capital Ratio = Cash Funded Capital divided by Capital Improvement Program annual expenses.

2.7 Proposed Rates

The proposed charges for water and wastewater service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including qualifying senior citizens, charities and schools, and the Philadelphia Housing Authority ("PHA"), receive services at a discounted rate. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools, and 5% for PHA) will continue to be applicable for the entire Study Period.

In designing the proposed rates, water, sanitary sewer, and stormwater costs of service are adjusted to reflect the fact that the above customer types are served at a discount and do not pay the full cost of service. Accordingly, the proposed retail water, sewer, and stormwater rates are adjusted to recover this COS revenue reduction due to discounts. In addition, in the case of the non-residential stormwater group, we adjust their stormwater rates to address the discounts as well as to recover the reduction in revenue

due to the existing stormwater customer assistance program ("CAP"). Additional information regarding the anticipated revenue reductions due to the stormwater CAP are discussed later in this Report.

Revenue loss due to providing TAP discounts and TAP-R revenues were excluded from the analysis of Base Rates. Consequently, Table 2-13 only summarizes the proposed Base Rates for the Rate Period (FY 2024 and FY 2025). Current effective rates for FY 2023 are presented for informational purposes. Refer to Table 5-2 for proposed fire protection service charges.

Table 2-13 Proposed FY 2024 and 2025 General Service Retail Rates

Water			
	Existing	Proposed	
Description	FY 2023	FY 2024	FY 2025
Monthly Water Service Charge ($/bill)			
Meter Size (Inches)			
5/8	$4.97	$5.30	$5.42
3/4	$5.37	$5.81	$5.96
1	$6.57	$7.27	$7.49
1-1/4	$8.01	$9.05	$9.35
1-1/2	$8.96	$10.28	$10.67
2	$12.59	$14.65	$15.25
3	$20.20	$23.99	$25.10
4	$36.45	$42.84	$44.71
6	$68.70	$81.39	$85.12
8	$104.91	$125.10	$131.01
10	$153.42	$182.51	$191.01
12	$253.19	$306.82	$322.40
Base Rate - Water Quantity Charges ($/Mcf)			
Monthly Water Usage			
First 2 Mcf	$48.96	$61.14	$66.42
Next 98 Mcf	$44.99	$54.93	$59.72
Next 1,900 Mcf	$34.85	$42.55	$46.27
Over 2,000 Mcf	$33.91	$41.40	$45.03

Wastewater			
	Existing	Proposed	
Description	FY 2023	FY 2024	FY 2025
Monthly Sanitary Sewer Service Charge ($/bill)			
Meter Size (Inches)			
5/8	$7.50	$7.54	$7.98
3/4	$9.57	$9.62	$10.19
1	$14.05	$14.10	$15.00
1-1/4	$19.77	$19.82	$21.14
1-1/2	$24.75	$24.80	$26.47
2	$38.19	$38.25	$40.87
3	$68.87	$68.97	$73.78
4	$117.03	$117.21	$125.31
6	$230.71	$231.03	$247.10
8	$365.13	$365.58	$391.12
10	$526.96	$527.64	$564.44
12	$958.27	$959.14	$1,026.89
Base Rate - Sanitary Sewer Quantity Charges ($/Mcf)			
Monthly Usage			
All Billable Water Usage	$34.57	$39.61	$43.09
Groundwater Charge	$12.58	$13.87	$15.27
Sanitary - Surcharge Rates ($/lb)			
BOD ($/lb in excess of 250 mg/l)	$0.391	$0.443	$0.470
SS ($/lb in excess of 350 mg/l)	$0.406	$0.452	$0.482
Residential Stormwater Charges			
Monthly Stormwater Management Service Charge			
Charge Per Parcel	$16.17	$17.09	$18.96
Monthly Billing & Collection Charge			
Charge Per Bill	$1.88	$1.95	$2.04
Non-Residential Stormwater Charges			
Monthly Stormwater Management Service Charge			
Gross Area ($/500 sf)	$0.778	$0.799	$0.884
Impervious Area ($/500 sf)	$5.492	$5.842	$6.475
Monthly Billing & Collection Charge			
Charge Per Bill	$2.44	$2.53	$2.65

Mcf - Thousand cubic feet
sf - square feet
BOD - Biochemical Oxygen Demand
SS - Suspended Solids
lb - pounds
mg/l - milligrams per liter

Notes:

1. All charges (existing and proposed) are effective effective September 1st of the respective Fiscal Year.
2. Non-Residential Stormwater Charges includes Condominiums.

2.7.1 Residential and Senior Citizen Typical Bills

Table 2-14 presents a series of typical or representative combined residential water, sanitary sewer, and stormwater monthly bills under existing and proposed rates for FY 2024 and FY 2025 for the 5/8-inch meter size. A typical PWD residential customer has a 5/8-inch meter and uses about 0.45 Mcf, or approximately 450 cubic feet, monthly. Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2024, this customer's monthly bill would increase from $69.31 to $77.47, an increase of $8.16 or about 11.8%. In FY 2025, the bill increases to $83.92, an increase of $6.45 over FY 2024 rates, or about 8.3%.

Table 2-14 Comparison of Typical Bill for Residential Customers Under Existing and Proposed Rates [Schedule BV-1: Table C-4]

		FY 2023	FY 2024		FY 2025	
METER SIZE	MONTHLY USE	EXISTING RATES	PROPOSED RATES	% PROPOSED OF EXISTING	PROPOSED RATES	% PROPOSED OF FY 2024
Inches	Mcf	$	$	%	$	%
5/8	0.00	30.52	31.88	4.5	34.40	7.9
5/8	0.20	47.76	52.14	9.2	56.42	8.2
5/8	0.30	56.38	62.28	10.5	67.42	8.3
5/8	0.40	65.00	72.40	11.4	78.42	8.3
5/8	0.45	69.31	77.47	11.8	83.92	8.3
5/8	0.50	73.62	82.54	12.1	89.44	8.4
5/8	0.60	82.23	92.66	12.7	100.44	8.4
5/8	0.70	90.85	102.80	13.2	111.44	8.4
5/8	0.80	99.47	112.92	13.5	122.44	8.4
5/8	1.70	177.04	204.10	15.3	221.50	8.5
5/8	2.70	260.45	301.05	15.6	326.87	8.6
5/8	3.30	309.79	358.10	15.6	388.89	8.6

Notes:

FY 2023 figures reflect the existing base and current TAP-R rates, of $1.03/Mcf for water and $1.63/Mcf for sewer.

FY 2024 and FY 2025 figures reflect the proposed base and TAP-R rates, of $0.21/Mcf for water and $0.34/Mcf for sewer.

The FY 2024 TAP-R rates are subject to the Rate Board's Determination in the 2023 TAP-R Reconciliation Proceeding.

The TAP-R Rates are subject to annual reconciliation.

A typical PWD senior residential customer has a 5/8-inch meter and uses about 0.3 Mcf monthly. Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2024, this customer's monthly bill would increase from $56.38 to $62.28, an increase of $5.90 or about 10.5%. In FY 2025, the bill increases to $67.42, an increase of $5.14 over FY 2024 rates, or about 8.3%. Qualifying senior citizens may receive a 25% discount on their entire bill. The total monthly bills presented in Table 2-14 do not reflect this discount. The typical qualifying senior residential customer's monthly bill (based upon the previously stated billing parameters) would increase from $42.28 to $46.71, an increase of $4.43 or about 10.5%. In FY 2025, the bill increases to $50.56, an increase of $3.85 over FY 2024 rates, or about 8.3%.

2.7.2 Non-Residential Typical Bills

Table 2-15 presents a series of typical or representative combined non-residential water, sanitary sewer, and stormwater monthly bills under existing and proposed rates for FY 2024 and FY 2025 for multiple meter sizes and various parcel characteristics (i.e., GA and IA). A PWD small commercial business

customer has a 5/8-inch meter and uses about 0.6 Mcf or approximately 600 cubic feet, monthly. A parcel with gross area of 5,500 square feet and impervious area of 4,000 square feet was assumed for development of the typical bill comparison.

Under the proposed schedules of water, sanitary sewer, and stormwater rates for FY 2024, this customer's monthly bill would increase from $119.11 to $131.68, an increase of $12.57 or about 10.5%. In FY 2025, the bill increases to $143.61, an increase of $11.93 over FY 2024 rates, or about 9.1%.

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Table 2-15 Comparison of Typical Bill for Non-Residential Customers Under Existing and Proposed Rates [Schedule BV-1: Table C-5]

				FY 2023	FY 2024		FY 2025	
METER SIZE	MONTHLY USE	IMPERVIOUS AREA	GROSS AREA	EXISTING RATES	PROPOSED RATES	% PROPOSED OF EXISTING	PROPOSED RATES	% PROPOSED OF FY 2024
Inches	Mcf	sf	sf	$	$	%	$	%
5/8	0.0	1,794	2,110	40.77	42.74	4.8	46.37	8.5
5/8	0.2	1,794	2,110	58.01	63.00	8.6	68.39	8.6
5/8	0.3	1,794	2,110	66.63	73.14	9.8	79.39	8.6
5/8	0.4	1,794	2,110	75.25	83.26	10.6	90.39	8.6
5/8	0.5	1,794	2,110	79.56	88.33	11.0	95.89	8.6
5/8	0.6	4,000	5,500	119.11	131.68	10.5	143.61	9.1
5/8	0.7	4,000	5,500	127.73	141.82	11.0	154.61	9.0
5/8	0.8	26,000	38,000	428.57	460.92	7.5	507.97	10.2
5/8	1.7	26,000	38,000	506.14	552.10	9.1	607.03	9.9
5/8	2.7	4,000	5,500	297.33	340.07	14.4	370.04	8.8
5/8	3.3	4,000	5,500	346.67	397.12	14.6	432.06	8.8
5/8	11.0	7,000	11,000	1,021.27	1,173.15	14.9	1,276.51	8.8
1	1.7	7,700	7,900	269.90	302.38	12.0	329.98	9.1
1	5.0	22,500	24,000	726.58	813.02	11.9	889.15	9.4
1	8.0	7,700	7,900	789.08	903.30	14.5	983.16	8.8
1	17.0	22,500	24,000	1,713.22	1,954.10	14.1	2,129.47	9.0
2	7.6	1,063	1,250	704.84	810.46	15.0	879.79	8.6
2	16.0	22,500	24,000	1,661.16	1,890.54	13.8	2,059.74	8.9
2	33.0	66,500	80,000	3,629.34	4,110.66	13.3	4,485.67	9.1
2	100.0	7,700	7,900	8,383.48	9,683.11	15.5	10,525.91	8.7
4	30.0	7,700	7,900	2,730.78	3,133.96	14.8	3,404.61	8.6
4	170.0	10,500	12,000	13,565.46	15,615.56	15.1	16,972.96	8.7
4	330.0	26,000	38,000	25,308.97	29,071.81	14.9	31,605.25	8.7
4	500.0	140,000	160,000	39,004.58	44,659.46	14.5	48,581.95	8.8
6	150.0	10,500	12,000	12,269.79	14,113.73	15.0	15,336.96	8.7
6	500.0	41,750	45,500	37,895.92	43,483.82	14.7	47,272.61	8.7
6	1,000.0	26,000	38,000	73,748.50	84,639.88	14.8	92,007.15	8.7
6	1,500.0	140,000	160,000	111,230.51	127,521.83	14.6	138,654.15	8.7
8	750.0	10,500	12,000	55,688.42	63,917.99	14.8	69,472.87	8.7
8	1,500.0	66,500	80,000	110,469.34	126,713.47	14.7	137,750.80	8.7
8	2,000.0	26,000	38,000	145,999.13	167,528.14	14.7	182,107.06	8.7
8	3,000.0	140,000	160,000	218,581.14	250,615.09	14.7	272,469.06	8.7
10	600.0	22,500	24,000	45,237.24	51,890.35	14.7	56,396.31	8.7
10	1,700.0	41,750	45,500	124,772.89	143,133.55	14.7	155,587.84	8.7
10	3,300.0	26,000	38,000	238,691.47	273,775.61	14.7	297,611.38	8.7
10	6,000.0	140,000	160,000	432,211.48	495,514.56	14.6	538,712.38	8.7

(a) Examples with gross area less than 5,000 square feet reflect an impervious area of 85% of the gross area consistent with PWD Regulations section 304.3.

(b) The FY 2023 figures reflect the existing base and current TAP-R rates, of $1.03/Mcf for water and $1.63/Mcf for sewer.

(c) FY 2024 and FY 2025 figures reflect the proposed base and TAP-R rates, of $0.21/Mcf for water and $0.34/Mcf for sewer.

(d) The FY 2024 TAP-R rates are subject to the Rate Board's Determination in the 2023 TAP-R Reconciliation Proceeding.

The TAP-R Rates are subject to annual reconciliation.

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3.0 Water System Revenue and Revenue Requirements

The major elements of the water system include three river supply intakes, three treatment plants, storage facilities and a conveyance network. Based on the 2021 U.S. Census Bureau estimate, the Water System served 1,576,251 individuals.

This section of the report focuses on the Revenue and Revenue Requirements component of the COS study for the Water System. These requirements establish how much money the Water System needs to meet its fiscal year operating and capital obligations. In the following discussion, we review O&M expenses, debt service payments, funding for specific deposits and reserves, and the cost of capital improvement projects that the Water Department does not fund via debt or contributions from third parties.

3.1 Water Revenue

The City's Water System derives revenue primarily from charges for water service. During the Study Period, future levels of revenue are projected based on an analysis of historical and future system growth in terms of the number of accounts and water consumption.

3.1.1 Customers and Growth

Table 3-1 summarizes the Water Department's customer account classifications. Customer types are based on a combination of service type, customer type, and installation type designations in Basis2.

Table 3-1 Water System Customer Types

CUSTOMER TYPES		
General Service	Other	Fire Service
- Residential	- PHA	- Public (Hydrants)
- Senior Citizens	- Charities & Schools	- Private
- Commercial	- Hospitals & Universities	Wholesale
- Industrial	- Hand Billed	
- Public Utilities	- Scheduled (Flat Rate)	

As noted above, the population served by the Water System is approximately 1,576,251 based on the 2021 Census Bureau estimate. Overall, this indicates only slight population growth within the City compared to the 2010 Census (1,526,006). As noted in Section 1.4, the Water Department saw an average annual increase in retail water accounts of 0.86% from FY 2020 to FY 2022. Customer account projections for FY 2023 to FY 2026 are based upon the number of accounts in FY 2022 and escalated by the 3-year average growth in the number accounts by type for FY 2020 to FY 2022. Accounts are assumed to remain stable thereafter. The customer accounts for the Water System over the Study Period are presented in Table 3-2.

Table 3-2 Number of Customer Accounts

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System							
1	Residential	439,793	444,623	449,685	455,004	455,004	455,004
2	Senior Citizens	21,614	21,174	20,743	20,321	20,321	20,321
3	Commercial	38,125	38,510	38,913	39,334	39,334	39,334
4	Industrial	1,055	1,053	1,051	1,049	1,049	1,049
5	Public Utilities	208	218	229	231	231	231
6	**Subtotal General Service**	**500,795**	**505,578**	**510,621**	**515,939**	**515,939**	**515,939**
7	PHA	5,597	5,529	5,462	5,396	5,396	5,396
8	Charities and Schools	1,736	1,643	1,555	1,472	1,472	1,472
9	Hospitals and Universities	96	67	47	33	33	33
10	Hand Billed	229	226	223	220	220	220
11	Scheduled (Flat Rate)	8	10	13	16	16	16
12	Private Fire Protection	7,334	7,868	8,441	9,055	9,055	9,055
13	**Subtotal Retail Customers**	**515,795**	**520,921**	**526,362**	**532,131**	**532,131**	**532,131**
14	Aqua Pennsylvania	1	1	1	1	1	1
15	**Total Water System**	**515,796**	**520,922**	**526,363**	**532,132**	**532,132**	**532,132**

3.1.2 Billed Volume

Section 1.4 discussed the assumptions underlying the billed volumes projections and noted that the Water Department saw an average annual decrease in overall billed water volume of 0.48%. Table 1-2 provides the baseline usage per account and summarizes the associated escalation factors for the Study Period. For all customer types, the FY 2022 usage per account serves as the initial basis for the projection of billed volume. The billed volume projections reflect the following adjustments:

- For FY 2023 to FY 2026, demand escalation factors for all customer types are based upon the 3-year average annual change in consumption per account for FY 2020 to FY 2022.
- Commercial customer water usage is adjusted to reflect the anticipated 90,000 Mcf reduction in water usage by Vicinity in FY 2024. As noted, earlier in Section 1.4, Vicinity, a top 10 customer for PWD, is working toward building their own facility to provide process water for their steam plant operations.
- To approximate anticipated ongoing reductions in residential billed water volume, a 0.68% reduction is applied to the 5/8-inch residential customers usage per account during FY 2027 to FY 2028 (see Table 1-2 for historical usage per account for Residential Service customers (5/8-inch meters)).
- No change in demand is applied to the remaining customer types during FY 2027 to FY 2028.

Table 3-3 presents the projected billed volume in Mcf for the Study Period. The bases of the projected water usage is the current number of accounts and the average usage per account based on historical demands, as presented in Appendix A.

Table 3-3 Projected Billed Volume

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System (Mcf)							
1	Residential	3,068,635	3,084,482	3,100,664	3,117,262	3,099,856	3,082,450
2	Senior Citizens	122,140	120,297	118,481	116,691	116,691	116,691
3	Commercial	1,701,116	1,607,139	1,642,981	1,679,866	1,679,866	1,679,866
4	Industrial	73,291	61,130	51,140	42,925	42,925	42,925
5	Public Utilities	10,243	10,623	11,064	10,827	10,827	10,827
6	**Subtotal General Service**	**4,975,425**	**4,883,671**	**4,924,330**	**4,967,571**	**4,950,165**	**4,932,759**
7	PHA	153,806	152,932	152,062	151,196	151,196	151,196
8	Charities and Schools	131,398	125,542	119,937	114,610	114,610	114,610
9	Hospitals and Universities	74,234	53,010	38,048	27,334	27,334	27,334
10	Hand Billed	504,400	525,131	546,620	568,885	568,885	568,885
11	Scheduled (Flat Rate)	46	62	88	117	117	117
12	Private Fire Protection	73	0	0	0	0	0
13	**Subtotal Retail Customers**	**5,839,382**	**5,740,348**	**5,781,085**	**5,829,713**	**5,812,307**	**5,794,901**
14	Aqua Pennsylvania	73,753	73,753	73,753	73,753	73,753	73,753
15	**Total Water System**	**5,913,135**	**5,814,101**	**5,854,838**	**5,903,466**	**5,886,060**	**5,868,654**

3.1.3 Bill Tabulation

In addition to analyzing the historical usage per account trends, the bill-frequency distribution (more commonly known as a bill tabulation) was also examined. Specifically, the bill tabulation presents the number of customer bills issued at different meter sizes and water usage levels for each customer type served by the utility. The bill tabulation of customer bills provides information on customer type meter distributions and usage patterns. For the analysis conducted herein, the bill tabulation results provide data on the number of accounts by meter size and how much volume passes through each block of the Water Department's quantity charge structure.

3.1.4 Water Revenue

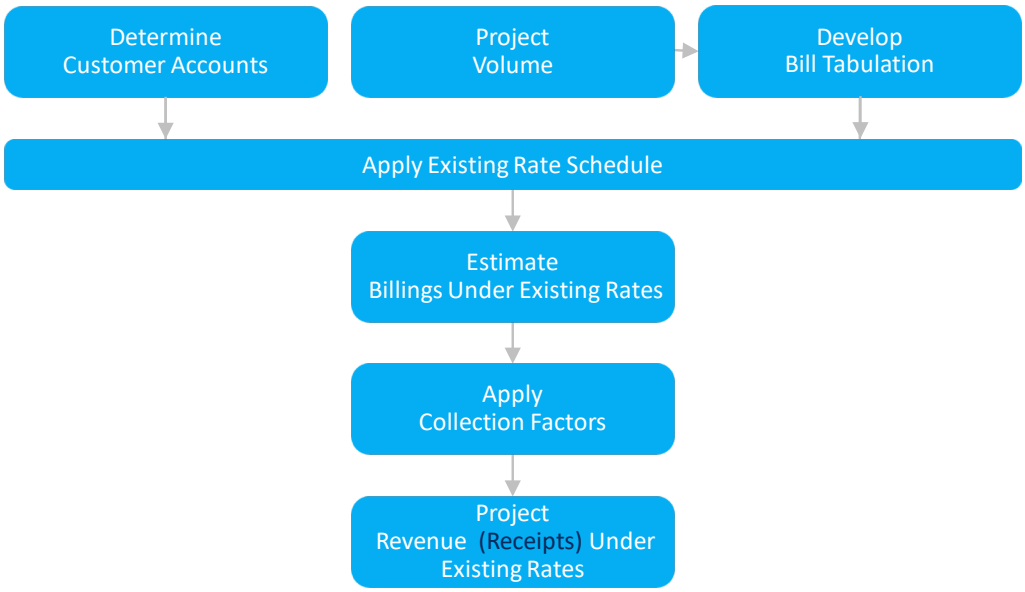
The total operating revenues for the Water Department include the following:

- Retail (i.e., all customers excluding wholesale) Water Service and Quantity charges;
- Private Fire Protection – A monthly charge based on meter size to recover a portion of the Water System costs related to serving certain customers with private fire systems;
- Public Fire Protection – An annual charge assessed to the City based on the annual cost of service to recover a portion of the Water System costs related to providing public fire protection; and
- Wholesale customer water charges.

3.1.4.1 Retail Operating Revenues

Retail operating revenues were developed following the process described below and illustrated in Figure 3-1.

Figure 3-1 Projecting Revenues Under Existing Rates



3.1.4.2 Projection of Gross Billings

To project the FY 2023 water gross billings, the FY 2022 rates (effective September 1, 2021) and current FY 2023 (effective September 1, 2022) schedules of water rates were applied to the projected FY 2023 annual water sales, number of customer accounts and bill tabulation results, to reflect the September 1, 2022 implementation of the FY 2023 rate schedule. To project FY 2024 to FY 2028 water gross billings, the FY 2023 schedule of water rates shown on Table 3-4 were applied to the projections of annual water sales, number of customer accounts, and bill tabulation results.

Table 3-4 Existing FY 2023 Water Rates

DESCRIPTION	WATER	PRIVATE FIRE RESIDENTIAL	PRIVATE FIRE OTHER
Monthly Water Service Charge ($/bill)			
Meter Size (Inches)			
5/8	$4.97		
3/4	$5.37	$7.22	
1	$6.57	$8.42	
1-1/2	$8.96	$10.81	
2	$12.59	$14.44	
3	$20.20		
4	$36.45		$22.90
6	$68.70		$41.63
8	$104.91		$61.58
10	$153.42		$91.13
12	$253.19		$136.73
Base Rate - Water Quantity Charges ($/Mcf)			
Monthly Water Usage			
First 2 Mcf	$48.96		
Next 98 Mcf	$44.99		
Next 1,900 Mcf	$34.85		
Over 2,000 Mcf	$33.91		

Notes:

Quantity Charges presented above exclude TAP-R rates.

Where applicable, discounts were applied for eligible customer types. Table 3-5 summarizes the current discounts available.

Table 3-5 Current Customer Discounts

	Senior Citizens	PHA	Charities/Hospitals/Education
Discount Rate	25%	5%	25%

Applying the appropriate rates and discounts to the number of accounts and billed volumes by customer type, billings for water services under existing rates were calculated, as shown in Table 3-6.

As shown on Line 14, the projected Water System billings generated reflect. combined effect of the account and volume escalation factor assumptions outlined in Section 1.4.

Table 3-6 Billings Under Existing Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
	Water Non-Discount						
1	Residential	$ 172,770	$ 175,753	$ 176,842	$ 177,966	$ 177,127	$ 176,289
2	Commercial	76,745	73,624	75,221	76,865	76,865	76,865
3	Industrial	3,201	2,724	2,300	1,952	1,952	1,952
4	Public Utilities	484	509	530	520	520	520
5	Private Fire Protection	4,042	4,358	4,684	5,034	5,034	5,034
6	Public Fire Protection	7,114	7,114	7,114	7,114	7,114	7,114
7	Wholesale	3,310	3,329	3,329	3,329	3,329	3,329
8	Other (Hand-Billed and Scheduled)	18,653	19,652	20,452	21,280	21,280	21,280
9	**Subtotal Water Non-Discount Billings**	**286,318**	**287,063**	**290,472**	**294,061**	**293,222**	**292,383**
	Water Discount						
10	Residential (Senior Citizens)	5,340	5,312	5,227	5,143	5,143	5,143
11	PHA	6,731	6,771	6,730	6,689	6,689	6,689
12	Charity/Schools/Hospital/University	6,762	6,000	5,353	4,843	4,843	4,843
13	**Subtotal Water Discount Billings**	**18,833**	**18,082**	**17,309**	**16,675**	**16,675**	**16,675**
14	**Total Water Service Billings**	**$ 305,151**	**$ 305,146**	**$ 307,782**	**$ 310,736**	**$ 309,897**	**$ 309,059**

3.1.4.3 Application of Collection Factors

The second step in the process of calculating revenues involves applying receipt factors (i.e., collection factors) to the corresponding gross billings to determine the operating retail cash receipts. The historical collection factors are based on eleven fiscal years (FY 2012 through FY 2022) of billing and associated collections.

The collection factors represent the multi-year payment pattern, as described below. Table 1-4 in Section 1.4.1 presents the historical collection factors[18] used in the Study. Appendix C provides the data used to determine the projected collection factors used in this analysis. The collection factors represent the multi-year payment pattern as described in Section 1.4.1.

As noted in Section 1.4.1, the following adjustments to the projected collection factors are utilized based upon the Water Department's recent experience:

- FY 2023 Billing Year Non-Stormwater Only Collection Factors – Reduce by 1.2% to align with FY 2020 to FY 2022 average experience.
- FY 2024 Billing Year Non-Stormwater Only Collection Factors – Increase by 0.76% to align with FY 2020 to FY 2022 average experience.

Figure 3-2 presents an illustration of how the billing year collection factors were applied to determine the projected revenues (receipts).

[18] As previously discussed in Section 1.4.1 collection factors used in the financial plan analysis reflect the average collection factors for FY 2012 through FY 2022. Collection factors do not represent all historical billings and receipts, as they are limited by available data and derived from historical collection data.

Figure 3-2 Sample Calculation for Application of Collection Factors to Billings for Derivation of Receipts

1. To determine the FY 2025 projected receipts for Residential customers, we use the following information:
   a. Identify the Billing Years and Collection Factors (Table 1-4) for each Collection Period relative to the FY 2025 receipts and accounting for the billing year collection factor adjustments as applicable:
      i. **Billing Year** is FY 2025 with a collection factor of 85.85% - 1.20% = 84.65%
      ii. **Billing Year Plus 1** is FY 2024 with a collection factor of 9.53% + 0.76% = 10.29%
      iii. **Billing Year Plus 2 and Beyond** is FY 2023 with a collection factor of 2.04%
   b. Identify Projected Billings (in $000s) for each Collection Period from Table 3-6 (Line 1)
      i. **Billing Year:** FY 2025 = $176,842
      ii. **Billing Year Plus 1:** FY 2024 = $175,753
      iii. **Billing Year Plus 2 and Beyond:** FY 2023 = $172,770
2. Calculate the projected FY 2025 receipts (in $000s) for each Collection Period:
   a. **Billing Year receipts** = $176,842 x 84.65% = $149,704
   b. **Billing Year Plus 1 receipts** = $175,753 x 10.29% = $18,089
   c. **Billing Year Plus 2 and Beyond receipts** = $172,770 x 2.04% = $3,521
3. Sum the projected FY 2025 receipts by Collection Period to arrive at the total FY 2025 receipts: $149,704 + $18,089 + $3,521 = $171,315 (Matches Line 1 of Table 3-7 for FY 2025)

Note: Above presentation of calculated receipts reflects modeling results which varies due to rounding.

3.1.4.4 Wholesale Operating Revenues

Currently, Aqua PA is the Water Department's only wholesale water customer. The Water Department's service to Aqua PA commenced in Fiscal Year 2002. Water charges for this service include a commodity charge designed to recover power and chemical costs and a fixed charge designed to recover allocated capital costs and all other allocated operation and maintenance expenses, excluding power and chemical costs.

3.1.4.5 Projected Operating Revenues

Table 3-7 summarizes the projected revenues (receipts) for the Study Period.

Table 3-7 Projected Water Receipts Under Existing Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
	Water System ($000s)						
1	Residential	$ 166,402	$ 169,900	$ 171,315	$ 172,440	$ 171,868	$ 171,094
2	Senior Citizens	5,160	5,152	5,080	5,000	4,990	4,988
3	Commercial	73,498	71,664	72,820	74,312	74,514	74,548
4	Industrial	3,145	2,708	2,293	1,945	1,900	1,893
5	Public Utilities	463	489	511	505	504	504
6	**Subtotal General Customers**	**248,668**	**249,914**	**252,019**	**254,201**	**253,776**	**253,027**
7	Housing Authority	6,472	6,554	6,531	6,493	6,488	6,487
8	Charities and Schools	4,398	4,297	4,115	3,931	3,908	3,904
9	Hospitals and Universities	2,206	1,629	1,172	842	800	793
10	Hand Billed	17,826	18,894	19,711	20,514	20,615	20,632
11	Scheduled (Flat Rate)	3	3	5	6	6	6
	Fire Protection						
12	Private	4,042	4,358	4,684	5,034	5,034	5,034
13	Public	7,114	7,114	7,114	7,114	7,114	7,114
14	**Subtotal Retail Customers**	**290,728**	**292,764**	**295,351**	**298,137**	**297,742**	**296,998**
15	Aqua Pennsylvania	3,310	3,329	3,329	3,329	3,329	3,329
16	**Total Water Sales**	**294,038**	**296,093**	**298,680**	**301,466**	**301,071**	**300,328**
17	Other Operating Revenues	13,558	13,554	13,584	13,617	13,607	13,596
	Interest Income						
18	Interest Income on Debt Reserve Account (a)	-	-	-	-	-	-
19	Operating Fund	751	793	814	885	922	966
20	Rate Stabilization Fund	552	549	547	557	582	612
21	**Total Interest Income**	**1,303**	**1,341**	**1,361**	**1,442**	**1,504**	**1,578**
22	**Total Receipts**	**$ 308,899**	**$ 310,988**	**$ 313,625**	**$ 316,525**	**$ 316,182**	**$ 315,501**

(a) Excludes deposit into Residual Fund for Transfer to City General Fund.

3.1.5 Tiered Assistance Program Rate Rider Surcharge

As, previously noted, revenue figures for the Study Period exclude the current TAP-R rate of $1.03/Mcf for water. The TAP-R currently recovers the cost of providing discounts to TAP customers from Non-TAP customers and is subject to an annual reconciliation.

3.1.6 Other Operating Revenues

The Water Department has several sources of other revenues including miscellaneous fees, City and UESF grants, L&I permits, penalties, and releases from the Debt Service Reserve Fund (if available). As noted above, no revenue losses associated with TAP discounts are included under Other Operating Revenues for the development of the Base Rates. Table 3-8 summarizes the other operating revenues for the Water System.

Table 3-8 Other Projected Receipts

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
1	Penalties	$ 3,779	$ 3,774	$ 3,805	$ 3,838	$ 3,827	$ 3,817
2	Miscellaneous City Revenue	719	719	719	719	719	719
3	Other	4,530	4,530	4,530	4,530	4,530	4,530
4	State & Federal Grants	567	567	567	567	567	567
5	Permits Issued by L&I	3,796	3,796	3,796	3,796	3,796	3,796
6	Miscellaneous (Procurement)	167	167	167	167	167	167
7	City & UESF Grants	0	0	0	0	0	0
8	Affordability Program Discount Cost (a)	0	0	0	0	0	0
9	Release from Debt Service Reserve (b)	0	0	0	0	0	0
10	**Total Water Other Income**	**13,558**	**13,554**	**13,584**	**13,617**	**13,607**	**13,596**
	Interest Income						
11	Debt Reserve Fund (c)	0	0	0	0	0	0
12	Operating Fund	751	793	814	885	922	966
13	Rate Stabilization Fund	552	549	547	557	582	612
14	**Total Water System**	**$ 14,861**	**$ 14,895**	**$ 14,944**	**$ 15,059**	**$ 15,110**	**$ 15,173**

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(b) Projected Release from Debt Reserve Account based on outstanding and proposed debt service payments.

(c) Excludes deposit into Residual Fund for Transfer to City General Fund.

3.2 Water Revenue Requirements

3.2.1 Operation and Maintenance Expenses

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the Water System during each year. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities and liquidated encumbrances. Capital and reserve fund transfers required by the General Bond Ordinance are also revenue requirements, but are handled separately from O&M.

Table 3-9 summarizes the results of applying the assumptions described in Section 1.4, as well as after making budget adjustments, applying actual-to-budget factors, escalation factors, and incorporating known future O&M expenses described in Section 1.4.3.

Table 3-9 Projected O&M Expense

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
1	Personal Services	70,056	73,289	77,655	80,391	83,222	86,151
2	Pension and Benefits	58,325	60,544	63,464	65,085	66,645	68,249
3	**Subtotal**	**128,381**	**133,833**	**141,119**	**145,475**	**149,867**	**154,400**
	Purchase of Services						
4	Power	9,374	10,382	10,382	10,537	10,696	10,856
5	Gas	946	1,126	1,126	1,143	1,160	1,178
6	Other	47,072	53,583	56,750	59,360	62,091	64,949
7	**Subtotal**	**57,393**	**65,091**	**68,258**	**71,040**	**73,947**	**76,983**
	Materials and Supplies						
8	Chemicals	19,343	27,595	34,168	38,073	42,425	47,274
9	Other	10,090	10,874	11,603	12,147	12,716	13,313
10	**Subtotal**	**29,433**	**38,469**	**45,770**	**50,220**	**55,141**	**60,587**
11	Equipment	1,942	2,604	2,849	3,038	3,240	3,454
12	Indemnities and Transfers	4,018	4,193	4,356	4,477	4,604	4,737
13	**Subtotal Expenses**	**221,167**	**244,190**	**262,352**	**274,250**	**286,798**	**300,161**
14	Liquidated Encumbrances	(11,722)	(14,255)	(15,790)	(16,842)	(17,985)	(19,229)
15	**Total Expenses**	**209,446**	**229,936**	**246,562**	**257,408**	**268,813**	**280,932**

3.2.2 Debt Service

As discussed earlier in this Report, the General Bond Ordinance views the Water and Wastewater Systems as one combined system for the purposes of the Rate Covenant. As a result, bond issuances are allocated between water and wastewater based on system needs.

The existing and proposed debt service were previously discussed in Sections 1.4.4 and 2.3.4 of this Report. Table 3-10 summarizes the Water System's share of the total existing and proposed debt financing for the Water System CIP.

Table 3-10 Summary of Existing and Proposed Water System Debt Service

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
Revenue Bonds							
1	Existing (a)	$ 66,577	$ 72,886	$ 71,804	$ 71,550	$ 71,464	$ 67,822
	Proposed						
2	Fiscal Year 2023 (b)	-	-	-	-	-	-
3	Fiscal Year 2024 (c)		9,625	14,449	14,449	14,449	14,449
4	Fiscal Year 2025 (c)			9,625	14,449	14,449	14,449
5	Fiscal Year 2026 (d)				10,500	15,256	15,256
6	Fiscal Year 2027 (d)					9,500	13,803
7	Fiscal Year 2028 (d)						18,750
8	**Total Proposed**	**-**	**9,625**	**24,074**	**39,398**	**53,655**	**76,708**
9	**Total Revenue Bonds**	**66,577**	**82,511**	**95,878**	**110,948**	**125,119**	**144,530**
PENNVEST Loans							
10	PENNVEST Loans (e)	4,579	5,324	8,218	11,549	15,451	17,382
Commercial Paper							
11	Commercial Paper	171	314	376	389	497	900
WIFIA							
12	WIFIA	-	17	956	4,812	8,532	16,153
13	**Total Senior Debt Service**	**$ 71,327**	**$ 88,166**	**$ 105,429**	**$ 127,697**	**$ 149,599**	**$ 178,965**

(a) Projected debt service amounts include debt service for all Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2022 and the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022).

(b) Projected debt service for the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022) included with Existing Bonds.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.50% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 6.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(e) Includes projected PENNVEST Loans.

3.2.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Water System required to meet regulatory requirements and maintain existing levels of service. The CIP includes engineering and administrative support, improvements to the water treatment plants, distribution system rehabilitation, large meter replacement including implementation of AMI, billing system replacement and equipment vehicle purchases.

As discussed in Sections 1.4.6 and 2.3.3, Black & Veatch adjusted the Water Department's appropriations-based CIP budget to develop the projected annual encumbrances and anticipated project expenses. Following the steps outlined in Section 1.4.6 produces the CIP shown in Table 3-11.

Table 3-11 Projected Water System CIP

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
1	Engineering and Administration (a)	$ 6,588	$ 5,891	$ 5,330	$ 4,769	$ 4,208	$ 3,647
2	Water Treatment Plant Improvements	73,479	207,565	178,281	71,935	254,854	384,531
3	Distribution System Rehabilitation	123,060	157,100	240,100	135,100	128,100	120,100
4	Large Meter Replacement	5,000	5,000	5,000	5,000	5,000	5,000
5	Billing System	0	0	0	15,000	15,000	15,000
6	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
7	**Total Improvements**	**214,127**	**381,555**	**434,711**	**237,804**	**413,162**	**534,279**
8	Inflation Adjustment (b)	0	0	17,388	19,038	51,589	90,752
9	**Inflated Total**	**214,127**	**381,556**	**452,100**	**256,843**	**464,752**	**625,031**
10	Rollforward Adjustments	(33,216)	88,958	13,142	61,040	(41,615)	(32,095)
11	**Total Inflated Adjusted CIP Budget**	**180,910**	**470,514**	**465,242**	**317,883**	**423,137**	**592,935**
12	Contingency Adjustment	(6,739)	(17,679)	(18,064)	(29,349)	(14,959)	(17,158)
13	**Annual Encumbrances**	174,172	452,834	447,178	288,533	408,178	575,777
14	Project Expenses (c)	136,725	300,115	352,471	301,488	412,029	524,108
15	Annual Net Encumbrances	$ 37,446	$ 152,720	$ 94,707	$ (12,955)	$ (3,851)	$ 51,669

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 4.0 percent per year after fiscal year 2024.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

3.2.4 Capital Flow of Funds

The Water Department meets its projected capital needs by using several sources for funding, including internally generated funds (cash) and debt. As defined by the General Bond Ordinance, the Construction Fund is where the Water Department draws funds to pay for the CIP. The Water Department may deposit bond proceeds, loan proceeds, commercial paper proceeds, and cash transfers from the Revenue Fund and the Residual Fund into the Construction Fund to pay for capital projects.

Table 3-12 presents the proposed sources and uses for the Water System CIP. As shown on Line 6, the Construction Fund has an estimated beginning balance of $169.1 Million on July 1, 2022. Over the course of the Study Period, the Water Department anticipates issuing debt and the proceeds for these transactions are shown on Line 1. The level of debt financing increases during the Study Period as the Water Department's CIP starts to ramp up. The Water System's share of bond proceeds totals $1.35 Billion during the Study Period.

Lines 8 and 9 show the anticipated WIFIA loan and related matching funding proceeds. Line 10 shows the anticipated PENNVEST loan proceeds. Line 15 shows the estimated level of total annual capital expenditures the Water Department will fund. Lines 11 and 12 show the estimated level of annual pay-go (i.e., cash-funded) the Water Department will fund.

Per the City's updated CIP funding policy, total outstanding project encumbrances may not exceed available funds; therefore, the Target Balance on Line 22, which represents the Water Departments estimated outstanding encumbrances (or project commitments) excluding PENNVEST and WIFIA funded projects, should not exceed the ending Construction Fund balance shown on Line 16.

Table 3-12 Projected Flow of Funds – Water: Construction Fund & Debt Reserve Account

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Water System ($000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	155,000	210,000	210,000	210,000	190,000	375,000
	Transfers:						
2	Debt Reserve Account (a)	3,893	-	-	-	-	-
3	Cost of Bond Issuance (b)	900	1,281	1,281	1,281	1,900	3,750
4	Construction Fund (c)	150,208	208,719	208,719	208,719	188,100	371,250
5	**Total Issue**	155,000	210,000	210,000	210,000	190,000	375,000
Construction Fund							
6	Beginning Balance	169,140	225,505	223,797	195,078	283,244	250,597
7	Transfer From Revenue Bond Proceeds	150,208	208,719	208,719	208,719	188,100	371,250
8	WIFIA Proceeds	-	9,063	20,772	47,939	58,563	59,127
9	WIFIA Match Funding Proceeds	-	9,338	20,958	47,915	58,497	59,246
10	PENNVEST Loan Proceeds	26,647	47,625	47,625	47,625	30,493	30,493
11	Capital Account Deposit	9,072	9,426	9,794	10,176	10,573	10,985
12	Transfer from Residual Fund	5,200	12,000	13,800	24,900	30,500	40,800
13	Interest Income on Construction Fund	1,963	2,235	2,084	2,380	2,656	2,745
14	**Total Available**	362,231	523,912	547,549	584,732	662,626	825,243
15	Net Cash Financing Required	136,725	300,115	352,471	301,488	412,029	524,108
16	**Ending Balance**	225,505	223,797	195,078	283,244	250,597	301,135
Capital Program Net Encumbrances							
17	Beginning Balance	181,867	179,848	177,787	144,569	245,211	159,548
18	Annual Encumbrances (excluding PENNVEST & WIFIA)	134,706	254,941	254,235	284,040	188,829	448,931
19	Project Expenses (excluding PENNVEST & WIFIA)	(136,725)	(257,002)	(287,452)	(183,397)	(274,493)	(387,408)
20	**Ending Balance**	179,848	177,787	144,569	245,211	159,548	221,071
21	Allowance Commitments Prior to Bond Issue	42,490	42,372	47,340	31,472	74,822	61,576
22	Target Balance	222,338	220,159	191,909	276,683	234,370	282,647
Debt Reserve Account							
23	Beginning Balance	71,593	75,936	76,563	79,360	82,673	86,571
24	Transfer From Bond Proceeds	3,893	-	-	-	-	-
25	Transfer From Residual Fund	451	626	2,797	3,313	3,898	1,930
26	Debt Reserve Account Release	-	-	-	-	-	-
27	**Ending Balance**	75,936	76,563	79,360	82,673	86,571	88,500
28	Interest Income on Debt Reserve Account	738	762	780	810	846	875

(a) Amount of Debt Reserve Account estimated based on outstanding and proposed debt service payments.

(b) Cost of bonds issuance reflects actual cost in FY 2023, assumed 0.61 percent of issue amount in FY 2024 to 2025, and assumed 1.0% of issuance in FY 2026 to FY 2028.

(c) Deposits equal proceeds from sale of bonds less transfers to Debt Reserve Account and Costs of Issuance.

(d) Transfer from Residual Fund to provide PENNVEST share of Debt Reserve Account requirement.

3.3 Water System Summary of Revenues and Revenue Requirements

The Water System's financial performance during the Study Period is presented in Table 3-13. As seen in Table 3-13, the Water System will need a series of revenue increases, of 18.90% in FY 2024, 9.00% in FY 2025, followed by 12.51%, 9.37%, and 11.62% over the remaining three years of the Study Period. These revenue adjustments are necessary to meet O&M, debt service, Capital Account deposit requirements, and provide additional coverage per the Rate Covenant.

Table 3-13 presents the Water System operating results for Base Rates. The proposed revenue increases in the table do not reflect any rate compression as discussed in Section 2.5.

As previously mentioned, the Water Department is addressing the reconciliation of TAP discounts and TAP-R revenues in a separate proceeding.

3.4 Projected Water System Operating Results

Line 1 on Table 3-13 is the consolidated total for water retail and wholesale receipts from Table 3-7. These represent receipts under existing rates. Lines 2 through 6 present the additional revenues from proposed revenue increases. Line 9 presents other operating receipts as detailed on Table 3-8. Interest income from the Debt Reserve Account, Operating Fund, and Rate Stabilization Funds is shown on Lines 10 through 12. Line 13 summarizes the projected Total Revenues for the Water System.

Operating expenses are summarized on Lines 14 and 15. Line 15 represents the Water System's share of costs to process water treatment sludge at the wastewater treatment plants. Refer to Section 4.6.1 of this Report for further explanation of these costs.

During the Study Period, it is assumed that the Water Department will make a series of deposits to and transfers from the Rate Stabilization Fund as shown on Line 17. Line 18 presents the Net Revenues after Operations. Existing and proposed senior debt service obligations, including those related to the CP program, PENNVEST and WIFIA are shown on Lines 19 through 23. Debt service coverage on senior debt is calculated on Line 25 and indicates that coverage meets the minimum 1.20x requirement. The Capital Account deposit is on Line 29. Line 30 then shows results of the total debt service coverage requirement and indicates that total coverage requirements meet the 1.00 minimum coverage required by the General Bond Ordinance.

As established in the General Bond Ordinance and Rate Covenant, debt service coverage requirements are for the Combined System. The calculations shown in Table 3-13 are presented to demonstrate that the Water System's proposed financial plan provides sufficient resources for the Water System to be financially stable on its own.

Table 3-13 Projected Water System Revenue and Revenue Requirements: Base Rates

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
	Water System ($000s)								
	Operating Revenues								
1	Water Service - Existing Rates (a)			$ 294,038	$ 296,093	$ 298,680	$ 301,466	$ 301,071	$ 300,328
	Additional Service Revenue Required								
	Year	Percent Increase	Months Effective						
2	FY 2024	18.90%	10		45,684	56,451	56,977	56,902	56,762
3	FY 2025	9.00%	10			26,092	32,260	32,218	32,138
4	FY 2026	12.51%	10				39,893	48,804	48,684
5	FY 2027	9.37%	10					33,595	41,052
6	FY 2028	11.62%	10						45,438
7	**Total Additional Service Revenue Required**			-	**45,684**	**82,542**	**129,130**	**171,520**	**224,074**
8	**Total Water Service Revenue**			**294,038**	**341,777**	**381,223**	**430,596**	**472,591**	**524,402**
	Other Income (b)								
9	Other Operating Revenue			13,558	13,554	13,584	13,617	13,607	13,596
10	Debt Reserve Account Interest Income			-	-	-	-	-	-
11	Operating Fund Interest Income			751	793	814	885	922	966
12	Rate Stabilization Interest Income			552	549	547	557	582	612
13	**Total Revenues**			**308,899**	**356,672**	**396,167**	**445,656**	**487,702**	**539,576**
	Operating Expenses								
14	Water Operations			(209,446)	(229,936)	(246,562)	(257,408)	(268,813)	(280,932)
15	Water Treatment Plant Sludge (c)			(14,570)	(16,592)	(18,043)	(20,081)	(21,491)	(22,989)
16	**Total Operating Expenses**			**(224,016)**	**(246,528)**	**(264,605)**	**(277,489)**	**(290,303)**	**(303,921)**
17	Transfer From/(To) Rate Stabilization Fund			710	65	225	(2,160)	(2,920)	(3,000)
18	**NET REVENUES AFTER OPERATIONS**			**85,594**	**110,209**	**131,786**	**166,007**	**194,478**	**232,655**
	Debt Service								
	Senior Debt Service								
	Revenue Bonds								
19	Outstanding Bonds			(66,577)	(72,886)	(71,804)	(71,550)	(71,464)	(67,822)
20	PENNVEST Loans			(4,579)	(5,324)	(8,218)	(11,549)	(15,451)	(17,382)
21	Projected Future Bonds			-	(9,625)	(24,074)	(39,398)	(53,655)	(76,708)
22	Commercial Paper			(171)	(314)	(376)	(389)	(497)	(900)
23	WIFIA			-	(17)	(956)	(4,812)	(8,532)	(16,153)
24	**Total Senior Debt Service**			**(71,327)**	**(88,166)**	**(105,429)**	**(127,697)**	**(149,599)**	**(178,965)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L24)**			**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	**Total Debt Service on Bonds**			**(71,327)**	**(88,166)**	**(105,429)**	**(127,697)**	**(149,599)**	**(178,965)**
29	**CAPITAL ACCOUNT DEPOSIT**			**(9,072)**	**(9,426)**	**(9,794)**	**(10,176)**	**(10,573)**	**(10,985)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**			**1.06 x**	**1.13 x**	**1.14 x**	**1.20 x**	**1.21 x**	**1.22 x**
31	**End of Year Revenue Fund Balance**			**$ 5,194**	**$ 12,616**	**$ 16,564**	**$ 28,133**	**$ 34,307**	**$ 42,704**

(a) Revenue from rates effective September 1, 2022.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

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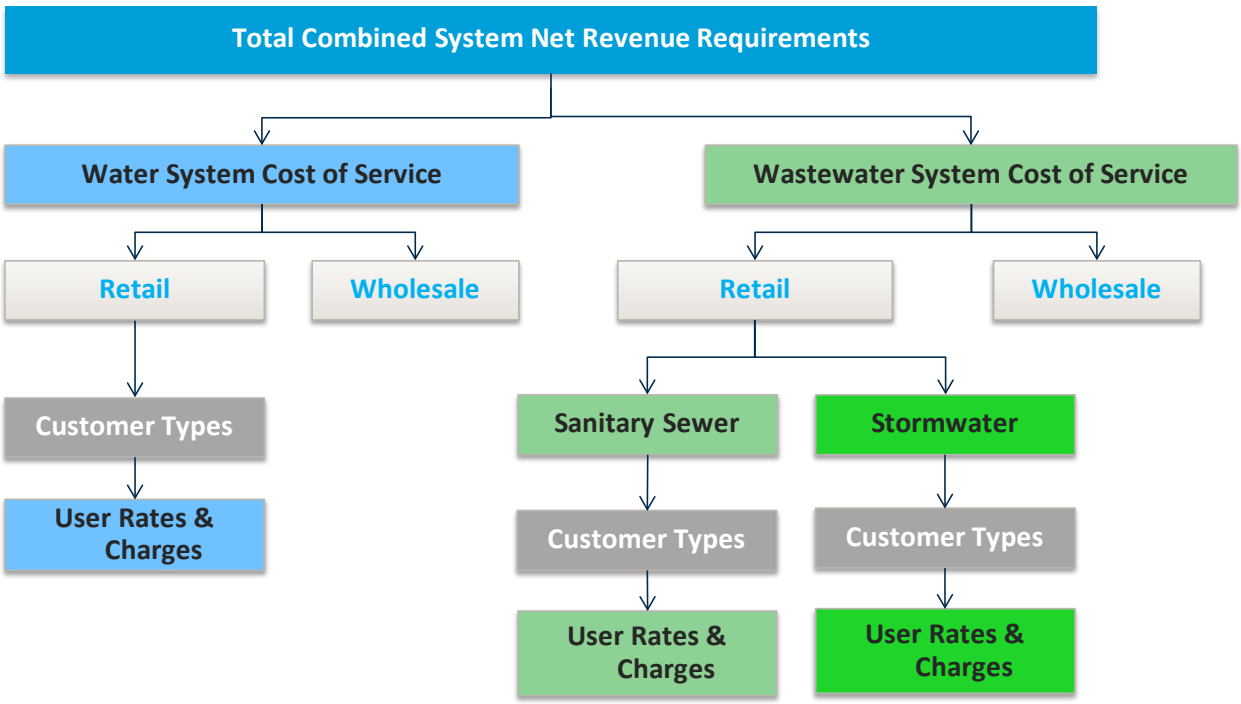
4.0 Water System Cost of Service Allocations

The cost-of-service analysis is the middle step of three depicted in Figure 2-1 that form the basis for how a utility sets its rates and charges. At the cost-of-service stage, we identify how different customer types are using the Water System. As such, each customer type potentially places a different level of demands on the system – requirements that the Water Department must meet. The types of demand are cost drivers and the cost-of-service step is where we develop the nexus between how the system is designed and operated and how customers are using the system.

4.1 General

The cost-of-service process involves a multi-level allocation, where the net revenue requirements for the Combined System are first allocated between water and wastewater, then between customer category (Retail versus Wholesale), and then finally among customer types to determine each type's cost responsibility. This process is illustrated in Figure 4-1.

Figure 4-1 Multi-Layer Allocation of Costs



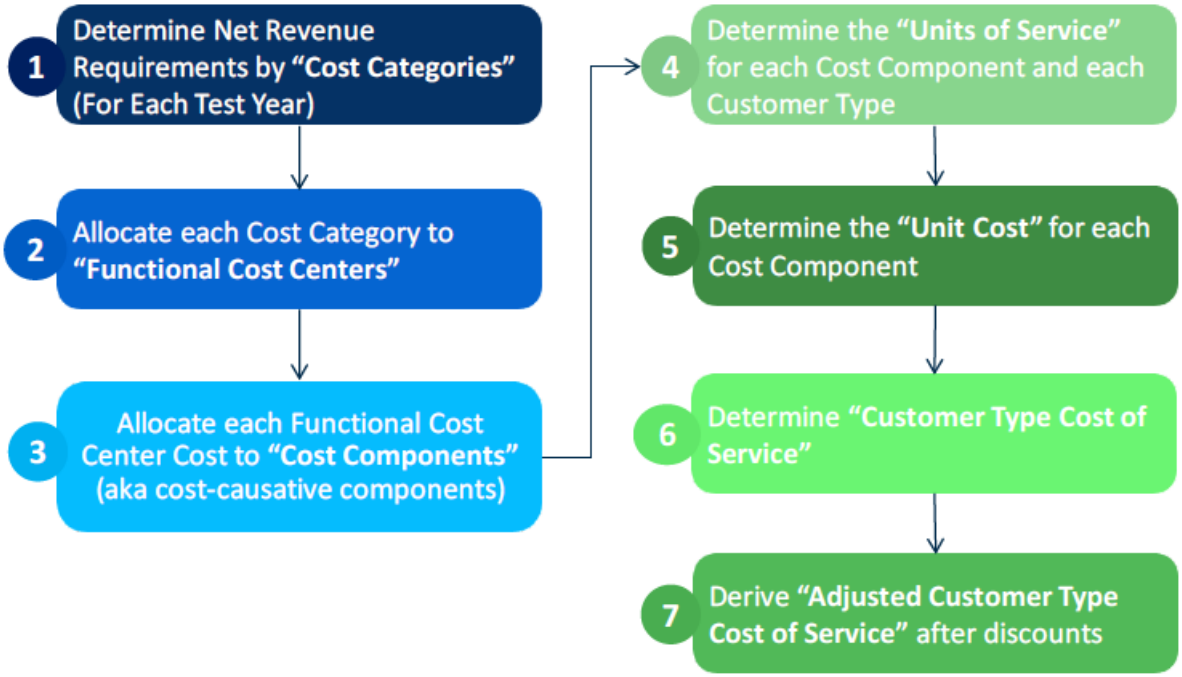
Cost of service is the process by which total net revenue requirements (O&M and capital costs) are allocated to the customer types of the system in proportion to the services received by the customer types. The process typically follows the following steps:

- Identification of net revenue requirements by cost category;

- Allocation of functional cost to appropriate cost centers;
- Allocate functional cost center costs to cost components or drivers;
- Determination of units of service by customer and by cost component;
- Development of unit cost for each cost component;
- Determine the cost of service by each customer type; and
- Apply any appropriate discounts and / or adjustments and derive the Adjusted COS by customer type.

Figure 4-2 shows the typical analytical steps performed as part of a COS study.

Figure 4-2 Seven Analytical Steps for Determining the Cost of Service



4.2 Identification of Net Revenue Requirements by Cost Category

The cash-needs revenue requirements for a utility consist mainly of O&M, debt service, and capital expenditures. These revenue requirements should be identified by cost category or center (function) as best as possible. A function represents the type of operational activity that the costs are used for such as source of supply, pumping, treatment, etc. for water systems. The operational costs can be attributable directly or indirectly to a function. Costs such as engineering, administration, finance, etc. are indirectly allocated based on other costs. The debt service and capital expenditure costs can be attributable to functions based on existing fixed asset records. Figure 4-3 illustrates the Water System cost centers examined in this Report.

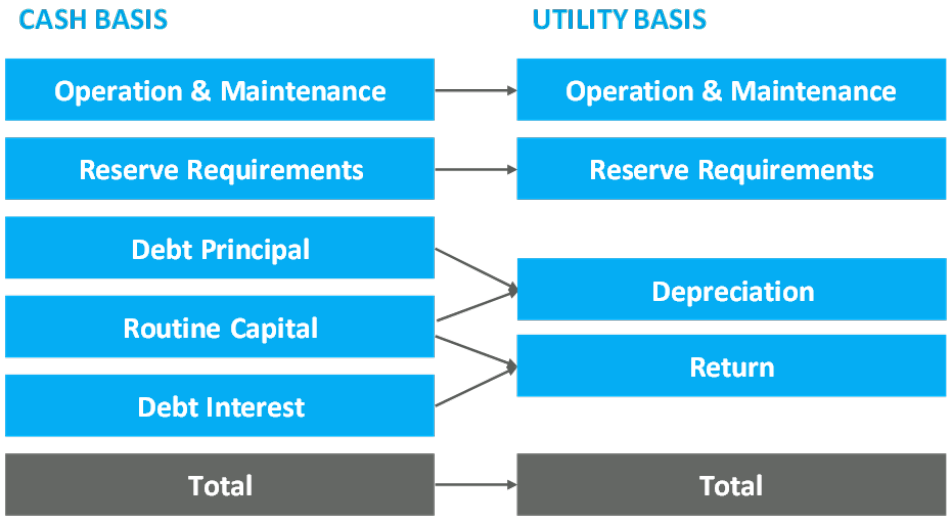
Figure 4-3 Functional Cost Centers

FUNCTIONAL COST CENTERS

- Water Supply
- Raw Water Pumping
- Treatment
- Treated Water Pumping
- Treated Water Storage
- Transmission & Distribution
- Water Meters
- Hydrants
- Customer Accounting & Collection
- Administration & General

O&M, debt service and capital are cost categories used under the cash-needs approach to cost of service. Because the Water Department also provides water services to a wholesale customer, these cost categories are translated into categories used under the utility-basis approach. Under the utility-basis, the relevant cost categories are O&M, depreciation, and return on rate base. Return on rate base recognizes the recovery of return on the Water Department's capital investment. Because the Water Department provides water service to wholesale customers (non-system owners), the Water Department is entitled to a higher rate of return from these customers. Figure 4-4 illustrates how the cash-needs basis cost categories relate to utility-basis cost categories.

Figure 4-4 Relationship Between Cash-Needs Basis and Utility-Basis



The process of allocating the net revenue requirements to the system's users allows recognition of issues such as:

- Differences between service levels
- Differences in user characteristics
- Regulations and covenants that affect user rates and charges
- Nexus between charges and service demands

In the analysis described herein, the cost of the service provided serves as the allocation basis for the Test Year ("TY") revenue requirements to the various customer types. Since the Water Department's Rate Proposal is for two fully projected fiscal years, we are using the naming convention of "Test Year 1" to refer to FY 2024 and "Test Year 2" to refer to FY 2025. Allocations of revenue requirements to customer types account for the quantity of water used relative to peak capacity requirements placed on the system, the number and size of services to customers, proprietary interest in the system investment, and other relevant factors.

4.3 Cost of Service to be Allocated

4.3.1 Overall Water System

The projected annual revenue requirements for FY 2024 serve as the Test Year 1 requirements for the analyses conducted herein. The proposed rate increases will go into effect on September 1st of each respective fiscal year. However, rates are designed based upon a 12-month period. Because the proposed revenue increase will not go into effect until September 1st of each fiscal year, the proposed rates are designed based on annualizing the 10-month period for which rates are effective. Table 4-1 shows the projected Test Year 1 cash flow of base rates for the Water System based on the annualizing the proposed revenue increase.

Table 4-1 Test Year 1 Annualized Revenue and Revenue Requirements

LINE NO.	DESCRIPTION			FY 2024
Water System ($000s)				
Operating Revenues				
1	Water Service - Existing Rates (a)			$ 296,093
	Additional Service Revenue Required			
	Year	Percent Increase	Months Effective	
2	FY 2024	18.90%	12	55,962
3	**Total Additional Service Revenue Required**			**55,962**
4	**Total Water Service Revenue**			**352,055**
	Other Income (b)			
5	Other Operating Revenue			13,554
6	Debt Reserve Fund Interest Income			-
7	Operating Fund Interest Income			793
8	Rate Stabilization Interest Income			549
9	**Total Revenues**			**366,950**
Operating Expenses				
10	Water Operations			(229,936)
11	Water Treatment Plant Sludge (c)			(16,592)
12	**Total Operating Expenses**			**(246,528)**
13	Transfer From/(To) Rate Stabilization Fund			(10,213)
14	**NET REVENUES AFTER OPERATIONS**			**110,209**
Debt Service				
	Senior Debt Service			
	Revenue Bonds			
15	Outstanding Bonds			(72,886)
16	PENNVEST Loans			(5,324)
17	Projected Future Bonds			(9,625)
18	Commercial Paper			(314)
19	WIFIA			(17)
20	**Total Senior Debt Service**			**(88,166)**
21	**TOTAL SENIOR DEBT SERVICE COVERAGE (L14/L20)**			**1.25 x**
22	Subordinate Debt Service			-
23	Transfer to Escrow			-
24	**Total Debt Service on Bonds**			**(88,166)**
25	**CAPITAL ACCOUNT DEPOSIT**			**(9,426)**
26	**TOTAL COVERAGE (L14/(L20+L22+L25))**			**1.13 x**
27	**End of Year Revenue Fund Balance**			**$ 12,616**

(a) Revenue from rates effective September 1, 2022.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

Table 4-2 presents the cost of service to be recovered from rates for Test Year 1. The net COS recovered from water service charges is the total revenue requirements less revenues received from other sources. The TY net COS of $352.1 Million (Column 3, Line 13), represents the total revenue requirements of $367.0 Million (Column 3, Line 10) minus other revenues and transfers received of $14.9 Million (Column 3, Lines 11 and 12). The cost of service to be recovered from rates consists of $248.4 Million of net operating expenses (Column 1, Line 13) and $103.7 Million of net capital-related costs (Column 2, Line 13).

Table 4-2 Water Estimated Test Year 1 COS

LINE NO.	DESCRIPTION	(1) OPERATING EXPENSE	(2) CAPITAL COSTS	(3) TOTAL
Water System ($000s)				
Revenue Requirements				
1	Operations & Maintenance Expense	142,055		142,055
2	Direct Interdepartmental Charges	87,881		87,881
3	Water Treatment Plant Sludge	16,592		16,592
	Existing Bond Debt Service			
4	Revenue Bonds (a)		78,210	78,210
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service (b)		9,956	9,956
7	Capital Account Deposit		9,426	9,426
8	Residual Fund Deposit	9,038	3,578	12,616
9	Deposit (From)/To Rate Stabilization Fund	7,316	2,897	10,213
10	**Total**	**262,882**	**104,068**	**366,950**
Deductions of Funds from Other Sources				
11	Other Operating Revenue	(13,554)	-	(13,554)
12	Interest Income	(961)	(380)	(1,341)
13	**COST OF SERVICE TO BE DERIVED FROM RATES**	**248,368**	**103,687**	**352,055**

(a) Includes PENNVEST Loans.

(b) Includes Commercial Paper and WIFIA

4.3.2 Wholesale Water

The cost of service allocable to Aqua PA and the rates developed to recover the allocated costs, reflect consideration of the contract demands for service as set forth in the contract between Aqua PA and the City, as well as the projected annual water consumption, and the maximum day and hour demands for Aqua PA. The Water Department allocates O&M expenses to Aqua PA in the same manner as for its retail customers. The annual capital costs allocable to Aqua PA recognize annual depreciation expense and return on investment, with the allocable investment based upon the contract maximum day demands versus the design capacity of the various facilities used in the provision of service to Aqua PA. The Water Department uses original cost to allocate plant investment for determining the applicable rate base. This approach is consistent with the methodology applied in previous rate filings and is consistent with the derivation of Aqua PA's existing rates. The rate of return for service to the City's wholesale water and wastewater customers used in this COS Study is 7.5%, which is consistent with the rate of return used in the development of Aqua PA's existing rates. The specific maximum day contract demands for Aqua PA used in the COS analysis amount to 9.5 million gallons per day ("MGD") for the period of July 1, 2023 through June 30, 2025.

As established under the contract, the rates applicable to Aqua PA include a commodity or usage charge, a fixed charge, and a management fee. The commodity charge includes only the costs associated with power and chemicals and applies to Aqua PA's metered consumption. As agreed to by both the City and Aqua PA, the COS analysis limits water loss percentage applied to Aqua PA to 20%. The fixed charge includes the allocated return on investment and depreciation expense, as described above, and the

balance of O&M expenses allocated to Aqua PA, excluding power and chemical costs. The O&M expenses allocable to Aqua PA reflect the relationship of the projected annual consumption, the maximum day demands, and the maximum hour demands from Aqua PA relative to the projected annual usage or production and total maximum day and hour demands of the facilities used by Aqua PA. The management fee amounts to 10% and is applied to the sum of the usage charge and fixed charge.

4.4 Functional Cost Components

The costs derived in revenue requirements are incurred as a result of cost drivers placed on the system by its customers. Many utilities are designed and sized to meet the cost drivers; therefore, the operational and capital costs (depreciation and return on rate base) are linked to these cost drivers. The principal cost drivers for water are volume of water consumed, peak water demands, number of customers, and the number of fire services.

Figure 4-5 Functional Cost Components

COST COMPONENTS

- **Wholesale (Aqua PA)**
- Base
- Maximum Day
- Maximum Hour
- Meters
- Billing & Collection
- Fire Protection

The various cost elements of water service are assigned to functional cost components as the first step in the subsequent distribution of the cost of service to the customer types. For the analyses conducted herein, the Base-Extra Capacity Method[19] as outlined in the AWWA M1 Manual is used. This COS allocation methodology uses base, extra-capacity, customer, and fire protection functional cost centers as listed in Figure 4-5.

- Base costs are those which vary directly with the quantity of water used, as well as those costs associated with serving customers under average load conditions without the elements necessary to meet peak demands. Base costs include purchased treatment chemicals, and other operating and capital costs of the water system associated with serving customers to the extent required for a constant, or average annual rate of use.
- Extra capacity costs represent those operating costs incurred due to demands in excess of average, and capital-related costs for additional plant and system capacity beyond that required for the average rate of use. Total extra capacity costs are subdivided into costs associated with maximum day and maximum hour demands.
- Customer costs are defined as costs that tend to vary in proportion to the number of customers connected to the system. These include meter reading, billing, collection and accounting costs, and maintenance and capital charges associated with meters and services.
- Fire Protection costs assigned to fire protection include operating expenses and capital costs associated with public and private fire protection.

The separation of costs of service into these principal categories provides the means of further allocating such costs to the various customer types based on the respective base, extra capacity, customer, and fire service requirements of each customer type.

[19] Per the AWWA M1 Manual, the Base-Extra Capacity Method is one of the "two most widely used methods" of allocating annual cost of service to cost components. Black & Veatch employs this methodology as appropriate in other cost of service studies and it has been used for allocating the Water Department's retail cost to the various cost components for years.

4.5 Allocation to Cost Components

Under Step 4 of the process, we determine units of service for each cost component and each customer type.

The Water System is comprised of various facilities, each designed and operated to fulfill a given function. To provide adequate service to its customers, the Water System must be capable of providing not only the total amount of water used but also supplying water at the maximum rates of demand.

4.5.1 Base, Maximum Day, and Maximum Hour

Since all customers do not exert their maximum demand for water at the same time, capacities of the various water system components are designed to meet the peak coincidental demands that all types of customers place on the system. For every water service facility on the system, there is an underlying average demand, or uniform rate of usage exerted by the customers for which the base cost component is applicable. For those facilities designed solely to meet average day demand, costs are allocated 100% to the base cost component. Extra capacity requirements associated with coincidental demands in excess of average use are further related to maximum daily ("max day") and maximum hourly ("max hour") demands.

For volume-related cost allocations, the first step in determining the allocation percentages is to assign system peaking factors. The base element is equal to the average daily demand ("ADD") and assigned a value of 1.0. For the Water System, max day and max hour ratios by Water System Facilities were reviewed.

As an example of how to interpret peaking factors and their relationship with base-extra capacity, we will use for illustrative purposes, the Water System's raw water pumping max day demand factor of 1.39 times the ADD for max day allocations. The costs associated with facilities required to meet maximum day demand are allocable to base and maximum day extra capacity as follows:

Base = (1.0/1.39) x 100 = 72%

Max Day = (1.39 – 1.0)/1.4 x 100 = 28%

These calculations indicate that the average or base use requires 72% of the capacity of facilities designed and generated to meet average day demand and the remaining 28% meets maximum day extra capacity requirements.

The Water System's treated water delivered max hour demand factor of 2.09 times the ADD and max day demand factor of 1.30 times the ADD for max hour allocations. The costs associated with facilities required to meet maximum hour demand are allocable to base, maximum day extra capacity and maximum hour extra capacity as follows:

Base = (1.0/2.09) x 100 = 48%

Max Day = (1.3 – 1.0)/2.09 x 100 = 14%

Max Hour = (2.09 – 1.3)/2.09 x 100 = 38%

4.5.2 Units of Service

The estimated Test Year 1 value of Water System facilities is allocated to appropriate cost functions as the basis for further distribution to the various customer types.

Base costs vary with the volume of water used and distributed to customer types on that basis. Extra Capacity costs are those associated with meeting peak rates of water use and distributed to customer types based on the respective customer type capacity requirements in excess of average rates of use. The number of bills for each customer type serves as the basis for distributing customer billing requirements. Customer meter and fire protection requirements are allocated based on the number of equivalent meters. The estimated number of equivalent meters for each customer type is based on the total number of various sizes of meters serving respective types and the capacity ratio of the meters for the various sizes to the cost of 5/8-inch meters. Table 4-3 summarizes the equivalent meter ratios and billing ratios used in this Report.

Table 4-3 Equivalent Meter and Bill Ratios

		(1)	(2)
		EQUIVALENT FACTORS	
LINE NO.	METER SIZE (INCHES)	METERS CAPACITY BASIS	BILLS
1	5/8	1.0	1.0
2	3/4	1.5	1.0
3	1	2.5	1.1
4	1-1/4	3.8	1.2
5	1-1/2	5.0	1.2
6	2	8.0	1.5
7	3	15.0	2.0
8	4	25.0	4.0
9	6	50.0	7.0
10	8	80.0	10.0
11	10	115.0	15.0
12	12	215.0	20.0

With respect to Fire Protection, Fire Protection Extra Capacity requirements are based on peak fire flow requirements reflected in previous COS studies and rate proceedings. The system wide fire protection demands reflect two simultaneous fires, one requiring 10,000 gallons per minute ("gpm") fire flow demand for 10 hours and the second requiring 5,000 gpm for 8 hours. Fire protection capacity requirements are allocated between Public Fire Protection and Private Fire Protection in proportion to the relative total number of equivalent fire connections in each type.

Table 4-4 summarizes the estimated Test Year 1 units of service for the Water System's retail customers. Estimates of test year annual water requirements, shown in Column 1, are based on the projections of total water sales developed in this Report. Column 2 presents the average daily use of all water sales. Columns 3 through 8 show the estimated maximum day and maximum hour capacity factors for each customer type, the resulting demands, and extra capacity requirements, respectively. We derived the customer type extra capacity factors based on previous COS studies and rate proceedings.

Based on our experience, we believe that the capacity factors determined in this analysis are reasonable. Generally, the peak water usage characteristics vary among the different customer types as follows:

- Residential customers place a higher peak demand on the water system than the non-residential customers. For example, the Residential customers typically would have high water usage in the morning due to shower and other morning chores and similarly may reflect a high usage in the evening when residents are usually back home from work/school, etc.
- The Senior Citizen and PHA types are projected to have usage patterns closely related to the Residential customers.
- Within the non-residential group, typically Commercial customer types and others including Charities and Schools are likely to have higher demand during business hours and very low demand during non-business hours.
- Industrial customer type usually has low peaking factors, as industrial enterprises often have very stable pattern of water usage. Industrial use is generally spread more uniformly throughout the day and hence their maximum rates of use vary less from their average day use.

To verify the reasonableness of the capacity factors, the system peak demand diversity factors were verified based on the capacity factors are within the AWWA industry acceptable range of 1.1 to 1.4.

In the following sections, we discuss the results of conducting Steps 5 through 7 of the COS process. The purpose of each of these remaining steps is outlined in Figure 4-6.

Figure 4-6 COS Steps 5 through 7

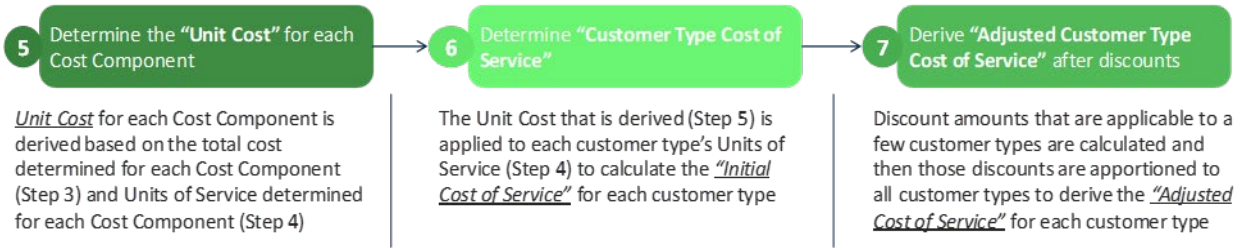


Table 4-4 Test Year 1 Retail Units of Service

LINE NO.	CUSTOMER TYPE	(1) TOTAL TEST YEAR WATER USE	(2) AVERAGE DAILY WATER USE (BASE)	(3) MAXIMUM DAY EXTRA CAPACITY CAPACITY FACTOR	(4) MAXIMUM DAY EXTRA CAPACITY TOTAL CAPACITY	(5) MAXIMUM DAY EXTRA CAPACITY EXTRA CAPACITY (a)	(6) MAXIMUM HOUR EXTR CAPACITY CAPACITY FACTOR	(7) MAXIMUM HOUR EXTR CAPACITY TOTAL CAPACITY	(8) MAXIMUM HOUR EXTR CAPACITY EXTRA CAPACITY (b)	(9) CUSTOMER COSTS METERS	(10) CUSTOMER COSTS BILLS
		Mcf	Mcf/day	%	Mcf/day	Mcf/day	%	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills
			(1) / 365		(2) x (3) /100	(4) - (2)		(2) x (6) / 100	(7) - (4)		
1	Residential	3,084,500	8,450	200	16,900	8,450	360	30,420	13,520	488,873	5,378,984
2	Senior Citizens	120,300	330	200	660	330	360	1,190	530	21,191	254,101
3	Commercial	1,607,100	4,400	180	7,920	3,520	265	11,660	3,740	142,094	585,801
4	Industrial	61,100	170	160	270	100	200	340	70	6,025	18,280
5	Public Utilities	10,600	30	160	50	20	200	60	10	1,788	4,396
6	**Total General Service**	**4,883,600**	**13,380**		**25,800**	**12,420**		**43,670**	**17,870**	**659,971**	**6,241,562**
7	Housing Authority	152,900	420	190	800	380	313	1,310	510	9,146	70,191
8	Charities & Schools	125,500	340	180	610	270	270	920	310	12,854	33,474
9	Hospital/University	53,000	150	180	270	120	233	350	80	1,308	2,442
10	Hand Billed	525,100	1,440	180	2,590	1,150	270	3,890	1,300	6,468	9
11	Scheduled (Flat Rate)	100	0	200	0	0	360	0	0	10	120
	Fire Protection (c)										
12	Public		0		800	800		2,090	1,290		
13	Private	0	0		310	310		800	490	9,641	864,791
14	**Total Retail Customers**	**5,740,200**	**15,730**		**31,180**	**15,450**		**53,030**	**21,850**	**699,398**	**7,212,589**

(a) Capacity in excess of average daily use.
(b) Capacity in excess of maximum day.
(c) System wide fire protection demands reflect two simultaneous fires, one requiring 10,000 gallons per minute (gpm) fire flow demand for 10 hours and the second requiring 5,000 gpm for 8 hours. These demands are allocated between standard pressure public fire service and private fire service based upon equivalent 6-inch connections for each of the two fire service classes.

Mcf - thousand cubic feet

4.6 Allocation of O&M Expense

4.6.1 Retail

Table 4-5 shows the allocation of Test Year 1 O&M expenses for the Water System to the identified functional cost components by cost center. The four key components of the Water System's portion of the Operating expenses are: (i) the O&M expense, (ii) the deposit to the Rate Stabilization Fund, (iii) the year-end Revenue Fund balance which is deposited into the Residual Fund and (iv) the cost of treating and disposing water treatment plant sludge that is discharged into the City's Wastewater System. The water treatment plant sludge expense of $16.6 Million is shown in Line 3 of Table 4-2. A corresponding credit for this amount is shown in the wastewater COS in Table 7-2.

The projected net O&M expense for Test Year 1 is $248.4 Million. Operation and Maintenance expense is allocated to water cost components generally in the same proportion as the plant investment and depreciation expense allocations.

The Test Year 1 O&M costs are allocated to the cost components using a two-step process.

- First, a portion of O&M costs are allocated to wholesale water contract customers.
- Then the retail portion of the total O&M (which is the total O&M expense less the proportionate share allocated to wholesale contract customers), is allocated to the cost components.

The O&M expenses that are directly allocable to Aqua PA are deducted from the total expenses shown in Column 1 of Table 4-5. The remaining expenses are allocated to the retail customer types as follows:

- Source of Supply: Raw water pumping expense, other than purchased power, is allocated 72% to Base and 28% to Maximum Day cost components. The power costs associated with raw water pumping is allocated 95% to Base and 5% to Maximum Day cost components in recognition of the operating characteristics of pumps and the demand structure of electric rates.
- Water Treatment Costs: Different expense items within the water treatment costs are allocated differently to the cost components.
  - Projected test year operating expense, exclusive of power, chemical costs, and sludge treatment and disposal costs, for the Baxter, Queen Lane, and Belmont treatment plants is allocated 72% to Base and 28% to Maximum Day Extra Capacity.
  - Chemical costs and sludge treatment and disposal costs, which generally vary directly with the quantity of water treated, are assigned 100% to the Base cost component.
  - Test year treated water pumping operating expenses, exclusive of power costs, are allocated 48% to Base, 14% to Maximum Day Extra Capacity, and 38% to Maximum Hour Extra Capacity cost components.
  - Treatment plant power costs are allocated 90% to Base, 5% to Maximum Day Extra Capacity and 5% to Maximum Hour Extra Capacity in recognition of the effect of the demand structure of electric rates.

Table 4-5 Allocation of Test Year 1 O&M Expense

LINE NO.	CUSTOMER TYPE	(1) TEST YEAR O&M EXPENSE	(2) BASE	(3) EXTRA CAPACITY MAX DAY IN EXCESS OF BASE	(4) EXTRA CAPACITY MAX HOUR IN EXCESS OF MAX DAY	(5) CUSTOMER COSTS METERS	(6) CUSTOMER COSTS BILLING	(7) PUBLIC FIRE PROTECTION - DIRECT STANDARD PRESSSURE	(8) PUBLIC FIRE PROTECTION - DIRECT WHOLESALE DIRECT
WATER SYSTEM ($)									
	Raw Water Pumping								
1	Purchased Power	$ 3,681,000	$ 3,461,000	$ 182,000					$ 38,000
2	Purchased Gas	1,000	1,000	-					-
3	Other	5,451,000	3,865,000	1,503,000					83,000
4	**Total Raw Water Pumping**	**9,133,000**	**7,327,000**	**1,685,000**	**-**	**-**	**-**	**-**	**121,000**
	Purification and Treatment								
	Power and Pumping (a)								
5	Purchased Power	4,945,000	4,406,000	245,000	244,000				50,000
6	Purchased Gas	754,000	358,000	104,000	284,000				8,000
7	Other	10,177,000	4,810,000	1,403,000	3,808,000				156,000
	Treatment								-
8	Purchased Power	-	-	-	-				-
9	Purchased Gas	45,000	32,000	13,000	-				-
10	Chemicals	23,109,000	22,873,000						236,000
	Other								-
11	Other	48,719,000	34,541,000	13,432,000					746,000
12	Water Treatment Plant Sludge	16,592,000	16,381,000						211,000
13	Subtotal Other (b)	65,311,000	50,922,000	13,432,000	-	-	-	-	957,000
14	**Total Purification and Treatment**	**104,341,000**	**83,401,000**	**15,197,000**	**4,336,000**	**-**	**-**	**-**	**1,407,000**
	Transmission and Distribution								
15	Mains	64,023,000	30,548,000	8,910,000	24,184,000				381,000
16	Meters	2,539,000				2,539,000			
17	Hydrants	543,000						543,000	
18	Filtered Water Storage	8,436,000	3,960,000	1,155,000	3,134,000				187,000
19	**Total Transmission and Distribution**	**$ 75,541,000**	**$ 34,508,000**	**$ 10,065,000**	**$ 27,318,000**	**$ 2,539,000**	**$ -**	**$ 543,000**	**$ 568,000**

Table 4-5 Allocation of Test Year 1 O&M Expense (continued)

LINE NO.	CUSTOMER TYPE	(1) TEST YEAR O&M EXPENSE	(2) BASE	(3) EXTRA CAPACITY MAX DAY IN EXCESS OF BASE	(4) EXTRA CAPACITY MAX HOUR IN EXCESS OF MAX DAY	(5) CUSTOMER COSTS METERS	(6) CUSTOMER COSTS BILLING	(7) PUBLIC FIRE PROTECTION - DIRECT STANDARD PRESSSURE	(8) PUBLIC FIRE PROTECTION - DIRECT WHOLESALE DIRECT
WATER SYSTEM ($)									
20	Customer Accounting and Collection	$ 23,521,000					$ 23,521,000		$ -
21	**Subtotal**	**212,536,000**	**125,236,000**	**26,947,000**	**31,654,000**	**2,539,000**	**23,521,000**	**543,000**	**2,096,000**
22	Administrative and General	33,994,000	16,169,000	5,493,000	6,475,000	528,000	4,893,000	113,000	323,000
23	Subtotal Water Operating Expense	246,530,000	141,405,000	32,440,000	38,129,000	3,067,000	28,414,000	656,000	2,419,000
24	Residual Fund Deposit	9,038,000	5,184,000	1,189,000	1,398,000	112,000	1,042,000	24,000	89,000
25	Deposit (from) to RSF	7,316,000	4,196,000	963,000	1,132,000	91,000	843,000	19,000	72,000
26	**Total Water Operating Expense**	**262,884,000**	**150,785,000**	**34,592,000**	**40,659,000**	**3,270,000**	**30,299,000**	**699,000**	**2,580,000**
27	Other Operating Revenue	13,554,000	7,828,000	1,795,000	2,110,000	169,000	1,572,000	36,000	44,000
28	Non-Operating Income	961,000	551,000	126,000	149,000	12,000	111,000	3,000	9,000
29	**Total Net Operating Expense**	**$ 248,369,000**	**$ 142,406,000**	**$ 32,671,000**	**$ 38,400,000**	**$ 3,089,000**	**$ 28,616,000**	**$ 660,000**	**$ 2,527,000**

(a) Includes booster pumping.
(b) Includes Wastewater System cost of treating water treatment plant sludge of $16,592,000.

- Water Treatment Sludge Costs: As shown in Line 12 in Table 4-5, the water treatment sludge O&M cost for FY 2024 is determined to be $16.6 Million. This cost represents the cost of treating the water treatment plant sludge. The water treatment sludge, which is discharged into the Wastewater System, is ultimately treated in the wastewater treatment facility, and thereby becomes a wastewater treatment cost. This wastewater treatment cost is appropriately charged back to the Water System.
- Transmission and Distribution: Transmission and distribution test year operating expenses associated with mains and reservoirs are allocated to Base, Maximum Day Extra Capacity, and Maximum Hour Extra Capacity cost components, with factors identical to that of the Treated Water Pumping operation and maintenance expense allocation, discussed above.
- Customer Meters and Public Fire Protection: Meter maintenance expense is allocated 100% to the Meter component of Customer costs. Projected fire hydrant maintenance expense is allocated 100% to Direct Public Fire Protection cost component. Test year customer accounting and collection is allocated 100% to the Billing component of Customer costs.
- Administrative and General: Administrative and general expense is allocated to cost components in proportion to the total allocation of all other expenses to the cost components, excluding expenses for power, chemicals, and water treatment sludge.
- Residual Fund and Rate Stabilization Fund Transfers: The deposit into the Residual Fund (Line 24) and the deposit from the Rate Stabilization Fund (Line 25), each of which is allocable to O&M expense, are allocated to the various cost components in proportion to the allocation of the Subtotal Water Operating Expense (Line 23).
- Net Operating Expense: The net operating expense to be recovered from all customers through charges for water service is derived by deducting the "Other Operating Revenue" and the non-operating "Interest Income" from the total operating expense.
  - Other operating revenue (Line 27) is allocated to the various O&M cost components, in proportion to the allocation of the Subtotal Water Operating Expense (Line 23).
  - The non-operating interest income (Line 28) is allocated to the various O&M cost components, in proportion to the allocation of the Subtotal Water Operating Expense (Line 22).
  - The total net operation and maintenance expense of $248.4 Million to be recovered from water rates is shown on Line 29.

4.6.2 Wholesale

Currently, Aqua Pennsylvania is the only wholesale water customer. O&M expenses are allocated to Aqua Pennsylvania taking into considerations their projected annual usage and maximum day demands for service relative to the annual production and maximum day demand of the overall Water System, excluding costs associated with mains less than 24 inches in diameter. As shown in Column 8 of Table 4-5, a total of $2.53 Million of Test Year 1 O&M expense has been allocated to Aqua PA.

4.7 Allocation of Net Plant Investment

Table 4-6 summarizes the test year investment in the Water System used in the allocation of test year capital related costs of service. The total Test Year 1 investment of $1.79 Billion is the total original cost investment in facilities as of June 30, 2022.

4.7.1 Retail

The Test Year 1 plant investment is allocated to the cost components using a two-step process.

- First, a portion of the Water System plant investment costs are allocated to wholesale water customers.
- Then the retail portion of the total plant investment costs (which is the total plant investment less the proportionate share allocated to wholesale customers), are allocated to the other five cost components (Base, Extra Capacity (Max Day and Max Hour), Customer, and Public Fire Protection).

  After deducting the investment directly allocable to Aqua PA, the balance of the plant investment is allocated to retail customers as follows:

- Source of Supply (Raw Water): The investment in the source of supply facilities shown in Lines 1 and 2 includes the Fairmont Dam and associated structures and equipment. These facilities are designed to meet average annual water supply requirements and are allocated 100% to the Base cost component.
- Raw Water Pumping: Lines 3 and 4 reflect investment in the Baxter, Queen Lane, and Belmont raw water intakes, buildings, structures, and raw water pumping equipment. These facilities not only supply the average annual volume needs but are also designed to meet the capacity needs of maximum day requirements. Hence, investment in these facilities is allocated 72% to Base cost component and 28% to Maximum Day Extra Capacity cost component.

Table 4-6 Allocation of Test Year 1 Net Plant Investment to Functional Cost Components

LINE NO.	CUSTOMER TYPE	(1) ESTIMATED PLANT INVESTMENT	(2) BASE	(3) EXTRA CAPACITY MAX DAY IN EXCESS OF BASE	(4) EXTRA CAPACITY MAX HOUR IN EXCESS OF MAX DAY	(5) PUBLIC FIRE PROTECTION CUSTOMER METERS	(6) PUBLIC FIRE PROTECTION DIRECT STANDARD PRESSURE	(7) WHOLESALE DIRECT
WATER SYSTEM ($)								
	Raw Water Supply and Pumping							
	Source of Supply							
1	Land	$ 200,000	$ 200,000					
2	Buildings and Equipment	4,218,000	4,218,000					
	Power and Pumping							
3	Land	31,000	22,000	9,000				-
4	Buildings and Equipment	49,689,000	35,365,000	13,753,000				571,000
5	**Total Raw Water Supply and Pumping**	**54,138,000**	**39,805,000**	**13,762,000**	-	-	-	**571,000**
	Purification and Treatment							
	Power and Pumping (a)							
6	Land	71,000	34,000	10,000	26,000			1,000
7	Buildings and Equipment	92,806,000	43,801,000	12,775,000	34,677,000			1,553,000
	Treatment							
8	Land	1,325,000	937,000	365,000				23,000
9	Buildings and Equipment	392,214,000	277,481,000	107,909,000				6,824,000
10	**Total Purification and Treatment**	**486,416,000**	**322,253,000**	**121,059,000**	**34,703,000**	-	-	**8,401,000**
	Transmission and Distribution							
11	Mains	980,550,000	468,469,000	136,637,000	370,872,000			4,572,000
12	Meters	46,227,000				46,227,000		-
13	Hydrants	9,200,000					9,200,000	-
	Filtered Water Storage							
14	Land	182,000	86,000	25,000	68,000			3,000
15	Buildings and Equipment	142,717,000	67,312,000	19,633,000	53,289,000			2,483,000
16	**Total Transmission and Distribution**	**1,178,876,000**	**535,867,000**	**156,295,000**	**424,229,000**	**46,227,000**	**9,200,000**	**7,058,000**
17	**Subtotal**	**1,719,430,000**	**897,925,000**	**291,116,000**	**458,932,000**	**46,227,000**	**9,200,000**	**16,030,000**
	Administrative and General (b)							
18	Land	205,000	106,000	35,000	55,000	6,000	1,000	2,000
19	Buildings and Equipment	70,524,000	36,829,000	11,940,000	18,823,000	1,896,000	377,000	659,000
20	**Total Administrative and General**	**70,729,000**	**36,935,000**	**11,975,000**	**18,878,000**	**1,902,000**	**378,000**	**661,000**
21	**Total Water Plant Investment**	**$ 1,790,159,000**	**$ 934,860,000**	**$ 303,091,000**	**$ 477,810,000**	**$ 48,129,000**	**$ 9,578,000**	**$ 16,691,000**

(a) Includes booster pumping

(b) Administrative and General allocated based on allocation of system investment.

- Treated Water Pumping: The investment in treated water pumping facilities at all three treatment plants, as well as the booster pumping stations in the distribution system, is included in Lines 6 and 7. These facilities are designed to fulfill maximum hour capacity needs in addition to meeting the Base and Maximum Day requirements. Hence, the retail portion of the plant investment costs of these facilities are allocated 48% to Base, 14% to Maximum Day Extra Capacity, and 38% to Maximum Hour Extra Capacity cost components.
- Water Treatment: The water purification and treatment facilities at the Baxter, Queen Lane, and Belmont treatment plants are designed to provide maximum day capacity needs. Hence, 72% of these costs are allocated to the Base cost component and 28% to the Maximum Day Extra Capacity cost component. The investment for Treatment is shown in Lines 8 and 9.
- Transmission and Distribution: Transmission and distribution investment, including transmission and distribution mains, and filtered water storage facilities are designed to meet maximum hour requirements of the system. Investment in these facilities is therefore allocated to Base, Maximum Day Extra Capacity, and Maximum Hour Extra Capacity cost components, with factors identical to that of the Treated Water Pumping allocation, discussed above.
- Customer Meters and Public Fire Protection: Investments in customer meters are entirely allocable to the Customer Meters cost component. Public fire protection service is comprised of the standard pressure fire system. Investment in public fire protection facilities is allocated 100% to the Public Fire Protection component.
- General Plant and Equipment: Other general plant and equipment investments are allocated to all the cost components based on the proportion of the total non-general plant and equipment component cost to the total plant investment cost.

4.7.2 Wholesale

Aqua PA is allocated a share of total Water System investment in large transmission mains, defined as 24 inch and larger mains, as well as raw water and treated water storage and pumping facilities, and a share of the investment in the Baxter, Queen Lane, and Belmont treatment facilities.

The plant investment costs are allocated to Aqua PA based on the proportionate share of their contract capacity in the various facilities relative to the total design capacity of the various facilities. Aqua PA's contract capacity in the various classes of facilities is in the range of 1.15% to 1.74% of the total design capacity of the facilities.

As shown in Column 7 of Table 4-6, a total of $16.69 Million of test year net plant investment has been allocated to Aqua PA. The associated return on investment at 7.50% is $1,252,000.

4.8 Allocation of Depreciation Expense

Table 4-7 shows the estimated annual depreciation expense of the Water System and it is estimated to be $41.7 Million for the Test Year 1. As shown on Line 14, the total depreciation expense allocated to Aqua PA is $403,000.

The annual depreciation expense to be distributed to Water System cost components is based on the application of appropriate depreciation expense rates to the various categories of Water System facilities. The various items of depreciation expense are allocated to cost components on the same basis as the proportion of plant investment costs allocated to each of those cost components.

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Table 4-7 Allocation of Test Year 1 Depreciation Expense

LINE NO.	CUSTOMER TYPE	(1) ESTIMATED PLANT INVESTMENT	(2) BASE	(3) EXTRA CAPACITY MAX DAY IN EXCESS OF BASE	(4) EXTRA CAPACITY MAX HOUR IN EXCESS OF MAX DAY	(5) PUBLIC FIRE PROTECTION CUSTOMER METERS	(6) PUBLIC FIRE PROTECTION DIRECT STANDARD PRESSURE	(7) WHOLESALE DIRECT
WATER SYSTEM ($)								
	Raw Water Supply and Pumping							
1	Source of Supply	$ 105,000	$ 105,000	$ -				
2	Power and Pumping	1,039,000	739,000	288,000				12,000
3	**Total Supply and Pumping**	**1,144,000**	**844,000**	**288,000**	**-**	**-**	**-**	**12,000**
	Purification and Treatment							
4	Power and Pumping (a)	1,840,000	868,000	253,000	688,000			31,000
5	Treatment	8,983,000	6,355,000	2,472,000				156,000
6	**Total Purification and Treatment**	**10,823,000**	**7,223,000**	**2,725,000**	**688,000**	**-**	**-**	**187,000**
	Transmission and Distribution							
7	Mains	18,433,000	8,807,000	2,569,000	6,971,000			86,000
8	Meters	3,236,000				3,236,000		-
9	Hydrants	230,000					230,000	-
10	Filtered Water Storage	5,638,000	2,659,000	776,000	2,105,000			98,000
11	**Total Transmission and Distribution**	**27,537,000**	**11,466,000**	**3,345,000**	**9,076,000**	**3,236,000**	**230,000**	**184,000**
12	**Subtotal**	**39,504,000**	**19,533,000**	**6,358,000**	**9,764,000**	**3,236,000**	**230,000**	**383,000**
13	Administrative and General	2,151,000	1,124,000	364,000	574,000	58,000	11,000	20,000
14	**Total Water Plant Depreciation Expense**	**$ 41,655,000**	**$ 20,657,000**	**$ 6,722,000**	**$ 10,338,000**	**$ 3,294,000**	**$ 241,000**	**$ 403,000**

(a) Includes booster pumping

4.9 Wholesale Cost of Service Allocations

Table 4-8 summarizes the COS allocations for Aqua PA based on the discussions presented above.

Table 4-8 Summary of Test Year 1 COS Allocated to Aqua PA

LINE NO.	DESCRIPTION	(1) ALLOCATED INVESTMENT	(2) COST OF SERVICE
1	Operating Expense		$ 2,527,000
2	Depreciation Expense		403,000
3	Return on Investment		
4	Allocated Investment	16,691,000	
5	Return @ 7.50%		1,252,000
6	**Total Allocated Cost of Service**		**$ 4,182,000**

4.10 Distribution of Costs to Customer Types

The cost of service is distributed to customer types by applying the unit costs to the individual customer types' units of service. Applying the unit costs of service to the number of units for which the customer type is responsible produces the customer type responsibility. The costs attributable to each customer type are based on the functional cost components described in earlier in this Report. Each customer type places a burden on the system in different ways and thus the allocation of the units is representative of this burden.

Table 4-9 presents the derivation of the unit costs of service for the Retail customers. Table 4-10 summarizes the distribution of the costs to the different customer types utilizing these unit costs. The total COS for each customer type is the sum of each type's units of service multiplied by the unit costs for the functional cost component.

As discussed earlier, the Water Department provides discounts to select customers. The cost of these discounts is not directly charged to customers. Instead, these costs are reallocated to the other retail customers in proportion to their allocated COS, as shown in Columns 2 to 4 of Table 4-11. The test year adjusted COS, reflecting the reallocation of these costs, is shown in Column 5.

Table 4-12 compares the total adjusted COS for each customer type to their respective revenues under existing rates. The indicated increase or decrease in the revenue required to meet the adjusted COS is shown in Column 3.

Table 4-9 Test Year 1 Retail Unit Costs of Service

LINE NO.	CUSTOMER TYPE	(1) TOTAL ALLOCATED COST OF SERVICE	(2)	(3) EXTRA CAPACITY	(4) EXTRA CAPACITY	(5) CUSTOMER COSTS	(6) CUSTOMER COSTS	(7) Direct Public Fire Protection
				MAX DAY	MAX HOUR IN EXCESS OF MAX DAY	METERS	BILLING	
Water System ($)								
	Total Retail Customer Units of Service							
1	Number		5,740,200	15,450	21,850	699,398	7,212,589	
2	Units		Mcf	Mcf/day	Mcf/day	Equiv. Meters	Equiv. Bills	Total
	Operating Expense							
3	Total Expense - $	245,842,000	142,406,000	32,671,000	38,400,000	3,089,000	28,616,000	660,000
4	Unit Expense - $/Unit		24.8085	2,114.6278	1,757.4371	4.4167	3.9675	
	Depreciation Expense							
5	Total Expense - $	41,252,000	20,657,000	6,722,000	10,338,000	3,294,000		241,000
6	Unit Expense - $/Unit		3.5987	435.0809	473.1350	4.7098		
	Plant Investment							
7	Total Investment - $	1,773,468,000	934,860,000	303,091,000	477,810,000	48,129,000		9,578,000
8	Unit Investment - $/Unit		162.8619	19,617.5405	21,867.7346	68.8149		
	Unit Return on Investment							
9	Total Return - $	60,362,000	31,819,000	10,316,000	16,263,000	1,638,000		326,000
10	Inside City - $/Unit (a)		5.5432	667.7026	744.2902	2.3422		
	Total Unit Costs of Service							
11	Inside City - $/Unit		33.9504	3,217.4113	2,974.8623	11.4687	3.9675	

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = $60,362,000 / $1,773,468,000 = 3.4036%

Mcf - thousand cubic feet

Table 4-10 Test Year 1 Distribution of Costs of Service by Functional Cost Component to Customer Types

LINE NO.	CUSTOMER TYPE	(1) TOTAL ALLOCATED COST OF SERVICE	(2) BASE	(3) EXTRA CAPACITY MAX DAY	(4) EXTRA CAPACITY MAX HOUR IN EXCESS OF MAX DAY	(5) CUSTOMER COSTS METERS	(6) CUSTOMER COSTS BILLING	(7) DIRECT PUBLIC FIRE PROTECTION
Water System ($)								
	Retail							
	General Service							
1	Senior Citizens	$ 7,974,000	$ 4,084,000	$ 1,062,000	$ 1,577,000	$ 243,000	$ 1,008,000	0
2	Residential	199,076,000	104,721,000	27,187,000	40,220,000	5,607,000	21,341,000	0
3	Commercial	80,967,000	54,562,000	11,325,000	11,126,000	1,630,000	2,324,000	0
4	Industrial	2,746,000	2,074,000	322,000	208,000	69,000	73,000	0
5	Public Utilities	492,000	360,000	64,000	30,000	21,000	17,000	0
6	**Subtotal General Service**	**291,255,000**	**165,801,000**	**39,960,000**	**53,161,000**	**7,570,000**	**24,763,000**	**0**
7	PHA	8,314,000	5,191,000	1,223,000	1,517,000	105,000	278,000	0
8	Charities & Schools	6,332,000	4,261,000	869,000	922,000	147,000	133,000	0
9	Hospitals & University	2,448,000	1,799,000	386,000	238,000	15,000	10,000	0
10	Hand Billed	25,468,000	17,827,000	3,700,000	3,867,000	74,000	-	0
11	Scheduled (Flat Rate)	3,000	3,000	-	-	-	-	0
	Fire Protection							
12	Private	5,997,000	-	997,000	1,458,000	111,000	3,431,000	0
	Public							
13	Standard Pressure	7,639,000	-	2,574,000	3,838,000	-	-	1,227,000
14	**Subtotal Public Fire Protection**	**7,639,000**	**-**	**2,574,000**	**3,838,000**	**-**	**-**	**1,227,000**
15	**Total Retail Service**	**$ 347,456,000**	**$ 194,882,000**	**$ 49,709,000**	**$ 65,001,000**	**$ 8,022,000**	**$ 28,615,000**	**$ 1,227,000**

Table 4-11 Test Year 1 Adjusted COS

LINE NO.	CUSTOMER TYPE	(1) ALLOCATED COST OF SERVICE	(2) DISCOUNT	(3) COST OF SERVICE WITH DISCOUNT	(4) RECOVERY OF DISCOUNT	(5) ADJUSTED COST OF SERVICE
Water System ($000s)						
1	Residential	$ 199,076,000	$ -	$ 199,076,000	$ 2,672,000	$ 201,748,000
2	Senior Citizens	7,974,000	1,994,000	5,980,000	80,000	6,060,000
3	Commercial	80,967,000	-	80,967,000	1,088,000	82,055,000
4	Industrial	2,746,000	-	2,746,000	37,000	2,783,000
5	Public Utilities	492,000	-	492,000	7,000	499,000
6	PHA	8,314,000	416,000	7,898,000	106,000	8,004,000
	Charities, Schools, & Universities					
7	Charities & Schools	6,332,000	1,583,000	4,749,000	64,000	4,813,000
8	Hospital/University	2,448,000	612,000	1,836,000	25,000	1,861,000
9	**Subtotal**	**8,780,000**	**2,195,000**	**6,585,000**	**89,000**	**6,674,000**
10	Hand Billed	25,468,000	-	25,468,000	342,000	25,810,000
11	Scheduled (Flat Rate)	3,000	-	3,000	-	3,000
	Fire Protection					
12	Private	5,997,000	-	5,997,000	81,000	6,078,000
	Public					
13	Standard Pressure	7,639,000	-	7,639,000	103,000	7,742,000
14	**Subtotal Public Fire Protection**	**7,639,000**	**-**	**7,639,000**	**103,000**	**7,742,000**
15	**Subtotal Retail Service**	**347,456,000**	**4,605,000**	**342,851,000**	**4,605,000**	**347,456,000**
16	Wholesale	4,600,000	-	4,600,000	-	4,600,000
17	**Total System**	**$ 352,056,000**	**$ 4,605,000**	**$ 347,451,000**	**$ 4,605,000**	**$ 352,056,000**

Table 4-12 Comparison of Test Year 1 COS and Adjusted COS with Revenues Under Existing Rates

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
		$	$	%
	Retail			
	General Service			
1	Senior Citizens	$ 5,151,885	$ 6,060,000	17.6%
2	Residential	169,900,488	201,748,000	18.7%
3	Commercial	71,663,828	82,055,000	14.5%
4	Industrial	2,708,368	2,783,000	2.8%
5	Public Utilities	489,405	499,000	2.0%
6	**Subtotal General Service**	**249,913,974**	**293,145,000**	**17.3%**
7	PHA	6,554,466	8,004,000	22.1%
8	Charities & Schools	4,297,017	4,813,000	12.0%
9	Hospitals & University	1,628,549	1,861,000	14.3%
10	Hand Billed	18,894,388	25,810,000	36.6%
11	Scheduled (Flat Rate)	3,379	3,000	-11.2%
	Fire Protection			
12	Private	4,358,150	6,078,000	39.5%
	Public			
13	Standard Pressure	7,114,000	7,742,000	8.8%
14	**Subtotal**	**7,114,000**	**7,742,000**	**8.8%**
15	**Total Retail Service**	**292,763,923**	**347,456,000**	**18.7%**
16	Total Wholesale	3,329,398	4,600,000	38.2%
17	**Total System**	**$ 296,093,321**	**$ 352,056,000**	**18.9%**

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5.0 Water System Rate Design

The revenue requirement and COS analyses described in the preceding sections of this Report provide a basis for the review and update of a schedule of water rates that recover allocated cost of service. These studies are the results of engineering estimates, consideration of historical data and, to some extent, judgment, and experience. Judgment must enter the final choice of rates, and factors such as public reaction to the extent of changes and adjustments, previous rate levels, contractual agreements, and past local practice are recognized in making rate adjustments.

Rates should be reasonably simple in application and subject to as few misinterpretations as possible. Considerations regarding the proposed rate adjustments reflect discussions with the Water Department staff and include the above considerations and the desire of the Water Department to maintain the existing structure for the Rate Period. This Report proposes water user rates in accordance with these considerations.

The cost-of-service analysis described in the preceding section of this Report provides the basis for the design of water rate schedules to cover the allocated cost for service for the Water System.

5.1 General Service

The proposed charges for water service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including senior citizens, charities and schools, and the PHA, receive services at a discounted rate. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools, and 5% for PHA) will continue to be applicable for the entire Study Period.

In designing the proposed rates, we adjust the retail water costs of service determined for each customer type to reflect the fact that these customer types will not pay full cost of service. Accordingly, we increase the proposed retail water, sewer, and stormwater rates to recover this cost-of-service revenue reduction due to discounts.

Additionally, the cost-of-service water rates that are designed for each Test Year require the application of a "lag factor." The lag factor reflects a final adjustment to the cost-of-service rates to recognize the fact that there will be a proration of quantity charge billings between the existing and proposed rates during the first month following the effective date of the rate increase, as well as the fact that the fiscal year billings will not be fully collected within that fiscal year. The lag factor is calculated to recover only the anticipated receipts of the prorated revenue increase projected for the test year, recognizing the normally expected historical payment patterns. A lag factor of 1.063 is applied to the FY 2024 water COS rates.

Table 5-1 presents the proposed water rates for General Service customers applicable for Test Year 1 (FY 2024) and Test Year 2 (FY 2025). The proposed rates reflect a continuation of the existing rate structure, including a service charge which varies by meter size and a declining block quantity charge. The proposed rates designed for each fiscal year, are designed to recover the water revenue increase

indicated in Table 3-13, taking into consideration the collection factor patterns as applied to billings from current and prior fiscal years.

Table 5-1 Proposed FY 2024 and FY 2025 General Service Water Rates [Schedule BV-1: Table C-10]

Description	Proposed FY 2024	Proposed FY 2025
Monthly Water Service Charge ($/bill)		
Meter Size (Inches)		
5/8	$5.30	$5.42
3/4	$5.81	$5.96
1	$7.27	$7.49
1-1/2	$10.28	$10.67
2	$14.65	$15.25
3	$23.99	$25.10
4	$42.84	$44.71
6	$81.39	$85.12
8	$125.10	$131.01
10	$182.51	$191.01
12	$306.82	$322.40
Base Rate - Water Quantity Charges ($/Mcf)		
Monthly Water Usage		
First 2 Mcf	$61.14	$66.42
Next 98 Mcf	$54.93	$59.72
Next 1,900 Mcf	$42.55	$46.27
Over 2,000 Mcf	$41.40	$45.03

5.2 Fire Protection

Table 5-2 presents the proposed rates for fire connections for Test Year 1 and Test Year 2.

Table 5-2 Proposed Rates for Fire Protection [Schedule BV-1: Table C-11 and C-11A]

Size of Meter or Connection	Monthly Charge ($/bill)	
	FY 2024	FY 2025
Private Fire Protection		
4" or less	$29.04	$29.34
6	$53.81	$54.38
8	$80.97	$81.81
10	$119.07	$120.32
12	$188.23	$190.21
Public Fire Protection		
	Annual Charge ($)	
	FY 2024	FY 2025
Standard Pressure	$7,742,000	$8,500,000

Size of Meter or Connection	Monthly Charge ($/bill)	
	FY 2024	FY 2025
Residential Private Fire Protection Water Service Charge w/ Fire Protection		
3/4	$9.47	$9.65
1	$10.93	$11.18
1-1/2	$13.94	$14.36
2	$18.31	$18.94
Monthly Sewer Service Charge		
3/4	$7.54	$7.98
1	$7.54	$7.98
1-1/2	$7.54	$7.98
2	$7.54	$7.98

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6.0 Wastewater System Revenue and Revenue Requirements

The Wastewater System currently serves the City of Philadelphia, and parts of Bucks, Montgomery, and Delaware Counties, a service area that is over 364 square miles, with 230 square miles in suburban communities and 134 square miles in the City.

The wastewater collection system consists of approximately 3,727 miles of total collector system piping, 20 pumping stations (17 wastewater and 3 stormwater), 95,091 manholes, 25 storm relief structures, and 71,825 stormwater inlets. The collection system is approximately 55% combined sewer system comprised of 767 miles of sanitary, 757 miles of storm, and 1,852 combined sanitary/storm sewers. Sewers range in size from 8-inch diameter to 21 feet by 24 feet arch-shaped conduits primarily constructed of brick, vitrified clay, or reinforced concrete.

This section focuses on the Revenue and Revenue Requirements part of the COS study for the Wastewater System. In the following discussion, we review O&M expenses, debt service payments, funding for specific deposits and reserves, and the cost of capital improvement projects that the Water Department does not fund via debt or contributions from third parties.

6.1 Wastewater Revenue

The Wastewater System derives revenue primarily from charges for sanitary sewer and stormwater services. During the Study Period, future levels of sanitary sewer revenues were projected based on an analysis of historical and future system growth in terms of the number of accounts and water consumption for sewer customers. For stormwater, trends for billable parcels and estimates of billable GA and IA were examined.

6.1.1 Stormwater Services Background

The Water Department has been responsible for providing stormwater services to the City of Philadelphia since its creation. Historically, stormwater costs were recovered from customers through the Water Department's rates and charges.

The Water Department fully transitioned the Stormwater Management Service Charge ("SWMS Charge") to a parcel area-based SWMS Charge, as of July 1, 2013. Prior to the transition to the parcel area-based SWMS Charge, stormwater costs were recovered from customers via a meter-based stormwater charge with the customers sanitary service fees. Under this approach, equivalent meter sizes were used as a proxy for the demand a customer places on stormwater services. While customers were charged on the same basis, water meter size (or water use) does not directly correlate to the generation of stormwater, or the demand placed on the Water Department's system and/or services. In addition, the use of equivalent meter as the basis for the stormwater charged did not capture properties without water meters, such as parking lots, which generate stormwater runoff and may place a demand on the system and/or services.

Based upon prior rate proceedings as well as discussions with City stakeholders, the Water Department undertook a process in the 1990s to develop and implement a more acceptable and technically appropriate methodology for stormwater cost recovery. The underlying change in cost recovery recognizes that stormwater costs of service are not related to sanitary service requirements, which are generally related to customers' water use, and that a more appropriate basis would be a measure of (or surrogate for) the generation of stormwater runoff. As a result of this process, the Water Department chose a methodology that considered (1) the overall area of customer properties (i.e., gross area), and (2) stormwater runoff potential, including the impervious area of the property was identified as a more appropriate basis for recovery of stormwater costs. These two elements are recognized in the two primary components which make up the SWMS Charge, namely the GA and IA charges. The parcel area-based fee is far more equitable, compared to an equivalent meter basis, as it better recognizes the generation of stormwater runoff from both pervious and impervious surfaces, associated demands placed on systems or services, and includes customers without a water meter, who previously did not contribute to cost recovery.

While this change in cost recovery approach was initially identified in the 1990s, billing data development and billing system updates to enable the use of a parcel area-based fee took several years. The Water Department began to transition customers to the current SWMS rate structure in July 2010.

In the past, it was not unusual for stormwater costs to be recovered from customers via charges based upon water or sewer system attributes (such as water meter size). However, with improved data availability and technology, recovering stormwater costs via area-based fees has become far more widely used and publicly accepted nationwide. Further, WEF's User Fee Funded Stormwater Programs manual provides guidance on the development and implementation of such stormwater fees, and recognizes the methodology employed by the Water Department as one of the five named "Property Characteristics-Based Stormwater User Fee Methods,[20]" which provide an equitable and defensible basis for establishing a stormwater rate structure and estimating units of service by customer class.

6.1.2 Customers and Growth

Table 6-1 summarizes the Water Department's wastewater customer account classifications.

For the most part, the sanitary sewer customer types are like those for water customers, except for sewer-only accounts, groundwater accounts, and hand-billed accounts. Hand-billed accounts are "H"-coded customers in the Basis2 billing system that receive surcharge and/or sewer credits. The adjustments to these accounts are made manually.

[20] See Section 5.4 of WEF's "User-Fee-Funded Stormwater Programs" Manual.

Table 6-1 Wastewater System Customer Types

Customer Types			
Sanitary Sewer			**Stormwater**
General Service - Residential - Senior Citizens - Commercial - Industrial - Public Utilities - Sewer Only - Groundwater	Other - PHA - Charities & Schools - Hospitals & Universities - Hand Bill - Scheduled (Flat Rate) - Surcharge	Fire Service Wholesale	Residential Condominiums Non-Residential Note: Stormwater also recognizes discounts as applicable to elderly, PHA and charities and schools.

As noted in Section 1.4, customer account projections for FY 2023 to FY 2026 are based upon the number of accounts in FY 2022 and escalated by the 3-year average growth in the number accounts by type for FY 2020 to FY 2022. Accounts are assumed to remain stable thereafter. The number of billable stormwater accounts and parcels are projected to decline during the Study period due to new community gardens. Table 6-2 and Table 6-3 present the projection for number of accounts and billable parcels during the Study Period.

Table 6-2 Number of Customer Accounts

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Sanitary Sewer							
1	Residential	437,419	442,249	447,311	452,630	452,630	452,630
2	Senior Citizens	21,594	21,154	20,723	20,301	20,301	20,301
3	Commercial	37,116	37,501	37,904	38,325	38,325	38,325
4	Industrial	1,009	1,007	1,005	1,003	1,003	1,003
5	Public Utilities	203	213	224	226	226	226
6	**Subtotal General Service**	**497,341**	**502,124**	**507,167**	**512,485**	**512,485**	**512,485**
7	PHA	5,596	5,528	5,461	5,395	5,395	5,395
8	Charities and Schools	1,695	1,602	1,514	1,431	1,431	1,431
9	Hospitals and University	93	64	44	30	30	30
10	Hand Billed	202	199	196	193	193	193
11	Scheduled	8	10	13	16	16	16
12	Fire Service	0	0	0	0	0	0
13	Sewer Only	63	63	63	63	63	63
14	Groundwater	5	5	5	5	5	5
15	**Subtotal Retail Customers**	**505,003**	**509,595**	**514,463**	**519,618**	**519,618**	**519,618**
16	Wholesale	10	10	10	10	10	10
17	**Total Sanitary Sewer**	**505,013**	**509,605**	**514,473**	**519,628**	**519,628**	**519,628**
Stormwater							
18	Residential	465,601	465,601	465,601	465,601	465,601	465,601
19	Non-Residential	77,662	77,654	77,646	77,638	77,630	77,622
20	Condominium	5,278	5,278	5,278	5,278	5,278	5,278
21	**Subtotal Stormwater**	**548,541**	**548,533**	**548,525**	**548,517**	**548,509**	**548,501**

Table 6-3 Number of Billable Parcels

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
	Residential						
1	Initial Parcel Count	463,408	463,408	463,408	463,408	463,408	463,408
2	Less Residential Zero Rate[1]	-	-	-	-	-	-
3	Subtotal Residential	463,408	463,408	463,408	463,408	463,408	463,408
	Non-Residential						
4	Initial Parcel Count	68,931	68,931	68,931	68,931	68,931	68,931
5	Less Non-Residential Zero Rate[2]	8	16	24	32	40	48
6	Subtotal Non Residential	68,923	68,915	68,907	68,899	68,891	68,883
	Condominium						
7	Initial Parcel Count	2,282	2,282	2,282	2,282	2,282	2,282
8	Less Stormwater Appeals Adjustments	0	0	0	0	0	0
9	Subtotal Condominium	2,282	2,282	2,282	2,282	2,282	2,282
10	**TOTAL: System Billable Parcels**	**534,613**	**534,605**	**534,597**	**534,589**	**534,581**	**534,573**

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens under Non-Residential Category

6.1.3 Sanitary Sewer Retail Billed Volume

Table 6-4 presents the projected billed volume for retail sanitary sewer customers. Section 1.4 discussed the assumptions underlying the billed volumes projections. The billed volume projections reflect the following adjustments:

- To address the pending change in water consumption and resulting sewer billed volume from Vicinity, the projected FY 2024 commercial customer billed volume reflects a reduction of 90,000 Mcf and the projected FY 2024 Sewer Only billed volume is increased by 90,000 Mcf.
- Projected FY 2028 wholesale billed volume reflects the loss of DELCORA as a wholesale customer.

Table 6-4 Retail Billed Volumes

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System (Mcf)							
1	Residential	3,057,101	3,072,948	3,089,130	3,105,728	3,088,322	3,070,916
2	Senior Citizens	122,006	120,163	118,347	116,557	116,557	116,557
3	Commercial	1,686,269	1,592,292	1,628,134	1,665,019	1,665,019	1,665,019
4	Industrial	68,789	56,628	46,638	38,423	38,423	38,423
5	Public Utilities	10,228	10,608	11,049	10,812	10,812	10,812
6	**Subtotal General Service**	**4,944,393**	**4,852,639**	**4,893,298**	**4,936,539**	**4,919,133**	**4,901,727**
7	PHA	153,741	152,867	151,997	151,131	151,131	151,131
8	Charities and Schools	130,706	124,850	119,245	113,918	113,918	113,918
9	Hospitals and University	74,165	52,941	37,979	27,265	27,265	27,265
10	Hand Billed	407,188	427,919	449,408	471,673	471,673	471,673
11	Scheduled	46	62	88	117	117	117
12	Fire Service	100	100	100	100	100	100
13	Sewer Only	60,516	150,516	150,516	150,516	150,516	150,516
14	Groundwater	211,696	211,696	211,696	211,696	211,696	211,696
15	**Subtotal Retail Customers**	**5,982,551**	**5,973,590**	**6,014,327**	**6,062,955**	**6,045,549**	**6,028,143**
16	Wholesale	3,853,388	3,853,388	3,853,388	3,853,388	3,853,388	2,766,598
17	**Total Sanitary Sewer System**	**9,835,939**	**9,826,978**	**9,867,715**	**9,916,343**	**9,898,937**	**8,794,741**

6.1.4 Wholesale Volume, Capacity, and Strength Loadings

Table 6-5 summarizes projections of billed volume, capacity, and biological oxygen demand ("BOD") and suspended solids ("SS") loadings for the wholesale customers. As previously noted in Section 1.4.1, projected wastewater wholesale billed volumes and loadings are estimated based on the three-year average of historical service levels, and DELCORA is anticipated to leave the City as a customer by FY 2028.

Table 6-5 Projections for Wholesale Customer Volumes, Capacities, and Strength Loadings

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System							
	Abington						
1	Volume (Mcf)	91,859	91,859	91,859	91,859	91,859	91,859
2	Capacity (Mcf/day)	824	824	824	824	824	824
3	SS (1,000 lbs)	998	998	998	998	998	998
4	BOD (1,000 lbs)	1,343	1,343	1,343	1,343	1,343	1,343
	Bucks County (Bensalem)						
5	Volume (Mcf)	150,020	150,020	150,020	150,020	150,020	150,020
6	Capacity (Mcf/day)	1,014	1,014	1,014	1,014	1,014	1,014
7	SS (1,000 lbs)	1,568	1,568	1,568	1,568	1,568	1,568
8	BOD (1,000 lbs)	1,623	1,623	1,623	1,623	1,623	1,623
	Bucks County						
9	Volume (Mcf)	893,899	893,899	893,899	893,899	893,899	893,899
10	Capacity (Mcf/day)	6,416	6,416	6,416	6,416	6,416	6,416
11	SS (1,000 lbs)	10,541	10,541	10,541	10,541	10,541	10,541
12	BOD (1,000 lbs)	10,369	10,369	10,369	10,369	10,369	10,369
	Cheltenham						
13	Volume (Mcf)	410,973	410,973	410,973	410,973	410,973	410,973
14	Capacity (Mcf/day)	2,743	2,743	2,743	2,743	2,743	2,743
15	SS (1,000 lbs)	3,069	3,069	3,069	3,069	3,069	3,069
16	BOD (1,000 lbs)	2,682	2,682	2,682	2,682	2,682	2,682
	Lower Moreland						
17	Volume (Mcf)	61,845	61,845	61,845	61,845	61,845	61,845
18	Capacity (Mcf/day)	508	508	508	508	508	508
19	SS (1,000 lbs)	626	626	626	626	626	626
20	BOD (1,000 lbs)	470	470	470	470	470	470
	Lower Southampton						
21	Volume (Mcf)	270,135	270,135	270,135	270,135	270,135	270,135
22	Capacity (Mcf/day)	1,364	1,364	1,364	1,364	1,364	1,364
23	SS (1,000 lbs)	1,964	1,964	1,964	1,964	1,964	1,964
24	BOD (1,000 lbs)	1,633	1,633	1,633	1,633	1,633	1,633
	DELCORA						
25	Volume (Mcf)	1,086,790	1,086,790	1,086,790	1,086,790	1,086,790	0
26	Capacity (Mcf/day)	13,392	13,392	13,392	13,392	13,392	0
27	SS (1,000 lbs)	12,017	12,017	12,017	12,017	12,017	0
28	BOD (1,000 lbs)	10,202	10,202	10,202	10,202	10,202	0
	Lower Merion						
29	Volume (Mcf)	309,643	309,643	309,643	309,643	309,643	309,643
30	Capacity (Mcf/day)	2,728	2,728	2,728	2,728	2,728	2,728
31	SS (1,000 lbs)	3,234	3,234	3,234	3,234	3,234	3,234
32	BOD (1,000 lbs)	2,760	2,760	2,760	2,760	2,760	2,760

Table 6-5 Projections for Wholesale Customer Volumes, Capacities, and Strength Loadings (continued)

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System							
	Springfield (less Wyndmoor)						
33	Volume (Mcf)	109,419	109,419	109,419	109,419	109,419	109,419
34	Capacity (Mcf/day)	397	397	397	397	397	397
35	SS (1,000 lbs)	2,141	2,141	2,141	2,141	2,141	2,141
36	BOD (1,000 lbs)	2,116	2,116	2,116	2,116	2,116	2,116
	Upper Darby						
37	Volume (Mcf)	451,287	451,287	451,287	451,287	451,287	451,287
38	Capacity (Mcf/day)	3,024	3,024	3,024	3,024	3,024	3,024
39	SS (1,000 lbs)	4,392	4,392	4,392	4,392	4,392	4,392
40	BOD (1,000 lbs)	3,745	3,745	3,745	3,745	3,745	3,745
	Springfield (Wyndmoor)						
41	Volume (Mcf)	17,518	17,518	17,518	17,518	17,518	17,518
42	Capacity (Mcf/day)	167	167	167	167	167	167
43	SS (1,000 lbs)	215	215	215	215	215	215
44	BOD (1,000 lbs)	166	166	166	166	166	166

6.1.5 Stormwater Impervious and Gross Areas

A stormwater units of service analysis was performed to develop estimates of the billable GA and IA units of service for the Study Period and is provided as Schedule BV-4: WP-2. The billable units of service are utilized in projecting the stormwater revenues under existing rates, as well as in developing the proposed GA and IA rates discussed later in this Report.

As discussed, in Section 1.4.1, the initial GA and IA stormwater billing data for the Study Period (beginning FY 2023) is based upon the end of FY 2022 stormwater billing data set. Table 6-6 summarizes the mean GA and IA square footage for each customer class. These values were used to project the initial GA and IA for each customer class based upon the associated number of parcels for each customer class beginning in FY 2023. Further discussion is provided in Schedule BV-4: WP-2.

Based upon the FY 2022 data set, the mean residential GA square footage has decreased slightly to 2,100 square feet compared to the mean residential GA of 2,110 square feet from prior rate proceeding. The mean residential IA has decreased slightly to 1,190 square feet as compared to the mean residential IA of 1,200 square feet from the prior rate proceeding.

Table 6-6 FY 2023 Mean GA and Mean IA

Line No.	Description	FY 2023 MEAN GA	FY 2023 MEAN IA
Stormwater (square feet)			
1	**All Residential Parcels**	**2,100**	**1,190**
	Non-Residential Sub-Classes		
	Non-Discount		
2	Water & Sewer	29,017	16,297
3	SW Only	9,175	2,726
	Discount: Senior, Education & Charities		
4	Water & Sewer	96,679	52,080
5	SW Only	37,581	18,413
	Discount: PHA		
6	Water & Sewer	54,964	29,681
7	SW Only	2,737	1,000
	Condominiums Sub-Classes		
	Non-Discount		
8	Water & Sewer	16,148	11,324
9	SW Only	27,126	18,031
	Discount: Senior, Education & Charities		
10	Water & Sewer	44,730	23,060
11	SW Only	-	-
	Discount: PHA		
12	Water & Sewer	9,358	6,158
13	SW Only	-	-

FY 2023 Mean GA and Mean IA is based on the end of FY 2022 stormwater billing dataset.

With this COS study, projected billable units of service reflect:

- For FY 2023 – Initial GA and IA square footage as reflected in the Water Department's stormwater billing data as of June 2022.
- Reduction in billable GA and IA square footage as a result of credits, based upon:
  - Projected increase in Impervious Area Reduction ("IAR") credits based upon the average 5-year growth and average IAR loss per parcel;
  - Projected increase in GA, IA, and National Pollutant Discharge Elimination System ("NPDES") Credits based upon the average 5-year growth in the number of parcels receiving credit and the associated average credit per parcel; and
  - Credits resulting from SMIP/GARP grants:
    - Based upon the overall annual program budget of $25 Million in FY 2023, $20 Million in FY 2024 and FY 2025, and $25 Million thereafter; and

- Average grant award per drainage acre, anticipated cost escalation and average project completion time.

- Reduction in billable GA and IA square footage due to appeals and other adjustments:
  - Adjustment appeals, include reductions in GA and IA billable square footage resulting from customers who seek clarification for and take exception to GA and IA billing data.
  - Other adjustments include reductions in GA and IA billable square footage resulting from a property's designation as a "Community Garden," which provides customers with a 100% discount on their stormwater bill and as referred to as a "Zero Rate Adjustment" in the tables below. This discount also applies to billing and collection charges associated with the subject parcel(s).

Additional information regarding the derivation of the billable GA and IA units of service, including the basis for above mentioned projections, are provided in Schedule BV-4: WP-2.

Table 6-7 summarizes the development of the billable GA for the Study Period, while Table 6-8 summarizes the development of the billable IA for the Study Period.

Table 6-7 Determination of Billable Gross Area

Line No.	Description	Fiscal Year Ending June 30, FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Stormwater (thousand square feet)							
	Residential						
1	Initial GA	973,157	973,157	973,157	973,157	973,157	973,157
2	Less Residential Zero Rate[1]	0	1	1	1	2	2
3	Subtotal Residential Billable GA (sf)	973,156	973,156	973,156	973,155	973,155	973,155
	Non-Residential						
4	Initial GA	1,427,132	1,427,132	1,427,132	1,427,132	1,427,132	1,427,132
5	Less Credits Adjustments	282,294	288,296	293,920	298,997	304,003	309,366
6	Less Stormwater Appeals	413	713	901	977	977	977
7	Less Non-Residential Zero Rate[2]	73	147	220	293	367	440
8	Subtotal Non Residential Billable GA (sf)	1,144,352	1,137,977	1,132,091	1,126,864	1,121,785	1,116,349
	Condominium						
9	Initial GA	38,449	38,449	38,449	38,449	38,449	38,449
10	Less Credits Adjustments	7,436	7,595	7,743	7,876	8,008	8,150
11	Subtotal Condominium Billable GA (sf)	31,012	30,854	30,706	30,572	30,441	30,299
12	**TOTAL: System Billable GA (sf)**	**2,148,521**	**2,141,987**	**2,135,953**	**2,130,592**	**2,125,380**	**2,119,803**

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens in the Non-Residential Category.

Table 6-8 Determination of a Billable Impervious Area

Line No.	Description	Fiscal Year Ending June 30, FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Stormwater (thousand square feet)							
	Residential						
1	Initial IA	551,455	551,455	551,455	551,455	551,455	551,455
2	Less Residential Zero Rate[1]	0	0	0	0	1	1
3	Subtotal Residential Billable IA (sf)	551,455	551,455	551,455	551,455	551,454	551,454
	Non-Residential						
4	Initial IA	718,798	718,798	718,798	718,798	718,798	718,798
5	Less Credits Adjustments	115,417	119,202	122,617	125,495	128,303	131,461
6	Less Stormwater Appeals	480	830	1,049	1,137	1,137	1,137
7	Less Non-Residential Zero Rate[2]	3	7	10	13	17	20
8	Subtotal Non Residential Billable IA (sf)	602,898	598,759	595,122	592,153	589,341	586,180
	Condominium						
9	Initial IA	26,577	26,577	26,577	26,577	26,577	26,577
10	Less Credits Adjustments	5,294	5,468	5,624	5,756	5,885	6,030
11	Subtotal Condominium Billable IA (sf)	21,283	21,109	20,953	20,821	20,692	20,547
12	**TOTAL: System Billable IA (sf)**	**1,175,635**	**1,171,323**	**1,167,530**	**1,164,428**	**1,161,488**	**1,158,181**

1: Comprises Community Gardens under Residential Category

2: Comprises Community Gardens in the Non-Residential Category.

Revenue Under Existing Rates projections utilize the number of billable residential parcels, since residential properties are billed a uniform charge per parcel. The influence of the IA and GA billing data is more evident in the allocation of stormwater cost of service (see Section 7.10). The distribution of projected credits, appeals, and community garden adjustments are based on current distributions within the stormwater billing data.

6.1.6 Bill Tabulation

Similar to our process for calculating water revenues, we used the bill tabulation results generated in Section 3.1.3 for the sewer revenue calculations as well. However, it is only necessary to utilize the distribution of accounts by meter size. The billed volume distribution is not required for sanitary sewer billings since the sanitary sewer quantity charge is a uniform volume charge for all billed volume.

6.1.7 Wastewater Revenue

The total operating revenues for the Water Department include the following:

- Retail (i.e., all customers excluding wholesale) Sanitary Sewer Service and Quantity charges and Stormwater charges
- Additional charges for high-strength customers (surcharges)
- Wholesale wastewater charges

6.1.7.1 Retail Operating Revenues

In developing projections for retail operating revenues, the process described in the following paragraphs and illustrated in Figure 3-1 was followed.

6.1.7.2 Projection of Gross Billings

To project the FY 2023 sewer gross billings, the FY 2022 rates (effective September 1, 2021) and current FY 2023 (effective September 1, 2022) schedules of sewer rates were applied to the projected FY 2023 annual sewer billed volumes, number of customer accounts and bill tabulation results, to reflect the September 1, 2022 implementation of the FY 2023 rate schedule. For stormwater, the method is like the sanitary sewer billing projections, the FY 2022 rates (effective September 1, 2021) and current FY 2023 (effective September 1, 2022) schedules of stormwater rates are applied to the projected FY 2023 billable residential parcels and accounts, and non-residential billable GA and IA, as well as accounts.

To project the FY 2024 to FY 2028 sewer gross billings, the FY 2023 schedule of sewer rates shown Table 6-9 were applied to the projections of annual billed water volume, number of customer accounts and bill tabulation results. For stormwater, we apply the FY 2023 GA and IA rates to the projected billable residential parcels and accounts, and non-residential billable GA and IA, and the projected number of billable accounts.

Table 6-9 Existing Sanitary Sewer and Stormwater Rates

Sanitary Sewer	
Monthly Sanitary Sewer Service Charge ($/bill)	
Meter Size (Inches)	
5/8	$7.50
3/4	$9.57
1	$14.05
1-1/2	$24.75
2	$38.19
3	$68.87
4	$117.03
6	$230.71
8	$365.13
10	$526.96
12	$958.27
Base Rate - Sanitary Sewer Quantity Charges ($/Mcf)	
Monthly Usage	
All Billable Water Usage	$34.57
Groundwater Charge	$12.58
Sanitary - Surcharge Rates ($/lb)	
BOD ($/lb in excess of 250 mg/l)	$0.391
SS ($/lb in excess of 350 mg/l)	$0.406

Stormwater		
Residential Stormwater Charges		
Monthly Stormwater Management Service Charge		
Charge Per Parcel		$16.17
Monthly Billing & Collection Charge		
Charge Per Bill		$1.88
Non-Residential Stormwater Charges		
Monthly Stormwater Management Service Charge		
Gross Area	($/500 sf)	$0.778
Impervious Area	($/500 sf)	$5.492
Monthly Billing & Collection Charge		
Charge Per Bill		$2.44

Notes:

Non-Residential Stormwater Charges includes Condominiums.
Non-Residential Stormwater Customers are subject to a minimum Stormwater Management Service Charge equal to the residential charge per parcel.
Mcf - Thousand cubic feet
mg/l - milligrams per liter

Where applicable, for all customer types that are eligible for discounts, the appropriate discounts previously shown on Table 3-5 were applied. Moreover, like to our analysis for the Water System, TAP discounts and TAP-R surcharge billings are excluded from this analysis. Thus, the proposed revenue adjustments and rates developed will reflect the Base Rates for sanitary sewer and stormwater.

6.1.7.3 Projection of Projected Billings

Table 6-10 presents the projected billings under existing rates for the Wastewater System.

Table 6-10 Billings Under Existing Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
Sewer Non-Discount							
1	Residential	$ 144,978	$ 147,501	$ 148,532	$ 149,603	$ 149,001	$ 148,399
2	Commercial	64,559	62,126	63,441	64,796	64,796	64,796
3	Industrial	2,601	2,211	1,865	1,580	1,580	1,580
4	Public Utilities	433	455	475	467	467	467
5	Fire Protection	3	3	3	3	3	3
6	Wholesale	38,888	35,924	35,924	35,924	35,924	27,055
7	Surcharge	6,224	6,286	6,286	6,286	6,286	6,286
8	Other (Hand-Billed and Groundwater)	16,797	17,708	18,449	19,216	19,216	19,216
9	Sewer Only	2,094	5,231	5,231	5,231	5,231	5,231
10	**Subtotal Sewer Non-Discount Billings**	**276,578**	**277,445**	**280,207**	**283,107**	**282,505**	**273,034**
Sewer Discount							
11	Residential (Senior Citizens)	4,574	4,544	4,468	4,393	4,393	4,393
12	PHA	5,648	5,675	5,639	5,603	5,603	5,603
13	Charity/Schools/Hospital/University	5,910	5,220	4,639	4,182	4,182	4,182
14	**Subtotal Sewer Discount Billings**	**16,132**	**15,439**	**14,746**	**14,178**	**14,178**	**14,178**
15	**Subtotal Sewer Service Billings**	**292,710**	**292,884**	**294,952**	**297,285**	**296,683**	**287,212**
Stormwater							
Stormwater General Service							
16	Residential	93,608	94,898	94,898	94,898	94,898	94,898
17	Non Residential	92,922	93,603	93,032	92,559	92,109	91,608
18	**Subtotal Stormwater Non-Discount**	**186,530**	**188,501**	**187,930**	**187,457**	**187,007**	**186,507**
Stormwater Discount							
19	Residential (Senior Citizens)	3,454	3,501	3,501	3,501	3,501	3,501
20	PHA	2,175	2,205	2,205	2,205	2,205	2,205
21	Charity/Schools/Hospital/University	8,085	8,167	8,136	8,109	8,082	8,053
22	**Subtotal Stormwater Discount**	**13,714**	**13,874**	**13,842**	**13,815**	**13,788**	**13,759**
23	**Subtotal Stormwater Service Billings**	**200,244**	**202,374**	**201,772**	**201,272**	**200,796**	**200,265**
24	**Subtotal Wastewater Billings**	**$ 492,953**	**$ 495,259**	**$ 496,724**	**$ 498,556**	**$ 497,479**	**$ 487,477**

6.1.7.4 Application of Collection Factors

As shown in Figure 3-2, the second step in the process of calculating revenues involves applying receipt factors (i.e., collection factors) to the corresponding gross billings to determine the operating retail cash receipts. Table 1-4 in Section 1.4.1 presents the collection factors used in determining the revenues for sanitary sewer and stormwater in the Study.

Table 6-11 and Table 6-12 summarizes the projected revenues (receipts) during the Study Period for the Retail and Wholesale customers of the Wastewater System.

Table 6-11 Projected Receipts Under Existing Sanitary Sewer Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Sanitary Sewer ($000s)							
1	Residential	$ 139,539	$ 142,578	$ 143,876	$ 144,939	$ 144,561	$ 144,011
2	Senior Citizens	4,417	4,408	4,343	4,271	4,262	4,261
3	Commercial	61,915	60,458	61,416	62,649	62,815	62,842
4	Industrial	2,561	2,199	1,859	1,575	1,538	1,533
5	Public Utilities	414	438	458	454	453	453
6	Sewer Only	2,028	4,687	5,009	5,073	5,073	5,073
7	Groundwater	2,542	2,576	2,582	2,583	2,583	2,583
8	**Subtotal General Customers**	**213,416**	**217,343**	**219,543**	**221,543**	**221,286**	**220,756**
9	Housing Authority	5,436	5,496	5,473	5,439	5,434	5,434
10	Charities and Schools	3,796	3,695	3,533	3,370	3,350	3,346
11	Hospitals and University	1,993	1,465	1,052	754	716	710
12	Hand Billed	13,546	14,451	15,196	15,939	16,033	16,048
13	Scheduled	2	3	4	5	5	5
14	Fire Service	3	3	3	3	3	3
15	Contract Service	38,888	35,924	35,924	35,924	35,924	27,055
16	Surcharge	6,224	6,286	6,286	6,286	6,286	6,286
17	**Total Sanitary Sewer Service Receipts**	**$ 283,305**	**$ 284,667**	**$ 287,015**	**$ 289,265**	**$ 289,037**	**$ 279,644**

Table 6-12 Projected Receipts Under Existing Stormwater Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Stormwater ($000s)							
	Residential						
1	Non Discount	$ 89,667	$ 91,491	$ 91,754	$ 91,781	$ 91,781	$ 91,781
2	Discount: Senior, Education & Charities	3,320	3,385	3,394	3,395	3,395	3,395
3	Discount PHA	767	782	785	785	785	785
	Non Residential						
4	Non Discount	82,987	83,922	83,679	83,274	82,862	82,416
5	Discount: Senior, Education & Charities	7,641	7,736	7,728	7,705	7,680	7,652
6	Discount PHA	1,284	1,303	1,307	1,308	1,308	1,308
	Condominium						
7	Non Discount	3,220	3,248	3,234	3,216	3,198	3,178
8	Discount: Senior, Education & Charities	101	102	101	100	100	99
9	Discount PHA	1	1	1	1	1	1
10	**Total Stormwater Receipts**	**$ 188,987**	**$ 191,970**	**$ 191,982**	**$ 191,564**	**$ 191,109**	**$ 190,615**

6.1.7.5 Wholesale Operating Revenues

The Water Department provides wholesale wastewater service to ten (10) suburban customers on a contractual basis. Three wholesale customers (Bensalem, Lower Merion, and Upper Darby) make capital contributions to the Water Department for their allocated share of investment in treatment and collection system facilities used in providing wastewater service to the customer. Contract rates for wastewater service apply monthly and generally consist of charges for O&M expense, applicable capital costs associated with the collection and treatment facilities used in providing the service, customer related costs, and a management fee. Cheltenham, Lower Southampton, Springfield, Abington, and Lower Moreland Townships, and DELCORA contract rates consist of charges for O&M expense and capital costs

associated with the Long-Term Control Plan Update("LTCPU") and COA in accordance with their contract terms. The Water Department actively manages the wholesale service agreements to recover the costs associated with the wholesale service.

As noted in Section 1.4.1 projected FY 2024 to FY 2028 wholesale customer revenues reflect a planned update to the LTCPU allocations based on PWD's updated H&H modeling. The updated calculation methodology is estimated to result in a reduction of wholesale wastewater revenues under existing rates of approximately $2.9 Million. In addition, FY 2028 reflects the anticipated loss of DELCCORA as a wholesale customer which will lead to an estimated $9 Million loss in revenue for the City.

Table 6-13 presents the projected revenues under existing rates from the wholesale customers based on their respective contract terms.

Table 6-13 Projected Receipts for Wholesale Contract Customers

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
1	Abington	$ 1,600	$ 1,483	$ 1,483	$ 1,483	$ 1,483	$ 1,483
2	Bucks County (Bensalem)	1,184	1,195	1,195	1,195	1,195	1,195
3	Bucks County	7,928	7,995	7,995	7,995	7,995	7,995
4	Cheltenham	4,332	4,014	4,014	4,014	4,014	4,014
5	Lower Moreland	875	803	803	803	803	803
6	Lower Southampton	4,213	4,065	4,065	4,065	4,065	4,065
7	DELCORA	11,180	8,870	8,870	8,870	8,870	0
8	Lower Merion	2,245	2,265	2,265	2,265	2,265	2,265
9	Springfield (less Wyndmoor)	2,105	1,981	1,981	1,981	1,981	1,981
10	Upper Darby	2,897	2,923	2,923	2,923	2,923	2,923
11	Springfield (Wyndmoor)	329	331	331	331	331	331
12	**Total Wastewater Wholesale**	**$ 38,888**	**$ 35,924**	**$ 35,924**	**$ 35,924**	**$ 35,924**	**$ 27,055**

6.1.7.6 Projected Wastewater System Operating Revenues

Table 6-14 summarizes the projected receipts for the Wastewater System during the Study Period.

Table 6-14 Projected Receipts Under Existing Rates

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
1	Sanitary Sewer Receipts	283,305	284,667	287,015	289,265	289,037	279,644
2	Stormwater Receipts	188,987	191,970	191,982	191,564	191,109	190,615
3	**Total Wastewater Service Receipts**	**472,292**	**476,637**	**478,997**	**480,829**	**480,147**	**470,259**

6.1.8 Tiered Assistance Program Rate Rider Surcharge

The projected revenues do not include the current TAP-R rate of $1.63/Mcf for sanitary sewer. Similar to our methodology for the Water System, the revenues developed in for the Wastewater COS analysis are referred to as the "Base Rates" (corresponding with Table 2-9) because they do not include the impact of providing discounts to TAP customers nor do they reflect the impact of TAP-R revenues.

6.1.9 Other Revenues and Adjustments

The Water Department has several sources of other revenues including miscellaneous fees, UESF grants, L&I permit fees, penalties, and releases from the Debt Reserve Account (if available). As noted above, no revenue losses associated with TAP discounts are included under Other Operating Revenues for the development of the Base Rates. Table 6-15 summarizes the other operating revenues for the Wastewater System.

Table 6-15 Other Revenue Projected Receipts

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
	Wastewater System ($000s)						
1	Penalties	5,809	5,877	5,896	5,919	5,905	5,891
2	Miscellaneous City Revenues	1,441	1,441	1,441	1,441	1,441	1,441
3	Other	4,530	4,530	4,530	4,530	4,530	4,530
4	State & Federal Grants	-	-	-	-	-	-
5	Permits Issued by Licenses & Inspections	3,796	3,796	3,796	3,796	3,796	3,796
6	Miscellaneous (Procurement)	167	167	167	167	167	167
7	City & UESF Grants	300	300	300	300	300	300
8	Affordability Program Discount Cost (a)	-	-	-	-	-	-
9	Release from Debt Reserve Account (b)	-	-	-	-	-	-
10	**Total Wastewater Other Income**	**16,043**	**16,111**	**16,130**	**16,153**	**16,139**	**16,125**
	Interest Income						
11	Debt Reserve Account (c)	-	-	-	-	-	-
12	Operating Fund	1,131	1,189	1,210	1,307	1,349	1,364
13	Rate Stabilization Fund	812	791	789	803	841	886
14	**Total Wastewater Operations**	**17,987**	**18,091**	**18,128**	**18,264**	**18,330**	**18,375**

(a) Beginning in FY 2019, TAP Revenue Loss is recovered via the TAP Rate Rider Surcharge.

(b) Projected Release from Debt Reserve Account based on outstanding and proposed debt service payments.

(c) Excludes deposit into Residual Fund for Transfer to City General Fund.

6.2 Wastewater Revenue Requirements

6.2.1 Operation and Maintenance Expenses

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the Wastewater System during each year. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities and liquidated encumbrances.

Table 6-16 summarizes the projected O&M expenses reflecting the assumptions and adjustments described in Sections 1.4.2 and 1.4.3.

Table 6-16 Projected O&M Expenses

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
1	Personal Services	102,620	107,841	115,898	122,089	127,366	133,518
2	Pension and Benefits	85,437	89,087	94,718	98,844	101,996	105,772
3	**Subtotal**	**188,056**	**196,928**	**210,616**	**220,934**	**229,362**	**239,290**
	Purchase of Services						
4	Power	8,619	9,545	9,545	9,688	9,833	9,981
5	Gas	5,988	7,124	7,124	7,231	7,339	7,449
6	SMIP/GARP	25,000	20,000	20,000	25,000	25,000	25,000
7	Other	107,741	121,905	129,280	135,250	141,500	148,041
8	**Subtotal**	**147,347**	**158,574**	**165,948**	**177,169**	**183,672**	**190,471**
	Materials and Supplies						
9	Chemicals	17,583	25,084	31,059	34,609	38,565	42,973
10	Other	15,018	16,184	17,269	18,079	18,927	19,814
11	**Subtotal**	**32,601**	**41,269**	**48,328**	**52,688**	**57,492**	**62,787**
12	Equipment	2,350	3,238	3,543	3,778	4,028	4,295
13	Indemnities and Transfers	6,836	7,147	7,436	7,651	7,877	8,114
14	**Subtotal Expenses**	**377,190**	**407,156**	**435,871**	**462,220**	**482,432**	**504,957**
15	Liquidated Encumbrances	(21,964)	(25,766)	(27,896)	(29,456)	(31,126)	(32,917)
16	**Total Expenses**	**355,225**	**381,390**	**407,974**	**432,764**	**451,305**	**472,040**

6.2.2 Debt Service

As discussed earlier in this Report, the General Bond Ordinance views the Water and Wastewater Systems as one combined system for the purposes of the Rate Covenant. Accordingly, bond issuances are allocated between water and wastewater based on System needs.

The existing and proposed debt service were previously discussed in Sections 1.4.4 and 2.3.4 of this Report.

Table 6-17 summarizes the Wastewater System's share of the total existing and proposed debt financing for the Wastewater System CIP.

Table 6-17 Summary of Existing and Proposed Debt Service

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
Revenue Bonds							
1	Existing (a)	$ 121,170	$ 112,961	$ 111,286	$ 111,539	$ 111,627	$ 98,496
	Proposed						
2	Fiscal Year 2023 (b)	-	-	-	-	-	-
3	Fiscal Year 2024 (c)		11,458	17,201	17,201	17,201	17,201
4	Fiscal Year 2025 (c)			12,604	18,921	18,921	18,921
5	Fiscal Year 2026 (d)				17,250	25,064	25,064
6	Fiscal Year 2027 (d)					14,500	21,068
7	Fiscal Year 2028 (d)						16,250
8	**Total Proposed**	**-**	**11,458**	**29,806**	**53,373**	**75,687**	**98,505**
9	**Total Revenue Bonds**	**121,170**	**124,419**	**141,091**	**164,911**	**187,313**	**197,001**
PENNVEST Loans							
10	PENNVEST Loans (e)	6,356	6,706	8,110	12,172	13,832	14,931
Commercial Water							
11	Commercial Paper	729	586	524	511	403	-
WIFIA							
12	WIFIA	-	-	-	-	-	-
13	**Total Debt Service**	**$ 128,255**	**$ 131,712**	**$ 149,726**	**$ 177,595**	**$ 201,548**	**$ 211,932**

(a) Projected debt service amounts include debt service for all Water and Wastewater Revenue Bonds and Revenue Refunding Bonds issued prior to July 1, 2022 and the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022).

(b) Projected debt service for the Water and Wastewater Revenue Bond Series 2022c (issued in August 2022) included with Existing Bonds.

(c) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 5.50% interest rate; and assume issuance during the first quarter of the fiscal year.

(d) Projected debt service amounts assume interest only payment for the first year of the bond authorization based on 6.00% interest rate; and assume issuance during the first quarter of the fiscal year.

(e) Includes projected PENNVEST Loans.

6.2.3 Capital Improvements

The Water Department's CIP reflects planned improvements to the Wastewater System required to meet regulatory requirements and maintain existing levels of service. The Wastewater System CIP includes major capital projects required for implementing the LTCPU and complying with the COA. The Water Department currently estimates that executing the 25-year LTCPU program will cost about $4.5 Billion, of which $3.5 Billion is related to anticipated capital expenditures. The Wastewater System CIP reflects an ongoing ramp-up of COA-related projects associated with increasing compliance criteria over the life of the LTCPU.

As discussed in Sections 1.4.6 and 2.3.3, several adjustments were made to the Water Department's appropriations-based CIP budget to develop the projected anticipated annual encumbrances and project expenses. Following the steps outlined in Section 1.4.6 produces the CIP shown in Table 6-18.

Table 6-18 Projected Wastewater System CIP

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
1	Engineering and Administration (a)	$ 7,733	$ 6,915	$ 6,257	$ 5,598	$ 4,940	$ 4,281
2	Water Pollution Control Plant	181,521	185,435	116,719	190,065	60,146	65,469
3	Storm Flood Relief	15,000	15,000	15,000	15,000	15,000	15,000
4	Reconstruction of Sewers	72,860	80,000	86,000	91,000	96,000	102,000
5	Green Infrastructure	83,000	90,000	90,000	170,000	170,000	170,000
6	Billing System	0	0	0	15,000	15,000	15,000
7	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
8	**Total Improvements**	**366,114**	**383,351**	**319,976**	**492,663**	**367,086**	**377,750**
9	Inflation Adjustment (b)	(0)	(0)	12,799	40,201	45,836	64,164
10	**Inflated Total**	**366,114**	**383,351**	**332,775**	**532,864**	**412,921**	**441,914**
11	Rollforward Adjustments	(67,669)	(6,018)	43,472	(24,057)	23,941	(5,854)
12	**Total Inflated Adjusted CIP Budget**	**298,446**	**377,332**	**376,246**	**508,807**	**436,862**	**436,060**
13	Contingency Adjustment	(42,522)	(54,663)	(54,525)	(72,492)	(61,172)	(60,993)
14	**Annual Encumbrances**	255,923	322,670	321,721	436,315	375,690	375,067
15	Project Expenses (c)	200,901	213,849	253,585	455,905	379,235	341,410
16	Annual Net Encumbrances	$ 55,022	$ 108,821	$ 68,137	$ (19,590)	$ (3,545)	$ 33,658

(a) Reflects shift in capital related salary costs from capital to operating budget.

(b) Allowance for inflation of 4.0 percent per year after fiscal year 2024.

(c) Reflects annual drawdown of capital budget appropriations based on project durations and annual encumbrances.

6.2.4 Capital Flow of Funds

The Water Department meets its projected capital needs by using several sources for funding, including internally generated funds (cash) and debt. As defined by the General Bond Ordinance, the Construction Fund is where the Water Department draws funds to pay for the CIP. The Water Department may deposit bond proceeds, loan proceeds, CP proceeds and cash transfers from the Revenue Fund and the Residual Fund into the Construction Fund to pay for capital projects.

Table 6-19 presents the proposed sources and uses for the Wastewater System CIP. As shown on Line 6, the Construction Fund has an estimated beginning balance of $354.5 Million on July 1, 2022. Over the course of the Study Period, the Water Department anticipates issuing debt and the proceeds for these transactions are shown on Line 1. The level of debt financing increases during the Study Period as the Water Department's CIP starts to ramp up. The Wastewater System's bond proceeds total $1.66 Billion during the Study Period. Lines 11 and 12 show the estimated level of annual pay-go (i.e., cash-funded) the Water Department will fund.

Per the City's updated CIP funding policy, total outstanding project encumbrances may need exceed available funds; therefore, the Target Balance on Line 22, which represents the Water Departments estimated outstanding encumbrances (or project commitments) excluding PENNVEST and WIFIA funded projects, should not exceed the ending Construction Fund balance shown on Line 16.

Table 6-19 Projected Flow of Funds – Wastewater: Construction Fund & Debt Reserve Account

LINE NO.	DESCRIPTION	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)							
Disposition of Bond Proceeds							
1	Proceeds From Sale of Bonds	$ 183,465	$ 250,000	$ 275,000	$ 345,000	$ 290,000	$ 325,000
	Transfers:						
2	Debt Reserve Account (a)	4,607	-	-	-	-	-
3	Cost of Bond Issuance (b)	1,065	1,525	1,678	2,105	2,900	3,250
4	Construction Fund (c)	177,792	248,475	273,323	342,896	287,100	321,750
5	**Total Issue**	**183,465**	**250,000**	**275,000**	**345,000**	**290,000**	**325,000**
Construction Fund							
6	Beginning Balance	354,541	389,068	496,497	588,493	558,330	551,574
7	Transfer From Revenue Bond Proceeds	177,792	248,475	273,323	342,896	287,100	321,750
8	WIFIA Proceeds	-	-	-	-	-	-
9	WIFIA Match Funding Proceeds	-	-	-	-	-	-
10	PENNVEST Loan Proceeds	28,227	35,728	30,812	27,840	20,880	-
11	Capital Account Deposit	14,310	14,868	15,448	16,051	16,677	17,327
12	Transfer from Residual Fund	11,400	17,800	20,600	33,250	42,300	45,300
13	Interest Income on Construction Fund	3,700	4,406	5,398	5,706	5,522	5,731
14	**Total Available**	**589,969**	**710,345**	**842,078**	**1,014,235**	**930,808**	**941,681**
15	Net Cash Financing Required	200,901	213,849	253,585	455,905	379,235	341,410
16	**Ending Balance**	**389,068**	**496,497**	**588,493**	**558,330**	**551,574**	**600,272**
Capital Program Net Encumbrances							
17	Beginning Balance	272,801	327,824	436,645	504,781	485,191	481,647
18	Annual Encumbrances (excluding PENNVEST & WIFIA)	255,923	322,670	321,721	436,315	375,690	375,067
19	Project Expenses (excluding PENNVEST & WIFIA)	(200,901)	(213,849)	(253,585)	(455,905)	(379,235)	(341,410)
20	**Ending Balance**	**327,824**	**436,645**	**504,781**	**485,191**	**481,647**	**515,304**
21	Allowance Commitments Prior to Bond Issue	53,778	53,620	72,719	62,615	62,511	72,570
22	Target Balance	381,602	490,265	577,501	547,806	544,158	587,874
Debt Reserve Account							
23	Beginning Balance	118,130	123,391	123,861	125,361	129,441	131,105
24	Transfer From Bond Proceeds	4,607	-	-	-	-	-
25	Transfer From Residual Fund	654	469	1,501	4,079	1,664	1,101
26	Debt Reserve Account Release	-	-	-	-	-	-
27	**Ending Balance**	**$ 123,391**	**$ 123,861**	**$ 125,361**	**$ 129,441**	**$ 131,105**	**$ 132,205**
28	Interest Income on Debt Reserve Account	$ 1,208	$ 1,236	$ 1,246	$ 1,274	$ 1,303	$ 1,317

(a) Amount of Debt Reserve Account estimated based on outstanding and proposed debt service payments.

(b) Cost of bonds issuance reflects actual cost in FY 2023, assumed 0.61 percent of issue amount in FY 2024 to 2025, and assumed 1.0% of issuance in FY 2026 to FY 2028.

(c) Deposits equal proceeds from sale of bonds less transfers to Debt Reserve Account and Costs of Issuance.

6.3 Wastewater System Summary of Revenue and Revenue Requirements

The Wastewater System's estimated financial performance during the Study Period is presented in Table 6-20. As shown in the table below, the Wastewater System will need a series of revenue increases, starting at 8.92% in FY 2024, followed by increases of 8.66%, 12.83%, 7.04%, and then 7.13% for each subsequent year. These revenue adjustments are necessary to meet O&M, debt service, Capital Account deposit requirements, and provide additional coverage per the Rate Covenant.

Table 6-20 presents the Wastewater System operating results for Base Rates. The proposed revenue increases in the table do not reflect any rate compression as discussed in Section 2.5.

As previously mentioned, the Water Department is addressing the reconciliation of TAP discounts and TAP-R revenues in a separate proceeding.

6.4 Projected Wastewater System Operating Results

Line 1 of Table 6-20 is the consolidated total for wastewater retail and wholesale receipts from Table 6-11, Table 6-12, Table 6-13. These represent receipts under existing rates. Lines 2 through 6 present the additional revenues from proposed revenue increases. Line 9 presents other operating receipts as detailed on Lines 1 to 9 of Table 6-15. Interest income from the Debt Reserve, Operating Fund, and Rate Stabilization Funds is shown on Lines 10 through 12. Line 13 summarizes the projected Total Revenues for the Wastewater System.

Operating expenses are summarized on Lines 14 and 15. Line 15 represents the Wastewater System's share of costs to process water treatment sludge at the wastewater treatment plants. As noted in Section 3.4, a portion of the cost to process this sludge is allocated back to the Water System as well. During the Study Period, it is estimated that the Water Department will make a series of transfers from and deposits to the RSF as shown on Line 17. Line 18 presents the Net Revenues after Operations. Existing and proposed senior debt service obligations, including those related to the CP program, PENNVEST and WIFIA are shown on Lines 19 through 23. Debt service coverage on senior debt is calculated on Line 25 and indicates that coverage meets the minimum 1.20x requirement. The Capital Account deposit is on Line 29. Line 30 then shows results of the total debt service coverage requirement and indicates that total coverage requirements meet the 1.00 minimum coverage required by the General Bond Ordinance.

As established in the General Bond Ordinance and Rate Covenant, debt service coverage requirements are for the Combined System. The calculations shown in Table 6-20 are presented to demonstrate that the Wastewater System's proposed financial plan provides sufficient resources for the Wastewater System to be financially stable on its own.

Table 6-20 Projected Revenue and Revenue Requirements: Base Rates

LINE NO.	DESCRIPTION			FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
Wastewater System ($000s)									
Operating Revenues									
1	Wastewater Service - Existing Rates (a)			$ 472,292	$ 476,637	$ 478,997	$ 480,829	$ 480,147	$ 470,259
	Additional Service Revenue Required								
	Year	Percent Increase	Months Effective						
2	FY 2024	8.92%	10		34,728	42,703	42,766	42,703	41,488
3	FY 2025	8.66%	10			36,885	45,359	45,295	44,320
4	FY 2026	12.83%	10				59,579	72,904	71,368
5	FY 2027	7.04%	10					36,925	44,176
6	FY 2028	7.13%	10						39,078
7	**Total Additional Service Revenue Required**			**-**	**34,728**	**79,588**	**147,704**	**197,826**	**240,429**
8	**Total Wastewater Service Revenue**			**472,292**	**511,365**	**558,585**	**628,532**	**677,973**	**710,688**
	Other Income (b)								
9	Other Operating Revenue			16,043	16,111	16,130	16,153	16,139	16,125
10	Debt Reserve Account Interest Income			-	-	-	-	-	-
11	Operating Fund Interest Income			1,131	1,189	1,210	1,307	1,349	1,364
12	Rate Stabilization Interest Income			812	791	789	803	841	886
13	**Total Revenues**			**490,279**	**529,456**	**576,713**	**646,796**	**696,303**	**729,063**
Operating Expenses									
14	Wastewater Operations			(355,225)	(381,390)	(407,974)	(432,764)	(451,305)	(472,040)
15	Water Treatment Plant Sludge (c)			14,570	16,592	18,043	20,081	21,491	22,989
16	**Total Operating Expenses**			**(340,655)**	**(364,798)**	**(389,931)**	**(412,683)**	**(429,815)**	**(449,051)**
17	Transfer From/(To) Rate Stabilization Fund			4,290	35	376	(3,240)	(4,380)	(4,500)
18	**NET REVENUES AFTER OPERATIONS**			**153,914**	**164,693**	**187,157**	**230,873**	**262,108**	**275,512**
Debt Service									
	Senior Debt Service								
	Revenue Bonds								
19	Outstanding Bonds			(121,170)	(112,961)	(111,286)	(111,539)	(111,627)	(98,496)
20	PENNVEST Loans			(6,356)	(6,706)	(8,110)	(12,172)	(13,832)	(14,931)
21	Projected Future Bonds			-	(11,458)	(29,806)	(53,373)	(75,687)	(98,505)
22	Commercial Paper			(729)	(586)	(524)	(511)	(403)	-
23	WIFIA			-	-	-	-	-	-
24	**Total Senior Debt Service**			**(128,255)**	**(131,712)**	**(149,726)**	**(177,595)**	**(201,548)**	**(211,932)**
25	**TOTAL SENIOR DEBT SERVICE COVERAGE L18/L24)**			**1.20 x**	**1.25 x**	**1.25 x**	**1.30 x**	**1.30 x**	**1.30 x**
26	Subordinate Debt Service			-	-	-	-	-	-
27	Transfer to Escrow			-	-	-	-	-	-
28	**Total Debt Service on Bonds**			**(128,255)**	**(131,712)**	**(149,726)**	**(177,595)**	**(201,548)**	**(211,932)**
29	**CAPITAL ACCOUNT DEPOSIT**			**(14,310)**	**(14,868)**	**(15,448)**	**(16,051)**	**(16,677)**	**(17,327)**
30	**TOTAL COVERAGE (L18/(L24+L26+L29))**			**1.08 x**	**1.12 x**	**1.13 x**	**1.19 x**	**1.20 x**	**1.20 x**
31	**End of Year Revenue Fund Balance**			**$ 11,348**	**$ 18,113**	**$ 21,984**	**$ 37,228**	**$ 43,884**	**$ 46,253**

(a) Revenue from rates effective September 1, 2022.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

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7.0 Wastewater System of Cost of Service Allocations

The cost-of-service analysis is the middle step of three depicted in Figure 2-1 that forms the basis for how a utility sets its rates and charges. At the cost-of-service stage, we identify how different customer types are using the sanitary sewer and stormwater systems. As such, each customer type potentially places a different level of demands on the system – requirements that the Water Department must meet. The types of demand are cost drivers and the cost-of-service step is where we develop the nexus between how the systems are designed and operated and how customers are using the systems.

7.1 General

As indicated previously for the Water System, in allocating the test year COS, we apportion revenue requirements between wholesale customers and retail customer types on a utility basis, per the industry accepted guidelines provided in WEF MoP 27. The tasks illustrated in Figure 7-1 to conduct the wastewater COS analysis presented herein.

Figure 7-1 Wastewater COS Steps

Wastewater Cost of Service Analytical Tasks	1. Categorize	2. Functionalize	3. Allocate	4. Distribute
	Determine net revenue requirements by *cost categories*	Assign revenue requirements to *functional cost centers*	Allocate functional costs to *cost components*	Distribute costs to *customer types*
Subcomponent Costs	• O&M Costs • Capital Costs	• Collection & Pumping • Water Pollution Control Plants • Customer Costs • Administrative & General	• Volume • Capacity • Strength (Suspended Solids & BOD) • Direct Stormwater	• Residential • Senior Citizens • Commercial • Industrial • Public Utilities • Housing Authority • Charities / Schools • Retail Infiltration/Inflow • Contract Services

7.2 Costs of Service to be Allocated

7.2.1 Overall Wastewater System

The projected annual revenue requirements for FY 2024 serve as the Test Year 1 requirements for the analyses conducted herein. The proposed rate increases will go into effect on September 1st of each respective fiscal year. However, rates are designed based upon a 12-month period. Because the proposed revenue increase will not go into effect until September 1st of each fiscal year, the proposed rates are designed based on annualizing the 10-month period for which rates are effective. Table 7-1 shows the

projected Test Year 1 cash flow of base rates for the Wastewater System based on the annualizing the proposed revenue increase.

Table 7-1 Test Year 1 Annualized Revenue and Revenue Requirements

LINE NO.	DESCRIPTION			FY 2024
Wastewater System ($000s)				
Operating Revenues				
1	Wastewater Service - Existing Rates (a)			$ 476,637
	Additional Service Revenue Required			
	Year	Percent Increase	Months Effective	
2	FY 2024	8.92%	12	42,562
3	**Total Additional Service Revenue Required**			**42,562**
4	**Total Wastewater Service Revenue**			**519,199**
	Other Income (b)			
5	Other Operating Revenue			16,111
6	Debt Reserve Account Interest Income			-
7	Operating Fund Interest Income			1,189
8	Rate Stabilization Interest Income			791
9	**Total Revenues**			**537,289**
Operating Expenses				
10	Wastewater Operations			(381,390)
11	Water Treatment Plant Sludge (c)			16,592
12	**Total Operating Expenses**			**(364,798)**
13	Transfer From/(To) Rate Stabilization Fund			(7,799)
14	**NET REVENUES AFTER OPERATIONS**			**164,693**
Debt Service				
	Senior Debt Service			
	Revenue Bonds			
15	Outstanding Bonds			(112,961)
16	PENNVEST Loans			(6,706)
17	Projected Future Bonds			(11,458)
18	Commercial Paper			(586)
19	WIFIA			-
20	**Total Senior Debt Service**			**(131,712)**
21	**TOTAL SENIOR DEBT SERVICE COVERAGE L14/L20)**			**1.25 x**
22	Subordinate Debt Service			-
23	Transfer to Escrow			-
24	**Total Debt Service on Bonds**			**(131,712)**
25	**CAPITAL ACCOUNT DEPOSIT**			**(14,868)**
26	**TOTAL COVERAGE (L14/(L20+L22+L25))**			**1.12 x**
27	**End of Year Revenue Fund Balance**			**$ 18,113**

(a) Revenue from rates effective September 1, 2022.

(b) Includes other operating and nonoperating income, including interest income on funds and accounts transferable to the Revenue Fund.

(c) Cost to process the Water Treatment Sludge at the wastewater treatment plants based on wastewater cost of service analysis.

The net COS recovered from wastewater service charges is the total revenue requirements less revenues received from other sources. Table 7-2 presents the COS to be recovered from sanitary sewer and stormwater rates for Test Year 1. The TY net COS of $519.2 Million (Column 3, Line 13), represents the total revenue requirements of $537.3 Million (Column 3, Line 10) minus other revenues and transfers received of $18.1 Million (Column 3, Lines 11 and 12). The COS to be recovered from rates consists of

$369.6 Million of net operating expenses (Column 1, Line 13) and $149.6 Million of net capital-related costs (Column 2, Line 13).

Table 7-2 Estimated Wastewater System Test Year 1 COS

LINE NO.	DESCRIPTION	(1) OPERATING EXPENSE	(2) CAPITAL COSTS	(3) TOTAL
Wastewater System ($000s)				
Revenue Requirements				
1	Operations & Maintenance Expense	$ 255,072		$ 255,072
2	Direct Interdepartmental Charges	126,318		126,318
3	Water Treatment Plant Sludge	(12,934)	(3,659)	(16,592)
	Existing Bond Debt Service			
4	Revenue Bonds (a)		119,668	119,668
5	Subordinate Bonds		-	-
6	Proposed Bond Debt Service (b)		12,044	12,044
7	Capital Account Deposit		14,868	14,868
8	Residual Fund Deposit	13,051	5,062	18,113
9	Deposit (From)/To Rate Stabilization Fund	5,619	2,180	7,799
10	**Total**	**387,127**	**150,163**	**537,289**
Deductions of Funds from Other Sources				
11	Other Operating Revenue	(16,111)	-	(16,111)
12	Interest Income	(1,446)	(534)	(1,980)
13	**COST OF SERVICE TO BE DERIVED FROM RATES**	**$ 369,570**	**$ 149,629**	**$ 519,199**

(a) Includes PENNVEST Loans.
(b) Includes Commercial Paper and WIFIA

7.2.2 Wholesale Wastewater

The cost of service allocable to the 10 wholesale wastewater customers and the rates developed to recover these allocated costs, reflect consideration of the contract demands for service as set forth in each customer's contract with the City. Contract rates for wastewater service apply monthly and generally consist of charges for O&M expense, applicable capital costs associated with the collection and treatment facilities used in providing the service, customer related costs, and a management fee ranging from 10 to 12% applied to the sum of the unit and fixed charges.

For Test Year 1, the O&M expense of $369.6 Million from Table 7-2 is allocated between wholesale and retail customers based on service demand characteristics. With respect to capital costs, to allocate the $149.6 Million (Column 2, Line 13 of Table 7-2) of Capital Costs using the utility-basis approach, typically we delineate the annual Capital Costs into two components, namely, the Depreciation Expense and the Return on Investment. Under the utility-basis approach, the restatement of Capital Costs into these two components is necessary as the Water Department provides service to wholesale customers outside the City, and hence is entitled to obtaining a return on investment from those wholesale customers.

To restate the Capital Costs in terms of depreciation and return, we determine the depreciation expense for the Wastewater System and subtract this amount from the Total Capital Costs. The resulting figure corresponds to the return on investment for the Wastewater System, which is recovered from both the inside City retail and outside City wholesale customers. As noted earlier, the rate of return for service to the City's wholesale wastewater customers used in the COS Study is 7.5%, which is consistent with the rate of return used in the development of the wastewater wholesale existing rates.

7.3 Functional Cost Components

The costs derived in revenue requirements are incurred as a result of cost drivers placed on the system by its customers. Many systems are designed and sized to meet the cost drivers; therefore, the operational and capital costs (depreciation and return on rate base) are linked to these cost drivers.

The various cost elements of wastewater service are assigned to functional cost components as the first step in the subsequent distribution of the cost of service to the customer types. For a wastewater system, the functional cost centers include collection system, pumping, treatment, pollutant loadings (strength), customer costs, and general administration. For the analyses conducted herein, the Design Basis COS methodology proposed in WEF MoP 27 was followed.

7.3.1 Wastewater System Facilities

A wastewater system includes different facilities each designed and operated to fulfill a given function. The sewage collection system in the City of Philadelphia consists of both separate sanitary and storm sewers as well as combined sanitary and storm sewers designed to convey sanitary and stormwater flows. In addition, these conveyance systems transport a large part of these flows to one of the three wastewater treatment plants for treatment prior to discharge into the rivers.

The wastewater treatment plants consist of different facilities as well. The sizing of certain facilities, such as the sedimentation basins, is based on the average annual volume of wastewater received at the plant. The sizing of other facilities, such as the aeration basins, use the measurable pollutant, BOD, since these facilities are required to reduce this pollutant prior to discharge into the river. The sizing of other facilities is based on SS loading, another readily measurable pollutant, contained in the influent wastewater. Finally, certain other facilities, such as sludge disposal facilities, are designed to manage both BOD and SS.

7.3.2 Wastewater System Design Basis

The Design Basis method uses volume, capacity, strengths, and customer. Volume represents costs incurred for the quantity of sewerage volume treated. Capacity represents costs incurred with meeting peak flows. Strengths represents costs incurred with treating and handling specific constituents in the sewer flow such as BOD, SS, nitrogen, and ammonia. Customer represents the costs associated with meter reading, billing, collecting, and accounting costs related to the provision of wastewater service.

7.3.3 Units of Service

Table 7-3 summarizes the Test Year 1 units of service for the sanitary sewer customers. Table 7-4 presents the Test Year 1 units of service for the wholesale customers and Table 7-5 summarizes the estimated average wastewater loadings applied for the wholesale customer contracts.

Table 7-3 Test Year 1 Sanitary Sewer Units of Service

LINE NO.	CUSTOMER TYPE	(1) TY 2024 VOLUME (Mcf)	(2) CAPACITY FLOW RATE (Mcf/day) COLLECTION SYSTEM	(3) CAPACITY FLOW RATE (Mcf/day) PUMPING & TREATMENT	(4) STRENGTH (1,000 lbs) SUSPENDED SOLIDS	(5) STRENGTH (1,000 lbs) BOD	(6) CUSTOMER COSTS EQUIV. METERS	(7) CUSTOMER COSTS EQUIV. BILLS	(8) CUSTOMER COSTS BILLS
Sanitary Sewer									
1	Residential	2,919,305	31,992	11,998	54,649	53,739	477,314	5,336,266	5,306,988
2	Commercial	1,512,677	16,577	6,216	28,317	27,845	111,993	531,071	450,012
3	Industrial	53,797	590	221	1,007	990	4,114	15,100	12,084
4	Public Utilities	10,078	110	41	189	186	1,547	4,075	2,556
5	Senior Citizens	114,155	1,251	469	2,137	2,101	21,174	253,864	253,848
6	Sewer Only	142,990	1,567	588	2,677	2,632	463	1,314	756
7	Groundwater	211,696	4,640	1,450	925	132	0	0	0
8	Surcharge	0	0	0	2,152	13,842	0	0	0
9	Water Treatment Plant Sludge	292,800	3,209	1,203	27,200	0	0	0	0
10	Housing Authority	145,224	1,591	597	2,719	2,673	9,138	70,174	66,336
11	Charities & Schools	118,608	1,300	487	2,220	2,183	12,706	32,863	19,224
12	Hospital/University	50,294	551	207	942	926	1,279	2,362	768
13	Hand Billed	406,523	4,455	1,671	7,610	7,483	4,500	8,036	2,388
14	Fire Meters	95	1	0	2	2	0	0	0
15	Scheduled (Flat Rate)	59	1	0	1	1	10	120	120
16	**Subtotal Retail Service**	**5,978,300**	**67,835**	**25,148**	**132,747**	**114,735**	**644,238**	**6,255,245**	**6,115,080**
17	Infiltration/Inflow	12,021,600	263,487	82,340	52,496	7,499	0	0	0
18	**Total Retail Service**	**17,999,900**	**331,322**	**107,488**	**185,243**	**122,234**	**644,238**	**6,255,245**	**6,115,080**
	Contract Service								
19	Sanitary	3,854,000	32,577	32,577	40,765	37,109			
20	Infiltration/Inflow	105,100	420	420	459	66			
21	**Total Contract Service**	**3,959,100**	**32,997**	**32,997**	**41,224**	**37,175**			
22	**Total System**	**21,959,000**	**364,319**	**140,485**	**226,467**	**159,410**	**644,238**	**6,255,245**	**6,115,080**

Table 7-4 Test Year 1 Wholesale Customer Units of Service

LINE NO.		UNITS	NORTHEAST WPC PLANT ABINGTON	BENSALEM	BUCKS COUNTY	CHELTENHAM	LOWER MORELAND	LOWER SOUTHAMPTON	TOTAL NORTHEAST
Wholesale Customers									
	Volume								
1	Sanitary Wastewater	(Mcf)	92,000	150,000	894,000	411,000	62,000	270,000	1,879,000
2	Infiltration	(Mcf)	4,500	5,600	35,100	15,000	2,800	7,500	70,500
3	Total	(Mcf)	96,500	155,600	929,100	426,000	64,800	277,500	1,949,500
	Suspended Solids								
4	Sanitary Wastewater	(1,000 lbs)	998	1,568	10,541	3,069	626	1,964	18,765
5	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308
6	Total	(1,000 lbs)	1,018	1,592	10,694	3,135	638	1,997	19,073
	BOD								
7	Sanitary Wastewater	(1,000 lbs)	1,343	1,623	10,369	2,682	470	1,633	18,120
8	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44
9	Total	(1,000 lbs)	1,346	1,626	10,391	2,691	472	1,638	18,164
	Contract Maximum Units								
	Capacity								
10	Sanitary Wastewater	(Mcf/day)	824	1,014	6,416	2,743	508	1,364	12,869
11	Infiltration	(Mcf/day)	20	20	140	60	10	30	280
12	Total	(Mcf/day)	844	1,034	6,556	2,803	518	1,394	13,149
	Volume								
13	Sanitary Wastewater	(Mcf)	217,292	299,271	1,171,123	654,370	92,714	348,409	2,783,179
14	Infiltration	(Mcf)	4,500	5,600	35,100	15,000	2,800	7,500	70,500
15	Total	(Mcf)	221,792	304,871	1,206,223	669,370	95,514	355,909	2,853,679
	Suspended Solids								
16	Sanitary Wastewater	(1,000 lbs)	2,481	3,734	13,400	5,635	966	6,000	32,216
17	Infiltration	(1,000 lbs)	20	24	153	66	12	33	308
18	Total	(1,000 lbs)	2,501	3,758	13,553	5,701	978	6,033	32,524
	BOD								
19	Sanitary Wastewater	(1,000 lbs)	2,102	5,340	13,400	4,900	729	5,500	31,971
20	Infiltration	(1,000 lbs)	3	3	22	9	2	5	44
21	Total	(1,000 lbs)	2,105	5,343	13,422	4,909	731	5,505	32,015

Table 7-4 Test Year 1 Wholesale Customer Units of Service (continued)

LINE NO.		UNITS	SOUTHWEST WPC PLANT DELCORA	LOWER MERION	SPRINGFIELD (EXCLUDING WYNDMOOR)	UPPER DARBY	TOTAL SOUTHWEST	SOUTHEAST WPC PLANT SPRINGFIELD (WYNDMOOR)	TOTAL
Wholesale Customers									
	Volume								
1	Sanitary Wastewater	(Mcf)	1,087,000	310,000	109,000	451,000	1,957,000	18,000	3,854,000
2	Infiltration	(Mcf)	0	14,900	2,200	16,600	33,700	900	105,100
3	Total	(Mcf)	1,087,000	324,900	111,200	467,600	1,990,700	18,900	3,959,100
	Suspended Solids								
4	Sanitary Wastewater	(1,000 lbs)	12,017	3,234	2,141	4,392	21,784	215	40,765
5	Infiltration	(1,000 lbs)	0	65	10	73	148	4	460
6	Total	(1,000 lbs)	12,017	3,299	2,151	4,465	21,932	219	41,225
	BOD								
7	Sanitary Wastewater	(1,000 lbs)	10,202	2,760	2,116	3,745	18,823	166	37,109
8	Infiltration	(1,000 lbs)	0	9	1	10	20	1	65
9	Total	(1,000 lbs)	10,202	2,769	2,117	3,755	18,843	167	37,174
	Contract Maximum Units								
	Capacity								
10	Sanitary Wastewater	(Mcf/day)	13,392	2,728	397	3,024	19,541	167	32,577
11	Infiltration	(Mcf/day)	0	60	10	70	140	0	420
12	Total	(Mcf/day)	13,392	2,788	407	3,094	19,681	167	32,997
	Volume								
13	Sanitary Wastewater	(Mcf)	2,439,840	707,553	156,150	829,545	4,133,088	48,797	6,965,064
14	Infiltration	(Mcf)	0	14,900	2,200	16,600	33,700	900	105,100
15	Total	(Mcf)	2,439,840	722,453	158,350	846,145	4,166,788	49,697	7,070,164
	Suspended Solids								
16	Sanitary Wastewater	(1,000 lbs)	19,487	7,250	3,300	7,349	37,386	200	69,802
17	Infiltration	(1,000 lbs)	0	65	10	73	148	4	460
18	Total	(1,000 lbs)	19,487	7,315	3,310	7,422	37,534	204	70,262
	BOD								
19	Sanitary Wastewater	(1,000 lbs)	21,771	6,871	3,100	6,831	38,573	155	70,699
20	Infiltration	(1,000 lbs)	0	9	1	10	20	1	65
21	Total	(1,000 lbs)	21,771	6,880	3,101	6,841	38,593	156	70,764

Table 7-5 Estimated Average Wastewater Loadings for Wholesale Customers

CUSTOMER	(1) WASTEWATER POLLUTANT LOADING (1,000 lbs) SUSPENDED SOLIDS	(2) BOD
Abington	998	1,343
Bensalem	1,568	1,623
Bucks County	10,541	10,369
Cheltenham	3,069	2,682
DELCORA	12,017	10,202
Lower Merion	3,234	2,760
Lower Moreland	626	470
Lower Southhampton	1,964	1,633
Springfield (excluding Wyndmoor)	2,141	2,116
Springfield (Wyndmoor)	215	166
Upper Darby	4,392	3,745

7.3.3.1 Retail Service

The units of service for the retail customer types of the Wastewater System are determined as follows:

- Volume: For the retail customer types, we estimate the sanitary wastewater quantities by applying a 95% return factor to the projected test year water sales from each customer type. The return factor reflects an allowance for water consumption which is not discharged into the Wastewater System. In addition, we also apportion the test year infiltration/inflow ("I/I") in the Wastewater System to the retail customer types based upon the total projected test year flow at all three treatment plants, less the estimated annual sanitary sewage contribution from the retail customers and the total annual flow projected for the wholesale customers.
- Collection System – Capacity: The sanitary wastewater peak (capacity) flow rate, exclusive of I/I, for each retail customer type is estimated to be approximately four times (4 times) the average daily flow rate, computed from the annual volumes shown in Column 1 of Table 7-3. These estimated capacity requirements reflect the system-wide ratio of maximum to average sanitary wastewater flow rates. The capacity flow rate of I/I in the collection system is estimated to be eight times (8 times) the average daily flow rate. Retail customers' I/I is largely due to leakage into sewers and direct extraneous inflows.
- Treatment – Capacity: The peak sanitary wastewater capacity flow rate, exclusive of I/I is estimated to be 1.5 times the average daily flow rate. The capacity flow rate of I/I at the water pollution control plants is estimated to be 2.5 times the average daily flow rate.
- Strengths (BOD and Suspended Solids): The estimated strength units for each customer type are shown in Columns 4 and 5 of Table 7-3. Based upon an analysis of historical data, the wastewater reaching the water pollution control plants is estimated to have a weighted average suspended solids concentration of approximately 163 milligrams per liter ("mg/l"), and a weighted average BOD concentration of approximately 118 mg/l. These weighted averages are based on estimated influent concentrations at the three treatment plants. Infiltration/ inflow is assumed to have a suspended

solids and BOD concentration of 70 mg/l and 10 mg/l, respectively. The estimates of strength units for customers with excess strength wastewater are based upon an analysis of surcharge bills.

- Additional wastewater strength loadings at the treatment plants are attributable to water plant sludge from the Belmont and Queen Lane treatment plants. An estimate of the volume and pounds of sludge from the water treatment plants has been included in the units of service shown in Table 7-3 in Line 9.
- The retail loadings for suspended solids and BOD are determined as the difference between the total influent wastewater loadings at the plant less the sum of I&I and water plant sludge loadings for those two components respectively. The resulting retail suspended solids and BOD concentrations are 300 mg/l and 295 mg/l, respectively.

- Customer: Units of service applicable for the allocation of customer costs are summarized in Columns 6 to 8 of Table 7-3. The number of accounts and bills for each customer type and meter size are derived from billing information prepared by the Water Department. Equivalent meters are based upon capacity factors determined for various size meters relative to the capacity associated with a 5/8-inch meter.

7.3.3.2 Wholesale Customers

Table 7-4 and Table 7-5 present a summary of the test year units of service for volume, capacity, strength, and customer units of service for each of the wholesale customers. The strength units from wholesale customers are estimated for each customer based on historical measured wastewater strength loadings, as measured at the point of their discharge to the City's sewers.

7.4 Allocation to Cost Components

We allocate the Test Year 1 cost to the functional cost components using a two-step process.

1. First, a portion of the Wastewater System costs (O&M, depreciation, and net plant investment) are allocated to wholesale wastewater customers.
2. Then the retail portion of the remaining costs are allocated to the various wastewater cost components, including direct charges to stormwater.

7.5 Allocation of O&M Expense

7.5.1 Retail

Table 7-6 shows the allocation of Test Year 1 O&M expenses for the Wastewater System to the identified functional cost components by cost center. O&M expense is allocated to wastewater cost components generally in the same proportion as the plant investment and depreciation expense allocations.

Table 7-6 Test Year 1 Allocation of O&M to Functional Cost Components

LINE NO.	COST COMPONENT	(1) NET O&M	(2) LESS O&M ALLOCATED TO CONTRACT SERVICE	(3) O&M ALLOCATED TO RETAIL SERVICE	(4) LESS RETAIL O&M DEDUCTIONS: OTHER OPERATING REVENUE	(5) NET O&M TO BE ALLOCATED TO RETAIL SERVICE
Wastewater System ($000s)						
	COLLECTION SYSTEM					
	Sewer Maintenance					
1	All Customers - Capacity	$ 84,192	$ 799	$ 83,393	$ 2,808	$ 80,585
	Inlet Cleaning					
2	Retail - Storm Capacity	19,739	-	19,739	665	19,074
	GSI Maintenance (LTCP O&M)					
3	All Customers - Capacity	44,884	196	44,688	1,505	43,183
	Neill Drive Pumping Station					
	Retail and Lower Merion					
4	Total Volume	10	2	8	-	8
5	Total Capacity	188	58	130	4	126
	Central Schuylkill Pumping Station					
	Retail and Springfield (excl. Wyndmoor)					
6	Total Volume	49	2	47	2	45
7	Total Capacity	564	10	554	19	535
	All Other Pumping Stations					
	Retail					
8	Total Volume	4,988	-	4,988	168	4,820
9	Total Capacity	21,581	-	21,581	727	20,854
10	**Total Collection Systems**	**176,195**	**1,067**	**175,128**	**5,898**	**169,230**
	WATER POLLUTION CONTROL PLANTS					
	Northeast Plant:					
	Retail and Cheltenham					
11	Volume	-	-	-	-	-
12	Capacity	-	-	-	-	-
	Retail, Abington, Bensalem, Bucks County, Lower Moreland, and Lower Southampton					
13	Volume	727	166	561	19	542
14	Capacity	4,198	1,020	3,178	107	3,071
	Retail, Abington, Bensalem, Bucks County, Cheltenham, Lower Moreland, and Lower Southampton					
15	Volume	15,742	3,412	12,330	415	11,915
16	Capacity	7,728	1,766	5,962	201	5,761
17	Suspended Solids	27,951	4,865	23,086	776	22,310
18	BOD	23,717	5,474	18,243	614	17,629

Table 7-6 Test Year 1 Allocation of O&M to Functional Cost Components (continued)

LINE NO.	COST COMPONENT	(1) NET O&M	(2) LESS O&M ALLOCATED TO CONTRACT SERVICE	(3) O&M ALLOCATED TO RETAIL SERVICE	(4) LESS RETAIL O&M DEDUCTIONS: OTHER OPERATING REVENUE	(5) NET O&M TO BE ALLOCATED TO RETAIL SERVICE
Wastewater System ($000s)						
	Southwest Plant:					
	Retail					
19	Volume	79	-	79	3	76
20	Capacity	646	-	646	22	624
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
21	Volume	15,195	3,393	11,802	397	11,405
22	Capacity	6,191	2,137	4,054	137	3,917
23	Suspended Solids	19,952	5,300	14,652	493	14,159
24	BOD	13,852	4,797	9,055	305	8,750
	Southeast Plant:					
	Retail and Springfield (Wyndmoor)					
25	Volume	11,023	51	10,972	369	10,603
26	Capacity	7,623	49	7,574	255	7,319
27	Suspended Solids	13,715	88	13,627	459	13,168
28	BOD	5,002	32	4,970	167	4,803
29	**Total Water Pollution Control Plants**	**173,341**	**32,550**	**140,791**	**4,739**	**136,052**
	CUSTOMER COSTS					
	All Customers					
30	Equivalent Bills	33,848	228	33,620	1,132	32,488
	Equivalent Meters					
31	Industrial Waste Unit	4,075	68	4,007	135	3,872
32	Other	5,187	-	5,187	175	5,012
33	Stormwater - Direct	-	-	-	-	-
34	Excess Strength Wastewater - Direct	2,008	-	2,008	68	1,940
35	**Total Customer Costs**	**45,118**	**296**	**44,822**	**1,510**	**43,312**
36	**Total O&M**	**$ 394,654**	**$ 33,913**	**$ 360,741**	**$ 12,147**	**$ 348,594**

The net O&M expenses are allocated to the retail customer types as follows:

- Collection System: The various functional cost centers of the wastewater collection system are designed based on different wastewater parameters. Therefore, those functional O&M expenses are allocated to respective wastewater parameter (cost component). The allocation of the operation and maintenance expense for each collection system component is presented in Table 7-7 and is summarized in Lines 1 to 10 on Table 7-6.
  - Wastewater Collection System - Sewers: The operation and maintenance costs of the wastewater collection system sewers are shown in Line 1 of Table 7-7. These facilities are designed to carry maximum rates of wastewater flows and are allocated 100% to the capacity cost component.

    We further delineate the test year collection system O&M between sanitary sewer related costs and stormwater costs. Based on an analysis of system-wide ratio of peak wet weather flows to peak dry weather flows, 60% of the sewer maintenance cost is allocated to stormwater and 40% to sanitary sewer. The rationale for using the peak flow ratio as the basis for apportioning sewer maintenance costs is that those costs would normally be incurred in proportional to the quantity of flow.

- Wastewater Collection System – Inlet Cleaning: The inlet cleaning related operation and maintenance expenses are shown on Line 2 of Table 7-7. These expenses are allocated 100% to the stormwater related capacity cost component.
- GSI Maintenance (LTCPU O&M): The operation and maintenance costs of the GSI Maintenance are shown in Line 3 of Table 7-7. These facilities are designed manage maximum rates of wastewater flows and are allocated 100% to the capacity cost component.

  In the same manner as the Wastewater Collection Costs, we further delineate the test year GSI Maintenance O&M between sanitary sewer related costs (40%) and stormwater costs (60%).
- Wastewater Collection System – Pumping: The power costs of the pumping stations located in the collection system, shown on Lines 4, 7, and 10 of Table 7-7, are allocated 85% to the volume cost component and 15% to the capacity cost component. The other operation and maintenance expense of the pumping stations located in the collection system, shown on Lines 6, 9, and 12 of Table 7-7 is allocated 100% to the capacity cost component.

- Wastewater Treatment: The various functional facilities of the water pollution control plants are designed to process different wastewater parameters. Therefore, those functional O&M expenses are allocated to respective wastewater parameter (cost component). The allocation of the operation and maintenance expense for each of the water pollution control plants is presented in Table 7-8, Table 7-9, and Table 7-10 and is summarized in Lines 11 to 29 on Table 7-6.
  - Volume: Wastewater treatment related power costs are allocated 85% to the volume cost component. Water pollution control plant facilities such as primary and secondary sedimentation basins, recirculation pumping and chlorination, are designed largely based on total average flow projected for the plant. Therefore, most of the operation and maintenance expense excluding power costs, associated with these functions, is allocated largely to the volume cost component.
  - Capacity: Wastewater treatment related power costs are allocated 15% to the capacity cost component. Most of the operation and maintenance expenses, excluding power, which is associated with facilities such as raw wastewater pumps, preliminary treatment, and effluent pumping vary according to peak wastewater flow rates. Therefore, the O&M costs of those functions are largely allocated to the capacity functional cost component.

Table 7-7 Test Year 1 Allocation of O&M for the Collection System

LINE NO.	DESCRIPTION	(1) TOTAL	(2) ALL CUSTOMERS CAPACITY	(3) RETAIL VOLUME	(4) RETAIL CAPACITY	(5) STORM CAPACITY	(6) RETAIL AND LOWER MERION VOLUME	(7) RETAIL AND LOWER MERION CAPACITY	(8) RETAIL AND SPRINGFIELD (EXCLUDING WYNDMOOR) Volume	(9) RETAIL AND SPRINGFIELD (EXCLUDING WYNDMOOR) Capacity
Wastewater System ($000s)										
1	Sewer Maintenance	$ 31,033	$ 31,033	$ -	$ -	$ -	$ -	$ -	$ -	$ -
2	Inlet Cleaning	12,973	-	-	-	12,973	-	-	-	-
3	GSI Maintenance	14,144	14,144	-	-	-	-	-	-	-
	Pump Stations									
	Neill Drive									
4	Power	12	-	-	-	-	10	2	-	-
5	Gas	-	-	-	-	-	-	-	-	-
6	Other	124	-	-	-	-	-	124	-	-
	Central Schuylkill									
7	Power	58	-	-	-	-	-	-	49	9
8	Gas	-	-	-	-	-	-	-	-	-
9	Other	370	-	-	-	-	-	-	-	370
	All Other Pumping Stations									
10	Power	5,889	-	5,006	883	-	-	-	-	-
11	Gas	-	-	-	-					
12	Other	14,375	-	-	14,375	-	-	-	-	-
13	**Total Collection System**	**$ 78,978**	**$ 45,177**	**$ 5,006**	**$ 15,258**	**$ 12,973**	**$ 10**	**$ 126**	**$ 49**	**$ 379**

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, & LOWER SOUTHAMPTON VOLUME	(3) CAPACITY	(4) RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON VOLUME	(5) CAPACITY	(6) SUSPENDED SOLIDS	(7) BOD
Wastewater System ($000s)								
	Personal Services:							
1	Raw Wastewater Pumping	$ 837,978	$ -	$ 837,978	$ -	$ -	$ -	$ -
2	Preliminary Treatment	1,629,401	-	-	1,156,875	472,526	-	-
3	Primary Sedimentation	657,580	-	-	657,580	-	-	-
4	Aeration	2,717,609	-	-	-	-	-	2,717,609
5	Secondary Sedimentation	663,399	-	-	663,399	-	-	-
6	Recirculating Pumping	488,820	-	-	488,820	-	-	-
7	Chlorination	459,724	-	-	280,432	179,292	-	-
8	Primary Sludge Pumping	133,844	-	-	-	-	133,844	-
9	Secondary Sludge Thickening	325,880	-	-	-	-	162,940	162,940
10	Sludge Digestion	2,560,488	-	-	-	-	1,920,366	640,122
11	Sludge Holding Tanks	186,217	-	-	-	-	139,663	46,554
12	Sludge Dewatering	471,363	-	-	-	-	353,522	117,841
13	Grit and Screening Incineration	1,047,472	-	-	701,806	345,666	-	-
14	Scum and Grease Incineration	250,230	-	-	-	-	250,230	-
15	Laboratory	867,074	-	-	-	-	433,537	433,537
16	**Subtotal Personal Services**	**13,297,079**	**-**	**837,978**	**3,948,912**	**997,484**	**3,394,102**	**4,118,603**
	Purchase of Services, Materials, Supplies, and Equipment:							
17	Raw Wastewater Pumping	1,520,668	-	1,520,668	-	-	-	-
18	Preliminary Treatment	2,403,032	-	-	-	2,403,032	-	-
19	Primary Sedimentation	1,126,421	-	-	1,126,421	-	-	-
20	Aeration	1,689,632	-	-	-	-	-	1,689,632
21	Secondary Sedimentation	1,295,384	-	-	1,295,384	-	-	-
22	Recirculating Pumping	488,116	-	-	488,116	-	-	-
23	Chlorination	1,970,047	-	-	1,970,047	-	-	-

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, & LOWER SOUTHAMPTON VOLUME	(3) CAPACITY	(4) RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON VOLUME	(5) CAPACITY	(6) SUSPENDED SOLIDS	(7) BOD
Wastewater System ($000s)								
24	Primary Sludge Pumping	206,511	-	-	-	-	206,511	-
25	Secondary Sludge Thickening	244,058	-	-	-	-	122,029	122,029
26	Sludge Digestion	3,172,753	-	-	-	-	2,379,565	793,188
27	Sludge Holding Tanks	450,568	-	-	-	-	337,926	112,642
28	Sludge Dewatering	356,700	-	-	-	-	267,525	89,175
29	Grit and Screening Incineration	1,013,779	-	-	-	1,013,779	-	-
30	Scum and Grease Incineration	281,605	-	-	-	-	281,605	-
31	Laboratory	2,177,747	-	-	-	-	1,088,874	1,088,873
32	**Subtotal Purchase of Services, Materials, Supplies & Equipment**	**18,397,021**	**-**	**1,520,668**	**4,879,968**	**3,416,811**	**4,684,035**	**3,895,539**
33	**Subtotal All Above**	**31,694,100**	**-**	**2,358,646**	**8,828,880**	**4,414,295**	**8,078,137**	**8,014,142**
	Administrative and General:							
34	Personal Services	3,421,744	-	215,637	1,016,176	256,683	873,406	1,059,842
35	Other	2,648,511	-	218,922	702,540	491,898	674,333	560,818
36	**Subtotal Administration & General**	**6,070,255**	**-**	**434,559**	**1,718,716**	**748,581**	**1,547,739**	**1,620,660**
	Power Requirements:							
37	Raw Wastewater Pumping	878,418	746,655	131,763	-	-	-	-
38	Preliminary Treatment	7,260	-	-	6,171	1,089	-	-
39	Primary Sedimentation	58,077	-	-	49,365	8,712	-	-
40	Aeration	4,813,150	-	-	-	-	-	4,813,150
41	Secondary Sedimentation	58,077	-	-	49,365	8,712	-	-
42	Recirculating Pumping	203,270	-	-	172,780	30,490	-	-
43	Chlorination	14,519	-	-	12,341	2,178	-	-
44	Primary Sludge Pumping	7,260	-	-	-	-	7,260	-
45	Secondary Sludge Thickening	544,474	-	-	-	-	272,237	272,237
46	Sludge Digestion	123,414	-	-	-	-	92,561	30,853
47	Sludge Dewatering	130,674	-	-	-	-	98,006	32,668
48	Grit and Screening Incineration	116,154	-	-	98,731	17,423	-	-
49	Scum and Grease Incineration	7,260	-	-	-	-	7,260	-
50	**Subtotal Power Requirements**	**6,962,007**	**746,655**	**131,763**	**388,753**	**68,604**	**477,324**	**5,148,908**

Table 7-8 Test Year 1 Allocation of O&M for the Northeast WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND, & LOWER SOUTHAMPTON VOLUME	(3) CAPACITY	(4) RETAIL, CHELTENHAM, ABINGTON BENSALEM, BUCKS COUNTY, LOWER MORELAND & LOWER SOUTHAMPTON VOLUME	(5) CAPACITY	(6) SUSPENDED SOLIDS	(7) BOD
Wastewater System ($000s)								
	Gas Requirements:							
51	Raw Wastewater Pumping	149,684	-	149,684	-	-	-	-
52	Preliminary Treatment	236,537	-	-	-	236,537	-	-
53	Primary Sedimentation	110,877	-	-	110,877	-	-	-
54	Aeration	166,315	-	-	-	-	-	166,315
55	Secondary Sedimentation	127,508	-	-	127,508	-	-	-
56	Recirculating Pumping	48,047	-	-	48,047	-	-	-
57	Chlorination	20,327	-	-	20,327	-	-	-
58	Primary Sludge Pumping	20,327	-	-	-	-	20,327	-
59	Secondary Sludge Thickening	24,023	-	-	-	-	12,012	12,011
60	Sludge Digestion	312,303	-	-	-	-	234,227	78,076
61	Sludge Holding Tanks	44,351	-	-	-	-	33,263	11,088
62	Sludge Dewatering	35,111	-	-	-	-	26,333	8,778
63	Grit and Screening Incineration	99,789	-	-	-	99,789	-	-
64	Scum and Grease Incineration	27,719	-	-	-	-	27,719	-
65	Laboratory	214,362	-	-	-	-	107,181	107,181
66	**Subtotal Gas Requirements**	**1,637,280**	**-**	**149,684**	**306,759**	**336,326**	**461,062**	**383,449**
67	Sludge Disposal	12,183,099	-	-	-	-	9,137,324	3,045,775
68	**Total Northeast WPC Plant Expense**	**$ 58,546,741**	**$ 746,655**	**$ 3,074,652**	**$ 11,243,108**	**$ 5,567,806**	**$ 19,701,586**	**$ 18,212,934**

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL VOLUME	(3) RETAIL CAPACITY	(4) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY VOLUME	(5) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY CAPACITY	(6) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY SUSPENDED SOLIDS	(7) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY BOD
Wastewater System ($000s)								
	Personal Services							
1	Raw Wastewater Pumping	$ 161,675	$ -	$ 161,675	$ -	$ -	$ -	$ -
2	Preliminary Treatment	2,134,108	-	-	1,557,899	576,209	-	-
3	Flocculation	388,020	-	-	388,020	-	-	-
4	Primary Sedimentation	562,628	-	-	562,628	-	-	-
5	Aeration	1,144,658	-	-	-	-	-	1,144,658
6	Secondary Sedimentation	970,049	-	-	970,049	-	-	-
7	Recirculating Pumping	362,152	-	-	362,152	-	-	-
8	Chlorination	549,694	-	-	324,319	225,375	-	-
9	Effluent Pumping	452,690	-	-	-	452,690	-	-
10	Primary Sludge Pumping	413,888	-	-	-	-	413,888	-
11	Secondary Sludge Thickening	342,751	-	-	-	-	167,948	174,803
12	Sludge Digestion	1,309,566	-	-	-	-	982,175	327,391
13	Sludge Holding Tanks	223,111	-	-	-	-	167,333	55,778
14	Sludge Dewatering	1,018,552	-	-	-	-	763,914	254,638
15	Sludge Lagoon	9,700	-	-	-	-	7,275	2,425
16	Grit and Screening Incineration	897,295	-	-	610,161	287,134	-	-
17	Scum and Grease Incineration	227,962	-	-	-	-	227,962	-
18	Laboratory	827,775	-	-	-	-	413,888	413,887
19	**Subtotal Personal Services**	**11,996,274**	**-**	**161,675**	**4,775,228**	**1,541,408**	**3,144,383**	**2,373,580**

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL VOLUME	(3) RETAIL CAPACITY	(4) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY VOLUME	(5) CAPACITY	(6) SUSPENDED SOLIDS	(7) BOD
Wastewater System ($000s)								
	Purchase of Services, Materials, Supplies, and Equipment:							
20	Raw Wastewater Pumping	119,392	-	119,392	-	-	-	-
21	Preliminary Treatment	1,366,760	-	-	-	1,366,760	-	-
22	Flocculation	708,395	-	-	708,395	-	-	-
23	Primary Sedimentation	399,112	-	-	399,112	-	-	-
24	Aeration	777,757	-	-	-	-	-	777,757
25	Secondary Sedimentation	838,022	-	-	838,022	-	-	-
26	Recirculating Pumping	349,081	-	-	349,081	-	-	-
27	Chlorination	1,009,687	-	-	1,009,687	-	-	-
28	Effluent Pumping	39,797	-	-	-	39,797	-	-
29	Primary Sludge Pumping	449,143	-	-	-	-	449,143	-
30	Secondary Sludge Thickening	79,595	-	-	-	-	39,002	40,593
31	Sludge Digestion	785,432	-	-	-	-	589,074	196,358
32	Sludge Holding Tanks	277,161	-	-	-	-	207,871	69,290
33	Sludge Dewatering	1,660,408	-	-	-	-	1,245,306	415,102
34	Sludge Lagoon	15,350	-	-	-	-	11,513	3,837
35	Grit and Screening Incineration	351,355	-	-	-	351,355	-	-
36	Scum and Grease Incineration	112,570	-	-	-	-	112,570	-
37	Laboratory	897,149	-	-	-	-	448,575	448,574
38	**Subtotal Purchase of Services, Materials, Supplies & Equipment**	**10,236,166**	**-**	**119,392**	**3,304,297**	**1,757,912**	**3,103,054**	**1,951,511**
39	**Subtotal All Above**	**22,232,440**	**-**	**281,067**	**8,079,525**	**3,299,320**	**6,247,437**	**4,325,091**

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL VOLUME	(3) RETAIL CAPACITY	(4) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY VOLUME	(5) CAPACITY	(6) SUSPENDED SOLIDS	(7) BOD
Wastewater System ($000s)								
	Administrative & General							
40	Personal Services	2,889,800	-	38,946	1,150,312	371,312	757,455	571,775
41	Other	1,307,100	-	15,246	421,940	224,475	396,242	249,197
42	**Subtotal Administration & General**	**4,196,900**	**-**	**54,192**	**1,572,252**	**595,787**	**1,153,697**	**820,972**
	Power Requirements							
43	Raw Wastewater Pumping	95,134	80,864	14,270	-	-	-	-
44	Preliminary Treatment	6,342	-	-	5,391	951	-	-
45	Flocculation	304,882	-	-	259,150	45,732	-	-
46	Primary Sedimentation	24,010	-	-	20,409	3,601	-	-
47	Aeration	2,970,445	-	-	-	-	-	2,970,445
48	Secondary Sedimentation	61,158	-	-	51,984	9,174	-	-
49	Recirculating Pumping	162,181	-	-	137,854	24,327	-	-
50	Chlorination	13,138	-	-	11,167	1,971	-	-
51	Effluent Pumping	39,866	-	-	33,886	5,980	-	-
52	Primary Sludge Pumping	3,624	-	-	-	-	3,624	-
53	Secondary Sludge Thickening	396,845	-	-	-	-	194,454	202,391
54	Sludge Digestion	92,755	-	-	-	-	69,566	23,189
55	Sludge Dewatering	67,953	-	-	-	-	50,965	16,988
56	Grit and Screening Incineration	42,130	-	-	35,811	6,319	-	-
57	Scum and Grease Incineration	6,455	-	-	-	-	6,455	-
58	**Subtotal Power Requirements**	**4,286,918**	**80,864**	**14,270**	**555,652**	**98,055**	**325,064**	**3,213,013**

Table 7-9 Test Year 1 Allocation of O&M for the Southwest WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL VOLUME	(3) RETAIL CAPACITY	(4) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY VOLUME	(5) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY CAPACITY	(6) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY SUSPENDED SOLIDS	(7) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR) AND UPPER DARBY BOD
Wastewater System ($000s)								
	Gas Requirements							
59	Raw Wastewater Pumping	38,807	-	38,807	-	-	-	-
60	Preliminary Treatment	444,246	-	-	-	444,246	-	-
61	Flocculation	230,254	-	-	230,254	-	-	-
62	Primary Sedimentation	129,726	-	-	129,726	-	-	-
63	Aeration	252,799	-	-	-	-	-	252,799
64	Secondary Sedimentation	272,387	-	-	272,387	-	-	-
65	Recirculating Pumping	113,464	-	-	113,464	-	-	-
66	Chlorination	38,807	-	-	38,807	-	-	-
67	Effluent Pumping	12,936	-	-	-	12,936	-	-
68	Primary Sludge Pumping	145,988	-	-	-	-	145,988	-
69	Secondary Sludge Thickening	25,871	-	-	-	-	12,677	13,194
70	Sludge Digestion	255,294	-	-	-	-	191,471	63,823
71	Sludge Holding Tanks	90,088	-	-	-	-	67,566	22,522
72	Sludge Dewatering	539,693	-	-	-	-	404,770	134,923
73	Sludge Lagoon	4,990	-	-	-	-	3,743	1,247
74	Grit and Screening Incineration	114,203	-	-	-	114,203	-	-
75	Scum and Grease Incineration	36,589	-	-	-	-	36,589	-
76	Laboratory	291,606	-	-	-	-	145,803	145,803
77	**Subtotal Gas Requirements**	**3,037,748**	**-**	**38,807**	**784,638**	**571,385**	**1,008,607**	**634,311**
78	Sludge Disposal	7,500,889	-	-	-	-	5,625,667	1,875,222
79	**Total Southwest WPC Plant Expense**	**$ 41,254,895**	**$ 80,864**	**$ 388,336**	**$ 10,992,067**	**$ 4,564,547**	**$ 14,360,472**	**$ 10,868,609**

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL AND SPRINGFIELD (WYNDMOOR) VOLUME	(3) RETAIL AND SPRINGFIELD (WYNDMOOR) CAPACITY	(4) RETAIL AND SPRINGFIELD (WYNDMOOR) SUSPENDED SOLIDS	(5) RETAIL AND SPRINGFIELD (WYNDMOOR) BOD
Wastewater System ($000s)						
	Personal Services					
1	Raw Wastewater Pumping	$ 939,988	$ -	$ 939,988	$ -	$ -
2	Preliminary Treatment	1,335,055	961,240	373,815	-	-
3	Flocculation	408,690	408,690	-	-	-
4	Primary Sedimentation	476,805	476,805	-	-	-
5	Aeration	476,805	-	-	-	476,805
6	Secondary Sedimentation	592,601	592,601	-	-	-
7	Recirculating Pumping	286,083	286,083	-	-	-
8	Chlorination	456,371	287,514	168,857	-	-
9	Effluent Pumping	361,010	-	361,010	-	-
10	Primary Sludge Pumping	381,444	-	-	381,444	-
11	Waste Sludge Pumping	279,272	-	-	237,381	41,891
12	Sludge Digestion	436,522	-	-	371,044	65,478
13	Sludge Holding Tanks	271,905	-	-	231,119	40,786
14	Sludge Dewatering	339,517	-	-	288,589	50,928
15	Sludge Lagoon	3,234	-	-	2,749	485
16	Grit and Screening Incineration	299,099	203,387	95,712	-	-
17	Scum and Grease Incineration	75,987	-	-	75,987	-
18	Scum Pumping	381,444	-	-	381,444	-
19	Primary Sludge Transfer Pumping	197,534	-	-	197,534	-
20	Waste Activated Sludge Xfer Pumping	183,911	-	-	156,324	27,587
21	Laboratory	653,904	-	-	326,952	326,952
22	**Subtotal Personal Services**	**8,837,181**	**3,216,320**	**1,939,382**	**2,650,567**	**1,030,912**

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL AND SPRINGFIELD (WYNDMOOR) VOLUME	(3) RETAIL AND SPRINGFIELD (WYNDMOOR) CAPACITY	(4) RETAIL AND SPRINGFIELD (WYNDMOOR) SUSPENDED SOLIDS	(5) RETAIL AND SPRINGFIELD (WYNDMOOR) BOD
Wastewater System ($000s)						
	Purchase of Services, Materials, Supplies, and Equipment:					
23	Raw Wastewater Pumping	504,060	-	504,060	-	-
24	Preliminary Treatment	1,471,529	-	1,471,529	-	-
25	Flocculation	617,880	617,880	-	-	-
26	Primary Sedimentation	398,370	398,370	-	-	-
27	Aeration	617,880	-	-	-	617,880
28	Secondary Sedimentation	504,060	504,060	-	-	-
29	Recirculating Pumping	300,810	300,810	-	-	-
30	Chlorination	924,042	924,042	-	-	-
31	Effluent Pumping	260,160	-	260,160	-	-
32	Primary Sludge Pumping	471,540	-	-	471,540	-
33	Waste Sludge Pumping	300,810	-	-	255,689	45,121
34	Sludge Digestion	261,811	-	-	222,539	39,272
35	Sludge Holding Tanks	328,157	-	-	278,933	49,224
36	Sludge Dewatering	553,470	-	-	470,450	83,020
37	Sludge Lagoon	5,117	-	-	4,349	768
38	Grit and Screening Incineration	117,118	-	117,118	-	-
39	Scum and Grease Incineration	37,523	-	-	37,523	-
40	Scum Pumping	471,540	-	-	471,540	-
41	Primary Sludge Transfer Pumping	170,730	-	-	170,730	-
42	Waste Activated Sludge Xfer Pumping	162,600	-	-	138,210	24,390
43	Laboratory	658,530	-	-	329,265	329,265
44	**Subtotal Purchase of Services, Materials, Supplies & Equipment**	**9,137,737**	**2,745,162**	**2,352,867**	**2,850,768**	**1,188,940**
45	**Subtotal All Above**	**17,974,918**	**5,961,482**	**4,292,249**	**5,501,335**	**2,219,852**

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL AND SPRINGFIELD (WYNDMOOR) VOLUME	(3) CAPACITY	(4) SUSPENDED SOLIDS	(5) BOD
Wastewater System ($000s)						
	Administrative & General					
46	Personal Services	2,491,730	906,873	546,828	747,353	290,676
47	Other	996,791	299,456	256,663	310,976	129,696
48	Gas	27,881	3,011	5,288	15,820	3,762
49	**Subtotal Administration & General**	**3,516,402**	**1,209,340**	**808,779**	**1,074,149**	**424,134**
	Power Requirements					
50	Raw Wastewater Pumping	301,099	255,934	45,165	-	-
51	Flocculation	463,534	394,004	69,530	-	-
52	Primary Sedimentation	18,489	15,716	2,773	-	-
53	Aeration	401,465	-	-	-	401,465
54	Secondary Sedimentation	13,206	11,225	1,981	-	-
55	Recirculating Pumping	31,695	26,941	4,754	-	-
56	Chlorination	3,962	3,368	594	-	-
57	Effluent Pumping	35,656	30,308	5,348	-	-
58	Primary Sludge Pumping	1,321	-	-	1,321	-
59	Waste Sludge Pumping	3,962	-	-	3,368	594
60	Sludge Digestion	30,919	-	-	26,281	4,638
61	Sludge Dewatering	22,651	-	-	19,253	3,398
62	Grit and Screening Incineration	14,044	11,937	2,107	-	-
63	Scum and Grease Incineration	2,152	-	-	2,152	-
64	Scum Pumping	3,962	-	-	3,962	-
65	Primary Sludge Transfer Pumping	27,733	-	-	27,733	-
66	Waste Activated Sludge Xfer Pumping	14,527	-	-	12,348	2,179
67	**Subtotal Power Requirements**	**1,390,377**	**749,433**	**132,252**	**96,418**	**412,274**

Table 7-10 Test Year 1 Allocation of O&M for the Southeast WPC Plant (continued)

LINE NO.	DESCRIPTION	(1) TOTAL O&M	(2) RETAIL AND SPRINGFIELD (WYNDMOOR) VOLUME	(3) RETAIL AND SPRINGFIELD (WYNDMOOR) CAPACITY	(4) RETAIL AND SPRINGFIELD (WYNDMOOR) SUSPENDED SOLIDS	(5) RETAIL AND SPRINGFIELD (WYNDMOOR) BOD
Wastewater System ($000s)						
	Gas Requirements					
68	Raw Wastewater Pumping	16,306	-	16,306	-	-
69	Preliminary Treatment	47,604	-	47,604	-	-
70	Flocculation	19,988	19,988	-	-	-
71	Primary Sedimentation	12,887	12,887	-	-	-
72	Aeration	19,988	-	-	-	19,988
73	Secondary Sedimentation	16,306	16,306	-	-	-
74	Recirculating Pumping	9,731	9,731	-	-	-
75	Chlorination	3,945	3,945	-	-	-
76	Effluent Pumping	8,416	-	8,416	-	-
77	Primary Sludge Pumping	15,254	-	-	15,254	-
78	Waste Sludge Pumping	9,731	-	-	8,271	1,460
79	Sludge Digestion	85,098	-	-	72,333	12,765
80	Sludge Holding Tanks	37,656	-	-	32,008	5,648
81	Sludge Dewatering	179,898	-	-	152,913	26,985
82	Sludge Lagoon	1,663	-	-	1,414	249
83	Grit and Screening Incineration	38,068	-	38,068	-	-
84	Scum and Grease Incineration	12,197	-	-	12,197	-
85	Scum Pumping	15,254	-	-	15,254	-
86	Primary Sludge Transfer Pumping	5,523	-	-	5,523	-
87	Waste Activated Sludge Xfer Pumping	5,260	-	-	4,471	789
88	Laboratory	21,303	-	-	10,652	10,651
89	**Subtotal Gas Requirements**	**582,076**	**62,857**	**110,394**	**330,290**	**78,535**
90	Sludge Disposal	3,211,765	-	-	2,730,000	481,765
91	**Total Southeast WPC Plant Expense**	**$ 26,675,538**	**$ 7,983,112**	**$ 5,343,674**	**$ 9,732,192**	**$ 3,616,560**

- The raw wastewater pumping facilities at the Southwest plant are not used by the wholesale contract customers whose flow is tributary to the plant. Consequently, the operation and maintenance expense of raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

- Strength (BOD and Suspended Solids): Aeration basins and oxygen, or air supply, facilities are designed principally on the basis of BOD, and the related O&M expense is assigned to the BOD functional cost component.
  - The operation and maintenance expense of sludge conditioning and disposal facilities pertains to both the suspended solids and BOD parameters and is allocated to those two cost components. The design of facilities handling only sludge from the primary sedimentation basins, such as the primary sludge pumps and scum disposal facilities, reflects the suspended solids content of the raw wastewater, and the related operating expense is therefore allocated to that cost component.
  - The O&M expense of certain other facilities handling both primary and waste activated sludge, such as digesters and sludge dewatering and composting facilities, is allocated to the suspended solids functional cost component and to the BOD functional cost component. The percentage allocation to these cost components is derived from an analysis of the relative quantities of sludge from the two sources and reflects the relative difficulty of treating waste activated sludge as compared with primary sludge. The resulting allocation percentages are 75% to the suspended solids functional cost component and 25% to the BOD functional cost component. The O&M expense of the sludge force main at the Southeast plant is allocated 85% to suspended solids and 15% to BOD functional cost components, based on design flows.
  - Some of the treatment and sludge related facilities in the Wastewater System service multiple treatment facilities. The digesters and the sludge processing and distribution facilities provide treatment and disposal of sludge from both the Southwest treatment plant and the Southeast treatment plant and provide disposal of sludge from the Northeast treatment plant. To properly recognize cost responsibility for these joint use facilities, a portion of the operations and maintenance expense associated with these facilities is allocated to the Southeast and Northeast plants.
- Customer: The allocation of customer related O&M costs is summarized on Lines 30 to 35 of Table 7-6. Test year customer accounting and collection is allocated 100% to the equivalent bills component of Customer costs. Meter maintenance expense is allocated 100% to the meter component of Customer costs. The operation and maintenance costs of the Industrial Waste Unit are allocated 33% to the excess strength component and 67% to the meter component of Customer costs.
- Administrative and General: Administrative and general expense is allocated to cost components in proportion to the total allocation of all other expenses to the cost components, excluding expenses for power.
- Residual Fund and Rate Stabilization Fund Transfers: The deposit into the Residual Fund (Line 8 of Table 7-2) and the deposit from the Rate Stabilization Fund (Line 9 of Table 7-2), each of which is allocable O&M expense, are allocated to the various cost components in proportion to the direct O&M expense.

- **Net Operating Expense:** The net operating expense to be recovered from all customers through charges for wastewater service is derived by deducting the "Other Operating Revenue" and the non-operating "Interest Income" from the total operating expense.
  - Other revenue is allocated to the various cost components applicable to retail customers, as shown on Column 4 of Table 7-6. Since virtually all these revenues are generated from retail customers, no credit is applicable to wholesale service.
  - The non-operating interest income which is assigned to operation and maintenance expense (Line 12 of Table 7-2) is allocated in proportion to the distribution of the O&M expenses allocable to retail service (Column 3 of Table 7-6).

7.5.2 Wholesale

The process of allocating O&M expenses to the Wholesale customers follows the analytical steps outlined below. The tables for these steps are provided in Appendix I.

The following four categories of O&M costs are allocated to wholesale contract service customers, as applicable:

- Pumping and Treatment;
- Collection System;
- LTCPU; and
- Customer.

The following analytical steps are used to allocate the applicable O&M costs to each wholesale contract service customer:

1. Determine O&M Unit cost by cost component for each "Pumping Station" and each "Water Pollution Control (Treatment) Plant" (Appendix I: Table 13).
2. Allocate Pumping & Treatment O&M Cost to each wholesale contract service customer based on contract customer's units of service and applicable O&M unit cost (Appendix I: Table 14 through Table 24). Only costs associated with facilities used directly by a customer are allocated to that customer.
3. Allocate Collection System O&M Cost to each wholesale contract service customer based on the allocation of applicable capital investments in sewer collection system which serves that specific contract service customer and the ratio of the total O&M expense associated with collection system maintenance to the total plant investment of the collection system (Appendix I: Table 14 through Table 24).
    a. Sewer Maintenance O&M costs are not applicable to DELCORA contract service customer since they pump their wastewater directly to the Southwest WPCP and do not utilize the Water Department's collection system.

4. Allocate LTCPU O&M Cost to applicable wholesale contract service customers in accordance with their contractual agreements (Appendix I: Table 14 through Table 24). Test year Green infrastructure maintenance expense is estimated based on 3.5% of the total estimated test year LTCPU investment. Wholesale customers are allocated a portion of the sewer maintenance expense on the basis of 3.5% of their respective allocated share of LTCPU investment. In lieu of recovering the annual SMIP and GARP O&M costs in the year the expenses are incurred, the Water Department allocates SMIP/GARP costs based on amortized costs determined recognizing expected project completion.

5. Allocate customer costs to the wholesale customers based on estimates of costs of billing for wastewater service, including allowances for flow and strength monitoring, bill preparation, and calibration of the flow meters.

7.6 Allocation of Net Plant Investment

Table 7-11 summarizes the Test Year 1 (FY 2024) investment in the Wastewater System used in the allocation of test year capital related costs of service. The total test year investment of $2.83 Billion is the total original cost investment in facilities as of June 30, 2022. Contributed plant investments from Federal grants on the three wastewater treatment plants are deducted in arriving at the plant investment for cost allocation and rate design purposes.

Table 7-11 Summary of Test Year 1 Allocation of Plant Investment to Functional Cost Components

LINE NO.	COST COMPONENT	(1) TOTAL DIRECT INVESTMENT	(2) INVESTMENT ALLOCATED TO CONTRACT SERVICE	(3) INVESTMENT ALLOCATED TO RETAIL SERVICE
Wastewater System ($)				
	COLLECTION SYSTEM			
1	Sewers-Capacity	$ 1,823,982,000	$ 17,991,000	$ 1,805,991,000
2	Pumping Stations Capacity	23,225,000	252,000	22,973,000
3	LTCP Investment	291,589,000	5,599,000	285,990,000
4	**Total Collection System**	**2,138,796,000**	**23,842,000**	**2,114,954,000**
	WATER POLLUTION CONTROL PLANTS			
	Northeast Plant			
	Retail, Abington, Bensalem, Bucks County			
	Cheltenham, Lower Moreland, & Lower Southampton			
5	Volume	60,597,000	16,876,000	43,721,000
6	Capacity	29,663,000	6,819,000	22,844,000
7	Suspended Solids	124,572,000	23,386,000	101,186,000
8	BOD	106,410,000	26,512,000	79,898,000
9	**Total Northeast Plant**	**321,242,000**	**73,593,000**	**247,649,000**
	Southwest Plant			
	Retail, DELCORA, Lower Merion, Springfield (excluding			
	Wyndmoor), & Upper Darby			
10	Volume	75,019,000	32,031,000	42,988,000
11	Capacity	41,969,000	7,334,000	34,635,000
12	Suspended Solids	64,118,000	18,436,000	45,682,000
13	BOD	53,154,000	26,243,000	26,911,000
14	**Total Southwest Plant**	**234,260,000**	**84,044,000**	**150,216,000**
	Southeast Plant			
	Retail & Springfield (Wyndmoor)			
15	Volume	33,139,000	301,000	32,838,000
16	Capacity	42,518,000	237,000	42,281,000
17	Suspended Solids	31,254,000	97,000	31,157,000
18	BOD	25,735,000	71,000	25,664,000
19	**Total Southeast Plant**	**132,646,000**	**706,000**	**131,940,000**
20	**Total Allocated Treatment Plants**	**688,148,000**	**158,343,000**	**529,805,000**
21	**Total Allocated System Investment**	**$ 2,826,944,000**	**$ 182,185,000**	**$ 2,644,759,000**

(a) Plant Investment as of 6/30/2022. Includes Administration & General Costs

7.6.1 Retail

Similar to our treatment of O&M expenses, the net plant investment allocable to Retail customers is the difference between the net plant investment on Line 21, Column 1 on Table 7-11 and the amount allocated to Wholesale customers on Line 21, Column 2. After deducting the investment directly allocable to Wholesale customers, the balance of the plant investment is allocated to Retail customers as follows:

- Collection System: The various functional cost centers of the wastewater collection system are designed based on different wastewater parameters. Therefore, the net plant investment allocable to Retail customers is allocated to the respective wastewater parameter (cost component). The

allocation of net plant investment allocable to retail customers for each collection system component is summarized in Lines 1 to 4 of Table 7-11.

- Wastewater Collection System - Sewers: The collection system is designed to carry maximum rates of wastewater flow and as such, 100% of the collection system costs are allocated to the capacity cost component.

  As the combined sewer system also conveys stormwater, the test year retail customer plant investment associated with the collection system is apportioned between sanitary sewer-related costs and stormwater-related costs. Consistent with the allocation factor presented in prior rate proceedings, 64% of the collection system retail plant investment costs were allocated to stormwater. This factor was determined based on an "inch-foot" analysis (the inch (diameter) of pipes times the number of feet of the sewer system), and then further adjusted to reflect the trenching cost savings typically associated with the construction of separate sanitary and storm sewers. As explained in prior rate proceedings, during construction, the sanitary sewer is buried deeper, and a storm sewer is placed in the same trench above the sanitary sewer. Our analysis indicates that it is reasonable to allocate 36% of the capacity of the system for conveyance of sanitary flows and 64% for stormwater drainage.

- Wastewater Collection System - Pumping: These facilities are designed to meet the maximum rates of wastewater flows and are allocated 100% to the capacity cost component.

- Wastewater Collection System - Long-Term Control Plan: The LTCPU investments reduce the maximum rates of wastewater flows and are allocated 100% to the capacity cost component.

  In the same manner as the Wastewater Collection Costs, we further delineate the test year GSI investments between sanitary sewer related costs (36%) and stormwater costs (64%).

- Wastewater Treatment: The various functional facilities of the water pollution control plants are designed to manage different wastewater parameters including average and peak flows, BOD, and suspended solids. Hence, the treatment plant investments in each functional facility are allocated across the key wastewater parameters, as shown in Table 7-12, Table 7-13, and Table 7-14 for each of the three water pollution control plants and summarized in Lines 5 to 20 of Table 7-11.

  - Volume: The water pollution control plant facilities such as flocculation, sedimentation basins, and recirculation pumping, are designed primarily to handle the total average flow projected for the plant. Therefore, investments in such facilities are allocated to the volume cost component.

  - Capacity: The investment in facilities such as raw wastewater pumps, preliminary treatment, chlorine contact basins, wastewater conduits, and outfall lines varies according to peak wastewater flow rates, and therefore is allocated to the capacity functional cost component.

  Wholesale customers whose flow is tributary to the plant do not use the raw wastewater pumping facilities at the Southwest plant. Consequently, the investment in raw wastewater pumping facilities at the Southwest plant is allocated entirely to the Retail customer group.

Table 7-12 Test Year 1 Allocation of Plant Investment for the Northeast WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL INVESTMENT (a)	(2) RETAIL, ABINGTON BENSALEM, BUCKS COUNTY, & LOWER SOUTHAMPTON CAPACITY	(3) RETAIL, ABINGTON, BENSALEM, BUCKS COUNTY, CHELTENHAM, LOWER MORELAND & LOWER SOUTHAMPTON VOLUME	(4) CAPACITY	(5) SUSPENDED SOLIDS	(6) BOD
Wastewater System ($000s)							
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Primary Sedimentation Basins	$ 5,677	$ -	$ 5,677	$ -	$ -	$ -
2	Pumping Station	1,370	-	-	1,370	-	-
3	Aeration Facilities	18,758	-	-	-	-	18,758
4	Primary Sludge Pumps	1,259	-	-	-	1,259	-
5	Scum Ejectors	197	-	-	-	197	-
6	Effluent Conduit	-	-	-	-	-	-
7	Final Sedimentation Basins	9,873	-	9,873	-	-	-
8	Recirculation Pumps	1,777	-	1,777	-	-	-
9	Digesters	19,325	-	-	-	14,494	4,831
10	Sludge Dewatering	49,711	-	-	-	37,283	12,428
11	Frankford Grit Chamber	-	-	-	-	-	-
12	Chlorination Facilities	5,160	-	-	5,160	-	-
13	Aeration Tank No. 1	2,667	-	-	-	-	2,667
14	Sludge Thickener Building	10,569	-	-	-	5,285	5,284
15	Sludge Transfer Station	286	-	-	-	215	71
16	Loading Terminal/Barges	6,706	-	-	-	5,030	1,676
17	**Subtotal All Above**	**133,335**	**-**	**17,327**	**6,530**	**63,763**	**45,715**
	Administrative and General Facilities						
18	Administrative and General Plant	65,581					
19	Land	945					
20	**Subtotal**	**66,526**	**1,544**	**14,406**	**5,960**	**22,921**	**21,695**
21	**Total**	**199,861**	**1,544**	**31,733**	**12,490**	**86,684**	**67,410**
	WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
22	New Preliminary Treatment Building	41,022	10,256	-	30,766	-	-
23	Primary Sedimentation Tanks	52,780	-	52,780	-	-	-
24	Blower Building	16,552	-	-	-	-	16,552
25	Aeration Tank No. 1	38,591	-	-	-	-	38,591
26	Chlorination Facilities	-	-	-	-	-	-
27	New Sludge Thickener Building	41,249	-	-	-	20,625	20,624
28	Effluent Conduits	2,291	-	-	2,291	-	-
29	New Final Sedimentation Tanks	25,574	-	25,574	-	-	-
30	Sludge Digestion System	34,438	-	-	-	25,829	8,609
31	Composting Facilities	-	-	-	-	-	-
32	Sludge Dewatering	26,096	-	-	-	19,572	6,524
33	Sludge Transfer Station	24,457	-	-	-	18,343	6,114
34	Loading Terminal/Barges	5,474	-	-	-	4,106	1,368
35	**Subtotal**	**308,524**	**10,256**	**78,354**	**33,057**	**88,475**	**98,382**
36	Admin. and General Facilities	47,544	1,104	10,295	4,260	16,381	15,504
37	Adjustment for Joint Use Facilities	3,435	-	-	-	2,576	859
38	**Total**	**359,503**	**11,360**	**88,649**	**37,317**	**107,432**	**114,745**
39	**Total Northeast WPC Plant Book Cost**	**559,364**	**12,904**	**120,382**	**49,807**	**194,116**	**182,155**
40	Less Federal Grants	238,122	7,825	59,785	25,223	69,544	75,745
41	**Adjusted Total Northeast WPC Plant**	**$ 321,242**	**$ 5,079**	**$ 60,597**	**$ 24,584**	**$ 124,572**	**$ 106,410**

(a) Plant Investment as of 6/30/2022.

Table 7-13 Test Year 1 Allocation of Plant Investment for the Southwest WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL INVESTMENT (a)	(2) RETAIL CAPACITY	(3)	(4) RETAIL, DELCORA, LOWER MERION, SPRINGFIELD (EXCLUDING WYNDMOOR), & UPPER DARBY	(5)	(6)
				VOLUME	CAPACITY	SUSPENDED SOLIDS	BOD
Wastewater System ($000s)							
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
1	Raw Wastewater Pumping Station	$ 12,730	$ 12,730	$ -	$ -	$ -	$ -
2	Sludge Digestion Facilities	11,863	-	-	-	8,656	3,207
3	Scum Incineration	-	-	-	-	-	-
4	Settling Tanks	35,185	-	35,185	-	-	-
5	Sludge Handling	7,397	-	-	-	5,548	1,849
6	Chlorination Facilities	1,217	-	-	1,217	-	-
7	Aeration Tanks	701	-	-	-	-	701
8	Oxygen Supply	3,637	-	-	-	-	3,637
9	Effluent Pump Station	1,566	-	-	1,566	-	-
10	Sludge Thickener Building	1,615	-	-	-	808	807
11	Composting Facilities	716	-	-	-	537	179
12	Sludge Gas Facilities	12,078	-	-	-	9,059	3,019
13	**Subtotal**	**88,705**	**12,730**	**35,185**	**2,783**	**24,608**	**13,399**
	Administrative and General Facilities						
14	Administrative and General Plant	83,629					
15	Land	687					
16	**Subtotal**	**84,316**	**5,797**	**23,017**	**8,835**	**24,847**	**21,820**
17	Adjustment for Joint Use Facilities	(5,114)	-	-	-	(4,051)	(1,063)
18	**Total**	**167,907**	**18,527**	**58,202**	**11,618**	**45,404**	**34,156**
	WATER POLLUTION ABATEMENT PROGRAM FACILITIES						
19	Influent Pumping Station	6,328	6,328	-	-	-	-
20	Preliminary Treatment Building	20,330	-	-	20,330	-	-
21	Primary Sedimentation Tanks	11,146	-	11,146	-	-	-
22	Aeration Tanks	16,416	-	-	-	-	16,416
23	Oxygen Supply System	14,118	-	-	-	-	14,118
24	Compressor Building	3,736	-	-	-	-	3,736
25	Final Tanks	29,345	-	29,345	-	-	-
26	Scum Concentration Building	1,374	-	-	-	1,374	-
27	Sludge Thickener Building	12,568	-	-	-	6,284	6,284
28	Sludge Digestion Facilities	31,156	-	-	-	22,733	8,423
29	Effluent Pumping Station	5,934	-	-	5,934	-	-
30	New Centrifuges	10,002	-	-	-	7,298	2,704
31	Composting Facilities	-	-	-	-	-	-
32	Sludge Dewatering	18,797	-	-	-	14,098	4,699
33	Sludge Gas Facilities	7,259	-	-	-	5,296	1,963
34	**Subtotal**	**188,509**	**6,328**	**40,491**	**26,264**	**57,083**	**58,343**
35	Admin. and Gen'l. Facilities	34,037	2,340	9,292	3,566	10,030	8,809
36	Adjust. for Joint Use Facilities	(8,788)	-	-	(455)	(6,226)	(2,107)
37	**Total**	**213,758**	**8,668**	**49,783**	**29,375**	**60,887**	**65,045**
38	**Total Southwest WPC Plant**	**381,665**	**27,195**	**107,985**	**40,993**	**106,291**	**99,201**
39	Less Federal Grants	147,405	5,152	32,966	21,067	42,173	46,047
40	**Adjusted Total Southwest WPC Plant**	**$ 234,260**	**$ 22,043**	**$ 75,019**	**$ 19,926**	**$ 64,118**	**$ 53,154**

(a) Plant Investment as of 6/30/2022.

Table 7-14 Test Year 1 Allocation of Plant Investment for Southeast WPC Plant

LINE NO.	DESCRIPTION	(1) TOTAL INVESTMENT (a)	(2) RETAIL AND SPRINGFIELD (WYNDMOOR) VOLUME	(3) CAPACITY	(4) SUSPENDED SOLIDS	(5) BOD
Wastewater System ($000s)						
	NON-WATER POLLUTION ABATEMENT PROGRAM FACILITIES					
1	Main Pumping Station	$ 1,108	$ -	$ 1,108	$ -	$ -
2	Grit Chambers	12,445	-	12,445	-	-
3	Outfall Line	570	-	570	-	-
4	Sludge Digestion Facilities	5,727	-	-	4,537	1,190
5	Settling Tanks & Floc. Channel	7,463	7,463	-	-	-
6	Sludge Force Main	5,022	-	-	3,767	1,255
7	**Subtotal**	**32,335**	**7,463**	**14,123**	**8,304**	**2,445**
	Administrative and General Facilities					
8	Administrative and General Plant	25,979				
9	Land	156				
10	**Subtotal**	**26,135**	**7,042**	**8,050**	**5,184**	**5,859**
11	Adjustment for Joint Use Facilities	5,114	-	-	4,051	1,063
12	**Total**	**63,584**	**14,505**	**22,173**	**17,539**	**9,367**
	WATER POLLUTION ABATEMENT PROGRAM FACILITIES					
13	Influent Pump. Stat. and Screen & Grit Chamb	21,872	-	21,872	-	-
14	Primary Sedimentation Tanks	21,183	21,183	-	-	-
15	Compressor Building	9,939	-	-	-	9,939
16	Air Supply Facilities	23,216	-	-	-	23,216
17	Final Sedimentation	26,117	26,117	-	-	-
18	Effluent Pumping Station	11,532	-	11,532	-	-
19	Effluent Conduit	11,620	-	11,620	-	-
20	Scum Concentration Facilities	2,822	-	-	2,822	-
21	Sludge Force Main	1,948	-	-	1,461	487
22	Preliminary Treatment Bldg.	3,459	-	3,459	-	-
23	Sludge Thickeners	4,667	-	-	2,334	2,333
24	Sludge Digesters	15,043	-	-	11,916	3,127
25	Sludge Disposal Facilities	4,830	-	-	3,826	1,004
26	Composting Facilities	-	-	-	-	-
27	Sludge Dewatering	9,169	-	-	6,877	2,292
28	Sludge Gas Facilities	3,504	-	-	2,776	728
29	**Subtotal**	**170,921**	**47,300**	**48,483**	**32,012**	**43,126**
30	Admin. and Gen'l. Facilities	37,167	10,014	11,448	7,372	8,333
31	Adjustment for Joint Use Facilities	5,353	-	455	3,650	1,248
32	**Total**	**213,441**	**57,314**	**60,386**	**43,034**	**52,707**
33	**Total Southeast WPC Plant**	**277,025**	**71,819**	**82,559**	**60,573**	**62,074**
34	Less Federal Grants	144,379	38,680	40,041	29,319	36,339
35	**Adjusted Total Southeast WPC Plant**	**$ 132,646**	**$ 33,139**	**$ 42,518**	**$ 31,254**	**$ 25,735**

(a) Plant Investment as of 6/30/2022.

- Strength (BOD and Suspended Solids): The aeration basins and oxygen, or air blower facilities are designed to handle BOD, and investments in these facilities are allocated to the BOD functional cost component.
  - The investment in sludge conditioning and disposal facilities depends upon both the suspended solids and BOD parameters and is allocated to those two components of cost. The design of facilities handling only sludge from the primary sedimentation basins, such as the primary sludge pumps and scum disposal facilities, reflects the suspended solids content of the raw wastewater, and the related investment is therefore allocated to that cost component. The investment in facilities handling waste activated sludge, such as waste activated sludge thickeners, is allocated 50% to the suspended solids and 50% to the BOD functional cost components based upon the design loadings and degree of treatment provided.

- Likewise, the investment in other facilities such as digesters and sludge dewatering and composting facilities, that handle both primary and waste activated sludge, is allocated to the suspended solids functional cost component and to the BOD functional cost component. We determined the allocation of cost between SS and BOD based on the relative quantities of sludge generated from BOD and SS components, and the relative difficulty of treating waste activated sludge as compared with primary sludge. The resulting allocation percentages are 75% to the suspended solids functional cost component and 25% to the BOD functional cost component. The investment in the sludge force main at the Southeast plant is allocated 75% to suspended solids and 25% to BOD functional cost components, based on design flows.
- Some of the treatment and sludge related facilities in the Wastewater System service multiple treatment facilities. The digesters and the sludge processing and distribution facilities provide treatment and disposal of sludge from both the Southwest treatment plant and the Southeast treatment plant and provide disposal of sludge from the Northeast treatment plant. To properly recognize cost responsibility for these joint use facilities, a portion of the investment in both existing and expanded plant joint use facilities is allocated to the Southeast and Northeast plants.

- General Plant and Equipment: Other general plant and equipment includes investment allocable to all the above and is allocated to cost components in proportion to the total of the preceding items of the direct plant investment allocation to those cost components.

7.6.2 Wholesale

For the Wholesale customers, the various contracts typically provide for maximum short-term flow rates expressed in cubic feet per second (“cfs”), maximum average daily flow rates expressed in MGD, and maximum annual suspended solids and BOD loadings expressed in pounds (“lbs”). The COS analysis recognizes the City’s obligation to provide service to its wholesale customers through the allocation of plant investment and operating expenses. Since installed capacity is the primary concern of the contracts, the basis for wholesale customer allocations uses the relationship of the contract service requirements to the total installed capacity of the respective facilities. Only plant investment associated with facilities used directly by a customer are allocated to that customer.

As presented earlier, Table 7-4 and Table 7-5 summarize the units of service applicable to wholesale customers used in the cost-of-service analysis. In Table 7-4, the section titled "Contract Maximum Units," is based upon the contractual rate of flow for each customer, including an allowance for I/I that can occur downstream from the wholesale customer’s discharge point into the City's Wastewater System. To determine the contract maximum units for suspended solids and BOD, contractual strength loadings for those customers that have such provisions in their contracts were used. For those customers that do not have specific loadings in their contracts, the estimated measured strength for each customer as applied to their contract maximum daily flow rate, expressed in MGD was used. The contract maximum units serve as the basis for allocation of capital investment related costs to the wholesale customers.

Each wholesale customer is allocated a share of the Wastewater System investment in the wastewater collection system (mains, pumping, and LTCPU) and treatment facilities serving them. The plant investment costs are allocated to the wholesale customers based on the proportionate share of their contract capacity in the various facilities relative to the total design capacity of the various facilities.

Please refer to Appendix I Tables 1 through 12 for details regarding the allocation of plant investment for each wholesale customer.

7.7 Allocation of Depreciation Expense

The allocation of depreciation expenses for Retail and Wholesale customers follows the steps used for the allocation of plant investment described above. The annual depreciation expense to be distributed to Wastewater System cost components is based on the application of appropriate depreciation expense rates to the various categories of Wastewater System facilities. The various items of depreciation expense are allocated to cost components on the same basis as the proportion of plant investment costs allocated to each of those cost components.

7.8 Wholesale Cost of Service Allocations

Table 7-15 summarizes the Test Year 1 COS allocated to the wholesale customers. Specifically, the table presents the total allocated plant investment, depreciable investment, depreciation expense, return on rate base, and operation and maintenance expense for the wholesale customers. The total COS allocable to wholesale customers, for Test Year 1 is estimated at $41.3 Million. This amount includes a return-on-investment requirement of $5.6 Million, which reflects a 7.50% rate of return on allocated investment.

It should be noted, that six of the wholesale customers have made front-end capital contributions related to the investment in plant which provides them service. These customers include Bucks County (Bensalem), Bucks County, DELCORA, Lower Merion, Lower Southampton, and Upper Darby.

Table 7-15 Summary of Test Year 1 Allocated COS for Wholesale Customers

LINE NO.	CUSTOMER	(1) INVESTMENT (a) ALLOCATED	(2) INVESTMENT (a) ALLOCATED DEPRECIABLE	(3) O&M	(4) DEPR'N	(5) RETURN	(6) ALLOCATED COST OF SERVICE
Wholesale Customers ($000S)							
1	Abington	$ 6,092	$ 6,077	$ 1,091	$ 148	$ 457	$ 1,696
2	Bucks County (Bensalem)	10,599	10,571	1,514	(a)	(a)	1,514
3	Bucks County (b)	33,103	33,010	9,184	232	697	10,114
4	Cheltenham	17,137	17,098	2,993	409	1,285	4,687
5	DELCORA (c)	48,734	48,593	8,890	229	697	9,817
6	Lower Merion	16,672	16,628	2,536	(a)	(a)	2,536
7	Lower Moreland	3,033	3,027	603	71	227	902
8	Lower Southampton (d)	22,442	22,407	2,247	507	1,683	4,437
9	Springfield (less Wyndmoor)	6,659	6,645	1,409	159	499	2,067
10	Springfield (Wyndmoor)	1,037	1,036	239	24	78	341
11	Upper Darby	16,677	16,630	3,207	(a)	(a)	3,207
12	Total	$ 182,185	$ 181,722	$ 33,913	$ 1,779	$ 5,625	$ 41,317

(a) It is assumed that Bensalem, Lower Merion and Upper Darby contribute their entire allocated plant investment, and therefore, are not allocated any depreciation expense or return on investment.

(b) Bucks County allocated Return on Investment and Depreciation Expense based on assets in service after 6/30/2007.

(c) DELCORA allocated Return on Investment and Depreciation Expense based on assets in service after 7/1/2011.

(d) Lower Southampton phased into Return on Investment and Depreciation Expense on total rate base uniformly over18 years staring in FY 2007.

The Water Department does not anticipate any contractual changes; as such Bucks County (Bensalem), Lower Merion and Upper Darby will continue to provide upfront annual capital contributions associated with applicable plant improvements. Therefore, there is no cost-of-service allocation of depreciation or return on rate base for these three wholesale customers.

Bucks County, DELCORA, and Lower Southampton were initially capital contribution-based customers. However, their current contracts reflect the utility basis for the recovery of allocated capital investment.

The allocation of return and depreciation, presented in Table 7-15, reflects the terms of the current contracts for these customers. The depreciation expense presented in Column 4 reflects 2% of the depreciable investment in the collection system and 2.5% of the depreciable investment in treatment and pumping facilities. The corresponding table for Test Year 2 (FY 2025) is provided as Appendix I Table 25.

7.9 Distribution of Costs to Customer Types

As a basis for estimating the cost of providing wastewater service to each customer type, we distribute each functional component cost among the customer types in proportion to their respective service requirements for each of those cost components.

We perform the following key steps to allocate the Sanitary Sewer Retail Capital and O&M Costs to the various customer types:

- Retail: Determination of Sanitary Sewer Unit Costs of Cost Components
  - The retail test year unit cost, for each of the cost components, is summarized on Table 7-16 and derived as follows:
    - Divide the operational and capital costs allocated to each cost component by the respective retail units of service.
  - Derive the total Retail unit cost for each cost component as follows:
    - Total Retail Unit Cost = Operation Expense unit cost + Depreciation Expense unit cost + Inside City Return on Plant Investment unit cost.
- Retail: Distribution of Sanitary Sewer Costs to Customer Types
  - The Wastewater test year COS is distributed to each customer type as follows:
    - Applying the total unit cost of each cost component to the corresponding units of service of each customer type as presented on Table 7-17; and
    - Reapportioning the Pumping & Treatment related I&I Costs between Sanitary Sewer and Stormwater as shown on Table 7-18.

7.9.1 Infiltration/Inflow Adjustments

The cost of service allocable to I/I must be distributed among the retail service customer types. As in the case of the allocation of stormwater costs, the relative customer type responsibility for I/I cost can neither be precisely measured, nor can it be directly associated with the parameters of sanitary wastewater service.

In general, I/I due to leakage in lateral sewers of individual residences would be expected to be less than in the services of individual large commercial or industrial establishments. The greater length, due to larger lot frontage, and greater size of main sewer required for the larger customers would also contribute to potential increased I/I with the size of customer. The number of equivalent meters of each customer type, discussed previously in this report, provides a reasonable means of recognizing both numbers and relative sizes of customers and provides a measure of customer type responsibility for I/I cost.

Columns 3 and 4 of Table 7-18 reflect the redistribution of the cost of I/I to the other customer types based upon equivalent meters and volume. In accordance with the prior rate proceeding decisions, the COS and rate design for the current study reflects a 30% recovery of pumping and treatment related I/I costs through the service charge and 70% through the volume charge.

Table 7-16 Test Year 1 Retail Unit Costs of Service

LINE NO.	DESCRIPTION	(1) TOTAL	(2) COLLECTION SYSTEM PUMPING STATION VOLUME	(3) COLLECTION SYSTEM PUMPING STATION CAPACITY	(4) SANITARY SEWERS CAPACITY	(5) STORMWATER	(6) WATER POLLUTION CONTROL PLANTS VOLUME	(7) WATER POLLUTION CONTROL PLANTS CAPACITY	(8) WATER POLLUTION CONTROL PLANTS SUSPENDED SOLIDS	(9) WATER POLLUTION CONTROL PLANTS BOD
Retail Sanitary Sewer										
	Total Units of Service									
1	Units	$000s	Mcf	Mcf/day	Mcf/day		Mcf	Mcf/day	1,000 lbs.	1,000 lbs.
2	Quantity		17,999,900	107,488	331,322		17,999,900	107,488	185,243	122,234
	Operation and Maintenance Expense									
3	Total Expense - $000s	$ 305,282	$ 4,873	$ 21,515	$ 49,507	$ 93,335	$ 34,541	$ 20,692	$ 49,637	$ 31,182
4	Unit Expense - $/unit		0.2707	200.1609	149.4232		1.9190	192.5052	267.9568	255.1001
	Capital Costs									
5	Total Plant Investment - $000s	2,644,759		22,973	753,113	1,338,868	119,547	99,760	178,025	132,473
6	Unit Plant Investment - $/unit			213.7262	2,273.0552		6.6415	928.1036	961.0349	1,083.7625
7	Depreciable Plant Investment - $000s	2,641,583		22,973	752,459	1,337,706	119,249	99,543	177,541	132,112
8	Unit Depreciable Plant Investment - $/unit			213.7262	2,271.0819		6.6250	926.0848	958.4221	1,080.8091
9	Depreciation Expense - $000s	55,589		574	15,049	26,754	2,981	2,489	4,439	3,303
10	Unit Depreciation Expense - $/unit			5.3432	45.4216		0.1656	23.1521	23.9606	27.0202
	Unit Return on Investment									
11	Total Return - $000s (a)	85,648		744	24,389	43,358	3,871	3,231	5,765	4,290
12	Inside City - $/Unit (a)			6.9213	73.6106		0.2151	30.0557	31.1221	35.0965
	Total Unit Capital Costs									
13	(Line 10 + Line 12) - $/unit			12.2645	119.0322		0.3807	53.2078	55.0827	62.1167
	Total Unit Costs of Service									
14	Inside City (Line 4 + Line 13) - $/unit		$ 0.2707	$ 212.4254	$ 268.4554		$ 2.2997	$ 245.7130	$ 323.0395	$ 317.2168

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = $85,647,900 / $2,644,759,000 = 3.2384 %.

Table 7-16 Test Year 1 Retail Unit Costs of Service (continued)

LINE NO.	DESCRIPTION	(10)	(11)	(12)	(13)	(14)	(15)
		CUSTOMER COSTS			INDUSTRIAL WASTE UNIT		
		METER	BILLING		RETAIL	DIRECT EXTRA STRENGTH	DIRECT
		COSTS	SANITARY	STORMWATER	CUSTOMERS	WASTEWATER	STORMWATER
Retail Sanitary Sewer							
	Total Units of Service						
1	Units	Eq. Meters	Eq. Bills		Eq. Meters		
2	Quantity	644,238	6,255,245		644,238		
	Operation and Maintenance Expense						
3	Total Expense - $000s	$ 5,012	$ 19,951	$ 12,537	$ 3,872	$ 1,940	$ -
4	Unit Expense - $/unit	7.7797	3.1895		6.0102		
	Capital Costs						
5	Total Plant Investment - $000s						
6	Unit Plant Investment - $/unit						
7	Depreciable Plant Investment - $						
8	Unit Depreciable Plant Investment - $/unit						
9	Depreciation Expense - $000s						
10	Unit Depreciation Expense - $/unit						
	Unit Return on Investment						
11	Total Return - $000s						
12	Inside City - $/Unit (a)						
	Total Unit Capital Costs						
13	(Line 10 + Line 12) - $/unit						
	Total Unit Costs of Service						
14	Inside City (Line 4 + Line 13) - $/unit	$ 7.7797	$ 3.1895		$ 6.0102	$ -	

(a) Retail rate of return = Retail allocation of Return on Investment / Retail Allocation of System Plant Investment = $85,647,900 / $2,644,759,000 = 3.2384 %.

Table 7-17 Test Year 1 Wastewater Retail Costs of Service

LINE NO.	CUSTOMER TYPE	(1) ALLOCATED COST OF SERVICE	(2) COLLECTION SYSTEM PUMPING VOLUME	(3) PUMING CAPACITY	(4) SEWER CAPACITY	(5) TREATMENT VOLUME	(6) CAPACITY	(7) SUSPENDED SOLIDS	(8) BOD	(9) CUSTOMER METER	(10) BILLING & COLLECTION	(11) INDUSTRIAL WASTE SURCHARGE	(12) METER
	Retail Service ($000s)												
1	Residential	$ 79,892	$ 790	$ 2,549	$ 8,588	$ 6,714	$ 2,948	$ 17,654	$ 17,047	$ 3,713	$ 17,020	$ -	$ 2,869
2	Commercial	32,405	409	1,320	4,450	3,479	1,527	9,148	8,833	871	1,694	-	673
3	Industrial	1,142	15	47	158	124	54	325	314	32	48	-	25
4	Public Utilities	229	3	9	30	23	10	61	59	12	13	-	9
5	Senior Citizens	3,303	31	100	336	263	115	690	666	165	810	-	127
6	Wastewater Only	2,768	39	125	421	329	144	865	835	4	4	-	3
7	Groundwater	2,795	57	308	1,246	487	356	299	42	-	-	-	-
8	Surcharge	7,013	-	-	-	-	-	695	4,391	-	-	1,926	-
9	Housing Authority	3,150	39	127	427	334	147	878	848	71	224	-	55
10	Charities & Schools	2,567	32	103	349	273	120	717	692	99	105	-	76
11	Hospital/University	995	14	44	148	116	51	304	294	10	8	-	8
12	Hand Billed	7,926	110	355	1,196	935	411	2,458	2,374	35	26	-	27
13	Water Treatment Plant Sludge	10,952	79	256	861	673	296	8,787	-	-	-	-	-
14	Private Fire	2	0	-	0	0	-	1	1	-	-	-	-
15	Scheduled (Flat Rate)	2	0	-	0	0	-	0	0	0	0	-	0
16	Conveyance	70,735	-	-	70,735	-	-	-	-	-	-	-	-
17	Pumping & Treatment	87,961	3,255	17,491	-	27,646	20,232	16,959	2,379	-	-	-	-
18	**Total**	**$ 313,834**	**$ 4,873**	**$ 22,833**	**$ 88,945**	**$ 41,394**	**$ 26,411**	**$ 59,841**	**$ 38,775**	**$ 5,012**	**$ 19,951**	**$ 1,926**	**$ 3,872**

(a) Annual Cost of Service by component for each customer type based on the customer type units of service (Table 7-3) and the total unit cost for each component (Tables 7-16).

Table 7-18 Test Year 1 Wastewater Adjusted Costs of Service

LINE NO.	CUSTOMER TYPE	(1) ALLOCATED COST OF SERVICE	(2) RE-ALLOCATION OF I/I (a) SANITARY SEWER	(3) RE-ALLOCATION OF I/I (a) STORMWATER	(4) ADJUSTED COST OF SERVICE	(5) DISCOUNTS	(6) ADJUSTED COST OF SERVICE W/ DISCOUNTS	(7) RECOVERY OF DISCOUNTS (b)	(8) ADJUSTED COST OF SERVICE
	Retail Service ($000s)								
1	Residential	$ 79,892	$ 71,959	$ -	$ 151,851	$ -	$ 151,851	$ 2,092	$ 153,943
2	Commercial	32,405	32,829		65,234		65,234	899	66,132
3	Industrial	1,142	1,172		2,314		2,314	32	2,346
4	Public Utilities	229	245		474		474	7	480
5	Senior Citizens	3,303	2,896		6,199	(1,550)	4,649	64	4,713
6	Wastewater Only	2,768	2,770		5,538		5,538	76	5,614
7	Groundwater	2,795	-		2,795		2,795	39	2,833
8	Surcharge	7,013	-		7,013		7,013	97	7,109
9	Housing Authority	3,150	3,099		6,249	(312)	5,936	82	6,018
10	Charities & Schools	2,567	2,703		5,270	(1,317)	3,952	54	4,007
11	Hospital/University	995	1,011		2,006	(502)	1,505	21	1,525
12	Hand Billed	7,926	7,979		15,906		15,906	219	16,125
13	Water Treatment Plant Sludge	10,952	5,640		16,592		16,592	-	16,592
14	Private Fire	2	2		4		4	0	4
15	Scheduled	2	1		3		3	0	3
16	Conveyance	70,735	(70,735)						
17	Pumping & Treatment	87,961	(61,572)	(26,388)	-	-	-	-	-
18	**Total**	**313,834**	**-**	**(26,388)**	**287,445**	**(3,681)**	**283,764**	**3,681**	**287,445**
	Allocation of I/I								
19	Sanitary Sewer	313,834		(26,388)	287,445				
20	Stormwater	-	-	26,388	26,388	-	-	-	-
21	**Total**	**$ 313,834**	**$ -**	**$ -**	**$ 313,834**	**$ -**	**$ -**	**$ -**	**$ -**

(a) 70% of allocated I/I costs are recovered by sanitary sewer rates and charges. 30% of allocated I/I costs are recovered by stormwater rates and charges.

(b) Reflects current policy of recovering discounts from all customer types.

7.9.2 Fee Discounts

The proposed COS reflects the continuation of the current practice of providing fee discounts to the following customer types:

- Senior Citizens, and Charities and Schools customer types are billed at 75% of the general customer rate levels.
- The PHA is billed at 95% of general customer rate levels.

The revenue reduction resulting from the discounts is recovered from all inside City retail customer types to recover the total test year COS for retail customers.

Column 8 of Table 7-18 presents the adjusted COS of the inside City customer types. This adjusted COS recognizes the fee reduction due to discounts and the recovery of those discounts from all customer types.

7.10 Stormwater Cost of Service Allocations

Stormwater management and related costs are an integral component of the Water Department's Wastewater System costs. We have already discussed in detail the Wastewater System COS allocations between sanitary sewer and stormwater, and the associated rationale for each allocation.

7.10.1 Test Year Revenue Requirements

The following is a summary of the key allocation factors used in determining the stormwater revenue requirements.

- Conveyance O&M Cost Allocation: As discussed earlier in Section 7.5.1, 60% of the sewer collection system maintenance and GSI maintenance costs are allocated to stormwater and 40% to sanitary sewer.
- Conveyance Capital Cost Allocation: As discussed in Section 7.6.1, 64% of the sewer collection system capital cost is allocated to stormwater and 36% to sanitary sewer based on a cost weighted pipe capacity analysis.
- Pumping & Treatment O&M and Capital Cost: A portion of the retail pumping and treatment component cost is allocated to Infiltration and Inflow. Affirmed in prior rate proceedings, the Infiltration and Inflow cost is allocated 70% to sanitary sewage and 30% to stormwater services based on the ratio of average dry weather flow to average wet weather flow.
- Customer Costs: The allocation approach used in allocating customer costs to stormwater is consistent with the method used in the previous general rate proceeding. The customer costs are first allocated one-third to water service and two-thirds to the wastewater service (as wastewater includes sanitary sewer and stormwater). The wastewater customer costs less the metering costs are further allocated 61% to sanitary sewer and 39% to stormwater services based on the relative revenue requirement levels between the two services.

Table 7-19 presents the total FY 2024 stormwater revenue requirements. Based on the detailed technical cost allocations, the estimated FY 2024 stormwater revenue requirements are $202.4 Million excluding stormwater Customer Assistance Program (CAP) costs.

Table 7-19 Summary of Test Year 1 Stormwater Costs

LINE NO.	COST COMPONENT	(1) ALLOCATED COST OF SERVICE
Stormwater ($000s)		
1	Billing & Collection Costs	12,537
2	Impervious Area and Gross Area Costs *(Excluding CAP Costs)*	189,835
3	**Total**	**202,372**

7.10.2 Allocation to Customer Types

To delineate the stormwater management costs from the balance of annual wastewater costs, a multi-step cost allocation approach was used to allocate the Test Year 1 stormwater costs to various customer types. The framework we used is outlined below:

- Allocate SWMS costs (i.e., impervious area and gross area costs) presented in Table 7-20, to their respective charge components.
  - As established in the 2009 Rate Determination, the SWMS charge costs are allocated 20% to GA and 80% to IA.
  - The GA and IA costs are divided by the total GA and IA units of service to determine the System Wide Unit Costs for GA and IA. The resulting System Wide Unit Costs for GA and IA are summarized on Line 3, Table 7-20.
  - System-Wide Unit Costs for GA and IA reflect overall reductions in billable GA and IA, resulting from credits and other adjustments; therefore, the recovery of these reductions is shared by all stormwater customers as reflected in the System-Wide Units Costs for GA and IA. Refer to Schedule BV-6: WP-3 Cost Recovery Approach of various customer assistance programs (including stormwater credits).
- Distribute GA and IA costs to Residential and Non-Residential Customer Types.
  - Residential GA and IA costs of service are calculated by applying the system-wide unit costs presented in Table 7-20 to the estimated residential billable GA and IA units of service (Table 6-7 and Table 6-8).
  - The initial Non-residential GA and IA costs of service are calculated as the total GA and IA COS less residential GA and IA costs of service. The resulting Non-Residential costs are then adjusted to account for the Stormwater CAP costs, which are also assigned to 20% to GA and 80% to IA .
  - Table 7-21 shows the results of this step.
- Determine the GA and IA COS rates prior to discount and lag factor adjustments.

- Residential Monthly GA and IA Unit rates are then calculated to reflect:
  - Residential customers are billed a uniform fee per parcel based upon the mean residential IA and GA.
  - As previously noted, based upon the updated Stormwater Billing Data the mean residential GA square footage is 2,100 square feet and the mean residential IA is 1,190 square feet.
  - The System-Wide GA and IA unit costs are applied to the mean residential GA and IA respectively and then summed to calculate the resulting stormwater management service charge per parcel.
- Non-residential customers GA and IA unit costs are calculated to account for the recovery of stormwater CAP costs (presented in Table 7-21) by dividing the Adjusted Non-Residential COS by the respective GA and IA billable units of service.
- Table 7-22 shows the results of the above steps.

- Allocate Billing & Collection costs to Residential and Non-Residential Customers.
  - Billing & Collection costs are allocated to Residential and Non-Residential customers based on the weighted number of billable accounts.
  - As with prior rate determinations, a cost weighting factor of 1.3 is assigned to calculate the billing & collection charges for non-residential accounts due to the additional time and effort needed to address billing issues and parcel data issues for non-residential class, as the charges are individually calculated for each parcel and the corresponding billing and collection unit costs.
  - The resulting monthly billing & collection unit cost by customer type are presented in Table 7-23.
- Determine "Adjusted Stormwater Cost of Service" by Customer Type after re-apportioning revenue reduction due to discounts to customer types. Table 7-24 illustrates the recovery of discounts.

The adjusted Stormwater COS determined for each retail customer type provides the basis for the design of the Stormwater Rates and Charges for the test year. Schedule BV-4: WP-2 provides additional information regarding the development of the stormwater units of service for the analysis conducted herein.

Table 7-20 Test Year 1 Estimate of GA and IA Unit Costs Adjusted for CAP

LINE NO.	DESCRIPTION	(1) GA	(2) IA	(3) TOTAL
		20%	80%	
1	Annual Cost of Service ($ 1000) from GA & IA **(Excluding CAP)**	$ 37,967	$ 151,868	$ 189,835
2	Stormwater Units of Service (500 Square Feet)	4,283,974	2,342,647	
3	System **Annual** Unit Cost ($/500 Square Feet)	8.86	64.83	
4	System **Monthly** Unit Cost ($/500 Square Feet)	$ 0.739	$ 5.402	

Table 7-21 Test Year 1 Estimate of Customer Type GA and IA COS Adjusted for CAP

LINE NO.	DESCRIPTION	(1) GA	(2) IA	(3) TOTAL
Stormwater ($000s)				
	RESIDENTIAL			
1	Residential Cost of Service (a)	$ 17,251	$ 71,499	$ 88,750
	NON-RESIDENTIAL			
2	Initial Non-Residential Cost of Service (b)	20,716	80,369	101,085
3	Adjustment for CAP (c)	200	800	1,000
4	Adjusted Non-Residential Cost of Service	20,916	81,169	102,085
5	Total GA & IA Cost of Service	$ 38,167	$ 152,668	$ 190,835

(a) Calculated as Residential GA and IA square footage times the GA and IA unit cost.
(b) Total GA and IA Cost of Service LESS Residential cost of service.
(c) To recover Non-residential CAP Loss from the Non-residential stormwater customer class.

Table 7-22 Test Year 1 Estimate of Customer Type GA and IA COS Rates Prior to Discount and Lag Factor Adjustments

Line No.	DESCRIPTION	(1) GA	(2) IA	(3) Total
GA and IA Cost of Service Rates				
1	Residential **Monthly** GA & IA Charge (a)	$ 3.10	$ 12.86	$ 15.96
2	Non-Residential **Monthly** GA & IA Unit Cost (Adjusted for CAP)	0.746	5.456	
3	Impact of CAP on Non-Residential GA & IA Rate	$ 0.007	$ 0.054	

(a) Calculated based on Residential Mean GA (2,100 sf) and Mean IA (1,190 sf).

Table 7-23 Test Year 1 Stormwater Billing and Collection Unit Costs

LINE NO.	DESCRIPTION	UNITS	(1) TEST YEAR
1	Stormwater Billing & Collection Annual Revenue Requirements	$	12,536,531
2	Monthly Billable Accounts: Residential	# Accounts	465,601
3	Non-Residential Cost Weighting Factor (a)		1.3
4	Weighted Monthly Billable Accounts: Non-Residential	# Accounts	107,812
5	Total Weighted Monthly Billable Accounts (Line 2+ Line 4)	# Accounts	573,413
6	Annual Billable Accounts: Residential (Line 2 x 12)	# Accounts	5,587,212
7	Weighted Annual Billable Accounts: Non-Residential (Line 4 x 12)	# Accounts	1,293,739
8	Total Weighted Annual Billable Accounts (Line 6 + Line 7)	# Accounts	6,880,951
9	Residential Billing & Collection Unit Cost per Billing Cycle	$/Unit	1.82
10	Non-Residential Billing & Collection Unit Cost per Billing Cycle (Line 9 x Line 3)	$/Unit	2.37

(a) A higher weighting factor is assigned to non-residential due to the additional time and effort needed to address billing issues and parcel data issues for non-residential class, as the charges are individually calculated for each parcel.

Table 7-24 Test Year 1 Stormwater Adjusted Costs of Service After Discounts

LINE NO.	CUSTOMER TYPE	(1) ALLOCATED COST OF SERVICE (a)	(2) DISCOUNTS	(3) ADJUSTED COST OF SERVICE WITH DISCOUNTS	(4) RECOVERY OF DISCOUNTS ALL (b)	(5) ADJUSTED COST OF SERVICE
Stormwater ($)						
	Residential					
1	Non-Discount	$ 93,478,024	$ -	$ 93,478,024	$ 1,851,459	$ 95,329,483
2	Discount - Non-PHA	4,598,464	(1,149,616)	3,448,848	68,309	3,517,157
3	Discount - PHA	844,138	(42,207)	801,931	15,883	817,814
	Non-Residential					
4	Non-Discount	88,935,983		88,935,983	1,761,498	90,697,481
5	Discount - Non-PHA	10,605,842	(2,651,460)	7,954,381	157,547	8,111,929
6	Discount - PHA	1,441,200	(72,060)	1,369,140	27,118	1,396,257
	Condominiums					
7	Non-Discount	3,327,816		3,327,816	65,912	3,393,728
8	Discount - Non-PHA	137,583	(34,396)	103,187	2,044	105,231
9	Discount - PHA	1,002	(50)	952	19	971
10	Total	**$ 203,370,052**	**$ (3,949,789)**	**$ 199,420,263**	**$ 3,949,789**	**$ 203,370,052**

Notes:

(a) Non-Residential Customer cost of service includes the cost of CAP.

(b) Reflects current policy of recovering discounts from all customer classes.

Table 7-25 and Table 7-26 compare the total adjusted COS for each customer type to their respective revenues under existing rates for sanitary sewer and stormwater, respectively. The indicated increase or decrease in the revenue required to meet the adjusted COS is shown in Column 3 of each table.

Table 7-25 Test Year 1 Distribution of Sanitary Sewer COS to Customer Types

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
	Retail Service ($000s)			
1	Residential	142,578	153,943	8.0%
2	Commercial	60,458	66,132	9.4%
3	Industrial	2,199	2,346	6.7%
4	Public Utilities	438	480	9.7%
5	Senior Citizens	4,408	4,713	6.9%
6	Wastewater Only	4,687	5,614	19.8%
7	Groundwater	2,576	2,833	10.0%
8	Surcharge	6,286	7,109	13.1%
9	Housing Authority	5,496	6,018	9.5%
10	Charities & Schools	3,695	4,007	8.4%
11	Hospital/University	1,465	1,525	4.1%
12	Hand Billed	14,451	16,125	11.6%
13	Private Fire	3	4	6.2%
14	Scheduled	3	3	8.5%
15	**Total Retail Service**	**248,743**	**270,853**	8.9%
16	Total Wholesale	35,924	45,931	27.9%
17	**Total System**	**284,667**	**316,784**	11.3%

Table 7-26 Test Year 1 Distribution of Stormwater COS to Customer Types

LINE NO.	CUSTOMER TYPE	(1) REVENUE UNDER EXISTING RATES	(2) ADJUSTED COST OF SERVICE	(3) INDICATED INCREASE (DECREASE) REQUIRED
Stormwater ($000)				
	Residential			
1	Non-Discount	$ 91,491	$ 95,329	4.2%
2	Discount - Non-PHA	3,385	3,517	3.9%
3	Discount - PHA	782	818	4.6%
	Non-Residential			
4	Non-Discount	83,922	90,697	8.1%
5	Discount - Non-PHA	7,736	8,112	4.9%
6	Discount - PHA	1,303	1,396	7.1%
	Condominiums			
7	Non-Discount	3,248	3,394	4.5%
8	Discount - Non-PHA	102	105	3.6%
9	Discount - PHA	1	1	4.6%
10	Total	$ 191,970	$ 203,370	5.9%

8.0 Wastewater System Rate Design

The revenue requirement and COS analyses described in the preceding sections of this Report provide a basis for the review and update of a schedule of sanitary sewer and stormwater rates that recover allocated COS. These studies are the results of engineering estimates, consideration of historical data and, to some extent, judgment, and experience. Judgment must enter the final choice of rates, and factors such as public reaction to the extent of changes and adjustments, previous rate levels, contractual agreements, and past local practice are recognized in making rate adjustments.

Rates should be reasonably simple in application and subject to as few misinterpretations as possible. Considerations regarding the proposed rate adjustments reflect discussions with the Water Department staff and include the above considerations and the desire of the Water Department to maintain the existing structure for the Rate Period. This Report proposes sanitary sewer and stormwater user rates in accordance with these considerations.

The cost-of-service analysis described in the preceding section of this Report provides the basis for the design of sanitary sewer and stormwater rate schedules to cover the allocated cost for service for the Wastewater System.

The proposed charges for sanitary sewer service derived in this Report are applicable to General Service retail customers and recognize that certain retail customer types, including senior citizens, charities and schools, and the PHA, receive services at a discounted rate. Similarly, the proposed charges for stormwater derived in this Report are applicable to Retail Residential, Non-residential and Condominium stormwater customers and recognize these same discounts. The Water Department anticipates that the existing discounts (25% for senior citizens, charities and schools, and 5% for PHA) will continue to be applicable for the entire Study Period.

In designing the proposed rates, we adjust the wastewater costs of service determined for each customer type to reflect the fact that these customer types will not pay full COS. Accordingly, we increase the proposed retail sanitary sewer and stormwater rates to recover this cost-of-service revenue reduction due to discounts.

Similar to the situation for water rates, the cost-of-service wastewater rates that are designed for Test Year-1 requires the application of a lag factor. The lag factor is calculated to recover only the anticipated receipts of the prorated revenue increase projected for FY 2024, recognizing the normally expected historical payment patterns. A lag factor of 1.050 is applied to the FY 2024 sanitary sewer and stormwater COS rates.

8.1 Proposed Sanitary Sewer Rates

The proposed sanitary sewer rates are designed based on the unit costs of service developed for the cost-of-service analysis. Since the sanitary sewer quantity charges are based on the water consumption volume, the unit costs of service are adjusted to eliminate the return factor reflected in the cost-of-service analysis. Table 8-1 presents the Unit Costs of Service adjusted for the basis of rate design. Column 2 of Table 8-1 presents the Unit Costs of Service developed for the wastewater cost-of-service

analysis (Line 14 of Table 7-16). Columns 3 to 5 present the adjustment factors to account for discounts and billed water consumption. Column 6 presents the adjusted unit costs of service for rate design.

Table 8-1 Test Year 1 Inside City Retail Service Unit COS for Rate Design

LINE NO.	COST COMPONENT	(1) UNITS	(2) UNADJUSTED UNIT COST	(3) COS DEFICIT RECOVERY FACTOR	(4) BILLING UNITS CONVERSION FACTOR	(5) TOTAL ADJUSTMENT FACTOR	(6) ADJUSTED UNIT COST
	Inside City Retail Service		$/Unit				$/Unit
	Collection System						
	Pumping Station						
1	Volume	Mcf	0.2707	1.0138	0.95	0.9631	0.2607
2	Capacity	Mcf/day	212.4254	1.0138	0.95	0.9631	204.5869
3	Sanitary Sewers - Capacity	Mcf/day	268.4554	1.0138	0.95	0.9631	258.5494
	WPC Plants						
4	Volume	Mcf	2.2997	1.0138	0.95	0.9631	2.2148
5	Capacity	Mcf/day	245.7130	1.0138	0.95	0.9631	236.6462
6	Suspended Solids	1,000 lbs	323.0395	1.0138	1.00	1.0138	327.4974
7	BOD	1,000 lbs	317.2168	1.0138	1.00	1.0138	321.5944
	Customer Costs						
8	Meter Costs	Eq. Meters	7.7797	1.0138	1.00	1.0138	7.8871
	Billing Costs						
9	Sanitary	Eq. Bills	3.1895	1.0138	1.00	1.0138	3.2335
10	Industrial Waste Unit - Retail	Eq. Meters	6.0102	1.0138	1.00	1.0138	6.0931
11	Infiltration/Inflow - Customer Related	Eq. Meters	32.9387	1.0138	1.00	1.0138	33.3933
12	Infiltration/Inflow - Volume Related	Volume	19.2638	1.0138	0.95	0.9631	18.5530

Table 8-2 and Table 8-3 illustrate the development of the cost-of-service monthly service charge for customers with a 5/8-inch meter and the quantity charge for normal strength sanitary wastewater. Table 8-4 presents the proposed sanitary sewer rates for General Service customers applicable for Test Year 1 and Test Year 2. The proposed rates reflect a continuation of the existing rate structure, including a service charge which varies by meter size and a uniform quantity charge.

Table 8-2 Test Year 1 Development of Cost-of-Service Monthly Service Charge for 5/8-inch Meter Customer

LINE NO.	COST COMPONENT	(1) UNITS	(2) ADJUSTED UNIT COST ($/unit)	(3) NUMBER OF UNITS		(4) TOTAL COST ($)
Sanitary Sewer						
	Customer Costs					
1	Meter Costs	Eq. Meter	0.6573	1.0	$	0.6573
2	Billing Costs	Eq. Bills	3.2335	1.0		3.2335
3	Industrial Waste Unit	Eq. Meter	0.5078	1.0		0.5078
4	Infiltration/Inflow Costs - Sanitary	Eq. Meter	2.7828	1.0		2.7828
5	**Total Service Charge (a)**					**7.1814**
6	**Total Service Charge - Rounded (a)**				**$**	**7.18**

(a) Prior to lag factor.

Table 8-3 Test Year 1 Development of Cost-of-Service Quantity Charge for Normal Strength Sanitary Wastewater

LINE NO.	COST COMPONENT	(1) UNITS	(2) ADJUSTED UNIT COST ($/unit)	(3) NUMBER OF UNITS	(4) TOTAL COST ($)
Sanitary Sewer					
	Collection System				
	Pumping Stations				
1	Volume	Mcf	0.2607	1.0000	$ 0.2607
2	Capacity (a)	Mcf/day/mo.	17.0489	0.0493	0.8405
3	Sanitary Sewers: Capacity (b)	Mcf/day/mo.	21.5458	0.1316	2.8354
	Water Pollution Control Plants				
4	Volume	Mcf	2.2148	1.0000	2.2148
5	Capacity (a)	Mcf/day/mo.	19.7205	0.0493	0.9722
6	Suspended Solids (c)	1,000 lbs	327.4974	0.0187	6.1242
7	BOD (d)	1,000 lbs	321.5944	0.0184	5.9173
8	**Total Cost per Mcf**				**19.1651**
9	Infiltration/Inflow Cost	Mcf	18.5530	1.0000	18.5530
10	**Total Cost + Infiltration/Inflow per Mcf (e)**				**37.7181**
11	**Total Cost per Mcf - Rounded (e)**				**$ 37.72**

(a) (1.0 Mcf * 1 month/30.4 days) * 1.5
(b) (1.0 Mcf * 1 month/30.4 days) * 4.0
(c) 1.0 Mcf @ 300 mg/l
(d) 1.0 Mcf @ 295 mg/l
(e) Prior to lag factor.

[This spacing is intentional]

Table 8-4 Proposed Test Year 1 (FY 2024) and Test Year 2 (FY 2025) General Service Sanitary Sewer Rates [Schedule BV-1: Table C-12]

LINE NO.	METER SIZE (inches)	(1) FY 2024 MONTHLY CHARGE	(2) FY 2025 MONTHLY CHARGE
	METER BASED SERVICE CHARGE ($/month)		
1	5/8	7.54	7.98
2	3/4	9.62	10.19
3	1	14.10	15.00
4	1 1/2	24.80	26.47
5	2	38.25	40.87
6	3	68.97	73.78
7	4	117.21	125.31
8	6	231.03	247.10
9	8	365.58	391.12
10	10	527.64	564.44
11	12	959.14	1,026.89

LINE NO.	DESCRIPTION	FY 2024 CHARGE	FY 2025 CHARGE
	QUANTITY CHARGE ($/Mcf)		
12	All billable water usage	39.61	43.09
13	Groundwater Charge	13.87	15.27
	SURCHARGE RATES ($/lb)		
14	BOD (excess of 250 mg/l)	0.443	0.470
15	SS (excess of 350 mg/l)	0.452	0.482
	SEPTIC HAULER RATES ($/1,000 gallons)		
16	Sanitary Wastewater Delivered to WPCP (a)	64.94	69.07

Notes: (a) Based on BOD and SS Loading of 9,000 mg/l.

8.2 Proposed Stormwater Rates

Table 8-5 illustrates the development of the Test Year 1 proposed rates for stormwater service. The proposed rates include recovery of provided discounts and application of the lag factor based upon the adjusted COS presented in Table 7-24.

Table 8-6 and Table 8-7 summarize the FY 2024 and FY 2025 proposed stormwater rates for residential and non-residential customers respectively.

Table 8-5 Development of Test Year 1 Stormwater COS Rates

LINE NO.	SERVICE TYPE	(1) COST OF SERVICE RATE	(2) DISCOUNT RECOVERY FACTOR	(3) COST OF SERVICE RATE	(4) LAG FACTOR ADJUSTMENT	(5) PROPOSED RATE
Stormwater ($)						
	Billing & Collection Charge					
1	Residential	$ 1.82	1.020	$ 1.86	1.050	$ 1.95
2	Non-Residential	2.37	1.020	2.41	1.050	2.53
3	Condominiums	2.37	1.020	2.41	1.050	2.53
	IA/GA Charge					
4	Residential	15.96	1.020	16.28	1.050	17.09
	Non-Residential					
5	IA Charge	5.456	1.020	5.564	1.050	5.842
6	GA Charge	0.746	1.020	0.761	1.050	0.799
	Condominiums					
7	IA Charge	5.456	1.020	5.564	1.050	5.842
8	GA Charge	$ 0.746	1.020	$ 0.761	1.050	$ 0.799

Notes: Non-Residential and Condominium have the same Billing & Collection and GA/IA rate

Table 8-6 Proposed Test Year 1 (FY 2024) and Test Year 2 (FY 2025) Residential Stormwater Rates [Schedule BV-1: Table C-13]

LINE NO.	DESCRIPTION	(1) FY 2024 MONTHLY CHARGE	(2) FY 2025 MONTHLY CHARGE
Residential Stormwater Service			
Stormwater Mangement Service Charge ($/month/parcel)			
1	Charge Per Parcel	$ 17.09	$ 18.96
Billing and Collection Charge ($/bill)			
2	Charge Per Bill	$ 1.95	$ 2.04

Table 8-7 Proposed Test Year 1 (FY 2024) and Test Year 2 (FY 2025) Non-Residential Stormwater Rates [Schedule BV-1: Table C-13]

LINE NO.	DESCRIPTION	(1) FY 2024 MONTHLY CHARGE	(2) FY 2025 MONTHLY CHARGE
Non-Residential Stormwater Service			
Stormwater Mangement Service Charge			
1	Min Charge	$ 17.09	$ 18.96
2	GA (per 500 sf)	$0.799	$0.884
3	IA (per 500 sf)	$5.842	$6.475
Billing and Collection Charge ($/bill)			
4	Charge Per Bill	$2.53	$ 2.65

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9.0 Findings and Conclusions

The data assessed in this Report clearly show that the Water Department's cost have been impacted by recent inflationary pressures and associated rising costs. The need for continued investment into the system to upgrade aging infrastructure, meet regulatory requirements, and providing the resources necessary to maintain the system also require additional revenues to meet the Water Department's mission. The majority of cost increases the Water Department is facing are unavoidable and involve non-discretionary spending critical to the operation and maintenance of the system. Pending changes in the Water Department's customer base put pressure on revenues along with shifting collection patterns. The combination of the above, require revenue adjustments to continue critical operations, continue to serve customers as well as meet General Bond Ordinance requirements.

Based on the analyses performed for this Report, the following findings are presented for the Rate Board's consideration:

1. Revenues under existing rates will be insufficient to fund the Combined System needs over the Rate Period and action is needed to offset anticipated reductions in revenues resulting from:
    a. Reduction of billed water usage by Vicinity, one of the Water Department's consistent Top Ten Customers.
    b. Changes in wholesale wastewater allocations based on updated H&H modeling; and
    c. Shifts in system-wide collection rates.
2. In addition, the total projected expenses will exceed revenues under existing rates during the Rate Period and will require additional service revenues as recommended in this Report.
3. The Water Department is embarking on a CIP that is budgeted to invest $4.53 Billion into the combined system between now and FY 2028. While the Water Department has made significant efforts to obtain the lowest cost financing possible (via WIFIA and PENNVEST loans), revenue bonds will still be the primary funding source for the CIP along with some cash funding. The Department needs additional revenues to adhere to the City's capital funding policy, as well as meet ongoing capital obligations and debt covenant requirements.
4. To help manage customer bill impacts, and meet the financial obligations and metrics of the Combined System the Water Department proposes the following for the Rate Period:
    a. Temporarily reduce the SMIP/GARP budget by $5 Million/year in FY 2024 and FY 2025.
    b. Setting rates to meet the interim senior debt service coverage requirement of 1.25x, instead of the target 1.30 set forth under the 2018 Rate Determination.
    c. Leaving the Rate Stabilization Fund slightly below the $135 Million target under the 2018 Rate Determination; and
    d. Deferring the 20% cash funding target for capital projects.

5. The Rate Stabilization Fund is projected to be below the target level during the Rate Period. As the Rate Stabilization Fund target was established in 2018, the Water Department may need to consider proposing an increase in the target level in the future, to recognize the Department's current level of operating expense and provide necessary reserve funding capacity in the event of an emergency.

6. Need for rate action is further illustrated by the Water Department's performance against the financial metrics and targets, if projections hold and rate relief is not granted:

    a. "90% Test" – Would not be met beginning in FY 2024

    b. Senior Debt Service Coverage – Would not be met in FY 2025

    c. The Rate Stabilization Fund would be depleted by the end of FY 2025.

7. Moving forward, lack of sufficient rate revenues may require the Water Department to reduce the existing level of service below current levels and further delay implementation of the capital improvement program. In both instances, this may lead to a lower overall level of service for customers as well as impact overall system performance and potentially jeopardize compliance efforts.

8. Based on the above, among other factors, explained herein, it is recommended that the proposed water, sanitary sewer and stormwater rates for FY 2024 and FY 2025 be adopted to become effective September 1st of each fiscal year.

Appendices

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Appendix A: Accounts and Billed Volume per Account

Number of Accounts and Account Growth

Customer Type	Average Annual Growth			Historical Number of Accounts			
	1 Year	2 Year	3 Year	FY 2019	FY 2020	FY 2021	FY 2022
Senior Citizens (Special Customer Group II)							
5/8" Meter	-0.73%	-1.52%	-2.04%	23,460	22,738	22,215	22,052
> 5/8" Meter	37.50%	17.26%	6.92%	9	8	8	11
General Service (Residential)							
5/8" Meter	0.50%	1.30%	0.73%	413,482	411,877	420,516	422,630
> 5/8" Meter	14.41%	12.83%	12.18%	8,885	9,851	10,962	12,542
General Service (Commercial)							
5/8" Meter	-0.16%	0.40%	-0.14%	28,142	27,807	28,074	28,028
> 5/8" Meter	6.02%	5.55%	4.18%	8,605	8,732	9,177	9,729
General Service (Industrial)							
5/8" Meter	-1.57%	-0.50%	-0.85%	514	506	509	501
> 5/8" Meter	2.39%	0.73%	0.36%	550	548	543	556
General Service (Public Utilities)							
5/8" Meter	5.33%	4.75%	2.20%	74	72	75	79
> 5/8" Meter	12.26%	8.55%	6.33%	99	101	106	119
General Service (Excluding Senior Citizens)							
5/8" Meter	0.46%	1.24%	0.68%	442,212	440,262	449,174	451,238
> 5/8" Meter	10.38%	9.23%	8.15%	18,139	19,232	20,788	22,946
General Service (Including Senior Citizens)							
5/8" Meter	0.40%	1.11%	0.54%	465,672	463,000	471,389	473,290
> 5/8" Meter	10.39%	9.23%	8.15%	18,148	19,240	20,796	22,957
PHA (Special Customer Group IV)	-0.91%	-0.43%	-1.21%	5,877	5,715	5,718	5,666
Charities & Schools (Special Customer Group I)	-1.29%	-2.90%	-5.35%	2,163	1,945	1,858	1,834
Hospital/University (Special Customer Group III)	-1.43%	-31.25%	-30.21%	406	292	140	138
Hand Billed	0.87%	-0.21%	-1.26%	241	233	230	232
Scheduled	20.00%	41.42%	25.99%	3	3	5	6
Fire Service	16.67%	10.43%	7.28%	5,538	5,606	5,860	6,837
TOTAL	0.98%	1.49%	0.86%	498,048	496,034	505,996	510,960

Annual Billed Volume Per Account (Mcf/Account)

Customer Type	Average Annual Growth			Historical Usage Per Account			
	1 Year	2 Year	3 Year	FY 2019	FY 2020	FY 2021	FY 2022
Senior Citizens (Special Customer Group II)							
5/8" Meter	-1.75%	-0.79%	0.48%	5.54	5.71	5.72	5.62
> 5/8" Meter	-37.25%	-6.45%	6.72%	5.71	7.93	11.06	6.94
General Service (Residential)							
5/8" Meter	-1.72%	-1.02%	-0.68%	6.42	6.42	6.40	6.29
> 5/8" Meter	-11.20%	-7.91%	-7.90%	40.30	37.12	35.45	31.48
General Service (Commercial)							
5/8" Meter	4.02%	1.63%	-0.60%	10.55	10.03	9.96	10.36
> 5/8" Meter	2.60%	-3.06%	-1.25%	146.62	150.22	137.59	141.17
General Service (Industrial)							
5/8" Meter	6.65%	-4.35%	-0.88%	13.01	13.85	11.88	12.67
> 5/8" Meter	1.62%	-6.68%	-18.27%	269.34	168.84	144.69	147.03
General Service (Public Utilities)							
5/8" Meter	7.28%	-12.18%	-14.34%	8.39	6.83	4.91	5.27
> 5/8" Meter	-5.66%	-5.71%	-1.88%	83.92	89.16	84.02	79.27
General Service (Excluding Senior Citizens)							
5/8" Meter	-1.21%	-0.83%	-0.70%	6.69	6.66	6.63	6.55
> 5/8" Meter	-3.12%	-6.41%	-6.12%	97.92	92.50	83.64	81.03
General Service (Including Senior Citizens)							
5/8" Meter	-1.21%	-0.76%	-0.66%	6.64	6.61	6.59	6.51
> 5/8" Meter	-3.12%	-6.40%	-6.11%	97.88	92.46	83.61	81.00
PHA (Special Customer Group IV)	7.44%	5.32%	0.66%	26.77	24.61	25.41	27.30
Charities & Schools (Special Customer Group I)	23.04%	3.20%	0.95%	72.89	70.40	60.94	74.98
Hospital/University (Special Customer Group III)	12.93%	-1.63%	2.32%	705.56	781.00	669.24	755.76
Hand Billed	0.93%	0.74%	5.49%	1,778.52	2,057.24	2,068.80	2,087.95
Scheduled	-30.26%	-33.54%	8.32%	4.17	12.00	7.60	5.30
Fire Service	-98.25%	-86.75%	-73.03%	1.53	1.71	1.71	0.03

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Appendix B: Stormwater Credit Historical Data

CREDITS FOR NON SURFACE DISCHARGE ELIGIBLE PROPERTIES

Line #	Fiscal Year Ending June 30,	Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total Impervious Credit	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	IA NPDES Credit (Avg per parcel)	GA NPDES Credit (Avg per parcel)
1	2013	604	223,367,443	61,793,808	84,520,414	17,965,807	67,429,822	11,563,893	10,305,605	-	-		111,639	19,146	17,062	-	-
2	2014	653	257,321,475	76,969,015	94,009,369	20,633,398	55,499,304	12,668,858	11,410,570	-	-	49	84,991	19,401	17,474	-	-
3	2015	670	264,384,894	83,734,431	100,305,627	25,029,525	54,712,505	13,777,050	12,373,766	-	-	17	81,660	20,563	18,468	-	-
4	2016	695	308,606,388	110,633,550	119,638,164	33,170,833	60,658,419	16,434,037	15,025,143	-	-	25	87,278	23,646	21,619	-	-
5	2017	767	348,805,332	118,146,821	138,022,843	33,920,101	72,445,173	15,539,131	14,141,507	-	-	72	94,453	20,260	18,437	-	-
6	2018	823	314,434,590	113,476,770	144,822,988	39,742,752	72,337,150	19,141,871	17,744,247	-	-	56	87,894	23,259	21,560	-	-
7	2019	782	310,134,440	115,126,357	149,679,885	41,344,307	62,542,914	16,212,413	15,425,254	-	-	(41)	79,978	20,732	19,725	-	-
8	2020	813	322,039,967	120,201,957	160,913,257	45,539,961	59,748,724	19,565,431	19,223,758	-	-	31	73,492	24,066	23,645	-	-
9	2021	881	305,691,545	120,195,540	150,962,635	47,627,283	57,891,589	22,690,285	22,031,291	-	-	68	65,711	25,755	25,007	-	-
10	2022	906	347,944,545	132,702,256	188,575,144	54,098,147	56,231,742	22,534,000	21,612,322	-	-	25	62,066	24,872	23,855	-	-
11	5-Yr Average	841	320,049,017	120,340,576	158,990,782	45,670,490	61,750,424	20,028,800	19,207,374	-	-	28	73,828	23,737	22,759	-	-

CREDITS FOR SURFACE DISCHARGE ELIGIBLE PROPERTIES

Line #	Fiscal Year Ending June 30,	Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total Impervious Credit	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)	IA NPDES Credit (Avg Per parcel)	GA NPDES Credit (Avg per parcel)
12	2013	152	220,024,320	79,752,423	129,107,867	47,612,306	80,471,840	43,703,240	43,717,412	1,500,062	2,575,193		529,420	287,521	287,615	9,869	16,942
13	2014	212	272,919,261	91,624,837	170,699,769	53,693,207	114,259,551	49,493,761	49,668,409	1,580,879	2,681,653	60	538,960	233,461	234,285	7,457	12,649
14	2015	246	283,413,656	98,224,301	176,930,329	60,226,500	122,127,335	55,736,478	47,311,404	1,524,473	2,590,089	34	496,453	226,571	192,323	6,197	10,529
15	2016	273	253,507,206	84,881,856	192,946,835	61,024,331	127,568,199	58,166,690	58,101,140	250,387	428,721	27	467,283	213,065	212,825	917	1,570
16	2017	312	289,520,162	88,550,428	223,008,811	63,952,942	151,024,452	61,284,210	61,338,258	242,176	423,291	39	484,053	196,424	196,597	776	1,357
17	2018	318	331,071,935	98,430,878	227,585,196	66,195,369	149,779,130	62,881,606	62,901,801	726,596	3,097,451	6	471,004	197,741	197,804	2,285	9,740
18	2019	308	340,151,826	95,665,431	241,876,061	65,118,503	165,977,231	62,023,047	62,089,933	621,466	2,942,661	(10)	538,887	201,374	201,591	2,018	9,554
19	2020	312	330,347,932	93,855,746	236,698,310	64,145,133	161,182,489	60,896,113	61,152,874	531,051	2,759,029	4	516,611	195,180	196,003	1,702	8,843
20	2021	313	316,186,603	99,071,024	220,700,957	66,765,983	100,873,887	63,039,153	63,232,852	531,051	2,759,029	1	322,281	201,403	202,022	1,697	8,815
21	2022	315	330,769,306	117,900,742	247,940,370	72,828,442	91,530,154	69,639,017	69,547,325	17,490	45,949	2	290,572	221,076	220,785	56	146
22	5-Yr Average	313	329,705,520	100,984,764	234,960,179	67,010,686	133,868,578	63,695,787	63,784,957	485,531	2,320,824	1	427,871	203,355	203,641	1,551	7,420

CREDITS FOR PROPERTIES RECEIVING SMIP/GARP GRANTS

Line #	Fiscal Year Ending June 30,	Number of Parcels	Gross Area	Impervious Area	Total Gross Credit	Total Impervious Credit	Open Space GA Credit	IA Managed Credit	GA Managed Credit	IA NPDES Credit	GA NPDES Credit	Parcel Growth/ Change	Open Space GA Credit (Per Parcel)	IA Managed Credit (Avg Per parcel)	GA Managed Credit (Avg per parcel)
23	2013	-	-	-	-	-	-	-	-	-	-				
24	2014	1	55,200	31,107	23,176	8,721	14,455	8,721	8,721	-	-	1	14,455	8,721	8,721
25	2015	10	6,634,034	4,522,112	2,564,644	3,813,527	1,070,554	3,778,379	1,494,090	-	-	9	107,055	377,838	149,409
26	2016	26	12,539,266	7,907,711	5,346,848	5,709,958	2,128,113	5,600,316	3,326,415	-	-	16	81,851	215,397	127,939
27	2017	50	23,040,962	13,228,000	11,342,572	9,138,988	4,724,492	8,848,391	6,516,302	-	-	24	94,490	176,968	130,326
28	2018	59	24,855,602	14,444,874	12,497,771	10,178,890	4,925,563	9,904,203	7,572,208	-	-	9	83,484	167,868	128,343
29	2019	106	35,717,801	21,226,658	19,007,315	15,138,098	6,531,348	14,759,336	12,476,267	-	-	47	61,616	139,239	117,701
30	2020	121	41,782,758	21,669,430	22,855,597	15,906,007	9,727,821	15,465,284	13,126,719	-	-	15	80,395	127,812	108,485
31	2021	133	52,164,844	28,064,938	26,831,310	17,189,958	12,412,895	16,394,454	14,450,023	-	-	12	93,330	123,267	108,647
32	2022	146	72,748,178	31,830,481	44,114,613	20,341,474	26,479,161	19,593,123	17,667,060	-	-	13	181,364	134,199	121,007
33	5-Yr Average	113	45,453,837	23,447,276	25,061,321	15,750,885	12,015,358	15,223,280	13,058,455	-	-	19	100,038	138,477	116,836

Note: The above tables summarize the historical IA, GA, and NPDES credits granted to parcels meeting eligibility requirements for Non-Surface and Surface Discharge as described under PWD Rates and Charges Section 4.5(c); Non-Surface are properties not eligible under surface discharge requirements. Credits resulting from properties that have received the award of SMIP/GARP grants are listed separately. Historical growth in the number of parcels receiving credit and average credit per parcel are not utilized in developing for SMIP/GARP projections. SMIP/GARP Projections are based upon program budget, average grant award amount per drainage acre, and estimated completion timeline.

Appendix C: Historical Retail Non-Stormwater Only and Stormwater Only Collection Factor Calculations Prior to Adjustments

Non-Stormwater Only Customers	Collection Factors Billing Year (Payments within 12 months)	Billing Year Plus 1 (Payments w/in 13-24 months)	Billing Year Plus 2 and Beyond (Payment after 24 months)
FY 2012	*84.82%*	*9.54%*	*2.85%*
FY 2013	*84.93%*	*9.70%*	*2.87%*
FY 2014	*85.28%*	*9.52%*	*2.66%*
FY 2015	*86.42%*	*8.97%*	*2.38%*
FY 2016	*87.09%*	*8.89%*	*2.07%*
FY 2017	*87.69%*	*8.64%*	*1.85%*
FY 2018	*87.12%*	*9.20%*	*1.56%*
FY 2019	*87.09%*	*9.82%*	*1.03%*
FY 2020	*85.02%*	*10.56%*	*1.08%*
FY 2021	*84.82%*	*10.49%*	
FY 2022	*84.13%*		
Average	**85.85%**	**9.53%**	**2.04%**

Stormwater Only Customers	Collection Factors Billing Year (Payments within 12 months)	Billing Year Plus 1 (Payments w/in 13-24 months)	Billing Year Plus 2 and Beyond (Payment after 24 months)
FY 2012	*59.28%*	*9.15%*	*9.83%*
FY 2013	*60.91%*	*7.39%*	*9.55%*
FY 2014	*58.38%*	*6.63%*	*10.00%*
FY 2015	*59.04%*	*8.55%*	*8.65%*
FY 2016	*63.44%*	*8.94%*	*7.90%*
FY 2017	*65.90%*	*8.76%*	*5.98%*
FY 2018	*66.58%*	*8.90%*	*4.64%*
FY 2019	*68.27%*	*9.78%*	*4.06%*
FY 2020	*69.15%*	*11.32%*	*4.44%*
FY 2021	*66.40%*	*10.52%*	
FY 2022	*68.90%*		
Average	**64.20%**	**8.99%**	**7.23%**

Source: Schedule RFC-7

Appendix D: Actual-to-Budget Factors

		Factor	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	2 Year	3 Year	5 Year	2022	2021	2020	2022	2021	2020	2022	2021	2020
Human Resources and Administration														
Salaries & Wages	100	96.23%	94.45%	96.23%	94.48%	95.52%	93.34%	99.99%	$ 9,951,298	$ 9,370,164	$ 9,673,937	$ 10,418,185	$ 10,039,053	$ 9,675,002
Services	200	65.49%	60.75%	65.49%	64.06%	59.62%	61.88%	81.61%	$ 3,126,084	$ 3,241,468	$ 2,516,056	$ 5,243,000	$ 5,238,000	$ 3,083,000
Materials and Supplies	300	61.21%	56.88%	61.21%	67.71%	57.53%	56.23%	73.55%	$ 705,328	$ 687,442	$ 631,090	$ 1,226,000	$ 1,222,500	$ 858,000
Equipment	400	39.64%	38.74%	39.64%	46.09%	28.80%	49.02%	51.18%	$ 201,305	$ 331,348	$ 55,271	$ 699,000	$ 676,000	$ 108,000
Indemnities	500	0.00%		0.00%	0.00%			0.00%	$ -	$ -	$ -	$ -	$ -	$ 100,000
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Human Resources and Administration			79.44%	83.34%	81.87%	79.52%	79.36%	93.14%	$ 13,984,015	$ 13,630,422	$ 12,876,354	$ 17,586,185	$ 17,175,553	$ 13,824,002
Finance														
Salaries & Wages	100	81.91%	71.55%	81.91%	80.78%	72.05%	71.03%	116.72%	$ 5,784,838	$ 5,450,152	$ 5,456,616	$ 8,029,177	$ 7,672,958	$ 4,675,000
Services	200	100.00%	116.15%	108.27%	101.35%	112.21%	120.04%	92.91%	$ 8,568,116	$ 9,271,497	$ 7,312,002	$ 7,635,974	$ 7,723,500	$ 7,870,000
SMIP/GARP	2xx	100.00%	130.14%	118.55%	110.31%	80.50%	212.88%	100.00%	$ 20,125,000	$ 31,932,618	$ 25,000,000	$ 25,000,000	$ 15,000,000	$ 25,000,000
Materials and Supplies	300	33.22%	49.71%	33.22%	46.33%	1.26%	98.16%	5.09%	$ 733	$ 56,931	$ 3,459	$ 58,000	$ 58,000	$ 68,000
Equipment	400	12.20%	0.00%	12.20%	33.66%	0.00%	0.00%	34.28%	$ -	$ -	$ 14,398	$ 38,000	$ 38,000	$ 42,000
Indemnities	500	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	$ -	$ -	$ -	$ 10,000	$ 10,000	$ 10,000
Transfers	800	79.12%	72.73%	61.08%	64.75%	84.28%	65.32%	40.21%	$ 6,489,730	$ 7,838,707	$ 4,423,296	$ 7,700,000	$ 12,000,000	$ 11,000,000
Subtotal Finance			105.00%	98.63%	95.06%	84.52%	128.35%	86.74%	$ 40,968,417	$ 54,549,905	$ 42,209,771	$ 48,471,151	$ 42,502,458	$ 48,665,000
Construction and Engineering														
Salaries & Wages	100	93.55%	87.21%	93.55%	90.25%	86.11%	88.60%	113.40%	$ 5,587,116	$ 4,576,001	$ 4,214,474	$ 6,488,450	$ 5,164,544	$ 3,716,360
Services	200	76.46%	73.39%	76.46%	80.46%	69.87%	77.27%	85.07%	$ 1,232,124	$ 1,240,537	$ 1,021,702	$ 1,763,500	$ 1,605,500	$ 1,201,000
Materials and Supplies	300	35.17%	24.76%	35.17%	38.18%	25.18%	24.32%	53.04%	$ 25,933	$ 23,587	$ 61,791	$ 103,000	$ 97,000	$ 116,500
Equipment	400	29.97%	0.16%	29.97%	22.90%	0.00%	0.32%	82.24%	$ -	$ 660	$ 193,259	$ 206,000	$ 206,000	$ 235,000
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Construction and Engineering			81.14%	86.96%	84.50%	79.96%	82.58%	104.22%	$ 6,845,173	$ 5,840,785	$ 5,491,226	$ 8,560,950	$ 7,073,044	$ 5,268,860

Note: Spend factors using 3-year average highlighted yellow and exceptions are highlighted in blue.

		Factor	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	2 Year	3 Year	5 Year	2022	2021	2020	2022	2021	2020	2022	2021	2020
Operations														
Salaries & Wages	100	94.47%	92.76%	94.47%	95.20%	94.96%	90.52%	98.10%	$ 88,799,038	$ 82,941,746	$ 85,482,469	$ 93,513,321	$ 91,633,042	$ 87,136,263
Services	200	84.89%	85.30%	84.89%	88.75%	90.05%	80.67%	84.00%	$ 88,611,437	$ 81,249,860	$ 77,776,273	$ 98,407,422	$ 100,715,250	$ 92,595,300
Power	220	82.77%	81.08%	82.77%	81.65%	78.91%	83.25%	86.44%	$ 14,915,470	$ 15,737,655	$ 15,046,774	$ 18,903,000	$ 18,903,000	$ 17,408,000
Gas	221	80.49%	78.39%	80.49%	82.32%	81.11%	75.53%	85.20%	$ 4,363,923	$ 3,870,000	$ 3,991,800	$ 5,380,200	$ 5,124,000	$ 4,685,000
Materials and Supplies	300	77.58%	74.65%	77.58%	79.55%	72.90%	76.53%	83.58%	$ 16,067,708	$ 15,618,059	$ 17,381,434	$ 22,040,500	$ 20,408,000	$ 20,796,766
Chemicals	307	100.00%	101.60%	100.46%	99.35%	112.11%	91.10%	97.90%	$ 29,339,822	$ 23,842,156	$ 22,886,203	$ 26,171,000	$ 26,171,000	$ 23,378,000
Equipment	400	66.50%	62.38%	66.50%	69.80%	58.61%	78.72%	74.04%	$ 6,010,373	$ 1,860,257	$ 5,098,204	$ 10,254,500	$ 2,363,000	$ 6,885,434
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Operations			87.64%	88.40%	90.22%	90.33%	84.85%	90.03%	$ 248,107,771	$ 225,119,733	$ 227,663,158	$ 274,669,943	$ 265,317,292	$ 252,884,763
Planning & Environmental Services														
Salaries & Wages	100	95.50%	93.58%	95.50%	95.83%	91.40%	96.20%	100.00%	$ 19,744,663	$ 17,273,380	$ 16,906,060	$ 21,602,592	$ 17,955,633	$ 16,906,740
Services	200	95.53%	95.13%	95.53%	95.82%	91.63%	98.75%	96.24%	$ 15,260,309	$ 15,957,673	$ 17,460,836	$ 16,654,600	$ 16,160,000	$ 18,142,850
Materials and Supplies	300	86.84%	85.03%	86.84%	86.60%	83.26%	86.95%	90.85%	$ 1,477,792	$ 1,425,909	$ 1,405,580	$ 1,775,000	$ 1,640,000	$ 1,547,200
Equipment	400	87.50%	89.31%	87.50%	74.94%	88.18%	90.49%	82.73%	$ 479,539	$ 470,365	$ 333,419	$ 543,800	$ 519,800	$ 403,000
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Planning & Environmental Services			93.80%	95.03%	95.05%	91.09%	96.84%	97.58%	$ 36,962,303	$ 35,127,327	$ 36,105,895	$ 40,575,992	$ 36,275,433	$ 36,999,790
Public Affairs														
Salaries & Wages	100	96.25%	94.58%	96.25%	94.61%	91.86%	97.56%	99.99%	$ 5,644,716	$ 5,464,005	$ 5,244,307	$ 6,145,116	$ 5,600,810	$ 5,245,060
Services	200	98.42%	98.62%	98.42%	98.77%	98.98%	98.24%	98.11%	$ 6,257,065	$ 5,949,469	$ 7,662,337	$ 6,321,527	$ 6,056,000	$ 7,810,000
Materials and Supplies	300	58.49%	46.43%	58.49%	65.88%	46.42%	46.43%	93.49%	$ 258,576	$ 258,613	$ 359,005	$ 557,000	$ 557,000	$ 384,000
Equipment	400	56.68%	100.28%	56.68%	36.33%	99.06%	101.50%	7.62%	$ 8,915	$ 9,135	$ 1,220	$ 9,000	$ 9,000	$ 16,000
Indemnities	500	99.67%	100.00%	99.67%	97.43%	100.00%	100.00%	99.01%	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 500,000	$ 505,000
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Public Affairs			94.65%	96.03%	95.82%	93.62%	95.74%	98.62%	$ 12,669,272	$ 12,181,222	$ 13,766,869	$ 13,532,643	$ 12,722,810	$ 13,960,060

Note: Spend factors using 3-year average highlighted yellow and exceptions are highlighted in blue.

		Factor	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	2 Year	3 Year	5 Year	2022	2021	2020	2022	2021	2020	2022	2021	2020
Division of Technology														
Salaries & Wages	100	80.22%	80.83%	80.22%	81.40%	81.33%	80.29%	78.96%	$ 7,538,568	$ 7,019,427	$ 6,869,622	$ 9,268,937	$ 8,742,629	$ 8,700,632
Services	200	73.81%	72.98%	73.81%	73.37%	72.04%	73.96%	75.56%	$ 15,557,123	$ 15,310,229	$ 15,123,111	$ 21,594,698	$ 20,700,879	$ 20,015,542
Materials and Supplies	300	70.57%	69.75%	70.57%	70.11%	77.81%	63.51%	71.96%	$ 1,233,200	$ 1,301,139	$ 1,535,616	$ 1,584,850	$ 2,048,850	$ 2,133,850
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Division of Technology			75.01%	75.42%	75.29%	74.98%	75.04%	76.27%	$ 24,328,891	$ 23,630,795	$ 23,528,349	$ 32,448,485	$ 31,492,358	$ 30,850,024
Mayor's Office of Transportation & Utilities and Office of Sustainability														
Salaries & Wages	100	77.98%	67.54%	77.98%	86.60%	38.26%	100.00%	100.00%	$ 85,874	$ 202,423	$ 202,433	$ 224,424	$ 202,424	$ 202,424
Services	200	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	$ 47,000	$ 30,000	$ 30,000	$ 47,000	$ 30,000	$ 30,000
Materials and Supplies	300	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Mayor's Office of Transportation & Utilities			72.50%	81.18%	88.47%	48.95%	100.00%	100.00%	$ 132,874	$ 232,423	$ 232,433	$ 271,424	$ 232,424	$ 232,424
Philadelphia Water, Sewer and Storm Water Rate Board														
Salaries & Wages	100	97.18%	96.98%	97.18%	64.39%	97.66%	96.28%	97.61%	$ 44,899	$ 42,901	$ 41,760	$ 45,973	$ 44,558	$ 42,782
Services	200	40.33%	23.93%	40.33%	41.75%	44.09%	4.04%	73.14%	$ 328,591	$ 30,499	$ 548,683	$ 745,200	$ 755,200	$ 750,200
Materials and Supplies	300	0.00%		0.00%	0.00%			0.00%	$ -	$ -	$ -	$ -	$ -	$ 25,000
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Philadelphia Water, Sewer and Storm Water Rate Board						47.21%	9.18%	72.18%	$ 373,490	$ 73,400	$ 590,443	$ 791,173	$ 799,758	$ 817,982

Note: Spend factors using 3-year average highlighted yellow and exceptions are highlighted in blue.

		Factor	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	2 Year	3 Year	5 Year	2022	2021	2020	2022	2021	2020	2022	2021	2020
Public Property														
Salaries & Wages	100	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Leases	200	99.96%	99.94%	99.96%	99.98%	99.89%	100.00%	100.00%	$ 4,490,292	$ 4,368,565	$ 4,270,347	$ 4,495,292	$ 4,368,565	$ 4,270,347
Materials and Supplies	300	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Public Property			99.94%	99.96%	99.98%	99.89%	100.00%	100.00%	$ 4,490,292	$ 4,368,565	$ 4,270,347	$ 4,495,292	$ 4,368,565	$ 4,270,347
Fleet Management														
Salaries & Wages	100	82.98%	77.43%	82.98%	87.33%	77.90%	76.93%	95.37%	$ 2,741,454	$ 2,589,222	$ 2,940,437	$ 3,519,283	$ 3,365,544	$ 3,083,114
Services	200	74.83%	69.60%	74.83%	78.72%	70.96%	68.25%	85.29%	$ 1,056,539	$ 1,016,231	$ 1,269,896	$ 1,489,000	$ 1,489,000	$ 1,489,000
Materials and Supplies	300	82.37%	86.98%	82.37%	80.09%	98.02%	75.94%	73.63%	$ 3,964,735	$ 3,071,606	$ 3,147,317	$ 4,044,640	$ 4,044,640	$ 4,274,640
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Fleet Management			80.44%	81.34%	82.49%				$ 7,762,728	$ 6,677,059	$ 7,357,650	$ 9,052,923	$ 8,899,184	$ 8,846,754
City Finance														
Salaries & Wages	100	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Benefits	1xx	100.00%	95.13%	92.61%	93.67%	96.31%	93.88%	87.73%	$ 63,161,240	$ 58,250,740	$ 57,760,775	$ 65,582,257	$ 62,047,800	$ 65,839,194
Pension	191	100.00%	106.93%	106.75%	106.67%	105.28%	108.16%	106.41%	$ 58,970,176	$ 81,201,619	$ 71,612,808	$ 56,012,110	$ 75,076,794	$ 67,300,000
Pension Obligations	190	100.00%	108.98%	109.37%	108.12%	103.85%	120.24%	109.69%	$ 8,541,319	$ 4,514,537	$ 15,686,125	$ 8,225,032	$ 3,754,608	$ 14,300,000
Services	200	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Materials and Supplies	300	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	68.42%	56.04%	54.74%	55.47%	78.25%	33.83%	52.13%	$ 5,868,696	$ 2,537,590	$ 3,909,860	$ 7,500,000	$ 7,500,000	$ 7,500,000
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal City Finance			99.07%	98.04%	98.37%	99.43%	98.74%	96.15%	$ 136,541,431	$ 146,504,486	$ 148,969,568	$ 137,319,399	$ 148,379,202	$ 154,939,194

Note: Spend factors using 3-year average highlighted yellow and exceptions are highlighted in blue.

		Factor	Historical Average			Actual to Budget Factor			Actual O&M Expense			Budgeted O&M Expense		
		Used	2 Year	3 Year	5 Year	2022	2021	2020	2022	2021	2020	2022	2021	2020
Revenue														
Salaries & Wages	100	88.60%	86.44%	88.60%	91.82%	84.45%	88.38%	92.91%	$ 9,070,937	$ 9,763,255	$ 10,102,618	$ 10,741,609	$ 11,047,032	$ 10,873,116
Services	200	59.20%	40.79%	59.20%	73.69%	15.83%	65.75%	96.02%	$ 817,369	$ 3,395,971	$ 4,959,294	$ 5,165,000	$ 5,165,000	$ 5,165,000
Materials and Supplies	300	54.78%	63.64%	54.78%	61.74%	65.55%	61.73%	37.01%	$ 940,371	$ 885,451	$ 529,102	$ 1,434,500	$ 1,434,500	$ 1,429,500
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%		0.00%	0.00%			0.00%	$ -	$ -	$ -	$ -	$ -	$ 5,000
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Revenue			71.09%	77.13%	83.86%	62.45%	79.59%	89.23%	$ 10,828,677	$ 14,044,677	$ 15,591,014	$ 17,341,109	$ 17,646,532	$ 17,472,616
Procurement														
Salaries & Wages	100	87.00%	95.55%	87.00%	90.10%	99.29%	91.64%	68.65%	$ 114,475	$ 101,275	$ 72,282	$ 115,290	$ 110,515	$ 105,285
Services	200	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Materials and Supplies	300	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Procurement			95.55%	87.00%	90.10%	99.29%	91.64%	68.65%	$ 114,475	$ 101,275	$ 72,282	$ 115,290	$ 110,515	$ 105,285
Law														
Salaries & Wages	100	98.14%	97.34%	98.14%	97.92%	95.29%	100.00%	100.00%	$ 3,189,335	$ 2,570,334	$ 2,569,445	$ 3,346,838	$ 2,570,334	$ 2,569,445
Services	200	99.99%	99.99%	99.99%	93.62%	99.99%	99.99%	100.00%	$ 691,536	$ 691,565	$ 691,589	$ 691,614	$ 691,614	$ 691,614
Materials and Supplies	300	85.52%	80.28%	85.52%	83.01%	99.86%	60.69%	96.01%	$ 42,950	$ 26,104	$ 41,295	$ 43,010	$ 43,010	$ 43,010
Equipment	400	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Indemnities	500	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Transfers	800	0.00%							$ -	$ -	$ -	$ -	$ -	$ -
Subtotal Law			97.64%	98.35%	96.87%	96.14%	99.49%	99.95%	$ 3,923,821	$ 3,288,003	$ 3,302,329	$ 4,081,462	$ 3,304,958	$ 3,304,069
Total Water Fund			90.69%	90.96%	91.32%	89.94%	91.46%	91.49%	$ 548,033,630	$ 545,370,077	$ 542,027,687	$ 609,313,421	$ 596,300,086	$ 592,441,170

Note: Spend factors using 3-year average highlighted yellow and exceptions are highlighted in blue.

Appendix E: Water Fund Historical O&M Costs

	Description	Historical					
		2017	2018	2019	2020	2021	2022
PWD Operating and Maintenance Expenses Summary							
100	Salaries & Wages	$ 125,010,184	$ 132,309,261	$ 137,155,996	$ 149,776,460	$ 147,364,285	$ 158,297,211
1xx	Benefits	52,651,923	56,886,859	54,912,153	57,760,775	58,250,740	63,161,240
191	Pension	55,552,438	62,666,813	64,686,954	71,612,808	81,201,619	58,970,176
190	Pension Obligations	13,362,362	14,290,585	14,170,375	15,686,125	4,514,537	8,541,319
200	Services	127,171,308	125,564,692	138,073,835	136,371,779	137,384,999	141,553,293
220	Power	18,252,847	15,002,114	13,854,363	15,046,774	15,737,655	14,915,470
221	Gas	3,176,528	3,855,757	4,652,000	3,991,800	3,870,000	4,363,923
2xx	Services - Property Leases	4,042,633	4,256,817	4,265,847	4,270,347	4,368,565	4,490,292
2xx	SMIP/GARP	15,000,000	26,900,000	25,000,000	25,000,000	31,932,618	20,125,000
300	Materials and Supplies	25,773,136	25,210,739	25,953,178	25,095,689	23,354,841	24,717,326
307	Chemicals	18,728,508	21,771,176	22,115,310	22,886,203	23,842,156	29,339,822
400	Equipment	2,120,160	3,094,873	4,839,384	5,695,771	2,671,765	6,700,132
500	Indemnities	7,352,313	6,779,219	3,816,246	4,409,860	3,037,590	6,368,696
800	Transfers	12,097,064	7,319,325	8,052,752	4,423,296	7,838,707	6,489,730
Total PWD Operating and Maintenance Expenses Summary		**$ 480,291,404**	**$ 505,908,230**	**$ 521,548,393**	**$ 542,027,687**	**$ 545,370,077**	**$ 548,033,630**

PWD Operating and Maintenance Expenses Summary - Annual Increase		**2017 - 2018**	**2018 - 2019**	**2019 - 2020**	**2020 - 2021**	**2021 - 2022**
100	Salaries & Wages		3.66%	9.20%	-1.61%	7.42%
1xx	Benefits		-3.47%	5.19%	0.85%	8.43%
191	Pension		3.22%	10.71%	13.39%	-27.38%
190	Pension Obligations		-0.84%	10.70%	-71.22%	89.20%
200	Services		9.96%	-1.23%	0.74%	3.03%
220	Power		-7.65%	8.61%	4.59%	-5.22%
221	Gas		20.65%	-14.19%	-3.05%	12.76%
2xx	Services - Property Leases		0.21%	0.11%	2.30%	2.79%
307	Chemicals		1.58%	3.49%	4.18%	23.06%
400	Equipment		56.37%	17.70%	-53.09%	150.78%
500	Indemnities		-43.71%	15.55%	-31.12%	109.66%
800	Transfers		10.02%	-45.07%	77.21%	-17.21%
Total PWD Operating and Maintenance Expenses Summary - Annual Increase			3.09%	3.93%	0.62%	0.49%

PWD Operating and Maintenance Expenses Summary - 2 Year Average Increase		**2018 - 2020**	**2019 - 2021**	**2020 - 2022**
100	Salaries & Wages	6.40%	3.65%	2.81%
1xx	Benefits	0.77%	3.00%	4.57%
191	Pension	6.90%	12.04%	-9.26%
190	Pension Obligations	4.77%	-43.56%	-26.21%
200	Services	4.21%	-0.25%	1.88%
220	Power	0.15%	6.58%	-0.44%
221	Gas	1.75%	-8.79%	4.56%
2xx	Services - Property Leases	0.16%	1.20%	2.54%
2xx	SMIP/GARP	-3.60%	13.02%	-10.28%
300	Materials and Supplies	-0.23%	-5.14%	-0.76%
307	Chemicals	2.53%	3.83%	13.22%
400	Equipment	35.66%	-25.70%	8.46%
500	Indemnities	-19.35%	-10.78%	20.17%
800	Transfers	-22.26%	-1.34%	21.13%
Total PWD Operating and Maintenance Expenses Summary - 2 Year Average Increase		**3.51%**	**2.26%**	**0.55%**

PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase			
100	Salaries & Wages	3.66%	4.89%
1xx	Benefits	0.79%	4.78%
191	Pension	9.02%	-3.04%
190	Pension Obligations	-31.89%	-15.53%
200	Services	3.04%	0.83%
220	Power	1.61%	2.49%
221	Gas	0.12%	-2.11%
2xx	Services - Property Leases	0.87%	1.72%
2xx	SMIP/GARP	5.88%	-6.98%
300	Materials and Supplies	-2.52%	-1.61%
307	Chemicals	3.08%	9.88%
400	Equipment	-4.78%	11.45%
500	Indemnities	-23.48%	18.61%
800	Transfers	2.31%	-6.94%
Total PWD Operating and Maintenance Expenses Summary - 3 Year Average Increase		**2.54%**	**1.66%**

Appendix F: O&M Cost Industry Indices Data

Month	Price Indices			
	Consumer Price Index All Urban Consumers Philadelphia Area	Producer Price Index Industrial Chemicals	Producer Price Index Materials for Construction	Producer Price Index Construction Equipment & Machinery
	Raw Number	Raw Number	Raw Number	Raw Number
Oct-19	258.0	252.3	250.8	233.7
Oct-20	260.0	227.7	262.5	236.7
Oct-21	274.6	332.8	311.4	257.3
Oct-22	296.0	349.1	349.2	283.4
12 Month Annual Change	**7.77%**	**4.89%**	**12.16%**	**10.12%**
24 Month Annual Change	**6.70%**	**23.82%**	**15.34%**	**9.41%**
36 Month Annual Change	**4.69%**	**11.43%**	**11.67%**	**6.63%**

Notes:

All consumer and producer price indexes are from the Bureau of Labor Statistics. References are provided below. Indexes are presented as the fiscal year average based upon the associated Water Department's fiscal year. Indexes are not seasonally adjusted.

Index	Series Id (s)	Area	Items	Base Period
CPI - All Urban Consumers - Philadelphia Area	CUURS12BSA0,CUUSS12BSA0	Philadelphia-Camden-Wilmington, PA-NJ-DE-MD	All Items	1982-84=100

Index	Series Id	Group	Items	Base Date
PPI - Industrial Chemicals	WPU061	Chemicals and allied products	Industrial chemicals	198200
PPI - Materials for Construction	WPUID612	Intermediate demand by commodity type	Materials and components for construction	198200
PPI - Construction Machinery & Equipment	WPU112	Machinery and equipment	Construction machinery and equipment	198200

Appendix G: Capital Cost Industry Indices

Fiscal Year	H.W. Index Cost of Construction Pump Plant - Equipment		H.W. Index Cost of Construction Treatment Plant - Equipment		H.W. Index Cost of Construction Transmission Plant - Steel Mains		H.W. Index Cost of Construction Distribution Plant - Mains		H.W. Index Cost of Construction Distribution Plant - Meters		McGraw-Hill (ENR) Construction Cost Index	
	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change	Raw Number	% Change
2013	800	2.56%	689	2.99%	724	1.83%	698	4.33%	677	4.80%	9,424.2	2.56%
2014	856	7.00%	713	3.48%	694	-4.14%	720	3.15%	688	1.62%	9,672.1	2.63%
2015	928	8.41%	736	3.23%	712	2.59%	736	2.22%	702	2.03%	9,933.1	2.70%
2016	990	6.68%	755	2.58%	697	-2.11%	747	1.49%	709	1.00%	10,166.6	2.35%
2017	1,052	6.26%	774	2.52%	723	3.73%	774	3.61%	722	1.83%	10,534.5	3.62%
2018	1,146	8.94%	797	2.97%	733	1.38%	790	2.07%	750	3.88%	10,898.1	3.45%
2019	1,261	10.03%	832	4.39%	792	8.05%	819	3.67%	765	2.00%	11,194.7	2.72%
2020	1,374	8.96%	871	4.69%	824	4.04%	847	3.42%	790	3.27%	11,371.2	1.58%
2021	1,436	4.51%	922	5.86%	845	2.55%	883	4.25%	815	3.16%	11,680.1	2.72%
2022	1,593	10.93%	1,012	9.76%	1,046	23.79%	984	11.44%	895	9.82%	12,650.1	8.30%
Avg.	-	7.35%	-	3.69%	-	2.83%	-	3.39%	-	2.53%	-	2.70%
2 Yr Avg												
2013	-	6.30%	-	3.60%	-	6.03%	-	5.01%	-	3.25%	-	2.61%
2014	-	4.76%	-	3.24%	-	-1.20%	-	3.74%	-	3.20%	-	2.59%
2015	-	7.70%	-	3.35%	-	-0.83%	-	2.69%	-	1.83%	-	2.66%
2016	-	7.54%	-	2.90%	-	0.22%	-	1.86%	-	1.51%	-	2.52%
2017	-	6.47%	-	2.55%	-	0.77%	-	2.55%	-	1.41%	-	2.98%
2018	-	7.59%	-	2.74%	-	2.55%	-	2.84%	-	2.85%	-	3.54%
2019	-	9.48%	-	3.68%	-	4.66%	-	2.87%	-	2.93%	-	3.09%
2020	-	9.50%	-	4.54%	-	6.03%	-	3.54%	-	2.63%	-	2.15%
2021	-	6.71%	-	5.27%	-	3.29%	-	3.83%	-	3.22%	-	2.14%
2022	-	7.67%	-	7.79%	-	12.67%	-	7.78%	-	6.44%	-	5.47%
3 Yr Avg												
2013	-	4.21%	-	2.97%	-	6.88%	-	4.20%	-	3.42%	-	2.90%
2014	-	6.53%	-	3.56%	-	2.52%	-	4.39%	-	2.71%	-	2.62%
2015	-	5.96%	-	3.23%	-	0.05%	-	3.23%	-	2.81%	-	2.63%
2016	-	7.36%	-	3.10%	-	-1.26%	-	2.29%	-	1.55%	-	2.56%
2017	-	7.11%	-	2.77%	-	1.37%	-	2.44%	-	1.62%	-	2.89%
2018	-	7.29%	-	2.69%	-	0.97%	-	2.39%	-	2.23%	-	3.14%
2019	-	8.40%	-	3.29%	-	4.35%	-	3.11%	-	2.57%	-	3.26%
2020	-	9.31%	-	4.01%	-	4.46%	-	3.05%	-	3.05%	-	2.58%
2021	-	7.81%	-	4.98%	-	4.85%	-	3.78%	-	2.81%	-	2.34%
2022	-	8.10%	-	6.75%	-	9.72%	-	6.31%	-	5.37%	-	4.16%
5 Yr Avg												
2013	-	4.56%	-	4.01%	-	5.92%	-	4.88%	-	3.43%	-	3.12%
2014	-	4.74%	-	3.03%	-	2.78%	-	2.90%	-	2.88%	-	2.56%
2015	-	5.59%	-	3.13%	-	3.73%	-	3.59%	-	2.78%	-	2.81%
2016	-	6.94%	-	3.30%	-	1.59%	-	3.37%	-	2.23%	-	2.58%
2017	-	6.17%	-	2.96%	-	0.34%	-	2.96%	-	2.25%	-	2.77%
2018	-	7.45%	-	2.96%	-	0.25%	-	2.51%	-	2.07%	-	2.95%
2019	-	8.06%	-	3.14%	-	2.68%	-	2.61%	-	2.14%	-	2.97%
2020	-	8.17%	-	3.43%	-	2.96%	-	2.85%	-	2.39%	-	2.74%
2021	-	7.72%	-	4.08%	-	3.93%	-	3.40%	-	2.83%	-	2.81%
2022	-	8.65%	-	5.51%	-	7.67%	-	4.92%	-	4.39%	-	3.73%

Appendix H: Stormwater Tables

Appendix H – Table 1 Stormwater Credit Projections

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
	Parcels (#)						
1	IAR Practices	553	582	612	641	670	699
2	GA/IA Management Practices [1]	1,250	1,279	1,308	1,337	1,366	1,395
3	SMIP/GARP	185	224	243	262	281	300
4	Subtotal	1,988	2,085	2,163	2,240	2,317	2,394
	Impervious Area (thousand square feet)						
5	IAR Practices	4,784	5,057	5,330	5,603	5,875	6,148
6	GA/IA Management Practices [1]	93,060	93,930	94,799	95,669	96,538	97,408
7	SMIP/GARP	22,866	25,683	28,112	29,980	31,774	33,935
8	Subtotal	120,711	124,670	128,241	131,251	134,188	137,491
	Gross Area (thousand square feet)						
9	IAR Practices	-	-	-	-	-	-
10	GA/IA Management Practices [1]	242,311	245,654	248,998	252,341	255,684	259,028
11	SMIP/GARP	47,419	50,236	52,665	54,533	56,328	58,488
12	Subtotal	289,730	295,890	301,663	306,874	312,012	317,516

Notes

1: GA/IA Management Practices Credits include Surface and Non-Surface Discharge credits for IA managed and open space.

Appendix H – Table 2 SMIP/GARP Program – Annual Cost Estimates

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
1	Annual Grant Budget (a)	$ 25,000,000	$ 20,000,000	$ 20,000,000	$ 25,000,000	$ 25,000,000	$ 25,000,000
2	PIDC Annual Administration Fee (b)	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
3	Service Fee % (c)	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
4	PIDC Estimated Service Fee Cost (Line 1 - Line 2) X Line 3	$ 498,000	$ 398,000	$ 398,000	$ 498,000	$ 498,000	$ 498,000
5	TOTAL PIDC SMIP/GARP FEE (Line 2 + Line 4)	$ 598,000	$ 498,000	$ 498,000	$ 598,000	$ 598,000	$ 598,000
6	Available Award Amount (Line 1 - Line 5)	$ 24,402,000	$ 19,502,000	$ 19,502,000	$ 24,402,000	$ 24,402,000	$ 24,402,000

Notes:

(a) Amount available in each fiscal year for new projects after accounting for amendments to previously awarded projects.

(b) Annual Administration Fee for SMIP/GARP Program is $100K. Paid to PIDC each fiscal year.

(c) Service Fee is calculated as 2% of annual grant budget less the annual administration fee paid to PIDC.

Appendix H – Table 3 SMIP/GARP Program – Awarded Project Projections

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
	INPUT PARAMETERS						
1	SMIP/GARP Grant Budget (a)	$ 24,402,000	$ 19,502,000	$ 19,502,000	$ 24,402,000	$ 24,402,000	$ 24,402,000
2	$/Drainage Acre	$ 350,000	$ 364,000	$ 378,560	$ 393,702	$ 409,450	$ 425,829
3	% of Award Amount	100%	100%	100%	100%	100%	100%
4	Acre conversion to square feet	43,560	43,560	$ 43,560	$ 43,560	$ 43,560	$ 43,560
Stormwater GA/IA Managed Area Projections - Anticipated Awards							
	Anticipated SMIP/ GARP Projects (b)						
5	Anticipated Award Amount (Line 1 x Line 4)	$ 24,402,000	$ 19,502,000	$ 19,502,000	$ 24,402,000	$ 24,402,000	$ 24,402,000
6	Drainage Acres (Line 6 / Line 2)	69.7	53.6	51.5	62.0	59.6	57.3
7	Gross Area to be Managed (sf)	3,036,132	2,334,816	2,243,340	2,700,720	2,596,176	2,495,988
8	Impervious Area to be Managed (sf)	3,036,132	2,334,816	2,243,340	2,700,720	2,596,176	2,495,988
	Annual Totals						
9	GA to be Managed (sf)	3,036,132	2,334,816	2,243,340	2,700,720	2,596,176	2,495,988
10	IA to be Managed (sf)	3,036,132	2,334,816	2,243,340	2,700,720	2,596,176	2,495,988
11	Total Drainage Acres	69.7	53.6	51.5	62.0	59.6	57.3

Notes:

(a) See Line 6 - Appendix H - Table 2: SMIP/GARP Program - Annual Cost Estimates

(b) Anticipated SMIP/GARP projects with an estimated award amount ($300,000 in FY 2023 and escalated at 4% thereafter) and within 24 months average project completion time.

Appendix H – Table 4 SMIP/GARP Program As-built & Verified Project Projections

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
	Awarded Projects Pre-FY 2023 (a)	**20.0**	**20.0**				
1	Drainage Acres	93.9	80.8				
2	Gross Area Managed (sf)	4,091,591	3,520,740				
3	Impervious Area Managed (sf)	4,091,591	3,520,740				
	Estimated Awarded Projects Post FY 2023						
	Anticipated New Projects (b)						
4	Drainage Acres	-	-	69.7	53.6	51.5	62.0
5	Gross Area Managed (sf)	-	-	3,036,132	2,334,816	2,243,340	2,700,720
6	Impervious Area Managed (sf)	-	-	3,036,132	2,334,816	2,243,340	2,700,720
	Annual Totals						
7	Drainage Acres (Line 1 + Line 4)	93.9	80.8	69.7	53.6	51.5	62.0
8	Gross Area Managed (sf) (Line 2 + Line 5)	4,091,591	3,520,740	3,036,132	2,334,816	2,243,340	2,700,720
9	Impervious Area Managed (sf) (Line 3 + Line 6)	4,091,591	3,520,740	3,036,132	2,334,816	2,243,340	2,700,720
10	Cummulative Drainage Acres	93.9	174.8	244.5	298.1	349.6	411.6

Notes:

(a) Completed Drainage Acres based upon actuals from PWD's SMIP/GARP Grant Tracking.
FY2023 - FY 2024 estimated based upon projects awarded prior to FY 2023 but not yet completed/verified.

(b) From Appendix H - Table 3: SMIP/GARP Program - Project Projections. Projects are expected to be completed and verified within 24 months.

Appendix H – Table 5 SMIP/GARP Program Projected Credit Impacts

Line No.	Description	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
INPUT PARAMETERS							
1	% of GA and IA Credits (a)	80%	80%	80%	80%	80%	80%
	Annual Total Credits						
2	GA Managed Credit (sf) (Line 1 X Appendix H Table 4: Line 8)	3,273,273	2,816,592	2,428,906	1,867,853	1,794,672	2,160,576
3	IA Managed Credit (sf) (Line 1 X Appendix H Table 4: Line 9)	3,273,273	2,816,592	2,428,906	1,867,853	1,794,672	2,160,576
	Cumulative Total Credits						
4	GA Managed Credit (sf)	3,273,273	6,089,865	8,518,771	10,386,624	12,181,296	14,341,872
5	IA Managed Credit (sf)	3,273,273	6,089,865	8,518,771	10,386,624	12,181,296	14,341,872

Notes:
(a) Assumes all SMIP/GARP projects will be granted Non-Surface Discharge Credit based upon 80% of managed IA and 80% of managed GA.

Appendix H – Table 6 Projections of Billable Parcels, Gross Area, and Impervious Area

Line No.	Customer Type	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
	Projected number of Billable Parcels						
1	Residential	463,408	463,408	463,408	463,408	463,408	463,408
2	Non-Residential	68,923	68,915	68,907	68,899	68,891	68,883
3	Condominium	2,282	2,282	2,282	2,282	2,282	2,282
4	**Total: Number of Billable Parcels**	**534,613**	**534,605**	**534,597**	**534,589**	**534,581**	**534,573**
	Projected Billable Gross Area (thousand of square feet)						
5	Residential	973,156	973,156	973,156	973,155	973,155	973,155
6	Non-Residential	1,144,352	1,137,977	1,132,091	1,126,864	1,121,785	1,116,349
7	Condominium	31,012	30,854	30,706	30,572	30,441	30,299
8	**Total: Billable Gross Area**	**2,148,521**	**2,141,987**	**2,135,953**	**2,130,592**	**2,125,380**	**2,119,803**
	Projected Billable Impervious Area (thousand of square feet)						
9	Residential	551,455	551,455	551,455	551,455	551,454	551,454
10	Non-Residential	602,898	598,759	595,122	592,153	589,341	586,180
11	Condominium	21,283	21,109	20,953	20,821	20,692	20,547
12	**Total: Billable Impervious Area**	**1,175,635**	**1,171,323**	**1,167,530**	**1,164,428**	**1,161,488**	**1,158,181**

Appendix H – Table 7 GA/IA Management Credit Projection Factors

Line No.	Description	Annual Increase in Parcels	Annual Average GA Credit	Annual Average IA Credit
Stormwater				
	Credit Type- IAR		**(sf)**	**(sf)**
1	Impervious Area Reduction	29		9,342
	Credit Type-Non Surface Discharge		**(sf)**	**(sf)**
2	Area Managed	28	22,759	23,737
3	Open Space		73,828	
4	NPDES		0	
	Credit Type		**(sf)**	**(sf)**
5	Area Managed	1	203,641	203,355
6	Open Space		427,871	
7	NPDES		7,420	1,551

Annual Increase in parcels is applied to the annual average IA and GA credit to project credits for the Study Period. Annual Increase in parcels and the annual average IA and GA credit are based on 5-year average (FY 2019-FY 2023) historical data provided by PWD.

Appendix H – Table 8 Stormwater Projected Number of Billable Accounts

Line No.	CUSTOMER TYPE	Fiscal Year Ending June 30, 2023	2024	2025	2026	2027	2028
Stormwater							
1	Residential	465,601	465,601	465,601	465,601	465,601	465,601
2	Non-Residential	77,662	77,654	77,646	77,638	77,630	77,622
3	Condominium	5,278	5,278	5,278	5,278	5,278	5,278
4	Total	548,541	548,533	548,525	548,517	548,509	548,501

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Appendix I: Wholesale Tables

Appendix I – Table 1 Wastewater Wholesale: Water Pollution Control Plant Investment Per Unit of Capacity

Line No.	Cost Component	(1) Direct Investment (a)	(2) Units of Capacity	(3) Unit Investment (a)	
Wholesale		**$**		**$**	
	Northeast Water Pollution Control Plant				
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
1	- Capacity	5,079,000	370 mgd = 49,470 Mcf/day	102.6683	/Mcf/day
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
2	Volume	60,597,000	76,650 mg = 10,247,000 Mcf	5.9136	/Mcf
3	Capacity	24,584,000	420 mgd = 56,150 Mcf/day	437.8272	/Mcf/day
4	Suspended Solids	124,572,000	173,240,000 lbs	719.0718	/1,000 lbs
5	BOD	106,410,000	128,491,000 lbs	828.1514	/1,000 lbs
	Southwest Water Pollution Control Plant				
6	Retail - Capacity	22,043,000	50 mgd = 6,684 Mcf/day	3,297.8755	/Mcf/day
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby				
7	Volume	75,019,000	73,000 mg = 9,759,000 Mcf	7.6872	/Mcf
8	Capacity	19,926,000	400 mgd = 53,476 Mcf/day	372.6158	/Mcf/day
9	Suspended Solids	64,118,000	130,534,000 lbs	491.1981	/1,000 lbs
10	BOD	53,154,000	78,168,000 lbs	679.9929	/1,000 lbs
	Southeast Water Pollution Control Plant				
	Retail and Springfield (Wyndmoor)				
11	Volume	33,139,000	40,880 mg = 5,465,000 Mcf	6.0639	/Mcf
12	Capacity	42,518,000	224 mgd = 29,947 Mcf/day	1,419.7749	/Mcf/day
13	Suspended Solids	31,254,000	66,065,000 lbs	473.0795	/1,000 lbs
14	BOD	25,735,000	56,940,000 lbs	451.9670	/1,000 lbs

mg - million gallons
mgd - million gallons per day
Mcf - thousand cubic feet
Mcf/day - thousand cubic feet per day
lbs - pounds

Appendix I – Table 2 Wastewater Wholesale: System Investment Allocated to Abington Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	844	-	86,652	87,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	221,792	-	1,311,589	1,312,000
3	Capacity	Mcf/day	437.8272	844	-	369,526	370,000
4	SS	1,000 lbs	719.0718	2,501	-	1,798,399	1,798,000
5	BOD	1,000 lbs	828.1514	2,105	-	1,743,259	1,743,000
6	Total Treatment					5,309,425	5,310,000
	Conveyance						
7	Shady Lane & City Line	cfs	58,421	1.3680	1.0225	81,718	82,000
8	Pennypack & City Line	cfs	49,045	7.6940	1.0225	385,843	386,000
9	Cottman and Orville	cfs	45,328	0.4800	1.0225	22,247	22,000
10	Total Conveyance					489,808	490,000
	Long Term Control Plan (LTCP)						
Line No.	**Cost Component**	**System Investment**		**Allocation**		**Allocated Investment (a)**	**Allocated Investment Rounded (a)**
		$				$	$
11	LTCP Infrastructure Investment	291,589,000	-	0.10000%		291,589	292,000
12	Total Allocated System Investment					$ 6,090,822	$ 6,092,000

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 3 Wastewater Wholesale: System Investment Allocated to Bensalem Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	1,034	-	106,159	106,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	304,871	-	1,802,885	1,803,000
3	Capacity	Mcf/day	437.8272	1,034	-	452,713	453,000
4	SS	1,000 lbs	719.0718	3,758	-	2,702,272	2,702,000
5	BOD	1,000 lbs	828.1514	5,343	-	4,424,813	4,425,000
6	Total Treatment					9,488,842	9,489,000
	Conveyance						
7	A-1	cfs	84,833	0.3700	1.02250	32,094	32,000
8	A-2	cfs	105,688	0.8800	1.02250	95,098	95,000
9	A-3	cfs	117,743	0.1200	1.02250	14,447	14,000
10	A-4	cfs	115,847	0.0800	1.02250	9,476	9,000
11	B	cfs	131,354	0.8400	1.02250	112,820	113,000
12	C	cfs	72,634	0.7500	1.02250	55,701	56,000
13	D	cfs	67,910	0.4600	1.02250	31,941	32,000
14	E	cfs	204,911	0.3800	1.02250	79,618	80,000
15	F	cfs	49,726	0.5800	1.02250	29,490	29,000
16	G-1	cfs	48,680	0.2700	1.02250	13,439	13,000
17	G-2	cfs	48,680	0.5100	1.02250	25,385	25,000
18	H	cfs	64,044	2.7200	1.02250	178,119	178,000
19	J-1	cfs	133,427	0.6760	1.02250	92,226	92,000
20	J-2	cfs	38,820	0.1610	1.02250	6,391	6,000
21	J-3	cfs	258,008	0.3830	1.02250	101,040	101,000
22	K-1	cfs	204,907	0.4300	1.02250	90,092	90,000
23	K-2	cfs	66,776	2.1300	1.02250	145,433	145,000
24	Total Conveyance					1,112,810	1,110,000
	Long Term Control Plan (LTCP)						

Line No.	Cost Component	System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		$		$	$
25	LTCP Infrastructure Investment	291,589,000	0.0000%	-	-
26	Total Allocated System Investment			$ 10,601,652	$ 10,599,000

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 4 Wastewater Wholesale: System Investment Allocated to Bucks County - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	6,556	-	673,093	673,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	1,206,223	-	7,133,120	7,133,000
3	Capacity	Mcf/day	437.8272	6,556	-	2,870,395	2,870,000
4	SS	1,000 lbs	719.0718	13,553	-	9,745,580	9,746,000
5	BOD	1,000 lbs	828.1514	13,422	-	11,115,448	11,115,000
6	Total Treatment					31,537,636	31,537,000
	Conveyance						
7	Large Sewers	cfs	18,000	85.08	1.02250	1,565,897	1,566,000
8	Total Conveyance					1,565,897	1,566,000
	Long Term Control Plan (LTCP)						
Line No.	Cost Component	System Investment		Allocation		Allocated Investment (a)	Allocated Investment Rounded (a)
		$				$	$
9	LTCP Infrastructure Investment	291,589,000		0.00000%		-	-
10	Total Allocated System Investment					**33,103,533**	**33,103,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 5 Wastewater Wholesale: System Investment Allocated to Cheltenham Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	NA	-	-	-
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	669,370	-	3,958,386	3,958,000
3	Capacity	Mcf/day	437.8272	2,803	-	1,227,230	1,227,000
4	SS	1,000 lbs	719.0718	5,701	-	4,099,428	4,099,000
5	BOD	1,000 lbs	828.1514	4,909	-	4,065,395	4,065,000
6	Total Treatment					13,350,439	13,349,000
	Conveyance						
7	Cheltenham and Tacony Creek	cfs	15,378	29.00	1.02250	455,996	456,000
8	Bouvier Street	cfs	23,315	2.75	1.02250	65,559	66,000
9	Total Conveyance					521,555	522,000
	Long Term Control Plan (LTCP)						
Line No.	**Cost Component**	**System Investment**		**Allocation**		**Allocated Investment (a)**	**Allocated Investment Rounded (a)**
		$				$	$
10	LTCP Infrastructure Investment	291,589,000		1.12000%		3,265,797	3,266,000
11	Total Allocated System Investment					**17,137,791**	**17,137,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 6 Wastewater Wholesale: System Investment Allocated to DELCORA - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Allocated Investment (a)	(5) Allocated Investment Rounded (a)
Wholesale			$		$	$
	Treatment					
	SW Treatment Plant: Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby					
1	Volume	Mcf	7.6872	2,439,840	18,755,538	18,756,000
2	Capacity	Mcf/day	372.6158	13,392	4,990,071	4,990,000
3	SS	1,000 lbs	491.1981	19,487	9,571,977	9,572,000
4	BOD	1,000 lbs	679.9929	21,771	14,804,125	14,804,000
5	Total Treatment				48,121,711	48,122,000
	Long Term Control Plan (LTCP)					

Line No.		System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		$		$	$
6	LTCP Infrastructure Investment	291,589,000	0.21000%	612,337	612,000
7	Total Allocated System Investment			**$ 48,734,048**	**$ 48,734,000**

(a) Estimated Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 7 Wastewater Wholesale: System Investment Allocated to Lower Merion Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.6872	722,453	-	5,553,641	5,554,000
2	Capacity	Mcf/day	372.6158	2,788	-	1,038,853	1,039,000
3	SS	1,000 lbs	491.1981	7,315	-	3,593,114	3,593,000
4	BOD	1,000 lbs	679.9929	6,880	-	4,678,351	4,678,000
5	Total Treatment					14,863,959	14,864,000
	Conveyance						
6	City Avenue & 73rd Street	cfs	30,189	2.860	1.0225	88,283	88,000
7	City Avenue & 66th Street	cfs	35,407	15.880	1.0225	574,914	575,000
8	City Avenue & Overbrook Station	cfs	69,259	2.290	1.0225	162,172	162,000
9	City Avenue & 59th Street	cfs	132,481	0.330	1.0225	44,702	45,000
10	City Avenue & 54th Street	cfs	57,917	0.050	1.0225	2,961	3,000
11	City Avenue & 51st Street	cfs	60,355	8.470	1.0225	522,709	523,000
12	City Avenue & Conshohocken Avenue	cfs	103,583	0.390	1.0225	41,306	41,000
	City Avenue & Presidential Boulevard						
13	Sewers and Meter Station	cfs	134,831	1.300	1.0225	179,224	179,000
14	Neill Drive Pump Station	cfs	143,297	1.300	1.0225	190,478	190,000
	Barclay Building & Friends Central School						
15	Charged Inside Rates	cfs	43,227	0.052	1.0225	2,298	2,000
16	Total Conveyance					1,809,047	1,808,000
	Long Term Control Plan (LTCP):						

Line No.	Cost Component	System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		$		$	$
17	LTCP Infrastructure Investment	291,589,000	0.00000%	-	-
18	Total Allocated System Investment			**16,673,006**	**16,672,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 8 Wastewater Wholesale: System Investment Allocated to Lower Moreland Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	518	-	53,182	53,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	95,514	-	564,832	565,000
3	Capacity	Mcf/day	437.8272	518	-	226,794	227,000
4	SS	1,000 lbs	719.0718	978	-	703,252	703,000
5	BOD	1,000 lbs	828.1514	731	-	605,379	605,000
6	Total Treatment					2,153,439	2,153,000
	Conveyance						
7	Woodhaven Road and City Line	cfs	195,719	0.4140	1.0225	82,851	83,000
8	Erwin Street and County Line	cfs	94,589	0.0650	1.0225	6,287	6,000
9	Moreland Road and Pine Road	cfs	64,910	0.0350	1.0225	2,323	2,000
10	Pine Road and Radburn Road	cfs	66,406	0.0380	1.0225	2,580	3,000
11	Welsh Road and County Line	cfs	66,860	0.6060	1.0225	41,429	41,000
12	City Line and Red Lion	cfs	66,860	0.0170	1.0225	1,162	1,000
13	Conveyance Line	cfs	62,555	7.7960	1.0225	498,652	499,000
14	PC-30 Improvements (b)					70,102	70,000
15	Total Conveyance					705,386	705,000
	Long Term Control Plan (LTCP):						

Line No.	Cost Component	System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		$		$	$
16	LTCP Infrastructure Investment	291,589,000	0.06000%	174,953	175,000
17	Total Allocated System Investment			3,033,778	3,033,000

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.
(b) Allocated 0.15 percent of the Sewer Fund's share of the project funding ($46,734,645).

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 9 Wastewater Wholesale: System Investment Allocated to Lower Southampton Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
1	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton Capacity	Mcf/day	102.6683	1,394	-	143,120	143,000
2	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton Volume	Mcf	5.9136	355,909	-	2,104,703	2,105,000
3	Capacity	Mcf/day	437.8272	1,394	-	610,331	610,000
4	SS	1,000 lbs	719.0718	6,033	-	4,338,160	4,338,000
5	BOD	1,000 lbs	828.1514	5,505	-	4,558,973	4,559,000
6	Total Treatment					11,755,287	11,755,000
	Conveyance						
7	Trevose and City Line	cfs	92,315	15.79	1.0225	1,490,451	1,490,000
8	PC-30 Improvements (b)					8,730,032	8,730,000
9	Total Conveyance					10,220,483	10,220,000
	Long Term Control Plan (LTCP)						
Line No.	**Cost Component**	**System Investment**		**Allocation**		**Allocated Investment (a)**	**Allocated Investment Rounded (a)**
		$				$	$
10	LTCP Infrastructure Investment	133,492,000		0.96317%		1,285,759	1,286,000
11	Total Allocated System Investment					**22,141,629**	**22,143,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.
(b) Allocated 18.68 percent of the Sewer Fund's share of the project funding ($4,6734,645).

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 10 Wastewater Wholesale: System Investment Allocated to Springfield (excl. Wyndmoor) Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
Wholesale			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.6872	158,350	-	1,217,268	1,217,000
2	Capacity	Mcf/day	372.6158	407	-	151,655	152,000
3	SS	1,000 lbs	491.1981	3,310	-	1,625,866	1,626,000
4	BOD	1,000 lbs	679.9929	3,101	-	2,108,658	2,109,000
5	Total Treatment					5,103,447	5,104,000
	Conveyance (b)						
	Erdenheim and Stenton						
6	Sewers	cfs	139,780	2.00	1.0225	285,850	286,000
7	Central Schuylkill Pump Station	cfs	13,211	2.00	1.0225	27,016	27,000
8	Meter Station	ea	35,702	1.00	1.0225	36,505	37,000
9	Total					349,371	350,000
	Northwestern and Stenton						
10	Sewers	cfs	139,780	2.60	1.0225	371,605	372,000
11	Central Schuylkill Pump Station	cfs	13,211	2.60	1.0225	35,121	35,000
12	Meter Station	ea	10,270	1.00	1.0225	10,501	11,000
13	Total					417,227	418,000
14	Total Conveyance					766,598	768,000
	Long Term Control Plan (LTCP)						

Line No.	Cost Component	System Investment	Allocation	Allocated Investment (a)	Allocated Investment Rounded (a)
		$		$	$
15	LTCP Infrastructure Investment	291,589,000	0.27000%	787,290	787,000
16	Total Allocated System Investment			**6,657,335**	**6,659,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.
(b) Excludes connection at Northwestern and Thomas which accounts for less than one half of one percent of township flow.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 11 Wastewater Wholesale: System Investment Allocated to Springfield (Wyndmoor) Township - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail and Springfield (Wyndmoor)						
1	Volume	Mcf	6.0639	49,697	-	301,358	301,000
2	Capacity	Mcf/day	1,419.7749	167	-	237,102	237,000
3	SS	1,000 lbs	473.0795	204	-	96,508	97,000
4	BOD	1,000 lbs	451.9670	156	-	70,507	71,000
5	Total Treatment					705,475	706,000
	Conveyance						
6		cfs	167,854	1.93	1.0225	331,247	331,000
7	Total Conveyance					331,247	331,000
8	Total Allocated System Investment					**1,036,722**	**1,037,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 12 Wastewater Wholesale: System Investment Allocated to Upper Darby - Test Year 2024

Line No.	Cost Component	(1) Units	(2) Investment Per Unit (a)	(3) Number of Contract Units	(4) Infiltration/Inflow Capacity Allocation Factor	(5) Allocated Investment (a)	(6) Allocated Investment Rounded (a)
			$			$	$
	Treatment						
	Retail, DELCORA, Lower Merion, Springfield, (excluding Wyndmoor), and Upper Darby						
1	Volume	Mcf	7.6872	846,145	-	6,504,486	6,504,000
2	Capacity	Mcf/day	372.6158	3,094	-	1,152,873	1,153,000
3	SS	1,000 lbs	491.1981	7,422	-	3,645,427	3,645,000
4	BOD	1,000 lbs	679.9929	6,841	-	4,651,831	4,652,000
5	Total Treatment					15,954,617	15,954,000
	Conveyance						
6	60th Street and Cobbs Creek Parkway	cfs	20,191	35.00	1.0225	722,585	723,000
7	Total Conveyance					722,585	723,000
	Long Term Control Plan (LTCP)						
Line No.	Cost Component	System Investment		Allocation		Allocated Investment (a)	Allocated Investment Rounded (a)
		$				$	$
8	LTCP Infrastructure Investment	291,589,000		0.00%		-	-
9	Total Allocated System Investment					**16,677,202**	**16,677,000**

(a) Plant Investment as of 6/30/2022. Includes Administration and General costs.

cfs - cubic feet per second
Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 13 Wastewater Wholesale: Unit Pumping and Treatment Operation and Maintenance Expense Applicable to Contract Service

Line No.	Cost Component	(1) Net Operating Expense	(2) Projected TY Units of Service		(3) Unit Operating Expense
		$			$/Unit
	PUMPING STATIONS				
	Neill Drive Pumping Station				
	Retail and Lower Merion				
1	Total Volume	10,000	61,250	Mcf	0.1633
2	Total Capacity	187,900	370	Mcf/day	507.8378
	Central Schuykill Pumping Station				
	Retail and Springfield (excl. Wyndmoor)				
3	Total Volume	49,000	3,425,000	Mcf	0.0143
4	Total Capacity	564,000	22,110	Mcf/day	25.5088
	WATER POLLUTION CONTROL PLANTS				
	Northeast Plant:				
	Retail and Cheltenham				
5	Volume	-	NA	Mcf	-
6	Capacity	-	NA	Mcf/day	-
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton				
7	Volume	727,000	6,656,000	Mcf	0.1092
8	Capacity	4,198,000	42,580	Mcf/day	98.5909
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton				
9	Volume	15,742,000	8,995,000	Mcf	1.7501
10	Capacity	7,728,000	57,546	Mcf/day	134.2926
11	Suspended Solids	27,951,000	109,593	1,000 lbs	255.0440
12	BOD	23,717,000	78,699	1,000 lbs	301.3647
	Southwest Plant:				
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby				
13	Volume	15,195,000	8,914,000	Mcf	1.7046
14	Capacity	6,191,000	57,028	Mcf/day	108.5607
15	Suspended Solids	19,952,132	82,561	1,000 lbs	241.6653
16	BOD	13,852,000	54,411	1,000 lbs	254.5809
	Southeast Plant:				
	Retail and Springfield (Wyndmoor)				
17	Volume	11,023,000	4,050,000	Mcf	2.7217
18	Capacity	7,623,000	25,911	Mcf/day	294.1994
19	Suspended Solids	13,715,000	34,313	1,000 lbs	399.7027
20	BOD	5,002,000	26,300	1,000 lbs	190.1901

NA - Not Applicable
Mcf - thousand cubic feet
Mcf/day - thousand cubic feet per day
lbs - pounds

Appendix I – Table 14 Wastewater Wholesale: Operating Expense Allocated to Abington Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	**Cost Component**	**Allocated Investment**				**Allocated Operating Expense**
		$				$
1	Sewer Maintenance (a)	490,000	x	3.50%		17,150
	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	96,500	Mcf	10,538
3	Capacity	98.5909	$/Mcf/day	844	Mcf/day	83,211
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	96,500	Mcf	168,885
5	Capacity	134.2926	$/Mcf/day	844	Mcf/day	113,343
6	Suspended Solids	255.0440	$/1,000 lbs	1,018	1,000 lbs	259,580
7	BOD	301.3647	$/1,000 lbs	1,346	1,000 lbs	405,643
8	Customer Costs					13,800
9	Total Treatment					1,072,150
	Long Term Control Plan (LTCP)					
Line No.	**LTCP O&M Costs**	**System Annual Cost**		**Allocation**		**Allocated Operating Expense**
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.1000%		8,401
11	LTCP O&M Costs	10,205,615		0.1000%		10,206
12	Total Annual Operating Expense					1,090,757
13	Total - Rounded					1,091,000

(a) Based on investment in sewers serving Abington.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 15 Wastewater Wholesale: Operating Expense Allocated to Bensalem Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	**Cost Component**	**Allocated Investment**				**Allocated Operating Expense**
		$				$
1	Sewer Maintenance (a)	1,110,000	x	3.50%		38,850
	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	155,600	Mcf	16,992
3	Capacity	98.5909	$/Mcf/day	1,034	Mcf/day	101,943
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	155,600	Mcf	272,316
5	Capacity	134.2926	$/Mcf/day	1,034	Mcf/day	138,859
6	Suspended Solids	255.0440	$/1,000 lbs	1,592	1,000 lbs	406,012
7	BOD	301.3647	$/1,000 lbs	1,626	1,000 lbs	489,968
8	Customer Costs					49,400
9	Total Treatment					1,514,340.00
	Long Term Control Plan (LTCP):					
Line No.	**LTCP O&M Costs**	**System Annual Cost**		**Allocation**		**Allocated Operating Expense**
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.0000%		-
11	LTCP O&M Costs	10,205,615		0.0000%		-
12	Total					1,514,340
13	Total - Rounded					1,514,000

(a) Based on investment in sewers serving Bensalem.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 16 Wastewater Wholesale: Operating Expense Allocated to Bucks County W&SA - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	Cost Component	Allocated Investment				Allocated Operating Expense
		$				$
1	Sewer Maintenance (a)	1,566,000	x	3.50%		54,810
	Treatment:					
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units		Allocated Operating Expense
		$				$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	929,100	Mcf	101,458
3	Capacity	98.5909	$/Mcf/day	6,556	Mcf/day	646,362
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	929,100	Mcf	1,626,018
5	Capacity	134.2926	$/Mcf/day	6,556	Mcf/day	880,422
6	Suspended Solids	255.0440	$/1,000 lbs	10,694	1,000 lbs	2,727,322
7	BOD	301.3647	$/1,000 lbs	10,391	1,000 lbs	3,131,514
8	Customer Costs					16,200
9	Total Treatment					9,184,106.00
	Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost		Allocation		Allocated Operating Expense
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.0000%		-
11	LTCP O&M Costs	10,205,615		0.0000%		-
12	Total					9,184,106
13	Total - Rounded					9,184,000

(a) Based on investment in sewers serving Bucks County W&SA.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 17 Wastewater Wholesale: Operating Expense Allocated to Cheltenham Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	**Cost Component**	**Allocated Investment**				**Allocated Operating Expense**
		$				$
1	Sewer Maintenance (a)	522,000	x	3.50%		18,270
	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				$
	NE Treatment Plants: Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	NA	Mcf	-
3	Capacity	98.5909	$/Mcf/day	NA	Mcf/day	-
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	426,000	Mcf	745,543
5	Capacity	134.2926	$/Mcf/day	2,803	Mcf/day	376,422
6	Suspended Solids	255.0440	$/1,000 lbs	3,135	1,000 lbs	799,512
7	BOD	301.3647	$/1,000 lbs	2,691	1,000 lbs	810,986
8	Customer Costs					33,700
9	Total Treatment					2,784,433
	Long Term Control Plan (LTCP):					
Line No.	**LTCP O&M Costs**	**System Annual Cost**		**Allocation**		**Allocated Operating Expense**
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		1.1200%		94,096
11	LTCP O&M	10,205,615		1.1200%		114,303
12	Total					2,992,832
13	Total - Rounded					2,993,000

(a) Based on investment in sewers serving Cheltenham.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 18 Wastewater Wholesale: Operating Expense Allocated to DELCORA - Test Year 2024

		(1)		(2)		(3)
	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				**$**
	SW Treatment Plant:					
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
1	Volume	1.7046	$/Mcf	1,087,000	Mcf	1,852,900
2	Capacity	108.5607	$/Mcf/day	13,392	Mcf/day	1,453,845
3	Suspended Solids	241.6653	$/1,000 lbs	12,017	1,000 lbs	2,903,976
4	BOD	254.5809	$/1,000 lbs	10,202	1,000 lbs	2,597,357
5	Customer Costs					43,000
6	Total Treatment					8,851,078

	Long Term Control Plan (LTCP):			
Line No.	**LTCP O&M Costs**	**System Annual Cost**	**Allocation**	**Allocated Operating Expense**
		$		**$**
7	Amortization of SMIP/GARP Expenses (a)	8,401,461	0.21000%	17,643
8	LTCP O&M	10,205,615	0.21000%	21,432
9	Total Annual Operating Expense			8,890,153
10	Total - Rounded			8,890,000

(a) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 19 Wastewater Wholesale: Operating Expense Allocated to Lower Merion Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	Cost Component	Allocated Investment				Allocated Operating Expense
		$				$
1	Sewer Maintenance (a)	1,808,000	x	3.50%		63,280
	Treatment:					
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units		Allocated Operating Expense
		$				$
	Neill Drive Pump Station					
	Retail and Lower Merion					
2	Volume	0.1633	$/Mcf	12,700	Mcf	2,074
3	Capacity	507.8378	$/Mcf/day	115	Mcf/day	58,401
	SW Treatment Plants:					
	Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
4	Volume	1.7046	$/Mcf	324,900	Mcf	553,825
5	Capacity	108.5607	$/Mcf/day	2,788	Mcf/day	302,667
6	Suspended Solids	241.6653	$/1,000 lbs	3,299	1,000 lbs	797,319
7	BOD	254.5809	$/1,000 lbs	2,769	1,000 lbs	704,963
8	Customer Costs					53,900
9	Total Treatment					2,536,429
	Long Term Control Plan (LTCP):					
Line No.	Cost Component	System Annual Cost		Allocation		Allocated Operating Expense
		$				$
10	Amortization of SMIP/GARP Expenses (a)	8,401,461		0.00000%		-
11	LTCP O&M	10,205,615		0.00000%		-
12	Total Annual Operating Expense					2,536,429
13	Total - Rounded					2,536,000

(a) Based on investment in sewers serving Lower Merion.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 20 Wastewater Wholesale: Operating Expense Allocated to Lower Moreland Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	**Cost Component**	**Allocated Investment**				**Allocated Operating Expense**
		$				$
1	Sewer Maintenance (a)	705,000	x	3.50%		24,675
	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				$
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	64,800	Mcf	7,076
3	Capacity	98.5909	$/Mcf/day	518	Mcf/day	51,070
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	64,800	Mcf	113,406
5	Capacity	134.2926	$/Mcf/day	518	Mcf/day	69,564
6	Suspended Solids	255.0440	$/1,000 lbs	638	1,000 lbs	162,770
7	BOD	301.3647	$/1,000 lbs	472	1,000 lbs	142,366
8	Customer Costs					20,700
	Long Term Control Plan (LTCP):					
Line No.	**LTCP O&M Costs**	**System Annual Cost**		**Allocation**		**Allocated Operating Expense**
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.06000%		5,041
11	LTCP O&M Costs	10,205,615		0.06000%		6,123
12	Total Annual Operating Expense					602,791
13	Total - Rounded					603,000

(a) Based on investment in sewers serving Lower Moreland.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 21 Wastewater Wholesale: Operating Expense Allocated to Lower Southampton Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	Cost Component	Allocated Investment				Allocated Operating Expense
		$				$
1	Sewer Maintenance (a)	10,220,000	x	3.50%		357,700
	Treatment:					
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units		Allocated Operating Expense
		$				$
	NE Treatment Plants:					
	Retail, Abington, Bensalem, Bucks County W&SA, Lower Moreland, and Lower Southampton					
2	Volume	0.1092	$/Mcf	277,500	Mcf	30,303
3	Capacity	98.5909	$/Mcf/day	1,394	Mcf/day	137,436
	Retail, Abington, Bensalem, Bucks County W&SA, Cheltenham, Lower Moreland, and Lower Southampton					
4	Volume	1.7501	$/Mcf	277,500	Mcf	485,653
5	Capacity	134.2926	$/Mcf/day	1,394	Mcf/day	187,204
6	Suspended Solids	255.0440	$/1,000 lbs	1,997	1,000 lbs	509,370
7	BOD	301.3647	$/1,000 lbs	1,638	1,000 lbs	493,558
8	Customer Costs					16,200
	Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost		Allocation		Allocated Operating Expense
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.16000%		13,442
11	LTCP O&M Costs	10,205,615		0.16000%		16,329
12	Total Annual Operating Expense					2,247,195
13	Total - Rounded					2,247,000

(a) Based on investment in sewers serving Lower Southampton.
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 22 Wastewater Wholesale: Operating Expense Allocated to Springfield (Excl. Wyndmoor) Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	Cost Component	Allocated Investment				Allocated Operating Expense
		$				$
1	Sewer Maintenance (a)	768,000	x	3.50%		26,880
	Treatment:					
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units		Allocated Operating Expense
		$				$
	Central Schuylkill Pump Station					
	Retail and Springfield (excluding Wyndmoor)					
2	Volume	0.0143	$/Mcf	111,200	Mcf	1,590
3	Capacity	25.5088	$/Mcf/day	407	Mcf/day	10,382
	SW Treatment Plants:					
	Retail, DELCORA, Lower Merion, Springfield					
	(Excluding Wyndmoor), and Upper Darby					
4	Volume	1.7046	$/Mcf	111,200	Mcf	189,552
5	Capacity	108.5607	$/Mcf/day	407	Mcf/day	44,184
6	Suspended Solids	241.6653	$/1,000 lbs	2,151	1,000 lbs	519,913
7	BOD	254.5809	$/1,000 lbs	2,117	1,000 lbs	538,876
8	Customer Costs					27,200
9	Total Treatment					1,358,577
	Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost		Allocation		Allocated Operating Expense
		$				$
10	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.27000%		22,684
11	LTCP O&M Costs	10,205,615		0.27000%		27,555
12	Total Annual Operating Expense					1,408,816
13	Total - Rounded					1,409,000

(a) Based on investment in sewers serving Springfield (excluding Wyndmoor).
(b) Reflects amortization of SMIP/GARP costs over 20 years at 5.5% long term bond interest rate.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 23 Wastewater Wholesale: Operating Expense Allocated to Springfield (Wyndmoor) Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	**Cost Component**	**Allocated Investment**				**Allocated Operating Expense**
		$				**$**
1	Sewer Maintenance (a)	331,000	x	3.50%		11,585

	Treatment:					
Line No.	**Cost Component**	**Operating Expense Per Unit**		**Test Yr. No. of Units**		**Allocated Operating Expense**
		$				**$**
	SE Treatment Plants:					
	Retail, Springfield (Wyndmoor)					
2	Volume	2.7217	$/Mcf	18,900	Mcf	51,440
3	Capacity	294.1994	$/Mcf/day	167	Mcf/day	49,131
4	Suspended Solids	399.7027	$/1,000 lbs	219	1,000 lbs	87,574
5	BOD	190.1901	$/1,000 lbs	167	1,000 lbs	31,816
6	Customer Costs					7,700
7	Total					239,246
8	Total - Rounded					239,000

(a) Based on investment in sewers serving Springfield (Wyndmoor).

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 24 Wastewater Wholesale: Operating Expense Allocated to Upper Darby Township - Test Year 2024

		(1)		(2)		(3)
	Collection System:					
Line No.	Cost Component	Allocated Investment				Allocated Operating Expense
		$				$
1	Sewer Maintenance (a)	723,000	x	3.50%		25,305
	Treatment:					
Line No.	Cost Component	Operating Expense Per Unit		Test Yr. No. of Units		Allocated Operating Expense
		$				$
	SW Treatment Plants: Retail, DELCORA, Lower Merion, Springfield (Excluding Wyndmoor), and Upper Darby					
2	Volume	1.7046	$/Mcf	467,600	Mcf	797,071
3	Capacity	108.5607	$/Mcf/day	3,094	Mcf/day	335,887
4	Suspended Solids	241.6653	$/1,000 lbs	4,465	1,000 lbs	1,079,066
5	BOD	254.5809	$/1,000 lbs	3,755	1,000 lbs	955,843
6	Customer Costs					13,800
7	Total Treatment					3,206,972
	Long Term Control Plan (LTCP):					
Line No.	LTCP O&M Costs	System Annual Cost		Allocation		Allocated Operating Expense
		$				$
8	Amortization of SMIP/GARP Expenses (b)	8,401,461		0.00000%		-
9	LTCP O&M Costs	10,205,615		0.00000%		-
10	Total Annual Operating Expense					3,206,972
11	Total - Rounded					3,207,000

(a) Based on investment in sewers serving Upper Darby.

Mcf - Thousand cubic feet
lbs - pounds

Appendix I – Table 25 Wastewater Wholesale: Summary of Allocated Cost of Service for Contract Customers - Test Year 2025

LINE NO.	CUSTOMER	(1) INVESTMENT (a) ALLOCATED	(2) INVESTMENT (a) ALLOCATED DEPRECIABLE	(3) O&M	(4) DEPR'N	(5) RETURN	(6) ALLOCATED COST OF SERVICE
Wholesale Customers ($000S)							
1	Abington	$ 6,092	$ 6,077	$ 1,175	$ 148	$ 457	$ 1,780
2	Bucks County (Bensalem)	10,599	10,571	1,631	(a)	(a)	1,631
3	Bucks County (b)	33,103	33,010	9,918	232	697	10,848
4	Cheltenham	17,137	17,098	3,222	409	1,285	4,916
5	DELCORA (c)	48,734	48,593	9,427	229	697	10,354
6	Lower Merion	16,672	16,628	2,684	(a)	(a)	2,684
7	Lower Moreland	3,033	3,027	649	71	227	948
8	Lower Southampton (d)	22,442	22,407	2,411	507	1,683	4,601
9	Springfield (less Wyndmoor)	6,659	6,645	1,485	159	499	2,143
10	Springfield (Wyndmoor)	1,037	1,036	257	24	78	359
11	Upper Darby	16,677	16,630	3,400	(a)	(a)	3,400
12	Total	$ 182,185	$ 181,722	$ 36,259	$ 1,779	$ 5,625	$ 43,663

(a) It is assumed that Bensalem, Lower Merion and Upper Darby contribute their entire allocated plant investment, and therefore, are not allocated any depreciation expense or return on investment.

(b) Bucks County allocated Return on Investment and Depreciation Expense based on assets in service after 6/30/2007.

(c) DELCORA allocated Return on Investment and Depreciation Expense based on assets in service after 7/1/2011.

(d) Lower Southampton phased into Return on Investment and Depreciation Expense on total rate base uniformly over 18 years staring in FY 2007.