

BEFORE THE
PENNSYLVANIA PUBLIC UTILITY COMMISSION

VOLUME I
(PART 1 OF 2)

RESPONSES TO FILING REQUIREMENTS

PITTSBURGH WATER & SEWER AUTHORITY
INITIAL TARIFF FILINGS AND RATE REQUESTS

DOCKET Nos. R-2018-3002645 and R-2018-3002647

JULY 2018

**Pittsburgh Water & Sewer Authority
Initial Tariff Filings and Rate Requests**

Docket Nos. R-2017-3002645 and R-2018-3002647

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THE PITTSBURGH WATER AND SEWER AUTHORITY

Initial Tariff Filings and Rate Requests Docket Nos. R-2018-3002645 and R-2018-3002647

STATEMENT OF REASONS

The Pittsburgh Water and Sewer Authority (“PWSA” or “Authority”) has asked the Pennsylvania Public Utility Commission (“PUC” or “Commission”) to increase its rates by \$27 million per year. Although the new rates are proposed to become effective on August 31, 2018, the Authority expects that they will be suspended for investigation by the PUC until approximately March 31, 2019.

The main reasons PWSA is asking for an increase in rates are:

- Although the Authority has worked diligently to control operating costs, certain costs have increased. The largest driver of increased costs is increased debt service caused by the planned issuance of some \$150.2 million in additional long-term debt in 2019. The Authority is also facing increased expenses to implement a variety of programs and initiatives designed to improve the safety, efficiency and quality of PWSA’s water and sewer service.
- PWSA has revised its demand projections for 2018. Its original 2018 projections were developed using data from 2014-2016. However, PWSA experienced meter reading data collection and customer billing issues during 2014-2016, which resulted in demand projections that were higher than actual consumption. The revised 2018 demand forecast, based on 2017 consumption, is lower than previous expectations; however, it is likely a much more reasonable estimate of customer demand. The new set of consumption and demand units for 2018 was then used as the basis for the units for 2019.
- The Authority must be able to raise capital on reasonable terms. Unless adjusted, the Authority’s present rates will not ensure its current credit rating and its ability to attract the capital necessary to continue to make investments in infrastructure to maintain and improve its safety, reliability and customer service levels. PWSA has incorporated contributions to reserves and financial targets to strengthen the financial position of the utility going forward.

PWSA is filing all of the supporting data required by the PUC’s regulations, as well as the written statements of five witnesses and numerous exhibits. All of the data and other

information supporting PWSA's rate increase have been prepared in ways that the PUC has approved in the past for other utilities.

In summary, the proposed increase in revenues is the minimum necessary to enable the Authority to appropriately invest in the infrastructure needed to maintain and improve its safety, reliability and customer service levels.

THE PITTSBURGH WATER AND SEWER AUTHORITY

Initial Tariff Filings and Rate Requests Docket Nos. R-2018-3002645 and R-2018-3002647

STATEMENT OF SPECIFIC REASONS FOR PROPOSED INCREASE IN RATES

The Pittsburgh Water and Sewer Authority (“PWSA” or “Authority”) is filing to increase its rates by \$27 million per year, or 17.1% percent on a total user rate revenue basis.

In accordance with Section 1308 of the Public Utility Code, the tariff setting forth the Authority’s proposed rates bears an effective date of August 31, 2018. However, the Authority anticipates that its requested increase will be suspended and investigated by the Pennsylvania Public Utility Commission (“PUC” or the “Commission”) and, therefore, the Authority does not expect that new Commission-approved rates will become effective until approximately March or April 2019.

The reasons for the Authority’s proposed increase are summarized below.

Rate Increase

The largest driver of the rate increase is increased debt service resulting from the planned issuance of some \$150.2 million in additional long-term debt in 2019 to fund its Capital Improvement Plan (“CIP”). PWSA anticipates issuing Revenue Bonds in the par amount of \$150.2 million in the first or second quarter of 2019. The exact timing of the issuance would be subject to market conditions. This new debt will require additional funds for debt service coverage.

The increase in debt service is directly attributable to increases in PWSA’s construction budget, reflected in its CIP. PWSA is committed to investing in its systems to replace aging infrastructure, to ensure safety, reliability and customer service levels. PWSA must construct

and replace infrastructure and equipment needed to provide high-quality service and continue to meet state and federal drinking water, wastewater and stormwater standards. PWSA's CIP is a comprehensive plan to improve the water, wastewater and stormwater infrastructure. Those efforts necessarily result in increased revenue requirement needs.

In addition, although the Authority works hard at controlling operating costs, certain operational costs have increased. The Authority is also facing increased expenses to implement a variety of programs and initiatives designed to improve the safety, efficiency and quality of PWSA's water and sewer service.¹ Only \$1.2 million of the rate increase is associated with these programs and initiatives. These costs may increase under PWSA's Compliance Plan, which is due by September 28, 2018. The Compliance Plan may detail additional actions that will need to be taken by PWSA in 2019 and beyond to bring its information technology, accounting, billing, collection and other operating systems and procedures into compliance with the requirements applicable to jurisdictional systems.

Another key factor causing the need for additional revenues is a decline in anticipated consumption in 2018 and 2019 compared to original projections of 2018 consumption. Its original 2018 projections were developed using data from 2014-2016. However, PWSA experienced meter reading data collection and customer billing issues during 2014-2016, which resulted in demand projections that were higher than actual consumption. The revised 2018 demand forecast, based on 2017 consumption, is lower than previous expectations; however, it is likely a much more reasonable estimate of customer demand. This is substantiated by five months of year-to-date actuals in 2018, showing that PWSA has experienced a difference in

¹ PWSA also manages stormwater that is conveyed both through its combined sewer systems and separate storm sewer systems. However, as previously explained, PWSA does not separately bill customers for stormwater, rather the costs associated with stormwater are recovered from customers through the sanitary sewer charges.

overall reduced usage by residential and non-residential customers compared to what was originally forecasted for 2018. PWSA has conducted a demand analysis to evaluate this issue, and the result is that PWSA believes that this recent reduction in usage will reflect performance in 2019 and beyond. Therefore, PWSA has adjusted its water and wastewater conveyance demand units to more accurately reflect anticipated year end usage and adjusted budgeted revenue downward for 2018 and future years. The new set of consumption and demand units for 2018 was then used as the basis for the units for 2019.

PWSA needs to maintain or improve its financial metrics. Without the requested rate relief, PWSA's financial results would deteriorate even further in 2019 and thereafter. This would jeopardize the Authority's ability to appropriately invest in the infrastructure needed to maintain and improve its safety, reliability and levels. It would also have an adverse impact on PWSA's credit-coverage ratios and negative implications with respect to maintaining the Authority's current credit ratings, which would increase its financing cost.

Supporting Data

PWSA is filing all of the supporting data required by the Commission's regulations,² including data for the historic test year ("HTY") ended December 31, 2017, the future test year ("FTY") ending December 31, 2018, and the fully projected future test year ("FPFTY") ending December 31, 2019. Because the Authority is basing its claim principally on the level of operations for the FPFTY, the discussion that follows will address FPFTY data.

To establish anticipated operating expenses and revenues under the proposed rates, operating expenses and revenue projections were derived from PWSA's budget for fiscal year

² PWSA's data is based on a fiscal year that begins on January 1 and ends on December 31. PWSA has, in the past, developed water and wastewater rates using combined revenue requirements. Simultaneously with the filing of the rate case, PWSA is filing petitions related to the use of the proposed FPFTY and the use of a consolidated revenue requirement.

2019. Adjustments to revenues and expenses are explained in the testimony of Ms. Lestitian (PWSA Statement No. 2).

As is evident from the foregoing and the extensive supporting data filed by the Authority, the proposed increase is just and reasonable and is necessary to maintain the integrity of its existing capital and to attract new capital.

Rate Structure and Rate Design

As Ms. Lestitian (PWSA Statement No. 2) explains, in developing its rate structure proposal, the Authority considered the results of a cost of service study performed by Mr. Smith (PWSA Statement No. 5).

In light of the limited amount of time available to prepare this filing, PWSA is proposing to continue its existing rate structure with minimal changes. PWSA may propose modifications to its existing rate structure in subsequent filings. PWSA's proposed Tariff-Water No. 1 and Tariff-Wastewater No. 1 contain rules and regulations that carry over PWSA's existing regulations as they exist in its "prior" tariff that was in place when it became subject to PUC regulation (April 1, 2018). It is important to note that, prior to that date, PWSA modified its Rules and Regulations in order to make them consistent with PUC Regulations reflected in Chapter 56.

CONCLUSION

The requested increase in revenues is necessary to enable the Authority to appropriately invest in the infrastructure needed to maintain and improve its safety, reliability and customer service levels; to maintain the integrity of its existing capital; and to attract additional capital at reasonable costs. The Authority's proposed revenue allocation and rate design are just,

reasonable and nondiscriminatory. For these and the other reasons set forth above, the Authority's proposed rates, rules and terms of service should be permitted to become effective as filed.

NOTICE OF PROPOSED RATE CHANGES

To Our Customers:

The Pittsburgh Water & Sewer Authority (PWSA) has filed a request with the Pennsylvania Public Utility Commission (PUC) to increase your water and wastewater conveyance rates. This notice describes the Authority's rate request, the PUC's role, and what actions you can take.

RATE REQUEST

PWSA has requested an overall rate increase of \$27.0 million per year. If the Authority's entire request is approved, the total water and wastewater conveyance bill for a residential customer using 3,000 gallons per month would increase from \$63.62 to \$74.23 per month or by 16.7%.

PWSA's rate request is scheduled to go into effect on August 31, 2018; however, in most cases, the PUC suspends the increase for up to an additional seven (7) months.

The breakdown by water and wastewater conveyance bill component for a residential customer is provided in the tables below.

<u>Residential Monthly Bill</u>	<u>Present</u>	<u>Proposed</u>	<u>% Increase</u>
Water	\$42.07	\$49.83	18.4%
Wastewater Conveyance	<u>\$21.55</u>	<u>\$ 24.40</u>	<u>13.2%</u>
Total Monthly Bill	\$63.62	\$74.23	16.7%

The total bill for a commercial customer using 13,000 gallons per month would increase from \$234.00 to \$283.12 per month or by 21.0%.

<u>Commercial Monthly Bill</u>	<u>Present</u>	<u>Proposed</u>	<u>% Increase</u>
Water	\$148.02	\$187.09	26.4%
Wastewater Conveyance	<u>\$85.98</u>	<u>\$96.03</u>	<u>11.7%</u>
Total Monthly Bill	\$234.00	\$283.12	21.0%

Rates for an industrial customer using 680,000 gallons per month would increase from \$9,409.52 to \$12,064.79 per month or by 28.2%.

<u>Industrial Monthly Bill</u>	<u>Present</u>	<u>Proposed</u>	<u>% Increase</u>
Water	\$5,505.62	\$7,266.88	32.0%
Wastewater Conveyance	<u>\$3,903.90</u>	<u>\$4,797.91</u>	<u>22.9%</u>
Total Monthly Bill	\$9,409.52	\$12,064.79	28.2%

Rates for a health or education customer using 50,000 gallons per month would increase from \$1,031.30 to \$1,131.73 per month or by 9.7%.

Health or Education Monthly Bill	Present	Proposed	% Increase
Water	\$649.46	\$762.62	17.4%
Wastewater Conveyance	\$381.84	\$369.11	-3.3%
Total Monthly Bill	\$1,031.30	\$1,131.73	9.7%

To find out your customer class or how the requested increase may affect your water and wastewater conveyance bill, contact PWSA at 412-255-2423. The rates requested by the Authority may be found in the initial Tariff Water – PA. P.U.C. No.1 and Tariff Wastewater – PA. P.U.C. No.1. You may also examine the material filed with the PUC, which explains the requested increase and the reasons for it. A copy of this material is kept at PWSA’s office. Upon request, the Authority will send you the Statement of Reasons for these Tariffs, explaining why the rate increase has been requested.

PUC ROLE

The state agency which now approves rates for PWSA is the PUC. The PUC will examine the requested rate increase and can prevent existing rates from changing until it investigates and/or holds hearings on the request. The Authority must prove that the requested rates are reasonable. After examining the evidence, the PUC may grant all, some, or none of the request or may reduce existing rates.

The PUC may change the amount of the rate increase or decrease requested by the Authority utility for each customer class. As a result, the rate charged to you may be different than the rate requested by the Authority as shown above.

ACTIONS YOU CAN TAKE

There are three ways to challenge PWSA’s request to change its rates:

1. You can be a witness at a public input hearing. Public input hearings are held if the PUC opens an investigation of the Authority’s rate increase request and if there is a large number of customers interested in the case. At these hearings, you have the opportunity to present your views in person to the PUC judge hearing the case and to the PWSA representatives. All testimony given “under oath” becomes part of the official rate case record. These hearings are held in the service area of the Authority.
2. You can send the PUC a letter telling why you object to the requested rate increase. At times there is information in these letters that makes the PUC aware of problems with the Authority’s service or management. This information can be helpful when the PUC investigates the rate request.

3. You can file a formal complaint. If you want a hearing before a judge, you must file a formal complaint. By filing a formal complaint, you assure yourself the opportunity to take part in hearings about the rate increase request. All complaints should be filed with the PUC before August 31, 2018. If no formal complaints are filed, the Commission may grant all, some or none of the request without holding a hearing before a judge. Send your letter or request for a formal complaint form to the Pennsylvania Public Utility Commission, Post Office Box 3265, Harrisburg, PA 17105-3265.

For more information, call the PUC's Bureau of Consumer Services at 1-800-692-7380. You may leave your name and address so you can be notified of any public input hearings that may be scheduled in this case. You may also contact the Pennsylvania Office of Consumer Advocate (OCA). The OCA represents the interests of consumers in cases before the PUC. You may contact the OCA with questions or requests for public input hearings at 1-800-684-6560 or by email at consumer@paoca.org.

The Pittsburgh Water and Sewer Authority
1200 Penn Avenue
Pittsburgh, PA 15222
412-255-2423



Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

§ 53.52. Applicability; public utilities other than canal, turnpike, tunnel, bridge and wharf companies.

(a) Whenever a public utility, other than a canal, turnpike, tunnel, bridge or wharf company files a tariff, revision or supplement effecting changes in the terms and conditions of service rendered or to be rendered, it shall submit to the Commission, with the tariff, revision or supplement, statements showing all of the following:

(1) The specific reasons for each change.

RESPONSE:

Please see Statement of Reasons and testimony of PWSA, witnesses Weimer, Lestitian, and Smith for additional information. PWSA is proposing an increase in minimum charges and volumetric charges for all customer classes (Residential, Commercial, Industrial, Health & Education, and Private Fire) while maintaining the existing rate structure. Please see the testimony of PWSA witnesses Lestitian and Smith for an explanation of the minimum charge and volumetric charge increases/decreases in each customer rate class.

(2) The total number of customers served by the utility.

RESPONSE:

Please see the schedules attached to response § 53.52(b)(3).

(3) A calculation of the number of customers, by tariff subdivision, whose bills will be affected by the change.

RESPONSE:

Please see the schedules attached to response § 53.52(b)(3).

(4) The effect of the change on the utility's customers.

RESPONSE:

Please see the schedules attached to response § 53.52(b)(3) and (b)(4).

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(5) The direct or indirect effect of the proposed change on the utility's revenue and expenses.

RESPONSE:

Please see PWSA Statement No. 2 – Debbie Lestitian and accompanying schedules.

(6) The effect of the change on the service rendered by the utility.

RESPONSE:

The changes will have no effect on the service rendered by the utility.

(7) A list of factors considered by the utility in its determination to make the change. The list shall include a comprehensive statement about why these factors were chosen and the relative importance of each. This subsection does not apply to a portion of a tariff change seeking a general rate increase as defined in 66 Pa.C.S. § 1308 (relating to voluntary changes in rates).

RESPONSE: Not applicable.

(8) Studies undertaken by the utility in order to draft its proposed change. This paragraph does not apply to a portion of a tariff change seeking a general rate increase as defined in 66 Pa.C.S. § 1308.

RESPONSE: Not applicable.

(9) Customer polls taken and other documents which indicate customer acceptance and desire for the proposed change. If the poll or other documents reveal discernible public opposition, an explanation of why the change is in the public interest shall be provided.

RESPONSE:

No customer polls or other documentation regarding customer acceptance and desire for the proposed change exists.

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(10) Plans the utility has for introducing or implementing the changes with respect to its ratepayers.

RESPONSE:

The Company is notifying customers of the proposed changes as required by 53 Pa. Code § 53.45.

(11) FCC, FERC or Commission orders or rulings applicable to the filing.

RESPONSE:

There are no FCC, FERC, or Commission orders or rulings applicable to this filing.

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(b) Whenever a public utility other than a canal, turnpike, tunnel, bridge or wharf company files a tariff, revision or supplement which will increase or decrease the bills to its customers, it shall submit in addition to the requirements of subsection (a), to the Commission, with the tariff, revision or supplement, statements showing the following:

(1) The specific reasons for each increase or decrease.

RESPONSE:

Please see Statement of Reasons and testimony of PWSA, witnesses Weimer, Lestitian, and Smith for additional information. PWSA is proposing an increase in minimum charges and volumetric charges for all customer classes (Residential, Commercial, Industrial, Health & Education, and Private Fire) while maintaining the existing rate structure. Please see the testimony of PWSA witnesses Lestitian and Smith for an explanation of the minimum charge and volumetric charge increases/decreases in each customer rate class.

(2) The operating income statement of the utility for a 12-month period, the end of which may not be more than 120 days prior to the filing. Water and wastewater utilities with annual revenues under \$100,000 and municipal corporations subject to Commission jurisdiction may provide operating income statements for a 12-month period, the end of which may not be more than 180 days prior to the filing.

RESPONSE:

Please see attached.

PWSA notes that the information provided by PWSA covers a 12-month time period, the end of which is more than 120 days prior to the filing. This information, however, is the most-recent information available that covers a 12-month period. PWSA can provide the Commission additional information upon request.

(3) A calculation of the number of customers, by tariff subdivision, whose bills will be increased.

RESPONSE:

Please see attached.

(4) A calculation of the total increases, in dollars, by tariff subdivision, projected to an annual basis.

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

RESPONSE:

Please see attached.

(5) A calculation of the number of customers, by tariff subdivision, whose bills will be decreased.

RESPONSE:

Please see the response to § 53.52(b)(3).

(6) A calculation of the total decreases, in dollars, by tariff subdivision, projected to an annual basis.

RESPONSE:

Please see the response to § 53.52(b)(3).

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(c) If a public utility files a tariff, revision or supplement which it is calculated will increase the bills of a customer or a group of customers by an amount, when projected to an annual basis, exceeding 3% of the operating revenues of the utility—subsection (b)(4) divided by the operating revenues of the utility for a 12-month period as defined in subsection (b)(2)—or which it is calculated will increase the bills of 5% or more of the number of customers served by the utility—subsection (b)(3) divided by subsection (a)(2)—it shall submit to the Commission with the tariff, revision or supplement, in addition to the statements required by subsections (a) and (b), all of the following information:

(1) A statement showing the utility's calculation of the rate of return or operating ratio (if the utility qualifies to use an operating ratio under § 53.54 (relating to small water and wastewater utilities)) earned in the 12-month period referred to in subsection (b)(2), and the anticipated rate of return or operating ratio to be earned when the tariff, revision or supplement becomes effective. The rate base used in this calculation shall be supported by summaries of original cost for the rate of return calculation. When an operating ratio is used in this calculation, it shall be supported by studies of margin above operation and maintenance expense plus depreciation as referred to in § 53.54(b)(2)(B).

RESPONSE: Not applicable

(2) A detailed balance sheet of the utility as of the close of the period referred to in subsection (b)(2).

RESPONSE:

Please see attached.

As mentioned previously, PWSA notes that the information provided by PWSA covers a 12-month time period, the end of which is more than 120 days prior to the filing. This information, however, is the most-recent information available that covers a 12-month period. PWSA can provide the Commission additional information upon request.

(3) A summary, by detailed plant accounts, of the book value of the property of the utility at the date of the balance sheet required by paragraph (2).

RESPONSE:

Please see attached.

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(4) A statement showing the amount of the depreciation reserve, at the date of the balance sheet required by paragraph (2), applicable to the property, summarized as required by paragraph (3).

RESPONSE:

Please see attached.

(5) A statement of operating income, setting forth the operating revenues and expenses by detailed accounts for the 12-month period ending on the date of the balance sheet required by paragraph (2).

RESPONSE:

Please see attached.

(6) A brief description of a major change in the operating or financial condition of the utility occurring between the date of the balance sheet required by paragraph (2) and the date of transmittal of the tariff, revision or supplement. As used in this paragraph, a major change is one which materially alters the operating or financial condition of the utility from that reflected in paragraphs (1)—(5).

RESPONSE:

There has not been any major change in the operating or financial condition of the utility since the balance sheet dated December 31, 2017.

It is important to note that PWSA is operating under two major orders: the Consent Order and Agreement dated November 17, 2017 on lead and an Administrative Order dated October 25, 2017 on water treatment. Both of these occurred before December 31, 2017 and are disclosed in PWSA's audited financial statements. As a result of the Consent and Administrative Orders and officially coming under PUC Jurisdiction Orders, PWSA re-forecasted the 2018 operating budget in April 2018. That budget is relied on for the purposes of this rate case filing.

One minor change since the December 31, 2017 Balance Sheet is the Consent Assessment of Civil Penalty dated May 18, 2018. It is for discharges of chlorinated water and sediments during two water main breaks. It includes a penalty of \$50,000, with \$10,000 paid, and payments of \$20,000 each in 2019 and 2020.

Pittsburgh Water and Sewer Authority Base Rate Filing

52 Pa. Code § 53.52

(d) If a utility renders more than one type of public service, such as electric and gas, information required by §§ 53.51—53.53 (relating to information furnished with the filing of rate changes), except subsection (c)(2), relates solely to the kind of service to which the tariff or tariff supplement is applicable. In subsection (c)(2), the book value of property used in furnishing each type of public service, as well as the depreciation reserve applicable to the property, shall be shown separately.

RESPONSE: Not applicable.

PITTSBURGH WATER AND SEWER AUTHORITY

STATEMENTS OF REVENUES, EXPENSES, AND CHANGES IN NET POSITION

(Dollars expressed in thousands)

YEARS ENDED DECEMBER 31, 2017 AND 2016

	2017	2016
Operating Revenues:		
Residential, commercial, and industrial water sales	\$ 128,488	\$ 113,818
Wastewater treatment	68,935	62,125
Other	5,573	4,784
Total operating revenues	202,996	180,727
Operating Expenses:		
Direct operating expenses	71,156	60,687
Wastewater treatment	75,107	62,125
Cooperation agreement operating expenses:		
Indirect cost allocation - sewer conveyance	2,250	2,846
Indirect cost allocation - water	3,113	4,304
Expense of water provided by other entities:		
Subsidy of customers located in the City	5,594	1,974
Depreciation	16,172	16,657
Total operating expenses	173,392	148,593
Operating Income	29,604	32,134
Non-operating Revenues (Expenses):		
Donated property	1,595	981
Interest revenue	460	383
Investment income (loss) - change in fair value of swap	835	1,690
Interest and amortization	(34,913)	(36,966)
Bond issuance costs	(3,894)	-
Total non-operating revenues (expenses)	(35,917)	(33,912)
Net Income (Loss)	(6,313)	(1,778)
Net Position:		
Beginning of year	(37,523)	(35,745)
End of year	\$ (43,836)	\$ (37,523)

The notes to financial statements are an integral part of this statement.

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Current Rates**

	FY 2019			PUC Approved Prior Tariff Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Water Revenues								
2 Residential								
3 5/8"	59,490	713,878	1,836,041	\$ 23.25	\$ 9.41	\$ 15,861,866	\$ 16,511,228	\$ 32,373,094
4 3/4"	2,578	30,934	123,071	37.83	9.41	1,118,355	1,106,757	2,225,113
5 1"	2,295	27,536	141,601	76.58	9.41	2,015,225	1,273,398	3,288,623
6 1 1/2"	-	-	-	149.47	9.41	-	-	-
7 2"	-	-	-	246.53	9.41	-	-	-
8 3"	-	-	-	546.96	9.41	-	-	-
9 4"	-	-	-	924.52	9.41	-	-	-
10 6"	-	-	-	2,181.24	9.41	-	-	-
11 8"	-	-	-	3,919.64	9.41	-	-	-
12 10" & Above	-	-	-	6,408.43	9.41	-	-	-
13 Total: Residential	64,362	772,348	2,100,713			\$ 18,995,446	\$ 18,891,384	\$ 37,886,830
14 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 11.63	\$ 9.41	\$ 295,028	\$ -	\$ 295,028
17 3/4"	26	312	-	18.92	9.41	5,640	-	5,640
18 1"	2	24	-	38.29	9.41	878	-	878
19 1 1/2"	-	-	-	74.74	9.41	-	-	-
20 2"	-	-	-	123.27	9.41	-	-	-
21 3"	-	-	-	273.48	9.41	-	-	-
22 4"	-	-	-	462.26	9.41	-	-	-
23 6"	-	-	-	1,090.62	9.41	-	-	-
24 8"	-	-	-	1,959.82	9.41	-	-	-
25 10" & Above	-	-	-	3,204.22	9.41	-	-	-
26 Total: Residential - CAP	2,241	26,892	-			\$ 301,546	\$ -	\$ 301,546
27 Commercial								
29 5/8"	2,693	32,311	139,919	\$ 23.25	\$ 8.93	\$ 717,928	\$ 1,194,088	\$ 1,912,015
30 3/4"	682	8,184	48,170	37.83	8.93	295,876	411,092	706,968
31 1"	1,312	15,745	147,483	76.58	8.93	1,152,299	1,258,642	2,410,941
32 1 1/2"	870	10,439	254,591	149.47	8.93	1,491,146	2,172,713	3,663,860
33 2"	792	9,503	453,608	246.53	8.93	2,238,916	3,871,147	6,110,063
34 3"	241	2,893	396,230	546.96	8.93	1,512,207	3,381,475	4,893,682
35 4"	199	2,387	725,387	924.52	8.93	2,108,997	6,190,537	8,299,535
36 6"	85	1,017	649,134	2,181.24	8.93	2,119,980	5,539,789	7,659,769
37 8"	8	95	295,054	3,919.64	8.93	355,858	2,518,026	2,873,885
38 10" & Above	-	-	-	6,408.43	8.93	-	-	-
39 Total: Commercial	6,881	82,574	3,109,578			\$ 11,993,208	\$ 26,537,510	\$ 38,530,718
40 Industrial								
42 5/8"	22	258	504	\$ 23.25	\$ 7.51	\$ 5,733	\$ 3,617	\$ 9,350
43 3/4"	14	162	166	37.83	7.51	5,857	1,191	7,048
44 1"	28	335	3,468	76.58	7.51	24,517	24,886	49,404
45 1 1/2"	6	72	302	149.47	7.51	10,285	2,167	12,452
46 2"	16	187	15,272	246.53	7.51	44,057	109,608	153,665
47 3"	2	24	13,262	546.96	7.51	12,545	95,182	107,727
48 4"	8	98	61,543	924.52	7.51	86,586	441,699	528,285
49 6"	2	24	4,926	2,181.24	7.51	50,029	35,354	85,383
50 8"	4	48	63,099	3,919.64	7.51	179,802	452,866	632,668
51 10" & Above	-	-	-	6,408.43	7.51	-	-	-
52 Total: Industrial	101	1,208	162,541			\$ 419,411	\$ 1,166,572	\$ 1,585,983
53 Health or Education								
55 5/8"	34	408	1,358	\$ 23.25	\$ 12.21	\$ 9,065	\$ 15,846	\$ 24,912
56 3/4"	9	109	539	37.83	12.21	3,941	6,289	10,230
57 1"	26	308	3,877	76.58	12.21	22,541	45,240	67,781
58 1 1/2"	65	779	10,713	149.47	12.21	111,275	125,007	236,282
59 2"	160	1,921	81,396	246.53	12.21	452,589	949,786	1,402,375
60 3"	104	1,252	193,559	546.96	12.21	654,436	2,258,588	2,913,025
61 4"	73	877	381,066	924.52	12.21	774,860	4,446,554	5,221,414
62 6"	38	450	449,187	2,181.24	12.21	938,044	5,241,429	6,179,473
63 8"	3	36	59,591	3,919.64	12.21	134,852	695,350	830,202
64 10" & Above	2	29	106,338	6,408.43	12.21	177,606	1,240,828	1,418,433
65 Total: Health or Education	514	6,169	1,287,624			\$ 3,279,209	\$ 15,024,917	\$ 18,304,127
66 Fire System								
68 1" or Less	1,130	13,559	3,253	\$ 26.94	\$ 11.50	\$ 349,086	\$ 35,746	\$ 384,832
69 1 1/2"-3"	64	773	199	71.02	11.50	52,465	2,187	54,652
70 4"	6	66	3	151.40	11.50	9,549	33	9,582
71 6" or Greater	15	181	596	433.13	11.50	74,921	6,550	81,471
72 Total: Fire System	1,215	14,579	4,051			\$ 486,021	\$ 44,516	\$ 530,538
73								
74 Total: Water (Units & Sales)	75,314	903,770	6,664,507			\$ 35,474,843	\$ 61,664,899	\$ 97,139,741

(1) Represents billable customer usage above minimum allowance included in minimum charge
 (2) User charge revenues include an adjustment factor to reflect actual collections.
 (3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Proposed Rates**

	FY 2019			Proposed Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Water Revenues								
2 Residential								
3 5/8"	59,490	713,878	1,836,041	\$ 27.77	\$ 11.03	\$ 18,945,550	\$ 19,353,756	\$ 38,299,305
4 3/4"	2,578	30,934	123,071	45.79	11.03	1,353,674	1,297,294	2,650,968
5 1"	2,295	27,536	141,601	93.73	11.03	2,466,532	1,492,623	3,959,155
6 1 1/2"	-	-	-	183.87	11.03	-	-	-
7 2"	-	-	-	303.92	11.03	-	-	-
8 3"	-	-	-	675.49	11.03	-	-	-
9 4"	-	-	-	1,142.48	11.03	-	-	-
10 6"	-	-	-	2,696.91	11.03	-	-	-
11 8"	-	-	-	4,847.16	11.03	-	-	-
12 10" & Above	-	-	-	7,925.65	11.03	-	-	-
13 Total: Residential	64,362	772,348	2,100,713			\$ 22,765,756	\$ 22,143,673	\$ 44,909,428
14 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 13.89	\$ 11.03	\$ 352,384	\$ -	\$ 352,384
17 3/4"	26	312	-	22.90	11.03	6,827	-	6,827
18 1"	2	24	-	46.87	11.03	1,075	-	1,075
19 1 1/2"	-	-	-	91.94	11.03	-	-	-
20 2"	-	-	-	151.96	11.03	-	-	-
21 3"	-	-	-	337.75	11.03	-	-	-
22 4"	-	-	-	571.24	11.03	-	-	-
23 6"	-	-	-	1,348.46	11.03	-	-	-
24 8"	-	-	-	2,423.58	11.03	-	-	-
25 10" & Above	-	-	-	3,962.83	11.03	-	-	-
26 Total: Residential - CAP	2,241	26,892	-			\$ 360,285	\$ -	\$ 360,285
27 Commercial								
29 5/8"	2,693	32,311	139,919	\$ 27.77	\$ 11.67	\$ 857,499	\$ 1,560,471	\$ 2,417,970
30 3/4"	682	8,184	48,170	45.79	11.67	358,132	537,228	895,360
31 1"	1,312	15,745	147,484	93.73	11.67	1,410,356	1,644,832	3,055,188
32 1 1/2"	870	10,439	254,591	183.87	11.67	1,834,328	2,839,369	4,673,697
33 2"	792	9,503	453,608	303.92	11.67	2,760,116	5,058,935	7,819,051
34 3"	241	2,893	396,230	675.49	11.67	1,867,561	4,419,016	6,286,576
35 4"	199	2,387	725,387	1,142.48	11.67	2,606,204	8,089,986	10,696,189
36 6"	85	1,017	649,134	2,696.91	11.67	2,621,167	7,239,568	9,860,735
37 8"	8	95	295,054	4,847.16	11.67	440,066	3,290,635	3,730,701
38 10" & Above	-	-	-	7,925.65	11.67	-	-	-
39 Total: Commercial	6,881	82,574	3,109,578			\$ 14,755,429	\$ 34,680,038	\$ 49,435,468
40 Industrial								
42 5/8"	22	258	504	\$ 27.77	\$ 10.04	\$ 6,847	\$ 4,836	\$ 11,683
43 3/4"	14	162	166	45.79	10.04	7,089	1,593	8,682
44 1"	28	335	3,468	93.73	10.04	30,008	33,270	63,278
45 1 1/2"	6	72	302	183.87	10.04	12,652	2,898	15,549
46 2"	16	187	15,272	303.92	10.04	54,314	146,533	200,847
47 3"	2	24	13,262	675.49	10.04	15,493	127,248	142,741
48 4"	8	98	61,543	1,142.48	10.04	107,000	590,500	697,499
49 6"	2	24	4,926	2,696.91	10.04	61,856	47,265	109,121
50 8"	4	48	63,099	4,847.16	10.04	222,349	605,429	827,779
51 10" & Above	-	-	-	7,925.65	10.04	-	-	-
52 Total: Industrial	101	1,208	162,541			\$ 517,608	\$ 1,559,571	\$ 2,077,179
53 Health or Education								
55 5/8"	34	408	1,358	\$ 27.77	\$ 13.90	\$ 10,828	\$ 18,039	\$ 28,867
56 3/4"	9	109	539	45.79	13.90	4,770	7,160	11,930
57 1"	26	308	3,877	93.73	13.90	27,589	51,501	79,090
58 1 1/2"	65	779	10,713	183.87	13.90	136,885	142,309	279,194
59 2"	160	1,921	81,396	303.92	13.90	557,948	1,081,247	1,639,195
60 3"	104	1,252	193,559	675.49	13.90	808,222	2,571,202	3,379,424
61 4"	73	877	381,066	1,142.48	13.90	957,537	5,062,007	6,019,544
62 6"	38	450	449,187	2,696.91	13.90	1,159,809	5,966,901	7,126,709
63 8"	3	36	59,591	4,847.16	13.90	166,762	791,595	958,357
64 10" & Above	2	29	106,338	7,925.65	13.90	219,655	1,412,572	1,632,227
65 Total: Health or Education	514	6,169	1,287,624			\$ 4,050,004	\$ 17,104,533	\$ 21,154,537
66 Fire System								
68 1" or Less	1,130	13,559	3,253	\$ 29.21	\$ 15.01	\$ 378,501	\$ 46,656	\$ 425,157
69 1 1/2"-3"	64	773	199	77.82	15.01	57,488	2,855	60,343
70 4"	6	66	3	166.46	15.01	10,499	43	10,542
71 6" or Greater	15	181	596	477.13	15.01	82,532	8,549	91,081
72 Total: Fire System	1,215	14,579	4,051			\$ 529,020	\$ 58,103	\$ 587,123
73 Total: Water (Units & Sales)	75,314	903,770	6,664,507			\$ 42,978,102	\$ 75,545,919	\$ 118,524,020

(1) Represents billable customer usage above minimum allowance included in minimum charge
(2) User charge revenues include an adjustment factor to reflect actual collections.
(3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Current Rates**

	FY 2019			PUC Approved Prior Tariff Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Wastewater Revenues								
2 Residential								
3 5/8"	83,875	1,006,501	1,865,883	\$ 7.71	\$ 6.92	\$ 7,416,106	\$ 12,339,506	\$ 19,755,612
4 3/4"	2,603	31,234	122,845	15.62	6.92	466,247	812,403	1,278,650
5 1"	2,314	27,764	141,795	37.10	6.92	984,381	937,724	1,922,105
6 1 1/2"	-	-	-	76.62	6.92	-	-	-
7 2"	-	-	-	129.72	6.92	-	-	-
8 3"	-	-	-	295.88	6.92	-	-	-
9 4"	-	-	-	506.20	6.92	-	-	-
10 6"	-	-	-	1,213.27	6.92	-	-	-
11 8"	-	-	-	2,197.82	6.92	-	-	-
12 10" & Above	-	-	-	3,618.63	6.92	-	-	-
13 Total: Residential	88,792	1,065,499	2,130,523			\$ 8,866,734	\$ 14,089,633	\$ 22,956,367
14 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 3.86	\$ 6.92	\$ 97,835	\$ -	\$ 97,835
17 3/4"	26	312	-	7.81	6.92	2,329	-	2,329
18 1"	2	24	-	18.55	6.92	425	-	425
19 1 1/2"	-	-	-	38.31	6.92	-	-	-
20 2"	-	-	-	64.86	6.92	-	-	-
21 3"	-	-	-	147.94	6.92	-	-	-
22 4"	-	-	-	253.10	6.92	-	-	-
23 6"	-	-	-	606.64	6.92	-	-	-
24 8"	-	-	-	1,098.91	6.92	-	-	-
25 10" & Above	-	-	-	1,809.32	6.92	-	-	-
26 Total: Residential - CAP	2,241	26,892	-			\$ 100,589	\$ -	\$ 100,589
27 Commercial								
29 5/8"	3,667	44,004	138,870	\$ 7.71	\$ 6.11	\$ 324,230	\$ 810,882	\$ 1,135,113
30 3/4"	801	9,611	49,327	15.62	6.11	143,469	288,029	431,497
31 1"	1,553	18,634	153,194	37.10	6.11	660,674	894,522	1,555,197
32 1 1/2"	908	10,892	256,339	76.62	6.11	797,549	1,496,797	2,294,346
33 2"	887	10,644	461,544	129.72	6.11	1,319,530	2,695,015	4,014,545
34 3"	239	2,864	396,049	295.88	6.11	809,834	2,312,584	3,122,418
35 4"	217	2,608	745,543	506.20	6.11	1,261,645	4,353,327	5,614,972
36 6"	106	1,267	671,265	1,213.27	6.11	1,469,066	3,919,610	5,388,676
37 8"	10	114	298,482	2,197.82	6.11	239,444	1,742,877	1,982,321
38 10" & Above	-	-	-	3,618.63	6.11	-	-	-
39 Total: Commercial	8,387	100,638	3,170,614			\$ 7,025,440	\$ 18,513,643	\$ 25,539,083
40 Industrial								
42 5/8"	20	240	506	\$ 7.71	\$ 5.57	\$ 1,768	\$ 2,693	\$ 4,462
43 3/4"	13	154	166	15.62	5.57	2,299	884	3,182
44 1"	28	335	3,468	37.10	5.57	11,878	18,458	30,335
45 1 1/2"	6	72	302	76.62	5.57	5,272	1,608	6,880
46 2"	18	210	15,607	129.72	5.57	26,034	83,076	109,110
47 3"	2	24	13,262	295.88	5.57	6,786	70,595	77,381
48 4"	9	108	61,898	506.20	5.57	52,246	329,490	381,736
49 6"	2	24	4,926	1,213.27	5.57	27,828	26,221	54,049
50 8"	4	48	63,099	2,197.82	5.57	100,819	335,881	436,699
51 10" & Above	-	-	-	3,618.63	5.57	-	-	-
52 Total: Industrial	101	1,215	163,234			\$ 234,929	\$ 868,905	\$ 1,103,834
53 Health or Education								
55 5/8"	34	408	1,358	\$ 7.71	\$ 7.64	\$ 3,006	\$ 9,915	\$ 12,921
56 3/4"	9	109	539	15.62	7.64	1,627	3,935	5,563
57 1"	26	308	3,877	37.10	7.64	10,920	28,307	39,227
58 1 1/2"	65	779	10,713	76.62	7.64	57,041	78,219	135,260
59 2"	160	1,921	81,396	129.72	7.64	238,145	594,297	832,442
60 3"	104	1,250	193,547	295.88	7.64	353,454	1,413,149	1,766,603
61 4"	73	876	388,561	506.20	7.64	423,773	2,837,006	3,260,779
62 6"	37	442	440,805	1,213.27	7.64	512,492	3,218,454	3,730,946
63 8"	3	36	59,591	2,197.82	7.64	75,614	435,092	510,706
64 10" & Above	2	29	106,338	3,618.63	7.64	100,288	776,407	876,695
65 Total: Health or Education	513	6,158	1,286,726			\$ 1,776,361	\$ 9,394,782	\$ 11,171,143
66 Fire System								
68 1" or Less	1,130	13,559	3,220	\$ -	\$ 9.17	\$ -	\$ 28,214	\$ 28,214
69 1 1/2"-3"	64	773	232	-	9.17	-	2,033	2,033
70 4"	6	66	3	-	9.17	-	26	26
71 6" or Greater	15	181	596	-	9.17	-	5,223	5,223
72 Total: Fire System	1,215	14,579	4,051			\$ -	\$ 35,497	\$ 35,497
73								
74 Total: Wastewater (Units & Sales)	101,248	1,214,981	6,755,147			\$ 18,004,053	\$ 42,902,459	\$ 60,906,513

(1) Represents billable customer usage above minimum allowance included in minimum charge
(2) User charge revenues include an adjustment factor to reflect actual collections.
(3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Proposed Rates**

	FY 2019			Proposed Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Wastewater Revenues								
2 Residential								
3 5/8"	83,875	1,006,501	1,865,883	\$ 11.28	\$ 6.56	\$ 10,850,023	\$ 11,697,567	\$ 22,547,589
4 3/4"	2,603	31,234	122,845	18.65	6.56	556,690	770,139	1,326,830
5 1"	2,314	27,764	141,795	40.27	6.56	1,068,491	888,941	1,957,432
6 1 1/2"	-	-	-	77.12	6.56	-	-	-
7 2"	-	-	-	128.21	6.56	-	-	-
8 3"	-	-	-	294.32	6.56	-	-	-
9 4"	-	-	-	509.61	6.56	-	-	-
10 6"	-	-	-	1,256.86	6.56	-	-	-
11 8"	-	-	-	2,318.86	6.56	-	-	-
12 10" & Above	-	-	-	3,888.48	6.56	-	-	-
13 Total: Residential	88,792	1,065,499	2,130,523			\$ 12,475,204	\$ 13,356,647	\$ 25,831,851
14 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 5.64	\$ 6.56	\$ 143,136	\$ -	\$ 143,136
17 3/4"	26	312	-	9.33	6.56	2,780	-	2,780
18 1"	2	24	-	20.14	6.56	462	-	462
19 1 1/2"	-	-	-	38.56	6.56	-	-	-
20 2"	-	-	-	64.11	6.56	-	-	-
21 3"	-	-	-	147.16	6.56	-	-	-
22 4"	-	-	-	254.81	6.56	-	-	-
23 6"	-	-	-	628.43	6.56	-	-	-
24 8"	-	-	-	1,159.43	6.56	-	-	-
25 10" & Above	-	-	-	1,944.24	6.56	-	-	-
26 Total: Residential - CAP	2,241	26,892	-			\$ 146,378	\$ -	\$ 146,378
27 Commercial								
29 5/8"	3,667	44,004	138,870	\$ 11.28	\$ 6.97	\$ 474,361	\$ 925,016	\$ 1,399,377
30 3/4"	801	9,611	49,327	18.65	6.97	171,299	328,569	499,868
31 1"	1,553	18,634	153,194	40.27	6.97	717,125	1,020,429	1,737,554
32 1 1/2"	908	10,892	256,339	77.12	6.97	802,753	1,707,476	2,510,229
33 2"	887	10,644	461,544	128.21	6.97	1,304,170	3,074,347	4,378,516
34 3"	239	2,864	396,049	294.32	6.97	805,564	2,638,086	3,443,651
35 4"	217	2,608	745,543	509.61	6.97	1,270,144	4,966,070	6,236,214
36 6"	106	1,267	671,265	1,256.86	6.97	1,521,846	4,471,306	5,993,152
37 8"	10	114	298,482	2,318.86	6.97	252,631	1,988,192	2,240,823
38 10" & Above	-	-	-	3,888.48	6.97	-	-	-
39 Total: Commercial	8,387	100,638	3,170,614			\$ 7,319,893	\$ 21,119,491	\$ 28,439,384
40 Industrial								
42 5/8"	20	240	506	\$ 11.28	\$ 7.03	\$ 2,587	\$ 3,399	\$ 5,987
43 3/4"	13	154	166	18.65	7.03	2,745	1,115	3,860
44 1"	28	335	3,468	40.27	7.03	12,892	23,296	36,188
45 1 1/2"	6	72	302	77.12	7.03	5,306	2,029	7,335
46 2"	18	210	15,607	128.21	7.03	25,731	104,852	130,583
47 3"	2	24	13,262	294.32	7.03	6,751	89,099	95,849
48 4"	9	108	61,898	509.61	7.03	52,598	415,855	468,453
49 6"	2	24	4,926	1,256.86	7.03	28,827	33,095	61,922
50 8"	4	48	63,099	2,318.86	7.03	106,371	423,921	530,292
51 10" & Above	-	-	-	3,888.48	7.03	-	-	-
52 Total: Industrial	101	1,215	163,234			\$ 243,808	\$ 1,096,661	\$ 1,340,469
53 Health or Education								
55 5/8"	34	408	1,358	\$ 11.28	\$ 7.30	\$ 4,398	\$ 9,474	\$ 13,872
56 3/4"	9	109	539	18.65	7.30	1,943	3,760	5,703
57 1"	26	308	3,877	40.27	7.30	11,853	27,047	38,901
58 1 1/2"	65	779	10,713	77.12	7.30	57,413	74,738	132,151
59 2"	160	1,921	81,396	128.21	7.30	235,373	567,849	803,222
60 3"	104	1,250	193,547	294.32	7.30	351,590	1,350,260	1,701,850
61 4"	73	876	388,561	509.61	7.30	426,628	2,710,752	3,137,380
62 6"	37	442	440,805	1,256.86	7.30	530,905	3,075,225	3,606,129
63 8"	3	36	59,591	2,318.86	7.30	79,778	415,730	495,508
64 10" & Above	2	29	106,338	3,888.48	7.30	107,767	741,854	849,621
65 Total: Health or Education	513	6,158	1,286,726			\$ 1,807,649	\$ 8,976,689	\$ 10,784,338
66 Fire System								
68 1" or Less	1,130	13,559	3,220	\$ -	\$ -	\$ -	\$ -	\$ -
69 1 1/2"-3"	64	773	232	-	-	-	-	-
70 4"	6	66	3	-	-	-	-	-
71 6" or Greater	15	181	596	-	-	-	-	-
72 Total: Fire System	1,215	14,579	4,051			\$ -	\$ -	\$ -
73								
74 Total: Wastewater (Units & Sales)	101,248	1,214,981	6,755,147			\$ 21,992,932	\$ 44,549,488	\$ 66,542,420

(1) Represents billable customer usage above minimum allowance included in minimum charge
(2) User charge revenues include an adjustment factor to reflect actual collections.
(3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

PITTSBURGH WATER AND SEWER AUTHORITY

STATEMENTS OF NET POSITION

(Dollars expressed in thousands)

DECEMBER 31, 2017 AND 2016

	2017	2016
Assets		
Current assets:		
Cash and cash equivalents	\$ 11,076	\$ 21,620
Accounts receivable, net:		
Water:		
Billed	9,335	6,388
Unbilled	6,760	5,886
Total water	16,095	12,274
Wastewater treatment:		
Billed	9,975	10,844
Unbilled	3,746	3,719
Total wastewater treatment	13,721	14,563
Other receivables	1,074	797
Total accounts receivable, net	30,890	27,634
Prepaid expenses	674	65
Inventory	3,777	2,218
Total current assets	46,417	51,537
Noncurrent assets:		
Restricted assets:		
Cash and cash equivalents	18,264	11,900
Investments	11,684	14,437
Total restricted assets	29,948	26,337
Capital assets, not being depreciated	100,240	88,861
Capital assets, net of accumulated depreciation	589,567	587,937
Total noncurrent assets	719,755	703,135
Total Assets	766,172	754,672
Deferred Outflows of Resources		
Deferred charge on refunding	110,326	25,008
Accumulated decrease in fair value of hedging derivatives	3,279	70,897
Total Deferred Outflows of Resources	113,605	95,905

(Continued)

The notes to financial statements are an integral part of this statement.

PITTSBURGH WATER AND SEWER AUTHORITY

STATEMENTS OF NET POSITION

(Dollars expressed in thousands)

DECEMBER 31, 2017 AND 2016

(Continued)

	2017	2016
Liabilities		
Current liabilities:		
Bonds and loans payable	24,603	22,492
Accrued payroll and related obligations	1,217	924
Accounts payable wastewater treatment	17,863	15,283
Accounts payable and other accrued expenses	15,506	17,936
Accrued interest payable from restricted assets	3,773	10,650
Total current liabilities	<u>62,962</u>	<u>67,285</u>
Noncurrent liabilities:		
Unearned revenue	164	185
Accrued payroll and related obligations	594	575
Swap liability	18,319	86,772
Bonds and loans payable, net	<u>841,574</u>	<u>733,283</u>
Total noncurrent liabilities	<u>860,651</u>	<u>820,815</u>
Total Liabilities	<u>923,613</u>	<u>888,100</u>
Net Position		
Net investment in capital assets	(29,609)	(5,395)
Restricted	13,240	9,999
Unrestricted	<u>(27,467)</u>	<u>(42,127)</u>
Total Net Position	<u>\$ (43,836)</u>	<u>\$ (37,523)</u>

(Concluded)

The notes to financial statements are an integral part of this statement.

Pittsburgh Water & Sewer Authority
Utility Plant in Service
As of December 31, 2017

<u>Description</u>	<u>Department</u>	<u>GL Account</u>	<u>2017</u> <i>Beginning</i> <i>Balance</i>	<i>Additions</i>	<u>2017</u> <i>Ending</i> <i>Balance</i>
General Water					
Utility - Machine - Equipment	300	1803	\$ 3,354,458	\$ -	\$ 3,354,458
Water Quality					
Utility - Building	321	1802	644,181	-	644,181
Utility - Machine - Equipment	321	1803	610,423	-	610,423
Utility - Computer Equipment	321	1805	8,817	-	8,817
Utility - Vehicles	321	1806	12,030	-	12,030
Utility - Miscellaneous	321	1807	<u>145,378</u>	-	<u>145,378</u>
<i>Subtotal: Water Quality</i>			1,420,829	-	1,420,829
Water Quality					
Utility - Building	322	1802	1,493,548	-	1,493,548
Utility - Machine - Equipment	322	1803	52,887,582	20,240	52,907,822
Utility - Computer Equipment	322	1805	459,535	2,233,880	2,693,415
Utility - Vehicles	322	1806	1,107,667	-	1,107,667
Utility - Miscellaneous	322	1807	<u>7,723,900</u>	-	<u>7,723,900</u>
<i>Subtotal: Water Quality</i>			63,672,231	2,254,121	65,926,352
Pumping					
Utility - Building	323	1802	90,054,199	-	90,054,199
Utility - Computer Equipment	323	1805	49,092	-	49,092
Utility - Miscellaneous	323	1807	<u>21,899</u>	-	<u>21,899</u>
<i>Subtotal: Pumping</i>			90,125,190	-	90,125,190
Membrane Plant					
Utility - Building	324	1802	20,355,348	-	20,355,348
Distribution					
Utility - Building	325	1802	232,984,692	5,911,598	238,896,289
Utility - Machine - Equipment	325	1803	39,585,878	16,990	39,602,868
Utility - Furniture - Fixtures	325	1804	7,500	-	7,500
Utility - Vehicles	325	1806	2,183,803	465,632	2,649,435
Utility - Miscellaneous	325	1807	12,311,149	-	12,311,149
Non-Utility - Building	325	1822	<u>2,950</u>	-	<u>2,950</u>
<i>Subtotal: Distribution</i>			287,075,970	6,394,220	293,470,190
Sewer Operations					
Utility - Building	424	1802	341,117,929	8,632,388	349,750,317
Utility - Machine - Equipment	424	1803	41,753,159	49,955	41,803,114
Utility - Furniture - Fixtures	424	1804	757	-	757
Utility - Computer Equipment	424	1805	980,644	-	980,644
Utility - Vehicles	424	1806	3,292,419	98,227	3,390,646
Utility - Miscellaneous	424	1807	<u>4,986,808</u>	-	<u>4,986,808</u>
<i>Subtotal: Sewer Operations</i>			392,131,717	8,780,570	400,912,287
Sewer Miscellaneous					
Utility - Miscellaneous	425	1807	30,744	-	30,744

Pittsburgh Water & Sewer Authority
Utility Plant in Service
As of December 31, 2017

<u>Description</u>	<u>Department</u>	<u>GL Account</u>	<u>2017</u> <i>Beginning</i> <i>Balance</i>	<i>Additions</i>	<u>2017</u> <i>Ending</i> <i>Balance</i>
<u>Other Miscellaneous</u>					
Non-Utility - Furniture - Fixtures	800	1824	30	-	30
Utility - Computer Equipment	900	1805	3,477	-	3,477
Non-Utility - Computer Equipment	900	1825	935,436	-	935,436
<i>Subtotal: Other Miscellaneous</i>			938,942	-	938,942
<u>Executive Director</u>					
Non-Utility - Building	910	1822	853,138	-	853,138
Non-Utility - Furniture - Fixtures	910	1824	74,490	-	74,490
Non-Utility - Vehicles	910	1826	25,864	-	25,864
<i>Subtotal: Executive Director</i>			953,493	-	953,493
<u>Customer Service</u>					
Non-Utility - Furniture - Fixtures	911	1824	165,426	-	165,426
Non-Utility - Computer Equipment	911	1825	2,430,938	184,207	2,615,144
Non-Utility - Miscellaneous	911	1827	9,472	-	9,472
<i>Subtotal: Customer Service</i>			2,605,835	184,207	2,790,042
<u>Management Information Systems</u>					
Non-Utility - Furniture - Fixtures	912	1824	8,773	-	8,773
Non-Utility - Computer Equipment	912	1825	11,328,678	151,119	11,479,797
Non-Utility - Miscellaneous	912	1827	63,345	-	63,345
<i>Subtotal: Management Information Systems</i>			11,400,796	151,119	11,551,915
<u>Finance</u>					
Non-Utility - Furniture - Fixtures	913	1824	50,129	-	50,129
Non-Utility - Computer Equipment	913	1825	6,142	-	6,142
<i>Subtotal: Finance</i>			56,271	-	56,271
<u>Warehouse</u>					
Utility - Machine - Equipment	918	1803	1,115	-	1,115
Non-Utility - Furniture - Fixtures	918	1824	35,332	-	35,332
Non-Utility - Computer Equipment	918	1825	33,455	-	33,455
Non-Utility - Vehicles	918	1826	173,808	-	173,808
Non-Utility - Miscellaneous	918	1827	3,937,558	-	3,937,558
<i>Subtotal: Warehouse</i>			4,181,267	-	4,181,267
<u>Engineering</u>					
Non-Utility - Building	930	1822	367,490	-	367,490
Non-Utility - Furniture - Fixtures	930	1824	169,740	38,193	207,933
Non-Utility - Computer Equipment	930	1825	1,397,849	-	1,397,849
Non-Utility - Vehicles	930	1826	53,895	-	53,895
Non-Utility - Miscellaneous	930	1827	218,241	-	218,241
<i>Subtotal: Engineering</i>			2,207,215	38,193	2,245,408
<i>Total: Fixed Assets</i>			\$ 880,510,306	\$ 17,802,429	\$ 898,312,735
Other Assets					
Construction in Progress		1840	\$ 74,663,867	\$ 16,839,160	\$ 91,503,027
Capitalized Interest		1841	7,437,197	(8,052)	7,429,145
CIP Accrual		1842	9,311,403	(4,440,449)	4,870,954
Total Utility Plant			\$ 971,922,773	\$ 30,193,088	\$ 1,002,115,861

Pittsburgh Water & Sewer Authority
Depreciation by PWSA Department & Code
As of December 31, 2017

<u>Description</u>	<u>Department</u>	<u>GL Account</u>	<u>2017</u> <i>Beginning</i> <i>Balance</i>	<i>Depreciation</i>	<u>2017</u> <i>Ending</i> <i>Balance</i>
General Water					
Utility - Machine - Equipment	300	1813	\$ -	\$ -	\$ -
Water Quality					
Utility - Building	321	1812	(644,181)	-	(644,181)
Utility - Machine - Equipment	321	1813	(440,549)	(21,893)	(462,442)
Utility - Computer Equipment	321	1815	(8,817)	(40)	(8,857)
Utility - Vehicles	321	1816	(12,030)	-	(12,030)
Utility - Miscellaneous	321	1817	<u>(21,542)</u>	<u>(13,923)</u>	<u>(35,465)</u>
<i>Subtotal: Water Quality</i>			(1,127,119)	(35,856)	(1,162,975)
Water Quality					
Utility - Building	322	1812	(531,827)	(27,348)	(559,174)
Utility - Machine - Equipment	322	1813	(22,116,835)	(1,117,061)	(23,233,896)
Utility - Computer Equipment	322	1815	(431,599)	(6,125)	(437,724)
Utility - Vehicles	322	1816	(1,107,667)	-	(1,107,667)
Utility - Miscellaneous	322	1817	<u>(2,560,539)</u>	<u>(185,388)</u>	<u>(2,745,927)</u>
<i>Subtotal: Water Quality</i>			(26,748,467)	(1,335,922)	(28,084,389)
Pumping					
Utility - Building	323	1812	(39,871,353)	(1,944,129)	(41,815,482)
Utility - Computer Equipment	323	1815	(14,425)	(2,293)	(16,718)
Utility - Miscellaneous	323	1817	<u>(21,899)</u>	<u>-</u>	<u>(21,899)</u>
<i>Subtotal: Pumping</i>			(39,907,677)	(1,946,422)	(41,854,099)
Membrane Plant					
Utility - Building	324	1812	(5,967,541)	(380,172)	(6,347,713)
Distribution					
Utility - Building	325	1812	(61,249,405)	(3,489,348)	(64,738,753)
Utility - Machine - Equipment	325	1813	(19,661,787)	(1,402,638)	(21,064,425)
Utility - Furniture - Fixtures	325	1814	(7,500)	-	(7,500)
Utility - Vehicles	325	1816	(1,725,043)	(76,677)	(1,801,720)
Utility - Miscellaneous	325	1817	(5,404,248)	(220,498)	(5,624,747)
Non-Utility - Building	325	1832	<u>-</u>	<u>-</u>	<u>-</u>
<i>Subtotal: Distribution</i>			(88,047,983)	(5,189,161)	(93,237,144)
Sewer Operations					
Utility - Building	424	1812	(89,826,959)	(5,850,721)	(95,677,680)
Utility - Machine - Equipment	424	1813	(18,525,093)	(642,551)	(19,167,644)
Utility - Furniture - Fixtures	424	1814	(757)	-	(757)
Utility - Computer Equipment	424	1815	(978,619)	(74)	(978,693)
Utility - Vehicles	424	1816	(2,535,237)	(123,554)	(2,658,791)
Utility - Miscellaneous	424	1817	<u>(2,149,377)</u>	<u>(185,734)</u>	<u>(2,335,111)</u>
<i>Subtotal: Sewer Operations</i>			(114,016,043)	(6,802,634)	(120,818,677)
Sewer Miscellaneous					
Utility - Miscellaneous	425	1817	(30,744)	-	(30,744)

Pittsburgh Water & Sewer Authority
Depreciation by PWSA Department & Code
As of December 31, 2017

<u>Description</u>	<u>Department</u>	<u>GL Account</u>	<u>2017 Beginning Balance</u>	<u>Depreciation</u>	<u>2017 Ending Balance</u>
Other Miscellaneous					
Non-Utility - Furniture - Fixtures	800	1834	-	-	-
Utility - Computer Equipment	900	1815	-	-	-
Non-Utility - Computer Equipment	900	1835	-	-	-
<i>Subtotal: Other Miscellaneous</i>			-	-	-
Executive Director					
Non-Utility - Building	910	1832	(198,043)	(19,695)	(217,738)
Non-Utility - Furniture - Fixtures	910	1834	(74,490)	-	(74,490)
Non-Utility - Vehicles	910	1836	(25,864)	-	(25,864)
<i>Subtotal: Executive Director</i>			(298,398)	(19,695)	(318,093)
Customer Service					
Non-Utility - Furniture - Fixtures	911	1834	(131,844)	(4,797)	(136,641)
Non-Utility - Computer Equipment	911	1835	(2,451,470)	(3,037)	(2,454,507)
Non-Utility - Miscellaneous	911	1837	(9,472)	-	(9,472)
<i>Subtotal: Customer Service</i>			(2,592,786)	(7,834)	(2,600,620)
Management Information Systems					
Non-Utility - Furniture - Fixtures	912	1834	(8,773)	-	(8,773)
Non-Utility - Computer Equipment	912	1835	(9,553,683)	(249,742)	(9,803,425)
Non-Utility - Miscellaneous	912	1837	(52,859)	(2,097)	(54,956)
<i>Subtotal: Management Information Systems</i>			(9,615,315)	(251,839)	(9,867,154)
Finance					
Non-Utility - Furniture - Fixtures	913	1834	(50,129)	-	(50,129)
Non-Utility - Computer Equipment	913	1835	(6,142)	-	(6,142)
<i>Subtotal: Finance</i>			(56,271)	-	(56,271)
Warehouse					
Utility - Machine - Equipment	918	1813	-	-	-
Non-Utility - Furniture - Fixtures	918	1834	(34,362)	(700)	(35,062)
Non-Utility - Computer Equipment	918	1835	(33,455)	-	(33,455)
Non-Utility - Vehicles	918	1836	(173,808)	-	(173,808)
Non-Utility - Miscellaneous	918	1837	(2,166,259)	(73,230)	(2,239,489)
<i>Subtotal: Warehouse</i>			(2,407,884)	(73,930)	(2,481,814)
Engineering					
Non-Utility - Building	930	1832	(198,638)	(6,468)	(205,106)
Non-Utility - Furniture - Fixtures	930	1834	(172,903)	(564)	(173,467)
Non-Utility - Computer Equipment	930	1835	(928,016)	(31,613)	(959,629)
Non-Utility - Vehicles	930	1836	(391,597)	(60,471)	(452,068)
Non-Utility - Miscellaneous	930	1837	(68,729)	(27,855)	(96,584)
<i>Subtotal: Engineering</i>			(1,759,884)	(126,970)	(1,886,855)
Total: Accumulated Depreciation			\$(292,576,111)	\$(16,170,436)	\$(308,746,547)

Pittsburgh Water & Sewer Authority
Statement of Operating Income
As of December 31, 2017

System Income Statement	HTY Per Books 12/31/2017
<u>Operating Revenues</u>	
Water Sales	\$ 80,953,618
Wastewater Sales	40,948,748
Wastewater Treatment	63,795,503
Sale for Resale & Contract Sales	5,151,309
Other Revenues	5,015,515
<i>System Operating Revenues</i>	\$ 195,864,693
<u>Operating Expenses</u>	
<i>Direct Operating Expenses</i>	
Administrative Division	
910 Executive Director	\$ 2,771,316
911 Customer Service	6,791,810
912 Management Information Systems	2,056,224
913 Finance	1,433,000
914 Procurement	281,865
915 Human Resources	955,078
916 Legal	2,230,893
921 Public Affairs	422,247
Operations Division	
931 Environmental Compliance	-
918 Warehouse	1,099,174
900 Ops Capital Assets	78,989
321 Water Quality (Lab)	1,607,006
322 Water Treatment Plant	14,144,593
424 Sewer Operations	10,234,288
325 Water Distribution	14,497,341
Engineering & Construction Division	
930 Engineering & Construction	11,226,880
<i>Subtotal: Direct Operating Expenses</i>	\$ 69,830,704
<i>Other Operating Expenses</i>	
ALCOSAN	\$ 72,555,038
Co-Op Agreement Op. Expenses - Water	2,075,000
Co-Op Agreement Op. Expenses - Sewer	1,500,000
Non-City Water Subsidy	5,260,476
<i>Subtotal: Other Operating Expenses</i>	\$ 81,390,514
<i>Subtotal: Operating Expenses</i>	\$ 151,221,218
Operating Income	\$ 44,643,475
<u>Debt Service</u>	
Senior and Subordinate Debt	\$ (51,429,521)
Revolving Line of Credit Interest	(610,992)
<i>Subtotal: Debt Service</i>	\$ (52,040,513)
<u>Capital Expenditures & Transfers</u>	
Rate Funded Capital (PAYGO)	\$ -
Other Transfers to Reserves	(3,144,510)
Reimbursements (Municipalities & Pennvest)	793,929
Remarketing & Liquidity Charges	(1,493,100)
<i>Subtotal: Capital Expenditures & Transfers</i>	\$ (3,843,681)
Revenue Surplus/(Deficit)	\$ (11,240,719)

Pittsburgh Water and Sewer Authority's Base Rate Filing

I. STATEMENT OF INCOME

Exhibit D – Water and Wastewater Utilities

I.1. Provide comparative operating statements for the historic test year and the immediately preceding 12 months showing increases and decreases between the two periods. These statements should supply detailed explanation of the causes of the major (greater than 15%) variances between the historic test year and preceding year by detailed account number. Limit the explanation to differences of \$10,000 or greater.

RESPONSE:

Please see the attached schedule (Descriptions on schedule).

Pittsburgh Water & Sewer Authority
Comparative Income Statements
Twelve Months Ended December 31, 2016 & 2017

System Operating Statement	HTY		Variance	% Variance	Explanation of Variance (15% and \$10K)
	Per Books 12/31/2016	Per Books 12/31/2017			
System Revenues					
Water Sales	\$ 69,359,271	\$ 80,953,618	\$ 11,594,347	16.72%	Significant water rate increases drove up water revenues
Wastewater Sales	39,739,338	40,948,748	1,209,410	3.04%	
Wastewater Treatment	62,731,097	63,795,503	1,064,406	1.70%	
Sale for Resale & Contract Sales	4,226,753	5,151,309	924,556	21.87%	Fox Chapel usage nearly doubled during 2017
Miscellaneous Revenues and Fees	5,737,849	5,015,515	(722,334)	-12.59%	Tap fee collections were significantly lower in 2017.
System Operating Revenues	\$ 181,794,309	\$ 195,864,693	\$ 14,070,384		
Operating Expenses					
<i>Direct Operating Expenses</i>					
<i>Administrative Division</i>					
Executive Director	\$ 1,564,079	\$ 2,771,316	\$ 1,207,237	77.19%	Costs increased due to consulting costs, fines, and education/outreach.
Customer Service	7,297,938	6,791,810	(506,129)	-6.94%	
Management Information Systems	1,762,744	2,056,224	293,480	16.65%	Cost increases were driven by enhanced computer networking capabilities.
Finance	1,526,779	1,433,000	(93,779)	-6.14%	
Procurement	240,058	281,865	41,807	17.42%	Spending increases were driven by professional services spending.
Human Resources	1,038,539	955,078	(83,461)	-8.04%	
Legal	2,027,711	2,230,893	203,182	10.02%	
Community Outreach / Public Affairs	570,912	422,247	(148,665)	-26.04%	Community outreach reductions reflect lower marketing material spending.
<i>Operations Division</i>					
Communications	6,706	-	(6,706)	-100.00%	(Removed)
Warehouse	333,798	1,099,174	765,376	229.29%	Spending was driven by increased inventory purchases, particularly new meters.
Ops Capital Assets	48,717	78,989	30,272	62.14%	Ops Capital Assets reflects increases in freight shipping spending.
Water Quality (Lab)	1,117,158	1,607,006	489,848	43.85%	Lab costs were driven by significant increases in water testing.
Water Treatment Plant	13,704,211	14,144,593	440,382	3.21%	
Sewer Operations	8,463,638	10,234,288	1,770,650	20.92%	Costs were driven by increased cranes repairs and annual contract costs.
Water Distribution	10,650,742	14,497,341	3,846,598	36.12%	Distribution costs were increased by concrete repairs costs.
<i>Engineering & Construction Division</i>					
Engineering & Construction	10,548,281	11,226,880	678,599	6.43%	
Subtotal, Direct Operating Expenses	\$ 60,902,012	\$ 69,830,704	\$ 8,928,692		

Pittsburgh Water & Sewer Authority
Comparative Income Statements
Twelve Months Ended December 31, 2016 & 2017

System Operating Statement	HTY		Variance	% Variance	Explanation of Variance (15% and \$10K)
	Per Books 12/31/2016	Per Books 12/31/2017			
<i>Other Operating Expenses</i>					
ALCOSAN	\$ 62,849,859	\$ 72,555,038	\$ 9,705,179	15.44%	ALCOSAN charges jumped due to billing adjustment catch-ups.
Co-Op Agreement Op. Expenses - Water	4,150,000	2,075,000	(2,075,000)	-50.00%	PWSA only made half of the co-op agreement payments in 2017
Co-Op Agreement Op. Expenses - Sewer	3,000,000	1,500,000	(1,500,000)	-50.00%	PWSA only made half of the co-op agreement payments in 2017.
Non-City Water Subsidy	2,169,429	5,260,476	3,091,047	142.48%	PAWC rate increases and new PWSA sewer-only billings drove up subsidy costs
Affordability Program Placeholder	-	-	-	0.00%	
<i>Subtotal: Other Operating Expenses</i>	<i>\$ 72,169,288</i>	<i>\$ 81,390,514</i>	<i>\$ 9,221,226</i>		
<i>Subtotal: Operating Expenses</i>	<i>\$ 133,071,300</i>	<i>\$ 151,221,218</i>	<i>\$ 18,149,918</i>		
Operating Income	\$ 48,723,009	\$ 44,643,475	\$ (4,079,534)		
<i>Debt Service</i>					
Senior and Subordinate Debt	\$ 51,895,152	\$ 51,429,521	\$ (465,631)	-0.90%	
Revolving Line of Credit Interest	94,890	610,992	516,102	543.90%	Interest costs increased due to increased draws and a full year of revolver interest
<i>Subtotal: Debt Service</i>	<i>\$ 51,990,042</i>	<i>\$ 52,040,513</i>	<i>\$ 50,471</i>		
<i>Capital Expenditures & Transfers</i>					
Rate Funded Capital (PAYGO)	\$ -	\$ -	\$ -	0.00%	
Other Transfers to Reserves	840,966	3,144,510	2,303,544	273.92%	PWSA's new bond indenture required increased contributions to the Operating Reserve.
Reimbursements (Municipalities & Pennvest)	783,246	(793,929)	(1,577,175)	-201.36%	
Remarketing & Liquidity Charges	1,483,083	1,493,100	10,017	0.68%	
<i>Subtotal Capital Expenditures & Transfers</i>	<i>\$ 3,107,295</i>	<i>\$ 3,843,681</i>	<i>\$ 736,386</i>		
Revenue Surplus/(Deficit)	\$ (6,374,328)	\$ (11,240,719)	\$ (4,866,391)		

Pittsburgh Water and Sewer Authority's Base Rate Filing

I. STATEMENT OF INCOME

I.2. Prepare an income statement for the various time frames of the rate proceeding including:

Col. 1—Book recorded income statement for the test year.

Col. 2—Adjustments to book recorded income statement to annualize and normalize under present rates.

Col. 3—Income statement under present rates after adjustments in Col. 2.

Col. 4—Adjustments to Col. 3 for revenue increase requested.

Col. 5—Income statement under proposed rates.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Statement of Projected Income at Present and Proposed Rates
Twelve Months Ending December 31, 2018

System Operating Statement	(1) Annualized 12 Months Ended 12/31/2019	(2) Adjustments Under Annualized Rates	(3) Annualized 12 Months Ended 12/31/2019	(4) Adjustments Under Proposed Rates	(5) Adjustments 12 Months Ended 12/31/2019
Operating Revenues					
Water Sales	\$ 97,139,741	\$ -	\$ 97,139,741	\$ 21,384,279	\$ 118,524,020
Wastewater Sales	60,906,513	-	60,906,513	5,635,907	66,542,420
Sale for Resale & Contract Sales	5,014,410	-	5,014,410	385,459	5,399,869
Other Water Revenues	5,460,309	-	5,460,309	-	5,460,309
<i>System Operating Revenues</i>	<u>\$ 168,520,973</u>	<u>\$ -</u>	<u>\$ 168,520,973</u>	<u>\$ 27,405,645</u>	<u>\$ 195,926,618</u>
Operating Expenses					
<i>Direct Operating Expenses</i>					
Administrative Divisions	\$ 23,510,439	\$ -	\$ 23,510,439	\$ -	\$ 23,510,439
Operations Divisions	69,001,962	-	69,001,962	-	69,001,962
Engineering & Construction Division	17,009,386	-	17,009,386	-	17,009,386
<i>Direct Operating Expenses</i>	<u>\$ 109,521,788</u>	<u>\$ -</u>	<u>\$ 109,521,788</u>	<u>\$ -</u>	<u>\$ 109,521,788</u>
<i>Other Operating Expenses</i>					
Loss on ALCOSAN Billings	\$ 3,699,738	\$ -	\$ 3,699,738	\$ -	\$ 3,699,738
Co-Op Agreement Op. Expenses - Water	4,150,000	-	4,150,000	-	4,150,000
Co-Op Agreement Op. Expenses - Sewer	3,000,000	-	3,000,000	-	3,000,000
Non-City Water Subsidy	4,800,000	-	4,800,000	-	4,800,000
<i>Other Operating Expenses</i>	<u>\$ 15,649,738</u>	<u>\$ -</u>	<u>\$ 15,649,738</u>	<u>\$ -</u>	<u>\$ 15,649,738</u>
<i>Subtotal: Allocated Operating Expenses</i>	<u>\$ 125,171,526</u>	<u>\$ -</u>	<u>\$ 125,171,526</u>	<u>\$ -</u>	<u>\$ 125,171,526</u>
Operating Income	\$ 43,349,447	\$ -	\$ 43,349,447	\$ 27,405,645	\$ 70,755,092
Debt Service					
Senior and Subordinate Debt	\$ (52,086,284)	\$ -	\$ (52,086,284)	\$ -	\$ (52,086,284)
Revolving Line of Credit Interest	(1,686,120)	-	(1,686,120)	-	(1,686,120)
Proposed Revenue Bonds	(9,724,542)	-	(9,724,542)	-	(9,724,542)
<i>Subtotal: Debt Service</i>	<u>\$ (63,496,946)</u>	<u>\$ -</u>	<u>\$ (63,496,946)</u>	<u>\$ -</u>	<u>\$ (63,496,946)</u>
Capital Expenditures & Transfers					
Rate Funded Capital (PAYGO)	\$ (1,500,000)	\$ -	\$ (1,500,000)	\$ -	\$ (1,500,000)
Other Transfers to Reserves	(5,700,000)	-	(5,700,000)	-	(5,700,000)
Reimbursements (Municipalities & Pennvest)	-	-	-	-	-
Remarketing & Liquidity Charges	-	-	-	-	-
<i>Subtotal: Capital Expenditures & Transfers</i>	<u>\$ (7,200,000)</u>	<u>\$ -</u>	<u>\$ (7,200,000)</u>	<u>\$ -</u>	<u>\$ (7,200,000)</u>
Revenue Surplus/(Deficit)	\$ (27,347,499)	\$ -	\$ (27,347,499)	\$ 27,405,645	\$ 58,146

Pittsburgh Water and Sewer Authority's Base Rate Filing

I. STATEMENT OF INCOME

I.3. If a company has separate operating divisions, an income statement must be shown for each division, plus an income statement for the company as a whole.

RESPONSE:

Please see the response to I.2.

Pittsburgh Water and Sewer Authority's Base Rate Filing

I. STATEMENT OF INCOME

I.4. Provide operating income claims under:

- a. Present rates.
- b. Pro forma present rates (annualized & normalized).
- c. Proposed rates (annualized & normalized).

RESPONSE:

Please see the response provided to I.2.

Pittsburgh Water and Sewer Authority's Base Rate Filing

I. STATEMENT OF INCOME

I.5. Provide rate of return on original cost under:

- a. Present rates.
- b. Pro forma present rates.
- c. Proposed rates.

RESPONSE: Not Applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.1. Prepare a summary of operating revenues for the historic test year and the year preceding the historic test year, providing the following information:

a. For each classification of customers:

(i) Number of customers as of year-end.

(ii) Gallons sold.

(iii) Revenues.

b. Customers' penalties and miscellaneous water revenues.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Summary of Operating Revenues
Twelve Months Ending December 31, 2017

	Water Operations		Wastewater Conveyance	
	12 Months Ended 12/31/2016	12 Months Ended 12/31/2017	12 Months Ended 12/31/2016	12 Months Ended 12/31/2017
a. Operating Revenues				
(i) <u>Number of Customers</u>				
Residential	67,416	66,603	66,365	91,033
Commercial	7,137	6,881	7,002	8,387
Industrial	108	101	110	101
Health or Education	556	514	550	513
Fire System	1,211	1,215	-	-
Wholesale and Contract	9	9	1	1
Total	76,439	75,323	74,028	100,035
(ii) <u>Gallons Billed (kgals)</u>				
Residential	2,351,579	2,100,713	2,301,322	2,130,523
Commercial	4,155,937	3,109,578	4,320,306	3,170,614
Industrial	293,330	162,541	293,331	163,234
Health or Education	1,483,044	1,287,624	1,305,727	1,286,726
Fire System	7,997	4,051	7,999	4,051
Wholesale and Contract	878,917	1,367,397	-	-
Total	9,170,805	8,031,904	8,228,685	6,755,147
(iii) <u>Revenues (1)</u>				
Residential	\$ 24,792,877	\$ 31,002,750	\$ 11,989,346	\$ 15,347,431
Commercial	29,222,501	31,690,575	18,807,902	16,605,154
Industrial	1,684,013	1,376,138	1,105,485	725,658
Health or Education	13,279,155	16,452,309	7,810,129	8,255,021
Fire System	380,726	431,846	26,476	15,484
Wholesale and Contract	3,762,701	4,687,257	464,052	464,052
Total Water Sales	\$ 73,121,972	\$ 85,640,875	\$ 40,203,390	\$ 41,412,800

(1) It is important to note that PWSA was experiencing billing system problems in 2015 and 2016. Customer counts and billed consumption produced by the billing system are unrealistically high. Revenues reflect billings adjusted for actual collections.

	Combined System	
	12 Months Ended 12/31/2016	12 Months Ended 12/31/2017
b. Customer Penalties & Misc. Revenues		
Dye Testing	\$ 162,116	\$ 168,010
Fire Hydrant Line Use	106,934	105,996
Fire Hydrant Sales	5,079	5,500
Map Fees	213	40
Backflow Fee	40,583	26,573
Meter Sales	169,127	73,955
Meter Test Fees	-	4,949
Non-Sufficient Funds Fees	21,223	27,053
Shut Fees	539,394	526,320
Tap Fees	3,005,809	1,907,576
Lien Satisfaction Fees	720	646
Miscellaneous Fees (300)	710,125	946,011
Miscellaneous Fees (400)	23,304	13,717
Penalties & Interest	677,999	895,970
Unmetered User Charges	275,224	313,199
Total	5,737,849	5,015,515

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.2. Prepare a summary of operating revenues for the historic test year, providing the following information:

a. For each classification of customers and for customers' penalties and miscellaneous water or wastewater revenues:

(i) Revenues.

(ii) Annualizing and normalizing adjustments to arrive at adjusted operating revenues for ratemaking.

(iii) Proposed increase in operating revenues.

(iv) Percent increase in operating revenues.

(v) Operating revenues under proposed rates.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Statement of Actual and Projected Revenues at Present and Proposed Rates
Twelve Months Ending December 31, 2017, 2018, & 2019

	HTY 12 Months Ended 12/31/2017	FTY 12 Months Ended 12/31/2018	Proposed Increase	Percent Increase	FPFTY Revenues at Proposed Rates 12/31/2019
Water					
<u>Customer Class</u>					
Residential	\$ 31,002,750	\$ 37,886,830	\$ 7,022,598	18.54%	\$ 44,909,428
Residential - CAP	-	301,546	58,739	19.48%	360,285
Commercial	31,690,575	38,530,718	10,904,749	28.30%	49,435,468
Industrial	1,376,138	1,585,983	491,196	30.97%	2,077,179
Health or Education	16,452,309	18,304,127	2,850,410	15.57%	21,154,537
Fire System	431,846	530,538	56,586	10.67%	587,123
Total Water Revenues	80,953,618	97,139,741	21,384,279	22.01%	118,524,020
Wastewater					
<u>Customer Class</u>					
Residential	15,347,431	22,956,367	\$ 2,875,484	12.53%	25,831,851
Residential - CAP	-	100,589	45,789	45.52%	146,378
Commercial	16,605,154	25,539,083	2,900,301	11.36%	28,439,384
Industrial	725,658	1,103,834	236,635	21.44%	1,340,469
Health or Education	8,255,021	11,171,143	(386,805)	-3.46%	10,784,338
Fire System	15,484	35,497	(35,497)	-100.00%	-
Total Wastewater Revenues	40,948,748	60,906,513	5,635,907	9.25%	66,542,420
Wholesale & Contracts - Water					
Allegheny	39,110	46,951	\$ 7,862	16.75%	54,814
Aspinwall	299,920	297,214	2,695	0.91%	299,909
Bay Valley Foods	1,640,176	1,479,519	(136,181)	-9.20%	1,343,338
Fox Chapel	2,199,651	2,127,355	352,854	16.59%	2,480,209
Hampton	8,318	69,611	11,622	16.70%	81,233
PAWC	66,107	66,107	661	1.00%	66,768
RSRV - 10"	304,543	410,018	21,008	5.12%	431,025
RSRV - 6"	48,901	51,388	2,620	5.10%	54,009
Sharpsburg	-	-	-	0.00%	-
Westview	80,531	104,700	17,485	16.70%	122,184
Bay Valley Foods / Riverbend	464,052	464,052	2,328	0.50%	466,380
Total Wholesale & Contract Revenues	4,687,257	4,652,861	280,628	6.03%	4,933,489
Other Operating Revenue					
Dye Testing	\$ 168,010	\$ 181,957	\$ 1,820	1.00%	\$ 183,777
Fire Hydrant Line Use	105,996	101,033	1,010	1.00%	102,043
Fire Hydrant Sales	5,500	4,415	44	1.00%	4,459
Map Fees	40	49	0	1.00%	49
Backflow Fee	26,573	37,466	375	1.00%	37,840
Meter Sales	73,955	75,802	(75,802)	-100.00%	-
Meter Test Fees	4,949	-	-	0.00%	-
Non-Sufficient Funds Fees	27,053	27,961	280	1.00%	28,240
Shut Fees	526,320	607,673	6,077	1.00%	613,749
Tap Fees	1,907,576	1,874,013	18,740	1.00%	1,892,754
Lien Satisfaction Fees	646	-	-	0.00%	-
Miscellaneous Fees (300)	946,011	1,151,229	11,512	1.00%	1,162,741
Miscellaneous Fees (400)	13,717	-	-	0.00%	-
Penalties & Interest	895,970	1,004,351	117,105	11.66%	1,121,456
Unmetered User Charges	313,199	313,199	-	0.00%	313,199
Total Other Operating Revenues	5,015,515	5,379,148	81,161	1.51%	5,460,309
Total Operating Revenues	132,069,190	168,542,316	27,384,302	16.25%	195,926,618

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.3. Provide a schedule of present and proposed tariff rates showing dollar change and percent of change by block. Provide increases to customers at various monthly uses (each 5,000 gallon consumption increment) showing billings at existing and proposed rates. Provide also an explanation of any change in block structure and the reason therefore. Provide a copy of the proposed tariff or tariff supplement on a red line basis, to easily identify any changes.

RESPONSE:

Please refer to the Cost of Service analysis and the testimony of Harold J. Smith.

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.4. Provide for the future test year a detailed customer consumption analysis and the application of rates to support present and proposed revenues by customer classification and tariff rate schedule.

RESPONSE:

Please see the attached schedules.

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Current Rates**

	FY 2019			PUC Approved Prior Tariff Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Water Revenues								
2 Residential								
3 5/8"	59,490	713,878	1,836,041	\$ 23.25	\$ 9.41	\$ 15,861,866	\$ 16,511,228	\$ 32,373,094
4 3/4"	2,578	30,934	123,071	37.83	9.41	1,118,355	1,106,757	2,225,113
5 1"	2,295	27,536	141,601	76.58	9.41	2,015,225	1,273,398	3,288,623
6 1 1/2"	-	-	-	149.47	9.41	-	-	-
7 2"	-	-	-	246.53	9.41	-	-	-
8 3"	-	-	-	546.96	9.41	-	-	-
9 4"	-	-	-	924.52	9.41	-	-	-
10 6"	-	-	-	2,181.24	9.41	-	-	-
11 8"	-	-	-	3,919.64	9.41	-	-	-
12 10" & Above	-	-	-	6,408.43	9.41	-	-	-
13 Total: Residential	64,362	772,348	2,100,713			\$ 18,995,446	\$ 18,891,384	\$ 37,886,830
14								
15 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 11.63	\$ 9.41	\$ 295,028	\$ -	\$ 295,028
17 3/4"	26	312	-	18.92	9.41	5,640	-	5,640
18 1"	2	24	-	38.29	9.41	878	-	878
19 1 1/2"	-	-	-	74.74	9.41	-	-	-
20 2"	-	-	-	123.27	9.41	-	-	-
21 3"	-	-	-	273.48	9.41	-	-	-
22 4"	-	-	-	462.26	9.41	-	-	-
23 6"	-	-	-	1,090.62	9.41	-	-	-
24 8"	-	-	-	1,959.82	9.41	-	-	-
25 10" & Above	-	-	-	3,204.22	9.41	-	-	-
26 Total: Residential - CAP	2,241	26,892	-			\$ 301,546	\$ -	\$ 301,546
27								
28 Commercial								
29 5/8"	2,693	32,311	139,919	\$ 23.25	\$ 8.93	\$ 717,928	\$ 1,194,088	\$ 1,912,015
30 3/4"	682	8,184	48,170	37.83	8.93	295,876	411,092	706,968
31 1"	1,312	15,745	147,483	76.58	8.93	1,152,299	1,258,642	2,410,941
32 1 1/2"	870	10,439	254,591	149.47	8.93	1,491,146	2,172,713	3,663,860
33 2"	792	9,503	453,608	246.53	8.93	2,238,916	3,871,147	6,110,063
34 3"	241	2,893	396,230	546.96	8.93	1,512,207	3,381,475	4,893,682
35 4"	199	2,387	725,387	924.52	8.93	2,108,997	6,190,537	8,299,535
36 6"	85	1,017	649,134	2,181.24	8.93	2,119,980	5,539,789	7,659,769
37 8"	8	95	295,054	3,919.64	8.93	355,858	2,518,026	2,873,885
38 10" & Above	-	-	-	6,408.43	8.93	-	-	-
39 Total: Commercial	6,881	82,574	3,109,578			\$ 11,993,208	\$ 26,537,510	\$ 38,530,718
40								
41 Industrial								
42 5/8"	22	258	504	\$ 23.25	\$ 7.51	\$ 5,733	\$ 3,617	\$ 9,350
43 3/4"	14	162	166	37.83	7.51	5,857	1,191	7,048
44 1"	28	335	3,468	76.58	7.51	24,517	24,886	49,404
45 1 1/2"	6	72	302	149.47	7.51	10,285	2,167	12,452
46 2"	16	187	15,272	246.53	7.51	44,057	109,608	153,665
47 3"	2	24	13,262	546.96	7.51	12,545	95,182	107,727
48 4"	8	98	61,543	924.52	7.51	86,586	441,699	528,285
49 6"	2	24	4,926	2,181.24	7.51	50,029	35,354	85,383
50 8"	4	48	63,099	3,919.64	7.51	179,802	452,866	632,668
51 10" & Above	-	-	-	6,408.43	7.51	-	-	-
52 Total: Industrial	101	1,208	162,541			\$ 419,411	\$ 1,166,572	\$ 1,585,983
53								
54 Health or Education								
55 5/8"	34	408	1,358	\$ 23.25	\$ 12.21	\$ 9,065	\$ 15,846	\$ 24,912
56 3/4"	9	109	539	37.83	12.21	3,941	6,289	10,230
57 1"	26	308	3,877	76.58	12.21	22,541	45,240	67,781
58 1 1/2"	65	779	10,713	149.47	12.21	111,275	125,007	236,282
59 2"	160	1,921	81,396	246.53	12.21	452,589	949,786	1,402,375
60 3"	104	1,252	193,559	546.96	12.21	654,436	2,258,588	2,913,025
61 4"	73	877	381,066	924.52	12.21	774,860	4,446,554	5,221,414
62 6"	38	450	449,187	2,181.24	12.21	938,044	5,241,429	6,179,473
63 8"	3	36	59,591	3,919.64	12.21	134,852	695,350	830,202
64 10" & Above	2	29	106,338	6,408.43	12.21	177,606	1,240,828	1,418,433
65 Total: Health or Education	514	6,169	1,287,624			\$ 3,279,209	\$ 15,024,917	\$ 18,304,127
66								
67 Fire System								
68 1" or Less	1,130	13,559	3,253	\$ 26.94	\$ 11.50	\$ 349,086	\$ 35,746	\$ 384,832
69 1 1/2"-3"	64	773	199	71.02	11.50	52,465	2,187	54,652
70 4"	6	66	3	151.40	11.50	9,549	33	9,582
71 6" or Greater	15	181	596	433.13	11.50	74,921	6,550	81,471
72 Total: Fire System	1,215	14,579	4,051			\$ 486,021	\$ 44,516	\$ 530,538
73								
74 Total: Water (Units & Sales)	75,314	903,770	6,664,507			\$ 35,474,843	\$ 61,664,899	\$ 97,139,741

(1) Represents billable customer usage above minimum allowance included in minimum charge
 (2) User charge revenues include an adjustment factor to reflect actual collections.
 (3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Proposed Rates**

	FY 2019			Proposed Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Water Revenues								
2 Residential								
3 5/8"	59,490	713,878	1,836,041	\$ 27.77	\$ 11.03	\$ 18,945,550	\$ 19,353,756	\$ 38,299,305
4 3/4"	2,578	30,934	123,071	45.79	11.03	1,353,674	1,297,294	2,650,968
5 1"	2,295	27,536	141,601	93.73	11.03	2,466,532	1,492,623	3,959,155
6 1 1/2"	-	-	-	183.87	11.03	-	-	-
7 2"	-	-	-	303.92	11.03	-	-	-
8 3"	-	-	-	675.49	11.03	-	-	-
9 4"	-	-	-	1,142.48	11.03	-	-	-
10 6"	-	-	-	2,696.91	11.03	-	-	-
11 8"	-	-	-	4,847.16	11.03	-	-	-
12 10" & Above	-	-	-	7,925.65	11.03	-	-	-
13 Total Residential	64,362	772,348	2,100,713			\$ 22,765,756	\$ 22,143,673	\$ 44,909,428
14 Residential - CAP (3)								
15 5/8"	2,213	26,556	-	\$ 13.89	\$ 11.03	\$ 352,384	\$ -	\$ 352,384
17 3/4"	26	312	-	22.90	11.03	6,827	-	6,827
18 1"	2	24	-	46.87	11.03	1,075	-	1,075
19 1 1/2"	-	-	-	91.94	11.03	-	-	-
20 2"	-	-	-	151.96	11.03	-	-	-
21 3"	-	-	-	337.75	11.03	-	-	-
22 4"	-	-	-	571.24	11.03	-	-	-
23 6"	-	-	-	1,348.46	11.03	-	-	-
24 8"	-	-	-	2,423.58	11.03	-	-	-
25 10" & Above	-	-	-	3,962.83	11.03	-	-	-
26 Total Residential - CAP	2,241	26,892	-			\$ 360,285	\$ -	\$ 360,285
27 Commercial								
28 5/8"	2,693	32,311	139,919	\$ 27.77	\$ 11.67	\$ 857,499	\$ 1,560,471	\$ 2,417,970
30 3/4"	682	8,184	48,170	45.79	11.67	358,132	537,228	895,360
31 1"	1,312	15,745	147,484	93.73	11.67	1,410,356	1,644,832	3,055,188
32 1 1/2"	870	10,439	254,591	183.87	11.67	1,834,328	2,839,369	4,673,697
33 2"	792	9,503	453,608	303.92	11.67	2,760,116	5,058,935	7,819,051
34 3"	241	2,893	396,230	675.49	11.67	1,867,561	4,419,016	6,286,576
35 4"	199	2,387	725,387	1,142.48	11.67	2,606,204	8,089,986	10,696,189
36 6"	85	1,017	649,134	2,696.91	11.67	2,621,167	7,239,568	9,860,735
37 8"	8	95	295,054	4,847.16	11.67	440,066	3,290,635	3,730,701
38 10" & Above	-	-	-	7,925.65	11.67	-	-	-
39 Total Commercial	6,881	82,574	3,109,578			\$ 14,755,429	\$ 34,680,038	\$ 49,435,468
40 Industrial								
41 5/8"	22	258	504	\$ 27.77	\$ 10.04	\$ 6,847	\$ 4,836	\$ 11,683
43 3/4"	14	162	166	45.79	10.04	7,089	1,593	8,682
44 1"	28	335	3,468	93.73	10.04	30,008	33,270	63,278
45 1 1/2"	6	72	302	183.87	10.04	12,652	2,898	15,549
46 2"	16	187	15,272	303.92	10.04	54,314	146,533	200,847
47 3"	2	24	13,262	675.49	10.04	15,493	127,248	142,741
48 4"	8	98	61,543	1,142.48	10.04	107,000	590,500	697,499
49 6"	2	24	4,926	2,696.91	10.04	61,856	47,265	109,121
50 8"	4	48	63,099	4,847.16	10.04	222,349	605,429	827,779
51 10" & Above	-	-	-	7,925.65	10.04	-	-	-
52 Total Industrial	101	1,208	162,541			\$ 517,608	\$ 1,559,571	\$ 2,077,179
53 Health or Education								
54 5/8"	34	408	1,358	\$ 27.77	\$ 13.90	\$ 10,828	\$ 18,039	\$ 28,867
56 3/4"	9	109	539	45.79	13.90	4,770	7,160	11,930
57 1"	26	308	3,877	93.73	13.90	27,589	51,501	79,090
58 1 1/2"	65	779	10,713	183.87	13.90	136,885	142,309	279,194
59 2"	160	1,921	81,396	303.92	13.90	557,948	1,081,247	1,639,195
60 3"	104	1,252	193,559	675.49	13.90	808,222	2,571,202	3,379,424
61 4"	73	877	381,066	1,142.48	13.90	957,537	5,062,007	6,019,544
62 6"	38	450	449,187	2,696.91	13.90	1,159,809	5,966,901	7,126,709
63 8"	3	36	59,591	4,847.16	13.90	166,762	791,595	958,357
64 10" & Above	2	29	106,338	7,925.65	13.90	219,655	1,412,572	1,632,227
65 Total Health or Education	514	6,169	1,287,624			\$ 4,050,004	\$ 17,104,533	\$ 21,154,537
66 Fire System								
67 1" or Less	1,130	13,559	3,253	\$ 29.21	\$ 15.01	\$ 378,501	\$ 46,656	\$ 425,157
69 1 1/2"-3"	64	773	199	77.82	15.01	57,488	2,855	60,343
70 4"	6	66	3	166.46	15.01	10,499	43	10,542
71 6" or Greater	15	181	596	477.13	15.01	82,532	8,549	91,081
72 Total Fire System	1,215	14,579	4,051			\$ 529,020	\$ 58,103	\$ 587,123
73 Total: Water (Units & Sales)	75,314	903,770	6,664,507			\$ 42,978,102	\$ 75,545,919	\$ 118,524,020

(1) Represents billable customer usage above minimum allowance included in minimum charge
 (2) User charge revenues include an adjustment factor to reflect actual collections.
 (3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Current Rates**

	FY 2019			PUC Approved Prior Tariff Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Wastewater Revenues								
2 Residential								
3 5/8"	83,875	1,006,501	1,865,883	\$ 7.71	\$ 6.92	\$ 7,416,106	\$ 12,339,506	\$ 19,755,612
4 3/4"	2,603	31,234	122,845	15.62	6.92	466,247	812,403	1,278,650
5 1"	2,314	27,764	141,795	37.10	6.92	984,381	937,724	1,922,105
6 1 1/2"	-	-	-	76.62	6.92	-	-	-
7 2"	-	-	-	129.72	6.92	-	-	-
8 3"	-	-	-	295.88	6.92	-	-	-
9 4"	-	-	-	506.20	6.92	-	-	-
10 6"	-	-	-	1,213.27	6.92	-	-	-
11 8"	-	-	-	2,197.82	6.92	-	-	-
12 10" & Above	-	-	-	3,618.63	6.92	-	-	-
13 Total Residential	88,792	1,065,499	2,130,523			\$ 8,866,734	\$ 14,089,633	\$ 22,956,367
14								
15 Residential - CAP (3)								
16 5/8"	2,213	26,556	-	\$ 3.86	\$ 6.92	\$ 97,835	\$ -	\$ 97,835
17 3/4"	26	312	-	7.81	6.92	2,329	-	2,329
18 1"	2	24	-	18.55	6.92	425	-	425
19 1 1/2"	-	-	-	38.31	6.92	-	-	-
20 2"	-	-	-	64.86	6.92	-	-	-
21 3"	-	-	-	147.94	6.92	-	-	-
22 4"	-	-	-	253.10	6.92	-	-	-
23 6"	-	-	-	606.64	6.92	-	-	-
24 8"	-	-	-	1,098.91	6.92	-	-	-
25 10" & Above	-	-	-	1,809.32	6.92	-	-	-
26 Total Residential - CAP	2,241	26,892	-			\$ 100,589	\$ -	\$ 100,589
27								
28 Commercial								
29 5/8"	3,667	44,004	138,870	\$ 7.71	\$ 6.11	\$ 324,230	\$ 810,882	\$ 1,135,113
30 3/4"	801	9,611	49,327	15.62	6.11	143,469	288,029	431,497
31 1"	1,553	18,634	153,194	37.10	6.11	660,674	894,522	1,555,197
32 1 1/2"	908	10,892	256,339	76.62	6.11	797,549	1,496,797	2,294,346
33 2"	887	10,644	461,544	129.72	6.11	1,319,530	2,695,015	4,014,545
34 3"	239	2,864	396,049	295.88	6.11	809,834	2,312,584	3,122,418
35 4"	217	2,608	745,543	506.20	6.11	1,261,645	4,353,327	5,614,972
36 6"	106	1,267	671,265	1,213.27	6.11	1,469,066	3,919,610	5,388,676
37 8"	10	114	298,482	2,197.82	6.11	239,444	1,742,877	1,982,321
38 10" & Above	-	-	-	3,618.63	6.11	-	-	-
39 Total Commercial	8,387	100,638	3,170,614			\$ 7,025,440	\$ 18,513,643	\$ 25,539,083
40								
41 Industrial								
42 5/8"	20	240	506	\$ 7.71	\$ 5.57	\$ 1,768	\$ 2,693	\$ 4,462
43 3/4"	13	154	166	15.62	5.57	2,299	884	3,182
44 1"	28	335	3,468	37.10	5.57	11,878	18,458	30,335
45 1 1/2"	6	72	302	76.62	5.57	5,272	1,608	6,880
46 2"	18	210	15,607	129.72	5.57	26,034	83,076	109,110
47 3"	2	24	13,262	295.88	5.57	6,786	70,595	77,381
48 4"	9	108	61,898	506.20	5.57	52,246	329,490	381,736
49 6"	2	24	4,926	1,213.27	5.57	27,828	26,221	54,049
50 8"	4	48	63,099	2,197.82	5.57	100,819	335,881	436,699
51 10" & Above	-	-	-	3,618.63	5.57	-	-	-
52 Total Industrial	101	1,215	163,234			\$ 234,929	\$ 868,905	\$ 1,103,834
53								
54 Health or Education								
55 5/8"	34	408	1,358	\$ 7.71	\$ 7.64	\$ 3,006	\$ 9,915	\$ 12,921
56 3/4"	9	109	539	15.62	7.64	1,627	3,935	5,563
57 1"	26	308	3,877	37.10	7.64	10,920	28,307	39,227
58 1 1/2"	65	779	10,713	76.62	7.64	57,041	78,219	135,260
59 2"	160	1,921	81,396	129.72	7.64	238,145	594,297	832,442
60 3"	104	1,250	193,547	295.88	7.64	353,454	1,413,149	1,766,603
61 4"	73	876	388,561	506.20	7.64	423,773	2,837,006	3,260,779
62 6"	37	442	440,805	1,213.27	7.64	512,492	3,218,454	3,730,946
63 8"	3	36	59,591	2,197.82	7.64	75,614	435,092	510,706
64 10" & Above	2	29	106,338	3,618.63	7.64	100,288	776,407	876,695
65 Total Health or Education	513	6,158	1,286,726			\$ 1,776,361	\$ 9,394,782	\$ 11,171,143
66								
67 Fire System								
68 1" or Less	1,130	13,559	3,220	\$ -	\$ 9.17	\$ -	\$ 28,214	\$ 28,214
69 1 1/2"-3"	64	773	232	-	9.17	-	2,033	2,033
70 4"	6	66	3	-	9.17	-	26	26
71 6" or Greater	15	181	596	-	9.17	-	5,223	5,223
72 Total Fire System	1,215	14,579	4,051			\$ -	\$ 35,497	\$ 35,497
73								
74 Total Wastewater (Units & Sales)	101,248	1,214,981	6,755,147			\$ 18,004,053	\$ 42,902,459	\$ 60,906,513

(1) Represents billable customer usage above minimum allowance included in minimum charge

(2) User charge revenues include an adjustment factor to reflect actual collections.

(3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

**Pittsburgh Water & Sewer Authority
Rate Case 2018
Rate Revenue at Proposed Rates**

	FY 2019			Proposed Rates		FY 2019		
	Number of Meters	Number of Annual Bills	Billable Usage (Kgal) (1)	Monthly Min. Charge	Volume Charge (Kgal)	Min. Charge Revenue (2)	Vol. Charge Revenue (2)	Total Rate Revenue
1 Wastewater Revenues								
2 Residential								
3 5/8"	83,875	1,006,501	1,865,883	\$ 11.28	\$ 6.56	\$ 10,850,023	\$ 11,697,567	\$ 22,547,589
4 3/4"	2,603	31,234	122,845	18.65	6.56	556,690	770,139	1,326,830
5 1"	2,314	27,764	141,795	40.27	6.56	1,068,491	888,941	1,957,432
6 1 1/2"	-	-	-	77.12	6.56	-	-	-
7 2"	-	-	-	128.21	6.56	-	-	-
8 3"	-	-	-	294.32	6.56	-	-	-
9 4"	-	-	-	509.61	6.56	-	-	-
10 6"	-	-	-	1,256.86	6.56	-	-	-
11 8"	-	-	-	2,318.86	6.56	-	-	-
12 10" & Above	-	-	-	3,888.48	6.56	-	-	-
13 Total: Residential	88,792	1,065,499	2,130,523			\$ 12,475,204	\$ 13,356,647	\$ 25,831,851
14 Residential - CAP (3)								
15 5/8"	2,213	26,556	-	\$ 5.64	\$ 6.56	\$ 143,136	\$ -	\$ 143,136
16 3/4"	26	312	-	9.33	6.56	2,780	-	2,780
17 1"	2	24	-	20.14	6.56	462	-	462
18 1 1/2"	-	-	-	38.56	6.56	-	-	-
19 2"	-	-	-	64.11	6.56	-	-	-
20 3"	-	-	-	147.16	6.56	-	-	-
21 4"	-	-	-	254.81	6.56	-	-	-
22 6"	-	-	-	628.43	6.56	-	-	-
23 8"	-	-	-	1,159.43	6.56	-	-	-
24 10" & Above	-	-	-	1,944.24	6.56	-	-	-
25 Total: Residential - CAP	2,241	26,892	-			\$ 146,378	\$ -	\$ 146,378
27 Commercial								
28 5/8"	3,667	44,004	138,870	\$ 11.28	\$ 6.97	\$ 474,361	\$ 925,016	\$ 1,399,377
29 3/4"	801	9,611	49,327	18.65	6.97	171,299	328,569	499,868
30 1"	1,553	18,634	153,194	40.27	6.97	717,125	1,020,429	1,737,554
31 1 1/2"	908	10,892	256,339	77.12	6.97	802,753	1,707,476	2,510,229
32 2"	887	10,644	461,544	128.21	6.97	1,304,170	3,074,347	4,378,516
33 3"	239	2,864	396,049	294.32	6.97	805,564	2,638,086	3,443,651
34 4"	217	2,608	745,543	509.61	6.97	1,270,144	4,966,070	6,236,214
35 6"	106	1,267	671,265	1,256.86	6.97	1,521,846	4,471,306	5,993,152
36 8"	10	114	298,482	2,318.86	6.97	252,631	1,988,192	2,240,823
37 10" & Above	-	-	-	3,888.48	6.97	-	-	-
38 Total: Commercial	8,387	100,638	3,170,614			\$ 7,319,893	\$ 21,119,491	\$ 28,439,384
40 Industrial								
41 5/8"	20	240	506	\$ 11.28	\$ 7.03	\$ 2,587	\$ 3,399	\$ 5,987
42 3/4"	13	154	166	18.65	7.03	2,745	1,115	3,860
43 1"	28	335	3,468	40.27	7.03	12,892	23,296	36,188
44 1 1/2"	6	72	302	77.12	7.03	5,306	2,029	7,335
45 2"	18	210	15,607	128.21	7.03	25,731	104,852	130,583
46 3"	2	24	13,262	294.32	7.03	6,751	89,099	95,849
47 4"	9	108	61,898	509.61	7.03	52,598	415,855	468,453
48 6"	2	24	4,926	1,256.86	7.03	28,827	33,095	61,922
49 8"	4	48	63,099	2,318.86	7.03	106,371	423,921	530,292
50 10" & Above	-	-	-	3,888.48	7.03	-	-	-
51 Total: Industrial	101	1,215	163,234			\$ 243,808	\$ 1,096,661	\$ 1,340,469
53 Health or Education								
54 5/8"	34	408	1,358	\$ 11.28	\$ 7.30	\$ 4,398	\$ 9,474	\$ 13,872
55 3/4"	9	109	539	18.65	7.30	1,943	3,760	5,703
56 1"	26	308	3,877	40.27	7.30	11,853	27,047	38,901
57 1 1/2"	65	779	10,713	77.12	7.30	57,413	74,738	132,151
58 2"	160	1,921	81,396	128.21	7.30	235,373	567,849	803,222
59 3"	104	1,250	193,547	294.32	7.30	351,590	1,350,260	1,701,850
60 4"	73	876	388,561	509.61	7.30	426,628	2,710,752	3,137,380
61 6"	37	442	440,805	1,256.86	7.30	530,905	3,075,225	3,606,129
62 8"	3	36	59,591	2,318.86	7.30	79,778	415,730	495,508
63 10" & Above	2	29	106,338	3,888.48	7.30	107,767	741,854	849,621
64 Total: Health or Education	513	6,158	1,286,726			\$ 1,807,649	\$ 8,976,689	\$ 10,784,338
66 Fire System								
67 1" or Less	1,130	13,559	3,220	\$ -	\$ -	\$ -	\$ -	\$ -
68 1 1/2"-3"	64	773	232	-	-	-	-	-
69 4"	6	66	3	-	-	-	-	-
70 6" or Greater	15	181	596	-	-	-	-	-
71 Total: Fire System	1,215	14,579	4,051			\$ -	\$ -	\$ -
73								
74 Total: Wastewater (Units & Sales)	101,248	1,214,981	6,755,147			\$ 21,992,932	\$ 44,549,488	\$ 66,542,420

(1) Represents billable customer usage above minimum allowance included in minimum charge

(2) User charge revenues include an adjustment factor to reflect actual collections.

(3) Residential CAP customers billable usage is included in the "Residential" class since there is no discount for volumetric charges

II. OPERATING REVENUES

II.5. Provide detailed computations of the determination of accrued revenues as of historic test year-end and year-end immediately preceding the historic test year, together with a detailed explanation of the procedures and methods used in developing accrued revenues.

RESPONSE:

PWSA's audited financial statements are prepared using the economic resources measurement focus and the accrual basis of accounting in accordance with accounting principles generally accepted in the United States of America, as prescribed by the Governmental Accounting Standards Board (GASB). Revenues are recorded when earned, regardless of the timing of related cash flows.

For the purpose of this rate filing, PWSA utilizing a cash basis and therefore there are no adjustments for accrued revenues. Revenues for each year of this filing are calculated using actual or projected customer units and the effective, or for the FPFTY, proposed, rates for the appropriate year. A collection factor is then applied to the system revenues to reflect actual cash collections for each year. More information and detailed calculations are available upon request.

II. OPERATING REVENUES

II.6. Provide a detailed breakdown of miscellaneous water revenues for the historic test year and the two years immediately preceding the historic test year. For the historic test year, provide a monthly breakdown and an explanation of monthly variances greater than 15%.

RESPONSE:

Please see attached schedule.

Explanations of Miscellaneous Revenues Variances

Variances of 15% or more occur almost every month across many accounts. A generic explanation is provided below for all material accounts.

Dye Testing

PWSA charges dye testing fees under City Ordinance No. 3 of 2006, adopted March 28, 2006, effective July 5, 2006, as codified in Title Four, Public Places and Property, Article III Sewers, Chapter 433, Illegal Storm Water Connections, of the Pittsburgh Code, and includes any amendments thereto. Dye testing refers to commonly accepted plumbing test whereby a nontoxic, non-staining dye is introduced into the surface Storm Water collection system of real property to determine if any surface Storm Water is entering the Sanitary Sewer system. PWSA collects application and inspection fees that fluctuate monthly.

Fire Hydrant Line Use

All water used through the fire system except during fires is metered, and the associated sized meter will be installed for the requested line size for each line used. Customers using hydrants for non-firefighting purposes are assessed a monthly minimum charge and metered usage charge. These charges fluctuate based on customer needs.

Backflow Fees

Business Use Properties are required to be equipped with an approved Backflow prevention device per section 608 of the Health Department's Plumbing Code. Backflow refers to the flow of water and other liquids, mixtures, and substances into the Authority's Water Mains, or into other lines carrying domestic water, from any sources other than those intended by the Authority. PWSA collects various charges related to backflow prevention including application and administration fees as well as inspection fees. These collections fluctuate monthly based on demand.

II. OPERATING REVENUES

Meter Sales

PWSA previously charges associated with meters, remote reading devices, meter replacement charges, and their installation. Based on PA PUC regulation, PWSA may not be able to collect these charges and, as such, these revenues have been excluded from the FPPTY.

Non-Sufficient Funds Fees

PWSA collects non-sufficient funds fees based on returned checks and in sufficient payments. These charges are based on customer payment patterns and fluctuate monthly.

Shut Fees

Customers are assessed shut off service fees when discontinuing service, whether voluntarily or involuntary. Shut fees fluctuate with service discontinuance patterns.

Tap Fees

PWSA charges tap fees to customers connecting to the system. These charges, which increase by meter size, recover both a share of the operating cost associated with connection to the system as well as a capital component of system "buy-in". These fees also fluctuate significantly based on a number of external factors. Large jumps typically indicate a tap fee assessed for a large meter (or meters) or a development paying a large number of tap fees.

Miscellaneous Fees (300)

The miscellaneous fees 300 account includes water miscellaneous revenues largely of immaterial amounts. Examples of these revenues include, tower rental payments from Verizon, scrap metal sales, immaterial reimbursements from vendors, ALCOSAN incidentals such as paper, ink, and materials for billing, past due reimbursements, occasional water billing adjustments, and other miscellaneous sources. These amounts fluctuate monthly based on various activity.

Miscellaneous Fees (400)

The miscellaneous fees 300 account includes sewer billing adjustments largely of immaterial amounts. These adjustments occur infrequently and at varying amounts.

Penalties & Interest

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

If current water and sewer bills are not paid in full by their due dates, interest of .0083 percent per month is applied to the outstanding balance. Unpaid water and sewer charges are a lien on the property and any resulting fines or penalties are the responsibility of the customer. These charges are based on customer payment patterns and fluctuate monthly.

Pittsburgh Water & Sewer Authority
Miscellaneous Utility Revenues

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Misc Utility Revenue			
Dye Testing	\$ 162,591	\$ 162,116	\$ 168,010
Fire Hydrant Line Use	74,679	106,934	105,996
Fire Hydrant Sales	9,040	5,079	5,500
Map Fees	625	213	40
Backflow Fee	24,677	40,583	26,573
Meter Sales	178,233	169,127	73,955
Meter Test Fees	-	-	4,949
Non-Sufficient Funds Fees	21,659	21,223	27,053
Shut Fees	488,824	539,394	526,320
Tap Fees	1,573,643	3,005,809	1,907,576
Lien Satisfaction Fees	222	720	646
Miscellaneous Fees (300)	1,093,981	710,125	946,011
Miscellaneous Fees (400)	23,169	23,304	13,717
Penalties & Interest	487,481	677,999	895,970
Unmetered User Charges	268,234	275,224	313,199
Total: Misc. Utility Revenue	\$4,407,057	\$5,737,849	\$5,015,515

	HTY ACTUAL Jan-17	HTY ACTUAL Feb-17	HTY ACTUAL Mar-17	HTY ACTUAL Apr-17	HTY ACTUAL May-17	HTY ACTUAL Jun-17	HTY ACTUAL Jul-17	HTY ACTUAL Aug-17	HTY ACTUAL Sep-17	HTY ACTUAL Oct-17	HTY ACTUAL Nov-17	HTY ACTUAL Dec-17
Monthly Totals for HTY												
Dye Testing	\$ 11,375	\$ 10,375	\$ 16,400	\$ 14,900	\$ 19,925	\$ 18,135	\$ 12,625	\$ 16,475	\$ 10,875	\$ 13,325	\$ 11,875	\$ 11,725
Fire Hydrant Line Use	3,000	8,259	8,859	7,039	6,000	19,245	4,500	15,578	9,619	9,579	8,359	5,960
Fire Hydrant Sales	-	-	1,500	-	-	1,000	-	500	1,500	-	1,000	-
Map Fees	-	15	-	15	-	-	-	10	-	-	-	-
Backflow Fee	6,548	6,269	4,340	3,173	1,954	685	1,117	51	305	761	279	1,091
Meter Sales	10,985	4,552	6,766	5,485	10,998	3,468	3,218	8,314	7,385	3,787	5,706	3,291
Meter Test Fees	-	-	-	-	483	689	419	276	770	-	-	2,311
Non-Sufficient Funds Fees	2,405	(597)	3,928	2,283	2,466	2,406	2,953	2,558	3,014	2,497	2,865	274
Shut Fees	12,977	62,829	67,916	36,259	72,902	47,068	45,627	61,219	31,366	53,265	25,942	8,952
Tap Fees	118,974	94,888	91,486	34,640	593,385	67,931	43,856	149,035	455,364	42,946	184,130	30,941
Lien Satisfaction Fees	-	181	-	63	-	105	-	98	46	81	-	72
Miscellaneous Fees (300)	70,046	19,746	368,564	60,086	49,650	52,631	33,282	40,827	30,143	35,831	164,026	21,180
Miscellaneous Fees (400)	4,299	1,486	426	620	1,614	172	1,586	1,367	527	-	1,101	521
Penalties & Interest	52,269	84,903	(53,934)	73,310	88,661	64,840	76,684	86,992	93,779	133,118	75,374	119,976
Total: Misc. Utility Revenue	\$ 292,878	\$ 292,905	\$ 516,251	\$ 237,873	\$ 848,037	\$ 278,374	\$ 225,867	\$ 383,299	\$ 644,691	\$ 295,190	\$ 480,656	\$ 206,295

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.7. Provide a monthly summary of customers added and lost by customer classification for the historic test year and the current year-to-date.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.8. Provide for the historic test year and the current year-to-date, the number of customers and monthly consumption for each classification of customers.

RESPONSE:

Please see the attached schedule for the customer billing information for the HTY (Jan-Dec 2017) and the FTY YTD (Jan-Feb 2018). The attached billing information was used for the customer billing analysis as a part of the Cost of Service Study and the direct testimony of Harold J. Smith. The data was provided in March 2018 and, therefore, March-May are not presented. Additional year-to-date information is available upon request.

Pittsburgh Water & Sewer Authority
HTY & YTD Customers and Consumption

Summary of Customers and Consumption - Water
 HTY 2017 Summary of Customers and Consumption

CLASS	Historical Test Year Ended Dec. 31											
	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17
Residential												
Number of Accounts Billed	66,235	66,242	66,202	66,036	66,275	81,934	50,323	71,194	60,946	66,145	66,202	71,506
Total Consumption	254,409	273,101	246,231	227,947	219,093	297,219	191,692	258,202	239,100	231,872	245,182	239,194
Billable Consumption	185,777	204,450	178,191	160,520	151,245	213,963	138,088	185,196	174,835	164,123	177,200	167,126
Commercial												
Number of Accounts Billed	6,864	6,901	6,858	6,836	6,844	8,169	5,470	7,470	6,079	6,783	6,782	7,518
Total Consumption	269,357	424,635	324,293	274,245	255,695	341,652	343,571	401,003	308,257	293,299	282,194	243,187
Billable Consumption	217,496	366,534	269,165	220,430	203,157	279,283	295,275	343,088	257,207	239,758	229,210	188,974
Industrial												
Number of Accounts Billed	99	101	99	97	98	125	82	103	100	103	100	101
Total Consumption	10,770	18,757	15,523	9,655	10,606	27,825	9,317	19,296	18,226	16,633	14,225	12,293
Billable Consumption	9,218	16,716	13,803	8,147	8,999	25,056	8,463	17,572	16,497	14,976	12,548	10,547
Health or Education												
Number of Accounts Billed	497	536	561	512	518	558	470	520	485	498	501	513
Total Consumption	83,478	155,249	141,179	91,430	117,047	125,660	161,319	133,960	136,735	138,038	115,362	83,946
Billable Consumption	69,071	133,775	122,490	75,967	101,195	109,991	146,462	118,487	121,271	121,723	99,051	68,141
Fire System												
Number of Accounts Billed	1,178	1,198	1,213	1,222	1,197	1,383	1,031	1,312	1,105	1,214	1,209	1,317
Total Consumption	428	530	337	225	293	516	380	493	509	364	622	358
Billable Consumption	337	439	254	180	221	419	298	397	419	284	536	267
TOTAL												
NUMBER OF ACCOUNTS BILLED	74,873	74,978	74,933	74,703	74,932	92,169	57,376	80,599	68,715	74,743	74,794	80,955
TOTAL CONSUMPTION	618,442	872,272	727,563	603,502	602,734	792,872	706,279	812,954	702,827	680,206	657,585	578,978
BILLABLE CONSUMPTION	481,899	721,914	583,903	465,244	464,817	628,712	588,585	664,740	570,229	540,864	518,545	435,055

**Pittsburgh Water & Sewer Authority
HTY & YTD Customers and Consumption**

Summary of Customers and Consumption - Wastewater
HTY 2017 Summary of Customers and Consumption

CLASS	Historical Test Year Ended Dec. 31											
	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17
Residential												
Customers	79,799	89,364	96,315	91,450	91,709	107,712	76,103	96,646	86,309	91,656	91,535	93,793
Total Consumption	253,076	276,528	250,391	232,130	223,460	302,206	196,318	262,681	243,488	235,817	249,803	242,660
Billable Consumption	181,362	206,432	180,921	163,601	154,512	217,823	141,622	188,591	178,137	166,983	180,730	169,809
Commercial												
Customers	7,673	8,308	8,817	8,385	8,413	9,808	7,040	9,041	7,632	8,348	8,349	8,824
Total Consumption	275,693	435,217	326,633	276,433	258,490	365,409	347,980	417,662	313,168	298,291	286,982	245,580
Billable Consumption	222,092	375,541	270,716	222,001	205,238	288,418	298,848	358,874	261,235	243,844	232,977	190,831
Industrial												
Customers	101	104	103	98	98	127	83	103	99	101	99	99
Total Consumption	10,784	18,789	15,579	9,687	10,633	27,884	9,425	19,393	18,331	16,673	14,394	12,369
Billable Consumption	9,222	16,736	13,841	8,175	9,023	25,090	8,560	17,658	16,593	15,014	12,708	10,615
Health or Education												
Customers	491	530	562	512	518	558	470	520	485	498	501	513
Total Consumption	77,161	147,625	141,719	91,642	117,220	125,825	161,319	133,960	136,759	149,356	115,362	83,946
Billable Consumption	63,204	126,482	122,831	76,176	101,367	110,272	146,462	118,487	121,253	133,035	99,034	68,123
Fire System												
Customers	1,177	1,197	1,212	1,221	1,197	1,383	1,031	1,312	1,105	1,214	1,209	1,317
Total Consumption	700	959	632	420	548	967	723	849	923	670	1,063	676
Billable Consumption	337	439	254	180	221	419	298	397	419	284	536	267
TOTAL												
NUMBER OF ACCOUNTS BILLED	89,241	99,503	107,009	101,666	101,935	119,588	84,727	107,622	95,630	101,817	101,693	104,546
TOTAL CONSUMPTION	617,415	879,119	734,954	610,312	610,350	822,291	715,765	834,545	712,669	700,807	667,605	585,230
BILLABLE CONSUMPTION	476,217	725,629	588,563	470,134	470,360	642,022	595,790	684,007	577,637	559,160	525,984	439,644

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.9. Provide by customer classification for the historic test year and for the 2 prior years the number of customers and consumption, and projected number of customers and consumption for the 2 subsequent years.

RESPONSE:

Please see the attached schedule.

**Pittsburgh Water & Sewer Authority
Historical & Projected Billing Units**

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017	FTY 12 Months Ended 12/31/2018	FPFTY 12 Months Ended 12/31/2019
Water					
<u>Billed Accounts</u>					
Residential	69,038	67,416	66,603	64,362	64,362
Residential - CAP	-	-	-	2,241	2,241
Commercial	7,254	7,137	6,881	6,881	6,881
Industrial	108	108	101	101	101
Health or Education	596	556	514	514	514
Fire System	1,190	1,211	1,215	1,215	1,215
<i>Total</i>	78,186	76,430	75,314	75,314	75,314
<u>Number of Bills</u>					
Residential	828,451	808,997	799,240	772,348	772,348
Residential - CAP	-	-	-	26,892	26,892
Commercial	87,043	85,647	82,574	82,574	82,574
Industrial	1,301	1,300	1,208	1,208	1,208
Health or Education	7,156	6,676	6,169	6,169	6,169
Fire System	14,281	14,536	14,579	14,579	14,579
<i>Total</i>	938,232	917,156	903,770	903,770	903,770
<u>Billable Consumption (Kgal) (1)</u>					
Residential	2,657,264	2,351,579	2,100,713	2,100,713	2,100,713
Commercial	3,544,635	4,155,937	3,109,578	3,109,578	3,109,578
Industrial	173,245	293,330	162,541	162,541	162,541
Health or Education	1,493,318	1,483,044	1,287,624	1,287,624	1,287,624
Fire System	23,509	7,997	4,051	4,051	4,051
<i>Total</i>	7,891,970	8,291,888	6,664,507	6,664,507	6,664,507
Wastewater					
<u>Billed Accounts</u>					
Residential	67,738	66,365	91,033	88,792	88,792
Residential - CAP	-	-	-	2,241	2,241
Commercial	7,088	7,002	8,387	8,387	8,387
Industrial	108	110	101	101	101
Health or Education	590	550	513	513	513
Fire System	394	225	217	-	-
<i>Total</i>	75,917	74,252	100,250	100,034	100,034
<u>Number of Bills</u>					
Residential	812,852	796,377	1,092,391	1,065,499	1,065,499
Residential - CAP	-	-	-	26,892	26,892
Commercial	85,058	84,024	100,638	100,638	100,638
Industrial	1,296	1,316	1,215	1,215	1,215
Health or Education	7,077	6,601	6,158	6,158	6,158
Fire System	4,724	2,701	2,600	-	-
<i>Total</i>	911,007	891,019	1,203,002	1,200,402	1,200,402
<u>Billable Consumption (Kgal) (1)</u>					
Residential	2,574,683	2,301,322	2,130,523	2,130,523	2,130,523
Commercial	3,573,074	4,320,306	3,170,614	3,170,614	3,170,614
Industrial	173,305	293,331	163,234	163,234	163,234
Health or Education	1,340,876	1,305,727	1,286,726	1,286,726	1,286,726
Fire System	23,519	7,999	4,051	4,051	4,051
<i>Total</i>	7,685,457	8,228,685	6,755,147	6,755,147	6,755,147

(1) It is important to note that PWSA was experiencing billing system problems in 2015 and 2016. Customer counts and billed consumption produced by the billing system are unrealistically high. Consumption presented in billable consumption

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.10. Provide a breakdown of the number and size of private fire services according to the general water service class of customers.

- a. Provide a listing of all public fire protection customers at historic test year-end and the pro forma billing of current rates for each customer.

RESPONSE:

Please see the table below. Private fire protection customers have been grouped by their existing rate classifications. PWSA is considering expanding this set of charges but due to time and data availability constraints, will not be doing so in this rate case filing. The implementation of additional fire protection charges will be included in PWSA's Compliance Plan.

Line Size	HTY 2017 Actual	FTY 2018 Actual	FPFTY 2019 Projected
1" or Less	1,130	1,130	1,130
1 1/2"-3"	64	64	64
4"	6	6	6
6" or Greater	15	15	15

- a. PWSA currently does not charge for public fire protection services. PWSA is considering implementation of public fire protection charges for the City of Pittsburgh but those charges are not a part of this rate case filing.

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.11. Provide a detailed schedule of sales for resale revenues for the historic test year and 2 preceding years showing revenues and units sold by customer.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Water Sales for Resale

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Resale Customer Units (Kgal)			
Allegheny	5,964	7,386	6,978
Aspinwall	69,290	79,175	92,000
Fox Chapel	641,820	617,688	1,170,449
Hampton	3,874	28,400	-
PAWC	11,210	14,000	-
RSRV - 10"	112,950	114,141	81,076
RSRV - 6"	13,258	8,369	12,302
Sharpsburg	12,362	470	-
Westview	-	1,055	-
<i>Total Units</i>	<u>870,728</u>	<u>870,684</u>	<u>1,362,805</u>
Resale Customer Water Billings			
Allegheny	\$ 30,824	\$ 36,944	\$ 39,110
Aspinwall	225,885	258,111	299,920
Fox Chapel	1,168,110	1,115,201	2,199,651
Hampton	15,684	71,051	8,318
PAWC	108,252	123,409	66,107
RSRV - 10"	386,806	396,956	304,543
RSRV - 6"	49,281	33,960	48,901
Sharpsburg	62,130	2,369	-
Westview	71,124	75,701	80,531
<i>Total Billings</i>	<u>\$ 2,118,096</u>	<u>\$ 2,113,701</u>	<u>\$ 3,047,081</u>

Pittsburgh Water and Sewer Authority's Base Rate Filing

II. OPERATING REVENUES

II.12. Provide for the historic test year and the 2 prior years consumption and billings for the ten largest customers at current rates. Provide the historic and future test year consumption priced at proposed rates.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Billings for 10 Largest Customers

	Actual 12 Months Ended 12/31/2015	Actual 12 Months Ended 12/31/2016	HTY Actual 12 Months Ended 12/31/2017	FTY Current 12 Months Ended 12/31/2018	FPFTY Proposed 12 Months Ended 1/1/2019
Top 10 Customers - Usage					
Fox Chapel Water Authority	637,764	572,890	1,170,449	816,968	816,968
University Of Pittsburgh	471,006	448,085	414,995	414,995	414,995
HACP	35,683	140,153	353,583	353,583	353,583
Riverbend Properties, Llc	786,110	738,226	724,835	578,215	600,000
Allegheny County Site # Jln	124,207	130,056	118,960	118,960	118,960
Reserve Water Dept	117,660	101,899	106,101	112,755	112,756
Borough Of Aspinwall	67,308	72,955	103,749	89,793	89,793
Carnegie Mellon University #Bo	48,465	85,079	83,933	83,933	83,933
Duq Univ Facilities Management	86,923	90,180	72,732	72,732	72,732
Allegheny Co Sanitary Auth	<u>52,272</u>	<u>65,564</u>	<u>68,553</u>	<u>68,553</u>	<u>68,553</u>
<i>Total Units</i>	2,427,398	2,445,087	3,217,890	2,710,486	2,732,273
Top 10 Customers - Billings					
Fox Chapel Water Authority	\$ 1,164,120	\$ 1,043,294	\$ 2,195,595	\$ 2,127,355	\$ 2,480,209
University Of Pittsburgh	3,764,138	3,700,656	4,531,142	5,482,682	5,976,124
HACP	219,190	795,855	2,833,543	3,232,797	3,478,659
Riverbend Properties, Llc	1,731,600	1,487,124	2,191,182	1,943,571	1,809,718
Allegheny County Site # Jln	697,825	729,499	890,878	1,016,792	1,202,389
Reserve Water Dept	406,839	354,882	396,755	461,406	485,034
Borough Of Aspinwall	219,418	237,833	342,308	297,214	299,909
Carnegie Mellon University	397,668	697,942	933,057	1,128,998	1,230,608
Duq Univ Facilities Management	746,211	773,912	822,254	994,928	1,084,471
Allegheny Co Sanitary Auth	<u>329,732</u>	<u>392,104</u>	<u>518,291</u>	<u>575,682</u>	<u>741,480</u>
<i>Total Charges</i>	\$ 9,676,742	\$ 10,213,100	\$ 15,655,005	\$ 17,261,424	\$ 18,788,602

II. OPERATING REVENUES

II.13. Provide for the historic test year and the 2 prior years consumption and billings for the ten largest sales for resale customers if such sales are not included in sales to the ten largest customers requested in Part II.12.

RESPONSE:

Please refer to schedule II.11.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.1. Prepare a summary of operating expenses by operating expense account for the historic test year and the 2 years preceding the test year.

RESPONSE:

Please see the attached schedule.

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Direct Operating Expenses			
<u>Wages & Salaries</u>			
4001 Salary.Wages	\$ 11,035,889	\$ 11,352,097	\$ 11,942,744
4005 OT Premium Pay	1,210,877	1,261,335	1,504,742
4010 Shift Differential	6,170	7,311	5,988
4015 Semi Skill	6,223	5,739	6,907
4020 Pay Adjustments	-	-	-
4025 Bonus	-	3,500	-
4030 Holiday Pay	531,144	537,915	579,017
4035 Vacation Pay	984,336	974,011	952,563
4040 Other	-	262	16,230
4045 Sick Pay	133,341	106,802	9,602
4050 Personal Time Pay	444,143	455,301	450,532
4055 Comp Time Taken	177,275	95,045	14,634
4060 Comp Time Earned	-	-	-
4065 Jury Duty	2,029	1,215	2,051
4070 Military Leave	1,092	2,982	-
4075 Supper Pay	17,722	17,060	20,783
4080 Bereavement	22,974	14,515	17,987
4085 Special	52,131	51,540	52,369
4090 Admin Leave	271,864	-	7,838
4095 Severance	<u>102,382</u>	<u>669,892</u>	<u>487,524</u>
Total Wages & Salaries	\$ 14,999,594	\$ 15,556,521	\$ 16,071,511
<u>Employee Benefits</u>			
4110 Fed Ins Contr Act Tx	925,936	945,396	990,699
4115 Medicare	217,829	224,732	232,506
4120 Fed Unemploy Tax	-	-	4
4125 State Unemploy Tax	24,886	65,430	-
4130 Workers Comp Insur	199,241	349,755	561,969
4135 Med Health Ins	2,969,278	2,928,766	3,089,588
4140 Med Hlth Ins Waiver	16,642	28,906	22,183
4145 Short Term Disability	170,670	171,661	161,659
4150 Long Term Disability	35,372	33,200	31,318
4155 Life Ins <50k	28,767	28,008	25,687
4160 Accident.Death.Dismember	3,020	3,175	3,274
4165 Dental Ins	139,668	133,593	132,857
4170 Vision Insur	9,707	8,853	9,512
4174 Cust Serv Week	-	-	550
4175 Uniforms	197,422	174,773	164,450
4180 Tuition Reimburse	28,750	22,330	35,873
4195 Misc Benefits	(19,845)	(21,274)	(22,584)
4199 Payroll Upload Except	<u>(685)</u>	<u>(6,027)</u>	<u>(14)</u>
Total Employee Benefits	\$ 4,946,658	\$ 5,091,276	\$ 5,439,531
TOTAL SALARIES & BENEFITS	\$ 19,946,252	\$ 20,647,796	\$ 21,511,042

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

Direct Operating Expenses	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
<u>Chemicals</u>			
5005 Alum	-	-	-
5010 Boiler Chemicals	25,845	13,311	5,331
5015 Calcium Hypochlorite	-	4,831	1,320
5020 Cat Flocc TL	45,946	22,996	57,540
5025 Caustic Soda	636,432	548,132	592,052
5030 Chlorine Cylinders	-	48,111	-
5035 Chlorine Rail Car	-	-	-
5040 Citric Acid	11,773	11,655	1,670
5045 Copper Sulphate	54,495	21,288	46,882
5050 Ferric Chloride	1,440,693	1,395,342	1,149,441
5055 Hydrofluorosilicic Acid	152,531	127,779	132,717
5060 Lime	209,399	59,069	213,807
5065 Potassium Permanganate	335,080	448,594	332,733
5070 Powdered Active Carbon	-	30,926	-
5075 Soda Ash	183,295	993,658	879,172
5080 Sodium Hypochlorite	290,664	358,197	349,780
5085 Sodium Carbonate Peroxyhy	-	12,720	12,720
Chemicals	<u>\$ 3,386,154</u>	<u>\$ 4,096,610</u>	<u>\$ 3,775,165</u>
<u>Equipment</u>			
5120 Computer & Peripherals	54,702	105,601	295,065
5125 Computers.Networking	66,602	82,313	336,517
5140 Furniture.Fixture	7,883	33,966	39,955
5145 Grounds.Maint	10,535	29,125	25,505
5147 Lab Equip	142,637	160,536	18,841
5150 Machinery	248,095	175,979	98,202
5160 Office Equipment	596	-	3,892
5190 Vehicles	588,272	166,806	614,171
Equipment	<u>\$ 1,119,323</u>	<u>\$ 754,325</u>	<u>\$ 1,432,148</u>
<u>Materials</u>			
5205 Asphalt Cold Patch	-	10,688	22,994
5210 Asphalt Cold-City	58,190	64,208	45,669
5215 Asphalt Hot-City	-	-	-
5220 Asphalt Hotmix	-	-	-
5225 Asphalt Patch Bit Sealer	-	4,076	-
5227 Brick	1,740	-	320
5230 Cement Bagged	3,611	4,580	5,217
5235 Gravel	12,863	17,255	8,933
5240 Iron Steel Brass	4,560	3,909	7,945
5245 Lumber	18,231	12,908	20,206
5250 Sand	71,012	26,221	47,087
5255 Slag	204,312	281,399	304,607
5260 Stone	-	-	-
5265 Top Soil	4,700	4,150	1,800
Materials	<u>\$ 379,218</u>	<u>\$ 429,394</u>	<u>\$ 464,778</u>

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Direct Operating Expenses			
<u>Operating Contracts</u>			
5305 Annual Sewer Contract	2,420,966	1,079,623	2,879,646
5310 Boiler Compressr Elevtr	3,602	544	9,504
5315 CB Cleaning	1,021,519	858,332	917,968
5316 CB Repairs	-	-	-
5328 Curb Box Repair	-	-	-
5330 Debris Removal	121,524	159,250	159,486
5335 Drag Bucket	-	-	-
5340 Dumpster	23,403	16,503	26,168
5341 Vactor Debris Remove Cont	38,863	55,132	308,070
5342 Emergency WaterLine Repair	1,403,171	2,533,443	1,934,291
5345 Inspection	456,267	-	(268,857)
5347 Inspection.Field	709,184	1,050,150	1,088,490
5350 Key.Lock Serv	11	-	524
5355 Landscape (Grounds)	62,192	69,883	86,046
5360 Meters	-	-	-
5370 Operating Contract.Other	1,085,437	2,445,907	2,250,760
5375 Radionuclides	-	4,511	-
5380 Intr-Gov Proj Panther Hollow	(72,174)	(114,327)	-
5383 Sewage Treatment	-	-	-
5385 Temporary Help	259,965	2,251,713	1,445,888
5390 Welding	4,418	139	-
5395 Water Relay.DISC	-	-	2,800
5396 Sewer Relay.DISC	-	-	-
Operating Contracts	\$ 7,538,348	\$ 10,410,802	\$ 10,840,784
<u>Repairs & Maintenance</u>			
5402 Annual Software Support	356,830	454,163	931,829
5405 Bldg.Property Repairs	146,415	100,838	390,277
5408 Computer Hardware	44,925	173,115	29,151
5411 Computer Software Support	-	-	-
5413 Concrete Repairs	3,010,703	2,565,787	3,964,050
5415 Cranes Repairs	1,000	14,656	8,405
5417 Electrical Repairs	49,284	80,316	58,471
5420 Fence Repairs	2,810	5,206	-
5422 Fence Installation	-	8,306	1,541
5427 GIS Hardware.Software	87,010	57,807	42,419
5432 Hardware Repairs	-	-	-
5437 Heavy Equip Repair	-	-	2,135
5439 HVAC.Plumbing	22,401	53,726	16,389
5444 Hydrant. A Section	7,446	-	-
5445 Hydrant Misc Parts	-	-	-
5447 Hydrant Repair Parts	539	-	-
5452 Machinery Repairs	123,918	19,243	6,365
5457 Office Equip Repairs	13,146	4,116	-
5462 Plant Repairs	-	-	-
5467 Power Tool Repairs	3,567	5,571	8,525
5472 Road Repair.Plant	-	700	-
5475 Scanner	-	-	-
5482 Tool Repairs	84,854	5,346	4,475
5484 Hand Tool Repairs	6,780	4,296	1,870
5486 Misc Tool Repairs	380	672	500
5488 CC TV Repairs	92,627	78,062	85,556
5490 Vactor Repairs	64,634	50,581	4,838
5491 Vehicle Repairs	151,830	378,059	79,124
5496 Repair.Maint Other	203,786	214,538	138,395
Repairs & Maintenance	\$ 4,474,883	\$ 4,275,104	\$ 5,774,315

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

Direct Operating Expenses	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
<u>Misc. Operating</u>			
5570 Testing Misc	89,803	187,347	847,210
Misc. Operating	\$ 89,803	\$ 187,347	\$ 847,210
<u>Inventory - Castings</u>			
6015 Casting Manhole.CBasin	12,812	133,256	107,127
6025 Casting Risers.Lids	49,798	-	-
6035 Casting Sewer Inlet	-	8,443	3,273
6060 Casting Water Valve Box	-	-	39,613
Inventory - Castings	\$ 62,610	\$ 141,699	\$ 150,013
<u>Inventory - Clarifier</u>			
6115 Clarifier Part Floc	-	-	-
6120 Clarifier Part Screw	-	-	-
6125 Clarifier Part Sludge	-	-	19,987
Inventory - Clarifier	\$ -	\$ -	\$ 19,987
<u>Inventory - Equipment</u>			
6200 Inventory-Equip	-	-	-
6220 Fire Extinguishers	542	-	-
6245 Materials.Handling	22,010	40	-
6260 Safety Equipment	24,628	33,800	40,994
6280 Vacuum Chlorinators	-	-	-
Inventory - Equipment	\$ 47,180	\$ 33,840	\$ 40,994
<u>Inventory - Hardware</u>			
6300 Inventory-Hardware	39,753	31,345	15,449
6315 Fittings	296,117	172,216	203,114
6320 Hardware Other	17,398	307	1,793
6325 Hose.Fitting	3,300	14,056	17,854
6330 Keys & Locks	-	-	-
6335 Lights	983	1,363	1,587
6340 Machinery Misc	-	-	2,878
6345 Meters	244,179	1,578	309,198
6350 Plumbing Inv Exp	18,897	39,288	94,055
6355 Power Tool Inv Exp	1,927	3,431	1,722
6360 Tools Inv Exp	63,247	57,914	66,985
6365 Hand Tools Inv Exp	-	-	3,461
Inventory - Hardware	\$ 685,803	\$ 321,497	\$ 718,096
<u>Inventory - Heavy Equipment</u>			
6420 Backhoe	1,796	1,242	1,393
Inventory - Heavy Equipment	\$ 1,796	\$ 1,242	\$ 1,393

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

Direct Operating Expenses	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
<u>Inventory - Miscellaneous</u>			
6500 Inventory-Misc	41,546	35,584	48,866
6506 Batteries	-	-	-
6515 Cleaning	50,397	39,659	42,649
6518 Concrete Accessories	-	-	80
6520 Copier Paper	366	-	-
6525 Filters	-	-	1,308
6526 Filters HVAC	-	-	939
6530 FirstAid	1,296	1,960	26
6540 Lamps	-	-	2,477
6544 Lubricating Oil	12,878	13,110	8,169
6548 Paint Oils Putty Glass	6,620	3,942	7,466
6552 Paper Products	-	-	-
6555 Pump Oil	120	-	-
6565 Sewer Mats.Supplies	3,381	3,187	249
6570 Testing Dyes	-	-	-
6580 Vehicle Oil	5,116	-	-
6585 Welding Supplies-Inventory	336	98	15,339
Inventory - Miscellaneous	\$ 122,055	\$ 97,540	\$ 127,568
<u>Inventory - Parts</u>			
6645 Parts Other	192,023	165,630	160,899
6680 Yard	-	-	-
Inventory - Parts	\$ 192,023	\$ 165,630	\$ 160,899
<u>Inventory - Pipe</u>			
6705 Pipe	96,194	131	1,589
6710 Pipe Ductile	13,496	55,806	56,321
6755 Pipe Plastic	1,177	-	-
6765 Pipe Service Line	-	-	-
Inventory - Pipe	\$ 110,866	\$ 55,938	\$ 57,910
<u>Inventory - Valves</u>			
6805 Valves <12in	-	-	-
6810 Valves >16in	-	-	-
6820 Valves GA	-	-	-
6825 Valves Misc	161,925	91,230	148,286
Inventory - Valves	\$ 161,925	\$ 91,230	\$ 148,286
INVENTORY TOTAL	\$ 1,384,257	\$ 908,616	\$ 1,425,146
DIRECT OPERATING TOTAL	\$ 38,318,237	\$ 41,709,993	\$ 46,070,588
<u>Fees</u>			
7003 Bank Fees	172,412	252,616	289,314
7005 Certification Fees	2,999	2,600	11,423
7010 Membership Fees	34,276	31,502	40,483
7015 Permits	13,641	6,009	7,165
7020 Registration Fees	1,828	2,874	1,150
7030 Licenses	-	-	-
7035 Customer CC Fees	169,648	180,363	240,363
Total Fees	\$ 394,804	\$ 475,964	\$ 589,898
<u>Freight and Postage</u>			
7105 Freight.Hauling	50	79	-
7110 Freight.Shipping	15,264	19,506	29,611
7115 Postage	682,266	407,748	455,890
Total Freight and Postage	\$ 697,580	\$ 427,333	\$ 485,501

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Direct Operating Expenses			
<u>Leases & Rents</u>			
7210 Copier.Fax Machine	73,208	75,671	80,279
7215 Equip Rental	44,883	141,553	181,748
7255 Office Rent	654,635	653,311	682,316
7260 Pagers	-	-	-
7265 RadioLease(City)	-	-	-
Total Leases & Rents	\$ 772,726	\$ 870,535	\$ 944,343
<u>Professional Services</u>			
7305 Advertising	8,709	21,137	29,088
7306 Annual Report	942	-	-
7307 Advertising - Marketing	115,910	148,516	18,465
7310 Annual Audit	87,390	48,670	59,170
7315 Billing Contract	291,961	511,118	486,391
7321 Coll Agency.Sewage	13,741	24,895	44,313
7323 Consultants	3,122,437	1,109,115	1,087,403
7325 Consumer Confidence Rpt	4,549	1,481	-
7328 Contingencies	433,435	24,287	22,111
7332 Consulting Engineers	-	-	238,347
7335 Misc Serv.NonCapital	368,053	4,506,051	7,314,114
7345 Ins.Auto	59,763	145,925	169,393
7348 Ins.Commercial Prop	262,011	162,871	210,767
7353 Ins.Gen Liability	4,786	5,018	5,308
7359 Ins.Officers.Director	62,166	14,710	63,812
7365 Ins.WorkersComp	-	-	-
7366 Ins.WorkersComp.City	42,420	40,025	18,120
7368 Internet Connection.Serv	45,022	54,300	44,508
7370 Legal	1,176,688	1,713,491	1,838,942
7371 Legal Self Ins	-	-	-
7373 Minority.Women Bus Enter	-	-	-
7375 Meter Services	715,747	754,539	910,908
7382 Payroll Services	55,825	59,103	54,044
7383 Prof Service.Other	1,421,634	1,609,538	1,427,969
7389 Trust Admin	126,077	106,312	76,940
7390 Water Liens	-	-	-
Total Professional Services	\$ 8,419,266	\$ 11,061,100	\$ 14,120,113
<u>Supplies</u>			
7405 Computer Software Supplies	32,426	42,147	53,155
7422 Fuel-Gasses	1,665	2,079	3,457
7423 Fuel Kerosene	-	-	-
7424 Fuel Propane	4,144	68,705	226,871
7435 GIS Plotter.Xerox	2,381	756	855
7440 Grounds & Maint Supp	-	36,360	38,814
7443 ICE	-	-	-
7445 Lab Chemicals	26,500	25,371	60,981
7447 Lab Supplies	73,478	80,726	20,634
7450 Office Supplies	22,303	22,614	21,289
7490 Welding Supplies	4,611	7,282	7,646
Total Supplies	\$ 167,507	\$ 286,040	\$ 433,702

Pittsburgh Water & Sewer Authority
Operating Expenses by Account

	12 Months Ended 12/31/2015	12 Months Ended 12/31/2016	HTY 12 Months Ended 12/31/2017
Direct Operating Expenses			
<u>Travel & Entertainment</u>			
7505 TE.Airfare	9,465	7,629	1,084
7510 TE.Auto Rentals	-	-	-
7520 TE.Fuel	-	-	-
7540 TE.Lodging	12,649	17,001	11,522
7545 TE.Meals	8,966	9,522	3,375
7550 TE.Mileage	3,482	3,151	1,267
7555 TE.SeminarsConferences	17,870	16,937	12,053
7560 TE.Training	29,129	54,666	14,942
7575 TE.Travel Misc	10,439	35,237	7,986
7590 TE.Travel Purch Orders	<u>29,149</u>	<u>4,964</u>	<u>-</u>
Total Travel & Entertainment	\$ 121,148	\$ 149,106	\$ 52,229
<u>Utilities</u>			
7605 Electric	4,061,572	4,409,946	4,555,391
7650 Natural Gas.City	447,035	333,770	410,764
7675 Telemeter	71,810	51,326	56,417
7680 Cellular Phone	78,054	101,589	157,331
7681 Local Phones	336,594	224,626	172,383
7682 Long Distance	<u>829</u>	<u>913</u>	<u>847</u>
Total Utilities	\$ 4,995,893	\$ 5,122,171	\$ 5,353,133
<u>Miscellaneous Admin</u>			
7705 Bad Debt	-	-	-
7710 Capital Asset Reclass	-	-	-
7711 DISC Asset Reclass	-	-	-
7712 Cash Discount Taken	(597)	(446)	(321)
7715 Claims.Deductibles	484,941	195,887	229,858
7720 Customer Refund.CSM	-	-	-
7721 Customer Refund. AP	368,354	290,602	331,386
7730 Fines.Penalties	131	359	600,603
7735 LienBuyBkExp	-	-	-
7742 Education & Outreach	21,356	119,235	270,044
7743 Employee Fund	34,028	19,356	54,722
7750 Inv.Adjustments	-	-	224,243
7760 Misc Gen.Admin Exp	(4,110)	682	14
7765 One Call	18,412	17,279	13,589
7770 Publication.Subscription	5,013	5,711	5,555
7787 3rd Pty LW Exp	-	-	-
7789 3rd Pty Sew Trt Exp	-	-	-
7799 Grants Awarded by PWSA	<u>106,500</u>	<u>151,105</u>	<u>51,504</u>
Total Miscellaneous Admin	\$ 1,034,029	\$ 799,770	\$ 1,781,197
 GRAND TOTAL: DIRECT OPERATING EXPENSE	 \$ 54,921,191	 \$ 60,902,012	 \$ 69,830,704

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.2. Prepare a summary of operating expenses for the historic test year providing annualizing and normalizing adjustments to arrive at adjusted future operating expenses for ratemaking, including supporting data.

RESPONSE:

Please see the attached schedule.

**Pittsburgh Water & Sewer Authority
Operating Expenses for Rate-making**

System Operating Expenses	HTY 12 Months Ended 12/31/2017	FTY 12 Months Ended 12/31/2018	Adjustments	FPFTY 12 Months Ended 12/31/2019	Annualizing Adjustments	FPFTY 12 Months Ended 12/31/2019
<u>Direct Operating Expenses</u>						
Administrative Division						
Executive Director	\$ (587,468)	\$ 2,183,848	\$ 1,163,870	\$ 3,347,718	\$ -	\$ 3,347,718
Customer Service	(83,152)	6,708,658	1,131,010	7,839,668	-	7,839,668
Management Information Systems	1,892,288	3,948,512	(786,929)	3,161,584	-	3,161,584
Finance	3,550,668	4,983,669	(1,193,934)	3,789,734	-	3,789,734
Procurement	282,325	564,190	(102,754)	461,436	-	461,436
Human Resources	590,077	1,545,155	37,527	1,582,683	-	1,582,683
Legal	1,505,108	3,736,001	(1,408,378)	2,327,622	-	2,327,622
Public Affairs	386,127	808,374	191,619	999,993	-	999,993
Operations Division						
Environmental Compliance	\$ 4,373,272	\$ 4,373,272	\$ 18,525	\$ 4,391,797	\$ -	\$ 4,391,797
Warehouse	(677,312)	421,862	6,200	428,061	-	428,061
Ops Capital Assets	(51,490)	27,499	8,501	36,000	-	36,000
Water Quality (Lab)	2,342,734	3,949,740	(102,181)	3,847,559	-	3,847,559
Water Treatment Plant	5,849,853	19,994,446	209,816	20,204,262	-	20,204,262
Sewer Operations	8,426,378	18,660,666	(2,142,212)	16,518,454	-	16,518,454
Water Distribution	8,008,991	22,506,332	1,069,497	23,575,829	-	23,575,829
Engineering & Construction Division						
Engineering & Construction	\$ 2,742,879	\$ 13,969,759	\$ 3,039,628	\$ 17,009,386	\$ -	\$ 17,009,386
<i>Subtotal: Direct Operating Expenses</i>	<i>\$38,551,280</i>	<i>\$ 108,381,984</i>	<i>\$ 1,139,804</i>	<i>\$ 109,521,788</i>	<i>\$ -</i>	<i>\$ 109,521,788</i>
<u>Indirect Operating Expenses</u>						
ALCOSAN	\$ 8,759,535	\$ 3,457,699	\$ 242,039	\$ 3,699,738	\$ -	\$ 3,699,738
Co-Op Agreement Op. Expenses - Water	2,075,000	4,150,000	-	4,150,000	-	4,150,000
Co-Op Agreement Op. Expenses - Sewer	1,500,000	3,000,000	-	3,000,000	-	3,000,000
Non-City Water Subsidy	5,260,476	4,800,000	-	4,800,000	-	4,800,000
<i>Subtotal: Other Operating Expenses</i>	<i>\$17,595,011</i>	<i>\$ 15,407,699</i>	<i>\$ 242,039</i>	<i>\$ 15,649,738</i>	<i>\$ -</i>	<i>\$ 15,649,738</i>
<i>Total: System Operating Expenses</i>	<i>\$56,146,291</i>	<i>\$ 123,789,683</i>	<i>\$ 1,381,843</i>	<i>\$ 125,171,526</i>	<i>\$ -</i>	<i>\$ 125,171,526</i>

III. OPERATING EXPENSE

III.3. List extraordinary property losses as a separate item, not included in operating expenses or depreciation and amortization. Sufficient supporting data must be provided, such as explanation and breakdown of costs.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.4. Supply detailed calculations of normalization of rate case expense, including supporting data for outside services rendered. Provide the items comprising the rate case expense claim (include the actual billings or invoices in support of each kind of rate case expense) and the items comprising the actual expenses of the prior rate cases.

RESPONSE:

Rate Case & Compliance Plan Expenses

	FTY 2018 Base Rate Case	FPFTY 2019 2019 Rate Case
Legal Counsel Costs	\$ 850,000	\$ 480,000
Legal Case Consultant	1,715,333	990,000
Total	\$ 2,565,333	\$ 1,470,000

The aforementioned projected rate case and Compliance Plan costs are expected to be incurred by PWSA in 2018 and 2019 as a result of the base rate case and proposed 2019 rate case proceedings. These costs are anticipated to be expensed as incurred with the full amount of the 2018 costs recognized in the FTY and the full amount of the 2019 costs recognized in the FPFTY.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.5. Submit detailed computation of adjustments to operating expenses for salary, wage and fringe benefit increases (union and nonunion merit, progression, promotion and general) granted during the historic test year and during the 12 months subsequent to the historic test year. Supply data for the historic test year showing:

- a. Actual payroll expense (regular and overtime separately) by categories of operating expenses, i.e., maintenance, operating transmission, distribution, other.
- b. Date, percentage increase and annual amount of each general payroll increase during the historic test year and future test year.
- c. Dates and annual amounts of merit increases or management salary adjustments.
- d. Total annual payroll increases in the historic and future test years.
- e. Proof that the actual payroll plus the increases equal the payroll expense claimed in the supporting data by categories of expenses.
- f. Detailed list of employee benefits and cost thereof for union and nonunion personnel. Specific benefits for executives and officers should be included, and costs thereof.
- g. Support the annualized pension cost figures by providing the following:
 - (i) State whether these figures include any unfunded pension costs. Explain.
 - (ii) Provide latest actuarial study used for determining pension accrual rates.
- h. Submit a schedule showing any deferred income and consultant fee, paid to both, corporate officers and employees in historic and future test years.

RESPONSE:

III.5a Please see the attached schedule.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.5b See below.

	Date Effective	Percent Increase	Estimated FY 2018 Impact
Pittsburgh Joint Collective Bargaining Committee	2017 / 2018	2% / 2%	\$1,616,200
District Council 84 AFSCME Local 2719 & Local 2037	2017 / 2018	2% / 2%	257,014
Non-Union	2017 / 2018	2% / 2%	1,917,109

Note: Salary increases for employees during 2017.

III.5c See below.

	Date Effective	Percent Increase	Estimated Annual Amount
Supervisory / Management	Jan 2017	13.5%	\$ 6,528
Supervisory / Management	Jun 2017	17.5%	14,146
Supervisory / Management	Jun 2017 / 2018	10% / 10%	7,500 / 8,568
Supervisory / Management	Jun 2017	8%	6,151
Supervisory / Management	Jun 2017	2.4%	2,297
Supervisory / Management	Jun 2017	2%	1,720

III.5d See below.

	Estimated Annual Amount
2017 – 2018 Increase in Salaries, Wages, & Benefits	\$ 9,068,330
2018 – 2019 Increase in Salaries, Wages, & Benefits	\$ 4,846,902

Note: Includes salaries for new positions added in 2018 and 2019.

III.5e See the attached schedule.

III.5f See below.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

Twelve Months Ended:		HTY	FTY	FPFTY
		2017	2018	2019
4110	Fed Insurance Contract Tax	\$ 990,699	\$ 1,417,993	\$ 1,640,121
4115	Medicare	232,506	331,627	383,576
4120	Fed Unemployment Tax	4	-	4
4125	State Unemployment Tax	-	105,000	120,000
4130	Workers Comp Insurance	561,969	490,000	490,000
4135	Med Health Insurance	3,089,588	4,390,703	5,278,643
4140	Med Health Insurance Waiver	22,183	34,873	54,578
4145	Short Term Disability	161,659	260,295	302,875
4150	Long Term Disability	31,318	50,255	55,674
4155	Life Ins <50k	25,687	43,334	49,357
4160	Accidental Death/Dismemberment	3,274	4,779	5,964
4165	Dental Insurance	132,857	203,414	232,656
4170	Vision Insurance	9,512	14,836	19,064
4174	Customer Service Week	550	2,000	2,000
4175	Uniforms	164,450	202,398	229,831
4180	Tuition Reimbursement	35,873	201,680	175,024
4195	Misc. Benefits	(22,584)	(40,291)	(53,126)
4199	Payroll Upload Except	(14)	(3,585)	(3,896)
	Total Employee Benefits	\$5,439,531	\$ 7,709,311	\$ 8,982,346

III.5g Support the annualized pension cost figures

- (i) Not applicable. Please see response to III.14 for additional information.
- (ii) Please see response to III.14 for additional information.

III.5h. Submit a schedule showing any deferred income and consultant fee to corporate officers or employees.

On April 30, 2018, Robert Weimar became Executive Director of PWSA. Weimar was previously a contractor of the Authority and, under that contract, was owed an expense report reimbursement prior to becoming a PWSA employee. That amount of \$39,116 was paid to Weimar in June 2018. Aside from that payment, PWSA has not paid any deferred income and consultant fee to corporate officers or employees.

Pittsburgh Water & Sewer Authority
Operating Expenses for Rate-making

Salary, Wage, & Fringe Benefits	HTY		FTY		FPFTY	
	Per Books	Adjustments	12 Months	Adjustments	12 Months	12 Months
	12/31/2017		Ended		Ended	Ended
Administrative Division						
<i>Executive Director</i>						
Salary & Wages	\$ 99,354	\$ 142,563	\$ 241,917	\$ 154,839	\$ 396,756	
Overtime	2,054	346	2,400	-	2,400	
Other Compensation	9,167	51,078	60,245	37,831	98,076	
Benefits	17,055	58,076	75,131	99,094	174,225	
<i>Subtotal: Executive Director</i>	\$ 127,630	\$ 252,064	\$ 379,694	\$ 291,763	\$ 671,457	
<i>Customer Service</i>						
Salary & Wages	\$ 1,326,141	\$ 530,079	\$ 1,856,220	\$ 427,097	\$ 2,283,317	
Overtime	113,617	81,097	194,714	(2,800)	191,914	
Other Compensation	283,993	43,711	327,704	65,778	393,482	
Benefits	581,301	185,638	766,939	165,824	932,763	
<i>Subtotal: Customer Service</i>	\$ 2,305,052	\$ 840,526	\$ 3,145,578	\$ 655,899	\$ 3,801,476	
<i>Management Information Systems</i>						
Salary & Wages	\$ 241,869	\$ 290,438	\$ 532,307	\$ 78,765	\$ 611,073	
Overtime	1,412	3,868	5,280	16,008	21,288	
Other Compensation	45,609	34,994	80,603	11,130	91,733	
Benefits	78,939	102,200	181,139	33,998	215,137	
<i>Subtotal: Management Information Systems</i>	\$ 367,829	\$ 431,501	\$ 799,330	\$ 139,902	\$ 939,232	
<i>Finance</i>						
Salary & Wages	\$ 298,328	\$ 385,124	\$ 683,452	\$ 53,087	\$ 736,539	
Overtime	-	-	-	-	-	
Other Compensation	76,690	21,658	98,348	(355)	97,993	
Benefits	77,368	134,412	211,780	115,651	327,431	
<i>Subtotal: Finance</i>	\$ 452,386	\$ 541,194	\$ 993,580	\$ 168,383	\$ 1,161,963	
<i>Procurement</i>						
Salary & Wages	\$ 138,680	\$ 123,873	\$ 262,553	\$ (44,555)	\$ 217,998	
Overtime	-	-	-	-	-	
Other Compensation	19,906	13,378	33,284	(3,591)	29,693	
Benefits	46,032	49,360	95,392	60,823	156,215	
<i>Subtotal: Procurement</i>	\$ 204,618	\$ 186,610	\$ 391,228	\$ 12,678	\$ 403,906	
<i>Human Resources</i>						
Salary & Wages	\$ 197,466	\$ 99,580	\$ 297,046	\$ 51,612	\$ 348,658	
Overtime	1,176	624	1,800	1,500	3,300	
Other Compensation	45,630	7,566	53,196	21,352	74,549	
Benefits	608,007	60,352	668,359	26,983	695,343	
<i>Subtotal: Human Resources</i>	\$ 852,279	\$ 168,122	\$ 1,020,401	\$ 101,447	\$ 1,121,849	
<i>Legal</i>						
Salary & Wages	\$ 158,847	\$ 164,277	\$ 323,124	\$ 41,191	\$ 364,315	
Overtime	-	-	-	-	-	
Other Compensation	22,990	20,857	43,847	5,392	49,238	
Benefits	38,309	59,700	98,009	(5,660)	92,349	
<i>Subtotal: Legal</i>	\$ 220,146	\$ 244,834	\$ 464,980	\$ 40,923	\$ 505,903	
<i>Public Affairs</i>						
Salary & Wages	\$ 226,011	\$ 107,151	\$ 333,162	\$ 68,000	\$ 401,162	
Overtime	6,394	(6,394)	-	4,800	4,800	
Other Compensation	26,124	21,506	47,630	3,170	50,800	
Benefits	59,765	52,107	111,872	12,269	124,142	
<i>Subtotal: Public Affairs</i>	\$ 318,294	\$ 174,370	\$ 492,664	\$ 88,239	\$ 580,903	
<i>Total: Administration Division</i>	\$ 4,848,234	\$ 2,839,221	\$ 7,687,455	\$ 1,499,234	\$ 9,186,689	

Pittsburgh Water & Sewer Authority
Operating Expenses for Ratemaking

	HTY Per Books 12/31/2017	Adjustments	FTY 12 Months Ended 12/31/2018	Adjustments	FPFTY 12 Months Ended 12/31/2019
Salary, Wage, & Fringe Benefits					
<u>Operations Division</u>					
<i>Environmental Compliance</i>					
Salary & Wages	\$ -	\$ 217,096	\$ 217,096	\$ 90,940	\$ 308,036
Overtime	-	1,200	1,200	2,400	3,600
Other Compensation	-	38,459	38,459	17,142	55,601
Benefits	-	103,734	103,734	27,061	130,796
<i>Subtotal: Environmental Compliance</i>	\$ -	\$ 360,489	\$ 360,489	\$ 137,543	\$ 498,032
<i>Warehouse</i>					
Salary & Wages	\$ 209,174	\$ 32,533	\$ 241,707	\$ 17,437	\$ 259,144
Overtime	5,364	463	5,827	1,110	6,936
Other Compensation	82,054	(31,646)	50,408	(4,768)	45,640
Benefits	76,664	7,299	83,963	5,200	89,163
<i>Subtotal: Warehouse</i>	\$ 373,256	\$ 8,649	\$ 381,905	\$ 18,979	\$ 400,883
<i>Ops Capital Assets</i>					
Salary & Wages	\$ -	\$ -	\$ -	\$ -	\$ -
Overtime	-	-	-	-	-
Other Compensation	-	-	-	-	-
Benefits	-	-	-	-	-
<i>Subtotal: Ops Capital Assets</i>	\$ -	\$ -	\$ -	\$ -	\$ -
<i>Water Quality (Lab)</i>					
Salary & Wages	\$ 287,742	\$ (61,962)	\$ 225,780	\$ 43,101	\$ 268,880
Overtime	31,901	(2,689)	29,212	7,940	37,152
Other Compensation	81,182	(45,625)	35,557	4,395	39,953
Benefits	109,896	(6,567)	103,329	16,480	119,808
<i>Subtotal: Water Quality (Lab)</i>	\$ 510,721	\$ (116,843)	\$ 393,878	\$ 71,915	\$ 465,793
<i>Water Treatment Plant</i>					
Salary & Wages	\$ 1,765,461	\$ 646,241	\$ 2,411,702	\$ 652,320	\$ 3,064,022
Overtime	503,970	(254,170)	249,800	-	249,800
Other Compensation	383,075	117,070	500,145	105,409	605,553
Benefits	760,907	264,056	1,024,963	166,039	1,191,002
<i>Subtotal: Water Treatment Plant</i>	\$ 3,413,413	\$ 773,197	\$ 4,186,610	\$ 923,767	\$ 5,110,378
<i>Sewer Operations</i>					
Salary & Wages	\$ 1,641,560	\$ (41,780)	\$ 1,599,780	\$ 130,543	\$ 1,730,323
Overtime	145,200	126,800	272,000	7,000	279,000
Other Compensation	413,962	(33,310)	380,652	(173,437)	207,214
Benefits	771,888	(39,529)	732,359	39,176	771,535
<i>Subtotal: Sewer Operations</i>	\$ 2,972,610	\$ 12,180	\$ 2,984,790	\$ 3,282	\$ 2,988,072
<i>Water Distribution</i>					
Salary & Wages	\$ 3,987,324	\$ 2,059,563	\$ 6,046,887	\$ 474,957	\$ 6,521,844
Overtime	687,869	(169,869)	518,000	45,000	563,000
Other Compensation	910,433	508,228	1,418,661	(151,520)	1,267,141
Benefits	1,781,948	819,443	2,601,391	134,050	2,735,440
<i>Subtotal: Water Distribution</i>	\$ 7,367,574	\$ 3,217,365	\$ 10,584,939	\$ 502,486	\$ 11,087,425
<i>Total: Operations Division</i>	\$ 14,637,574	\$ 4,255,036	\$ 18,892,610	\$ 1,657,973	\$ 20,550,583
<u>Engineering & Construction Division</u>					
<i>Engineering & Construction</i>					
Salary & Wages	\$ 1,364,787	\$ 1,291,937	\$ 2,656,724	\$ 1,116,744	\$ 3,773,468
Overtime	5,785	14,711	20,496	16,607	37,103
Other Compensation	223,210	247,926	471,136	180,297	651,433
Benefits	431,452	419,498	850,950	376,048	1,226,998
<i>Subtotal: Engineering & Construction</i>	\$ 2,025,234	\$ 1,974,073	\$ 3,999,307	\$ 1,689,695	\$ 5,689,002
Total: Systemwide Salary, Wage, & Fringe Benefits	\$21,511,042	\$9,068,330	\$30,579,371	\$4,846,902	\$35,426,274

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.6. Supply an exhibit showing an analysis, by functional accounts, of the charges by affiliates (service corporations, etc.) for services rendered included in the operating expenses of the filing company for the historic and future test years and for the 12-month period ended prior to the historic test year:

- a. Supply a copy of contracts, if applicable.
- b. Explain the nature of the services provided.
- c. Explain the basis on which charges are made.
- d. If charges are allocated, identify allocation factors used.
- e. Supply the components and amounts comprising the expense in this account.
- f. Provide details of initial source of charge and reason thereof.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.7. Describe costs relative to leasing equipment, computer rentals, and office space, including terms and conditions of the lease. Explain the method of calculating monthly or annual payments. If allocated from the parent company, provide the method of allocation.

RESPONSE:

PWSA has leasing arrangements with various companies for the leasing of office and equipment and technology. The following table identifies the long-term leases with an explanation for the method used for calculating the monthly or annual payments.

	<u>Annual Payment</u>
<u>Name: The Buncher Company</u>	\$855,031
Under this agreement, PWSA leases office space of 45,618 square feet for the main administrative, field ops and engineering offices. Additionally, PWSA leases outdoor space of 196 square feet for a backup generator. Payments are made at a rental rate using a predetermined rental rate equation throughout the term of 243 months of the lease agreement.	
<u>Name: The Wilson Group</u>	\$106,800
Under this agreement, PWSA leases fifteen multi-functional printers related to management information systems. Payments are made at a predetermined rental rate constant throughout the term (5 years) of the lease agreement.	
<u>Name: Ceridian</u>	\$15,152
Under this agreement, PWSA leases time clocking equipment used at the water treatment plant. Payments are made at a predetermined rental rate constant throughout the term of the lease agreement.	
<u>Name: Pittsburgh National Bank</u>	\$1,800
Under this agreement, PWSA leases a credit card machine used in the customer service department for customer payments. Payments are made at a predetermined rental rate constant for the life of the lease agreement.	
<u>Name: Sensus USA, Inc.</u>	\$646,992
This agreement is for an advanced metering infrastructure lease that is overseen by the customer service. Payments are made at a predetermined rate constant through June 2029, of the lease agreement.	

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.8. Submit detailed calculations (or best estimates) of the cost resulting from storm damage.

RESPONSE:

There are no costs for storm damage included in the HTY, FTY, or FPFTY.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.9. Submit details of expenditures for advertising (national, institutional and local media). Provide a schedule of advertising expense by media categories for the historic test year and the prior two comparable years with respect to:

- a. Public health and safety.
- b. Conservation of energy.
- c. Explanation of billing practices, rates, rules and regulations.
- d. Provision of factual and objective data programs in educational institutions.
- e. Other advertising programs.
- f. Total advertising expense.

RESPONSE:

Despite “advertising” line items within PWSA’s budget, the Authority does not advertise on national, institutional, or local media. The Advertising account (7305) includes costs such as: Board of Directors meeting solicitations and job postings which mostly represent payments to the New Pittsburgh Courier and the Pittsburgh Post-Gazette. The Advertising Marketing account (7307) largely consists of payments to local businesses for staff business cards, website design and support, banners, and other printed material needs. Education and Outreach (7742) consists of payments to Dollar Energy Fund for CAP costs, sponsorships, brochures, and other materials.

Public Affairs costs have been included in the HTY, FTY, and FPFTY but these costs largely include salaries for External Affairs staff and professional services costs. Advertising-Marketing and Education & Outreach include budgeted amounts for minimal advertising. These costs are identified below.

	FTY 2018	FPFTY 2019
Print Ads	\$ 24,000	\$ 24,500
Digital Media / TV	24,000	27,000
Educational Campaigns	32,000	32,000
Total	\$ 80,000	\$ 83,500

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.10. Prepare a detailed schedule for the historic test year showing types of social and service organization memberships paid for by the company and the cost thereof.

RESPONSE:

PWSA pays membership fees to water industry organizations and other industry-related associations. The payments for 2017 are included in III.24. There were no social and/or service memberships paid during the test year by PWSA.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.11. Submit a schedule showing a breakdown by the expenditures associated with outside services employed, regulatory commission expenses, showing expenses relating to rate cases separately, and miscellaneous general expenses, for the historic test year and prior 2 comparable years.

RESPONSE:

7300: Professional Services

	Actual	Actual	HTY
Twelve Months Ended:	2015	2016	2017
7305 Advertising	\$ 8,709	\$ 21,137	\$ 29,088
7306 Annual Report	942	-	-
7307 Advertising - Marketing	115,910	148,516	18,465
7310 Annual Audit	87,390	48,670	59,170
7315 Billing Contract	291,961	511,118	486,391
7321 Coll Agency Sewage	13,741	24,895	44,313
7323 Consultants	3,122,437	1,109,115	1,087,403
7325 Consumer Confidence Report	4,549	1,481	-
7328 Contingencies	433,435	24,287	22,111
7332 Consulting Engineers	-	-	238,347
7335 Misc. Services – Non-Capital	368,053	4,506,051	7,314,114
7345 Auto Insurance	59,763	145,925	169,393
7348 Commercial Prop Insurance	262,011	162,871	210,767
7353 Gen Liability Insurance	4,786	5,018	5,308
7359 Officers Director Insurance	62,166	14,710	63,812
7365 WorkersComp Insurance	-	-	-
7366 WorkersComp City Insurance	42,420	40,025	18,120
7368 Internet Connection Server Insurance	45,022	54,300	44,508
7370 Legal (1)	1,176,688	1,713,491	1,838,942
7375 Meter Services	715,747	754,539	910,908
7382 Payroll Services	55,825	59,103	54,044
7383 Prof Service - Other (1)	1,421,634	1,609,538	1,427,969
7389 Trust Admin	126,077	106,312	76,940
7390 Water Liens	-	-	-
Total Professional Services	\$ 8,419,266	\$ 11,061,100	\$ 14,120,113

(1) Includes PUC Assessments, Rate Case, and Compliance Plan costs.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

Regulatory Commission Expenses (From 7383 & 7370)

Twelve Months Ended:	Actual 2015	Actual 2016	HTY 2017
PUC Assessments (910)	\$ 0	\$ 0	\$ 0
<u>Rate Case & Compliance Plan Expenses</u>			
Finance (913)	0	0	0
Legal (916)	0	0	0
Total Regulatory & Rate Case Expenses	\$ 0	\$ 0	\$ 0

7700: Miscellaneous Admin

Twelve Months Ended:	Actual 2015	Actual 2016	HTY 2017
7712 Cash Discount Taken	\$ (597)	\$ (446)	\$ (321)
7715 Claims Deductibles	484,941	195,887	229,858
7721 Customer Refund. AP	368,354	290,602	331,386
7730 Fines Penalties	131	359	600,603
7742 Education & Outreach	21,356	119,235	270,044
7743 Employee Fund	34,028	19,356	54,722
7750 Inventory Adjustments	-	-	224,243
7760 Misc. General Admin Expense	(4,110)	682	14
7765 One Call	18,412	17,279	13,589
7770 Publication Subscription	5,013	5,711	5,555
7799 Grants Awarded by PWSA	106,500	151,105	51,504
Total Miscellaneous Admin	\$ 1,034,029	\$ 799,770	\$ 1,781,197

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III. 12. Submit details of information covering research and development expenditures, by project, within the company and note forecasted company programs.

RESPONSE:

No research and development expenditures were incurred during the HTY nor are any expected to be incurred in the FTY and FPFTY.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.13. Provide a detailed schedule of all charitable and civic contributions by recipient and amount for the historic test year.

RESPONSE:

There were no charitable and civic contributions paid during the historic test year by PWSA.

III. OPERATING EXPENSE

III.14. Provide the two most recent actuarial studies for both pension expense and postretirement benefits other than pensions (OPEBs).

RESPONSE:

PWSA employees participate in the City of Pittsburgh Municipal Pension Fund Plan (Plan). Employees who became members of the Plan prior to January 1, 1988 are required to contribute 5% of pre-tax pay. Those joining thereafter are required to contribute 4%. The City's obligations relative to the Plan are determined in accordance with various Pennsylvania statutes. The extent of the Authority's participation in such obligations with respect to those former City employees whose membership continued upon becoming employees of the Authority is determined by the shared interpretation of the City and Authority of the intent of the Cooperation Agreement.

Uncertainty exists about the future obligation of the Authority and its employees to make contributions to the Plan. Such contributions are contingent upon the continuing eligibility of the Authority's employees to participate in the City's Plan. Eligibility for ongoing employee participation in the City's Plan could end if the Authority were to introduce another pension plan. At this time, the Authority and City have no definite plans to establish another pension plan for the Authority, other than an agreement in principle that the Authority should have its own plan in the future. Future obligations of the Authority to make contributions to the Plan may also be subject to other amendments of the existing arrangement agreed-upon by the Authority and the City.

The Plan has not reported or attributed measurements of assets or the net pension liability on the basis of the group of members who are Authority employees. As of the date of this filing, the amount of the assets and liabilities of the Plan that is attributable to PWSA participants (both employees and retirees) is unknown as a detailed study has not been performed to separate the plan between the City and the Authority. As such, this information is unavailable at this time.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.15. Identify the total pension expense under statement of accounting standards (SFAS 87) for the historic test year and the portion charged to operation and maintenance (O & M). Include an analysis showing the contribution to the pension plan and the amount deferred or expensed for each of the past 2 years and the historic test year. Also provide any estimates for the future year.

RESPONSE:

Please see the response to III.14.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.16. Provide an analysis of OPEBs showing the accrual amount under SFAS 106 and the pay-as-you-go expense.

RESPONSE:

Not applicable. PWSA does not offer other post-employment benefits.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.17. Reconcile the historic and future test year SFAS No. 106 expense levels with the amount identified in the actuarial report.

RESPONSE:

Not applicable. PWSA does not offer other post-employment benefits.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.18. Identify the actual or projected amounts contributed to SFAS No. 106 funds for the historic and future test years. Identify the actual or projected dates and amounts of the contributions.

RESPONSE:

Not applicable. PWSA does not offer other post-employment benefits.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.19. Explain the funding options or plans which are being used for SFAS No. 106 costs. Identify the portion of costs which are eligible for tax preferred funding.

RESPONSE:

Not applicable. PWSA does not offer other post-employment benefits.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.20. State whether the company is studying or anticipating any changes to its postretirement benefits offered to employees as a result of SFAS No. 106 or for other reasons. If yes, provide the study and explain the anticipated change.

RESPONSE:

We do not anticipate any changes in postretirement benefits during the FTY or FPFTY and therefore have not included any cost for such changes.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.21. State whether the historic test year expenses reflect any accruals for postemployment benefits under SFAS 112. If yes, provide complete details including supporting documentation, assumptions, and funding mechanisms.

RESPONSE:

The historic test year is presented on a cash basis and, therefore, reflects actual cash disbursements as opposed to accruals. In 2015, PWSA enacted a Voluntary Severance Plan (VSP) which allowed eligible employees to take a lump sum of 80% of their current salary or 100% of their salary spread through payments over two years. In 2017, PWSA made payments of \$487,524. The last of those payments will be made in 2018 (FTY) and the budgeted amount for these payments is \$101,055. No costs for severance pay has been included in 2019 (FPFTY).

III. OPERATING EXPENSE

III.22. Provide a copy of all incentive compensation and bonus plans and provide the level of related bonus payments included in the cost of service. Provide information for the preceding 2 years and any changes since the last rate case.

RESPONSE:

In 2018, PWSA extended an offer to Bob Weimar to officially become Executive Director. Per Weimar's contract, he is eligible for semi-annual bonuses of up to \$13,000. This bonus is based on performance metrics and the amount is determined at the sole discretion of the PWSA Board of Directors. There were no bonus or incentive compensation costs paid in HTY.

The FPFTY includes two budgeted bonus payments to Weimar of \$12,500. There are no other bonus or incentive compensation costs included in the FTY and FPFTY.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.23. Provide the most recent insurance premiums for each type of insurance coverage, both employee benefit and those purchased for the company, reflected in the company's filing. If available, provide estimated premiums for the subsequent calendar year.

RESPONSE:

Please see the tables below.

4100: Employee Benefits - Insurance

	HTY	FTY	FPFTY
Twelve Months Ended:	2017	2018	2019
4110 Fed Insurance Contract Act Tax	990,699	1,417,993	1,640,121
4130 Workers Comp Insurance	561,969	490,000	490,000
4135 Med Health Insurance	3,089,588	4,390,703	5,278,643
4140 Med Health Insurance Waiver	22,183	34,873	54,578
4145 Short Term Disability	161,659	260,295	302,875
4150 Long Term Disability	31,318	50,255	55,674
4155 Life Ins <50k	25,687	43,334	49,357
4160 Accidental Death/Dismember	3,274	4,779	5,964
4165 Dental Insurance	132,857	203,414	232,656
4170 Vision Insurance	9,512	14,836	19,064
Total Employee Benefit – Insurance	\$5,028,746	\$6,910,481	\$8,128,932

7300: Professional Services - Insurance

	HTY	FTY	FPFTY
Twelve Months Ended:	2017	2018	2019
7345 Auto Insurance	169,393	100,000	92,700
7348 Commercial Prop Insurance	210,767	215,000	221,450
7353 Gen Liability Insurance	5,308	5,500	21,630
7359 Officers Director Insurance	63,812	65,000	77,250
7365 WorkersComp Insurance	-	-	-
7366 WorkersComp City Insurance	18,120	42,000	32,000
7368 Internet Connection Server Insurance	44,508	69,060	80,700
Total Professional Svcs. Insurance	\$ 511,908	\$ 496,560	\$ 525,730

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.24. Provide the level of payments made to industry organizations included in the cost of service along with a description of each payee organization.

RESPONSE:

Please see below.

Organization	Per Books 12/31/2017	Description
Allegheny Conference on Community Development	\$ 3,400	2017 Corporate Contribution
American Water Works Association	14,139	Membership Dues & Partnership for Safe Water
Association of Metropolitan Water Agencies	3,863	Membership Dues
AWWA - PA Section	1,476	Membership Dues
Greater Pittsburgh Chamber of Commerce	3,200	2017 Silver Sponsor
MWDBE Governmental Committee	200	Membership Dues
NACWA	6,200	2017 Dues
PA Association of Environmental Labs	560	Annual meeting and membership fee
PA Rural Water Association	1,019	Membership Dues
PAWARN	1,250	Membership Dues
Pennsylvania Municipal Auth. Assoc.	2,600	2017 Membership Dues
PRSA	365	Membership Dues
Society for Human Resource Mgmnt	199	Membership Dues

III. OPERATING EXPENSE

III.25. If the company has included any costs associated with canceled construction projects or obsolete inventory in requested rates, separately identify the items, provide the related amounts and explain the reason for the cancellation or obsolescence.

RESPONSE:

PWSA has not included any costs associated with cancelled construction or obsolete inventory.

III. OPERATING EXPENSE

III.26. Explain how the company accounts for vacation pay for book and ratemaking purposes.

RESPONSE:

For accrual-basis financial reporting (PWSA Audit), a liability for vacation, personal, and sick days is accrued when related benefits are attributable to services rendered and to the extent it is probable that the Authority will ultimately compensate employees.

PWSA is filing this rate case on a cash-basis and, accordingly, PWSA has made no claim for vacation pay for ratemaking purposes since a full cash salary and wage costs for each employee has been included in PWSA's Revenue Requirement. In addition to a full year of salary costs, FPFTY 2019 includes 27 pay periods (one additional pay period) since January 1, 2020 falls on a Wednesday (PWSA pays employees on Wednesdays bi-weekly) which is a holiday. PWSA's payroll provider will process that payroll on Tuesday, December 31, 2019.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.27. Indicate whether any employee positions have been eliminated since the commencement of the historic test year or are expected to be eliminated during the future test year.

RESPONSE:

<u>Job Title</u>	<u>Department</u>	<u>Date</u>
Exoneration Analyst	Customer Service	March 2018

Exoneration Analyst position acted as the designee for all Authority Exoneration Hearings as well as being responsible for analyzing exoneration applications to determine eligibility. Under the PUC guidelines, the Pittsburgh Water and Sewer Authority Exoneration process has been eliminated. The employee was retained and has assumed a new role within customer service.

Pittsburgh Water and Sewer Authority's Base Rate Filing

III. OPERATING EXPENSE

III.28. Furnish the name of each supplier, gallonage and expense for water purchased as recorded in Water Purchased for Resale-Account 706 for the historic test year and two preceding years.

RESPONSE:

PWSA has not purchased water for resale in the HTY nor the two preceding years.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.1. Provide a copy of the latest Pennsylvania Corporate Tax report and the latest Pennsylvania Corporate Tax settlement.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.2. Submit details of calculations for taxes, other than income, where a company is assessed taxes for doing business in another state, or on its property located in another state.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.3. Submit a schedule showing for the last 3 years the Income Tax refunds, plus interest, net of taxes, received from the Federal government due to prior years' claims.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.4. Provide detailed computations showing the deferred income taxes derived by using accelerated tax depreciation applicable to post-1969 utility property that increases productive capacity, and accelerated depreciation rate (ADR) rates on property (separate between State and Federal; also, rate used). If based on the historic test year, justify.

a. State whether tax depreciation is based on all rate base items claimed as of the end of the future test year, and whether it is the annual tax depreciation at the end of the future test year.

b. Reconcile any difference between the deferred tax balance, as shown as a reduction to measures of value (rate base), and the deferred tax balance as shown on the balance sheet.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.5. Submit a schedule showing a breakdown of accumulated investment tax credits, (3%, 4%, 7%, 10% and 11%), together with details of methods used to write-off the unamortized balances.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.6. Submit a schedule showing the adjustments for taxable net income per book, including below-the-line items, and pro-forma under existing rates, together with an explanation of any difference between the adjustments. Indicate charitable donations and contributions in the tax calculation for ratemaking purposes.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.7. Submit detailed calculations supporting historic and future taxable income before State and Federal Income Taxes where the income tax is subject to allocation due to operations in another state, or due to operation of other taxable utility or nonutility business, or by operating divisions or areas.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.8. Furnish a breakdown of major items comprising prepaid and deferred Income Tax charges and other deferred income tax credits and reserves by accounting areas.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.9. Explain the reason for the use of cost of removal of any retired plant figures in the Income Tax calculations.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.10. State whether all tax savings due to accelerated depreciation on property installed prior to 1970 have been passed through to income. If not, explain.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.11. Show any income tax loss/gain carryovers from previous years that may affect historic test year income taxes or future test year Income Taxes. Show loss or gain carryovers by years of origin and amounts remaining by years at the end of the historic test year.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.12. Provide a detailed analysis of taxes accrued per books as of the historic and future test year date. Also supply the basis for the accrual and the amount of taxes accrued monthly.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.13. Under Section 1552 of the Internal Revenue Code and Regulations at 1.1552-1 if applicable, a parent company, in filing a consolidated Income Tax return for the group, must choose one of four options by which it must allocate total income tax liability of the group to the participating members to determine each member's tax liability to the Federal government. If this request is not applicable, provide an explanation.

- a. State what option has been chosen by the group.
- b. Provide, in summary form, the amount of tax liability that has been allocated to each of the participating members in the consolidated Income Tax return.
- c. Provide a schedule, in summary form, of contributions, which were determined on the basis of separate tax return calculations, made by each of the participating members to the tax liability indicated in the consolidated group tax return. Provide total amounts of actual payments to the tax depository for the tax year, as computed on the basis of separate returns of members.
- d. Provide annual Income Tax return for group, and if Income Tax return shows net operating loss, provide details of amount of net operating loss allocated to the Income Tax returns of each of the members of the consolidated group.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.14. Provide a copy of the Corporate Federal Tax Returns and supporting schedules for the preceding 3 years and, if applicable, a copy of the calculation workpapers for the company's consolidated tax savings adjustment.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.15. Provide a schedule of Federal and Pennsylvania taxes, other than Income Taxes, calculated on the basis of test year per book, pro forma at present rates, and pro forma at proposed rates, to include the following categories:

- a. Social Security.
- b. Unemployment.
- c. Capital Stock.
- d. Public Utility Realty.
- e. PUC assessment.
- f. Other property.
- g. Any other appropriate categories.

RESPONSE:

15.a. Social Security

PWSA's employer share of Social Security and Medicare Taxes is as follows:

Fiscal Year Ending December 31, 2017	\$ 1,223,205
Fiscal Year Ending December 31, 2018	\$ 1,749,620
Fiscal Year Ending December 31, 2019	\$ 2,023,697

15.b. Unemployment

PWSA's employer Pennsylvania Unemployment Tax is as follows:

Fiscal Year Ending December 31, 2017	\$ 0
Fiscal Year Ending December 31, 2018	\$ 105,000
Fiscal Year Ending December 31, 2019	\$ 120,000

15.c. Capital Stock

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

15. Public Utility Realty

Not applicable.

15.e. PUC Assessment

PWSA's PUC assessment is expensed as follows:

Fiscal Year Ending December 31, 2017	\$ 0
Fiscal Year Ending December 31, 2018	\$ 0
Fiscal Year Ending December 31, 2019	\$1,000,000

15.f. Other Property

Not applicable.

15.g. Any Other Appropriate Categories

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.16. Submit a schedule showing a breakdown of the deferred Income Taxes by State and Federal per book, pro forma, existing rates, and under proposed rates.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.17. With respect to determination of income taxes, Federal and State:

- a. Show Income Tax results of the annualizing and normalizing adjustments to the historic test year before any rate increase.
- b. Show Income Taxes for the annualized and normalized test year.
- c. Show Income Tax effect of the rate increase requested.
- d. Show Income Taxes for the normalized and annualized test year after application of the full rate increase.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

IV. TAXES

IV.18. State amount of debt interest utilized for Income Tax calculations, and details of debt interest computations, under each of the following rate case bases:

- a. Actual per book test year.
- b. Annualized historic test year-end.
- c. Proposed future test year-end.

RESPONSE:

Not applicable to PWSA as tax-exempt municipally-owned authority.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.1. Provide a schedule showing the measures of value and the rates of return at the original cost in the current case. All claims made on this exhibit should be cross-referenced to appropriate exhibits.

RESPONSE: Not applicable.

V. RATE BASE

V.2. If a claim is made for construction work in progress, include, in the form of an exhibit, the summary page from all work orders, amount expended at the end of the historic and future test year and anticipated in-service dates. Indicate if any of the construction work in progress will result in insurance recoveries, reimbursements, or retirements of existing facilities. Describe in exact detail the necessity of each project claimed if not detailed on the summary page from the work order. Include final completion dates and estimated total amounts to be spent on each project. This exhibit should be updated at the conclusion of these proceedings.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.3. If a claim is made for nonrevenue producing construction work in progress, include, in the form of an exhibit, the summary page from all work orders, amount expended at the end of the historic and future test year and anticipated in-service dates. Indicate if any of the construction work in progress will result in insurance recoveries, reimbursements, or retirements of existing facilities. Describe in exact detail the necessity of each project claimed if not detailed on the summary page from the work order. Include a list of items needed to complete each project, such as landscaping and fencing, and estimated total amounts to be spent to complete each project. These exhibits should be updated at the conclusion of these proceedings.

RESPONSE:

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.4. If a claim is made for plant held for future use, supply the following:

- a. A brief description of the plant or land site and its original cost.
- b. expected date of use for each item claimed.
- c. Explanation as to why it is necessary to acquire each item in advance of its date of use.
- d. Date when each item was acquired.
- e. Date when each item was placed in the plant held for future use account.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.5. If fuel stocks comprise part of the cash working capital claim, provide an exhibit showing the actual book balances, noting quantity and price for the fuel inventories by type of fuel for the 13 months prior to the end of the historic test year by location, station, etc. Explain the method of determining the claim if other than that described above.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.6. Explain in detail by statement or exhibit the appropriateness of claiming any additional items, not previously mentioned, in the measures of value.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.7. Provide schedules and data in support of the following working capital items:

- a. Prepayments—list and identify all items.
- b. Federal Income Tax accrued or prepaid.
- c. Pennsylvania State Income Tax accrued or prepaid.
- d. Pennsylvania Capital Stock Tax accrued or prepaid.
- e. Pennsylvania Public Utility Realty Tax accrued or prepaid.
- f. Payroll taxes accrued or prepaid.
- g. Any adjustments related to the above items for ratemaking purposes.

RESPONSE:

- 7.a. Prepayments—list and identify all items – See the response to FR X.6.
- 7.b. Federal Income Tax accrued or prepaid - Not applicable.
- 7.c. Pennsylvania State Income Tax accrued or prepaid - Not applicable.
- 7. Pennsylvania Capital Stock Tax accrued or prepaid - Not applicable.
- 7.e. Pennsylvania Public Utility Realty Tax accrued or prepaid - Not applicable.
- 7.f. Payroll taxes accrued or prepaid – Not applicable.
- 7.g. Any adjustments related to the above items for ratemaking purposes - Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.8. Supply an exhibit supporting the claim for cash working capital requirement based on the lead-lag method.

a. Pro forma expenses and revenues are to be used in lieu of book data for computing lead-lag days.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.9. Indicate if amortized expenses have been removed from the lead-lag study. If so, please provide documentation showing such removal. If not, provide a list of such amortization expenses included.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.10. Identify the funds availability arrangements or terms which the company has with its banks with respect to deposits of customer checks. For example, does the company have same day or next day access to funds deposited?

RESPONSE:

PWSA has a number of payment options for the collection of customer accounts receivables. Payments for PWSA service are accepted by customer check, ACH (electronic) transfer, in-person at 7-Eleven and Family Dollar stores, and from collection agencies for past due accounts.

The following excerpt is from the PNC Bank, PWSA's primary checking and deposit account, Corporate Funds Availability Policy for PWSA regarding the availability of customer deposits.

Same Day Availability

Funds from the following deposits are available on the same business day as the day of their deposit:

- All cash deposits made to a PNC Bank teller
- Wire Transfers
- Electronic Deposits

Next Day Availability

If you make a deposit before the cut-off time on a business day that we are open, funds from deposits of checks or money orders identified below will be available on the first business day after the business day of your deposit for all purposes.

- Checks and money orders drawn on PNC Bank
- U.S. Treasury checks payable to you
- Federal Reserve Bank checks, Federal Home Loan Bank checks and U.S. Postal Service money orders payable to you
- State and local government checks that are payable to you, if you use a special deposit ticket available upon request at a PNC Bank branch office
- Non-PNC Bank cashier's, certified and teller's checks that are payable to you, if you use a special deposit ticket available upon request at a PNC Bank branch office

You are required to separate checks requiring special deposit tickets from other checks you are depositing.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

Longer Delays May Apply

Funds you deposit by check may be delayed for a longer period under the following circumstances:

- We believe a check you deposited will not be paid.
- You deposit checks in any one day totaling more than \$5,000.
- You redeposit a check that has been returned unpaid.
- You have overdrawn your account repeatedly in the last six months.
- There is an emergency such as a failure of communications or computer equipment.

We will notify you of the delay in your ability to withdraw funds for any of the reasons listed, and we will tell you when the funds will be available. In this case, funds from items deposited as set forth above under "Other Check Deposits" will usually be available no later than the fifth business day after the business day of your deposit for all purposes

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.11. In reference to materials and supplies:

- a. What method of inventory valuation was used to develop the claim for materials and supplies?
- b. Does the utility use a material and supply model to calculate needed material and supply levels?
- c. If so, provide the model. Supply an illustrative example of how the monthly balances are derived.
- d. Provide the actual monthly value for the inventory of materials and supplies for the past 12 months. Supply as of the end of the historic test year, a 13-month average, by month, for the material and supply account.
- e. Provide the monthly level of materials and supplies for 3 years prior to the conclusion of the historic test year.

RESPONSE:

11.a. What method of inventory valuation was used to develop the claim for materials and supplies?

Not applicable to a cash-basis utility.

11.b. Does the utility use a material and supply model to calculate needed material and supply levels?

No, it does not.

11.c. If so, provide the model. Supply an illustrative example of how the monthly balances are derived.

Please refer to response to question 11b.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

- 11.d** Provide the actual monthly value for the inventory of materials and supplies for the past 12 months. Supply as of the end of the historic test year, a 13-month average, by month, for the material and supply account.

PWSA expenses materials and supplies as incurred and does not track materials and supplies in a balance sheet account. In addition, PWSA is filing on a cash basis and, therefore, is not making a claim for materials and supplies.

- 11.e.** Provide the monthly level of materials and supplies for 3 years prior to the conclusion of the historic test year.

Please see the response to 11d.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.12. For each nonblanket or projected plant addition to cost the greater of \$100,000 or 0.5% of current rate base, included in the future test year, please provide:

- a. Description of the project.
- b. Original budgeted cost broken down by allowance for funds used during construction (AFUDC) and non-AFUDC components.
- c. Current budgeted cost broken down by AFUDC and non-AFUDC components.
- d. Reason for change in budgeted cost.
- e. Original estimated date of completion and in service.
- f. Current estimated date of completion and in service.
- g. Reason for change in completion date.
- h. Anticipated retirement related to the plant addition.
- i. Starting date of project.
- j. Amount expended to date.
- k. Percent of project currently complete.
- l. The depreciation rate applicable.
- m. Identify which projects are due to a Pennsylvania Department of Environmental Protection (PA-DEP) or Federal Environmental Protection Agency (EPA) requirement.

RESPONSE:

PWSA's Capital Improvement's Plan (CIP) is addressed in the written testimony of Robert A. Weimer. The testimony includes summary level descriptions of the key projects as well as the CIP itself. A detailed listing of planned capital projects and information related to their intended use will be included as part of the LTIP, which will be filed September 28, 2018 with the PWSA Compliance Plan. Responses to these requirements will be available at that time.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.13. Explain how the future test year plant balances were projected and provide supporting workpapers and documentation.

RESPONSE:

PWSA is filing on a cash-basis fully projected test year. Due to the nature of a cash basis filing, projected plant balances do not directly impact the revenue requirement and resulting rates. However, utilizing the five-year CIP, PWSA has projected future plant and fixed asset balances. The objective of this projection is to show the magnitude of the CIP and it's means for financing. For the CIP and projected plant balances, please refer to the written testimony of Robert Weimer and Debbie Lestitian.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.14. Are all of the assets used in the plant-in-service claim used exclusively by the water or wastewater utility? If not, provide the estimated percentage that each shared asset is used by other entities.

RESPONSE:

All assets in the plant-in-service claim are used by the water or wastewater utility.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.15. Is all plant included in rate base currently being used in providing water or wastewater service? If not, provide a schedule which presents those plant items which are not, and indicate the corresponding amounts and account numbers. Further, provide a detailed narrative explaining the reason why such plant is not being used and the anticipated future disposition of the plant.

RESPONSE:

All plant in service included in the rate base is used and useful. All projected investments during 2018 will be placed in service by the end of 2018 and be used and useful. All projected investments during 2018 will be placed into service by the end of the FPFTY and will be used and useful.

Pittsburgh Water and Sewer Authority's Base Rate Filing

V. RATE BASE

V.16. Provide all workpapers and supporting documentation showing the derivation of the projected balances of contributions in aid of construction, customer advances for construction and company service line and customer deposits for the future test year.

RESPONSE:

In 2017, PWSA received donated property, or contributions in aid of construction, of \$275,000 for water and \$1,320,000 for wastewater. For the purposes of this rate filing and since PWSA is filing on a cash basis, PWSA has not projected balances contributions in aid of construction, customer advances for construction and company service line and customer deposits. Projects identified in the CIP are assumed to be funded through the issuance of debt or available utility cash from operations and reserve funds.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

If any of the following questions under this section have been previously answered pursuant to 52 Pa. Code Chapter 73, please note in your response. It is not necessary to provide responses to questions previously answered.

VI.1. Provide a description of the depreciation methods used to calculate annual depreciation amounts and depreciation reserves, together with a discussion of the factors which were considered in arriving at estimates of service life and dispersion by account. Supply a comprehensive statement of any changes made in method of depreciation. Provide dates of all field inspections and facilities visited.

RESPONSE:

Depreciation of capital assets owned by the Authority is provided on the straight-line method based on the estimated useful lives of the various classes of assets with no salvage value. Utility assets (such as treatment plant and distribution fixed assets) have estimated useful lives ranging from 30 to 70 years. Non-utility assets (such as administration fixtures) have estimated useful lives ranging from five to 10 years.

The Authority also receives donated property relating mostly to dedicated water and sewer lines. These assets are capitalized at acquisition value at the date of the donation and depreciated in accordance with the estimated useful lives noted above.

The water and sewer system represents assets leased from the City. Amortization of capital lease assets is provided on the straight-line basis applying an estimated average remaining useful life from the inception of the lease.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

VI.2. Set forth, in exhibit form, charts depicting the original and estimated survivor curves and a tabular presentation of the original life table plotted on the chart for each account where the retirement rate method of analysis is utilized.

RESPONSE:

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

VI.3. Provide the surviving original cost at historic test year-end by vintage by account and include applicable depreciation reserves and accruals. These calculations should be provided for plant in service as well as other categories of plant, including contributions in aid of construction and customers' advances for construction.

RESPONSE:

Please see attached schedule.

Pittsburgh Water & Sewer Authority
Utility Plant in Service Net of Accumulated Depreciation
As of December 31, 2017

Description	Department	GL Account	HTY 2017		HTY 2017		HTY 2017	
			Beginning Plant Balance	Additions	Ending Plant Balance	Accumulated Depreciation	Net Plant In Service	
General Water								
Utility - Machine - Equipment	300	1803	\$ 3,354,458	\$ -	\$ 3,354,458	\$ -	\$ 3,354,458	
Water Quality								
Utility - Building	321	1802	644,181	-	644,181	(644,181)	-	
Utility - Machine - Equipment	321	1803	610,423	-	610,423	(462,442)	147,980	
Utility - Computer Equipment	321	1805	8,817	-	8,817	(8,857)	-	
Utility - Vehicles	321	1806	12,030	-	12,030	(12,030)	-	
Utility - Miscellaneous	321	1807	145,378	-	145,378	(35,465)	109,913	
<i>Subtotal: Water Quality</i>			1,420,829	-	1,420,829	(1,162,975)	257,893	
Water Quality								
Utility - Building	322	1802	1,493,548	-	1,493,548	(559,174)	934,373	
Utility - Machine - Equipment	322	1803	52,887,582	20,240	52,907,822	(23,233,896)	29,673,926	
Utility - Computer Equipment	322	1805	459,535	2,233,880	2,693,415	(437,724)	2,255,692	
Utility - Vehicles	322	1806	1,107,667	-	1,107,667	(1,107,667)	0	
Utility - Miscellaneous	322	1807	7,723,900	-	7,723,900	(2,745,927)	4,977,972	
<i>Subtotal: Water Quality</i>			63,672,231	2,254,121	65,926,352	(28,084,389)	37,841,963	
Pumping								
Utility - Building	323	1802	90,054,199	-	90,054,199	(41,815,482)	48,238,717	
Utility - Computer Equipment	323	1805	49,092	-	49,092	(16,718)	32,373	
Utility - Miscellaneous	323	1807	21,899	-	21,899	(21,899)	-	
<i>Subtotal: Pumping</i>			90,125,190	-	90,125,190	(41,854,099)	48,271,091	
Membrane Plant								
Utility - Building	324	1802	20,355,348	-	20,355,348	(6,347,713)	14,007,635	
Distribution								
Utility - Building	325	1802	232,984,692	5,911,598	238,896,289	(64,738,753)	174,157,537	
Utility - Machine - Equipment	325	1803	39,585,878	16,990	39,602,868	(21,064,425)	18,538,443	
Utility - Furniture - Fixtures	325	1804	7,500	-	7,500	(7,500)	-	
Utility - Vehicles	325	1806	2,183,803	465,632	2,649,435	(1,801,720)	847,715	
Utility - Miscellaneous	325	1807	12,311,149	-	12,311,149	(5,624,747)	6,686,402	
Non-Utility - Building	325	1822	2,950	-	2,950	-	2,950	
<i>Subtotal: Distribution</i>			287,075,970	6,394,220	293,470,190	(93,237,144)	200,233,046	
Sewer Operations								
Utility - Building	424	1802	341,117,929	8,632,388	349,750,317	(95,677,680)	254,072,637	
Utility - Machine - Equipment	424	1803	41,753,159	49,955	41,803,114	(19,167,644)	22,635,470	
Utility - Furniture - Fixtures	424	1804	757	-	757	(757)	-	
Utility - Computer Equipment	424	1805	980,644	-	980,644	(978,693)	1,951	
Utility - Vehicles	424	1806	3,292,419	98,227	3,390,646	(2,658,791)	731,855	
Utility - Miscellaneous	424	1807	4,986,808	-	4,986,808	(2,335,111)	2,651,697	
<i>Subtotal: Sewer Operations</i>			392,131,717	8,780,570	400,912,287	(120,818,677)	280,093,610	
Sewer Miscellaneous								
Utility - Miscellaneous	425	1807	30,744	-	30,744	(30,744)	-	
Other Miscellaneous								
Non-Utility - Furniture - Fixtures	800	1824	30	-	30	-	30	
Utility - Computer Equipment	900	1805	3,477	-	3,477	-	3,477	
Non-Utility - Computer Equipment	900	1825	935,436	-	935,436	-	935,436	
<i>Subtotal: Other Miscellaneous</i>			938,942	-	938,942	-	938,942	
Executive Director								
Non-Utility - Building	910	1822	853,138	-	853,138	(217,738)	635,400	
Non-Utility - Furniture - Fixtures	910	1824	74,490	-	74,490	(74,490)	-	
Non-Utility - Vehicles	910	1826	25,864	-	25,864	(25,864)	-	
<i>Subtotal: Executive Director</i>			953,493	-	953,493	(318,093)	635,400	
Customer Service								
Non-Utility - Furniture - Fixtures	911	1824	165,426	-	165,426	(136,641)	28,785	
Non-Utility - Computer Equipment	911	1825	2,430,938	184,207	2,615,144	(2,454,507)	160,638	
Non-Utility - Miscellaneous	911	1827	9,472	-	9,472	(9,472)	-	
<i>Subtotal: Customer Service</i>			2,605,835	184,207	2,790,042	(2,600,620)	189,422	
Management Information Systems								
Non-Utility - Furniture - Fixtures	912	1824	8,773	-	8,773	(8,773)	-	
Non-Utility - Computer Equipment	912	1825	11,328,678	151,119	11,479,797	(9,803,425)	1,676,372	
Non-Utility - Miscellaneous	912	1827	63,345	-	63,345	(54,956)	8,389	
<i>Subtotal: Management Information Systems</i>			11,400,796	151,119	11,551,915	(9,867,154)	1,684,761	

Pittsburgh Water & Sewer Authority
Utility Plant in Service Net of Accumulated Depreciation
As of December 31, 2017

<u>Description</u>	<u>Department</u>	<u>GL Account</u>	<u>HTY 2017</u> <i>Beginning Plant Balance</i>	<i>Additions</i>	<u>HTY 2017</u> <i>Ending Plant Balance</i>	<u>HTY 2017</u> <i>Accumulated Depreciation</i>	<u>HTY 2017</u> <i>Net Plant In Service</i>
Finance							
Non-Utility - Furniture - Fixtures	913	1824	50,129	-	50,129	(50,129)	-
Non-Utility - Computer Equipment	913	1825	6,142	-	6,142	(6,142)	-
<i>Subtotal: Finance</i>			56,271	-	56,271	(56,271)	-
Warehouse							
Utility - Machine - Equipment	918	1803	1,115	-	1,115	-	1,115
Non-Utility - Furniture - Fixtures	918	1824	35,332	-	35,332	(35,062)	270
Non-Utility - Computer Equipment	918	1825	33,455	-	33,455	(33,455)	-
Non-Utility - Vehicles	918	1826	173,808	-	173,808	(173,808)	-
Non-Utility - Miscellaneous	918	1827	3,937,558	-	3,937,558	(2,239,489)	1,698,069
<i>Subtotal: Warehouse</i>			4,181,267	-	4,181,267	(2,481,814)	1,699,454
Engineering							
Non-Utility - Building	930	1822	367,490	-	367,490	(205,106)	162,384
Non-Utility - Furniture - Fixtures	930	1824	169,740	38,193	207,933	(173,467)	34,465
Non-Utility - Computer Equipment	930	1825	1,397,849	-	1,397,849	(959,629)	438,220
Non-Utility - Vehicles	930	1826	53,895	-	53,895	(452,068)	(398,173)
Non-Utility - Miscellaneous	930	1827	218,241	-	218,241	(96,584)	121,656
<i>Subtotal: Engineering</i>			2,207,215	38,193	2,245,408	(1,886,855)	358,553
<i>Total: Fixed Assets</i>			\$ 880,510,306	\$ 17,802,429	\$ 898,312,735		
Other Assets							
Construction in Progress		1840	\$ 74,663,867	\$ 16,839,160	\$ 91,503,027	-	\$ 91,503,027
Capitalized Interest		1841	7,437,197	(8,052)	7,429,145	-	7,429,145
CIP Accrual		1842	9,311,403	(4,440,449)	4,870,954	-	4,870,954
Total Utility Plant			\$ 971,922,773	\$ 30,193,088	\$ 1,002,115,861	\$ (308,746,547)	\$ 693,369,353

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

VI.4. Provide a comparison of the calculated depreciation reserve used for ratemaking purposes v. the book reserve by account at the end of the test year, if they differ.

RESPONSE:

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

VI.5. Supply a schedule by account and depreciable group showing the survivor curve and annual accrual rate estimated to be appropriate:

- a. For the purposes of this filing.
- b. For the purposes of the most recent rate increase filing prior to the current proceedings.

RESPONSE:

5.a. For the purposes of this filing.

Please see response for VI.3.

5.b. For the purposes of the most recent rate increase filing prior to the current proceedings.

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VI. DEPRECIATION

VI.6. Provide an exhibit showing gross salvage, cost of removal, and net salvage for the 5 most recent calendar or fiscal years by account.

RESPONSE:

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.1. Provide capitalization and capitalization ratios for the last 5-year period and projected through the next 2 years (with short-term debt and without short-term debt) for the company, parent and consolidated system.

- a. Provide year-end interest coverages before and after taxes for the last 3 years and at the latest date, including indenture and Securities and Exchange Commission (SEC) bases, for the company, parent and consolidated system.
- b. Provide year-end preferred stock dividend coverages for the last 3 years and at latest date, including charter and SEC bases.

RESPONSE:

Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.2. Provide latest prospectus for the company and the parent.

RESPONSE: Not applicable.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.3. Supply projected capital requirements and the sources of company, parent and consolidated system for the historic test year and each of 3 comparable future years.

RESPONSE:

Attached are PWSA's sources and uses of cash for capital improvement expenditures for Fiscal Years 2018-2023.

Projected Capital Sources & Uses	FTY 12 Months Ending 12/31/2018	FPFY 12 Months Ending 12/31/2019	Projected 12 Months Ending 12/31/2020	Projected 12 Months Ending 12/31/2021	Projected 12 Months Ending 12/31/2022	Projected 12 Months Ending 12/31/2023
Capital Requirements						
Water Treatment Plant	\$ 8,344,590	\$ 9,160,628	\$ 22,462,623	\$ 40,495,302	\$ 40,241,094	\$ 46,976,326
Water Pumping and Storage	9,842,169	23,175,580	42,161,185	83,398,816	74,783,779	38,524,736
Water Distribution System	10,049,193	30,297,215	48,304,439	55,544,716	59,767,398	60,098,027
Water Lead-Related Projects	18,921,276	44,332,173	37,281,592	41,834,637	37,999,089	39,159,086
Wastewater System	3,251,559	15,944,289	42,335,853	33,368,592	26,324,832	31,140,180
Stormwater System	2,506,272	8,282,282	24,190,736	35,421,531	39,149,858	34,211,467
Green Infrastructure	6,051,149	16,349,444	29,340,688	28,294,341	12,099,308	12,434,136
Other	2,401,875	7,649,000	10,151,000	8,367,200	6,079,310	3,516,857
Total Capital Requirements	\$ 61,368,082	\$155,190,611	\$256,228,116	\$326,725,135	\$296,444,669	\$266,060,814
Funding Sources						
Debt (Revenue Bonds)	\$ 61,368,082	\$153,690,611	\$252,228,116	\$319,725,135	\$286,444,669	\$251,060,814
Cash (PAYGO)	-	1,500,000	4,000,000	7,000,000	10,000,000	15,000,000
Total Funding Sources	\$ 61,368,082	\$155,190,611	\$256,228,116	\$326,725,135	\$296,444,669	\$266,060,814

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.4. Provide a schedule of debt and preferred stock of company, parent and consolidated system as of historic test year-end and latest date, detailing for each issue (if applicable):

- a. Date of issue.
- b. Date of maturity.
- c. Amount issued.
- d. Amount outstanding.
- e. Amount retired.
- f. Amount required.
- g. Gain on reacquisition.
- h. Coupon rate.
- i. Discount or premium at issuance.
- j. Issuance expenses.
- k. Net proceeds.
- l. Sinking fund requirements.
- m. Effective interest rate.
- n. Dividend rate.
- o. Effective cost rate.
- p. Total average weighted effective cost rate.

RESPONSE:

Please see the attached FY 2017, 2018, and 2019 debt schedules for the response to: a, b, c, d, e, h, i, j, k, l, and m.

In order to accurately reflect the PWSA's debt portfolio, additional columns have been added to provide information related to the variable rate debt and the related swap agreements, currently outstanding. The debt structure of the Authority is very

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

complicated and includes fixed rate debt, hedged and unhedged variable rate debt, senior and subordinate lien debt. Additionally, debt has been issued both in the public markets and privately placed with banks. The summary attempts to summarize all aspects of the Authority's debt.

4.f. Not applicable.

4.g. Not applicable.

4.n. Not applicable.

4.o. Not applicable.

4.p. Not applicable.

Pittsburgh Water & Sewer Authority
Outstanding Bonds and Loans Payable as of June 1, 2018

	A	B	C	D	E	H	I	J	K	L	M	N	O
Bonds and Loans Payable	Date of Issue	Date of Maturity	Amount issued	Amount Outstanding	Amount Retired	Coupon Rate/ Bank Index	Fixed Swap Rate (Paid)	Variable Swap Rate (Received)	Net Rate (VRDB)(H+I-J)	Discount at Issuance	Premium at Issuance	Issuance Expenses	Net Proceeds
Revenue Bonds													
1998 Series B ¹	Mar-1998	2027-2030	\$ 32,400	\$ 55,837	\$ 70,655	5.18%	N/A	N/A	N/A	\$ -	\$ -	\$ -	\$ 32,400
2013 Series A	Dec-2013	9/1/2015-2033	130,215	93,825	36,390	0.75%-5.00%	N/A	N/A	N/A	-	10,903	798	140,320
2013 Series B	Dec-2013	9/1/2015-2040	86,695	38,760	47,935	3.00-5.25%	N/A	N/A	N/A	-	3,926	553	90,068
2017 Series A	Dec-2017	9/1/2018-2032	159,795	159,795	-	3.00-5.00%	N/A	N/A	N/A	-	23,374	1,778	181,391
2017 Series B	Dec-2017	9/1/2018	5,595	5,595	-	1.89%	N/A	N/A	N/A	-	-	31	5,564
2017 Series C (JPM Swap) ^{2,3}	Dec-2017	9/1/2040	72,748	72,748	-	70% LIBOR + 64%	3.7835%	70% LIBOR	4.4235%	-	-	693	72,054
2017 Series C (MLCS Swap) ^{2,3}	Dec-2017	9/1/2040	72,748	72,748	-	70% LIBOR + 64%	3.7700%	70% LIBOR	4.4100%	-	-	693	72,054
2017 Series C (JPM Swap) ^{2,3}	Dec-2017	9/1/2040	71,225	71,225	-	70% LIBOR + 64%	3.8255%	70% LIBOR	4.4655%	-	-	679	70,546
2017 Series C (Unhedged) ²	Dec-2017	9/1/2040	2,085	2,085	-	70% LIBOR + .64%	N/A	N/A	2.0600%	-	-	20	2,065
Subordinate Debt													
2008 Series C-1A ^{2,4,5}	Jun-2008	9/1/2035	10,000	10,000	-	(70% LIBOR + .70%)*MFR	3.5000%	70% LIBOR	4.6566%	-	-	273	9,727
2008 Series C-1B ^{2,4,5}	Jun-2008	9/1/2035	10,000	10,000	-	(70% LIBOR + .70%)*MFR	3.5000%	70% LIBOR	4.6566%	-	-	273	9,727
2008 Series C-1C ^{2,4,5}	Jun-2008	9/1/2035	5,000	5,000	-	(70% LIBOR + .70%)*MFR	3.5000%	70% LIBOR	4.6566%	-	-	136	4,864
2008 Series C-1D ^{2,4,5}	Jun-2008	9/1/2035	26,870	26,840	70	(70% LIBOR + .69%)*MFR	3.5000%	70% LIBOR	4.6445%	-	-	733	26,137
2008 Series C-2 ^{2,4}	Jun-2008	9/1/2038	51,885	51,820	65	(70% LIBOR + .75%)*MFR	3.5000%	70% LIBOR	4.7174%	-	-	1,415	50,470
State Loans (PENNVEST)	Various	Various	34,000	29,136	4,864	1.00-3.25%*MFR	N/A	N/A	N/A	-	-	-	34,000
Capital Lease	Dec-2015	12/1/2025	7,445	1,489	5,956	0.00%	N/A	N/A	N/A	-	-	-	7,445

¹ Column C is the Initial Stated Amount (Capital Appreciation Bonds), Column D is based on accreted value as of 9/1/2018 and Column E is total amount paid as of 9/1/2018

² Column N represents a proportional breakdown of cost of issuance per Official Statements

³ Column C represents the portion of the Series C of 2017 which is connected to certain swap agreements or is unhedged.

⁴ Subordinate Bonds Series 2008C-1A-D and C-2 have related swaps that are proportionately allocated to each Sub-Series. 40% Bank of America and 60% JP Morgan. Related Bank Loans are Series C-1 A,B,C,D (BoFA) and Series C-2 (JPM)

⁵ Due to tax reform, the Marginal Rate Factor was increased from 1 to 1.2154 which has increased the interest rate for the Subordinated Debt

⁶ One Month LIBOR is assumed to be 2.029% (6/6/2016), 70% of one month LIBOR is 1.42% for the purposes of this summary

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.5. Supply financial data of company and/or parent for last 5 years:

- a. Earnings-price ratio (average).
- b. Earnings-book value ratio (per share basis) (average book value).
- c. Dividend yield (average).
- d. Earnings per share (dollar).
- e. Dividends per share (dollars).
- f. Average book value per share yearly.
- g. Average yearly market price per share (monthly high-low basis).
- h. Pre-tax funded debt interest coverage.
- i. Post-tax funded debt interest coverage.
- j. Market price-book value ratio.

RESPONSE:

Not applicable to a municipally-owned, cash flow method.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.6. Provide AFUDC charged by company at historic test year-end and latest date, explain method by which rate was calculated and provide workpaper showing derivation of the company's current AFUDC rate.

RESPONSE:

PWSA does not utilize a AFUDC accrual in its accounting system. PWSA has not utilized capitalized interest in the HTY nor do they anticipate utilizing any in the FTY and FPFTY. Financing costs incurred during construction are expensed as they occur.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.7. Set forth provisions of company's and parent's charter and indentures, if applicable, which describe coverage requirements, limits on proportions of types of capital outstanding, and restrictions on dividend payouts.

RESPONSE:

The following documents are attached:

- Amended and Restated Trust Indenture - November 1, 2017

AMENDED AND RESTATED TRUST INDENTURE

BETWEEN

THE PITTSBURGH WATER AND SEWER AUTHORITY

and

THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A.
as Successor Trustee

Originally dated as of October 15, 1993
Amended and Restated as of November 1, 2017
And Effective on the First Effective Date

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AMENDED AND RESTATED TRUST INDENTURE

THIS AMENDED AND RESTATED TRUST INDENTURE dated as of the 1st day of November, 2017 (as amended and supplemented from time to time, the "Indenture"), is by and between THE PITTSBURGH WATER AND SEWER AUTHORITY, a body corporate and politic organized and existing under the laws of the Commonwealth of Pennsylvania, having its principal office in the City of Pittsburgh, Allegheny County, Pennsylvania (the "Authority"), and THE BANK OF NEW YORK MELLON TRUST COMPANY, N.A., a national banking corporation organized and existing under and by virtue of the laws of the United States of America, having power and authority to accept and execute trusts and having a corporate trust office in the City of Pittsburgh, Allegheny County, Pennsylvania, as successor trustee (the "Trustee").

WHEREAS, the Authority makes the following findings and statements:

1. The Act. The Authority is a public body, corporate and politic, duly organized and validly existing under the provisions of the Pennsylvania Municipality Authorities Act of the Commonwealth of Pennsylvania (the "Commonwealth"), Title 53 of the Pennsylvania Consolidated Statutes, Section 5601, et seq., as amended (the "Act").

2. Relationship with the City. The Authority was organized in February 1984 by the City of Pittsburgh, Allegheny County, Pennsylvania (the "City") for the purpose of assuming the responsibility for the operation of the City's water supply and distribution and wastewater collection systems (as further modified as defined herein, the "System"). Pursuant to a Lease and Management Agreement dated as of March 29, 1984 between the City and the Authority (the "Lease and Management Agreement"), the System was leased by the City to the Authority. The Authority then designated the City as its agent to operate and maintain the System. The City and the Authority entered into a Capital Lease Agreement dated as of July 15, 1995 (the "Capital Lease Agreement") under which the Lease and Management Agreement was terminated and the Authority was granted the option to acquire the portion of the System owned by the City. Pursuant to the Capital Lease Agreement, which has a term of 30 years, the Authority made three payments totaling \$101,416,974.60 during the first three years, and on September 1, 2025, upon the payment of \$1.00, the Authority will acquire title to the System. At the same time the City and the Authority entered into the Capital Lease Agreement, they also entered into a Cooperation Agreement dated as of June 15, 1995, effective January 1, 1995, as amended by a First Amendment to Cooperation Agreement dated March 21, 2011 (the "Cooperation Agreement"). The Cooperation Agreement provides for the following matters: the Authority agreed to assume responsibility for management and operation of the System, with some sewer functions remaining with the City. The City provides certain specified services to the Authority on a fee for services basis and the Authority makes certain payments to the City to reimburse it for costs incurred by the City in regard to the operation and maintenance of the System. The Authority agrees to provide the City with water without charge to be used by the City, its departments, agencies and instrumentalities, and the Authority agrees to reimburse the City for equalization payments made by the City to a private utility which serves customers in a portion of the City. In the 2011 amendment to the Cooperation Agreement, the City agreed to subordinate the payments it is entitled to under the Cooperation Agreement to the Authority's debt obligations.

3. Existing Senior Indenture. The Authority's senior lien debt has been issued under a Trust Indenture dated as of October 15, 1993 (the "Original Indenture") with a bond trustee, now being The Bank of New York Mellon Trust Company, N.A. (the "Trustee"), as amended and supplemented by a First Supplemental Indenture dated as of July 15, 1995 (the "First Supplemental Indenture"), a Second Supplemental Indenture dated as of March 1, 1998 (the "Second Supplemental Indenture"), a Third Supplemental Indenture dated as of March 1, 2002 (the "Third Supplemental Indenture"), a Fourth Supplemental Indenture dated as of September 15, 2003 (the "Fourth Supplemental Indenture"), a Fifth Supplemental Indenture dated as of June 1, 2005 (the "Fifth Supplemental Indenture"), a Sixth Supplemental Indenture dated as of March 1, 2007 (the "Sixth Supplemental Indenture"), a Seventh Supplemental Indenture dated as of June 1, 2008 (the "Seventh Supplemental Indenture"), an Amending Supplement to the Initial First Lien Indenture and the Seventh Supplemental Indenture dated as of October 15, 2009 (the "2009 Supplemental Indenture"), a Second Amendment to the Seventh Supplemental Indenture dated as of August 1, 2010 (the "2010 Supplemental Indenture"), a Second Amending Supplement to the Initial First Lien Indenture and the Third Amending Supplement to the Seventh Supplemental Indenture dated as of October 22, 2013 (the "2013 Supplemental Indenture"), an Eighth Supplemental First Lien Indenture dated as of December 1, 2013 (the "Eighth Supplemental Indenture"), a Third Amending Supplement to the First Lien Indenture and Fourth Amending Supplement to the Seventh Supplemental Indenture dated as of October 19, 2016 (the "2016 Supplemental Indenture"), a 2017-1 Supplemental Trust Indenture dated as of November 1, 2017 (the "2017-1 Supplemental Indenture"), and a 2017-2 Supplemental Trust Indenture dated as of December 1, 2017 (the "2017-2 Supplemental Indenture") (the Original Indenture, as amended and supplemented by the First Supplemental Indenture, the Second Supplemental Indenture, the Third Supplemental Indenture, the Fourth Supplemental Indenture, the Fifth Supplemental Indenture, the Sixth Supplemental Indenture, the Seventh Supplemental Indenture, the 2009 Supplemental Indenture, the 2010 Supplemental Indenture, the 2013 Supplemental Indenture, the Eighth Supplemental Indenture, the 2016 Supplemental Indenture, the 2017-1 Supplemental Indenture and the 2017-2 Supplemental Indenture, collectively, the "Existing Senior Indenture").

4. Existing Subordinate Indenture. The Authority's subordinate lien bond debt has been issued to date under a Subordinate Trust Indenture dated as of July 15, 1995 (the "Original Subordinate Indenture") between the Authority and a bond trustee, now being The Bank of New York Mellon Trust Company, N.A. (the "Subordinate Trustee"), as amended and supplemented by a First Supplemental Subordinate Indenture dated as of March 1, 1998 (the "First Supplemental Subordinate Indenture"), a Second Supplemental Subordinate Indenture dated as of June 1, 2008 (the "Second Supplemental Subordinate Indenture"), an Amending Supplement to the Initial Subordinate Indenture and Second Supplemental Subordinate Indenture dated as of November 1, 2009 (the "2009-1 Supplemental Subordinate Indenture"), an Amendment to the Amending Supplement to the Initial Subordinate Indenture and Second Supplemental Subordinate Indenture dated as of November 15, 2009 (the "2009-2 Supplemental Subordinate Indenture"), a Second Amending Supplement to the Second Supplemental Indenture dated as of September 1, 2012 (the "2012 Supplemental Subordinate Indenture"), a Third Amending Supplement to the Second Supplemental Subordinate Indenture dated as of September 1, 2013 (the "Third Supplemental Subordinate Indenture"), a Fourth Amending Supplement to the Second Supplemental Indenture dated as of November 3, 2014 (the "2014 Supplemental Subordinate Indenture"), and a Fifth Amending Supplement to the Second Supplemental Indenture dated as of September 1, 2015 (the "2015 Supplemental Subordinate Indenture") (the Original Subordinate Indenture, as amended and

supplemented by the First Supplemental Subordinate Indenture, the Second Supplemental Subordinate Indenture, the 2009-1 Supplemental Subordinate Indenture, the 2009-2 Supplemental Subordinate Indenture, the 2012 Supplemental Subordinate Indenture, the 2013 Supplemental Subordinate Indenture, the 2014 Supplemental Subordinate Indenture and the 2015 Supplemental Subordinate Indenture, as amended and supplemented (the “Existing Subordinate Indenture”).

5. 1998B Bonds. In 1998, the Authority issued its \$36,440,069.70 Water and Sewer System First Lien Revenue Bonds, Series B of 1998 (the “1998B Bonds”) pursuant to the Second Supplemental Indenture. The 1998B Bonds are capital appreciation bonds that funded capital projects. The 1998B Bonds were initially insured by Financial Guaranty Insurance Company (“FGIC”). FGIC also provided a debt service reserve fund policy for the 1998B Bonds; such debt service reserve fund policy for the 1998B Bonds was terminated and replaced by a policy issued by Assured Guaranty Municipal Corp. (“AGM”; formerly Financial Security Assurance, Inc. (“FSA”)) on November 29, 2017. Pursuant to a Novation Agreement dated as of September 14, 2012 entered into between FGIC and National Public Finance Guarantee Corporation (“National”), the bond insurance policy relating to the 1998B Bonds and the debt service reserve fund policy for the 1998B Bonds were transferred by novation to National, with the effect that National is the designated successor in interest to, and substituted in place of, FGIC as if it were the original insurer for each such policy. Pursuant to side letters dated October 22, 2009 and October 13, 2016 between National and the Authority, National has certain approval rights related to the relationship between the Authority and the letter of credit banks securing the 2008B-1 Bonds (hereinafter defined) and the 2008B-2 Bonds (hereinafter defined).

6. 2008 Bonds. In 2008, the Authority issued \$310,355,000 of senior bonds, including the \$68,970,000 (Fixed Rate) Water and Sewer System First Lien Revenue Refunding Bonds, Series A of 2008 Taxable (the “2008A Bonds”), \$145,495,000 (Variable Rate Demand) Water and Sewer System First Lien Revenue Refunding Bonds, Series B of 2008 (the “2008B Bonds”), \$24,665,000 (Fixed Rate) Water and Sewer System First Lien Revenue Bonds, Series D-1 of 2008 (the “2008D-1 Bonds”), and \$71,225,000 (Variable Rate Demand) Water and Sewer System First Lien Revenue Bonds, Series D-2 of 2008 (the “2008D-2 Bonds”) pursuant to the Seventh Supplemental Indenture.

7. 2008A Bonds. The 2008A Bonds are fixed rate bonds and were issued to refund certain prior bonds, fund capital projects, and fund swap termination payments. The 2008A Bonds are insured by AGM (formerly FSA). AGM (formerly FSA) also provides the debt service reserve fund policy for the 2008A Bonds.

8. 2008B-1 Bonds, 2008B-2 Bonds and Swaps. The 2008B Bonds are variable rate bonds that currently refunded certain prior bonds, funded a swap termination payment, and funded capital projects. The 2008B Bonds were initially insured by FSA, but, in 2009, the 2008B Bonds were divided into two subseries, the \$72,750,00 Series B-1 of 2008 (the “2008B-1 Bonds”) and the \$72,745,000 Series B-2 of 2008 (the “2008B-2 Bonds”), the FSA insurance was terminated, and the bonds were secured by direct draw letters of credit, pursuant to the 2009 Supplemental Indenture. AGM (formerly FSA) provides the debt service reserve fund policy for the 2008B Bonds. There were subsequent adjustments to the letter of credit banks securing the 2008B-1 Bonds and 2008B-2 Bonds as reflected in the 2013 Supplemental Indenture and the 2016 Supplemental Indenture. The current letter of credit providers are Bank of America, N.A. for the

2008B-1 Bonds and PNC Bank, National Association for the 2008B-2 Bonds. Pursuant to side letters dated October 22, 2009 and October 13, 2016 between National and the Authority, National has certain approval rights related to the relationship between the Authority and the letter of credit banks securing the 2008B-1 Bonds and the 2008B-2 Bonds. In 2008, with respect to the 2008B Bonds, the Authority entered into long-term interest rate swap agreements with Merrill Lynch Capital Services, Inc. and J.P. Morgan Chase Bank, National Association. The swap payments are insured by AGM (formerly FSA).

9. 2008D-1 Bonds. The 2008D-1 Bonds are fixed rate bonds that funded capital projects. The 2008D-1 Bonds are insured by AGM (formerly FSA). AGM (formerly FSA) also provides the debt service reserve fund policy for the 2008D-1 Bonds.

10. 2008D-2 Bonds and Swap. The 2008D-2 Bonds are variable rate bonds that funded capital projects. The 2008D-2 Bonds are insured by AGM (formerly FSA). The liquidity facility for the 2008D-2 Bonds is a standby bond purchase agreement with PNC Bank, National Association. AGM (formerly FSA) also provides the debt service reserve fund policy for the 2008D-2 Bonds. In 2008, with respect to the 2008D-2 Bonds, the Authority entered into a long-term interest rate swap agreement with J.P. Morgan Chase Bank, National Association. The swap payments are insured by AGM (formerly FSA). Pursuant to the 2010 Supplemental Indenture, a minor amendment was made to the redemption provisions related to the 2008D-2 Bonds.

11. 2008C-1 Subordinate Bonds, 2008C-2 Subordinate Bonds and Swaps. In 2008, the Authority issued its \$51,910,000 (Variable Rate Demand) Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1 of 2008 (the “2008C-1 Subordinate Bonds”) and its \$51,885,000 (Variable Rate Demand) Water and Sewer System Subordinate Revenue Refunding Bonds, Series C of 2008 (the “2008C-2 Subordinate Bonds”) pursuant to the Second Supplemental Subordinate Indenture. The 2008C-1 Subordinate Bonds and the 2008C-2 Subordinate Bonds are variable rate bonds issued to refund certain prior debt. With respect to such bonds, the Authority entered into long-term interest rate swap agreements with J.P. Morgan Chase Bank, National Association and Merrill Lynch Capital Services, Inc. These swaps are insured by AGM (formerly FSA). AGM (formerly FSA) provides the debt service reserve fund policy for the 2008C-1 Subordinate Bonds and the 2008C-2 Subordinate Bonds.

12. Subseries of 2008C-1 Subordinate Bonds. The 2008C-1 Subordinate Bonds were initially insured by FSA with a liquidity facility provided by Dexia Credit Local. In 2009, the Authority, pursuant to the 2009-1 Supplemental Subordinate Indenture and an Amendment to the Amending Supplement to the Initial Subordinate Indenture and the 2009-2 Supplemental Subordinate Indenture, divided the 2008C-1 Subordinate Bonds into four subseries: the \$10,000,000 Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1A of 2008 (the “2008C-1A Subordinate Bonds”); the \$10,000,000 Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1B of 2008 (the “2008C-1B Subordinate Bonds”); the \$5,000,000 Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1C of 2008 (the “2008C-1C Subordinate Bonds”); and the \$26,910,000 Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1D of 2008 (the “2008C-1D Subordinate Bonds”). All of these bonds were converted into a term mode. Dexia Credit Local was removed as the liquidity facility for all of these bonds. New banks were designated as liquidity facility providers for the 2008C-1A Subordinate Bonds, the 2008C-1B Subordinate Bonds and the 2008C-

1C Subordinate Bonds. The 2008C-1D Subordinate Bonds were remarketed without a liquidity facility. In 2012, the 2008C-1D Subordinate Bonds were remarketed again without a liquidity facility and the Authority entered into the 2012 Supplemental Subordinate Indenture.

13. 2008C-2 Subordinate Bonds. The 2008C-2 Subordinate Bonds are insured by AGM (formerly FSA) with a liquidity facility furnished by PNC Bank, National Association.

14. Direct Placement of 2008C-1ABC Subordinate Bonds. In 2013, the Authority began a process in which all of the subordinate bonds would eventually be put into direct placements by 2016. Pursuant to the Third Supplemental Subordinate Indenture, the FSA insurance on the 2008C-1A Subordinate Bonds, the 2008C-1B Subordinate Bonds and the 2008C-1C Subordinate Bonds (collectively, the “2008C-1ABC Subordinate Bonds”) was terminated, and the 2008C-1ABC Subordinate Bonds were directly placed with Banc of America Preferred Funding Corporation. In connection with the direct placement, the Authority and Banc of America Preferred Funding Corporation entered into a Continuing Covenant Agreement dated as of September 1, 2013 (the “2008C-1ABC Continuing Covenant Agreement”).

15. 2013A Bonds and 2013B Bonds. Also in 2013, the Authority issued additional senior bonds, the \$130,215,000 (Fixed Rate) Water and Sewer System First Lien Revenue Refunding Bonds, Series A of 2013 (the “2013A Bonds”) and the \$86,695,000 (Fixed Rate) Water and Sewer System First Lien Revenue Bonds, Series B of 2013 (the “2013B Bonds”), pursuant to the Eighth Supplemental Indenture. The 2013A Bonds are fixed rate bonds that refunded certain prior bonds and paid termination payments in order to terminate interest rate swap agreements. The 2013B Bonds are fixed rate bonds that funded capital projects. The 2013A Bonds and the 2013B Bonds are insured by AGM. AGM also provides the debt service reserve fund policy for the 2013A Bonds and the 2013B Bonds.

16. Direct Placement of 2008C-2 Subordinate Bonds; LIBOR Rates for 2008C-1ABC Subordinate Bonds, 2008C-2 Subordinate Bonds and Swaps. In 2014 and 2015, the rest of the subordinate bonds were put into direct placements. Pursuant to the 2014 Supplemental Indenture, the 2008C-1ABC Subordinate Bonds, which were directly placed with the Banc of America Preferred Funding Corporation in 2013, were converted to a LIBOR-based interest rate mode; and the 2008C-2 Subordinate Bonds were directly placed with DNT Asset Trust (an affiliate of J.P. Morgan Chase Bank, N.A.) in a LIBOR-based interest rate mode. The Authority and Banc of America Preferred Funding Corporation entered into a First Amendment to Continuing Covenant Agreement dated as of November 3, 2014 (the “2008C-1ABC First Amendment to Continuing Covenant Agreement”). The Authority and DNT Asset Trust entered into a Continuing Covenant Agreement dated as of November 3, 2014 (the “2008C-2 Continuing Covenant Agreement”). In connection with these actions, the Authority entered into amendments to the long-term interest rate swap agreements with J.P. Morgan Chase Bank, National Association and Merrill Lynch Capital Services, Inc. to provide for LIBOR-based payments by the counterparties under the swap agreements (with respect to all of the 2008C Subordinate Bonds).

17. Direct Placement of 2008C-1D Subordinate Bonds. In 2015, pursuant to the 2015 Supplemental Indenture, the 2008C-1D Subordinate Bonds were directly placed with Bank of America, N.A. in a LIBOR-based interest rate mode. The Authority and Bank of America,

N.A. entered into a Continuing Covenant Agreement dated as of September 1, 2015 (the “2008C-1D Continuing Covenant Agreement”).

18. Agreements with AGM Regarding Swap Insurance. The Authority has two agreements with AGM regarding the interest rate swap agreements that AGM insures related to the 2008C Subordinate Bonds: an Agreement Regarding Insured Swap Transaction dated as of September 1, 2013, as amended by an Amendment dated as of July 11, 2017 (collectively, the “AGM 2008C-1ABC and 2008C-1D Agreement”), and an Agreement Regarding Insured Swap Transaction dated as of November 1, 2014 (the “AGM 2008C-2 Agreement”). These agreements require the swaps or the insurance thereof to be terminated in certain circumstances.

19. Non-Bond Subordinate Debt: PENNVEST Loans and 2016 Revolving Credit Agreement. In addition to the senior and subordinate bonds, the Authority has two other types of debt which are subordinate to both the senior and the subordinate bonds, but are on parity with each other with respect to the Authority’s Revenues (as hereinafter defined). The first type of debt consists of multiple loans (the “PENNVEST Loans”) from the Pennsylvania Infrastructure Investment Authority (“PENNVEST”). The PENNVEST Loans were entered into by the Authority between 2001 and 2014 and have an outstanding principal amount of approximately \$33 million. The second type of debt is an \$80 million maximum principal amount revolving construction loan evidenced by a Revenue Note, Series of 2016 (the “2016 Note”). The 2016 Note was issued pursuant to a Revolving Credit and Security Agreement dated as of July 1, 2016 (the “2016 Revolving Credit Agreement”) between the Authority and the lender, JPMorgan Chase Bank, National Association. In connection with the execution of the 2016 Revolving Credit Agreement, the Authority, PENNVEST, JPMorgan Chase Bank, National Association and The Bank of New York Mellon Trust Company, N.A., as collateral trustee, entered into an Intercreditor Agreement dated as of July 1, 2016 (the “2016 Intercreditor Agreement”) setting forth their respective rights with respect to the Revenues.

20. Bondholder Consent for this Indenture. The Authority is determined to improve both its operations and its capital assets. As part of these improvements, the Authority intends to improve and modernize its financing documents and to refund and restructure much of its outstanding debt. The Authority has obtained the consent of 66 2/3% of the bondholders under the Existing Senior Indenture and other required consents in order to have this Indenture become effective as of the First Effective Date (defined herein). The Authority, upon consultation with its counsel, has determined that the consents referenced in the previous sentence are sufficient to permit the actions contemplated herein. If and when 100% bondholder approval is obtained, one additional provision of this Indenture will become effective (see Section 11.02).

21. 2017A Bonds and 2017B Bonds. The Authority has issued its \$_____ Water and Sewer System First Lien Revenue Refunding Bonds, Series A of 2017 (the “2017A Bonds”) and its Water and Sewer System First Lien Revenue Refunding Bond, Series B of 2017 (Federally Taxable) (the “2017B Bonds”) to finance the refunding of a portion of the 1998B Bonds, the 2008A Bonds and the 2013B Bonds and all of the 2008D-1 Bonds pursuant to the 2017-1 Supplemental Indenture. \$_____ principal amount of the 1998B Bonds remain outstanding, \$_____ principal amount of the 2008A Bonds remain outstanding, and \$_____ principal amount of the 2013B Bonds remain outstanding.

22. 2017C Bonds. The Authority has issued its \$_____ Water and Sewer System First Lien Revenue Refunding Bonds, Series C of 2017 (the “2017C Bonds”) to finance the refunding of the 2008B-1 Bonds, the 2008B-2 Bonds and the 2008D-2 Bonds pursuant to the 2017-2 Supplemental Indenture.

23. Need for Amended and Restated Trust Indenture. The Authority has determined that this Amended and Restated Trust Indenture is necessary to update and modernize provisions and covenants, including those related to financing structures and bondholder security.

24. First Effective Date. This Indenture as amended by the 2017-1 Supplemental Indenture and the 2017-2 Supplemental Indenture is effective as of the First Effective Date; and

WHEREAS, the Authority determined that substantial changes were needed in the Existing Senior Indenture to provide the Authority, among other things, greater flexibility in conducting its operations and in financing its capital needs; as a result, the Authority is amending and restating the provisions of the Existing Senior Indenture by entering into this Indenture, which is now effective as described in Section 1.03 hereof, and the Authority has requested the Trustee to participate in this Indenture; and

WHEREAS, the execution and delivery of this Indenture have been duly authorized by a resolution of the Authority; and

WHEREAS, all acts, conditions and things required by the Constitution and laws of the Commonwealth, including the Act, to happen, exist and be performed precedent to and in the execution and delivery of this Indenture have happened, exist and have been performed as so required, in order to make this Indenture a valid and binding trust indenture for the security of the Bonds, subject to the lien on Revenues created under this Indenture, in accordance with its terms;

NOW, THEREFORE, THIS AMENDED AND RESTATED TRUST INDENTURE WITNESSETH: that in consideration of the premises and of the acceptance by the Trustee of the trusts hereby created, and of the purchase and acceptance of the Bonds by the registered Owners thereof, and for the purpose of fixing and declaring the terms and conditions upon which the Bonds are or may be issued, authenticated, delivered, secured and accepted by all persons who shall from time to time be or become Owners thereof, and to declare the terms and conditions upon which the Bonds are secured, and to secure equally and on parity the payment of (i) the principal of, and interest and premium (if any) on all Bonds at any time issued and outstanding hereunder, according to their tenor, purport and effect, and (ii) Other Senior Parity Indebtedness and to secure the performance and observance of all of the covenants, agreements and conditions therein and herein contained, the Authority, intending to be legally bound, has executed and delivered this Indenture and by these presents does hereby sell, assign, transfer, set over, grant a security interest in and pledge unto The Bank of New York Mellon Trust Company, N.A., as Trustee, its successors in the trust and its assigns forever, to the extent provided in this Indenture, the Revenues (as defined in this Indenture), after payment of the Current Expenses (as defined in this Indenture), together with all cash and investments from time to time held in any fund (other than the Rebate Fund) by the Trustee hereunder or held by the Authority in the Revenue Fund, the Operating Reserve Fund or the Rate Stabilization Fund (collectively, the “Trust Estate”).

TO HAVE AND TO HOLD the same unto the Trustee, its successors and assigns in trust forever, IN TRUST, NEVERTHELESS, upon the terms and trusts herein set forth, to secure the payment of all Bonds issued hereunder and the interest thereon and the observance and performance of all the terms, provisions and conditions of this Indenture, and for the equal and ratable benefit and security of all and singular the present and future holders of the Bonds and Other Senior Parity Indebtedness Parties, without preference, priority or distinction as to lien or otherwise, except as otherwise hereinafter provided, of any one Bond or Other Senior Parity Indebtedness over any other Bond or Other Senior Parity Indebtedness by the reason of priority in the issue, sale or authentication thereof or otherwise and to secure the performance and observance of all of the covenants, agreements and conditions therein and herein contained, including the payment of Other Senior Parity Indebtedness, and it is hereby covenanted and agreed by and between the parties hereto that the terms and conditions upon which the Bonds are to be issued, authenticated, delivered, secured and accepted by all persons who shall from time to time be or become registered Owners thereof, and the trusts and conditions upon which the pledged Revenues are to be held and disposed of, are as follows:

ARTICLE I

DEFINITIONS AND GENERAL INDENTURE MATTERS

Section 1.01 Definitions.

(a) The following terms defined in the Recitals of this Indenture shall have the meanings as defined therein for all purposes of this Indenture (including any Supplemental Indentures), unless the context clearly otherwise requires:

Act
 AGM
 AGM 2008C-1ABC and 2008C-1D Agreement
 AGM 2008C-2 Agreement
 Capital Lease Agreement
 City
 Commonwealth
 Cooperation Agreement
 Eighth Supplemental Indenture
 Existing Senior Indenture
 Existing Subordinate Indenture
 FGIC
 Fifth Supplemental Indenture
 First Supplemental Indenture
 First Supplemental Subordinate Indenture
 Fourth Supplemental Indenture
 FSA
 Lease and Management Agreement
 National
 Original Indenture

Original Subordinate Indenture
PENNVEST
PENNVEST Loans
Second Supplemental Indenture
Second Supplemental Subordinate Indenture
Seventh Supplemental Indenture
Sixth Supplemental Indenture
Third Supplemental Indenture
Third Supplemental Subordinate Indenture
1998B Bonds
2008A Bonds
2008B-1 Bonds
2008B-2 Bonds
2008C-1 Subordinate Bonds
2008C-1A Subordinate Bonds
2008C-1ABC Subordinate Bonds
2008C-1ABC Continuing Covenant Agreement
2008C-1ABC First Amendment to Continuing Covenant Agreement
2008C-1B Subordinate Bonds
2008C-1C Subordinate Bonds
2008C-1D Subordinate Bonds
2008C-1D Continuing Covenant Agreement
2008C-2 Subordinate Bonds
2008C-2 Continuing Covenant Agreement
2009 Supplemental Indenture
2009-1 Supplemental Subordinate Indenture
2009-2 Supplemental Subordinate Indenture
2010 Supplemental Indenture
2012 Supplemental Subordinate Indenture
2013 Supplemental Indenture
2013A Bonds
2013B Bonds
2014 Supplemental Subordinate Indenture
2015 Supplemental Subordinate Indenture
2016 Intercreditor Agreement
2016 Note
2016 Revolving Credit Agreement
2016 Supplemental Indenture
2017A Bonds
2017B Bonds
2017C Bonds
2017-1 Supplemental Indenture
2017-2 Supplemental Indenture

(b) Terms defined below in this Article I shall have the meanings set forth below for all purposes of this Indenture (including any Supplemental Indentures), unless the context clearly otherwise requires:

Account

The term “Account” shall mean any of the various accounts, sometimes created within a Fund, under this Indenture including in a Supplemental Indenture.

Accreted Values

The term "Accreted Values" with respect to any Capital Appreciation Bonds, Capital Appreciation and Income Bonds, and Current Interest Capital Appreciation Bonds shall mean an amount equal to the Principal Amount of such Bonds (determined on the basis of the Principal Amount per \$5,000 at maturity thereof) plus the amount assuming semiannual compounding of earnings which would be produced on the investment of such Principal Amount, beginning on the dated date of such Bonds and ending at the maturity date thereof, at a yield which if produced until maturity will produce \$5,000 at maturity. As of any Valuation Date, the Accreted Value of any such Bonds shall mean the amount set forth for such date in the Supplemental Indenture and as of any date other than a Valuation Date, the sum of (a) the Accreted Value on the preceding Valuation Date and (b) the product of (i) a fraction, the numerator of which is the number of days having elapsed from the preceding Valuation Date and denominator of which is the number of days from such preceding Valuation Date to the next succeeding Valuation Date, and (ii) the difference between the Accreted Values for such Valuation Dates. For purposes of consents, voting rights, Bondowner rights, or any other matter herein determined by a percentage of the aggregate Principal Amount of Bonds Outstanding, Capital Appreciation Bonds, Capital Appreciation and Income Bonds, and Current Interest Capital Appreciation Bonds shall be valued at their Accreted Values.

Additional Bonds

The term “Additional Bonds” shall mean Bonds authenticated and delivered hereunder of any Series other than the First Effective Date Outstanding Bonds.

Additional Indebtedness Test

The term “Additional Indebtedness Test” shall mean the certification requirement set forth in Section 3.02(g)(ii) or 3.02(h)(ii) for the issuance of Additional Bonds, in Section 3.03(a) for the issuance of Other Senior Parity Indebtedness.

Additional Indebtedness Test Net Revenues

The term “Additional Indebtedness Test Net Revenues” shall mean Net Revenues adjusted for the purpose of determining fulfillment of the Additional Indebtedness Test to exclude for the relevant Test Period any Revenues consisting of Grants, proceeds of any business interruption insurance, and investment income earned on the Construction Fund and Rate Stabilization Fund.

Annual Budget

The term "Annual Budget" shall mean the budget required by Section 7.12 herein.

Annual Debt Service

The term "Annual Debt Service" shall mean the amount of payments scheduled to come due within a specified Fiscal Year for principal of and interest on any specified Indebtedness. For purposes of calculating Annual Debt Service, the following assumptions are to be used to calculate the principal and interest due in such specified Fiscal Year:

(a) In determining the Principal Amount due in the Fiscal Year, except to the extent that another subparagraph of this definition applies, payment shall be assumed to be made in accordance with any amortization schedule established for such Indebtedness, including any scheduled redemption of such specified Indebtedness and, for such purpose, the redemption payment shall be deemed a principal payment. In determining the amount of interest due in each Fiscal Year, except to the extent subparagraphs (b) through (h) of this definition apply, (i) interest payable at a fixed rate shall be assumed to be made at such fixed rate and on the required payment dates and (ii) the interest rate to be used for Variable Rate Indebtedness that has been Outstanding for at least twelve (12) months shall be the average rate over the twelve (12) months immediately preceding the date of calculation, or for Variable Rate Indebtedness that has been Outstanding less than twelve (12) months the interest rate to be used shall be the actual rate on the date of calculation, or, for Variable Rate Indebtedness proposed to be issued the interest rate to be used for such computation shall be determined by (1) a Qualified Independent Consultant to be a reasonable market rate for fixed-rate bonds of a corresponding term issued under this Indenture on the date of such calculation, with no credit enhancement and taking into consideration whether such Indebtedness bears interest that is or is not excluded from gross income for federal income tax purposes and that is or is not subject to any alternative minimum tax or (2) an Authorized Representative of the Authority by applying the Municipal Market Data (MMD) Index of the same rating category as the Authority for fixed-rate bonds of the most closely corresponding final term and parameters in (1) above.

For the purpose of verifying compliance with the rate covenant contained in Section 7.01 hereof, Variable Rate Indebtedness shall be deemed to bear interest at the actual rate or rates borne during any applicable Fiscal Year.

The amount of Capitalized Interest on deposit in the Debt Service Fund shall be subtracted from the amount of interest due for any related Fiscal Year, but only to the extent that such Capitalized Interest is dedicated to a particular interest payment coming due during such Fiscal Year.

(b) Each maturity of Indebtedness that constitutes Balloon Indebtedness shall be treated as if it were to be amortized over a term of not more than forty (40) years and with substantially level annual debt service payments commencing not later than the year following the year in which such Balloon Indebtedness was issued, and extending not later

than forty (40) years from the date such Balloon Indebtedness was originally issued. For fixed rate obligations, the interest rate used for such computation shall be determined by (1) a Qualified Independent Consultant to be a reasonable market rate for fixed-rate bonds of a corresponding term issued under this Indenture on the date of such calculation, with no credit enhancement and taking into consideration whether such Indebtedness bears interest that is or is not excluded from gross income for federal income tax purposes and that is or is not subject to any alternative minimum tax or (2) an Authorized Representative of the Authority by applying the Municipal Market Data (MMD) Index of the same rating category as the Authority for fixed-rate bonds of the most closely corresponding final term and parameters in (1) above in this sentence. For Balloon Indebtedness that also constitutes Variable Rate Indebtedness, the interest rate used for such computation shall be determined by (1) a Qualified Independent Consultant to be a reasonable market rate for fixed-rate Bonds of a corresponding term issued under this Master Bond Resolution on the date of such calculation, with no credit enhancement and taking into consideration whether such Bonds bear interest that is or is not excluded from gross income for federal income tax purposes and that is or is not subject to any alternative minimum tax or (2) an Authorized Representative of the Authority by applying the Municipal Market Data (MMD) Index of the same rating category as the Authority for fixed-rate bonds of the most closely corresponding final term and parameters in (1) above.

(c) Notwithstanding subparagraph (b) above, if any stated maturity date of Indebtedness that constitutes Balloon Indebtedness occurs within twelve (12) months from the date of the calculation of Annual Debt Service, the principal amount maturing shall be assumed to become due and payable on the stated maturity date unless there is delivered a certificate of an Authorized Representative of the Authority stating that (i) the Authority intends to refinance such maturity and (ii) the probable terms of such refinancing. Upon delivery of such certificate, such Balloon Indebtedness shall be assumed to be refinanced, and Annual Debt Service shall be calculated, in accordance with the probable terms set out in such certificate, except that such assumption shall not result in an interest rate lower than that which would be assumed under subparagraph (b) above and such Balloon Indebtedness shall be amortized over a term of not more than forty (40) years from the date of refinancing.

(d) If any Indebtedness that is then proposed to be issued constitutes Tender Indebtedness, then Tender Indebtedness shall be treated as if the principal amount of such Bonds were to be amortized over a term of not more than 40 years from the date such Tender Indebtedness was originally issued, except that if any principal maturity or amortization schedule is set forth in a Supplemental Indenture or other applicable agreement, such schedule shall be used to determine the principal maturity or amortization of such Indebtedness. The interest rate used for such computation shall be determined by (1) a Qualified Independent Consultant to be a reasonable market rate for fixed-rate Bonds of a corresponding term issued under this Indenture on the date of such calculation, with no credit enhancement and taking into consideration whether such Indebtedness bears interest that is or is not excluded from gross income for federal income tax purposes and that is or is not subject to any alternative minimum tax or (2) an Authorized Representative of the Authority by applying the Municipal Market Data (MMD) Index of the same rating category as the Authority for fixed-rate bonds of the most closely corresponding final term

and parameters in (1) above. For all principal and interest payments becoming due prior to the year in which such Tender Indebtedness is first subject to tender, such payments shall be treated as described in the other applicable subparagraphs of this definition.

(e) With respect to any Interim Indebtedness, it shall be assumed that the principal amount of the Interim Indebtedness will be continuously refinanced and will remain Outstanding until the first Fiscal Year for which interest on the Interim Indebtedness has not been capitalized or otherwise funded or provided for. For such first Fiscal Year, it shall be assumed that (i) the Outstanding principal amount of the Interim Indebtedness will be refinanced with a Series of Additional Bonds that will be amortized over a period not to exceed forty (40) years in such manner as will cause the maximum annual debt service payments applicable to such Series in any twelve (12) month period not to exceed 110% of the minimum annual debt service payments applicable to such Series for any other twelve (12) month period, and (ii) the Series of Additional Bonds will bear interest at a fixed interest rate estimated by (1) a Qualified Independent Consultant to be the interest rate such Series of Additional Bonds would bear if issued on such terms on the date of such estimate to be a reasonable market rate for fixed-rate bonds of a corresponding term issued under this Indenture on the date of such calculation, with no credit enhancement and taking into consideration whether such Indebtedness bears interest that is or is not excluded from gross income for federal income tax purposes and that is or is not subject to any alternative minimum tax or (2) an Authorized Representative of the Authority by applying the Municipal Market Data (MMD) Index of the same rating category as the Authority for fixed-rate bonds of the most closely corresponding final term and parameters in (1) above. Indebtedness which is Interim Indebtedness shall not be treated as Balloon Indebtedness.

(f) Except for Hedge Agreements, Qualified Interest Rate Swap Agreements are to be disregarded in calculating the Series Debt Service Reserve Requirement. Upon incurrence of a Hedge Agreement, all calculations, including for the annual amount on account of principal and interest on Indebtedness subject to the Hedge Agreement, shall be made using the Hedge Fixed Rate for the applicable period and such Indebtedness shall not be considered as Variable Rate Indebtedness for such period.

(g) If money that is not included in the definition of "Revenues" has been used to pay or has been irrevocably deposited with and is held by the Authority to pay principal and/or interest on Indebtedness, then the principal and/or interest paid from such money shall be excluded from the computation of Annual Debt Service.

(h) For any Indebtedness for which a binding commitment, letter of credit or other credit arrangement providing for the extension of such Indebtedness beyond its original maturity date exists, the computation of the annual amount payable on account of principal and interest on such Indebtedness shall, at the option of the Authority, be made on the assumption that such Indebtedness will be amortized in accordance with such credit arrangement.

Approval Amount

The term "Approval Amount" shall mean (a) prior to the Second Effective Date, sixty-six and two-thirds per centum (66-2/3 %) in aggregate Principal Amount of the applicable Bonds then Outstanding, and (b) on and after the Second Effective Date, a majority in aggregate Principal Amount of the applicable Bonds then Outstanding.

Authority

The term "Authority" shall mean The Pittsburgh Water and Sewer Authority, a body corporate and politic existing and operating under the Act.

Authorized Depository

The term "Authorized Depository" shall mean any incorporated bank or trust company doing business in the Commonwealth, which is insured by the Federal Deposit Insurance Corporation or by any other agency of the United States of America performing functions similar to the Federal Deposit Insurance Corporation (provided such an agency shall be in existence), which has a combined capital and surplus of not less than Fifty Million Dollars (\$50,000,000), and which is not unsatisfactory to the Trustee, and shall include the Trustee; provided that the Authority may deposit funds in any bank or trust company doing business in the Commonwealth to the extent that such funds are insured, by the Federal Deposit Insurance Corporation or by any other agency of the United States of America performing similar functions to the Federal Deposit Insurance Corporation.

Authorized Representative of the Authority

The term "Authorized Representative of the Authority" shall mean the Chairperson, the Vice Chairperson, the Secretary, the Assistant Secretary, the Executive Director, the Chief Financial Officer, the Director of Finance or any such other person or persons as may be designated to act on behalf of the Authority by a certificate executed by the Chairperson of the Authority and on file with the Trustee.

Balloon Indebtedness

The term "Balloon Indebtedness" shall mean all or any portion of any Indebtedness 25% or more of the initial principal of which matures on the same date or within such Fiscal Year. For purposes of this definition, the principal amount maturing on any date shall be reduced by the amount of such Indebtedness scheduled to be amortized by prepayment or redemption prior to its stated maturity date. If any indebtedness consists partially of Variable Rate Indebtedness and partially of indebtedness bearing interest at a fixed rate, the portion constituting Variable Rate Indebtedness and the portion bearing interest at a fixed rate shall be treated as separate issues for purposes of determining whether any such indebtedness constitutes Balloon Indebtedness.

Board

The term "Board" shall mean the governing body of the Authority.

Bond or Bonds

The term "Bond" or "Bonds" shall mean any bond or all the bonds, as the case may be, authenticated and delivered under this Indenture, but not including Subordinate Debt.

Bond Counsel

The term "Bond Counsel" shall mean an attorney or firm of attorneys selected by the Authority which is a nationally recognized and experienced bond counsel relating to the financing of facilities through the issuance of tax-exempt or taxable bonds.

Bond Insurance Policy

The term "Bond Insurance Policy" shall mean a municipal bond insurance policy or policies, including any endorsements thereto, issued by a Bond Insurer guaranteeing the scheduled payment of the principal of and interest on Bonds.

Bond Insurer or Insurer

The term "Bond Insurer" or "Insurer" shall mean an insurance company guaranteeing the payment of principal and interest on Bonds when due.

Bond Year

The term "Bond Year" shall mean, each year, the twelve (12) month period commencing on the date of issuance of a Series of Bonds or the anniversary date thereof, or as otherwise provided in the Supplemental Indenture or the Tax Regulatory Certificate for a Series of Bonds.

Business Day

Except as otherwise defined in a Supplemental Indenture related to a Series of Bonds, the term "Business Day" shall mean a day on which banking business is transacted, but not including a Saturday, Sunday or legal holiday, or any day on which banks located in each of the cities in which the offices of the Trustee and the Paying Agent responsible for the administration of this Indenture are located are authorized by law to close, or any day on which the New York Stock Exchange is closed.

Capital Additions

The term "Capital Additions" shall mean all new or additional property, which the Authority has authority to, or is required to, construct or acquire with respect to the System, and any and all permanent improvements, replacements, additions, extensions and betterments to real or fixed property of the Authority with respect to the System.

Capital Appreciation Bonds

The term “Capital Appreciation Bonds” shall mean Bonds as to which the Accreted Value is payable only at the maturity or prior redemption of the Bonds. For purposes of consents, voting rights, Bondowner rights, or any other matter herein determined by a percentage of the aggregate Principal Amount of Bonds Outstanding, Capital Appreciation Bonds shall be valued at their Accreted Values.

Capital Appreciation and Income Bonds

The term “Capital Appreciation and Income Bonds” shall mean Bonds as to which interest is deferred and compounded prior to the date after which interest ceases to be deferred and compounded and the interest becomes currently payable. For purposes of consents, voting rights, Bondowner rights, or any other matter in herein determined by a percentage of the aggregate Principal Amount of Bonds Outstanding, Capital Appreciation and Income Bonds shall be valued at their Accreted Values.

Capitalized Interest

The term “Capitalized Interest” shall mean the amount of interest on Bonds, if any, funded from the proceeds of the Bonds or other money that are deposited with the Trustee in the Debt Service Fund as shall be described in a Supplemental Indenture upon issuance of Bonds to be used to pay interest on the Bonds.

Code

The term “Code” shall mean the Internal Revenue Code of 1986, as amended, including applicable regulations, rulings and revenue procedures promulgated or applicable thereunder.

Common Debt Service Reserve Requirement

The term “Common Debt Service Reserve Requirement” shall mean, for all Common Debt Service Reserve Secured Bonds, the least of (i) 10% of the aggregate original stated Principal Amount of all Common Debt Service Reserve Secured Bonds (provided that if any Common Debt Service Reserve Secured Bonds have more than a *de minimis* (2%) amount of original issue discount or premium, the issue price of such Common Debt Service Reserve Secured Bonds (net of pre-issuance accrued interest) is used to measure the 10% limitation in lieu of its stated Principal Amount), (ii) the maximum amount of aggregate Annual Debt Service on all Common Debt Service Reserve Secured Bonds in any Fiscal Year, or (iii) 125% of average aggregate Annual Debt Service on all Common Debt Service Reserve Secured Bonds.

Common Debt Service Reserve Secured Bonds

The term “Common Debt Service Reserve Secured Bonds” shall mean any Series of Bonds for which the Supplemental Indenture authorizes said Bonds to be secured by the Common Debt Service Reserve Requirement.

Construction Fund

The term "Construction Fund" shall mean the Construction Fund designated and established pursuant to Section 5.01 hereof.

Construction Project

The term "Construction Project" shall mean the acquisition or construction of Capital Additions or other improvements to the System, as the same may be amended from time to time.

Consulting Engineer

The term "Consulting Engineer" shall mean a person who is a registered professional engineer under the laws of the Commonwealth qualified to pass on engineering questions relating to the operation and maintenance of water, stormwater and sewer systems, who is appointed by the Board, who is in fact independent (although such person may be regularly retained by the Authority) and who is not unsatisfactory to the Trustee. If such person be an individual, such person shall not be a member of the Board or an officer or employee of the Authority or the City. If such person be a partnership or corporation, such person shall not have a partner, director, officer or substantial stockholder who is a member of the Board or an officer or employee of the Authority or the City. The Consulting Engineer may perform similar services for the City.

Continuing Disclosure Undertaking

The term "Continuing Disclosure Undertaking" shall mean the continuing disclosure undertaking or continuing disclosure agreement, if any, relating to a Series of Bonds.

Cost

The term "Cost", when used with reference to a Construction Project or with reference to Capital Additions, shall mean the amounts required to be paid to construct and complete the Construction Project or to construct or otherwise acquire such Capital Additions, and shall include, in addition to such other items as are included within any proper definition of cost, allowances or charges for interest during construction and for a reasonable period thereafter, which is not otherwise provided for, taxes, engineering, legal, fiscal and superintendence expenses and premiums for casualty and other insurance and all expenses incurred by the Authority in connection with the preparation, issue and sale of the Bonds or other Indebtedness including discounts (if any) incurred on the sale of the Bonds or other Indebtedness.

Counsel

The term "Counsel" shall mean legal counsel admitted to practice before the Supreme Court of the Commonwealth, who may but need not be counsel regularly retained by the Authority, and not unsatisfactory to the Trustee.

Counsel's Opinion

The term “Counsel’s Opinion” shall mean an opinion signed by an attorney or firm of attorneys selected by the Authority or the Trustee, respectively.

Counterparty

The term “Counterparty” shall mean any counterparty (the party other than the Authority) on a Qualified Interest Rate Swap Agreement.

Credit Facility

The term “Credit Facility” shall mean a letter of credit, liquidity facility, a bond insurance policy, surety bond or similar arrangement securing any obligation of the Authority with respect to any Indebtedness.

Current Expenses

The term "Current Expenses" shall mean all current expenses directly or indirectly attributable to the ownership or operation of the System, including reasonable and necessary usual expenses of administration, operation, maintenance and repair; costs for billing and collecting the rates; insurance premiums; costs and expenses of any Credit Facility; and legal, engineering, auditing and financial advisory expenses; all as determined (except as otherwise specified in this Indenture) in accordance with GAAP for entities such as the Authority consistently applied, excluding (a) any payments payable by the Authority to the City under the Cooperation Agreement, (b) any payments in lieu of taxes or allowance for depreciation or amortization, and (c) expenses which constitute extraordinary, nonrecurring and non-continuing expenses of the System in the written opinion of the Qualified Independent Consultant.

Current Interest Capital Appreciation Bonds

The term “Current Interest Capital Appreciation Bonds” shall mean Bonds as to which a portion of interest is currently payable and a portion of the interest is deferred and compounded until the Accreted Value is payable only at the maturity or prior redemption of the Bonds. For purposes of consents, voting rights, Bondowner rights, or any other matter herein determined by a percentage of the aggregate Principal Amount of Bonds Outstanding, Current Interest Capital Appreciation Bonds shall be valued at their Accreted Values.

Debt Service Fund

The term “Debt Service Fund” shall mean the fund so designated and created by Section 6.01(3).

Debt Service Reserve Fund

The term “Debt Service Reserve Fund” shall mean the fund so designated and created by Section 6.01(4).

Debt Service Reserve Fund Policy

The term “Debt Service Reserve Fund Policy” shall mean a Municipal Bond Debt Service Reserve Fund Policy or Policies issued by a Bond Insurer and deposited into the Debt Service Reserve Fund.

Debt Service Reserve Requirement

The term “Debt Service Reserve Requirement” shall mean the applicable Common Debt Service Reserve Requirement or the Series Debt Service Reserve Requirement.

Default Rate

The term “Default Rate” shall mean the “Default Rate” as defined in a Credit Facility.

Disbursement Date

The term “Disbursement Date” shall have the meaning set forth in Section 6.02 hereof.

DTC

The term “DTC” shall have the meaning set forth in Section 2.10 hereof.

DTC Representation Letter

The term “DTC Representation Letter” shall have the meaning set forth in Section 2.10 hereof.

EMMA

The term “EMMA” shall mean the Electronic Municipal Market Access system operated by the MSRB, or any successor system.

First Effective Date

The term “First Effective Date” shall mean the date on which at least sixty-six and two-thirds per centum (66-2/3 %) in aggregate Principal Amount of the applicable Bonds Outstanding shall have approved this Amended and Restated Trust Indenture, as described in Section 1.03 hereof. The First Effective Date is _____, 2017.

First Effective Date Outstanding Bonds

The term “First Effective Date Outstanding Bonds” shall mean the Bonds Outstanding on the First Effective Date (being the then Outstanding 1998B Bonds, 2008A Bonds, 2013A Bonds, 2013 B Bonds, 2017A Bonds, 2017B Bonds and 2017C Bonds).

Fiscal Year

The term "Fiscal Year" shall mean the period of twelve months beginning on January 1 of each year or such other twelve month period as may be designated by the Authority.

Fund

The term “Fund” shall mean any of the various funds created under this Indenture including in a Supplemental Indenture.

GAAP

The term “GAAP” shall mean generally accepted accounting principles.

Grant

The term “Grant” shall mean a grant provided by any entity to or for the Authority for the payment of Current Expenses.

Hedge Agreement

The term “Hedge Agreement” shall mean an Interest Rate Swap, cap, collar, floor, forward or other hedging agreement, arrangement or security however denominated, expressly identified pursuant to its terms as being entered into in connection with and in order to hedge interest rate fluctuations on all or a portion of any Indebtedness where (a) interest on such Indebtedness or such portion of such Indebtedness is payable at a variable rate of interest for any future period of time or is calculated at a varying rate per annum, and (b) a fixed rate is specified by the Authority in such agreement, or such Indebtedness, taken together with such agreement results in a net fixed rate payable by the Authority for such period of time (the “Hedge Fixed Rate”), assuming the Authority and the party(ies) with whom the Authority has entered into the agreement make all payments required to be made by the terms of the agreement, provided that no such agreement may be entered into by the Authority unless any termination or similar payment which may be payable by the Authority thereunder is expressly subordinate to the obligation of the Authority on the Indebtedness.

Hedge Fixed Rate

The term “Hedge Fixed Rate” shall have the meaning set forth in the definition of Hedge Agreement above.

Holder of Bonds

The term “Holder of Bonds” or “Bondholder” or “Holder” or “Owner of Bonds” or “Owner” or “Bondowner” or any similar term shall mean any registered owner of any Bond.

Indebtedness

The term “Indebtedness” shall mean (a) Senior Debt, (b) Subordinate Debt, and (c) other debt of the Authority not secured by the Revenues. The term shall include all debt of the Authority outstanding as of the First Effective Date.

Indenture

The term “Indenture” or “this Indenture” shall mean this amended and restated trust indenture and all indentures supplemental hereto.

Independent Auditor

The term "Independent Auditor" shall mean a person who is engaged in the accounting profession, who is a nationally recognized certified public accountant under the laws of the Commonwealth, who is in fact independent (although such person may be regularly retained by the Authority) who is appointed by the Board and who is not unsatisfactory to the Trustee. If such person be an individual, such person shall not be a member of the Board, or an officer or employee of the Authority. If such person be a partnership or corporation, such person shall not have a partner, director, officer or substantial stockholder who is a member of the Board or an officer or employee of the Authority.

Interest Account

The term “Interest Account” shall mean the Interest Account in the Debt Service Fund so designated and created by Section 6.01(3) hereof.

Interest Payment Date

The term “Interest Payment Date” shall mean the interest payment dates specified in any Supplemental Indenture with respect to Bonds issued thereunder, or the applicable interest payment dates for any other Indebtedness.

Interim Indebtedness

The term “Interim Indebtedness” shall mean any Indebtedness (i) for or with respect to which no principal payments are required to be made other than on the maturity date thereof, which date shall be no later than five (5) years from the date of its delivery to the initial purchasers, and (ii) which are authorized by an agreement that declares the Authority’s intent, at the time of issuance, to refund or refinance all or a part of the same prior to or on such maturity date, including commercial paper, notes, and similar obligations

Letter of Credit

The term “Letter of Credit” shall mean an irrevocable transferable direct-pay letter of credit or standby letter of credit issued for a Series of Bonds by a Letter of Credit Bank for the account of the Authority in favor of the Trustee supporting a Series of Bonds as set forth in a Reimbursement Agreement.

Letter of Credit Bank

The term “Letter of Credit Bank” shall mean the issuer of a Letter of Credit pursuant to a Reimbursement Agreement.

Liquidity Facility

The term “Liquidity Facility” shall mean a standby bond purchase agreement or other liquidity facility pursuant to which the provider or providers agree to purchase Bonds issued pursuant to this Indenture tendered for purchase in accordance with a Supplemental Indenture, (ii) the provider of which has short-term ratings of at least “A-1” from S&P and “P-1” from Moody’s (unless such requirement is waived by the applicable Bond Insurer or Letter of Credit Bank) and (iii) which is acceptable to the applicable Bond Insurer or Letter of Credit Bank and each Rating Service and otherwise satisfying the requirements of a Supplemental Indenture pursuant to which Bonds supported by such Liquidity Facility were issued.

Liquidity Facility Issuer

The term “Liquidity Facility Issuer” shall mean the issuer of a Liquidity Facility pursuant to a Reimbursement Agreement.

Moody's

The term "Moody's" shall mean Moody's Investors Service, its successors and assigns, and, if such corporation shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, "Moody's" shall be deemed to refer to any other nationally recognized securities rating agency designated by the Authority, by notice to the Trustee.

MSRB

The term “MSRB” shall mean the Municipal Securities Rulemaking Board, or any successor agency.

Net Revenues

The term "Net Revenues", when used with reference to any period, shall mean the Revenues of the Authority for such period, less all Current Expenses for such period.

Operating Fund

The term “Operating Fund” shall mean the Operating Fund designated and created by Section 6.01(2) hereof.

Operating Reserve Fund

The term “Operating Reserve Fund” shall mean the Operating Reserve Fund designated and created by Section 6.01(5) hereof.

Operating Reserve Requirement

The term “Operating Reserve Requirement” shall mean an amount equal to one-sixth (1/6th) of the Current Expenses reflected in the most recent annual audited financial statements of the Authority.

Other Senior Parity Indebtedness

The term “Other Senior Parity Indebtedness” shall mean any other Indebtedness incurred by the Authority under this Indenture or secured by this Indenture that the Authority is required, or has elected, to treat as payable on a parity with the Bonds with respect to the pledge of Revenues, including Reimbursement Obligations under Reimbursement Agreements and Periodic Payments under Qualified Interest Rate Swap Agreements.

Other Senior Parity Indebtedness Party

The term “Other Senior Parity Indebtedness Party” shall mean the other party (not the Authority) on Other Senior Parity Indebtedness, including, without limitation, any Letter of Credit Bank, Liquidity Facility Issuer, or Counterparty (but only with respect to Periodic Payments).

Outstanding

The term “Outstanding under this Indenture” or “Outstanding hereunder” or “Outstanding”, when used with reference to Bonds, shall mean, at any date as of which the amount of Outstanding Bonds is to be determined, the aggregate of all Bonds authenticated and delivered under this Indenture, except

- (i) Bonds cancelled at or prior to such date;
- (ii) Bonds for the payment of which funds shall have been theretofore deposited in trust with the Trustee and which shall have matured by their terms but shall not have been surrendered for payment;
- (iii) Bonds for the redemption or payment of which funds in the full amount required, either alone or together with the interest to be earned thereon, but without the need to reinvest interest or principal, shall then be irrevocably held in trust by the Trustee, provided that notice of such redemption shall have been provided as set forth in Article IV or provisions satisfactory to the Trustee shall have been made for providing such notice;
- (iv) Bonds deemed to be paid pursuant to the provisions of Article XII hereof.

With respect to Indebtedness other than Bonds, "Outstanding" shall mean Indebtedness which has not been paid and with respect to which payment has not been provided for.

Paying Agent

The term "Paying Agent" shall initially mean The Bank of New York Mellon Trust Company, N.A., its successors and assigns, and any successor paying agent or co-paying agent appointed by the Authority.

Periodic Payments

The term "Periodic Payments" shall mean any regularly scheduled fixed payment payable by the Authority to the Counterparty pursuant to the terms of any Qualified Interest Rate Swap Agreement(s); however, Periodic Payments shall not include any termination payments or any other sums payable under the Qualified Interest Rate Swap Agreement that are not regularly scheduled payments payable by the Authority.

Policy Costs

The term "Policy Costs" shall mean, collectively, the repayment of any draws under a Debt Service Reserve Fund Policy and related reasonable expenses incurred by a Bond Insurer (together with interest thereon).

Prime Rate

The term "Prime Rate" means the rate of interest announced, from time to time, by the Trustee as its prime rate.

Principal Account

The term "Principal Account" shall mean the Principal Account in the Debt Service Fund so designated and created by Section 6.01(3) hereof.

Principal Amount

The term "Principal Amount" with respect to any Indebtedness, shall mean the stated principal thereon, the Accreted Value thereof, as applicable, or such other amount payable on any Indebtedness that is designated as principal pursuant to a Supplemental Indenture.

Principal Office of the Trustee

The term "Principal Office" shall mean the designated corporate trust office of the Trustee responsible for the administration of this Indenture or at the office of any successor trustee or paying agent appointed under this Indenture.

Qualified Independent Consultant

The term “Qualified Independent Consultant” shall mean an independent professional consultant having the skill and experience necessary to provide the particular certificate, report or approval required by the provision of this Indenture or any Supplemental Indenture in which such requirement appears, including without limitation a Consulting Engineer and an Independent Auditor.

Qualified Interest Rate Swap Agreement

The term “Qualified Interest Rate Swap Agreement” shall mean any agreement relating to any Bonds issued or to be issued under this Indenture with a Counterparty whereby the Authority will pay to the Counterparty periodic fixed amounts based upon a fixed percentage of a notional amount specified in such agreement and such Counterparty will pay to the Authority certain periodic floating amounts based upon a variable percent of the same notional amount; provided, that the underwriter for the applicable Bonds or the Authority's financial advisor has certified to the Authority and the Trustee that (based upon then current market conditions) such Qualified Interest Rate Swap Agreement creates an overall lower Debt Service Requirement than would be attained through the issuance of Additional Bonds in an amount equal to such notional amounts at a fixed rate without such Qualified Interest Rate Swap Agreement. Periodic Payments under a Qualified Interest Rate Swap Agreement may be on parity with the Bonds to which the Qualified Interest Rate Swap Agreement relates.

Rate Covenant

The term “Rate Covenant” shall mean the obligation of the Authority to fix, charge, collect and revise rates, fees and other charges for the use of, and the services furnished by, the System sufficient to meet the requirements of this Indenture, including without limitation Section 7.01.

Rate Covenant Net Revenues

The term “Rate Covenant Net Revenues” shall mean Net Revenues, provided that Net Revenues shall be adjusted for the purpose of determining compliance with the Rate Covenant as follows: (i) to include transfers from the Rate Stabilization Fund to the Revenue Fund (as provided in Section 6.08 hereof), and (ii) to exclude transfers to the Rate Stabilization Fund from the Revenue Fund (as provided in Section 6.08 hereof).

Rate Stabilization Fund

The term “Rate Stabilization Fund” shall mean the fund so designated and created pursuant to Section 6.01(8) hereof.

Rating Agency

The term “Rating Agency” shall mean Moody's or S&P, or either of them, and their successors, or any other nationally recognized statistical rating organization selected by the Authority.

Rebate Fund

The term "Rebate Fund" shall mean the Rebate Fund designated and created pursuant to Section 6.01(10) hereof.

Record Date

The term "Record Date" shall mean the fifteenth day of (whether or not such day is a Business Day) immediately preceding any Interest Payment Date or such other date set forth in a Supplemental Indenture.

Redemption Fund

The term "Redemption Fund" shall mean the fund so designated and created pursuant to Section 6.01(9) hereof.

Reimbursement Agreement

The term "Reimbursement Agreement" shall mean an agreement between the Authority and a Letter of Credit Bank or between the Authority and a Liquidity Facility Issuer, which agreements may be amended from time to time in accordance with the terms hereof and thereof.

Reimbursement Obligations

The term "Reimbursement Obligations" shall mean the obligations to reimburse the Letter of Credit Bank for draws on such Letter of Credit Bank's Letter of Credit, or to reimburse a Liquidity Facility Issuer making liquidity payments pursuant to a Liquidity Facility and to pay all other amounts due or to become due under the applicable Reimbursement Agreement.

Reserve Determination Date

The term "Reserve Determination Date" shall mean any date established in writing by an Authorized Representative of the Authority for the valuation of investments, including any Debt Service Reserve Fund Policy and other applicable credit facilities, in the Debt Service Reserve Fund, which valuation shall be at least annually.

Resolution of the Board or Resolution of the Authority

The term "Resolution of the Board" or "Resolution of the Authority" shall mean a resolution certified by the Secretary or Assistant Secretary of the Authority to have been duly adopted by the Board and to be in full force and effect on the date of such certification.

Revenue Fund

The term "Revenue Fund" shall mean the fund so designated and created by Section 6.01(1) hereof.

Revenues

The term "Revenues" shall mean any and all rates, fees, rents and charges established or to be established, levied and collected in connection with, and all other payments, revenues of whatever kind or character arising from, the operation or ownership of any property of the Authority or any part thereof (except tap or connection fees and charges to the extent such fees or charges are pledged in accordance with the Act as a refund to such person who has paid for the construction of any extension of the System), any income earned on the moneys or investments on deposit in the Debt Service Fund, Debt Service Reserve Fund, Construction Fund, Revenue Fund, Operating Fund, Operating Reserve Fund, Rate Stabilization Fund and any sinking, purchase or analogous fund created hereunder and any Periodic Payments received by the Authority from the Counterparty pursuant to any Qualified Interest Rate Swap Agreement which, upon receipt, shall be transferred to and deposited in the Revenue Fund, all as determined (except as otherwise specified in this Indenture) in accordance with GAAP for entities such as the Authority consistently applied. Revenues shall not include refundable customer deposits or other payments solely in aid of construction, any Grants, payments from PENNVEST or similar payments, or the proceeds resulting from the sale of all or a portion of the System.

Second Effective Date

The term "Second Effective Date" shall mean the date on which one hundred per centum (100%) in aggregate Principal Amount of the applicable Bonds Outstanding shall have approved this Amended and Restated Trust Indenture, as described in Section 1.04 hereof.

Senior Debt

The term "Senior Debt" shall mean Bonds and Other Senior Parity Indebtedness. The term shall include all bonds of the Authority outstanding under the Existing Senior Indenture as of the First Effective Date.

Separate Series Debt Service Reserve Requirement

The term "Separate Series Debt Service Reserve Requirement" shall mean, for any Series of Additional Bonds for which the Supplemental Indenture authorizes a Separate Series Debt Service Reserve Requirement, the amount, if any, specified in such Supplemental Indenture

as the Separate Series Debt Service Reserve Requirement; provided, however, that such amount shall not exceed the maximum amount permitted by the Code. Such amount may be zero.

Separate Series Debt Service Reserve Secured Bonds

The term “Separate Series Debt Service Reserve Secured Bonds” shall mean any Series of Bonds for which the Supplemental Indenture authorizes said Bonds to be secured by funds constituting a Separate Series Debt Service Reserve Requirement.

Series or Series of Bonds

The term “Series” or “Series of Bonds” shall mean a separate series or subseries of Bonds issued under a Supplemental Indenture.

Series Debt Service Reserve Account

The term “Series Debt Service Reserve Account” shall mean each account in the Debt Service Reserve Fund related to a particular Series of Bonds that is required to be funded as required in a Supplemental Indenture.

Series Debt Service Reserve Requirement

The term “Series Debt Service Reserve Requirement” shall mean for any Series of the Bonds, the Common Debt Service Reserve Requirement or the Separate Series Debt Service Reserve Requirement set forth in the Supplemental Indenture authorizing such Series of Bonds.

Sinking Fund Account

The term “Sinking Fund Account” shall mean the Sinking Fund Account in the Debt Service Fund created in Section 6.01(3) hereof.

S&P

The term “S&P” shall mean Standard & Poor's Corporation, its successors and assigns, and, if such corporation shall be dissolved or liquidated or shall no longer perform the functions of a securities rating agency, "S&P" shall be deemed to refer to any other nationally recognized securities rating agency designated by the Authority, by notice to the Trustee.

Subordinate Debt

The term “Subordinate Debt” shall mean any bonds, notes or other obligations issued in connection with the System (a) which are designated by the Authority as Subordinate Debt, and (b) which may have pledged to their payment Net Revenues, alone or in conjunction with other sources, as a subordinate lien pledge after the pledge of Net Revenues to Senior Debt. Subordinate Debt shall include amounts owed to letter of credit banks or liquidity facility providers securing Subordinate Debt or periodic payments due on interest rate swap agreements related to Subordinate Debt, which shall be payable in accordance with Section 6.03(3) hereof, or

termination or other payments (other than periodic payments) due under interest rate swap agreements related to Subordinate Debt, which shall be payable in accordance with Section 6.03(5) hereof.

Subordinate Debt Service Fund

The term “Subordinate Debt Service Fund” is the fund so designated and created by Section 6.01(6) hereof.

Subordinate Debt Service Reserve Fund

The term “Subordinate Debt Service Reserve Fund” is the fund so designated and created by Section 6.01(7) hereof.

Supplemental Indenture

The term "Supplemental Indenture" or "Indenture supplemental hereto" shall mean any indenture now or hereafter duly authorized and entered into in accordance with the provisions of this Indenture.

System

The term "System" shall mean and include, as of any particular time, (i) all tangible property, fixed or moveable, then owned or operated by the Authority and used in the rendering of water service, stormwater service, and sewer service by the Authority, (ii) all Capital Additions then constructed or otherwise acquired relating to water service, stormwater service, and sewer service, and (iii) all franchises used or useful to the Authority at such particular time in the rendering of water service, stormwater service, and sewer service by the Authority.

Tax Regulatory Certificate

The term “Tax Regulatory Certificate” shall mean a Tax Regulatory Certificate, Tax Regulatory Agreement, Non-Arbitrage Certificate or similar tax certificate of the Authority executed and delivered by the Authority in respect of a Series of Bonds issued under this Indenture.

Tender Indebtedness

The term “Tender Indebtedness” shall mean any Indebtedness a feature of which is an option or obligation on the part of the holders of such Indebtedness to tender all or a portion of such Indebtedness to a fiduciary for payment or purchase and requiring that such Indebtedness or a portion of such Indebtedness be purchased if properly tendered.

Term Bonds

The term “Term Bonds” shall mean any Bonds stated to mature on a specified date and required to be redeemed in part prior to maturity according to a sinking fund schedule.

Test Period

The term “Test Period” shall mean any 12 consecutive months of the last 24 months prior to the testing date.

Tested Fiscal Year

The term “Tested Fiscal Year” shall have the meaning set forth in Section 7.01 hereof.

Trust Estate

The term “Trust Estate” shall have the meaning set forth in the Granting Clause hereto.

Trustee

The term "Trustee" shall mean The Bank of New York Mellon Trust Company, N.A., its successors in the trust hereunder.

Valuation Date

The term “Valuation Date” with respect to any Capital Appreciation Bonds, Capital Appreciation and Income Bonds, or Current Interest Capital Appreciation Bonds, shall mean the date or dates set forth in the Supplemental Indenture on which specific Accreted Values are assigned to such Capital Appreciation Bonds, Capital Appreciation and Income Bonds, or Current Interest Capital Appreciation Bonds.

Variable Rate Indebtedness

The term “Variable Rate Indebtedness” shall mean any Indebtedness the interest rate on which is not fixed to maturity at the time of calculation, or other relevant time.

Section 1.02 Rules of Interpretation. Except where the context otherwise requires, (i) words importing one gender shall include all genders and words importing the singular number shall include the plural and vice versa, (ii) references to any entities shall include their successors and assigns, and (iii) references to any documents shall include any subsequent amendments and supplements thereto.

Section 1.03 Certification and Effect of First Effective Date. The Authority hereby certifies to the Trustee that the Holders of in excess of 66 2/3% principal amount of the Bonds Outstanding under the Existing Senior Indenture have consented to this Amended and Restated Trust Indenture and therefore the First Effective Date is _____, 2017, and this Amended and Restated Trust Indenture, as supplemented by the 2017-1 Supplemental Indenture and the 2017-2 Supplemental Indenture, is now effective. The Authority has provided the Trustee with a separate certificate setting forth the relevant calculations. This Amended and Restated Trust Indenture is now in full force and effect, and it supersedes the Existing Senior Indenture, except

for the provisions incorporated by reference in Section 1.05 below and, through December 31, 2018, the Rate Covenant as described in Section 7.01(a) hereof.

Section 1.04 Second Effective Date. When 100% of Bondholders have consented to this Amended and Restated Indenture, the Authority will certify that fact to the Trustee. Thereupon, the amendment reflected in the definition of Approval Amount will become effective.

Section 1.05 First Effective Date Outstanding Bonds. The following First Effective Date Outstanding Bonds were issued under the Existing Senior Indenture, prior to the First Effective Date:

(a) The portion of the 1998B Bonds not refunded by the 2017A Bonds. These bonds are capital appreciation bonds. The following provisions of the Second Supplemental Indenture remain in full force and effect and are incorporated by reference in this Section 1.05(a) as if fully set forth herein: the provisions related to the accreted valuation of the 1998B Bonds, the maturities, redemption provisions, payment dates and interest rates on the 1998B Bonds, the form of the 1998B Bonds set forth in Exhibit A, the debt service schedule on the 1998B Bonds set forth in Exhibit B, and the compound accreted value table set forth in in Exhibit C.

(b) The portion of the 2008A Bonds not refunded by the 2017A Bonds and the 2017B Bonds. These are fixed rate bonds. The following provisions of the Seventh Supplemental Indenture remain in full force and effect and are incorporated by reference in this Section 1.05(b) as if fully set forth herein: the provision related to the maturities, redemption provisions, payment dates and interest rates on the 2008A Bonds, the form of the 2008A Bonds set forth in Exhibit B, and the debt service schedule for the 2008A Bonds set forth in Exhibit D.

(c) The 2013A Bonds. These bonds are fixed rate bonds. The following provisions of the Eighth Supplemental Indenture remain in full force and effect and are incorporated by reference in this Section 1.05(c) as if fully set forth herein: the provisions related to the maturities, redemption provisions, payment dates and interest rates on the 2013A Bonds, the form of the 2013A Bonds in Exhibit A, and the debt service schedule for the 2013A Bonds set forth in Exhibit B.

(d) The portion of the 2013B Bonds not refunded by the 2017A Bonds. These bonds are fixed rate bonds. The following provisions of the Eighth Supplemental Indenture remain in full force and effect and are incorporated by reference in this Section 1.05(d) as if fully set forth herein: the provisions related to the maturities, redemption provisions, payment dates and interest rates on the 2013B Bonds, the form of the 2013A Bonds in Exhibit A, and the debt service schedule for the 2013B Bonds set forth in Exhibit B.

(e) The 2017A Bonds and the 2017B Bonds. The 2017-1 Supplemental Indenture remains in full force and effect as a Supplemental Indenture with respect to this Indenture.

(f) The 2017C Bonds. The 2017-2 Supplemental Indenture remains in full force and effect as a Supplemental Indenture with respect to this Indenture.

ARTICLE II

DESCRIPTION, EXECUTION AND REGISTRATION OF BONDS

Section 2.01 Issuance of Bonds; Form and Terms thereof. The Bonds may, at the election of the Authority, be issued in one or more Series and shall be designated generally as the “Water and Sewer System First Lien Revenue Bonds” of the Authority or similar designation. Subject to applicable provisions hereof, all Bonds shall be issued and shall contain such maturities, payment terms, interest rate provisions, redemption or prepayment features and other provisions as shall be set forth in the Supplemental Indenture providing for the issuance of such Bonds.

The Bonds shall be limited obligations of the Authority, payable solely from the Trust Estate. The Bonds shall constitute a valid claim of the respective Owners thereof against the Trust Estate, which is pledged to secure the payment of the principal of, redemption premium, if any, and interest on the Bonds, and which shall be utilized for no other purpose, except as expressly authorized in this Indenture. The Bonds shall not constitute general obligations of the Authority and under no circumstances shall the Bonds be payable from, nor shall the registered Owners thereof have any rightful claim to, any income, revenues, funds or assets of the Authority other than those pledged hereunder as security for the payment of the Bonds.

Section 2.02 Registration of Bonds. The Authority shall keep or cause to be kept at the Principal Office of the Trustee books for the registration and transfer of Bonds; and the Authority will register or transfer or cause to be registered or transferred therein, as hereinafter provided and under such reasonable regulations as it may prescribe, any Bond entitled to be so registered or transferred, upon presentation for such purpose. The Trustee is hereby appointed as registrar of the Authority for the purpose of registering, transferring and exchanging the Bonds. A Bond Insurer shall, upon the occurrence of an event of default triggering an obligation to make payments under the Insurance Policy, have the right to inspect the registration books maintained pursuant to this Section 2.02.

Section 2.03 Uniform Commercial Code. The Bonds shall be securities under the Pennsylvania Uniform Commercial Code Investment Securities and shall be negotiable instruments to the extent provided therein.

Section 2.04 Transfers and Exchanges of Bonds. Upon surrender for transfer of any fully registered Bond at the Principal Office of the Trustee, the Trustee shall authenticate and deliver in the name of the transferee or transferees one or more new fully registered Bonds of authorized denominations for the aggregate Principal Amount which the Bondholder is entitled to receive.

Any Bond shall be exchangeable for Bonds of any authorized denomination, in an aggregate Principal Amount equal to the Principal Amount of the Bond presented for exchange.

All Bonds presented for transfer or exchange shall be accompanied by a written instrument or instruments of transfer or authorization for exchange, in form satisfactory to the Trustee, duly executed by the Bondholder or by his duly authorized attorney. No transfer of any Bond shall be valid unless made on the registration books by the registered Owner in person, or

by his duly authorized attorney. Such registrations, exchanges and transfers shall be without expense to the Holders of the Bonds, but any taxes, fees or other governmental charges required to be paid with respect to the same shall be paid by the Holder requesting any such registration, exchange or transfer as a condition precedent to the exercise of such privilege. Bonds may be presented for exchange or transfer only at the Principal Office of the Trustee or at the office of any Paying Agent as the Authority may hereafter appoint.

The Trustee shall not be required to register the transfer or exchange of any Bond (i) during a period beginning at the opening of business fifteen (15) days before the day of the mailing of notice of redemption of the Bonds and ending at the close of business on the date of such mailing, (ii) at any time following the selection of such Bonds, in whole or in part, for redemption, or (iii) during the period commencing on a Record Date and ending on the corresponding Interest Payment Date.

Section 2.05 Form of Bonds; Temporary Bonds. Bonds in definitive form shall be printed or typewritten. Until Bonds in definitive form of any Series are ready for delivery, the Authority may execute and upon its request in writing the Trustee shall initially authenticate and deliver in lieu of any thereof, and subject to the same provisions, limitations and conditions, one or more printed, or typewritten Bonds in temporary form, substantially of the tenor of the Bonds hereinbefore described, and with appropriate omissions, variations and insertions, with regard to the Bonds. Such Bonds or Bonds in temporary form may be for the amount of \$5,000 or any multiple or multiples thereof, as the Authority may determine. Until exchanged for Bonds in definitive form such Bonds in temporary form shall be entitled to the lien and benefit of this Indenture. The Authority shall, without unreasonable delay, prepare, execute and deliver to the Trustee, and thereupon, upon the presentation and surrender of any Bond or Bonds in temporary form, the Trustee shall authenticate and deliver, in exchange therefor, a Bond or Bonds in definitive form of the same Series and same maturity for the same aggregate Principal Amount as the Bond or Bonds in temporary form surrendered. Such exchange shall be made by the Authority at its own expense and without making any charge therefor. Until such Bonds in definitive form are ready for delivery, the Holder of one or more Bonds in temporary form may, with the consent of the Authority, exchange the same, upon the surrender thereof to the Trustee for cancellation, for Bonds in temporary form of like aggregate Principal Amount, of the same Series and maturity, in authorized denominations.

Section 2.06 Numbering of Bonds. Any Bond may bear such numbers, letters, or other marks of identification or designation, and may be endorsed with or have incorporated in the text thereof such legends or recitals with respect to transferability or in respect of the Bond or Bonds for which it is exchangeable and may contain such provisions, specifications and descriptive words, not inconsistent with the provisions of this Indenture, as may be determined by the Authority and approved by the Trustee.

Section 2.07 Execution of Bonds. All the Bonds shall, from time to time, be executed on behalf of the Authority by the manual or facsimile signature of its Chairperson or its Vice Chairperson and its corporate seal (which may be in facsimile) shall be thereunto affixed or thereon imprinted and attested by the manual or facsimile signature of its Secretary or its Assistant Secretary. If any of the officers whose signature shall be upon the Bonds shall cease to be such officers of the Authority before the Bonds so signed and sealed shall have been actually

authenticated by the Trustee or delivered by the Authority, such Bonds nevertheless may be authenticated, issued, and delivered with the same force and effect as though the person or persons whose signature shall be upon such Bonds had not ceased to be such officer or officers of the Authority; and also any such Bond may be signed and sealed on behalf of the Authority by the signature of such persons as at the actual date of the execution of such Bond shall be the proper officers of the Authority, although at the nominal date of such Bond any such person shall not have been such officer of the Authority.

Section 2.08 Mutilated, Lost, Stolen or Destroyed Bonds. Upon receipt by the Authority and the Trustee of evidence satisfactory to all of them that any Outstanding Bond has been mutilated, destroyed, lost or stolen, and of indemnity satisfactory to all of them, the Authority, in its discretion, may execute and thereupon the Trustee shall authenticate and deliver, a new Bond of the same Series and same maturity and of like tenor in exchange and substitution for, and upon surrender and cancellation of, the mutilated Bond or in lieu of and in substitution for the Bond so destroyed, lost or stolen. The Authority may, for each new Bond authenticated and delivered under the provisions of this Section, require the payment of the expenses, including counsel fees, which may be incurred by the Trustee in the premises. Any Bond issued under the provisions of this Section in lieu of any Bond alleged to be destroyed, lost or stolen, shall constitute an original additional contractual obligation on the part of the Authority whether or not the Bond so alleged to be destroyed, lost or stolen be at any time enforceable by anyone; and shall be equally and proportionately entitled to the benefits of this Indenture with all other Bonds issued under this Indenture.

Section 2.09 Certificate of Authentication. Subject to the qualifications hereinbefore set forth, the Bonds to be secured hereby shall be substantially of the tenor and effect hereinbefore recited, and no Bonds shall be secured hereby or entitled to the benefit hereof, or shall be or become valid or obligatory for any purpose, unless there shall be endorsed thereon a certificate of authentication, substantially set forth in the form of the Bond as shall be set forth in the Supplemental Indenture providing for the issuance of such Bonds, executed by the Trustee; and such certificate on any Bond issued by the Authority shall be conclusive evidence and the only competent evidence that it has been duly authenticated and delivered hereunder. The Bonds shall be authenticated by the Trustee.

Section 2.10 Book-Entry Only Bonds. Unless a Supplemental Indenture shall provide otherwise with respect to a Series of Bonds, the Bonds of a Series shall be initially issued in book-entry only form. Unless a Supplemental Indenture shall provide otherwise with respect to a Series, in the event that any provision of this Section 2.10 is inconsistent with other provisions of this Indenture, so long as the Bonds shall be in book-entry only form, the provisions of this Section 2.10 shall govern. The Depository Trust Company ("DTC") will act as securities depository for the Bonds. The ownership of one fully registered Bond for each maturity set forth in this Indenture, each in the aggregate Principal Amount of such maturity, will be registered in the name of CEDE & Co., as nominee for DTC; provided that if DTC shall request that the Bonds be registered in the name of a different nominee, the Trustee shall exchange all or any portion of the Bonds for an equal aggregate Principal Amount of Bonds registered in the name of such nominee or nominees of DTC. No person other than DTC or its nominee shall be entitled to receive from the Authority or the Trustee either a Bond or any other evidence of ownership of the Bonds, or any right to receive any payment in respect thereof unless DTC or its nominee shall transfer

record ownership of all or any portion of the Bonds on the registration books maintained by the Trustee, in connection with discontinuing the book entry system or otherwise.

So long as the Bonds or any portion thereof are registered in the name of DTC or any nominee thereof, all payments of the principal or redemption price of or interest on such Bonds shall be made to DTC or its nominee in New York Clearing House or equivalent next day funds on the dates provided for such payments under this Indenture. Each such payment to DTC or its nominee shall be valid and effective to fully discharge all liability of the Authority or the Trustee with respect to the principal or redemption price of or interest on the Bonds to the extent of the sum or sums so paid. In the event of the redemption of less than all of the Bonds Outstanding, the Trustee shall not require surrender by DTC or its nominee of the Bonds so redeemed, but DTC or its nominee may retain such Bonds and make an appropriate notation on the Bond certificate as to the amount of such partial redemption; provided that, in each case the Trustee shall request, and DTC shall deliver to the Trustee, a written confirmation of such partial redemption and thereafter the records maintained by the Trustee shall be conclusive as to the amount of the Bonds which have been redeemed.

The Authority and the Trustee may treat DTC or its nominee as the sole and exclusive Owner of the Bonds registered in its name for the purposes of payment of the principal or redemption price of or interest on the Bonds, selecting the Bonds or portions thereof to be redeemed, giving any notice permitted or required to be given to Bondholders under this Indenture, registering the transfer of Bonds, obtaining any consent or other action to be taken by Bondholders and for all other purposes whatsoever; and neither the Authority nor the Trustee shall be affected by any notice to the contrary. Neither the Authority nor the Trustee shall have any responsibility or obligation to any participant in DTC, any person claiming a beneficial ownership interest in the Bonds under or through DTC or any such participant, or any other person which is not shown on the registration books of the Trustee as being a Bondholder, with respect to either: (i) the Bonds; or (ii) the accuracy of any records maintained by DTC or any such participant; or (iii) the payment by DTC or any such participant of any amount in respect of the principal or redemption price of or interest on the Bonds; or (iv) any notice which is permitted or required to be given to Bondholders under this Indenture; or (v) the selection by DTC or any such participant of any person to receive payment in the event of a partial redemption of the Bonds; or (vi) any consent given or other action taken by DTC as Bondholder.

So long as the Bonds or any portion thereof are registered in the name of DTC or any nominee thereof, all notices required or permitted to be given to the Bondholders under this Indenture shall be given to DTC as provided in the Representation Letter between the Authority and DTC (the "DTC Representation Letter"), in such form as is acceptable to the Trustee, the Authority and DTC.

In connection with any notice or other communication to be provided to Bondholders pursuant to this Indenture by the Authority or the Trustee with respect to any consent or other action to be taken by Bondholders, DTC shall consider the date of receipt of notice requesting such consent or other action as the record date for such consent or other action, provided that the Authority or the Trustee may establish a special record date for such consent or other action. The Authority or the Trustee shall give DTC notice of such special record date not fewer than fifteen (15) calendar days in advance of such special record date to the extent possible.

At or prior to the issuance of the Bonds, the Authority and the Trustee shall execute or signify their approval of the DTC Representation Letter. Any successor Trustee shall, in its written acceptance of its duties under this Indenture, agree to take any actions necessary from time to time to comply with the requirements of the DTC Representation Letter.

The book-entry system for registration of the ownership of the Bonds may be discontinued at any time if either: (i) DTC determines to resign as securities depository for the Bonds; or (ii) the Authority provides thirty (30) days' notice of such discontinuation to the Trustee and DTC that continuation of the system of book-entry transfers through DTC (or through a successor securities depository) is not in the best interests of the Authority. Upon occurrence of either such event, the Authority may attempt to establish a securities depository book-entry relationship with another securities depository. If the Authority does not do so, or is unable to do so, and after the Authority has notified DTC and upon surrender to the Trustee of the Bonds held by DTC, the Authority will issue and the Trustee will authenticate and deliver the Bonds in registered certificate form in denominations of \$5,000 and integral multiples thereof (or such other denominations as are applicable to a Series as set forth in a Supplemental Indenture), at the expense of the Authority, to such persons, and in such maturities and Principal Amounts, as may be designated by DTC, but without any liability on the part of the Authority or the Trustee for the accuracy of such designation. Whenever DTC requests the Authority or the Trustee to do so, the Authority or the Trustee shall cooperate with DTC in taking appropriate action after reasonable notice to arrange for another securities depository to maintain custody of certificates evidencing the Bonds.

ARTICLE III

AUTHENTICATION AND DELIVERY OF BONDS

Section 3.01 Purposes of Bonds. The Authority may issue Additional Bonds from time to time under this Indenture. Bonds may be issued (a) to pay Costs, (b) to refund Bonds or any other Indebtedness (including Senior Debt or Subordinate Debt or other debt not secured by the Revenues), (c) to pay costs of issuance, (d) to fund reserves and/or pay costs associated with Capitalized Interest or terminating Qualified Interest Rate Swap Agreements, or (e) for a combination of such purposes. The provisions in this Article III relating to the issuance of Bonds do not apply to the issuance of the 2017A Bonds, the 2017B Bonds or the 2017C Bonds, which bonds were issued in compliance with the requirements of the Existing Senior Indenture.

In the event that any Policy Costs are due and owing at the time of issuance of the Additional Bonds, for the purpose of the debt tests required by Section 3.02 hereof, Revenues of the Authority shall be reduced by the amount of any Policy Costs then due and owing.

No Additional Bonds may be issued without the prior written consent of a Bond Insurer if any Policy Costs are past due and owing to the Bond Insurer.

Section 3.02 Conditions for Issuing Bonds. Before the issuance and authentication of any Series of Bonds by the Trustee, there shall be filed with the Trustee:

- (a) In connection with the initial execution of this Indenture:

- (i) A certified copy of this Indenture;
 - (ii) A Counsel's Opinion, subject to customary exceptions and qualifications, substantially to the effect that this Indenture has been duly authorized, executed and delivered to the Trustee and is a valid, binding and enforceable obligation of the Authority.
- (b) A certified copy of a Supplemental Indenture which (1) shall include: (A) provisions authorizing the issuance, fixing the Principal Amount and setting forth the details of such Bonds, including their date, the interest rate or rates and the manner in which the Bonds are to bear and pay interest (including whether such Bonds constitute Capital Appreciation Bonds, Capital Appreciation and Income Bonds or Current Interest Capital Appreciation Bonds), the principal and Interest Payment Dates of the Bonds; the purposes for which such Bonds are being issued, the manner of numbering of such Bonds, the Series designation, the denominations, the maturity dates and principal maturities, the Principal Amounts required to be redeemed pursuant to any mandatory redemption provisions or the manner for determining such Principal Amounts, any provisions for optional or extraordinary redemption before maturity, and any provisions regarding the Common Debt Service Reserve Requirement or Separate Series Debt Service Reserve Requirement; and (B) provisions for the application of the proceeds of such Bonds; and (2) may include: (A) provisions for Credit Facilities and for other Funds and Accounts to be established with respect to such Bonds; (B) provisions necessary or expedient for the issuance and administration of Bonds bearing interest at a variable rate or other manner of bearing interest, including remarketing provisions, liquidity facility provisions and provisions for establishing the variable rate and converting to a fixed rate; (C) provisions for entering into credit enhancement devices permitted by Commonwealth law; and (D) such other provisions as the Authority may deem appropriate.
- (c) A certified copy of applicable Resolution of the Board authorizing, as required by law, the issuance, sale, award, execution and delivery of such Bonds and, in the case of a Series of Bonds issued to refund Indebtedness, calling for redemption or payment of the Indebtedness to be refunded, fixing any redemption date and authorizing any required notice of redemption in accordance with the provisions of this Indenture.
- (d) A certificate signed by an Authorized Representative of the Authority and dated the date of such issuance, to the effect that:
- (i) Either (A) upon and immediately following such issuance, no Event of Default has occurred which has not been cured or waived, and no event or condition exists which, with the giving of notice or lapse of time or both, would become an Event of Default or (B) if any such event or condition is happening or existing, specifying such event or condition, stating that the Authority will act with due diligence to correct such event or condition after the issuance of such Bonds, and describing in reasonable detail the actions to be taken by the Authority toward such correction; and
 - (ii) All required approvals, limitations, conditions and provisions precedent to the issuance of such Series of Bonds have been obtained, observed, met and satisfied.

(e) A Counsel's Opinion, subject to customary exceptions and qualifications, substantially to the effect that the Supplemental Indenture for such Series of Bonds has been duly authorized, executed and delivered, is binding on the Authority and complies in all respects with the requirements of this Indenture.

(f) An opinion of Bond Counsel, subject to customary exceptions and qualifications, substantially to the effect that the issuance of such Bonds has been duly authorized, that such Bonds are valid and binding limited obligations of the Authority, and with respect to Bonds to be issued on a tax-exempt basis that the interest on such Bonds is excludable from gross income for purposes of Federal income taxation.

(g) If a Series of Bonds are issued to pay Costs, the following:

(i) (A) if the Bonds are Common Debt Service Reserve Secured Bonds, evidence that upon issuance of such Bonds, the Common Debt Service Reserve Requirement will be fully funded, or (B) if the Bonds are Separate Series Debt Service Reserve Secured Bonds, evidence that, upon issuance of such Bonds, the Separate Series Debt Service Reserve Requirement for such Bonds will be fully funded or will be funded in accordance with the requirements of the applicable Supplemental Indenture; and

(ii) A certificate of (A) a Qualified Independent Consultant, stating that based on the Authority's financial records for a Test Period, the Authority would have been able to meet the Rate Covenant in Section 7.01, taking into account (i) the maximum Annual Debt Service on the proposed Series of Additional Bonds in the current or any future Fiscal Year, (ii) the additional Net Revenues from the rates, fees and other charges adjusted to reflect any rate increases that had not been in effect throughout the Test Period but that have been approved by and can be implemented by the Authority at the time of the delivery of the proposed Series of Additional Bonds to go into effect within the following five years; and (iii) additional Net Revenues that the Authority may realize from the addition to the System of the assets it proposes to finance through the issuance of the proposed Series of Additional Bonds or other funding sources within the following five years or (B) the Authorized Representative of the Authority stating that based on the Authority's financial records for a Test Period, the Authority has met the Rate Covenant in Section 7.01, taking into account the maximum Annual Debt Service on the proposed Series of Additional Bonds. In making the certifications required under this paragraph, the Authorized Representative of the Authority or the Qualified Independent Consultant, as applicable, shall determine and utilize the Additional Indebtedness Test Net Revenues in place of the Rate Covenant Net Revenues in determining whether the Authority would have been able to meet the Rate Covenant in Section 7.01.

(h) Except in the case of the 2017A Bonds, the 2017 B Bonds and the 2017C Bonds, if any Bonds are issued to refund any Indebtedness, the following:

(i) Evidence that the Authority has made provision as required by this Indenture for the payment or redemption of all Indebtedness to be refunded;

(ii) A certificate of an Authorized Representative of the Authority demonstrating that the proposed refunding will not result in an increase in the Annual Debt Service payable on all Indebtedness in any Fiscal Year. If the proposed refunding will result in an increase in the Annual Debt Service payable on all Indebtedness in any Fiscal Year, then the issuance of that Series of Additional Bonds shall be subject to the same requirements as the issuance of a Series of Additional Bonds to pay Costs under Section 3.02(g)(ii).

(i) A request and authorization of the Authority, signed by an Authorized Representative of the Authority, to the Trustee to authenticate and deliver such Bonds to the purchaser upon payment to the Trustee of a specified sum plus accrued interest to the date of delivery.

Except for the requirements of subsection (d) of this Section (which may be waived by the purchasers of such Bonds by an instrument or concurrent instruments in writing signed by such purchasers), none of the requirements in this Section may be waived without the consent of the holders of not less than a majority in aggregate Principal Amount of the Outstanding Bonds.

Section 3.03 Other Senior Parity Indebtedness.

(a) The Authority may incur or refinance Other Senior Parity Indebtedness provided that:

(1) the documents relating to the Other Senior Parity Indebtedness acknowledge that such debt constitutes Other Senior Parity Indebtedness under this Indenture and is subject to the applicable terms and conditions hereof as if it were Bonds, and specify the amounts and due dates of Annual Debt Service with respect to the Other Senior Parity Indebtedness;

(2) the requirements of Sections 3.02(g) or 3.02(h), as appropriate, have been met as if the Other Senior Parity Indebtedness was an additional Series of Bonds;

(3) the Trustee receives written notice of the issuance of the Other Senior Parity Indebtedness and the material terms and conditions thereof and the Trustee shall register the holder as owner thereof as such on its books and records, and

(4) the Trustee receives a Counsel's Opinion that the documents creating the Other Senior Parity Indebtedness have been duly authorized, executed and delivered on behalf of the Authority and constitute valid, binding and enforceable obligations.

(b) The Authority shall fulfill its obligations under all contracts or agreements creating Other Senior Parity Indebtedness as they may exist from time to time.

Section 3.04 Subordinate Debt of Authority. In addition to the foregoing and in addition to any subordinate pledge granted by the Authority to a Bond Insurer in connection with

a Debt Service Reserve Fund Policy, the Authority may incur or assume Subordinate Debt provided that:

- (1) the security for such debt is subordinate to the lien of and security interests granted by this Indenture; and
- (2) any agreement for the repayment of such subordinate debt and any instrument evidencing or securing such subordinate debt shall provide: (i) that an event of default thereunder may be an event of default under this Indenture, and (ii) that, notwithstanding the occurrence of any event of default in respect of any subordinate debt, the lender shall not be entitled to exercise any rights or remedies with respect to the Revenues until and unless the Trustee shall have instituted proceedings to exercise its rights pursuant to Article VIII hereof.

Section 3.05 Covenant as to Prior Lien Debt. The Authority will not incur or assume any debt which will be secured by a lien on the Revenues which will be prior to the lien granted by the terms of this Indenture.

Section 3.06 Deposit of Bond Proceeds. Upon receipt of the proceeds of any Series of Bonds issued under this Indenture, such moneys shall be deposited to a Clearing Fund for such Bonds and shall be disbursed for the purposes and in the amounts set forth in the closing certificate of the Authority executed on the date of issuance of such Bonds. To the extent it is determined on or before the first day of the month after the date of issuance of such Bonds that any remaining moneys in such fund will not be necessary to pay costs of issuance, such moneys shall be transferred to the Debt Service Fund and applied to pay interest on such Bonds on the next Interest Payment Date for such Bonds.

ARTICLE IV

REDEMPTION OF BONDS

Section 4.01 Redemption of Bonds.

The Bonds of any Series issued under the provisions of this Indenture shall be subject to redemption, in whole or in part, and at such times and prices as may be provided in the Supplemental Indenture pursuant to which such Bonds are issued, which Supplemental Indenture shall include provisions for extraordinary redemption in accordance with Section 7.10 hereof. The Bonds of any Series to be called for redemption shall be selected as provided in the applicable Supplemental Indenture. The Trustee shall treat each Bond of a denomination greater than the minimum denomination authorized in the applicable Supplement Indenture as can be obtained by dividing the Bond's actual Principal Amount by such minimum denomination.

Section 4.02 Notice of Redemption. Whenever the Authority shall redeem all or part of the Bonds, it shall cause a written notice of intention to redeem, signed in the name of the Authority by an Authorized Representative of the Authority to be sent, by the Trustee by first class mail to each registered Owner of the Bonds to be redeemed at the last address of said registered Owner appearing upon the registration books not less than twenty (20) days or more than sixty (60) days before the redemption date (unless the applicable Supplemental Indenture provides for

other timing for the notice). Failure to mail any such notice shall not affect the validity of the proceeding for redemption. Such notice shall specify the information set forth in the next following paragraph. The notice shall further state that, from and after such redemption date, interest thereon will cease to accrue. Simultaneously with the mailing of notice to Bondholders, the Trustee shall notify a Bond Insurer of any redemption, other than mandatory sinking fund redemption, of Bonds being insured by a Bond Insurer. In the case of an optional redemption, the notice may, at the Authority's discretion, state (1) that it is conditioned upon the deposit of moneys, in an amount equal to the amount necessary to effect the redemption, with the Trustee no later than the redemption date or (2) that the Authority retains the right to rescind such notice at any time prior to the scheduled redemption date if the Authority delivers a certificate of an Authorized Representative of the Authority to the Trustee instructing the Trustee to rescind the redemption notice (in either case, a "Conditional Redemption"), and such notice and optional redemption shall be of no effect if such monies are not so deposited or if the notice is rescinded as described below.

In addition to the foregoing, the redemption notice shall contain with respect to each Bond being redeemed, (1) the CUSIP number as provided in Section 4.04 hereof, (2) the date of issue; (3) the interest rate, (4) the maturity date, and (5) any other descriptive information determined by the Trustee to be needed to identify the Bonds. If a redemption is a Conditional Redemption, the notice shall so state. The Trustee also shall send each notice of redemption to (i) any Rating Service then rating the Bonds to be redeemed; (ii) all of the registered clearing agencies known to the Trustee to be in the business of holding substantial amounts of bonds of a type similar to the Bonds; and (iii) one or more national information services that disseminate notices of redemption of bonds such as the Bonds, such services to be identified by the Trustee.

Any Conditional Redemption may be rescinded in whole or in part at any time prior to the redemption date if the Authority delivers a certificate of an Authorized Representative of the Authority to the Trustee instructing the Trustee to rescind the redemption notice. The Trustee shall give prompt notice of such rescission to the affected Bondholders. Any Bonds subject to Conditional Redemption where redemption has been rescinded shall remain Outstanding, and the rescission shall not constitute an Event of Default. Further, in the case of a Conditional Redemption, the failure of the Authority to make funds available in part or in whole on or before the redemption date shall not constitute an Event of Default.

Section 4.03 Nonpresentment of Bonds. Notice having been given in the manner hereinbefore provided in this Article and irrevocable instructions having been given to the Trustee to pay said Bonds or portions thereof and cash equal to the redemption price of said Bonds and the interest accrued thereon to the date of redemption having been deposited in trust with the Trustee on or prior to the date set for redemption, the Bonds so called for redemption shall become due and payable on the redemption date so designated, and interest on such Bonds shall cease to accrue from such redemption date, whether such Bonds are presented for redemption or not. The Principal Amount of all Bonds so called for redemption, together with the premium, if any, and accrued interest thereon, shall be paid by the Trustee, upon presentation and surrender thereof.

Section 4.04 CUSIP Numbers. The Trustee shall use the "CUSIP" numbers assigned to the Bonds, if then generally in use, in notices of redemption of Bonds as a convenience to Bondholders; provided that any such notice shall state that no representation is made as to the correctness of such numbers either as printed on the Bonds or as contained in any notice of

redemption and that reliance may only be placed on the identification numbers established under the Indenture.

ARTICLE V

CONSTRUCTION FUND

Section 5.01 Construction Fund. There is hereby created a special fund known as the "Construction Fund", which shall be held in trust by the Trustee. Money shall be deposited to the Construction Fund pursuant to the provisions of Article II and from any other sources identified by the Authority. To the extent Costs of a Construction Project are paid for from Bonds, the Authority must deposit the construction proceeds of the Bonds in the Construction Fund and must follow the provisions of this Article V. To the extent the Authority is self-funding Costs from other than proceeds of Bonds, the Authority may use moneys in the Revenue Fund and the Operating Fund to pay such Costs, and the Authority need not use the Construction Fund or follow the provisions of this Article V.

Payment of the Costs of a Construction Project shall be made from the Construction Fund. A special account shall be created and identified for each such Construction Project, although funds, at the written direction of the Authority, may be transferred from one such account in the Construction Fund to another account in such Fund. On the date of issuance of Bonds to finance in whole or in part a Construction Project, the moneys directed, in writing, by the Authority to be transferred from the Clearing Fund shall be deposited into the Construction Fund or an account therein. All moneys on deposit in the Construction Fund shall be held in Trust by the Trustee as security under this Indenture and disbursed by the Trustee pursuant to this Section 5.01 in payment of the Costs of the Construction Project. Before each such withdrawal and payment of the Costs of the Construction Project from the Construction Fund by the Trustee, the Authority shall deliver to the Trustee the following:

- (a) A requisition, signed by any two of the Chairperson or Vice Chairperson or Secretary or Assistant Secretary or the Executive Director or the Chief Financial Officer or the Director of Finance of the Authority, or signed by such other person or persons who is or are authorized to do so pursuant to a Resolution of the Board, stating in respect of each payment to be made:
 - (1) the item number of the payment;
 - (2) the name and address of the person to whom payment is due;
 - (3) the amount to be paid and the Construction Fund from which payment is to be made;
 - (4) the purpose for which the obligation was incurred;
 - (5) that obligations in the stated amount have been incurred by the Authority and that each item thereof is a proper part of the Cost of the Construction Project and has not been paid;

(6) that there has not been filed with or served upon the Authority notice of any lien, right to lien or attachment upon, or claim affecting the right to receive payment of any of the moneys payable to any persons named in such requisition;

(7) that such requisition contains no items representing payment on account of any retained percentage which the Authority is on the date of such certificate entitled to retain;

(8) that neither the Authority nor any of its officers or members has received any discount, rebate, commission, fee, proceeds from insurance or other abatement which is not reflected on the requisition in connection with any such expenditures or indebtedness; and

(9) that no part of any such item has been included in any previous requisition for the withdrawal of moneys from the Construction Fund; and

(b) Except to the extent to which a requisition relates to financing costs, a certificate signed by the Consulting Engineer approving such requisition and certifying that each item to be paid as set forth in such requisition constitutes an obligation which has been properly incurred as part of the Cost of the Construction Project and is then due and unpaid.

Upon the receipt of each such requisition and the accompanying certificate, the Trustee shall pay to the persons named in such requisition, the respective amounts stated therein to be due to such persons.

Investment earnings on the amounts on deposit in the Construction Fund shall be retained in the Construction Fund unless the Authority directs the Trustee, in writing, to transfer such earnings to the Debt Service Fund.

Any moneys remaining in the Construction Fund after all amounts due in respect of the Construction Project shall have been paid (including any Costs of any amendment or revision of the Construction Project pursuant to Section 5.02 below), which fact shall be evidenced to the Trustee by delivery of a certificate of an Authorized Representative of the Authority to that effect, shall be transferred by the Trustee to the Revenue Fund and applied as directed in writing by the Authority; with respect to such application, the Authority will obtain an opinion of Bond Counsel that such application in and of itself will not adversely affect the exclusion from gross income of interest on the Series of Bonds issued to fund such Construction Project. If an Event of Default pursuant to Section 8.01(a) or (b) occurs, and only to the extent that no other available moneys are held under this Indenture, the Trustee shall transfer moneys from the Construction Fund to the Debt Service Fund to pay principal and interest on the Bonds.

All requisitions received by the Trustee pursuant to Section 5.01(a) may be relied upon without investigation or inquiry by and shall be retained in the possession of the Trustee for a period of five (5) years, subject at all times to the inspection of the Authority, its agents and representatives, and any other person authorized by a certificate of an Authorized Representative of the Authority.

Section 5.02 Amendment of Construction Project. The Authority may from time to time amend or revise a Construction Project with the approval of the Consulting Engineer, but only if the Authority shall have first delivered to the Trustee (i) a written statement describing the proposed amendments and revisions, (ii) a Resolution of the Board approving the proposed amendments and revisions, (iii) a certificate signed by the Consulting Engineer setting forth the general effect of such proposed amendments and revisions and certifying in his opinion that such proposed amendments and revisions are in the best interests of the Authority, and (iv) an opinion of Bond Counsel that such amendment or revision in and of itself will not adversely affect the exclusion from gross income of interest on the Series of Bonds issued to fund such Construction Project.

Section 5.03 Contract Security. All contracts which provide for the furnishing of material or the doing of work with regard to a Construction Project shall be in compliance with all federal and state statutes, rules and regulations and shall be subject to the approval of the Consulting Engineer. The Authority will require each person with whom it may contract for construction to furnish a performance security and a labor and materialmen's security each for not less than 100% of the full amount of the contract entered into with such person or such greater or lesser amount as may be required by applicable law, and to carry such insurance as may be required by law and as may be recommended by the Consulting Engineer. The proceeds of any such performance security shall forthwith, upon the receipt thereof by the Authority, be deposited to the credit of the applicable Construction Fund or account therein and applied toward the completion of the construction covered by the contract in connection with which such performance security shall have been furnished except that any such proceeds as shall constitute liquidated damages for delay shall be deposited to the credit of the Revenue Fund.

ARTICLE VI

REVENUES, FUNDS AND INVESTMENTS

Section 6.01 Funds and Accounts. In addition to the Construction Fund established in Section 5.01 hereof, there are hereby established the following Funds and Accounts to be held by the Authority or the Trustee, as applicable:

- (1) Revenue Fund to be held by the Authority in one or more Authorized Depositories, subject to the lien of this Indenture;
- (2) Operating Fund to be held by the Authority in one or more Authorized Depositories, not subject to the lien of this Indenture;
- (3) Debt Service Fund, in which there shall be established an Interest Account, a Principal Account and a Sinking Fund Account, and a separate subaccount in each such Account with respect to (i) all Series of Common Debt Service Reserve Secured Bonds and (ii) each Series of Separately Secured Debt Service Reserve Fund Bonds; and (iii) Other Senior Parity Indebtedness, to be held by the Trustee, subject to the lien of this Indenture;

(4) Debt Service Reserve Fund to be held by the Trustee, subject to the lien of this Indenture, in which there shall be established (1) a Series Debt Service Reserve Account for all Series of Common Debt Service Reserve Secured Bonds, and (2) as applicable, a Series Debt Service Reserve Account for each Series of Bonds that has a Separate Series Debt Service Reserve Requirement;

(5) Operating Reserve Fund to be held by the Authority in one or more Authorized Depositories, subject to the lien of this Indenture;

(6) Subordinate Debt Service Fund to be held by the Trustee, subject to the lien of this Indenture;

(7) Subordinate Debt Service Reserve Fund to be held by the Trustee, subject to the lien of this Indenture;

(8) Rate Stabilization Fund to be held by the Authority in one or more Authorized Depositories, subject to the lien of this Indenture;

(9) Redemption Fund to be held by the Trustee, subject to the lien of this Indenture; and

(10) Rebate Fund to be held by the Trustee, but is not subject to the lien of this Indenture.

Section 6.02 Disposition of Revenues. All Revenues and all other amounts received by the Authority from any source (except as otherwise provided herein) shall be deposited in the Revenue Fund to be held by the Authority in one or more Authorized Depositories; provided, however, that upon an Event of Default, the Authority will transfer all amounts in all Authority held funds (other than the Operating Fund) to the Trustee, and the Trustee shall hold such moneys in trust for the beneficiaries hereunder. If and when the Event of Default is cured, such moneys shall be returned by the Trustee to the Authority.

The Authority shall transfer from the Revenue Fund to the Operating Fund from time to time the amounts needed to pay Current Expenses.

On the 20th day of each month (or, if such day is not a Business Day, then on the last Business Day prior to the 20th day of each month) (the "Disbursement Date"), Net Revenues shall be disbursed by the Authority in the following order (except that the payments into the Interest Account, the Principal Account and the Sinking Fund Account of the Debt Service Fund shall be on a parity with each other):

(1) To the Debt Service Fund:

(a) To the subaccounts established for each Series of Bonds or Other Senior Parity Indebtedness in the Interest Account, monthly, on the Disbursement Date, an amount equal to the amount of interest falling due on or before the 20th day of the following month, as set forth in the applicable Supplemental Indentures with respect to each Series of Bonds or Other Senior Parity Indebtedness (including Periodic Payments with respect to Qualified Interest

Rate Swap Agreements); provided, however, that if such Other Senior Parity Indebtedness is evidenced by documents other than a Supplemental Indenture, to the related interest accounts set forth therein, as applicable; and such deposits shall be adjusted to give credit for any other available money then in such interest account or subaccount or otherwise available and designated to be used for such purpose. Moneys in the Interest Account shall be used to pay interest due on any Interest Payment Date (including any redemption date other than a mandatory sinking fund redemption date) related to such Series of Bonds or Other Senior Parity Indebtedness, as applicable.

(b) To the subaccounts established for each Series of Bonds or Other Senior Parity Indebtedness in the Principal Account and Sinking Fund Account, monthly, on the Disbursement Date, an amount equal to the principal and sinking fund redemption amounts payable on or before the 20th day of the following month, or if principal is payable once per year on the Series of Bonds or Other Senior Parity Indebtedness, then an amount equal to one half (1/2) of the principal or sinking fund payments due within the next seven months, and the other one half (1/2) when due by the 20th day of the following month, all as shall be necessary to ensure deposits for the payment in full of principal on the next principal payment date or sinking fund redemption date, as set forth in the applicable Supplemental Indentures with respect to each Series of Bonds or Other Senior Parity Indebtedness; provided, however, that if such Other Senior Parity Indebtedness is evidenced by documents other than a Supplemental Indenture, to the related principal and sinking fund accounts set forth therein, as applicable; and such deposits shall be adjusted to give credit for any other available money then in the principal or sinking fund account or subaccount or otherwise available and designated to be used for such purpose. Moneys in the Principal Account shall be used to pay principal required to be paid on any principal payment date related to such Series of Bonds or Other Senior Parity Indebtedness, as applicable. Moneys in the Sinking Fund Account shall be used to pay the amount required for mandatory sinking fund redemption on the applicable redemption date (including any redemption date other than a mandatory sinking fund redemption date) related to such Series of Bonds or Other Senior Parity Indebtedness, as applicable.

(2) To the Debt Service Reserve Fund the amounts, if any, required to be deposited pursuant to (i) Section 6.07(b) hereof, to restore the amount on deposit in each Series Debt Service Reserve Account to the related Series Debt Service Reserve Requirement or to reimburse the provider of any Credit Facility deposited in the Debt Service Reserve Fund, and (ii) a Supplemental Indenture, to fund a Series Debt Service Reserve Account to the applicable Separate Series Debt Service Reserve Requirement or Common Debt Service Reserve Requirement, and such amounts shall be transferred to the appropriate Series Debt Service Reserve Account.

(3) To the Subordinate Debt Service Fund, the amount equal to the deposits to such funds and accounts required by the related indenture or other documents evidencing such debt, which amounts shall be used to pay principal and

interest or other amounts owing on Subordinate Debt. To the extent that the Subordinate Debt is issued pursuant to Subordinate Debt documents, applicable amounts shall be transferred to the respective Subordinate Debt fiduciary. In addition, to the extent that moneys on deposit in the Debt Service Fund are insufficient to make the required interest and principal payments on Senior Debt, moneys in the Subordinate Debt Service Fund shall be used, prior to any withdrawal from the Debt Service Reserve Fund, to cure any such deficiencies, but only after withdrawals from the Revenue Fund, the Operating Reserve Fund and any Subordinate Debt Service Reserve Fund, in that order, for that purpose.

(4) To Subordinate Debt Service Reserve Fund with respect to each Subordinate Debt issue the amounts, if any, necessary to restore the amount on deposit therein to the related Subordinate Debt Service Reserve Requirement. To the extent that the Subordinate Debt is issued pursuant to Subordinate Debt documents, applicable amounts shall be transferred to the respective Subordinate Debt fiduciary.

(5) To any Counterparty, any and all payments owed by the Authority on or before the 20th day of the following month under its Qualified Interest Rate Swap Agreement, other than Periodic Payments.

(6) To the Operating Reserve Fund the amounts, if any, necessary to restore the amounts on deposit therein to the Operating Reserve Requirement. Such amounts shall be funded within 24 months of withdrawal by depositing in such fund 1/24 of the Operating Reserve Requirement on each Disbursement Date after such withdrawal, if necessary. Moneys in the Operating Reserve Fund shall be used to pay, to the extent necessary, Current Expenses of the Authority.

(7) To the City, any amounts owed to the City on or before the 20th day of the following month under the Cooperation Agreement.

(8) Any moneys remaining in the Revenue Fund after all deposits and transfers required by subsections (1) through (7) of this Section have been made on the Disbursement Date shall be applied as follows: to the extent that moneys on deposit in the Debt Service Fund are insufficient to make the required interest and principal payments on Senior Debt, (i) moneys in the Revenue Fund shall be transferred to the Debt Service Fund, and then (ii) there shall be withdrawals from the Operating Reserve Fund, the Subordinate Debt Service Fund, any Subordinate Debt Service Reserve Fund, and the Debt Service Reserve Fund, in that order, to cure any such deficiencies. If not needed for that purpose, moneys in the Revenue Fund may be used for any authorized purpose, including but not limited to transfers in an amount that an Authorized Representative of the Authority may determine, in his discretion, to transfer to the Rate Stabilization Fund for rate stabilization purposes, or to the Debt Service Fund to be used to redeem Bonds as herein provided for deposit in any Account therein, or to the Operating Fund to pay Costs of Construction Projects or Capital Additions. Additionally, moneys remaining in the Revenue Fund to the extent all transfers required by subsections (1) through (7)

of this Section have been made, shall be applied for any lawful purpose of the Authority.

Notwithstanding anything in this Indenture to the contrary, at any time that the Authority is required to make transfers pursuant to subsections (1) through (7) of this Section, and there are insufficient Net Revenues to make all required transfers pursuant to such subsections, the Authority, after paying Current Expenses, shall make the transfers in the order set forth above first from Net Revenues, then from any other legally available monies.

In the event this Section requires transfers to the Debt Service Fund or the Debt Service Reserve Fund from any Fund held by the Authority, the Authority shall effect that transfer to the Trustee in accordance with this Section.

The Authority's obligation to repay any Policy Costs to a Bond Insurer related to the Debt Service Reserve Fund shall have the same priority and be paid in the same manner from the Revenue Fund as the obligation to maintain and refill the Debt Service Reserve Fund. Repayment of Policy Costs shall commence in the first month following each draw on the Debt Service Reserve Fund Policy, and each such monthly payment shall be in an amount at least equal to one-twelfth of the aggregate of the Policy Costs related to such draw.

The Authority's obligation to repay any Policy Costs to a Bond Insurer related to the Subordinate Debt Service Reserve Fund shall have the same priority and be paid in the same manner from the Revenue Fund as the obligation to maintain and refill the Subordinate Debt Service Reserve Fund. Repayment of Policy Costs shall commence in the first month following each draw on the Subordinate Debt Service Reserve Fund Policy, and each such monthly payment shall be in an amount at least equal to one-twelfth of the aggregate of the Policy Costs related to such draw.

The Trustee shall provide for a mandatory sinking fund redemption of any Term Bonds in accordance with the schedules set forth in the Supplemental Indenture for such Bonds; provided, however, that on or before the 45th day next preceding any such sinking fund payment date, the Authority may:

- (i) deliver to the Trustee for cancellation Term Bonds of the maturity required to be redeemed on such sinking fund payment date in any aggregate Principal Amount desired; or
- (ii) instruct the Trustee, in writing, to apply a credit against the Authority's next sinking fund redemption obligation for any such Term Bonds that previously have been redeemed (other than through the operation of the sinking fund) and canceled but not theretofore applied as a credit against any sinking fund redemption obligation.

Upon the occurrence of any of the events described in the subsections (i) or (ii) above, the Trustee shall credit against the Authority's sinking fund redemption obligation on the next sinking fund payment date the amount of such Term Bonds so delivered or previously redeemed. Any Principal Amount of such Term Bonds in excess of the Principal Amount required to be redeemed on such sinking fund payment date shall be similarly credited in such order as may be determined by the Authority against future payments to the Sinking Fund Account and shall similarly reduce

the Principal Amount of the Term Bonds of the applicable Series to be redeemed on the next sinking fund payment date. Within seven days of receipt of such Term Bonds or instructions to apply as a credit, any amounts remaining in the Sinking Fund Account in excess of the amount required to fulfill the remaining required sinking fund redemption obligation on the next sinking fund payment date shall be used in such manner as determined at the direction of the Authority.

In the event the amount on deposit in the Interest Account on any Interest Payment Date exceeds the amount required to pay interest on the Senior Debt on the next Interest Payment Date, the Authority shall, if the amount on deposit in any Series Debt Service Reserve Account is less than the applicable Series Debt Service Reserve Requirement, transfer such excess to any Series Debt Service Reserve Account to the extent of such deficiency (on a *pro rata* basis if funds are not sufficient to cause the Series Debt Service Reserve Requirement to be fully funded at the Common Debt Service Reserve Requirement or Separate Series Debt Service Reserve Requirement), and otherwise retain any remaining excess in the Interest Account or transfer any remaining excess to the related Principal Account to be credited against subsequent required deposits thereto, as determined by the Authority.

In the event the amount on deposit in the Principal Account or Sinking Fund Account on any principal or mandatory redemption payment date exceeds the amount required on such date to pay Bonds at maturity or to redeem Term Bonds pursuant to mandatory sinking fund requirements, the Authority shall, if the amount on deposit in any Series Debt Service Reserve Account is less than the applicable Series Debt Service Reserve Requirement, transfer such excess to the Series Debt Service Reserve Account to the extent of such deficiency (on a *pro rata* basis if funds are not sufficient to cause the Series Debt Service Reserve Requirement to be fully funded at the Common Debt Service Reserve Requirement or Separate Series Debt Service Reserve Requirement), and otherwise retain such excess in the Principal Account or transfer such excess to the Interest Account to be credited against subsequent required deposits thereto, as determined by the Authority.

Section 6.03 Operating Fund. The Authority shall promptly pay out of the Operating Fund its Current Expenses as the same shall become due. All withdrawals or payments from the Operating Fund shall be made in accordance with the procedures of the Authority. If all transfers required under subsections (1) through (7) of Section 6.02 have been made, the Authority may pay from the Operating Fund the Costs of Construction Projects or Capital Additions.

Section 6.04 Debt Service Fund. The Authority shall deposit and the Trustee shall apply the amounts required to be deposited in the Debt Service Fund on the applicable dates pursuant to the provisions of this Indenture including in any Supplemental Indenture for the purpose of paying the interest on and principal of Bonds and Other Senior Parity Indebtedness.

Section 6.05 Subordinate Debt Service Fund. The Authority shall deposit and the Trustee shall apply the amounts required to be deposited on the applicable dates pursuant to the provisions of this Indenture and any documents related to the Subordinate Debt for the purpose of paying the interest on and principal of Subordinate Debt.

Section 6.06 Operating Reserve Fund. Moneys in the Operating Reserve Fund shall be used by the Authority to pay, to the extent necessary, Current Expenses of the Authority. Such moneys shall also be used to make up for deficiencies in certain other funds as described in

Section 6.02(6) hereof. To the extent that moneys on deposit in the Debt Service Fund are insufficient to make the required interest and principal payments on Senior Debt, moneys in the Operating Reserve Fund shall be used, prior to any withdrawal from any Subordinate Debt Service Reserve Fund, the Subordinate Debt Service Fund, and then the Debt Service Reserve Fund, in that order, to cure any such deficiencies, but only after withdrawals from the Revenue for that purpose.

Section 6.07 Debt Service Reserve Fund.

The Series Debt Service Reserve Account maintained for all Common Debt Service Reserve Secured Bonds shall be funded at all times to the Common Debt Service Reserve Requirement, and all other Series Debt Service Reserve Accounts shall be funded at all times to the applicable Separate Series Debt Service Reserve Requirement as set forth in a Supplemental Indenture. Amounts in each Series Debt Service Reserve Account shall be used to pay debt service on the related Series of Bonds and related Other Senior Parity Indebtedness on the date such debt service is due if insufficient funds for that purpose are available in the related Series subaccount in the Interest Account and the related Series subaccount in the Principal Account (but only to the extent amounts in such subaccounts are less than the amounts required). Amounts in each Series Debt Service Reserve Account shall be pledged to Holders of the Bonds and Other Related Parity Indebtedness Parties secured by such Series Debt Service Reserve Account.

The Authority shall withdraw from the Revenue Fund and deposit into the Debt Service Reserve Fund:

(a) on the dates specified in this Indenture or any Supplemental Indenture, the amounts required to be deposited on such dates to the credit of the applicable accounts of the Debt Service Reserve Fund; and

(b) if a deficiency exists in any account of the Debt Service Reserve Fund, on the dates specified in this Indenture or a Supplemental Indenture, such amounts as will be sufficient to repair any deficiencies in such account of the Debt Service Reserve Fund in not more than twenty-four equal monthly payments.

In lieu of or in addition to cash or investments, at any time the Authority may cause to be deposited to the credit of the Debt Service Reserve Fund any form of Credit Facility, including a Debt Service Reserve Fund Policy, in the amount of all or a portion of the Debt Service Reserve Fund, irrevocably payable to the Trustee as beneficiary for the Holders of the respective Series of Bonds, provided that the Trustee has received evidence satisfactory to it that the provider of the Credit Facility has a credit rating in one of the three highest credit rating categories by two Rating Agencies.

If a disbursement is made pursuant to any Credit Facility, the Authority shall either (a) reinstate the maximum limits of such Credit Facility, or (b) deposit to the credit of the Debt Service Reserve Fund moneys in the amount of the disbursement made under such Credit Facility from available Net Revenues. To the extent such moneys are still insufficient, then the Authority shall transfer to the Trustee from any legally available moneys the amount of such deficiency as

soon as practicable and in any event within 24 months by depositing one-twenty-fourth of the required amount each month.

Amounts, if any, released from any Debt Service Reserve Fund upon deposit to the credit of such Debt Service Reserve Fund of a Credit Facility shall, upon designation by an Authorized Representative of the Authority, accompanied by an opinion of Bond Counsel that such use in and of itself will not adversely affect the exclusion from gross income of interest on the respective Series of Bonds, be transferred (a) to the Debt Service Fund and used to pay interest on, principal of or to redeem such Bonds, or (b) to the Authority to be used to pay all or any portion of the Costs designated by the Authority and approved by Bond Counsel.

On or within five days after each Reserve Determination Date, the Trustee shall determine if the balance on deposit in each applicable account of the Debt Service Reserve Fund was, as of the Reserve Determination Date, at least equal to the applicable Debt Service Reserve Requirement. In making such determination, any obligations in the Debt Service Reserve Fund shall be valued in accordance with Section 6.12.

In the event the amount on deposit in the Debt Service Reserve Fund exceeds the applicable Debt Service Reserve Fund Requirement, the Trustee shall (a) transfer such excess to the Debt Service Fund to be used to pay interest and principal on Bonds on the next Interest Payment Date, and (b) transfer such excess to the Authority to be used to pay all or any portion of Costs designated by the Authority and approved by Bond Counsel; provided, however, that if an Authorized Representative of the Authority calls for a Reserve Determination Date in connection with the refunding and/or defeasance of a Series of Bonds, then the Trustee is authorized to take such refunding and/or defeasance into account in valuing the Debt Service Reserve Fund securing such Series of Bonds and is further authorized to apply the amount of any surplus arising from such valuation to reduce the amount of the refunding bonds and/or to provide for the defeasance of the Bonds in such manner as the Authorized Representative of the Authority may direct.

The Trustee shall ascertain the necessity for a claim upon a Debt Service Reserve Fund Policy and provide notice to the Bond Insurer of any such claim in accordance with the Debt Service Reserve Fund Policy at least two Business Days prior to each Interest Payment Date. The Trustee shall without any direction from the Authority, transfer moneys from the Debt Service Reserve Fund to the Debt Service Fund or to any sinking, purchase or analogous fund to the extent that the moneys in the Debt Service Fund or any sinking, purchase or analogous fund may on any Interest Payment Date be insufficient to make the payments for which the Debt Service Fund or any sinking, purchase or analogous fund was established as the same shall become due. If and to the extent that cash has been deposited into the Debt Service Reserve Fund in addition to a Debt Service Reserve Fund Policy, all such cash shall be used (or investments purchased with such cash shall be liquidated and the proceeds applied as required) prior to any drawing under the Debt Service Reserve Fund Policy, and repayment of any Policy Costs shall be made prior to replenishment of any such cash amounts.

If, in addition to the Debt Service Reserve Fund Policy, any other reserve fund substitute instrument ("Additional Reserve Fund Policy") is provided, drawings on the Debt Service Reserve Fund Policy and any such Additional Reserve Fund Policy, and of repayment of Policy Costs and reimbursement of amounts due under the Additional Reserve Policy, shall be

made on a pro rata basis (calculated by reference to maximum amounts available thereunder) after applying all cash available in the Debt Service Reserve Fund and prior to replenishment of any such cash draws, respectively.

If the Authority shall fail to pay any Policy Costs in accordance with the provisions of this Indenture, the Bond Insurer shall be entitled to exercise any and all remedies under this Indenture other than (i) acceleration of the maturity of the Bonds, or (ii) remedies which would adversely affect Bondholders.

The Trustee shall notify the Bond Insurer of any withdrawal from the Debt Service Reserve Fund due to a deficiency in any other fund or of any deficiency in the Debt Service Reserve Fund due to market fluctuation of the investments held therein.

Section 6.08 Rate Stabilization Fund. The Rate Stabilization Fund authorized by Section 6.01(8) shall be held by the Authority at one or more Authorized Depositories in a Fund separate and apart from all other Funds and Accounts of the Authority and payments therefrom shall be made as hereinafter provided. Moneys may be transferred by an Authorized Representative of the Authority to the Rate Stabilization Fund from the Revenue Fund as provided in Section 6.02 as determined by the Authorized Representative of the Authority. At any time the Authority shall transfer from the Rate Stabilization Fund to the Revenue Fund an amount determined by an Authorized Representative of the Authority.

Section 6.09 Redemption Fund. The Authority may transfer to the Trustee for deposit to the credit of the Redemption Fund such amounts as it may elect for the purchase of Bonds or redemption of Bonds at the option of the Authority and the Trustee shall apply such moneys to the redemption of Bonds in the amounts directed, in writing, by the Authority. Upon any such purchase or redemption, the Trustee shall transfer from the Debt Service Fund to the Redemption Fund any amount deposited in the Debt Service Fund with respect to interest on the Bonds being redeemed and shall pay the interest due on the redemption date out of such moneys.

Section 6.10 Rebate Fund. The Rebate Fund is established with the Trustee separate and apart from the pledge of this Indenture. The Trustee shall make deposits to and disbursements from the Rebate Fund upon directions furnished by the Authority. The Authority will retain a Qualified Independent Consultant, experienced in preparing rebate reports, to assist the Authority with respect to rebate requirements related to the Bonds. The Trustee has undertaken no duty, and is under no obligation to calculate any amount due with respect to such rebate, to verify amounts contained in any written request or direction, or to make such payments.

Section 6.11 Other Funds and Accounts. The Authority may establish in each Supplemental Indenture such other Funds and Accounts as the Authority determines to be desirable.

Section 6.12 Authorized Investments. At the written direction of the Authority, signed by any two of its Chairperson or Vice Chairperson or Secretary or Assistant Secretary or Executive Director or Chief Financial Officer or Director of Finance, or signed by such other person or persons who is or are authorized to do so pursuant to a Resolution of the Board, a certified copy of which shall be on file with the Trustee, moneys to the credit of the following Funds shall be invested by the Trustee in the following securities:

(a) Obligations of the United States of America or any of its agencies or instrumentalities backed by the full faith and credit of the United States of America; and short term obligations of the United States Government or its agencies or instrumentalities.

(b) Deposits in savings accounts or time deposits or share accounts of institutions insured by the Federal Deposit Insurance Corporation or the National Credit Union Share Investment Fund to the extent such accounts are so insured and for any amounts above the insured maximum if the approved collateral as provided by law shall be pledged by the depository (including pursuant to Pennsylvania Act 72 of 1971, as amended).

(c) Obligations, participations or other instruments of any Federal agency, instrumentality or United States government-sponsored enterprise, including those issued or fully guaranteed as the principal and interest by Federal agencies, instrumentalities or United States government-sponsored enterprises, if the debt obligations are rated at least "A" or its equivalent by at least two Rating Agencies.

(d) Repurchase agreements with respect to United States Treasury bills or obligations, participations or other instruments of or guaranteed by the United States or any Federal agency, instrumentality or United States government-sponsored enterprise.

(e) Negotiable certificates of deposit or other evidences of deposit, with a remaining maturity of three years or less, issued by a nationally or State-chartered bank, a Federal or State savings and loan association or a State-licensed branch of a foreign bank. For obligations with a maturity of one year or less, the debt obligations of the issuing institution or its parent must be rated in the top short-term rating category by at least two Rating Agencies. For obligations with a maturity in excess of one year, the senior debt obligations of the issuing institution or its parent must be rated at least "A" or its equivalent by at least two Rating Agencies.

(f) Bills of exchange or time drafts drawn on and accepted by a commercial bank, otherwise known as bankers' acceptances, if the bankers' acceptances do not exceed 180 days' maturity and the accepting bank is rated in the top short-term category by at least two Rating Agencies.

(g) Commercial paper issued by corporations or other business entities organized in accordance with Federal or State law, with a maturity not to exceed 270 days, if the issuing corporation or business entity is rated in the top short-term category by at least two Rating Agencies.

(h) Shares of an investment company registered under the Investment Company Act of 1940 (54 Stat. 789, 15 U.S.C. § 80a-1 et seq.) whose shares are registered under the Securities Act of 1933 (48 Stat. 74, 15 U.S.C. § 77a et seq.), if all of the following conditions are met: (1) the investments of the company are the authorized investments under this definition; (2) the investment company is managed in accordance with 17 CFR 270-2a7 (relating to money market funds); and (3) the investment company is rated in the highest category by a Rating Agency.

(i) Savings or demand deposits placed in accordance with the following conditions: (1) the money is initially deposited and invested through a federally insured institution having a place of business in the Commonwealth which is selected by the Authority; (2) the selected

institution arranges for the redeposit of the money in savings or demand deposits in one or more financial institutions insured by the Federal Deposit Insurance Corporation for the account of the Authority; the full amount of principal and any accrued interest of each such deposit is insured by the Federal Deposit Insurance Corporation; and (4) on the same date that the money is redeposited pursuant to paragraph (2), the selected institution receives an amount of deposits from customers of other financial institutions equal to or greater than the amount of money initially invested through the selected institution by the Authority.

All investments shall mature or shall be subject to withdrawal, as the case may be, not later than the date required for the operation of such Fund and in no event later than the date or the number of months or years after the date of such investment or deposit as specified in the following columns:

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<u>Fund</u>	<u>Period of Investment</u>
Revenue Fund	Such dates as may be specified by the Authority to permit it to meet its obligations to be paid therefrom.
Operating Fund	Such dates as may be specified by the Authority to permit it to meet its obligations to be paid therefrom.
Construction Fund	Such dates as may be specified by the Authority to permit it to meet its obligations to be paid therefrom.
Debt Service Fund	Not later than one day prior to the next interest or principal payment date.
Debt Service Reserve Fund	Not later than 5 years from the date of investment.
Operating Reserve Fund	Not later than 1 year from the date of investment.
Subordinate Debt Service Fund	Not later than one day prior to the next interest or principal payment date.
Subordinate Debt Service Reserve Fund	Not later than 5 years from the date of investment.
Rate Stabilization Fund	Not later than 1 year from the date of investment.
Redemption Fund	Not later than the day prior to the redemption date with respect to which such deposit has been made.
Rebate Fund	Such dates as may be specified by the Authority to permit it to meet its obligations to be paid therefrom.

In any such case, the full purchase price (including accrued interest and premiums, if any) of obligations, shall be paid out of the Fund for which the investment was made. Upon a like direction by the Authority, or whenever the moneys in said Funds are to be applied and paid out pursuant to any provisions of this Indenture, or, whenever the Trustee shall deem such action to be advisable, the Trustee shall sell all or any part of the obligations in which the moneys in one or more such Funds shall be invested or withdraw moneys from such accounts or certificates of deposit, and the proceeds of such sale or the amount of such withdrawal shall be deposited to the credit of the respective Fund or Funds. Interest and income derived from any such investments or deposits shall be held and transferred as follows, unless otherwise directed by the Authority:

- (a) Revenue Fund – remain in that fund;
- (b) Operating Fund – remain in that fund;

- (c) Construction Fund – remain in that fund;
- (d) Debt Service Fund - remain in that fund;
- (e) Debt Service Reserve Fund - remain in that fund to make up any deficiency therein; otherwise, transferred to Revenue Fund;
- (f) Operating Reserve Fund - remain in that account to make up any deficiency therein; otherwise, transferred to Revenue Fund;
- (g) Subordinate Debt Service Fund - remain in that fund;
- (h) Subordinate Debt Service Reserve Fund - remain in that fund to make up any deficiency therein; otherwise, transferred to Revenue Fund;
- (i) Rate Stabilization Fund – remain in that fund;
- (j) Redemption Fund - transferred to Revenue Fund; and
- (k) Rebate Fund - remain in that fund.

Any loss resulting from any such investment shall be charged to the respective Fund or Funds, for which such investment was made. Obligations purchased as an investment of any of said Funds shall be deemed at all times to be a part of such Fund. The Trustee shall not be liable or responsible for any loss resulting from any investment made in accordance with the provisions of this Section or resulting from any sale by the Trustee of such investment made in accordance with instructions from the Authority.

Cash in each of the Funds and accounts therein and all certificates of deposit, repurchase agreements and investment agreements all as referred to in this Article, to the extent that the same is not insured or guaranteed by the Federal Deposit Insurance Corporation or other Federal agency, shall be continuously secured by a pledge of securities described in (a) and/or (b) of Section 6.12 hereof having an aggregate market value, exclusive of accrued interest in the case of certificates of deposit and including accrued interest in the case of repurchase agreements or other investment agreements, at all times at least equal to 100% (or 102 % in the case of repurchase agreements or investment agreements) of the balance on deposit (including interest earned in the case of repurchase agreements or investment agreements) in such Fund or account. Such securities shall be held by a Trustee or agent satisfactory to the Authority and to the Trustee. In the event the Authority determines that the market value of such security is determined by the Trustee to be less than the required amount, the Authority shall provide written instructions to Trustee to obtain additional security.

All Authorized Investments (except investment agreements) shall be valued by the Trustee as frequently as deemed necessary by a Bond Insurer, but not less often than annually, at the market value thereof, exclusive of accrued interest.

No later than 20 days before each Interest Payment Date, the Trustee shall advise the Authority of the amount of interest credited and to be credited to the Debt Service Fund prior

to the next Interest Payment Date to enable the Authority to determine the amount to be transferred from the Revenue Fund on such Interest Payment Date.

Ratings of authorized investments shall be determined at the time of purchase of such authorized investments and the Trustee shall have no responsibility to monitor the ratings thereof. The Trustee may make any and all such investments through its own investment department or that of its affiliates or subsidiaries, and may charge its ordinary and customary fees for such trades, including cash sweep account fees. In the absence of investment instructions from the Authority, the Trustee shall not be responsible or liable for keeping the moneys held by it hereunder fully invested in authorized investments. The Trustee is not required to provide brokerage confirmations so long as the Trustee provides periodic statements that include investment activity to the Authority; provided that such statement is not required if (i) the Trustee is willing to provide broker confirmations or (ii) the investments permitted in the transaction are limited solely to investments for which brokerage confirmations are never issued or issued only at closing (i.e., state and local government obligations).

Section 6.13 Transfer of Funds and Accounts. On the First Effective Date, moneys in any Funds and Accounts in the Existing Senior Indenture maintaining the same name in this Indenture shall remain in such Funds and Accounts. The moneys in the Operation and Maintenance Account shall be transferred to the Operation Account hereunder. The moneys in the Renewal and Replacement Fund and the Depreciation Reserve Account shall be transferred to the Revenue Fund.

ARTICLE VII

RATE COVENANT AND PARTICULAR COVENANTS

Section 7.01 Authority Rate Covenant.

(a) From the First Effective Date through the Tested Fiscal Year (as hereinafter defined) ending December 31, 2018, the Rate Covenant set forth in Section 7.01 of the Existing Senior Indenture shall remain in effect. This means that in 2018, the Authority will calculate whether the Rate Covenant in Section 7.01 of the Existing Senior Indenture was complied with in the 2017 Fiscal Year, and in 2019, the Authority will calculate whether the Rate Covenant in Section 7.01 of the Existing Senior Indenture was complied with in the 2018 Fiscal Year.

(b) Beginning on January 1, 2019 and thereafter, the Rate Covenant set forth in 7.01(c) below shall be in effect. This means that in 2020, the Authority will calculate whether the Rate Covenant in Section 7.01(c) below was complied with in the 2019 Fiscal Year.

(c) The Authority shall fix, charge and collect such rates, fees and other charges for the use of and the services furnished by the System and shall, from time to time and as often as shall appear necessary, revise such rates, fees and other charges so as to satisfy all of the following three independent requirements:

(i) Rate Covenant Net Revenues shall be sufficient in each Fiscal Year (the "Tested Fiscal Year") to pay (A) Annual Debt Service on Senior Debt in such Fiscal

Year, (B) any amount necessary to be deposited in any Series Debt Service Reserve Account to restore the amount on deposit therein to the applicable Series Debt Service Reserve Requirement, (C) Annual Debt Service on Subordinate Debt in such Fiscal Year (including reserves in connection therewith and the required restoration thereof), (D) any amount required to be deposited in the Operating Reserve Fund to cause the required balance therein to equal the Operating Reserve Requirement, and (E) all other amounts which the Authority may by law or contract be obligated to pay; and

(ii) Rate Covenant Net Revenues in each Fiscal Year shall equal not less than: (A) 125% of the Annual Debt Service with respect to Senior Debt for such Fiscal Year; plus (B) 110% of the aggregate Annual Debt Service with respect to Subordinate Debt for such Fiscal Year; and

(iii) Rate Covenant Net Revenues, excluding transfers from the Rate Stabilization Fund to the Revenue Fund (as provided in Section 6.08 hereof) and the proceeds of Grants, shall equal not less than 100% of Annual Debt Service on Senior Debt and Subordinate Debt for such Fiscal Year.

The Authority shall test for compliance with this Section 7.01(c) within 120 days after the end of each Fiscal Year.

(d) If, subject to the provisions of subsection (e) below, the Rate Covenant Net Revenues are less than the amounts specified in (c) above, the Authority must take appropriate action under the law and subsection (f) below within its powers to revise the Authority's rates, fees and other charges or the method of operation of the System in order to satisfy the foregoing requirements in the next Fiscal Year following the Tested Fiscal Year.

(e) For purposes of this Section, the Authority shall not be deemed to have failed to comply with the Rate Covenant and shall not be required to implement the procedures set forth in subsection (d) hereof, if an Authorized Representative of the Authority certifies in writing that the Rate Covenant Net Revenues the Authority would have received in the Tested Fiscal Year would have been sufficient to meet the requirements of subsection (c) hereof if the Revenues for the Tested Fiscal Year were determined by giving effect for the entire Tested Fiscal Year to any increase or decrease in rates, fees, rentals or other charges already authorized by the Authority to be implemented on a date that is within 120 days after the end of the Tested Fiscal Year.

(f) If the Authority fails to comply with the Rate Covenant, the Authority shall promptly request a Qualified Independent Consultant to submit a written report and recommendations with respect to increases in the Authority's rates, fees and other charges and improvements in the operations of and the services rendered by the System and the Authority's accounting and billing procedures necessary to bring the Authority into compliance with the Rate Covenant. Any failure to meet the Rate Covenant will not constitute an Event of Default under this Indenture if within 180 days after the end of the Tested Fiscal Year, (1) the report and recommendations of the Qualified Independent Consultant shall be filed with the Authority, and (2) the Authority shall revise its rates, fees and charges, and alter its operations and services to conform with the report and recommendations of the Qualified Independent Consultant to the extent permitted by law. Notwithstanding clause (2) in the prior sentence, to the extent that the

Authority's rates are governed by an external regulatory body, an Event of Default will not be deemed to have occurred if the Authority files with said regulatory body within 180 days after the end of the Tested Fiscal Year a petition to revise its rates, fees and charges to a level sufficient to achieve compliance with the Rate Covenant in future years. If, in response to such petition, the regulatory body establishes rates, fees and charges, within 180 days of the date the petition is filed, that are expected by the Authority to achieve future compliance with the Rate Covenant, then an Event of Default will not have occurred. If, in response to such petition, the regulatory body (a) does not establish rates fees and charges within 180 days of the petition being filed or (b) establishes rates, fees and charges that are not expected by the Authority to achieve future compliance with the Rate Covenant, then an Event of Default will have occurred.

(g) If the Authority fails to make a deposit required by Section 6.02 to the Interest Account or the Principal Account (or the Sinking Fund Account, as applicable), or if there is a deficiency in the Debt Service Reserve Fund for which the Authority has not made required restoration payments for three consecutive months, the Authority shall promptly request a Qualified Independent Consultant to submit a written report and recommendations with respect to increases in the Authority's rates, fees and other charges and improvements in the operations of and the services rendered by the System and the Authority's accounting and billing procedures necessary to bring the Authority into compliance with the Rate Covenant. The report and recommendations shall be filed with the Authority within 60 days from the date of discovery of failure to make the required deposits, and within 90 days from the receipt of such report, the Authority shall revise its rates, fees and charges, and alter its operations and services to conform with the report and recommendations of the Qualified Independent Consultant to the extent permitted by law.

Section 7.02 Principal and Interest; Cancellation. The Authority will punctually pay the principal of (and premium, if any) and interest on each of the Bonds issued hereunder and secured hereby on the dates, at the places and in the manner specified herein and in said Bonds. All Bonds paid, redeemed or purchased, shall be cancelled by the Trustee. All such Bonds so cancelled may at any time be destroyed by the Trustee.

Section 7.03 No Extension of Payment. The Authority will not directly or indirectly extend or assent to the extension of the time of payment of any claim for interest upon any of the Bonds by purchasing or funding such claim or by any other arrangement, and, in case the time for payment of any such claim for interest shall be extended, such claim shall not be entitled, in case of any default hereunder, to the benefits of this Indenture, or to any payment out of the assets of the Authority, except subject to the prior payment of the principal of all Bonds issued and Outstanding hereunder, and of such portion of the accrued interest thereon as shall not be represented by such extended claims.

Section 7.04 Appointment of Trustee. The Authority hereby irrevocably appoints the Trustee as its agent to maintain an office or agency at its corporate trust office in the City, where Bonds may be presented for registration and transfer and where notices, presentations and demands in respect to the Bonds, or of this Indenture, may be served. The Trustee shall not be under any liability to the Authority or to any other corporation or person in respect of any such presentation, demand or notice. The Authority shall have the right to appoint a Paying Agent to

perform any of the Trustee's duties hereunder with respect to the authentication, transfer, exchange or payment of the Bonds hereunder.

Section 7.05 Corporate Existence. The Authority is duly authorized under its certificate of incorporation and all applicable laws to issue the Bonds and execute and deliver this Indenture and to pledge the Revenues pledged hereby, and all corporate action on its part to that end has been duly and validly taken; this Indenture is and will be a legal, binding and enforceable instrument in accordance with its terms except to the extent that the enforcement of the remedies provided for herein may be limited by bankruptcy laws or the Act; and the Bonds are and will be valid and binding obligations of the Authority entitled to the benefits and security of this Indenture. The Authority will at all times preserve and protect the security of the Bonds and the rights of the Trustee and the Bondholders hereunder.

Section 7.06 Compliance with Act; Maintenance of Existence. The Authority will at all times comply with the laws of the Commonwealth applicable to the Authority, particularly the Act and its amendments and supplements, and it will take such actions and proceedings as may be required, from time to time, to preserve its corporate existence, rights and franchises.

Section 7.07 Liens; Sale of Assets. So long as any of the Bonds secured hereby are Outstanding, none of the Revenues shall be used for any purpose other than as provided in this Indenture, and no contract or contracts will be entered into or any action taken by which the rights of the Trustee or of the Bondholders might be impaired or diminished.

The Authority will not voluntarily create or permit to be created any debt, lien or charge on a parity with (except pursuant to Section 3.03 hereof) or having priority over the lien of this Indenture upon any of the Revenues pledged hereby or any other revenues or other amounts at any time pledged for the payment of the Bonds. The Authority will not sell or otherwise dispose of or encumber the System or any part thereof except as herein otherwise having provided. No sale or other disposition of fixed properties having a fair market value in excess of One Million Dollars (\$1,000,000) shall be made unless the Consulting Engineer shall first have filed his certificate with the Authority and the Trustee recommending such sale or other disposition of said fixed properties and shall have stated in such certificate that the sale or other disposition of said properties is in the best interests of the Authority and will not impair the security of the Bonds and the retention of said properties is not necessary for the efficient operation of the System. If, after receiving the certificate of the Consulting Engineer, the Authority determines to sell or otherwise dispose of said fixed properties, it shall by Resolution of the Authority adopted by a majority vote of a quorum of the Board, authorize such sale or other disposition and shall file a certified copy of such Resolution of the Authority with the Trustee.

The proceeds from such sale or other disposition of any such fixed properties shall be deposited in the Revenue Fund.

The Authority may from time to time sell or otherwise dispose of property other than fixed property included in the System if the Authority shall determine that the sale or other disposition of such property is in the best interests of the Authority and will not impair the security of the Bonds and the retention of said properties is not necessary for the efficient operation of the

System. The proceeds from the sale or other disposition of such property shall be deposited in the Revenue Fund.

In case the Authority shall have acquired any property constituting part of the System within or after the period for which any calculation of Net Revenues is made there shall be included in ascertaining the Net Revenues for such period, the net earnings or net losses, as the case may be, of such property for the whole of such period to the extent the same may not have been otherwise included. The net earnings or net losses, as the case may be, of such property for the period preceding its acquisition by the Authority shall be computed as if such property had been operated by the Authority during such period. If within or after the period for which any such calculation is made, the Authority shall have disposed of any property constituting part of the System, then the net earnings or net losses, as the case may be, of such property for the whole of such period shall be excluded, to the extent the same may not have been otherwise excluded, in ascertaining the Net Revenues for such period. If the rates, rents and charges during all or any part of the period for which any such calculation is made shall be different from the rates, rents and charges which are in effect at the time such calculation is made, there shall be added to or deducted from the Net Revenues so calculated, any increase or decrease of the Revenues for such period which would result from the computation of such Revenues on the basis of the rates, rents and charges in effect at the date of said calculation, rather than the rates, rents and charges which were actually in effect during that period.

Section 7.08 Payment of Taxes and other Governmental Charges. The Authority will pay all taxes, assessments and other governmental charges lawfully imposed upon its properties or the Revenues when the same shall become due as well as all lawful claims for labor, material and supplies, which, if unpaid, might by law become a lien or charge on the System or the Revenues or any part thereof prior to or on a parity with the lien hereof, or which might impair the security of this Indenture, so that the priority and security of this Indenture shall be preserved, provided that nothing in this Section contained shall require the Authority to pay and discharge any such tax, assessment, charge or claim so long as the validity thereof shall be contested in good faith by appropriate proceedings diligently conducted (unless and until foreclosure, distraint, sale or other similar proceedings shall have been commenced) and if such reserves or other appropriate provisions, if any, as shall be required by generally accepted accounting principles shall have been made therefor.

Section 7.09 Insurance of System. The Authority will at all times cause all the property of the System which is of a character usually insured by persons operating properties of a similar nature to be properly insured and kept insured by a reputable insurance company or companies against loss or damage by fire or other hazards to the extent that such properties are usually insured by persons operating properties of a similar nature in the same or similar localities. All policies shall be so written that the Trustee will be notified of cancellation or amendment at least fifteen (15) days prior to the effective date of such cancellation or amendment. In case the Trustee shall at any time notify the Authority in writing that it disapproves of any insurance company issuing a policy of insurance covering any one or more such risks, the Authority will forthwith affect other insurance with companies satisfactory to the Trustee.

All such policies shall be for the benefit of the Trustee and the Authority as their interests may appear. All policies shall provide that claims in excess of \$5,000,000 shall be made

payable to the Trustee and shall be deposited with the Trustee and the Trustee shall have the sole right to receive the proceeds of such policies and to collect and receipt for claims in excess of \$5,000,000 thereunder. The Trustee may accept as conclusive the adjustment of any loss or losses by the Authority and any insurance company. The proceeds of all such policies paid to the Trustee shall be held by it as additional security hereunder until paid out by it as herein provided. All claims of \$5,000,000 or less shall be paid to the Authority.

Section 7.10 Damage, Destruction or Condemnation of System; Application of Proceeds. In the event of any damage to the System covered by insurance or condemnation or taking by eminent domain of any part of the System for which the cost of repair or replacement shall exceed \$5,000,000, the proceeds shall be deposited in the Revenue Fund and the Authority shall promptly notify the Trustee and file with the Trustee a Consulting Engineer's certificate stating whether, in the signer's opinion, it is practicable and advantageous to repair or replace the damaged or condemned property. If the certificate states that repair or replacement is practicable and advantageous, the Consulting Engineer shall, if appropriate, prepare and file with the Trustee plans and specifications therefor with an estimate of the cost thereof, and the insurance or condemnation proceeds, if any, shall be transferred to the Operating Fund and applied thereto. If the certificate states that the repair or replacement is not practical and advantageous, the proceeds shall be remain deposited in the Revenue Fund or, at the option of the Authority, be transferred to the Redemption Fund for the extraordinary redemption of Bonds as hereinafter provided.

The Bonds are subject to redemption without premium at any time, in whole or in part, within a maturity by lot, by the Authority upon the occurrence of any condemnation or taking or damage or injury of the nature set forth in this Article, from the proceeds collected as a result of such damage, injury or taking. In all cases of redemption under this Section, including redemptions resulting from the damage, destruction or condemnation of equipment, the Authority shall cause to be filed with the Trustee the certificate of the Consulting Engineer referred to above, determining that repair, reconstruction or replacement is not practicable, desirable or financially feasible. In the event that less than all of the Bonds outstanding are to be redeemed, the Authority shall furnish to the Trustee a Consulting Engineer's Certificate stating (i) that the property forming a part of the System that was damaged or injured or taken by such condemnation proceedings is not essential to the operation of the System and that the continued operation of the remaining System will not, in the signer's opinion, adversely affect the security of the Bonds remaining outstanding after such redemption, or (ii) that the System has been restored to a condition substantially equivalent to its condition prior to the occurrence of such damage, injury or condemnation, and that continued operation of the System will not, in the signer's opinion, adversely affect the security of the Bonds remaining outstanding after such redemption. For purposes of this Section 7.10, the term Consulting Engineer shall also include an employee of the City or the Authority who is otherwise qualified to act as Consulting Engineer under this Indenture.

Section 7.11 Employment of Consulting Engineer; Reports. The Authority will employ a Consulting Engineer to perform such duties as are imposed on the Consulting Engineer by the provisions of this Indenture.

It shall be the duty of the Consulting Engineer, in addition to the other duties prescribed elsewhere in this Indenture, to prepare and file with the Authority and with the Trustee

on or before thirty days prior to the beginning of each Fiscal Year thereafter, a report setting forth the following:

(a) Advice and recommendations as to the proper maintenance, repair and operation of the System during the next Fiscal Year and an estimate of the amounts of money that should be expended for such purposes;

(b) Advice and recommendations as to the Capital Additions that should be made during the next Fiscal Year, and an estimate of the amount of money that is recommended for such purposes; and

(c) Whether the properties of the System have been maintained in good repair and sound operating condition and the Consulting Engineer's estimate of the amount, if any, required to place such properties in such condition and the details of such expenditures and the approximate time required therefor.

Section 7.12 Adoption of Annual Budget. The Authority covenants that it will on or before each December 31, prior to the beginning of each Fiscal Year thereafter, prepare and adopt a budget of Current Expenses for the next Fiscal Year, which budget shall contain an estimate of the Revenues to be derived for the period covered by such budget, and a copy of such budget shall be promptly filed with the Trustee and each Bond Insurer. Any budget may be amended from time to time by the Authority and such amended budget shall be promptly filed with the Trustee and each Bond Insurer. The annual budget shall also be filed, if and when required under a Continuing Disclosure Undertaking, with the EMMA system of the MSRB. Filing of the annual budget with EMMA and placement of the annual budget on the Authority's website with notice provided to the Trustee and Bond Insurer will constitute compliance with this section.

Until the adoption of the annual budget of Current Expenses for a particular Fiscal Year, the budget for the preceding Fiscal Year shall be deemed to be in force for such particular Fiscal Year.

Section 7.13 Maintenance of System. The Authority will at all times maintain or cause to be maintained the System and every part thereof in good repair, working order and condition, will continuously operate the same and will, from time to time, make or cause to be made all needful and proper repairs, renewals and replacements so that the aggregate efficiency and capacity of the System shall at no time be unreasonably impaired or reduced.

Section 7.14 Employment of Independent Auditor; Annual Financial Report. Authority covenants that it has employed and will continue to employ an Independent Auditor to perform such duties as are imposed on the Independent Auditor by this Indenture.

The Authority has caused an accurate system of accounts to be installed as recommended by its Independent Auditor. The Authority will keep proper books of record and accounts in which complete and correct entries shall be made of all its dealings and transactions in accordance with generally accepted accounting principles, consistently applied. On or before May 1 of each year, the Authority will furnish to the Trustee and each Bond Insurer, and to any Holder of any of the Bonds, at the written request of such Holder, a copy of its audit report for the preceding Fiscal Year. The Authority shall also file said audit report, if and when required under

a Continuing Disclosure Undertaking, with the EMMA system of the MSRB. Filing of said audit with EMMA and placement of said audit on the Authority's website with notice provided to the Trustee and Bond Insurer will constitute compliance with this section. Said audit report shall, in each instance, have been prepared by an Independent Auditor after having made an audit of the Authority's books and accounts pertaining to the System for such year and shall include therein for the year in question a statement as to whether the schedule of rates then in effect complies with the covenants contained in Section 7.01.

Section 7.15 Advances by Trustee. If the Authority shall fail to perform any of the covenants contained in this Article, the Trustee or any Bondholder through the Trustee may, but has no duty to, make advances to perform the same on behalf of the Authority, but shall be under no duty so to do; and all sums so advanced shall be at once repayable by the Authority and shall bear interest at the Prime Rate until paid, and shall be secured hereby, having the benefit of a lien hereby created on a parity with the Bonds, but no such advances shall be deemed to relieve the Authority from any default hereunder.

Section 7.16 Further Assurances. The Authority shall execute and deliver such further instruments and do such further acts as may be necessary or proper to carry out more effectually the purposes of this Indenture and the transfer to any new trustee of the estate, powers, instruments or funds held in trust hereunder. The Authority shall, on an ongoing basis, execute and deliver all documents and make or cause to be made all filings and recordings necessary or desirable in order to perfect, preserve and protect the interest of the Trustee in the Trust Estate to the extent possible under applicable law. The Trustee shall not be responsible for and makes no representation as to the legality, effectiveness or sufficiency of any security document or for the creation, perfection, priority or protection of any lien securing the Bonds. The Trustee shall not be responsible for filing any financing or continuation statement or recording any documents or instruments in any public office at any time or otherwise for perfecting or maintaining the perfection of any lien or security interest in the trust estate it being understood that the Authority shall be obligated to make such filings on behalf of the Trustee and provide a copy of the filed initial financing statement to the Trustee.

Section 7.17 Construction of Construction Projects; Operation of System. The Authority covenants that upon the completion of any Construction Project it will operate and maintain the same as a part of the System. The Authority further covenants that it will operate the System in an efficient and economical manner.

Section 7.18 Covenant Against Encumbrances. The Authority further covenants that it will duly observe and comply with all valid requirements of any governmental authority relative to the System, that it will not create or suffer to be created any lien or charge upon the System or any part thereof, other than as provided in this Indenture, and that it will pay or cause to be discharged, or will make adequate provision to satisfy and discharge all lawful claims and demands for labor, materials, supplies or other objects which, if unpaid, might by law become a lien upon the System or any part thereof or the Revenues; provided, however, that nothing contained in this Section shall require the Authority to pay or cause to be discharged, or make provisions for, any such lien or charge so long as the validity thereof shall be contested in good faith and by appropriate legal proceedings.

Section 7.19 Use of Revenues. The Authority covenants and agrees that, so long as any of the Bonds secured hereby shall be Outstanding, none of the Revenues will be used for any purpose other than as provided in this Indenture, and that no contract or contracts will be entered into or any action taken to impair or diminish the rights of Holders of the Bonds.

Section 7.20 No Free Service. Except as provided in Section 7.01 hereof, the Authority will not render or cause to be rendered any free services of any nature by the facilities of the System nor will any preferential rates be established for users of the same class, excluding (a) as provided in the Cooperation Agreement, the rates, fees or charges for services rendered to the City including its departments, agencies and instrumentalities and the Authority's reimbursement of the City for equalization payments made by the City to a private utility which serves customers in a portion of the City, and (b) the provision to several municipalities of conveyance without charge of storm water and sanitary sewer flows through Authority trunk lines to the Allegheny County Sanitary Authority.

Section 7.21 Failure of Customers to Pay; Enforcement of Collections. The Authority will diligently enforce and collect the rates, fees and other charges from customers for the services of the System; will take all steps, actions and proceedings for the enforcement and collections of such rates, fees and charges as shall become delinquent to the full extent permitted or authorized by law; and will maintain accurate records with respect thereto. All such rates, fees, charges and revenues herein pledged shall, as collected, be held in trust to be applied as provided in this Indenture and not otherwise.

Section 7.22 Covenants with Bond Insurers, Letter Credit Banks, Liquidity Facility Issuer, etc. The Authority may make such covenants and agreements in a Supplemental Indenture and related documents as it may determine to be appropriate with any Bond Insurer, Letter of Credit Bank, Liquidity Facility Issuer, or other financial institution that agrees to insure or to provide credit or liquidity support to enhance the security or the value of any Bonds.

Section 7.23 Internal Revenue Code and Other Covenants. The Authority hereby covenants with the registered Owners, from time to time, of the Bonds that no part of the proceeds of the Bonds or of any moneys on deposit with the Trustee hereunder will be used, at any time, directly or indirectly, in a manner which, if such use had been reasonably expected on the date of issuance of the Bonds, would have caused the Bonds to be arbitrage bonds within the meaning of Section 148 of the Code, and that it will comply with the requirements of that section and the regulations throughout the term of the Bonds. In the event the Authority is of the opinion that is necessary to restrict or limit the yield on the investment of any moneys paid to or held by the Trustee to comply with the covenants herein set forth, the Authority shall issue to the Trustee a written certificate to such effect, with appropriate instructions, and the Trustee shall thereupon take such action in accordance with such certificate and instructions. The Authority's covenants set forth in any Tax Regulatory Certificate are incorporated herein.

ARTICLE VIII

EVENTS OF DEFAULT AND REMEDIES

Section 8.01 Events of Default. Each of the following events is hereby declared an "Event of Default" for any Bond issued hereunder:

(a) failure by the Authority to pay the principal of, or the premium (if any) payable upon the redemption of, any Bond when due and payable either at maturity, declaration, or by proceedings for redemption, or otherwise (no effect being given to payments made under a Bond Insurance Policy); or

(b) failure by the Authority to pay any installment of interest on any Bond when due and payable (no effect being given to payments made under a Bond Insurance Policy); or

(c) the entry of an order or decree appointing a receiver or receivers of the System or of the Revenues with the consent or acquiescence of the Authority, or, if such order or decree shall have been entered without the acquiescence or consent of the Authority, the failure of the Authority to cause such order or decree to be vacated or discharged or stayed on appeal within ninety (90) days after entry; or

(d) the institution of any proceeding with the consent or acquiescence of the Authority for the purpose of effecting a composition between the Authority and its creditors, or for the purpose of adjusting the claims of such creditors pursuant to any Federal or Commonwealth statute now or hereafter enacted, if the claims of such creditors are under any circumstances payable out of the Revenues, or if such proceeding shall have been instituted without the consent or acquiescence of the Authority, the failure of the Authority to have such proceeding withdrawn, or any order entered therein vacated or discharged, within ninety (90) days after the institution of such proceeding or the entry of such order; or

(e) the entry of a final judgment against the Authority, which judgment constitutes or could result in a lien or charge upon the System or the Revenues, or which materially and adversely affects the ownership, control or operation of the System, if such judgment shall not be discharged within ninety (90) days from the entry thereof, or if an appeal shall not be taken therefrom, or from the order, decree or process upon which or pursuant to which such judgment was granted or entered, in such manner as to conclusively set aside the execution or levy under such judgment, order, decree or process, or the enforcement thereof; or

(f) the failure or refusal of the Authority to comply with any provisions of the Act applicable to the Authority, or the rendering of the Authority, for any reason, incapable of fulfilling its obligations hereunder or thereunder; or

(g) the failure of the Authority to observe any other covenant, condition or agreement of the Authority contained in the Bonds or in this Indenture and the continuation of such failure for a period of sixty (60) days after written notice of such failure from the Trustee, which may give such notice in its discretion and shall give such notice at the written request of the Holders of not less than twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then outstanding, provided that, the failure of the Authority to meet the rate covenant set forth in Section

7.01 hereof shall not constitute an Event of Default hereunder, and provided further that if such failure is not capable of being remedied within sixty (60) days after such notice, no Event of Default shall exist if the Authority commences the actions necessary for the cure of such failure within such sixty (60) day period and diligently pursues such actions thereafter; or

(h) failure by the Authority to pay principal of, or the premium (if any) payable upon the redemption of any Subordinate Debt when due and payable either at maturity, or otherwise or to pay any installment of interest on any Subordinate Debt when due and payable (no effect being given to payments made under a Bond Insurance Policy); or

(i) the Trustee shall have received written notice from a Letter of Credit Bank that an Event of Default shall have occurred under the Reimbursement Agreement, with a direction from the Letter of Credit Bank to the Trustee to accelerate the principal and interest on the respective Series of Bonds secured by such Letter of Credit Bank's Letter of Credit; or

(j) any acceleration of the payment of principal of any Series of Bonds or the payment of Reimbursement Obligations pursuant to Section 8.02 shall have occurred; or

(k) failure by the Authority to pay the principal of any Reimbursement Obligation when due or within any applicable grace period, if any, set forth in the applicable Reimbursement Agreement; or

(l) failure by the Authority to pay any installment of interest on any Reimbursement Obligation when due or within any applicable grace period, if any, set forth in the applicable Reimbursement Agreement.

The Trustee shall (i) provide immediate notice to each Bond Insurer of the occurrence of an Event of Default under clause (a), (b), (i) or (j) above and (ii) provide notice to each Bond Insurer of any other Event of Default known to the Trustee within thirty (30) days of the Trustee's knowledge thereof.

Section 8.02 Acceleration of Principal. Upon the occurrence and continuance of any Event of Default described in Section 8.01, the Trustee may, and at the written request of Bondholders of not less than 25% in Principal Amount of the Bonds then Outstanding, shall by written notice to the Authority, declare the Bonds to be immediately due and payable, whereupon they shall, without further action, become and be immediately due and payable, anything in this Indenture or in the Bonds to the contrary notwithstanding, and the Trustee shall give notice thereof to the Authority and shall give notice thereof by certified mail to all Holders of Outstanding Bonds.

A Bond Insurer or a Letter of Credit Bank securing a Series of Bonds, provided the Bond Insurer or Letter of Credit Bank is not in default under its Bond Insurance Policy or Letter of Credit, may exercise all rights of the Bondholders of such Series under this Article VIII, including without limitation giving notice, making a request, giving a direction or giving a waiver under Section 8.01(g), Section 8.02, Section 8.03, Section 8.04 and Section 8.08. That is, the Bond Insurer or Letter of Credit Bank may, in such cases, vote the Bonds of the Bondholders of the Series secured by such Bond Insurer or Letter of Credit Bank, as the case may be. If a Series of Bonds is both insured by a Bond Insurance Policy and secured by a Letter of Credit, the Bond

Insurer shall exercise such rights not the Letter of Credit Bank. In any such cases, the Trustee shall not take direction by the Owners of the Bonds of such Series.

In addition, the Trustee shall be entitled to exercise any or all of the remedies granted to a trustee or under a Bond Insurance Policy, a Credit Facility or the Act.

The above provision, however, is subject to the condition that if, after the principal of said Bonds shall have been so declared to be due and payable, all arrears of interest, if any, upon the Bonds and interest on overdue installments of interest at the rate of interest specified therein, and the principal of all Bonds which have matured other than by reason of such declaration, shall have been paid by the Authority, and the Authority shall also have performed all other things in respect to which it may have been in default hereunder, and shall have paid the reasonable charges of the Trustee and its counsel and of the Holders of said Bonds, including reasonable attorneys' fees paid or incurred, then, and in every such case, the Holders of not less than a majority in aggregate Principal Amount of the Bonds then outstanding, by written notice to the Authority and to the Trustee, may waive such default and its consequences and such waiver shall be binding upon the Trustee and upon all Holders of Bonds issued hereunder; but no such waiver shall extend to or affect any subsequent default or impair any rights or remedy consequent thereon.

Section 8.03 Remedies of Trustee and Bondholders; Rights of Entry. Subject to Sections 8.02 and 9.06, upon the happening and during the continuance of any event of default specified in Section 8.01, then and in every such case, the Trustee may and, upon written request of the Holders of not less than twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then Outstanding, shall enter into and upon and take possession of the System and each and every part thereof as for a condition broken and may exclude the Authority, its agents and employees and all persons claiming under them wholly therefrom and have, hold, use, operate, manage and control the same and each and every part thereof, and in the name of the Authority or otherwise as the Trustee shall deem best, conduct the business thereof and exercise all the rights and powers of the Authority with respect to the System and use all its then existing property, assets and franchises for that purpose and out of the Revenues, maintain, restore, insure and keep insured, the System against such hazards as are ordinarily insured against by a person operating a water, stormwater and sewer system similar to the System and from time to time may make all such necessary or proper repairs as to it may seem expedient, and establish, levy, maintain and collect such rates, rents and charges in connection with the System as it may deem necessary, proper, desirable and reasonable, and collect and receive all Revenues, and after deducting therefrom the expenses of operation, maintenance and repair and all expenses incurred hereunder and all other proper outlays herein authorized and all such payments which may be made for insurance and other proper charges, including just and reasonable compensation for its own services, and for the services of such attorneys, agents and employees as it may, in the exercise of its discretion, employ for any of the purposes aforesaid, the Trustee shall apply the rest and residue of the moneys received by it, as well as all cash and investments held by the Trustee in any fund hereunder, subject to the provisions hereof with respect to claims for principal and interest, to the payment of the principal of and interest on the Bonds. Whenever all that is due upon such Bonds and installments of interest and under any of the terms of this Indenture shall have been paid or deposited with the Trustee and all defaults made good, the Trustee in possession shall surrender possession to the Authority, its successors or assigns. However, the same right of entry shall exist upon any subsequent default or defaults.

Section 8.04 Judicial Action. In case of the breach of any of the covenants or conditions of this Indenture, the Trustee shall have the right and power to take appropriate judicial proceedings for the enforcement of its rights and the rights of the Bondholders hereunder, including, as appropriate, an action in mandamus. Upon the happening of an event of default hereunder, the Trustee may either after entry, or without entry, proceed by suit or suits, actions or special proceedings at law or in equity to enforce its rights and the rights of the Bondholders hereunder, and it shall be obligatory upon the Trustee to take action to that end, either by such proceedings or by the exercise of its powers with respect to entry or otherwise, as it may determine, upon being requested to do so by the Holders of twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then Outstanding hereunder and upon being indemnified as hereinafter provided.

No remedy by the terms of this Indenture conferred upon or reserved to the Trustee or to the Bondholders is intended to be exclusive of any other remedy, but each and every such remedy shall be cumulative and shall be in addition to any other remedy given hereunder or now or hereafter existing at law or in equity or by statute.

The Holders of a majority in aggregate Principal Amount of the Bonds then Outstanding hereunder, at any time, by an instrument in writing executed and delivered to the Trustee, may reasonably direct the method and place of conducting all proceedings to be taken for the enforcement of any of the rights of the Bondholders; provided that such direction shall not be otherwise than in accordance with the provisions of law or of this Indenture.

Section 8.05 Payments by Authority. The Authority covenants that if any default shall be made in the payment of the principal of or interest on any Bond hereby secured when the same shall become payable, the Authority will pay to the Trustee, upon demand, for the benefit of the Holders of the Bonds so in default, the whole amount then due and payable for principal and interest, with interest upon the overdue principal and upon the overdue installments of interest at the rate of interest specified in the Bonds from the date of default to the date of payment; and in case the Authority shall fail to pay the same forthwith upon such demand, the Trustee in its own name and as trustee of an express trust shall be entitled to sue for and to recover judgment for the whole amount so due and unpaid.

Section 8.06 Application of Moneys. Any moneys received by the Trustee or by any receiver from the operation of the System, shall, after payment of the costs and expenses of the operation thereof, be applied,

First: to the payment of the fees, counsel fees and expenses of the Trustee and of the receivers, if any, and all costs and disbursements allowed by the court, if there be any court action.

Second: to the payment of the whole amount of principal and interest which shall then be owing or unpaid upon the Bonds, or to the payment of the whole amount of any Reimbursement Obligations which shall then be owing or unpaid, then to the payment of such principal and interest or Reimbursement Obligations ratably, without preference or priority of principal over interest or Reimbursement Obligations, Reimbursement Obligations over principal or interest or of interest over principal or Reimbursement Obligations or of any installment of

interest over any other installment of interest and without preference or priority of any such payments over Periodic Payments (such principal and interest on Bonds, amounts owing under Reimbursement Obligations and Periodic Payments to be paid ratably).

Third: to the payment of the surplus, if any, to the Authority, or to whoever is lawfully entitled to receive the same or as a court of competent jurisdiction may direct.

Section 8.07 Trustee's Rights. Any right of action under this Indenture, or under any of the Bonds, may be enforced by the Trustee without the possession of any of the Bonds or the production thereof on any trial or other proceedings relative thereto and any such suit or proceeding instituted by the Trustee shall be brought in its name as Trustee and any recovery of judgment shall be for the equal benefit of the registered Owners of the Bonds in respect of which such judgment shall have been recovered, subject to the provisions hereof with respect to extended claims for interest.

Section 8.08 Limitations on Bondholders. No Holder of any Bonds shall have any right to institute any suit, action, or proceeding in equity or at law for the enforcement of this Indenture or for the execution of any trust hereof or for the appointment of a receiver or to exercise any other remedy hereunder, unless such Holder shall have previously given to the Trustee written notice of an event of default and of the continuance thereof as hereinbefore provided nor unless also the Holders of at least twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then Outstanding hereunder shall have made written request of the Trustee and shall have offered it reasonable opportunity either to proceed to exercise the powers hereinbefore granted or to institute such action, suit or proceeding in its own name nor unless also they shall have offered to the Trustee adequate security and indemnity against the costs, expenses and liability to be incurred therein or thereby; and such notification, request and offer of indemnity are hereby declared in every such case at the option of the Trustee to be conditions precedent to the execution of the powers and trusts of this Indenture or for the appointment of a receiver or for any other remedy hereunder; it being understood and intended that no one or more holders or registered Owners of the Bonds shall have any right in any manner whatsoever to affect, disturb or prejudice the lien of this Indenture by his own or their action or to enforce any right hereunder except in the manner herein provided, and that all such proceedings at law or in equity shall be instituted, had and maintained in the manner herein provided and for the benefit of all Holders of outstanding Bonds, subject to the provisions hereof with respect to claims for interest.

Subject to the following paragraph, nothing in this Article shall, however, affect or impair the right of any Bondholder which is absolute and unconditional, to enforce the payment of the principal and interest of such Bondholder's Bonds, or the obligation of the Authority which is also absolute and unconditional, to pay the principal of and interest on each of the Bonds issued hereunder to the respective holders or registered Owners thereof at the time and place in said Bonds expressed.

Section 8.09 Waiver by Authority. The Authority may waive any period of grace provided for in this Article.

Section 8.10 Waiver of Default; Delay or Omission of Trustee. No waiver of any default hereunder, whether by the Trustee, a Bond Insurer or the Bondholders shall extend to or

shall affect any subsequent default or shall impair any rights or remedies consequent thereon. No delay or omission of the Trustee, a Bond Insurer or of any Holders of Bonds hereby secured to exercise any right or power accruing upon any default shall impair any such right or power or shall be construed to be a waiver of any such default, or acquiescence therein; and every right, power and remedy given by this Indenture to the Trustee, a Bond Insurer or to the Bondholders may be exercised from time to time and as often as may be deemed expedient by the Trustee, the Bond Insurer or in an appropriate case, by the Bondholders.

In case the Trustee shall have proceeded to enforce any right under this Indenture by entry or otherwise, and such proceedings shall have been discontinued or abandoned for any reason, or shall have been determined adversely to the Trustee, then and in every such case the Authority and the Trustee shall be restored to their former positions and rights hereunder with respect to the pledged revenues, and all rights, remedies and powers of the Trustee shall continue as if no such proceedings had been taken.

Section 8.11 Appointment of Receiver. Subject to Section 8.02, as provided by the Act, as amended, the Trustee shall be entitled as a matter of right to the appointment of a receiver, and the Trustee, the Bondholders, the Bond Insurer of any Bonds, any receiver so appointed and any Letter of Credit Bank then supporting any Series of Bonds with a Letter of Credit shall have all such rights and powers and shall be subject to such limitations and restrictions as are contained in the Act.

Section 8.12 Limitation on Rights to Transfer. It is expressly understood and agreed that nothing in the provisions of the Bonds or in this Indenture shall be taken to authorize the Trustee, or any receiver appointed hereunder to operate and maintain the System, or to sell, assign, mortgage or otherwise dispose of any of the assets of whatever kind and character belonging to the Authority.

Section 8.13 Issuer of Bond Insurance Policy as Subrogee of Holders of Bonds. Any Bond delivered to the Bond Insurer pursuant to the Bond Insurance Policy shall be deemed to continue to be Outstanding under and secured by this Indenture.

ARTICLE IX

CONCERNING THE TRUSTEE

Section 9.01 Acceptance of Trust. The Trustee shall, prior to an Event of Default, and after the curing of all Events of Default which shall have occurred, perform such duties and only such duties as are specifically set forth in this Indenture and shall not be liable except for the performance of such duties and obligations as are specifically set forth in this Indenture, and no implied covenants or obligations shall be read into this Indenture against the Trustee, as the case may be. The Trustee shall, during the existence of any Event of Default (which has not been cured), exercise such of the rights and powers vested in it by this Indenture, and use the same degree of care and skill in their exercise, as prudent persons would exercise or use under the circumstances in the conduct of their own affairs. The Trustee shall not be liable to the parties hereto or deemed in breach or default hereunder if and to the extent its performance hereunder is prevented by reason of force majeure. The term "force majeure" means an occurrence that is beyond the control of the

Trustee and could not have been avoided by exercising due care. Force majeure shall include acts of God, terrorism, war, riots, strikes, floods, earthquakes, epidemics or other similar occurrences.

Section 9.02 Responsibility for Statements in Indenture or Bonds. The recitals of fact herein and in the Bonds contained, except only the Trustee's certificate of authentication upon the Bonds, shall be taken as the statements of the Authority and the Trustee assumes no responsibility for the correctness of the same. The Trustee makes no representations as to the validity or sufficiency of this Indenture or the due execution or acknowledgment thereof on the part of the Authority or in respect of the Bonds issued hereunder, and the Trustee shall incur no responsibility in respect of such matter.

Section 9.03 Maintenance of Insurance. The Trustee shall be under no obligation to effect or maintain insurance or to renew any policies of insurance or to inquire as to the adequacy of any insurance or for responsibility of insurers, or to report, make or file claims or proofs of loss for any loss or damage insured against or which may occur or to keep itself advised or informed as to the payment of any insurance premiums, taxes or assessments or to see to or require such payment to be made nor shall the Trustee be under any liability for the failure of the Authority to effect or renew any insurance; but the Trustee may, in its discretion, do any or all of the matters and things in this Section set forth, or require the same to be done.

Section 9.04 Disposition of Bonds and Proceeds. The Trustee shall be under no responsibility or duty with respect to the disposition of the Bonds authenticated and delivered hereunder or the application of the proceeds of any of the Bonds or of any other moneys deposited with it and withdrawn in the manner provided in this Indenture.

Section 9.05 Agents of Trustee; Responsibility for Default of Agents. The Trustee may execute any of the trusts or powers hereof and perform any duty hereunder by or through its attorneys or agents, and it shall not be answerable or accountable for any act, default, neglect or misconduct of any such attorney or agent, if reasonable care has been exercised in his appointment and retention, nor shall the Trustee be otherwise answerable or accountable under any circumstances whatever in connection with the Trust, except for its own gross negligence or willful misconduct.

Section 9.06 Indemnity; No Duty to Notice Default. The Trustee shall be under no obligation or duty to perform any act which would involve it in expense or liability or to institute or defend any suit in respect hereof unless properly indemnified against such expense or liability to its satisfaction. The Trustee shall not be required to take notice, or be deemed to have knowledge, of any default of the Authority hereunder, except a default pursuant to Section 8.01(a) or (b), and may conclusively assume that there has been no such default unless and until it shall have been specifically notified in writing of such default by the Authority or the Holders of not less than twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then Outstanding hereunder. The Trustee shall provide each Bond Insurer with immediate notice of a default pursuant to Section 8.01(a) or (b) and, within thirty (30) days of the Trustee's knowledge thereof, any other default known to the Trustee. The Trustee shall not be under any obligation to take any action in respect of any default or otherwise, or to institute, appear in or defend any suit or other proceeding in connection therewith or to ascertain or inquire as to the performance of any of the covenants or agreements herein contained on the part of the Authority, unless requested in

writing so to do by the Holders of not less than twenty-five per centum (25%) in aggregate Principal Amount of the Bonds then Outstanding hereunder and indemnified to its satisfaction but this provision shall not affect any discretionary power herein given to the Trustee. The Trustee shall, however, take actions pursuant to Section 13.02 hereof, as required therein.

The foregoing provisions are intended only for the protection of the Trustee, and shall not affect any discretion or power given by any provision of this Indenture to the Trustee to take action in respect to any default without such notice or request from the Bondholders or without such security or indemnity. The Trustee may, at any time in its discretion, require of the Authority full information and advice as to the performance of any of the covenants, conditions and agreements, and may further make or cause to be made independent investigations at the expense of the Authority, concerning the affairs of the Authority insofar as such affairs are related to the System.

Section 9.07 Right to Rely Upon Documents. The Trustee shall be protected and shall incur no liability in relying, acting or proceeding in good faith upon any notice, resolution, request, consent, order, certificate, report, opinion, bond, telephonic notice, facsimile transmission, waiver, statement, affidavit, voucher, appraisal, application or other paper or document believed by it to be genuine and to have been signed, passed or presented by the proper person or authority, or to have been prepared and furnished pursuant to the provisions of this Indenture, and before acting upon any of the same the Trustee shall not be bound to make any investigation into the matters stated therein.

The Trustee may consult with legal counsel to be selected and employed by it and the opinion of such counsel shall be full and complete authorization and protection in respect of any action taken or suffered by it hereunder in good faith and in accordance with the opinion of such counsel.

The Trustee shall not be bound to recognize any person as the Holder of a Bond Outstanding hereunder unless and until his Bond is submitted to the Trustee for inspection, if required, and his title thereto satisfactorily established, if disputed.

Whenever in the administration of the trusts imposed upon it by this Indenture the Trustee shall deem it necessary or desirable that a matter be proved or established prior to taking or suffering any action hereunder, such matter (unless other evidence in respect thereof be herein specifically prescribed) may be deemed to be conclusively proved and established by a certificate of the Authority, and such certificate shall be full warrant to the Trustee for any action taken or suffered in good faith under the provisions of this Indenture in reliance upon such Certificate, but in its discretion the Trustee may, in lieu thereof, accept other evidence of such matter or may require such additional evidence as it may deem reasonable.

Any action taken, or omitted to be taken, by the Trustee in good faith pursuant to this Indenture upon the request or authority or consent of any person who, at the time of making such request or giving such authority or consent, is a Bondholder, shall be conclusive and binding upon all future Bondholders and upon Bonds executed and delivered in exchange therefore or in place thereof. The permissive right of the Trustee to do things enumerated in this Indenture shall not be construed as a duty.

The Trustee shall have no responsibility, opinion or liability with respect to any information statement or recital found in any official statement or other disclosure material, prepared or distributed with respect to the issuance of the Bonds, except for information provided by the Trustee.

Section 9.08 Trustee Compensation; Indemnification of Trustee. The Authority shall, out of the Revenues, pay to the Trustee, from time to time, reasonable compensation for all services rendered hereunder, and shall also reimburse the Trustee for all of its reasonable expenses, charges and other disbursements and those of its attorneys, agents and employees, incurred in and about the administration and execution of the trusts hereby created, and the performance of its powers and duties hereunder, and the Trustee shall have a lien on the Revenues therefor, prior and superior to the lien of the Bonds issued hereunder. The Authority further covenants and agrees to protect, exonerate, defend, indemnify and save the Trustee and its officers, directors, employees and agents (collectively, the "Indemnitees") harmless from and against any and all liabilities, losses, damages, fines, suits, actions, demands, penalties, costs and expenses, including out-of-pocket, incidental expenses, legal fees and expenses, the allocated costs and expenses of in-house counsel and legal staff and the costs and expenses of defending or preparing to defend against any claim ("Losses") that may be imposed on, incurred by, or assessed against, the Indemnitees or any of them for following any instruction or other direction upon which the Trustee is authorized to rely pursuant to the terms of this Indenture. In addition to and not in limitation of the immediately preceding sentence, the Authority also covenants and agrees to indemnify and hold the Indemnitees and each of them harmless from and against any and all Losses that may be imposed on, incurred by, or asserted against the Indemnitees or any of them in connection with or arising out of the Trustee's performance, as applicable, under the Indenture provided that such party has not acted with negligence or engaged in willful misconduct. The provisions of this Section shall survive the termination of this Indenture and the resignation or removal of the Trustee.

Section 9.09 Trustee's Right to Make Advances. If the Authority shall fail to perform any of the covenants or agreements contained in this Indenture, the Trustee may, in its discretion and without notice to the Bondholders, at any time and from time to time, make advances to effect performance of the same on behalf of the Authority, but the Trustee shall be under no obligation so to do; and any and all moneys paid or advanced by the Trustee for any such purpose, together with interest thereon at the rate equal to 102% of the Prime Rate in effect at the time of such advance, shall be a lien in favor of the Trustee upon the Revenues prior and superior to the lien of the Bonds issued hereunder; but no such advance shall operate to relieve the Authority from any default hereunder. Nothing herein shall be construed to require the Trustee to expend its own funds.

Section 9.10 Right to Own and Deal in Bonds. The Trustee may become the Owner of Bonds issued hereunder and secured hereby, with the same rights it would have if it were not Trustee. The Trustee may also engage in, or be interested in any financial or other transaction with the Authority and may act as depositary for and permit any of its officers or directors to act as a member of, or in any other capacity with respect to, any committee formed to protect the rights of Bondholders or to effect or aid any reorganization growing out of the enforcement of the Bonds or this Indenture, whether or not any such committee shall represent the Holders of a majority in Principal Amount of the Bonds Outstanding hereunder.

Section 9.11 Construction of Provisions of Indenture. The Trustee may construe any of the provisions of this Indenture insofar as the same may appear to be ambiguous or inconsistent with any other provisions hereof; and any construction of any such provisions hereof by the Trustee in good faith shall be binding upon the Bondholders.

Section 9.12 Resignation or Replacement of Trustee. The Trustee may resign on its motion or may be removed at any time by an instrument or instruments in writing signed by (1) the Authority, provided no Event of Default has occurred and is continuing or (2) the Holders of not less than fifty percent (50%) of the Principal Amount of Bonds then Outstanding, if an Event of Default has occurred and is continuing, provided no Event of Default has occurred and is continuing. No such resignation or removal shall become effective unless and until a successor Trustee (or temporary successor trustee as provided below) has been appointed and has assumed the trusts created hereby. Written notice of such resignation or removal shall be given to each Holder of a Bond then Outstanding to the address then reflected on the books of the Trustee and such resignation or removal shall take effect upon the appointment, qualification and acceptance of a successor Trustee. A successor Trustee may be appointed at the direction of the Authority, or if the Authority shall fail to appoint a successor Trustee, a successor Trustee may be appointed at the direction of the Holders of not less than fifty percent (50%) in aggregate Principal Amount of Bonds Outstanding. In the event a successor Trustee has not been appointed and qualified within sixty (60) days of the date notice of resignation or removal is given, the Trustee or any Bondholders may apply to any court of competent jurisdiction for the appointment of a temporary successor Trustee to act until such time as a successor is appointed as above provided. No resignation or removal of the Trustee shall be effective until a successor has been appointed and has accepted the duties of the Trustee hereunder.

Every successor shall always be a bank or trust company in good standing, qualified to act hereunder, and having a combined capital, surplus and undivided profits of not less than Fifty Million Dollars (\$50,000,000). Any successor appointed hereunder shall execute, acknowledge and deliver to the Authority an instrument accepting such appointment hereunder, and thereupon such successor shall, without any further act, deed or conveyance, become vested with all the estates, properties, rights, powers and trusts of its predecessor in the trust hereunder with like effect as if originally named as Trustee herein; but the Trustee retiring shall, nevertheless, on the written demand of its successor, execute and deliver an instrument conveying and transferring to such successor, upon the trusts herein expressed, all the estates, properties, rights, powers and trusts of the predecessor, who shall duly assign, transfer and deliver to the successor all properties and moneys held by it under this Indenture. Should any instrument in writing from the Authority be required by any successor for more fully and certainly vesting in and confirming to it all of such estates, properties, rights, powers and trusts, the Authority shall, on request of such successor, make, execute, acknowledge and deliver the deeds, conveyances and necessary instruments in writing.

The notices herein provided for shall be given by mailing a copy thereof to the registered Owners at their addresses as the same shall last appear on the Bond register. A copy shall be provided to each Bond Insurer.

The instruments evidencing the resignation or removal of the Trustee and the appointment of a successor hereunder together with all instruments provided for in this Section

shall be filed and/or recorded by the successor Trustee in each recording office, if any, where this Indenture shall have been filed and/or recorded.

Section 9.13 Successor Trustee by Merger. Any bank or trust company having power to execute the trusts of this Indenture and otherwise qualified to act as Trustee hereunder, with or into which the Trustee may be merged or consolidated or any such bank or trust company resulting from any merger or consolidation to which the Trustee shall be a party, shall be the successor trustee under this Indenture, without the execution or filing of any paper or the performance of any further act on the part of any other parties hereto, anything herein to the contrary notwithstanding.

Section 9.14 Appointment of Paying Agent. The Authority may appoint a successor Paying Agent or a co-paying agent at any time upon written notice to each Bond Insurer and the Trustee.

Section 9.15 Trustee to Notify S&P and Moody's. The Trustee hereby agrees to notify S&P and Moody's of (i) any change of the Trustee, (ii) any change in the Bond Insurance Policy, and (iii) any mandatory redemption of Bonds other than mandatory sinking fund redemption. Notices shall be sent to Moody's Investors Service, 7 World Trade Center, 250 Greenwich Street, New York, New York 10007, Attention: Municipal Department/Structured Finance Group.

ARTICLE X

CONCERNING THE HOLDERS OF THE BONDS

Section 10.01 Execution of Instruments. Whenever in this Indenture it is provided that the Holders of a specified percentage or a majority of the Bonds Outstanding hereunder may take any action (including the making of any demand or request, the giving of any notice, consent or waiver or the taking of any other action) the fact that at the time of taking any such action the Holders of such specified percentage or majority have joined therein may be evidenced by any instrument or any number of instruments of similar tenor executed by Bondholders in person or by agent or proxy appointed in writing.

Section 10.02 Proof of Ownership. Subject to the provisions of Article IX, proof of the execution of any instrument by a Bondholder or his agent or proxy and proof of the holding by any persons of any of the Bonds shall be sufficient if made in the following manner:

(1) The fact and date of the execution by any such persons of any instrument may be proved by the certificate of any notary public or other officer authorized to take acknowledgments of deeds to be recorded in any State within the United States, that the person executing such instrument acknowledged to him the execution thereof, or by an affidavit of a witness to such execution sworn to before any such notary or other such officer; and

(2) The ownership of Bonds may be proved by the registration books for such Bonds maintained by the Authority at the Principal Office of the Trustee.

The Trustee and any Paying Agent may require such additional proof of any matter referred to in this Section as it shall deem necessary or may accept such other proof as it may deem appropriate.

ARTICLE XI

AMENDMENTS AND MODIFICATIONS

Section 11.01 Waivers and Supplemental Indentures Not Requiring Consent of Bondholders. In addition to any Supplemental Indenture otherwise authorized by this Indenture, the Authority, and the Trustee may, from time to time and at any time, enter into such indentures or agreements supplemental hereto as shall not be inconsistent with the terms and provisions hereof and which shall not adversely affect the rights of the Holders of the Bonds Outstanding hereunder (which supplemental indentures or agreements shall thereafter form a part thereof) for the following purposes:

- (a) to cure any ambiguity, formal defect or omission in this Indenture or any Supplemental Indenture; or
- (b) to grant or confer upon the Trustee for the benefit of the Bondholders any additional rights, remedies, powers, authority or security that may lawfully be granted to or conferred upon the Bondholders, or the Trustee; or
- (c) to add to the covenants and agreements of the Authority in this Indenture contained, other covenants and agreements thereafter to be observed, or to surrender any right or power herein reserved to or conferred upon the Authority; or
- (d) to modify any of the provisions of this Indenture or to relieve the Authority of any of the obligations, conditions or restrictions contained in this Indenture, provided that such modification or relief shall not, by the express terms of the particular Supplemental Indenture, become effective until all Bonds Outstanding on the date of the execution and delivery of such Supplemental Indenture shall no longer be Outstanding; or
- (e) to make such provision in regard to matters or questions arising under the Indenture as may be necessary or desirable and not inconsistent with the Indenture; or
- (f) to close this Indenture against, or to restrict, in addition to the limitations and restrictions herein contained, the issue of Additional Bonds hereunder, by imposing additional conditions and restrictions to be thereafter observed, whether applicable in respect to all Bonds issued and to be issued hereunder or in respect of one or more Series of Bonds, or otherwise; or
- (g) to modify, amend or supplement this Indenture in such manner as required to permit the Authority to comply with the provisions of the Code relating to the rebate to the United States of America of earnings derived from the investment of the proceeds of Bonds, provided that such modification, amendment or supplement does not materially adversely affect the Holders of all Outstanding Bonds; or

(h) to modify, amend or supplement this Indenture in such manner as may be required by a Rating Agency to maintain or enhance its rating on the Bonds, provided that such modification, amendment or supplement does not materially adversely affect the Holders of all Outstanding Bonds; or

(i) to modify, amend or supplement this Indenture to implement any covenants or agreements contemplated by Section 7.22; or

(j) to authorize the issuance of, to describe the terms of, and to secure one or more Series of Additional Bonds pursuant to Article III; or

(k) to amend any agreement with a securities depository relating to a book-entry system to be maintained with respect to any Bonds; or

(l) to modify, amend or supplement this Indenture in any manner that the Trustee concludes is not materially adverse to the Holders of all Outstanding Bonds.

Section 11.02 Supplemental Indentures Requiring Consent of Bondholders. With the consent, evidenced as provided in Section 10.01, of the Holders of not less than the Approval Amount or, in the case one or more but less than all of the Series of the Bonds then Outstanding are affected, then, in addition, with the consent of the Holders of the Approval Amount of each Series so affected, and with the consent of any guarantor of principal and interest of any Series of Bonds issued under a supplemental Indenture, the Authority and the Trustee may from time to time and at any time enter into an Indenture or Indentures Supplemental hereto for the purpose of eliminating any of the provisions of this Indenture or of any Supplemental Indenture or of modifying in any manner the rights of the Holders of the Bonds so affected; provided, however, that no such supplemental Indenture shall (i) extend the fixed maturity date of any Bond, or reduce the Principal Amount thereof, or reduce the rate or extend the time of payment of interest thereon, or reduce any premium payable upon the redemption thereof, without the consent of the Holder of each Bond so affected, or (ii) permit the creation by the Authority of any lien prior to the lien of this Indenture upon any part of the Revenues, or reduce the Approval Amount, without the consent of the Holders of all Bonds then Outstanding. It shall not be necessary for the consent of the Bondholders under this Section to approve the particular form of any proposed Supplemental Indenture, but it shall be sufficient if such consent shall approve the substance thereof. Nothing herein contained, however, shall be construed as making necessary the approval by the Bondholders of the execution of any Supplemental Indenture or agreement as authorized in Section 11.01.

Section 11.03 Authorization to Trustee; Opinion of Counsel. The Trustee shall join with the Authority in the execution of any Supplemental Indenture which the Authority is authorized to execute under the provisions of Section 11.01 or Section 11.02 upon the delivery by the Authority to the Trustee of the following:

(a) (i) A certified copy of a Resolution of the Board authorizing such Supplemental Indenture and requesting the execution thereof by the Trustee and (ii) evidence of consent to such amendment by any party whose consent is required hereunder;

(b) An opinion of counsel (i) to the effect that the Authority and the Trustee are authorized to enter into such Supplemental Indenture by the provisions of Section 11.01 and that all other conditions precedent have been satisfied, or (ii) to the effect that the Authority and the Trustee are authorized to enter into such Supplemental Indenture by the provisions of Section 11.02, that the consent of the Bondholders required has been secured and is evidenced by specified documents meeting the requirements of Section 10.01, and that all other conditions precedent have been satisfied; and

(c) If the opinion of counsel shall state that the Authority and the Trustee are authorized to enter into such Supplemental Indenture by the provisions of Section 11.02, the documents evidencing the consent of the Bondholders as specified in said opinion;

provided, however, that the Trustee shall not be obligated to join in any such Supplemental Indenture which, in its opinion, adversely affects its own duties, rights or immunities under the Indenture.

Section 11.04 Effectiveness of Amendments, Modifications. Upon the execution of any Supplemental Indenture pursuant to the provisions of this Article, the Indenture shall be and be deemed to be modified and amended in accordance therewith and the respective rights, limitations of rights, obligations, duties and immunities under this Indenture of the Trustee, the Authority and the Holders of Bonds shall thereafter be determined, exercised and enforced hereunder subject in all respect to such modifications and amendments, and all the terms and conditions of any such Supplemental Indenture shall be and be deemed to be part of the terms and conditions of this Indenture for any and all purposes. The Authority shall provide each Bond Insurer with a full transcript of all proceedings relating to the execution of any supplement or amendment to this Indenture. The Authority shall provide Moody's and S&P with a notice of each amendment to this Indenture and a copy thereof at least fifteen (15) days in advance of its execution.

ARTICLE XII

DISCHARGE OF INDENTURE

Section 12.01 Release of Indenture. If the Authority, its successors or assigns, shall pay or cause to be paid unto the Holders of all Bonds Outstanding hereunder the principal and interest to become due thereon and the premium thereon, if any, at the times and in the manner stipulated therein, then this Indenture and the estate and rights hereby granted shall cease, determine and be void, and thereupon the Trustee shall, upon the request of the Authority, deliver to the Authority such instruments as shall be requisite to satisfy the lien hereof, and reconvey to the Authority the estate and title hereby conveyed, and assign and deliver to the Authority any property at the time subject to the lien of this Indenture which may then be in the possession of the Trustee; but the Trustee shall take any such action only upon the receipt of an officer's certificate and an opinion of counsel, each stating in substance that in the opinion of the respective signers all conditions precedent provided for in this Indenture relating to such release, cancellation and discharge have been complied with. In addition, this Indenture shall not be discharged until all Policy Costs owing to any Bond Insurer shall have been paid in full.

Bonds for the payment or redemption of which there shall have been deposited with the Trustee cash or Defeasance Obligations (which shall mean direct non-callable obligations of the United States of America and securities fully and unconditionally guaranteed as to the timely payment of principal and interest by the United States of America, to which direct obligation or guarantee the full faith and credit of the United States of America has been pledged, Refcorp interest strips, CATS, TIGRS, STRPS, or defeased municipal bonds rated "AAA" by S&P or "Aaa" by Moody's, any combination thereof or any other security approved by the applicable Bond Insurer), the principal of and interest on which when due, will, without reinvestment of principal or interest, provide sufficient moneys to pay the Bonds in full at maturity or the date fixed for redemption, shall be deemed to be paid within the meaning of this Article. In the event of an advance refunding, the Authority shall cause to be delivered a verification report of a Qualified Independent Consultant experienced in delivering verification reports. For purposes of determining whether any Outstanding Variable Rate Indebtedness is deemed paid and discharged pursuant to this Article XII, such Variable Rate Indebtedness shall be deemed to bear interest at the maximum rate of interest such Variable Rate Indebtedness may bear pursuant to the applicable Supplemental Indenture.

The release, cancellation and discharge of this Indenture, however, shall be without prejudice to the right of the Trustee to be paid any compensation then due to it hereunder and to be protected and saved harmless by the Authority from any and all losses, liabilities, costs and expenses, including counsel fees, at any time incurred by the Trustee hereunder or connected with any Bond issued hereunder, of and from which, if this Indenture had not been released, cancelled and discharged, the Authority would have been obligated by the terms of this Indenture to protect and save the Trustee harmless, and the Authority hereby covenants to protect and save the Trustee harmless of and from such losses, liabilities, costs and expenses.

If any Bond shall not be presented for payment when the principal thereof shall become due, either at maturity or otherwise, or at the date fixed for the redemption thereof, and if the Authority shall have deposited with the Trustee, for the purpose, or left with it in trust if previously so deposited, funds sufficient to pay the principal of such Bond (and the premium, if any payable upon the redemption thereof), together with all interest due thereon, to the date of maturity thereof or to the date fixed for redemption thereof, for the benefit of the Holder or Holders thereof, respectively, all liability of the Authority to the Holder of such Bond for the payment of the principal thereof, the interest thereon, and the premium, if any, shall forthwith cease, determine and be completely discharged, and thereupon it shall be the duty of the Trustee, to hold said fund or funds, without liability for interest thereon, for the benefit of the Holder of such Bond who shall thereafter be restricted exclusively to said fund or funds for any claim of whatsoever nature on his part under this Indenture or on, or with respect to, said Bond.

Any moneys deposited with the Trustee, by the Authority, pursuant to the terms of this Indenture, for the payment or redemption of Bonds which remain unclaimed by the Holders of the Bonds for five (5) years after the date of maturity or the date fixed for redemption, as the case may be, shall upon the written request of the Authority if the Authority is not at that time, to the knowledge of the Trustee, in default hereunder be paid to the Authority. Thereafter, such Holders of the Bonds shall thereafter look only to the Authority for payment and then only to the extent of the amounts so received without interest thereon.

ARTICLE XIII

MISCELLANEOUS

Section 13.01 Limitation of Rights, Remedy or Claim. With the exception of rights herein expressly conferred, nothing in this Indenture, expressed or implied, is intended or shall be construed to confer upon, or to give to, any person or corporation, other than the parties hereto and the Holders of the Bonds outstanding hereunder, any rights, remedy or claim under or by reason of this Indenture or any covenant, condition or stipulation hereof; and all the covenants, stipulations, promises and agreements in this Indenture contained by and on behalf of the Authority shall be for the sole and exclusive benefit of the parties hereto, and of the Holders of the Bonds Outstanding hereunder.

Section 13.02 Notices to Rating Agencies. The Authority shall instruct the Trustee to give notice to the Rating Agencies upon an occurrence of any of the following that relates to the Bonds:

- (i) expiration of any credit enhancement;
- (ii) termination of any credit enhancement;
- (iii) extension of any credit enhancement;
- (iv) substitution of any credit enhancement;
- (v) redemption;
- (vi) acceleration;
- (vii) conversion;
- (viii) changes in bond documents;
- (ix) changes in any credit facility;
- (x) changes in Trustee and/or any remarketing agent; or
- (xi) defeasance.

Section 13.03 Invalidity of Provisions. If any one or more of the covenants or agreements provided in this Indenture on the part of the Authority or the Trustee to be performed should be finally determined by a court of competent jurisdiction to be contrary to law, then such covenant or covenants or agreement or agreements shall be null and void and shall be deemed separable from the remaining covenants and agreements, and shall in no way affect the validity of the Indenture.

Section 13.04 Governing Law. This Indenture shall be deemed to be and shall be construed as a Pennsylvania contract and wherever enforced shall be construed in accordance with the laws of the Commonwealth.

Section 13.05 Limitation of Liability. No covenant, agreement or obligation contained in the Bonds or in this Indenture shall be deemed to be the covenant, agreement or obligation of any member, agent or employee of the Authority in his individual capacity and neither the members of the Board of the Authority nor any official executing the Bonds shall be liable personally on the Bonds or be subject to any personal liability or accountability by reason of the issuance thereof.

Section 13.06 Execution in Counterparts. This Indenture may be executed in multiple counterparts, each of which shall be regarded for all purposes as an original; but such counterparts shall constitute but one and the same instrument.

Section 13.07 Payment on Saturday, Sunday or Legal Holiday. If any case where the date of maturity of interest on or principal of any Bond or the date fixed for redemption or tender of any Bond shall be a Saturday, Sunday or a legal holiday or a day on which banking institutions in the Commonwealth are authorized by law to close, then payment of such interest or principal and premium, if any, need not be made on such date but may be made on the next succeeding Business Day not a Saturday, Sunday nor a legal holiday nor a day upon which banking institutions are authorized by law to close, with the same force and effect as if made on the date of maturity or the date fixed for redemption, and no interest shall accrue for the period after such date.

Section 13.08 Notices. Except as otherwise expressly provided in this Indenture, or in any Indenture supplemental hereto, any request, opinion, consent, demand, notice, order, appointment, or other direction required or permitted to be made or given by the Authority, shall be deemed to have been sufficiently made or given if executed on behalf of the Authority by its Chairperson or Vice Chairperson or Secretary or Assistant Secretary or Executive Director or Chief Financial Officer or Director of Finance, or signed by such other person or persons who is or are authorized to do so pursuant to a Resolution of the Board.

Any notice to or demand upon the Trustee may be served, presented, or made at the Principal Office of the Trustee at The Bank of New York Mellon Trust Company, N.A., 500 Ross Street, 12th Floor, Pittsburgh, PA 15262, Attention: Corporate Trust Administration. Any notice to or demand upon the Authority shall be deemed to have been sufficiently given or served by the Trustee for all purposes, by being sent by certified or registered United States mail, postage prepaid, to the Authority at The Pittsburgh Water and Sewer Authority, 1200 Penn Avenue, Pittsburgh, Pennsylvania 15222, Attention: Executive Director or at such other address as may be filed in writing by the Authority with the Trustee.

The Trustee shall have the right to accept and act upon instructions, including funds transfer instructions ("Instructions") given pursuant to this Indenture and delivered using Electronic Means; provided, however, that the Authority shall provide to the Trustee an incumbency certificate listing Authorized Representatives of the Authority to provide such Instructions and containing specimen signatures of such Authorized Representatives of the

Authority, which incumbency certificate shall be amended by the Authority whenever a person is to be added or deleted from the listing. If the Authority elects to give the Trustee Instructions using Electronic Means and the Trustee in its discretion elects to act upon such Instructions, the Trustee's understanding of such Instructions shall be deemed controlling. The Authority understands and agrees that the Trustee cannot determine the identity of the actual sender of such Instructions and that the Trustee shall conclusively presume that directions that purport to have been sent by an Authorized Representative of the Authority listed on the incumbency certificate provided to the Trustee have been sent by such Authorized Representative of the Authority. The Authority shall be responsible for ensuring that only Authorized Representatives of the Authority transmit such Instructions to the Trustee and that the Authority and all Authorized Representatives of the Authority are solely responsible to safeguard the use and confidentiality of applicable user and authorization codes, passwords and/or authentication keys upon receipt by the Authority. The Trustee shall not be liable for any losses, costs or expenses arising directly or indirectly from the Trustee's reliance upon and compliance with such Instructions notwithstanding such directions conflict or are inconsistent with a subsequent written instruction. The Authority agrees: (i) to assume all risks arising out of the use of Electronic Means to submit Instructions to the Trustee, including without limitation the risk of the Trustee acting on unauthorized Instructions, and the risk of interception and misuse by third parties; (ii) that it is fully informed of the protections and risks associated with the various methods of transmitting Instructions to the Trustee and that there may be more secure methods of transmitting Instructions than the method(s) selected by the Authority; (iii) that the security procedures (if any) to be followed in connection with its transmission of Instructions provide to it a commercially reasonable degree of protection in light of its particular needs and circumstances; and (iv) to notify the Trustee immediately upon learning of any compromise or unauthorized use of the security procedures.

"Electronic Means" shall mean the following communications methods: S.W.I.F.T., e-mail, facsimile transmission, secure electronic transmission containing applicable authorization codes, passwords and/or authentication keys issued by the Trustee, or another method or system specified by the Trustee as available for use in connection with its services hereunder.

Section 13.09 Binding Effect of Covenants. All the covenants, promises and agreements in this Indenture contained by or on behalf of the Authority, or by or on behalf of the Trustee shall bind and inure to the benefit of their respective successors and assigns, whether so expressed or not.

Section 13.10 Provisions Related to Bond Insurance and Reserve Policies. The provisions related to bond insurance set forth in Exhibit A hereto are incorporated herein by reference as if fully set forth herein. The provisions related to reserve policies set forth in Exhibit B hereto are incorporated herein by reference as if fully set forth herein.

IN WITNESS WHEREOF, The Pittsburgh Water and Sewer Authority, party of the first part, has caused this Amended and Restated Trust Indenture to be executed by its Chairperson or its Vice Chairperson and its corporate seal to be hereunto impressed and attested by its Secretary or its Assistant Secretary, and The Bank of New York Mellon Trust Company, N.A., party of the second part, in evidence of its acceptance of the trusts hereby created, has caused this Indenture to be executed by one of its authorized officers.

ATTEST:

THE PITTSBURGH WATER AND
SEWER AUTHORITY

Secretary

By _____
Chairperson

[SEAL]

THE BANK OF NEW YORK MELLON
TRUST COMPANY, N.A., as Trustee

By _____
Authorized Officer
Title: _____

EXHIBIT A

PROVISIONS RELATED TO BOND INSURANCE

The provisions set forth in this Exhibit A shall, with respect to Bonds insured by Assured Guaranty Municipal Corp., or any successor thereto or assignee thereof, apply to such Bonds notwithstanding any other provision of this Indenture to the contrary. The provisions set forth in this Exhibit A shall, with respect to Bonds insured by National Public Finance Guarantee Corporation ("National"), or any successor thereto or assignee thereof, apply to such Bonds notwithstanding any other provision of this Indenture to the contrary.

- (a) "Bond Insurance Policy" shall mean the insurance policy issued by the Insurer guaranteeing the scheduled payment of principal of and interest on the Insured Bonds when due. "Insured Bonds" shall mean the Bonds insured by the Insurer". "Insurer" shall mean, with respect to Bonds insured by Assured Guaranty Municipal Corp.: Assured Guaranty Municipal Corp., a New York stock insurance company, or any successor thereto or assignee thereof; "Insurer" shall mean, with respect to Bonds insured by National: National Public Finance Guarantee Corporation, or any successor thereto or assignee thereof. "Related Document" shall have the meaning set forth in paragraph (h) below.
- (b) The prior written consent of the Insurer shall be a condition precedent to the deposit of any credit instrument provided in lieu of a cash deposit into the Debt Service Reserve Fund, if any, except for a credit instrument provided by the Insurer. Amounts on deposit in the Debt Service Reserve Fund shall be applied solely to the payment of debt service due on the Bonds secured by the Debt Service Reserve Fund.
- (c) The Insurer shall be deemed to be the sole holder of the Insured Bonds for the purpose of exercising any voting right or privilege or giving any consent or direction or taking any other action that the holders of the Insured Bonds are entitled to take pursuant to the Indenture pertaining to (i) defaults and remedies and (ii) the duties and obligations of the Trustee. In furtherance thereof and as a term of the Indenture and each Insured Bond, the Trustee (solely with respect to the Insured Bonds) and each Insured Bondholder appoint the Insurer as their agent and attorney-in-fact and agree that the Insurer may at any time during the continuation of any proceeding by or against the Authority under the United States Bankruptcy Code or any other applicable bankruptcy, insolvency, receivership, rehabilitation or similar law (an "Insolvency Proceeding") direct all matters relating to such Insolvency Proceeding (to the extent of their voting rights with respect to the Insured Bonds), including without limitation, (A) all matters relating to any claim or enforcement proceeding in connection with an Insolvency Proceeding (a "Claim"), (B) the direction of any appeal of any order relating to any Claim, (C) the posting of any surety, supersedeas or performance bond pending any such appeal, and (D) the right to vote to accept or reject any plan of adjustment. In addition, the Trustee (solely with respect to the Insured Bonds) and each Insured Bondholder delegate and assign to the Insurer, to the fullest extent permitted by law, the rights of the Trustee and each Insured Bondholder in the conduct of any Insolvency Proceeding, including, without limitation, all rights of any party to an adversary proceeding or action with respect to any court order issued in connection with any such Insolvency Proceeding. Remedies granted in Section 8.04 of the Indenture include mandamus.

- (d) Acceleration of the Bonds is permitted under the Indenture. As set forth in paragraph (c) above, the Insurer is deemed to be the sole holder of the Insured Bonds for purposes of voting on acceleration. In the event the maturity of the Insured Bonds is accelerated, the Insurer shall not be obligated to pay any accelerated amount but may elect, in its sole discretion, to pay accelerated principal and interest accrued, on such principal to the date of acceleration (to the extent unpaid by the Authority) and the Trustee shall be required to accept such amounts. Upon payment of such accelerated principal and interest accrued to the acceleration date as provided above, the Insurer's obligations under the Bond Insurance Policy with respect to such Insured Bonds shall be fully discharged.
- (e) No grace period for a covenant default shall exceed sixty (60) days or be extended for more than sixty (60) days, without the prior written consent of the Insurer. No grace period shall be permitted for payment defaults.
- (f) The Insurer is a third party beneficiary to the Indenture.
- (g) Upon the occurrence of an extraordinary optional, special or extraordinary mandatory redemption in part, the selection of Insured Bonds to be redeemed shall be subject to the approval of the Insurer. The exercise of any provision of the Indenture which permits the purchase of Insured Bonds in lieu of redemption shall require the prior written approval of the Insurer if any Insured Bond so purchased is not cancelled upon purchase.
- (h) Any amendment, supplement, modification to, or waiver of, the Indenture or any other transaction document, including any underlying security agreement (each a "Related Document"), that requires the consent of Bondowners or adversely affects the rights and interests of the Insurer shall be subject to the prior written consent of the Insurer.
- (i) The rights granted to the Insurer under the Indenture or any other Related Document to request, consent to or direct any action are rights granted to the Insurer in consideration of its issuance of the Bond Insurance Policy. Any exercise by the Insurer of such rights is merely an exercise of the Insurer's contractual rights and shall not be construed or deemed to be taken for the benefit, or on behalf, of the holders of the Insured Bonds, and such action does not evidence any position of the Insurer, affirmative or negative, as to whether the consent of the owners of the Insured Bonds or any other person is required in addition to the consent of the Insurer.
- (j) Only (1) cash, (2) non-callable direct obligations of the United States of America ("Treasuries"), (3) evidences of ownership of proportionate interests in future interest and principal payments on Treasuries held by a bank or trust company as custodian, under which the owner of the investment is the real party in interest and has the right to proceed directly and individually against the obligor and the underlying Treasuries are not available to any person claiming through the custodian or to whom the custodian may be obligated, (4) subject to the prior written consent of the Insurer, pre-refunded municipal obligations rated "AAA" and "Aaa" by S&P and Moody's, respectively, or (5) subject to the prior written consent of the Insurer, securities eligible for "AAA" defeasance under then existing

criteria of S&P or any combination thereof, shall be used to effect defeasance of the Insured Bonds unless the Insurer otherwise approves.

To accomplish defeasance, the Authority shall cause to be delivered to the Insurer (i) a report of an independent firm of nationally recognized certified public accountants or such other accountant or financial firm as shall be acceptable to the Insurer ("Accountant") verifying the sufficiency of the escrow established to pay the Insured Bonds in full on the maturity or redemption date ("Verification"), (ii) an Escrow Deposit Agreement (which shall be acceptable in form and substance to the Insurer), (iii) an opinion of nationally recognized bond counsel to the effect that the Insured Bonds are no longer "Outstanding" under the Indenture and (iv) a certificate of discharge of the Trustee with respect to the Insured Bonds; each Verification and defeasance opinion shall be acceptable in form and substance, and addressed, to the Authority, Trustee and Insurer. The Insurer shall be provided with final drafts of the above-referenced documentation not less than five business days prior to the funding of the escrow.

Insured Bonds shall be deemed "Outstanding" under the Indenture unless and until they are in fact paid and retired or the above criteria are met.

- (k) Amounts paid by the Insurer under the Bond Insurance Policy shall not be deemed paid for purposes of the Indenture and the Insured Bonds relating to such payments shall remain Outstanding and continue to be due and owing until paid by the Authority in accordance with the Indenture. The Indenture shall not be discharged unless all amounts due or to become due to the Insurer have been paid in full or duly provided for.
- (l) Each of the Authority and Trustee covenant and agree to take such action (including, as applicable, filing of UCC financing statements and continuations thereof) as is necessary from time to time to preserve the priority of the pledge of the Trust Estate under applicable law.
- (m) Claims Upon the Bond Insurance Policy and Payments by and to the Insurer.

If, on the third Business Day prior to the related scheduled interest payment date or principal payment date ("Payment Date") there is not on deposit with the Trustee, after making all transfers and deposits required under the Indenture, moneys sufficient to pay the principal of and interest on the Insured Bonds due on such Payment Date, the Trustee shall give notice to the Insurer and to its designated agent (if any) (the "Insurer's Fiscal Agent") by telephone or telecopy of the amount of such deficiency by 12:00 noon, New York City time, on such Business Day. If, on the second Business Day prior to the related Payment Date, there continues to be a deficiency in the amount available to pay the principal of and interest on the Insured Bonds due on such Payment Date, the Trustee shall make a claim under the Bond Insurance Policy and give notice to the Insurer and the Insurer's Fiscal Agent (if any) by telephone of the amount of such deficiency, and the allocation of such deficiency between the amount required to pay interest on the Bonds and the amount required to pay principal of the Insured Bonds, confirmed in writing to the Insurer and the Insurer's Fiscal Agent by 12:00 noon, New York City time, on such second

Business Day by filling in the form of Notice of Claim and Certificate delivered with the Bond Insurance Policy.

The Trustee shall designate any portion of payment of principal on Insured Bonds paid by the Insurer, whether by virtue of mandatory sinking fund redemption, maturity or other advancement of maturity, on its books as a reduction in the principal amount of Insured Bonds registered to the then current Insured Bondholder, whether DTC or its nominee or otherwise, and shall issue a replacement Insured Bond to the Insurer, registered in the name of Assured Guaranty Municipal Corp. or National, as the case may be, in a principal amount equal to the amount of principal so paid (without regard to authorized denominations); provided that the Trustee's failure to so designate any payment or issue any replacement Insured Bond shall have no effect on the amount of principal or interest payable by the Authority on any Insured Bond or the subrogation rights of the Insurer.

The Trustee shall keep a complete and accurate record of all funds deposited by the Insurer into the Policy Payments Account (defined below) and the allocation of such funds to payment of interest on and principal of any Insured Bond. The Insurer shall have the right to inspect such records at reasonable times upon reasonable notice to the Trustee.

Upon payment of a claim under the Bond Insurance Policy, the Trustee shall establish a separate special purpose trust account for the benefit of Insured Bondholders referred to herein as the "Policy Payments Account" and over which the Trustee shall have exclusive control and sole right of withdrawal. The Trustee shall receive any amount paid under the Bond Insurance Policy in trust on behalf of Insured Bondholders and shall deposit any such amount in the Policy Payments Account and distribute such amount only for purposes of making the payments for which a claim was made. Such amounts shall be disbursed by the Trustee to Insured Bondholders in the same manner as principal and interest payments are to be made with respect to the Insured Bonds under the sections hereof regarding payment of Insured Bonds. It shall not be necessary for such payments to be made by checks or wire transfers separate from the check or wire transfer used to pay debt service with other funds available to make such payments. Notwithstanding anything herein to the contrary, the Authority agrees to pay to the Insurer (i) a sum equal to the total of all amounts paid by the Insurer under the Bond Insurance Policy (the "Insurer Advances"); and (ii) interest on such Insurer Advances from the date paid by the Insurer until payment thereof in full, payable to the Insurer at the Late Payment Rate per annum (collectively, the "Insurer Reimbursement Amounts"). "Late Payment Rate" means the lesser of (a) the greater of (i) the per annum rate of interest, publicly announced from time to time by JPMorgan Chase Bank at its principal office in The City of New York, as its prime or base lending rate (any change in such rate of interest to be effective on the date such change is announced by JPMorgan Chase Bank) plus 3%, and (ii) the then applicable highest rate of interest on the Insured Bonds and (b) the maximum rate permissible under applicable usury or similar laws limiting interest rates. The Late Payment Rate shall be computed on the basis of the actual number of days elapsed over a year of 360 days. The Authority hereby covenants and agrees that the Insurer Reimbursement Amounts are secured by a lien on and pledge of the Trust Estate and payable from such Trust Estate on a parity with debt service due on the Insured Bonds.

Funds held in the Policy Payments Account shall not be invested by the Trustee and may not be applied to satisfy any costs, expenses or liabilities of the Trustee. Any funds remaining in the Policy Payments Account following an Insured Bond payment date shall promptly be remitted to the Insurer.

- (n) The Insurer shall, to the extent it makes any payment of principal of or interest on the Insured Bonds, become subrogated to the rights of the recipients of such payments in accordance with the terms of the Bond Insurance Policy (which subrogation rights shall also include the rights of any such recipients in connection with any Insolvency Proceeding). Each obligation of the Authority to the Insurer under the Related Documents shall survive discharge or termination of such Related Documents.
- (o) The Authority shall pay or reimburse the Insurer any and all charges, fees, costs and expenses that the Insurer may reasonably pay or incur in connection with (i) the administration, enforcement, defense or preservation of any rights or security in any Related Document; (ii) the pursuit of any remedies under the Indenture or any other Related Document or otherwise afforded by law or equity, (iii) any amendment, waiver or other action with respect to, or related to, the Indenture or any other Related Document whether or not executed or completed, or (iv) any litigation or other dispute in connection with the Indenture or any other Related Document or the transactions contemplated thereby, other than costs resulting from the failure of the Insurer to honor its obligations under the Bond Insurance Policy. The Insurer reserves the right to charge a reasonable fee as a condition to executing any amendment, waiver or consent proposed in respect of the Indenture or any other Related Document.
- (p) After payment of reasonable expenses of the Trustee, the application of funds realized upon default shall be applied to the payment of expenses of the Authority only after the payment of past due and current debt service on the Insured Bonds and amounts required to restore the Debt Service Reserve Fund to the Reserve Requirement.
- (q) The Insurer shall be entitled to pay principal or interest on the Insured Bonds that shall become Due for Payment but shall be unpaid by reason of Nonpayment by the Authority (as such terms are defined in the Bond Insurance Policy) and any amounts due on the Insured Bonds as a result of acceleration of the maturity thereof in accordance with the Indenture, whether or not the Insurer has received a Notice of Nonpayment (as such terms are defined in the Bond Insurance Policy) or a claim upon the Bond Insurance Policy.
- (r) The notice address of the Insurer Assured Guaranty Municipal Corp. is: Assured Guaranty Municipal Corp., 1633 Broadway, New York, New York 10019, Attention: Managing Director – Surveillance, Re: Policy No. ____, Telephone: (212) 974-0100; Telecopier: (212) 339-3556. In each case in which notice or other communication refers to an Event of Default, then a copy of such notice or other communication shall also be sent to the attention of the Deputy General Counsel – Public Finance and shall be marked to indicate "URGENT MATERIAL ENCLOSED." The notice address of the Insurer National: National Public Finance Guarantee Corporation, 1 Manhattanville Road, Suite 301,

Purchase, NY 10577, Attention: Insured Portfolio Management, Telephone: 914-273-4545, Facsimile: 914-765-3555.

- (s) The Insurer shall be provided with the following information by the Authority or Trustee, as the case may be:
- (i) Annual audited financial statements within 180 days after the end of the Authority's fiscal year (together with a certification of the Authority that it is not aware of any default or Event of Default under the Indenture), and the Authority's annual budget within 30 days after the approval thereof together with such other information, data or reports as the Insurer shall reasonably request from time to time;
 - (ii) Notice of any draw upon the Debt Service Reserve Fund within two Business Days after knowledge thereof other than (i) withdrawals of amounts in excess of the Debt Service Reserve Requirement and (ii) withdrawals in connection with a refunding of Insured Bonds;
 - (iii) Notice of any default under the Indenture known to the Trustee or Authority within five Business Days after knowledge thereof;
 - (iv) Prior notice of the advance refunding or redemption of any of the Insured Bonds, including the principal amount, maturities and CUSIP numbers thereof;
 - (v) Notice of the resignation or removal of the Trustee and bond registrar and the appointment of, and acceptance of duties by, any successor thereto;
 - (vi) Notice of the commencement of any proceeding by or against the Authority commenced under the United States Bankruptcy Code or any other applicable bankruptcy, insolvency, receivership, rehabilitation or similar law (an "Insolvency Proceeding");
 - (vii) Notice of the making of any claim in connection with any Insolvency Proceeding seeking the avoidance as a preferential transfer of any payment of principal of, or interest on, the Insured Bonds;
 - (viii) A full original transcript of all proceedings relating to the execution of any amendment, supplement, or waiver to the Related Documents;
 - (ix) All reports, notices and correspondence to be delivered to holders of Insured Bonds under the terms of the Related Documents; and
 - (x) To the extent that the Authority has entered into a continuing disclosure agreement, covenant or undertaking with respect to the Bonds, all

information furnished pursuant to such agreements shall also be provided to the Insurer, simultaneously with the furnishing of such information. The Authority shall also provide the Insurer with copies of all amendments, modifications, supplements and restatements relating to such documents.

- (xi) So long as the 1998B Bonds remain Outstanding, the Authority shall provide National with written notice of its intent to issue any type of variable rate security (including, without limitation, variable rate obligations, floating rate notes and auction rate securities) no later than 15 days prior to execution of the documentation relating to the proposed variable rate securities (the "Proposed Securities"). The Authority shall also provide National with drafts of the documentation relating to the Proposed Securities promptly upon the request of National.
- (t) The Insurer shall have the right to receive such additional information as it may reasonably request.
- (u) The Authority will permit the Insurer to discuss the affairs, finances and accounts of the Authority or any information the Insurer may reasonably request regarding the security for the Bonds with appropriate officers of the Authority and will use commercially reasonable efforts to enable the Insurer to have access to the facilities, books and records of the Authority on any business day upon reasonable prior notice.
- (v) The Trustee shall notify the Insurer of any failure of the Authority to provide notices, certificates and other information under the transaction documents.
- (w) Notwithstanding satisfaction of the other conditions to the issuance of Additional Bonds set forth in the Indenture, no such issuance may occur (1) if an Event of Default (or any event which, once all notice or grace periods have passed, would constitute an Event of Default) exists unless such default shall be cured upon such issuance and (2) unless the Debt Service Reserve Fund is fully funded at the Debt Service Reserve Requirement (including the proposed issue) upon the issuance of such Additional Bonds, in either case unless otherwise permitted by the Insurer. In addition, so long as the 1998B Bonds are Outstanding, without the prior written consent of the National, no issuance of Balloon Indebtedness or Tender Indebtedness may occur unless the maturity date of such indebtedness is 2031 or later. In addition, so long as the 1998B Bonds are Outstanding, without the prior written consent of National, no issuance of Interim Indebtedness may occur unless (1) the principal amount of the Interim Indebtedness does not exceed \$150,000,000; or (2) the Interim Indebtedness matures within one year; or (3) the Interim Indebtedness is Subordinate Debt.
- (x) In determining whether any amendment, consent, waiver or other action to be taken, or any failure to take action, under the Indenture would adversely affect the security for the Insured Bonds or the rights of the holders of Insured Bonds, the Trustee shall consider the

effect of any such amendment, consent, waiver, action or inaction as if there were no Bond Insurance Policy.

- (y) No contract shall be entered into or any action taken by which the rights of the Insurer or security for or sources of payment of the Bonds may be impaired or prejudiced in any material respect except upon obtaining the prior written consent of the Insurer.
- (z) If the Bonds are issued for refunding purposes, there shall be delivered an opinion of Bond Counsel addressed to the Insurer (or a reliance letter relating thereto), or a certificate of discharge of the trustee for the Refunded Bonds, to the effect that, upon the making of the required deposit to the escrow, the legal defeasance of the Refunded Bonds shall have occurred. If the Refunded Bonds are insured by Assured Guaranty Municipal Corp., at least three business days prior to the proposed date for delivery of the Policy with respect to the Refunding Bonds, the Insurer shall also receive (i) the verification letter, of which the Insurer shall be an addressee, by an independent firm of certified public accountants or other financial firm which is either nationally recognized or otherwise acceptable to the Insurer, of the adequacy of the escrow established to provide for the payment of the Refunded Bonds in accordance with the terms and provisions of the Escrow Deposit Agreement, and (ii) the form of an opinion of Bond Counsel addressed to the Insurer (or a reliance letter relating thereto) to the effect that the Escrow Deposit Agreement is a valid and binding obligation of the parties thereto, enforceable in accordance with its terms (such Escrow Deposit Agreement shall provide that no amendments are permitted without the prior written consent of the Insurer). An executed copy of each of such opinion and reliance letter, if applicable, or Trustee's discharge certificate, as the case may be, shall be forwarded to the Insurer prior to delivery of the Bonds.
- (aa) Any interest rate exchange agreement ("Swap Agreement") entered into by the Authority shall meet the following conditions: (i) the Swap Agreement must be entered into to manage interest costs related to, or a hedge against (a) assets then held, or (b) debt then outstanding, or (iii) debt reasonably expected to be issued within the next twelve (12) months, and (ii) the Swap Agreement shall not contain any leverage element or multiplier component greater than 1.0x unless there is a matching hedge arrangement which effectively off-sets the exposure from any such element or component. Unless otherwise consented to in writing by the Insurer, any uninsured net settlement, breakage or other termination amount then in effect shall be subordinate to debt service on the Bonds and on any debt on parity with the Bonds. The Authority shall not terminate a Swap Agreement unless it demonstrates to the satisfaction of the Insurer prior to the payment of any such termination amount that such payment will not cause the Authority to be in default under the Related Documents, including but not limited to, any monetary obligations thereunder.

EXHIBIT B

PROVISIONS RELATED TO RESERVE POLICIES

The provisions set forth in this Exhibit B shall, with respect to Reserve Policies issued by Assured Guaranty Municipal Corp., or any successor thereto or assignee thereof ("AGM") related to Bonds issued under this Indenture, apply to such Reserve Policies notwithstanding any other provision of this Indenture to the contrary.

(a) The prior written consent of AGM shall be a condition precedent to the deposit of any credit facility (other than a credit facility provided by AGM) (a "Credit Facility") credited to the Debt Service Reserve Fund established for the Bonds (the "Reserve Fund") in lieu of a cash deposit into the Reserve Fund. Amounts drawn under the Reserve Policy shall be available only for the payment of scheduled principal and interest on the Bonds when due.

(b) The Authority shall repay any draws under the Reserve Policy and pay all related reasonable expenses incurred by AGM and shall pay interest thereon from the date of payment by AGM at the Late Payment Rate. "Late Payment Rate" means the lesser of (x) the greater of (i) the per annum rate of interest, publicly announced from time to time by JPMorgan Chase Bank at its principal office in the City of New York, as its prime or base lending rate ("Prime Rate") (any change in such Prime Rate to be effective on the date such change is announced by JPMorgan Chase Bank) plus 5% (3% to the extent AGM is the bond insurer of the related Bonds), and (ii) the then applicable highest rate of interest on the Bonds and (y) the maximum rate permissible under applicable usury or similar laws limiting interest rates. The Late Payment Rate shall be computed on the basis of the actual number of days elapsed over a year of 360 days. In the event JPMorgan Chase Bank ceases to announce its Prime Rate publicly, Prime Rate shall be the publicly announced prime or base lending rate of such national bank as AGM shall specify. If the interest provisions of this subparagraph (b) shall result in an effective rate of interest which, for any period, exceeds the limit of the usury or any other laws applicable to the indebtedness created herein, then all sums in excess of those lawfully collectible as interest for the period in question shall, without further agreement or notice between or by any party hereto, be applied as additional interest for any later periods of time when amounts are outstanding hereunder to the extent that interest otherwise due hereunder for such periods plus such additional interest would not exceed the limit of the usury or such other laws, and any excess shall be applied upon principal immediately upon receipt of such moneys by AGM, with the same force and effect as if the Authority had specifically designated such extra sums to be so applied and AGM had agreed to accept such extra payment(s) as additional interest for such later periods. In no event shall any agreed-to or actual exaction as consideration for the indebtedness created herein exceed the limits imposed or provided by the law applicable to this transaction for the use or detention of money or for forbearance in seeking its collection.

Repayment of draws and payment of expenses and accrued interest thereon at the Late Payment Rate (collectively, "Policy Costs") shall be made from all available funds and shall commence in the first month following each draw, and each such monthly payment shall be in an amount at least equal to 1/12 of the aggregate of Policy Costs related to such draw.

Amounts in respect of Policy Costs paid to AGM shall be credited first to interest due, then to the expenses due and then to principal due. As and to the extent that payments are made to AGM on account of principal due, the coverage under the Reserve Policy will be increased by a like amount, subject to the terms of the Reserve Policy. The obligation to pay Policy Costs shall be secured by a valid lien on all revenues and other collateral pledged as security for the Bonds (subject only to the priority of payment provisions set forth under the Indenture).

All cash and investments in the Reserve Fund shall be transferred to the Debt Service Fund for payment of debt service on Bonds before any drawing may be made on the Reserve Policy or any other Credit Facility credited to the Reserve Fund in lieu of cash. Payment of any Policy Costs shall be made prior to replenishment of any such cash amounts. Draws on all Credit Facilities (including the Reserve Policy) on which there is available coverage shall be made on a pro-rata basis (calculated by reference to the coverage then available thereunder) after applying all available cash and investments in the Reserve Fund. Payment of Policy Costs and reimbursement of amounts with respect to other Credit Facilities shall be made on a pro-rata basis prior to replenishment of any cash drawn from the Reserve Fund. For the avoidance of doubt, "available coverage" means the coverage then available for disbursement pursuant to the terms of the applicable alternative credit instrument without regard to the legal or financial ability or willingness of the provider of such instrument to honor a claim or draw thereon or the failure of such provider to honor any such claim or draw.

(c) Upon a failure to pay Policy Costs when due or any other breach of the terms of this Exhibit B, AGM shall be entitled to exercise any and all legal and equitable remedies available to it, including those provided under the Indenture, other than (i) acceleration of the maturity of the Bonds or (ii) remedies which would adversely affect owners of the Bonds.

(d) The Indenture shall not be discharged until all Policy Costs owing to AGM shall have been paid in full. The Authority's obligation to pay such amounts shall expressly survive payment in full of the Bonds.

(e) The Authority shall include any Policy Costs then due and owing AGM in the calculation of the additional bonds test and the rate covenant in the Indenture.

(f) The Indenture shall require the Trustee to ascertain the necessity for a claim upon the Reserve Policy in accordance with the provisions of subparagraph (b) hereof and to provide notice to AGM in accordance with the terms of the Reserve Policy at least two business days prior to each date upon which interest or principal is due on the Bonds. Where deposits are required to be made by the Authority with the Trustee to the debt service fund for the Bonds more often than semi-annually, the Trustee shall be instructed to give notice to AGM of any failure of the Authority to make timely payment in full of such deposits within two business days of the date due.

(g) The Authority will pay or reimburse AGM any and all reasonable charges, fees, costs, losses, liabilities and expenses which AGM may pay or incur, including, but not limited to, reasonable fees and expenses of attorneys, accountants, consultants and auditors and reasonable costs of investigations, in connection with (i) any accounts established to facilitate payments under the Reserve Policy, (ii) the administration, enforcement, defense or preservation of any rights in

respect of the Indenture or any document executed in connection with the Bonds (the “Related Documents”), including defending, monitoring or participating in any litigation or proceeding (including any bankruptcy proceeding in respect of the Authority) relating to the Indenture or any other Related Document, any party to the Indenture or any other Related Document or the transactions contemplated by the Related Documents, (iii) the foreclosure against, sale or other disposition of any collateral securing any obligations under the Indenture or any other Related Document, if any, or the pursuit of any remedies under the Indenture or any other Related Document, to the extent such costs and expenses are not recovered from such foreclosure, sale or other disposition, (iv) any amendment, waiver or other action with respect to, or related to the Indenture, the Reserve Policy or any other Related Document whether or not executed or completed, or (v) any action taken by AGM to cure a default or termination or similar event (or to mitigate the effect thereof) under the Indenture or any other Related Document; costs and expenses shall include a reasonable allocation of compensation and overhead attributable to time of employees of AGM spent in connection with the actions described in clauses (ii) through (v) above. AGM reserves the right to charge a reasonable fee as a condition to executing any amendment, waiver or consent proposed in respect of the Indenture or any other Related Document. Amounts payable by the Authority hereunder shall bear interest at the Late Payment Rate from the date such amount is paid or incurred by AGM until the date AGM is paid in full.

(h) The obligation of the Authority to pay all amounts due to AGM shall be an absolute and unconditional obligation of the Authority and will be paid or performed strictly in accordance with the provisions of this Exhibit B, irrespective of (i) any lack of validity or enforceability of or any amendment or other modifications of, or waiver with respect to the Bonds, the Indenture or any other Related Document, or (ii) any amendment or other modification of, or waiver with respect to the Reserve Policy; (iii) any exchange, release or non-perfection of any security interest in property securing the Bonds, the Indenture or any other Related Documents; (iv) whether or not such Bonds are contingent or matured, disputed or undisputed, liquidated or unliquidated; (v) any amendment, modification or waiver of or any consent to departure from the Reserve Policy, the Indenture or all or any of the other Related Documents; (vi) the existence of any claim, setoff, defense (other than the defense of payment in full), reduction, abatement or other right which the Authority may have at any time against the Trustee or any other person or entity other than the Insurer, whether in connection with the transactions contemplated herein or in any other Related Documents or any unrelated transactions; (vii) any statement or any other document presented under or in connection with the Reserve Policy proving in any and all respects invalid, inaccurate, insufficient, fraudulent or forged or any statement therein being untrue or inaccurate in any respect; or (viii) any payment by the Insurer under the Reserve Policy against presentation of a certificate or other document which does not strictly comply with the terms of the Reserve Policy.

(i) The Authority shall fully observe, perform, and fulfill each of the provisions (as each of those provisions may be amended, supplemented, modified or waived with the prior written consent of the Insurer) of the Indenture applicable to it, each of the provisions thereof being expressly incorporated into this Exhibit B by reference solely for the benefit of AGM as if set forth directly herein. No provision of the Indenture or any other Related Document shall be amended, supplemented, modified or waived, without the prior written consent of AGM, in any material respect or otherwise in a manner that could adversely affect the payment obligations of the Authority hereunder or the priority accorded to the reimbursement of Policy Costs under the

Indenture. The Insurer is hereby expressly made a third party beneficiary of the Indenture and each other Related Document

(j) The Authority covenants to provide to AGM, promptly upon written request, any information regarding the Bonds or the financial condition and operations of the Authority as reasonably requested by AGM. The Authority will permit AGM to discuss the affairs, finances and accounts of the Authority or any information AGM may reasonably request regarding the security for the Bonds with appropriate officers of the Authority and will use commercially reasonable efforts to enable AGM to have access to the facilities, books and records of the Authority on any business day upon reasonable prior notice.

Notices and other information to AGM shall be sent to the following address (or such other address as AGM may designate in writing): Assured Guaranty Municipal Corp., 1633 Broadway, New York, New York 10019, Attention: Managing Director – Surveillance, Re: Policy No. _____

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.8. Attach copies of the summaries of the company's projected revenues, expenses and capital budgets for the next 2 years.

RESPONSE:

Please see below for a summary of the total PWSA's water and wastewater projected revenues, expenses and capital budget for 2018 – FY 2021.

	FTY 12 Months Ending 12/31/2018	FPFY 12 Months Ending 12/31/2019	Projected 12 Months Ending 12/31/2020	Projected 12 Months Ending 12/31/2021
Projected Revenues & Expenses				
Total System Revenues	\$168,542,316	\$195,926,618	\$216,784,733	\$239,952,871
Direct Operating Expenses	(108,381,984)	(109,521,788)	(112,732,695)	(116,125,891)
Indirect Operating Expenses	(15,407,699)	(15,649,738)	(15,908,720)	(16,185,830)
Debt Service (Principal & Interest)	(50,316,641)	(63,496,946)	(78,327,598)	(88,567,404)
PAYGO	-	(1,500,000)	(4,000,000)	(7,000,000)
Other Capital Costs	<u>(2,000,000)</u>	<u>(5,700,000)</u>	<u>(3,500,000)</u>	<u>(8,500,000)</u>
<i>Rate Surplus / (Deficit)</i>	\$ (7,564,008)	\$ 58,146	\$ 2,315,720	\$ 3,573,745
Projected Capital Budget				
Water Treatment Plant	\$ 8,344,590	\$ 9,160,628	\$ 22,462,623	\$ 40,495,302
Water Pumping and Storage	9,842,169	23,175,580	42,161,185	83,398,816
Water Distribution System	10,049,193	30,297,215	48,304,439	55,544,716
Water Lead-Related Projects	18,921,276	44,332,173	37,281,592	41,834,637
Wastewater System	3,251,559	15,944,289	42,335,853	33,368,592
Stormwater System	2,506,272	8,282,282	24,190,736	35,421,531
Green Infrastructure	6,051,149	16,349,444	29,340,688	28,294,341
Other	<u>2,401,875</u>	<u>7,649,000</u>	<u>10,151,000</u>	<u>8,367,200</u>
<i>Total Capital Requirements</i>	\$ 61,368,082	\$155,190,611	\$256,228,116	\$326,725,135

VII. RATE OF RETURN

VII.9. Describe long-term debt reacquisitions by company and parent as follows:

- a. Reacquisitions by issue by year.
- b. Total gain on reacquisitions by issue by year.
- c. Accounting of gain for income tax and book purposes.

RESPONSE:

PWSA does not have any long-term debt reacquisitions.

VII. RATE OF RETURN

VII.10. Provide the following information concerning compensating bank balance requirements for actual per book test year:

- a. Name of each bank.
- b. Address of each bank.
- c. Type of accounts with each bank (checking, savings, escrow, other services, etc.).
- d. Average daily balance in each account.
- e. Amount and percentage requirements for compensating bank balances at each bank.
- f. Average daily compensating bank balance at each bank.
- g. Documents from each bank explaining compensating bank balance requirements.
- h. Interest earned on each type of account.

RESPONSE:

PWSA does not have compensating bank balances.

Pittsburgh Water and Sewer Authority's Base Rate Filing

VII. RATE OF RETURN

VII.11. Provide the following information concerning bank notes payable for actual per book test year:

- a. Line of credit at each bank.
- b. Average daily balances of notes payable to each bank, by name of bank.
- c. Interest rate charged on each bank note (prime rate, formula).
- d. Purpose of each bank note, (for example, construction, fuel storage, working capital, debt retirement).
- e. Prospective future need for this type of financing.

RESPONSE:

- a. PWSA has a drawdown revolving line of credit facility with JPMorgan Chase Bank N.A. At this time, the maximum amount that can be drawn and outstanding at any one time is \$80 million, although PWSA is considering increasing this amount.
- b. The average daily amount outstanding in 2017 was \$27.8 million.
- c. Each revolving advance bears interest at the LIBOR Index Rate, which ranged from 1.4958% to 2.04% during the year ended December 31, 2017.
- d. PWSA uses this credit facility for financing certain capital costs. Once PWSA reaches the maximum, the intent is to refund the outstanding principal into long-term revenue bonds.
- e. PWSA will continue to rely on this type of borrowing instrument in the foreseeable future.