NEW ISSUE – BOOK-ENTRY ONLY

RATINGS: Fitch: "A+"
Moody's: "A1"
S&P: "A+"
(See "RATINGS" herein)

In the opinions of Co-Bond Counsel, under existing law, interest on the Bonds is excludable from gross income for purposes of federal income tax, assuming continuing compliance by the City with the requirements of the federal tax law. Interest on the Bonds is not a preference item for purposes of the individual federal alternative minimum tax; however, interest paid to certain corporate holders of the Bonds indirectly may be subject to alternative minimum tax under circumstances described under "TAX EXEMPTION" herein. Under the laws of the Commonwealth of Pennsylvania, as enacted and construed on the date of initial delivery of the Bonds, the Bonds are exempt from personal property taxes and interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax. For a more complete discussion of federal and state tax exemptions, see "TAX EXEMPTION" herein.

$276,935,000
CITY OF PHILADELPHIA, PENNSYLVANIA
Water and Wastewater Revenue Bonds,
Series 2018A

Dated: Date of Delivery **Due: October 1, as shown on the inside front cover**

The City of Philadelphia, Pennsylvania, a corporation, body politic and city of the first class existing under the laws of the Commonwealth of Pennsylvania (the "City") is issuing its $276,935,000 Water and Wastewater Revenue Bonds, Series 2018A (the "Bonds") pursuant to (i) the First Class City Revenue Bond Act and (ii) the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989 (as supplemented and amended, collectively referred to as the "General Ordinance"). The Bonds are being issued for the purpose of providing funds which, together with other available funds of the City, will be used to finance (i) capital improvements to the City's Water and Wastewater Systems and (ii) the costs of issuance relating to the Bonds. See "PLAN OF FINANCE" and "ESTIMATED SOURCES AND USES OF FUNDS" herein. Capitalized terms used but not otherwise defined in this Official Statement have the meanings ascribed to them in APPENDIX III-A hereof.

The Bonds are special obligations of the City secured, equally and ratably, with the City's outstanding Water and Wastewater Revenue Bonds (other than Subordinated Bonds, of which there are none outstanding on the date hereof) in the aggregate principal amount of $1,810,395,690 (as of September 30, 2018) issued under the General Ordinance and all Water and Wastewater Revenue Bonds hereafter issued under the General Ordinance (the "Water and Wastewater Revenue Bonds"). All Water and Wastewater Revenue Bonds are secured by a pledge of and security interest in all Project Revenues derived from the City's Water and Wastewater Systems (the "System") and by monies deposited in the funds and accounts (other than the Rebate Fund) established by the City under the General Ordinance (the "Water and Wastewater Funds"). Project Revenues means: (i) all rents, rates, fees and charges imposed or charged for connection to, or use or product of or services generated by the System to the ultimate users thereof, (ii) all payments under bulk contracts with municipalities, governmental instrumentalities or other bulk users, (iii) all subsidies or payments payable by federal, state or local governments or governmental agencies on account of the cost of operation of, or the payment of the principal of or interest on monies borrowed to finance costs chargeable to the System, (iv) all grants, payments and contributions made in aid or on account of the System exclusive of grants and similar payments and contributions solely in aid of construction and (v) all accounts, contract rights and general intangibles representing the foregoing "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS."

THE BONDS ARE PAYABLE SOLELY FROM PROJECT REVENUES AND MONIES DEPOSITED IN THE WATER AND WASTEWATER FUNDS. THE BONDS ARE SPECIAL OBLIGATIONS OF THE CITY AND DO NOT PLEDGE THE FULL FAITH, CREDIT OR TAXING POWER OF THE CITY, OR CREATE ANY DEBT OR CHARGE AGAINST THE TAX OR GENERAL REVENUES OF THE CITY, OR CREATE ANY LIEN OR CHARGE AGAINST ANY PROPERTY OF THE CITY OTHER THAN AGAINST THE PROJECT REVENUES AND AMOUNTS, IF ANY, AT ANY TIME ON DEPOSIT IN THE WATER AND WASTEWATER FUNDS.

Ordinance No. 171110-A, signed by the Mayor on April 24, 2018, includes certain amendments to the General Ordinance (the "Springing Amendments") that will become effective upon the consent of the holders of at least 67% of Water and Wastewater Revenue Bonds outstanding. See "INTRODUCTORY STATEMENT – Recent Amendments to General Ordinance" herein and APPENDIX III-A and APPENDIX III-B hereof. **By virtue of their purchase, holders of the Bonds will consent or be deemed to have consented to the Springing Amendments.**

The Bonds will be issued only as fully registered bonds and, when issued, will be registered in the name of Cede & Co., as nominee of The Depository Trust Company, New York, New York ("DTC"), which will act as securities depository for the Bonds. Purchasers will not receive certificates representing their ownership interests in the Bonds purchased. Disbursements of principal, interest or redemption payments are the responsibility of DTC.

The Bonds will be dated and will bear interest from the date of delivery thereof. Interest on Bonds will be payable semiannually on April 1 and October 1 of each year, beginning April 1, 2019. The Bonds are subject to optional and mandatory sinking fund redemption prior to maturity as described herein.

This cover page contains information for quick reference only. It is not a summary of this issue. Investors must read the entire Official Statement, including the Appendices, which are an integral part hereof, to obtain information essential to making an informed investment decision regarding the Bonds.

The Bonds are offered when, as and if issued and delivered to and received by the Underwriters (defined herein), and subject to the legal opinions of Ballard Spahr LLP and Ahmad Zaffarese LLC, both of Philadelphia, Pennsylvania, Co-Bond Counsel. Certain legal matters will be passed upon for the Underwriters by Dilworth Paxson LLP, Philadelphia, Pennsylvania. Certain legal matters will be passed upon for the City by the City Solicitor. Certain other legal matters respecting the Bonds will be passed upon for the City by Greenberg Traurig, LLP and Turner Law, P.C., both of Philadelphia, Pennsylvania, Co-Disclosure Counsel. It is expected that the Bonds will be available for delivery through the facilities of DTC on or about November 28, 2018.

CITIGROUP **SIEBERT CISNEROS SHANK & CO., L.L.C.**

BofA Merrill Lynch **FTN Financial Capital Markets** **PNC Capital Markets, LLC**

The Williams Capital Group, L.P. **UBS Financial Services Inc.**

The date of this Official Statement is November 15, 2018

$276,935,000
CITY OF PHILADELPHIA, PENNSYLVANIA
Water and Wastewater Revenue Bonds,
Series 2018A

MATURITIES, PRINCIPAL AMOUNTS, INTEREST RATES, PRICES, YIELDS AND CUSIPS*

Maturity Date (October 1)	Principal	Interest Rate	Price	Yield	CUSIP* (717893)
2019	$10,000,000	5.000%	102.497	1.990%	G54
2020	10,000,000	5.000	105.097	2.160	G62
2021	10,000,000	5.000	107.468	2.270	G70
2022	5,000,000	5.000	109.715	2.340	G88
2032	6,190,000	5.000	113.731†	3.350	G96
2033	6,505,000	5.000	113.194†	3.410	H20
2034	6,840,000	5.000	112.748†	3.460	H38
2035	7,190,000	5.000	112.039†	3.540	H46
2036	7,560,000	5.000	111.598†	3.590	H53
2037	7,945,000	5.000	111.247†	3.630	H61
2038	8,355,000	5.000	110.898†	3.670	H79

$48,650,000 5.00% Term Bonds due October 1, 2043, Priced at 109.685%† to Yield 3.810% CUSIP* H87

$62,475,000 5.00% Term Bonds due October 1, 2048, Priced at 109.084%† to Yield 3.880% CUSIP* H95

$80,225,000 5.00% Term Bonds due October 1, 2053, Priced at 107.980%† to Yield 4.010% CUSIP* J28

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* The above CUSIP (Committee on Uniform Securities Identification Procedures) numbers have been assigned by an organization not affiliated with the City or the Underwriters, and such parties are not responsible for the selection or use of the CUSIP numbers. The CUSIP numbers are included solely for the convenience of bondholders and no representation is made as to the correctness of such CUSIP numbers. CUSIP numbers assigned to securities may be changed during the term of such securities based on a number of factors including, but not limited to, the refunding or defeasance of such issue or the use of secondary market financial products. Neither the City nor the Underwriters have agreed to, and there is no duty or obligation to, update this Official Statement to reflect any change or correction in the CUSIP numbers set forth above. CUSIP is a registered trademark of the American Bankers Association (the "ABA"). CUSIP data is provided by CUSIP Global Services, which is managed on behalf of the ABA by S&P Global Market Intelligence, a part of S&P Global, Inc.

† Priced to first optional call date of October 1, 2028.

CITY OF PHILADELPHIA, PENNSYLVANIA

MAYOR
Honorable James F. Kenney

MAYOR'S CHIEF OF STAFF
James Engler

MAYOR'S CABINET

Michael DiBerardinis	Managing Director
Rob Dubow	Director of Finance
Marcel S. Pratt, Esq.	City Solicitor
Nolan Atkinson	Chief Diversity & Inclusion Officer
Christine Derenick-Lopez	Chief Administrative Officer
Harold Epps	Commerce Director
Anne Fadullon	Director of Planning & Development
Otis Hackney	Chief Education Officer
Sheila Hess	City Representative
Ellen Kaplan	Chief Integrity Officer
Amy Kurland	Inspector General
Richard Lazer	Deputy Mayor for Labor Relations
Deborah Mahler	Deputy Mayor for Intergovernmental Affairs
Mark Wheeler	Chief Information Officer

CITY TREASURER
Rasheia Johnson

CITY CONTROLLER
Rebecca Rhynhart

PHILADELPHIA WATER DEPARTMENT
Aramark Tower at One Reading Center
Philadelphia, Pennsylvania 19107

Debra A. McCarty, Water Commissioner
Michelle L. Bethel, Deputy Revenue Commissioner
Marc Cammarata, Deputy Water Commissioner
Joanne Dahme, General Manager, Public Affairs
Stephen J. Furtek, General Manager, Engineering and Construction
David A. Katz, Deputy Water Commissioner
Melissa LaBuda, Deputy Water Commissioner
Gerald D. Leatherman, Deputy Water Commissioner
Sarah E. Stevenson, Assistant Deputy Water Commissioner
Donna Schwartz, Deputy Water Commissioner
Scott J. Schwarz, General Counsel to the Water Department
Alicia Robertson, Assistant Deputy Water Commissioner

Consulting Engineer
Black & Veatch Management Consulting, LLC

Financial Advisors
Acacia Financial Group, Inc. and
PFM Financial Advisors LLC

No dealer, broker, salesperson or other person has been authorized by the City or the Underwriters (defined herein) to give any information or to make any representations with respect to the Bonds other than those contained in this Official Statement, and, if given or made, such other information or representations must not be relied upon. This Official Statement does not constitute an offer to sell or the solicitation of an offer to buy, nor shall there be any sale of the Bonds by any person in any jurisdiction in which it is unlawful for such person to make such offer, solicitation or sale.

This Official Statement is not to be construed as a contract with the purchasers of the Bonds. The information set forth herein has been obtained from the City and other sources believed to be reliable and has been reviewed by the Underwriters in accordance with and as part of their responsibilities to investors under the federal securities laws as applied to the facts and circumstances of this transaction but is not guaranteed as to accuracy or completeness by the Underwriters who provided this sentence for inclusion here. This information and expressions of opinions herein are subject to change without notice, and neither delivery of this Official Statement nor any sale made hereunder shall, under any circumstances, create any implication that there has been no change in the affairs of the City or the Water Department since the date hereof.

Statements contained in this Official Statement, including the Appendices hereto, which involve estimates, forecasts or other matters of opinion, whether or not expressly so described herein, are intended solely as such and are not to be construed as representations of fact. If and when included in this Official Statement, the words “expects,” “forecasts,” “projects,” “intends,” “anticipates,” “estimates,” “assumes” and analogous expressions are intended to identify forward-looking statements and any such statements inherently are subject to a variety of risks and uncertainties that could cause actual results to differ materially from those that have been projected. Such risks and uncertainties which could affect the amount of revenue collected by the City or the Water Department include, among others, changes in economic conditions and various other events, conditions and circumstances, many of which are beyond the control of the City and the Water Department. Such forward-looking statements speak only as of the date of this Official Statement. The City disclaims any obligation or undertaking to release publicly any updates or revisions to any forward-looking statement contained herein to reflect any changes in the City’s expectations with regard thereto or any change in events, conditions or circumstances on which any such statement is based.

Upon their issuance, the Bonds will not be registered under the Securities Act of 1933, as amended, will not be listed on any stock or other securities exchange and neither the Securities and Exchange Commission nor any other federal, state, municipal or other governmental entity, other than the City (subject to the limitations set forth herein), will have passed upon the accuracy or adequacy of this Official Statement.

This Official Statement is submitted in connection with the sale of the securities referred to herein and may not be reproduced or used, in whole or in part, for any other purpose.

The order and placement of materials in this Official Statement, including the Appendices hereto, are not to be deemed to be a determination of relevance, materiality or importance, and this Official Statement, including the Appendices, must be considered in its entirety.

IN MAKING AN INVESTMENT DECISION, INVESTORS MUST RELY ON THEIR OWN EXAMINATION OF THE CITY, THE WATER DEPARTMENT AND THE TERMS OF THE OFFERING, INCLUDING THE MERITS AND RISKS INVOLVED. THESE SECURITIES HAVE NOT BEEN RECOMMENDED BY ANY FEDERAL OR STATE SECURITIES COMMISSION OR REGULATORY AUTHORITY. FURTHERMORE, THE FOREGOING AUTHORITIES HAVE NOT CONFIRMED THE ACCURACY OR DETERMINED THE ADEQUACY OF THIS DOCUMENT. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

IN CONNECTION WITH THE OFFERING OF THE BONDS, THE UNDERWRITERS MAY OVER-ALLOT OR EFFECT TRANSACTIONS WHICH STABILIZE OR MAINTAIN THE MARKET PRICE OF THE BONDS AT A LEVEL ABOVE THAT WHICH MIGHT OTHERWISE PREVAIL IN THE OPEN MARKET. SUCH STABILIZING, IF COMMENCED, MAY BE DISCONTINUED AT ANY TIME WITHOUT PRIOR NOTICE.

This Official Statement speaks only as of the date printed on the cover page hereof. This Official Statement, and any supplement or amendment thereto, will be delivered to the Municipal Securities Rulemaking Board through the Electronic Municipal Market Access System.

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OFFICIAL STATEMENT SUMMARY

This summary is furnished to provide limited introductory information regarding the terms of the Bonds and is qualified by the more detailed descriptions appearing in this Official Statement and the appendices hereto. The offering of the Bonds is made only by means of this entire Official Statement, and no person is authorized to make offers to sell or solicit offers to buy the Bonds unless the entire Official Statement is delivered. Certain terms used in this summary are defined elsewhere in this Official Statement.

The City	The City of Philadelphia, Pennsylvania (the "City") is a corporation, body politic and city of the first class of the Commonwealth of Pennsylvania.
The Bonds	$276,935,000 City of Philadelphia, Pennsylvania Water and Wastewater Revenue Bonds, Series 2018A ("Bonds"), as shown on the inside cover page of this Official Statement.
Use of Proceeds	The Bonds are being issued for the purpose of providing funds which, together with other available funds of the City, will be used to finance (i) capital improvements of the City's Water and Wastewater Systems and (ii) the costs of issuance relating to the Bonds. See "PLAN OF FINANCE" and "ESTIMATED SOURCES AND USES OF FUNDS" contained herein.
Maturity	The Bonds mature on the dates in the principal amounts set forth in the inside cover page hereof.
Interest	Interest on the Bonds accrues from their date of delivery and is payable on April 1 and October 1, commencing April 1, 2019, until maturity or earlier redemption.
Redemption	The Bonds are subject to optional and mandatory sinking fund redemption prior to maturity as described herein. See "THE BONDS – Redemption Provisions" contained herein.
Ratings	Fitch Ratings, Inc. ("Fitch"), Moody's Investors Service, Inc. ("Moody's") and S&P Global Ratings ("S&P") have assigned credit ratings of "A+", "A1" and "A+", respectively, to the Bonds. See "RATINGS" contained herein.
Security for the Bonds	The Bonds, together with other Water and Wastewater Revenue Bonds currently outstanding or hereafter issued under the General Ordinance, are revenue bonds secured by and payable from (i) all rents, rates, fees and charges imposed or charged for connection to, or use or product of or services generated by the System to the ultimate users thereof, (ii) all payments under bulk contracts with municipalities, governmental instrumentalities or other bulk users, (iii) all subsidies or payments payable by Federal, State or local governments or governmental agencies on account of the cost of operation of, or the payment of the principal of or interest on monies borrowed to finance costs chargeable to the System, (iv) all grants, payments and contributions made in aid or on account of the System exclusive of grants and similar payments and contributions solely in aid of construction and (v) all accounts, contract rights and general intangibles representing the foregoing (collectively referred to as, the "Project Revenues"). The City pledges, assigns and grants to the Fiscal Agent, in trust for the security and payment of all Water and Wastewater Revenue Bonds, a lien on and security interest in all Project Revenues and all amounts on deposit in or standing to the credit of the Water and Wastewater Funds, for the equal and ratable benefit of all

	present and future holders of Water and Wastewater Revenue Bonds issued under the General Ordinance. See "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS" contained herein.
Debt Reserve Account	On the date of issuance of the Bonds, the outstanding balance in the Debt Reserve Account will be sufficient to meet the Debt Reserve Requirement for all Water and Wastewater Revenue Bonds outstanding after the issuance of the Bonds. If at any time and for any reason, the monies in the Debt Service Account of the Sinking Fund are insufficient to pay as and when due, the principal of (and premium, if any) or interest on any Water and Wastewater Revenue Bond, the Fiscal Agent is authorized and directed to withdraw from the Debt Reserve Account and pay over the amount of such deficiency for deposit in the Debt Service Account. As of September 30, 2018, the balance of cash and investments in the Debt Reserve Account was $202,358,702.68, which was in excess of the Debt Reserve Requirement on such date. See "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Debt Reserve Account."
Parity Bonds	All Water and Wastewater Revenue Bonds are equally and ratably secured under the General Ordinance.
Rate Covenant	The City covenants to Bondholders that it will establish rents, rates, fees and charges for the use of the System sufficient to yield Net Revenues in each Fiscal Year at least equal to 1.20 times the Debt Service Requirements for such Fiscal Year. In addition, the City covenants with Bondholders that Net Revenues, in each Fiscal Year, will be at least equal to (A) 90% of the Debt Service Requirements for each Fiscal Year (recalculated to exclude principal and interest payments in respect of Subordinated Bonds) and (B) 1.00 times the following, referred to as "total debt service" for such Fiscal Year: (i) the Debt Service Requirements; (ii) amounts required to be deposited into the Debt Reserve Account; (iii) debt service payable on General Obligation Bonds issued for the System; (iv) debt service due on Interim Debt; and (v) the Capital Account Deposit Amount, less any amounts transferred from the Residual Fund to the Capital Account. As of the date hereof, no General Obligation Bonds issued for the System are outstanding, and no Interim Debt is outstanding. See "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Rate Covenant" contained herein.
Springing Amendments	Ordinance No. 171110-A, signed by the Mayor on April 24, 2018, includes certain amendments to the General Ordinance (the "Springing Amendments") that will become effective upon the consent of the holders of at least 67% of Water and Wastewater Revenue Bonds outstanding. See "INTRODUCTORY STATEMENT – Amendments to General Ordinance" herein and APPENDIX III-A and APPENDIX III-B hereof. **By virtue of their purchase, holders of the Bonds will consent or be deemed to have consented to the Springing Amendments. The consent of the holders of 67% of Water and Wastewater Bonds outstanding will <u>not</u> be met upon the issuance of the Bonds.**
Consulting Engineer's Report	Black & Veatch Management Consulting, LLC has performed engineering evaluations of the current condition and financial operations of the System providing the basis for the required findings that Net Revenues are sufficient to comply with the Rate Covenant and that the System is in good operating condition. See "INTRODUCTORY STATEMENT – Consulting Engineer's Report" and APPENDIX II for a copy of the Engineering Report.

Book-Entry Only System	The Bonds are initially issuable only to Cede & Co., the nominee of The Depository Trust Company, New York, New York ("DTC"), pursuant to a book-entry only system. No physical delivery of the Bonds will be made to the beneficial owners of the Bonds. Principal of and interest on the Bonds will be paid to Cede & Co., which will distribute such payments to the participating members of DTC for remittance to the beneficial owners of the Bonds. See APPENDIX VIII herein.
No Payment Defaults	The City has never failed to make a payment of principal of or interest on its Water and Wastewater Revenue Bonds.
Fiscal Agent/Registrar	The Fiscal Agent and registrar for the Bonds is U.S. Bank National Association, Philadelphia, Pennsylvania.
Tax Exemption	In the opinions of Co-Bond Counsel, interest on the Bonds is excludable from gross income for purposes of federal income tax, assuming continuing compliance by the City with the requirements of the federal tax laws. Interest on the Bonds is not a preference item for purposes of the individual federal alternative minimum tax; however, interest paid to certain corporate holders of the Bonds may be subject to alternative minimum tax under certain circumstances described under "TAX EXEMPTION" herein. Under the laws of the Commonwealth of Pennsylvania, the Bonds are exempt from personal property taxes and interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax. For a more complete discussion of federal and state tax exemptions, see "TAX EXEMPTION" contained herein.
Investment Considerations	For certain investment considerations relating to the decision to purchase the Bonds, see "INVESTMENT CONSIDERATIONS."

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OFFICIAL STATEMENT
relating to

$276,935,000
City of Philadelphia, Pennsylvania
Water and Wastewater Revenue Bonds,
Series 2018A

INTRODUCTORY STATEMENT

General

This Official Statement, including the cover page and appendices attached hereto, sets forth certain information in connection with the issuance by the City of Philadelphia, Pennsylvania, a corporation, body politic and city of the first class existing under the laws of the Commonwealth of Pennsylvania (the "City") of its Bonds. Capitalized terms used but not otherwise defined in this Official Statement have the meanings ascribed to them in APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Certain Definitions."

The Bonds are being issued for the purpose of providing funds which, together with other available funds of the City, will be used to finance (i) capital improvements to the City's Water and Wastewater Systems and (ii) the costs of issuance relating to the Bonds. See "PLAN OF FINANCE" and "ESTIMATED SOURCES AND USES OF FUNDS" herein.

The Bonds are being issued under (i) The First Class City Revenue Bond Act, P.L. 955, Act No. 234 of the General Assembly of the Commonwealth of Pennsylvania, approved October 18, 1972 (the "Act") and (ii) the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989, approved by the Mayor June 24, 1993 (the "Restated General Ordinance"), as supplemented and amended from time to time, including by the Seventeenth Supplemental Ordinance approved by the Mayor on April 4, 2014 (the "Seventeenth Supplemental Ordinance") and the Eighteenth Supplemental Ordinance approved by the Mayor on December 8, 2015 (the "Eighteenth Supplemental Ordinance"), which provide specific authority for the issuance of the Bonds. The Restated General Ordinance, as supplemented or amended from time to time, is referred to as the "General Ordinance." All bonds issued under the General Ordinance (whether prior to or following the date hereof) are referred to herein as "Water and Wastewater Revenue Bonds." U.S. Bank National Association, Philadelphia, Pennsylvania, is acting as Fiscal Agent (the "Fiscal Agent") for the Water and Wastewater Revenue Bonds.

Changes from the Preliminary Official Statement. The Preliminary Official Statement for the Bonds, as supplemented, was dated November 6, 2018 (the "Preliminary Official Statement"). In addition to updating the Preliminary Official Statement to reflect pricing information for the Bonds, the City has included additional information regarding the scheduled hearing on the on the Public Advocate's motion to stay rates and charges that occurred on November 7, 2018, see "RATES – Current Rates" herein. The City also has included a summary of certain key financial results from the FY 2019 First Quarter QCMR (as defined in APPENDIX IV), which was released on November 15, 2018. For more information on the FY 2019 First Quarter QCMR, see APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – DISCUSSION OF FINANCIAL OPERATIONS – Current Financial Information – FY 2019 First Quarter QCMR."

The Water Department

Pursuant to the Philadelphia Home Rule Charter (the "Charter"), the City's Water Department (the "Water Department") has the power and duty to operate, maintain, repair and improve the City's water system (the "Water System") and the City's wastewater system (the "Wastewater System" and together with the Water System, the "Water and Wastewater Systems" or the "System"). The Water Department, which began water service in the 1800's, supplies water and wastewater services to customers within the City and has one wholesale water contract and ten wholesale wastewater contracts with entities outside the City. Under the General Ordinance, the Water and Wastewater Systems are treated as one combined utility for the purpose of revenue bond financing. See "THE WATER DEPARTMENT" herein.

Rate Covenant Under the General Ordinance

Under the General Ordinance, the City must set rates and charges at levels that provide sufficient revenue to meet Operating Expenses (defined herein) of the System, including Interfund Charges (defined herein) for services provided to the Water Department, and Debt Service Requirements on all obligations issued for the Water Department, as well as to meet other specific covenants contained in the General Ordinance. For a more detailed discussion, see "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Rate Covenant" and "RATES" contained herein.

Recent Amendments to General Ordinance

Ordinance No. 171110-A, signed by the Mayor on April 24, 2018 (the "Twenty-First Supplemental Ordinance") includes amendments to the General Ordinance. Certain amendments became effective when the Mayor signed the Twenty-First Supplemental Ordinance and certain amendments (the "Springing Amendments") will become effective upon the consent of the holders of at least 67% of Water and Wastewater Revenue Bonds outstanding (the "67% Effective Date").

By virtue of their purchase, holders of the Bonds will consent or be deemed to have consented to the Springing Amendments. The consent of the holders of 67% of Water and Wastewater Revenue Bonds outstanding will <u>not</u> be met upon the issuance of the Bonds.

On the 67% Effective Date, the Springing Amendments contained in the Twenty-First Supplemental Ordinance will amend the General Ordinance as follows.

1. In Section 2.01, amend the definitions of "Credit Facility" and "Substitute Credit Facility" to remove the minimum rating threshold for a Credit Facility and a Substitute Credit Facility provider.

2. In Section 2.01, amend the definition of "Rating Agency" to include any rating service that has a rating in effect for the Water and Wastewater Revenue Bonds at the subject time.

3. Amend Section 4.09 to allow the City, pursuant to the Supplemental Ordinance authorizing the issuance of a Series of Water and Wastewater Revenue Bonds, to establish a separate debt reserve subaccount in the Debt Reserve Account to secure such Series of Water and Wastewater Revenue Bonds (and only such Series) in lieu of a deposit to the Debt Reserve Account in respect of such Series of Water and Wastewater Revenue Bonds, upon receipt of a rating confirmation from any one Rating Agency then rating the Water and Wastewater Revenue Bonds that such action, in and of itself, will not result in a downgrade, suspension or withdrawal of the credit rating on any Water and Wastewater Revenue Bonds Outstanding.

4. Further amend Section 4.09 to allow the City, pursuant to the Supplemental Ordinance authorizing the issuance of a Series of Water and Wastewater Revenue Bonds, to provide for no

deposit to the Debt Reserve Account and no establishment of a Series-specific debt reserve subaccount in respect of a Series of Water and Wastewater Revenue Bonds, upon receipt of a rating confirmation from any one Rating Agency then rating the Water and Wastewater Revenue Bonds that such action, in and of itself, will not result in a downgrade, suspension or withdrawal of the credit rating on any Water and Wastewater Revenue Bonds Outstanding.

5. In connection with #3 and #4 above, add the definitions "Series Debt Reserve Requirement" and "Series Debt Reserve Subaccount" to Section 2.01.

6. Further amend Section 4.09 to permit the City to transfer any excess in the Debt Reserve Account or subaccount thereof directly to (i) the Sinking Fund or a refunding escrow to pay the Debt Service Requirements or redemption price, as applicable, on Water and Wastewater Revenue Bonds secured by such account or subaccount, or (ii) if such moneys do not constitute tax-exempt bond proceeds, the Residual Fund for the purposes thereof.

7. Further amend Section 4.09 to permit the City, in connection with the issuance of refunding bonds pursuant to Section 5.04(g) of the General Ordinance, to transfer amounts from the Debt Reserve Account or a subaccount held by the Fiscal Agent in respect of the Water and Wastewater Revenue Bonds being refunded to the Debt Reserve Account or a subaccount to satisfy any debt reserve requirements in respect of such refunding bonds.

8. Amend the provisions of Section 4.09 relating to the City's right to deposit into the Debt Reserve Account, to meet the Debt Reserve Requirement, a surety bond, irrevocable letter of credit or insurance policy (a "Debt Reserve Facility"), to qualify a Debt Reserve Facility whose provider has a current long-term rating in at least the "A" category from one Rating Agency at the time the Debt Reserve Facility is obtained by the City. In the event that after the City has deposited cash into the Debt Reserve Account as required in connection with a Debt Reserve Facility rating reduction or suspension, but prior to any cancellation thereof, such Debt Reserve Facility meets the rating criteria described above, no excess of the Debt Reserve Requirement will result for purposes of calculating the Debt Reserve Requirement.

9. Amend Section 5.01 of the General Ordinance concerning the determination of Debt Service Requirements relating to Variable Rate Bonds for the purposes of meeting the Rate Covenant and the requirements for issuing additional Water and Wastewater Revenue Bonds, and concerning the determination of the Debt Reserve Requirement relating to variable rate bonds.

10. In connection with #9 above, (i) amend the definition of "Debt Service Requirements" in, and (ii) add a definition of "Balloon Bonds" to, Section 2.01.

See "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Debt Reserve Account – *Springing Amendments*" herein and APPENDIX III-A and APPENDIX III-B of this Official Statement for additional description of the Springing Amendments and other amendments; and see APPENDIX III-B of this Official Statement for a copy of the Twenty-First Supplemental Ordinance.

Rate Ordinance and Ratemaking Board

Ordinance No. 130251-A (the "Rate Ordinance") amended the Philadelphia Code to establish an independent rate-making body known as the Philadelphia Water, Sewer, and Stormwater Rate Board (the "Rate Board") responsible for fixing and regulating rates and charges for supplying water, sewer and stormwater services. For a further discussion of the Rate Ordinance, see "RATES – Charter Amendment and Rate Ordinance."

Security and Sources of Payment for the Bonds

The Bonds, equally and ratably with all Water and Wastewater Revenue Bonds (other than Subordinated Bonds), are payable from and secured by a pledge of all Project Revenues and amounts on deposit in the Water and Wastewater Funds. See "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS" herein and APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance."

Under the General Ordinance, a Debt Reserve Account of the Sinking Fund has been established to secure the Water and Wastewater Revenue Bonds, other than Subordinated Bonds (of which none currently are outstanding). On the date of issuance of the Bonds, the outstanding balance in the Debt Reserve Account will be sufficient to meet the Debt Reserve Requirement for all Water and Wastewater Revenue Bonds outstanding after the issuance of the Bonds. For a discussion of the Debt Reserve Account, see "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Debt Reserve Account" herein.

Consulting Engineer's Report

Black & Veatch Management Consulting, LLC (the "Consulting Engineer") has delivered to the City its engineering report dated as of October 26, 2018 (the "Engineering Report"), a copy of which is attached hereto and incorporated herein by reference as APPENDIX II. The assessments concerning the condition and current and future financial operations of the System contained in the Engineering Report provide the basis for the following findings: (i) that Project Revenues will be sufficient to meet payment or deposit requirements of the operation, maintenance, repair and replacement of the System, reserve funds, and principal or redemption price of and interest on outstanding Water and Wastewater Revenue Bonds (including the Bonds); (ii) that Net Revenues (including projected revenue increases as indicated in the Engineering Report) are currently sufficient to comply with the Rate Covenant and are projected to be sufficient to comply with the Rate Covenant for each of the two Fiscal Years following the Fiscal Year in which the Bonds are issued; and (iii) that the System is in good operating condition or that adequate steps are being taken to return it to good operating condition. The findings above mirror the findings made by the Director of Finance in connection with the adoption by City Council of the Seventeenth Supplemental Ordinance and the Eighteenth Supplemental Ordinance, pursuant to which the Bonds are authorized and issued, based upon the financial and operating condition of the System at the time each Supplemental Ordinance was adopted.

Capital Improvement Program

As required by the Charter, the Water Department has adopted a six-year capital improvement program to plan and manage the capital investments necessary to fulfill the Water Department's service missions, comply with regulatory requirements and preserve and upgrade the System (the "Water Capital Improvement Program"). The Water Department updates the Water Capital Improvement Program annually as part of its yearly budget process, based on a detailed project review by engineering staff, external engineering consultants, and senior management. For a more detailed discussion of the Water Capital Improvement Program and the Water Department's capital budgeting process, see "CAPITAL IMPROVEMENT PROGRAM" herein.

Financial Information

The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City. The Water Fund is an accounting convention established pursuant to the Charter to account for the assets, liabilities, revenues, expenses of, and to measure Rate Covenant compliance for, the Water and Wastewater System.

The City is required by the Charter to issue, within 120 days after the close of each Fiscal Year, a statement as of the end of the Fiscal Year showing the balances in all funds of the City, the amounts of the

City's known liabilities, and such other information as is necessary to furnish a true picture of the City's financial condition (the "Annual Financial Report"). The Annual Financial Report, which is released on or about October 28 of each year, is intended to meet these requirements and is unaudited. The Annual Financial Report contains financial statements for all City governmental funds and blended component units presented on the modified accrual basis. The Annual Financial Report also contains a budgetary comparison schedule for the Water Fund in the supplementary information. The City released the Annual Financial Report for Fiscal Year 2017 on or about October 27, 2017 and the Annual Financial Report for Fiscal Year 2018 on October 26, 2018.

The City reports its financial performance for each Fiscal Year on a consolidated basis in its audited Comprehensive Annual Financial Report ("CAFR"), which is published not later than February 28 of each year. The City's CAFR for Fiscal Year 2017, which includes audited financials of and other information relating to the Water Fund, was filed on the Electronic Municipal Market Access System of the Municipal Securities Rulemaking Board ("MSRB") on February 24, 2018 and is available at http://www.emma.msrb.org. The City Controller has examined and expressed opinions on the basic financial statements of the City contained in the CAFR for Fiscal Year 2017. See APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – City Finances and Financial Procedures – Independent Audit and Opinion of the City Controller."

The financial statements of the Water Fund for the Fiscal Year ended June 30, 2017, attached hereto as APPENDIX I, are derived from the CAFR for the Fiscal Year ended June 30, 2017. Preliminary, unaudited Financial Statements for Fiscal Year 2018 are detailed in the Annual Financial Report. The financial statements pertaining to the Water Fund are derived from the CAFR in order to present the financial condition of the Water Fund separately from the financial condition of the City and its other funds and units as a whole. The City Controller has neither examined nor expressed an opinion on the financial statements of the Water Fund contained in APPENDIX I to this Official Statement or on any other financial data contained in this Official Statement, except as noted in the preceding paragraph as to the CAFR.

The City Controller has neither participated in the preparation of this Official Statement nor in the preparation of the budget estimates and projections and cash flow statements and forecasts set forth in various tables contained in this Official Statement except as noted regarding the CAFR. The City Controller expresses no opinion with respect to any of the data contained in this Official Statement.

Miscellaneous

Brief descriptions of the Water Department, the Bonds and the security therefor, and certain information about the City are included herein. All references herein to the Act, the Charter, the General Ordinance and the Engineering Report are qualified in all respects by reference to each such document in its entirety. The Annual Financial Report, the CAFR, and the financial statements of the Water Fund are available on the City's Investor Website at http://www.phila.gov/investor (the "City's Investor Website").

The "Terms of Use" statement of the City's Investor Website, which applies to all users of the City's Investor Website, provides, among other things, that the information contained therein is provided for the convenience of the user, that the City is not obligated to update such information, and that the information may not provide all information that may be of interest to investors. The information contained on the City's Investor Website does not constitute an offer to buy or sell securities, nor is it a solicitation therefor. The information contained in the City's Investor Website is not incorporated by reference in this Official Statement and persons considering the purchase of the Bonds should rely only on information contained in this Official Statement or incorporated by reference herein.

The foregoing statement as to filing or furnishing of additional information reflects the City's current practices but is not a contractual obligation to the holders of the City's bonds. The foregoing information is furnished solely to provide limited introductory information with respect to the Bonds and does not purport to be comprehensive or definitive. All such information is qualified in its entirety by reference to the more detailed descriptions appearing elsewhere in this Official Statement, inclusive of the Appendices, which should be read in its entirety, and to the complete documents referenced herein. The sale of the Bonds is made only by means of this entire Official Statement.

The financial statements of the Water Fund, are attached hereto as APPENDIX I. The Engineering Report is attached hereto as APPENDIX II. Summaries of certain provisions of the Act, the General Ordinance, the Seventeenth Supplemental Ordinance and the Eighteenth Supplemental Ordinance, (including definitions of certain terms), are attached hereto as APPENDIX III-A. A description of the Government and Financial Information of the City is attached hereto as APPENDIX IV. The City of Philadelphia Socioeconomic Information is attached hereto as APPENDIX V. The form of approving opinion of Co-Bond Counsel to be delivered in connection with the issuance and delivery of the Bonds is attached hereto as APPENDIX VI. The form of Continuing Disclosure Agreement relating to the Bonds is attached hereto as APPENDIX VII. Information relating to the Depository Trust Company is attached hereto as APPENDIX VIII.

PLAN OF FINANCE

The City is issuing the Bonds to provide funds which together with other available funds of the City, will be used to finance (i) capital improvements to the City's Water and Wastewater Systems and (ii) the costs of issuance relating to the Bonds.

ESTIMATED SOURCES AND USES OF FUNDS

The following table sets forth estimated sources and uses of the proceeds of the Bonds.

Sources of Funds	**Total**
Principal Amount of the Bonds	$276,935,000.00
Original Issue Premium	24,907,583.25
Total Sources of Funds	$301,842,583.25
Uses of Funds	
Deposit to Construction Fund	$300,000,000.00
Costs of Issuance*	1,842,583.25
Total Uses of Funds	$301,842,583.25

* Includes Underwriters' discount; legal, printing, rating agency, consultant, Fiscal Agent and financial advisor fees; and other expenses of the issuance and offering of the Bonds.

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THE BONDS

General

The Bonds will be issued in the aggregate principal amount, will be dated, will bear interest at the rates and will mature on the dates and in the amounts shown on the inside front cover page of this Official Statement. The Bonds will be issued in fully-registered form, registered in the name of Cede & Co., as nominee of The Depository Trust Company ("DTC") pursuant to DTC's Book-Entry Only System. See APPENDIX VIII herein.

The Bonds will be issued in denominations of $5,000 or any integral multiple thereof. Interest on the Bonds, calculated on the basis of a 360-day year comprised of twelve 30-day months, will be payable semiannually on April 1 and October 1 of each year, commencing April 1, 2019 (each, an "Interest Payment Date"). The Record Date for the Bonds will be each March 15 and September 15.

Redemption Provisions

Optional Redemption. The Bonds maturing on or after October 1, 2032 are subject to optional redemption prior to maturity on or after October 1, 2028, at the option of the City, as a whole at any time or in part from time to time in the maturities selected by the City and within a maturity and a given interest rate, if applicable, by lot as determined by the Fiscal Agent at the redemption price of 100% of the principal amount of the Bonds to be redeemed, plus accrued interest to the redemption date.

Mandatory Sinking Fund Redemption. The Bonds maturing on October 1, 2043, October 1, 2048 and October 1, 2053 are subject to mandatory sinking fund redemption prior to maturity, as drawn by lot by the Fiscal Agent, in the following years at a redemption price equal to 100% of the principal amounts set forth below.

Bonds Maturing October 1, 2043

Year	Principal Amount
2039	$ 8,780,000
2040	9,235,000
2041	9,705,000
2042	10,205,000
2043*	10,725,000

*Final maturity

Bonds Maturing October 1, 2048

Year	Principal Amount
2044	$11,275,000
2045	11,855,000
2046	12,465,000
2047	13,105,000
2048*	13,775,000

*Final maturity

Bonds Maturing October 1, 2053

Year	Principal Amount
2049	$14,480,000
2050	15,225,000
2051	16,005,000
2052	16,825,000
2053*	17,690,000

*Final maturity

The principal amount of the Bonds required to be redeemed on each mandatory sinking fund redemption date may be reduced by the principal amount of the Bonds theretofore redeemed (otherwise than by mandatory sinking fund redemption) or delivered to the Fiscal Agent for cancellation, and not theretofore applied as a credit against any mandatory sinking fund redemption obligation. Any such reduction will be applied as a credit against the mandatory sinking fund obligation for the year or years selected by the City.

Notice of Redemption

Notice of the call for any redemption of Bonds prior to maturity shall be given in the name of the City and shall contain the following information: "CUSIP" number; and, in the case of a partial redemption of any Bond, the certificate number and the respective principal amounts of the Bonds to be redeemed; the publication date; the redemption date; the redemption price and the name and address of the redemption agent, and shall further identify the Bonds by date of issue, interest rate and maturity date. Such notice shall be given by the Fiscal Agent by depositing a copy of the notice of redemption in the United States mail, first-class, postage prepaid, at least 20 days and not more than 60 days prior to the date fixed for redemption, to the registered owner of each such Bond to be redeemed at the address shown on the registration books kept by the Fiscal Agent, provided, however, that notice of redemption shall be given by certified mail, return receipt requested, to each owner of at least $1,000,000 aggregate principal amount of Bonds.

Notice having been so given and provisions having been made for redemption from funds on deposit with the Fiscal Agent, all interest on Bonds called for redemption accruing after the date fixed for redemption shall cease, and the holders or registered owners of the Bonds called for redemption shall have no security, benefit or lien under the General Ordinance or any right except to receive payment of the redemption price.

If at the time of mailing notice of redemption the City shall not have deposited with the Fiscal Agent monies sufficient to redeem the Bonds called for redemption, such notice may state that it is conditional in that it is subject to the deposit of the redemption monies with the Fiscal Agent not later than the redemption date, and such notice shall be of no effect unless such monies are so deposited.

Debt Service Requirements

The table on the following page sets forth the Debt Service Requirements for the Bonds and the aggregate Debt Service Requirements for all Outstanding Water and Wastewater Revenue Bonds following the issuance of the Bonds.

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Table 1
Debt Service Requirements for Fiscal Years ending June 30
for Water and Wastewater Revenue Bonds
As of September 30, 2018

FY Ending June 30	Aggregate Debt Service on Water and Wastewater Revenue Bonds Outstanding[(1)]	The Bonds		Aggregate Debt Service
		Principal	Interest	
2019	$ 147,379,707		$ 4,730,973	$ 152,110,680
2020	174,009,080	$10,000,000	13,596,750	197,605,830
2021	152,277,691	10,000,000	13,096,750	175,374,441
2022	142,641,263	10,000,000	12,596,750	165,238,013
2023	142,029,229	5,000,000	12,221,750	159,250,979
2024	117,612,895	–	12,096,750	129,709,645
2025	117,784,575	–	12,096,750	129,881,325
2026	118,825,628	–	12,096,750	130,922,378
2027	118,902,112	–	12,096,750	130,998,862
2028	103,654,690	–	12,096,750	115,751,440
2029	118,356,579	–	12,096,750	130,453,329
2030	110,763,204	–	12,096,750	122,859,954
2031	110,838,154	–	12,096,750	122,934,904
2032	107,904,462	–	12,096,750	120,001,212
2033	88,518,414	6,190,000	11,942,000	106,650,414
2034	86,620,457	6,505,000	11,624,625	104,750,082
2035	86,274,869	6,840,000	11,291,000	104,405,869
2036	87,676,163	7,190,000	10,940,250	105,806,413
2037	85,867,000	7,560,000	10,571,500	103,998,500
2038	85,861,750	7,945,000	10,183,875	103,990,625
2039	85,866,000	8,355,000	9,776,375	103,997,375
2040	85,867,375	8,780,000	9,348,000	103,995,375
2041	91,310,375	9,235,000	8,897,625	109,443,000
2042	83,297,950	9,705,000	8,424,125	101,427,075
2043	83,294,881	10,205,000	7,926,375	101,426,256
2044	64,896,500	10,725,000	7,403,125	83,024,625
2045	54,128,125	11,275,000	6,853,125	72,256,250
2046	54,130,000	11,855,000	6,274,875	72,259,875
2047	19,082,375	12,465,000	5,666,875	37,214,250
2048	19,085,250	13,105,000	5,027,625	37,217,875
2049	19,085,656	13,775,000	4,355,625	37,216,281
2050	19,085,631	14,480,000	3,649,250	37,214,881
2051	19,083,406	15,225,000	2,906,625	37,215,031
2052	19,081,794	16,005,000	2,125,875	37,212,669
2053	19,083,550	16,825,000	1,305,125	37,213,675
2054	–	17,690,000	442,250	18,132,250
Total[(2)]	$3,040,176,791	$276,935,000	$322,049,848	$3,639,161,639

(1) As of September 30, 2018, the interest rate on the Series 1997B Bonds is calculated at 0.987082%, the average interest rate on the bonds during the 24 consecutive calendar months preceding the date of calculation, in accordance with the General Ordinance.

(2) Totals may not add due to rounding.

SECURITY AND SOURCES OF PAYMENT FOR THE BONDS

Parity Bonds

All Water and Wastewater Revenue Bonds (other than Subordinated Bonds) are equally and ratably secured under the General Ordinance. As of the date of this Official Statement, no Subordinated Bonds are Outstanding under the General Ordinance.

Pledge of Project Revenues

Pursuant to the General Ordinance, the City pledges and assigns to the Fiscal Agent, in trust, for the security and payment of all Water and Wastewater Revenue Bonds (other than Subordinated Bonds) issued under or subject to the General Ordinance, and grants to the Fiscal Agent, in trust, a lien on and security interest in all Project Revenues and amounts on deposit in or standing to the credit of the Water and Wastewater Funds (other than the Rebate Fund). The Fiscal Agent must hold and apply the security interest in and lien on Project Revenues and funds and accounts, in trust, for the equal and ratable benefit and security of all present and future holders of Water and Wastewater Revenue Bonds (other than Subordinated Bonds). The General Ordinance provides that such pledge also may be for the benefit of the provider of a Credit Facility or a Qualified Swap (as defined therein), or any other person who undertakes to provide monies for the account of the City for the payment of principal or redemption price of and interest on any series of Water and Wastewater Revenue Bonds (other than Subordinated Bonds), on an equal and ratable basis with the holders of Water and Wastewater Revenue Bonds (other than Subordinated Bonds).

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Priority and Application of Project Revenues

The priority and application of Project Revenues under the terms of the General Ordinance and other amounts deposited into the Revenue Fund are set forth in the waterfall below:

1	Payment of Operating Expenses;
2	Payment of the principal or redemption price of and interest on Water and Wastewater Revenue Bonds issued under the General Ordinance (except Subordinated Bonds), regularly scheduled payments under any parity Swap Agreement, payments under any parity Credit Facility to repay advances thereunder to pay any of the foregoing and payments with respect to fees and expenses in respect of any parity Credit
3	if the transfers in (1) and (2) are made when due, payments into the Debt Reserve Account to the extent necessary to cure a deficiency therein;
4	if the transfers in (1) and (2) are made when due, and following any transfer described in (3), payments into any debt reserve account established within the Sinking Fund and not held for the equal and ratable benefit of all Water and Wastewater Revenue Bonds (other than Subordinated Bonds) to the extent necessary to cure a deficiency therein;
5	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) and (4), payment of principal or redemption price of and interest on any Subordinated Bonds and payments due under any Swap Agreement or Credit Facility respecting Subordinated Bonds;
6	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) through (5), all payments due under a Qualified Swap, other than regularly scheduled swap payments, including, without limitation, any payments due to a Swap Provider upon the early termination of a Swap Agreement;
7	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) through (6), transfer to the City of the amount necessary to pay General Obligation Bonds issued for the System;
8	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) through (7), transfer to the Rate Stabilization Fund of the amount determined by the Water Commissioner;
9	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) through (8), transfer to the Capital Account of the Construction Fund the sum of the Capital Account Deposit Amount, the Debt Service Withdrawal and the Operating Expense Withdrawal, less any amounts transferred to the Capital Account from the Residual Fund; and
10	if the transfers in (1) and (2) are made when due, and following any transfers described in (3) through (9), after providing for repayment of any interfund loans, transfer to the Residual Fund of any amount remaining on deposit in the Revenue Fund.

The General Ordinance permits the application of Project Revenues to pay Interfund Charges (defined herein) and permits monies to be transferred in each Fiscal Year from the Residual Fund to the City's General Fund in an amount not to exceed the lesser of (A) all Net Reserve Earnings (as defined below) and (B) $4,994,000. "Net Reserve Earnings" means the amount of interest earnings during the Fiscal Year on amounts in the Debt Reserve Account and the Subordinated Bond Fund less the amount of interest earnings during the Fiscal Year on amounts in any such reserve funds and accounts giving rise to a rebate obligation pursuant to Section 148(f) of the Internal Revenue Code of 1986, as amended. In Fiscal Years 2016 and 2017, the Water Department transferred $1,555,702.46 and $1,866,454.75, respectively, from the Residual Fund to the City's General Fund. The preliminary (and unaudited) transfer to the City's General Fund for Fiscal Year 2018 is approximately $1,627,837.51. The budgeted transfer to the City's General Fund for Fiscal Year 2019 is approximately $1,500,000. For a brief discussion of the Residual Fund, see " – Residual Fund" below.

Water and Wastewater Funds

Funds and Accounts. The Act and the General Ordinance establish the following funds and accounts to be held by the Fiscal Agent:

(a) Revenue Fund;

(b) Sinking Fund and within such fund a Debt Service Account, a Charges Account and a Debt Reserve Account;

(c) Subordinated Bond Fund;

(d) Rate Stabilization Fund;

(e) Construction Fund and within such fund an Existing Projects Account, a Bonds Proceeds Account and a Capital Account; and

(f) Residual Fund and within such fund a Special Water Infrastructure Account.

The foregoing funds are referred to herein as the "Water and Wastewater Funds." The Water and Wastewater Funds are required under the General Ordinance to be held separate and apart from all other funds and accounts of the City and the Fiscal Agent, and the funds and accounts therein shall not be commingled with, loaned or transferred among themselves or to any other City funds or accounts except as expressly permitted by the General Ordinance. The General Ordinance also establishes a Rebate Fund, which is not held for the benefit of the holders of the Water and Wastewater Revenue Bonds, and provides that the City can direct transfers to the Rebate Fund at the times and in the amounts necessary to pay any amounts required to be rebated pursuant to Section 148(f) of the Code.

Project Revenues. The City is required by the General Ordinance to cause all Project Revenues received by it on any date to be deposited into the Revenue Fund upon receipt thereof by the City, and the Fiscal Agent shall, upon receipt of Project Revenues, deposit such Project Revenues into the Revenue Fund. The City and the Fiscal Agent also shall cause to be deposited into the Revenue Fund such portion of the proceeds of the Bonds as are designated by Supplemental Ordinance or Bond Committee Determination and any other funds directed to be deposited into the Revenue Fund by the City. The City has covenanted in the General Ordinance that it will not direct the Fiscal Agent to transfer, loan or advance proceeds of the Bonds or Project Revenues from the Water and Wastewater Funds to any City account for application other than as permitted under the General Ordinance.

Project Revenues include, among other things, rents, rates, fees and charges from users of the products and services generated by the System (collectively, "rates and charges"). Collection and accounting of rates and charges are administered by the Water Revenue Bureau within the City's Department of Revenue. See

“THE WATER DEPARTMENT – Administration” herein. Historically, all rates and charges collected by the Water Revenue Bureau, whether by cashier, mail, or electronic payment, are recorded upon receipt, and are held temporarily by the City’s fiscal agent in a consolidated cash account of the City. The City generates a report of rates and charges collected at each day’s end and transfers, typically on the next day, all rates and charges so held to one or more accounts controlled by the Fiscal Agent for the Water and Wastewater Funds for deposit by the Fiscal Agent into the Revenue Fund. The City continues to examine the collection and accounting process with a view towards causing rates and charges to be deposited with the Fiscal Agent into the Revenue Fund as and when received.

See APPENDIX I – “FINANCIAL STATEMENTS OF THE WATER FUND DERIVED FROM THE CITY’S AUDITED COMPREHENSIVE ANNUAL FINANCIAL REPORT FOR FISCAL YEAR ENDED JUNE 30, 2017” and APPENDIX III-A – “SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance” for additional information concerning the priority and application of Project Revenues and further description of the funds and accounts established under the General Ordinance and their purposes.

Interfund Loans. If at any time sufficient monies are not available in the Revenue Fund to pay both Operating Expenses and to make the transfers described above under “SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Priority and Application of Project Revenues,” then amounts on deposit in the Construction Fund, Rate Stabilization Fund and/or Residual Fund may be loaned temporarily, at the written direction of the City, to the Revenue Fund, for the payment of such Operating Expenses until such loaned amounts are required by the Water Department for purposes of the Fund making the loan. Such interfund loans permit the Water Department then to use Project Revenues for the other transfers described above under “ – Priority and Application of Project Revenues.” If a similar deficiency exists in the Construction Fund, amounts on deposit in any of the Revenue Fund, Rate Stabilization Fund and Residual Fund may be loaned temporarily, at the written direction of the City, to the Construction Fund, to the extent of the deficiency, until required by the Water Department for purposes of the Fund making the loan.

The Water Department has from time to time made interfund loans in prior Fiscal Years from the Rate Stabilization Fund to the Revenue Fund. The Water Department does not currently intend to make a loan in Fiscal Year 2019.

Debt Reserve Account

General. The General Ordinance establishes within the Sinking Fund a Debt Reserve Account that will be funded (if required to be funded) with the proceeds of each series of Water and Wastewater Revenue Bonds; provided, however, that if the Supplemental Ordinance authorizing a series of Water and Wastewater Revenue Bonds shall so authorize, the deposit to the Debt Reserve Account in respect of such Water and Wastewater Revenue Bonds may be accumulated from Project Revenues over a period of not more than three Fiscal Years after the issuance and delivery of the related Water and Wastewater Revenue Bonds. The monies and investments in the Debt Reserve Account will be held and maintained in an amount equal at all times to the Debt Reserve Requirement.

If at any time the monies in the Debt Service Account of the Sinking Fund are insufficient to pay as and when due the principal of (and premium, if any) or interest on any series of Water and Wastewater Revenue Bonds or other obligations payable from the Debt Service Account (including obligations arising in connection with Qualified Swap Agreements and Credit Facilities), the Fiscal Agent is required to transfer from the Debt Reserve Account the amount of such deficiency for deposit in the Debt Service Account.

With respect to any issue of Water and Wastewater Revenue Bonds, in lieu of the required deposit into the Debt Reserve Account, the City may cause to be deposited into the Debt Reserve Account a surety bond, an insurance policy or an irrevocable letter of credit. In addition, the General Ordinance authorizes the City to apply monies on deposit in the Debt Reserve Account to purchase a surety bond, an insurance policy or an irrevocable letter of credit. Under the terms of the General Ordinance, any surety bond, insurance policy or letter of credit provided by the City in lieu of required deposits within the Debt Reserve Account would, at the time of issuance thereof, be required to meet the credit quality requirements of the General Ordinance as described in APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Debt Reserve Account."

Debt Reserve Requirement. As of June 30, 2018, the Debt Reserve Requirement for all Outstanding Water and Wastewater Revenue Bonds based on maximum annual Debt Service Requirements prior to the issuance of the Bonds was approximately $185,847,270.99. The balance of cash and investments credited to the Debt Reserve Account as of October 30, 2018 was $202,358,702.68.

On November 26, 2007, the City purchased a surety policy from Assured Guaranty Municipal Corp. ("AGM") in the aggregate principal amount of $67,000,000 (the "AGM Surety Policy"). The AGM Surety Policy expires on July 1, 2035. In the event of a draw on the Debt Reserve Account, the AGM Surety Policy requires that cash available in the Debt Reserve Account be applied first, before the AGM Surety Policy is drawn upon. The AGM Surety Policy remains in effect, but it does not meet the rating requirements of the General Ordinance. **Thus, the value of the AGM Surety Policy is excluded in calculating the amount on deposit in the Debt Reserve Account.** (Val to send)

On the date of issuance of the Bonds, money deposited in the Debt Reserve Account will satisfy the Debt Reserve Requirement for all Water and Wastewater Revenue Bonds outstanding after the issuance of the Bonds. In addition, as authorized in the General Ordinance, the City intends to transfer a portion of estimated Net Reserve Earnings from the Debt Reserve Account to the Residual Fund as part of the Fiscal Year end 2019 closing process, as described in (10) of the waterfall contained in " – Priority and Application of Project Revenues" above.

Springing Amendments. The Springing Amendments include certain provisions that relate to the calculation and maintenance of the Debt Reserve Requirement. Once the Springing Amendments are approved, the City will be authorized to, among other things, determine at the time of issuance whether to secure a Series of Water and Wastewater Revenue Bonds by depositing monies into the Debt Reserve Account or a Series subaccount within the Debt Reserve Account solely for such Series of bonds. See "INTRODUCTORY STATEMENT – Recent Amendments to the General Ordinance" herein and APPENDIX III-A and APPENDIX III-B of this Official Statement hereof.

The Springing Amendments also contain certain provisions that change the rating requirements to qualify a Credit Facility (such as the AGM Surety Policy) for deposit into the Debt Reserve Account to meet the Debt Reserve Requirement. The Springing Amendments further provide that if the City had deposited cash into the Debt Reserve Account to cure a deficiency caused by a downgrade or withdrawal of the ratings on such a Credit Facility — as the City did in the case of the AGM Surety Policy — and subsequently that Credit Facility meets the new rating requirements contained in the Springing Amendments, no excess of the Debt Reserve Requirement will result. In other words, the cash that the City had deposited described above will not become in excess of the Debt Reserve Requirement and available for other purposes.

Rate Stabilization Fund

Pursuant to the General Ordinance, as of June 30 of each Fiscal Year, the City may transfer (i) from the Rate Stabilization Fund to the Revenue Fund or (ii) from the Revenue Fund to the Rate Stabilization Fund, the amount determined by the Water Commissioner to be transferred for such Fiscal Year. For purposes of calculating Net Revenues, transfers from the Rate Stabilization Fund to the Revenue Fund are included in the calculation, whereas transfers from the Revenue Fund to the Rate Stabilization Fund are excluded from Net Revenues. As discussed above under "Water and Wastewater Funds – Interfund Loans," amounts on deposit in the Rate Stabilization Fund also may be loaned temporarily to the Revenue Fund to pay Operating Expenses under certain conditions. See APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Rate Stabilization Fund."

Residual Fund

Amounts on deposit in the Residual Fund may be used at the written direction of the City (i) to pay Operating Expenses; (ii) to fund transfers to any fund or account established under the General Ordinance or under a Supplemental Ordinance (other than the Revenue Fund and the Rate Stabilization Fund); (iii) to make payments required under any Exchange Agreement; (iv) for the payment of principal, redemption premium, if any, and interest on any revenue bonds or notes (the proceeds of which were applied in respect of the System) issued under the Act but not under the General Ordinance; (v) for the payment of principal, redemption premium, if any, and interest on any General Obligation Bonds; (vi) for the payment of principal, redemption premium, if any, and interest on other general obligation debt issued in respect of the System; (vii) for the payment of amounts due under capitalized leases or similar obligations relating to the System; and (viii) to fund a transfer to the City's "General Fund" in an amount not to exceed the lower of (A) all Net Reserve Earnings or (B) $4,994,000. See APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Residual Fund." In addition, as discussed above under "Water and Wastewater Funds – Interfund Loans," amounts on deposit in the Residual Fund also may be loaned temporarily to the Revenue Fund to pay Operating Expenses under certain conditions.

In connection with the rate proceeding that occurred in July of 2018, the Rate Board adopted a target of $150 million in the Rate Stabilization Fund and the Residual Fund. There is no requirement in the General Ordinance or the Act to maintain such amount and no assurance can be given that it will be maintained.

Additional Sources of Funds for Deficiencies in Sinking Fund

At the written direction of the City, the General Ordinance permits monies on account in the Capital Account of the Construction Fund and in the Residual Fund to be utilized to cure deficiencies in the Sinking Fund. See APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Construction Fund" and " – Residual Fund."

Rate Covenant

The General Ordinance contains a number of covenants (collectively, the "Rate Covenant") concerning the City's imposition of rates and charges sufficient to support the System. The Rate Covenant requires, while any Water and Wastewater Revenue Bonds remain outstanding, the City to establish rents, rates, fees and charges for the use of the Water and Wastewater Systems sufficient to yield Net Revenues in each Fiscal Year at least equal to 1.20 times the Debt Service Requirements for such Fiscal Year (recalculated to exclude principal and interest payments in respect of Subordinated Bonds, of which none exist). In addition, Net Revenues (defined herein), in each Fiscal Year must be at least equal to (A) 90% of the Debt Service Requirements for such Fiscal Year (recalculated to exclude principal and interest payments in respect of Subordinated Bonds) and (B) 1.00 times the sum of the following for such Fiscal Year: (i) the Debt Service Requirements (including Debt Service Requirements in respect of Subordinated Bonds); (ii) amounts required to be deposited into the Debt Reserve Account; (iii) debt service payable on General Obligation Bonds issued for the System; (iv) debt service due on Interim Debt; and (v) the Capital Account Deposit Amount, less any amounts transferred from the Residual Fund to the Capital Account. As of the date hereof, no Subordinated Bonds, General Obligation Bonds issued for the System or Interim Debt are outstanding.

"Net Revenues" for any period means: the Project Revenues collected during such period and deposited into the Revenue Fund plus (x) the amounts, if any, transferred from the Rate Stabilization Fund into the Revenue Fund as of the end of such period and (y) interest earnings during such period on monies in any of the funds or accounts established under the General Ordinance to the extent such interest earnings are credited to the Revenue Fund pursuant to the General Ordinance, and minus the sum of (a) Operating Expenses incurred during such period and (b) the amounts, if any, transferred from the Revenue Fund to the Rate Stabilization Fund as of the end of such period; provided, however that in determining such Net Revenues, the Initial Deposit (as defined in APPENDIX III-A) shall not reduce such Net Revenues. To ensure compliance with the Rate Covenant, the General Ordinance requires that the City review its rents, rates, fees and charges promptly upon any material change in the circumstances which were contemplated at the time such rents, rates, fees and charges were reviewed, but not less frequently than once each Fiscal Year. For a discussion of the Water Department's experience in meeting the Rate Covenant, see "HISTORICAL AND PROJECTED FINANCIAL INFORMATION – Compliance with Rate Covenant" herein. Notwithstanding any future changes in the rate-making process, while any Water and Wastewater Bonds remain outstanding, the City is required to comply with the Rate Covenant.

Additional Bonds

The General Ordinance permits the issuance of additional bonds, which may be secured on a parity basis with the outstanding bonds issued thereunder. The General Ordinance imposes certain conditions precedent (which conditions have been met in connection with the issuance of the Bonds) to the issuance of additional bonds, including the delivery of the Engineering Report concluding that Net Revenues are currently sufficient to comply with the Rate Covenant and are projected to be sufficient to comply with the Rate Covenant for each of the two Fiscal Years following the Fiscal Year in which the additional bonds are to be issued. Such conditions precedent to the issuance of additional bonds are described in APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Covenants of the City – Conditions of and Provisions Relating to Issuing Bonds."

Limitations on Effectiveness of Pledge of Project Revenues and Water and Wastewater Funds

The effectiveness of the pledge of the Project Revenues and the Water and Wastewater Funds may be limited because, although the Fiscal Agent will have custody of the Water and Wastewater Funds, the City will have complete control of deposits into and expenditures from the Water and Wastewater Funds, except for amounts on deposit in the Sinking Fund, including the Debt Reserve Account. While the City has covenanted not to direct the Fiscal Agent to transfer Project Revenues other than as permitted under the General Ordinance, no requisition procedure or other similar procedure will be established for the expenditure of monies by the City from the Water and Wastewater Funds (other than the Sinking Fund, including the Debt Reserve Account), and no consent or approval of the Fiscal Agent is required to be obtained by the City as a condition of the City's expenditure of such monies. The Fiscal Agent will not monitor deposits into or withdrawals from the Water and Wastewater Funds (other than the Sinking Fund, including the Debt Reserve Account) or the purposes for which such monies are utilized.

The General Ordinance provides that if the City fails to make a deposit of Project Revenues as required under the General Ordinance, the Fiscal Agent is authorized to and shall seek, by mandamus or other suit, action or proceeding at law or in equity, the specific enforcement or performance of the obligation of the City to cause the Project Revenues to be transferred to the Revenue Fund.

No daily, monthly or other periodic deposits are required to be made into the Sinking Fund prior to the dates on which debt service payments on the Water and Wastewater Revenue Bonds are due.

REMEDIES OF BONDHOLDERS

Remedies under the Act and the General Ordinance available to Bondholders and to any trustee for Bondholders appointed by the holders of 25% of the outstanding principal amount of any series of Water and Wastewater Revenue Bonds in default are described in APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Defaults and Remedies." In addition to the remedies therein described, Bondholders or a trustee therefor are entitled under the Pennsylvania Uniform Commercial Code to remedies as secured parties with respect to the Project Revenues and the funds on deposit in the Water and Wastewater Funds. See "INVESTMENT CONSIDERATIONS – Limited Recourse on Default."

Enforcement of Bondholders' rights may be limited by and is subject to the provisions of the Federal Bankruptcy Code, as now or hereafter enacted, and to other laws or legal or equitable principles which may affect the enforcement of creditors' rights. References to the Federal Bankruptcy Code should not be construed as implying that the City expects to resort to the provisions of such statute or that, if it did, any proposed restructuring would include a dilution of the sources of payment of and security for the Bonds. See "INVESTMENT CONSIDERATIONS – Bankruptcy" herein.

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OUTSTANDING INDEBTEDNESS AND OTHER LONG-TERM AGREEMENTS

Outstanding Indebtedness

As set forth in the table below, as of September 30, 2018, $1,810,395,690 aggregate principal amount of Water and Wastewater Revenue Bonds were outstanding.

Table 2
Outstanding Indebtedness
as of September 30, 2018

Series of Bonds	Original Principal Amount	Outstanding Principal Amount	Fixed/ Variable Rate	Year of Maturity
1997B	$ 100,000,000	$ 45,400,000	Variable	2027
2009A	140,000,000	4,615,000	Fixed	2019
2010A	396,460,000	35,760,000	Fixed	2019
2010C	185,000,000	59,030,000	Fixed	2040
2011A	135,000,000	135,000,000	Fixed	2041
2011B	49,855,000	37,015,000	Fixed	2026
2012	70,370,000	38,785,000	Fixed	2028
2013A	170,000,000	163,150,000	Fixed	2043
2014A	123,170,000	104,500,000	Fixed	2043
2015A	275,820,000	275,820,000	Fixed	2045
2015B	141,740,000	141,740,000	Fixed	2035
2016	192,680,000	191,070,000	Fixed	2035
2017A	279,865,000	279,865,000	Fixed	2052
2017B	174,110,000	171,205,000	Fixed	2034
Pennvest 1999	6,700,000	52,410	Fixed	2019
Pennvest 2009B	42,886,000	19,116,976	Fixed	2033
Pennvest 2009C	57,268,000	33,106,519	Fixed	2032
Pennvest 2009D	84,759,000	51,776,797	Fixed	2032
Pennvest 2010B	30,000,000	23,387,987	Fixed	2033
TOTAL	**$2,655,683,000**	**$1,810,395,690**		

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Other Obligations

Contract for Biosolids Treatment with Philadelphia Biosolids Services, LLC

In 2008, the City entered into a long-term contract and lease with the Philadelphia Municipal Authority (the "PMA") for the PMA to operate the Water Department's existing Biosolids Recycling Center (the "Biosolids Recycling Center"). The PMA and Philadelphia Biosolids Services, LLC ("Philadelphia Biosolids") entered into a Service Agreement (the "Biosolids Service Contract"), pursuant to which Philadelphia Biosolids designed and built, and currently operates, a facility at the Biosolids Recycling Center to heat, dry and dispose of biosolids captured during wastewater treatment, and the PMA pays Philadelphia Biosolids for operating such Biosolids Recycling Center. Pursuant to a Service Agreement between the PMA and the City (the "City Service Contract"), the City assumed all of PMA's obligations under the Biosolids Service Contract. The obligations under the City Service Contract constitute Operating Expenses of the Water Department. In Fiscal Years 2016 and 2017, the City paid to PMA, from revenues generated from the Water Department, \$20,074,514 and \$17,941,469, respectively. The Water Department has made payments of \$21,782,486 for Fiscal Year 2018 (unaudited). The Water Department's budgeted obligation for Fiscal Year 2019 is approximately \$26,698,000. The City Service Contract contains adjusters for the Consumer Price Index, Producer Price Index and fluctuations in fuel prices, among others; thus, expenditures under the City Service Contract may vary over time. The contract expires on October 13, 2028, and contains the possibility of a five-year renewal term at the option of the City. In addition to facilitating compliance with various state and federal environmental regulations, including the Clean Air Act, the Biosolids Service Contract has produced cost savings for the Water Department. See "THE SYSTEM – Wastewater System – Environmental Compliance – Clean Air Act and – Biosolids Treatment and Utilization."

Northeast Water Pollution Control Plant Cogeneration Facility

In 2011, the City entered into a long-term contract and lease with the PMA for the PMA to arrange the construction, financing, maintenance and sublease of a digester gas cogeneration facility at the Northeast Water Pollution Control Plant. The PMA entered into a lease (the "Lease") with BAL Green Biogas I, LLC, a special purpose entity of Bank of America (the "Lessor"), which requires the PMA to make certain lease payments to the Lessor. Pursuant to a sublease dated December 23, 2011 (the "Sublease"), the City assumed all of the PMA's obligations under the Lease. The obligations under this contract constitute Operating Expenses of the Water Department. In Fiscal Year 2016 and Fiscal Year 2017, the City paid to the Lessor from revenues generated from the Water Department, \$5,556,547 and \$4,718,599.72, respectively. As of the date hereof, the Water Department has made payments of \$5,937,935.32 for Fiscal Year 2018 (unaudited). The Water Department's budgeted obligation for Fiscal Year 2019 is \$6,610,000. Expenditures, including maintenance fees, may vary during the term of the contract. The Sublease expires on September 25, 2029, unless renewed by PMA for an additional term of eighteen months.

Contract for Automatic Meter Reading System with ITRON

In 1997, the City, through the PMA, entered into a long-term contract with ITRON for the replacement of residential water meters with new meters equipped with radio transmitter devices and for services and materials required to implement, operate and maintain the Water Department's Automatic Meter Reading System. The Water Department paid ITRON, through the PMA, \$1,689,812.10 and \$1,940,536.28 in Fiscal Years 2016 and 2017, respectively, for meter reading services. This obligation constitutes an Operating Expense of the Water Department. Additionally, the Water Department paid ITRON, through the PMA, \$2,745,478.74 and \$2,087,360.04 in Fiscal Years 2016 and 2017, respectively, for the purchase of new water meters. This obligation constitutes a capital expenditure of the Water Department. Payments due to ITRON for Fiscal Year 2018 (unaudited) are \$2,052,000 for meter reading services and \$1,880,000 for new water meters. Payments for Fiscal Year 2019 are estimated to be \$2,255,000 for meter reading services and \$2,500,000 for new water meters. The agreement with ITRON will expire in September 2019. When the agreement expires, the Water Department will continue to read meters on its own or through a vendor. For information on the Water Department's plans for advanced metering technology, see "RATES – Automatic Meter Reading System and Advanced Meter Reading Infrastructure" herein.

Laurel Street Combined Sewer Overflow Project

In 2011, the City entered into an Amended and Restated Development and Tax and Claim Settlement Agreement (the "Sugarhouse Agreement") with Sugarhouse HSP Gaming, L.P. ("HSP"). Under the terms of the Sugarhouse Agreement, HSP is required to fund the development and expansion of the Laurel Street Combined Sewer Overflow Project and has been allotted a five-year credit against real estate taxes and settlement payments otherwise due to the City as compensation. The amount of the credit corresponds to the amount expended by HSP on the Laurel Street Combined Sewer Overflow Project. The Laurel Street Combined Sewer Overflow Project is a capital asset of the Water Department, and the credit awarded to HSP is a capital expenditure of the Water Department payable to the City. The Water Department paid the City $7,028,842 for Fiscal Years 2014 and 2015 combined and $3,514,421 for Fiscal Year 2016. The Water Department paid the City $7,028,842 in Fiscal Year 2017, which sum included its payment obligations for both Fiscal Years 2017 and 2018 combined. The Water Department's payment obligations under the terms of the Sugarhouse Agreement have been met.

THE WATER DEPARTMENT

General

The City established the Water Department to operate, maintain, repair and improve the Water and Wastewater Systems. The Charter requires that rates and charges for supplying water and for wastewater treatment be fixed and regulated in accordance with standards established by City Council. Such standards must enable the City to realize from rates and charges an amount at least equal to operating expenses and Debt Service Requirements on any debt incurred or to be incurred for the Water and Wastewater System, including general obligations and revenue bond obligations, and proportionate charges for all services performed for the Water Department by all officers, departments, boards or commissions of the City. See "HISTORICAL AND PROJECTED FINANCIAL INFORMATION – Compliance with Rate Covenant" below. The Charter also authorizes the Water Department, with the approval of City Council, to enter into contracts for supplying water service and sewer and sewage disposal service to users outside the limits of the City.

The operations of the Water Department are accounted for in the Water Fund, which is an enterprise fund of the City. The Water Fund is an accounting convention established pursuant to the Charter for the purpose of accounting for the assets, liabilities, revenues, expenses of and Rate Covenant compliance for, the Water and Wastewater Systems. See APPENDIX I – "FINANCIAL STATEMENTS OF THE WATER FUND DERIVED FROM THE CITY'S AUDITED COMPREHENSIVE ANNUAL FINANCIAL REPORT FOR FISCAL YEAR ENDED JUNE 30, 2017" attached hereto.

Relationship to the City

The Water Department is one of the City's operating departments and is overseen by the Office of the Managing Director. Various City departments and agencies provide operational support to the Water Department, for which they receive a direct appropriation at the beginning of each Fiscal Year (a "Direct Appropriation"), which provides a portion of the funding for such department or agency from the Water Department's operating budget. The departments that receive Direct Appropriations from the Water Department are: the Revenue Department (Water Revenue Bureau) for meter reading, billing and collection services; the Law Department for legal services; the Department of Public Property for the rental of office space and parking; the Office of Fleet Management for vehicle acquisition, fuel, and vehicle maintenance; the Office of Innovation and Technology for communications and computer support services; the Procurement Department for services related to the acquisition of goods and services; the Office of the Director of Finance for fringe benefits, indemnities and support services; the Sinking Fund Commission for the payment of debt service; the Office of Sustainability for energy procurement services; and the Office of Transportation and Infrastructure Systems. The Rate Board also receives a Direct Appropriation from the Water Department.

In addition, approximately 15 City departments and agencies, including the Revenue Department and the Department of Public Property, provide services to the Water Department for which they bill the Water Department at the close of each Fiscal Year ("Interfund Charges"). These services are distinct from the ones discussed in the previous paragraph and include, but are not limited to, cash management (City Treasurer); auditing (City Controller); debt management (City Treasurer); testing and hiring (Human Resources and Labor Relations); and other support services (Managing Director's Office, Civil Service Commission, Department of Licenses & Inspections, and Police Department).

All Direct Appropriations and Interfund Charges are accounted for in the historical operating results in Table 9 and factored into the forecast in Table 11A. See also "HISTORICAL AND PROJECTED FINANCIAL INFORMATION – The Water Department's Budget."

The City is the largest customer of the Water Department. The City, through the General Fund and the Aviation Fund, pays the Water Department for water and wastewater services, maintenance of the fire system (consisting of hydrants system capacity and pumping stations), inlet cleaning and snow removal. Such payments are credited to the Water Fund for each Fiscal Year as of the last day of such Fiscal Year, and payment occurs on or before October 31 in the same calendar year. See "THE SYSTEM – The City and Other Large Customers" and APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA."

Administration

The Water Department is managed by a Commissioner appointed by the Managing Director of the City with the approval of the Mayor. The Commissioner then appoints deputies with the approval of the City's Managing Director. Substantially all other employees of the Water Department are hired pursuant to the City's Civil Service Regulations.

Under the Charter, the City's Department of Revenue performs all functions relating to meter reading, customer accounts and collections for the Water Department through the Water Revenue Bureau. The Department of Revenue and the Water Revenue Bureau are under the direction of the Director of Finance. The Director of Finance, as the chief financial, accounting and budget officer of the City, has overall responsibility for the fiscal administration of all City departments, including the Water Department. Audits of all City departments, including the Water Department, are performed annually by the Office of the City Controller. The Law Department of the City, headed by the City Solicitor, handles all legal matters affecting the Water Department.

The following are brief biographical descriptions of the Commissioner, her deputies and the senior management of the Water Department:

Debra A. McCarty was appointed Water Commissioner in January, 2016. She has served the Water Department for 36 years in various capacities, including Deputy Water Commissioner. Ms. McCarty is responsible for oversight of the whole Water Department. As Deputy Water Commissioner, she was principally responsible for managing the Water Department's Operations Division. She received a Bachelor of Engineering Sciences in Environmental Engineering from Johns Hopkins University. After serving in a private engineering firm for a few years, she began her employment with the Water Department in 1982. Since her initial appointment, Ms. McCarty has held a number of increasingly responsible engineering and managerial positions, such as holding the position of Chief of Wastewater, which included responsibility for the operation of the City's three large wastewater treatment plants. She also served as plant manager of the Southwest Water Pollution Control Plant and Process Manager for the Northeast Water Pollution Control

Plant. Ms. McCarty expects to retire in April of 2019. The administration is currently conducting a search for a new Water Commissioner upon Ms. McCarty's retirement.

Donna Schwartz was appointed Deputy Water Commissioner in March, 2016. She is principally responsible for managing the Water Department's Operations Division. She has served the Water Department for 36 years in various capacities. Since her initial appointment with the Water Department in 1982, Ms. Schwartz has held a number of increasingly responsible engineering and managerial positions, such as program manager in industrial waste and plant manager in water treatment. She has a BS in chemical engineering from Drexel University, a professional engineer's license from Pennsylvania and is a certified plant operator.

David A. Katz was appointed Deputy Water Commissioner in June, 2001, managing the Water Department's environmental compliance efforts. Previously, Mr. Katz had served as Divisional Deputy City Solicitor. He has been with the City's Law Department since 1987 and has served as the General Counsel to the Water Department since April, 1992. He holds a B.S. in Economics from the Wharton School, University of Pennsylvania and a J.D. from the Washington College of Law, American University. Prior to joining the Law Department, Mr. Katz served in a variety of public and private legal positions.

Scott J. Schwarz was appointed as Divisional Deputy City Solicitor and General Counsel to the Philadelphia Water Department in March, 2013. He joined the City's Law Department in 2009, serving as a Senior Attorney in the Law Department's Regulatory Affairs Unit. Prior to that, he spent over 25 years working in the environmental law divisions of law firms in Philadelphia and Washington, D.C. and gained government experience working for the State of Alabama's Office of the Attorney General and the U.S. Environmental Protection Agency. Mr. Schwarz received a B.S. in biology from Bucknell University and a J.D. from George Washington University.

Gerald D. Leatherman was appointed Deputy Water Commissioner for Human Resources & Administration in April, 2013. Since March 2008, Mr. Leatherman was Divisional Deputy City Solicitor and General Counsel to the Water Department. He joined the City's Law Department in 2003, serving as a Deputy City Solicitor in the Housing Code Enforcement and Neighborhood Transformation Divisions. Prior to that, Mr. Leatherman worked in the General Counsel's Office of the Philadelphia Housing Development Corporation and in private practice. Mr. Leatherman received a B.A. from American University and a J.D. from the Temple University Beasley School of Law.

Joanne Dahme was appointed General Manager of the Public Affairs Division in January, 2009. She holds a B.C.E. degree in Civil Engineering from Villanova University and an M.J. in Journalism and a Masters in Creative Writing, both from Temple University. Ms. Dahme joined the Water Department in 1980 and served as the Manager of the Public Affairs Division from 1994 to 1999. She later served as a Watersheds Programs Manager for the Water Department's Office of Watersheds until returning to assume her current position in Public Affairs. She currently serves on the board of the Tookany/Tacony-Frankford Watershed Partnership in addition to the board of her local community center and several regional watershed planning committees. Ms. Dahme expects to retire in April of 2019. The Water Department is currently conducting a search for a new General Manager of the Public Affairs Division upon Ms. Dahme's retirement.

Melissa LaBuda was appointed Deputy Water Commissioner in August, 2014 and Assistant Deputy Commissioner in October, 2013. Melissa has overall responsibility for the Water Department's financial management including: accounting operations and financial reporting; budget formulation and execution; and financial planning. Ms. LaBuda joined the Water Department from a global financial institution where she was an investment banker to Public Power and Combined Utility systems. Previously, Ms. LaBuda worked for Public Financial Management, Inc. (now PFM Financial Advisors LLC) as both a financial advisor and a fixed income trader. In these roles, Ms. LaBuda has raised in excess of $25 billion in the capital markets. Melissa received her B.S. from Bloomsburg University in 1995.

Stephen J. Furtek was appointed General Manager of Planning and Engineering (now Engineering and Construction) in March, 2005. Mr. Furtek is a registered Professional Engineer and holds a B.S. in Civil and Urban Engineering from the University of Pennsylvania. He has held a number of increasingly responsible positions since joining the Water Department in 1982, including Supervisor of the Water and Sewer Design Section and Manager of the Design Branch.

Michelle L. Bethel was appointed Deputy Revenue Commissioner in charge of the Water Revenue Bureau in July, 2008. She holds a B.S. in Accounting with a Minor in Public Relations from Kutztown University and an M.B.A. in Human Resource Management from the University of Phoenix. Prior to her appointment as Deputy Revenue Commissioner, Ms. Bethel worked for the Commonwealth of Pennsylvania Department of Revenue in Harrisburg for 14 years. Ms. Bethel has extensive knowledge of and experience with customer service, collections, and compliance issues gained through working in increasingly responsible management positions.

Marc Cammarata was appointed Deputy Water Commissioner for Planning and Environmental Services in November of 2016. His responsibilities include the integration, direction and management of numerous aspects of the Water Department's planning initiatives, including strategic environmental and sustainability programming, water quality and quantity modeling, wet weather compliance, flood mitigation, both green and traditional infrastructure planning, stream and wetland restoration, watershed and source water protection, laboratory services, and climate mitigation and adaptation efforts. He has over 20 years of experience in water resources engineering and environmental planning. He is a Professional Environmental Engineer with a B.S. in Civil and Environmental Engineering from Villanova University and a M.S. in Environmental Engineering, Water Resources from Drexel University.

Sarah E. Stevenson was appointed Director of Government Affairs & Policy in January 2016 and Assistant Deputy Commissioner in March 2017. Prior to her current position, Ms. Stevenson served for nearly two years as the Water Department's Enforcement Director and five years in the City of Philadelphia Law Department, primarily representing the Water Department. She received her undergraduate degree from the University of Pennsylvania in 2003 and her JD/MPA from Villanova University in 2007. Prior to joining the City, Ms. Stevenson worked for a government watchdog non-profit organization where she focused on municipal policy and election law. She is licensed to practice law in Pennsylvania and New York.

Alicia Robertson was appointed Assistant Deputy Water Commissioner in October 2016 and manages the Departments accounts payable processing and payroll functions. Since joining the Water Department in 2006, she has held increasingly responsible fiscal and managerial positions. Prior to her tenure at the Water Department, Ms. Robertson worked for the City Controller's office as an auditor for seven years. She holds a BBA in Accounting from Temple University and a Masters in Public Administration from Villanova University.

Personnel Information

As of June 30, 2018, the Water Department employed approximately 2,139 full-time employees (this figure excludes seasonal workers), of whom 1,536 are represented by District Council 33 and 405 by District Council 47, both of the American Federation of State, County and Municipal Employees. The balance (198 full-time employees) represents the Water Department's upper management, supervisory and senior engineering and administrative personnel who are not eligible for union membership. The wages and salaries of approximately 200 employees in the Water Revenue Bureau are funded by the Water Department. Water Revenue Bureau employee participation in unions parallels that of the Water Department. For information on the status of arbitration awards and labor contract settlements and certain retirement plan information, see APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Expenditures of the City – Overview of Current Labor Situation."

THE SYSTEM

The Water Department provides water and wastewater services (which includes stormwater services) to residents and businesses located in the City. Additionally, the Water Commissioner is authorized to enter into agreements with municipalities, townships, authorities and entities outside the limits of the City to provide for the sale of fresh water or the receipt, conveyance, treatment and disposal of wastewater. The Water Department currently has ten wholesale wastewater contracts and one wholesale water contract. The following sections describe the largest customers of the Water Department, the Water Department's wholesale contracts and the System, including certain environmental matters.

Large Customers

The ten largest customers of the Water Department for water and wastewater services, which include stormwater services, for Fiscal Year 2018 are set forth in Table 3 below. The Water Department does not charge itself or include in revenue the retail value of the water and wastewater services (including stormwater services) used by the Water Department.

The City is the largest customer of the Water Department. In addition to charges for general service customers, which are based on metered water consumption, the Water Department charges the City for water and wastewater services provided to City properties and for operation and maintenance of the fire system (consisting of hydrants and pumping stations).

Table 3
Top 10 Customers
Fiscal Year Ending June 30, 2018

	Customer	Revenue ($)	% Total Revenue
1	City of Philadelphia*	$23,686,204.05	3.16%
2	Philadelphia Housing Authority	13,345,561.93	1.78
3	School District of Philadelphia	5,971,061.09	0.80
4	Veolia Energy Philadelphia	5,184,053.28	0.69
5	University of Pennsylvania	5,011,080.55	0.67
6	SEPTA	4,468,666.93	0.60
7	AdvanSix Inc.**	4,398,889.45	0.59
8	Temple University	3,274,600.10	0.44
9	University of Pennsylvania Health System	2,665,986.86	0.36
10	Federal Government	2,340,591.65	0.31
	TOTALS* **	$70,346,695.89	9.40%

*The total above for the City of Philadelphia includes, among others, charges for water, wastewater and stormwater services as follows: (i) $19,554,936.30 – General Fund; and (ii) $4,131,267.75 – Aviation Fund.
**Based on the best information available as of June 30, 2017, AdvanSix Inc. was just outside of the Water Department's top 10 customers. For Fiscal Year 2018, their usage increased and revenues were $4,398,889.
***Totals may not add due to rounding.

Wholesale Customers. The Water Department generates approximately 5.40% of total revenues from wholesale wastewater and water customers ("Wholesale Customers"). Table 4 below presents revenues as of June 30, 2018 from Wholesale Customers and describes certain terms of the Water Department's wholesale contracts for water and wastewater services. The last column on Table 4 sets forth each wholesale customer's proportional share of the Water Department's expenditures ("COA Expenditures") relating to its Consent Order and Agreement (the "COA") with the Pennsylvania Department of Environmental Protection (the

"PaDEP"). For more information regarding the Water Department's COA and its associated costs, see "THE SYSTEM – The Wastewater System – Environmental Compliance – Combined Sewer Overflow Program." Revenues in Fiscal Year 2016 from wholesale wastewater contracts and the wholesale water contract were approximately $31.8 million and $3.6 million, respectively. Revenues in Fiscal Year 2017 from wholesale wastewater contracts and the wholesale water contract were approximately $34.6 million and $3.2. million, respectively. Preliminary revenues for Fiscal Year 2018 from wholesale wastewater contracts and the wholesale water contract were approximately $37.4 million and $3.2, respectively. Budgeted revenues from wholesale contracts for Fiscal Year 2019 are approximately $37 million for wholesale wastewater customers and $3.0 million for the wholesale water customer.

Table 4
Preliminary Wholesale Water and Wastewater Customer Revenues and Contract Terms
Fiscal Year Ending June 30, 2018

	Total Revenue	% Total Revenue	Contract End Date	COA %
Wastewater				
1. Bucks County Water & Sewer Authority (BCWSA)	$ 9,368,448	1.25%	3/31/2038	N/A
2. Delcora[1]	8,839,578	1.18	4/1/2028	9.44%
3. Cheltenham Township	4,056,591	0.54	6/30/2025	2.43
4. Lower Southampton Township	3,763,178	0.50	6/30/2024	0.96
5. Upper Darby Township	2,559,240	0.34	8/8/2023	N/A
6. Lower Merion Township	2,359,459	0.31	N/A	N/A
7. BCWSA - Springfield Township		0.00		
Erdenheim [2]	1,975,879	0.26	6/30/2023	0.79
Wyndmoor[2] [3]	343,636	0.05	6/30/2023	N/A
8. BCWSA - Bensalem[2]	1,944,698	0.26	6/30/2023	N/A
9. Abington Township	1,326,888	0.18	6/30/2023	0.58
10. Lower Moreland Township	890,109	0.12	6/30/2025	0.36
Sub-total	$37,427,704	4.99%		14.57%
Water				
1. Aqua Pennsylvania	$ 3,265,964	0.44%	3/1/2026	N/A
Sub-total	$ 3,265,964	0.44%		
Total Wholesale Revenues	$40,693,668	5.43%		

Note: The Water Department includes capital charges within operation and maintenance charges for all customers except Bensalem, Lower Merion, and Upper Darby.
(1) Delcora allocated capital is based on assets in service after July 4, 2011.
(2) Bucks County Water and Sewer Authority purchased the wastewater collection and disposal system of Springfield Township in December 2015 and purchased the wastewater collection system of Bensalem in September 1999.
(3) The total amount of the COA for Springfield Township – Wyndmoor is contained in the Springfield Township – Erdenheim amount.

The Water System

General

The Water System's service area includes the City. The Water System has one wholesale water service contract (see Table 4 – Wholesale Water and Wastewater Customer Revenues Fiscal Year Ending June 30, 2018 on the preceding page). Based on the 2017 U.S. Census Bureau estimate, the Water System served 1,580,863 individuals.

As of June 30, 2018, the Water System served approximately 480,000 active customer accounts using approximately 3,100 miles of mains and approximately 25,000 fire hydrants. Customer accounts have been stable the past several years and are expected to remain consistent for Fiscal Year 2019.

The City obtains approximately 59% of its water from the Delaware River and the balance from the Schuylkill River. Under the City's water allocation permit issued by the PaDEP, which expires in September 2041, the City is authorized to withdraw up to 423 million gallons per day ("MGD") from the Delaware River and up to 258 MGD from the Schuylkill River.

Water treatment is provided by the Samuel S. Baxter Water Treatment Plant on the Delaware River and by the Belmont and Queen Lane Water Treatment Plants on the Schuylkill River. The combined rated treatment capacity of these plants under the Water Department's Partnership for Safe Water procedures is 546 MGD. The combined maximum source water withdrawal capacity from the two rivers that supply these plants is 680 MGD. The excess source water capacity enables higher than normal withdrawal from either river should conditions limit withdrawals from one. The storage capacity for treated and untreated water in the combined plant and distribution system totals 950 million gallons ("MG"). In Fiscal Year 2018, the Water System distributed 81,459 MG of water at an average daily rate of 223.2 MGD. In Fiscal Year 2018, the maximum delivery experienced by the Water System in one day was 301.0 MGD.

Baxter Water Treatment Plant Clear Well

The Baxter Water Treatment Plant is the Water Department's largest water treatment facility. Its current clear water basin (the "CWB") contains 50 million gallons of water, which it supplies to the Lardner's Point Pump Station. In February 2017, the Water Department commenced construction on a project to replace the CWB with four 5MG basins. Construction is expected to be completed in two phases and take three and a half years to complete. The first phase is expected to cost approximately $111 million. The second phase is not expected to start until the first phase is completed.

Wholesale Contracts

The Water Department has a wholesale contract for water services with Aqua Pennsylvania, Inc. ("AP") under which the Water Department has agreed to provide wholesale water service through March 1, 2026. For wholesale water customer revenues for Fiscal Year 2018, see Table 4 on the preceding page.

Environmental Compliance

Drinking Water Regulatory Matters

The water provided by the Water System meets all physical, chemical, radiological and bacteriological water quality standards established by the United States Environmental Protection Agency (the "EPA") under the federal Safe Drinking Water Act and by the PaDEP. The EPA required a second round of source water sampling beginning in April 2015 to measure the concentration of cryptosporidium present at the intakes of the three water treatment plants. As a result of samples collected over two years, the Baxter Water Treatment Plant is now classified in the BIN 2 category, which is the same classification that the Queen Lane Water

Treatment Plant has had for years. Consequently, a source water protection plan for the Delaware River may be required. The Water Department currently has a source water protection plan in place for the Schuylkill River.

The Water Department continues to prepare for possible future regulations regarding the distribution system using a variety of tools that allow the Water Department to track water through the Water System. The Water Department also is actively involved in monitoring, commenting on, and implementing practices to respond to rules and regulations for distribution systems enacted by the PaDEP and the EPA.

Lead and Copper Rule

Pursuant to the federal Safe Drinking Water Act, the Water Department is required to conduct Lead and Copper Rule ("LCR") monitoring every three years per the requirements of the PaDEP (the "Required LCR Testing"). In February 2016, the EPA re-issued guidance for public water systems regarding LCR tap sampling procedures, and in May 2016, the PaDEP endorsed the EPA's guidance. The Water Department follows such guidance.

The Water Department conducted LCR Testing in 2017. One hundred residential customers responded to a recruitment campaign for testing and 89 customers completed the testing. The regulatory action levels are 15 ppb for lead and 1.3 ppm for copper. Ninety percent (90%) of the homes tested at less than 2.0 ppb for lead and less than 0.23 ppm for copper, which complies with the regulation. The Water Department will conduct the next round of sampling in calendar year 2019.

On June 2, 2016, a class action lawsuit was filed in the Philadelphia Court of Common Pleas on behalf of residents who have resided in an area where the Water Department has replaced water mains or meters since January 1, 2006. The City filed preliminary objections to the complaint on August 8, 2016, and on November 4, 2016, the Court ordered the class action dismissed without prejudice to the plaintiff.

Clean Streams Law

The Water System is subject to various environmental laws and regulations, and from time to time, receives notices of violations of such environmental laws and regulations. As a result of such violations, the Water Department has incurred minor fines from time to time.

The Wastewater System

General

The Wastewater System's service area includes the City. The Water Department has ten wholesale wastewater service contracts (see Table 4 – Wholesale Water and Wastewater Customer Revenues Fiscal Year Ending June 30, 2018). Based on the 2017 U.S. Census Bureau estimate, the Wastewater System served 1,580,863 individuals that live in the City and ten wholesale contracts.

As of June 30, 2018, the Wastewater System served approximately 545,000 accounts, including approximately 50,000 stormwater-only accounts (see "THE SYSTEM – Stormwater Management" below), and ten wholesale contracts with neighboring municipalities and authorities. Customer accounts have been stable the past several years and are expected to remain consistent for Fiscal Year 2019.

The Wastewater System consists of three water pollution control plants, the Northeast, Southwest and Southeast water pollution control plants (the "WPCPs"), 19 pumping stations, approximately 3,700 miles of sewers, and a privately managed centralized biosolids handling facility. It includes approximately 1,850 miles of combined sewers, 760 miles of sanitary sewers, 740 miles of stormwater sewers, 13 miles of force mains (sanitary and storm) and 349 miles of appurtenant piping. The three WPCPs processed a combined average of

413 MGD of wastewater in Fiscal Year 2018, have a 522 MGD combined average daily design capacity and a peak capacity of 1,059 MGD.

Stormwater Management Services

The Water Department delivers many of the City's stormwater management services, including maintenance of the City's approximately 760 miles of separate storm sewers, 1,850 miles of combined sewers and 72,000 stormwater inlets. In recent years, changes in work practices and investment in new equipment have enabled the Water Department to steadily increase the number of inlets cleaned annually.

Wastewater Regulation and Permits

The Clean Water Act requires cities, like Philadelphia, whose separate storm sewer systems serve a population of over 100,000 to obtain a permit from the National Pollutant Discharge Elimination System ("NPDES") for their discharges. The EPA has delegated the NPDES program for the Commonwealth to the PaDEP. In addition to the Clean Water Act, the City and its WPCPs are subject to regulation by the PaDEP, which exercises regulatory authority over municipal sewage treatment operations, and by the Delaware River Basin Commission, which exercises regulatory authority over withdrawals from and discharges into the Delaware and Schuylkill Rivers. The City's NPDES permits require reduction of pollution from commercial and residential areas, illicit connections, industrial facilities and construction sites. The NPDES permits also require the City to manage and treat the excess stormwater and wastewater mix that discharges directly into local waterways during certain precipitation events. See – "Environmental Compliance – Combined Sewer Overflow Program" below.

Current NPDES permits for the Northeast, Southeast and Southwest WPCPs expired on August 31, 2012. The facilities are operating under an extension of the expired permits, as dictated by the policies of the PaDEP. The expired NPDES permits will remain in place until new permits are issued. The Water Department submitted applications for renewals to the PaDEP in February of 2012. The Water Department and the PaDEP are undergoing final negotiations for the Northeast WPCP permit. The Water Department anticipates that the other two permits will be negotiated shortly after the Northeast WPCP permit is finalized. See "Environmental Compliance – *Combined Sewer Overflow Program*" below.

In 2017, the Water Department's three WPCPs were selected to receive Platinum Awards from the National Association of Clean Water Agencies ("NACWA"). NACWA's Peak Performance Awards Program recognizes excellence in wastewater treatment as measured by compliance with NPDES permits. Platinum Awards pay special tribute to facilities that have been awarded 5 or more consecutive Gold Awards, which recognize 100% compliance for the calendar year. The Southwest, Northeast, and Southeast WPCPs have achieved 100% compliance for the past 7 years, 13 years and 18 years, respectively.

Wholesale Contracts

Contracts for wastewater treatment service with neighboring municipalities and authorities provide for charges based on operating costs attributable to the volume and strength of the wastewater received from each of these customers. Capital costs for wholesale wastewater customers are recovered by one of two methods. Seven customers are billed monthly for depreciation and return on investment on allocated wastewater conveyance and treatment facilities. Three customers make capital contributions to the Water Department for an allocated share of the investment in facilities related to the provision of services to such customers. Revenues for Fiscal Years 2016 and 2017 were $33,747,029 and $34,652,023, respectively. Revenues from wholesale wastewater customers for Fiscal Year 2018 are $37,427,704. See Table 4 – Wholesale Water and Wastewater Customer Revenues Fiscal Year Ending June 30, 2018. Budgeted revenues for Fiscal Year 2019 are $37,145,000.

The Water Department has implemented certain changes to the existing long-term wholesale contracts presented in Table 4. Such changes include extending the terms of certain contracts, excluding the contracts with Lower Moreland Township and Abington Township, which had already been extended, increasing management fees from 10% to 12%, and requiring wholesale wastewater customers to assume their respective proportionate share of COA Expenditures. The contract end dates shown in Table 4 represent the dates for the contracts as extended. As demonstrated in Table 4, the Water Department currently charges six wholesale wastewater customers for their respective share of COA Expenditures.

Environmental Compliance

Combined Sewer Overflow Program

The current NPDES permits require the Water Department to implement a program to manage combined system overflows. In certain sections of the City, both wastewater and stormwater are collected and conveyed in a single pipe to the sewage treatment plant. During certain precipitation events, the additional stormwater produced exceeds the capacity of the Wastewater System, resulting in a combined system overflow that discharges directly into local waterways ("CSOs").

The PaDEP and the Water Department signed the COA on June 1, 2011 that allowed the Water Department to implement its Combined Sewer Overflow Program known as the "Green City, Clean Waters Program." Under the program, the City has been investing in green and traditional infrastructure, including wastewater treatment facility enhancements, interceptor pipe lining and collection system improvements, to mitigate CSOs and enhance the quality of local waterways.

As required under the COA, by the year 2036 (year 25 of the COA), the City's Combined Sewer Overflow Program seeks to eliminate and remove the mass of pollutants that otherwise would be removed by the capture of 85% by volume, city-wide, of CSOs. The COA requires interim milestones at the end of the fifth, tenth, fifteenth and twentieth years in four categories: (1) Total Greened Acres; (2) Overflow Reduction Volume; (3) Miles of Interceptor Lined; and (4) Wastewater Treatment Plant Upgrades in design and construction. The COA also includes significant penalties for non-compliance with the milestones. Penalties start at $25,000 per month for each violation (for the first 6 months) and increase up to $100,000 monthly for uncured violations of 13 months or more.

On December 31, 2015, the Water Department received a request for information concerning the COA from the EPA, pursuant to Section 308 of the Clean Water Act. On November 9, 2016, the Water Department received a revised request directing the Water Department to analyze the controls necessary to achieve 85% capture in each of its CSO receiving streams, which is inconsistent with the metrics contained in its approved COA that require 85% capture based on a city-wide average. On April 10, 2017, the EPA agreed to stay the obligation to respond to the information request and scheduled a meeting with the Water Department to discuss the issue further, which meeting took place on June 26, 2018. Based on the meeting, the Water Department anticipates a favorable resolution of the matter. In the meantime, the information request remains stayed.

The Water Department anticipates that over the next 18 years, compliance with the COA will significantly increase capital and operating expenditures related to its Combined Sewer Overflow Program. Moreover, any resulting changes to the COA as a result of the EPA's information request could further increase the costs of compliance. Looking ahead to the 10th-year milestone, the Water Department continues to review program cost and delivery in an effort to optimize the program while satisfying the necessary regulatory requirements. As of the most recent projections, the total cost of the 25-year program is approximately $4.5 billion, of which approximately $3.5 billion are capital related costs and $1 billion are operation and maintenance costs. For Fiscal Year 2017, the City budgeted $55 million for capital COA Expenditures. For Fiscal Year 2018, the City budgeted $76 million for capital COA Expenditures. For Fiscal Year 2019, the budget is $76 million. The projected budget for Fiscal Year 2020 and Fiscal Year 2021 is $76 million and $122 million, respectively. See Table 5 – Fiscal Years 2019-2034 Water Capital Improvement Program and COA Budget.

The Water Department has completed the requirements of the fifth-year milestone by completing approximately 838 greened acres and reducing CSO by approximately 1,710 million gallons. Under the COA, the Water Department must complete an additional 1,310 greened acres and reduce CSO by an additional 334 million gallons by the end of 2021 (the "Tenth Year Milestone"). As of June 30, 2018, the Water Department has completed 1,159 greened acres and needs to complete 990 more greened acres to meet the next five-year milestone.

The City has the option to petition the PaDEP for an extension of time to satisfy the requirements of the COA if the wastewater component of a customer's bill were to exceed 2.27% of median household income. The Water Department currently anticipates that it will meet the targets for the Tenth Year Milestone and has procedures in place to track compliance with the COA. Delays in completing greened acres and reducing CSO can occur and no assurance can be given that any milestone under the CSO will be met. For more information regarding the COA, see APPENDIX II – Engineering Report.

Clean Streams Law

The Wastewater System is subject to environmental laws and regulations and receives notices, from time to time, of violations of such environmental laws and regulations. As a result of such violations, the Water Department has occasionally incurred minor fines.

Clean Air Act

The federal Clean Air Act sets forth requirements for the regulation of certain air emissions. The PaDEP, pursuant to the Clean Air Act's mandates, issued regulations for the control of Volatile Organic Compounds ("VOC") and Nitrogen Oxide ("NOx") emissions from major stationary sources. The Northeast and Southwest WPCPS and the Biosolids Recycling Center were found to be major sources of VOC and Nox emissions, while the Southeast WPCP is a minor source. From time to time, the Water Department has incurred minor fines for violation of the Clean Air Act.

Polychlorinated Biphenyls (PCBs)

Pursuant to Section 303(d) of the Clean Water Act, the Delaware River has been declared impaired because of the levels found in the water of an organic chemical known as polychlorinated biphenyls ("PCBs"). As a result, the Delaware River Basin Commission is performing a Total Maximum Daily Load ("TMDL") analysis that will define the magnitude of PCBs and set forth a plan to reduce loadings of PCBs into the river. The current understanding is that the river exceeds its allowable loadings by 1,000 times its allowance. Loadings come from virtually every source, e.g., sediments, air, runoff from land, contaminated sites and the Water Department's three WPCPs. The Water Department's NPDES permits require implementation of a pollutant minimization plan, which involves tracking down sources of PCBs and referring them to the appropriate agency for remediation. This involves additional staff to track the sources of PCBs and to devise programs to reduce the loadings. The level and extent of clean up that will be required by each source category in the future is currently being evaluated by the Delaware River Basin Commission, the EPA and the states comprising the Delaware River Basin Commission.

Biosolids Treatment and Utilization

The City is required by federal and state law administered by the EPA and the PaDEP to treat and dispose of biosolids captured during wastewater treatment at the City's WPCPs. Under the Biosolids Service Contract, Philadelphia Biosolids treats biosolids from the City's three WPCPs and produces and disposes of Class A pellets to be used as fertilizer and potentially fuel. For more information on the Biosolids Service

Contract, see "OUTSTANDING INDEBTEDNESS AND OTHER LONG-TERM AGREEMENTS – Other Obligations" – Contract for Biosolids Treatment with Philadelphia Biosolids Services, LLC.

Stormwater Management

The Water Department's Municipal Separate Storm Sewer NPDES Permit, a city-wide permit, expired in 2010. The Water Department submitted an application for renewal to the PaDEP in 2010 and is in negotiations with the PaDEP to finalize the permit requirements. The Water Department continues operating under an extension of the expired permit, as dictated by the policies of the PaDEP, which will remain in place until a new permit is issued.

The Water Department's stormwater system is subject to environmental laws and regulations and receives notices, from time to time, of violations of such environmental laws and regulations. As a result of such violations, the Water Department has occasionally incurred minor fines.

CAPITAL IMPROVEMENT PROGRAM

The Charter requires City Council to adopt annually, on or prior to May 31, a one-year capital budget for the ensuing Fiscal Year and a six-year budget showing the capital expenditures planned for that year and each of the five ensuing Fiscal Years known as the "City Capital Improvement Program." The Water Capital Improvement Program is included in the City Capital Improvement Program. The City Capital Improvement Program is prepared annually by the City Planning Commission to present the capital expenditures planned for each of the five ensuing Fiscal Years, including the estimated total cost of each project and the estimated sources of funding (local, state, federal, and private) for each project. The City Capital Improvement Program is reviewed by the Mayor and transmitted to City Council for adoption with his recommendation. The capital budget ordinance, authorizing in detail the capital expenditures to be made or incurred in the ensuing Fiscal Year from City Council appropriated funds, is adopted by City Council concurrently with the City Capital Improvement Program. The one-year capital budget must be in full conformity with the City Capital Improvement Program applicable to the Fiscal Year that it covers. City Council approved the City Capital Improvement Program for Fiscal Years 2019 through 2024 on June 21, 2018. The Fiscal Year 2019 budget for the Water Capital Improvement Program is $353,705,000. The Water Department will submit its proposed Fiscal Year 2020 through Fiscal Year 2025 Capital Improvement Program to the City Planning Commission in November 2018. It is expected that the Fiscal Year 2020 to Fiscal Year 2025 Capital Improvement Program will increase by $1 billion over the next six-year planning period to total approximately $3.3 billion.

For a discussion of the Water Capital Improvement Program, see "– Capital Improvement Program" contained in APPENDIX II – Engineering Report.

Table 5, summarizing the budget for the Water Capital Improvement Program from Fiscal Year 2019 through 2024, including expected COA Expenditures, follows on the next page. A list of the Water Department's top fifteen capital projects in terms of estimated cost and expected financing sources also are presented in Tables 6 and 7, respectively. The Water Department may change the elements of the Water Capital Improvement Program at any time and from time to time, including the proposed financing vehicles and/or schedules associated therewith.

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Table 5
Fiscal Years 2019-2024
Water Capital Improvement Program and COA Budget

Capital Budget Summary	**FY 2019**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Total FY 2019-2024**
Collector System/Flood Relief	$ 56,660,000	$ 56,660,000	$ 71,660,000	$ 71,660,000	$ 71,660,000	$ 71,660,000	$ 399,960,000
Collector System (*CSO COA)*	56,340,000	56,340,000	102,725,000	98,125,000	98,125,000	98,125,000	509,780,000
Conveyance System	89,060,000	93,060,000	71,060,000	75,060,000	78,060,000	82,060,000	488,360,000
Engineering Administration & Material Support	31,645,000	32,234,000	32,841,000	33,467,000	34,111,000	34,774,000	199,072,000
Water & Wastewater Facilities	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	100,000,000	600,000,000
Wastewater Treatment Facilities (*CSO COA)*	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	120,000,000
Total	**$353,705,000**	**$358,294,000**	**$398,286,000**	**$398,312,000**	**$401,956,000**	**$406,619,000**	**$2,317,172,000**
Budget: Non-CSO COA versus CSO COA							
Subtotal Non-CSO COA	$277,365,000	$281,954,000	$275,561,000	$280,187,000	$283,831,000	$288,494,000	$1,687,392,000
Subtotal CSO COA*	$ 76,340,000	$ 76,340,000	$122,725,000	$118,125,000	$118,125,000	$118,125,000	$ 629,780,000
Total	**$353,705,000**	**$358,294,000**	**$398,286,000**	**$398,312,000**	**$401,956,000**	**$406,619,000**	**$2,317,172,000**

* COA Expenditures represent 27.18% of the Water Capital Improvement Program budget for Fiscal Years 2019 through 2024.
Source: City Capital Improvement Program budget.

The following table presents the Water Department's top fifteen projects in terms of estimated cost. Such projects are included in the Water Capital Improvement Program and are constructed and paid over a number of Fiscal Years.

Table 6
Philadelphia Water Department
Top Fifteen Capital Projects by Estimated Cost
Fiscal Year Ending June 30, 2018

No.	Project Title	Status	Estimated Cost	FY Construction Commencement
1	Three 30 Million Gallon Storage Tanks at East Park	Under construction	$110,800,000	2017
2	New Clear Water Basin at Baxter Water Treatment Plant	Under Construction	111,000,000	2017
3	Frankford High Level 3rd Barrel	Design Started	80,200,000	2020*
4	New Preliminary Treatment Building at NE WPCP	Design 95% Complete	76,900,000	2021*
5	Baxter Clear Water Basin – Phase 3.	Design Started	77,100,000	2021*
6	Advanced Metering Infrastructure (AMI)	Starting in FY2019	75,000,000	2019*
7	Improvements to the 29th St. Facility	Design Started	65,000,000	2022*
8	New Lardner's Point Pump Station	Design Started	56,700,000	2022*
9	Water Main Replacements	Ongoing Replacement	56,000,000	2017
10	Sidestream Treatment at SWWPCP	Design Started	50,800,000	2023*
11	New Gravity Thickeners at NE WPCP	Under construction	38,700,000	2017
12	Queen Lane Raw Water Pump Station Rehabilitation	Design Started	37,500,000	2023*
13	Sewer Main Replacements	Ongoing Replacement	37,000,000	2017
14	Dredging of Raw Water Basin and Closing of Lagoon at Queen Lane WTP	Design 70% complete	28,100,000	2019*
15	Dissolved Air Flotation System Improvements at SWWPCP	Construction Started	21,300,000	2018
	TOTAL		**$922,100,000**	

* Reflects current projection for start of construction.

Capital Improvement Program Financing Sources

The Water Department expects to finance the Water Capital Improvement Program using revenue bonds, pay-as-you-go financing, and possibly alternate sources of funding, including loans or grants. A significant portion of the costs of the Water Capital Improvement Program is expected to be funded with the proceeds of debt as indicated below. The City expects most of such debt to be in the form of new money revenue bonds issued in several transactions, as necessary. The emphasis of the Water Capital Improvement Program is on: (i) renewal and replacement of the water conveyance and sewage collection systems, (ii) improvements to water and wastewater treatment plants and (iii) CSO mitigation projects consistent with the Water Department's COA.

As described in the Engineering Report, the Water Department anticipates additional borrowings for Fiscal Years 2020 through 2024 as follows:

Table 7
Anticipated Future Borrowings for Water Capital Improvement Program

Fiscal Year	Estimated Principal Amount
2020	$295,000,000
2021	310,000,000
2022	350,000,000
2023	355,000,000
2024	360,000,000

City Council has preauthorized by supplemental ordinance approximately half of the debt that will finance a majority of the projects contained in the Water Capital Improvement Program. The Water Department may change the financing elements of the Water Capital Improvement Program, including the financing vehicles utilized and the timing thereof, at any time and from time to time.

Capital Planning Initiatives

The Water Department's Operations, Planning and Environmental Services, and Engineering and Construction Divisions develop capital programs to better anticipate future needs for infrastructure maintenance and upgrades and to manage long-term capital expenditures. Included in these efforts are a sewer assessment program, a geographic information system based records viewer, a capital facilities assessment program, and a standardized planning process for all large capital projects.

The Water Department has enhanced its planning process for capital projects that have an initial estimated design and construction cost of $2 million or more. As part of such initiative, the Water Department will focus on and document the following three project planning steps: Project Need Identification, Project Alternatives Identification, and Project Alternatives Evaluation. A prioritization system is utilized to capture the primary driving factors associated with a wide range of project types. The desired timing of capital projects also is documented through this process. The improved planning process also will help inform the Water Department's future critical strategic planning efforts, in addition to improving communication and coordination among units within the Water Department. Below is a discussion of a few of the Water Department's capital planning initiatives.

Water Main Replacement

The Water Department's five-year average breaks per 100 miles is 26.4 per year. The Water Department assesses its water main break rate against the optimal level of 15 breaks per 100 miles/year as defined by the Distribution System Optimization Program under the American Waterworks Association (the "AWWA") Partnership for Safe Water. The Water Department closely monitors water main conditions to determine that adequate capital investment is made, to predict long-term water main replacement needs and refine the criteria for replacement selection. Over the last 24 years, the Water Department has replaced on average 19 miles of water mains per year. In Fiscal Year 2019, the Water Department budgeted $56 million for water main replacement in order to accelerate its water main replacement program with a new goal of replacing a total of 32 miles of water mains. For Fiscal Years 2020 through 2024, the Water Department intends to increase the annual budget by 2 miles per year until it reaches a total of 42 miles of water main replacement for that period.

Linear Asset Management Program

The Linear Asset Management Program ("LAMP") evaluates the Water Department's water and sewer assets. LAMP is leveraging several information systems, existing programs and statistical tools to evaluate non-capital options for extending an asset's useful life and assess the risk of pipeline failure for the water distribution system and the sewer collector system, the costs of replacement, ancillary damages and operations and maintenance history. With this information, a new long-term plan for water pipeline renewal was developed in Fiscal Year 2016, under which the Water Department has begun to prepare for the replacement of additional miles of failure prone leadite joint piping, a cohort that has the highest statistical likelihood of failure.

Distribution System Reservoir Planning Initiative

The reservoir team was created to better manage the strategic and capital planning and operations and maintenance functions of the Water Department's finished water reservoirs. Initially, the team updated all standard operating procedures and improved as-built facility documentation and has since strategically focused on the East Park Reservoir. The costs and construction status of the East Park Reservoir project are detailed in the preceding Table 6 – Top Fifteen Capital Projects by Estimated Cost.

Sewer Replacement and Renewal Program

Over the last 24 years, the Water Department has reconstructed and/or rehabilitated, on average, approximately 8 miles of sewer annually. The Water Capital Improvement Program currently includes reconstructing or relining from six to ten miles of sewers per year based upon results of the Sewer Infrastructure Assessment Program and other reports, including data from LAMP. Some sewers are scheduled for reconstruction as a result of programmed water main replacement. As infrastructure is studied further, it is likely that annual sewer renewal will increase. The Fiscal Year 2019 budget for sewer replacement and/or rehabilitation is $40 million per year, which generally yields 8 to 10 miles of sewers per year depending on their size and location.

Sewer Infrastructure Assessment Program

The Water Department has incorporated a sewer assessment program to evaluate the condition of its sewer system. Data collected from the program is used to determine necessary repairs and capital and operating costs of such repairs. The program has helped to identify sewers in immediate need of repair, and it is anticipated that over time it will result in a reduction of costly and disruptive emergency sewer repairs. The sewer assessment program also is used to schedule repairs for sewers that have reached the end of their useful life. Such sewers will be reconstructed as part of the Water Capital Improvement Program.

HISTORICAL AND PROJECTED FINANCIAL INFORMATION

Historical Comparative Statement of Net Position

The Water Department's financial statements are prepared in accordance with accounting principles promulgated by the Governmental Accounting Standards Board ("GASB"). The statement of net position presents the financial position of the Water Department. It presents information on the Water Department's assets, deferred outflows of resources, and liabilities with the difference between the three reported as net position. A three year condensed summary of the Water Department's net position as of June 30 for Fiscal Years 2017-2015, as presented in the audited financial statements for such years, is presented below. As of the date of this Official Statement, the audited financial statements for Fiscal Year 2018 are not complete.

Table 8
Condensed Statement of Net Position as of June 30
(Thousands of Dollars)

	FY 2017	FY 2016	FY 2015*
Assets:			
Current Assets	$ 258,444	$ 233,821	$ 240,216
Capital Assets	2,318,410	2,230,233	2,149,680
Restricted Assets	887,924	772,376	889,928
Total Assets	3,464,778	3,236,430	3,279,824
Deferred Outflows of Resources	94,211	108,809	83,507
Total Assets and Deferred Outflows	3,558,989	3,345,239	3,363,331
Liabilities:			
Current Liabilities	240,464	238,542	225,234
Bonds Payable	2,022,636	1,842,386	1,974,073
Other Non-Current Liabilities	483,646	496,344	454,445
Total Liabilities	2,746,746	2,577,272	2,653,752
Deferred Inflows of Resources	2,144	2,863	--
Total Liabilities and Deferred Inflows	2,748,890	2,580,135	2,653,752
Net Position:			
Net Investment in Capital Assets	542,042	523,367	385,721
Restricted	511,113	499,916	559,802
Unrestricted	(243,056)	(258,179)	(235,944)
Total Net Position, as Restated	$ 810,099	$ 765,104	$ 709,579

*The capital asset balances and net position of Fiscal Year 2015 was not restated for a reclassification of expense.

The following discussion relates to the Water Fund's net position at June 30, 2017, based upon the audited financial statements for the Water Fund. The Water Fund's net position at June 30, 2017 was approximately $810.1 million, a $45.0 million or 5.9% increase from June 30, 2016. Total assets and deferred outflows of resources increased by $213.8 million, or 6.4%, to $3.6 billion, and total liabilities and deferred inflows of resources increased $168.8 million, or 6.5%, to $2.7 billion.

The following is a discussion of the more significant changes in assets and deferred outflows of resources, liabilities and deferred inflows of resources, and net position in Fiscal Year 2017:

- After restatement (see Note III. 5. and Note III. 10.), capital assets, net of depreciation and amortization, increased by $88.2 million to $2.3 billion, or 4.0%, as a result of capital additions of $462.3 million, offset by depreciation of $105.2 million and net retirements of $258.0 million.

- Current assets increased by $24.6 million to $258.4 million, or 10.5%, due to increases in equity in City Treasurer's account and accounts receivable.

- Restricted assets increased by $115.5 million to $887.9 million, or 15.0%, due to increases in the Water Capital Fund primarily due to a bond issuance.

- Deferred outflows of resources decreased by $14.6 million to $94.2 million, or 13.4%, due to deferred outflows of resources related to the Water Fund's net pension liability, which was partially offset by amortization of the unamortized loss on refunded debt.

- Current liabilities increased by $1.9 million to $240.4 million, or 0.8%, primarily due to increases in amounts due to other funds, accounts payable and current state of long term obligations, partially offset by reductions in vouchers payable, salaries and wages payable, and construction contracts payable.

- Bonds payable increased by $180.2 million to $2.0 billion, or 9.8%, primarily due to the issuance of revenue bonds.

- Other non-current liabilities decreased by $12.7 million to $483.6 million, or 2.6%, primarily due to a decrease in net pension liability of $11.6 million.

- Deferred inflows of resources decreased by $0.7 million to $2.1 million, or 25.1%, due to deferred inflows of resources related to the Water Fund's net pension liability.

- The Water Fund's net position increased by $45.0 million to $810.1 million, or 5.9%, as a result of Fiscal Year 2017 operations and capital contributions.

- Net investment in capital assets increased by $18.7 million, or 3.6%, to $542.0 million.

- Unrestricted net position increased by $15.1 million, or 5.9%, to a deficit of $243.1 million. The unrestricted component of net position represents the net amount of total assets, deferred outflows of resources, total liabilities, and deferred inflows of resources that are not included in the determination of net investment in capital assets or restricted components of net position. The $15.1 million change is primarily due to a prior period adjustment of $49.4 million, which relates to items that were capitalized and should have been expensed in prior years.

Historical Operating Results (Legally Enacted Basis)

For purposes of rate setting, calculating compliance with the Rate Covenant and debt service coverage and budgeting, the Water Fund accounts are maintained on the modified accrual basis of accounting, also referred to as the "Legally Enacted Basis." Under this basis, revenues are recorded on a receipts basis, except revenues from other governments and interest, which are accrued as earned. A 100% reserve is provided for all doubtful non-governmental receivables. With respect to governmental receivables, a 100% reserve is provided when the City has reason to believe that no appropriation has been made by other governments to finance these receivables. The Water Department does not account for payments for water and sewer service from its governmental contract customers as "revenues from other governments."

Expenditures are recognized and recorded as expenses at the time they are paid or encumbered, except expenditures for debt service, which are recorded when paid. A reserve is maintained for encumbrances at the close of the Fiscal Year intended to pay expenses incurred in such Fiscal Year.

Table 9
Philadelphia Water Department Historical Operating Results
(Thousands of Dollars)

	FY 2018*	FY 2017	FY 2016
Operating Revenues:			
Sales to General Customers	$635,072	$615,886	$587,572
Service (Sales) to Other Municipalities	37,428	34,652	32,389
Services to Other Philadelphia Agencies (Includes Fire Protection)	33,490	33,364	34,810
Private Fire Connections	3,169	2,872	2,737
Industrial Sewer Surcharge	5,628	5,911	7,375
Other Operating Revenue	7,208	7,122	5,158
Total Operating Revenues	**$721,995**	**$699,807**	**$670,041**
Non-Operating Revenues			
Interest on Investments	$1,506	$920	$20
Operating Grants	569	1,408	745
Other Non-Operating Revenues	26,000	18,511	8,100
Total Non-Operating Revenues	**$28,075**	**$20,839**	**$8,865**
Total Revenues	**$750,070**	**$720,646**	**$678,906**
Operating Expenses	**$506,184**	**$480,257**	**$433,026**
Deduct: Commitments Cancelled – Net**	32,413	24,550	24,088
Net Operating Expenses	**$473,771**	**$455,707**	**$408,938**
Adjustment between Debt Service and Net Operating Expenses (due to timing differences)* **	**--**	**--**	**$340**
Excess of Operating Revenues over Operating Expenses	**$248,224**	**$244,100**	**$261,443**
Excess of Revenues over Expenses before Interest Expenses and Principal Payments on Bonded Indebtedness	**$276,299**	**$264,939**	**$270,308**
Interest Expenses:			
Revenue Bonds	$86,294	$80,294	82,594
Total Interest Expenses	**$86,294**	**$80,294**	**$82,594**
Excess of Revenues over Expenses Exclusive of Debt Principal Payments	**$190,005**	**$184,645**	**$187,714**
Add: Adjustment between Debt Service Payments to Sinking Fund, Revenue Bond Payments, LOC expenses and Net Operating Expenses due to timing differences	235	1,244	--
Deduct: Debt Principal Payments on Bonded Indebtedness During Fiscal Year	132,189	125,848	136,710
Deduct: Transfer to Escrow Account to Redeem Bonds	19,000	11,000	--
Net Unapplied Project Revenues	**$39,051**	**$49,041**	**$51,004**
Deduct: Funds Transferred to Residual Fund	28,905	31,301	31,136
Deduct: Funds Transferred to Capital Account	34,776	22,302	21,497
Transfer (TO)/FROM The Rate Stabilization Fund	$24,630	$ 4,562	$1,629
Coverage Ratios****			
Senior Revenue Bond Debt Service	**1.38x**	**1.31x**	**1.24x**
Total Debt Service and Other Transfers	**1.19x**	**1.18x**	**1.13x**

*Preliminary, unaudited.
**Commitments Cancelled represent the liquidation of encumbrances and offset operating expenses. An encumbrance is an expense that is anticipated to be charged to the Water Fund.
***Per Section 5.01 of the General Ordinance, debt service is adjusted, if necessary, to reflect the principal of and interest on Water and Wastewater Revenue Bonds required to be paid during the period, plus the net amount due and payable on Qualified Swaps during such period. At times, an adjustment to debt service may be needed to reflect timing differences that may occur if the Sinking Fund is pre-funded in the current year for a portion of the following year's Debt Service Requirements.
****See Table 10 – Philadelphia Water Department Rate Covenant Compliance for methods of calculation of Coverage Ratios.

As discussed above, the Water Department is required to comply with the Rate Covenant under the General Ordinance. For a discussion of the Rate Covenant, see "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Rate Covenant" herein. All Water Fund expenditures are included in the Rate Covenant calculation under the General Ordinance. See "HISTORICAL AND PROJECTED FINANCIAL INFORMATION – Historical Operating Results (Legally Enacted Basis)" above. Historically, the Water Department has used the Rate Stabilization Fund to manage compliance with the Rate Covenant each year. See Note 1 to the financial statement of the Water Fund contained in APPENDIX I. See also Table 11A – Projected Revenue and Revenue Requirements and Table 11B – Rate Stabilization Fund Flow of Funds contained herein.

In Fiscal Years 2016 and 2017, the Water Department complied with the Rate Covenant, with a revenue bond debt service coverage ratio of at least 1.20 each year, and a total debt service coverage ratio of at least 1.00 each year. In Fiscal Year 2016, the Water Department complied with the Rate Covenant, with a revenue bond debt service coverage ratio of 1.24 and a total coverage ratio of 1.13, after taking into account a withdrawal from the Rate Stabilization Fund of $1,629,000. In Fiscal Year 2017, the Water Department complied with the Rate Covenant, with a revenue bond debt service coverage ratio of 1.31 and a total coverage ratio of 1.18, after taking into account a withdrawal from the Rate Stabilization Fund of $4,563,000. In Fiscal Year 2018, the Water Department complied with the Rate Covenant, with a revenue bond debt service coverage ratio of 1.38 and a total coverage ratio of 1.19 after taking into account a withdrawal from the Rate Stabilization Fund of $24,630,000. The Water Department's current financial plan calls for debt service coverage ratios of 1.30 times starting in Fiscal Year 2019 as noted in the section titled "Projected Revenues, Expenses and Debt Service." Table 10 sets forth the Water Department's Rate Covenant compliance over the last three Fiscal Years.

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Table 10
Philadelphia Water Department
Rate Covenant Compliance
(Thousands of Dollars)

	FY18*	FY17	FY16
Coverage A[(1)]:			
Net Revenues	$300,929	$269,501	$271,937
/Revenue Bonds Debt Service	218,483	206,142	219,304
= Coverage A	1.38x	1.31x	1.24x
Coverage B[(2)]:			
Net Revenues	$300,929	$269,501	$271,937
/Total Debt Service + Transfer to Capital Fund	253,259	228,444	240,801
= Coverage B	1.19x	1.18x	1.13x
Coverage C[(3)]:			
Net Revenues +/-Transfer (To) From Rate Stabilization Fund	$276,299	$264,938	$270,308
/Revenue Bonds Debt Service	218,483	206,142	219,304
= Coverage C	1.26x	1.29x	1.23x

*Preliminary, unaudited.

(1) **Coverage A:** The Rate Covenant requires the City to establish rates and charges for the use of the Water and Wastewater Systems sufficient to yield Net Revenues, as defined therein, in each Fiscal Year at least equal to 120% of the Debt Service Requirements for such Fiscal Year (excluding debt service due on any Subordinated Bonds).

(2) **Coverage B:** Net Revenues, in each Fiscal Year, must equal at least 100% of: (i) the Debt Service Requirements (including Debt Service Requirements in respect of Subordinated Bonds) payable in such Fiscal Year; (ii) amounts required to be deposited for Subordinated Bonds payable in such Fiscal Year; (iii) amounts required to be deposited into the Debt Reserve Account during such Fiscal Year; (iv) debt service on all General Obligations Bonds issued for the Water and Wastewater Systems payable is such Fiscal Year; (v) debt service payable on Interim Debt in such Fiscal Year; and (vi) the Capital Account Deposit Amount for such Fiscal Year, less amounts transferred from the Residual Fund to the Capital Account during such Fiscal Year. To ensure compliance with the Rate Covenant, the General Ordinance requires that the City review its rates, rents, fees, and charges at least annually.

(3) **Coverage C:** The City is required to establish rates and charges for the use of the System sufficient to yield Net Revenues (excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such Fiscal Year) at least equal to 90% of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) in such Fiscal Year.

The Water Department's Budget

At least 90 days before the end of the Fiscal Year, the operating budget for the next Fiscal Year is prepared by the Mayor and submitted to City Council for adoption. The budget, as adopted, must be balanced and provide for discharging any estimated deficit from the current Fiscal Year and make appropriations for all items to be funded with City revenues. At least 30 days before the end of the Fiscal Year, City Council must adopt by ordinance an operating budget.

Fiscal Year 2019 Budget

The City's Fiscal Year 2019 operating budget was presented to City Council on March 2, 2018 and approved by City Council and signed by the Mayor on June 21, 2018. The Water Fund budget for Fiscal Year 2019 is $844,708,000, which excludes commitments cancelled from the prior year. See footnote to Table 9 above regarding commitments cancelled. Fiscal Year 2019 Water Fund budgeted revenues total $814,708,000, inclusive of the transfer from the Rate Stabilization Fund in the amount of $84,359,000. The amount of such transfer from the Rate Stabilization Fund is calculated solely for purposes of the budget to provide additional appropriations to balance the budget, but it does not represent the Water Department's expected transfer at the end of Fiscal Year 2019. See Table 11A – Projected Revenue and Revenue Requirements. The Consulting Engineer's calculation of the operating budget and transfer from the Rate Stabilization Fund differs from how the City calculates the transfer from the Rate Stabilization Fund for purposes of the budget. For more information on the City's budget procedure, see APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Discussion of Financial Operations – Budget Procedure."

Pension Obligations of the Water Department

As of the date of this Official Statement, the Water Fund has made its scheduled payments for the Municipal Pension Fund (defined herein) and its allocable share of the City's Pension Bonds (as defined in APPENDIX IV) for Fiscal Year 2018. The City maintains a single employer defined-benefit pension program (the "Municipal Pension Fund"), which provides benefits to police officers, firefighters, non-uniformed employees, and non-represented appointed and elected officials, including employees of the Water Department. Contributions are made by the City to the Municipal Pension Fund from (i) the City's General Fund, (ii) funds that are received by the City from the Commonwealth for deposit into the Municipal Pension Fund, and (iii) various City inter-fund transfers, representing amounts contributed, or reimbursed, to the City's General Fund for pension payments for employees of the Water Fund, Aviation Fund, and certain other City funds or agencies. An additional source of expected funding is that portion of the 1% sales tax rate increase that is required under Pennsylvania law to be deposited to the Municipal Pension Fund. See APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Revenues of the City – Sales and Use Tax" and APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Pension System."

Prior to Fiscal Year 2018, payments from the Water Fund to the City's General Fund for the Municipal Pension Fund were comprised of two components: (i) payments from the Revenue Fund for employees paid from such account, which are treated as Operating Expenses and (ii) payments from the Capital Account for employees paid from such account. Similarly, the Water Department makes payments from the Revenue Fund and the Capital Account for the Water Fund's allocable share of principal and interest payments on the City's Pension Bonds. Commencing in Fiscal Year 2018 and onward, all pension obligations of the Water Fund will be paid exclusively from the Revenue Fund as Operating Expenses.

Payments from the Water Fund to the City's General Fund for the Municipal Pension Fund were approximately \$55.1 million (approximately \$46.6 million from the Revenue Fund and \$8.5 million from the Capital Account) for Fiscal Year 2016.

Payments from the Water Fund to the City's General Fund for the Municipal Pension Fund were approximately \$57.9 million (approximately \$52.3 million from the Revenue Fund and \$5.6 million from the Capital Account) for Fiscal Year 2017. See APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Pension System – Annual Contributions – Table 29," which reports such payments as \$61.0 million for Fiscal Year 2017.

Payments from the Water Fund to the City's General Fund for the Water Fund's allocable share of principal and interest payments on the City's Pension Bonds were approximately \$12.6 million (approximately \$11.4 million from the Revenue Fund and \$1.2 million from the Capital Account) and \$13.7 million (approximately \$12.5 million from the Revenue Fund and \$1.2 million from the Capital Account) for Fiscal Years 2015 and 2016, respectively. See APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Pension System – Annual Contributions – Table 30." Payments for Fiscal Year 2017 totaled \$14.5 million (approximately \$13.3 million from the Revenue Fund and \$1.1 million from the Capital Account). Payments for Fiscal Year 2018 (unaudited) \$14.3 million, paid solely from the Revenue Fund. Payments for Fiscal Year 2019 are budgeted to be \$14.1 million solely from Revenue Fund. As of Fiscal Year 2018, contributions from the Water Fund to the City's General Fund for the Municipal Pension Fund will equal approximately 10% of total payments to the Municipal Pension Fund, exclusive of the Water Department's allocable share of Pension Bonds. In Fiscal Year 2017, contributions from the Water Fund to the City's General Fund for the Municipal Pension Fund were approximately 7.5% of total payments to the Municipal Pension Fund, exclusive of the Water Department's allocable share of Pension Bonds.

Projected Revenues, Expenses and Debt Service

Table 11A – Projected Revenue and Revenue Requirements, presents a statement of projected revenues and revenue requirements for the operation of the Water and Wastewater Systems for Fiscal Years Ending June 30, 2019 through June 30, 2024, consistent with the requirements of the General Ordinance. See APPENDIX II – Engineering Report herein for the full text of the Engineering Report. The Engineering Report should be read in its entirety. As stated in the Engineering Report, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur and are unknown at this time and/or which are beyond the control of the Consulting Engineer.

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Table 11A
Philadelphia Water Department
Projected Revenue and Revenue Requirements
Fiscal Year Ending June 30 (Thousands of Dollars)

No.	Description			2019	2020	2021	2022	2023	2024
	OPERATING REVENUE								
1	Water Service - Existing Rates			$ 282,998	$ 281,665	$ 279,030	$ 276,520	$ 274,051	$ 271,596
2	Wastewater Service - Existing Rates			436,512	441,575	440,485	437,168	433,543	431,259
3	Total Service Revenue - Existing Rates			719,510	723,240	719,515	713,688	707,594	702,855
	Additional Service Revenue Required								
		Percent	Months						
	Year	Increase	Effective						
4	FY 2021	8.20%	10			48,238	58,522	58,023	57,634
5	FY 2022	4.60%	10				29,042	35,218	34,982
6	FY 2023	4.60%	10					30,119	36,592
7	FY 2024	2.00%	10						13,606
8	Total Additional Service Revenue Required			0	0	48,238	87,565	123,360	142,814
9	Total Water & Wastewater Service Revenue			719,510	723,240	767,753	801,253	830,954	845,669
	Other Income (a)								
10	Other Operating Revenue			17,215	14,142	11,167	11,071	10,975	10,604
11	Operating Fund Interest Income			409	364	434	451	449	460
12	Rate Stabilization Interest Income			690	596	523	534	544	556
13	**Total Revenues**			**737,823**	**738,341**	**779,876**	**813,308**	**842,922**	**857,288**
	OPERATING EXPENSES								
14	Water & Wastewater Operations			(297,645)	(303,647)	(311,870)	(320,273)	(328,499)	(337,077)
15	Direct Interdepartmental Charges			(201,576)	(206,331)	(211,466)	(217,171)	(222,677)	(229,183)
16	**Total Operating Expenses**			**(499,222)**	**(509,978)**	**(523,336)**	**(537,445)**	**(551,176)**	**(566,260)**
	NET REVENUES								
17	Transfer From/(To) Rate Stabilization Fund			10,600	36,500	(200)	(5,300)	500	(6,600)
18	**NET REVENUES (L13 +L16+L17)**			**249,202**	**264,864**	**256,340**	**270,564**	**292,245**	**284,429**

No.	Description	2019	2020	2021	2022	2023	2024
	DEBT SERVICE						
	Senior Debt Service						
	Revenue Bonds						
19	Outstanding Bonds	(176,140)	(164,217)	(142,398)	(132,668)	(131,955)	(107,445)
20	Pennvest Parity Bonds	(10,684)	(10,638)	(10,638)	(10,638)	(10,638)	(10,638)
21	Projected Future Bonds	(4,811)	(28,879)	(44,129)	(64,746)	(82,179)	(100,680)
22	Total Senior Debt Service	(191,635)	(203,734)	(197,164)	(208,052)	(224,772)	(218,763)
23	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L22)**	**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**
	Subordinate Debt Service						
24	Outstanding General Obligation Bonds	0	0	0	0	0	0
25	Pennvest Subordinate Bonds	0	0	0	0	0	0
26	Total Subordinate Debt Service	0	0	0	0	0	0
27	Transfer to Escrow	0	0	0	0	0	0
28	Total Debt Service on Bonds Plus Transfer to Escrow	(191,635)	(203,734)	(197,164)	(208,052)	(224,772)	(218,763)
29	**CAPITAL ACCOUNT DEPOSIT**	(23,972)	(24,787)	(38,445)	(39,752)	(41,104)	(42,502)
30	TOTAL COVERAGE (L18/(L22+L26+L29))	1.15 x	1.15 x	1.08 x	1.09 x	1.09 x	1.08 x
	RESIDUAL FUND						
31	Beginning of Year Balance	15,030	15,085	15,087	15,078	15,098	15,028
32	Interest Income	60	60	60	60	60	60
	Plus:						
33	End of Year Revenue Fund Balance	33,594	36,342	20,730	22,760	26,370	23,165
34	Deposit for Transfer to City General Fund (b)	1,500	1,516	1,528	1,584	1,662	1,752
	Less:						
35	Transfer to Construction Fund	(33,600)	(36,400)	(20,800)	(22,800)	(26,500)	(23,200)
36	Transfer to City General Fund	(1,500)	(1,516)	(1,528)	(1,584)	(1,662)	(1,752)
37	Transfer to Debt Service Reserve Fund	0	0	0	0	0	0
38	End of Year Balance	$ 15,085	$ 15,087	$ 15,078	$ 15,098	$ 15,028	$ 15,053

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

(b) Transfer of interest earnings from the Debt Reserve Account to the Residual Fund as shown in Line 34 to satisfy the requirements for the Transfer to the City General Fund.

Table 11B
Rate Stabilization Fund Flow of Funds
Fiscal Year Ending June 30 (Thousands of Dollars)

No.	Description	2019	2020	2021	2022	2023	2024
	RATE STABILIZATION FUND						
1	Beginning of Year Balance	$177,760	$167,160	$130,660	$130,860	$136,160	$135,660
2	Deposit From/(To) Revenue Fund	(10,600)	(36,500)	200	5,300	(500)	6,600
3	End of Year Balance	$167,160	$130,660	$130,860	$136,160	$135,660	$142,260

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RATES

Current Rates

Pursuant to the Rate Ordinance, the Water Department initiated a general rate increase proceeding by filing an advance notice with the Rate Board and City Council on February 12, 2018, followed by formal notice on March 14, 2018. In accordance with its regulations, the Rate Board appointed Community Legal Services to serve as the Public Advocate to represent the concerns of the residential consumers and other small users in the proceeding and held nine public hearings and five days of technical hearings. On July 12, 2018, the Rate Board issued a Rate Determination approving overall rate increases of 1.33% and 1.20% to take effect in Fiscal Years 2019 and 2020, respectively. As proposed by the Water Department, the first rate change became effective on September 1, 2018 for Fiscal Year 2019, and the second is scheduled to become effective on September 1, 2019 for Fiscal Year 2020. The Water Department has estimated that the rate changes and targets for financial metrics approved by the Rate Board will result in total revenue increases of approximately $7,884,000 in Fiscal Year 2019 and $16,645,000 in Fiscal Year 2020.

On August 9, 2018, the Public Advocate filed an appeal of the Rate Board's Rate Determination with the Court of Common Pleas of Philadelphia County. On August 28, 2018, the Public Advocate filed a motion asking the Court to stay the new rates and charges. A hearing on the motion to stay is scheduled for November 7, 2018. The City filed an Answer in Opposition to the motion on September 18, 2018. The scheduling order dated September 28, 2018 requires that the Public Advocate file its appellate brief no later than January 7, 2019 and that the City file its brief no later than February 4, 2019. Oral Argument is scheduled for March 4, 2019. Prior cases involving rate case appeals by the Public Advocate typically have not been resolved in less than two years from the commencement of the initial filing with the court.

The hearing on the Public Advocate's motion to stay the new rates and charges occurred on November 7, 2018, as scheduled. Judge Patrick did not rule on the motion and asked each side to prepare a brief. The City expects the Judge to issue an order directing the Public Advocate to file a brief by December 7, 2018, and the City to respond by January 7, 2019.

Water rates for general service customers of the Water Department consist of a service charge related to the size of the meter, plus a schedule of quantity charges for water use. Sewer rates for general service customers are similar. To more fairly reflect the burden on the System, stormwater charges are calculated based on a customer's property size and its relative imperviousness. A uniform stormwater charge based on the average size and imperviousness of residential properties is billed to residential customers. Charges to non-residential and condominium customers are based on each property's specific size and impervious area.

Special rates with partial discounts are established pursuant to the Water Department's Rates and Charges for the following customers: (1) public and private schools which provide instruction up to or below the twelfth grade; (2) institutions of "purely public charity;" (3) places used for religious worship; (4) residences of eligible senior citizens; (5) universities and colleges; and (6) public housing properties of the Philadelphia Housing Authority. In addition, the Rate Board approved discounts of 100% on stormwater rates for eligible community gardens in 2016 and an exemption from water, sewer and stormwater rates for unoccupied properties of the Philadelphia Land Bank in 2018. Some real estate also is exempt from stormwater charges, including, cemeteries, residential sideyards, City-owned or City-controlled vacant lots or improvements, portions of Fairmount Park, streets, medians, sidewalks, and rights-of-way. Water and sewer charges, including stormwater charges, terminate when any vacant or unoccupied premises are acquired by the City and when property is acquired by the Philadelphia Housing Development Corporation or the Philadelphia Redevelopment Authority under provisions of the Philadelphia Code pertaining to vacant properties.

In addition to the special rates referenced above, the Water Department offers additional assistance and incentive programs to customers, which constitute either an Operating Expense of the Water Department or contra-revenue in the form of credits or reductions to customers' bills.

The Tiered Assistance Program ("TAP") program was launched on July 1, 2017 and assists low-income households at or below 150% of the federal poverty level ("FPL") and those experiencing a special hardship, as discussed herein. Under the TAP program bills are tied to household income and do not fluctuate based on actual consumption. Under the TAP program, monthly bills for water, sewer, and stormwater usage and service charges are as follows.

Income	Fixed Charge %*	
50% of FPL or lower	at 2% of the household income	$12.00 minimum bill
above 100% and at or below 150% FPL	3% of the household income	
Above 150% FLP, with proof of hardship	4% of the household income	A special hardship can be increase in household size, loss of a job lasting more than 4 months, serious illness lasting more than 9 months, death of primary wage earner, domestic violence, other circumstances that threaten household's access to necessities of life

*Any actual charges above the fixed amount are forgiven.

Certain financial information regarding some of the programs discussed above is set forth in Table 12 below.

Table 12
Stormwater Incentives and Assistance Program
Fiscal Year Ending June 30, 2018

Program	Program Type	FY 2018*	FY 2017	FY 2016
SMIP(1) and GARP(2)	Operating Expense	$25,900,000	$16,900,000	$11,450,000
Phase in Program (CAP)(4)	Bill Reduction	2,011,096	2,531,367	3,282,654
Stormwater Credits(4)	Bill Reduction	16,038,856	13,819,758	12,864,862
Community Gardens	Bill Reduction	14,320	-	-
Tiered Assistance Program (TAP)(5)	Bill Reduction	2,927,221	-	-
Total		**$46,891,493**	**$33,251,125**	**$27,597,516**

(*) Budgeted.
(1) Stormwater Management Incentives Program.
(2) Grant and Greened Acres Retrofit Program.
(3) In Fiscal Year 2015, SMIP and GARP were partially funded with grants.
(4) Amounts are credits against certain customers' bills.
(5) TAP is a low-income assistance program commenced in July of 2017. It reduces customers' bills and results in a reduction in revenue for the Water Department.

Rates

Table 13 below shows monthly water and sewer bills for Fiscal Years 2017 through 2019 and is based, in each case, on a typical residential customer with a 5/8 inch meter using 500 cubic feet per month and a typical residential customer that is also an income eligible senior citizen, who receives a 25% discount, with a 5/8 inch meter using 500 cubic feet per month.

Table 13
Typical Residential
Monthly Water and Sewer Rate Charges
Fiscal Year Ending June 30, 2018

	Effective Date	Water	Sewer*	Total	Percentage Increase
5/8" Meter Residential	9/1/2019	$28.09	$39.10	$67.19	1.3%
500 Cu. Ft. Monthly	9/1/2018	27.88	38.45	66.33	-0.3
	7/1/2017	28.15	38.35	66.50	--
5/8" Meter Residential	9/1/2019	$14.20	$24.44	$38.64	1.3%
300 Cu. Ft. monthly	9/1/2018	14.082	24.0735	38.16	-1.0
Income Eligible Senior Citizen	7/1/2017	14.6505	23.8935	38.54	--
(25% Discount)					

* Sewer charges include stormwater costs.
Note: Fiscal Year 2020 figures reflect assumed TAP Rate Rider Surcharge rates, which are subject to annual reconciliation. Final Fiscal Year 2020 figures may vary.

Billing and Collections

Under the Charter, the Water Revenue Bureau is directly responsible for the billing, metering and collection of revenues for the Water Fund. Since February 2003, oversight of the Water Revenue Bureau has been under the City's Revenue Commissioner, who reports directly to the Finance Director. The Water Revenue Bureau uses outside collection agencies to collect delinquent accounts.

The Water Department's collection factor was approximately 96% for Fiscal Year 2018, including collections realized in the current and past fiscal year, and approximately 95% for Fiscal Years 2017 and 2016. The City is pursuing a multifaceted strategy for improving collections while decreasing delinquencies, key compliance strategies of which include revocation of commercial licenses and sequestration. Although these efforts have concentrated primarily on general fund revenues, certain improvements in processes and equipment may affect Water Fund revenues. The financial projections provided herein do not include any additional revenue or acceleration of revenue as a result of these initiatives.

In addition to compliance efforts, the City is engaged in two active projects to implement technology solutions for its cashier and payment processing systems and to develop an integrated data warehouse and case management system. These initiatives are designed to improve operational efficiencies by providing tools currently unavailable to the City. See also "OTHER OBLIGATIONS – Contract for Automatic Meter Reading System with ITRON."

Automatic Meter Reading System and Advanced Meter Reading Infrastructure

The Water Department's Automatic Meter Reading System has produced a number of positive results, including more accurate meter reading and billing, fewer billing disputes, better customer service and increased revenue collection, including collection of delinquent accounts. From 2011 to 2013, the Water Department replaced the batteries in the vast majority of radio transmitter devices, thereby extending their life to approximately the year 2025. See also "OTHER OBLIGATIONS – Contract for Automatic Meter Reading System with ITRON."

The City, through the Procurement Department, Water Department and the Water Revenue Bureau, is currently negotiating a contract for an advanced metering infrastructure system (AMI) for water meters. The project will include: AMI system network, installation of new meter reading units; operation and maintenance of the AMI system; data management system for customer portal and billing system; integration of software with the City's existing systems; training, documentation, and product support. The City does not intend to replace all of the water meters during the initial installation phase of the new system. The Water Department expects installation of the AMI system and communications network to take approximately 12 months. The deployment phase, during which AMR meter reading equipment will be replaced with AMI units is expected to take approximately 24 months. The project is part of the Water Capital Improvement Program and included in Table 6 – Top Fifteen Capital Projects by Estimated Cost.

Charter Amendment and Rate Ordinance

In November 2012, Philadelphia voters approved an amendment to the Charter to allow City Council to establish an independent rate-making body responsible for fixing and regulating rates and charges for water and sewer services. The Rate Ordinance became effective January 20, 2014, and the Rate Board was formed, promulgated regulations governing the rate review process in December 2015, and completed its first rate proceeding in June 2016.

The Charter still mandates that the standards pursuant to which rates and charges are fixed shall be such as to yield to the City at least an amount equal to operating expenses and interest and sinking fund charges on any debt incurred or about to be incurred for water supply, sewage and sewage disposal purposes. In computing operating expenses, proportionate charges for all services performed for the Water Department by all officers, departments, boards or commissions of the City also are included.

While any Water and Wastewater Bonds are outstanding, the Rate Board also will be required to set rates and charges in amounts sufficient for the City to comply with the provisions of the General Ordinance. The Rate Ordinance subjects the Rate Board to certain standards when making a rate determination in addition to those set forth in the General Ordinance. The Rate Ordinance also requires the Water Department to develop a comprehensive plan, pursuant to which the Water Department forecasts capital and operating costs and expenses and corresponding revenue requirements.

See "— Philadelphia Water, Sewer and Stormwater Rate Board" and "— Rate Setting" below. A copy of the Rate Ordinance is available at the Office of the Director of Finance, 1300 Municipal Services Building, 1401 JFK Boulevard, Philadelphia, Pennsylvania 19102 and must be read in conjunction with the Philadelphia Code.

Philadelphia Water, Sewer and Stormwater Rate Board

The Rate Board consists of five members serving staggered terms. The members are appointed by the Mayor and confirmed by City Council, and the Mayor has sole discretion to remove members for cause, including conflicts of interest and neglect of duty. Members who resign or are removed may be replaced by a mayoral appointee confirmed by City Council, and such successor may serve for the remaining term of the replaced member. Members are not compensated for their services, but are entitled to reasonable expenses consistent with their duties. The Rate Board receives an appropriation sufficient to allow it to carry out its responsibilities.

The Rate Ordinance requires that Board members be City residents with a minimum of five years professional experience in one or more of the following fields: (1) public or business administration, (2) finance, (3) utilities, (4) engineering or (5) water resources management. At least one member must have experience as a consumer advocate in utility rate cases, and one member must be a commercial and/or industrial ratepayer with knowledge and experience related to stormwater management and rates. Brief biographical descriptions of the remaining members of the Rate Board are set forth below.

Folasade (Sade) A. Olanipekun-Lewis – Ms. Olanipekun-Lewis is the Regional Director for Government and Airport Affairs with American Airlines. She currently serves as the Rate Board's Secretary. She has worked in many areas of Philadelphia government for over 20 years. Previously, she served as the Deputy Commerce Director for Finance and Administration for the City of Philadelphia, Chief Financial Officer for City Council, Chief Financial Officer for the School District, and also as City Treasurer, where her responsibilities included overseeing the issuance of debt and other financing instruments and managing the investment of cash reserves of the city totaling about $2 billion. Ms. Olanipekun-Lewis completed secondary school in Nigeria, West Africa; obtained an undergraduate degree in Economics from the Graduate Center, City University of New York, CUNY BA Program; a Juris Doctor degree from Temple University Beasley School of Law; and a Master degree in Government Administration from the University of Pennsylvania, Fels School of Government. (Term expires July 1, 2020.)

Sonny Popowsky – Mr. Popowsky currently serves as the Rate Board's Chairperson. He previously served as the Consumer Advocate of Pennsylvania from 1990 to 2012 and was a member of the Keystone Energy Board and the U.S. Department of Energy and Electricity Advisory Committee. Mr. Popowsky satisfies the requirement of a consumer advocate in utility rate cases. (Term expires July 1, 2023.)

Wendell Anthony Ewing – Vice President of Leasing and Development at Liberty Property Trust, a commercial real estate development firm. Mr. Ewing satisfies the requirement of a commercial and/or industrial rate payer with knowledge and experience related to stormwater management and rates. (Term expires July 1, 2022.)

Abby Pozefsky – Ms. Pozefsky has been a licensed practicing attorney for over 40 years and has worked in various capacities in Philadelphia government since 1986. In Philadelphia, she has served as: Water Department General Counsel; Airport General Counsel; Law Department: Chief Deputy of Regulatory Affairs; Gas Works: General Counsel and Chief Administrative Officer; and School District: Legal Department transformation consultant. (Term expires July 1, 2021.)

Rasheia R. Johnson – Rasheia R. Johnson, City Treasurer, was appointed as Treasurer to the City of Philadelphia on January 19, 2016. With over 17 years of financial experience and accomplishments, Ms. Johnson decided to leave the private sector and serve the public with the appointment as City Treasurer by Mayor James F. Kenney. As City Treasurer, Ms. Johnson oversees the cash management and investments of the City's $3.2 billion in funds, all custodial and commercial banking relationships, and the disbursement of City funds. In addition to managing the City's $8.4 billion debt portfolio, she is tasked with overseeing the issuance of all notes and bonds on behalf of the City's General Fund and Enterprise Funds (Airport, Gas Works, Water and Wastewater) to finance capital projects and major equipment acquisitions in adherence with the City's debt management policies and ensures that all principal and interest is paid in a timely and efficient manner. (Term expires July 1, 2019).

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MANAGEMENT INITIATIVES

The Water Department has implemented several initiatives designed to increase the efficiency of its operations and reduce costs.

Water Accountability

The Water Department has been successful in developing and implementing programs to recover uncaptured revenue through reduction in the loss of finished water from the distribution system. The Water Department's non-revenue water has averaged 85-95 MGD from Fiscal Year 2014 to Fiscal Year 2017, remained stable for Fiscal Year 2018. The Water Department accounts for all finished water as either consumption or losses. Losses are accounted for in two ways: (i) apparent losses are calculated losses, due to customer meter inaccuracies, billing errors or unauthorized consumption that cause water utilities to lose a portion of consumption-based revenue, (ii) real losses are physical losses, largely leakage, that cause excess production costs for water utilities.

Over recent years the Water Department has implemented a host of programs to reduce and control water and revenue losses. The Water Department operates a Customer Meter Management Program and a Revenue Protection Program, which have increased billing by approximately $4.4 million in Fiscal Year 2016, $4.9 million in Fiscal Year 2017 and $4.5 million in Fiscal Year 2018. See also "RATES – Automatic Meter Reading System and Advanced Meter Reading Infrastructure" for more information on the program.

The Water Department conducts a variety of activities to proactively contain leakage losses, including (i) the Leak Detection Program, (ii) the district metered area and (iii) the hydrant tracking program. The Water Department was one of the first water utilities in the United States to employ such techniques to mitigate leakage and lessen the occurrence of water main breaks. Through the Leak Detection Program, the Water Department also contracts for in-line leak detection in active large-diameter transmission water piping. This service has added another highly effective tool to minimize lost water. The small pilot district metered area has achieved up to 90% reduction in the leakage rate through installed instrumentation to control leakage by advanced pressure management. Finally, the hydrant tracking program has resulted in hydrant availability remaining significantly above 99% through initiatives such as routine inspection, repair and painting.

Wastewater Master Planning

The Wastewater Planning Program developed a 25-year Master Plan that incorporates the regulatory requirements contained in the COA, connecting the collection system and treatment facilities holistically, and looks beyond current regulatory drivers to envision the future of the utility. The Master Plan is expected to be updated every 5 years to ensure that the wastewater system meets regulatory requirements and any changes in population projections. The Wastewater Master Planning Program's data and findings will help refine the Water Capital Improvement Program, prioritize capital projects and inform facility planning as it relates to potential water quality regulations, resource recovery, and process renewal technologies. Facility major asset inspection programs are under development to ensure that the condition of infrastructure is known and that related costs are reflected in the Water Capital Improvement Program.

The Master Plan concluded that the current facilities are adequate for projected population growth and established a wet weather facility plan to meet the COA requirements through 2036. The wet weather facility plan was delivered to the EPA in June 2016.

Water Master Planning

The Water Facilities Planning Program is currently developing a 25-year Water System Master Plan that will outline a program to upgrade the City's drinking water treatment and supply facilities and address repairs required to address aging infrastructure to increase reliability and reduce redundancy of the Water

System and ensure sustainable delivery of safe, clean and affordable drinking water. The Water System Master Plan will focus on six key categories: water quality, operability, capital availability, water quantity, service pressure and public perception. The Water System Master Plan is expected to be completed early in 2019. The Water Master Plan will project the capital improvement needs at water treatment, pumping and storage facilities over a 25-year period, which will assist the Water Department in developing the Water Capital Improvement Program and prioritizing capital projects. The Water System Master Plan has preliminarily identified 400 projects to rehabilitate existing facilities and construct several new facilities. The estimated cost of these projects over the next 25 years is $2.5 billion, half of which has already been accounted for in the existing Water Capital Improvement Program.

Security of Water Department Facilities and Water Supply

The Water Department has performed a vulnerability analysis of its entire potable water system and has extensive water quality monitoring, protection and security plans in place. All finished water basins are completely covered; all plants are fenced in and topped by barbed wire; main entrances and gates are secured; video surveillance equipment has been installed; and the Water Department continues to draw and conduct nearly one thousand tests on water samples from various locations each day. Online water quality monitors provide continuous testing during all stages of the treatment process. The City also has implemented a surveillance and response system, a source water protection program and early warning systems for the Schuylkill and Delaware Rivers and surrounding areas. Additional upgrades are planned to enhance security at the three water treatment plants and the pumping stations.

To further ensure the safety of the City's drinking water, the Water Department will continue to monitor water quality using online instrumentation that allows real-time tracking of water conditions at strategic locations throughout the City's water distribution system.

CERTAIN INVESTMENT CONSIDERATIONS

Introduction

The purchase of the Bonds involves numerous investment risks, some of which are referred to in this Official Statement. No representation is made that the risks described or referred to in this Official Statement constitute all of the risks associated with investing in the Bonds. Accordingly, prior to making a decision to invest in the Bonds, each prospective purchaser thereof should make an independent evaluation of all of the information presented in this Official Statement, including the Appendices, and should review other pertinent information.

System Revenues, Expenditures, Financing and Capital Assets

Actual operation, maintenance and repair expenses of the System may be greater or less than currently projected. Factors such as damages to facilities and infrastructure, changes in technology, regulatory standards, and increased costs of material, energy, labor and administration can substantially affect the expenses of the Water Department. Although the City has covenanted to set rates and charges in amounts sufficient to pay debt service on all Water and Wastewater Revenue Bonds in accordance with the provisions of the General Ordinance, there can be no assurance that amounts will be so sufficient or that sufficient amounts will be collected. Furthermore, increases in rates and charges could result in a decrease in demand for usage and result in a decrease in revenues.

Operation of the System requires significant capital expenditures that are partially dependent on the City's ability to secure appropriate financing. Disruptions in the capital and credit markets may limit the City's access to capital. Without sufficient capital, or if the cost of borrowing increases, it may materially and adversely affect the business, financial condition, and results of operations of the Water Department.

Water and wastewater operations entail specific risks and may impose significant costs. Wastewater collection and treatment and septage pumping and sludge hauling involve various unique risks. If collection or treatment systems fail or do not operate properly, or if there is a spill, untreated or partially treated wastewater could discharge onto property or into nearby streams and rivers, causing various damages and injuries, including environmental damage. These risks are most acute during periods of substantial rainfall or flooding, which are the main causes of CSO and system failure. Any failure of water and wastewater treatment plants, networks of water and wastewater pipes, or water reservoirs could result in losses and damages that may adversely affect the business, financial condition, and results of operations of the Water Department.

General Economic Conditions

General economic conditions may affect the Water Department's financial condition and results of operations. A general economic downturn may lead to a reduction in discretionary and recreational water use. General economic turmoil also may lead to an investment market downturn, which may result in asset market values (including pension plan assets) suffering a decline and significant volatility. For instance, a decline in the City's pension plans' asset market values could increase required cash contributions to these plans from the Water Fund and increased pension expenses in subsequent years.

Environmental Regulations

The City is subject to state and federal environmental laws and regulations applicable to the System. These laws and regulations are subject to change, and the City may be required to expend substantial funds to meet the requirements of such changing laws and regulations in the future. Failure to comply with these laws and regulations may result in the imposition of administrative, civil and criminal penalties, or the imposition of an injunction requiring the City to take or refrain from taking certain actions. In addition, the City may be required to remediate contamination on properties owned or operated by the City or on properties owned by others, but contaminated as a result of City operations.

Water and wastewater services are governed by various federal and state environmental protection and health and safety laws and regulations, including the federal Safe Drinking Water Act, the Clean Water Act and similar state laws, and federal and state regulations issued under these laws by the EPA and PaDEP. These laws and regulations establish, among other things, criteria and standards for drinking water and for discharges into the waters of the United States and nearby states. Pursuant to these laws, the Water Department is required to obtain various environmental permits for operations. Violations or noncompliance could result in fines or other sanctions by regulators and/or such violations or noncompliance could result in civil suits. Environmental laws and regulations are complex and change frequently. These laws, and the enforcement thereof, have tended to become more stringent over time. While the Water Department has budgeted for future capital and operating expenditures to comply with these laws and permitting requirements, it is possible that new or stricter standards could be imposed that will require additional capital expenditures or raise operating costs.

Climate change is receiving ever increasing attention worldwide. Because of the uncertainty of future climate change regulatory requirements, the Water Department cannot predict the potential effects of future laws and regulations on operations.

Weather and Seasonal Fluctuations

The Water Department's operations are affected by weather conditions and are subject to seasonal fluctuations, which could adversely affect demand for services and revenues and earnings.

The Water Department depends on an adequate water supply to meet the present and future demands of customers. Drought conditions could interfere with sources of water supply and could reduce demand due to the implementation of the Water Department's drought emergency restrictions, which could adversely affect the Water Department's ability to supply water in sufficient quantities to existing and future customers. An interruption in water supply could have a material adverse effect on the operations of the Water Department.

Security of the System

Damage to the System resulting from vandalism, sabotage, or terrorist activities may adversely affect the operations and finances of the System. There can be no assurance that the City's security, emergency preparedness and response plans will be adequate to prevent or mitigate such damage, or that the costs of maintaining such security measures will not be greater than currently anticipated. See "MANAGEMENT INITIATIVES – Security of Water Department Facilities and Water Supply" for efforts the Water Department has taken to secure the System.

The Water Department is increasingly dependent on the continuous and reliable operation of information technology systems, and a disruption of these systems, resulting from cyber security attacks or other events, including material disasters or severe weather events, could adversely affect its business. The Water Department relies on information technology systems with respect to customer service and billing, accounting and, in some cases, the monitoring and operation of treatment, storage and pumping facilities. In addition, the Water Department relies on these systems to track utility assets and to manage maintenance and construction projects, materials and supplies. Any major problems with the operation of these systems could adversely affect operations and have a material adverse effect on the financial condition and results of operations of the Water Department.

Although the Water Department does not believe that its systems are at a materially greater risk of cyber security attacks than other similar utilities, its information technology systems may be vulnerable to damage or interruption from cyber security attacks or other events or actions, and such incidents or other events may go undetected for a period of time.

Limited Recourse on Default

The rights of Bondholders are limited in the event the City defaults on its obligation to pay debt service on the Bonds. The ultimate enforcement of Bondholders' rights upon any default by the City in the performance of its obligations under the Act, the General Ordinance and the Bonds will depend upon the application of remedies provided in the Act, the General Ordinance and other applicable laws. Litigation may be necessary to obtain relief in accordance with these remedies. Such litigation may be protracted and costly. Remedies such as mandamus, specific performance or injunctive relief are equitable remedies, which are subject to the discretion of the court. See "REMEDIES OF BONDHOLDERS" and APPENDIX III-A – "SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS – Summary of Operative Provisions of the General Ordinance – Remedies to be Enforced Only Against Project Revenues" herein.

Bankruptcy

The rights of the owners of the Bonds are subject to the limitations on legal remedies against the City, including applicable bankruptcy, moratorium, insolvency or other laws affecting creditor's rights or remedies and are subject to general principles of equity (regardless of whether such enforceability is considered in equity or at law), to the exercise of judicial discretion in appropriate cases and to the limitations on legal remedies against governmental entities in the Commonwealth of Pennsylvania. Bankruptcy proceedings, or the exercise of powers by the federal or state government, if initiated, could subject the owners of the Bonds to judicial discretion and interpretation of their rights in bankruptcy or otherwise, and consequently may entail risks of delay, limitation, or modification of their rights or the modification of City covenants affecting the System or Project Revenues.

The Pennsylvania Intergovernmental Cooperation Authority Act for Cities of the First Class (the "PICA Act") prevents the City from filing a petition for relief under Chapter 9 of the Federal Bankruptcy Code

("Chapter 9") as long as the Pennsylvania Intergovernmental Cooperation Authority ("PICA") has outstanding any bonds issued pursuant to the PICA Act ("PICA Bonds"). In order to file for bankruptcy under Chapter 9 after the PICA Bonds have been repaid in full, the City must obtain the written approval of the Governor of the Commonwealth. As of June 30, 2018, the principal amount of PICA Bonds outstanding was $168,505,000. The final maturity date of the PICA Bonds is June 15, 2023. See APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – The Government of the City of Philadelphia – Local Government Agencies – Non-Mayoral-Appointed or Nominated Agencies – PICA and Debt of the City – PICA Bonds."

The filing of a petition under Chapter 9 operates as an automatic stay of the commencement or continuation of any judicial or other proceeding against the debtor or its property. However, a petition filed under Chapter 9 does not operate as a stay of the application of pledged special revenues to the payment of indebtedness secured by such revenues. Special revenues include receipts derived from the ownership or operation of systems that are primarily used or intended to be used primarily to provide transportation, utility or other services, including the proceeds of borrowings to finance such systems. The Federal Bankruptcy Code further provides that special revenues acquired by the debtor after the commencement of a Chapter 9 case shall remain subject to any lien resulting from any security agreement entered into by the debtor before the commencement of the case. However, the lien on special revenues derived from a system will be subject to the payment of the necessary operating expenses of that system. Therefore, Project Revenues acquired by the City after the filing of a Chapter 9 petition would remain subject to the lien created by the General Ordinance in favor of the Bondholders, but will be subject to the payment of Operating Expenses of the System, which are priority payments. A bankruptcy court's interpretation of 'necessary operating expenses' under the Federal Bankruptcy Code could differ from the definition of Operating Expenses of the System under the General Ordinance. The Federal Bankruptcy Code also provides that a pre-bankruptcy transfer of property of a debtor to or for the benefit of a bondholder, on account of such bond, may not be avoided as a preferential transfer. Although Project Revenues appear to satisfy this definition, no assurance can be given that a court would hold that Project Revenues are special revenues. If Project Revenues were determined not to be "special revenues," then there is a risk that Project Revenues collected after the commencement of the bankruptcy case would not be subject to the lien of the General Ordinance, such that the recovery by holders of the Bonds could be negatively affected.

Unless the debtor consents or the plan proposed under Chapter 9 so provides, the bankruptcy court may not interfere with any of the property or revenues of a Chapter 9 debtor or with such debtor's use or enjoyment of any income-producing property. Accordingly, the City may be able to defer the application of Bond proceeds, Project Revenues or the pledged Water and Wastewater Funds to payment of the Bondholders during the pendency of the bankruptcy case, but the lien on such funds and revenues would remain, and would continue to encumber such funds and revenues (subject again to payment of 'necessary operating expenses' and Operating Expenses of the System, to the extent these differ from 'necessary operating expenses' as determined by a bankruptcy court under the Federal Bankruptcy Code). Even if a bankruptcy court had the power to compel immediate payment, the court, in the exercise of its equitable powers, could decline to require the City to use Bond proceeds, Project Revenues and the Water and Wastewater Funds to pay Bondholders during the pendency of the case.

The debtor may file a plan for the adjustment of its debts that may include provisions modifying or altering the rights of creditors generally, or any class of them, secured or unsecured. The plan, when confirmed by the court, binds all creditors that have had notice or knowledge of the plan and discharges all claims against the debtor provided for in the plan. No plan may be confirmed unless certain conditions are met, among which are that the plan is in the best interests of creditors, is feasible and has been accepted by each class of claims impaired thereunder. Even if the plan is not so accepted, it may be confirmed if the court finds that the plan is fair and equitable with respect to each class of non-accepting creditors impaired thereunder and does not discriminate unfairly. Thus, under the above described "cram-down" provisions of the Federal Bankruptcy Code, a plan of adjustment could be imposed on the Bondholders that would give them less than their anticipated rate of interest on the Bonds or possibly even less than a full return of their principal under certain circumstances, and/or extend the time for payment of principal of or interest on the Bonds.

The foregoing references to the Federal Bankruptcy Code should not be construed as implying that the City expects to resort to the provisions of such statute or that, if it did, any proposed restructuring would include a dilution of the sources of payment of and security for the Bonds.

Loss of Tax Exemption

In order to maintain the exclusion from gross income for federal income tax purposes of the interest on the Bonds, the City has covenanted to comply with the applicable requirements of the Internal Revenue Code of 1986, as amended. Interest on the Bonds could become includable in gross income for purposes of federal income taxation retroactive to the date of issuance of such Bonds as a result of acts or omissions of the City in violation of this or other covenants applicable to the Bonds. See "TAX EXEMPTION." The Bonds are not subject to redemption or any increase in interest rates in the event of an event of taxability and will remain outstanding until maturity or prior redemption in accordance with the provisions contained in the General Ordinance.

Tax legislation, administrative actions taken by tax authorities, and court decisions may cause interest on the Bonds to be subject, directly or indirectly, to federal income taxation or state income taxation, or otherwise prevent the beneficial owners of the Bonds from realizing the full current benefit of the tax status of such interest. For example, future legislation to resolve certain federal budgetary issues may significantly reduce the benefit of, or otherwise affect, the exclusion from gross income for federal income tax purposes of interest on all state and local obligations, including the Bonds. In addition, such legislation or actions (whether currently proposed, proposed in the future or enacted) could affect the market price or marketability of the Bonds. Prospective purchasers of the Bonds should consult their own tax advisors regarding any pending or proposed federal or state tax legislation, regulations or litigation, and its impact on their individual situations.

Water Conservation

Decreased customer water consumption as a result of water conservation efforts may adversely affect demand for water services and may reduce revenues and earnings. There may be declines in water usage per customer as a result of an increase in conservation awareness, and the structural impact of an increased use of more efficient plumbing fixtures and appliances. Difficulty obtaining future rate increases to offset decreased customer water consumption to cover investments and expenses, may adversely affect the business, financial condition, and results of operations of the Water Department.

Limitations on Effectiveness of Pledge of Project Revenues and Water and Wastewater Funds

The effectiveness of the pledge of the Project Revenues and the Water and Wastewater Funds may be limited because, although the Fiscal Agent will have custody of the Water and Wastewater Funds, the City will have complete control of deposits into and expenditures from the Water and Wastewater Funds, except for amounts on deposit in the Sinking Fund, including the Debt Reserve Account. While the City has covenanted not to direct the Fiscal Agent to transfer Project Revenues other than as permitted under the General Ordinance, no requisition procedure or other similar procedure will be established for the expenditure of monies by the City from the Water and Wastewater Funds (other than the Sinking Fund, including the Debt Reserve Account), and no consent or approval of the Fiscal Agent is required to be obtained by the City as a condition of the City's expenditure of such monies. For more information on the limitations of the pledge, see "SECURITY AND SOURCES OF PAYMENT FOR THE BONDS – Limitations on Effectiveness of Pledge of Project Revenues and Waste and Wastewater Funds."

Other Considerations

Debt Covenants. The City is obligated to comply with the Rate Covenant and other debt covenants under certain agreements, including its insurance contracts. Failure to comply with such covenants, which if not cured or waived, could result in the City's being required to repay or finance the related borrowings before their due date, limit future borrowings, cause cross default issues, and increase borrowing costs. If forced to repay or refinance (on less favorable terms) these borrowings, the Water Department's business, financial condition, and results of operations could be adversely affected by increased costs and rates.

Variable Rate Bonds. The City has one Series of Water and Wastewater Revenue Bonds outstanding in a variable rate, which are subject to fluctuation in interest rates.

LITIGATION AND CLAIMS

Claims against the City relating to the Water Department are paid out of the Water and Wastewater Funds and only secondarily out of the City's General Fund, in the event cash balances in the Water and Wastewater Funds are insufficient at the time of payment of the claim. The General Fund is then reimbursed by the Water and Wastewater Funds for any such advance. The following discussion concerning litigation and claims, which has been prepared based on information supplied by the Law Department of the City and has been reviewed by the Law Department of the City, relates to litigation and claims against the City chargeable to the Water Fund. A discussion of other litigation affecting the City is set forth under the caption in APPENDIX IV – "GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA – Litigation." See also "THE SYSTEM – The Water System – Environmental Compliance – Lead and Copper Rule" for a discussion of the class actions suit filed against the City and dismissed without prejudice to the plaintiff.

On March 15, 2018, a religious organization filed a complaint against the City for alleged miscalculation of stormwater management service charges and asserts the following causes of action against the City: (1) a request for declaratory judgment that the stormwater management charge is a tax improperly imposed on the organization; and (2) a violation of procedural due process related to termination of water service to the premises. The City filed preliminary objections to the complaint. The trial court sustained the City's preliminary objections and dismissed all claims with prejudice on July 3, 2018. The organization filed an appeal of the trial court's decision, which is currently pending before the Commonwealth Court of Pennsylvania. The City believes that its stormwater charges are equitable and closely reflect the actual cost of servicing stormwater in City properties; however, there can be no assurance of the outcome of this litigation and the effect of such litigation on future rates or on potential refunds of previously collected stormwater charges if the organization prevails on the merits of its claims.

Various other claims have been asserted against the City respecting the Water Department and in some cases lawsuits have been initiated. The City may be liable if these claims are reduced to judgment or otherwise settled in a manner requiring payment by the City.

The City, from the Water and Wastewater Funds, paid \$5.44 million in Fiscal Year 2016 and \$6.90 million in Fiscal Year 2017 in judgments and settlements for claims. The Water Department paid \$6.20 million in Fiscal Year 2018 (unaudited), and the Fiscal Year 2019 budget is \$8.50 million.

TAX EXEMPTION

Federal Taxation

In the opinions of Ballard Spahr LLP and Ahmad Zaffarese LLC, both of Philadelphia, Pennsylvania, Co-Bond Counsel, interest on the Bonds is excludable from gross income for purposes of federal income tax under existing laws as enacted and construed on the date of initial delivery of the Bonds, assuming the accuracy of the certifications of the City and continuing compliance by the City with the requirements of the Internal Revenue Code of 1986, as amended (the "Code"). Interest on the Bonds is not an item of tax preference for purposes of the individual federal alternative minimum tax. The corporate alternative minimum tax was repealed by legislation enacted on December 22, 2017 (known as the "Tax Cuts and Jobs Act"), effective for tax years beginning after December 31, 2017. For tax years beginning on or before December 31, 2017 interest on the Bonds is not an item of tax preference for purposes of the corporate alternate minimum tax in effect prior to enactment of the Tax Cuts and Jobs Act; however, interest on Bonds held by a corporation (other than an S Corporation, regulated investment company, or real estate investment trust) indirectly may be subject to federal alternative minimum tax because of its inclusion in the adjusted current earnings of a corporate holder. Co-Bond Counsel express no opinion regarding other federal tax consequences of ownership or disposition of, or the accrual or receipt of interest on, the Bonds.

The opinion of Co-Bond Counsel will assume the accuracy of certifications made by the City and will be subject to the condition that the City comply with all requirements of the Code that must be satisfied subsequent to the issuance of the Bonds in order that the interest thereon be, and continue to be, excludable from gross income for federal income tax purposes. The City has covenanted to comply with all such requirements, which include, among others, restrictions upon the yield at which proceeds of the Bonds and other money held for the payment of the Bonds and deemed to be proceeds thereof may be invested, the requirement to calculate and rebate any arbitrage that may generated with respect to investments allocable to the Bonds, and restrictions regarding the use of the facilities financed or refinanced with the proceeds of the Bonds. Failure to comply with such requirements could cause interest on the Bonds to be includible in gross income retroactive to the date of issuance of the Bonds.

Original Issue Premium. The Bonds being offered at a premium ("original issue premium") equal generally to the excess of their public offering price over their principal amount are referred to herein as the "Premium Bonds." For federal income tax purposes, original issue premium is amortizable periodically over the term of a Premium Bond through reductions in the holder's tax basis for such Premium Bond for determining taxable gain or loss from sale or from redemption prior to maturity. Amortization of premium does not create a deductible expense or loss. Holders should consult their tax advisors for an explanation of the amortization rules.

Commonwealth of Pennsylvania Taxation

The Bonds are exempt from personal property taxes in Pennsylvania, and interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax, under the laws of the Commonwealth of Pennsylvania as enacted and construed on the date of issuance and delivery of the Bonds.

Changes in Federal and State Tax Law

From time to time, there are Presidential proposals, proposals of various federal committees, and legislative proposals in the Congress and in the states that, if enacted, could alter or amend the federal and state tax matters referred to herein or adversely affect the marketability or market value of the Bonds or otherwise prevent holders of the Bonds from realizing the full benefit of the tax exemption of interest on the Bonds. Further, such proposals may impact the marketability or market value of the Bonds simply by being proposed. It cannot be predicted whether or in what form any such proposals may be enacted or whether if enacted such proposals would apply to bonds issued prior to enactment. In addition, regulatory actions are from time to time announced or proposed and litigation is threatened or commenced which, if implemented or concluded in a particular manner, could adversely affect the market value, marketability or tax status of the Bonds. It cannot be predicted whether any such regulatory action will be implemented, how any particular litigation or judicial action will be resolved, or whether the Bonds would be impacted thereby.

Purchasers of the Bonds should consult their tax advisors regarding any pending or proposed legislation, regulatory initiatives or litigation. The opinions expressed by Co-Bond Counsel are based upon existing legislation and regulations as interpreted by relevant judicial and regulatory authorities as of the date of issuance and delivery of the Bonds, and Co-Bond Counsel have expressed no opinion as of any date subsequent thereto or with respect to any proposed or pending legislation, regulatory initiatives or litigation.

The foregoing is only a general summary of certain provisions of the Code as enacted and in effect on the date hereof and does not purport to be complete. Holders of the Bonds should consult their own tax advisors as to the effects, if any, of the Code in their particular circumstances.

See APPENDIX VI hereto for the Form of Approving Opinion of Co-Bond Counsel.

NEGOTIABLE INSTRUMENTS

The Act provides that bonds issued thereunder shall have all the qualities and incidents of securities under the Uniform Commercial Code of the Commonwealth of Pennsylvania and shall be negotiable instruments.

ENGINEERING REPORT

The Engineering Report is included in APPENDIX II of this Official Statement in reliance upon the authority of the Consulting Engineer in engineering and related financial matters. Potential purchasers of the Bonds should read the Engineering Report in its entirety. As stated in the Engineering Report, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur that are unknown at this time and/or which are beyond the control of the Consulting Engineer.

UNDERWRITING

The Bonds are being purchased by the underwriters listed on the front cover page of the Official Statement (collectively, the "Underwriters") pursuant to a Bond Purchase Agreement between the City and Citigroup Global Markets Inc., on behalf of itself and as representative of the other Underwriters, at a purchase price of $300,704,831.43, which equals the principal amount of the Bonds, plus original issue premium of $24,907,583.25 and less an aggregate Underwriters' discount of $1,137,751.82. The Underwriters will purchase all of the Bonds if any such Bonds are not purchased. The obligation of the Underwriters to purchase the Bonds is subject to certain terms and conditions set forth in the Bond Purchase Agreement.

The initial public offering prices of the Bonds set forth on the inside front cover page hereof may be changed without notice by the Underwriters. The Underwriters may offer and sell Bonds to certain dealers (including dealers depositing Bonds into investment trusts, certain of which may be sponsored or managed by one or more of the Underwriters) and others at prices lower than the offering prices set forth on the inside front cover page hereof.

Citigroup Global Markets Inc., an Underwriter of the Bonds, has entered into a retail distribution agreement with Fidelity Capital Markets, a division of National Financial Services LLC (together with its affiliates, "Fidelity"). Under this distribution agreement, Citigroup Global Markets Inc. may distribute municipal securities to retail investors at the original issue price through Fidelity. As part of this arrangement, Citigroup Global Markets Inc. will compensate Fidelity for its selling efforts.

Certain of the Underwriters have entered into distribution agreements with other broker-dealers (that have not been designated by the City as Underwriters) for the distribution of the Bonds to retail investors at the original issue prices. Such agreements generally provide that the relevant Underwriter will share a portion of its underwriting compensation or selling concession with such broker-dealers.

The Underwriters and their respective affiliates are full service financial institutions engaged in various activities, which may include sales and trading, commercial and investment banking, advisory, investment management, investment research, principal investment, hedging, market making, brokerage and other financial and non-financial activities and services. Certain of the Underwriters and their respective affiliates have provided, and may in the future provide, a variety of these services to the issuer and to persons and entities with relationships with the issuer, for which they received or will receive customary fees and expenses.

In the ordinary course of their various business activities, the Underwriters and their respective affiliates, officers, directors and employees may purchase, sell or hold a broad array of investments and actively trade securities, derivatives, loans, commodities, currencies, credit default swaps and other financial instruments for their own account and for the accounts of their customers, and such investment and trading activities may involve or relate to assets, securities and/or instruments of the City (directly, as collateral securing other obligations or otherwise) and/or persons and entities with relationships with the City. The Underwriters and their respective affiliates may also communicate independent investment recommendations, market color or trading ideas and/or publish or express independent research views in respect of such assets, securities or instruments and may at any time hold, or recommend to clients that they should acquire, long and/or short positions in such assets, securities and instruments.

RATINGS

Fitch, Moody's and S&P have assigned to the Bonds municipal bond ratings of "A+", "A1" and "A+", respectively. Certain information was supplied by the City and the Water Department to the rating agencies to be considered in evaluating the Bonds. Such ratings express only the views of the respective rating agencies and are not a recommendation to buy, sell or hold the Bonds.

Any desired explanation of the significance of such ratings should be obtained from the rating agency furnishing the same, at the following addresses: Moody's, 7 World Trade Center, 250 Greenwich Street, New York, New York 10007; S&P, 55 Water Street, New York, New York 10041; and Fitch, One State Street Plaza, New York, New York 10004. Generally, a rating agency bases its rating on the information and materials furnished to it and on investigations, studies and assumptions of its own. There is no assurance such ratings will not be revised downward or withdrawn entirely by the rating agencies, if in the judgment of such rating agencies, circumstances so warrant. Any such downward revision or withdrawal of such ratings may have an adverse effect on the market price of the Bonds.

The Underwriters have not assumed responsibility to advise the owners of the Bonds of any change in any rating on the Bonds and neither the City nor the Underwriters have undertaken any responsibility to maintain any particular rating on the Bonds. The City has agreed, in the Continuing Disclosure Agreement, to report actual rating changes on the Bonds. See "CONTINUING DISCLOSURE" herein and APPENDIX VII. Any downward change in or withdrawal of a credit rating may have an adverse effect on the marketability or market price of the Bonds.

LEGAL MATTERS

Certain legal matters incident to the authorization, issuance and sale of the Bonds will be passed upon by Ballard Spahr LLP and Ahmad Zaffarese LLC, both of Philadelphia, Pennsylvania, Co-Bond Counsel. The proposed form of such legal opinion is included herein as APPENDIX VI. Certain legal matters will be passed upon for the City by the City Solicitor. Certain legal matters will be passed upon for the City by Greenberg Traurig, LLP and Turner Law, P.C., both of Philadelphia, Pennsylvania, Co-Disclosure Counsel. Certain legal matters relating to the information contained in APPENDIX IV and APPENDIX V will be passed upon for the City by Hawkins Delafield & Wood LLP and Law Office of Ann C. Lebowitz of Philadelphia, Pennsylvania. Certain legal matters will be passed upon for the Underwriters by Dilworth Paxson LLP of Philadelphia, Pennsylvania.

FINANCIAL ADVISORS

PFM Financial Advisors LLC, of Philadelphia, Pennsylvania and Acacia Financial Group, Inc., of Mount Laurel, New Jersey, have been retained by the City as Co-Financial Advisors in connection with the issuance of the Bonds and, in such capacity, have assisted the City in the preparation of Bond-related documents. The Co-Financial Advisors' fee for services rendered with respect to the sale of the Bonds is contingent upon the issuance and delivery of the Bonds. Although the Co-Financial Advisors have read and participated in the preparation of this Official Statement, they have not independently verified any of the information set forth herein. The information contained in this Official Statement has been obtained primarily from the City's records and from other sources that are believed to be reliable, including financial records of the City, reports of consultants and other entities that may be subject to interpretation. No guarantee is made as to the accuracy or completeness of any such information. No person, therefore, is entitled to rely upon the participation of the Co-Financial Advisors as an implicit or explicit expression of opinion as to the completeness and accuracy of the information contained in this Official Statement.

NO LITIGATION OPINION

Upon the delivery of the Bonds, the City Solicitor will furnish an opinion, in form satisfactory to Co-Bond Counsel and the Underwriters, to the effect that, among other things, and except as disclosed in this Official Statement, there is no litigation or other legal proceeding pending, or, to the best of his knowledge after customary inquiry, threatened in writing against the City, to restrain or enjoin the issuance or delivery of the Bonds or challenging the validity of the proceedings of the City taken in connection therewith or the pledge or application of any monies provided for the payment of the Bonds, or contesting the powers of the City with respect to any of the foregoing.

CERTAIN REFERENCES

All summaries of the provisions of the Bonds and the security therefor, the Act and the General Ordinance set forth herein and in APPENDIX III-A and all summaries and references to other materials not purported to be quoted in full, are only brief outlines of certain provisions thereof and do not constitute complete statements of such documents or provisions. Reference is made hereby to the complete documents relating to such matters for the complete terms and provisions thereof or for the information contained therein. All estimates, assumptions and statistical information contained herein, while taken from sources considered reliable, are not guaranteed. So far as any statements are made in this Official Statement involving matters of opinion, or projections or estimates, whether or not expressly so stated, they are made merely as such and not as representations of fact.

The attached Appendices are integral parts of this Official Statement and should be read in their entireties together with all foregoing statements in this Official Statement.

The agreement between the City and holders of Bonds is fully set forth in the Bonds and the General Ordinance. Neither this Official Statement nor any advertisement for the Bonds is to be construed as constituting an agreement with purchasers of the Bonds.

CONTINUING DISCLOSURE

In order to assist the Underwriters in complying with the requirements of Rule 15c2-12 promulgated by the Securities and Exchange Commission under the Securities Exchange Act of 1934, as amended (the "Rule"), the City (i) will enter into a Continuing Disclosure Agreement with Digital Assurance Certification, L.L.C., as dissemination agent for the benefit of the holders of the Bonds, to be dated the date of original delivery and payment for the Bonds, the form of which is annexed hereto as APPENDIX VII, and (ii) has provided the disclosure in the following paragraphs.

During the previous five years, in one instance, the City timely filed notice of a rating change, but did not associate the notice with all specific relevant outstanding obligations and filed the notice through incorporation by reference of information in an offering document. The foregoing description of an instance of non-compliance by the City with its continuing disclosure undertakings should not be construed as an acknowledgement by the City that such instance was material.

The City has reviewed and updated its disclosure policies and procedures to assist the City in complying with its continuing disclosure undertakings in the future.

CERTAIN RELATIONSHIPS

Ballard Spahr LLP, Co-Bond Counsel, and Greenberg Traurig, LLP, Co-Disclosure Counsel, represent some of the Underwriters of the Bonds, from time to time, in matters unrelated to the issuance of the Bonds. Dilworth Paxson LLP, counsel to the Underwriters, from time to time represents the City in matters unrelated to the issuance of the Bonds. Black & Veatch Management Consulting, LLC, the Consulting Engineer, provides ongoing consulting services to the Water Department and other departments of the City.

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This Official Statement has been duly executed and delivered by the following officer on behalf of the City of Philadelphia, Pennsylvania.

THE CITY OF PHILADELPHIA

By: /s/ Rob Dubow
Rob Dubow, Director of Finance

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APPENDIX I

FINANCIAL STATEMENTS OF THE WATER FUND DERIVED FROM THE CAFR FOR FISCAL YEAR ENDED JUNE 30, 2017

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City Of Philadelphia
Philadelphia Water Department
Financial Statements
Fiscal Years Ended June 30, 2017 And 2016

CITY OF PHILADELPHIA WATER DEPARTMENT

YEAR ENDED JUNE 30, 2017 AND 2016

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The City of Philadelphia Water Department Management Discussion and Analysis

The Philadelphia Water Department is one of the City's ten operating departments and its activities are accounted for under a dedicated Water Fund established pursuant to the Philadelphia Home Rule Charter. Pursuant to the Charter, the Water Department has the power and duty to operate, maintain, repair, and improve the City's water system (the "Water System") and the City's wastewater system (the "Wastewater System") and, together with the Water System, the "Water and Wastewater Systems" (or the "Combined System").

The Water Department's primary mission is to plan for, operate, and maintain both the infrastructure and the organization necessary to purvey high-quality drinking water, to provide an adequate and reliable water supply for all household, commercial, and community needs, and to sustain and enhance the region's watersheds and quality of life by managing wastewater effectively.

The Water Department serves the City of Philadelphia and also provides wastewater services to ten wholesale customers and water services to one wholesale water customer. The Water Department operates three drinking water plants which have the capacity to treat and deliver about 522 million gallons per day of top quality drinking water that meets or exceeds all federal, state, and local regulations. Additionally, it operates three water pollution control plants that have the capacity to treat over 1 billion gallons of wastewater per day at a level that meets or exceeds federal and state standards.

The operations and activities of the Water Department are accounted for with a separate set of balancing accounts that comprise the assets, deferred outflows of resources, liabilities, deferred inflows of resources, net position, revenues, and expenses. The activity of the Water Department is grouped in the financial statements into the broad category referred to as an enterprise fund (the "Water Fund"). The Water Fund is comprised of the funds and accounts established by the City under its Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended (the "General Ordinance"),

2017 Financial Highlights

The Water Fund met its required coverage ratios for the year with a revenue bond coverage ratio of 1.31, a coverage ratio of 1.18 for total debt service and certain other transfers and expenditures, and a net operating revenue bond coverage ratio of 1.29 prior to the inclusion of the transfer from the Rate Stabilization Fund.

At the end of the current fiscal year, the Water Fund's net position totaled $810.1 million resulting from an excess of its assets and deferred outflows of resources over its liabilities and deferred inflows of resources; its unrestricted net position showed a deficit of $243.1 million. This deficiency will have to be funded from resources generated in future years.

The Water Fund's net position showed an increase of $45.0 million during the current fiscal year compared with the prior fiscal year.

Overview of the Financial Statements

This section serves as an introduction to the Basic Financial Statements. It represents management's examination and analysis of the Water Fund's financial condition and performance.

The Financial Statements report information about the Water Fund using the Full Accrual Accounting method as used by similar business activities in the private sector. The Water Fund's basic financial statements include the statements of net position, statements of revenues, expenses, and changes in net position, statements of cash flows, and notes to the financial statements.

The financial statements are prepared in accordance with accounting principles promulgated by the Governmental Accounting Standards Board ("GASB").

> **Statement of Net Position:** The statement of net position presents the financial position of the Water Fund. It presents information on the assets, deferred outflows of resources, liabilities, and deferred inflows of resources with the difference between them reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Water Fund is improving or deteriorating.
>
> **Statement of Revenues, Expenses, and Changes in Net Position:** The statement of revenues, expenses, and changes in net position presents information showing how the net position changed during the most recent fiscal year. All changes in net position are reported as soon as the underlying event giving rise to the change occurs, regardless of the timing of related cash flows. Revenues are recognized when earned, not when they are received. Expenses are recognized when incurred, not when they are paid. Thus, revenues and expenses are reported in this statement for some items that will result in cash flows in future fiscal periods (e.g. salaries and wages payable).
>
> **Statement of Cash Flows:** The statement of cash flows presents information on the effects changes in assets, liabilities, and operations have on cash during the course of the fiscal year.

The Water Fund's financial statements can be found following the Management Discussion and Analysis. The notes provide additional information that is essential to a full understanding of the data provided in the Water Fund financial statements. In addition to the basic financial statements and accompanying notes, government accounting standards require presentation of required supplementary information ("RSI"). Following the RSI, the Fund has presented other supplementary information ("OSI").

Please see the Comprehensive Annual Financial Report of the City of Philadelphia for complete financial information for the City and its component units, which can be found at http://www.phila.gov/investor/CAFR.html.

Financial Analysis

Net Position

A three year condensed summary of the Water Fund's net position as of June 30 of each year follows:

Condensed Statement of Net Position
(Thousands of Dollars)
June 30

	2017	2016	2015*
Assets:			
Current Assets	$ 258,444	$ 233,821	$ 240,216
Capital Assets	2,318,410	2,230,233	2,149,680
Restricted Assets	887,924	772,376	889,928
Total Assets	3,464,778	3,236,430	3,279,824
Deferred Outflows of Resources	94,211	108,809	83,507
Total Assets and Deferred Outflows	3,558,989	3,345,239	3,363,331
Liabilities:			
Current Liabilities	240,464	238,542	225,234
Bonds Payable	2,022,636	1,842,386	1,974,073
Other Non-Current Liabilities	483,646	496,344	454,445
Total Liabilities	2,746,746	2,577,272	2,653,752
Deferred Inflows of Resources	2,144	2,863	-
Total Liabilities and Deferred Inflows	2,748,890	2,580,135	2,653,752
Net Position:			
Net Investment in Capital Assets	542,042	523,367	385,721
Restricted	511,113	499,916	559,802
Unrestricted	(243,056)	(258,179)	(235,944)
Total Net Position, as Restated	$ 810,099	$ 765,104	$ 709,579

*The capital asset balances and net position of fiscal year 2015 was not restated for a reclassification of expense. For more information on the restatement, see Note III. 10. to the financial statements.

The Water Fund's net position at June 30, 2017 was approximately $810.1 million, a $45.0 million or 5.9% increase from June 30, 2016. Total assets and deferred outflows of resources increased by $213.8 million, or 6.4%, to $3.6 billion, and total liabilities and deferred inflows of resources increased $168.8 million, or 6.5%, to $2.7 billion.

The following is a discussion of the more significant changes in assets and deferred outflows of resources, liabilities and deferred inflows of resources, and net position in fiscal year 2016:

- After restatement (see Note III. 5. and Note III. 10.), capital assets, net of depreciation and amortization, increased by $88.2 million to $2.3 billion, or 4.0% as a result of capital additions of $462.3 million, offset by depreciation of $105.2 million and net retirements of $258.0 million.

- Current assets increased by $24.6 million to $258.4 million, or 10.5%, due to increases in Equity in Treasurer's account and accounts receivable.

- Restricted assets increased by $115.5 million to $887.9 million, or 15.0%, due to increases in the Water Capital Fund primarily due to a bond issuance.

- Deferred outflows of resources decreased by $14.6 million to $94.2 million, or 13.4%, due to deferred outflows of resources related to the Water Fund's net pension liability which was partially offset by amortization of the unamortized loss on refunded debt.

- Current liabilities increased by $1.9 million to $240.4 million, or 0.8%, primarily due to increases in amounts due to other funds, accounts payable and current portion of long term obligations, partially offset by reductions in vouchers payable, salaries and wages payable, and construction contracts payable.

- Bonds payable increased by $180.2 million to $2.0 billion, or 9.8%, primarily due to the issuance of revenue bonds.

- Other non-current liabilities decreased by $12.7 million to $483.6 million, or 2.6%, primarily due to a decrease in net pension liability of $11.6 million.

- Deferred inflows of resources decreased by $0.7 million to $2.1 million, or 25.1%, due to deferred inflows of resources related to the Water Fund's net pension liability.

- The Water Fund's net position increased by $45.0 million to $810.1 million, or 5.9%, as a result of fiscal year 2017 operations and capital contributions.

- Net investment in capital assets increased by $18.7 million, or 3.6%, to $542.0 million.

- Unrestricted net position increased by $15.1 million, or 5.9%, to a deficit of $243.1 million. The unrestricted component of net position represents the net amount of total assets, deferred outflows of resources, total liabilities, and deferred inflows of resources that are not included in the determination of net investment in capital assets or restricted components of net position. The $15.1 million change is primarily due to a prior period adjustment (see Note III. 10.) of $49.4 million, which relates to items that were capitalized and should have been expensed in prior years.

Changes in Net Position

A condensed summary of the Water Fund's Statement of Revenues, Expenses, and Changes in Net Position for the years ended June 30 is presented as follows:

Condensed Statement of Revenues, Expenses, and Changes in Net Position
(Thousands of Dollars)
Year Ended June 30

	2017	2016	2015*
Operating Revenues:			
Charges for Goods and Services	$ 702,059	$ 659,583	$ 667,699
Miscellaneous Operating Revenues	12,607	10,367	8,261
Operating Grants	1,283	870	907
Total Operating Revenues	715,949	670,820	676,867
Operating Expenses:			
Operating Expenses excluding Depreciation and Amortization	413,339	382,272	376,528
Depreciation and Amortization	105,208	101,711	103,763
Total Operating Expenses	518,547	483,983	480,291
Operating Income (Loss)	197,402	186,837	196,576
Nonoperating Revenues (Expenses):			
Federal, State, & Local Grants	-	250	-
Interest Income	7,626	5,600	3,732
Debt Service – Interest	(66,295)	(82,659)	(65,933)
Other Expenses	(16,909)	(2,339)	(3,993)
Total Nonoperating Revenues (Expenses)	(75,578)	(79,148)	(66,194)
Increase in Net Position before Transfers	121,824	107,689	130,382
Transfers Out	(28,483)	(31,622)	(30,258)
Capital Contributions	1,077	1,506	1,337
Change in Net Position	94,418	77,573	101,461
Net Position – Beginning of Period, Before Restatement	765,104	709,579	970,483
Cumulative Effect of Change in Accounting Principle	-	-	(362,365)
Reclassification of Expense	(49,423)	(22,048)	-
Net Position – Beginning of Period, as Restated*	715,681	687,531	608,118
Net Position – Ending of Period	$ 810,099	$ 765,104	$ 709,579

*The net position of fiscal year 2015 was not restated for a reclassification of expense. For more information on the restatement, see Note III. 10. to the financial statements.

- Operating revenues increased by $45.1 million to $715.9 million due to an increase in charges for goods and services.
- Operating expenses increased by $34.6 million to $518.5 million due primarily to increases in employee benefits, personal services, and purchase of services partially offset by a reduction in indemnities and taxes, and materials and supplies.
- Non-operating expenses decreased by $3.6 million to $75.6 million. The decrease in non-operating expenses is due primarily to the debt service interest expense decrease of $16.4 million, partially offset by the $14.6 million increase in other expenses and $2.0 million increase in interest income.

Capital Assets and Debt Administration

Capital Assets

Investment in capital assets, net of accumulated depreciation, amounted to $2.3 billion as of June 30, 2017. This represented an increase of $88.2 million, or 4.0% over the previous year's total of $2.2 billion. Capital assets consist primarily of land, infrastructure, construction in progress, buildings, and equipment. Infrastructure consists of water and wastewater transmission and distribution lines. The following is a summary of capital assets as of June 30:

Capital Asset Activity
(Thousands of Dollars)
June 30

	2017	2016	2015*
Land	$ 5,919	$ 5,919	$ 5,919
Construction in Progress	354,702	296,254	303,005
Infrastructure	2,544,238	2,466,451	2,422,387
Buildings and Equipment	1,766,014	1,768,387	1,667,810
Accumulated Depreciation	(2,352,463)	(2,306,778)	(2,249,441)
Total Capital Assets, net	$2,318,410	$ 2,230,233	$ 2,149,680

*The capital assets of 2015 were not restated for a reclassification of expense. For more information on the restatement, see Note III. 10. to the financial statements.

Long-Term Debt

As of June 30, 2017, the Water Fund had $2.5 billion of non-current liabilities outstanding. This was an increase of $167.6 million or 7.2% from the previous year. The following is a summary of the non-current liability outstanding as of June 30:

Non-Current Liability Activity
(Thousands of Dollars)
June 30

	2017	2016	2015
Revenue Bonds – Net	$2,022,636	$1,842,386	$1,974,073
Derivative Instrument	356	1,508	3,289
Other Non-Current Liabilities	39,057	38,995	35,829
Net Pension Obligation	444,233	455,841	415,327
Total Non-Current Liabilities	$2,506,282	$2,338,730	$2,428,518

The following details activity of debt during fiscal year 2017:

	(Thousands of Dollars)
Beginning balance at July 1, 2016	$1,967,114
Debt issued	542,604
Less principal payments and amortization	(357,233)
Ending balance at June 30, 2017	$2,152,485

More detailed information concerning long-term debt activity and capital asset activity is disclosed in Note III. 6. and Note III. 5., respectively, of the financial statements.

Budgetary Highlights

Please see the supplementary Budgetary Comparison Schedule located in the Required Supplementary Information section.

Requests for Information

This financial report is designed to provide a general overview of the City of Philadelphia Water Department's finances for all interested parties. Questions concerning any of the information provided in this report, or requests for additional information, should be addressed to the Philadelphia Water Department, Finance Division, Aramark Tower, 5th Floor, 1101 Market Street, Philadelphia, Pennsylvania 19107.

CITY OF PHILADELPHIA WATER DEPARTMENT

STATEMENTS OF FUND NET POSITION, JUNE 30, 2017 AND 2016

(amounts in thousands)

	2017	2016
ASSETS		
Current Assets:		
Cash on Deposit and on Hand	$ 30	$ 30
Equity in Treasurer's Account	95,258	79,044
Due from Other Governments	-	125
Accounts Receivable	161,306	152,588
Allowance for Doubtful Accounts	(13,058)	(13,007)
Inventories	14,772	14,915
Receivables	136	126
Total Current Assets	258,444	233,821
Noncurrent Assets:		
Restricted Assets:		
Equity in Treasurer's Account	667,688	550,746
Sinking Funds and Reserves	219,100	220,890
Receivables	1,136	740
Total Restricted Assets	887,924	772,376
Capital Assets:		
Land	5,919	5,919
Infrastructure	2,544,238	2,466,451
Construction in Progress	354,702	296,254
Buildings and Equipment	1,766,014	1,768,387
Accumulated Depreciation	(2,352,463)	(2,306,778)
Total Capital Assets	2,318,410	2,230,233
Total Noncurrent Assets	3,206,334	3,002,609
Total Assets	**3,464,778**	**3,236,430**
DEFERRED OUTFLOWS OF RESOURCES:		
Deferred Outflow - Fin. Instruments	356	1,508
Deferred Outflow - Net Pension Liability	37,683	59,042
Unamortized Loss - Refunded Debt	56,172	48,259
Total Deferred Outflows	**94,211**	**108,809**
LIABILITIES		
Current Liabilities:		
Vouchers Payable	4,794	6,635
Accounts Payable	14,299	11,939
Salaries & Wages Payable	3,024	6,598
Construction Contracts Payable	39,851	42,880
Accrued Expenses	32,195	33,215
Due to Other Components	1,052	918
Due to Other Funds	3,804	103
Unearned Revenue	9,914	9,785
Funds Held in Escrow	1,682	1,741
Current Portion of Long Term Obligations	129,849	124,728
Total Current Liabilities	240,464	238,542
Noncurrent Liabilities:		
Bond Payable - Net	2,022,636	1,842,386
Derivative Instrument Liability	356	1,508
Other Noncurrent Liabilities	39,057	38,995
Net Pension Liability	444,233	455,841
Total Noncurrent Liabilities	2,506,282	2,338,730
Total Liabilities	**2,746,746**	**2,577,272**
DEFERRED INFLOWS OF RESOURCES:		
Deferred Inflow - Net Pension Liability	**2,144**	**2,863**
NET POSITION		
Net Investment in Capital Assets	542,042	523,367
Restricted For:		
Capital Projects	89,905	73,266
Debt Service	219,100	220,889
Rate Stabilization	202,108	205,761
Unrestricted	(243,056)	(258,179)
Total Net Position	**$ 810,099**	**$ 765,104**

The accompanying notes are an integral part of the financial statements.

STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION
FOR FISCAL YEARS ENDED JUNE 30, 2017 AND 2016

(amounts in thousands)

	2017	2016
Operating Revenues:		
Charges for Goods and Services	$ 702,059	$ 659,583
Miscellaneous Operating Revenues	12,607	10,367
Operating Grants	1,283	870
Total Operating Revenues	715,949	670,820
Operating Expenses:		
Personal Services	128,535	122,873
Purchase of Services	110,222	97,409
Materials and Supplies	35,013	36,376
Employee Benefits	132,650	117,394
Indemnities and Taxes	6,919	8,220
Depreciation and Amortization	105,208	101,711
Total Operating Expenses	518,547	483,983
Operating Income	197,402	186,837
Nonoperating Expenses:		
Federal, State, & Local Grants	-	250
Interest Income	7,626	5,600
Debt Service - Interest	(66,295)	(82,659)
Other Expenses	(16,909)	(2,339)
Total Nonoperating Expenses	(75,578)	(79,148)
Increase in Net Position before Transfers	121,824	107,689
Transfers Out	(28,483)	(31,622)
Capital Contributions	1,077	1,506
Change in Net Position	94,418	77,573
Net Position - Beginning of Year	765,104	709,579
Restatement (see Note III. 10.)	(49,423)	(22,048)
Net Position - End of Year	**$ 810,099**	**$ 765,104**

CITY OF PHILADELPHIA WATER DEPARTMENT

STATEMENTS OF CASH FLOWS
FOR THE FISCAL YEARS ENDED JUNE 30, 2017 AND 2016 (amounts in thousands)

	2017	2016
Cash Flows from Operating Activities		
Receipts from Customers	$ 706,195	$ 677,061
Payments to Suppliers	(144,305)	(143,758)
Payments to Employees	(255,179)	(230,376)
Claims Paid	(6,919)	(5,441)
Net Cash Provided by Operating Activities	**299,792**	**297,486**
Cash Flows from Non-Capital Financing Activities		
Operating Grants Received	1,283	1,120
Operating Subsidies and Transfers to Other Funds	(27,343)	(31,622)
Net Cash Used by Non-Capital Financing Activities	**(26,060)**	**(30,502)**
Cash Flows from Capital & Related Financing Activities		
Proceeds from Capital Debt	306,245	5,823
Acquisition and Construction of Capital Assets	(247,431)	(175,797)
Interest Paid on Capital Debt	(79,638)	(82,250)
Principal Paid on Capital Debt	(125,012)	(136,712)
Other Receipts (Payments)	-	33
Net Cash Used by Non-Capital Financing Activities	**(145,836)**	**(388,903)**
Cash Flows from Investing Activities		
Interest and Dividends	5,260	3,626
Net Cash Provided by Investing Activities	**5,260**	**3,626**
Net Increase (Decrease) in Cash & Cash Equivalents	133,156	(118,293)
Cash and Cash Equivalents, July 1 (including $550.7 in restricted accounts)	629,820	748,113
Cash and Cash Equivalents, June 30 (including $667.7 in restricted accounts)	**$ 762,976**	**$ 629,820**
Reconciliation of Operating Income (Loss) to		
Net Cash Provided (Used) by Operating Activities:		
Operating Income	197,402	186,837
Adjustments to Reconcile Operating Income to Net Cash		
Provided (Used) by Operating Activities:		
Depreciation Expense	105,208	101,711
Change in Assets and Liabilities:		
Receivables, Net	(9,884)	4,220
Inventories	143	(1,593)
Accounts and Other Payables	(2,300)	2,265
Accrued Expenses	9,094	3,166
Unearned Revenue	129	880
Net Cash Provided by operating activities	**$ 299,792**	**$ 297,486**

I. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

The financial statements of the Water Department have been prepared in conformity with generally accepted accounting principles ("GAAP") as applied to governmental units. The Governmental Accounting Standards Board ("GASB") is the accepted standard setting body for establishing governmental accounting and financial reporting principles. The more significant of the Water Department's accounting policies are described below.

1. REPORTING ENTITY

The City of Philadelphia was founded in 1682 and was merged with the county in 1854. Since 1951 the City has been governed largely under the Philadelphia Home Rule Charter. However, in some matters, including the issuance of short-term and long-term debt, the City is governed by the laws of the Commonwealth of Pennsylvania.

The operations and activities of the Water Department are accounted for with a separate set of balancing accounts that comprise the assets, deferred outflows of resources, liabilities, deferred inflows of resources, net position, revenues, and expenses. The activity of the Water Department is grouped in the financial statements into the broad category referred to as an enterprise fund (the "Water Fund"). The Water Fund is comprised of the funds and accounts established by the City under its Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended (the "General Ordinance"),

2. FINANCIAL STATEMENTS

The Water Fund's (i.e., the Statement of Net Position and Statement of Revenues, Expenses and Changes in Net Position) report information of all Water Department's activities.

The Statement of Revenues, Expenses and Changes in Net Position demonstrates the degree to which direct operating expenses are offset by operating revenues.

3. BASIS OF ACCOUNTING, MEASUREMENT FOCUS AND FINANCIAL STATEMENTS

The Water Fund's financial statements are reported using the economic resources measurement focus and the accrual basis of accounting. Revenues are recorded when earned and expenses are recorded when a liability is incurred, regardless of timing of related cash flows. Grants and similar items are recognized as revenues as soon as all eligibility requirements imposed by the provider have been met.

Operating revenues and expenses are distinguished from non-operating items in the statement of revenues, expenses and changes in net position. Operating revenues and expenses result from providing services in connection with the Water Department's principal ongoing operations. Principal operating revenues are charges to customers for water use and wastewater collection, transmission and treatment. When calculating user fees charged to customers, the Water Department includes a component for the repayment of principal on the Water Department's outstanding debt.

Operating expenses include the cost of providing water and wastewater services, inclusive of stormwater, administrative expenses and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as non-operating revenues and expenses. The principal non-operating revenues are interest and certain grants. The principal non-operating expenses of interest expense and other miscellaneous expenses.

As a general rule, the effect of interfund activity has been eliminated from the financial statements. Exceptions to this general rule are charges between the City's water and sewer function and various other programs of the City. Elimination of these charges would distort the direct costs and revenues reported for the various programs concerned.

The operations of the Water Department are accounted for in separate balancing funds and accounts that comprise its assets, deferred outflows of resources, liabilities, deferred inflows of resources, net position, revenues and expenses. The activity of the Water Department is grouped in the financial statements into the broad category referred to as an enterprise fund (the "Water Fund"). The Water Fund is comprised of the funds and accounts established by the City under its Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended (the "General Ordinance"),

Such activities are used to account for operations (1) that are financed and operated in a manner similar to private business enterprises – where the intent of the government body is that costs (expenses, including depreciation) of providing goods and services to the general public on a continuous basis be recovered primarily through user charges or (2) where the government body has decided that periodic determination of revenues earned, expenses occurred, and/or net income is appropriate for capital maintenance, public policy, management's control of accountability, and other purposes.

The activities of the Water Fund are segregated as follows:

- The Revenue Fund is used to account for the operations of the water and wastewater systems.
- The Revenue Bond Sinking Fund is used to account for the payment of interest of the outstanding revenue bonds.

- The Debt Reserve Fund account of the sinking fund is funded from the proceeds of each series of Water and Wastewater Revenue Bonds; provided, however, that if the Supplemental Ordinance authorizing a series of Water and Wastewater Revenue Bonds shall so authorize, the deposit to the Debt Reserve Account in respect of such Water and Wastewater Revenue Bonds may be accumulated from project revenues over a period of not more than three fiscal years after the issuance and delivery of such Water and Wastewater Revenue Bonds. The moneys and investments in the Debt Reserve Account are held and maintained in an amount equal at all times to the Debt Reserve Requirement. If at any time the moneys in the Debt Service Account of the Sinking Fund shall be insufficient to pay as and when due the principal of (and premium, if any) or interest on any Water and Wastewater Revenue Bonds or other obligations payable from the Debt Service Account (including obligations arising in connection with Qualified Swap Agreements and Credit Facilities), the fiscal agent is required to pay over from the Debt Reserve Account the amount of such deficiency for deposit in the Debt Service Account. With respect to any issue of Water and Wastewater Revenue Bonds, in lieu of the required deposit into the Debt Reserve Account, the City may cause to be deposited into the Debt Reserve Account a surety bond, an insurance policy or an irrevocable letter of credit meeting the requirements of the General Ordinance and the Bond Committee Determination relating to such issue.

  The Debt Reserve Account Amendment authorizes (i) the Director of Finance to apply moneys currently on deposit in the Debt Reserve Account to purchase a surety bond or insurance policy complying with the terms of the General Ordinance (described below), (ii) the transfer of the resulting excess moneys in the Debt Reserve Fund to the Revenue Fund and from there, upon compliance with the provisions of the General Ordinance to a new account in the Residual Fund called the Special Water Infrastructure Account and (iii) the application of the moneys deposited in the Special Water Infrastructure Account to the cost of certain renewals, replacements and improvements to the water and wastewater systems described in the Debt Reserve Account Amendment.

- The Rate Stabilization Fund was created with the sale of the Series 1993 Revenue Bonds on August 20, 1993. The purpose of the Fund is to maintain assets to be drawn down to offset future deficits (and corresponding rate increase requirements) in the Water Fund.

During Fiscal 2017, the Fund had the following activity:

Balance at July 1, 2016	$ 205,760,628
Transfer to Revenue Fund	(4,563,393)
Interest Earnings	911,126
Balance at June 30, 2017	$202,108,361

During Fiscal 2016, the Fund had the following activity:

Balance at July 1, 2015	$ 206,446,966
Transfer to Revenue Fund	(1,629,332)
Interest Earnings	942,994
Balance at June 30, 2016	$205,760,628

- The Residual Fund was created with the sale of the Series 1993 Revenue Bonds on August 20, 1993. The Residual Fund is the last Fund into which Project Revenues are transferred from the Revenue Fund. Money in the Residual Fund may be used to pay Operating Expenses or debt service, or other purpose to support the System. In addition, money in the Residual Fund is used transfer to the annual payment to the City's general fund of an amount equal to the lesser of (i) the interest earnings for the Fiscal Year on the Debt Reserve Account and Subordinated Bond Fund (less amounts subject to rebate) and (ii) $4.994 million. The balance as of June 30, 2017 was $15,285,705 and the balance as of June 30, 2016 was $15,202,102.

4. DEPOSITS AND INVESTMENTS

The Water Fund's deposits and investments are held in segregated operating and capital accounts. Sinking funds and reserves are maintained in segregated investment accounts to comply with reserve and other requirements of the bond covenants.

All highly liquid investments (except for Repurchase Agreements) with a maturity of three months or less when purchased are considered to be cash equivalents.

The Water Fund reports investments at fair value. Short-term investments are reported at cost, which approximates fair value. Securities traded on national or international exchanges are valued at the last reported sales price. The fair value of real estate investments is based on independent appraisals. Investments, which do not have an established market, are reported at estimated fair value.

Statutes authorize the City to invest in obligations of the Treasury, agencies, and instruments of the United States, repurchase agreements, collateralized certificates of deposit, bank acceptance or mortgage obligations, certain corporate bonds, and money market funds. The Pension Trust Fund is also authorized to invest in corporate bonds rated AA or better by Moody's Bond Ratings, common stocks, and real estate.

5. INVENTORIES

The materials and supplies inventories are valued at moving average cost.

6. CAPITAL ASSETS

Capital assets, which include property, plant, equipment and infrastructure assets, are defined by the City as assets with an initial individual cost of more than $5,000 and an estimated useful life in excess of three years. Capital assets are reported at cost including any liability for contract retainage and construction costs payable. Assets acquired by gift or bequest are recorded at their acquisition price at the date of the gift. Upon sale or retirement, the cost of the assets and the related accumulated depreciation, if any, are removed from the accounts. Maintenance and repair costs are charged to operations. Renewals and betterments are capitalized and depreciated based upon the expected life of such improvements.

The Water Fund transfers construction in progress to one or more of the major asset classes when projects are considered substantially complete.

Cost of construction includes all direct contract costs. Overhead costs include direct and indirect engineering costs and interest incurred during the construction period on projects financed with tax-exempt debt. The amount of interest to be capitalized is calculated by offsetting interest expense incurred from the date of the borrowing until completion of the project with interest on invested proceeds over the same period. Capitalization of interest during construction for Fiscal Year 2017 was $8,080,248 and for Fiscal Year 2016 was $6,212,946.

Depreciation on the capital assets is provided on the straight-line method over their estimated useful lives: computer equipment – 3 years; automotive – 5 years; leasehold improvements – 8 years; general and monitoring equipment – 10 – 20 years; buildings – 40 years; reconstructed transmission and distribution lines – 40 years; and new transmission and distribution lines – 50 years.

7. BONDS AND RELATED PREMIUMS, DISCOUNTS & ISSUANCE COSTS

Bond premiums and discounts are deferred and amortized over the life of the bonds using the effective interest method. Bonds payable are reported net of the applicable bond premium or discount. In FY13, GASB Statement No. 65 was implemented resulting in bond issuance costs being recognized as an expense and reported in the period incurred.

8. INSURANCE

The City, except for the Airport and certain other properties, is self-insured for most fire and casualty losses to its structures and equipment and provides statutory workers' compensation and unemployment benefits to its employees. The City is self-insured for medical benefits provided to employees in the City-administered health plan.

9. RECEIVABLES AND PAYABLES

Activities between funds that are representative of lending/borrowing arrangements outstanding at the end of the fiscal year are referred to as due to/from other funds.

Accounts receivable included in current assets consists of billed and unbilled fees, which have been earned but not collected as of June 30, 2017 and 2016. Credit balance accounts have been included in unearned revenue in the statement of net position. The allowance for doubtful accounts is management's estimate of the amount of accounts receivable which will be deemed to be uncollectible and is based upon specific identification. Unpaid accounts are referred to the City's Law Department if deemed uncollectible. Accounts are written off when recommended by the Law Department.

As of June 30, 2017 and 2016 the allowance for doubtful accounts was $13,057,526 and $13,006,803 respectively.

10. DEFERRED OUTFLOWS/INFLOWS OF RESOURCES AND NET POSITION

Beginning with the fiscal year ended June 30, 2013 the Water Fund implemented GASB Statement No. 63, *Financial Reporting of Deferred Outflows of Resources, Deferred Inflows of Resources, and Net Position*. This GASB Statement replaces the term Net Assets with Net Position. Net Position is the residual of (a) assets and deferred outflows, less (b) liabilities and deferred inflows. The deferred classifications take into consideration the fact that governments enter into transactions that are applicable to future periods.

Also, beginning with the fiscal year ended June 30, 2013 the Water Fund chose to implement GASB Statement No. 65, *Items Previously Reported as Assets and Liabilities*. The objective of Statement No. 65 is to either properly classify or recognize certain items that were previously reported as assets and liabilities as outflows of resources (expenses) or inflows of resources (revenues).

Beginning in fiscal year ended June 30, 2015 the Water Fund implemented GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*. This statement requires the reporting of pension transactions that incorporates deferred outflows of resources and deferred inflows of resources related to pensions over a defined, closed period, rather than a choice between an open or closed period.

Deferred Outflows of Resources represents consumption of net position that applies to a future period(s) and will not be recognized as an expense until that time. Deferred Inflows of Resources represents an acquisition of net position that applies to future periods and will not be recognized as revenue until that time.

On the full accrual basis of accounting, the Water Fund has three items that qualify for reporting in all three categories.

- Derivative instruments are reported for the changes in fair value.
- Deferred refunding results from the difference in the refunding of debt and its reacquisition price.
- Deferred pension transactions are recognized as an expense or revenue in a future period. Deferred outflows of resources related to pensions are discussed in Note IV. 1.

11. COMPENSATED ABSENCES

It is the City's policy to allow employees to accumulate earned but unused vacation benefits. Vacation pay is accrued when earned in the financial statements. Sick leave balances are not accrued in the financial statements because sick leave rights are non-vesting.

The Water Fund's employees' vacation time accrued under Other Noncurrent Liabilities on the Statement of Net Position in Fiscal Year 2017 was $11.5 million and in Fiscal Year 2016 was $10.8 million.

12. CLAIMS AND JUDGMENTS

Pending claims and judgments are recorded as expenses in the financial statements when the City solicitor has deemed that a probable loss to the Water Fund has occurred.

13. UNEARNED REVENUE

GASB Statement No. 65 prohibits the usage of the term "deferred" on line items other than deferred inflows or outflows. Therefore, the term "Deferred Revenue" has been replaced by "Unearned Revenue". Unearned revenues in the Water Fund's financial statements represent funds received in advance of being earned. Unearned revenues relate principally to overpaid water and sewer bills.

14. NEW ACCOUNTING STANDARDS

The Water Fund adopted the requirements of GASB Statement No. 74, *Financial Reporting for Postemployment Benefits Plans Other Than Pension Plans*. As a result of the adoption of GASB Statement No. 74, the Water Fund has determined that there was no effect on its financial statements.

The Water Fund adopted the requirements of GASB Statement No. 77, *Tax Abatement Disclosures*. The adoption of this statement had no effect on the Water Fund's Financial Statements.

The Water Fund adopted the requirements of GASB Statement No. 78, *Pensions Provided through Certain Multiple-Employer Defined Benefit Pension Plans*. The adoption of this statement did not result in any significant changes to the financial statements of the Water Fund.

The Water Fund adopted the requirements of GASB Statement No. 79, *Certain External Investment Pools and Pool Participants*. The adoption of this statement had no effect on previously reported amounts.

The Water Fund adopted the requirements of GASB Statement No. 80, *Blending Requirements for Certain Component Units – An Amendment of GASB Statement No. 14*. The adoption of this statement had no effect on previously reported amounts.

The Water Fund adopted the requirements of GASB Statement No. 82, *Pension Issues – An amendment of GASB Statements No. 67, No. 68, and No. 73*. The adoption of this statement did not result in any significant changes to the financial statements of the Water Fund.

In June 2015, the GASB issued Statement No. 75, *Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions*. The Water Fund is required to adopt the provisions of GASB Statement No. 75 for its fiscal year 2018.

In March 2016, the GASB issued Statement No. 81, *Irrevocable Split-Interest Agreements*. The Water Fund is required to adopt the provisions of GASB Statement No. 81 for its fiscal year 2018 financial statements.

In November 2016, the GASB issued Statement No. 83, *Certain Asset Retirement Obligations*. The Water Fund is required to adopt the provisions of GASB Statement No. 83 for its fiscal year 2019 financial statements.

In January 2017, the GASB issued Statement No. 84, *Fiduciary Activities*. The Water Fund is required to adopt the provisions of GASB Statement No. 84 for its fiscal year 2020 financial statements.

In March 2017, the GASB issued Statement No. 85, *Omnibus 2017*. The Water Fund is required to adopt the provisions of GASB Statement No. 84 for its fiscal year 2018 financial statements.

In May 2017, the GASB issued Statement No. 86, *Certain Debt Extinguishment Issues*. The Water Fund is required to adopt the provisions of GASB Statement No. 86 for its fiscal year 2018 financial statements.

In June 2017, the GASB issued Statement No. 87, *Leases*. The Water Fund is required to adopt the provisions of GASB Statement No. 87 for its fiscal year 2021 financial statements.

The Water Fund has not yet completed the various analyses required to estimate the financial statement impact of these new pronouncements.

15. RESTRICTED ASSETS

Restricted assets represent revenues set aside for liquidation of specific obligations as described in Note IV. 14.

16. PAYMENT TO THE CITY

In accordance with an agreement between the Finance Director and the Water Department, the Finance Director may transfer to the City's General Fund up to a limit of $4,994,000 in any fiscal year in "excess interest earnings" as defined under the General Ordinance. In Fiscal Years 2017 and 2016, excess interest earnings of $1,866,455 and $1,555,702, respectively, were transferred from the Residual Fund to the General Fund of the City.

17. TRANSFERS FOR LONG TERM CONTRACTS

In addition to the transfer of funds to the General Fund of the City, the Water Fund had operating expenses of $26,687,965 and $30,066,352 in Fiscal Years 2017 and 2016, respectively, payable to the Philadelphia Municipal Authority ("PMA") under the long-term contracts described in Note IV.12 A, B, and C.

18. ACCOUNTING ESTIMATES

The preparation of financial statements, in conformity with accounting principles generally accepted in the United States of America, requires management to make estimates and assumptions that affect the reported amounts of assets, deferred outflows of resources, liabilities, deferred inflows of resources and net position and disclosures at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results may differ from those estimates.

II. LEGAL COMPLIANCE

1. BUDGETARY INFORMATION

The City's budgetary process accounts for certain transactions on a basis other than U.S. generally accepted accounting principles (GAAP). In accordance with the Philadelphia Home Rule Charter, the City has formally established budgetary accounting control for its operating and capital improvement funds. One of the City's operating funds is the Water Fund. Included in the Water Fund is the Water Residual Fund. These budgets appropriate funds for all City departments, boards and commissions by major class of expenditure within each department. Major classes are defined as personal services; purchase of services; materials and supplies; equipment; contributions; indemnities; debt service; payments to other funds; and advances and other miscellaneous payments. The appropriation amounts for each fund are supported by revenue estimates and take into account the elimination of accumulated deficits and the re-appropriation of accumulated surpluses to the extent necessary. All transfers between major classes (except for materials and supplies and equipment, which are appropriated together) must have council approval. Appropriations that are not expended or encumbered at year end are lapsed. Comparisons of budget to actual activity at the legal level of compliance are located in the Water Fund's *Budgetary Comparison Schedule (Legally Enacted Basis) – Water Operating Fund.*

During the year, classification adjustments and supplementary appropriations were necessary for the Water Fund. Therefore, budgeted amounts presented are as originally passed and as amended by the City Council. As part of the amendment process, budget estimates of Water Fund revenues and expenses are adjusted and submitted to City Council for review. Changes in revenue estimates do not need City Council approval, but are submitted in support of testimony with regard to the adjustments. Revenue and expense estimates are presented as originally passed and as amended.

III. DETAILED NOTES ON ALL FUNDS AND ACCOUNTS

1. DEPOSITS AND INVESTMENTS

Deposits

State statutes require banks to collateralize City deposits at amounts equal to or in excess of the City's balance. Such collateral is to be held by the Federal Reserve Bank or the trust department of a commercial bank other than the pledging bank. At year end, the bank balances were $423.8 million and $621.3 million for 2017 and 2016, respectively.

Investments

The City has established a comprehensive investment policy that covers all funds other than the Municipal Pension Fund, the Philadelphia Gas Works Retirement Reserve, and the Fairmount Park and Free Library Trust Funds. Those funds have separate investment policies designed to meet the long-term goals of the funds.

The City's investments include all operating, capital, debt service, and debt service reserve accounts of each of the City's General Fund, Water Fund, and Aviation Division. All City investments must be in compliance with applicable provisions of the City Code and City bond resolutions, as well as the City's Investment Policy. The City's Investment Policy is meant to supplement the applicable provisions of the City Code and City bond resolutions, and is reviewed and adopted by the City's Investment Committee. The City's Investment Committee consists of the Director of Finance, the City Treasurer, and a representative from the Water Department, Aviation Division, and the Philadelphia Gas Works.

As of June 30, 2017 the fair values of the Water Fund's investments consist of the following:

(Thousands of Dollars)

Classifications		Fair Value	Percent of Total
U.S. Government Securities	$	266,272	48.25%
U.S. Government Agency Securities		199,291	36.12%
Corporate Bonds		50,217	9.10%
Other Bonds and Investments		36,017	6.53%
Grand Total	$	551,797	100.00%

As of June 30, 2016, the fair values of the Water Fund's investments consist of the following:

(Thousands of Dollars)

Classifications		Fair Value	Percent of Total
U.S. Government Securities	$	366,587	53.97%
U.S. Government Agency Securities		236,884	34.88%
Corporate Bonds		24,642	3.63%
Other Bonds and Investments		51,081	7.52%
Grand Total	$	679,194	100.00%

Credit Risk

Credit Risk: The City's policy is to limit credit risk by limiting the type of allowable investments, as well as setting a maximum percent of the portfolio for each type of investment.

The City's investments in U.S. Government Securities (48.25%) or U.S. Government Agency obligations (36.12%) are allowable up to 100% of the portfolio. The U.S. Government Agency obligations must be rated AAA by Standard & Poor's Corp. ("S&P") or Aaa by Moody's Investor Services ("Moody's"). All US Government Securities meet the criteria.

The City's investment in Commercial Paper is limited to 25% of the portfolio, and must be rated A1 by S&P and/or M1G1 by Moody's and the senior long-term debt of the issuer must not be rated lower than A by S&P and/or Moody's. All commercial paper investments meet the criteria.

The City's investments in corporate bonds (9.10%) are limited to 25% of the portfolio, and have an S&P rating of AAA or AA or Moody's rating of Aa2 or better.

Short Term Investment Pools are rated AAA by S&P and Aaa by Moody's. The Short Term Investment Pools' amortized cost-based net asset value per share/unit is the same as the value of the pool shares. Cash accounts are swept nightly and idle cash is invested in money market funds (short term investment pools).

The City limits its foreign currency risk by investing in certificates of deposits and banker's acceptances issued or endorsed by non-domestic banks that are denominated in U.S. dollars, providing that the banking institution has assets of not less than $100 million and has a Thompson's Bank Watch Service "Peer Group Rating" not lower than II. At the end of the fiscal year, the City did not have any investments of that nature.

To minimize custodial credit risk, the City's policy is to select custodian banks that are members of the Federal Reserve System to hold its investments. Delivery of the applicable investment documents to the City's custodian is required for all investments.

As of June 30, 2017 the fixed income investments of the Water Fund had the following ratings by Moody's:

Classifications	Credit Quality Rating	Percent of Investment Type
U.S. Government Securities	Aaa	100%
U.S. Government Agency Securities	Aaa	100%
Corporate Bonds	Aaa	46%
Corporate Bonds	Aa1	10%
Corporate Bonds	Aa2	33%
Corporate Bonds	A1	11%
Other Bonds and Investments	Aa2	42%
Other Bonds and Investments	Aa3	42%
Other Bonds and Investments	A1	16%

As of June 30, 2016 the fixed income investments of the Water Fund had the following ratings by Moody's:

Classifications	Credit Quality Rating	Percent of Investment Type
U.S. Government Securities	Aaa	100%
U.S. Government Agency Securities	Aaa	100%
Corporate Bonds	Aaa	18%
Corporate Bonds	Aa1	29%
Corporate Bonds	Aa2	53%
Other Bonds and Investments	Aa1	23%
Other Bonds and Investments	Aa2	65%
Other Bonds and Investments	Aa3	12%

Interest Rate Risk

Interest Rate Risk: The City's investment portfolio is managed to accomplish preservation of principal, maintenance of liquidity, and to maximize the return on investments. To limit its exposure to fair value losses from rising interest rates, the City's investment policy limits fixed income investments to maturities of no longer than 2 years, except in sinking fund reserve portfolios.

As of June 30, 2017 the maturities of the Water Fund's fixed income investments were as follows:

	(Thousands of Dollars)	
Classifications	**Less Than 1 Year**	**1 - 2 Years**
U.S. Government Securities	$ 122,483	$ 143,788
U.S. Government Agency Securities	176,828	22,464
Corporate Bonds	41,198	9,019
Other Bonds and Investments	36,017	-
Grand Total	$ 376,526	$ 175,271

As of June 30, 2016 the maturities of the Water Fund's investments were as follows:

	(Thousands of Dollars)	
Classifications	**Less Than 1 Year**	**1 - 2 Years**
U.S. Government Securities	$ 131,486	$ 235,101
U.S. Government Agency Securities	132,136	104,748
Corporate Bonds	7,013	17,629
Other Bonds and Investments	31,931	19,150
Grand Total	$ 302,566	$ 376,628

Fair Value Measurement

The City measures and records its investments using fair value measurement guidelines established by U.S. generally accepted accounting principles. These guidelines recognize a three-tiered fair value hierarchy, as follows:

- Level 1: Observable inputs that reflect quoted prices (unadjusted) for identical assets or liabilities in active markets.
- Level 2: Inputs other than quoted prices included in Level 1 that are observable for the asset or liability through corroboration with observable market data.
- Level 3: Unobservable inputs for an asset or liability.

The Water Fund has the following recurring fair value measurements as of June 30, 2017:

- U.S. Government securities of $266.3 million are valued using quoted prices from active markets (Level 1).
- U.S. Agency Securities of $199.3 million are valued using quoted prices from identical securities that are traded in active markets (Level 2).
- Corporate Bonds of $50.2 million and other bonds and investments of $36.0 million are valued using quoted prices for similar securities in active markets and via matrix pricing models (Level 2).

Municipal Pension Fund

See Footnote IV. 1. E. PENSION PLANS Cash Deposits, Investments and Securities Lending

2. SECURITIES LENDING

A. GOVERNMENTAL FUNDS

The City Treasurer is prohibited from lending or selling city-owned securities with an agreement to buy them back after a stated period of time (City of Philadelphia – Investment Policy Section VI. Investment Restrictions).

B. PENSION TRUST FUNDS

The Board of Directors of the Municipal Pension Fund has authorized management of the Fund to participate in securities lending transactions.

See Footnote IV. 1. E. PENSION PLANS Cash Deposits, Investments and Securities Lending.

3. AMOUNTS HELD BY FISCAL AGENT

Under Section 4.02 of the General Bond Ordinance, which authorizes the issuance of Water and Wastewater Revenue Bonds, the City pledges and assigns to the Fiscal Agent, for the security and payment of all Water and Wastewater Revenue Bonds issued under the General Ordinance, a lien on and security interest in all Project Revenues and amounts on deposit in or standing to the credit of the: 1) Revenue Fund; 2) Sinking Fund et.al.; 3) Subordinated Bond Fund: 4) Rate Stabilization Fund; 5) Residual Fund; and 6) Construction Fund and all of the accounts established therein. The Fiscal Agent shall hold and apply the security interest so granted in trust for the holders of Water and Wastewater Revenue Bonds, excluding Subordinate Bonds, without preference, priority, or distinction; provided however, that the pledge of General Bond Ordinance may also be for the benefit of a credit facility and qualified swap, or any other person who undertakes to provide moneys for the account of the City for the payment of principal or redemption price and interest on any series of Water and Wastewater Revenue Bonds (other than subordinated bonds), on an equal and ratable basis with Water and Wastewater Revenue Bonds, to the extent provided by any Supplemental Ordinance or Determination. The purpose for the debt secured by the pledge can be found in Note III. 5. to the financial statements.

The following chart displays information related to the pledge as of June 30, 2017:

	Water and Wastewater Revenue Bonds
Pledged Revenue Required for Principal and Interest Payments	$3,350.4 million
Term of Pledge	2053
Percentage of Revenue Pledged	100%
Current Year Pledged Revenue	$722.5 million

Current Year Principal and Interest Paid	$206.1
Current Year Transfers to Escrow & LOC	$9.7

The following chart displays information related to the pledge as of June 30, 2016:

	Water and Wastewater Revenue Bonds
Pledged Revenue Required for Principal and Interest Payments	$2,979.7 million
Term of Pledge	2046
Percentage of Revenue Pledged	100%
Current Year Pledged Revenue	$676.7 million
Current Year Principal and Interest Paid	$219.3 million

4. INTERFUND PAYABLES

Interfund receivable and payable balances among Water and City Funds at year-end are the result of the time lag between the dates that interfund goods and services are provided, the date the transactions are recorded in the accounting system and the date payments between funds are made. All balances are expected to be settled during the subsequent year.

Interfund payable balances within the Water Fund at year-end are as follows:

Due to Other Funds:	(Amounts in Thousands of USD)
General Fund	
Philadelphia Municipal Authority	$3,725
Capital Projects Fund	
Philadelphia Municipal Authority	79
Total Balance Due	$3,804

Due to City's Component Units:	
General Fund	
Philadelphia Gas Works	$ 26
Philadelphia Authority for Industrial Development	923
Capital Projects Fund	
Philadelphia Authority for Industrial Development	103
Total Balance Due	$1,052

5. CAPITAL ASSET ACTIVITY

Capital asset activity for the years ended June 30, 2017 and 2016 was as follows:

	Beginning Balance*	Additions	Dispositions	Ending Balance
Fiscal Year Ended June 30, 2017				
Capital Assets Not Being Depreciated				
Land	$ 5,919,160	$ -	$ -	$ 5,919,160
Construction in Progress	296,253,530	266,560,079	(208,112,228)	354,701,381
Total Capital Assets Not Being Depreciated	$ 302,172,690	$ 266,560,079	$ (208,112,228)	$ 360,620,541
Capital Asssets Being Depreciated				
Buildings and related improvements	1,685,012,573	34,632,419	(48,246,638)	1,671,398,354
Intangible Assets	15,182,928	2,524,386	-	17,707,314
Equipment	83,374,347	30,777,218	(19,535,944)	94,615,621
Infrastructure	2,451,267,729	154,727,014	(79,464,010)	2,526,530,733
Total Capital Assets Being Depreciated	$ 4,234,837,577	$ 222,661,037	$ (147,246,592)	$ 4,310,252,022
Less Accumulated Depreciation For:				
Buildings and related improvements	(994,057,364)	(45,044,994)	20,861,146	(1,018,241,212)
Intangible Assets	(10,241,583)	(3,699,789)	290,044	(13,651,328)
Equipment	(69,585,419)	(5,334,074)	(2,531,739)	(77,451,232)
Infrastructure	(1,232,893,876)	(51,128,651)	40,903,597	(1,243,118,930)
Total Accumulated Depreciation	(2,306,778,242)	(105,207,508)	59,523,048	(2,352,462,702)
Total Capital Assets, Being Depreciated, Net	1,928,059,335	117,453,529	(87,723,544)	1,957,789,320
Total Capital Assets	$ 2,230,232,025	$ 384,013,608	$ (295,835,772)	$ 2,318,409,861

	Beginning Balance	Additions	Dispositions	Ending Balance
Fiscal Year Ended June 30, 2016				
Capital Assets Not Being Depreciated				
Land	$ 5,919,160	$ -	$ -	$ 5,919,160
Construction in Progress	284,357,128	195,326,061	(183,429,659)	296,253,530
Total Capital Assets Not Being Depreciated	$ 290,276,288	$ 195,326,061	$ (183,429,659)	$ 302,172,690
Capital Asssets Being Depreciated				
Buildings and related improvements	1,590,656,309	102,294,925	(7,938,661)	1,685,012,573
Intangible Assets	14,441,712	741,216	-	15,182,928
Equipment	77,153,927	25,282,377	(19,061,957)	83,374,347
Infrastructure	2,407,945,075	138,637,147	(95,314,493)	2,451,267,729
Total Capital Assets Being Depreciated	$ 4,090,197,023	$ 266,955,665	$ (122,315,111)	$ 4,234,837,577
Less Accumulated Depreciation For:				
Buildings and related improvements	(953,842,551)	(45,229,475)	5,014,662	(994,057,364)
Intangible Assets	(8,760,351)	(1,481,232)	-	(10,241,583)
Equipment	(66,265,555)	(4,055,849)	735,985	(69,585,419)
Infrastructure	(1,223,971,858)	(50,944,974)	42,022,956	(1,232,893,876)
Total Accumulated Depreciation	(2,252,840,315)	(101,711,530)	47,773,603	(2,306,778,242)
Total Capital Assets, Being Depreciated, Net	1,837,356,708	165,244,135	(74,541,508)	1,928,059,335
Total Capital Assets	$ 2,127,632,996	$ 360,570,196	$ (257,971,167)	$ 2,230,232,025

*Fiscal years 2017 and 2016 beginning balances have been restated; see Note III. 10. for additional information.

Impaired Assets

Government Accounting Standards Board (GASB) Statement 42 requires the disclosure of the impairment of any major capital assets. Over the years, there have been a number of the Water Fund's assets that were either damaged or destroyed, were abandoned or became functionally obsolete.

No asset impairments occurred during fiscal years 2017 and 2016.

6. **DEBT PAYABLE**

(1) Governmental Debt Payable

A summary of changes in long-term debt obligations as of June 30, 2017 follows:

(In Thousands)

	Beginning Balance	Additions	Reductions	Ending Balance	Amounts Due Within One Year
Water and Sewer Revenue Bonds	$ 1,721,585	$ 472,545	$ (332,010)	$ 1,862,120	$ 120,720
Pennvest Loans	138,739	6,245	(10,188)	134,796	9,129
Unamortized Bond Premium	106,790	63,814	(15,035)	155,569	-
Derivative Instrument Liability	1,508	-	(1,152)	356	-
Net Pension Liability	455,841	-	(11,608)	444,233	-
Other Non-Current Liabilities:					
Accrued Worker's Compensation	21,718	-	(165)	21,553	-
Accrued Legal Claims	6,484	-	(434)	6,050	-
Compensated Absences	10,793	2,653	(1,992)	11,454	-
Total Non-Current Liabilities	$ 2,463,458	$ 545,257	$ (372,584)	$ 2,636,131	$ 129,849

A summary of changes in long-term debt obligations as of June 30, 2016 follows:

(In Thousands)

	Beginning Balance	Additions	Reductions	Ending Balance	Amounts Due Within One Year
Water and Sewer Revenue Bonds	$ 1,847,625	$ -	$ (126,040)	$ 1,721,585	$ 113,985
Pennvest Loans	143,583	5,823	(10,667)	138,739	10,743
Unamortized Bond Premium	119,589	-	(12,799)	106,790	-
Derivative Instrument Liability	3,289	-	(1,781)	1,508	-
Net Pension Liability	415,327	40,514	-	455,841	-
Other Non-Current Liabilities:					
Accrued Worker's Compensation	21,990	3,770	(4,042)	21,718	-
Accrued Legal Claims	3,706	8,178	(5,400)	6,484	-
Compensated Absences	10,133	2,505	(1,845)	10,793	-
Total Non-Current Liabilities	$ 2,565,242	$ 60,790	$ (162,574)	$ 2,463,458	$ 124,728

An analysis of debt service requirements to maturity on the long-term obligations follows:

(Amounts in Millions of USD)

Year Ended June 30:	Principal	Interest	Total Debt Service
2018	$ 129.8	$ 89.1	$ 218.9
2019	103.9	84.7	188.6
2020	96.8	79.9	176.7
2021	80.5	76.0	156.5
2022	73.1	72.4	145.5
2023-2037	312.0	318.4	630.4
2028-2032	321.6	254.4	576.0
2033-2037	246.1	190.7	436.8
2038-2042	307.4	124.8	432.2
2043-2047	227.2	48.4	275.6
2048-2052	79.9	15.5	95.4
2053-2057	18.6	0.4	19.0
	$ 1,996.9	$ 1,354.7	$ 3,351.6

Pertinent information regarding long-term debt obligations outstanding is presented below:

Date of Issue	Amount of Original Issue	Purpose	Balance Outstanding at: June 30, 2017	June 30, 2016
1997	$78,500,000	Water and Wastewater Revenue Bonds, Variable Rate Series of 1997B, issued for various capital projects, to fund the Debt Reserve Account, and to pay the costs of issuance related to the bond issue at a variable rate.	$53,200,000	$56,900,000
1999	6,700,000	Pennsylvania Infrastructure Investment Authority Loan of 1999, issued for various capital projects. The bonds bear rates of 1.41% - 2.73%.	161,950	246,933
2005	83,665,000	Water and Wastewater Revenue Refunding Bonds, Variable Rate Series of 2005B, issued to defease a portion of the Series of 1995 Bonds, and to pay the costs of issuance related to the bonds. The bonds bear rates at a variable rate.	18,180,000	35,325,000
2007	345,035,000	Water and Wastewater Revenue Refunding Bonds, Series of 2007A and 2007B, issued to defease the Series of 1997A and Series of 2001A Bonds, and to pay the costs of issuance related to the bond issue. The bonds bear rates of 4% - 5%.	161,380,000	241,375,000
2009	140,000,000	Water and Wastewater Revenue Bonds, Series of 2009A, issued for various capital projects, issued to fund the Debt Reserve Account of the Sinking Fund, and to pay the costs of issuance. The bonds bear rates of 4% - 5.75%.	8,980,000	140,000,000
2009	22,828,000	Pennsylvania Infrastructure Investment Authority Loan of 2009 (B), issued for various capital projects. The bonds bear rates of 1.193% - 2.107%.	19,297,861	21,464,949
2009	35,667,000	Pennsylvania Infrastructure Investment Authority Loan of 2009 (C), issued for various capital projects. The bonds bear rates of 1.193% - 2.107%.	35,667,752	35,528,947
2009	64,380,000	Pennsylvania Infrastructure Investment Authority Loan of 2009 (D), issued for various capital projects. The bonds bear rates of 1.193% - 2.107%.	55,985,423	56,396,744

Date of Issue	Amount of Original Issue	Purpose	Balance Outstanding at: June 30, 2017	June 30, 2016
2010	$ 8,111,000	Pennsylvania Infrastructure Investment Authority Loan of 2010 (B), issued for various capital projects. The bonds bear rates of 1.193% - 2.107%.	$ 23,683,419	$ 25,101,563
2010	396,460.000	Water and Wastewater Revenue Refunding Bonds, Series of 2010A, issued to defease the Series of 2003 Bonds, issued for funding a payment to terminate the Series of 2003 Swap Agreement, funding the required deposit into the Debt Reserve Account of the Sinking Fund, and to pay the costs of issuance. The bonds bear rates of 2.00% - 5.00%.	69,880,000	102,395,000
2010	185,000,000	Water and Wastewater Revenue Bonds, Series of 2010C, issued for funding a payment to terminate the Series of 2007 Swap Agreement, fund the required deposit into the Debt Reserve Account of the Sinking Fund, and to pay the costs of issuance. The bonds bear rates of 3.00% - 5.00%.	134,005,000	185,000,000
2011	184,855,000	Water and Wastewater Revenue Bonds, Series of 2011A, and Water and Wastewater Revenue Refunding Bonds, Series of 2011B, issued for partially defeasing the Series of 2001A and Series of 2007A Bonds, for various capital projects, for funding of capitalized interest, for financing any required deposit into the Debt Reserve Account of the Sinking Fund, and to pay the cost of issuance. The bonds bear rates of 4.00% - 5.00%.	179,220,000	184,855,000
2012	70,370,000	Water and Wastewater Revenue Refunding Bonds, Series of 2012, issued for defeasing the Series of 2001A and 2001B Bonds and to pay the cost of issuance. The bonds bear rates of 1.00% - 5.00%.	65,005,000	65,005,000

Date of Issue	Amount of Original Issue	Purpose	Balance Outstanding at: June 30, 2017	June 30, 2016
2013	$170,000,000	Water and Wastewater Revenue Bonds, Series of 2013A, issued to finance capital improvements, finance a deposit to the Debt Reserve Account, and to pay the cost of issuance. The bonds bear rates of 3.00% to 5.125%.	$ 166,575,000	$ 170,000,000
2014	123,170,000	Water and Wastewater Revenue Bonds, Series of 2014A, issued to advance refund a portion of the Series of 2005A Bonds, to finance capital improvements, finance a deposit to the Debt Reserve Account, and to pay the cost of issuance. The bonds bear rates of 3.00% to 5.00%.	117,200,000	123,170,000
2015	417,560,000	Water and Wastewater Revenue Bonds, Series of 2015A and 2015B, issued to finance capital improvements, finance a deposit to the Debt Reserve Account, current refund a portion of the Series of 2005 A Bonds, advance refund a portion of the Series of 2007A Bonds, and pay the cost of issuance The bonds bear rates of 3.45% to 5.00%.	417,560,000	417,560,000
2016	192,680,000	Water and Wastewater Revenue Refunding Bonds, Series 2016 issued to finance (i) the advance refunding of portions of the City's outstanding (a) Water and Wastewater Revenue Refunding Bonds, Series 2007A, (b) Water and Wastewater Revenue Bonds, Series 2009A, and (c) Water and Wastewater Revenue Bonds, Series 2010C, and (ii) the costs of issuance relating to the bonds. The bonds bear rates of 3.00% to 5.00%.	191,070,000	-

Date of Issue	Amount of Original Issue	Purpose	Balance Outstanding at: June 30, 2017	June 30, 2016
2017	279,865,000	Water and Wastewater Revenue Bonds, Series 2017A issued to finance (i) capital improvements to the City's Water and Wastewater Systems, (ii) a deposit to the Debt Reserve Account of the Sinking Fund and (iii) the costs of issuance relating to the Bonds. The bonds bear interest rates of 5.00% to 5.25%.	$279,865,000	$ -
		Totals	$1,996,916,405	$1,860,324,136

(2) Pennvest Loans

In July 2010, the Water Department received approval from the Pennsylvania Infrastructure Investment Authority ("PENNVEST") for the Green Infrastructure Project (Series 2010B), bringing the total financing from PENNVEST to $214.9 million. The funding is through low interest loans evidenced by and payables secured on a parity basis with water and wastewater revenue bonds which bear interest of 1.193% during the construction period and for the first five years of amortization (interest only payment are due during the construction period up to three years) and 2.107% for the remaining fifteen years.

During fiscal year 2017 and 2016, PENNVEST drawdowns totaled $6,245,094 and $5,823,347, respectively, which represent an increase in bond issuances.

Individual loan information, by series of bonds, as of June 30, 2017 is as follows:

Date	Series	Maximum Loan Amount	Amount Received through 6/30/17	Current Balance Outstanding 6/30/17
October 2009	2009B	$ 42,886,030	$ 29,432,930	$19,297,861
October 2009	2009C	57,268,193	49,157,776	35,667,752
March 2010	2009D	84,759,263	75,744,096	55,985,423
July 2010	2010B	30,000,000	28,500,000	23,683,419
	Totals	$214,913,486	$182,834,802	$134,634,455

Individual loan information, by series of bonds, as of June 30, 2016 is as follows:

Date	Series	Maximum Loan Amount	Amount Received through 6/30/16	Current Balance Outstanding 6/30/16
October 2009	2009B	$ 42,886,030	$ 29,432,930	$ 21,464,949
October 2009	2009C	57,268,193	46,699,887	35,528,947
March 2010	2009D	84,759,263	71,956,891	56,396,744
July 2010	2010B	30,000,000	28,500,000	25,101,563
	Totals	$214,913,486	$176,589,708	$138,492,203

(3) Defeased Debt

The Water Fund has defeased certain bonds by placing the proceeds of new bonds in irrevocable trusts to provide for all future debt service payments on old bonds. Accordingly, the trust account assets and the liability for the defeased bonds are not included in the Water Fund's financial statements. As of June 30, 2017, $286.7 million of bonds outstanding are considered defeased. As of June 30, 2016, $70.3 million of bonds outstanding were considered defeased.

(4) Arbitrage Liability

The City has issued Water and Waste Water Revenue Bonds subject to Federal arbitrage requirements. Federal tax legislation requires the accumulated net excess of interest income on the proceeds of these issues over interest expense paid on the bonds be paid to the federal government at the end of a five-year period. The arbitrage liability was zero as of June 30, 2017 and 2016.

(5) Derivative Instrument

City of Philadelphia, 2005 Water & Sewer Swap

Objective: In December 2002, the City entered into a swaption that provided the City with an up-front payment of $4.0 million. As a synthetic refunding of all or a portion of its 1995 Bonds, this payment approximated the present value savings, as of December 2002, of a refunding on May 4, 2005. The swaption gave Citigroup (formerly of Salomon Brothers Holding Company, Inc.), the option to enter into an interest rate swap to receive fixed amounts and pay variable amounts.

Terms: Citigroup exercised its option to enter into a swap May 4, 2005, and the swap commenced on that date. Under the terms of the swap, the City pays a fixed rate of 4.53% and receives a variable payment computed as the actual bond rate or the alternatively, 68.5% of one month LIBOR, in the event the average rate on the Bonds as a percentage of the average of one month LIBOR has exceeded 68.5% for a period of more than 180 days. Citigroup is currently paying 68.5% of one month LIBOR under the swap. The payments are based on an amortizing notional schedule (with an initial notional amount of $86.1 million), and when added to an assumption for remarketing, liquidity costs and cost of issuance expected to approximate the debt service of the refunded bonds at the time the swaption was entered into.

In May 2013, the City and Water Department converted the original variable rate bonds associated with the swap to an index-based rate, terminating the existing letter of credit in the process.

As of June 30, 2017, the swap had a notional amount of $18.18 million and the associated variable rate bonds had an $18.18 million outstanding aggregate principal amount. The bonds' variable rate coupons are based on the same index as variable rate received on the swap. The bonds mature on August 1, 2018 and the related swap agreement terminates on August 1, 2018.

Fair value: Effective in fiscal year 2010, the City adopted the provisions of GASB Statement No. 53, *Accounting and Financial Reporting for Derivative Instruments*. As of June 30, 2017, the swap had a negative fair value of ($.36 million). This means that the Water Department would have to pay this amount if the swap terminated. The fair value of the swap was measured using the income approach and is categorized within Level 2 of the fair value hierarchy.

Risk: As of June 30, 2017, the City is not exposed to credit risk because the swap had a negative fair value. Should interest rates change and the fair value of the swap become positive, the City would be exposed to credit risk in the amount of the swap's fair value. Since the City is now receiving 68.5% of one month LIBOR, and paying 68.5% of one month LIBOR plus a fixed spread, the City is no longer exposed to basis risk or tax risk.

The swap includes an additional termination event based on credit ratings. The swap may be terminated by the City if the ratings of Citigroup or its Credit Support Provider fall below A3 or A-, or by Citigroup if the rating of the City's Water and Wastewater Revenue Bonds falls below A3 or A-. There are 30-day cure periods to these termination events. However, because the City's swap payments are insured by Assured Guaranty Municipal Corporation (Assured) (formerly FSA), no termination event based on the City's Water and Wastewater Revenue Bond ratings can occur as long as Assured is rated at least A or A2.

As of June 30, 2017, rates were as follows:

	Terms	Rates
Interest Rate Swap		
Fixed payment to Citi under swap	Fixed	4.53000 %
Variable rate payment from Citi under swap	68.5% of 1-month Libor	(0.83836)%
Net interest rate swap payments		3.69164 %
Variable rate bond coupon payments	68.5% of 1-month Libor + fixed spread	0.83836 %*
Synthetic interest rate on bonds		4.53000 %

**Excludes fixed spread, which is similar to the City's expected Letter of Credit costs on a comparable variable rate bond*

As of June 30, 2016, rates were as follows:

	Terms	Rates
Interest Rate Swap		
Fixed payment to Citi under swap	Fixed	4.53000 %
Variable rate payment from Citi under swap	68.5% of 1-month Libor	(0.31856)%
Net interest rate swap payments		4.21144 %
Variable rate bond coupon payments	68.5% of 1-month Libor + fixed spread	0.31856 %*
Synthetic interest rate on bonds		4.53000 %

**Excludes fixed spread, which is similar to the City's expected Letter of Credit costs on a comparable variable rate bond*

Swap payments and associated debt: As of June 30, 2017, debt service requirements of the variable rate debt and net swap payments for their term, assuming current interest rates remain the same, were as follows

Fiscal Year Ending June 30	Variable Rate Bonds Principal	Variable Rate Bonds Interest	Interest Rate Swaps, Net	Total Interest
2018	18,015,000	$152,415	$671,139	$823,554
2019	165,000	1,383	6,091	7,475
Total	$18,180,000	$153,798	$677,230	$831,029

7. LEASE COMMITMENTS AND LEASED ASSETS

The Water Fund enters into various operating leases to finance the purchase of photocopier and computer equipment. Leases are defined by the Financial Accounting Standard Board in Statement 13, *Accounting for Leases*. Lease payments consisted of $2,540,050 in fiscal year 2017 and $1,899,734 in fiscal year 2016. The assets acquired through the leases are shown as equipment within the Capital Asset Note (See Note III. 4.).

8. DEFERRED COMPENSATION PLAN

The City offers its employees a deferred compensation plan in accordance with Internal Revenue Code section 457. As required by the Internal Revenue Code and Pennsylvania laws in effect at June 30, 2014, the assets of the plan are held in trust for the exclusive benefit of the participants and their beneficiaries. In accordance with GASB Statement No. 32, *Accounting and Financial Reporting for Internal Revenue Code Section 457 Deferred Compensation Plans,* the City does not include the assets or activity of the plan in its financial statements.

9. NET POSITION POLICIES

GASB requires the classification of net position into three components – net investment in capital assets, restricted, and unrestricted. These classifications are defined as follows:

> *Net Investment in Capital Assets* – This component of net position consists of capital assets, net of accumulated depreciation, reduced by the outstanding balances of bonds, mortgages, notes, or other borrowings, net of unspent bond proceeds that are attributable to the acquisition, construction, or improvement of those assets. Deferred outflows of resources and deferred inflows of resources that are attributable to the acquisition, construction, or improvement of those assets or related debt are included.
>
> *Restricted* – This component of net position consists of restricted assets and deferred outflows of resources reduced by liabilities and deferred inflows of resources related to those assets. The restrictions would be imposed by external parties including creditors, grantors, contributors, or laws or regulations of other governments and restrictions imposed by law through constitutional provisions or enabling legislation.
>
> *Unrestricted* – This component of net position consists of the net amount of the assets, deferred outflows of resources, liabilities, and deferred inflows of resources that are not included in the determination of net investment in capital assets or the restricted component of net position.

When both restricted and unrestricted resources are available for use, it is the City's policy to use restricted resources first, then unrestricted resources, as needed.

10. PRIOR PERIOD ADJUSTMENT

The Water Fund's Net Position decreased by ($49.4) million as a result of:

(1) reclassification of net equipment purchases in prior years of ($.7) million that should have been capitalized and depreciated,

(2) prior year construction projects that were cancelled for $16.0 million,

(3) utility payments classified as construction in progress that should have been expensed of $2.5 million, and

(4) the net effect of reclassifying fixed assets that should have been expensed from the prior year of $31.6 million.

The effect of the adjustment is reflected as a decrease to the Water Fund's Net Position as of July 1, 2016 in the June 30, 2017 Statement of Revenues, Expenses and Changes in Net Position.

The Water Fund's Net Position decreased by ($22.0) million as a result of:

(1) direct payments and cancelled projects of ($18.6) million being carried in Construction in Progress (CIP) that should have been expensed in prior fiscal years when incurred; and

(2) depreciation from CIP of ($3.4) million that should have been transferred to fixed assets in previous fiscal years.

The effect of the adjustment is reflected as a decrease to the Water Fund's Net Position as of July 1, 2015 in the June 30, 2016 Statement of Revenues, Expenses and Changes in Net Position.

11. INTERFUND TRANSACTIONS

During the course of normal operations, the City has numerous transactions between funds. These transactions are recorded as operating transfers and are reported as other financial sources (uses) in the Governmental Funds and as transfers in the Proprietary Funds. Some of the more significant transfers are: the PICA administrative fund collects a portion of the wage tax paid by City residents and transfer funds that are not needed for debt service and administrative costs to the general fund. Also, the general fund and the PICA administrative fund make transfers to the debt service funds for principal and interest payments.

Transfers between fund types during the year were:

	Transfers To:				
	Governmental	Non Major Governmental			
(Amounts in Thousands of USD)		Special	Debt	Capital	
Transfers From:	General	Revenue	Service	Improvement	Total
General Fund	$ -	$ 11,265	$ 168,694	$ 5,764	$ 185,723
Grants Revenue Fund	42,592	1,200	4,579	-	48,371
Non major Secial Rev. Fds	409,518	-	55,706	1,500	466,724
Permanent Funds	-	72	-	-	72
Capital Improvements	-	2,045	-	-	2,045
Water Fund	1,866	26,617	-	-	28,483
Total	$ 453,976	$ 41,199	$ 228,979	$ 7,264	$ 731,418

IV. OTHER INFORMATION

1. CITY PENSION PLANS

The City maintains two single employer defined benefit plans for its employees and several of its component units. The two plans maintained by the City are the City Plan and the Philadelphia Gas Works (the "PGW") Plan. In addition to the City, the three other quasi-governmental agencies that participate in the City Plan are the Philadelphia Parking Authority (the "PPA"), the Philadelphia Municipal Authority (the "PMA"), and the Philadelphia Housing Development Corporation (the "PHDC").

Effective with Fiscal Year 2015, the City implemented GASB Statement No. 68, "*Accounting and Financial Reporting for Pensions – An Amendment of GASB Statement No. 27"*. This statement revises existing standards for measuring and reporting pension liabilities for pension plans. GASB Statement No. 68 defines a single employer as the primary government and its component units. All three quasi-governmental agencies that participate in the City Plan were determined to be component units of the City. Therefore, the City Plan meets the definition of a single employer plan.

The note disclosures and Required Supplementary Information required by GASB Statement No. 67, "*Financial Reporting for Pension Plans – an amendment of GASB Statement No. 25*", are presented in separately issued audited financial statements of the City Plan and PGW plan. Copies of these financial statements may be obtained by contacting the Director of Finance of the City of Philadelphia.

A. PENSION FUND DESCRIPTION

Plan Administration. The Philadelphia Board of Pensions and Retirement (the "Board") administers the City of Philadelphia Municipal Pension Fund (the

"Pension Fund"), a single employer defined benefit pension plan with a small but increasing defined contribution component, which provides pensions for all officers and employees of the City, as well as those of three quasi-governmental agencies (per applicable enabling legislation and contractual agreements). The Board was established by section 2-308 of the 1952 Philadelphia Home Rule Charter. Its actions in administering the Retirement System are governed by Title 22 of the Philadelphia Code.

The Board consists of nine voting members – four elected by the active members within the civil service, and the City's Controller, Solicitor, Managing Director, Personnel Director, and Director of Finance, who serves as the Chair.

Plan Membership. At July 1, 2016, the date of the most recent actuarial valuation, pension plan membership consisted of the following:

Actives	28,308
Terminated Vested	1,248
Disabled	4,005
Retirees	22,412
Beneficiaries	8,567
DROP	1,614
Total City Members	66,154
Annual Salaries	$1,676,548,962
Average Salary per Active Member	$59,225
Annual Retirement Allowances	$741,828,339
Average Retirement Allowance	$21,205

Contributions.

Per Title 22 of the Philadelphia Code, members contribute to the System at various rates based on bargaining unit, uniform status, and entry date into the System. As of July 1, 2016 members contributed at one of the following rates:

Employee Contribution Rates

For the Period of July 1, 2016 to June 30, 2017

	Municipal (1)	Elected	Police	Fire
Plan 67	6.00%	N/A	6.00%	6.00%
Plan 67 - 50% of Aggregate Normal Cost (2)	5.95%	N/A	N/A	N/A
Plan 87	3.02%	8.21%	5.00%	5.00%
Plan 87 - 50% of Aggregate Normal Cost (3)	3.37%	N/A	N/A	N/A
Plan 87 - Accelerated Vesting (4)	3.63%	10.60%	N/A	N/A
Plan 87 Prime (5)	4.02%	9.21%	6.00%	6.00%
Plan 87 Prime - Accelerated Vesting	4.63%	11.60%	N/A	N/A
Plan 10	3.14%	N/A	5.50%	5.50%
Plan 16	4.14%	N/A	N/A	N/A

1- For the Municipal Plan 67 members who participate in the Social Security System, employee contributions are 3.75% of compensation up to the social security wage base and 6% above it.

2- Effective November 2014 guards represented by DC 33 contributions at 50% of the aggregate Normal Cost of all members in Plan J.

3- This represents 50% of aggregate Normal Cost for all members in Plan Y.

4- Member rates for Municipal Plan 87 (Y5) members eligible to vest in 5 years and Elected Officials (L8) eligible to be vested in 8 years instead of 10.

5- Plan 87 Prime refers to new hires who have the option to elect Plan 10 but have elected to stay in Plan 87.

Employer contributions are made by the City throughout each fiscal year (which ends June 30) and by three (3) quasi-governmental agencies on a quarterly basis. These contributions, determined by an annual actuarial valuation report (“AVR”), when combined with plan member contributions, are expected to finance the cost of benefits earned by plan members during the year, with an additional amount to finance any unfunded accrued liability.

Within the AVR, two contribution amounts are determined based upon two different sets of rules for determining the way the unfunded actuarial liability is funded.

The first method is defined in accordance with Act 205 and defines the Minimum Municipal Obligation (“MMO”), which is the City’s minimum required contribution under Pennsylvania state law.

The second method is in accordance with the City's Funding Policy which predates the Act 205 rules and calls for contributions that are greater than the MMO until the initial unfunded liability determined in 1984 is fully funded.

Under both funding methods there are two components: the normal cost and the amortized unfunded actuarial liability. The actuarial unfunded liability is the amount of the unfunded actuarial liability that is paid each year based upon the given or defined amortization periods. The amortization periods are different under the MMO and City's Funding Policy.

Funding Policy:

The initial July 1, 1985 unfunded actuarial liability ("UAL") is amortized over 34 years ending June 30, 2019 with payments increasing at 3.3% per year, the assumed payroll growth. Other charges in the actuarial liability are amortized in level-dollar payments as follows:

- Actuarial gains and losses – 20 years beginning July 1, 2009. Prior gains and losses were amortized over 15 years.
- Assumptions changes – 15 years beginning July 1, 2010. Prior changes were amortized over 20 years.
- Plan changes for active members – 10 years.
- Plan changes for inactive members – 1 year.
- Plan changes mandated by the State – 20 years.

In fiscal year 2017, the City and other employers' contributions of $706.2 million was less than the actuarially determined employer contribution (ADEC) of $881.4 million. In the event that the City contributes less than the funding policy, an experience loss will be created that will be amortized in accordance with funding policy over 20 years.

The Schedule of Employer Contributions (based on the City's Funding Policy) is included as Required Supplemental Information and provides a 10-year presentation of employer contributions.

Minimum Municipal Obligation (MMO):

For the purposes of the MMO under Act 205 reflecting the fresh start amortization schedule, the July 1, 2009 UAL was "fresh started" to be amortized over 30 years ending June 30, 2039. This is a level dollar amortization of the UAL. All future amortization periods will follow the City's Funding Policies as outlined above.

In fiscal year 2017, the City and other employers' contributions of $706.2 million exceeded the Minimum Municipal Obligation of $629.6 million.

The Schedule of Employer Contributions (based on the MMO Funding Policy) is included as Required Supplemental Information and provides a 10-year presentation of employer contributions.

B. BENEFITS

The Pension Fund provides retirement, disability, and death benefits according to the provisions of Title 22 of the Philadelphia Code. These provisions prescribe retirement benefit calculations, vesting thresholds, and minimum retirement ages, that vary based on bargaining unit, uniform/non-uniform status, and entry date into the System.

Non-uniform employees may retire at either age 55 with up to 80% of average final compensation ("AFC") or may retire at either age 60 with up to 100% or 25% of AFC, depending on entry date into the System. Uniform employees may retire at either age 45 with up to 100% of AFC or age 50 with up to either 100% or 35% of AFC, depending on entry date into the System. Survivorship selections may result in an actuarial reduction to the calculated benefit.

Members may qualify for service-connected disability benefits regardless of length of service. Service-connected disability benefits are equal to 70% of a member's final rate of pay, and are payable immediately without an actuarial reduction. These applications require approval by the Board.

Eligibility to apply for non-service-connected disability benefits varies by bargaining unit and uniform/non-uniform status. Non-service connected disability benefits are determined in the same manner as retirement benefits, and are payable immediately.

Service connected death benefits are payable to:

1) surviving spouse/life partner at 60% of final rate of pay plus up to 2 children under age 18 at 10% each of final rate of pay (maximum payout: 80%);

2) if no surviving spouse/life partner, up to 3 children under age 18 at 25% each of final rate of pay (maximum payout 75%); or

3) if no surviving spouse/life partner or children under age 18, up to 2 surviving parents at 15% each of final rate of pay (maximum payout 30%).

Non-service connected deaths are payable as a lump sum payment, unless the deceased was either vested or had reached minimum retirement age for their plan, in which case the beneficiary(s) may instead select a lifetime monthly benefit, payable immediately with an actuarial reduction.

A Pension Adjustment Fund ("PAF") is funded with 50% of the excess earnings that are between 1% and 6% above the actuarial assumed earnings rate. Each year within sixty days of the end of the fiscal year, by majority vote of its members, the Board of Directors of the Fund (the "Board") shall consider whether sufficient funds have accumulated in the PAF to support an enhanced benefit distribution (which may include, but is not limited to, a lump sum bonus payment, monthly pension payment increases, ad-hoc cost-of-living adjustments, continuous cost-of-living adjustments, or some other form of increase in benefits as determined by the Board) to retirees, their beneficiaries and their survivors. As of July 1, 2016, the date of the most recent actuarial valuation, there was $7,222,828 in the PAF and the Board voted to make distributions of $6,855,987 during the fiscal year ended June 30, 2017.

The Pension Fund includes a Deferred Retirement Option Plan (DROP Plan). The DROP Plan allows a participant to declare that they will retire within 4 years. During the 4-year period, the City will make no further contributions for the participant. The participant would continue to work and to receive their salary; however, any increases would not be counted towards their pension benefit. During the 4-year period the individual participates in the DROP Plan, their pension benefits will be paid into an escrow account in the participant's name. After the 4-year period, the participant would begin to receive their pension benefits and the amount that has been accumulated in the escrow account in a lump sum payment. The balance in the DROP Plan as of June 30, 2017 is $122.3 million.

C. INVESTMENTS

The Pension Board’s Investment Policy Statement provides, in part:

The overall investment objectives and goals should be achieved by use of a diversified portfolio, with safety of principal a primary emphasis. The portfolio policy should employ flexibility by prudent diversification into various asset classes based upon the relative expected risk-reward relationship of the asset classes and the expected correlation of their returns.

The Pension Fund seeks an annual total rate of return of not less than 7.70% over a full market cycle. It is anticipated that this return standard should enable the Fund to meet its actuarially assumed earnings projection (currently 7.70%) over a market cycle. The investment return assumption was reduced by the Board from 7.75% to 7.70%. The Pension Fund’s investment program will pursue its afore-stated total rate of return by a combination of income and appreciation, relying upon neither exclusively in evaluating a prospective investment for the Pension Fund.

All investments are made only upon recommendation of the Pension Fund’s Investment Committee and approval by a majority of the Pension Board. In order to document and communicate the objectives, restrictions, and guidelines for the Fund’s investment staff and investments, a continuously updated Investment Policy Statement will be maintained. The Investment Policy Statement will be updated (and re-affirmed) each year at the January Board meeting.

The following was the Board's approved asset allocation policy as of June 30, 2017:

Asset Class	Target Allocation
Broad Fixed Income	10.0%
Global Fixed Income	2.0%
Emerging Market Debt	2.0%
U.S. Large-Cap Core	22.0%
U.S. Mid-Cap Core	3.0%
U.S. Small-Cap Core	5.0%
ACWI ex-U.S.	15.0%
Non-U.S. Small Cap	6.0%
Emerging Markets	4.0%
Public REITs	1.0%
Real Estate Core	11.0%
Real Estate-Mezzanine	1.0%
Real Estate-Opportunistic	1.0%
Infrastructure	5.0%
Private Equity	10.0%
Private Debt	2.0%
Total	100.0%

Money Weighted Rate of Return: For the year ended June 30, 2017, the annual money-weighted return on pension plan investments, net of pension plan investment expense, was 13.68%. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

D. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

Financial statements of the Pension Fund are prepared using the accrual basis of accounting. Member contributions are recognized in the period in which the contributions are due. Employer contributions are recognized when due and the employer has made a formal commitment to provide the contributions. Benefits and refunds of contributions are recognized when due and payable in accordance with the terms of the Pension Fund.

Methods Used to Value Investments

The Pension Fund's investments are reported at fair value. Fair value is the amount that the Pension Fund can reasonably expect to receive for an investment in a current sale between a willing buyer and a willing seller, that is, other than in a forced or liquidation sale. Fixed income securities and common and preferred stocks are generally valued based on published market prices and quotations from national security exchange or security pricing services. Securities which are not traded on a national security exchange are valued by the respective fund manager or other third parties based on similar sales.

Directly-owned real estate investments are primarily valued based on appraisals performed by independent appraisers and for properties not appraised, the present value of the projected future net income stream is used.

For private market investments which include private equity, private debt, venture capital, hedge funds and equity real estate investments where no readily ascertainable market value exists, management, in consultation with the general partner and investment advisors, has determined the fair values for the individual investments based upon the partnership's most recent available financial information. Futures contracts, foreign exchange contracts, and options are marked-to-market daily with changes in market value recognized as part of net appreciation/depreciation in the fair value of investments. Initial margin requirements for such financial instruments are provided by investment securities pledged as collateral or by cash.

Investment expenses consist of investment manager fees and investment consultant fees related to the traditional investments only, and not those fees related to the alternative investments. Unsettled investment sales are reported as Accrued Interest and Other Receivable, and unsettled investment purchases are included in Accrued Expenses and Other Liabilities.

Dividend income is recorded on the ex-dividend date. Interest income is recorded as earned on an accrual basis.

Income Taxes

The Pension Fund qualifies under Section 401(a) of the Internal Revenue Code (IRC) and is exempt from income taxation as allowed by Section 501(a) of the IRC.

Related Parties

The City's Department of Finance provides cash receipt and cash disbursement services to the Pension Fund. The City's Solicitor's office provides legal services to the Pension Fund. Other administrative services are also provided by the City.

Use of Estimates in Preparing Financial Statements

The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the reported amounts of assets, liabilities and changes therein, and disclosure of contingent assets and liabilities. Actual results could differ from those estimates.

Risks and Uncertainties

The Pension Fund invests in various investment securities. Investment securities are exposed to various risks such as interest rate, market, and credit risks. Due to the level of risk associated with certain investment securities, it is at least reasonably possible that changes in the values of investment securities will occur in the near term and that such changes could materially affect the amounts reported in the Pension Fund's Statement of Fiduciary Net Position.

Contributions are calculated based on certain assumptions pertaining to interest rates, inflation rates, and employee demographics, all of which are subject to change. Due to uncertainties inherent in the estimation and assumption process, it is at least reasonably possible that changes in these statements and assumptions in the near term would be material to the financial statements.

Administrative Expenses

Administrative expenses of the Pension Fund are paid for by the Pension Fund.

E. CASH DEPOSITS, INVESTMENTS AND SECURITIES LENDING

Legal Provisions

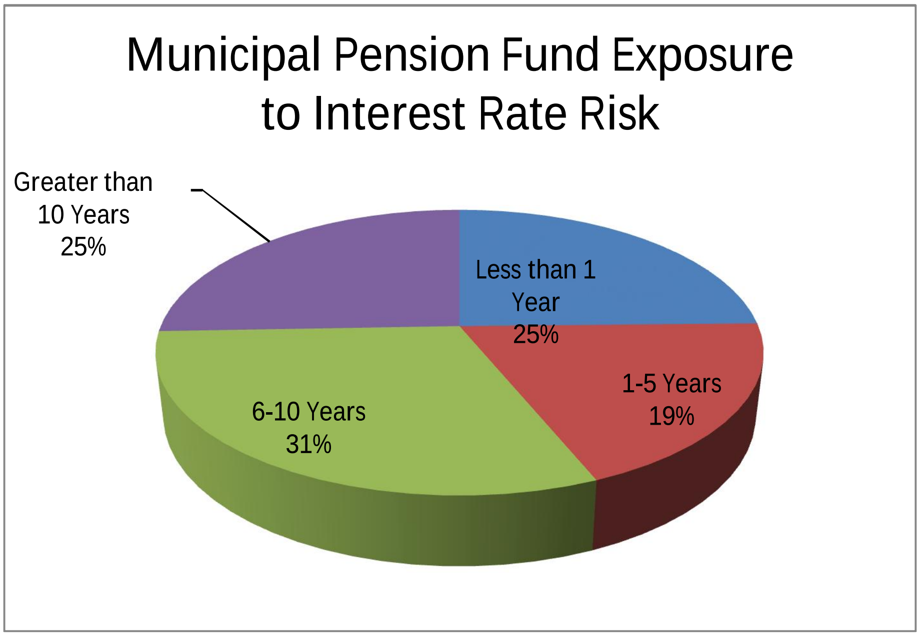
The Pension Fund is authorized to invest in "prudent investments," including obligations of the U.S. Treasury, agencies and instrumentalities of the United States, investment grade corporate bonds, common stock, real estate, private market, etc. City ordinances contain provisions which preclude the Pension Fund from investing in organizations that conduct business in certain countries and also impose limitations on the amounts invested in certain types of securities.

Interest Rate Risk

Interest rate risk is the largest risk faced by an investor in the fixed income market. The price of a fixed income security generally moves in the opposite direction of the change in interest rates. Securities with long maturities are highly sensitive to interest rate changes.

Duration is a measure of the approximate sensitivity of a bond's value to interest rate changes. The higher the duration, the greater the changes in fair value when interest rates change. The Pension Fund measures interest rate risk using option-adjusted duration, which recognizes the fact that yield changes may change the expected cash flows due to embedded options.

This chart details the exposure to interest rate changes based on maturity dates of the fixed income securities at June 30, 2017:



Custodial Credit Risk

In the event of counter-party failure, the Pension Fund may not be able to recover the value of its investment or collateral securities that are in the possession of an outside party. Investment securities are exposed to custodial credit risk if the securities held by the counterparty or counterparty's trust department, are uninsured and are not registered in the name of the Pension Fund. The Pension Fund requires that all investments be clearly marked as to ownership, and to the extent possible, be registered in the name of the Pension Fund. Certain investments may be held by the managers in the Pension Fund's name.

Concentration of Credit Risk

Concentration of credit risk is the risk of substantial loss if investments are concentrated in one issuer. As of June 30, 2017, the Pension Fund has no single issuer that exceeds 5% of total investments. Investments issued or explicitly guaranteed by the U.S. government and investments in mutual funds, external investment pools, and other pooled investments are excluded.

Credit Risk

Credit Risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligation. The Pension Fund is subject to credit risk on $852.3 million of directly owned fixed income. The Pension Fund's directly owned rated debt investments as of June 30, 2017 were rated by S&P, a nationally recognized statistical rating agency and are presented below using S&P rating scale:

		Credit Rating										
2017 (in thousands)	Total Fair Value	AAA	AA	A	BBB	BB	B	CCC	CC	C	D	NR
Asset Backed Securities	$ 20,970	$ 6,890	$ 2,162	$ 3,163	$ 4,458	-	$ -	$ -	$ -	$ -	$ -	$ 4,297
CMO/REMIC	4,271	-	2,663	812	278	188			-	-	-	331
Commercial Mortgage Backed Securities	21,853	6,095	11,893	1,512	255	96	63	-	-	-	-	1,940
Corporate Bonds	300,807	1,466	15,620	62,238	79,782	43,259	60,995	27,206	-	454	95	9,694
Government Bonds	403,240	10,905	272,918	47,460	25,397	22,836	11,710	3,311	-	-	-	8,701
Mortgage Backed Securities	87,593	-	87,593	-	-	-	-	-	-	-	-	-
Municipal Bonds	13,574	-	9,329	3,591	654	-	-	-	-	-	-	-
Total Credit Risk of Debt Securities	$ 852,308	$25,356	$ 402,178	$ 118,776	$ 110,824	$66,379	$72,768	$30,517	$ -	$ 454	$ 95	$24,963

Foreign Currency Risk

The Pension Fund's exposure to foreign currency risk derives from its position in foreign currency-denominated cash and investments in fixed income, equities, and derivatives. The foreign currency investment in equity securities is 39% of the total investment in equities.

			(thousands of USD)		
Currency	Cash	Fixed Income	Equities	Derivatives	Total
Euro (EUR)	$ 2,015	$ 6,123	$ 262,079	$ (110)	$ 270,107
Pound Sterling (GBP)	640	11,302	177,421	99	189,462
Japanese Yen (JPY)	343	-	186,820	(7)	187,156
Hong Kong Dollar (HKD)	381	-	95,179	-	95,560
Canadian Dollar (CAD)	336	75	93,138	88	93,637
Swiss Franc (CHF)	185	-	80,098	-	80,283
Australian Dollar (AUD)	80	8,899	52,388	147	61,514
South Korean Won (KRW)	-	-	52,661	(14)	52,647
Mexican Peso (MXN)	-	25,631	9,826	4	35,461
Brazilian Real (BRL)	492	9,563	16,679	-	26,734
South African Rand (ZAR)	(1)	8,510	16,226	5	24,740
Swedish Krona (SEK)	445	-	21,250	344	22,039
Malaysian Ringgit (MYR)	7	10,268	7,700	-	17,975
Indonesian Rupiah (IDR)	26	9,025	8,390	-	17,441
Polish Zloty (PLN)	2	10,851	3,741	45	14,639
Danish Krone (DKK)	122	-	10,551	-	10,673
Singapore Dollar (SGD)	45	-	8,560	-	8,605
Thai Baht (THB)	2	-	7,128	-	7,130
New Turkish Lira (TRY)	-	2,739	3,285	-	6,024
Philippine Peso (PHP)	-	393	5,126	-	5,519
Norwegian Krone (NOK)	125	-	4,389	281	4,795
Chilean Peso (CLP)	-	-	4,008	(86)	3,922
All Others	2,631	7,688	6,420	39	16,778
	$ 7,876	$ 111,067	$ 1,133,063	$ 835	$ 1,252,841

Derivatives

The Pension Fund may invest in derivatives as permitted by guidelines established by the Pension Board. Pursuant to such authority, the Pension Fund may invest in foreign currency forward contracts, options, futures (S&P Fund) and swaps. No derivatives were purchased with borrowed funds.

Derivatives are generally used to provide market exposure in the equity portfolio and to hedge against foreign currency risk and changes in interest rates, improve yield and adjust the duration of the Pension Fund's fixed income portfolio. These securities are subject to changes in value due to changes in interest rates or currency valuations. Credit risk for derivatives results from the same considerations as other counterparty risk assumed by the Pension Fund, which is the risk that the counterparty might be unable to meet its obligations.

Derivative instruments such as swaps, options, futures and forwards are often complex financial arrangements used by governments to manage specific risks or to make investments. By entering into these arrangements, governments receive and make payments based on market prices without actually entering into the related financial or commodity transactions. Derivative instruments associated with changing financial and commodity prices result in changing cash flows and fair values that can be used as effective risk management or investment tools. Derivative instruments, however, also can expose governments to significant risks and liabilities.

The Pension Fund enters into a variety of financial contracts, which include options, futures, forwards and swap agreements to gain exposure to certain sectors of the equity and fixed income markets; collateralized mortgage obligations (CMOs); other forward contracts, and U.S. treasury strips. The contracts are used primarily to enhance performance and reduce the volatility of the portfolio. The Pension Fund is exposed to credit risk in the event of non-performance by counterparties to financial instruments. The Pension Fund generally enters into transactions only with high quality institutions. Legal risk is mitigated through selection of executing brokers and review of all documentation. The Pension Fund is exposed to market risk, the risk that future changes in market conditions may make an instrument less valuable. Exposure to market risk is managed in accordance with risk limits set by senior management, through buying or selling instruments or entering into offsetting positions. The notional or contractual amounts of derivatives indicate the extent of the Pension Fund’s involvement in the various types and uses of derivative financial instruments and do not measure the Pension Fund’s exposure to credit or market risks and do not necessarily represent amounts exchanged by the parties. The amounts exchanged are determined by reference to the notional amounts and the other terms of the derivatives.

Derivative Instruments

The following table summarizes aggregate notional or contractual amounts for the Pension Fund's derivative financial instruments at June 30, 2017 in addition to the fair value and change in the fair value of derivatives.

List of Derivatives Aggregated by Investment Type

Classification	Change in Fair Value			Fair Value at June 30, 2017			Notional	
Investment Derivatives:								
Forwards Currency Contracts	Net appreciation/(depreciation) in Investments	$	1,442,945	Accrued interest and other receivables	$	854,480	$	220,310,216
Futures	Net appreciation/(depreciation) in Investments	$	65,566	Accrued expenses and other liabilities	$	(75,965)	$	156
Grand Totals		$	1,508,511		$	778,515	$	220,310,372

A Derivatives Policy Statement identifies and allows common derivative investments and strategies, which are consistent with the Investment Policy Statement of the City of Philadelphia Municipal Pension Fund. The guidelines identify transaction-level and portfolio-level risk control procedures and documentation requirements. Managers are required to measure and monitor exposure to counterparty credit risk. All counterparties must have credit ratings available from nationally recognized rating institutions such as Moody, Fitch, and S&P. The details of other risks and financial instruments in which the Fund involves are described below:

Credit risk:

The Pension Fund is exposed to credit risk on hedging derivative instruments that are in asset positions. To minimize its exposure to loss related to credit risk, it is the Pension Fund's policy to require counterparty collateral posting provisions in its non-exchange-traded hedging derivative instruments. These terms require full collateralization of the fair value of hedging derivative instruments in asset positions (net of the effect of applicable netting arrangements) should the counterparty's credit rating fall below AA as issued by Fitch Ratings and Standard & Poor's or Aa as issued by Moody's Investors Service. Collateral posted is to be in the form of U.S. Treasury securities held by a third-party custodian. The city has never failed to access collateral when required.

It is the Pension Fund's policy to enter into netting arrangements whenever it has entered into more than one derivative instrument transaction with counterparty. Under the terms of these arrangements, should one party become insolvent or otherwise default on its obligations, close-out netting provisions permit the non-defaulting party to accelerate and terminate all outstanding transactions and net the transactions' fair values so that a single sum will be owed by, or owed to, the non-defaulting party.

Swap agreements:

These derivative instruments provide for periodic payments at predetermined future dates between parties based on the change in value of underlying securities, indexes or interest rates. Under fixed interest rate type swap arrangements, the Pension Fund receives the fixed interest rate on certain equity or debt securities or indexes in exchange for a fixed charge. There were not any total receive fixed interest Swaps during 2017. On its pay-variable, received-fixed interest rate swap, as LIBOR increases, the Fund's net payment on the swap increases. Alternatively, on its pay-fixed, receive-variable interest rate swap, as LIBOR or the SIFMA swap index decreases, the Pension Fund's net payment on the swap increases.

Futures contracts:

These derivative instruments are types of contracts in which the buyer agrees to purchase and the seller agrees to make delivery of a specific financial instrument at a predetermined date and price. Gains and losses on futures contracts are settled daily based on a notional (underlying) principal value and do not involve an actual transfer of the specific instrument. Futures contracts are standardized and are traded on exchanges. The exchange assumes the risk that counterparty will not pay and generally requires margin payments to minimize such risk. In addition, the Pension Fund enters into short sales, sales of securities it does not presently own, to neutralize the market risk of certain equity positions. Initial margin requirements on futures contracts and collateral for short sales are provided by investment securities pledged as collateral and by cash held by various brokers. Although the Pension Fund has the right to access individual pledged securities, it must maintain the amount pledged by substituting other securities for those accessed. The realized gain from Futures contracts was $1,474,541.

Forward contracts:

The Pension Fund is exposed to basis risk on its forward contracts because the expected funds purchase being hedged will price based on a pricing point different than the pricing point at which the forward contract is expected to settle. The realized gain from Forward contracts was $55,615.

Termination risk:

The Pension Fund or its counterparties may terminate a derivative instrument if the other party fails to perform under the terms of the contract. In addition, the Pension Fund is exposed to termination risk on its receive-fixed interest rate swap. The Pension Fund is exposed to termination risk on its rate cap because the counterparty has the option to terminate the contract if the SIFMA swap index exceeds 12 percent. If at the time of termination, a hedging derivative instrument is in a liability position, the City would be liable to the counterparty for a payment equal to the liability, subject to netting arrangements.

Rollover risk:

The Pension Fund is exposed to rollover risk on hedging derivative instruments that are hedges of debt that mature or may be terminated prior to the maturity of the hedged debt. When these hedging derivative instruments terminate, or in the case of a termination option, if the counterparty exercises its option, the Pension Fund will be reexposed to the risks being hedged by the hedging derivative instrument.

Fair Value Measurement

The Municipal Pension Fund has the following recurring fair value measurement as of June 30, 2017:

		Fair Value Measurements Using		
	6/30/2017	Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investments by fair value level				
U.S. Treasury Securities	$ 180,538,575	$ -	$ 180,538,575	$ -
Agency Bonds	67,357,205	-	67,357,205	-
Asset Backed Securities	20,970,026	-	20,970,021	5
Corporate Bonds	300,807,297	-	300,806,001	1,296
Government Bonds	144,638,309	-	144,638,309	-
Mortgage Backed Securities	113,717,302	-	113,717,302	-
Municipal Bonds	13,574,040	-	13,574,040	-
Sovereign Debt	10,705,557	-	10,705,557	-
Mutual Funds	456,121	456,121	-	-
Equity	2,871,077,516	2,866,682,157	2,902,089	1,493,270
Total Investments by fair value level	$3,723,841,949	$2,867,138,278	$ 855,209,099	$ 1,494,571
Investments measured at the net asset value (NAV)				
Credit Distressed Hedge Fund	$ 22,419,608			
Equity Long/Short hedge funds	27,857,614			
Real Estate	258,320,778			
Private Equity	442,257,227			
Fixed Income Funds	188,473,203			
Equity Funds	529,857			
Total Investments measured at the NAV	939,858,287			
Total Investments measured at fair value	$4,663,700,236			
Investment derivative instruments				
Equity index Futures (Assets)	$ 191	$ 191		
Equity index Futures (Liabilities)	(76,156)	(76,156)		
Forward Currency Contracts (Assets)	1,541,922		1,541,922	
Forward Currency Contracts (Liabilities)	(687,443)		(687,443)	
Total Investment derivative instruments	$ 778,515	$ (75,965)	$ 854,480	

Equity securities classified in Level 1 of the fair value hierarchy are valued using quoted market prices. Debt securities classified in Level 2 of the fair value hierarchy are valued using a matrix pricing technique. Mortgage and Asset backed securities and Corporate bonds in Level 3 are valued using discounted cash flow techniques.

Derivative instruments classified in Level 1 of the fair value hierarchy are valued using quoted market prices. Derivative instruments classified in Level 2 are valued using a market approach that considers benchmark for foreign exchange rates.

The valuation method for investments measured at the net asset value (NAV) per share (or its equivalent) is presented on the following table.

		Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Investment Measured at the net asset value (NAV)				
Credit Distressed Hedge Fund	$ 22,419,608	-	Quarterly	90 days
Equity Long/Short hedge funds	27,857,614	-	Quarterly	90 days' notice
Real Estate	258,320,778	31,048,304	N/A	N/A
Private Equity	442,257,227	232,073,081	N/A	N/A
Fixed Income Funds	188,473,203	-	Quarterly	90-120 days
Equity Funds	529,857	-	Quarterly	90-120 days
Total Investments measured at the NAV	$ 939,858,287			

1. Equity long/short hedge funds: This Fund will typically hold 0-50 long positions and 10-15 short positions in U.S. common stocks. Management has the ability to shift investments from value to growth strategies, from small to large capitalization stocks, and from a net long position to a net short position. The Fund mitigates market risk by utilizing short positions. In periods of extreme volatility, the Fund may hold a significant portion of its assets in cash. The fair values of the investments in this type have been determined using the NAV per share of the investments. Investment can be redeemed with a 90 days' notice.

2. Credit distressed hedge funds: The Funds seek to identify and exploit event driven opportunities both on the long and short side in the stressed and distressed corporate debt markets. Investments are generally driven by fundamental, value-oriented analysis and specific credit events. The Funds maintain the flexibility to invest globally and across capital structures of stressed and distressed companies. Investments generally target secondary U.S. credit opportunities across all tranches of a company's debt capital structure. The Funds may also invest opportunistically in certain equities, long and short. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the in-vestments. Investment can be redeemed with a 90 days' notice.

3. Real estate funds: This type includes funds that invest in U.S. and Non-U.S. commercial and residential real estate. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. These investments can never be redeemed with the funds. Distributions from each fund will be received as the underlying investments of the funds are liquidated. However, the individual investments that will be sold have not yet been determined. Because it is not probable that any individual investment will be sold, the fair value of each individual investment has been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. Once it has been determined which investments will be sold and whether those investments will be sold individually or in a group, the investments will be sold in an auction process. The investee fund's management is required to approve of the buyer before the sale of the investments can be completed. It is expected that the underlying assets of the funds will be liquidated over the next seven to 10 years.

4. Private equity funds: The primary goal of these Funds is to generate returns for investors that exceed private equity industry benchmarks and are commensurate with asset class risk through the construction of a portfolio of opportunistic, highly performing private equity investments. Investments that fund may undertake include early-stage venture capital, later-stage growth financings, leveraged buyouts of medium and large-sized companies, mezzanine investments, PIPES and investments in companies that are being taken private. These investments can never be redeemed with the funds. Instead, the nature of the investments in this type is that distributions are received through the liquidation of the underlying assets of the fund. If these investments were held, it is expected that the underlying assets of the fund would be liquidated over five to 10 years. The fair values of the investments in this type have been determined using recent observable transaction information for similar investments and nonbinding bids received from potential buyers of the investments. Once a buyer has been identified, the investee fund's management is required to approve of the buyer before the sale of the investments can be completed.

5. Fixed Income funds: The primary goal of these Funds is to create alpha by sourcing proprietary opportunities, avoiding capital loss, buying securities below their intrinsic value and selling securities above their intrinsic value. Firms look for opportunities that are currently mispriced, based on fundamentals or potentially an event that may improve the price of the holding.

6. Equity funds: The primary goal of these Funds is employ a private equity approach to public market investing which seeks to deliver superior returns through a value-oriented investment strategy focusing on companies that are (or should be) implementing strategic change.

Securities Lending Program

The Pension Fund, pursuant to a Securities Lending Authorization Agreement, has authorized J.P. Morgan Bank and Trust Company (J.P. Morgan) to act as the Pension Fund's agent in lending the Pension Fund's securities to approved borrowers. J.P. Morgan, as agent, enters into Securities Loan Agreements with borrowers.

During the fiscal year, J.P. Morgan lent, on behalf of the Pension Fund, certain securities of the Pension Fund held by J.P. Morgan Chase Bank, N.A. as custodian and received cash or other collateral including securities issued or guaranteed by the United States, U.K., and Eurozone governments. J.P. Morgan does not have the ability to pledge or sell collateral securities delivered absent a borrower default. Borrowers were required to deliver collateral for each loan equal to at least 102% or 105% of the market value of the loaned securities.

Pursuant to the Securities Lending Authorization Agreement, J.P. Morgan had an obligation to indemnify the Pension Fund in the event of default by a borrower. There were no failures by any borrowers to return loaned securities or pay distributions thereon during the fiscal year that resulted in a declaration or notice of default of the borrower.

During the fiscal year, the Pension Fund and the borrowers maintained the right to terminate securities lending transactions upon notice. The cash collateral received on each loan was invested in a separately managed account based upon the investment guidelines established by the Pension Fund. As of June 30, 2017 the weighted average maturity was 48 days and the final maturity was 351 days. Because the securities lending transactions were terminable at will, their duration did not generally match the duration of the investments made with the cash collateral received from the borrower.

On June 30, 2017, the Pension Fund had no credit risk exposure to borrowers.

As of June 30, 2017, the fair value of securities on loan was $360.6 million. Associated collateral totaling $369.2 million was comprised of cash which was invested in a separately managed account based upon the investment guidelines established by the Pension Fund. As of June 30, 2017, the invested cash collateral was $369.2 million and is valued at amortized cost.

F. INVESTMENT ADVISORS

The Pension Fund utilizes investment advisors to manage long-term debt, real estate, private market, and equity portfolios. To be eligible for consideration, investments must meet criteria set forth in governing laws and regulations.

G. NET PENSION LIABILITY

The components of the net pension liability for the pension plan as of June 30, 2017 were as follows:

Total Pension Liability	$ 11,192,601,311
Plan Fiduciary Net Position	4,874,074,826
Net Pension Liability	$ 6,318,526,485

Plan Fiduciary Net Position as a Percentage of the Total Pension Liability is 43.5%.

The Water Fund's portion of the net pension liability was $444,232,700 and $455,840,648 as of June 30, 2017 and 2016, respectively.

Actuarial Assumptions

The total pension liability was determined by an actuarial valuation as of June 30, 2016 and was rolled forward to June 30, 2017. The June 30, 2016 actuary valuation used the following actuarial assumptions, applied to all periods including the measurement period:

Actuarial Cost Method: Entry Age Normal
Investment Rate of Return: 7.70% compounded annually, net of expenses
Salary Increases: Age Based Table

- The investment return assumption was changed from 7.75% from the prior year valuation to 7.70 percent for the current year valuation.
- To recognize the expense of the benefits payable under the Pension Adjustment Fund, the actuarial liabilities have been increased 0.54%. This estimate is based on the statistical average expected value of the benefits.
- The mortality rates were based on the RP 2000 Healthy Annuitant Mortality Table for males and females with adjustments for mortality improvements using Scale AA with five years set-back for Municipal males and females and a 2-year set-back for Police and Fire males and females.

The measurement date for the net pension liability is June 30, 2017. Measurements are based on the fair value of assets as of June 30, 2017 and the Total Pension Liability ("TPL") as of the valuation date, July 1, 2016 updated to June 30, 2017. The roll-forward procedure included the addition of service cost and interest cost offset by actual benefit payments. During the measurement year, the collective NPL decreased by approximately $201 million. The service cost and interest cost increased the collective net pension liability by approximately $982 million while contributions plus investment income offset by administrative expenses decreased the collective net pension liability by approximately $1,338 million.

There were no changes in benefits during the year. There were actuarial experience losses during the year of approximately $104 million which includes the loss due to the Pension Adjustment Fund payment of $30 million for the previous year.

The Board adopted an assumption change to decrease the expected long-term return on assets from 7.75% to 7.70% which increased the TPL by approximately $51 million.

Long-term expected rate of return:

The long-term rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation.

Best estimates of geometric real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2017 (see discussion of pension plan's investment policy) are summarized in the following table:

	Average 10-Year Annualized Return	Benchmark Index
Fixed Income		
Broad Fixed Income	2.80%	Bloomberg Barclays U.S. Aggregate TR
Int. government	2.20%	Bloomberg Barclays U.S. Govt TR
High Yield	4.5%	Bloomberg Barclays U.S. High Yield TR
Global Aggregate	1.70%	Bloomberg Barclays U.S. Global Aggregate TR
Bank Loans	4.90%	Credit Suisse Leveraged Loans
Emerging Market Debt	6.30%	JP Morgan EMBI Global TR
Equities		
Broad U.S. Equity	7.30%	Russell 3000
Global Equity	7.40%	MSCI ACWI
Broad Non-U.S. Equity	7.60%	MSCI EAFE
Emerging Market	8.60%	MSCI Emerging Markets
Hedge Fund		
Hedge Funds	5.00%	HFRI Fund of Funds Composite Index
Real Estate		
Real Estate – Core	7.60%	NCREIF Fund Index

Public REITs	7.10%	NAREIT
Opportunistic Real Estate	11.70%	NCREIF Property Index
Real Estate		
MLPs	7.60%	Alerian MLP Index
Global Infrastructure	7.50%	Dow Jones Brookfield Global Infrastructure Index
Private Equity		
Private Equity	11.10%	Cambridge Associates
Private Debt	10.00%	Cambridge Associates
Cash		
TIPS	3.80%	Bloomberg Barclays U.S. TIPS TR
91-Day T-Bills	1.20%	

The above table reflects the expected (7-10 year) real rate of return for each major asset class. The expected inflation rate is projected 2.5% for the same time period.

Discount Rate: The discount rate used to measure the total pension liability was 7.70%. The projection of cash flows used to determine the discount rate assumed that plan member contributions will be made at the current contribution rate and the participating governmental entity contributions will be made at rates equal to the difference between the actuarial determined contribution rates and the member rate. Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all on project benefit payment to determine the total pension liability.

Sensitivity of the net pension liability: The following presents the net pension liability of the System, calculated using the discount rate of 7.70%, as well as what the System's net pension liability would be if it were calculated using a discount rate that is 1% lower or 1% higher than the current rate:

	1% Decrease (6.70%)	Discount Rate (7.70%)	1% Increase (8.70%)
Total Pension Liability	$12,314,093,713	$11,192,601,311	$10,236,978,416
Plan Fiduciary Net Position	4,874,074,826	4,874,074,826	4,874,074,826
Collective Net Pension Liability	$ 7,440,018,887	$ 6,318,526,485	$ 5,362,903,590
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	39.6%	43.5%	47.6%

H. GUARANTEE OF BENEFITS

Benefits under the Pension fund are guaranteed by statute. In the event that employee contributions do no equal required benefits, the City's General Fund must provide any shortfall.

I. PARTICIPATION IN THE PENSION FUND

The trustees for the Pension Fund are also members of the Fund and as such, are subject to the provisions of the Fund as described in the notes to these financial statements.

J. SUBSEQUENT EVENTS

Management evaluated subsequent events through December 20, 2017, the date the pension financial statements were available to be issued. Events or transactions occurring after June 30, 2017, but prior to December 20, 2017 that provided additional evidence about conditions that existed at June 30, 2017, have been recognized in the financial statements for the year ended June 30, 2017. Events or transactions that provided evidence about conditions that did not exist at June 30, 2017, but arose before the financial statements were available to be issued have not been recognized in the financial statements for the year ended June 30, 2017.

K. REPORTING INFORMATION FOR PARTICIPATING EMPLOYERS

Changes in Collective Net Pension Liability: The following table shows the changes in total pension liability (TPL), the plan fiduciary net position (i.e., fair value of the System assets) (FNP), and the net pension liability (NPL) during the measurement period ending June 30, 2017:

Change in Collective Net Pension Liability

	Increase (Decrease)		
	Total Pension Liability (a)	**Plan Fiduciary Net Position (b)**	**Net Pension Liability (a) - (b)**
Balances at 6/30/2016	$ 10,877,209,958	$ 4,357,975,073	$ 6,519,234,885
Changes for the year:			
Service cost	157,607,110		157,607,110
Interest	823,959,345		823,959,345
Changes of benefits	0		0
Differences between expected and actual experience	103,878,650		103,878,650
Changes of assumptions	51,441,475		51,441,475
Contributions - employer		706,236,698	(706,236,698)
Contributions - member		73,607,359	(73,607,359)
Net investment income		566,624,580	(566,624,580)
Benefit payments	(821,495,227)	(821,495,227)	0
Administrative expense		(8,873,657)	8,873,657
Net Changes	315,391,353	516,099,753	(200,708,400)
Balances at 6/30/2017	$ 11,192,601,311	$ 4,874,074,826	$ 6,318,526,485

Employer's Proportionate Shares: GASB 68 requires that the proportionate share for each employer be determined based upon the "employer's projected long-term contribution effort to the pension…as compared to the total long-term contribution effort of all employers." In addition to the City, three quasi-governmental agencies currently participate in the system, PHDC, PPA, and PMA. The method of allocation is based on the ratio of quasi-governmental agency contributions in proportion to total contributions of the plan.

Pension amounts by employer: The following schedule presents the pension amounts for each participating employer: Philadelphia Parking Authority (PPA), Philadelphia Municipal Authority (PMA), Philadelphia Housing Development Corporation (PHDC), and the City of Philadelphia (City):

Schedule of Pension Amounts by Employer

	For the Year Ended	PPA	PMA	PHDC	City	Total
Collective Pension Expense		$ 21,764,584	$ 339,545	$ 1,983,059	$ 803,618,540	$ 827,705,728
Change in Proportion		2,060,545	218,642	(298,075)	(1,981,112)	-
Contribution Difference		4,529,808	30,619	317,046	(4,877,473)	-
Employer Pension Expense		28,354,937	588,806	2,002,030	796,759,955	827,705,728
Net Pension Liability	06/30/16	209,757,356	2,965,619	20,257,850	6,286,254,060	6,519,234,885
Net Pension Liability	06/30/17	166,146,127	2,592,010	15,138,241	6,134,650,107	6,318,526,485
Change in Net Pension Liability		(43,611,229)	(373,609)	(5,119,609)	(151,603,953)	(200,708,400)
Deferred Outflows	06/30/16	65,741,046	1,275,353	5,267,031	806,510,385	878,793,815
Deferred Outflows	06/30/17	43,794,815	842,698	3,319,721	527,544,043	575,501,277
Change in Deferred Outflows		(21,946,231)	(432,655)	(1,947,310)	(278,966,342)	(303,292,538)
Deferred Inflows	06/30/16	-	-	-	(42,392,584)	(42,392,584)
Deferred Inflows	06/30/17	(25,061,614)	(190,428)	(3,032,702)	(32,992,732)	(61,277,476)
Change in Deferred Inflows		(25,061,614)	(190,428)	(3,032,702)	9,399,852	(18,884,892)
Employer Contributions		24,958,321	339,332	2,141,627	678,797,417	706,236,697
Employer Pension Expense		28,354,937	588,806	2,002,030	796,759,955	827,705,728

Reconciliation of Net Pension Liability

The following table reconciles the Collective Net Pension Liability to the amount reported in the Statement of Net Position included in the City of Philadelphia's Comprehensive Annual Financial Report:

Reconciliation of Collective Net Pension Liability to the Primary Government Net Pension Liability

(Amounts in thousands of USD)

Municipal Pension Fund	Proportionate Share of NPL	Discretely Presented Component Units	City and Blended Component Units
City	6,134,650	0	6,134,650
PPA	166,146	166,146	
PMA	2,592		2,592
PHDC (1)	15,138	15,138	
Collective Net Pension Liability	6,318,526	181,284	6,137,242
State Pension Fund			
PICA			1,387
City's Primary Government Net Pesnion Liability (Exhibit I)			6,138,629

(1) PHDC does not appear in the Component Unit Financial Statements (Exhibit XI Statement of Net Position and Exhibit XII Statement of Activities) due to immaterially.

Deferred Outflows by Employer

The following table summarizes the deferred outflows allocated to each employer for experience, assumption changes, investment returns, and contribution differences:

Schedule of Employers' Deferred Outflows

	PPA	PMA	PHDC	City	Total
Proportionate Shares	2.63%	0.04%	0.24%	97.09%	100.00%
Experience	$ 4,275,467	$ 66,701	$ 389,555	$ 157,863,998	$ 162,595,721
Assumption Changes	2,450,479	38,229	223,273	90,479,593	93,191,574
Investment Returns	6,795,607	106,017	619,175	250,915,708	258,436,507
Proportion Change	20,828,833	564,235	1,425,650	28,284,744	51,103,462
Contribution Differences	9,444,429	67,517	662,068	-	10,174,014
	$ 43,794,815	$ 842,699	$ 3,319,721	$ 527,544,043	$ 575,501,278

Deferred Inflows by Employer

The following table summarizes the deferred inflows allocated to each employer for experience, assumptions changes, investment return, and contribution differences:

Schedule of Employers' Deferred Inflows

	PPA	PMA	PHDC	City	Total
Proportionate Shares	2.63%	0.04%	0.24%	97.09%	100.00%
Experience	$ -	$ -	$ -	$ -	$ -
Assumption Changes	-	-	-	-	-
Investment Returns	-	-	-	-	-
Proportion Change	(25,061,614)	(190,428)	(3,032,702)	(22,818,718)	(51,103,462)
Contribution Differences	-	-	-	(10,174,015)	(10,174,015)
	$ (25,061,614)	$ (190,428)	$ (3,032,702)	$ (32,992,733)	$ (61,277,477)

Recognition of Deferred Outflows and Inflows by Employer

The following table shows the net amount of deferred outflows and inflows to be recognized by each participating employer in each of the next five years and the total thereafter:

Schedule of Employer's Recognition of Deferred Outflows and Intflows

For Year ending	PPA	PMA	PHDC	CITY	Total
2018	$ 13,020,233	$ 349,573	$ 604,825	$ 230,553,287	$ 244,527,918
2019	11,262,115	334,926	470,650	211,696,262	223,763,953
2020	(4,323,955)	(13,115)	(676,823)	97,539,752	92,525,859
2021	(1,225,191)	(19,114)	(111,632)	(45,237,991)	(46,593,928)
2022	-	-	-	-	-
Thereafter	-	-	-	-	-
Total	$ 18,733,202	$ 652,270	$ 287,020	$ 494,551,310	$ 514,223,802

2. ACCUMULATED UNPAID SICK LEAVE

Employees are credited with varying amounts of sick leave according to type of employee and/or length of service. Employees may accumulate unused sick leave to predetermined balances. Employees (upon retirement only) are paid varying amounts ranging from 25% to 50% of unused sick time, not to exceed predetermined amounts. Employees, who separate for any reason other than indicated above, forfeit their entire sick leave. The City budgets for and charges the cost of sick leave as it is taken.

3. OTHER POST EMPLOYMENT BENEFITS (OPEB)

Plan Description: The City of Philadelphia self-administers a single employer, defined benefit plan and provides health care for five years subsequent to separation for eligible retirees. Certain union represented employees may defer their coverage until a later date, but the amount that the City pays for their health care is limited to the amount that the City would have paid at the date of their retirement. The City also provides lifetime insurance coverage for all eligible retirees. Firefighters are entitled to $7,500 coverage and all other employees receive $6,000 in coverage. The plan does not issue stand-alone financial statements, and the accounting for the plan is reported within the financial statements of the City of Philadelphia.

Funding Policy: The City funding policy is to pay the net expected benefits for the current retirees. To provide health care coverage, the City pays a negotiated monthly premium for retirees covered by union contracts and is self-insured for non-union employees. The City's contributions are estimated to be about $114.8 million for fiscal year ended June 30, 2017.

Annual OPEB Cost and Net OPEB Obligation: The City's annual other post-employment benefit (OPEB) expense is calculated based on the annual required contribution of the employer (ARC), an amount actuarially determined in accordance with the parameters of GASB Statement No. 45. The ARC represents a level of funding, which if paid on an ongoing basis, is projected to cover normal cost each year and amortize any unfunded actuarial liabilities over a period not to exceed thirty (30) years. The following table shows the components of the City's annual OPEB cost for the year, the amount actually contributed to the plan, and changes in the net OPEB obligation:

	(Thousands of Dollars)
Annual Required Contribution	$ 140,272
Interest on Net OPEB Liability	12,600
Adjustment to Annual Required Contribution	(11,353)
Annual OPEB Cost	141,519
Payments Made	
Increase in Net OPEB Obligation	(114,800)
Net OPEB Obligation - beginning of year	296,474
Net OPEB Obligation - end of year	$ 323,193

The City of Philadelphia's annual OPEB cost, the percentage of annual OPEB cost contributed to the Plan, and the net OPEB obligation for the fiscal year ended June 30, 2017 was as follows:

(Amounts in Thousands of USD)

Fiscal Year Ended	Annual OPEB Cost	Percentage of Annual OPEB Contributed	Net OPEB Obligation
6/30/2017	$ 141,519	81%	$ 323,193
6/30/2016	137,388	78%	296,474
6/30/2015	133,052	72%	266,286

Funded Status and Funding Progress: As of July 1, 2016, the most recent actuarial valuation date, the City is funding OPEB on a pay as you go basis and accordingly, the unfunded actuarial accrued liability for benefits was $1.94 billion. The covered annual payroll was $1.68 billion and the ratio of the UAAL to the covered payroll was 115.5%.

The required schedule of funding progress immediately following the notes to the financial statements presents multi-year trend information about whether the actuarial value of the plan assets is increasing or decreasing over time relative to the actuarial accrued liability for benefits.

The projections of future benefit payments for an ongoing plan obligation involves estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. Amounts determined regarding the funded status of the obligation and the contributions of the employer are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future.

Actuarial Methods and Assumptions: The July 1, 2016 valuation was performed using a full valuation methodology. This means that new claims cost assumptions were developed based on the claims data available for the fiscal year ending June 30, 2015 through June 30, 2017, and this was applied to census data as of July 1, 2016.

The Entry Age Cost Method was used to value the Plan's actuarial liabilities and to set the normal cost. Under this method, the normal cost rate is the percentage of pay contribution which would be sufficient to fund the plan benefits if it were paid from each member's entry into the Retirement System until termination or retirement.

Changes in Methods and Assumptions: The valuation includes updated claims cost and trend assumptions based on information available as of June 30, 2016, and increased to 3.58% as of June 30, 2017.

4. PENNSYLVANIA INTERGOVERNMENTAL COOPERATION AUTHORITY (PICA)

PICA, a body corporate and politic, was organized in June 1991 and exists under and by virtue of the Pennsylvania Intergovernmental Cooperation Authority Act for Cities of the First Class (the Act). Pursuant to the Act, PICA was established to provide financial assistance to cities of the first class. The City currently is the only city of the first class in the Commonwealth of Pennsylvania. Under the Act, PICA is administered by a governing Board consisting of five voting members and two ex officio non-voting members. The Governor of Pennsylvania, the President Pro Tempore of the Pennsylvania Senate, the Minority Leader of the Pennsylvania Senate, the Speaker of the Pennsylvania House of Representatives, and the Minority Leader of the Pennsylvania House of Representatives each appoints one voting member to the Board.

The Act provides that, upon PICA's approval of a request of the City to PICA for financial assistance, PICA shall have certain financial and oversight functions. First, PICA shall have the power to issue bonds and grant or lend the proceeds thereof to the City. Second, PICA also shall have the power, in its oversight capacity, to exercise certain advisory and review powers with respect to the City's financial affairs, including the power to review and approve five-year financial plans prepared at least annually by the City and to certify noncompliance by the City with its current five-year financial plan (which certification would require the Secretary of the Budget of the Commonwealth of Pennsylvania to cause certain Commonwealth payments due to the City to be withheld).

PICA bonds are payable from the proceeds of a PICA tax on the wages and income earned by City residents. The City has reduced the amount of wage and earnings tax that it levies on City residents by an amount equal to the PICA tax so that the total tax remains the same. PICA returns to the City any portion of the tax not required to meet their debt service and operating expenses. In Fiscal 2017 this transfer amounted to $409.5 million.

5. RELATED PARTY TRANSACTIONS

The city is associated, through representation on the respective Board of Directors, with several local governmental organizations and certain quasi-governmental organizations created under the laws of the Commonwealth of Pennsylvania. These organizations are separate legal entities having governmental character and sufficient autonomy in the management of their own affairs to distinguish them as separate independent governmental entities. A list of such related party organizations and a description of significant transactions with the City, where applicable, is as follows:

A. SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY (SEPTA)

During the year the City provided an operating subsidy of $79.72 million to SEPTA.

B. OTHER ORGANIZATIONS

The City provides varying levels of subsidy and other support payments which totaled $100.39 million during the year to the following organizations:

- Philadelphia Health Management Corporation
- Philadelphia Industrial Development Corporation
- Fund for Philadelphia Incorporated

6. RISK MANAGEMENT

The City is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; injuries to employees; and natural disasters. The City (except for Aviation Fund operations, the Municipal Authority, and PICA) is self-insured for fire damage, casualty losses, public liability, Workers' Compensation and Unemployment Compensation. The Aviation Fund is self-insured for Workers' Compensation and Unemployment Compensation and insured through insurance carriers for other coverage. The City is self-insured for medical benefits provided to employees in the Fraternal Order of Police, its city-administered health plan, the International Association of Fire Fighters, and District Council 47.

The City covers all claim settlements and judgments, except for those discussed above, out of the resources of the fund associated with the claim. Claims expenditures and liabilities are reported when it is probable that a loss has occurred and the amount of the loss can be reasonably estimated. These losses include: an estimate of claims that have been incurred but not reported; the effects of specific, incremental claims adjustment expenditures, salvage, and subrogation; and unallocated claims adjustment expenditures.

At June 30, 2017 the amount of these liabilities was $365.1 million for the City. This liability is the City's best estimate based on available information. Changes in the reported liability since June 30, 2015 resulted from the following:

(Amounts in Millions of USD)

Fiscal Years Ending June 30	Beginning Liability	Current Year Claims and Changes in Estimates	Claim Payments	Ending Liability
2015	349.3	296.0	(291.7)	353.6
2016	353.6	216.2	(219.5)	350.3
2017	350.3	243.9	(229.1)	365.1

The City's Unemployment Compensation and Workers' Compensation coverages are provided through its General Fund. Unemployment Compensation and Workers' Compensation coverages are funded by a pro rata charge to the various funds. Payments for the year were $2.9 million for Unemployment Compensation claims and $67.4 million for Workers' Compensation claims.

The City's estimated outstanding workers' compensation liabilities are $269.4 million discounted at 3.5%. On an undiscounted basis, these liabilities total $352.6 million. These liabilities include provisions for indemnity, medical and allocated loss adjustment expense (ALAE). Excluding the ALAE, the respective liabilities for indemnity and medical payments relating to workers' compensation total $244.1 million (discounted) and $321.3 million (undiscounted). The Water Fund's accrued liability for workers' compensation was $21.6 million and $21.7 million at June 30, 2017 and 2016, respectively.

During the last five (5) fiscal years, no claim settlements have exceeded the level of insurance coverage for operations using third party carriers. None of the City's insured losses have been settled with the purchase of annuity contracts.

7. COMMITMENTS

Encumbrance accounting is utilized to assure effective budgetary control and accountability and to facilitate effective cash planning and control. At year end the open encumbrances for both the current and prior fiscal years for the Water Fund totaled $554 million.

8. CONTINGENCIES

Generally, claims against the City are payable out of the General Fund, except claims against the City Water Department, City Aviation Division, or Component Units which are paid out of their respective funds and only secondarily out of the General Fund which is then reimbursed for the expenditure. Unless specifically noted otherwise, all claims hereinafter discussed are payable out of the Water Fund. The

Act of October 5, 1980, P.L. 693, No. 142, known as the "Political Subdivision Tort Claims Act," established a $500,000 aggregate limitation on damages arising from the same cause of action, transaction, occurrence, or series of causes of action, transactions or occurrences with respect to governmental units in the Commonwealth such as the City. The constitutionality of that aggregate limitation has been upheld by the United States Supreme Court. There is no such limitation under federal law.

Various claims have been asserted against the Water Fund and in some cases lawsuits have been instituted. Many of these claims are reduced to judgment or otherwise settled in a manner requiring payment by the Water Fund. As of June 30, 2017 and 2016, the aggregate estimate of loss deemed to be probable is $27.6 million and $28.2 million, respectively. This amount has been included on the Statement of Net Position under Other Long-Term Liabilities.

In addition to the above, there are certain lawsuits against the City for which an additional loss is reasonably possible. These lawsuits relate to General Fund and Enterprise Fund operations. The aggregate estimate of the loss, which could result if unfavorable legal determinations were rendered against the City with respect to these lawsuits is approximately $100.4 million to the General Fund, $11.2 million from the Water Fund and $2.7 million from the Aviation Fund.

9. SUBSEQUENT EVENTS

In August of 2017, the City of Philadelphia, issued Water and Wastewater Revenue Refunding Bonds, Series 2017B in the amount of $174,110,000 to finance (i) the refunding, on a current basis, of all or a portion of the City's outstanding Water and Wastewater Revenue Refunding Bonds, Series 2007B, (ii) the refunding, on an advance basis, of portions of the City's outstanding Water and Wastewater Revenue Bonds, Series 2010C and portions of its Water and Wastewater Revenue Refunding Bonds, Series 2012, and (iii) the costs of issuance relating to the bonds. The bonds bear interest rates of 2.00% to 5.00%. The debt service requirements of the Water Fund following the issuance of the Series 2016 Water and Wastewater Revenue Refunding Bonds are detailed in the Other Supplementary Information section.

10. ACCOUNTS RECEIVABLE

Balances of accounts receivable and allowance for doubtful accounts consisted of the following:

FISCAL YEAR ENDED JUNE 30, 2017	
Accounts Receivable	
Billed in the Last Twelve Months	$149,661,403
Billed in 15-year Cycle Billing	8,440,721
Penalties on Receivables	12,359,977
Other Receivables	4,095,452
Subtotal	174,557,554
Bad Debt Written Off	13,251,217
Total	$161,306,337
Allowance for Doubtful Accounts	$ 13,057,526
FISCAL YEAR ENDED JUNE 30, 2016	
Accounts Receivable	
Billed in the Last Twelve Months	$ 135,402,994
Billed in 15-year Cycle Billing	9,113,657
Penalties on Receivables	7,321,722
Other Receivables	18,736,616
Subtotal	170,574,989
Bad Debt Written Off	17,986,820
Total	$ 152,588,169
Allowance for Doubtful Accounts	$ 13,006,803

11. ACCOUNTING FOR THE NEW RIVER CITY PROJECT FUNDS – WATER SINKING FUND RESERVE SUBSTITUTION

Pursuant to the Water Department's General Bond Ordinance, the Sinking Fund Reserve provides a reserve against default of the payment of principal and interest on Water Revenue Bonds when due.

The New River City Ordinance dated January 23, 2007 (Bill No 060005) authorized the purchase and deposit of a surety bond that meets the requirements of the General Ordinance to replace $67,000,000 of the Sinking Fund Reserve Balance. The $67,000,000 was used as follows:

Cost of the surety bond	$ 2,010,000
Legal and financial services	290,000
Management fees	375,000
Costs of certain water and sewer infrastructure components of the New River City Program	64,325,000
Total	$67,000,000

The prepaid surety bond was recorded as an asset in the Sinking Fund Reserve and amortized over the lives of the outstanding bonds.

In connection with the New River City Program, the City executed a program agreement with Philadelphia Authority for Industrial Development ("PAID") to provide program management and oversight for the program. To date, twelve projects totaling $83,697,833 have been executed (disbursements were limited to the $64,325,000). As of June 30, 2016, all projects were completed and all of the project funds have been disbursed. The transfer of the water and sewer utilities at Philadelphia Naval Business Center from PAID to the Water Department, including the projects outlined above, occurred in November, 2009.

12. LONG TERM AGREEMENTS

The City has entered into several long term agreements with third parties through the Philadelphia Municipal Authority as follows:

A. Automatic Meter Reading

In September 1997, the Water Department and the Water Revenue Bureau began the implementation of the Automatic Meter Reading Program (the "AMR Program") involving the replacement of all residential water meters with new meters equipped with radio transmitter endpoint reading devices ("ERT"). Installation commenced on schedule on September 11, 1997. By June 30, 2012, more than 482,841 new meters had been installed. From 2011 through 2013, as required in the long-term meter reading contract, the service provider (ITRON) conducted battery replacement of the vast majority of customer ERTs, thus enabling the battery capability of the existing population through 2025. The Water Department is also working on the purchase and installation of upgraded AMR devices for all commercial customers that have ERTs. The AMR Program agreement term ends in 2017. The Department has two one-year renewal options, and is in the process of exercising the first one year extension.

Under the agreement ITRON is paid a fixed amount for each monthly meter reading actually obtained. The Water Department paid ITRON, through the Philadelphia Municipal Authority ("PMA"), $1,940,536 and $1,689,812 in Fiscal Year 2017 and Fiscal Year 2016, respectively for meter reads. Additionally, the Water Department paid ITRON, through PMA, $2,087,360 and $2,745,479 in Fiscal Year 2017 and Fiscal Year 2016, respectively, for the purchase of meters.

B. Biosolids Treatment and Utilization

In 2008, the City entered into a long-term contract and lease with the Philadelphia Municipal Authority (the "PMA") for the PMA to operate the Water Department's existing Biosolids Recycling Center (the "BRC"). The PMA and Philadelphia Biosolids Services, LLC ("PBS") entered into a Service Agreement (the "PBS Service Contract"), pursuant to which PBS designed and built, and currently operates, a facility at the BRC to heat dry and dispose of biosolids captured during wastewater treatment. The PMA is required to make annual payments to PBS for operating the BRC. Pursuant to a Service Agreement between the PMA and the City (the "City Service Contract"), the City assumed all of PMA's obligations under the PBS Service Contract. The obligations under the City Service Contract constitute operating expenses of the Water Department. In Fiscal Years 2016 and 2017, the City paid to PMA, from revenues generated by the Water Department, $20,074,514 and $17,941,469, respectively. The City Service Contract contains adjusters for the Consumer Price Index, Producer Price Index, and fluctuations in fuel prices, among others; thus, expenditures under the City Service Contract may vary over time. The contract expires on October 13, 2028, and contains the possibility of a five-year renewal term at the option of the City. In addition to facilitating compliance with various state and federal environmental regulations, including the Clean Air Act, the PBS Service Contract has produced cost savings for the Water Department.

C. Northeast Water Pollution Control Plant Digester Gas Cogeneration Facility

In 2011, the City entered into a long-term contract and lease with the PMA for the PMA to arrange the construction, financing, maintenance and sublease of a digester gas cogeneration facility at the Northeast Water Pollution Control Plant. The PMA entered into a lease (the "Lease") with BAL Green Biogas I, LLC, a special purpose entity of Bank of America (the "Lessor"), which requires the PMA to make certain lease payments to the Lessor. Pursuant to a sublease dated December 23, 2011 (the "Sublease"), the City assumed all of the PMA's obligations under the Lease. The obligations under this contract constitute operating expenses of the Water Department. In Fiscal Year 2016 and Fiscal Year 2017, the City paid to the Lessor from revenues generated from the Water Department, $5,556,547 and $4,718,600, respectively. The Sublease expires on September 25, 2029, unless renewed by PMA for an additional term of eighteen months.

D. Laurel Street Combined Sewer Overflow

In 2011, the City entered into an Amended and Restated Development and Tax and Claim Settlement Agreement (the "Sugarhouse Agreement") with Sugarhouse HSP Gaming, L.P. ("HSP"). Under the terms of the Sugarhouse Agreement, HSP is required to fund the development and expansion of the Laurel Street Combined Sewer Overflow Project. As compensation for the development and expansion of the project, HSP has been allotted a five-year credit against real estate taxes and settlement payments otherwise due to the City. The amount of the credit corresponds to the amount expended by HSP on the Laurel Street Combined Sewer Overflow Project.

The Laurel Street Combined Sewer Overflow Project is a capital asset of the Water Department, and the credit awarded to HSP is a capital expenditure of the Water Department payable to the City. The Water Department paid the City $3,514,421 for Fiscal Year 2016. The Water Department paid the City $7,028,842 in Fiscal Year 2017, which sum included its payment obligations for both Fiscal Years 2017 and 2018 combined.

13. COMBINED SEWER OVERFLOW PROGRAM

The PaDEP and the City signed the Consent Order and Agreement ("COA") on June 1, 2011 that allowed the City to officially to embark on the implementation of its strategy known as the Green City, Clean Waters Program to use green and traditional infrastructure investments to substantially mitigate combined sewer overflows ("CSOs") and enhance the quality of local waterways over 25 years.

The Water Department anticipates that over the next 20 years, compliance with the COA will significantly increase capital and operating expenditures related to its Combined Sewer Overflow Program. Moreover, any resulting changes to the COA as a result of the EPA's Section 308 information request could further increase the costs of compliance. Looking ahead to the 10th-year milestone, the Water Department continues to review program cost and delivery in an effort to optimize the program while satisfying the necessary regulatory requirements. As of the most recent projections, the total cost of the 25-year program is approximately $4.5 billion, of which approximately $3.5 billion are capital related costs and $1 billion are operation and maintenance costs.

In its current form, the COA adopts the presumption approach to the management of CSOs. The goal under the presumption approach is to eliminate and remove by 2036 (year 25 of the COA) the mass of pollutants that otherwise would be removed by the capture of 85% by volume city-wide of the combined sewage otherwise collected in the City's combined sewer system during precipitation events. To ensure this ultimate goal is met, the COA requires interim milestones at the end of the fifth, tenth, fifteenth and twentieth years. The interim milestones require the City to achieve specific targets in four categories: (1) Total Greened Acres; (2) Overflow Reduction Volume; (3) Miles of Interceptor Lined; and (4) Wastewater Treatment Plant Upgrades: Design and Construction. The COA includes financial protections in the event that the costs of complying with the COA exceed the Water Department's projections. Should the costs of complying with the COA increase to the extent that the wastewater component of a customer's bill exceeds 2.27% of median household income, the City may petition the PaDEP for an extension of time to satisfy the requirements of the COA so that the financial burden does not become excessive on ratepayers. The COA also includes significant penalties for non-compliance with the various 5-year milestone targets. Penalties start at $25,000 per month for each violation (for the first 6 months) and increase up to $100,000 monthly for uncured violations of 13 months or more.

The Water Department has completed its fifth year of the 25 year COA. 1,310 additional greened acres and 334 million gallons of combined sewer overflow reduction are required over the next 5 years for a total of 2,148 greened acres and 2,044 million gallons of combined sewer overflow reduction by the end of year 10.

14. RESTRICTED ASSETS

Assets whose use is limited to a specific purpose have been classified as "restricted" in the Statement of Fund Net Position. Restricted assets as of June 30, 2017, are comprised of the following:

	(Thousands of Dollars)	
	Cash and Investments	**Accrued Interest**
Amounts Reserved for:		
Capital Projects	$ 450,667	$ 318
Rate Stabilization	201,759	349
Residual	15,262	23
Sinking Fund	823	-
Debt Service Reserve	218,277	446
Total	$ 886,788	$ 1,136

Restricted assets as of June 30, 2016, are comprised of the following:

	(Thousands of Dollars)	
	Cash and Investments	**Accrued Interest**
Amounts Reserved for:		
Capital Projects	$ 329,957	$ 20
Rate Stabilization	205,600	160
Residual	15,189	14
Debt Service Reserve	220,890	546
Total	$ 771,636	$ 740

Required Supplementary Information

CITY OF PHILADELPHIA WATER DEPARTMENT

BUDGETARY COMPARISON SCHEDULE
Water Operating Fund
For the Fiscal Year Ending June 30, 2017
(Legally Enacted Basis) **(Thousands of Dollars)**

Revenues	Budgeted Amounts			Final Budget to Actual Positive (Negative)
	Original	Final	Actual	
Locally Generated Non-Tax Revenue	$ 663,450	$ 663,440	$ 685,515	$ 22,075
Revenue from Other Governments	1,000	1,000	1,408	408
Revenue from Other Funds	86,735	88,986	38,285	(50,701)
Total Revenues	**$ 751,185**	**$ 753,426**	**$ 725,208**	**$ (28,218)**
Expenditures and Encumbrances				
Personal Services	131,865	129,886	125,010	4,876
Pension Contributions	60,200	68,915	68,915	-
Other Employee Benefits	53,765	52,652	52,652	-
Sub-Total Employee Compensation	245,830	251,453	246,577	4,876
Purchase of Services	187,942	183,942	167,609	16,333
Materials and Supplies	49,813	50,177	42,592	7,585
Equipment	6,522	6,157	4,030	2,127
Contributions, Indemnities and Taxes	7,006	7,481	7,352	129
Debt Service	207,372	218,372	215,898	2,474
Payments to Other Funds	66,700	65,700	65,700	-
Advances and Other Miscellaneous Payments	-	-	-	-
Total Expenditures and Encumbrances	771,185	783,282	749,758	33,524
Operating Surplus (Deficit) for the Year	**$ (20,000)**	**$ (29,856)**	**$ (24,550)**	**$ 5,306**
Fund Balance Available, July 1, 2016	-	-	-	-
Operations in Respect to Prior Fiscal Years				
Commitments Cancelled - Net	20,000	25,000	24,550	(450)
Prior Period Adjustments	-	-	-	-
Adjusted Fund Balance, July 1, 2016	20,000	25,000	24,550	(450)
Fund Balance Available, June 30, 2017	**$ -**	**$ (4,856)**	**$ -**	**$ 4,856**

CITY OF PHILADELPHIA
OTHER POST EMPLOYMENT BENEFITS
SCHEDULE OF FUNDING PROGRESS
FISCAL YEAR ENDED JUNE 30, 2017

(Amounts in Millions of USD)

Actuarial Valuation Date	Actuarial Value of Assets	Actuarial Accrued Liability (AAL)	Unfunded AAL (UAAL)	Funded Ratio	Covered Payroll	UAAL as a Percentage of Covered Payroll
	(a)	(b)	(b - a)	(a / b)	(c)	(b - a) / c
<u>City of Philadelphia Other Post-Employment Benefits</u>						
07/01/2008	-	$ 1,156.0	$ 1,156.0	0.00%	$ 1,456.5	79.37%
07/01/2009	-	1,119.6	1,119.6	0.00%	1,461.7	76.60%
07/01/2010	-	1,169.5	1,169.5	0.00%	1,419.5	82.39%
07/01/2011	-	1,212.5	1,212.5	0.00%	1,469.2	82.53%
07/01/2012	-	1,511.9	1,511.9	0.00%	1,371.6	110.23%
07/01/2013	-	1,703.6	1,703.6	0.00%	1,416.9	120.23%
07/01/2014	-	1,732.1	1,732.1	0.00%	1,495.1	115.85%
07/01/2015	-	1,772.6	1,772.6	0.00%	1,544.5	114.77%
07/01/2016	-	1,936.6	1,936.6	0.00%	1,676.5	115.51%

This schedule represents the other post-employment benefits plan of the City of Philadelphia. The Water Department is a department of the City of Philadelphia.

Schedule of Changes in Net Pension Liability
Fiscal Year Ending June 30, 2017, 2016, 2015, and 2014

Schedule of Changes in Net Pension Liability

	Fiscal Year Ending			
	June 30, 2017	**June 30, 2016**	**June 30, 2015**	**June 30, 2014**
Total Pension Liability				
Service Cost (MOY)	$ 157,607,110	$ 148,370,075	$ 143,556,347	$ 136,986,515
Interest (Includes Interest on Service Cost)	823,959,345	802,450,569	791,298,503	774,518,750
Changes of Benefit Terms	-	-	-	-
Differences Between Expected and Actual Experience	103,878,650	151,918,733	34,909,464	-
Change of Assumptions	51,441,475	85,147,737	48,146,352	213,156,725
Benefit Payments, Including Refund of Member Contributions	(821,495,227)	(889,343,124)	(881,464,964)	(808,597,357)
Net Change in Total Pension Liability	$ 315,391,353	$ 298,543,990	$ 136,445,702	$ 316,064,633
Total Pension Liability - Beginning	10,877,209,958	10,578,665,968	10,442,220,266	10,126,155,633
Total Pension Liability - Ending	$ 11,192,601,311	$ 10,877,209,958	$ 10,578,665,968	$ 10,442,220,266
Plan Fiduciary Net Position				
Contributions - Employer	$ 706,236,698	$ 660,246,511	$ 577,195,412	$ 553,178,927
Contributions - Member	73,607,359	67,055,003	58,657,817	53,722,275
Net Investment Income	566,624,580	(145,681,480)	13,838,367	681,469,584
Benefit Payments, Including Refunds of Member Contributions	(821,495,227)	(889,343,124)	(881,666,036)	(808,597,357)
Administrative Expense	(8,873,657)	(8,553,837)	(10,478,541)	(8,291,820)
Net Change in Plan Fiduciary Net Position	$ 516,099,753	$ (316,276,927)	$ (242,452,981)	$ 471,481,609
Plan Fiduciary Net Position - Beginning	4,357,975,073	4,674,252,416	4,916,705,397	4,445,223,788
Plan Fiduciary Net Position - Ending	$ 4,874,074,826	$ 4,357,975,073	$ 4,674,252,416	$ 4,916,705,397
Net Pension Liability - Ending	$ 6,318,526,485	$ 6,519,234,885	$ 5,904,413,552	$ 5,525,514,869
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	43.55%	40.07%	44.19%	47.08%
Covered-Employee Payroll	$ 1,744,729,284	$ 1,676,411,925	$ 1,597,848,869	$ 1,556,660,223
Net Pension Liability as a Percentage of Covered-Employee Payroll	362.15%	388.88%	369.52%	354.96%

This schedule represents the changes in net pension liability of the Municipal Pension Plan. The entities within the Municipal Pension Plan are the City of Philadelphia, the Philadelphia Parking Authority, Philadelphia Municipal Authority, and the Philadelphia Housing Development Corporation. The Water Department is a department of the City of Philadelphia.

Schedules of Collective Contributions - Last 10 Years

Schedule of Collective Contributions (Based on Minimum Municipal Obligation)

Last 10 Fiscal Years
(Thousands of Dollars)

	FYE 2016	FYE 2016	FYE 2015	FYE 2014	FYE 2013	FYE 2012	FYE 2011	FYE 2010	FYE 2009	FYE 2008
Actuarially Determined Contribution	$ 629,620	$ 594,975	$ 556,030	$ 523,368	$ 727,604	$ 534,039	$ 463,375	$ 297,446	$ 438,522	$ 412,449
Contributions in Relation to the Actuarially Determined Contribution	706,237	660,246	577,195	553,179	781,823	555,690	470,155	312,556	455,389	426,934
Contribution Deficiency/(Excess)	$ (76,617)	$ (65,271)	$ (21,165)	$ (29,811)	$ (54,219)	$ (21,651)	$ (6,780)	$ (15,110)	$ (16,867)	$ (14,485)
Covered-Employee Payroll*	$ 1,744,729	$ 1,676,412	$ 1,597,849	$ 1,495,421	$ 1,429,723	$ 1,372,174	$ 1,371,274	$ 1,421,151	$ 1,463,260	$ 1,456,520
Contributions as a Percentage of Covered-Employee Payroll	40.48%	39.38%	36.12%	36.99%	54.68%	40.50%	34.29%	21.99%	31.12%	29.31%

Schedule of Collective Contributions (Based on Funding Policy)

Last 10 Fiscal Years
(Thousands of Dollars)

	FYE 2016	FYE 2016	FYE 2015	FYE 2014	FYE 2013	FYE 2012	FYE 2011	FYE 2010	FYE 2009	FYE 2008
Actuarially Determined Contribution	$ 881,356	$ 846,283	$ 798,043	$ 823,885	$ 738,010	$ 722,491	$ 715,544	$ 581,123	$ 539,464	$ 536,874
Contributions in Relation to the Actuarially Determined Contribution	706,237	660,247	577,195	553,179	781,823	555,690	470,155	312,556	455,389	426,934
Contribution Deficiency/(Excess)	$ 175,119	$ 186,036	$ 220,848	$ 270,706	$ (43,813)	$ 166,801	$ 245,389	$ 268,567	$ 84,075	$ 109,940
Covered-Employee Payroll*	$ 1,744,729	$ 1,676,412	$ 1,597,849	$ 1,495,421	$ 1,429,723	$ 1,372,174	$ 1,371,274	$ 1,421,151	$ 1,463,260	$ 1,456,520
Contributions as a Percentage of Covered-Employee Payroll	40.48%	39.38%	36.12%	36.99%	54.68%	40.50%	34.29%	21.99%	31.12%	29.31%

This schedule represents the collective contributions of the Municipal Pension Plan. The entities within the Municipal Pension Plan are the City of Philadelphia, the Philadelphia Parking Authority, Philadelphia Municipal Authority, and the Philadelphia Housing Development Corporation. The Water Department is a department of the City of Philadelphia.

Schedules of Collective Contributions - Last 10 Years

Notes to Schedules of Collective Contributions

Valuation Date	July 1, 2015
Timing	Actuarially determined contribution rates are calculated based on the actuarial valuation two years prior to the beginning of the plan year

Key Methods and Assumptions Used to Determine Contribution Rates

Actuarial Cost Method	Entry Age
Asset Valuation Method	Ten-year smoothed market
Amortization Method	Gain/Losses are amortized over closed 20-year periods, assumption changes over 15 years, benefit changes for actives over 10 years, benefit changes for inactives members over 1 year, plan changes mandated by the State over 20 years Under the City's Funding Policy, the initial July 1, 1985 unfunded actuarial liability (UAL) is amortized over a 34 year period ending June 30, 2019 with payments increasing 3.3% per year, the assumed payroll growth Under the MMO Funding Policy, the July 1, 2009 unfunded actuarial liability (UAL) was "fresh started" to be amortized over a 30 year period, ending June 30, 2039. This is a level dollar amortization of the UAL.
Discount Rate	7.75%
Amortization Growth Rate	3.30%
Salary Increases	Age based salary scale
Mortality	Sex distinct RP-2000 Combined Mortality with adjustments and improvements using Scale AA

A complete description of the methods and assumptions used to determine contribution rates for the year ending June 30, 2017 can be found in the July 1, 2015 actuarial valuation report.

Other Supplementary Information

CITY OF PHILADELPHIA WATER DEPARTMENT

BONDED DEBT
WATER AND WASTEWATER REVENUE BONDS
AS OF DECEMBER 10, 2017

Year End	Principal Requirements	Interest Requirements	Total Debt Service
6/30/2018	45,946,041	44,811,635	90,757,676
6/30/2019	102,581,328	83,123,823	185,705,151
6/30/2020	95,411,027	78,425,136	173,836,163
6/30/2021	77,560,288	74,562,584	152,122,873
6/30/2022	71,383,257	71,121,733	142,504,990
6/30/2023	73,905,012	68,005,422	141,910,434
6/30/2024	52,775,634	64,741,603	117,517,237
6/30/2025	55,160,205	62,550,026	117,710,231
6/30/2026	58,563,808	60,209,820	118,773,629
6/30/2027	61,136,531	57,736,952	118,873,483
6/30/2028	48,108,460	55,542,140	103,650,601
6/30/2029	65,219,686	53,136,894	118,356,579
6/30/2030	60,475,298	50,287,906	110,763,204
6/30/2031	63,340,391	47,497,763	110,838,154
6/30/2032	63,266,185	44,638,277	107,904,462
6/30/2033	44,360,206	42,463,976	86,824,181
6/30/2034	45,965,000	40,316,063	86,281,063
6/30/2035	48,115,000	38,159,869	86,274,869
6/30/2036	51,715,000	35,961,163	87,676,163
6/30/2037	52,345,000	33,522,000	85,867,000
6/30/2038	55,005,000	30,856,750	85,861,750
6/30/2039	57,810,000	28,056,000	85,866,000
6/30/2040	60,755,000	25,112,375	85,867,375
6/30/2041	69,025,000	22,285,375	91,310,375
6/30/2042	64,810,000	18,487,950	83,297,950
6/30/2043	68,130,000	15,164,881	83,294,881
6/30/2044	53,225,000	11,671,500	64,896,500
6/30/2045	44,910,000	9,218,125	54,128,125
6/30/2046	47,215,000	6,915,000	54,130,000
6/30/2047	13,690,000	5,392,375	19,082,375
6/30/2048	14,395,000	4,690,250	19,085,250
6/30/2049	15,145,000	3,940,656	19,085,656
6/30/2050	15,945,000	3,140,631	19,085,631
6/30/2051	16,785,000	2,298,406	19,083,406
6/30/2052	17,670,000	1,411,794	19,081,794
6/30/2053	18,605,000	478,550	19,083,550
6/30/2054	-	-	-
Total	**1,870,453,358**	**1,295,935,403**	**3,166,388,761**

(1) Interest on the Series 1997B bonds assumes a rate of 0.5724760%, the average interest rate of the bonds during the period 24 consecutive calendar months preceding the date of calculation per the Ordinance.

(2) Interest on Series 2005B assumes rate of 4.53%

(3) Totals may not add due to rounding.

CITY OF PHILADELPHIA WATER DEPARTMENT

SUPPLEMENTAL SCHEDULE OF RATE COVENANT COMPLIANCE FOR FISCAL YEARS ENDED JUNE 30, 2017, 2016, AND 2015 (Legally Enacted Basis)

(amounts in thousands)

LINE NO.		YEAR ENDED JUNE 30 2017	2016	2015
1.	Total Revenue	$ 720,645	$ 678,906	$ 676,846
2.	Net Operating Expense	(480,257)	(433,025)	(426,767)
2a	Liquidated Encumbrances (Commitments Cancelled which reduces operating expenses)	24,550	24,088	19,389
2b	Adjustment between Debt Service and Net Operating Expenses due to timing differences	-	339	4,470
3.	Transfer (To) From Rate Stabilization Fund	4,563	1,629	(21,456)
4.	**Net Revenues**	**269,501**	**271,937**	**252,482**
5.	Revenue Bonds Outstanding	(206,142)	(219,304)	(205,270)
6.	Transfer to Escrow Account to Redeem Bonds	(11,000)	-	-
6a	Other (Adjustment between Debt Service Payments to Sinking Fund, Revenue Bond Payments, LOC expenses	1,244	-	-
7.	Pennvest Loan	-	-	-
8.	**Total Debt Service**	**(215,898)**	**(219,304)**	**(205,270)**
9.	**Net Revenue after Debt Service**	53,603	52,633	47,212
10.	Transfer to General Fund ("Scoop")[1]	-	-	-
11.	Transfer to Capital Fund	(22,302)	(21,497)	(20,705)
12.	Transfer to Residual Fund	(31,301)	(31,136)	(26,507)
13.	**Total Transfers**	**(53,603)**	**(52,633)**	**(47,212)**
14.	**Net Operating Balance for Current Year**	**-**	**-**	**-**

[1] Payment to the General Fund (Scoop Payment) occurs annually as a transfer from the Water Residual Fund to the General Fund, in accordance with the General Ordinance

The rate covenant contained in the General Ordinance requires the City to establish rates and charges for the use of the Water and Wastewater Systems sufficient to yield Net Revenues, as defined therein , in each fiscal year at least equal to 120%(coverage A) of the Debt Service Requirements for such fiscal year (excluding debt service due on any Subordinated Bonds). In addition, Net Revenues, in each fiscal year, must equal at least 100%(coverage B) of : (i) the Debt Service Requirements (including Debt Service Requirements in respect of Subordinated Bonds) payable is such fiscal year; (ii) amounts required to be deposited of Subordinated Bonds) payable in such fiscal year; (ii) amounts required to be deposited into the Debt Reserve Account during such fiscal year; (iii)debt service on all General Obligations Bonds issued for the Water and Wastewater Systems payable is such fiscal year; (iv) debt service payable on Interim Debt in such fiscal year; and (v) the Capital Account Deposit Amount for such fiscal year, less amounts transferred from the Residual Fund to the Capital Account during such fiscal year. To insure compliance with the rate covenant, the General Ordinance requires that the City review its rates, rents, fees, and charges at least annually.

Additional Rate Covenant. As long as the Insured Bonds are outstanding, the City covenants to establish rates and charges for the use of the System sufficient to yield Net Revenues (excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year) at least equal to 90% (coverage C) of the Debt Service Requirements (excluding debt service on any Subordinated Bonds) in such fiscal year.

	2017	2016	2015
COVERAGE A:			
Line 4	**$269,501**	**$271,937**	**$252,482**
/ Line 5	**$206,142**	**$219,304**	**$205,270**
= COVERAGE A:	**1.31**	**1.24**	**1.23**
COVERAGE B[2]:			
Line 4	**$269,501**	**$271,937**	**$252,482**
/ Line 8 + Line 11	**$228,444**	**$240,801**	**$225,975**
= COVERAGE B:	**1.18**	**1.13**	**1.12**

[2] For FY 2017, Coverage B calculated as follows: Net Revenues (Line 4)/ Debt Service Requirements which does not include transfer to escrow+ Capital Account Deposit (Line 5 + Line 11)

	2017	2016	2015
COVERAGE C:			
Line 4 - Line 3	**$264,938**	**$270,308**	**$273,938**
/ Line 5	**$206,142**	**$219,304**	**$205,270**
= COVERAGE C:	**1.29**	**1.23**	**1.33**

CITY OF PHILADELPHIA WATER DEPARTMENT

HISTORICAL OPERATING RESULTS FOR FISCAL YEARS ENDED JUNE 30, 2017, 2016, AND 2015
Legally Enacted Basis

(Amounts in Thousands of Dollars)

	YEAR ENDED JUNE 30		
Operating Revenues:	**2017**	**2016**	**2015**
Sales to General Customers	$ 615,886	$ 587,572	$ 585,911
Service (Sales) to Other Municipalities	34,652	32,389	33,222
Services to Other Philadelphia Agencies (Includes Fire Protection)	33,364	34,810	35,251
Private Fire Connections	2,872	2,737	2,374
Industrial Sewer Surcharge	5,911	7,375	3,407
Other Operating Revenue	7,121	5,158	5,033
Total Operating Revenue	**699,806**	**670,041**	**665,198**
Non-Operating Revenues			
Interest on Investments	920	20	270
Operating Grants	1,408	745	1,083
Other Non-Operating Revenues	18,511	8,100	10,295
Total Non-Operating Revenues	**20,839**	**8,865**	**11,648**
Total Revenues	**$ 720,645**	**$ 678,906**	**$ 676,846**
Operating Expenses	**$ 480,257**	**$ 433,026**	**$ 426,767**
Deduct: Commitments Cancelled - Net	24,550	24,088	19,389
Net Operating Expenses	**$ 455,707**	**$ 408,938**	**$ 407,378**
Adjustment between Debt Service and Net Operating Expenses **(due to timing differences)**	**$ -**	**$ 340**	**$ 4,470**
Excess of Operating Revenues over Operating Expenses	**$ 244,099**	**$ 261,443**	**$ 262,290**
Excess of Revenues over Expenses before Interest Expenses and Principal Payments on Bonded Indebtedness	**$ 264,938**	**$ 270,308**	**$ 273,938**
Interest Expenses:			
Revenue Bonds	$ 80,294	$ 82,594	$ 79,975
Total Interest Expenses	**$ 80,294**	**$ 82,594**	**$ 79,975**
Excess of Revenues over Expenses Exclusive of Debt Principal Payments	**$ 184,644**	**$ 187,714**	**$ 193,963**
Add: Unencumbered Funds Available for Appropriation at Beginning of Fiscal Year	-	-	-
Add: Adjustment between Debt Service Payments to Sinking Fund, Revenue Bond Payments, LOC expenses and Net Operating Expenses due to timing differences	1,244	-	-
Deduct: Debt Principal Payments on Bonded Indebtedness During Fiscal Year	125,848	136,710	125,295
Deduct: Transfer to Escrow Account to Redeem Bonds	11,000	-	-
Net Unapplied Project Revenues	**$ 49,040**	**$ 51,004**	**$ 68,668**
Deduct: Funds Transferred to Residual Fund	31,301	31,136	26,507
Deduct: Funds Transferred to Capital Account	22,302	21,497	20,705
Transfer (TO)/FROM The Rate Stabilization Fund	$ 4,563	$ 1,629	$ (21,456)
Debt Service Coverage Ratio:			
Total Debt Service	1.18	1.13	1.12
Revenue Bond Debt Service	1.31	1.24	1.23

WHOLESALE WATER AND WASTEWATER CUSTOMER REVENUES AND CONTRACT TERMS FISCAL YEAR ENDING JUNE 30, 2017

	Total [5]	% Total Revenue	Contract End Date	COA %
Wastewater				
Delcora [1]	$ 8,274,572	1.14%	4/1/2028	9.44%
Bucks County Water & Sewer Authority	7,940,300	1.09%	3/31/2038	N/A
Cheltenham Township	3,712,261	0.51%	6/30/2025	2.43%
Lower Southampton Township	3,540,324	0.49%	6/30/2024	0.96%
Upper Darby Township	2,442,757	0.34%	8/8/2023	NA
Lower Merion Township	2,225,241	0.31%	N/A	N/A
Springfield Township				
Erdenheim [2]	1,864,095	0.26%	6/30/2023	0.79%
Wyndmoor [2] [3]	326,765	0.05%	6/30/2023	N/A
Bucks (for Bensalem) [2]	1,925,423	0.27%	6/30/2023	N/A
Abington Township	1,614,469	0.22%	6/30/2023	0.58%
Lower Moreland Township [4]	785,757	0.11%	6/30/2025	0.36%
Other Municipal Revenue	60	0.00%	N/A	N/A
Sub-total	**$ 34,652,023**	**4.78%**		**14.57%**
Water				
Aqua Pennsylvania	$ 3,276,834	0.45%	3/1/2026	N/A
Sub-total	**$ 3,276,834**	0.45%		
Total Wholesale Revenues	**$ 37,928,857**	**5.23%**		

Note: The Water Department includes capital charges within operation and maintenance charges for all customers except Bensalem, Lower Merion, and Upper Darby.

(1) Delcora allocated capital is based on assets placed in service on or after July 4, 2011.

(2) Bucks County Water and Sewer Authority maintains and operates the Bensalem Township Sewer System and the Springfield Township System.

(3) The total amount of the COA for Springfield Township – Wyndmoor is contained in the Springfield Township – Erdenheim amount.

(4) During Fiscal Year 2016, Lower Moreland renewed its wholesale wastewater contract, which now includes its proportional share of the Water Department's COA Expenditures and will expire in Fiscal Year 2025.

(5) Totals may not add due to rounding.

TOP 10 CUSTOMERS
FISCAL YEAR ENDING JUNE 30, 2017

	Customer		Revenue ($)	% Total Revenue
1	City of Philadelphia*	$	24,312,071	3.35%
2	Philadelphia Housing Authority		13,672,016	1.89%
3	Veolia Energy Philadelphia		7,027,161	0.97%
4	University of Pennsylvania		5,750,699	0.79%
5	School District of Philadelphia		5,597,120	0.77%
6	Federal Government		3,839,127	0.53%
7	SEPTA		3,407,420	0.47%
8	Temple University		3,164,536	0.44%
9	Paperworks Industries Inc.		2,925,902	0.40%
10	University of Pennsylvania Health System		2,084,287	0.29%
	TOTALS**	$	71,780,341	9.90%

*The total above for the City of Philadelphia includes, among others, charges for water and wastewater services, which include stormwater services as follows: (i) $17,703,287.82 – General Fund; (ii) $4,267,811.64 – Aviation Fund; and (iii) $2,340,971.77 – Philadelphia Zoo.

** Totals may not add due to rounding.

INCENTIVE AND ASSISTANCE PROGRAMS
FISCAL YEARS ENDING JUNE 30

Program	2017		2016	2015	
SMIP[1] and GARP[2]	$ 18,518,690	[3]	$ 9,217,109	$ 14,507,948	[3]
Phase in Program (CAP)[4]	$ 2,531,367		$ 3,282,654	$ 4,164,073	
Stormwater Credits[4]	$ 13,819,758		$ 12,864,862	$ 12,262,191	
Total	**$ 34,869,815**		**$ 25,364,625**	**$ 30,934,212**	

[*] Budgeted, unaudited

[1] Stormwater Management Incentives Program.

[2] Grant and Greened Acres Retrofit Program.

[3] In Fiscal Year 2015 and 2017, SMIP and GARP were partially funded with grants.

[4] Amounts are credits against certain customers' bills.

CITY OF PHILADELPHIA WATER DEPARTMENT

RECONCILIATION OF LEGALLY ENACTED AND GAAP BASIS OPERATING REVENUES AND EXPENSES
JUNE 30, 2017

		(Thousands of Dollars)
Legal Basis of Accounting Revenues		
Legal Basis Revenues	$	725,208
GAAP Adjustments		
Reverse Fiscal Year 2016 Accounts Receivable Accrual		(38,015)
Record Fiscal Year 2017 Accounts Receivable Accrual		39,499
Accounts Receivable Adjustment		7,048
Allowance for Doubtful Accounts Adjustment		6
Reverse Fiscal Year 2016 Grants Receivable Accrual		(125)
Reclassification of Interest Income to Nonoperating Revenue		(17,672)
Total GAAP Adjustments		(9,259)
Total GAAP Basis Operating Revenues	$	715,949
Legal Basis of Accounting Expenses		
Legal Basis Expenses	$	749,758
GAAP Adjustments		
Expense in Fiscal Year 2017, included in Fiscal Year 2016 for Legal Basis		31,722
Encumbrances in Fiscal Year 2017, included in Fiscal Year 2017 for Legal Basis		(75,777)
Depreciation on Capital Assets, not included for Legal Basis		105,208
Payments among Water Department Funds, netted for GAAP Basis		(60,679)
Accrual of Probable Indemnities and Worker's Compensation Expenses		(599)
Reclassification of Transfers Out to Nonoperating Expenses		(24,601)
Reclassification of Payment to General Fund (Sugarhouse)		(5,021)
Allocation of Interfund Activity - Payment to General Fund (Excluding Sugarhouse)		7,076
Allocation of Accrued Expenses		4,905
Change in Inventory Balance as of June 30, 2017		143
Elimination of Legal Basis Net Position Adjustments		34
Net Pension Expense, included in GAAP Basis		9,032
Removal of Debt Service Principal Payments and Transfers to the Escrow Account, included in Legal Basis		(215,898)
Net Adjustments from Capitalization of Capital Assets		(7,128)
Removal of Legal Basis Compensated Absences Expense and Increase in Compensated Absence Liability		303
Amortization of Prepaid Surety Bond Insurance		73
Refund of Prior Year Revenue (Capital Fund)		(4)
Total GAAP Adjustments		(231,211)
Total GAAP Basis Operating Expenses	$	518,547

APPENDIX II

ENGINEERING REPORT

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ENGINEERING REPORT

For Water and Wastewater Revenue Series 2018 Bonds

BLACK & VEATCH PROJECT NO. 198909

PREPARED FOR

Philadelphia Water Department

26 OCTOBER 2018

BLACK & VEATCH

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Black & Veatch Management Consulting, LLC
One Penn Center-1617 JFK BLVD., Suite 1675, Philadelphia, PA 19103
P +1 617-416-1661 E mcardlej@bv.com

26 October 2018

Mr. Rob Dubow
Director of Finance
City of Philadelphia
1300 Municipal Services Building
1401 J.F. Kennedy Boulevard, 13th Floor
Philadelphia, PA 19102

Dear Mr. Dubow:

In accordance with the requirements of The First Class City Revenue Bond Act (the "Act"), the Restated General Water and Wastewater Revenue Bond Ordinance of 1989, and the amendments and supplements thereto as set forth in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twentieth, and Twenty-First Supplemental Ordinances (together the "General Ordinance"), we are submitting herewith our Engineering Report dated 26 October 2018 (the "Engineering Report") prepared in anticipation of the issuance of Water and Wastewater Revenue Series 2018A Bonds ("2018A Bonds") and Water and Wastewater Revenue Refunding Bonds, Series 2018B ("2018B Bonds"), collectively, "the Bonds." The 2018A Bonds are issued to fund a portion of the fiscal year ("FY") 2019 to FY 2024 six-year CIP, make deposits to the Debt Reserve Account (if needed), and fund associated issuance costs. The 2018B Bonds are issued to refund a portion of the City of Philadelphia's ("City's") outstanding Water and Wastewater Revenue Bonds and fund associated issuance costs. This Engineering Report summarizes findings of engineering and financial studies related to the Water and Wastewater Systems of the City. We have made such investigation and review of the books, records, capital improvement programs, and water and wastewater facilities of the Philadelphia Water Department ("Water Department" or "PWD") and such other investigations as we deemed necessary. Unless otherwise indicated, capitalized terms used but not defined herein shall have the same meanings assigned to such terms in the General Ordinance.

This Engineering Report presents projections of revenues and revenue requirements for the Water Department for the six-year period of FY 2019 through FY 2024 (the "Study Period"). In the preparation of this Engineering Report, we conducted onsite inspections of the major water and wastewater facilities in June and July 2017, and personal interviews with key Water Department operating, engineering, and financial staff during the months of June through August 2017. Our general field observations were visual, above-ground examinations of selected areas which we deemed adequate to comment on the condition, but were not in the detail which would be necessary to reveal conditions with respect to safety, geologic or environmental conditions, codes, permits or applicable regulations. We again conferred with staff in August 2018 to affirm current conditions and identify changes that occurred since the previous site visits. We have evaluated the general physical condition of the Water and Wastewater Systems using three rating categories – good, adequate, and poor – as described below.

- *Good: The* facility is in condition to provide reliable operation in accordance with design parameters and requires only routine maintenance or minor improvements.

- Adequate: The facility is operating at or near design levels, however, non-routine renovation, upgrading, and repairs are needed to ensure continued reliable operation.
- Poor*:* The facility is not being operated within design parameters. Major renovations are required to restore the facility and assure reliable operation. Major expenditures for these improvements may be required.

Subject to the limitations set forth herein, this Engineering Report was prepared for the City of Philadelphia by Black & Veatch Management Consulting, LLC (Black & Veatch) and is based on information not within the control of Black & Veatch. Black & Veatch has not been requested to make an independent analysis, to verify the information provided to it, or to render an independent judgment of the validity of the information provided by others. As such, Black & Veatch cannot, and does not, guarantee the accuracy thereof.

In conducting our analyses and in forming an opinion of the projection of future operations summarized in this Engineering Report, Black & Veatch has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. The methodology utilized by Black & Veatch in performing the analysis follows generally accepted practices for such projections. While Black & Veatch believes the assumptions are reasonable and appropriate, and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that actually occur that are unknown at this time and/or which are beyond the control of Black & Veatch.

The City may only distribute the complete Engineering Report to third parties, including the above statements and not parts thereof. Any distribution of this Engineering Report or any excerpt thereof to third parties shall be at the City's sole risk. The City's duty to distribute only the complete Engineering Report, including the above statements, shall not apply to internal City documents derived from this Engineering Report, that come within the scope of applicable records laws and as requested under such laws by interested citizens.

Based on the Engineering Report and subject to the limitations therein, we offer the following statements and conclusions to indicate the City's conformance with specific requirements which the City must meet for the issuance of the Bonds, as stipulated in the Act and the General Ordinance:

1. Based on onsite physical inspections and investigations of major system facilities, conducted in June and July 2017, combined with discussions with key Water Department staff at that time and subsequently in June through August 2017 and again in August 2018, it is our opinion that the Water and Wastewater Systems are in good operating condition or the Water Department is taking adequate steps to return them to good operating condition. The capital improvement budget for FY 2019 and the proposed capital program for FY 2019 through 2024 should provide adequate funds to sustain the systems in good operating condition.

2. Proceeds from the issuance of the Series 2018A Bonds are anticipated to: (i) finance portions of the Water Department's capital improvement program for FY 2019 through 2024; (ii) make deposits to the Debt Reserve Account; and (iii) pay the issuance costs of the proposed bonds. Proceeds from the

issuance of the Series 2018B Bonds are anticipated: (i) to refund a portion of the City's outstanding Water and Wastewater Revenue Bonds, and (ii) fund the issuance costs of the proposed bonds.

3. Project Revenues pledged to secure the Bonds are to be derived from the following sources: all rents, rates, fees, and charges imposed or charged for the connection to, or use or product of or services generated by the Water and Wastewater Systems to the ultimate users or customers thereof, all payments under bulk contracts with municipalities, governmental instrumentalities or other bulk users, all subsidies or payments payable by Federal, State or local governments or governmental agencies on account of the cost of operation of, or the payment of the principal of or interest on moneys borrowed to finance costs chargeable to the Water and Wastewater Systems, all grants, payments, and contributions made in aid or on account of the Water and Wastewater Systems exclusive of grants and similar payments and contributions solely in aid of construction and all accounts, contract rights, and general intangibles representing the foregoing.

4. Based on actual and estimated future annual financial operations of the Water and Wastewater Systems, it is our opinion that the Water and Wastewater Systems will yield pledged Project Revenues (including projected revenue increases indicated in this Engineering Report) over the amortization period of the Bonds sufficient to meet the payment or deposit requirements of:

    a. All expenses of operation, maintenance, repair and replacement of the Water and Wastewater Systems;

    b. All reserve funds required to be established out of such Project Revenues;

    c. The principal or redemption price of and interest on all Existing Bonds and all Bonds issued under the General Ordinance, as the same become due and payable, for which such Project Revenues are pledged; and

    d. The Rate Covenant set forth in Section 5.01 of the General Ordinance.

    The Project Revenues forming the basis for this projection comply with the requirements of the definition of "Project Revenues" contained in Section 2 of the Act.

5. The Net Revenues are currently sufficient to comply with the Rate Covenant and projected to be sufficient (including projected revenue increases indicated in this Engineering Report) to comply with the Rate Covenant for each of two fiscal years following the fiscal year in which the Bonds are issued.

6. It is our opinion the rates and charges for use by the Water and Wastewater Systems should be sufficient to yield Net Revenues (excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such fiscal year) at least 90 percent of the Debt Service Requirements (excluding debt service due on Subordinated Bonds) in such fiscal year. The levels of additional service revenue projected for the Study Period are anticipated to provide for the debt service coverage and requirements of the Insurance Covenants.

7. In our opinion, water and wastewater rents, rates and charges, including projected increases are within generally acceptable ranges for such services.

Very truly yours,
BLACK & VEATCH MANAGEMENT CONSULTING, LLC

Judith McArdle

Judith McArdle
Associate Vice President

Enclosure[s]

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LIST OF FIGURES

LIST OF DEFINED TERMS AND ACRONYMS

Abbreviation / Term	Definition
2018A Bonds	The anticipated Series 2018A Water and Wastewater Revenue Bonds
2018B Bonds	The anticipated Series 2018B Water and Wastewater Revenue Refunding Bonds
AMF	Average Monthly Flow
AMI	Advanced Metering Infrastructure
AMR	Automatic Meter Reading
AWWA	American Water Works Association
BCWSA	Bucks County Water and Sewer Authority
Black & Veatch	Black & Veatch Management Consulting, LLC
BLS	The Philadelphia Water Department's Planning and Environmental Services Division's Bureau of Laboratory Services
BMP	Best Management Practices
BOD	Biochemical Oxygen Demand
BOD_5	Biochemical Oxygen Demand (five day)
BRC	Biosolids Recycling Center
Capital Account Deposits	Deposits to the Water Department's Capital Account of the Construction Fund
CBOD	Carbonaceous Biochemical Oxygen Demand
$CBOD_5$	Carbonaceous Biochemical Oxygen Demand (five day)
CCAP	Climate Change Adaptation Program
CCR	Consumer Confidence Report
CCTV	Closed-Circuit Television
Center	The Fairmount Water Works Interpretive Center
CFAP	Capital Facilities Assessment Plan
CFE	Combined Filters Effluents
CIP	Capital Improvement Program
CIPIT	The Philadelphia Water Department's Capital Improvement Program Information Tracking
Clean Air Act or CAA	The Federal Clean Air Act
CIS	Customer Information System
City	The City of Philadelphia
City Charter	Philadelphia's Home Rule Charter
CMMS	Computerized Maintenance Management System
COA	Consent Order and Agreement
CSO	Combined Sewer Overflow

Abbreviation / Term	Definition
DAF	Dissolved Air Flotation
DBP	Disinfection Byproducts
DCS	Distributed Control Systems
DELCORA	Delaware County Regional Water Authority
DMA	District Metered Area
DRBC	Delaware River Basin Commission
DRR	The Pennsylvania Department of Environmental Protection's Proposed Disinfection Requirements Rulemaking
EAP	Evaluation and Adaptation Plan
Energy Plan	The Philadelphia Water Department's Utility-Wide Strategic Energy Plan
ESWTR	The Interim Enhanced Surface Water Treatment Rule
ERTs	Encoder, Receiver, and Transmitter units
FPL	Federal Poverty Level
FY	Fiscal Year
GARP	Greened Acre Retrofit Program
General Ordinance	The Restated General Water and Wastewater Revenue Bond Ordinance of 1989 and the amendments and supplements thereto, including those set forth in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twentieth, and Twenty-First Supplemental Ordinances
GCCW	The Philadelphia Water Department's Green City, Clean Waters Program
GHG	Greenhouse gas emissions
GIS	Geographic Information Systems
gpd	Gallons Per Day
Greened Acre	Unit of measure used to track runoff managed by green infrastructure under the COA
GSI	Green Stormwater Infrastructure
HAA5	five haloacetic acids
HPC	heterotrophic bacteria plate count
HVAC	Heating, ventilation, and air conditioning
ICOIS	Inlet Cleaning Operating Information System
IESWTR	The Interim Enhanced Surface Water Treatment Rule
IFE	individual filters effluents
ILI	Infrastructure Leakage Index
IS&T	The Philadelphia Water Department's Information Services and Technology Unit

Abbreviation / Term	Definition
ITIL	Information Technology Infrastructure Library
IWBC	The Philadelphia Water Department's Industrial Waste & Backflow Compliance Unit
kWh	Kilowatt Hours
LCR	The Lead and Copper Rule
L&I	The City of Philadelphia's Department of License & Inspection
LRAAs	Locational running annual averages
LT2ESWTR	Long Term 2 Enhanced Surface Water Treatment Rule
LTCPU	The Philadelphia Water Department's Combined Sewer Overflow Long-Term Control Plan Update
MCL	Maximum contaminant level
MDF	Maximum Daily Flow
MDMS	Meter Data Management System
MEL	The Philadelphia Water Department's Materials Engineering Laboratory
MG	Million gallons
mgd	Million gallons per day
mg/L	Milligrams per liter
MRDLs	Maximum residual disinfectants levels
MS4	Municipal Separate Storm Sewer System
MWh	megawatt hours
NACWA	National Association of Clean Water Agencies
NASSCO	National Association of Sewer Service Companies
NOx	Nitrogen Oxides
NPDES	National Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
OELs	Operational Evaluation Levels
OIT	The City of Philadelphia's Office of Innovation and Technology
OOW	The Philadelphia Water Department's Planning and Environmental Services Division's Office of Watersheds
P&R	The Philadelphia Water Department's Planning and Environmental Services Division's Planning and Research Unit
PaDEP	Pennsylvania Department of Environmental Protection
PCBs	Polychlorinated Biphenyls
PCB PMP	Polychlorinated biphenyl pollutant minimization plan

Abbreviation / Term	Definition
PBS	Philadelphia Biosolids Services Company
PCB	Polychlorinated Biphenyls
PCC	Process Control Center
PCR	Polymerase Chain Reaction
PCSMP	Post Construction Stormwater Management Plans
Pennvest	Pennsylvania Infrastructure Investment Authority
PLFs	performance limiting factors
PMA	Philadelphia Municipal Authority
PMP	Pollution Minimization Plan
PPC	Preparedness, Prevention, and Contingency Plan
ppd	Pounds per day
ppm	Parts per million
PST	Primary Settlement Tank
PTB	Preliminary Treatment Building
PUMA	Pump stations information system
QCP	Quality Certification Program
RAA	Running annual average
Rate Board	The City of Philadelphia's Water, Sewer and Stormwater Rate Board
Report	The Engineering Report for Water and Wastewater Revenue Series 2018 Bonds dated October 26, 2018
RFI	Request for Information
RTC	Real Time Control
RTCR	The Revised Total Coliform Rule
SAP	The Philadelphia Water Department's Sewer Assessment Program
SCADA	Supervisory Control and Data Acquisition
SDWA	Safe Drinking Water Act of 1974
SIUs	Significant Industrial Users
SMIP	Stormwater Management Incentive Program
SMOIS	Sewer Maintenance Operating Information System
SRF	Sewer Rental Factors
SRS	The Philadelphia Water Department's Surveillance and Response System
Stage 1 D/DBPR	The Stage 1 Disinfectants and Disinfection Byproducts Rule
Stage 2 D/DBPR	The Stage 2 Disinfectants/Disinfection Byproducts Rule
Study Period	Six-Year Study Period covering FY 2019 through FY 2024

Abbreviation / Term	Definition
SWMP	Stormwater Management Plan
Synagro	Synagro Technologies, Inc.
TAP	The Philadelphia Water Department's Tiered Assistance Program
TCR	Total Coliform Rule
TMDL	Total Maximum Daily Loads
TRC	Total Residual Chlorine
TSS	Total Suspended Solids
TTHM	Trihalomethanes
UCMR	The Unregulated Contaminant Monitoring Rule
UESF	Utility Emergency Services Fund
USEPA	The United States Environmental Protection Agency
USGS	The United States Geological Survey
WAS	Waste Activated Sludge
Water Department	The Philadelphia Water Department
WEF	Water Environment Federation
WPCP	Water Pollution Control Plant
WLA	Water Laboratory Alliance
WQBEL	Water Quality Based Effluent Limit
WRB	The City of Philadelphia's Water Revenue Bureau
VOCs	Volatile Organic Compounds
μg/L	Micrograms Per Liter

I. Introduction

A. PURPOSE

The purpose of this report ("Report") is to summarize the findings of engineering studies performed by Black & Veatch Management Consulting, LLC ("Black & Veatch") related to the water and wastewater systems of the Philadelphia Water Department ("Water Department"), a self-supporting enterprise fund utility that is a department within the City of Philadelphia ("City"). The Restated General Water and Wastewater Revenue Bond Ordinance of 1989 and the amendments and supplements thereto, including those set forth in the First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Tenth, Eleventh, Twelfth, Thirteenth, Fourteenth, Fifteenth, Sixteenth, Seventeenth, Eighteenth, Nineteenth, Twentieth, and Twenty-First Supplemental Ordinances (together the "General Ordinance"), require the preparation and submission of an Engineering Report prior to the issuance of bonds under the General Ordinance. This report is intended to fulfill the requirements of the Engineering Report.

Subject to the limitations set forth herein, this Report was prepared for the City by Black & Veatch and is based on information not within the control of Black & Veatch. Black & Veatch has not been requested to make an independent analysis, to verify the information provided to it, or to render any independent judgment of the validity of the information provided by others. As such Black & Veatch cannot, and does not, guarantee the accuracy thereof.

In conducting the analysis and in forming an opinion of the projection of future operations summarized in this Report, Black & Veatch has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. The methodology utilized by Black & Veatch in performing the analysis follows generally accepted practices for such projections. While Black & Veatch believes the assumptions are reasonable and appropriate, and the projection methodology valid, actual results may differ materially from those projected, as influenced by the conditions, events, and circumstances that occur, that are unknown now and/or which are beyond the control of Black & Veatch.

The City may only distribute the complete Report to third parties (including the above statements) and not parts thereof. Any distribution of this Report, or any excerpt thereof, to third parties shall be at the City's sole risk, and Black & Veatch makes no assurances that the projections or forecasts will be consistent with actual results or performance. The City's duty to distribute only the complete Report, including the above statements, shall not apply to internal City documents derived from this Report, that come within the scope of applicable records laws and are requested under such laws by interested citizens.

B. SCOPE

This Report presents the results of the current financial plan of the water and wastewater systems, which are based on a review of the Water Department's financial data, records, and other information. The Report also addresses the organization and management, system infrastructure condition, adequacy of system capacity, operation and maintenance practices, staffing levels of the water and wastewater systems, and includes a review of the proposed Capital Improvement Program ("CIP") of the Water Department.

This Report is prepared in anticipation of the issuance of Water and Wastewater Revenue Bonds, Series 2018A ("2018A Bonds") and Water and Wastewater Revenue Refunding Bonds, Series 2018B ("2018B Bonds"). The 2018A Bonds are being issued to fund a portion of the fiscal year ("FY") 2019 to FY 2024 six-year CIP, make deposits to the Debt Reserve Account (if needed), and fund the issuance costs of such bonds. The 2018B Bonds are being issued to refund a portion of the City's outstanding Water and Wastewater Revenue Bonds and fund the issuance costs of such bonds. Black & Veatch performed a financial feasibility analysis and this Report summarizes the financial projections for the six-year period of FY 2019 through FY 2024.

In the preparation of this Report, the Black & Veatch team performed site visits and conducted inspections of major water and wastewater facilities during the months of June and July 2017. We conferred with staff again in August 2018 regarding any major changes at the facilities or changes in conditions that have occurred since the site visits and inspections were conducted. Black & Veatch reviewed the current condition, and operation and maintenance of the water and wastewater systems. Our general field observations were visual, above-ground examinations of selected areas which we deemed adequate to comment on the condition, but were not in the detail which would be necessary to reveal conditions with respect to safety, geologic or environmental conditions, codes, permits or applicable regulations. We also met with key Water Department staff during June through August 2017 and again in August 2018 to discuss other facilities, regulatory compliance, staffing, and the overall mission of the Water Department. Staff interviewed during our studies included representatives from the following six of the seven divisions within the Water Department: Finance; Operations; Engineering and Construction; Public Affairs; Human Resources; and Planning and Environmental Services.

C. BLACK & VEATCH QUALIFICATIONS

The Black & Veatch Group of companies are global engineering, construction and consulting firms specializing in utility engineering and utility financial management. The firm's experience includes the planning, design, operational analysis and construction of water, wastewater, and energy generation and transmission systems. In addition, the firm has extensive experience in assisting utilities with the management and financial aspects of utility operations. Black & Veatch has worked for utilities owned by municipalities ranging in size from small villages to large metropolitan regions, investor-owned utilities, industrial and commercial businesses, and agencies of the United States and international government agencies.

Professionals from Black & Veatch Management Consulting, LLC, which provides services in such areas as utility rate studies, property valuation, depreciation rate studies, financial analysis and planning, non-audit accounting, management and operations analysis, and the preparation of consulting reports for official statements, conducted the financial feasibility review. Having performed various financial studies for the City of Philadelphia Water Department continuously since 1972, including the preparation of reports for the Water and Sewer Revenue Bonds, issued under both the General Water and Sewer Revenue Bond Ordinance of 1974, as amended and supplemented, and the Water and Wastewater Revenue Bonds, Series 1993, 1995, 1997A, 1997B, 1998, 1999, 2001, 2003, 2005, 2007, 2009, 2010A, 2010B, 2010C, 2010D, 2011A, 2011B, 2012, 2013A, 2014A, 2015A and 2015B issued under the General Ordinance, we are familiar with the Water Department's financial affairs as they relate to revenues, expenses, rates, and other financing matters. We were also involved in the most recent water and wastewater rate proceedings related to the overall level of increases for FY 2019 and FY 2020, completed in August 2018. Because of these rate hearings, the City of Philadelphia's Water, Sewer and Stormwater Rate Board ("Rate Board") approved schedules of water and wastewater rates for retail service for FY 2019 through FY 2020, and the FY 2019 and FY 2020 rate adjustments are to be effective September 1, 2018 and September 1, 2019, respectively. The City also adopted rates applicable to wholesale water and wastewater rates for this same period.

Personnel from Black & Veatch's Water Sector Business conducted the physical evaluation of the Water Department's water and wastewater systems. This division provides study, design, and construction services in all facets of the water and wastewater fields. Water system engineering experience of this business unit includes the design of a broad variety of facilities such as source of supply, pumping stations, treatment plants, and transmission and distribution systems. Wastewater system engineering experience includes design of collection, interceptor, and trunk sewers; pumping stations; treatment systems; and sludge disposal facilities. The Water Sector Business also has extensive experience in operator training, plant management studies, and preparation of operation and maintenance manuals for both water and wastewater systems.

II. Organization and Management

A. ORGANIZATION AND STRUCTURE

The City of Philadelphia owns and operates the water and wastewater systems serving the City and 10 wholesale wastewater contract customers and one wholesale water contract customer, as a self-supporting enterprise fund utility. On April 17, 1951, the Philadelphia Home Rule Charter ("City Charter") established the Water Department as one of the City's ten operating departments. The Water Department is responsible for the planning, construction, operation, and maintenance of the water and wastewater systems; for complying with regulatory requirements; for rate setting and stakeholder engagement; budgeting and detailed cost accounting; and preparation of financial statements for the systems. The City's combined Comprehensive Annual Financial Report includes the data from the Water Department's annual statements.

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

The audit function for the City is the responsibility of the Office of the City Controller. Legal matters affecting the Water Department are the responsibility of the City Solicitor's office, although the Water Department does have a Divisional Deputy City Solicitor assigned directly to the Water Department under the direction of the City Solicitor's office.

The Water Commissioner, who is appointed by the City's Managing Director with approval of the Mayor, leads the Water Department. In January 2016, the City appointed Ms. Debra McCarty as Water Commissioner. Prior to her appointment as Commissioner, Ms. McCarty served in multiple positions during her 35 years at the Water Department, including Deputy Commissioner of Operations. Ms. McCarty is expected to retire in the spring of 2019 and the City is currently conducting a search for a new Commissioner to succeed Ms. McCarty upon her retirement.

Figure II-1 shows the Water Department's current Organizational Chart. The Water Department consists of five divisions led by five Deputy Water Commissioners, who assist the Commissioner with the management of the Water Department: Finance; Operations; Planning and Environmental Services; Compliance; and Administration and Human Resources. Additionally, two functions, Public Affairs and Engineering and Construction, overseen by General Managers, and one function, Government Affairs, overseen by an Assistant Deputy Commissioner, report directly to the Commissioner. The Information Systems & Technology unit is part of the City's Office of Innovation and Technology ("OIT"). Overseen by a General Manager, this unit reports to both OIT and the Commissioner of the Water Department. Each division consists of units and subunits responsible for carrying out specific functions. Senior management is actively involved in industry associations such as the American Water Works Association ("AWWA"), Water Environment Federation ("WEF"), National Association of Clean Water Agencies ("NACWA"), the Clean Water Council, and the National Resources Defense Council, with several staff members contributing to manuals that document best practices in the field of water and wastewater management.

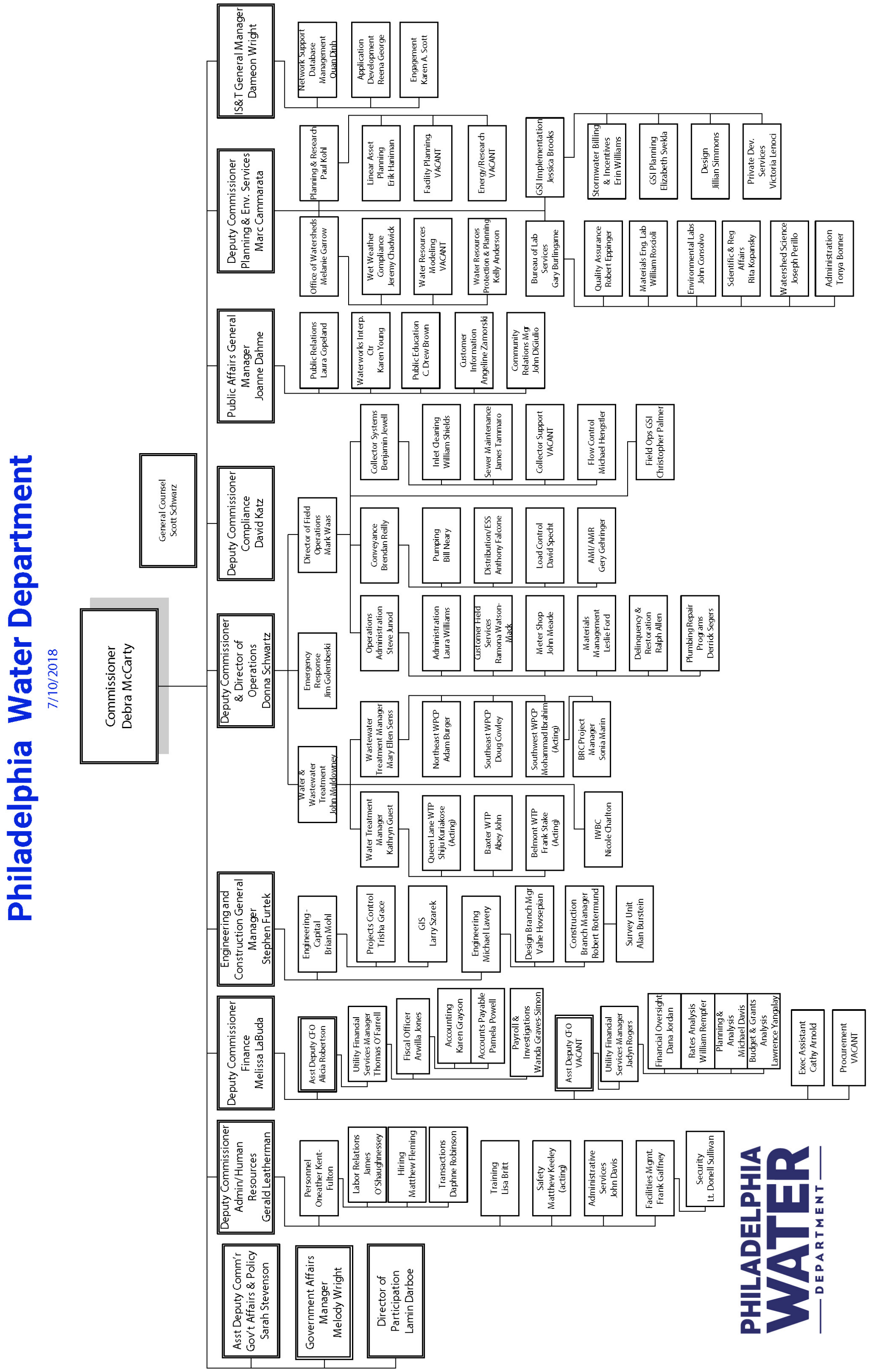

Figure II-I Organizational Chart

As of August 2018, the Water Department had a total of approximately 2,129 employees. Of these, the American Federation of State, County, and Municipal Employees Union District Councils 33 and 47 represent 1,536 and 369 employees, respectively. The Water Department's 224 upper management, supervisory, senior engineering, and part time personnel are not eligible for union membership. The City has completed a labor agreement with District Council 33 which runs through FY 2020. The City is currently negotiating a new labor agreement with District Council 47.

In addition to the above employees, the Water Department funds approximately 232 employees in the WRB.

The following sections provide an overview of the Water Department's key divisions and the WRB.

1. Operations Division

The Philadelphia water and wastewater systems are among the most complex, large municipal systems of their kind in the country. Operation and maintenance of these systems requires continuous attention for the following reasons:

- The public drinking water must be safe and comply with both the Safe Drinking Water Act of 1974 ("SDWA") regulations of the U.S. Environmental Protection Agency ("USEPA") and state requirements by the Pennsylvania Department of Environmental Protection ("PaDEP").
- The effluent from the wastewater treatment plants discharged to the Delaware River must meet the limits set forth in the plants' National Pollutant Discharge Elimination System ("NPDES") permits.
- The City must maintain and operate the water and wastewater treatment plants, the sewerage and water conveyance systems, and the pumping facilities in an acceptable manner that assures cost-effective and continuous performance with minimal adverse impacts to the public and the environment.
- The treatment, disposal and distribution of sewage sludge and other residuals must be in accordance with governing federal and state regulations and Water Department policy.

Additionally, the Water Department must provide sufficient forward-looking engineering and planning to ascertain future operating requirements likely to emerge from upcoming drinking water and environmental regulations. Because of the continued promulgation of new and highly probable future regulations, prudent advanced planning and engineering is essential to comply with strict timetables, and to minimize costly expenditures that result from these regulations. Due to the continued need for future regulatory compliance, the Operations Division interacts and works closely with the Planning and Environmental Services Division, the Engineering and Construction Division, and the Office of Compliance in planning for the future potential regulations.

The Operations Division's current organizational structure includes a Deputy Commissioner of Operations, who reports to the Water Commissioner. This Division includes the following key operating units:

- Water Treatment

- Wastewater Treatment
- Water Conveyance
- Wastewater and Stormwater Collection
- Operations Administration
- Industrial Waste & Backflow Compliance

The Operations Division is responsible for the day-to-day operations and maintenance of the water and wastewater systems and relies on the support of the other divisions to accomplish its mission. It maintains a close relationship with the Planning and Environmental Services and the Engineering and Construction Divisions in the following areas:

- Undertaking long-range planning and engineering.
- Coordinating regulatory agency requirements.
- Producing analytical results required to demonstrate permit and regulatory compliance.
- Preparing construction documents and coordinating design consultants.
- Coordinating construction projects.
- Establishing capital budgets and maintaining the current CIP.

Based upon our interviews and investigations, we believe that the organization of the Operations Division is effective for responding to the myriad of issues affecting operations and maintenance. The structure provides for a smooth flow of communication to and from the division level and unit levels. Management places great emphasis on holding regularly scheduled staff meetings with superintendents and technical group leaders to communicate plans and receive feedback.

Based upon our observations and discussions with key staff, we find that the Operations Division coordinates effectively with the Planning and Environmental Services and the Engineering and Construction Divisions. Typically, the Operations Division or the Planning and Environmental Services Division identifies operations-related planning and design projects. The Engineering and Construction Division is responsible for developing the identified projects and including them in the CIP.

To provide for efficient decision making, the Operations Division has implemented procedures focused on identifying all capital improvements and replacement/rehabilitation project needs at each of its major facilities. The Operations Division identifies projects on a master list by facility and projects needs for a six-year capital planning period.

The managers of the Operations, the Planning and Environmental Services, and the Engineering and Construction Divisions have responded capably to the needs of the water and wastewater systems. They possess qualifications and experience commensurate with their responsibilities which enable them to deliver reliable, cost-effective water and wastewater services to the Water Department's customers, making them well-positioned to meet projected needs in the coming years.

The Operations Division has developed a strong technical staff to supervise its operations and maintenance program. As of August 2018, there are approximately 1,370 employees in the Operations Division. This staffing level is similar to the previous two fiscal years. Based on consistent operational performance that meets or exceeds regulatory requirements, as well as discussions with management, it is our opinion that there is adequate staffing within the Operations Division to meet current system requirements.

2. Planning and Environmental Services Division

The Planning and Environmental Services Division consists of four specialty related units designed to support the needs of the Water Department. A reorganization of the Division in 2017 created the Green Stormwater Infrastructure Implementation Unit in addition to the Planning and Research Unit; Office of Watersheds Unit; and the Bureau of Laboratory Services Unit. The Green Stormwater Infrastructure Implementation Unit consolidates functions related to the implementation of green infrastructure, previously divided between Planning and Research and the Office of Watersheds. As of September 2018, there are approximately 215 employees with only a few vacancies. Provided below are descriptions of the units:

a) **Planning and Research Unit**

The Planning and Research Unit ("P&R") focuses on the capital planning and research activities associated with water and wastewater facility planning; linear infrastructure planning; and strategic energy management planning. The P&R's primary mission is to direct and coordinate strategic planning and associated research for each of the Water Department's program areas. Within the P&R there are three functional units, including: Linear Asset Planning, Facilities Planning and Research & Energy. In 2017, the Water Department consolidated private development and stormwater management related activities into the new Green Stormwater Infrastructure Implementation Unit as part of the reorganization within Planning and Environmental Services.

- Linear Asset Planning is comprised of the Water/Sewer and Flood Risk Management Groups. These groups conduct planning and studies related to long-term infrastructure needs and system capacity related flooding in specific areas of concern.
    - The Water/Sewer group conducts planning on a 25-year horizon to position the Water Department to meet long-term linear infrastructure needs, to be ready to address future challenges, and be able to take advantage of potential opportunities that arise. One of this unit's key focus areas is Asset Management. The unit supports the Water Department's infrastructure condition assessment, prioritization, and replacement programs. The unit runs the CapPlan™ water model and provides support to the Sewer Assessment Program ("SAP"). CapPlan™ facilitates focusing preventative maintenance and repair or replacement activities on the highest priority water mains. The program uses physical criteria such as pipe age and material along with assessing risk associated with proximity to nearby buildings and infrastructure to identify priority projects. The Operations Division uses CapPlan™ to develop water main replacement projects for inclusion in the CIP. The Water/Sewer group also conducts planning in support of the Water Department's new lead service line initiative. Under this initiative the Water Department offers complete service line replacement (from the water main to the customer meter) when replacing the water main in a given street.

  - The Flood Risk Management group seeks to mitigate the risk of localized and larger scale flooding through technical evaluations, policy development and intra-agency coordination. This group uses hydrologic and hydraulic models and cost-benefit analysis to develop conceptual solutions to mitigate existing and potential future flood impacts, as well as to address flooding issues that are raised by customers. This group is currently leading an effort to address ongoing flooding issues in the Germantown neighborhood of the City.

- Facilities Planning leads the Water Department's long-term planning efforts associated with the water and wastewater treatment plants, pump stations and storage facilities including the development of the long-term water and wastewater master plans and relevant follow-on activities.
  - It is the responsibility of this group to provide a holistic approach to the facility planning efforts which includes assessing and planning to meet future demands and changing climatic conditions as well as the identification of emerging technologies considering future regulations and operational challenges.
  - Through the master planning process, the Water Department is assessing the adequacy of their system capacity, asset condition and ability to meet current and anticipated future regulatory requirements and level of service goals. These plans will provide a road map for capital investments via a 25-year capital improvement plan which will guide future decision making. Sections IV and V of this report discuss these plans in more detail.
- Research & Energy: The Water Department employs a variety of processes and equipment at the treatment facilities and pump stations and strives to continually evaluate and improve performance and efficiency to meet the ever changing and more stringent standards of tomorrow.
  - The Research group is responsible for identifying new processes and approaches, and conducting research for the development and application of new technologies in the Water Department's business and operations. These are tactical initiatives that inform planning efforts.
  - One recent initiative investigated the use of air scour technology for backwashing filters via a pilot study at the Queen Lane Water Treatment Plant. The study showed the technology to have favorable performance, and the Water Department intends to convert all three plants in the coming years.
  - The Energy group is responsible for the implementation of the Utility Wide Strategic Energy Plan, including development of new energy initiatives, tracking of key performance indicators, coordinating with City initiatives and integrating energy considerations and priorities into the planning of large capital projects. Section V.E.2 discusses energy initiatives in more detail.

b) Office of Watersheds

The Office of Watersheds ("OOW") Unit supports the Combined Sewer System, Municipal Separate Storm Sewer System ("MS4"), and Source Water Protection programs. The objective of the unit is to attain comprehensive achievement of the goals and regulatory requirements for these programs. This includes developing a holistic and innovative planning approach for protecting and restoring the City's watersheds and water resources.

OOW developed and is now responsible for maintaining compliance with the Water Department's:

- Combined Sewer Overflow ("CSO") Long-Term Control Plan Update ("LTCPU") in accordance with the Consent Order and Agreement ("COA");
- Stormwater Management Plan ("SWMP") as required under the MS4 permit; and
- Source Water Protection Plans for the Schuylkill and Delaware Rivers.

The LTCPU presents a source control-focused approach to managing wet weather, specifically CSOs, and its impact on receiving waters. The plan focuses on using green stormwater infrastructure ("GSI") along with traditional infrastructure and the restoration of the natural hydrologic cycle in the urban environment to intercept urban runoff before it reaches the sewer system thus reducing the burden on the collection system and the receiving waters.

To achieve the unit's overarching objectives, OOW is comprised of three functional subunits: Wet Weather Compliance, Water Resources Modeling and Water Resources Protection and Management. Provided below is more information concerning these functional subunits.

- Wet Weather Compliance is comprised of four groups: Regulatory Compliance Assurance; Data Analysis & Planning; Compliance Planning and Monitoring; and Analysis & Research. Collectively these groups focus on ensuring both near and long-term compliance with the regulatory obligations of the COA and the MS4 permits.
    - The Regulatory Compliance Assurance group tracks progress toward meeting permit benchmarks, coordinates the drafting and submittal of required planning documents and annual reports, and ultimately ensures that the Water Department maintains compliance. This group has adopted a risk based approach to compliance management which evaluates compliance scenarios as well as the risks and costs associated with non-compliance, including financial, environmental and social costs.
    - The Data Analysis & Planning and Compliance Planning groups focus on the regulatory obligations related to "greened acres," the unit of measure used to track runoff managed by green infrastructure under the COA. These groups achieve this using advanced data system development, data management and analysis, inter-departmental coordination, and the identification and vetting of innovative and sustainable solutions for meeting greened acre targets.

- The Monitoring, Analysis & Research group primarily focuses on field-based monitoring of GSI and the development of new and innovative monitoring technologies.

- Water Resources Modeling utilizes modeling and monitoring tools to support project development and demonstration of performance.
  - The Hydraulic and Hydrologic Modeling group develops and maintains the models of the watersheds and sewer system, supports planning and alternatives analyses related to traditional infrastructure improvements and tracks progress toward the mass load pollutant reductions required under the COA. This unit also conducts hydraulic modeling to identify solutions for storm flow-related basement flooding which has occurred in certain areas of the City.
- Water Resources Protection and Management is comprised of four groups: Watershed Protection, Climate Change Adaptation, Water Quality Compliance Modeling, and Watershed Field Services.
  - The Watershed Protection group focuses on implementation of the Source Water Protection Plans and the Watershed Control Program Plan for the Queen Lane Water Treatment Plant. This group works with regional watershed groups to monitor and assess the impact of potential contaminants on the region's drinking water sources and identify mitigation strategies. Another area of focus is the Delaware Valley Early Warning System which provides water purveyors and other users with early notification of contamination events to the raw water supply. This group is also responsible for surface water quality monitoring in streams throughout the City's watershed, in accordance with permit requirements, and for investigating new and innovative technologies.
  - The Climate Change Adaptation Program ("CCAP") group seeks to address potential impacts and reduce the risks and expenses associated with climate change. The CCAP performs comprehensive risk assessments with the goal of developing adaptation strategies and informing existing Water Department programs and plans, major investments and operational and design standards. CCAP and the Water Department are committed to working with other city agencies, local and regional partners, stakeholders, scientists, industry experts and officials from all levels of government to address climate change.
  - The Water Quality Compliance Modeling group has developed tributary and tidal waters water quality models to evaluate the effectiveness of the LTCPU and support the evaluation of climate change related risks.
  - The Watershed Field Services group conducts various watershed field based activities ranging from floatables control to scrap yard monitoring.

c) Green Stormwater Infrastructure Implementation Unit

The Green Stormwater Infrastructure Implementation Unit is a newly formed unit that focuses on developing and implementing green infrastructure projects to achieve the green infrastructure metrics defined in the LTCPU. This unit has the following primary responsibilities: planning and design of green infrastructure projects on public land, review of stormwater management plans for private development, maintenance of stormwater billing data, management of the stormwater credit program and implementation of incentive programs for private development. The Unit consists of four functional subunits: GSI Planning, Design, Stormwater Billing and Incentives, and Private Development Services.

- GSI Planning is responsible for identifying potential GSI projects on public lands and feeding the projects to the Design unit. This unit uses urban planning principles to identify and evaluate potential sites for green stormwater infrastructure on public lands and works with partners (i.e. other City agencies) to facilitate the implementation of these projects. This unit also coordinates within the Water Department to incorporate green stormwater infrastructure into water /sewer main replacement projects and facility projects.
- The Design subunit is responsible for managing design contracts for GSI and Ecological Restoration projects from initiation through the completion of construction documents. The engineers in this subunit oversee GSI and ecological restoration project designs, and support the construction inspectors in their oversight of projects. The engineers also develop and maintain the Water Department's design standards and specifications for green infrastructure and ecological restoration practices. This group coordinates with other units along with other City departments to ensure that the project designs are compatible with construction and operations and maintenance requirements and procedures. The Ecological Restoration group staff also work to proactively assess infrastructure within stream corridors, provide ongoing monitoring, and coordinate maintenance of previous projects.
- Private Development Services interacts with the development community and is responsible for implementing the City's stormwater regulations, through review of Post Construction Stormwater Management Plans ("PCSMP") and ongoing inspections. It is responsible for reviewing and approving the PCSMPs for proposed private development greater than 15,000 square feet (5,000 square feet in select watersheds). Private Development Services also verifies ongoing compliance with the stormwater regulations by conducting regular inspections of stormwater infrastructure on private properties to ensure proper operation and maintenance after installation. The Green City, Clean Waters ("GCCW") program partially relies on stormwater management on private properties, particularly within the combined sewer portion of the Water Department's system. During FY 2018, Private Development Services conducted approximately 4,203 inspections of active construction projects to ensure compliance with PCSMPs.
- Stormwater Billing and Incentives provides services that support routine stormwater billing as well as the incentive programs that the Water Department has implemented to encourage implementation of GSI on private lands. Stormwater billing related activities include parcel data management and data processing; generation of monthly stormwater user fee billing and adjustment files; programmatic management of water account-parcel ID reference; and reviews of applications for credits or appeals. The Water Department incentivizes implementation of green infrastructure by offering property owners credits for managing stormwater. This group also manages the Stormwater Management Incentive Program ("SMIP") and the Greened Acre Retrofit Program ("GARP") grant programs that

incentivize stormwater retrofits on individual non-residential properties and large-scale retrofits across multiple properties, respectively.

d) Bureau of Laboratory Services

The Bureau of Laboratory Services ("BLS") is the Water Department's environmental laboratory responsible for providing analytical services to meet water and wastewater regulatory requirements and to support various Water Department research initiatives. As the Water Department and regulations evolve, BLS strives to stay positioned to support the Water Department through sampling and analytical support at the levels required for modeling and regulatory development. To this end, BLS continues to expand its analytical capabilities and participates in cutting edge research initiatives. It is developing polymerase chain reaction ("PCR") capabilities to track microbial contaminants and is using liquid chromatography with tandem mass spectrometers to monitor emerging chemical contaminants such as cyanotoxins.

BLS operates a state-of-the-art laboratory facility and is comprised of the following groups: (1) Administrative, (2) Water Analysis and Metals Laboratory, (3) General Analysis and Nutrients Laboratory, (4) Organics Analysis Laboratory, (5) Aquatic Biology Laboratory, (6) Scientific and Regulatory Affairs, (7) Quality Assurance & Support Services and (8) Watershed Sciences. This work is critical to maintaining high water quality standards, meeting regulatory reporting requirements, and assuring the quality of materials used in capital improvements projects. BLS is an accredited laboratory with the Commonwealth of Pennsylvania under Act 25, Chapter 252 for the analysis of environmental samples. BLS also maintains three process control laboratories; one at each of the Water Department's three wastewater treatment plants.

BLS is responsible for managing compliance with the water quality monitoring requirements under both the federal SDWA and state regulations. BLS personnel collect approximately 2,500 drinking water samples each month from the water treatment plants, storage reservoirs, and distribution system and then test these samples for chemical and bacteriological parameters to assure product quality. BLS conducts drinking water quality surveillance and investigations in the water distribution system and responds to water quality issues as reported through the Water Department's customer complaint system, helping customers solve problems within their facilities. In addition to collecting water samples from approximately 85 routine monitoring locations throughout the City, BLS operates and maintains 40 online real-time water quality monitoring instrument panels placed at strategic locations within the drinking water network. This online monitoring system serves as the foundation of the Water Department's Surveillance and Response System ("SRS"). Section IV.C.3 of this report discusses the SRS in more detail.

BLS is involved in monitoring the water quality in Philadelphia's urban streams. In this capacity, BLS maintains a staff of scientists focused on stream water quality monitoring, aquatic life assessments, and the operation and monitoring of the Fairmount Fish Ladder. These scientists work closely with the OOW's data collection efforts required for the annual reports specified under the MS4 and CSO program permits. The Watershed Sciences group is currently assisting the USEPA, Delaware River Basin Commission ("DRBC") and the U.S. Geological Survey ("USGS") with the collection of Delaware River samples for various research efforts to evaluate and ultimately enhance the water quality of the Delaware River.

The Materials Engineering Laboratory ("MEL") is responsible for testing products used by the Water Department and other city agencies. While its focus is on testing products used in construction of the Water Department's infrastructure, it also tests items such as tools, fasteners, and paint for adherence to specifications and performance. The MEL uses a Quality Certification Program ("QCP") to obtain quality materials for the Water Department's construction projects. The objective of the QCP is to protect the quality of major infrastructure materials and products by requiring adherence to accepted principles of quality control at the point of manufacture. To be eligible for supplying listed products to the Water Department, the supplier must achieve certification by BLS-MEL. Qualifications include an approved quality control manual and evidence that the manufacturing staff consistently follow the manual. MEL staff perform periodic on-site audits of manufacturing facilities. The Materials Analysis Laboratory serves as the laboratory for the City's Procurement Department, testing a wide variety of purchased materials for conformance to specifications.

Finally, BLS participates on national committees to help develop industry specifications, manuals and comments on national regulations. BLS has been involved with national guidance for water utility response to USEPA's revised Long-Term Lead and Copper Rule, which is expected to be released in 2019. BLS participated in the development of revised PaDEP regulations on disinfectant residual requirements issued in 2018. Through this process BLS and other participating utilities helped guide PaDEP to adopting requirements that are both protective of public health and defensible. BLS has also been involved in national efforts to address water quality in building plumbing systems; helping to reduce the occurrence of Legionella and better ensure that customers will enjoy the high quality of water that is delivered through their water meters.

3. Engineering and Construction Division

The primary responsibility of the Engineering and Construction Division is to implement the Water Department's CIP. The division consists of the Design, Projects Control, and Construction units.

a) Design Unit

This group performs all engineering functions associated with the design of the Water Department's CIP. Generally, the Operations Division or Planning and Environmental Services Division identifies projects and then submits these projects to the Design Unit where they receive a project number and are entered into the Water Department's Capital Improvement Program Information Tracking ("CIPIT") system. The Design Unit designs (or manages the design) and submits the projects to Operations for review and approval. Approved designs are forwarded to the Projects Control Unit for public bidding. The Water Department transitioned to CIPIT, a newer version of the prior tracking system, in August 2017. CIPIT includes improved reporting capabilities and captures additional data on capital projects.

The Design Unit has two large groups (Plant Design and Water and Sewer Design) and has 103 approved positions as of September 2018. The Unit maintains its service levels despite vacancies by employing outside consultants to supplement the in-house staff, as necessary. A representative list of the group's activities follows:

- Evaluates and designs new and rehabilitation projects.
- Provides input into maintenance, renovation, and reconstruction issues.
- Reviews and coordinates designs prepared by consultants.
- Reviews shop drawings and reviews requests by contractors for deviations from plans and specifications.
- Maintains record plans.
- Provides engineering assistance to Operations Division during disruptions in water and wastewater service.
- Coordinates with other agencies such as the Pennsylvania Department of Transportation, Philadelphia Streets Department, Philadelphia Redevelopment Authority, Southeastern Pennsylvania Transportation Authority and private utilities.
- Assists in public education of various issues associated with the water and wastewater systems.
- Reviews plans prepared by private developers for adherence to Water Department standards.

b) Projects Control Unit

This unit is comprised of the Projects Control, Records Unit, and Geographic Information Systems ("GIS") groups. The GIS group transferred to Projects Control from the City Office of Innovation and Technology as of July 1, 2017. This transfer enables the GIS group to interact more seamlessly with the Water Department programs that generate and use geographic information. The Unit has 35 budgeted positions and no vacancies as of September 2018.

The Projects Control Unit is responsible for developing, maintaining, tracking, and coordinating the CIP as well as overseeing the bidding process prior to forwarding projects to the Construction Unit. The facility manager develops projects and passes them for approval by the section manager and Deputy Commissioner of Operations. Following approval, the projects move to Projects Control for prioritization and placed in a timeline to allow budget development over a six-year horizon. Staff note any longer-term projects and place them in a year 2050 file for incorporation into future budgets. Large complex capital projects (non-linear projects greater than $2,000,000) go through a comprehensive and participatory planning process which includes project development meetings with project stakeholders, standardized documentation, alternatives analysis and prioritization, as well as conceptual project development prior to inclusion in the CIP.

The Records group provides services related to private development projects including one-call services, sharing of engineering records, inspection of new connections to water and sewer mains, and assessing sewer system capacity for new development in association with Act 537 compliance.

The GIS group is responsible for operating and maintaining the Water Department's ArcGIS database, including the asset layers and the quality control of geolocations in the GIS database. The GIS group digitally houses the Water Department's engineering records and is an element of all utility planning and operations.

c) Construction and Survey Unit

The Construction Unit has 194 approved positions, which represents an increase of 25 positions in response to the overall expansion of the capital program in recent years. This unit assumes responsibility for all projects upon issuance of the construction notice-to-proceed and provides full time inspection of projects. In-house staff perform all construction management. For large projects, outside consultants may also assist with construction management activities. Responsibilities include assurance of contractor compliance with design contract documents, processing change orders if necessary, responding to requests for information and handling payment requests from contractors. The Construction Unit also provides surveying services to assist contractors with construction site stake out and compliance with surveying procedures. In addition, the Construction Unit prepares as-built drawings of water main replacement and sewer reconstruction projects.

4. Finance Division

The Finance Division is responsible for the development of water and wastewater revenue requirements and rates, the preparation and control of operating budgets, the management of capital financing programs, the monitoring of customer revenue and rate programs, and the general accounting of operating and capital funds. In addition, the division handles the maintenance of the inventory control, functionalized cost, fixed asset accounting, procurement of goods and services, and preparation and follow-up on documentation related to federal and state grants.

The Division also promotes performance management measurement and reporting. Rate related responsibilities are subject to the authorization of the Rate Board.

A Deputy Commissioner who reports directly to the Water Commissioner oversees the Finance Division. The authorized staffing level for the division is 58. As of August 2018, the Division has filled 48 positions. The Division has two units: Financial Planning & Rates and General Accounting. The unit's responsibilities are as follows:

- The Financial Planning & Rates unit is responsible for long-range financial planning, debt issuance, wholesale rates, grant accounting, budget, cost of service, performance metrics and procurement.
- The General Accounting unit is responsible payroll, accounts payable and general accounting.

Highly capable individuals staff key management positions within the Finance Division. In our opinion, the Finance Division's organization allows it to efficiently respond to financial needs from the other divisions of the Water Department as well as working with other City of Philadelphia departments and entities outside of the City government to meet the financial needs of the utility.

5. Administrative and Human Resources Division

The Administrative and Human Resources Division provides administrative and human resources planning services to the various divisions and their respective units. Some of the key responsibilities of this division include:

- Coordinating traditional personnel functions with initiatives in manpower and management training.
- Ensuring that personnel recruitment, placement, training, career development and safety programs are consistent with the Water Department's long-term human resources needs and support its diversity and inclusion goals.
- Initiating policy development related to administration and human resources management.
- Ensuring the effective communication of policies and procedures generated by management throughout the Water Department.
- Coordinating labor management initiatives and employee relations programs with the Water Department's long range operational plans.

The five units in this division are Safety, Training, Human Resources and Employee and Labor Relations, Administrative Service, and Facilities Management. Authorized staff for the division is 184, and there are currently approximately 26 vacancies as of September 2018.

The Training Unit leads the implementation of the Water Department's Apprentice Program, which started in 2013. Under this program the Water Department seeks out motivated high school students interested in applicable trades (e.g., science, electrical, and mechanical) and hires these students as apprentices. The students work part-time as an apprentice until they graduate, and are then hired full-time under the apprentice program. Once they complete the required training, the Water Department hires them as full-time civil service employees. Managers and mentors working with apprentices and graduates of the program speak highly of the program. The Water Department continues to fine tune this program and is looking to improve the quality of candidates selected in the future. Since 2013, the Water Department has hosted 39 apprentices, 20 of which have become full time employees with 6 additional employees anticipated in the coming months.

The Safety Unit utilizes an industrial hygienist to build training programs and support Water Department safety committees in their goal to assure a safe work environment. As noted in Table II-1, the number of paid days lost has generally fluctuated between approximately 2,000 and 3,000 in recent years and the FY 2018 is higher than historical performance. Overall the Water Department's staffing levels continue to increase to accommodate operation and maintenance, capital improvement and regulatory needs. One of the Water Department's goals in the coming years is to have a greater focus on safety to reduce work-related injuries and improve overall safety numbers. In addition, the City has hired a new third-party administrator to aid in monitoring and reducing overall paid days lost.

Table II-1 Safety Record

FISCAL YEAR	PAID DAYS LOST
2015	2,059
2016	2,117
2017	3,608
2018	4,364

The Administrative Services unit is comprised of staff that focuses on managing the work space utilized by the Water Department, primarily the Water Department's space at Aramark Tower. Example of recent work performed by this unit includes the renovation of the sixth floor and third floors of Aramark Tower to accommodate an expanded customer call center as well as additional staff. This unit also manages the contracts for office equipment such as copiers, phones, and other miscellaneous office supplies.

The Facilities Management unit consists of skilled staff that focuses on maintaining other Water Department facilities such as pump stations and operations facilities. Responsibilities include repairing pumps; maintaining heating, ventilation, and air conditioning ("HVAC") systems, and other general maintenance activities necessary to keep facilities in good working order.

6. Public Affairs Division

The Public Affairs Division supports and enhances the stakeholder engagement services performed by the Water Department's six other divisions to provide better service to the public. Public Affairs plays a critical role of representing the work performed by the Philadelphia Water Department to the public and representing the interests of the public to the Water Department. The Public Affairs Division consists of nine units as shown in the inset box and discussed in more detail in the following sections.

Public Affairs Division Includes Nine Functional Units

- Community Relations
- Customer Contact Center
- Public Relations
- Digital Communications
- Creative Team
- Green City Clean Waters Public Engagement
- Watersheds Programs
- Fairmount Waterworks Interpretive Center
- Public Education

a) Public Education Unit

This unit is responsible for carrying out the Water Department's public education outreach programs, particularly programs that bring information and educational materials about the Water Department's initiatives to schools, neighborhood groups, community events, and the individual water customer. The Public Education Unit has been responsible for the Water Department's publications and extended outreach programs geared toward providing a better understanding of urban watersheds, and the part each citizen and industry plays in protecting these valuable resources.

b) Fairmont Waterworks Interpretive Center

The Fairmount Water Works Interpretive Center ("Center") opened in October 2003, traces the history of the Schuylkill River and illustrates the complicated relationship between human civilization and the river. The Center is staffed by environmental educators and features interactive exhibits on the urban watershed; a Water Laboratory; a classroom/media center; a fresh water mussel hatchery demonstration exhibit and interpretive displays. The Center has attracted approximately 50,000 visitors per year during the last two fiscal years consisting of school children, adult groups, professional groups, and the general public. The Center has formed strategic partnerships with partners such as the School District of Philadelphia, the Partnership for the Delaware Estuary, the University of Pennsylvania Institute for Environmental Studies, the Academy of Natural Sciences, and others. The Center is working on a number planning grants from the William Penn Foundation and the Pew Charitable Trusts for new exhibits and programs. A newly reconstituted Fund for the Water Works Board is providing guidance and support.

c) Public Relations Unit

This Unit oversees the Water Department's communications with the press to provide effective message delivery. The Water Department takes a proactive approach to informing the press about its mission. The Unit routinely sends topical press kits to the media to address subjects such as illegal use of fire hydrants, drought, and seasonal variations in the frequency of water main breaks.

The Public Relations Unit has developed a Philadelphia Water Department Communications Guide to serve as a reference information document. This guide provides information on what the Public Affairs Division does, the target audiences, the key topics, and the communication methods.

For each of these areas, the Public Relations Unit will be focusing on identifying its target audience and determining how to best reach out to that audience. Engagement strategies include all forms of social media.

Public Affairs Division Key Topics:

- Community Relations
- Construction Projects
- Customer Services
- Customer Responsibility
- Assistance Programs
- Rates
- Education & Stewardship
- Flooding
- Green City, Clean Waters
- Source Water Protection
- Stormwater Fee
- Stream Restoration
- Wastewater & Stormwater Services
- Water Quality
- Water Main Breaks & Sewer Repair

d) Community Relations

The Community Relations unit keeps the public and community organizations informed via public meetings and written updates related to long-term, high impact capital improvement projects. The unit works in coordination with partner agencies (municipal and private) on strategic communication for communities impacted by water main breaks or sewer emergencies. When necessary, the unit also handles media calls for water main breaks, customer complaints and capital improvement projects.

e) Creative Team

The Creative Team supports the initiatives of Public Affairs and the Water Department by providing visual communication design services for both external and internal audiences. Two major focus areas of the team include: 1) Water Brand Architecture, which involves the development of a framework to account for the relationship between City of Philadelphia, Partners, Philadelphia Water, Fairmount Water Works, and sub-brands for at least 20 different initiatives and/or programs; and 2) Graphics for Public-Facing Campaigns which includes combining elements of informal education and marketing to develop easy-to read and comprehend graphics that simplify complex issues. The team's approach is guided by a focus on the end needs of the user to inform the creation and implementation of designs, services and strategies.

f) Digital Communications

The Digital Team manages the Water Departments external facing websites, social media channels in accordance with the Department-wide Digital Strategy. The team coordinates with other City agencies to manage Water Department web content on City websites. Current work includes building a comprehensive/consolidated web presence and enhancing digital outreach capacity with email and text message.

g) Watersheds Programs

The Watersheds Programs Unit provides regulatory and policy support to monitor that the Water Department's public education and engagement programs follow the requirements of the Clean Water Act and Safe Drinking Water Act. The team achieves this by implementing watershed improvement related volunteer opportunities within the City and partnering with regional stakeholders to implement projects to improve the City's source water and the regions shared watersheds.

h) Public Engagement

The Public Engagement team is responsible for building public support for the Water Department's infrastructure investments that result in cleaner waterways in Philadelphia. The Team generates public support generally through community outreach, public participation and partnership-building and capacity building with local organizations. By creating tools that inform, educate and inspire action, the Public Engagement Team helps to facilitate the implementation the Water Department's initiatives, while furthering environmental stewardship of the City's waterways. Current initiatives include the implementation of Green City, Clean Waters, Rain Check, and stormwater regulations and credits support.

i) Customer Contact Center

The Water Department is a customer service oriented organization. The Water Department has been working on a comprehensive initiative over the last three years to redesign its call center via a merger with the Water Revenue Call Center. This includes cross training of all skills (billing, emergency and customer service) to serve the City of Philadelphia's retail water customers. The overarching goal of this project is to improve customer service by reducing wait-times, reducing the confusion related to multiple call centers, and strengthening the skill and professionalism of the customer service agents. The physical merger is complete. The cross training is on-going as is an initiative to implement new call center technology to further improve response efficiency.
The Water Department has also defined a new management structure, with a realignment of positions to better support call center technology needs and employee development. As a part of this redesign, the Water Department plans to retrain supervisors to focus more fully on employee coaching and development.

Public Affairs Division Caters to Diverse Groups of Stakeholders:

- Visitors
- Individual Rate Payers
- Groups of Rate Payers
- Civic Organizations and Community Development Corporations
- Businesses
- Environmental Partners
- Public Advocate Partner
- Media
- City Council/Elected Officials
- Regulators

The Public Affairs Division uses many different tools to communicate Water Department messages to their diverse target audiences. Choosing the appropriate tool requires an understanding of both the message being communicated and the audience receiving the message. Communication tools include:

- Web and digital media;
- Phone/email;
- Print and collateral materials;
- Community meetings and public events;
- Partnerships and Citizens Advisory Councils; and
- Tours and demonstration projects.

7. The Office of Compliance

The Office of Compliance is responsible for proactively managing and addressing the various environmental issues applicable to the operation of the Water and Wastewater System. These responsibilities include:

- Negotiating and challenging, as necessary, all permits including NPDES, Stormwater, Clean Air Act, and Total Maximum Daily Loads ("TMDLs").
- Developing an overall strategy for the Water Department for the handling of new and emerging regulatory challenges, such as the TMDLs for volatile organic compounds

("VOCs"), polychlorinated biphenyls ("PCBs") and sediment loads, CSO LTCPU implementation, and sanitary sewer overflow implementation.

- Reviewing, commenting on, and challenging, as necessary, any new laws and regulations affecting the Water Department.
- Testifying before applicable government agencies and commissions to advance and advocate the Water Department's position.
- Responding effectively to any potential environmental problems or issues should they arise.
- Developing environmental policies that guide decision-making on operating and capital budget issues.
- Ensuring that all environmental reporting to governmental agencies is timely and accurate.
- Negotiating and resolving any environmental violations alleged by any regulatory agency.
- Negotiating and entering into contracts with the Water Department's suburban customers related to the Water Department's environmental initiatives or the customer's violations of the terms of its contract.
- Responding to both formal and informal requests for information as requested by any regulatory agency.

8. Information Science & Technology

The Information Services and Technology ("IS&T") unit located within the Water Department and is part of the OIT. The IS&T unit is led by a General Manager, who directly reports to the OIT, and at the functional level also reports to the Commissioner of the Water Department. The IS&T unit provides software, hardware, network support, and other technology-related services for the water, sewer and stormwater utility operations. GIS support has historically been a part of this unit but transferred to Projects Control in 2017 as previously discussed. As of September 2018, the Water Department funds 106 positions within OIT.

Personnel focused on critical operational tasks such as monitoring and maintaining the treatment plants' Supervisory Control and Data Acquisition ("SCADA") and Distributed Control Systems ("DCS") are not part of the IS&T unit.

Described below are the organization and key initiatives of the unit:

1. IS&T Unit organizational structure consists of three teams:
   a. System Team: This team is responsible for the operations, maintenance and planning activities associated with the physical network and server environment, database management and new technologies.
   b. Business Team: This team focuses on IS&T portfolio management (historical, current, and planned applications), development and management of business requirements and documentation; and project management.
   c. Applications Team: This team is responsible for applications development, maintenance, and production support.

2. IT Best Practices: As part of organizational development, IS&T unit has adopted best practice initiatives including the following:
    a. Training: With the goal of adopting best practices and sustaining a skilled workforce, the IS&T unit is currently providing its staff various training opportunities, including:
        i. Information Technology Infrastructure Library ("ITIL") best practices: This includes ITIL 3-day training for managers and supervisors. The goal of this initiative is to better align and integrate the IS&T units and their service offerings with the Water Department's Strategic Plan and general needs.
        ii. Application Development Skills in the areas of mobile applications development using Zamoran; android applications and visual studio applications development; and a boot camp on SQL development.
        iii. In collaboration with OIT, staff receives online training options using CBT Nuggets, and Plural Site.
    b. Knowledge Exchange: The IS&T unit provides staff with opportunities to visit data centers of other utilities such as Philadelphia Gas Works, which enables learning through knowledge networking.
    c. Issues and Documentation Management: To enhance consistent logging and tracking of issues and enhance project management, IS&T has implemented the JIRA application. In conjunction with issues documentation, IS&T staff are also now using GITSTACK tool to consistently adopt and maintain source code documentation for applications developed by IS&T.

9. Water Revenue Bureau

Established under the City Charter, the WRB reports to the Revenue Commissioner and ultimately to the Office of the Director of Finance. The WRB has the responsibility for billing and collection of water and wastewater revenue for services provided by the Water Department. WRB responsibilities also include enforcement of payments and customer relations pertaining to payment for services. Currently, WRB reports 208 filled positions out of 232 budgeted positions. The reduction in budgeted positions for WRB reflects the merger of the WRB and Water Department Call Centers and the shift in positions between WRB and the Water Department.

Since 1992, the WRB and the Water Department have increased their level of coordination with respect to billing and collection of the Water Department's revenue. In accordance with a 1992 agreement, both the Office of the Director of Finance and the Water Commissioner monitor collection of water and wastewater revenues. The cooperation between these two City agencies has improved reporting on revenue collections, implementation of monthly billing, collection of aged receivables by private collection agencies, and enforcement actions. Monthly meetings with the WRB and the Water Department executive staffs, and meetings between the Office of the Director of Finance, Water Commissioner, and other key personnel, serve to maintain communications and enable prompt and direct response to issues involving both the WRB and the Water Department.

An Automatic Meter Reading ("AMR") Program ("AMR Program") involving the replacement of all water meters with new meters equipped with radio transmitter meter reading devices commenced in 1997 and finished in 2013. The Water Department and WRB have seen clear benefits from this program with improved billing accuracy, which has resulted in fewer billing disputes and has had a positive effect on customer service and collections. In addition to the increased revenue that typically results from such billing program improvements, the AMR Program significantly reduced the costs of meter reading and related support.

As of the writing of this Report, the Water Department has solicited and received proposals from qualified vendors to provide an Advanced Metering Infrastructure ("AMI") system for water meters. The proposed project will include: installation of new units; data management software development; integration with the City's existing systems; as well as training, documentation, and product support. Based upon information provided by the Water Department, not all water meters require replacement during the initial installation phase of the new system. The Water Department anticipates a 24-month installation period once the project is fully authorized and contracted in accordance with City procurement requirements.

B. STRATEGIC AND MANAGEMENT INITIATIVES

The Water Department's primary mission is to provide a reliable supply of high quality drinking water for residential and community needs, and effectively manage wastewater and stormwater to enhance and sustain the region's watersheds and quality of life. Based upon the Water Department's Strategic Plan Fall 2015 update, the five (5) key elements of the Water Department's mission are:

- *Provide the City of Philadelphia with integrated water, wastewater, and stormwater services.*
- *Protect public health by always delivering the Water Department's customers the highest quality of drinking water at a competitive and affordable cost.*
- *Protect the environment by managing and treating the region's wastewater and stormwater, protecting and advocating for rivers and streams and their watersheds, and protecting sources of drinking water.*
- *Support the sustainable growth of Philadelphia and its residents, communities, businesses, and industry as well as the financial well-being of the utility.*
- *Continue to be America's most innovative utility with a constant focus on quality, efficiency, customer service, and affordability.*

The Water Department is currently updating the Strategic Plan. The updated plan will continue to outline the Department's "Vision, Mission and Goals" in addition to aligning the performance indicators with Performance Based Budgeting for tracking progress.

While the Water Department has many important initiatives underway, the following are key initiatives identified by the Water Department in the current FY 2019 to FY 2022 period:

Water Accountability - The Water Accountability initiative proactively addresses non-revenue water loss, promotes a high-level of efficiency in the water delivery and billing processes, and performs the strategic planning necessary to implement lasting improvements in water and revenue loss reduction. Sections IV-C and IV-G of this report further discuss these programs.

The Water Department accounts for all delivered water as either consumption or losses. Losses may be either: 1) apparent losses due to customer meter inaccuracies, billing errors or unauthorized consumption; or 2) real losses due to physical losses related largely to leakage within the distribution system. These two components make up the Water Department's non-revenue water in that they result in a loss of consumption-based revenue or excess production. Based upon Water Department records, non-revenue water averaged 92 million gallons per day ("mgd") from FY 2014 to FY 2017. The Water Department's Water Accountability initiatives focus on the recovery of this uncaptured revenue through a variety of activities and programs including the:

- Customer Meter Management Program;
- Revenue Protection Program;
- Leaked Detection Program;
- District Metered Area; and
- Hydrant Tracking Program.

In addition to the existing programs and activities noted above, the planned replacement of existing meter transmitters with AMI technology will enhance the Water Department's meter reading, billing, and collection process. The AMI technology and associated Meter Data Management System ("MDMS") will provide the Water Department with better information related to real-time system performance and enhanced tools to identify leakage and tampering. Following implementation of AMI, the Water Department anticipates reviewing the non-revenue water programs and refining the associated metrics.

Water and Wastewater Master Planning – The Water Department has substantially completed master plans for its water and wastewater systems. A draft Wastewater Master Plan is complete and the Water System Master Plan is nearing completion. These plans take a holistic, system wide approach to evaluating future CIP needs and position the Water Department to make sound decisions about future capital investments. The master planning process was a highly collaborative effort developed in three general phases performed in sequence. The first phase included assessment and documentation of water and wastewater system assets, as well as current, major initiatives such as the LTCPU. The second segment considered future water and wastewater system needs, incorporating drivers such as demographic changes, population projections, potential regulatory changes, and other factors such as climate change. The third segment consisted of developing and evaluating alternative planning scenarios, assessing system risks, and prioritizing projects for inclusion in the CIP. The master plans will be revised every five-years and will serve as roadmaps, guiding decision making over the planning horizon. The Water and Wastewater Master Plans are discussed further in Sections IV and V of this report.

Security of the System - The Water Department continues to implement security improvements to key facilities and water supplies in accordance with the Vulnerability Assessments completed in

2002 and as needed to enhance security. These improvements focus on preventing, monitoring, or detecting access to key facilities, as well as maintaining critical operations during potential emergency situations and monitoring for and responding to potential contamination of the raw and treated water supplies. As of the date of this report, the Water Department has completed the following improvements:

- Complete covering of all finished water basins;
- Barbed wire topped fencing of all plants;
- Securing of all main entrances and gates; and
- Installation of video surveillance equipment at all main entrances and gates.

In addition, the Water Department:

- Conducts nearly one thousand tests on water samples drawn from various locations each day;
- Tests water quality continuously throughout the treatment process and at strategic locations in the distribution system via on-line monitors; and
- Runs a surveillance and response system, a source water protection program and early warning systems for the Schuylkill and Delaware Rivers and surrounding areas.

The Water Department expects to bid additional security upgrades to the three water treatment plants and pumping facilities in FY 2019 and has initiated continuity planning to insure continued operations of management systems during an emergency

Enhanced Customer Service

The Water Department is committed to maintaining a high level of customer satisfaction and trust by providing reliable and efficient service to its customers. This commitment extends from the provision of providing superior water, wastewater and stormwater services to effectively addressing customer concerns. The reorganization of the Call Center to improve responsiveness and reduce customer wait times is a key element of this initiative as are the Department's lead service line replacement program, financial assistance programs and public education and outreach programs.

C. CONCLUSIONS

It is our opinion that:

- The Water Department's organizational structure provides for efficient system operations and maintenance, and the divisional and sub-divisional structure provides for delegation of management authority and responsibility through various levels and work units;
- A good working internal relationship exists among divisions to facilitate execution of all phases of the Water Department's responsibilities;
- Highly qualified and trained personnel occupy senior management positions;

- The Water Department has filled recent senior staff retirements with experienced Water Department professionals and succession planning for future retirements is in progress;
- Senior management professionals that oversee critical operating, engineering, financial, planning, and support functions have worked at the Water Department for many years; and
- This institutional knowledge and experience provides stability as the Water Department moves forward with key initiatives.

III. Financial Requirements

A. OVERVIEW

Black & Veatch evaluated the adequacy of revenues to meet projected revenue requirements for FY 2019 through FY 2024. In February 2018, the Water Department initiated a request to increase water rates and charges for three years, FY 2019 through FY 2021. In July 2018, the Rate Board adopted a final decision that approved increased rates and charges for FY 2019 and FY 2020. The Rate Board decision did not approve increased rates and charges for FY 2021, but noted that the Water Department can file a rate proposal for FY 2021 if it believes it is necessary at that time. Based upon the rate hearings, the Rate Board's adopted decision provided two revenue increases: a FY 2019 overall revenue increase of approximately 1.33 percent, effective September 1, 2018; and a FY 2020 overall revenue increase of approximately 1.20 percent, effective September 1, 2019. Revenue projections for retail service customers are based on these adopted schedules of rates for water and wastewater service for FY 2019 and FY 2020 as applicable.

Beyond FY 2020, the Water Department needs additional annual operating revenue increases to meet the Water Department's projected expenses, complete necessary capital projects, and comply with the rate covenants of the General Ordinance. As shown later in this report, Table III-9 provides a projected statement of revenues and expenses for the six-year study period covering FY 2019 through FY 2024 ("Study Period") and shows the adequacy of revenues and the feasibility of issuing the 2018A Bonds and future indicated revenue bond issues consistent with the requirements of the General Ordinance.

The financial data used in the analyses presented herein are from the Water Department's historical audited financial statements through FY 2017, preliminary, unaudited FY 2018 financial results, and the approved operating and capital budgets for FY 2019.

The Water Department operates on a modified accrual basis of accounting. As such, the Water Department records revenues upon receipt. The exceptions to this are revenues from other governments which the Water Department accrues as billed, and interest which the Water Department accrues as earned. With respect to expenditures, the Water Department records these as expenses on an encumbrance basis, except debt service and personnel costs (salaries, pension, medical, etc.).

B. EXISTING RATES AND RATE METHODOLOGY

Per the approved November 2012 ballot referendum, an amendment to the City Charter allows City Council to establish an independent ratemaking body responsible for fixing and regulating rates and charges for water and sewer services; and establish open and transparent processes and procedures for fixing and regulating said rates and charges. The resulting Rate Ordinance became effective on January 20, 2014.

The Rate Ordinance established the following rate standards for use by the Rate Board in the establishment of future rates as follows:

- Rates and charges shall be fixed to provide a minimum of 100 percent of funding for operating expenses, other City fund charges and debt service from current revenues with reasonable sums to cover unforeseeable or unusual expenses, reasonably anticipated cost increases or diminutions in expected revenue;
- Rates and charges may be fixed to stabilize customer costs over a reasonable number of years and include anticipated changes in operating and capital costs, including personnel cost changes and other cost inflation;
- In fixing rates and charges the Rate Board shall recognize the importance of financial stability to customers, consider the Water Department's Financial Stability Plan and evaluate the impact of the Rate Board-approved rates and charges on planned improvements, operating expenses, debt service coverage, financial reserves, credit ratings and future rates and charges;
- In determining the level of current funding of capital expenditures and minimum levels of reserves, the Rate Board shall consider all relevant information presented including, but not limited to, peer utility practices, best management practices and projected impacts on customer rates;
- Rates and charges shall be developed in accordance with sound utility rate making practices and consistent with the current industry standards for water, wastewater and stormwater rates. Industry standards include the current versions of: AWWA Principles of Rates, Fees and Charges Manual and the WEF's Manual of Practice 27, Wastewater Financing & Charges for Wastewater Systems; and
- Whenever the Water Department has proposed changes to the rates and charges, the Rate Board shall issue a written report incorporating the information used by the Rate Board in reaching a decision to approve, modify or reject the proposed rates and charges. The Rate Board shall approve the proposed rates and charges unless the Rate Board finds that the Water Department has proposed rates and charges that are inequitable or have not been reasonably supported by the information provided to the Rate Board by all participants in the rate setting process. If the Rate Board has rejected or modified the proposed rates and charges, the Rate Board's report shall identify the impacts of the approved rates and charges on planned improvements, operating expenses, debt service coverage requirements, reserve fund levels and future rates and charges.
- The Rate Board's decision must be made no later than 120 days from the Water Department's filing proposed changes. If the Rate Board is unable to act on the proposed rates and charges within that time frame, the Water Department may establish emergency rates and charges on a temporary basis pending a final determination by the Rate Board.

The Rate Board consists of five members appointed by the Mayor. Members serve staggered terms and continue to serve until the Mayor appoints a replacement. In December 2015, the Rate Board established processes and procedures for public comment on proposed rates and charges and promulgated regulations for rate hearings and determination of rates and charges consistent with the City Code. These regulations were last revised in September 2017.

The Rate Ordinance requires the Water Department to provide supporting documentation (including financial accounting and engineering data) to the Rate Board with regard to (i) establishing revenue requirements necessary to meet the Water and Wastewater System's immediate and long-term operating and capital needs, (ii) maintaining the utility's financial stability (with reliance upon the Financial Stability Plan), and (iii) providing a fair allocation of costs among customer groups based upon cost of service principles.

The Water Department retained Black & Veatch in March 2017 to assist in the development of cost of service based rates for the period of FY 2019 through FY 2021 as well as a multi-year financial plan for the period of FY 2018 through FY 2023. Rates for wholesale water and wastewater service became effective September 1, 2018. The water and wastewater rates applicable to retail customers, including residential, commercial, industrial, charities and schools, the Philadelphia Housing Authority, and municipal service which became effective September 1, 2018 are based on the results of the fiscal year 2019 and 2020 rate proceeding[1] related to retail service.

The schedules of retail rates shown in Table III-1 are those that were in effect as of September 1, 2018. The rates for FY 2019 in effect as of September 1, 2018 and the adopted rates for FY 2020 (effective September 1, 2019) are the basis for the "base" level of revenue projections used in this Report.

In addition to the existing General Service rates presented in Table III-1, reduced rates are applicable to certain properties or special customer groups such as charitable institutions, schools, and eligible senior citizens as prescribed by ordinance. Reduced rates are also applicable to the Philadelphia Housing Authority. In January 2017, reduced rates were extended to the qualified Community Gardens[2]. As part of the FY 2019 and FY 2020 rate proceeding, reduced rates were extended to the Philadelphia Land Bank. The Water Department also establishes charges for municipal fire protection and private fire protection and for dischargers of high strength wastewater service.

Service to customers located outside the City is on a wholesale basis through contracts with various municipalities, authorities, and townships. The respective contracts for service to each wholesale customer sets forth the present bases for charges. There are currently 10 wholesale wastewater customers and one wholesale water customer. Black & Veatch's cost-of-service study prepared for the Water Department as part of the FY 2019 and FY 2020 rate proceedings are the basis for the existing rates for the wholesale customers. The existing rates for wholesale customers became effective September 1, 2018. For purposes of revenue projections from wholesale customers beyond FY 2020, Black & Veatch has assumed the overall revenue increases shown on Lines 4 through 8 in Table III-9 of this Report to equally apply to both wholesale and retail customers.

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[1] As part of the adopted rates and charges, the Rate Board approved the implementation of a rate rider, which establishes a reconcilable surcharge related to the recovery of lost revenues associated with the Water Department's Tiered Income Assistance Program (TAP). The TAP Surcharge is included as a component of the water and sewer quantity charges presented in Table III-I. The TAP Surcharge is subject to annual reconciliation.
[2] Pursuant to Section 19-1603 of the Philadelphia Code.

Table III-1 General Service Water and Wastewater Rates

METER BASED MONTHLY SERVICE CHARGES

Water Meter Size (Inches)	Water Existing Effective September 1, 2018 ($)	Wastewater Meter Size (Inches)	Wastewater Existing Effective September 1, 2018 ($)
5/8	5.12	5/8	7.10
3/4	5.47	3/4	8.97
1	6.62	1	13.02
1-1/2	8.83	1-1/2	22.68
2	12.26	2	34.86
3	19.39	3	62.62
4	35.27	4	106.62
6	66.12	6	209.84
8	100.48	8	331.69
10	147.20	10	478.92
12	239.66	12	868.18

QUANTITY CHARGES

Water Monthly Water Usage	Units	Existing Effective September 1, 2018	Wastewater Description	Units	Existing Effective September 1, 2018
First 2 Mcf	$/Mcf	46.19	All Billable Water Usage	$/Mcf	32.42
Next 98 Mcf	$/Mcf	39.88			
Next 1900 Mcf	$/Mcf	31.21	BOD in excess of 250 mg/l	$/lb	0.391
Over 2000 Mcf	$/Mcf	30.39	SS in excess of 350 mg/l	$/lb	0.391

RESIDENTIAL STORMWATER

Description	Existing Effective September 1, 2018 ($)
Charge Per Parcel	13.73
Billing & Collection	1.80

NON RESIDENTIAL STORMWATER

Description	Units	Existing Effective September 1, 2018
Gross Area	$/500 sf	0.701
Impervious Area	$/500 sf	5.304
Billing & Collection	$	2.34

Notes:

Water and Sewer Quantity Charges for billable water usage (presented above) include the respective Tap Surcharge effective September 1, 2018.

The stormwater charges for Non-Residential and Condominium parcels are same

sf - square feet

Mcf - Thousand cubic feet

mg/l - miligrams per liter

BOD - Biochemical Oxygen Demand

SS - Suspended Solids

C. PROJECTED REVENUES UNDER EXISTING RATES

Table III-2 shows projected operating and non-operating revenues of the Water Department for FY 2019 through FY 2024 under rate schedules for water and wastewater service applicable to General Service customers and Contract Service customers in effect as of September 1, 2018 and September 1, 2019. Operating revenues of the Water Department consist of several components, and are projected separately for the water and wastewater systems.

Operating revenues for the water and wastewater systems include charges for water and wastewater service to several customer classes. Wastewater service revenues include revenues for both sanitary sewer and stormwater services. The General Service customer group, shown on Lines 1, 8 and 11 of Table III-2, consists of residential, commercial, industrial, senior citizens, charitable institutions, schools, and the Philadelphia Housing Authority. Projected water and wastewater gross billings are developed by applying the existing schedules of rates to normalized projections of water sales, number of customers, number of billable parcels, and billable gross and impervious area for respective classes based upon an analysis of historical trends. The projection of customer accounts reflects no growth in the total system accounts.

The projection of water sales reflects an annual decrease of approximately 1.0 percent, which is primarily due the annual reduction in the sales per account associated with 5/8" meter General Service customers. Based on the three most recent fiscal years, the average residential consumption per account is projected to decrease from 133 gallons per day ("gpd") in FY 2019 to 121 gpd by FY 2024. The decrease in the use per customer for smaller accounts has been a consistent trend observed over the past several years.

For stormwater, the projection of billable gross and impervious area reflects the average annual decrease of 24.5 million square feet of gross area and 11.5 million square feet of impervious area per year as an allowance for additional stormwater credits issued by the Water Department during the projection period. Revenues under existing rate levels from General Service customers, which are comprised of the above-mentioned accounts, reflect an adjustment to the projections of gross billings to anticipated cash receipts based on an analysis of historical annual billings and receipts. These revenues reflect cumulative collections of approximately 96.4 percent of annual billings.

Table III-2 Projected Revenue Under Rates Effective September 1, 2018 and September 1, 2019 (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	Operating Revenue						
	Water Operations						
1	Retail Customers	266,081	264,606	261,966	259,456	256,986	254,531
2	Private Fire Protection	3,814	3,884	3,889	3,889	3,889	3,889
3	Public Fire Protection	9,300	9,235	9,235	9,235	9,235	9,235
4	Wholesale	3,803	3,940	3,940	3,940	3,940	3,940
5	Subtotal Water Service Revenue	282,998	281,665	279,030	276,520	274,051	271,596
6	Other Operating Revenue	9,815	8,459	7,163	7,125	7,087	6,917
7	Total Water Operations	292,813	290,125	286,193	283,645	281,137	278,512
	Wastewater Operations						
8	Retail Customers	225,662	226,866	226,246	224,558	222,759	220,950
9	Wholesale	38,005	38,007	38,007	38,007	38,007	38,007
10	Excess Strength Service Charge	5,502	5,562	5,565	5,565	5,565	5,565
11	Stormwater	167,343	171,140	170,667	169,038	167,212	166,738
12	Subtotal Wastewater Service Revenue	436,512	441,575	440,485	437,168	433,543	431,259
13	Other Operating Revenue	7,400	5,682	4,004	3,946	3,888	3,688
14	Total Wastewater Operations	443,912	447,257	444,488	441,114	437,432	434,947
15	Total Operating Revenue	736,725	737,381	730,681	724,759	718,569	713,459
	Nonoperating Income						
16	Interest Income - Operating Funds (a)	1,099	960	957	985	993	1,015
17	Total Nonoperating Income	1,099	960	957	985	993	1,015
18	**Total Water Department Revenue**	**737,823**	**738,341**	**731,638**	**725,744**	**719,561**	**714,474**

The projected FY 2019 revenues under existing and adopted (effective September 1, 2018) rates from retail water customers is approximately $266,081,000. Existing schedules of charges also include a charge for private fire protection connections to the water system, as show on Line 2 of Table III-2.

Wholesale Line 4 of Table III-2 consists of water sales to Aqua Pennsylvania, Inc. on a wholesale basis.

The charges to Aqua Pennsylvania, Inc., which commenced taking service from Philadelphia in FY 2002, include a commodity charge applicable to metered water usage for the recovery of power and chemical costs, and a fixed charge to recover all other allocable operation and maintenance expenses and capital related costs. The contract with Aqua Pennsylvania, Inc. is for up to 9.5 mgd of maximum day capacity and covers a term of 25 years, ending in 2026.

Other operating revenue from the water operations shown on Line 6 of Table III-2 consists largely of penalties on overdue bills for retail water service customers and miscellaneous other revenue. Other operating revenue also reflects a proportionate share of contra-revenue credits associated with the Department's affordability programs including the Tiered Income Assistance Program[3] ("TAP") and Utility Emergency Services Fund ("UESF") grants.

The Water Department has ten wholesale wastewater contracts with multi-year terms; customers include: Abington, Bucks County Water and Sewer Authority (BCWSA), BCWSA - Bensalem[4], Cheltenham, Delaware County Regional Water Authority (DELCORA), Lower Merion and Lower Moreland Townships, Lower Southampton, BCWSA - Springfield[5], and Upper Darby. Based upon their current agreements, BCWSA - Bensalem, Lower Merion and Upper Darby make capital contributions to the Water Department for their allocated share of investment in treatment and collection system facilities used in providing wastewater service to the particular customer. The Water Department applies contract rates for wastewater service monthly and the rates generally consist of charges for operation and maintenance expense, certain capital costs associated with the collection and treatment facilities used in providing the service, and a management fee. Cheltenham, Lower Southampton, BCWSA - Springfield, Abington, and Lower Moreland Townships, and DELCORA contract rates consist of charges for operation and maintenance expense and capital costs associated with the LTCPU in accordance with their contract terms. The Water Department actively manages the wholesale service agreements to recover the costs associated with the wholesale service. Recent wholesale contract negotiation efforts include the following existing wholesale customers:

- ***Cheltenham Township.*** Cheltenham Township ("Cheltenham") and the Water Department entered into a new five-year agreement effective June 30, 2010. The new contract acknowledged Cheltenham's periodic exceedance of its peak contractual flow limits and required the Township to commence Act 537 sewage facilities planning and initiated a 12 percent management fee on its total billings. On March 19, 2014, the Water Department and Cheltenham executed Amendment No. 1 to its 2010 contract. The amendment extended the contract through FY 2025 and requires that Cheltenham pay depreciation and return on investment on all new capital facilities serving them, including a proportional share of the Water Department's LTCPU expenditures. The amendment further requires Cheltenham to undertake significant improvements to its sewer system including intensive efforts to reduce its infiltration/inflow to control its flows above the contractual limit. The Water Department has temporarily agreed to accept flows in excess of the 18 cubic feet per second limit at the Township's Adams Avenue connection while it evaluates Cheltenham's progress in reducing its flow exceedances.

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[3]In accordance with ordinance requirements, the City has implemented a new affordability program called the Tiered Assistance Program ("TAP"). TAP provides water, sewer, and stormwater bill relief for qualifying customers. Customers that have household income at or below 150% of the federal poverty level ("FPL") can qualify for the TAP and may receive a deduction to their overall bill based on their household income compared to the FPL and water usage if admitted into the program. It is anticipated that TAP will result in reduced annual revenue to the Water Department of approximately $9.8 million in FY 2019. For the purposes of the financial planning analysis, this amount is assumed to increase to $17.0 million in FY 2021 and remain steady at that level through FY 2024. To address potential difference in the current revenue reduction projections, the Water Department proposed and the Rate Board adopted a TAP Rate Rider which provides a mechanism to adjust rates and charges to better reflect actual experience and protect revenues.

[4] BCWSA purchased the Bensalem System in September 1999. The agreement for Bensalem Township is a separate contract and owned by BCWSA.

[5] BCWSA purchased the wastewater collection and disposal system of Springfield Township in December 2015. The agreement for Springfield Township is a separate contract and owned by BCWSA.

- ***Lower Moreland Township.*** The Water Department negotiated a new wastewater services contract with Lower Moreland Township on May 18, 2015. The new agreement provides modest increases to the Township's annual average daily flow limits, as well as the loadings limits and implements a significant reduction in peak flows limits. Notably, the contract provides that Lower Moreland pay its proportional share of the Water Department's LTCPU costs and includes a 12 percent management fee. The new contract provides for services through FY 2025.

- ***BCWSA - Bensalem Township.*** As of the date of this report, the Water Department is in the process of negotiating new contract terms with BCWSA regarding the Bensalem System. While the final contract terms are currently not available, Bensalem is expected to convert from the current capital contribution to paying depreciation and return on investment on all new capital facilities serving them.

Line 9 of Table III-2 shows the projected revenue under existing rates from wholesale wastewater customers.

The Water Department assesses retail customers which contribute high strength wastewater an extra-strength surcharge based upon monitored strength. Line 10 of Table III-2 summarizes the revenue from these customers.

Other operating revenues for the wastewater utility, shown on Line 13 of Table III-2, include penalties on overdue bills, and income from permits and licenses, and other miscellaneous sources. Other operating revenue also reflects a proportionate share of contra-revenue credits associated with the Department's affordability programs including the TAP and UESF grants.

Non-operating revenue of the Water Department consists of interest and other income. Interest income recognizes the interest income earned on the Revenue Fund itself. Projections of interest income for the Study Period are based on the projected average balances in these funds and are available to meet the Water Department's revenue requirements throughout the Study Period. Black & Veatch has assumed an interest rate of 0.40 percent in estimating interest income on the various operating funds and accounts. Line 17 of Table III-2 presents the total non-operating interest income available to the Revenue Fund.

D. CAPITAL IMPROVEMENTS FINANCING

Table III-3 summarizes the Water Department's CIP for FY 2019 through FY 2024 on an encumbrance basis, that is, the table shows the total cost of each project in the year that design of the project commences.

Table III-3 Capital Improvement Program (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	WATERWORKS IMPROVEMENTS						
1	Engineering and Administration (a)	9,037	9,308	9,587	9,875	10,171	10,476
2	Water Treatment Plant Improvements	44,000	44,000	44,000	44,000	44,000	44,000
3	Distribution System Rehabilitation	59,060	63,060	66,060	70,060	73,060	77,060
4	Large Meter Replacement	30,000	30,000	5,000	5,000	5,000	5,000
5	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
6	Other	0	0	0	0	0	0
7	Subtotal	148,097	152,368	130,647	134,935	138,231	142,536
	WASTEWATER COLLECTION AND TREATMENT						
8	Engineering and Administration	10,608	10,926	11,254	11,592	11,940	12,298
9	Water Pollution Control Plant Improvements	76,000	76,000	76,000	76,000	76,000	76,000
10	Storm Flood Relief	10,000	10,000	15,000	15,000	15,000	15,000
11	Reconstruction of Old Sewers	56,000	56,000	61,260	56,660	56,660	56,660
12	Green Infrastructure	47,000	47,000	98,125	98,125	98,125	98,125
13	Vehicles	6,000	6,000	6,000	6,000	6,000	6,000
14	Subtotal	205,608	205,926	267,639	263,377	263,725	264,083
15	Total Improvements (Line 7 + Line 14)	353,705	358,294	398,286	398,312	401,956	406,619
16	Inflation Adjustment (b)	0	8,452	19,109	28,976	39,433	50,440
17	Inflated Total	353,705	366,746	417,395	427,288	441,389	457,059

(a) Excludes allowance for inflation, which is included on Line 16.

(b) Cost estimates for fiscal years 2020 to 2024 are in terms of fiscal year 2019 cost levels. Allowance for inflation of 2.5 percent.

Costs shown in Table III-3 reflect the estimated total costs of the various projects. The Water Department anticipates financing a portion of these projects from deposits to the Capital Account of the Construction Fund ("Capital Account Deposits") (refer to Section III.E.3 for additional discussion regarding the Capital Account Deposit Amount), including transfers from the Residual Fund, and other non-bond sources. Table III-3 states projected FY 2019 through FY 2024 costs for the CIP at estimated FY 2019 cost levels based on the Water Department's approved FY 2019 capital budget. Line 16 of Table III-3 shows an annual inflation allowance of 2.5 percent beginning with FY 2020.

Table III-4 shows the total projected capital improvement costs, a net cash flow adjustment, and the annual net cash financing requirements associated with the CIP. The cash flow adjustment indicated in Table III-4 represents the net result of carrying forward encumbered costs that do not become a cash expenditure until a subsequent year. Black & Veatch anticipates estimated Engineering and Administration will be fully incurred costs during the fiscal year in which the Water Department budgets the costs. The Water Department anticipates it will be able to accomplish the processing of a higher level of annual capital expenditures compared to historical levels through the Study Period to meet the projected timeline for the objectives set forth in its LTCPU.

Table III-4 Annual Cash Capital Improvement Financing Requirement (in thousands of dollars)

Fiscal Year Ending June 30	Total Capital Improvements	Net Cash Flow Adjustment	Net Cash Financing Required
2019	353,705	(35,370)	318,335
2020	366,746	(36,675)	330,071
2021	417,395	(41,740)	375,655
2022	427,288	(42,729)	384,559
2023	441,389	(44,139)	397,250
2024	457,059	(45,706)	411,353

Net cash financing requirements indicated in Table III-4 are primarily met from future revenue bond issues, Capital Account Deposit Amounts, and transfers to the Capital Account from the Residual Fund. The Water Department anticipates issuing the projected revenue bonds to finance a major portion of the Water Department's share of costs as the encumbrances mature into actual cash payments to contractors. The annual net cash financing required for capital improvements through FY 2024 is expected to be met by the outstanding proceeds from the Water and Wastewater Revenue Bonds Series 2017A, proceeds from the proposed Series 2018A Bonds and the issuance of additional revenue bonds, including:

- $295,000,000 of revenue bonds anticipated to be issued in the first half of FY 2020;
- $310,000,000 of revenue bonds anticipated to be issued in the first half of FY 2021;
- $350,000,000 of revenue bonds anticipated to be issued in the first half of FY 2022;
- $355,000,000 of revenue bonds anticipated to be issued in the first half of FY 2023; and
- $360,000,000 of revenue bonds anticipated to be issued in the first half of FY 2024.

Table III-5 presents estimated projection of the flow of funds in the Construction Fund and Debt Reserve Account of the Water Department for FY 2019 through FY 2024. Line 1 of the table shows the total amount of the proposed revenue bond issues used to finance a portion of the Water Department's CIP. Lines 2 through 4 show the disposition of the proceeds of these revenue bond issues. Lines 6 through 18 of Table III-5 show the estimated receipts and disposition of funds in the Construction Fund and the Debt Reserve Account. Line 8 of Table III-5 shows that the Water Department anticipates no draws of Pennvest Loan proceeds for the Study Period. Line 9 of Table III-5 shows the annual Capital Account Deposit Amount transfer into the Capital Account of the Construction Fund. The projected amount of this deposit is equal to 1.0 percent of the net plant investment in water and wastewater facilities for FY 2019 and FY 2020 and 1.5 percent beginning in FY 2021. Lines 10 and 17 of Table III-5 show transfers from the Residual Fund into the Capital Account of the Construction Fund and Debt Reserve Account, respectively. For purposes of this Report, we have shown Residual Fund balances used as an additional source of cash financing of the Water Department's CIP. Line 18 of Table III-5 shows that no transfers from the Debt Reserve Account to the Revenue Fund are projected for the Study Period. The General Ordinance requires the Water Department to maintain the Debt Reserve Account fund balance at a level equal to the maximum annual debt service on senior debt.

Table III-5 Projected Flow of Funds - Construction Fund and Debt Reserve Account (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	Disposition of Bond Proceeds						
1	Proceeds From Sale of Bonds	302,240	295,000	310,000	350,000	355,000	360,000
	Transfers:						
2	Debt Reserve Account (a)	0	3,229	0	14,825	6,213	17,579
3	Cost of Bond Issuance (b)	2,239	1,652	1,736	1,960	1,988	3,600
4	Construction Fund (c)	300,001	290,119	308,264	333,215	346,800	338,821
5	Total Issue	302,240	295,000	310,000	350,000	355,000	360,000
	Construction Fund						
6	Beginning Balance	263,747	304,119	326,613	319,758	332,267	350,784
7	Transfer From Bond Proceeds	300,001	290,119	308,264	333,215	346,800	338,821
8	PENNVEST Loan Proceeds	0	0	0	0	0	0
9	Capital Account Deposit Amount	23,972	24,787	38,445	39,752	41,104	42,502
10	Transfer from Residual Fund to Capital Account	33,600	36,400	20,800	22,800	26,500	23,200
11	Total Available	621,320	655,425	694,123	715,525	746,671	755,307
12	Net Cash Financing Required	(318,335)	(330,071)	(375,655)	(384,559)	(397,250)	(411,353)
13	Interest Income	1,133	1,259	1,290	1,301	1,363	1,389
14	Ending Balance	304,119	326,613	319,758	332,267	350,784	345,343
	Debt Reserve Account						
15	Beginning Balance	200,505	200,505	203,734	203,734	218,559	224,772
16	Transfer From Bond Proceeds	0	3,229	0	14,825	6,213	17,579
17	Transfer From Residual Fund	0	0	0	0	0	0
18	Transfer to Revenue Fund	0	0	0	0	0	0
19	Ending Balance	200,505	203,734	203,734	218,559	224,772	242,350
	Interest Income						
20	Debt Reserve Account (d)	1,500	1,516	1,528	1,584	1,662	1,752

(a) Amount of Debt Service Reserve Account deposit estimated based on maximum annual future debt service payment.

(b) FY 2019 cost of bonds issuance based on preliminary pricing provided by Citigroup Global Markets Inc. FY 2020 to FY 2024 cost of bonds issuance assumed at 0.56 percent of issue amount.

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

(d) Interest income is transferred to the Residual Fund in the lesser amount of $4,994,000 or the annual interest earned on the Debt Reserve Account.

Lines 13 and 20 of Table III-5 show the estimated interest earnings from the investment of the Construction Fund and the Debt Reserve Account based on respective average annual balances. As previously indicated, we have assumed an interest earnings rate of 0.40 percent for the Debt Reserve Account and the Construction Fund. In accordance with the General Ordinance, Black & Veatch has included a deposit to and a transfer from the Residual Fund to provide the annual payment to the City General Fund in an amount not to exceed the lesser of $4,994,000 and the annual interest earnings on the Debt Reserve Account.

E. PROJECTED REVENUE REQUIREMENTS

The annual revenue requirements of the Water Department consist of operating expenses for existing and proposed water and wastewater system facilities, including interdepartmental charges for services provided to the Water Department by other departments of the City, debt service on all obligations issued by the Water Department, projected Capital Account Deposit Amounts, and a payment to the City General Fund. In addition, revenues must be adequate to meet applicable rate covenants, as set forth in the General Ordinance.

1. Operating Expenses

Operating expenses consist of all costs of the Water Department necessary and appropriate for the operation, maintenance, and administration of the water and wastewater systems during each year; this includes interdepartmental charges, which encompass fringes for water fund employees (i.e. pensions and benefits), and services from other City departments including WRB and OIT. Shown on Table III-6 are projections of operating expenses for the Water and Wastewater System for the FY 2019 through FY 2024. Projections of operating expenses include expenses such as personal services, purchased services including power, materials and supplies, equipment, pensions and benefits, as well as indemnities.

Table III-6 Projected Operation and Maintenance Expense (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	Total Water Fund						
1	Personal Services	115,125	119,144	123,219	127,347	131,168	135,103
2	Purchase of Services	157,690	159,246	163,612	168,121	172,777	177,709
3	Materials and Supplies	41,689	42,216	42,536	42,858	43,183	43,511
4	Equipment	4,328	4,384	4,441	4,499	4,558	4,617
5	Contributions, Indemnities, Refunds and Taxes	8,457	8,654	8,857	9,064	9,277	9,495
6	**Subtotal Departmental Charges**	**327,290**	**333,645**	**342,665**	**351,890**	**360,962**	**370,434**
7	Pension and Benefits	138,340	143,088	146,698	150,749	154,611	159,400
8	Office of Information and Technology	25,583	24,816	25,547	26,302	27,080	27,899
9	Water Revenue Bureau	15,254	15,704	16,169	16,648	17,142	17,656
10	Other	22,400	22,723	23,052	23,473	23,844	24,228
11	**Subtotal Interdepartmental Charges**	**201,576**	**206,331**	**211,466**	**217,171**	**222,677**	**229,183**
12	**Subtotal Operating Expenses**	**528,866**	**539,976**	**554,131**	**569,061**	**583,639**	**599,617**
13	Less: Liquidated Encumbrances	(29,645)	(29,999)	(30,795)	(31,616)	(32,463)	(33,357)
14	**Total Operating Expenses**	**499,222**	**509,978**	**523,336**	**537,445**	**551,176**	**566,260**

Direct operating expense projections shown in Table III-6 include recognition of the potential impact of anticipated escalation in costs due to inflation during the Study Period. Black & Veatch based FY 2019 expenses on the Water Department's adopted budgeted expenditures for that year. Black & Veatch conducted an analysis of previous years' budgets and actual obligations by functional division and by budgetary object class within each division and subsequently adjusted the adopted budgeted expenditures for FY 2019 downward slightly to reflect recent actual obligation experience. Projections for the outer years of the projections period reflect anticipated reductions in actual expenditures based upon reduced purchase of services associated with maturing programs after FY 2019.

Over the Study Period, the Water Department expects projected operating expenses to increase for the following categories as provided below:

- Labor costs:
  - FY 2020 to FY 2024 – 3.0 percent annual increase
- Electric power costs:
  - FY 2020 – 0.0 percent
  - FY 2021 to FY 2024 – 3.0 percent annual increase
- Natural Gas costs:
  - FY 2020 – 0.0 percent
  - FY 2021 to FY 2024 – 3.0 percent annual increase
- Chemical costs:
  - FY 2020 – 2.0 percent
  - FYs 2021 to FY 2024 - 1.0 percent annual increase
- Purchased services:
  - FY 2020 to FY 2024 – 3.3 percent annual increase
- Materials and supplies:
  - FY 2020 to FY 2024 – 0.5 percent annual increase
- Equipment expenditures:
  - FY 2020 to FY 2024 – 1.3 percent annual increase

Table III-6 also includes interdepartmental charges for service provided to the Water Department by other City departments and fringes for water fund employees anticipated through the Study Period. These charges represent the Water Department's proportionate charge for services provided directly by other City departments and agencies, including WRB, which has responsibility for the collection of revenue for water and wastewater service provided by the Water Department. Executing this responsibility requires meter reading, maintaining customer accounts, billing, collecting payments, enforcing payments, and customer relations. Also included as interdepartmental expenses are the Water Department's pension and benefit costs.

Projections of interdepartmental expenses are based on the adopted budget for FY 2019. Cost escalation factors used to project expenditures for the Study Period are the same as those used to project direct Water Department operating expenditures mentioned above. In addition, projected pension and fringe benefit costs increase in accordance with projections provided by the City's Finance Department and reflect funding the capital related pension and fringe benefit costs as annual operating expenses, which began in FY 2018. The projected pension costs are based on the FY 2019 budget adjusted to reflect the Water Fund's current allocable share of the overall City pension costs (based on the actual FY 2018 pension costs) and escalated annually beginning in

FY 2020.The projected average annual increase in pension and benefits during the Study Period is 2.9 percent.

2. Debt Service Requirements

Line 1 of Table III-8 shows projected debt service on outstanding revenue bonds for the Study Period. The projection of debt service on outstanding revenue bonds reflects projected debt service schedules provided by the Water Department and the underwriter for the Series 2018A Bonds. The projected debt service payments on the outstanding variable rate bonds reflect the following assumptions based on discussions with and guidance from Water Department staff:

- Series 1997B. The projected interest cost is estimated based on an interest rate of 3.0 percent.
- Series 2005B. The projected interest cost for the Study Period reflects an overall average interest rate of 4.53 percent in FY 2019. As of September 2018, these bonds have matured all related payments have been made on these bonds.

The Water Department's projected debt service on currently outstanding bonds (excluding outstanding Pennvest loans) decreases significantly during the Study Period (decreasing from approximately $176.1 million in FY 2019 to approximately $107.4 million in FY 2024). Table III-7 presents the Water Department's assumptions for the debt service structure of the anticipated bonds in FY 2020 to FY 2024.

Table III-7 Future Debt Service Schedule

Fiscal Year	Issuance	Initial Maturity	Final Maturity
2020	December 2019	October 2021	October 2051
2021	December 2020	October 2022	October 2052
2022	December 2021	October 2023	October 2053
2023	December 2022	October 2024	October 2054
2024	December 2023	October 2025	October 2055

The projected debt service on outstanding and proposed bond issues does not reflect the savings anticipated as a result of the proposed issuance of the 2018B Bonds.

Projected debt service for the 2018A Bonds and the anticipated bond issues in FY 2020 to FY 2024 reflect bond issuance in the first half of the fiscal year with October and April interest payments. For the purposes of this Report, Black & Veatch is using the debt service schedules for the Series 2018A Bond issue based upon the preliminary pricing provided by the Citigroup Global Markets Inc., an underwriter for the 2018A Bonds. For the projected subsequent bond issues of $295,000,000 in FY 2020, $310,000,000 in FY 2021, $350,000,000 in FY 2022, $335,000,000 in

FY 2023, and $360,000,000 in FY 2024, we are assuming a 30-year term and a 5.25 percent interest rate. Table III-8 summarizes the total revenue bond debt service projected for the Study Period.

Line 10 of Table III-8 shows the debt service payments on the outstanding Pennvest loans.

Table III-8 Future Debt Service Requirements (in thousands of dollars)

Line		Fiscal Year Ending June 30,					
No.	Description	2019	2020	2021	2022	2023	2024
	Revenue Bonds						
1	Existing (a)	176,140	164,217	142,398	132,668	131,955	107,445
	Proposed						
2	Fiscal Year 2019 (b)	4,811	23,717	23,217	22,717	17,342	12,217
3	Fiscal Year 2020 (c)		5,163	15,488	19,629	19,623	19,617
4	Fiscal Year 2021 (c)			5,425	16,275	20,627	20,621
5	Fiscal Year 2022 (c)				6,125	18,375	23,288
6	Fiscal Year 2023 (c)					6,213	18,638
7	Fiscal Year 2024 (c)						6,300
8	**Total Proposed**	**4,811**	**28,879**	**44,129**	**64,746**	**82,179**	**100,680**
9	**Total Revenue Bonds**	**180,951**	**193,096**	**186,527**	**197,414**	**214,134**	**208,125**
	Pennvest Loans						
10	Pennvest Parity Loans	10,684	10,638	10,638	10,638	10,638	10,638
	Transfer to Escrow						
11	Transfer to Escrow	0	0	0	0	0	0
12	**Total Debt Service**	**191,635**	**203,734**	**197,164**	**208,052**	**224,772**	**218,763**

(a) Assumes the average interest rates of 3.0 % for the Variable Rate Series 1997B Bonds and 4.53% for the Variable Rate Series 2005B Bonds.

(b) Based on preliminary pricing provided by Citigroup Global Markets Inc. Assumed to be issued during the first half of the fiscal year.

(c) Assumes interest only payments through the first two fiscal years following issue based on 5.25% interest rate. Assumed to be issued during the first half of the fiscal year.

3. Capital Account Deposit Amount

The General Ordinance establishes a Capital Account as an account within the Construction Fund. The City covenants under the General Ordinance to make one deposit to the Capital Account as of June 20th of each fiscal year in an amount not less than one percent of the total net plant investment in water and wastewater facilities (the "Capital Account Deposit Amount"). The Water Department must use amounts in the Capital Account to fund annual renewals, replacements, and improvements to maintain adequate water and wastewater service to the areas served by the system. The projected level of the annual Capital Account Deposit Amount reflects the current level of net plant investment in water and wastewater facilities, the historical rate of growth in net plant investment value, and increasing the Capital Account Deposit Amount from 1.0 percent of net plant investment to 1.5 percent of net plant investment in FY 2021. The projected FY 2019 requirement amounts to $23,972,000 and increases during the Study Period to $42,502,000 in FY 2024.

4. City General Fund Deposit

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

F. ADEQUACY OF PROJECTED REVENUES TO MEET PROJECTED REVENUE REQUIREMENTS UNDER GENERAL ORDINANCE

Table III-9 presents a statement of projected revenues and revenue and rate covenant requirements for water and wastewater operations for FY 2019 through FY 2024 under the stipulations of the General Ordinance. The table provides an indication of the adequacy of system revenues and the feasibility of the issuance of the 2018A and 2018B Bonds and future anticipated revenue bond sales during the Study Period.

Projections of annual operating revenue for water and wastewater service shown on Lines 1 and 2 of Table III-9 include revenue from retail customers under the rate levels in effect as of September 1, 2018 and September 1, 2019, as previously presented in Table III-2. Lines 4 through 8 indicate estimated additional service revenue required in each fiscal year to meet revenue requirements and rate covenant compliance during the Study Period.

As indicated by the positive year-end balances shown on Line 33 of Table III-9, the adopted rates effective September 1, 2018 and September 1, 2019 and proposed future revenue increases beyond FY 2020 are projected to be adequate to satisfy the basic City Charter and Rate Ordinance requirements based on the assumptions and conditions described previously. The proposed revenue increases should provide the Water Department sufficient revenues to meet all operating expenses of the water and wastewater systems, debt service requirements on all obligations issued for the water and wastewater systems, and certain payments to the City General Fund, as well as other specific bond ordinance covenants.

In addition to meeting the requirements listed above, the City has covenanted under the General Ordinance that during each fiscal year it will, at a minimum, impose, charge, and collect in each fiscal year such water and wastewater rents, rates, fees, and charges as shall yield net revenues which shall be equal to at least:

(i) 1.20 times the debt service requirements for such fiscal year (recalculated to exclude therefrom principal and interest payments in respect of Subordinated Bonds);

(ii) 0.90 times the debt service requirements for such fiscal year (recalculated to exclude therefrom principal and interest payments in respect of Subordinated Bonds), provided that Net Revenues shall be calculated to exclude any transfers from the Rate Stabilization Fund

(iii) 1.00 times the sum of the following:

  a. the debt service requirements for such fiscal year (including debt service requirements in respect of Subordinated Bonds);

b. amounts required to be deposited into the Debt Reserve Account during such fiscal year;

c. the principal or redemption price of and interest on General Obligation Bonds payable during such fiscal year;

d. debt service requirements on interim debt payable during such fiscal year; and

e. the Capital Account Deposit Amount for such fiscal year (less any amounts transferred from the Residual Fund to the Capital Account during such fiscal year).

To comply with the General Ordinance covenants discussed above, additional water and wastewater service revenue, above the increase in rates which were in effect on September 1, 2019, are necessary during the Study Period, and Lines 4 through 8 of Table III-9 reflect such requirements in the revenue projections. As shown on Lines 23 and 30 of Table III-9, the levels of additional service revenue projected for the Study Period are adequate to provide for the debt service coverage requirements as described above, and as mentioned previously, the positive year-end balances shown on Line 33 of Table III-9 indicate that the Water Department will satisfy City Charter and Rate Ordinance requirements. It is important to note that under the General Ordinance, which provides for the various rate covenants discussed above, the Water Department utilizes the Rate Stabilization Fund, along with necessary increases in revenue, to manage its debt service coverage on its senior lien bonds to meet the required 1.20 level each year. As shown on Line 23 of Table III-9, senior debt service coverage is projected to be 1.30 during the Study Period. This reflects the Water Department's intent to increase coverage to generate additional cash funded capital funds through the planned increase in the annual Capital Account Deposits in FY 2021 and additional transfers from the Residual Fund.

Table III-9 presents the Flow of Funds in the Residual Fund (Lines 31-38 for the Study Period through FY 2024). As indicated on Line 38 of Table III-9, the Residual Fund end of year fund balance remains at $15.0 million in FY 2019 through FY 2024. In accordance with the General Ordinance, the Water Department may use funds in the Residual Fund for the following purposes: (1) to pay operating expenses; (2) to fund transfers to any fund or account other than the Revenue Account and the Rate Stabilization Fund; (3) to pay principal and interest on any revenue bonds and general obligation debt; (4) for the payment of amounts due under capitalized leases or similar obligations; and (5) to fund required transfers to the City's General Fund. One of the most prudent uses of such funds is for capital program financing in future years. Accordingly, for purposes of this Report, we have indicated the annual transfers of available Residual Fund balances to the Construction Fund in the amounts shown on Line 35 of Table III-9.

Table III-9 Projected Revenue and Revenue Requirements (in thousands of dollars)

Line No.	Description			2019	2020	2021	2022	2023	2024
				Fiscal Year Ending June 30,					
	OPERATING REVENUE								
1	Water Service - Existing Rates			282,998	281,665	279,030	276,520	274,051	271,596
2	Wastewater Service - Existing Rates			436,512	441,575	440,485	437,168	433,543	431,259
3	Total Service Revenue - Existing Rates			719,510	723,240	719,515	713,688	707,594	702,855
	Additional Service Revenue Required								
	Year	Percent Increase	Months Effective						
4	FY 2021	8.20%	10			48,238	58,522	58,023	57,634
5	FY 2022	4.60%	10				29,042	35,218	34,982
6	FY 2023	4.60%	10					30,119	36,592
7	FY 2024	2.00%	10						13,606
8	Total Additional Service Revenue Required			0	0	48,238	87,565	123,360	142,814
9	Total Water & Wastewater Service Revenue			719,510	723,240	767,753	801,253	830,954	845,669
	Other Income (a)								
10	Other Operating Revenue			17,215	14,142	11,167	11,071	10,975	10,604
11	Operating Fund Interest Income			409	364	434	451	449	460
12	Rate Stabilization Interest Income			690	596	523	534	544	556
13	**Total Revenues**			**737,823**	**738,341**	**779,876**	**813,308**	**842,922**	**857,288**
	OPERATING EXPENSES								
14	Water & Wastewater Operations			(297,645)	(303,647)	(311,870)	(320,273)	(328,499)	(337,077)
15	Direct Interdepartmental Charges			(201,576)	(206,331)	(211,466)	(217,171)	(222,677)	(229,183)
16	**Total Operating Expenses**			**(499,222)**	**(509,978)**	**(523,336)**	**(537,445)**	**(551,176)**	**(566,260)**
	NET REVENUES								
17	Transfer From/(To) Rate Stabilization Fund			10,600	36,500	(200)	(5,300)	500	(6,600)
18	**NET REVENUES (L13 +L16+L17)**			**249,202**	**264,864**	**256,340**	**270,564**	**292,245**	**284,429**
	DEBT SERVICE								
	Senior Debt Service								
	Revenue Bonds								
19	Outstanding Bonds			(176,140)	(164,217)	(142,398)	(132,668)	(131,955)	(107,445)
20	Pennvest Parity Bonds			(10,684)	(10,638)	(10,638)	(10,638)	(10,638)	(10,638)
21	Projected Future Bonds			(4,811)	(28,879)	(44,129)	(64,746)	(82,179)	(100,680)
22	Total Senior Debt Service			(191,635)	(203,734)	(197,164)	(208,052)	(224,772)	(218,763)
23	**TOTAL SENIOR DEBT SERVICE COVERAGE (L18/L22)**			**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**	**1.30 x**
	Subordinate Debt Service								
24	Outstanding General Obligation Bonds			0	0	0	0	0	0
25	Pennvest Subordinate Bonds			0	0	0	0	0	0
26	Total Subordinate Debt Service			0	0	0	0	0	0
27	Transfer to Escrow			0	0	0	0	0	0
28	Total Debt Service on Bonds Plus Transfer to Escrow			(191,635)	(203,734)	(197,164)	(208,052)	(224,772)	(218,763)
29	**CAPITAL ACCOUNT DEPOSIT**			(23,972)	(24,787)	(38,445)	(39,752)	(41,104)	(42,502)
30	TOTAL COVERAGE (L18/(L22+L26+L29))			1.15 x	1.15 x	1.08 x	1.09 x	1.09 x	1.08 x

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	RESIDUAL FUND						
31	Beginning of Year Balance	15,030	15,085	15,087	15,078	15,098	15,028
32	Interest Income	60	60	60	60	60	60
	Plus:						
33	End of Year Revenue Fund Balance	33,594	36,342	20,730	22,760	26,370	23,165
34	Deposit for Transfer to City General Fund (b)	1,500	1,516	1,528	1,584	1,662	1,752
	Less:						
35	Transfer to Construction Fund	(33,600)	(36,400)	(20,800)	(22,800)	(26,500)	(23,200)
36	Transfer to City General Fund	(1,500)	(1,516)	(1,528)	(1,584)	(1,662)	(1,752)
37	Transfer to Debt Service Reserve Fund	0	0	0	0	0	0
38	End of Year Balance	15,085	15,087	15,078	15,098	15,028	15,053

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

(b) Transfer of interest earnings from the Debt Reserve Account to the Residual Fund as shown in Line 34 to satisfy the requirements for the Transfer to the City General Fund.

Table III-10 presents the flow of funds of the Rate Stabilization Fund from FY 2019 through FY 2024. The balance of funds projected in the Rate Stabilization Fund at the end of FY 2018 amounts to $177,760,000. The Water Department has indicated the need to maintain a combined balance in the Rate Stabilization and Residual Funds to provide for working capital needs and has established a Rate Stabilization Fund balance target of $135 million, as stipulated in the FY 2019 and FY 2020 decision issued by the Rate Board. The updated projection of revenues for FY 2019 to FY 2024 recognize the levels required to meet projected revenue requirements and debt service coverage covenants and to maintain the end of FY 2024 Rate Stabilization Fund and Residual Fund cumulative balance to provide for adequate cash reserves. Cash reserves represent the financial resources the Water Department can access to deal with cash flow needs, as impacted by volatility in expenses or disruption in revenues. The Water Department's unrestricted cash includes the Rate Stabilization Fund and Residual Fund. The term unrestricted applies to funds that are readily available for any financial need, as opposed to restricted funds that have a specified use (e.g. Debt Service Reserve Fund).

Projected FY 2021 to FY 2024 additional service revenues require the authorization of the rate increases required for these additional revenues.

Table III-10 Rate Stabilization Fund Flow of Funds (in thousands of dollars)

Line No.	Description	Fiscal Year Ending June 30, 2019	2020	2021	2022	2023	2024
	RATE STABILIZATION FUND						
1	Beginning of Year Balance	177,760	167,160	130,660	130,860	136,160	135,660
2	Deposit From/(To) Revenue Fund	(10,600)	(36,500)	200	5,300	(500)	6,600
3	End of Year Balance	167,160	130,660	130,860	136,160	135,660	142,260

G. CONCLUSIONS

Based upon the assumptions recognized in this Report regarding the estimated future annual financial operations of the Water and Wastewater Systems, it is our opinion that:

- The Water and Wastewater Systems will yield pledged Project Revenues (including projected revenue increases indicated in this Report) over the amortization period of the Bonds sufficient to meet the payment or deposit requirements of: all expenses of operation, maintenance, repair and replacement of the Water and Wastewater Systems; all reserve funds required to be established out of such Project Revenues; the principal or redemption price and interest on all Bonds, as the same become due and payable, for which such Project Revenues are pledged; and, the Rate Covenant set forth in Section 5.01 of the General Ordinance; and

- The Net Revenues are currently sufficient to comply with the Rate Covenant and are projected to be sufficient (including projected revenue increases indicated in this Report) to comply with the Rate Covenant for each of the two fiscal years following the fiscal year in which the Bonds are issued, which is inclusive of the requirement that the system should yield Net Revenues excluding amounts transferred from the Rate Stabilization Fund into the Revenue Fund of at least 90 percent of the Debt Service Requirements (excluding debt service due on any Subordinated Bonds) during each fiscal year.

IV. Water System

A. INTRODUCTION

The Water Department began service in 1801 with the dedication of two pumping stations that raised water from the Schuylkill River to two elevated tanks located where City Hall now stands. From there the water flowed to the homes of early Philadelphia through wooden pipes. The Water Department has continued to serve the City's growing needs without interruption since this beginning, through continual adaptation of the latest technological advancements in water service.

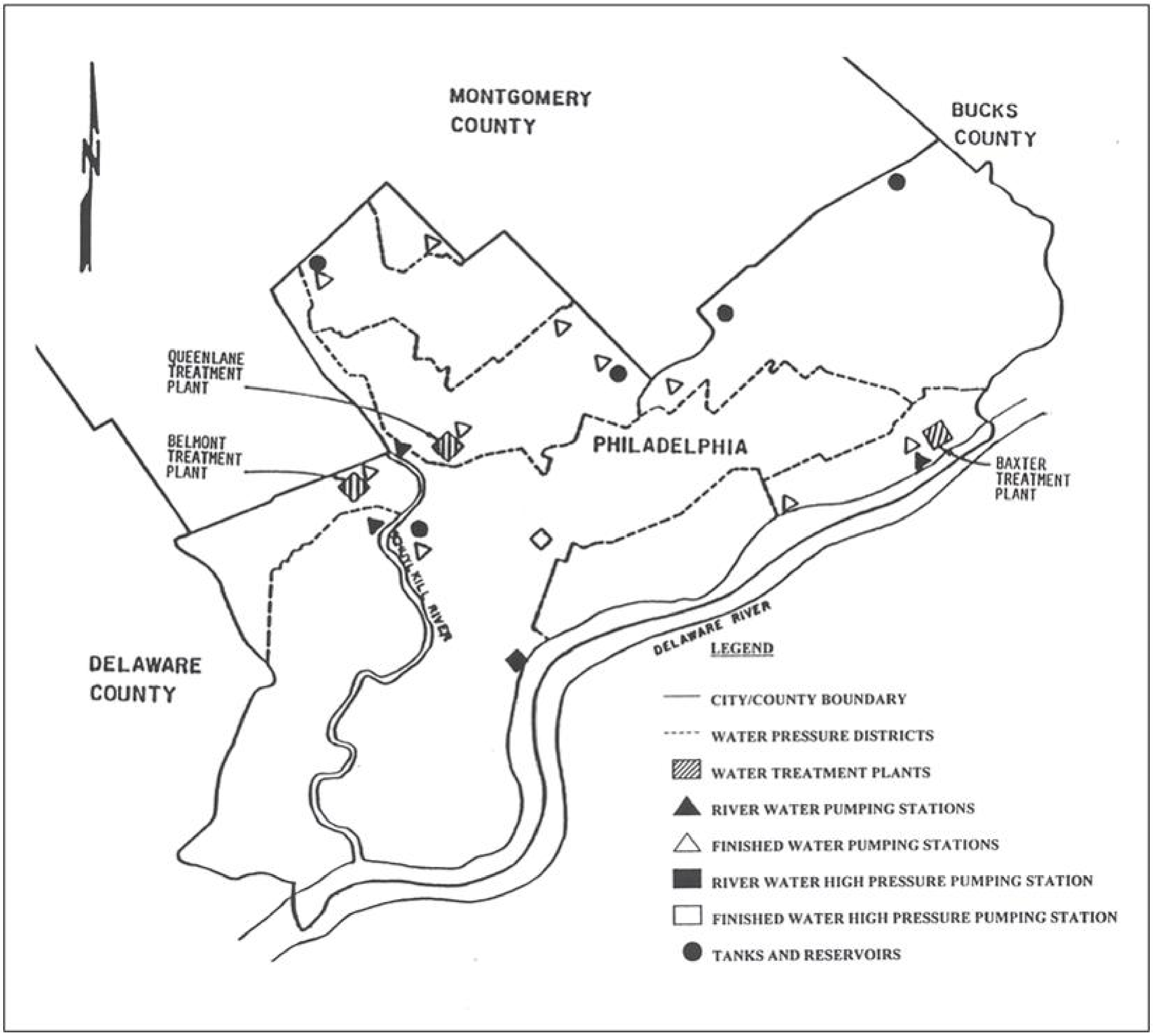
Today, the major elements of the water system include three river supply intakes, three treatment plants, storage facilities and a conveyance network. Figure IV-1 on the following page shows the water system service areas and major facilities.

B. WATER SUPPLY

The Water Department presently supplies water to Philadelphia and portions of Montgomery County and Delaware County. The Water Department provides service to Montgomery and Delaware Counties under an agreement signed in FY 2000 with Aqua Pennsylvania, Inc., a subsidiary of Aqua America, Inc., which provides for the sale of treated water at a rate of up to 9.5 mgd.

The Water Department obtains approximately 58 percent of the water supply from the Delaware River and 42 percent from the Schuylkill River. These withdrawals are authorized under water allocations granted to the City of Philadelphia by the PaDEP and a water entitlement by the DRBC. The DRBC is an interstate agency responsible for regulation of water resources in the Delaware River Basin. It is accountable to the states of Delaware, New Jersey, New York and Pennsylvania, and to the federal government.

The Water Department participates with the DRBC on drought and flow management planning and the Water Department is prepared to address future drought conditions should they occur. A 1983 Agreement among the states dependent on the Delaware River established patterns of division for the Basin's resources during formally declared drought periods. The Water Department has used this agreement and resulting drought management plans to effectively manage drought emergencies declared in the past and expects to effectively address future drought emergencies. The Water Department participated in flow management planning with the DRBC as an advisor to Pennsylvania on the Supreme Court Consent Decree Parties Flow Working Group for the Delaware River. This effort led to the parties signing a Flow Management Plan that ensures adequate supplies for all users and provides protection against salt line migration, which is a significant concern for the Water Department.



Note: In January 2005, both the River Water High Pressure Pumping Station and the Finished Water High Pressure Pumping Station were decommissioned. These facilities are those shown above and remain in place, but have been taken out of service. The standard pressure fire protection system, which has been utilized for the provision of fire protection service to Center City for many years, replaces the decommissioned non-potable water high pressure fire system.

Figure IV-I Water System Facilities

The Water Department's ability to draw water supply from both the Schuylkill and the Delaware Rivers provides flexibility and additional drought protection as it is not dependent on a single-source of supply. The current permit for water withdrawal with PaDEP allows for the withdrawal of 423 mgd and 258 mgd from the Delaware River and Schuylkill River, respectively. These allocation limits are well above the treatment capacities of the Water Department's three treatment plants. As of September 2018, Philadelphia County, which includes most of the Water Department's customers, was not under a drought watch or warning as declared by PaDEP.

1. System Capacity

The Water Department delivers water through an integrated system that reflects the PaDEP allocation and DRBC entitlements, and contains raw water intake capability, treated water capacity, and storage capacity commensurate with those entitlements. The total rated capacity of the three water treatment plants is 546 mgd. The capacities of other elements within the water supply system appear in Table IV-1. Compared with these capacities, the average annual daily treated water supplied in FY 2017 and FY 2018 were both 223 mgd.

2. Population

The population served by the Water System is approximately 1,580,563 based on the 2017 Census Bureau estimate. The Water Department also holds one wholesale contract with Aqua Pennsylvania, Inc. This represents slight population growth within the City compared to the 2010 Census, and, growth for the service area is generally expected to be flat out to the year 2030. Declining average customer consumption is accounting for lower water delivery from the treatment plants. This value stood at approximately 223 mgd for FY 2018. The reduction in consumption will impart both a slight reduction in water revenue and marginal operating costs. The Financial Requirements presented in Section III does not reflect any marginal reduction in operating costs because of the reduction in consumption. In summary, the water treatment, storage, and distribution facilities are of adequate capacity to provide for the present and foreseeable future requirements.

Table IV-1 Water System Capacities

FACILITY	RAW WATER PUMPING CAPACITY	ALLOCATION, MAXIMUM DAILY WITHDRAWAL	HYDRAULIC TREATMENT CAPACITY	TREATMENT CAPACITY FOR PARTNERSHIP FOR SAFE WATER	TOTAL WATER STORAGE CAPACITY	
					Raw Water	Treated Water
	mgd	mgd	mgd	mgd	mg	mg
Queen Lane Plant	200		150	140	207.2	85.0
Belmont Plant	170		110	86	83.3	42.1
Schuylkill Supply		258				
Baxter Plant	480		420	320	170.0	206.8**
Delaware Supply		423 per PaDEP				
Distribution System*					--------	154.55**
System Totals	**850**	**681 per PaDEP**	**680**	**546**	**460.5**	**488.4**

mg – million gallons

mgd – million gallons per day

* Includes treated water stored at East Park Tank(s), Roxborough Basins and Standpipes, Somerton Standpipes, Fox Chase Tank, and Oak Lane Reservoir.

** There are currently capital projects underway for the Baxter Plant clearwell and East Park Reservoir facilities. This total treated water storage in the distribution system represents the capacity as of the writing of this report. The total treated water storage capacity will increase upon completion of the projects.

C. WATER SYSTEM PLANNING INITIATIVES AND COMPLIANCE

The Water Department works to maintain continuous compliance with all drinking water regulations and adapt to regulatory requirements as they evolve. This Section describes the Water Department's water quality initiatives, compliance with present regulations, and the ongoing planning initiatives and actions to meet anticipated future regulations, water system demands and Water Department goals.

1. Partnership for Safe Water

Since January 1996, when the Water Department signed a voluntary agreement with the USEPA to participate in the Partnership for Safe Water Program (the "Partnership"), the Water Department has committed to reducing turbidity, an industry standard measure of water quality and water treatment effectiveness. The purpose of the multi-phased Partnership is to provide a format for drinking water utilities around the country to survey their facilities, treatment systems, operations, maintenance, and management to identify opportunities and implement practices that will enhance the water system's potential to prevent the entry of *Cryptosporidium, Giardia*, and other parasitic organisms into the treated water. The Water Department joined approximately 300 other water treatment utilities in evaluating and assessing their water treatment procedures against extremely stringent performance goals. The self-assessments and other reviews focused on improvements that do not require incurring substantial capital or operating expenditures. Through these efforts, the turbidity of Philadelphia's drinking water is consistently about five times lower than required by state and federal requirements. The stringent quality standards of the Partnership result in less available capacity (546 mgd) when compared to the total hydraulic capacity (680 mgd) of the treatment plants. Recent peak demands are still well within the Partnership capacities for each treatment plant.

In 1998, Philadelphia became the first major city in the U.S. with multiple drinking water plants to receive an USEPA Director's Award for meeting certain additional requirements of the Partnership for Safe Water (Phase III of the program), including completion of a self-assessment and peer review. In 2013, the Water Department received the 15-year Director's Award marking fifteen consecutive years achieving Partnership for Safe Water - Phase III Goals. The Water Department continues to meet or exceed all Phase III requirements. This represents a tremendous accomplishment and has resulted in overall lower turbidity of its finished drinking water and enhanced public health protection. These efforts have also enabled the Water Department to meet the requirements of the Interim Enhanced Surface Water Treatment Rule and the Long Term 2 Enhanced Surface Water Treatment Rule ("LT2ESWTR").

In the spring of 2011, the Water Department extended its commitment to the protection of public health and the Partnership process by becoming a charter member of the Partnership for Safe Water's Distribution System Optimization program. This program builds upon the self-assessment and optimization pillars of the Water Treatment Program but focuses on the distribution system. Recognizing that water quality changes from the time the water leaves the plant to when it reaches the customer tap, this program encourages and assists utilities in evaluating their distribution system operations and developing strategies for improvement. The program emphasizes improving distribution system integrity, particularly in the areas of water quality, hydraulic reliability, and physical security. The cornerstone of the program is the self-assessment through which the utilities identify limiting factors to develop an improvement plan.

The Water Department completed the Phase II data collection and reporting requirements and submitted those results to the Partnership. The Water Department also completed the Phase III self-assessment, which included identifying areas for system optimization that do not require capital improvements by focusing on the nineteen (19) performance limiting factors ("PLFs") identified by the Partnership. To complete the assessment, the Water Department conducted a series of internal interviews during which younger staff interviewed experienced "subject matter experts" in each of the PLF areas to identify opportunities for improvement. In the process, the Water Department also identified performance improvement initiatives or areas for improvement that the Partnership did not specifically address. The Water Department compiled the results of the assessment into a series of summary reports identifying potential improvements within specific operational areas and distributed the reports to the appropriate operating unit for consideration and integration in future operations as appropriate. Additionally, the Water Department recently used the assessment tools to evaluate the Water Department's capability to meet PaDEP's proposed Disinfection Residual Requirements Rule.

2. Regulatory Requirements

The water operations of the Water Department are subject to the requirements of the SDWA of 1974, as amended in 1986 and 1996. The 1986 Amendments extended the regulatory agenda of the USEPA to include, among other things, the development of drinking water standards for 83 contaminants, criteria by which surface water supplies would be required to utilize filtration performance standards for disinfection, and the banning of lead-containing materials from distribution and home plumbing systems. The 1996 Amendments changed the emphasis of developing rules only slightly, adding focus on issues such as the protection of source waters, annual reports to consumers on the quality of their drinking water, regulation of filter backwash water within treatment facilities, and the establishment of a state revolving loan fund. Since 1998, several additional rules relevant to the Water Department have been implemented including: the Interim Enhanced Surface Water Treatment Rule ("ESWTR"), the Stage 1 Disinfectants and Disinfection Byproducts Rule ("Stage 1 D/DBPR"), the Radionuclides Rule, the Arsenic Rule, the LT2ESWTR, and the Stage 2 Disinfectants/Disinfection Byproducts Rule ("Stage 2 D/DBPR"). Additionally, in September 1999, the USEPA promulgated the Unregulated Contaminant Monitoring Rule ("UCMR"), with two additional rounds of monitoring having been required since that time and a fourth round anticipated in 2019.

The Water Department has an extensive water quality monitoring program to assess the potential impacts of, and ensure compliance with the SDWA regulations. The Water Department's BLS analyzes approximately 2,500 drinking water samples each month collected from the water treatment plants, storage reservoirs, and the distribution system. The Water Department's Planning and Environmental Services Division tracks the development of regulations, provides input into the formulation of the regulations, and works cooperatively with the Operations Division to conduct research (laboratory, pilot, and plant scale) to position the Water Department to meet future regulations.

The Water Department's treated water quality, as reported to the public annually in the Consumer Confidence Report, meets all existing drinking water regulations. Several of the key regulations that drive the Water Department's treatment operations are discussed below.

a) Lead and Copper Rule

In June 1991, the USEPA promulgated the Lead and Copper Rule ("LCR"). It addresses the control of copper and lead that may leach from home plumbing systems. Compliance with the rule is based upon treatment technique requirements that are triggered if measured lead and copper levels exceed the action levels of 0.015 milligrams per liter ("mg/L") for lead or 1.3 mg/L for copper at more than 10 percent of customer taps sampled.

Compliance Status: The Water Department is in full compliance with the regulation. The Water Department has a uniform treatment approach at all three water treatment plants, using optimized pH and a zinc orthophosphate corrosion inhibitor. The Water Department adds zinc orthophosphate at a dose of 1.5 parts per million ("ppm") phosphate to water to minimize the release of lead and copper from the service lines and internal piping in residences, commercial and industrial facilities.

The Water Department achieved a 90th percentile lead level of 0.005 mg/L and a 90th percentile copper level of 0.3 mg/L based on 2014 monitoring results. In 2016, the Water Department participated in a special round of non-compliance LCR monitoring and achieved a 90th percentile lead level of 0.003 mg/L and a 90th percentile copper level of 0.312 mg/L. The Water Department recently completed compliance monitoring during 2017, with the Water Department achieving a 90th percentile lead level of 0.002 mg/L and a 90th percentile copper level of 0.2 mg/L. An additional round of compliance sampling will take place during 2019, by request of the PaDEP, to get the Water Department on the same schedule as other water systems in Pennsylvania. The Water Department is complying with the requirements of the associated Optimized Corrosion Control Treatment permit, which requires finished water levels of phosphate to be greater than 0.2 mg/L as phosphorus and finished water pH to be between 6.8 and 7.8.

The Water Department participated on the USEPA's National Drinking Water Advisory Council's Lead and Copper Work Group during 2014-2015. The Work Group reviewed the LCR and recommended changes and updates to the LCR. Based on the US General Services Administration's Spring 2018 Agenda of Regulatory Actions, the Water Department expects the USEPA to take those recommendations and additional information into account in proposing a revised, long-term LCR by February 2019, with a final rule currently anticipated during February 2020. BLS stays involved in national conversations concerning this rule through participation in American Water Works Association committees.

b) Total Coliform Rule

The Total Coliform Rule ("TCR") was published in 1989 and became effective in 1990. It set goals and limits for the presence of total coliforms in drinking water and required water systems to monitor for total and fecal coliform at specific locations throughout their distribution systems. The USEPA published revisions to the TCR in February 2013. The Water Department participated in technical reviews that supported the revisions to the rule and has provided ongoing support in the national awareness of rule changes. The Revised Total Coliform Rule ("RTCR") became effective beginning April 1, 2016.

The RTCR removed the maximum contaminant level ("MCL") for total coliform that was established under the TCR, and focuses more on using detection of total coliform as a means of identifying and addressing potential contamination issues. The rule also established criteria that enabled systems to transition to reduced monitoring requirements. Such an approach creates incentives for better system operation and has the potential to reduce the monitoring burden. The RTCR maintained the MCL for *E. coli* and the associated required actions.

Compliance Status: The Water Department is in full compliance with the RTCR. The Water Department routinely monitors and tests for the presence of total coliforms and *E. coli* from over 70 representative RCTR compliance locations within the distribution system and has not had any violations of the rule.

c) Disinfectants/Disinfection By-products Rule

This rule regulates levels of disinfectants and disinfection by-products by defining maximum residual disinfectants levels ("MRDLs"), MCLs for disinfection by-products and a treatment technique for total organic carbon removal. Stage 1 of the rule reduced the MCL for total trihalomethanes ("TTHM") from 100 micrograms per liter ("µg/L") to 80 µg/L and established an MCL of 60 µg/L for the sum of five haloacetic acids ("HAA5"), another group of disinfection by-products. Under the Stage 1 rule, purveyors calculate a system-wide running annual average ("RAA") and, to achieve compliance with the MCL for disinfection by-products, the system-wide RAA had to be at or below 80 µg/L for TTHM and at or below 60 µg/L for HAA5.

In addition, the USEPA established MRDLs for chlorine (4 mg/L), chloramines (4 mg/L), chlorine dioxide (0.8 mg/L), chlorite (1.0 mg/L), and bromate (0.010 mg/L). Stage 2 of the rule maintains the TTHM and HAA5 MCLs at 80 µg/L and 60 µg/L, respectively, but changes the method of calculating the system annual average from running annual averages to locational running annual averages ("LRAAs"). This regulation also requires compliance with Operational Evaluation Levels ("OELs") for TTHM and HAA5. The OELs are indicators of operational performance and assist in identifying operational issues that could lead to future non-compliance. Under Stage 2, the Water Department no longer needs to report the annual averages of TTHMs and HHA5, only the LRAAs.

Compliance Status with Stage 2:
The Water Department is in full compliance with LRAAs for the first quarter of FY 2019 with running annual averages for all locations ranging from 32 to 46µg/L for TTHMs and 21 to 38 µg/L for HAA5s. The Water Department is also in compliance with the OELs and the 4.0 mg/L MRDL for chloramines, with the highest monthly average chlorine residual for calendar year 2017 measuring 2.25 mg/L.

d) Enhanced Surface Water Treatment Rule

The Interim Enhanced Surface Water Treatment Rule ("IESWTR") lowered the turbidity treatment technique level to 0.3 nephelometric turbidity units ("NTU") in 95 percent of the samples from the previous level of 0.5 NTU. It also set a maximum turbidity of 1.0 NTU in the finished water and required installation of continuous turbidity monitors on each filter. The IESWTR requires revision of operating procedures and follow-up investigations if individual filters exceed specific monitoring criteria.

The LT2ESWTR maintained the filter performance criteria of IESWTR but added treatment requirements based upon the concentration of *Cryptosporidium* or *E. coli* in the source water of individual treatment plants. The IESWTR required microbial monitoring (2 years of monthly *Cryptosporidium* and *E. coli* monitoring) to determine each drinking water treatment plants average source water *Cryptosporidium* level. Based on this level, the requirements place the treatment plants in different "bins" with varying removal and/or inactivation credit requirements, with higher influent *Cryptosporidium* levels requiring greater removal or inactivation. Utilities must meet the resulting requirements by implementing enhanced treatment practices as defined in a "microbial toolbox." The microbial toolbox defines a range of treatment, prevention or optimization options that utilities can implement to obtain the additional removal and/or inactivation credits required to meet the treatment technique of the IESWTR.

Compliance Status: The Water Department is in full compliance with all requirements of the LT2ESWTR. Through its participation in the Partnership program, the Water Department maintained filtered effluent turbidity at levels less than or equal to 0.1 NTU more than 99.9 percent of the time during FY 2016 and FY 2017.

Based on the first round of microbial monitoring conducted in 2011 and 2012, Belmont and Baxter Treatment Plants qualified for Bin 1, meaning that no additional treatment is required at these plants. However, the Queen Lane Plant average raw water *Cryptosporidium* level exceeded the Bin 1 threshold, putting Queen Lane into Bin 2. Bin 2 plants must achieve 1.0 log removal/inactivation credit through implementation of microbial toolbox components. The Water Department meets this requirement at the Queen Lane Plant by maintaining the very low levels of turbidity in the combined and individual filters effluents ("CFE" and "IFE") required to achieve the CFE and IFE credits, and by implementing a Watershed Control Program Plan as a back-up to the CFE and IFE credits. The Water Department strives to meet the CFE and IFE at all three plants, not just Queen Lane.

The Water Department completed the required second round of microbial monitoring in April 2017 and has submitted that data to the PaDEP. Based on the monitoring results, the Belmont and Queen Lane Treatment Plants qualify for Bin 1, but the Baxter Plant falls into Bin 2. However, according to PaDEP, because Queen Lane Plant had been in Bin 2 based on the first round of sampling it must continue to meet the enhanced treatment requirements of that Bin. The Water Department submitted a compliance plan to PaDEP in September 2017 and is in full compliance with IFE and CFE turbidity requirements.

e) Consumer Confidence Reports Rule

The 1996 SDWA Amendments require the Water Department to issue an annual Consumer Confidence Report ("CCR") to convey source water, treated water quality and compliance information to its consumers. In January 2013, the USEPA released the Consumer Confidence Report Delivery Options Memorandum, which allows water systems to deliver CCRs electronically.

Compliance Status: The Water Department has done this annually in the format required by the rule. In spring 2018, the Water Department electronically delivered the 2017 CCR, highlighting monitoring data collected in 2017, in accordance with the 2013 requirements. The Water Department's CCR goes beyond the requirements and provides educational information regarding source water protection and the water treatment process, along with information about research and public outreach initiatives.

f) Unregulated Contaminant Monitoring Rule

The USEPA has used the Unregulated Contaminant Monitoring Rule ("UCMR") to collect data on unregulated contaminants since 2001. The Water Department conducted UCMR-1 and UCMR-2 from 2001 to 2005 and 2007 to 2011, respectively. Each of these rules required utilities to monitor for 25 unregulated contaminants. In 2012, the USEPA published UCMR-3 and it went into effect in 2013. UCMR-3 required monitoring for 30 contaminants during 2013 to 2015. The Water Department is preparing for UCMR-4 which will require a new round of monitoring for unregulated contaminants.

Compliance Status: The Water Department completed UCRM-1, 2 and 3 monitoring and published the results in the CCR as required and is scheduled to conduct UCRM-4 monitoring in calendar years 2019 and 2020.

g) PaDEP Proposed Residual Disinfectant Rule

In February 2016, PaDEP published the Proposed Disinfection Requirements Rulemaking ("DRR"). One of the main impacts of this proposed rulemaking would be on the minimum level of disinfectant required within the water distribution system. Currently, the minimum level of disinfectant required within the water distribution system is 0.02 mg/L with the provision that if a sample falls below 0.02 mg/L and the heterotrophic bacteria plate count ("HPC") does not exceed 500/mL, a water system remains compliant. The proposed rulemaking changes the required residual disinfectant from 0.02 mg/L to 0.2 mg/L required in 95 percent of water distribution samples collected every month, and removes the HPC alternative to achieving compliance. Additionally, if a location does not meet the proposed disinfection requirements over two consecutive months, a water system must investigate to determine the cause, implement appropriate corrective actions, and submit these finding to PaDEP within 60 days.

The DRR was published in the PA Bulletin on April 28, 2018. Full compliance with the DRR is expected beginning April 29, 2019. Some provisions of the DRR became effective immediately, such as reporting individual distribution system disinfectant residual results for RTCR locations monthly to PaDEP. Other provisions are delayed and become effective 6 months after publication, such as the submission of the DRR sample siting plan to PaDEP. While other provisions are effective one year after publication, such as meeting the new minimum distribution system disinfectant requirement of 0.2 mg/L and the development and implementation of a nitrification control plan.

Compliance Status: In anticipation of the finalization of this rule, the Water Department utilized the information developed as part of the Partnership Distribution System Optimization program to evaluate potential impacts of this proposed rule. The evaluation determined that the Water Department may be able to meet the rule as proposed without major capital investments.

3. Water Security

The Water Department continues to implement the recommendations of the Vulnerability Assessments conducted water system wide in 2002. These recommendations included the installation of physical security measures (e.g., fencing and alarm systems), cyber security measures, emergency generators, and real-time water quality monitors at key locations in the treatment process. Additional improvements included the conversion from gaseous chlorine to liquid sodium hypochlorite and the use of security guards at critical facilities. The last phase of the planned security improvements was bid in FY 2018 and construction is underway. The planned improvements will cost approximately $17 million and are scheduled to be completed by FY 2021.

In 2008, Philadelphia was one of four cities nationwide to receive the USEPA Water Security Initiative Contamination Warning System Demonstration Pilot grant. Through this program the Water Department developed a comprehensive and integrated system to detect, confirm, respond to, and remediate contamination of the distribution system. The primary components of the SRS are the on-line water quality monitoring, enhanced response sampling and analysis procedures, customer complaint surveillance, enhanced security monitoring, and public health surveillance. These five core components are integrated via a GIS-based dashboard that builds upon Cityworks® and provides Water Department management access to all the information and tools real-time and in a user-friendly application. The final component of the program is the Consequence Management Plan, which defines in detail how the Water Department will respond to a contamination event. Both the USEPA and the Water Department view this program as a success. The Water Department, particularly BLS which maintains the SRS, continues to organize and perform annual drills and exercises to ensure that frontline staff remain ready and trained to respond to incidents.

The Water Department is a founding member of the USEPA Region 3 Laboratory Response Plan for Drinking Water, which is now part of the Water Laboratory Alliance ("WLA") under the Environmental Laboratory Response Network. Through the WLA, the Water Department has access to federal, state and local laboratories for analytical support during a water quality contamination event. The Plan defines the roles of various agencies that might be involved in a response, includes protocols for initiation of the laboratory network, and details sample transport, quality assurance/quality control, and data reporting requirements.

4. Water Accountability

The Water Accountability Committee of the City of Philadelphia exists to promote a high level of efficiency in the water delivery and billing processes, and perform the strategic planning necessary to implement lasting improvements in water and revenue loss reduction. The committee is a multi-functional team including personnel from the Water Department and the WRB. The Water Loss Control Program strives to reduce the volume of non-revenue water. Major elements of this program are: compilation of the annual water audit, progressive leakage management, customer meter management, revenue protection and reduction of unauthorized consumption. The first two elements are discussed in this Section, the remaining are discussed in Section IV.G of this report.

a) Annual Water Audit

The Water Department has been very active in promoting new auditing methods through the AWWA, and was the first utility in the United States to adopt the best management water audit methodology published in 2000. They have received recognition as an industry leader in this regard. The method accounts for all water as either consumption or losses (apparent or real). Apparent Losses are the paper losses due to customer meter inaccuracies, data handling error, and unauthorized consumption. These losses cause water utilities to lose a portion of the revenue to which they are entitled and understate the aggregate consumption of the customer population. Real Losses are physical losses, largely leakage. These losses inflate the marginal water production costs for water utilities. Table IV-2 presents a summary results of the annual audit for FY 2007 to FY 2017. The structure of the audit methodology is important in that it fixes a cost impact on the volume of both apparent and real losses. Table IV-2 shows that despite a reduction in overall loss volumes, the overall cost impact of losses continues to increase, largely due to increased costs to supply water and the costs of uncaptured revenue due to apparent losses. Hence, enhanced water loss control is still a large priority for the Water Department.

The Infrastructure Leakage Index ("ILI") gives a measure of leakage control and is the ratio of the current level of leakage to the technically low limit believed achievable (unavoidable level) if a complete minimization of leakage is necessary due to scarce resource availability, shortages, or other causes. For systems not confronting such pressures, AWWA recommends targeting an ILI of no more than 8.0. Over the reporting period, the ILI fluctuated between 8.8 and 11.5.

Table IV-2 Water Audit Results

COMPONENT	FY 2015	FY 2016	FY 2017	FY 2018(1)
Water Supplied, mgd	230.8	223.2	221.2	223.2
Billed Consumption, mgd (may include some unmetered consumption)	136.5	133.0	133.9	128.8
Non-Revenue Water, mgd	94.2	90.2	91.3	94.3
Percent Non-Revenue Water by volume	41.3	40.7	41.3	42.3
Percent Non-Revenue Water by cost	22.0	20.2	16.9	16.2
Unbilled Authorized Consumption, mgd	3.6	3.7	4.0	4.3
Unbilled Authorized Consumption Costs ($1,000)	$1,393.3	$1,320.1	$1,246.7	$1,344.02
Apparent Losses, mgd	16.2	15.7	17.3	15.4
Apparent Losses costs, million	$41.5	$39.1	$44.9	$42.32
Real Losses, mgd	74.3	70.8	70.1	74.7
Real Losses costs, million	$11.9	$9.9	$7.5	$7.96
Infrastructure Leakage Index, dimensionless	10.4	9.9	9.8	10.4

Philadelphia Water Department – Water Revenue Bureau Annual Water Audit Summary
(1) FY 2018 results are preliminary and subject to change.

b) Leakage Management

The Water Department manages leakage via a combination of traditional leak detection and repair activities (find and fix approach) and by advanced technologies such as pressure management (predict and prevent approach) and highly sensitive leak detection applications for large water mains. The Leak Detection Survey program has operated successfully within the Water Conveyance Section for over thirty years. Leak detection crews use state-of-the-art technology (leak correlator and correlating leak loggers) to proactively survey the water distribution system for hidden leaks. In FY 2017, the Water Department surveyed 1,052 miles of small diameter mains, with corrective measures abating approximately 14.0 mgd of leakage. Summary results of this proactive program are presented in Table IV-3.

Table IV-3 Leak Survey

SERVICE PARAMETER	FY 2015	FY 2016	FY 2017	FY 2018(1)
Leak Survey (miles of pipeline)	851	799	1,052	742
Leakage Abated (mgd)	21.1	14.1	14.0	46.6

(1) During FY 2018 the number of leaks abated increased by 158 from FY 2017. Also, in FY 2018 a more accurate method for the calculation of volume of abated leaks was developed and implemented by Leakage Management staff. Per discussion with staff, it will take several fiscal years to establish trending with this improved analysis.

As part of the project "Leakage Management Technologies," the Water Department isolated a small area of the distribution system to establish a pilot District Metered Area ("DMA"). The objective of the pilot is to utilize continuous flow and pressure monitoring to evaluate leakage levels, and apply advanced pressure management techniques to control leakage and prevent water main breaks. The research found that the DMA approach is feasible and the Water Department achieved a significant, sustainable leakage reduction in the DMA. Upon the completion of the study in 2007, the Water Department continued its efforts to fully optimize operations of the DMA for leakage control by integrating established Water Department programs such as acoustic leak detection and water main replacement. Flow modulated pressure control is used to coincide with changes in demand to reduce the potential for leakage. Pressure reducing valves are used to reduce system pressure during low flow periods (typically at night), and increase pressure during higher flow (daytime) periods. Maintaining optimal pressure is effective in reducing background leaks or seepage, while monitoring the change in flows during low flow periods helps to identify trends of newly emerging leakage. A future study will examine whether, and to what extent the present management approach also reduces consumption and related revenue. In 2012, the Water Department expanded the DMA initiative to the Navy Yard.

In 2007, the Water Department began to contract for services from the Pressure Pipe Inspection Company (now part of Pure Technologies, a Xylem brand) for use of its *Sahara*® service of inline acoustic leak detection for large diameter transmission pipelines. Traditional, above-ground acoustic leak detection cannot detect leaks on inaccessible piping (e.g., under highways or creeks) and the Sahara® technology is providing a valuable tool for the Water Department to better maintain its large diameter piping. The eleven-year program has scanned 64.5 miles of large piping and identified 94 leaks, the vast majority of which the Water Department has repaired. The Water Department conducts the surveys two times per year, with the assistance of a contractor. Between surveys, the Water Department addresses the leaks detected as appropriate. Two of the leaks that have been detected to date would be very difficult to access for repair but present little risk due to the low volume of leakage identified. Consequently, management has determined to delay repairing these leaks.

The Water Department is assessing other technologies as they become available. Such technologies might feature enhanced capabilities with respect to leak detection, condition assessment, and video.

5. Water System Planning

The Water Department has several ongoing initiatives that are specific to assessing the long-term needs of the water supply, treatment plants and distribution system.

a) Water Master Planning

In the 1950's and 1960's, the City invested significantly in its Water System, which included the expansion and addition of rapid sand filters at the three water treatment plants and improvements to pumping and storage systems. Through capital and operating funds, the City has maintained these facilities for approximately 70 years, and now some of the facilities are reaching the end of their useful life.

The Water Department is currently finalizing a long-term Water System Master Plan that will chart the course for the drinking water utility through the year 2043 and beyond. The Water Master Plan outlines a comprehensive 25-year program to upgrade the City's drinking water treatment and supply facilities. The three water treatment plants are aging and require significant repairs to address the potential failure points to maintain a sufficient, safe, and reliable supply of water for the citizens of the City. Without significant investment, the Water Department will likely experience more emergency repairs and potentially impact the reliability of service. In addition, the City is proactively taking steps to add new treatment processes to allow the Water Department to more efficiently meet current and future federal water quality regulations as well as provide a uniform level of service and water quality to its customers.

The planning process engaged staff across the Water Department who, both individually and collectively, have decades of historical knowledge. Together this team worked to develop the Water Master Plan that will shape the future of the Water System. A steering committee of Water Department senior leadership was formed and directed the overall planning process. The committee developed goals for the Water Master Plan in the following six categories:

- Water Quality – Achieve present and future regulatory requirements.
- Operability – Provide the appropriate system redundancy for a wide range of emergency conditions.
- Capital Availability – Manage financial resources to make necessary investments in the Water System while maintaining affordable rates.
- Water Quantity – Provide long-term water supply to the service area.
- Service Pressure – Provide adequate water pressure for system operation.

- Public Perception – Seek public involvement during implementation to meet overall customer expectations and project-specific needs.

The Water Master Plan is a long-term plan with the goal of updating the City's aging Water System infrastructure as efficiently and affordably as possible while delivering safe, reliable drinking water for the next 50 years and beyond.

The Water Master Plan identified approximately 400 projects focused on the rehabilitation of existing facilities, complete reconstruction of several existing facilities, and construction of several new facilities. The combined estimate of these projects over the next 25 years is $2.5 billion, half of which was already contemplated. Therefore, the Water Master Plan added $1.25 billion to the 25-year capital program.

In addition to numerous rehabilitation projects required to maintain Water System facilities in good, reliable condition the plan includes several significant projects required to upgrade the system for the future. These upgrades are intended to improve system reliability, improve long-term regulatory compliance and drinking water quality and provide for water supply redundancy. Following is a list of these highlight projects:

- Baxter Water Treatment Plant Upgrades
- Belmont Water Treatment Plant 40 MGD Upgrade
- Queen Lane Water Treatment Plant Reconstruction
- Belmont Water Treatment Plant Partial Demolition & Storage Reconstruction
- Upper Roxborough Storage Reconstruction
- East Oak Lane Reservoir/Pump Station
- Georges Hill Pump Station
- New Schuylkill River Crossing
- Various Transmission Main Improvements

With respect to the current CIP, approximately $500 million of the additional $1.25 billion identified as part of the Master Plan is anticipated to be programmed during FY 2020to FY 2024; this is in addition to the six-year CIP costs contemplated in this Report. The Water Department expects to propose the updated capital program to the City Planning Commission in November 2018. If approved by the City, the six-year CIP will go to City Council for approval in the spring of 2019.

b) Linear Asset Planning

In recent years the Water Department has increased planned water main replacements to 32 miles per year with the goal of bringing the system breaks per mile performance indicator closer to industry standard. Over the next five years, this goal will increase to 42 miles per year. In addition to reducing breaks, in our opinion, we anticipate that the increased replacement rate will improve water quality and increase system performance by targeting unlined first-generation pipes for replacement. The expanded replacement program is supported by the asset management program CapPlan™ which utilizes a variety of data to prioritize infrastructure improvements. Inputs include physical attributes such as pipe age, material and inspection results, along with risk information such as proximity to and type of nearby infrastructure. The software uses the information to develop a prioritized list of capital improvement projects. The Water Department uses this information to identify projects for inclusion into the annual update of the CIP.

c) Climate Change Planning and Adaptation

The Water Department's CCAP seeks to understand the impacts that climate change will have on the Water Department's infrastructure and reduce the risks and associated expenses from those impacts by identifying and implementing effective, achievable adaptation strategies. CCAP performs comprehensive risk assessments using localized climate change projections to develop adaptation strategies that inform Water Department programs and long-term plans, major investments and operational and design standards. An important aspect of CCAP's work is to regularly collaborate with the Office of Sustainability and other city agencies, partners, stakeholders, scientists and industry experts to stay-up-to-date on the latest climate science, share information, leverage resources and help ensure that city-wide adaptation efforts are coordinated.

D. WATER TREATMENT PLANTS

The Baxter, Queen Lane, and Belmont Water Treatment Plants serve the City's water system. The Baxter Plant treats water from the Delaware River, while the Schuylkill River supplies the Queen Lane and Belmont Plants. All three plants provide similar treatment, consisting of raw water sedimentation, coagulation, flocculation, clarification, dual media filtration, disinfection, fluoridation and corrosion control. The Water Department can store finished water at the treatment site for later distribution, or discharge it directly to the distribution system. Portions of each treatment facility date from the early 1900s. The Water Department completed major improvements and additions at the Belmont Plant in 1965 and at the Queen Lane Plant in 1960. The Baxter Plant went on line as a new rapid sand filtration plant in 1959. The Water Department has invested in continuous plant upgrades over the years to address structural issues and to incorporate advancements in equipment and technologies. All three plants are fully automated and have recently completed replacement of their original distributed control systems such that they have state of the art technology that offers enhanced system security and flexibility with a Microsoft Windows®-based interface.

A centralized preventive maintenance program serves common components of the three water treatment plants. Staff place components that require either periodic repair or rehabilitation on a master schedule that includes both preventive and corrective maintenance activities. Personnel then use this schedule to prioritize actions and conduct periodic reviews. Each plant maintains a preventive maintenance program for equipment components that require inspection, calibration, interval maintenance, or rebuilding on a more frequent basis than the centralized program's master schedule.

The Water Department continues to be proactive in researching and implementing new technologies and operating practices to optimize treatment and prepare for future regulatory requirements. A decade long pilot study precipitated the ongoing full-scale trials of post filter chlorination at the Belmont Plant and bench scale evaluations of alternative pre-oxidants and coagulants as new products become available. In FY 2011 the Water Department compiled the results of a decade of pilot, bench and full-scale tests, and in FY 2012 initiated a planning effort to develop a vision for future long-term upgrades to the water treatment plants. This project involved evaluating site constraints and developing conceptual designs for several advanced treatment processes (MIEX®, membrane filtration, ultraviolet disinfection and post filtration chlorination) to prepare the Water Department to make future plant upgrades as needed. The project was completed in December 2013. The report was used in the Water System Master Plan, which includes the incorporation of ultraviolet disinfection and chlorine dioxide at each treatment facility over the next 25 years.

1. Baxter Water Treatment Plant

The Baxter Plant draws water from the Delaware River and sends treated water to the Torresdale Treated Water Pumping Station for distribution to the northern and central parts of the City. The Baxter Plant is the largest of the three water plants, with a design capacity of 320 mgd and a peak hydraulic rate of 420 mgd. Table IV-4 shows plant production information for the past five years.

Table IV-4 Baxter Annual Plant Production

FISCAL YEAR	DAILY OUTPUT (MGD)	
	AVERAGE	MAXIMUM
2015	132	162
2016	135	161
2017	136	193
2018	132	169

The Baxter Plant has a budget for a staff of 56, and currently has three vacancies as of September 2018. In our opinion, these vacancies are non-critical.

In May 2010, a section of roof of the Baxter clearwell basin failed. This basin is approximately 100 years old and stores 40 million gallons ("MG") of treated drinking water for supply by gravity to the Lardner's Point Pump Station. The failure presented a significant challenge to the Water Department as the basin cannot go off-line without disrupting the operation of the Lardner's Point Pump Station. As a temporary measure, the Water Department installed covers and is monitoring water quality at the influent and effluent of the basin. These measures have allowed for continued operation of the basin, with no adverse effects to water quality, while a permanent solution was developed. The solution is to replace the 100-year old 40 MG basin with four 5 MG tanks and associated yard piping and other ancillaries. The Water Department has awarded a contract for the construction of the first two tanks. The total estimated project cost is $111 million. The Water Department expects to install two additional tanks through a future contract expected to be released in approximately three years.

In an ongoing effort to optimize the treatment process, Baxter staff conducted bench scale evaluation of alternative coagulants (a polymer/ferric blend and ferric sulfate). The study arose due to the need for very high coagulation doses during and after extreme weather events. The test results indicate that the current coagulant remains the best solution for treatment relative to organics removal, TTHM and HAA5 levels in the distribution system, facilitation of solids settling, and cost.

The Baxter Plant uses a SCADA system to monitor the treatment process from the intake to the plant effluent. The Water Department collects and displays in real time, all on-line process data (water quality and operational), allowing plant staff to quickly observe and react to changes. Baxter completed the replacement of an outdated DCS with a new state-of-the-art system. Recent upgrades of the associated software and hardware systems were completed in calendar year 2018. These upgrades were necessary to align with releases and to maintain continued system.

Vulnerability Assessments conducted in 2002 identified measures to reduce vulnerability to an emergency situation (intentional or accidental). The measures identified included physical security, cyber security, process control, and redundancy. While the Water Department has completed implementation of the recommendations, the Baxter Plant continues to enhance its security system and expects to deploy additional security cameras, speakers and access control to internal areas as part of a currently ongoing capital project. In addition, the plant completed the replacement of the he court-access hatches and vents in the filtered water storage basins during calendar year 2018.

Listed below are other projects recently completed or currently ongoing at the Baxter Plant:

- Completion of a project to dredge the intake and bypass intake in FY 2017.
- Installation of new backwash valves on the north-side filters started in spring 2013 and is now complete. Installation of new backwash valves on the south-side filters along with backwash pump magmeters started in fall of 2017 is now complete.
- Replacement of the ammonia feed system. The improvements include a backup controller system.
- Completion of improvements to the carbon dosing lines and diffusers.
- Replacement of the ferric chloride tanks (two tanks, 55,000 gallons each) with four above ground 50,000-gallon fiberglass reinforced polymer tanks. As part of the project, the Water Department replaced the ferric dosing system and installed a backup controller.
- The replacement of filter effluent and flow valve packages on filters continues as an internal initiative. To date, staff has replaced 92 filters with the remaining 2 filters slated for replacement in early FY 2019.
- Automation of the sedimentation basin effluent gate valves using in-house staff are targeted for FY 2019. Sedimentation basin influent gate value automation is targeted for completion in early FY 2020.
- Replacement of windows in the filter and chemical buildings – upgrade to energy efficient windows are close to completion as of the writing of this report.

- The repair and replacement of intake valves, gates, and rotating screen are schedule for completion by the summer of 2019.

Construction contracts recently bid and/or awarded include:

- Perimeter lighting improvements at the sedimentation basins (project facilitates round-the-clock sampling cycle) were bid in FY 2018.
- Baxter HVAC upgrades are expected to be bid in FY 2019.

Projects currently in the Design/ Projects Control/bidding pipeline include:

- Replacement and downsizing of the fluoride storage tanks in keeping with the reduced dosing standard (0.7 ppm as compared to 1.0 ppm). Replacement of the chemical feed system. Staff expects this project to be bid in FY 2019.
- Replacement of post-treatment building switchgear is expected to be bid in FY 2019.
- New zinc orthophosphate (corrosion control chemical) storage and feed system are in Design.
- Replacement of the carbon feed system, tanks, mixers and pumps is in Design.
- Improvements to the hydrated lime system are in Projects Control.
- Flocculator rehabilitation including bearing and shaft replacements are in Projects Control.
- Improvements to the sludge pumping chamber are in Design.
- The design of raw water basin outlet gates, and inspection and repair of existing concrete is currently underway. Staff is coordinating construction with an emergency intake upgrade project at Torresdale Raw Water Pump Station, as both will require a temporary plant shutdown for underwater inspection. The project is scheduled in FY 2020.
- Installation of an alternative chlorine and ammonia dosing location at the combined filter effluent to better manage chloramine residual levels in the distribution network is in Design.
- Dredging and disposal of raw water basin solids is in Design.
- Establishment of a new process control laboratory and sample collection lines is in Design

Projects planned for FY 2019/FY 2020 include:

- Upgrade of filter surface wash to air-scour technology.
- Design of two additional 5 MG clear well tanks (project discussed earlier in this section).

2. Queen Lane Treatment Plant

The Queen Lane Plant draws water from the Schuylkill River and serves as the main distribution point for service to center city and northwest Philadelphia, west of Broad Street and east of the Schuylkill River. The plant is rated at 140 mgd. Recent plant production rates are shown on Table IV-5. A spike in daily output was noticed in January 2018; severe winter weather conditions contributed water main breaks. System demands were balanced out by the other two plants during this time.

Table IV-5 Queen Lane Annual Plant Production

FISCAL YEAR	DAILY OUTPUT (MGD)	
	AVERAGE	MAXIMUM
2015	60.8	89.8
2016	51.4	70.7
2017	49.2	87.6
2018	50.1	102.4

The Queen Lane Plant has 55 budgeted positions with four vacancies as of September 2018, none of which, in our opinion, are considered critical.

Residuals from the flocculation and sedimentation basins are sent to the Southeast WPCP, as is the filter backwash. The solids load necessitates the addition of phosphate at the WPCP.

Vulnerability Assessments conducted in 2002 identified measures to reduce vulnerability to an emergency situation (intentional or accidental). The measures identified included physical security, cyber security, process control and redundancy. The Water Department has been actively implementing the recommendations of the assessments at Queen Lane through the installation of a new security system at the raw water basin (fence alarm and new key pads), security cameras at select locations, closure of an existing raw water basin access tunnel, and installation of real-time water quality monitors (pH, turbidity, chlorine and conductivity) at the raw water basin effluent and clearwell effluent. At this time, plant staff has completed the installation of all internal plant measures. External measures including new fencing and lighting around the clearwell basin, a new driveway, and new maintenance entrance are expected to be completed in calendar year 2019.

Vulnerability to power outages, exposed during Hurricane Sandy in October 2012 when both power lines to the plant were lost, has been addressed in two ways. A standby third power line has been installed with a commitment by the power provider, PECO Energy Company, to make the physical connection if either of the existing feeds goes down. In addition, a new backup generator capable of carrying the full plant load has been installed as part of the upgrades to the plant's main switchgear.

A full-scale plant trial completed in FY 2017 evaluated using air scour for filter backwashing, assessed the potential for improved filter performance, and evaluated the potential water and energy savings that may be realized. Backwash water is sent to the combined sewer system; therefore, reducing the volume of backwash waste would have the added benefit of reducing the load to the system consistent with the Water Department's efforts under the CSOLTCPU program. The study showed that air scour reduced the volume of backwash water required, reduced energy use and enhanced post backwash water quality. Design of the Queen Lane Air Scour system is 90 percent complete and currently under review. The project is expected to be bid in FY 2019.

Projects recently completed or ongoing at the Queen Lane Plant are listed below.

- The software upgrade for the Distributed Control System is complete. Staff expects to make hardware upgrades in the next three years
- Completion of the contract to rehabilitate two failed filters (Filters #7 and #16) with new media, underdrains, and surface wash systems.
- The replacement of the main switchgear is complete. The project included a new generator adequate to run key plant processes during power outages.
- Replacement of the actuators and influent valves for all the filters is ongoing.
- Completion of the construction of new backup water service lines for the plant.
- Completion of the installation of a new HVAC system in the administration section of the filter building.
- Painting of the wash water tank was completed in FY 2018.
- Drinking water system security improvements is expected to be completed in calendar year 2019.
- Low voltage distribution equipment in the filter building will be completed by the end of calendar year 2018.
- Masonry repair at the filter building and replacement of the truck scale in the pre-treatment building is currently in progress.
- Replacement of two fluoride tanks is complete and installation of the five new ferric tanks is in progress and expected to be completed during FY 2020.

Listed below are planned projects over the next several years at the Queen Lane Plant.

- A project to replace butterfly backwash valves and actuators on the north filters is in Projects Control. A prior contract handled the replacement of the corresponding valves in the south filters.
- A project to replace the backwash pumps, valves, actuators and vacuum breakers in is Design.
- Phases I and II of design for the renovation of the pretreatment building are complete. Phase I involves the removal of old chemical storage tanks. Phase II consists of a layout for future use as office space, a conference room, and storage areas. The project is currently on hold as staff addresses structural concerns.
- A project for the dredging of the raw water basins to remove accumulated sediment is currently in Projects Control and expected to be bid in FY 2019.
- A project to repair cracks in the north and south clearwells, expanded to include roof replacement, is in Projects Control awaiting the completion of the installation of new tanks at East Park Reservoir.

- A project to rebuild four dual media filters has been awarded and is expected to commence shortly.
- The replacement of windows in the pump house building has been awarded and work is expected to be completed in calendar year 2019.
- Hydrated lime feed storage system upgrade is in Design undergoing scope review.
- A new storage building is under design.
- The rehabilitation of plant sewers is in Design, currently awaiting third-party inspection and evaluation.

3. Belmont Treatment Plant

The Belmont Water Treatment Plant draws water from the Schuylkill River and serves as the source of supply for West Philadelphia. The Belmont Plant is rated at 86 mgd. Table IV-6 shows recent plant production rates.

Table IV-6 Belmont Annual Plant Production

FISCAL YEAR	DAILY OUTPUT (MGD)	
	AVERAGE	MAXIMUM
2015	44.7	52.4
2016	43.5	48.2
2017	43.5	50.4
2018	44.7	61.6

The Belmont Plant has 53 budgeted positions, with six vacancies as of September 2018. Management is working to fill positions for an Assistant Manager, one Industrial Process Mechanic and one Lab Scientific Technician as soon as possible.

The Southwest WPCP receives residuals from the flocculation and sedimentation basins as well as the filter backwash.

The Water Department continues to investigate methods for the reduction of DBP production at all three plants. At Belmont, these investigations have focused on switching to post-filtration chlorine contact. The Belmont Plant converted part of the clearwell to a post-filter chlorine contactor and conducted full scale trials of post-filter chlorination starting in August 2008 and continuing each spring through fall of 2012. Results of this effort were promising and suggested that the Water Department could reduce DBPs below current levels, which are already in compliance. Staff discontinued the trials in 2013 as the rehabilitation of the raw water basin has limited the plant's operational flexibility. The post-filter chlorine contactor trials were continued in calendar year 2017 and 2018; DBPs were reduced as expected, but due to unusually high river flows each year it remains unclear if the post-filter chlorine contactor will be feasible to run in warm weather drought conditions using the current pre-treatment process configuration. Management anticipates continuing the trials in July 2019.

Other projects recently completed or ongoing at the Belmont Plant are listed below:

- Rehabilitation of the raw water basin was completed in early FY 2018.
- Finished water basin crack repair and roof replacement: The North Basin, Monument Road Basin and South Basin are complete; the final stages of clear well basin work and slope repairs are planned for completion in FY 2019.
- Installation of a new ferric storage system has been initiated and is expected to be operational in the fall of calendar year 2019. This project will address PaDEP's 30-day supply and chemical building spill containment requirements and includes drain replacement.
- Backup water service replacement was completed in early FY 2018.
- Dredging of the Schuylkill River at the intake was completed in fall of FY 2019.
- The rehabilitation of four filters with new media, troughs and underdrains was completed early in FY 2018. This was the first phase of the planned rehabilitation of all 26 filters.
- The automation of the filter-to-waste process to allow for remote initiation of valves that send filter effluent to a drain after filter startup is complete. Staff is planning connection of this system to the ABB DCS system for fall of FY 2019.
- In-house rehabilitation of the powdered activated carbon feed system was substantially completed in FY 2018, with demolition of the old system pending continued testing of the newly installed pumps, controls, and piping are planned for FY 2019.
- In-house upgrades to the zinc phosphate dosing system, replacement of chemical feed pumps and addition of flow meters, are expected to be completed in FY 2019.
- Preliminary work for major security upgrades, installation of security lighting and cameras, access control, fencing, access card system, cameras, and portal hardening, began in late FY 2018.
- Automation of the flocculation/sedimentation basin blowdown process for the removal of settled solids are expected to be completed in FY 2019.
- Sodium hypochlorite mixing system upgrades are expected to be complete in FY 2019.
- Chemical Building boiler replacements are expected to be completed in FY 2019.
- ABB replaced one of three DCS Harmony Area Controller Cabinets; the remaining two cabinets are scheduled for replacement in FY 2019 and FY 2020.
- Symphony Plus software upgrades to the DCS system have been substantially completed, completion is pending completion of automated reports and continued system testing.

Other projects that are currently in Design/Projects Control include:

- The rehabilitation of flocculation/sedimentation basins is in Projects Control.
- Motor control center replacement was bid and construction will begin in FY 2019.
- Heating and mixing improvements to the sodium hydroxide tanks are in Projects Control.

- Re-coating of the sodium hydroxide tanks are in Projects Control.
- Replacement of sodium hypochlorite feed loops is in Design and expected to be bid in FY 2019.
- Removal of old chlorine system piping and rehabilitation of the old chlorine house building are in Projects Control.
- Replacement Filter Building HVAC is in Projects Control.
- Replacement of the North Filter Building cat walk is in Projects Control.
- Carbon system rehabilitation (including replacement of carbon mixers and dust collection system) is in Projects Control after a scope change and in-house work.
- Design for replacement of the steel fluoride tanks is complete and in Projects Control.
- Replacement of the Filter Building dehumidifier is in Design.
- Replacement Filter Building windows are in Design.
- Replacement of combined South Filter effluent sluice gates is in Design.
- Replacement of rapid mix isolation valves is in Design.
- Replacement of the Chemical Building drains and concrete floor repairs are in Design.
- Replacement of the back-wash pumps and associated piping, including redundant water supply, are in Design.
- Back wash tower rehabilitation, including painting for corrosion control and safety upgrades, is in Design.

Future projects at the Belmont plant are listed below:

- Repair of terrazzo floor in Filter Building (along with similar work at Baxter and Queen Lane).
- Continued underwater conduit inspections.

E. WATER CONVEYANCE

The mission of the Water Conveyance Section is to reliably and efficiently transport and distribute water on demand, preserving quality and providing service focused on overall customer satisfaction. The section consists of three units, including: Distribution, Pumping, and Load Control. The Division has 344 authorized positions as of September 2018 with 29 vacancies.

Approximately, three quarters of both the approved positions and the vacancies are in the Distribution Unit. The vacancies are cyclical by nature, the result of turnover in upper level positions, promotions to fill the next level vacancies and ultimately a trickle down to vacancies in entry level positions such as Water Distribution Repair Helper. When staffing levels slide, meeting service levels becomes challenging, as the vacancies reduce the number of crews available for repairs.

1. Distribution Unit

The main responsibilities of this unit are as follows:

- Provide permanent repairs and maintenance to the water distribution infrastructure.
- Provide twenty-four-hour emergency response and local control of the water distribution system.
- Rectify system failures and maintain product control.
- Provide reliable and cost-effective water supply, while being responsive to customers' needs and the environment.

Major components of the distribution system include: approximately 3,184 total miles of pipeline (400 miles of transmission and 2,783 miles of distribution mains), 25,419 hydrants, and 92,747 valves.

Table IV-7 shows the major performance parameters for the unit for the last four fiscal years.

Table IV-7 Repair Record

SERVICE PARAMETER	FY 2015	FY 2016	FY 2017	FY 2018
Breaks Repaired	907	699	706	977
Discontinuance Orders Completed	309	480	387	311
Valves Repaired	155	183	66	56
Connections	91	75	88	88
Leak Survey (miles of pipeline)	637	799	816	742
Hydrants Repaired	4,141	4,812	3,077	2,584

The Water Department's FY 2018 level of 307 breaks per 1,000 miles exceeded than the national average of 270 breaks per 1,000 miles; however, the 5-year average of 265 breaks per 1,000 miles is below the national average. This increase can be attributed to the severe winter experienced from 2017-2018.

A preventive maintenance program that involves both field investigations as well as systematic scheduling of repairs and replacements is in place for the pipeline infrastructure. The Distribution Unit conducts leak surveys, examinations of portions of repaired mains to determine the root cause of breaks, and corrosion control studies as part of the preventative maintenance program.

To ensure proper operation of the network's 92,747 valves, a valve tracking program is in place. This program records all valve activities (operation, inspection, repair and replacement). Table IV-8 summarizes the valve maintenance program for FY 2018.

Table IV-8 Valve Maintenance (FY 2018)

VALVES	TOTAL	SMALL (12" OR SMALLER)	LARGE (16" OR LARGER)
Operated	13,651	12,518	1,133
Found defective	204	192	12
Repair/Replace	217	211	6

In FY 2018, hydrant availability was 99.6 percent. The Water Department attributes this high reliability to the implementation of its process to track hydrant information and deploy repair crews. The process was initiated in 2006 and has resulted in hydrant availability above 99 percent since that time. A preventive maintenance program includes routine inspections, repairs, and painting. During FY 2018, the Water Department partnered with the Fire Department to inspect almost all of the City's 25,419 fire hydrants, leading to 5,250 repairs and 2,610 hydrants painted. Additionally, the Water Department installed 350 tamper-proof hydrant locks. The Water Department reports that the hydrant locking devices have helped to reduce instances of hydrant tampering resulting in no noticeable effect on the operation of the water system.

2. Pumping Unit

The unit's responsibility is to maintain and repair all raw and potable water pumping systems. Additionally, the unit maintains all raw water intakes, finished water reservoirs, system tanks and standpipes. The unit strives to maximize pump availability, pump efficiency, and the productive use of all maintenance resources. Table IV-9 details the unit's performance for these three parameters.

Table IV-9 Pumping Unit Activity

PERFORMANCE MEASURE	FY 2015	FY 2016	FY 2017	FY 2018
% Pump Availability	94.6	91.7	90.3	92.3
% Station Efficiency (wire to water)	77.7	77.9	76.6	77.4
% Planned Work (a productivity measurement)	91.8	93.7	96.5	97.6

Pump availability remains at a consistently high level due to the proactive maintenance approach employed. Availability in FY 2017 and FY 2018 were at 90 percent, and 92 percent, respectively. These are slightly lower than previous years and reflect extended pump outages due to ongoing capital projects.

Despite the age of most of the pumps, the unit has been able to hold pump efficiencies steady through good maintenance practices and the use of techniques such as impeller modification to better suit actual demand. Station efficiency is an overall measure of pumping efficiencies across all stations and represents the percentage of energy put into the system that is used to move water (the ratio of mechanical output to electrical input). The efficiency has remained stable at about 77 percent over the past five years. The percent planned work activity is a measure of productivity for the Pumping Unit staff in terms of time spent on planned maintenance activities as compared to time spent on emergency repairs. This measure reflects the effectiveness of the preventative maintenance program. The Pumping Unit uses a Computerized Maintenance Management System ("CMMS") to plan and track maintenance activities and to generate monthly and annual reports regarding pump efficiency, pump availability, and labor productivity. The software, MAXIMO®, is also used in the Water Department's treatment plants to support asset management.

3. Load Control Unit

The mission statement of the Load Control Unit follows: "*In order to provide a reliable supply of water to meet all community needs we will operate the water transmission system Load Control Center, maintain the Supervisory Control and Data Acquisition system, conduct hydraulic investigations, develop and utilize a current hydraulic model of the entire water distribution system and assist in long-term planning for responsible management of the City's water supply infrastructure.*"

An integrated system-wide hydraulic model is used to simulate operational changes, size pumps, plan water main replacements, and investigate water quality issues. Load Control staff updates the integrated model to account for ongoing system changes and increase the accuracy and reliability of information produced.

The Load Control Center and water transmission system operate continuously. All pumps are controlled centrally using a SCADA system. It is a priority of the unit to provide a reliable supply of water in a cost-effective manner. This is achieved by using the SCADA system to maximize the use of system storage during peak hours, and then pumping to refill lost storage during the less costly off-peak hours. This protocol also ensures adequate turnover in the storage tanks throughout the City. Table IV-10 illustrates the unit's ability to control electrical demand.

Table IV-10 Load Control Unit – Water Conveyance Unit Electrical Demand

PERFORMANCE MEASURE	FY 2015	FY 2016	FY 2017	FY 2018
Average Daily Delivered Water, mgd	230.8	223.8	223.0	223.2
Total Power Consumption, million kilowatt-hours	118.2	110.5	109.6	113.0
Total Peak Billing Demand, Kilowatts	161,156	158,376	160,109	154,008
Total Expenditures for Power	$9,846,800	$8,827,200	$6,691,036	$6,034,779
Cost per million gallons pumped (raw & treated water)	$116.89	$107.77	$82.20	$75.34

Average daily treated water delivery to the system in FY 2017 was approximately 223 mgd, down from the system's historical peak of 378 mgd in 1977 and down from recent years in which it exceeded 230 mgd. Load Control is challenged to find operational cost savings to match the delivery rate decline, while using pumping systems that were designed for higher demands. At most pumping stations, only the smallest pump runs during on-peak hours. The Water Master Plan addresses this issue by analyzing current and projected future demands and providing allowance for more flexibility with pumping and storage demands. In the meantime, Load Control engineers have worked with Pumping Unit staff to trim the diameter of a pump impeller at the Torresdale High Service Pump Station. This project will allow for operational flexibility during the rehabilitation of the Baxter Clearwell. Load Control and Pumping Unit staff continues to monitor each district for opportunities to improve pumping efficiency and lower overall costs.

The Water Department maintains master meters on transmission supply mains at its three water treatment plants, pumping stations, reservoirs, as well as interconnections to Aqua Pennsylvania. All master meters connect to the Load Control Center SCADA system and are monitored and balanced daily. Most master meters are verified on at least an annual basis by Load Control technicians and an engineering consultant, and the export sales meters are checked quarterly. This structured level of meter management ensures accuracy in the calculation of the total volume of water supplied to the distribution system.

The Load Control Unit also provides a variety of water distribution system testing and investigative functions. The unit uses multiple technologies to inspect large diameter transmission mains which require greater sensitivity than smaller mains due to the level of detectable noise made by leaking water. There is a regular inspection rotation using *Sahara®* inspection technology, which allows for in-pipe inspections of active transmission mains. The unit is currently piloting the EchoShoreTX system from Echologics to regularly monitor approximately 24,000 feet of transmission piping for leakage detection. Additional functions include: monitoring and maintenance of cathodic protection systems on transmission and distribution mains, fire flow testing, water quality investigations, and investigation of new leak management initiatives. Asset management support services provided by the unit include: planning review and scheduling of capital program water system work; review of all capital program design documents; and coordination of the Large Valve Management Program. The unit also plays a key role in the Water Accountability Committee and the Reservoir Team.

F. SYSTEM STORAGE AND PUMPING

The Water Department provides finished water storage at each treatment plant. There are also six other treated water storage reservoirs, standpipes, or basins in the system. All finished water storage is covered.

1. Finished Water Reservoirs

The Water Department's Reservoir Team manages the strategic planning, capital program projects, and operations and maintenance functions of the Water Department's reservoirs.

The principal covered storage reservoirs and their approximate total capacities are:

- East Park (Northeast) 230.0 MG
- Oak Lane 72.8 MG
- Roxborough (Upper & Lower) 28.5 MG

In addition, the Fox Chase elevated storage tank (1.5 MG), the two Somerton standpipes (10 MG), and the two Roxborough standpipes (11 MG) provide a total of 22.5 MG of distribution system storage. The Pumping Unit completed the rehabilitation of all the standing storage tanks within the past 10 years and continues to conduct routine inspections and maintenance as needed. This effort is expected to enhance water quality and increase the security and integrity of the tanks.

The floating cover on the East Park Reservoir has reached its useful life. The Water Department is currently replacing the reservoir with three, 30 MG concrete tanks, for a usable storage volume of 65 MG. The tanks will provide greater water quality, security and maintenance benefits than the existing reservoir and floating cover. The first tank has been constructed and is in service; the second and third tanks are currently under construction. Two pressure reducing valves were installed at the East Park Reservoir site to allow for emergency bypass of the decommissioned reservoir or future three-tank reservoir configuration. The total estimated cost for all three tanks is estimated at $110.8M.

2. Pumping Stations

Pumping stations are located at each treatment plant with seven other stations located off-site that provide water service pressure for the distribution system. The major pumping stations, divided into Delaware and Schuylkill Divisions, are presented in Figure IV-II.

Figure IV-II Water System Facilities

DELAWARE DIVISION	SCHUYLKILL DIVISION
East Oak Lane	Belmont High Service
Fox Chase Booster	Belmont Raw Water
Lardners Point	Chestnut Hill
Torresdale Low Service	East Park Booster
Torresdale High Service	Queen Lane High Service
Torresdale Raw Water	Queen Lane to Roxborough
West Oak Lane	Queen Lane Raw Water
	Roxborough High Service
	Navy Pumping Station

By utilizing reservoir storage capacity and pumping capabilities through the Load Control Center, the Water Department can provide water during periods of water shortage in a given service area. A great deal of flexibility is built into the system.

The Water Department continues to implement the recommendations of the Vulnerability Assessments system-wide. To this end, the Water Department has installed new fencing and security systems at key pumping facilities and has installed surveillance cameras at all remote facilities. The Water Department is installing emergency generators at all pumping stations. Generators have been installed at the Belmont High Service, Roxborough High Service, Torresdale High Service, Fox Chase, Torresdale Raw Water and East Oak Lane Pumping Stations. Installation of generators at Belmont Raw Water and West Oak Lane Pumping Stations are planned for FY 2019. Installation of a generator at the Queen Lane Raw Water Pump Station is being incorporated into a large-scale rehabilitation project that is planned for FY 2023.

The assessment and evaluation of the long-term needs of the pumping stations is an element of the Water Department's Water Master Plan. The plan is taking into consideration the current and projected demands and right-sizing of overall system pumping capacity to better match current and projected demands and to ensure the integrity of the facilities. As part of this planning process, the Water Department has completed the inspection of all existing facilities (pump stations and water treatment plants) to identify needed upgrades or repairs. Inspections included electrical, mechanical, and structural components. With the Master Plan nearly completed, Lardner's Point and West Oak Lane stations are targeted for replacement, while the Torresdale Raw Water, Belmont Raw Water, Queen Lane Raw Water, Torresdale Low Service, East Oak Lane and Chestnut Hill Pumping Stations will undergo phased rehabilitation. Additionally, preliminary planning is underway for a redundant system for the Belmont High Service District.

Other capital projects recently completed, ongoing or planned include:

- The rehabilitation of the Baxter clearwell is underway. The Pumping and Load Control units have collaborated with Water Treatment on this project to incorporate improvements such as a piping bypass and redundant effluent piping from the clearwell, both of which will allow for greater operational flexibility of the Torresdale High Service Pumping Station.
- The notice to proceed was issued for the rehabilitation of the emergency intake for the Baxter Plant in May 2018.
- The design of a new pump station to replace Lardner's Point is underway. This is the first major project pump station project coming out of the Water Master Plan.

G. OPERATIONS ADMINISTRATION

Operations Administration provides administrative support services to all operating units within the Operations Division. Operations Administration reports to the Director of Field Operations and includes five (5) operating units: Metering, Delinquency & Restoration, Customer Field Services, Plumbing Repairs, and Materials Management. There are currently 201 budgeted positions and 13 vacancies as of September 2018. The number of approved positions has increased primarily because of the transfer of eighteen meter reading positions from Water Revenue Bureau into the Operations Administration Metering Unit. The transfer is part of a larger integration of the Water Department and Water Revenue Bureau call centers to streamline customer service response.

Operations Administration is responsible for leading several initiatives including the implementation of Cityworks®, the operations and maintenance of customer meters city-wide, responding to customer complaints, and addressing delinquency and restoration issues. The following sections discuss the key programs led or supported by Operations Administration.

1. Cityworks® Implementation

A major ongoing initiative within the Water Department over the past decade has been the implementation of the customer complaint and maintenance management system, Cityworks® (a product of Azteca, Inc.). Cityworks® is used primarily by the Water Department's field units that work on street-side assets associated with the conveyance and collector systems. The software is used to track service requests taken from the Call Center, as well as work orders for system maintenance and repair generated within the field units. It replaced the individual systems that were previously used by each unit to track infrastructure repairs, replacements, and related projects. This has resulted in streamlined work, consolidated data in one location, and reduced duplication of effort between units. Cityworks® is also an integral component of the Surveillance Response System, specifically as related to tracking customer complaints and reviewing maintenance activities that might contribute to a water quality event in the distribution system.

In the past year, the Water Department upgraded to a new version of the software. One of the benefits of the new software is improved tablet access for field crews. Because of this upgrade, the Water Department is replacing laptops currently in use by field personnel with tablets which provide improved functionality. Additionally, the Water Department is developing standard procedures, policies and processes to guide the continued use of Cityworks®.

2. Meter Management

The water meter management program involves a customer meter population of approximately 486,000 meters. The Water Department also manages the AMR system that provides routine customer meter readings for the billing process. Discussed below are these programs and upcoming enhancements.

The Water Department's Metering Unit manages customer meters. This group replaces faulty meters and AMR equipment, investigates suspicious consumption patterns, and performs a host of related duties. The Metering Unit also operates meter test equipment and performs routine meter accuracy testing. The demands on the Metering Unit have grown since the implementation of AMR, as more reliable customer consumption data now exists, revealing many more problems such as tampering and equipment failure.

The Meter Shop has also focused recently on the assessment of large customer meters to determine whether they are appropriate for the customer location. Large meters are defined by the Water Department as those greater than one inch in size. Approximately 3 percent of all meters fall in this category, but these accounts tally almost 50 percent of the billed consumption total.

Presented below are highlights of this program:

- The Water Department generally replaces meters ranging from one to two inches in size every 10 years to maintain accurate registration. Meters from three to six-inches have a 4-year replacement interval, and those from eight to ten-inches are replaced on a 2-year frequency. This increasing frequency of replacement for the large meters provides a higher level of accuracy and performance.
- The Metering Unit has undertaken a concerted look at changing out large meters that are functionally inappropriate for the application. The Water Department has an incentive to "right-size" or "right-type" larger customer meters to more accurately measure metered flow that can vary across a broad range. Large meter management results in benefits to both the customer and the Water Department. Meter downsizing results in a decrease to the customer's monthly water service charge, while replacing misapplied or improperly-sized meters typically results in increased flow registration and related volumetric billings. In anticipation of implementing Advanced Metering Infrastructure technology, as described

below, the focus of this program has shifted from identifying individual meters for change-out, to conducting research on a more holistic approach to identify the most appropriate meters to install as part of the larger AMI initiative.

3. Automatic Meter Reading System and Advanced Metering Infrastructure

The first installation phase of the AMR system from 1997 to 1999 included the replacement of all residential water meters, sized 5/8-inch or 3/4-inch, with new meters equipped with Encoder, Receiver, and Transmitter units ("ERTs"). Until very recently, the Water Department's AMR system was the largest and most significant AMR endeavor in the United States to be fully implemented. The installation of the AMR system was complete as of March 2013 for all residential, large meter commercial and industrial customers. The Water Department has realized significant improvements in customer service and consumption data integrity because of the AMR system. Staff has also leveraged the system to gain additional benefits in the areas of leakage management and control of unauthorized consumption. Additional benefits of the system include:

- Reduced intrusion into individual homes, resulting in greater customer convenience and security
- More accurate and reliable meter readings
- Fewer customer complaints due to estimated billing
- Improved ability to detect apparent losses, particularly unauthorized consumption
- Long-term savings and revenue improvements

In January 2013, the Water Department completed a two-year initiative to change out AMR batteries. Additionally, the Water Department converted ERTs for all large metered accounts (1-inch and above) and all accounts within District Metered Area 5 and the Navy Yard District Metered Area to fixed network-capable ERTs. These ERTs can provide meter reads as often as every 15 minutes and can transmit the data real-time (hourly) via a fixed communication system. The ability to provide more frequent meter reads aids the development of detailed customer consumption profiles, management of district pressures, and better identification of leaks or meter tampering. The intent of the change-out was to keep the AMR system functioning properly through its contract life (2019) and provide an opportunity to assess the benefits and drawbacks of a fixed network system.

The Water Department completed a feasibility study to evaluate the economic and customer benefits, and the technical feasibility of transitioning to AMI in conjunction with the use of a MDMS. This study included four pilot studies to evaluate the compatibility of the existing metering hardware and billing system with vendor specific fixed networks. Based on the results of the feasibility and pilot studies, the Water Department is planning a major project to convert to AMI system-wide.

The switch-over to AMI is being coordinated with the expiration of the current AMR contract and is anticipated to begin in the fall of 2018. The AMI installation will be substantially performed through a contract, with a small portion (approximately 10 percent) anticipated to be performed by Water Department staff. The Water Department anticipates that most of its residential customers will only need the ERTs changed out to AMI-compatible ERTs; however, the Water Department will install new meters with tamper protection features for accounts where theft of service and meter tampering are suspected (approximately 40,000 accounts).

Anticipated benefits of AMI include:

- Real-time access to customer use data for both the Water Department and the customers themselves.
- Increased data capture and data integrity, not limited by mobile data collection.
- Remote shutoff valves will be built into the meter, giving the Water Department the ability to terminate service without accessing the building.
- Enhanced functionality to identify when tampering is occurring.

Additionally, the opportunity to visit every customer site will also be leveraged to gather information on the locations of any lead service lines.

4. Revenue Protection

The Revenue Protection Program focuses on recovering uncaptured billings from compromised customer accounts. Management estimates that it has been successful in recovering over $50 million in billings since its inception. Each year the program pursues targeted groups of accounts perceived as areas of missed water consumption and billings. For the past three years the major focus of the program has been “zero consumption” accounts; the majority of which have occurred due to tampering. Table IV-11 presents the annual amount of revenue billings identified over the past several years, but does not represent actual cash collections.

Many of the accounts investigated by Revenue Protection occur due to unauthorized consumption. As in many large urban areas, unauthorized consumption occurs in many ways. The Water Department actively attempts to address the major causes of unauthorized consumption and the associated lost revenue. Over 30,000 accounts are shut off for non-payment every year, and a for notable portion of these accounts, customers illegally restore service. In these instances, the Water Department shuts these accounts off a second time. The Delinquency & Restoration Unit has implemented new technologies to improve shutoff effectiveness. Using tablet based technology, Delinquency & Restoration representatives can accept payments on delinquent accounts in the field or shut off the meter for delinquency after electronically recording the final meter read. Having the final meter read allows the Water Department to more quickly identify and address unauthorized restoration of services. The conversion to the next generation of meters and AMI will include leak noise loggers on customer piping, integrated meter and shutoff valve where appropriate, automated backflow detection and other enhancements. The Water Department is also looking at enforcement actions and billing policies to discourage the high level of unauthorized consumption in the City.

Table IV-11 Water Department and Water Revenue Bureau Annual Water Audit Summary

FISCAL YEAR	WATER RECOVERED, MGD	RECOVERED BILLINGS
2014*	1.74	$5,015,532
2015	1.35	$4,446,222
2016	2.76	$4,423,024
2017	3.10	$4,976,896
2018	2.81	$4,507,116
Total	**11.76**	**$23,368,790**

* Starting in FY 2014 data reflects Water Department's Revenue Protection Program efforts only as the Water Revenue Re-inspection program was transferred to the Water Department in 2013.

Operations Administration's ongoing activities continue to build on successful efforts of the past. Future program initiatives include:

- Utilize the full potential of the billing system to enhance the management of customer account data.
- Increase staff levels to enhance revenue collections.
- Identify opportunities to improve efficiency and timeliness in addressing leakage on customer services connection piping.
- Continue to leverage the Cityworks® maintenance management system to better track leak occurrences, pipeline failure modes, and response and repair times. The Department has retained a consulting firm to help improve the utilization of Cityworks®.
- Establish a process to reliably track the period when leaks are identified to the completion of repairs, and improve practices to minimize this lag period.
- Investigate opportunities for additional DMAs with enhanced pressure management capabilities.

H. CONCLUSIONS

The findings discussed in Sections B through G of this chapter provide the basis for our overall conclusion on the condition of the Water System. The general physical condition of the major facilities of the Water System has been evaluated using the following three ratings:

- *Good:* The facility is in condition to provide consistent and reliable operation in accordance with regulatory requirements and service needs with the planned level of maintenance and capital improvements.
- *Adequate:* The facility is operating at or near design levels, however, non-routine renovation, upgrading, and repairs are needed to ensure continued reliable operation.
- *Poor:* The facility is not being operated within design parameters. Major renovations are required to restore the facility and assure reliable operation. Major expenditures for these improvements may be required.

Based on onsite physical inspections and investigations of major system facilities, conducted in June, July and August of 2017, combined with discussions with key Water Department staff at that time and subsequently in August of 2018, it is our opinion that:

- The major facilities of the Water System are in good operating condition or adequate steps are being taken to return them to good operating condition; and
- The approved capital improvement budget for FY 2019 and the proposed six-year capital program for FY 2019 through FY 2024 should provide adequate funds to sustain the systems in good operating condition. With the additional improvements identified as part of the Water System Master Plan, the Water Department has outlined additional improvements to address the system needs over the near term and provides a roadmap to maintaining reliable and safe service for customers in the future.

V. Wastewater System

A. INTRODUCTION

By the end of the Nineteenth Century, Philadelphia had established a Department of Sewerage and had constructed approximately 800 miles of sanitary and storm sewers. In 1923, the Northeast Water Pollution Control Plant ("WPCP") went into service with a capacity of 60 mgd. From that point until the mid-1940s, most expenditures were for collection and transmission facilities rather than for treatment works. It was not until 1946 that wastewater service charges in the City provided the means of financing the modernization of the original Northeast WPCP and the construction of the original Southeast and Southwest WPCPs as primary treatment facilities. All three wastewater treatment plants were upgraded in the 1970s and 1980s to provide secondary treatment. Construction of the Biosolids Recycling Center ("BRC"), formerly the Sludge Processing and Distribution Center which manages sludge produced from all three treatment plants, was subsequently completed in 1989. The most significant change to the wastewater system since that time was the privatization of BRC in 2008 which facilitated the construction of a new facility capable of producing Class A pelletized biosolids for beneficial reuse, as discussed in Section V.J below.

B. WASTEWATER SYSTEM OVERVIEW

The Philadelphia Water Department's wastewater system currently serves the City of Philadelphia, and parts of Bucks, Montgomery, and Delaware Counties. According to the 2015 Census data estimate and Water Department estimates, the total service area population is approximately 2,317,442 including approximately 1,567,442 people within the City and approximately 750,000 residents in outlying municipalities. The service area population is distributed over 364 square miles, with 230 square miles in suburban communities and 134 square miles in the City.

The wastewater collection system consists of approximately 3,714 miles of total collector system piping, 19 pumping stations (16 Water Department owned and 3 owned by others but operated by the Water Department), 94,293 manholes, 25 storm relief structures, and 71,926 stormwater inlets. There are approximately 763miles, 740 miles, and 1,852 miles of sanitary, stormwater, and combined sanitary/stormwater mains, respectively. The sewers range in size from 8-inch diameter to 21 feet by 24 feet arch-shaped conduits primarily constructed of brick, vitrified clay, or reinforced concrete. The wastewater system consists of three drainage districts, each served by a treatment plant as indicated in Figure V-1.

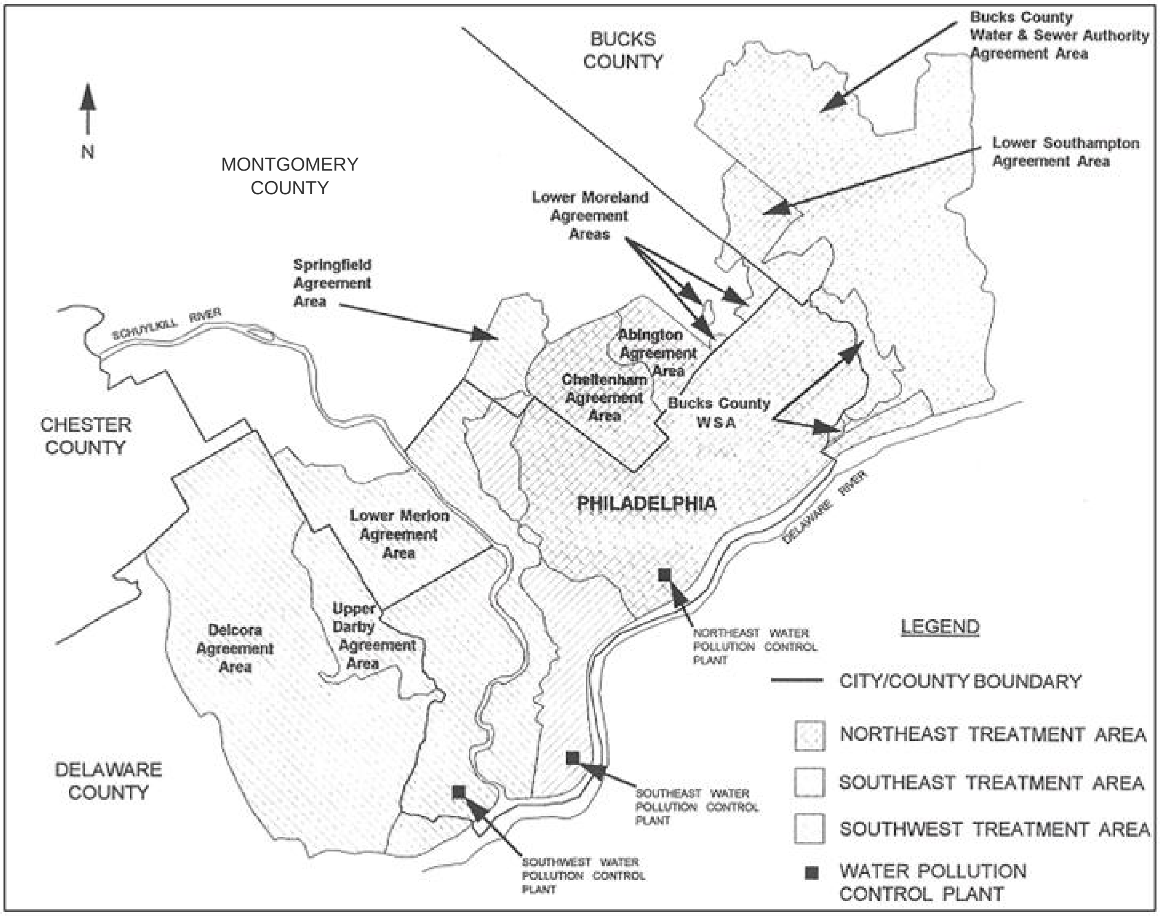


Figure V-I Wastewater Service Areas

C. WHOLESALE SUBURBAN CUSTOMERS

Contracts for wastewater treatment service with eight neighboring municipalities and authorities provide for the billing of charges based on wastewater strength and volume. As illustrated in Figure V-1, parts of Bucks and Montgomery Counties contribute to the Northeast WPCP; parts of Montgomery and Delaware Counties contribute to the Southwest WPCP; and Springfield Township of Montgomery County contributes to the Southeast WPCP.

Table V-1 summarizes the contract limit flows and actual flows by receiving plant.

Table V-1 Wholesale Suburban Flows to WPCPs

PLANT	AVERAGE DAILY FLOW (MGD)	
	Annual Maximum (Contract Limit)	Fiscal Year 2018
Northeast WPCP	56.6	35.0
Southeast WPCP	1.0	0.4
Southwest WPCP	84.7	44.3
Total	**142.3**	**79.7**

D. CONSENT ORDER AGREEMENT AND RELEVANT REGULATORY PERMITS

The Water Department's combined sewer system is subject to the COA with the PaDEP.

In addition to the COA, the Water Department's wastewater treatment plants and collection systems are regulated by three permits which include:

- NPDES Permits
- MS4 Permit
- Title V Major Source Operating Permits-Clean Air Act (Title V) Permit

1. Consent Order Agreement

The Water Department entered a COA with PaDEP on June 1, 2011. The COA formalized the Water Department's LTCPU, also known as the Green City, Clean Waters ("GCCW") program, as the means by which the Water Department will reduce CSOs to achieve compliance with the CSO Control Policy. This policy requires the capture of 85 percent of the combined sewage collected in the combined sewer system during rainfall events on an annual average basis.

Under the COA, the Water Department has committed to invest in green and traditional infrastructure, including wastewater treatment plant capacity increases, interceptor lining and collection system improvements that will cumulatively achieve the required 85 percent capture by the year 2036, or year 25 of the COA. The infrastructure improvements to be implemented under the COA will eliminate and remove no less than the mass of pollutants (Biochemical Oxygen Demand ("BOD"); Total Suspended Solids ("TSS"); and fecal coliform bacteria) that would be removed by the capture of 85 percent by volume of combined sewage collected in the Combined Sewer System during precipitation events on a system-wide annual average basis. The COA takes an adaptive management approach to meeting the program goals thereby allowing the Water Department to review and revise the approach routinely over time to insure environmental, financial and regulatory metrics are met in an efficient and sustainable manner.

To track the progress toward compliance with the 25-year program goals, the COA includes interim performance standards at the end of the fifth, tenth, fifteenth and twentieth years in four categories: (1) Total Greened Acres; (2) Overflow Reduction Volume; (3) Miles of Interceptor Lined; and (4) Wastewater Treatment Plant Upgrades: Design and Construction. The Water Quality Based Effluent Limit ("WQBEL") Table in the COA summarizes these performance standards. The WQBEL

Table below (see Table V-2) is an excerpt from the COA and the Water Department anticipates it to be included in the Water Department's renewed NPDES permits.

Table V-2 WQBEL Performance Standards Table (COA Excerpt)

WQBEL Performance Standards – COA TABLE 1							
Metric	**Units**	**Baseline value**	**Cumulative amount as of Year 5**	**Cumulative amount as of Year 10**	**Cumulative amount as of Year 15**	**Cumulative amount as of Year 20**	**Cumulative amount as of Year 25**
***[plant name]* WPCP upgrade: Design**	percent complete	0	* note (1)	* note (1)	* note (1)	100%	100%
***[plant name]* WPCP upgrade; Construction**	percent complete	0	* note (1)	* note (1)	* note (1)	100%	100%
Miles of interceptor lined	miles	0	2	6	14.5	14.5	14.5
Overflow Reduction Volume (2)	million gallons per year	0	600	2,044	3,619	5,985	7,960
Total Greened Acres	Greened Acres	0	744	2,148	3,812	6,424	9,564
Equivalent Mass Capture - TSS	percent	62%	Report value	Report value	Report value	Report value	85%
Equivalent Mass Capture - BOD5	percent	62%	Report value	Report value	Report value	Report value	85%
Equivalent Mass Capture - Coliform bacteria	percent	62%	Report value	Report value	Report value	Report value	85%

(1) Performance Standards for "percent complete" for the WPCP upgrade design and construction projects were not available at the time of the COA. The City shall provide these targets to the Water Department along with the Facility Concept Plan for the WPCP. The Facility Concept Plan is due on a specific date given in the COA. After the Water Department approves the Facility Concept Plan, the targets for "percent complete" will be entered into COA Table 1. The formal modification of COA Table 1 may be accomplished by the DEP by issuing a revised NPDES permit.

(2) Overflow Reduction Volume means the difference between the volume of overflow in million gallons per year for the condition prevailing at the time of the report and the volume of overflow in million gallons per year for the baseline year. The baseline year is represented by Philadelphia's physical systems as they were configured on January 1, 2006. Both volumes will be determined from modeling, using climatic data representing the same "typical year" for Philadelphia as determined in the LTCPU development process, and a hydrologic/hydraulic model calibrated with flow data collected for verification of actual performance.

The COA outlines civil penalties to be assessed should the Water Department be unable to meet the WQBEL performance standards or other requirements related to submission of periodic deliverables; record keeping; and planning, design, and construction requirements. Penalties for not meeting the incremental performance standards start at $25,000 per month per violation for the first six months and could increase up to $100,000 per month per violation should the Water Department remain in violation for 13 months or more. Additionally, there are penalties that could reach up to $2,000 per day per violation for failure to submit timely and adequate plans, reports and other deliverables.

The Water Department's progress toward achieving the performance standards is summarized below:

- Upgrade of Water Pollution Control Plants (Design and Construction): The Wet Weather Facility Plan for the three WPCPs was submitted to PaDEP by the June 1, 2016 deadline and provides details on scheduling, cost and anticipated construction completion dates for the projects listed in the Facility Concept Plans. This plan supersedes the previously submitted Facility Concept Plans. The Water Department's plan is to increase the primary treatment capacity of the Northeast WPCP by 215 mgd, and Southeast WPCP by 60 mgd. These increases will be achieved through a combination of collection system and plant upgrades to increase both the flow delivery to the plant and the flow through the treatment train. The Southwest WPCP and associated sewer district are currently being reevaluated for the purposes of identifying opportunities for additional capacity improvements.
- Miles of interceptor lined: Involves lining streamside interceptors within the Cobbs and Tacony-Frankford watersheds to improve stream quality and aesthetics during dry weather. The Water Department has met the five-year target. They are conducting this work under contract to increase inspections and identify new projects without compromising existing preventative maintenance services. As of June 2018, 7.5 miles of interceptor had been lined, which surpasses the 10-year target. Additionally, 4.3 miles of lining projects are being prepared for construction, and another 3.3 miles of projects are in design.
- Reduction of CSO volume: Tracks the reduction of total CSO volume compared to the baseline year of 2006. The Water Department has met the 5-year requirement of 600 MG of overflow reduction by achieving 1,710 MG of reduction as of June 2016. Planned traditional and green infrastructure projects including ongoing upgrades to the Northeast WPCP are anticipated to achieve the volume reduction necessary to meet the 10-year target in 2021. Overflow reduction volume achieved is reported every 5 years in the Evaluation and Adaptation Plans.
- Total Greened Acres: A Greened Acre (GA) is an expression of the volume of stormwater managed by green stormwater infrastructure, based on the design for the project. One Greened Acre is equivalent to one inch of managed stormwater runoff from one acre of drainage area. As of June 2018, a total of 1,159 cumulative greened acres have been implemented resulting from the following project types: Public Retrofits, Private Development and the Incentivized Retrofit Program.

  The Water Department currently has $47 million budgeted in FY 2019 for construction of green infrastructure that will be self-owned, operated and maintained. Additional greened acres will be achieved through private development.

Equivalent Mass Capture: Using the presumption approach outlined in the National CSO Control Policy, the goal is to reduce the impact of BOD, TSS, and fecal coliform bacteria on local waterways equivalent to the capture and treatment of 85 percent of CSO overflows. The Water Department has met all the 5-year metrics and is working towards the 10-year performance standards defined above as well as the other deliverables identified in the COA. In October 2016, the Water Department submitted its first Evaluation and Adaptation Plan ("EAP") to USEPA and PaDEP as required. The plan reviews compliance with the 5-year metrics, assesses effectiveness of LTCPU implementation to date and proposes modifications to the management approach as appropriate. The Water Department is required to submit an EAP every five years.

The Water Department anticipates that over the next 20 years, compliance with the COA will significantly increase capital and operating expenditures related to its Combined Sewer Overflow Program. As of the most recent projections, the total cost of the 25-year program is approximately $4.5 billion, of which approximately $3.5 billion are capital related costs and $1 billion are operation and maintenance costs. For FY 2017 and FY 2018, the City budgeted $55 million and $76 million for capital COA Expenditures, respectively. The FY 2019 budget for capital COA Expenditures is $76 million. The Water Department is committed to identifying and implementing wet weather solutions that are both protective of water quality and fiscally responsible. To achieve this, the Water Department is currently reevaluating traditional infrastructure alternatives and investigating opportunities to increase the efficiency of GSI implementation and maintenance on both public and private lands.

On December 31, 2015, the Water Department received a request from the USEPA, pursuant to Section 308 of the Clean Water Act, for information related to its COA. On November 9, 2016, the Water Department received a revised information request obligating the Water Department to perform an analysis that is inconsistent with its approved COA. For example, the revised information request directed the Water Department to analyze the controls necessary to achieve 85 percent capture in each of its CSO receiving streams, rather than 85 percent capture based on a city-wide average, as stated in the Water Department's approved COA. On March 16, 2017, the Water Department sent a letter to the Acting Administrator at USEPA Region III asking that it reconsider its Section 308 information request and stating its intent to seek relief from USEPA Headquarters and, if necessary, federal court. On April 10, 2017, the USEPA responded in writing by stating that they will stay the obligation to respond to the Section 308 information request and schedule a meeting with the Water Department to discuss the issue further. The meeting occurred on June 27, 2017, and the parties are in the process of negotiating a mutually acceptable resolution to the 308 information request. Any changes to the Water Departments obligations under the COA because of the negotiations could increase the overall cost of compliance beyond the current $4.5 billion estimate. The Water Department is currently in negotiations with USEPA regarding how to measure "capture": by sewer district or system-wide. The NPDES permits for the wastewater treatment plants will embody the outcome of these negotiations.

2. National Pollutant Discharge Elimination System Permits

The NPDES permits for the Northeast, Southeast, and Southwest WPCPs all became effective September 1, 2007 and expired August 31, 2012 after the 5-year permit term. As required, the Water Department submitted a renewal application, and continues to operate under the administratively extended 2007 permit until PaDEP issues a new one. In February 2012 PaDEP certified that the application for the permit renewal was Administratively Complete. The Water Department has received draft versions of the NPDES permits for all three plants, reviewed those drafts and provided comments to PaDEP. The PaDEP has incorporated the requirements of the LTCPU COA into the NPDES permit as was negotiated in the COA. The permits will be administered at the discretion of PaDEP after the negotiation process and required public comment period and the Water Department anticipates the new permits to be issued during FY 2019.

The NPDES permits are comprised of three major components: Parts A, B and C. Part A regulates the effluent discharges for each plant and provides for monitoring, record keeping, and reporting requirements. Table V-3 details the key effluent discharge limitations established in the permits. It is anticipated that ammonia-nitrogen will be regulated under new permits. Future permits may include limits on dissolved oxygen and nutrients but the Water Department does not anticipate modifications or additions for these parameters in the next permit cycle.

Part A of the NPDES permit also outlines monitoring requirements for a plant's stormwater outfall system (each plant has its own stormwater system) and lists all combined sewer outfalls that are tributary to each of the wastewater treatment plants. The permit requires monitoring of every stormwater outfall at the WPCPs for select parameters on an annual basis. The permit also details specific requirements for the combined sewer outfalls. The Water Department, in compliance with the requirements of the permits, developed a Preparedness, Prevention, and Contingency Plan ("PPC") to assure that stormwater outfalls do not pollute the receiving waters and that staff is implementing Best Management Practices ("BMPs"). The Water Department updates the PPC annually in concert with updates to the spill prevention plans.

Part B of the NPDES permit outlines Management Requirements, Penalties and Liabilities and Other Responsibilities.

Part C of the permits contains 29 "Other Requirements." Summarized as follows are some of the key requirements:

- Referencing of standard test methods for all the parameters being monitored.
- Establishing requirements for stormwater outfalls serving the wastewater plants. This section calls for the preparation of a PPC for each facility. Also, performance of an annual comprehensive site compliance evaluation as well as the implementation of Stormwater Management BMPs.
- Completing a re-evaluation of the local limits for Significant Industrial Users ("SIUs") within one year of the permit issuance date. The Water Department re-evaluated its local limits associated with its pretreatment program and submitted them to the PaDEP for approval. The Water Department's current regulations reflect the approved local limits.
- Acknowledging the Water Department's efforts to reduce the frequency and volume of untreated sewage discharges and allows flexibility in calculating and reporting removal levels and mass loadings at the treatment plants during high flows.

Table V-3 Current NPDES Key Effluent Limitations

EFFLUENT CHARACTERISTIC	DISCHARGE LIMITATION
	(Average Monthly)
$CBOD_5$ (mg/l)	25[1] [2]
$CBOD_5$ (lbs/d)	36,430[1], 19,800[2]
$CBOD_{20}$ (lbs/d)	71,760[1], 35,830[2], 33,600[3]
$CBOD_5$ (% removal)	86[1], 89.25[2]
$CBOD_5$ (% removal at flows > MDF)	See footnote 5
BOD_5 (mg/l)	30[3]
BOD_5 (lbs/d)	19,650[3]
BOD $_5$ (% removal)	86[3]
BOD_5 (% removal at flows > MDF)	See footnote 6
TSS (mg/l)	30[1] [2] [3]
TSS (lbs/d)	52,540[1], 50,400[2], 28,025[3]
TSS (% removal)	85[1] [2] [3]
TSS (% removal at flows > MDF)	See footnote 7
pH	6-9[1] [2] [3]
Fecal Coliform	200/100 ml [4]
Total Residual Chlorine (mg/l)	0.5[1] [2] [3]
Average Monthly Flow - AMF (mgd)	monitor/report
Maximum Daily Flow – MDF (mgd)	monitor/report
Maximum Daily Flow – MDF recognized for calculating % removals at high flow day events (mgd)	315[1], 300[2], 168[3]

(1) Northeast WPCP
(2) Southwest WPCP
(3) Southeast WPCP
(4) Geometric mean
(5) If a calendar month includes one or more days where flows exceed the MDF, a value of 86 percent and 89.25 percent respectively at the Northeast WPCP and the Southwest WPCP may be used for those days for calculating $CBOD_5$ percent removal.
(6) If a calendar month includes one or more days where flows exceed the MDF, a value of 86 percent at the Southeast WPCP may be used for those days for calculating BOD_5 percent removal.
(7) If a calendar month includes one or more days where flows exceed the MDF, a value of 85 percent may be used for those days for calculating TSS percent removal.

mg/l	milligrams per liter
ppd	pounds per day
mgd	million gallons per day
$CBOD_5$	Carbonaceous Biological Oxygen Demand (five day)
BOD_5	Biochemical Oxygen Demand (five day)
TSS	Total Suspended Solids
AMF	Average Monthly Flow
MDF	Maximum Daily Flow

- Requiring the development of an Operations and Maintenance Plan. Each wastewater treatment facility must update its plan whenever a significant revision to the facility occurs. The plan contains the following elements:
  - Process control strategy
  - Monitoring and compliance plan
  - Wet weather operations strategy
  - Emergency operations plan
  - Preventative maintenance plan
  - Emergency maintenance plan
  - Solids management plan

  Each of the wastewater treatment plants already has operations and maintenance manuals and standard operating procedures that are in total conformity with this requirement.
- Requiring a Sludge Dewatering Summary Report. This monthly report is to be filed along with the Discharge Monitoring Reports.
- Preparing a required PCBs Requirements Plan. The Water Department has previously prepared, and the DRBC has accepted, a Pollution Minimization Plan ("PMP") related to PCBs. The Water Department updates this plan annually.
- Requiring development of a CSO Program. This section details a comprehensive program to minimize combined sewer overflows and has three components:
  - Implementation of the Nine Minimum Controls
  - Implementation of the Long Term CSO Control Plan
  - Monitoring and Assessment

The details and schedules for all components of the LTCPU are documented in the June 1, 2011 COA discussed above.

3. Municipal Separate Storm Sewer System Permit

PaDEP has the authority to regulate municipal stormwater through the MS4 program. The PaDEP issued the Water Department's previous permit in September 2005 and it expired in September 2010 after the five-year permit term. As required, the Water Department submitted a renewal application in March 2010, and continues to operate under the old permit until PaDEP issues a new permit. The PaDEP made the draft permit available for public comment in July 2017. The permit will be administered at the discretion of PaDEP after the negotiation process and required public comment period and the Water Department commented on the draft permit and anticipates a finalized permit in late calendar year 2019.

Sections of the Water Department's expired MS4 permit include:

- Sediment TMDL for Wissahickon Creek

- PMP for PCBs in the City's MS4
- Stormwater Management Program:
  - Source Identification
  - Discharge Management, Characterization, and Watershed-based Assessment and Management Program for three watersheds (Pennypack, Poquessing and Wissahickon)
  - Detection, Investigation, and Abatement of Illicit Connections and Improper Disposal
  - Monitoring and Control of Pollutants from Industrial Sources
  - Monitoring and Control of Stormwater from Construction Activities
  - Best Management Practices

4. Title V Major Source Operating Permits

The Federal Clean Air Act, as amended, (the "Clean Air Act," or "CAA") sets forth requirements for the regulation of certain air emissions. In January 1994, the PaDEP published regulations pursuant to the Clean Air Act's mandates for the control of VOCs and nitrogen oxides ("NOx") emissions from major stationary sources. These regulations required, in part, that all sources of VOC and NO_x quantify their emissions. The three WPCPs are sources of VOCs and NO_x

The Title V permits require bi-annual reporting for NO_x and VOC emissions. Section C, Facility Wide Requirement of the Title V permits, also contains requirements regarding odor emissions. The Water Department must report any detection of a malodorous air contaminant outside the facility property line. Permit requirements consist of monitoring and reporting. The permit does not stipulate any limitations.

In June 2001, Title V Major Source Operating Permits were issued for the Northeast WPCP and the combined site of the Southwest WPCP and the BRC. In January 2013, the Water Department entered into a Title V consent order agreement to address the odor issues from the Northeast WPCP by installing gravity thickeners and related odor control by 2018. Due to construction delays, the Water Department requested and was granted an extension to complete the work by June 2019; The gravity thickeners are under construction and anticipated to be operational in accordance with the requested extension.

The Water Department completed negotiations with the City of Philadelphia's Air Management Services and received a new permit for the Northeast WPCP in 2014. The Title V permit for the BRC is the responsibility of the Philadelphia Biosolids Services, LLC (the "PBS") going forward, as they are the operator of the BRC. With the removal of the BRC, the Water Department anticipates that by the end of 2018 the Southwest WPCP will be permitted as a minor facility that is no longer subject to Title V.

Since 2008, no odor violations have been reported at the Northeast WPCP, Southeast WPCP, or Southwest WPCP.

E. WASTEWATER SYSTEM INITIATIVES

1. Wastewater Master Planning

Similar to the Water System Master Plan mentioned in Section IV, the Water Department completed a draft Wastewater System Master Plan in spring of 2016. The general objective of the wastewater master plan is to develop a roadmap for long-term wastewater system improvements. The wastewater system master plan incorporates elements of the COA and LTCPU that have already been agreed to with PaDEP. The following bullets summarize phases of the wastewater master planning effort:

- Phase 1 focused on system capacity, evaluating current conditions, projecting future flows and loadings, and developing a wet weather conveyance and treatment strategy, and incorporated elements of the Water Department's LTCPU. The capacity evaluation demonstrated that the wastewater system has sufficient capacity for projected population growth through 2066.
- Phase 2 consisted of evaluating future wastewater system needs, particularly with respect to renewal and replacement of equipment and structures in the existing wastewater plants, and potential future regulatory requirements that may result in additional capital needs to achieve compliance. The assessment of potential future regulatory requirements included elements related to nutrient removal, biosolids, odors, and micro-constituents.
- Phase 3, the final phase, included the development of the overall wastewater system master plan that reflects the Water Department's vision of the "utility of the future." To achieve this vision the plan includes elements related to resource recovery, energy efficiency and resilience.

The completed draft Wastewater Master Plan outlines projected capital improvements necessary for achieving overall plan elements based on the conditions, assumptions and goals prevailing in 2016. The plan will be re-evaluated every five-years to ensure it still reflects system conditions and requirements. The identified capital improvements that have resulted from the master planning effort will be incorporated into the Water Department's overall CIP as appropriate.

2. Energy Initiatives

The Water Department is committed to achieving energy efficiency in all its operations. This commitment is driven by a series of internal and external factors that include: the January 2011 deregulation of power utilities in Pennsylvania; volatile energy markets; global and industry-wide emphasis on renewable energy and greenhouse gas reduction; the potential for energy intensive pumping or treatment requirements in the future; and the City's increased emphasis on sustainable energy management. The City's initiatives include: the Greenworks Philadelphia Plan which calls for reductions in energy consumption and greenhouse gas emissions, along with increased energy independence; participation in C40 Cities which calls for cities to lead the charge in achieving 80 percent reduction in greenhouse gas emissions by 2050 (Philadelphia's target for 2050 is 4.6 million metric tons per year, a 90 percent reduction from the 1990 baseline) and commitments to Zero Waste and 100% renewable energy by 2035.

In FY 2017, the Water Department updated its Utility-Wide Strategic Energy Plan ("Energy Plan"). The Energy Plan focuses on the achievement of four goals: reduction of the Department's carbon footprint/greenhouse gas emissions ("GHG"), renewable energy generation and use at its facilities, resource recovery and energy efficiency gains.

The Water Department estimates that it has achieved GHG emissions reductions of 35 percent from 1990 levels and seeks to increase this to 50 percent by the year 2027. The reported reduction was measured using the greenhouse gas inventorying protocols outlined in the Local Government Operations Protocol (v 1.1, 2010).

The Water Department continues to implement the Energy Plan by implementing energy conservation measures, developing renewable energy sources, and pursuing strategic energy purchasing opportunities. The Water Department strives to increase the implementation of energy efficiency projects while maintaining a stable energy footprint over the next decade. Strategies to achieve this goal include optimization of biogas use and increased energy independence at the wastewater treatment plants.

The Water Department has a variety of energy-related projects in various stages of investigation, development, and implementation, including the following:

- Renewable Energy Generation:
  - Biogas Cogeneration: A facility at the Northeast WPCP captures methane gas generated by anaerobic digestion and utilizes the gas in a 5.6-megawatt cogeneration facility. The facility can generate 42 megawatt hours (MWh) per year, which accounts for 85 percent of the WPCP's total power consumption. In FY 2017, the power generated was 34 MWh, approximately 68 percent of plant demand.
  - At the Southeast WPCP, the Water Department's photovoltaic solar system continues to generate approximately 300,000 kilowatt hours (kWh) of AC power per year. In FY 2016, 332,692 kWh were generated, which accounts for approximately 2 percent of the power used at the plant. The FY 2017 generation was 351,655 kWh.
- Resource Recovery:
  - The Water Department continues to accept used aircraft de-icer fluid from the Philadelphia International Airport directly into the anaerobic digesters at Southwest WPCP to enhance digester gas production.
  - The Water Department has considered that by accepting food waste, its excess digestion capacity could be beneficially utilized and this could enhance biogas generation processing. Staff issued a Request for Information ("RFI") in June 2017 to evaluate market interest in the delivery of pre-processed, liquefied food waste. The RFI seeks information from interested parties on collection, pre-treatment, quality assurance, delivery, and a business plan.
  - The Water Department has participated in and/or led multiple Water Environment Research Foundation projects focused on energy recovery at wastewater facilities.

- ENER1C12 – A Guide to Net-Zero Energy Solutions for Water Resource Facilities (2015). This project developed methods to evaluate opportunities for energy neutrality at wastewater facilities and found that in most cases policy issues limit neutrality not technical feasibility issues.
- ENER10C13 – State of the Science and Issues Related to Heat Recovery from Wastewater, a follow-on study, is nearing completion.

- Energy Efficiency:
  - The Water Department is seeing gains achieved through technology changes (e.g.; Biomix large bubble mixing program at Southwest WPCP), lighting evaluations and improvements system-wide and incorporation of energy efficiency considerations into all new projects.

The Water Department actively participates in Peak Load reduction and Demand Response programs offered by the local utility and grid operator.

F. WATER POLLUTION CONTROL PLANTS OVERALL OPERATIONS

The three WPCPs maintain high levels of treatment efficiency and have been recognized by the National Association of Clean Water Agencies ("NACWA") with either Silver, Gold, or Platinum awards over the past decades. The Northeast, Southwest and Southeast WPCPs met all permit requirements in calendar year 2017 and received their 13th, 7th, and 18th NACWA platinum awards, respectively. The platinum award is given to facilities that are in perfect compliance with NPDES requirements for five consecutive calendar years.

MAXIMO® CMMS facilitates maintenance management. The Water Department uses MAXIMO primarily at the treatment plants (both water and wastewater) and the pumping stations for planning and tracking maintenance. The Water Department uses the program to organize all plant maintenance activities and to help staff emphasize predictive and preventive maintenance. Currently, planned maintenance accounts for approximately 75 percent of all the work orders.

The status of plant tankage, conduits, buildings, and structures is tracked through the Capital Facilities Assessment Plan ("CFAP"). The CFAP identifies critical assets within the plant that need to undergo detailed inspection. Assets are cataloged, and inspections are programmed over a ten-year period. The capital planning process uses the results of the facility inspections. The Water Department has prioritized difficult to access structures, not routinely inspected, for inspection as a follow-on activity from the master planning effort. These inspections will supplement CFAP.

G. NORTHEAST WPCP

1. Service Area

The Northeast WPCP serves northeast Philadelphia and suburban areas in southeast Bucks and eastern Montgomery counties.

2. Capacity and Performance

The plant is sized for a design average flow of 210 mgd and a peak flow of 435 mgd. Through the LTCPU, the Water Department has committed to expanding the capacity of the Northeast WPCP to include a 215 mgd high flow management conduit, which will divert flow around the secondary treatment process and allow for the better capture and treatment of combined sewage during wet weather events. The high flow management conduit construction was completed by July 2018 and is available for operation when needed.

Average and maximum plant flows were 148 mgd and 500 mgd in FY 2017 and 175 mgd and 526 mgd for FY 2018. Effluent concentrations were consistently at or below 20 mg/L for $CBOD_5$ and TSS. Total Residual Chlorine ("TRC") levels were also below permit requirements.

3. Liquid Stream Process

The facility consists of a Preliminary Treatment Building ("PTB") providing screening, influent pumping and grit removal; primary clarifiers; aeration basins; final clarifiers; and disinfection.

The Northeast WPCP receives residuals discharged from the Baxter Water Treatment Plant. The characteristics of these residuals reduce available phosphorous for the activated sludge process. The plant can add phosphoric acid (to assure proper nutrient levels) if needed. Key activities or improvements to the liquid stream process that are currently in progress include the following:

Projects recently completed:

- Frankford High Level lining project and sealing of a diversion chamber
- New high flow management conduit from Set 1 to effluent conduit – completed in July 2018

Projects either planned or ongoing:

- Under Construction:
  - Replacement of aeration tank diffusers (being completed in-house)
- In Design Process:
  - New Preliminary Treatment Facility; this project includes a land acquisition element.

4. Scum and Sludge Stream Process

Dissolved Air Flotation ("DAF"), thickening of Waste Activated Sludge ("WAS"), and anaerobic digestion of combined primary and thickened waste activated sludge provides sludge treatment at the plants. Digested sludge is gravity-fed to two transfer tanks. Approximately once daily, the tanks discharge sludge to barges which then transport the sludge to the BRC for final processing for beneficial reuse.

Key activities or improvements to the sludge stream process recently made or currently in progress include the following:

- Under Construction:
  - New Gravity Sludge Thickeners, expect to be completed by June 2019
- Projects in Design Process:
  - Final Sedimentation Tank Set 2 return sludge piping replacement

5. Facility and Utility Maintenance Projects

Listed below are additional liquid stream and sludge stream projects, key facility and utility maintenance projects:

Projects recently completed:

- Replacement of process air blower valves and actuators
- Rehabilitation of the plant water system
- Replacement of aeration tank high voltage switchgear
- Replacement of existing 480V switchgear on Set 2 Final Sedimentation Tank
- Painting of aeration tanks process air headers

Projects either planned or ongoing:

- Under Construction:
  - Rehabilitation of Pier 217 North
  - Gas storage tank bladder replacement
  - Replacement of digester roof
  - Installation of a new plant entrance gate
- In Projects Control Pending Bid:
  - Replacement of emergency lighting throughout the plant
  - Replacement of interior and exterior doors throughout the plant being performed with in-house resources
- In Design Process:
  - Upgrades to Final Sedimentation Tank Set 1 scum collection controls
  - Automation of Final Tank scum removal (both Set 1 and Set 2)
- Planned for Future Implementation:
  - Acquisition of properties for siting of new Pretreatment Building
  - Replacement of sludge gas piping
  - Replacement of boilers and chillers

6. Operation and Maintenance

The Northeast WPCP is operated seven days per week with three daily operating shifts. Currently, there are 110 total staff (of 132 authorized), including administrative, operations, and maintenance personnel that work at the Northeast WPCP. There are five certified operators. Currently, there are 22 vacant positions, including one operator position which management anticipates filling in the near-term.

A process computer system is currently used for monitoring certain plant processes and for computing various process trends. The following unit processes are automated: raw influent pumps, bar screen rakes and conveyors, influent flow splitting to the primary settling tanks, scum gates, dissolved oxygen and air flow controls for the aeration tanks, return sludge system components, hypochlorite disinfection, digester feeding, and DAF thickening system. Automation of final settling tank scum collection is currently under design. Operators have assigned responsibility for key plant facilities with dedicated operator stations. The stations have computer monitors which assist the operator in making process control decisions. Upgrades have made process and lab data more available via web-based reporting, and greatly enhancing analysis and trending of data. An on-site process control laboratory is also used to check and optimize plant operation.

7. Cogeneration System

In 2011, the City entered into a long-term contract and lease with PMA to arrange the construction, financing, maintenance and sublease of a digester gas cogeneration facility at the Northeast Water Pollution Control Plant. PMA entered into a lease (the "Lease") with BAL Green Biogas I, LLC, a special purpose entity of Bank of America (the "Lessor"), which requires PMA to make certain lease payments to the Lessor. Pursuant to a sublease dated December 23, 2011 (the "Sublease"), the City assumed all of PMA's obligations under the Lease. The obligations under this contract constitute operating expenses of the Water Department. The Sublease expires on September 25, 2029, unless renewed by PMA for an additional term of eighteen months.

As mentioned in the Energy Initiatives Section, the facility produced approximately 68 percent of the plant's power in FY 2016; performance for FY 2017 was approximately 68 percent and performance for FY 2018 was approximately 67 percent.

H. SOUTHEAST WPCP

1. Service Area

The Southeast WPCP service area includes the eastern portion of Center City, the eastern portion of South Philadelphia, a portion of North Philadelphia, the majority of Kensington/Richmond, and the central portion of Germantown/Chestnut Hill. The Southeast WPCP also services the Philadelphia Naval Base and a small portion of Springfield Township in Montgomery County.

2. Capacity and Performance

The plant provides treatment for an average annual design flow of 112 mgd and a peak flow of 224 mgd. Through the LTCPU, a commitment has been made to expand the wet weather capacity of the Southeast WPCP by 50 mgd primarily through hydraulic improvements in the collection system. This effort will also review bottlenecks within the plant related to the aeration tanks and the secondary clarifier weirs to allow for better capture and treatment of combined sewage during wet weather events. Studies conducted to detail the hydraulic capacities of the processes and inform future projects are ongoing, but there have not yet been any capital projects identified.

The average daily flow to the plant in FY 2017 was 75 mgd, while peak flow was 345 mgd; the average daily flow and peak flow for FY 2018 were 77 mgd and 317 mgd, respectively. The plant consistently achieved effluent concentrations of less than 10 mg/L for BOD and TSS. Total residual chlorine levels were also below permit requirements.

3. Liquid Stream Process

Liquid stream processes of the plant facilities include: influent pumping, bar screens, grit removal, pre-aeration, primary clarifiers, air activated sludge process in covered aeration basins, final clarifiers, chlorination, and effluent pumping. The Water Department trucks screenings, scum, and grit removed from the process to the Southwest WPCP for processing and ultimate disposal to a landfill.

The Southeast WPCP receives residuals discharged from the Queen Lane Water Treatment Plant. The characteristics of these residuals reduce the amount of phosphorus available for the activated sludge process. Staff adds phosphoric acid to assure maintenance of proper nutrient levels.

Projects either planned or ongoing in this area of the facility include:

- In-house replacement of 30-year-old sluice gates in grit and screenings facility. All six gates have been replaced.
- Bar screen system rehabilitation – expect to use in-house staff and complete in calendar year 2019. Parts are being ordered for rehabilitation as needed.

4. Sludge and Scum Stream Process

Pumps located in sumps at the primary clarifiers move primary sludge to a wet well in the sludge pumping station. Next, pumps move the waste activated sludge to sludge storage tanks. The primary and waste activated sludge have separate sludge transfer pumping systems. Both systems are located in the pump room of the sludge pumping station, and two eight-inch force mains convey the sludge to the Southwest WPCP for processing. The processed sludge then transfers to BRC and pelletized for beneficial reuse.

Pumps transfer the scum and grease from the primary and secondary clarifiers to scum concentration tanks. Following collection, the scum is trucked to the Southwest WPCP for separate processing and ultimate disposal to a landfill.

Projects either planned or ongoing in this area of the facility include:

- In Design Process:
  - Replacement of sludge return piping
  - Rehabilitate or replace sludge force main (portion under the river)
  - Scum Concentration Building and scum transport modifications, these two projects were re-evaluated and combined, design modifications are underway.

5. Facility and Utility Maintenance Projects

In addition to the liquid stream and sludge stream projects mentioned above, projects recently completed, ongoing or planned at the Southeast WPCP include the following:

Projects recently completed:

- Replacement of the influent bar racks.

- Rehabilitation of the HVAC system throughout the plant - Phase II is being conducted by in-house staff.
- Replacement of existing perimeter fencing.
- High mast lights and other exterior fixtures have been upgraded to LED for better lighting and efficiency as an in-house project.
- Emergency project to replace leaking sewer force main in front of the plant with ductile iron pipe – completed in September 2017.

Projects either planned or ongoing:

- Under Construction:
  - Concrete repairs and replacement of flights and chains in the Final Sedimentation Tanks.
- In Projects Control: Replace/refurbish railings throughout the plant.
- In Design Process: Repaving of roads within plant.
- Planned for Future Implementation:
  - Replace switchgear in the Compressor Building;
  - Recoat water tower; and
  - Building enclosure for grit handling.

6. Operation and Maintenance

The plant operates continuously and has an authorized staffing level of 67, including four certified operators. There are currently nine staff vacancies as of September 2018.

The Process Control Center ("PCC") controls the plant. The PCC operator has unit process graphic displays available at the Central Computer Console. The system can control the influent and effluent pumping stations, primary sludge pumping, final clarifier scum collection, return and waste activated sludge and disinfection systems.

I. SOUTHWEST WPCP

1. Service Area

The Southwest WPCP serves the western portions of Philadelphia and areas in eastern Delaware and southeastern Montgomery counties.

2. Capacity and Performance

The Southwest WPCP was designed to handle an average annual flow of 200 mgd and a peak flow of 400 mgd. Future plans call for the treatment of additional flow during storm conditions. In order to accept flows beyond 400 mgd, the Water Department needs to eliminate a variety of hydraulic bottlenecks. Through the LTCPU, the Water Department has committed to addressing bottlenecks in the collection system and within the plant to increase the delivery and treatment of combined sewage during wet weather events. Studies are ongoing to determine the most effective means of increasing plant capacity to accommodate a peak flow of 540 mgd.

For FY 2017 the average daily and peak flows were 152 mgd and 490 mgd, respectively; for FY 2018 the average daily and peak flows were 162 mgd and 499 mgd, respectively. Plant performance is well below permit limits with effluent concentrations consistently below 10 mg/L for CBOD and TSS. TRC levels are also below permit requirements.

The plant continues to be proactive in anticipating and addressing challenges. For example, a pilot study is currently being developed to assess the impact on the treatment process of side stream loadings from the solids processing centrate stream in anticipation of potentially more stringent nutrient limits.

3. Liquid Stream Process

The plant liquid stream processes include influent pumping, screening, grit removal, pre-aeration/flocculation, primary clarification, secondary treatment using pure oxygen activated sludge, secondary clarification, effluent pumping, and disinfection.

The Southwest WPCP receives water plant residuals from the Belmont facility and is the only plant to receive septage. The on-site laboratory and the Industrial Waste Unit monitor the septage receiving program.

The Water Department is continuously implementing upgrades and improvements to the Southwest WPCP.

Projects ongoing or planned for future implementation:

- Projects recently completed:
  - Replacement of influent screw pumps
  - Installation of a sixth effluent pump was completed in August 2018
- Projects either planned or ongoing:
  - Replacement of return sludge piping
  - Concrete repairs and coating of aeration tank
- In Design Process:
  - Replacement of Aeration Tank mixers
  - Centrate Side Stream Treatment Pilot Project
  - Additional centrate line for redundancy
- Planned for Future Implementation:
  - Replacement of process air piping and blowers
  - Effluent conduit rehabilitation (will be assessed as part of the Wastewater Master Plan)
  - Automation of the oxygen generation system
  - Replacement of underground oxygen piping
  - Automation of screenings conveyance and collection

4. Scum and Sludge Stream Process

Mixing Chamber No. 1 combines the Waste Activated Sludge ("WAS") from the Southwest WPCP with the WAS from the Southeast WPCP and sends the resultant stream to the DAF tanks for thickening. The DAF-thickened WAS combines with primary sludge from both the Southwest and Southeast WPCPs in Mixing Chamber No. 2. From there, the blended sludge goes to the digesters.

After digestion, the sludge overflows into a sump where pumps move it to the BRC for final processing.

Projects on going or planned for future implementation:

- Projects under construction:
  - Replacement and right-sizing of underground gas lines
  - Rehabilitation of DAF tanks
- In Design Process:
  - Scum concentration and collection system upgrade

5. Facility and Utility Maintenance Projects

In addition to the liquid stream and sludge stream projects mentioned above, projects recently completed, ongoing or planned at the Southwest WPCP include the following:

Projects either planned or ongoing:

- Under Construction:
  - Replace elevator in PTB: this project is now combined with the gas piping work.
  - Installation of high efficiency lighting: project is moving forward with internal forces
  - Replace North and South Digester Buildings roofing (this project is undergoing re-design to include replacement of piping on the roof)
- In Projects Control Pending Bid:
  - Inspect, repair and paint Gallery Tunnel
  - Concrete repairs and coating of aeration tanks
  - Replacement of Maintenance Building boilers
  - New Truck Scale Facility
- In Design Process:
  - Replacement and automation of Primary Settlement Tank scum gate actuators
  - Coating of Final Sedimentation Tank interiors
  - Replace switchgear in Influent Pump Station, Effluent Pump Station, Access Buildings, and Scum Building
  - Disinfection system upgrade

6. Operation and Maintenance

The plant continuously operates seven days per week. There are 127 budgeted positions, including administrative, operations, and maintenance personnel for the Southwest facility, including seven certified operators. Currently, there are 11 vacant positions, mostly in the maintenance group, which are anticipated to be filled within the coming calendar year.

The operating staff have main control of the plant. Operators have assigned responsibility for key plant facilities with dedicated operator stations. The stations have with computer monitors to assist the operators in making decisions regarding process control. The Water Department has upgraded the process control computer system. The system monitors all unit processes and currently controls the following operational parameters:

- Aeration tank oxygen feed

- Return sludge pumping
- Activated sludge wasting
- Secondary scum collection
- Effluent hypochlorite dosing
- Effluent pumping station
- Digester tank feeding
- Dissolved air flotation thickening
- Primary sludge pumping

Future unit processes to be automated include the primary scum collection. An on-site process control laboratory is used to check operating parameters. The process engineering staff analyzes data, determines operating set points, and establishes operating procedures.

7. Digester Gas Utilization

Utilization of digester gas has allowed the 22-building campus to be heated with only digester gas. No fuel oil is utilized. Also, since May 2012, Synagro Technologies, Inc. ("Synagro") has been offsetting natural gas consumption for sludge drying by utilizing a portion of the digester gas produced in the summertime. Dryers can be operated solely on digester gas as well as natural gas/digester gas blends.

J. BIOSOLIDS RECYCLING CENTER

Federal and state law administered by the USEPA and the PaDEP requires the City to treat and dispose of biosolids captured during wastewater treatment at the City's WPCPs. The Water Department terminated the ocean disposal of biosolids in 1980 and later constructed a centralized biosolids dewatering and composting facility to handle the biosolids processing requirements associated with all three treatment plants. Completed in 1989, the BRC is formerly known as the Sludge Processing and Distribution Center.

In 2008, the City entered into a long-term contract and lease with the Philadelphia Municipal Authority (the "PMA") for the PMA to operate the existing BRC facility. The PMA and the PBS entered into a Service Agreement (the "Biosolids Service Contract"), under which a joint venture led by Synagro through PBS designed and built, and currently operates, a thermal drying facility capable of producing Class A biosolids and the PMA pays PBS for ongoing operations of the BRC. Through a Service Agreement between the PMA and the City (the "City Service Contract"), the City assumed all of PMA's obligations under the Biosolids Service Contract. The obligations under the City Service Contract constitute operating expenses of the Water Department. The City Service Contract contains adjusters for the Consumer Price Index, Producer Price Index and fluctuations in fuel prices, among others; thus, expenditures under the City Service Contract may vary over time. The contract expires on October 13, 2028, and contains the possibility of a five-year renewal term at the option of the City.

The Water Department maintains an engineer that monitors PBS performance and compliance with the Biosolids Service Contract. A high-level meeting is conducted every month as a means for exchanging information and discussing issues associated with the BRC. PBS continues to meet or exceed all contractual requirements and monetary targets.

The venture is viewed as a success by Water Department management. In addition to facilitating compliance with various state and federal environmental regulations, including the Clean Air Act, the Biosolids Service Contract has produced cost savings for the Water Department.

The BRC processed a total of 56, 263 net billable dry tons of sludge in FY 2017, and 60,098 billable dry tons in FY 2018. Pellets are being applied as a soil amendment in Pennsylvania, Maryland, Virginia and Florida and are also used as an energy source and material for concrete production.

K. WASTEWATER COLLECTION AND PUMPING

1. Organization and Responsibility

The Wastewater Collection section of the Water Department oversees an extensive urban sewer network. The section has the operational and maintenance responsibility for the sanitary, storm, combined sewers and stormwater inlets within the City limits. The Wastewater Collection section also operates and maintains storm and sanitary pump stations and township wastewater metering chambers. In addition, the Wastewater Collection section performs the field work for many of the programs outlined in NPDES CSO, and MS4 Permits. The section is subdivided into four units. The units and their principal areas of responsibility are:

- Sewer Maintenance - responsible for maintenance and repair of the wastewater and stormwater collector systems (storm, sanitary, and combined sewers) and includes the Waterways Restoration Team and Defective Connections Group. The unit is also responsible for cleaning, debris removal, and relief of emergency flooding conditions for all stormwater inlets. Inlet Cleaning, previously a standalone unit, is now part of Sewer Maintenance. Management believes this consolidation will result in greater efficiencies within Wastewater Collection, a larger pool of candidates from which to recruit candidates for higher level positions, and a closer designation with job levels in the Distribution Unit.
- Flow Control - operates and maintains all system pumping stations, combined sewer regulators, tide gates, rain gauges, and township metering chambers as well as the Real Time-Control System and all associated meters and equipment. This unit also conducts all sewer Closed-Circuit Television ("CCTV") inspections.
- Collector System Support - provides engineering and technical support to the other operating units.
- Green Stormwater Infrastructure Maintenance: this newly formed unit is responsible for the ongoing operation and maintenance of City-owned green stormwater infrastructure. Currently, operations and maintenance of these facilities is via contract services. The Water Department is phasing out this approach over the coming years as this unit will take on these functions. Through this transition, this unit is performing administrative oversight of the service contracts and developing internal capacity, policies and procedures to provide these services internally.

2. Sewer Maintenance Unit

The Sewer Maintenance Unit maintains the City's network of sewers which includes all storm, sanitary, and combined sewers and the associated inlets and manholes. Responsibilities include repairs to sewers, stormwater inlets and manholes; inlet and sewer cleaning, and relieving choked sewers. The authorized staff level for the unit is 219 (excluding Inlet Cleaning as discussed below). As of September 2018, there are 26 vacancies, including critical vacancies for sewer inspectors. Table V-4 contains a summary of the Sewer Maintenance Unit work order history.

Table V-4 Sewer Maintenance Unit Work Order History

MAINTENANCE CATEGORY	FISCAL YEAR			
	2015	2016	2017	2018
Sewers Laterals Examined	5,496	5,933	4,875	5,368
Waterway Restoration- tons of debris removed	915	1,130	817*	1,582
Inlets Reset and Reconstructed	7,295	8,344	7,118	6,992

Note: *Estimated for June 2018

To more effectively provide service, the Water Department has reduced crew sizes and increased the number of crews to 44, enabling the unit to more consistently manage their work orders. The reorganization has also allowed the unit to dedicate two crews full time to planned work. These crews perform proactive pre-inspections to uncover and identify problems prior to CCTV video inspections. The inspection crews have further increased their diagnostic capabilities by utilizing quick view cameras. By lowering these cameras in the manhole, they provide valuable information without the need for a confined space entry. The Water Department has also added a full-time exam crew to reduce the back-log of sewer and lateral exams. This will result in a faster response to cave-ins and depressions.

The Waterways Restoration Team is responsible for general inspection, debris removal, culvert cleaning, plunge pool filling, bank stabilization, and outfall repair. In FY 2017 the Waterways Restoration Team removed over 817 tons of debris from City streams along with other bulk items (cars, tires, shopping carts).

The Defective Connections Group operates out of the Sewer Maintenance Unit. The Defective Lateral Detection and Abatement Program was initiated in FY 1994 to ensure Water Department compliance with the NPDES MS4 Permit. The 16-employee group performs a variety of tasks with the goal of identifying, tracking, and eliminating sanitary flow into the storm system. In FY 2016, 33 defective lateral connections were abated. From the program's inception through June 2017, the group has tested 59,814 properties and found 1,440 illicit connections of which 1,420 have been repaired. It is estimated that the program has eliminated 190 million gallons per year of sewer flow discharged to City creeks and streams. From July 1, 2018 through September 19, 2018, the Defective Connection Group completed an additional 382 tests and identified 24 cross connections. Quarterly and annual reports on the program are provided to the PaDEP. The Water Department Plumbing Repair Programs Unit is responsible for abating defective laterals that are detected.

In July 2010, the management of inlet cleaning moved to the Sewer Maintenance Unit. The Inlet Cleaning Unit is primarily responsible for the inspection and cleaning of 74,240 stormwater inlets, the maintenance of inlet covers (retrieving, replacing, and locking), and for relieving choked inlet traps and outlet piping. The unit uses computerized routing to maximize crew utilization and efficiency. The Water Department recently purchased smaller inlet cleaning trucks. They anticipate that this equipment will have the dual benefit of allowing better access to smaller streets and reducing fuel consumption.

The Inlet Cleaning Unit has an authorized staff of 111 and a current vacancy level of 11 as of September 2018. Critical vacancies are semi-skilled laborers and heavy equipment operators. Despite these vacancies, overall performance has remained excellent. Inlet Cleaning has 3 positions for inlet maintenance for green stormwater infrastructure. Table V-5 contains a summary of inlet cleaning. The Water Department reports that an estimated 90 percent of the work is planned or scheduled, as opposed to being reactive or emergency-type activities.

Table V-5 Inlet Cleaning

FISCAL YEAR	INLETS CLEANED	RESPONSE TIME (DAYS)
2015	94,776	2.1
2016	98,147	1.2
2017	107,638	1.3
2018	103,535	1.2

3. Flow Control Unit

The Flow Control Unit is responsible for the operation and maintenance of the combined sewer overflow system, the remote wastewater and stormwater pumping stations, the remote odor control facilities, the wastewater metering chambers, and the rain gauge network. The unit also performs all CCTV sewer inspections and contracted seasonal operation of the Water Department's floatables removable boat. As of September 2018, the Flow Control Unit has 94 authorized staff and 14 current vacancies. Critical vacancies are Electronic Technicians positions and the CSO Maintenance Interceptor positions.

The Flow Control Unit is continually updating their equipment to allow for the most efficient capture of CSOs, and to provide the most accurate and up-to-date information. They are using solar power for approximately one-third of their remotely monitored stations and have updated all stations to use cellular data transmission. This reduced transmission costs, as compared to traditional hard-wire transmission, while allowing for more frequent data transmission.

a) Combined Sewer Overflow Program

The Flow Control Unit is tasked with a significant amount of operation and maintenance activities to support on-going compliance with the LTCPU and the CSO program.

The Flow Control Unit uses the Real Time Control ("RTC") center at its Fox Street facility to monitor 175 CSO points in its collection system. The combined system also consists of 89 tide gates associated with CSOs, 26 storm relief structures (diversion chambers), 5 siphons, related wastewater control devices, and a city-wide remote monitoring system.

Combined sewer systems are designed so that during dry weather all sanitary wastewater is conveyed to the sewage treatment plant. However, during certain rain events, the additional stormwater flow exceeds the capacity of the collection system and/or wastewater treatment plant. During these rain events, the combined sewer system is designed to discharge, or overflow, the excess mix of stormwater and sanitary wastewater directly to local waterways. Overflow conditions can also occur during dry weather when the capacity of the system is reduced because of clogging or when a regulator malfunctions. These types of overflows are known as dry weather overflows. A primary objective of the Flow Control Unit is to minimize the occurrence of dry-weather overflows through proactive maintenance, inspections and analysis of real-time flow data.

The Flow Control Unit has increased remote monitoring of CSOs over time. The monitoring network currently includes over 320 sites with over 720 individual level and/or flow measurements. CSO sites managed through Real Time Control have received control upgrades (4 sites) or are in the process of being upgraded (4 sites).

b) Sewer Assessment Program

The Flow Control Unit currently has seven crews dedicated to routine CCTV inspection of sewers. In addition, the Unit also contracts resources to conduct inspections for specific projects. This allows the City crews to focus on planned proactive inspections while the contractor conduct project based inspections. The unit has recently added two CCTV crews which inspect subsurface components of GSI. Inspections are conducted on new construction projects and on in-service sites as pre-maintenance inspections to inform the GSI unit if subsurface maintenance is needed.

All City technicians are National Association of Sewer Service Companies' ("NASSCO") Pipeline Assessment Certification Program - certified, and all CCTV trucks have truck mounted laptops. Each inspection results in the creation of a video record of each sewer segment inspected. This video contains observations regarding any sewer defects in accordance with consistent defect code standards. At the end of a shift, staff wirelessly download all inspections for the day from the truck onto a server. The GIS-tied information is made available to Water Department staff for planning, design, hydraulic analysis, and field troubleshooting purposes.

The Sewer Assessment Committee reviews all new field information monthly and repair and creates and prioritizes replacement projects using the field information. The Water Department currently focuses on identifying NASSCO level 5 (pipeline has failed or will fail within 5 years) defects for repair or replacement, however, future plans call for evaluating NASSCO level 4 (pipeline has severe defects and is likely to fail in 5 to 10 years) defects for potential preventative maintenance lining projects.

A recent inspection history is provided in Table V-6. During the past 10 years, the unit has inspected approximately 40 miles per year on average to satisfy the needs of various internal requests for preventative maintenance, trouble shooting, and long-term planning.

Table V-6 Sewer Inspection Miles

FISCAL YEAR		2015	2016	2017	2018
CCTV Inspections		36.1	41.7	43.7	51.44

c) Wastewater/Stormwater Pumping Stations

The Wastewater System includes 16 sanitary pumping stations (15 Water Department-owned and 1 owned by others but operated by the Water Department) and 3 stormwater pumping stations (1 Water Department owned and 2 owned by others but operated by the Water Department) that are operated and maintained by the Flow Control Unit. The wastewater pumping stations range in capacity from 0.2 mgd to 195 mgd, and the stormwater pumping stations range in capacity from 6 mgd to 832 mgd. All the pumping stations are automated and remotely monitored. Each station has an emergency standby generator. Staff routinely practice preventive and predictive maintenance and approximately 85 percent of the maintenance work orders are planned activities. Main Pump equipment availability was 98.9 percent in FY 2018. The availabilities in FY 2015, FY 2016, and FY 2017 were 98.1 percent, 98.1 percent, and 100 percent, respectively.

Capital improvements for the remote wastewater pumping stations include the rehabilitation of the Central Schuylkill wastewater pumping station, which is currently under construction, as well as rehabilitation of the Ford Road, Belfry Drive, Rennard and Linden Avenue pumping stations, which are in design. Additionally, notice to proceed has been issued for the rehabilitation of the 26th and Vare stormwater pumping station.

d) Odor Control

The Flow Control Unit operates and maintains two remote odor control facilities. Both facilities utilize a sodium hypochlorite solution to eliminate the buildup of hydrogen sulfide, thereby reducing odors and protecting the sewer structure. Staff remotely monitor and routinely inspect facilities. The dosing station located at the Queen Lane Raw Water pumping station injects the solution into the Upper Schuylkill East interceptor. The dosing station at the Totem Road pumping station injects the solution into the Bucks County force main. The Water Department is currently evaluating opportunities to reduce the sodium hypochlorite dose at these facilities as a result of recent changes in the characteristics the wastewater discharged to these sewers.

e) Wastewater Metering Chambers

The Flow Control Unit maintains 56 chambers for the metering of flows from the surrounding communities. The sites are routinely inspected, and flow meter calibration is done annually. All flow signals are transmitted to the RTC. Operational availability for these metering chambers averaged 89.9, 92.4, 93.6, and 90.6 percent in FY 2015, FY 2016, FY 2017, and FY 2018, respectively.

f) Rain Gauge Network

This city-wide system is operated and maintained by the Flow Control Unit. There are 35 gauges which routinely transmit data to the computer system at Fox Street. Rain gauge information is used to estimate CSO discharge volume for PaDEP reports, modeling sewer hydraulics, and analyzing storm sewer capacity. Staff routinely service and annually calibrate gauges.

4. Collector System Support

The primary function of the Collector System Support Unit is to provide technical expertise to the operating units through engineering evaluations and studies. The unit investigates complex drainage and flooding problems, and conducts hydraulic analysis of the collector system through field surveys and computer aided calculations. In addition, the Collector System Support Unit is also responsible for the management of maintenance contracts for collector system equipment. The unit has 12 positions and 1 vacancy.

The Water Department has integrated the legacy data management systems previously used by the Sewer Maintenance and Inlet Cleaning units to manage complaints and maintenance activities into Cityworks®. The Inlet Cleaning Operating Information System ("ICOIS") and the Sewer Maintenance Operating Information System ("SMOIS") have been migrated to the Customer Information System ("CIS") data archive. CIS provides a user interface for querying and reviewing work previously documented in ICOIS and SMOIS. The remote pump stations information system ("PUMA") will be replaced by MAXIMO® in the future.

5. Capital Projects

Noteworthy capital projects within Wastewater Collection and Pumping are:

- The Inlet Cleaning Waste Dewatering Facility project which will result in construction of a permanent facility at Inlet Cleaning headquarters for temporary disposal of collected debris. The facility will allow dewatering of this waste prior to delivery to the City's waste transfer station. This new procedure increases crew efficiency by reducing stops in the field and saves the City's general fund money by reducing the weight of waste disposal.
- A new maintenance headquarters for Sewer Maintenance's West Philadelphia division is currently under construction. When completed, this Leadership in Energy and Environmental Design certified facility will provide state of the art amenities for Sewer Maintenance staff as well as a training facility to assist with training of employees in a variety of tasks related to sewer system maintenance and safety. This project is expected to be completed during FY 2019.
- The Central Schuylkill Pumping Station is currently undergoing a rehabilitation project including replacement of the station's switchgear, pump controls, installation of all new pumps and motors. This project will modernize the key components of this station and permit its continued operation into the future. This project is expected to be completed during FY 2019.
- Under the LTCPU the Water Department committed to lining 14.5 miles of streamside interceptors within the Cobbs and Tacony-Frankford watersheds. Projects already completed account for 7.5 miles.
  - Cobbs Creek, Parts 1 and 2 and Phase 1- construction complete
  - Cobbs Creek, Phases 2, 3 and 4 -in Projects Control
  - Tacony Creek, Phases 1 & 2 - construction complete
  - Tacony Creek, Phases 3, 4 and 5 - in design

L. TOXICS REDUCTIONS AND CONTROL

In FY 2016, the Water Department's Industrial Waste Unit (in the Operations Division) merged with the Backflow Prevention/Cross Connection Control staff from BLS to form a new unit called Industrial Waste & Backflow Compliance ("IWBC"). The two groups shared a common mission: to prevent contamination and reduce pollution. Further, both groups' primary focus was conducting field based inspections of primarily private facilities for compliance purposes. Merging the two groups makes it possible to increase efficiency through improved data management, knowledge transfer and conducting of joint inspections. Currently, there are 26 budgeted positions in IWBC and three vacancies as of September 2018.

1. Industrial Waste

The primary function of the Water Department's Industrial Waste group is to ensure compliance with federal industrial pretreatment standards. The National Pollutant Discharge Elimination System requires the Water Department to regulate industrial waste discharged to the wastewater collection system. The unit handles a wide variety of additional assignments including:

- Monitoring wastewater characteristics from townships
- Determining industrial surcharges
- Investigating spill incidents, unauthorized discharges, grease issues and water main breaks
- Managing the Water Department's hazardous chemical storage tanks compliance program
- Overseeing the sewer rental factor program
- Administering the Water Department's hazardous waste removal contracts
- Pretreatment support required for the Water Department's CSO program efforts
- Stormwater sampling services as part of the illicit connection program
- Assisting PaDEP to control storm quality from industrial activities - pertains to storm flows from industrial sites discharged to the municipal separate sewer system
- Administering the Water Department's polychlorinated biphenyl pollutant minimization plan ("PCB PMP")
- Issuing groundwater discharge permits, septage permits and manhole pump-out permits

The Water Department's Pretreatment Program dates from 1980. It is an USEPA-approved program that has grown in scope. A formal permitting system is in place that addresses federal requirements and the impacts of each industrial discharge. SIUs are subject to local limits, which consider their potential for adversely impacting the performance, compliance, and sludge disposal options of the Water Department's treatment plants. The program distinguishes significant industries from categorical industries, which are federally-identified industries in specific categories such as metal finishing and electroplating and subject to published federal categorical pretreatment standards. The Water Department has issued approximately 128 permits to all identified categorical and significant users, however the identification of SIUs is an ongoing process. The Water Department incorporated the local limits as required by the NPDES permit. Permitted industries, through required self-monitoring and reporting obligations, provide the bulk of data used by the Industrial

Waste group to ascertain compliance with effluent standards. The Industrial Waste group samples and inspects each permitted user at least once annually. For FY 2018, the industrial user compliance rate was 80.9 percent, consistent with recent years.

The pretreatment program is computerized and includes the ability to assess the compliance status of SIUs, and generate enforcement actions. In 2016, mobile data collection devices were introduced. Each Industrial Waste inspector now has a tablet that enables them to record information and access various computer programs and databases from the field.

Industrial waste oversees the assessment of the surcharge for wastewater that exceeds 250 mg/l BOD or 350 mg/l TSS in strength. In FY 2018, the Industrial Waste group collected 777 samples for the billing of surcharge industrial customers. Table V-7 presents the surcharge revenues for the past ten years. At the end of FY 2017, Paperworks, a customer that average close to $1 million in annual surcharge revenues, ceased operations. Even with this change in surcharge customers, fiscal year industrial surcharge revenue in line with expectations at $5.59 million. This was primarily due to enhanced surveying efforts to identify additional surcharge customers. Projected surcharge revenues for FY 2019 are approximately $5.5 million.

Table V-7 Surcharge Revenues

FISCAL YEAR	SURCHARGE
2015	$3,406,894
2016	$7,374,873
2017	$5,908,824
2018	$5,645,475

The Industrial Waste group is also responsible for permitting septage haulers that discharge wastewater at the Southwest WPCP. This facility only accepts sanitary waste and the Industrial Waste group samples all loads prior to discharge. The Water Department prohibits industrial/chemical haulers from discharging into the sewer collection system.

Industrial Waste also receives and processes applications for sewer rental factors (“SRF”). The SRF provides customers with a credit for metered water not discharged to the wastewater system. An example of this is a manufacturing customer that incurs water loss during its processes or where the final product includes water. Currently there are approximately 401 SRF accounts. Industrial Waste receives, reviews, modifies, and approves applications and then continues to review SRF accounts to determine whether the historical conditions that resulted in the permit still align with current operating conditions. This review is ongoing as the Water Department continues to request information from customers. They have adopted a policy to revoke credits if the Water Department receives no response after several requests for information are made.

Additional Industrial Waste responsibilities include administration of a PCB PMP. The plan was created to address the concerns of the DRBC and meet the requirements of the Delaware River PCB TMDL. The PCB PMP identifies sources of PCBs that could potentially enter the Water Department’s wastewater or stormwater systems. Activities under this plan include monitoring the sewer system to determine the source of PCB discharges, and assessing City parcel sites that are potential PCB sources with the goal of minimizing or eliminating PCB discharges to the wastewater or stormwater systems. The Water Department inspects over 70 sites per year, and some have been identified for follow-up as they need more information or have concerns. A five-year PMP report was submitted to PaDEP and DRBC as required. The report documented activities through the end of the NPDES permit cycle. Follow-up activities continue as the Water Department awaits the issuance of the new NPDES permit and associated PMP requirements.

Industrial Waste also samples the separate storm sewer outfalls as part of the Water Department's defective lateral detection and abatement program. There are approximately 433 stormwater outfalls and in FY 2018 approximately 152 outfalls were sampled for fecal coliform bacteria during dry weather flows. The Industrial Waste group works with the Sewer Maintenance Unit to attempt to locate illicit sources if fecal coliform is detected and the presence of sewage is suspected.

One of the most significant challenges for the Industrial Waste group is responding to accidental spill incidents and dealing with the unauthorized dumping of hazardous materials into the sewer system. IWBC recently incorporated its spill incident response dataset into Cityworks®. In FY 2018, the Industrial Waste group responded to approximately 185 spill incidents where it assisted with preventing the spill from entering the sewer system or mitigating the impact of any spill on the Water Department's operations. While it is impossible to prevent the unauthorized discharge of hazardous materials into the sewer system, Industrial Waste staff believes that a more concerted effort of public education may help to reduce the amount of unauthorized dumping. To this end the Industrial Waste group distributes a periodic newsletter, "Pre-treatment Times" to their permittees. The newsletter provides regulatory updates and tips. It also lists recipients of Industrial Waste's 100 percent compliance award, a small incentive program which recognizes permittees for their diligence and commitment to compliance. Industrial Waste also updates its grease handling practices fact sheet, which is distributed to select residential and commercial customers.

2. Backflow Compliance

The primary focus of the Backflow Compliance group is to maintain and enforce the Water Department's drinking water Cross Connection Control Program as required under state and federal laws. The Water Department's Regulation 403 prohibits backflow of contaminants into the public water supply through cross connections. The Backflow Compliance group enforces this regulation in collaboration with the Department of Licenses & Inspections ("L&I") and the Department of Public Health. Enforcement activities include inspection of permitted backflow prevention assemblies, tracking of required third-party annual inspection reports and maintenance of lists of approved backflow assemblies and certified private backflow inspection technicians.

In FY 2018, 1,141 permits were issued for the installation of backflow prevention assemblies. Backflow Compliance conducts inspections of industrial, commercial, institutional and residential facilities where backflow prevention assemblies are required. In FY 2017, the number of inspections averaged 205 per month; in FY 2018 inspections averaged 137 per month. The decrease is attributed to the departure of a full-time backflow inspector. Two additional backflow inspectors were hired in FY 2019.

Public education is integral to the success of the Cross-Connection Control Program. The Backflow Compliance group has developed and distributes a brochure called "*A Business Persons Guide to Cross Connection Control and Backflow Prevention*." They have also conducted training sessions for L&I inspectors, information sessions for registered backflow technicians and presentations for numerous business and community organizations.

M. CONCLUSIONS

The findings discussed in Sections B through L of this chapter provide the basis for our overall conclusion on the condition of the Wastewater System. We have evaluated the general physical condition of the major facilities of the Wastewater System using the following three ratings:

- *Good:* The facility is in condition to provide reliable operation in accordance with design parameters and requires only routine maintenance or minor improvements.
- *Adequate:* The facility is operating at or near design levels, however, non-routine renovation, upgrading, and repairs are needed to ensure continued reliable operation.
- *Poor:* The facility is not being operated within design parameters. Major renovations are required to restore the facility and assure reliable operation. Major expenditures for these improvements may be required.

Based on onsite physical inspections and investigations of major system facilities, conducted in June through August of 2017, combined with discussions with key Water Department staff at that time and again in August of 2018, it is our opinion that:

- The major facilities of the Wastewater System are in good operating condition or the Water Department is taking adequate steps to return them to good operating condition; and
- The approved capital improvement budget for FY 2019 and the proposed six-year capital program for FY 2019 through FY 2024 should provide adequate funds to sustain the systems in good operating condition.

VI. Capital Improvement Program

A. OVERVIEW

The City of Philadelphia has for many years used a formal capital programming and budgeting process in which the Water Department participates, along with all other elements of City government. The Capital Program covers a six-year period and the Water Department adopts a detailed budget for the first year. The Water Department reviews both program and budget commitments each year and modifies the Capital Program as necessary.

The Water Department projects included in the six-year program proposed for FY 2019 through FY 2024 involve planned expenditures of $2.317 billion in 2019 dollars. The program covers the Water Department's costs for design and construction of improvements related to the water, wastewater, and stormwater systems. The program also covers the costs of administrative personnel who work on these projects. As of the date of this report, the Water Department has developed a preliminary budget for the next 6-year CIP planning period for FY 2020 to FY 2025. The updated CIP planned expenditures will increase by approximately $1.0 billion as compared to the prior planning period; bringing the total CIP to $3.3 billion. The draft proposed program will be submitted to the City Planning Commission in November 2018.

Beginning in the mid-1970s, the CIP concentrated heavily on the upgrade and expansion of the Water Department's three wastewater treatment plants, and the BRC. In recent years, the Water Department has placed greater emphasis on potable water treatment, distribution and collection system rehabilitation, implementation of the LTCPU, and storm flood relief. The Projects Control unit of the Engineering and Construction Division manages the CIP. In the coming years, there will be a focus on continued implementation of the LTPCU, including installation of green infrastructure and wastewater treatment plant upgrades, as well as other necessary upgrades related to the conveyance and collector systems; more aggressive distribution system repair and replacement projects; pump station replacement and rehabilitation projects; and water treatment facility improvements.

B. FISCAL YEARS 2019 – 2024 CAPITAL IMPROVEMENT PROGRAM

The Water Department began preparation of its capital budget for FY 2019 through FY 2024 in October 2017, when all divisions were supplied with documentation to complete and return to the Projects Control Unit reflecting their budgetary requests for the next fiscal year. The Water Department has developed and installed a computerized budgeting system to enable each division to prepare budget requests based on historical and current experience. The Water Commissioner reviewed all budget proposals with the assistance of the Projects Control staff and submitted the Water Department's proposed FY 2019 budget to the City's Planning Commission in December 2017. The Mayor approved the Water Department's Capital Budget and included it as part of his proposed budget to the City Council in March 2018.

The total proposed FY 2019 to FY 2024 capital budget of $2.317 billion reflects a 5.28 percent increase over the FY 2018 to FY 2023 capital budget of $2.201 billion. The increase in budgeted capital improvements is manageable within the current staffing and organizational structure utilized by the Water Department. Table VI-1 summarizes key capital programming areas. Presented In the sections that follow is a brief discussion of each.

Table VI-1 Capital Improvement Program FY 2019 to FY 2024 (in thousands of dollars)

CIP CATEGORIES	2019	2020	2021	2022	2023	2024
Engineering and Administration[1]	$31,645	$32,234	$32,841	$33,467	$34,111	$34,774
Improvements to Treatment Plants	$120,000	$120,000	$120,000	$120,000	$120,000	$120,000
Improvements to Conveyance System	$89,060	$93,060	$71,060	$75,060	$78,060	$82,060
Improvements to Collector System	$113,000	$113,000	$174,385	$169,785	$169,785	$169,785
Total	$353,705	$358,294	$398,286	$398,312	$401,956	$406,619

Note: 1. Engineering and Administration costs include an allowance for inflation.

1. Engineering and Administration

This program provides for the funding of all Engineering and Administrative personnel within the Water Department who are involved with the CIP. Pension and fringe benefits are included in the cost projection. Starting in FY 2018, capital related pension and fringe benefit costs were included as an operating expense. This category also includes approximately $12 million annually for the replacement of certain vehicles, but excludes maintenance of vehicles, which is covered under a separate contract with Fleet Management and included as an operating expense.

2. Improvements to Water and Wastewater Treatment Plants

Included in this category are upcoming improvements to water and wastewater treatment facilities, pumping stations, and finished water reservoirs. This category also includes capacity expansions to the wastewater treatment facilities as contemplated in the COA and associated LTCPU. The Water Department's planning documents identify all the various improvement projects and rehabilitation/replacement projects. Several of the included projects are identified in other sections of this Report.

3. Improvements to the Conveyance System

This category encompasses the replacement of existing water mains throughout the City. It is an ongoing project that replaces aged mains to reduce the likelihood of water main breaks. The preventive nature of this program puts the Water Department in a proactive rather than reactive posture for addressing main replacements. The funding level is based on the current replacement goal of 32 miles of water main per year in FY 2019 and increasing 2 miles per year until 2024 when the replacement rate will be 42 miles per year. Another significant project included in this category is the planned installation of AMI citywide. There is $25 million budgeted for AMI installation in FY 2019. The Water Department has also budgeted another $5 million for the general purchase of new or replacement meters.

4. Improvements to the Collector System

The Collector System replacement program is an ongoing project and involves the replacement of old and worn out sewers, as well as the construction of new sanitary sewers to serve new or previously un-sewered developments with the objective of relieving existing unsanitary conditions. The benefits of this program include improved hydraulics by eliminating old lines with blockages, and reductions in the likelihood of street collapse. It is also preventive in nature, and generates similar benefits as its counterpart in water conveyance. Lastly, this category covers the conversion of old septic tank systems to public sewers, particularly in the northwestern sections of the City.

Other projects included in this category, which are ongoing, entail the construction of new storm flood relief sewers or storage tanks in flood-prone areas, stream restoration, as well as projects related to the COA and associated LTCPU. The projects that are part of the LTCPU target reducing the amount of pollution that enters Philadelphia's rivers and streams that is equivalent to the capture of 85 percent of the CSOs under annual average conditions. These projects will consist of GSI and traditional upgrades to combined sewer interceptors. The benefits of these projects include controlling excessive erosion, managing the watersheds by capturing and infiltrating or conveying stormwater, reducing combined sewer overflows, reducing unplanned sewer maintenance activity, and minimizing citizen complaints related to chronic flooding. The COA and LTCPU specifically protect the overall water environment in the Philadelphia area and fulfilling the Water Department's obligations under the Clean Water Act and the Pennsylvania Clean Streams Act.

As noted earlier, the future capital program for FY 2020 to FY 2025 will include an additional $1 billion. This increase is related to increased activity and updated pricing for projects in the following areas:

- Approximately $660 million in additional and enhanced water treatment, pumping and supply related improvements, as discussed previously in the Waster Master Planning section of this report;
- Approximately $120 million reflecting an increase in repair and replacement activity for the water conveyance system;
- Approximately $190 million in additional green stormwater infrastructure related project costs, reflecting both the ramp-up in milestone metrics in accordance with the COA as well as revised construction costs for these types of facilities; and
- Approximately $120 million in additional sewer reconstruction and replacement costs. These costs reflect an increase in the target annual replacement goal from 8 miles to 10 miles per year and accounts for new pricing for these types of projects.

APPENDIX III-A

SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS

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APPENDIX III-A

SUMMARIES OF CERTAIN AUTHORIZATIONS FOR THE BONDS

The following are summaries of certain provisions of The First Class City Revenue Bond Act (the "Act"), the Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended and supplemented (the "General Ordinance"), the Seventeenth Supplemental Ordinance to the General Ordinance (the "Seventeenth Supplemental Ordinance"), and the Eighteenth Supplemental Ordinance to the General Ordinance (the "Eighteenth Supplemental Ordinance"). The summaries are not, and should not be regarded as, complete statements of the provisions of these documents and legislation. Reference is made to the Act, the General Ordinance, the Seventeenth Supplemental Ordinance and the Eighteenth Supplemental Ordinance, copies of which are available from the Office of the Director of Finance, 1300 Municipal Services Building, 1401 John F. Kennedy Boulevard, Philadelphia, Pennsylvania 19102, for the complete terms and provisions thereof.

THE FIRST CLASS CITY REVENUE BOND ACT
(Act 234 of the General Assembly of
the Commonwealth, approved October 18, 1972,
P.L. 955; 53 P.S. §§ 15901-15924)

The City of Philadelphia Water and Wastewater Revenue Bonds, Series 2018A (the "Series 2018A Bonds") are being issued under the terms of the Act, the General Ordinance and pursuant to the Seventeenth Supplemental Ordinance and Eighteenth Supplemental Ordinance. The following summarizes the terms of the Act. All capitalized terms used in the following summary of the Act are defined as in the Act and may be differently referenced in other portions of this Official Statement.

General Authorization; Definition of Project; Bonds to be Special Obligations

The Act is intended to provide a comprehensive authorization to the City of Philadelphia (the "City") and any other Pennsylvania cities of the first class to issue revenue bonds ("Bonds") to finance various types of projects.

The Act defines "Project" to include, among other things, any buildings, structures, facilities or improvements of a public nature, the related land, rights or leasehold estates in land and the related furnishings, machinery, apparatus or equipment of a capital nature, which the City is authorized to own, construct, acquire, improve, lease, operate, maintain or support; any item of construction, acquisition or extraordinary maintenance or repair thereof, the City's share of the cost of any of the foregoing or any combination thereof undertaken jointly with others; and any combination of any of or all of the foregoing or any undivided portion of the cost of any of the foregoing as may be designated as a "Project" by the City for financing purposes and in respect of which the City may reasonably be expected to receive Project Revenues.

Bonds issued under the Act are required to be payable solely from Project Revenues and to be secured solely by such revenues and by any reserve funds which may be created or funded in connection with the Bonds. The Bonds are not permitted to pledge the credit or taxing power of the City to create any debt or charge against the tax or general revenues of the City, or create any lien against any of the City property other than the Project Revenues pledged therefore and reserve Funds established in respect of the Bonds. The Bonds do not constitute a debt of the City, and are excluded from the calculation of the City's debt-incurring capacity under the Pennsylvania Constitution.

Estimates of Future Revenues

To establish that Project Revenues will be sufficient to amortize all Bonds outstanding, the Act requires a finding to be made in the ordinance authorizing the issuance of the Bonds that the pledged Project Revenues will be sufficient to pay any prior parity charges thereon and the principal of and interest on the Bonds. This finding is to be based on a report of the chief fiscal officer of the City filed with the City Council and supported by appropriate schedules and summaries. The report of the chief fiscal officer of the City may be based on a report of consulting engineers employed by the City to evaluate the project.

For the purpose of estimating future Project Revenues, the Act provides that only the following shall be included: (i) those rents, rates, tolls or charges to the general public which, under existing authorizations, will be reasonably collectible in such year under the schedule or rate of rents, rates or charges which are or will be in effect during such year in accordance with such ordinance, resolutions or rate schedule or which may be imposed by administrative action without further legislation; (ii) those bulk payments which may be imposed under subsisting legislation or which are provided under subsisting agreements or which are the subject of an expression of intent by the prospective obligor deemed reliable by the chief fiscal officer of the City; and (iii) those governmental subsidies or payments which, under subsisting legislation, are subject to reasonably precise calculation and, unless stated in such legislation or authorization to be of an annually or more frequently recurring nature, are payable in such year.

Detail of Bonds and City Covenants

The Act provides that the ordinance authorizing the issuance of the Bonds shall fix the aggregate amounts of the Bonds to be issued from time to time and determine, or designate officers of the City to determine, the form and details of the Bonds. The City may include in its Bond ordinance various covenants with Bondholders, including covenants governing the imposition, collection and disbursement of Project Revenues, Project operation and maintenance, the establishment, segregation, maintenance, custody, investment and disbursement of sinking funds and reserves, the issuance of additional priority or parity bonds, the redemption of the Bonds and such other provisions as the City deems necessary or desirable in the interest or for the protection of the City or of such Bondholders. Under the Act the covenants, terms and provisions of the Bond ordinance made for the benefit of Bondholders constitute contractual obligations of the City, but such covenants (within limitations, if any, fixed by the Bond ordinance) may be modified by agreement with a majority in interest of the Bondholders or such larger portion thereof as may by provided in the Bond ordinance.

Sinking Fund

The Act requires that the Bond ordinance shall provide for the establishment of a sinking fund for the payment of the principal of and interest (including Qualified Swap payments) on the Bonds. Payment into such sinking fund shall be made in annual or more frequent installments and shall be sufficient to pay or accumulate for payment all principal of and interest on the Bonds for which the sinking fund is established as and when the same shall become due and payable. The sinking fund shall be managed by the chief fiscal officer of the City and moneys therein to the extent not currently required, shall be invested, subject to limitations established by the Bond ordinance and the Act. Interest and profits from investment of moneys in the sinking fund shall be added to such fund and may be applied in reduction of or to complete required deposits into the sinking fund. Excess moneys in the sinking fund shall be repaid to the City for its general purposes or may be applied as may be provided in the Bond ordinance. All moneys deposited in the sinking fund are subjected to a perfected security interest for the benefit of the holders of the Bonds, for which the fund is established, until property disbursed. This perfected security interest also applies, under the terms of the Act, to moneys in the sinking fund reserve created as part of the sinking fund by the General Ordinance.

Refunding

Any outstanding Bonds issued under the Act or other bonds issued for purposes for which Bonds are issuable under the Act, whether issued before or after the effective date of the Act, may from time to time be refunded by Bonds issued under the Act and are subject to the same protections and provisions required for the issuance of an original issue of Bonds. The last stated maturity date of the refunding Bonds may not be later than ten years after the last stated maturity date of the Bonds to be refunded. If outstanding Bonds are refunded in advance of their maturity or redemption date, the principal thereof and interest thereon to payment or redemption date, and redemption premium payable, if any, will no longer be deemed to be outstanding obligations when the City shall have deposited with a bank, bank and trust company or trust company, funds irrevocably pledged to the purpose, which are represented by demand deposits, interest-bearing time accounts, savings deposits, certificates of deposit (insured or secured as public funds) or specified obligations of the United States or of the Commonwealth of Pennsylvania sufficient to effect such redemption or payment or, if interest on the deposited funds to the time of disbursement is also pledged, sufficient, together with such interest, for such purpose and, in the case of redemption, shall have duly called the Bonds for redemption or given irrevocable instructions to give notice of such call.

Validity of Proceedings; Suits and Limitations Thereon

Prior to the delivery of any Bonds, the City is required to file with the Court of Common Pleas of Philadelphia County (the "Court") a transcript of the proceedings authorizing the issuance of the Bonds. If no action is brought on or before the twentieth day following the date of recording of the transcript, or when the proceedings have been approved finally by the Court, then notwithstanding any defect or error in such proceedings, the validity of the proceedings, the City's right to issue the Bonds, the lawful nature of the purpose for which the Bonds are issued, and the validity and enforceability of the Bonds in accordance with their terms may not thereafter be inquired into judicially, in equity, at law, or by civil or criminal proceedings, or otherwise, either directly or collaterally except where a constitutional question is involved.

Negotiable Instruments

The Act provides that Bonds issued thereunder shall have the qualities and incidents of securities under Article 8 of the Uniform Commercial Code of the Commonwealth and shall be negotiable instruments.

Exemption from State Taxation

The Commonwealth pledges with the holders from time to time of Bonds issued under the Act that such Bonds, and interest thereon, shall at all times be free from taxation within and by the Commonwealth, but this exemption does not extend to underwriting profits or to gift, succession or inheritance taxes or any other taxes not levied directly on the Bonds and the receipt of interest thereon.

Defaults and Remedies

If the City should fail to pay the principal of or interest on any Bond when the same shall be due and payable, the remedy provisions of the Act permit the holder of such Bond, subject to the limitations described below, to recover the amount due in an action in Philadelphia Common Pleas Court; but a judgment rendered in favor of the Bondholder in such an action is collectible only from Pledged Amounts. The holders of 25% or more in aggregate principal amount of the Bonds of such series then outstanding which are in default, whether because of failure of timely payment which is not cured in 30 days, or failure of the City to comply with any other provisions of the Bonds or any Bond ordinance, may appoint a trustee to represent them. On being appointed, the trustee shall be the exclusive representative for the affected

Bondholders and the individual rights of action described above shall no longer be available. The trustee may, and upon written request of the holders of 25% or more in aggregate principal amount of Bonds in default, and on being furnished with indemnity satisfactory to it, shall, take one or more of the following actions, which, if taken, shall preclude similar action, whether previously or subsequently initiated, by individual holders of Bonds; enforce, by proceedings at law or in equity, all rights of the holders of the Bond; bring suit on the Bonds; bring in suit in equity to require the City to make an accounting for all pledged Project Revenues received and to enjoin unlawful action or action in violation of the holders' rights; and, after 30 days' written notice to the City, and subject to any limitations in the Bond ordinance, declare the unpaid principal of the Bonds to be immediately due and payable, together with interest thereon at the rates stated in the Bonds until final payment, and upon the curing of all defaults, to annul such declaration. In any suit, action or proceeding by or on behalf of holders of defaulted Bonds, trustee fees and expenses, including operating costs of a project and reasonable counsel fees, shall constitute taxable costs, and all such costs and expenses allowed by the Court shall be deemed additional principal due on the Bonds and shall be paid in full from any recovery prior to any distribution to the holders of the Bonds. The General Ordinance limits any such recovery to Pledged Amounts. The trustee shall make distribution of any sums so collected in accordance with the Act.

Refunding with General Obligation Bonds

Upon certification by the City's chief fiscal officer that Project Revenues pledged for the payment of Bonds have become insufficient to meet the requirements of the ordinance or ordinances under which the Bonds were issued, the City Council is empowered, but not required, subject to applicable Pennsylvania constitutional debt limitations, to authorize the issuance and sale of general obligation refunding bonds of the City, without limitation as to rate of interest and in such principal amount (subject to the aforesaid limitations on indebtedness) as may be required, together with other available funds, to pay and redeem such Bonds including principal, interest to the date fixed for redemption or payment and premium, whether or not the principal of or interest on the refunding bonds shall exceed the principal of or interest on the bonds to be refunded.

THE RESTATED GENERAL WATER AND WASTEWATER REVENUE BOND ORDINANCE OF 1989

(Ordinance of the City Council approved June 24, 1993 - Bill No. 544)

The following is a summary of certain terms defined in the Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended (the "General Ordinance"), used in this Official Statement. Reference should be made to the General Ordinance for a full and complete statement of its terms and any capitalized terms used herein but not otherwise defined. The Series 2018A Bonds are being issued under the terms of the General Ordinance, as supplemented by the Seventeenth Supplemental Ordinance and the Eighteenth Supplemental Ordinance. The Seventeenth Supplemental Ordinance and the Eighteenth Supplemental Ordinance (see below) set forth the specific terms of the Series 2018A Bonds. All capitalized terms used in the following summary of the General Ordinance are defined as in the General Ordinance, and may be differently referenced in other portions of this Official Statement.

Certain Definitions*

Accreted Value means, with respect to Capital Appreciation Bonds, the amount to which, as of any specified time, the Original Value of any such Bond has been increased by accretion, all as may be provided in an applicable Supplemental Ordinance.

Act means The First Class City Revenue Bond Act, approved October 18, 1972 (Act No. 234, 53 P.S. §15901 to 15924), as from time to time amended.

Bond or *Bonds* means, upon and after issuance of the first series of bonds under the General Ordinance, if and to the extent Outstanding at any time, (i) the Existing Bonds and (ii) all series of bonds authorized and issued under one or more supplemental ordinances amending and supplementing the General Ordinance.

Bond Committee means the Mayor, City Controller and City Solicitor or a majority thereof.

Bond Counsel means a firm of nationally recognized bond counsel selected by the City.

Bondholder or *Holder* means any registered owner of Bonds or holder of Bonds issued in coupon form at the time Outstanding.

Capital Account means the Capital Account within the Construction Fund.

Capital Account Deposit Amount means an amount equal to one percent (1%) of the depreciated value of property, plant and equipment of the System or such greater amount as shall be annually certified to the City in writing by a Consulting Engineer as sufficient to make renewals, replacements and improvements in order to maintain adequate water and wastewater service to the areas served by the System.

Capital Appreciation Bonds means any Bonds issued under the General Ordinance which do not pay interest either until maturity or until a specified date prior to maturity, but whose Original Value increases periodically by accretion to a final Maturity Value.

Charges Account means the Charges Account within the Sinking Fund established to provide for the payment of fees under any Credit Facility to the extent payment of such fees are not otherwise provided.

City Controller means the head of the City's auditing department as provided by the Philadelphia Home Rule Charter.

City Solicitor means the head of the City's law department as provided by the Philadelphia Home Rule Charter.

Code means the Internal Revenue Code of 1986, as amended.

Construction Fund means the Construction Fund established pursuant to the General Ordinance.

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* See APPENDIX III-B – "Twenty-First Supplemental Ordinance" for definitional modifications and additions contained in the Springing Amendments set forth in the Twenty-First Supplemental Ordinance (Bill No. 171110-A) approved on April 24, 2018 (the "Twenty-First Supplemental Ordinance"). The Springing Amendments will not become effective until at least 67% of Holders of outstanding Bonds have consented to such amendments.

Consulting Engineer means a nationally recognized Independent registered consulting engineer or a nationally recognized Independent firm of registered consulting engineers, in either case having experience in the design and analysis of the operation of water and wastewater systems of the magnitude and scope of the System.

Credit Facility[*] means any letter of credit, standby bond purchase agreement, line of credit, surety bond, insurance policy or other insurance commitment or similar agreement (other than a Qualified Swap or an Exchange Agreement) that is provided by a commercial bank, insurance company or other institution, with a current long term rating (or whose obligations thereunder are guaranteed by a financial institution with a long term rating) from Moody's and S&P not lower than the credit rating of any Series of Bonds which has no Credit Facility, to provide support for a Series of Bonds or for any issue of Subordinated Bonds, and shall include any Substitute Credit Facility.

Debt Reserve Account means the Debt Reserve Account within the Sinking Fund established pursuant to the General Ordinance.

Debt Reserve Facility means a surety bond, insurance policy or irrevocable letter of credit deposited to the Debt Reserve Account pursuant to the provisions of the General Ordinance.

Debt Reserve Requirement[†] means (i) with respect to all Bonds outstanding (regardless whether interest thereon may be excluded from the gross income of the holder thereof for federal income tax purposes) (a) whose Debt Service Requirements are payable from the Sinking Fund (i.e., excluding Subordinated Bonds) and (b) that are of a Series for which the City has not created a Series Debt Reserve Subaccount, an amount equal to the greatest amount of Debt Service Requirements on such Bonds payable in any one Fiscal Year (except that such Debt Service Requirements will be computed as if any Qualified Swap did not exist and the Debt Service Requirements attributable to any Variable Rate Bonds may be based upon the fixed rate of interest as set forth in the Supplemental Ordinance or Determination for such Bonds) determined as of any particular date, and (ii) with respect to the amount to be deposited in the Debt Reserve Account, pursuant to the General Ordinance, in connection with the issuance of such a Series of Bonds, the lesser of (x) the amount necessary to comply clause (i) and (y) the maximum amount permitted to be financed with proceeds of Bonds permitted by Section 148(d)(1) of the Code (or any successor provision).

Debt Service Account means the Debt Service Account within the Sinking Fund established pursuant to the General Ordinance.

Debt Service Requirements[‡], with reference to a specified period, means:

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[*] See APPENDIX III-B – "Twenty-First Supplemental Ordinance" for definitional modifications and additions contained in the Springing Amendments, including modifications to the definition of Credit Facility.

[†] This definition was amended pursuant to the Twenty-First Supplemental Ordinance upon its enactment.

The Springing Amendments include provisions that will allow the City to establish a Series Debt Reserve Subaccount and a related Series Debt Reserve Requirement. See APPENDIX III-B – "Twenty-First Supplemental Ordinance" attached to this Official Statement.

[‡] See APPENDIX III-B – "Twenty-First Supplemental Ordinance" for definitional modifications and additions contained in the Springing Amendments, including modifications to the definition of Debt Service Requirements.

(a) amounts required to be paid into any mandatory sinking fund established for the benefit of Bonds during the period;

(b) amounts needed to pay the principal or redemption price of Bonds maturing during the period and not to be redeemed at or prior to maturity through any sinking fund established for the benefit of Bonds;

(c) interest payable on Bonds during the period, with adjustment for capitalized interest or redemption through any sinking fund established for the benefit of Bonds; and

(d) all net amounts, if any, due and payable by the City under a Qualified Swap during such period.

For purposes of estimating Debt Service Requirements for any future period, (i) any Option Bond outstanding during such period shall be assumed to mature on the stated maturity date thereof, except that the principal amount of any Option Bond tendered for payment and cancellation before its stated maturity date shall be deemed to accrue on the date required for payment pursuant to such tender; and (ii) Debt Service Requirements on Bonds for which the City has entered into a Qualified Swap shall be calculated assuming that the interest rate on such Bonds shall equal the stated fixed or variable rate on the Qualified Swap or, if applicable and if greater than such stated rate, the applicable rate for any Bonds issued in connection with the Qualified Swap adjusted, in the case of a variable rate obligation, as provided in the General Ordinance.

Calculation of Debt Service Requirements with respect to Variable Rate Bonds shall be subject to adjustment as permitted by the General Ordinance.

Debt Service Withdrawal means the aggregate amount withdrawn from the Capital Account during a Fiscal Year and applied toward the payment of principal or redemption price of or interest on Bonds or toward the elimination of a deficiency in any reserve fund established for the benefit of Bonds.

Determination means a determination by the Bond Committee regarding certain matters relating to the issuance of a Series of Bonds, made pursuant to the General Ordinance or the Supplemental Ordinance providing for the issuance of such Series of Bonds.

Director of Finance means the chief financial officer of the City as established by the Philadelphia Home Rule Charter.

Effective Date means when (but only when) all Prior Bonds issued under the Prior Ordinance have been paid or defeased as set forth in Section 10 of the Act.

Exchange Agreement means, to the extent from time to time permitted by applicable law, any interest exchange agreement, interest rate swap agreement, currency swap agreement or other contract or agreement, other than a Qualified Swap, authorized, recognized and approved by a Supplemental Ordinance or Determination as an Exchange Agreement and providing for (i) certain payments by the City from the Residual Fund and (ii) payments by an entity whose senior long term debt obligations, other senior unsecured long term obligations or claims paying ability, or whose obligations under an Exchange Agreement are guaranteed by an entity whose senior long term debt obligations, other senior unsecured long term obligations or claims paying ability are rated not less than "A3" by Moody's, "A-" by S&P or "A-" by Fitch, or the equivalent thereof by any successor thereto as of the date the Exchange Agreement is entered into; which payments by the City and counterparty are calculated by reference to fixed or variable rates and constituting a financial accommodation between the City and such counterparty.

Existing Bonds means the bonds originally issued under the Prior Ordinance other than Prior Bonds, which Existing Bonds shall be specified in a certificate of the Director of Finance on the Effective Date and thereafter shall be secured by the General Ordinance.

Financial Consultant means a firm of investment bankers, a financial consulting firm, a firm of certified public accountants or any other firm which is qualified to calculate amounts required to be rebated to the United States pursuant to Section 148(f) of the Code.

Fiscal Agent means a bank or other entity designated as such pursuant to the General Ordinance or its successor.

Fiscal Year means the fiscal year of the City.

Fitch means Fitch Ratings and any successor thereto.

General Obligation Bonds means the general obligation bonds of the City issued and outstanding from time to time to finance improvements to the System and adjudged, pursuant to the Constitution and laws of the Commonwealth of Pennsylvania, to be self-sustaining on the basis of expected Project Revenues.

General Ordinance means the Restated General Water and Wastewater Revenue Bond Ordinance of 1989.

Government Obligations means direct obligations of, or obligations the principal of and interest on which are unconditionally guaranteed by, the United States of America, including but not limited to interest obligations of the Resolution Funding Corporation or any successor thereto.

Independent means a person who is not a salaried employee or elected or appointed official of the City; provided, however, that the fact that such person is retained regularly by or transacts business with the City shall not make such person an employee within the meaning of this definition.

Initial Deposit means the initial, one time, deposit to be made by the City from any source into the Rate Stabilization Fund upon the establishment of such Rate Stabilization Fund.

Interdepartmental Charges means the proportionate charges for services performed for the Water Department by all officers, departments, boards or commissions of the City which are required by the Philadelphia Home Rule Charter to be included in the computation of operating expenses of the Water Department.

Interim Debt means any bond anticipation notes or other temporary borrowing which the City anticipates permanently financing with Bonds or other long term indebtedness under the General Ordinance or otherwise.

Kroll means Kroll Bond Rating Agency, Inc. and any successor thereto.

Maturity Value with respect to Capital Appreciation Bonds means the amount due on the maturity date.

Moody's means Moody's Investors Service and any successor thereto.

Net Revenues for any period means the Project Revenues collected during such period and deposited into the Revenue Fund plus (x) the amounts, if any, transferred from the Rate Stabilization Fund into the Revenue Fund during, or as of the end of, such period and (y) interest earnings during such period on moneys in any of the funds or accounts established under the General Ordinance to the extent such interest earnings are credited to the Revenue Fund pursuant to the General Ordinance minus the sum of (a) Operating Expenses incurred during such period and (b) the amounts, if any, transferred from the Revenue Fund to the Rate Stabilization Fund during, or as of the end of, such period; provided, however that in determining such Net Revenues the Initial Deposit shall not reduce such Net Revenues.

Operating Expense Withdrawal means the aggregate amount withdrawn from the Capital Account during a Fiscal Year and applied toward the payment of Operating Expenses.

Operating Expenses for any period means all costs and expenses of the Water Department necessary and appropriate to operate and maintain the System in good operating condition, and shall include, without limitation, salaries and wages, purchases of services by contract, costs of materials, supplies and expendable equipment, maintenance costs, costs of any property or the replacement thereof or for any work or project, related to the System, which is not properly chargeable to property, plant and equipment, pension and welfare plan and worker's compensation requirements, provisions for claims, refunds and uncollectible receivables and for Interdepartmental Charges, all in accordance with generally accepted accounting principles consistently applied, but Operating Expenses shall exclude depreciation, amortization, interest and sinking fund charges.

Option Bond means any Bond which by its terms may be tendered by and at the option of the Holder thereof for payment by the City prior to its stated maturity date or the maturity date of which may be extended by and at the option of the Holder thereof.

Ordinance means the General Ordinance, as amended from time to time in accordance with the provisions of the General Ordinance.

Original Value with respect to Capital Appreciation Bonds means the principal amount paid by the initial purchasers on the date of original issuance.

Outstanding, when used with reference to Bonds, means, as of any date, all Bonds theretofore or thereupon being authenticated and delivered under the General Ordinance except (i) any Bonds cancelled by the Fiscal Agent at or prior to such date; (ii) Bonds (or portion of Bonds) for the payment or redemption of which moneys, equal to the principal amount, Accreted Value or redemption price thereof, as the case may be, with interest (except to the extent of any Capital Appreciation Bonds) to the date of maturity or redemption date, shall be held in trust under the General Ordinance and set aside for such payment or redemption (whether at or prior to the maturity or redemption date), provided that if such Bonds (or portions of Bonds) are to be redeemed, notice of such redemption shall have been given as provided in the General Ordinance or provision satisfactory to the Fiscal Agent shall have been made for the giving of such notice; (iii) Bonds in lieu of or in substitution for which other Bonds shall have been authenticated and delivered pursuant to the General Ordinance; and (iv) Bonds deemed to have been paid as provided in the General Ordinance.

Philadelphia Home Rule Charter means the Philadelphia Home Rule Charter, as amended or superseded by any new home rule charter, adopted pursuant to authorization of the First Class City Home Rule Act approved April 21, 1949, P.L. 665 §l, *et seq*. (53 P.S. §13101, *et seq*.).

Prior Bonds means the bonds issued under the Prior Ordinance designated as Water and Sewer Revenue Bonds (i) the First Series through Ninth Series, and the Eleventh Series and Twelfth Series, and

(ii) to the extent the following bonds are defeased on the Effective Date, the Tenth Series and the Thirteenth Series through Seventeenth Series.

Prior Ordinance means the General Water and Sewer Revenue Bond Ordinance of 1974 approved May 16, 1974, as amended and supplemented from time to time.

Project Revenues means all rents, rates, fees and charges imposed or charged for the connection to, or use or product of or services generated by the System to the ultimate users or customers thereof, all payments under bulk contracts with municipalities, governmental instrumentalities or other bulk users, all subsidies or payments payable by Federal, State or local governments or governmental agencies on account of the cost of operation of, or the payment of the principal of or interest on moneys borrowed to finance costs chargeable to the System, all grants, payments and contributions made in aid or on account of the System exclusive of grants and similar payments and contributions solely in aid of construction and all accounts, contract rights and general intangibles representing the foregoing.

Qualified Escrow Securities means funds which are represented by (a) demand deposits, interest-bearing time accounts, savings deposits or certificates of deposit, but only to the extent such deposits or accounts are fully insured by the Federal Deposit Insurance Corporation or any successor United States governmental agency, or to the extent not insured, fully secured and collateralized by Government Obligations having a market value (exclusive of accrued interest) at all times at least equal to the principal amount of such deposits or accounts, (b) if at the time permitted under the Act, obligations of any state or political subdivision thereof or any agency or instrumentality of such state or political subdivision for which cash, Government Obligations or a combination thereof have been irrevocably pledged to or deposited in a segregated escrow account for the payment when due of principal or redemption price of and interest on such obligations, and any such cash or Government Obligations pledged and deposited are payable as to principal or interest in such amounts and on such dates as may be necessary without reinvestment to provide for the payment when due of the principal or redemption price of and interest on such obligations, and such obligations are rated by any Rating Agency in the highest rating category assigned by each such rating service to obligations of the same type, or (c) noncallable Government Obligations. In each case such funds (i) are subject to withdrawal, maturing or payable at the option of the holder, at or prior to the dates needed for disbursement, provided such deposits or accounts, whether deposited by the City or by such depository, are insured or secured as public deposits with securities having at all times a market value exclusive of accrued interest equal to the principal amount thereof, (ii) are irrevocably pledged for the payment of such obligations and (iii) are sufficient, together with the interest to disbursement date payable with respect thereto, if also pledged, to meet such obligations in full.

Qualified Rebate Fund Securities means either:

(a) Government Obligations; or

(b) rights to receive the principal of or the interest on Government Obligations through (i) direct ownership, as evidenced by physical possession of such Government Obligations or unmatured interest coupons or by registration as to ownership on the books of the issuer or its duly authorized paying agent or transfer agent, or (ii) purchase of certificates or other instruments evidencing an undivided ownership interest in payments of the principal of or interest on Government Obligations.

Qualified Swap or *Swap Agreement* means, with respect to a Series of Bonds, any financial arrangement that (i) is entered into by the City with an entity that is a Qualified Swap Provider at the time the arrangement is entered into; (ii) provides that (a) the City shall pay to such entity an amount based on the interest accruing at a fixed rate on an amount equal to the principal amount of the Outstanding Bonds of such Series, and that such entity shall pay to the City an amount based on the interest accruing on a principal amount initially equal to the same principal amount as such Bonds, at either a variable rate of interest or a fixed rate of interest computed according to a formula set forth in such arrangement (which need not be the same as the actual rate of interest borne by the Bonds) or that one shall pay to the other any net amount due under such arrangement or (b) the City shall pay to such entity an amount based on the interest accruing on the principal amount of the Outstanding Bonds of such Series at a variable rate of interest as set forth in the arrangement and that such entity shall pay to the City an amount based on interest accruing on a principal amount equal to the Outstanding Bonds of such Series at an agreed fixed rate (which shall not be the same as the rate on the Bonds) or that one shall pay to the other any net amount due under such arrangement; and (iii) which has been designated in writing to the Fiscal Agent by the City as a Qualified Swap with respect to the Bonds.

Qualified Swap Provider means, with respect to a Series of Bonds, an entity whose senior long term debt obligations, other senior unsecured long term obligations or claims paying ability, or whose payment obligations under a Qualified Swap are guaranteed by an entity whose senior long term debt obligations, other senior unsecured long term obligations or claims paying ability, are rated (at the time the subject Qualified Swap is entered into) at least as high as Aa by Moody's, and AA by S&P, or the equivalent thereof by any successor thereto.

Rate Covenant means the rate covenant contained in the General Ordinance.

Rate Stabilization Fund means the Rate Stabilization Fund established pursuant to the General Ordinance.

Rating Agency[*] means Moody's, S&P or Fitch, to the extent that any of such rating services have issued a credit rating on the Bonds or, upon discontinuance of any of such rating services, such other nationally recognized rating service or services if any such rating service has issued a credit rating on the Bonds.

Rebate Bond Year, for purposes of the General Ordinance and in order to facilitate compliance with the arbitrage rebate requirements of the Code, shall mean the period or periods specified in a Supplemental Ordinance or Determination for a Series of Bonds.

Rebate Fund means the Rebate Fund established pursuant to the General Ordinance.

Remarketing Agent means a Remarketing Agent appointed in the manner provided in the applicable Supplemental Ordinance or Determination authorizing the issuance of Variable Rate Bonds.

Remarketing Agreement means an agreement providing for the remarketing of tendered Variable Rate Bonds by a Remarketing Agent, as more fully set forth and defined in the Supplemental Ordinance authorizing any Series of Variable Rate Bonds.

Residual Fund means the Residual Fund established pursuant to the General Ordinance.

Revenue Fund means the Revenue Fund established pursuant to the General Ordinance.

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[*] See APPENDIX III-B – "Twenty-First Supplemental Ordinance" for definitional modifications and additions contained in the Springing Amendments, including modifications to the definition of Rating Agency.

S&P means S & P Global Ratings and any successor thereto.

Series when applied to Bonds means, collectively, all of the Bonds of a given issue authorized by Supplemental Ordinance, as provided in the General Ordinance, and may also mean, if appropriate, a subseries of any Series if, for any reason, the City should determine to divide any Series into one or more subseries of Bonds.

Series Debt Reserve Requirement[*] means, for any Series of Bonds, the amount, if any, required pursuant to a Supplemental Ordinance or Determination to be reserved and (if such amount is greater than zero dollars ($0)) deposited or maintained in the Series Debt Reserve Subaccount established for such Series of Bonds; provided that such amount may equal zero dollars ($0); and provided further that such amount may not exceed the lesser of (i) the greatest amount of Debt Service Requirements payable on such Series of Bonds in any one Fiscal Year and (ii) the maximum amount permitted to be financed with proceeds of such Series of Bonds permitted by Section 148(d)(1) the Code (or any successor provision).

Series Debt Reserve Subaccount[*] means any subaccount of the Debt Reserve Account created, pursuant to a Supplemental Ordinance or Determination for a particular Series of Bonds, which Series of Bonds will not otherwise be secured by the Debt Reserve Account and for which a Series Debt Reserve Requirement applies.

Sinking Fund means the Sinking Fund established pursuant to the General Ordinance.

Sinking Fund Installment means an amount so designated which is established pursuant to the General Ordinance.

Special Water Infrastructure Account means the Special Water Infrastructure Account of the Residual Fund established in the General Ordinance.

Standby Agreement with respect to a Series of Bonds, means an irrevocable letter of credit and related reimbursement agreement, line of credit, standby bond purchase agreement or similar agreement providing for the purchase of all or a portion of the Bonds of such Series, as amended, supplemented or extended from time to time.

Standby Purchaser, with respect to a Series of Bonds, means the provider of the Standby Agreement for such Series of Bonds.

Subordinated Bond means any Bond referred to in, and complying with the provisions of the General Ordinance with respect to Subordinated Bonds.

Subordinated Bond Fund means the Subordinated Bond Fund established in the General Ordinance.

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[*] See APPENDIX III-B – "Twenty-First Supplemental Ordinance" attached to this Official Statement for definitional modifications and additions contained in the Springing Amendments, including adding this defined term. The Springing Amendments include provisions that will allow the City to establish a Series Debt Reserve Subaccount and a related Series Debt Reserve Requirement.

Substitute Credit Facility[*] means any letter of credit, standby bond purchase agreement, line of credit, surety bond, insurance policy or other insurance commitment or similar agreement (other than a Qualified Swap or an Exchange Agreement) that replaces a Credit Facility and is provided by a commercial bank, insurance company or other financial institution with a current long term credit rating (or whose obligations thereunder are guaranteed by a financial institution with a long term rating) from Moody's and S&P not lower than the credit rating of any Series of Bonds which has no Credit Facility.

Supplemental Ordinance means an ordinance supplemental to the General Ordinance enacted pursuant to the Act and the General Ordinance by the Council of the City.

System means the entire combined water system and wastewater system of the City, now existing and hereafter acquired by lease, direct control, purchase or otherwise or constructed by the City, including any interest or participation of the City in any facilities in connection with said System, together with all additions, betterments, extensions and improvements to said System or any part thereof hereafter constructed or acquired and together with all lands, easements, licenses and rights of way of the City and all other works, property or structures of the City and contract rights and other tangible and intangible assets of the City now or hereafter owned or used in connection with or related to said System.

Tender Agent, with respect to a Series of Bonds, means any commercial bank or trust company organized under the laws of any state of the United States or any national banking association designated as a tender agent for such Series of Bonds, and its successor or successors hereafter appointed in the manner provided in the applicable Supplemental Ordinance or Determination.

Uncertificated Bond means any Bond which is fully registered as to principal and interest and which is not represented by an instrument.

Variable Rate Bond means any Bond, the rate of interest on which is subject to change prior to maturity and cannot be determined in advance of such change.

Water and Wastewater Funds means, collectively, the Revenue Fund, the Sinking Fund, the Subordinated Bond Fund, the Rate Stabilization Fund, the Residual Fund and the Construction Fund.

Water Commissioner means the head of the Water Department as provided by the Philadelphia Home Rule Charter.

Water Department means the Water Department of the City created pursuant to Section 3-100 of the Philadelphia Home Rule Charter.

SUMMARY OF OPERATIVE PROVISIONS OF THE GENERAL ORDINANCE

The following is a summary of certain operative provisions of the General Ordinance. Reference should be made to the General Ordinance for a full and complete statement of its provisions and the meaning of any capitalized terms used herein but not otherwise defined.

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[*] See APPENDIX III-B – "Twenty-First Supplemental Ordinance" for definitional modifications and additions contained in the Springing Amendments, including modifications to the definition of Substitute Credit Facility.

Form and Terms of Bonds

All Bonds shall be in substantially such form as may be approved by the City and set forth in the Supplemental Ordinance or Determination providing for the issuance thereof. Bonds shall be generally designated as Water and Wastewater Revenue Bonds of the City and shall be issued in such Series and within such Series in such subseries as the City may from time to time determine. The aggregate principal amount of Bonds which may be issued, authenticated and delivered under the General Ordinance is unlimited, but prior to the issuance of such Series of Bonds, the City shall enact a Supplemental Ordinance authorizing such Series and the maximum aggregate principal amount of such Series.

The Bonds shall be issued in fully registered form, except as provided in the General Ordinance and, such Bonds shall be issued upon and contain such additional terms as may be set forth in the supplemental Ordinance and Determination providing for the issuance of the Bonds in question. As required by Section 5 of the Act, all Bonds shall contain a brief statement of the Project Revenues pledged as security therefor and the priority or priorities, if any, in the application of such pledged Project Revenues and shall contain a covenant of the City to pay from the pledged Project Revenues on the respective due dates the amounts required to pay the interest on and principal or redemption price of the Bonds. Bonds may be designated as of such Series by date, number, letter or otherwise and may also have such individual letters, identifying numbers or other marks, and such descriptive panels, registration panels, legends or endorsements placed thereon as may, consistent with the General Ordinance and the Act, be determined by a Supplemental Ordinance, Determination or the Director of Finance. The Bonds may also have printed thereon or on the reverse thereof the text of an approving legal opinion with respect thereto. Any portion of the text of any Bond may be set forth on the reverse thereof with an appropriate reference on the face of the Bond.

The Bonds of each Series shall be issued in such aggregate principal amount, shall be in such denominations, shall mature or be subject to mandatory redemption in such principal amounts, on such dates and at such places, shall have such Sinking Fund Installments for Bonds of like maturity and interest rate, shall bear interest from such date or dates and at such rate or rates (including variable, adjustable, convertible or other rates), shall be subject to optional redemption at such times and upon such terms, shall (if such Bonds are Option Bonds) be subject to optional or mandatory tender, and shall contain such other terms and conditions not inconsistent with the General Ordinance or the Act, all as shall be determined by the City and set forth in the Supplemental Ordinance or Determination under which such Bonds are issued, or as shall be determined by a designated officer or officers of the City thereunto authorized by the Supplemental Ordinance, or in the absence of such provisions or designation, as shall be determined by the Director of Finance as specified below.

If permitted by applicable law, any Series of Bonds may be issued as Uncertificated Bonds and the foregoing provisions specifying the form of Bonds shall be inapplicable to such Series.

A Series of Bonds may be secured by a Credit Facility meeting the requirements of the General Ordinance and the applicable Supplemental Ordinance. In connection with the issuance of its Bonds or at any time thereafter so long as a Series of Bonds remains Outstanding, the City also may enter into Qualified Swaps or Exchange Agreements if the Bond Committee determines that such Qualified Swap or Exchange Agreement will assist the City in more effectively managing its interest costs. The City's payment obligation under any Qualified Swap shall be made from the Sinking Fund and its payment obligation under any such Exchange Agreement shall be made from the Residual Fund created pursuant to the General Ordinance. Unless otherwise acknowledged by each Rating Agency by virtue of its confirmation of the existing credit ratings on the City's Outstanding Bonds, the City will not enter into any Qualified Swap or Exchange Agreement unless it gives at least fifteen (15) day's advance notice of its intention to do so to each of the Rating Agencies, which notice shall specify the identity of the Qualified Swap Provider or Exchange Agreement counterparty, as the case may be.

Sale of Bonds; Taxes Not to be Assumed; Authority of Director of Finance

Bonds may be sold by the City at public, private, or invited sale upon such terms not inconsistent with the Act and at such prices as the City may determine. To the extent that the Supplemental Ordinance authorizing any Series of Bonds and the Determination relating to such Series shall not otherwise provide:

(a) all Bonds shall be sold at competitive public sale to the purchaser or purchasers submitting the highest and best bid upon such terms and conditions of the bidding as shall be specified in an official notice of sale issued in the name of the City by the Director of Finance;

(b) no covenant to pay or assume any taxes shall be included in such Bonds; and

(c) subject to the foregoing, the terms upon which are the prices for which the Bonds are to be sold or exchange, and the form, terms or provisions of the Bonds including, without limitation, the matters referred to in Section 5 of the Act, shall be determined by the Director of Finance who is designated in the General Ordinance as the officer of the City authorized to make such determinations based, to the extent applicable, on the prices, interest rates or other terms set forth in the highest and best proposal conforming to the bidding specifications, as ascertained and accepted on behalf of the City by the Director of Finance.

Payments of Principal, Redemption Price and Interest; Date of Bonds

Unless otherwise provided in any Bond or the Supplemental Ordinance or Determination relating thereto:

(a) The principal or redemption price of each Bond shall be payable upon surrender thereof at the principal Philadelphia office of the Fiscal Agent in Philadelphia, Pennsylvania or at the principal office of a paying agent designated in such Bonds.

(b) The interest due on any Bond in fully registered form shall be payable by check or draft mailed to the Holder thereof, or at the request of a Holder of $1,000,000 or more in principal amount or maturity value of Bonds by wire transfer to an account at a financial institution in the United States, designated in writing to the Fiscal Agent or the paying agent, subject to such provisions concerning record dates as may be contained in such Bond and in the Supplemental Ordinance and Determination providing for the issuance and terms thereof.

(c) The principal or redemption price of and the interest on each Bond shall be payable in any coin or currency of the United States of America which, at the time of payment, is legal tender for the payment of public and private debts, or Bonds of a Series may be payable in such foreign currency as may be specified in the Supplemental Ordinance authorizing such Series of Bonds, if applicable law permits.

(d) Fully registered Bonds of each Series shall be dated as of the date six months preceding the interest payment date next following the date of execution thereof by the Fiscal Agent, unless such date of execution shall be an interest payment date, in which case they shall be dated as of such date of execution; provided, however, that if, as shown by the records of the Fiscal Agent, interest on the Bonds of any Series shall be in default, fully registered Bonds of such Series issued in lieu of Bonds surrendered for transfer or exchange may be dated as of the date to which interest has been paid in full on the Bonds surrendered. Fully registered Bonds of each Series shall bear interest from their date.

Notwithstanding any other provision in The General Ordinance to the contrary, the foregoing provisions are subject to the express understanding that the principal of and interest on all Bonds issued under the General Ordinance and the premium, if any, payable on redemption thereof, shall be payable only from Project Revenues and other funds provided for the payment of Bonds. The Bonds are not general obligations of the City and do not pledge the general credit or taxing power or create any debt or charge against the general revenues of the City, or create any lien against any property of the City other than pledged Project Revenues.

Execution of Bonds

The Bonds shall be executed on behalf of the City by the Fiscal Agent by the manual signatures of two of its duly authorized officers or signers, under the seal of the City which shall be either affixed or reproduced thereon in facsimile and shall be countersigned and attested by the manual or facsimile signature of the City Controller, or in such other manner as shall be authorized by law and prescribed by Supplemental Ordinance. Any such Bonds may be executed, issued and delivered notwithstanding that one or more of the officers or signers signing such Bonds or whose facsimile signature shall be upon such Bonds shall have ceased to be such officers or signers at the time when such Bonds shall actually be delivered, and although at the nominal date of the Bond any such person shall not have been such officer or signer.

Bond Registrar and Bond Register

The City shall designate one or more persons to act as "Bond Registrar" for the Bonds provided that the Bond Registrar appointed for the Bonds shall be either the Fiscal Agent or a person which would meet the requirements for qualification as a Fiscal Agent imposed by the General Ordinance. Any person other than the Fiscal Agent undertaking to act as Bond Registrar shall first execute a written agreement, in form satisfactory to the City and the Fiscal Agent, to perform the duties of a Bond Registrar under the General Ordinance, which agreement shall be filed with the Fiscal Agent.

The Bond Registrar shall act as registrar and transfer agent for the Bonds. The City shall cause the Bond Registrar to designate, by a written notification to the Fiscal Agent, a specific office location at which the Bond Register is kept. The principal corporate trust office of the Fiscal Agent shall be such office in respect of the Bonds for which the Fiscal Agent is acting as Bond Registrar.

The Bond Registrar shall, in any case where it is not also the Fiscal Agent, forthwith following each regular record date and at any other time as reasonably requested by the Fiscal Agent, certify and furnish to the Fiscal Agent and any paying agent as the Fiscal Agent shall specify, the names, addresses, and holdings of Bondholders and any other relevant information reflected in the Bond Register, and the Fiscal Agent and any such paying agent shall for all purposes be fully entitled to rely upon the information so furnished to it and shall have no liability or responsibility in connection with the preparation thereof.

Interchangeability of Bonds

Fully registered Bonds, upon surrender thereof at the office of Bond Registrar with a written instrument of transfer satisfactory to the Bond Registrar, duly executed by the registered owner or his duly authorized attorney may at the option of the registered owner thereof, and upon payment by such registered owner of any charges, which the City or Bond Registrar may make, be exchanged for an equal aggregate principal amount of fully registered Bonds of the same Series, maturity and interest rate of any other authorized denominations.

Negotiability, Transfer and Registry

Fully registered Bonds shall be transferable only by the registered owner thereof in person or by his attorney duly authorized in writing, upon surrender thereof together with a written instrument of transfer satisfactory to the Bond Registrar duly executed by the registered owner or his duly authorized attorney. Upon the transfer of any such fully registered Bonds the City shall issue and the Bond Registrar shall execute in the name of the transferee a new fully registered Bond or Bonds of the same aggregate principal amount and Series, maturity and interest rate as the surrendered Bonds.

The City, the Fiscal Agent and any paying agent designated in the Bonds may deem and treat the person in whose name any Bond shall be registered in the Bond Register as the absolute owner of such Bond, whether such Bond shall be overdue or not, for the purpose of receiving payment of, or on account of, the principal and redemption price of and interest on such Bond and for all other purposes, and all such payments so made to any such registered owner or upon his order shall be valid and effectual to satisfy and discharge the liability upon such Bond to the extent of the sum or sums so paid, and neither the City, the Fiscal Agent nor any paying agent designated in the Bond shall be affected by any notice to the contrary.

Any consent, waiver or other action taken by the registered owner of any Bond pursuant to the provisions of the General Ordinance shall be conclusive and binding upon such Holder, his heirs, successors or assigns, and upon all transferees of such Bond whether or not notation of such consent, waiver or other action shall have been made on such Bond or on any Bond issued in exchange therefor.

Regulations With Respect to Exchanges and Transfers

In all cases in which the privilege of exchanging Bonds or transferring registered Bonds is exercised, the City shall execute and deliver Bonds in accordance with the General Ordinance. All Bonds surrendered in any such exchanges or transfers shall forthwith be delivered to the Bond Registrar and cancelled or retained by the Bond Registrar. For every such exchange or transfer of Bonds, whether temporary or definitive, the City or the Bond Registrar may make a charge sufficient to reimburse it for any tax, fee or other governmental charge imposed by a governmental unit other than the City in connection with said exchange, transfer or registration and for any charge of insuring Bonds during the delivery thereof. Neither the City nor the Bond Registrar shall be required to transfer or exchange Bonds of any Series for a period of 20 days next preceding any selection of Bonds to be redeemed or thereafter until after the first mailing of any notice of redemption, or to transfer, exchange or register any Bonds called for redemption.

Credit Enhancement; Exchange Agreements; Qualified Swaps

As provided by Supplemental Ordinance or Determination relating to any Series of Bonds and subject to the requirements of the General Ordinance, the City may provide for a Credit Facility, Exchange Agreement or Qualified Swap with respect to any Series of Bonds.

Purpose of Bonds; Combination or Projects for Financing Purposes

The Bonds issued under the General Ordinance shall be issued for the purpose (i) of paying the costs of Projects (as such term is defined in the Act) relating to the System, (ii) of reimbursing any fund of the City from which such costs shall have been paid or advanced, (iii) of funding any of such costs for which the City shall have outstanding bond anticipation notes or other obligations, (iv) of refunding any Bonds or bonds of the City issued for the foregoing purposes or (v) of financing anything else relating to the System permitted under the Act. The water and wastewater systems of the City (referenced in the definition of "System" above) are combined as a Project for the purpose of capital financing but the separate accounts or subaccounts required by the Philadelphia Home Rule Charter shall be maintained within the funds and accounts established under the General Ordinance in accordance with the Philadelphia Home Rule Charter.

Pledge or Revenues; Grant of Security Interest; Limitation on Recourse

The City pledges, and assigns to the Fiscal Agent, its successors in trust and its assigns, for the security and payment of all Bonds (other than Subordinated Bonds) and grants to said Fiscal Agent, its successors in trust and its assigns, a lien on and security interest in (i) all Project Revenues and (ii) all amounts on deposit in or standing to the credit of the funds and accounts (other than the Rebate Fund) established in the General Ordinance together with interest earnings on amounts in such funds and accounts (other than the Rebate Fund). The Fiscal Agent shall hold and apply the security interest granted in the General Ordinance and the pledged revenues and funds described therein, in trust, for the equal and ratable benefit and security of all present and future Holders of Bonds (other than Subordinated Bonds) issued pursuant to the provisions of the General Ordinance and each Supplemental Ordinance, without preference, priority or distinction of any one Bond over any other Bond (other than Subordinated Bonds); provided however, that the pledge of the General Ordinance may also be for the benefit of a Credit Facility and Qualified Swap, or any other person who undertakes to provide moneys for the account of the City for the payment of principal or redemption price of and interest on any Series of Bonds (other than Subordinated Bonds), on an equal and ratable basis with Bonds, to the extent provided by any Supplemental Ordinance or Determination.

For the purpose of compliance with the filing requirements of the Uniform Commercial Code in order to perfect the security interest granted by the General Ordinance, the Fiscal Agent shall be deemed to be, and the City recognizes the Fiscal Agent as, the representative of Bondholders to execute financing statements as the secured party.

Neither the Bonds nor the City's reimbursement or other contractual obligations under any Credit Facility, Qualified Swap or Exchange Agreement shall constitute a general indebtedness or a pledge of the full faith and credit of the City within the meaning of any constitutional or statutory provision or limitation of indebtedness. No Bondholder or beneficiary of any of the foregoing agreements shall ever have the right, directly or indirectly, to require or compel the exercise of the ad valorem taxing power of the City for the payment of the principal and redemption price of or interest on the Bonds or the making of any payments under the General Ordinance. The Bonds and the obligations evidenced thereby and by the foregoing agreements, shall not constitute a lien on any property of or in the City, other than the Project Revenues and amounts on deposit in or standing to the credit of the Water and Wastewater Funds and interest earnings on amounts in such funds.

Parity Bonds

All Bonds issued under the General Ordinance (other than Subordinated Bonds) shall be parity Bonds equally and ratably secured by the pledge of and grant of the security interest in the Project Revenues and the amounts on deposit in or standing to the credit of the funds and accounts (other than the Rebate Fund), together with interest earnings on amounts in such funds and accounts (other than the Rebate Fund) without preference, priority or distinction as to lien or otherwise, except as otherwise provided, of any one Bond over any other Bond or as between principal and interest.

The City reserves the right, and nothing in the General Ordinance shall be construed to impair such right, to finance improvements to the System by the issuance of its general obligation bonds or by the issuance, under ordinances other than Supplemental Ordinances, of water and/or wastewater revenue bonds or notes for the payment of which Project Revenues may be used or pledged subject and subordinate to the payment from such Project Revenues of the payments described below under "Transfers From Revenue

Fund" and subject to the elimination of any deficiency in any fund or account established under the General Ordinance or under any Supplemental Ordinance.

Establishment of Funds and Accounts

The following funds and accounts are established by the General Ordinance and shall be held by the Fiscal Agent:

(a) Revenue Fund;

(b) Sinking Fund and within such Fund a Debt Service Account, a Charges Account and a Debt Reserve Account;

(c) Subordinated Bond Fund;

(d) Rate Stabilization Fund;

(e) Residual Fund and within such Fund a Special Water Infrastructure Account;

(f) Construction Fund, and within the Construction Fund, separate accounts designated as follows:

(i) the Existing Projects Account, into which existing proceeds, if any, of revenue bonds heretofore issued under the Act in respect of the System shall be deposited,

(ii) the Bond Proceeds Account, into which proceeds of Bonds issued under the General Ordinance shall be deposited, and

(iii) the Capital Account;

(g) Rebate Fund.

Nothing in the General Ordinance shall be construed to prevent the City from establishing, in connection with the issuance of one or more Series of Bonds, additional funds or accounts to be held for the benefit of one or more Series of Bonds issued under the General Ordinance, as set forth in Supplemental Ordinances; provided that, no such additional funds or accounts shall be established unless, in the opinion of Bond Counsel, establishment of additional funds or accounts would not adversely affect the exclusion of interest on Bonds, if any, from gross income for federal income tax purposes.

Segregation of Water and Wastewater Funds; Deposit of Project Revenues into Revenue Fund

(a) The Water and Wastewater Funds shall be held separate and apart from all other funds and accounts of the City and the Fiscal Agent and the funds and accounts therein shall not be commingled with, loaned or transferred among themselves or to any other City funds or accounts except as expressly permitted by the General Ordinance.

(b) The City shall cause all Project Revenues received by it on any date to be deposited into the Revenue Fund upon receipt thereof by the City and the Fiscal Agent shall, upon receipt of Project Revenues, deposit such Project Revenues into the Revenue Fund. The City and Fiscal Agent also shall cause to be deposited into the Revenue Fund such portion of proceeds of Bonds as designated by Supplemental Ordinance or Determination and any other funds directed to be deposited into the Revenue

Fund by the City. The Fiscal Agent shall, at the written direction of the City, disburse from the Revenue Fund the amounts and at the times specified below under "Transfers From Revenue Fund."

(c) If at any time sufficient moneys are not available in the Revenue Fund to pay Operating Expenses and to make transfers required pursuant to the General Ordinance, then amounts on deposit in the Construction Fund, Rate Stabilization Fund and Residual Fund may be loaned temporarily, at the written direction of the City, to the Revenue Fund for the payment of such Operating Expenses to the extent of the deficiency, until such loaned amounts are required by the Water Department for purposes of the Fund making the loan. If a similar deficiency exists in the Construction Fund, amounts on deposit in the Revenue Fund, Rate Stabilization Fund and Residual Fund may be loaned temporarily, at the written direction of the City, to the Construction Fund, to the extent of the deficiency, until required by the Water Department for purposes of the Fund making the loan.

Transfers From Revenue Fund

Amounts on deposit in the Revenue Fund shall be applied by the Fiscal Agent, at the written direction of the City, in the following manner and in the following order of priority:

(a) to the City or its designees to pay such sums as are necessary to meet Operating Expenses in a timely manner;

(b) (i) on or before the dates that the principal or redemption price of and interest on Bonds (other than Subordinated Bonds) or payments under a Swap Agreement or Credit Facility are due, to deposit in the Debt Service Account of the Sinking Fund the amount necessary to provide for the timely payment of the principal or redemption price of and interest on such Bonds (other than Subordinated Bonds), any payments under any Swap Agreement and any amounts under a Credit Facility to repay advances thereunder to pay any of the foregoing, and (ii) on or before the dates that other payments are due under any Credit Facility with respect to Bonds (other than Subordinated Bonds) to deposit in the Charges Account of the Sinking Fund the amount necessary to make such payments;

(c) if the transfers in paragraphs (a) and (b) above are being made according to schedule, for deposit in the Debt Reserve Account, the amount, if any, required to eliminate any deficiency therein;

(d) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer required pursuant to paragraph (c) above, to deposit in any debt reserve account established within the Sinking Fund and not held for the equal and ratable benefit of all Bonds (other than Subordinated Bonds), the amount, if any, required to eliminate any deficiency therein;

(e) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer then required to be made pursuant to paragraphs (c) and (d) above, to deposit in the Subordinated Bond Fund the amount necessary to provide for the timely payment of the principal or redemption price of and interest on Subordinated Bonds, and forward to the paying agent in respect of bond anticipation notes (payable by exchange for, or out of the proceeds of the sale of Subordinated Bonds) the amount necessary to provide for the timely payment of interest thereon (to the extent not capitalized);

(f) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer then required to be made pursuant to paragraphs (c), (d) and (e) above to pay to the City the amount necessary to provide for the timely payment of the principal or redemption price of and interest on General Obligation Bonds;

(g) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer then required to be made pursuant to paragraphs (c), (d), (e) and (f) above, to transfer to the Rate Stabilization Fund such amount as the Water Commissioner may determine, the first such determination to be made on the Effective Date and to include the balance on that date in the Renewal and Replacement Fund created under the Prior Ordinance and the unencumbered operating balance of the Water Department as of the end of the Fiscal Year immediately preceding the Effective Date;

(h) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer then required to be made pursuant to paragraphs (c) , (d) , (e), (f) and (g) above, to transfer to the Capital Account of the Construction Fund on June 20, of each Fiscal Year (or the first business day following June 20 if June 20 is not a business day) an amount equal to the sum of (i) the Capital Account Deposit Amount, (ii) the Debt Service Withdrawal for the preceding Fiscal Year and (iii) the Operating Expense Withdrawal for the preceding Fiscal Year, less any amounts transferred during the Fiscal Year to such Capital Account from the Residual Fund; and

(i) if the transfers in paragraphs (a) and (b) above are being made according to schedule, and following any transfer then required to be made pursuant to paragraphs (c), (d), (e), (f), (g) and (h) above and after providing for the repayment of any inter-Fund loans, to transfer as of June 30 of each year all remaining amounts to the Residual Fund.

Notwithstanding the foregoing, nothing in the General Ordinance shall prevent the City from directing the transfer of amounts on deposit in any fund or account established under the General Ordinance into the Rebate Fund in the amounts and at the times specified below under “Funds and Accounts — Rebate Fund.”

Sinking Fund

The Sinking Fund is to be a consolidated fund for the equal and proportionate benefit of the Holders of all Bonds (other than Subordinated Bonds) from time to time Outstanding and each account therein may be invested and reinvested on a consolidated basis.

The Fiscal Agent, as directed by the City by Supplemental Ordinance, Determination or other written direction, shall pay out of the Debt Service Account of the Sinking Fund to the designated paying agent or agents (i) on or before each interest payment date for any of the Bonds (other than Subordinated Bonds) the amount required for the interest payable on such date; and (ii) on or before each principal, redemption or prepayment date for any Bonds (other than Subordinated Bonds), the amount required for the principal, redemption or prepayment payable on such date, and (iii) on or before the respective due dates the amounts, if any, due under any Swap Agreements. Such amounts shall be applied by the designated paying agent or agents on the due dates thereof. The Fiscal Agent shall also pay out of the Debt Service Account of the Sinking Fund the accrued interest included in the purchase price of Bonds purchased for retirement and on or before the due dates any amounts owing by the City under any Credit Facility on account of advances to pay principal of or interest or redemption premium on Bonds (other than Subordinated Bonds).

Amounts accumulated in the Debt Service Account with respect to any Sinking Fund Installment (together with amounts accumulated therein with respect to interest on the Bonds for which such Sinking Fund Installment was established) if so directed by the City, shall be applied by the Fiscal Agent, on or prior to the 60th day preceding the due date of such Sinking Fund Installment, to the purchase of Bonds of the Series, maturity and interest rate within each maturity for which such Sinking Fund Installment was established. All purchases of Bonds pursuant to this provision shall be made at prices not exceeding the applicable sinking fund redemption price of such Bonds plus accrued interest, and such purchases shall be made by the Fiscal Agent as directed by the City. As soon as practicable after the 42nd day preceding the due date of any such Sinking Fund Installment, the Fiscal Agent shall proceed to call for redemption, by giving notice as provided in the General Ordinance, on such due date Bonds of the Series, maturity and interest rate within each maturity for which such Sinking Fund Installment was established (except in the case of Bonds maturing on a Sinking Fund Installment date) in such amount as shall be necessary to complete the retirement of the unsatisfied balance of such Sinking Fund Installment after making allowance for any Bonds purchased with moneys held in the Subordinated Bond Fund which the City has directed the Fiscal Agent to apply as a credit against such Sinking Fund Installment. The Fiscal Agent shall pay out of the Sinking Fund to the appropriate paying agent or agents, on or before such redemption date (or maturity date) the amount required for the redemption of the Bonds so called for redemption (or for the payment of such Bonds then maturing) and such amount shall be applied by such paying agent or agents to such redemption (or payment). All expenses in connection with the purchase or redemption of Bonds shall be paid by the City from Project Revenues.

In the event of the refunding of any Bonds, the Fiscal Agent shall, if the City so directs, withdraw from the Sinking Fund all, or any portion of, the amounts accumulated therein with respect to principal or interest on the Bonds being refunded and deposit such amounts with itself or another financial institution serving as escrow agent to be held for the payment of the principal or redemption price, if applicable, and interest on the Bonds being refunded; provided that such withdrawal shall not be made unless immediately thereafter the Bonds being refunded shall be deemed to have been paid as described below under "Deposit of Funds for Payment of Bonds." In the event of a refunding, the City may also direct the Fiscal Agent to withdraw from the Sinking Fund all, or a portion of, the amounts accumulated therein with respect to principal and interest on the Bonds being refunded and deposit such amounts in any fund or account established under the General Ordinance.

If any Bond shall not be presented for payment when the principal thereof becomes due, either at maturity or otherwise or at the date fixed for redemption thereof, if moneys sufficient to pay such Bond shall have been deposited with the Fiscal Agent, it shall be the duty of the Fiscal Agent to hold such moneys, without liability to the City, any Bondholder or any other person for interest thereon, for the benefit of the owner of such Bond. Notwithstanding the foregoing, any moneys in the Sinking Fund for the payment of the interest, principal or redemption premium of Bonds unclaimed for two (2) years after the due date shall be repaid to the City but such repayment shall not discharge the obligation, if any, for which such moneys were previously held in the Sinking Fund; provided, however, that such repayment shall not be made unless, at the time of such repayment, there shall exist no deficiency in any fund or account established under the General Ordinance or any Supplemental Ordinance.

The Fiscal Agent shall pay out of the Charges Account to the appropriate payees any fees, expenses and other amounts due under any Credit Facility with respect to Bonds (other than Subordinated Bonds), to the extent such amounts are not paid from the Debt Service Account.

Credits Against Sinking Fund Installments

If at any time Bonds of any Series or maturity for which Sinking Fund Installments shall have been established are purchased or redeemed other than (i) from amounts accumulated in the Debt Service Account or (ii) Bonds deemed to have been paid as described under "Deposit of Funds for Payment of Bonds" below, and, with respect to such Bonds which have been deemed paid, irrevocable instructions have been given to the Fiscal Agent to redeem or purchase the same on or prior to the due date of the Sinking Fund Installment to be credited under this paragraph, the City may from time to time and at any time by written notice to the Fiscal Agent specify the portion, if any, of such Bonds so purchased, redeemed or deemed to have been paid and not previously applied as a credit against any Sinking Fund Installment which are to be credited against future Sinking Fund Installments. Such notice shall specify the amounts of such

Bonds to be applied as a credit against such Sinking Fund Installment or Installments and the particular Sinking Fund Installment or Installments against which such Bonds are to be applied as a credit; provided, however that none of such Bonds may be applied as a credit against a Sinking Fund Installment to become due less than 42 days after such notice is delivered to the Fiscal Agent. All such Bonds to be applied as a credit shall be surrendered to the Fiscal Agent for cancellation on or prior to the due date of the Sinking Fund Installment against which they are being applied as a credit. The portion of any such Sinking Fund Installment remaining after the deduction of any such amounts credited toward the same (or the original amount of any such Sinking Fund Installment if no such amounts shall have been credited toward the same) shall constitute the unsatisfied balance of such Sinking Fund Installment for the purpose of calculation of Sinking Fund Installments due on a future date.

Debt Reserve Account*

Unless otherwise provided in the applicable Supplemental Ordinance, the City is required, under direction of the Director of Finance, to deposit in the Debt Reserve Account from the proceeds of sale of each Series of Bonds issued under the General Ordinance, an amount which, when added to the existing balance in the Debt Reserve Account, will be equal to the Debt Reserve Requirement immediately after the issuance of such Series of Bonds. The money and investments in the Debt Reserve Account shall be held and maintained in an amount equal at all times to the Debt Reserve Requirement provided that if the Supplemental Ordinance authorizing a Series of Bonds shall authorize the accumulation from Project Revenues of a reserve of such amount in respect of such Bonds over a period of not more than three Fiscal Years after the issuance and delivery of such Bonds, then the full payment of the annual deposits required under such Supplemental Ordinance will meet the Debt Reserve Requirements of the General Ordinance in respect of such Bonds.

If at any time and for any reason, the moneys in the Debt Service Account of the Sinking Fund are insufficient to pay as and when due, the principal of (and premium, if any) or interest on any Bond or Bonds or other obligations payable from the Debt Service Account then due (including under Swap Agreements and Credit Facilities), the Fiscal Agent is authorized and directed to withdraw from the Debt Reserve Account and pay over the amount of such deficiency for deposit in the Debt Service Account. If by reason of such withdrawal or for any other reason there shall be a deficiency in the Debt Reserve Account, the City covenants to restore such deficiency promptly from Net Revenues.

Any moneys in the Debt Reserve Account in excess of the Debt Reserve Requirement is required to be transferred to the Revenue Fund at the written direction of the City.

Notwithstanding the foregoing provisions, in lieu of the required deposits into the Debt Reserve Account, the City may cause to be deposited into the Debt Reserve Account a surety bond or an insurance policy payable to the Fiscal Agent for the account of the Bondholders and any Qualified Swap or an irrevocable letter of credit in an amount equal to the difference between the Debt Reserve Requirement and the remaining sums, if any, then on deposit in the Debt Reserve Account. The surety bond, insurance policy or letter of credit shall be payable (upon the giving of notice as required thereunder) on any interest payment date on which moneys will be required to be withdrawn from the Debt Reserve Account and applied to the payment of debt service on the Bonds and such withdrawal cannot be met by amounts on deposit in the Debt Reserve Account or provided from any other Fund under the General Ordinance. The insurer providing such surety bond or insurance policy shall be an insurer whose municipal bond insurance policies

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* The provisions described under this heading will be amended upon the consent to the Springing Amendments of 67% of Holders of the outstanding Bonds. See APPENDIX III-B – “Twenty-First Supplemental Ordinance” attached to this Official Statement.

insuring the payment, when due, of the principal of and interest on municipal bond issues results in such issues being rated in not lower than the second highest rating category (without regard to rating subcategories) by either Moody's or S&P. The letter of credit issuer shall be a bank or trust company which is rated not lower than the second highest rating category (without regard to ratings sub-categories) by either Moody's or S&P. If a disbursement is made pursuant to a surety bond, an insurance policy or a letter of credit provided pursuant to this paragraph, the City shall be obligated either (i) to reinstate the maximum limits of such surety bond, insurance policy or letter of credit or (ii) to deposit into the Debt Reserve Account, funds in the amount of the disbursement made under such surety bond, insurance policy or letter of credit, or a combination of such alternatives, as shall provide that the amount in the Debt Reserve Account equals the Debt Reserve Requirement within a time period not longer than would be required to restore the Debt Reserve Account by operation of this provision and from the same source of funds as provided in the General Ordinance. Upon the occurrence of any reduction or suspension or any credit rating with respect to such surety bond, insurance policy or letter of credit (or the provider thereof) required by the General Ordinance, the City shall so notify the provider of the surety bond, insurance policy or letter of credit and prior to the effective date of such cancellation shall either provide a substitute surety bond, insurance policy or letter of credit meeting the above-described requirements or shall deposit cash in the Debt Reserve Account so that the amount in such Account shall equal the Debt Reserve Requirement. The Director of Finance may use funds already held in the Debt Reserve Account to purchase appropriate surety bonds or insurance policies for deposit in the Debt Reserve Account in lieu of some or all of the current cash or other deposits therein, which surety bonds or insurance policies shall satisfy the requirements described in this paragraph.

Subordinated Bond Fund

Subject to the third paragraph under this heading, the Fiscal Agent shall apply amounts in the Subordinated Bond Fund to the payment of the principal of, redemption premium, if any, and interest on Subordinated Bonds of a Series and to payments due under any Credit Facilities and Exchange Agreements with respect to Subordinated Bonds in accordance with the provisions of, and subject to the priorities and limitations and restrictions provided in, the Supplemental Ordinance and Determination authorizing such Series of Subordinated Bonds.

At any time and from time to time the City may deposit in the Subordinated Bond Fund for the payment of the principal of, redemption premium, if any, and interest on Subordinated Bonds amounts received from any source other than Project Revenues which is not inconsistent with the General Ordinance or any Supplemental Ordinance or Determination.

If at any time the amounts in the Sinking Fund shall be less than the current requirement of such fund pursuant to paragraphs (b) and (c) under "Transfers from Revenue Fund" above and there shall not be on deposit in the Debt Reserve Account, the Capital Account or the Residual Fund available moneys sufficient to cure such deficiency, then the Fiscal Agent shall withdraw from the Subordinated Bond Fund and deposit in the Sinking Fund the amount necessary (or all the moneys in said fund, if less than the amount necessary) to eliminate such deficiency.

Any moneys in the Subordinated Bond Fund for the payment of the interest, principal or redemption premium of Subordinated Bonds unclaimed for two years after the due date are to be repaid to the City but such repayment shall not discharge the obligation, if any, for which such moneys were previously held in the Subordinated Bond Fund; provided, however, that such repayment shall not be made unless, at the time of such repayment, there shall exist no deficiency in any fund or account established under the General Ordinance or any Supplemental Ordinance.

Construction Fund

Proceeds of Bonds issued for capital purposes are to be deposited into the Bond Proceeds Account of the Construction Fund and disbursed according to established procedures of the City.

The Fiscal Agent shall on the Effective Date deposit in the Existing Projects Account proceeds of Prior Bonds as directed by a Supplemental Ordinance or Determination; deposit in the Bond Proceeds Account the proceeds of Bonds as directed by a Supplemental Ordinance or Determination; and deposit in the Capital Account any amounts transferred pursuant to paragraph (h) under "Transfers from Revenue Fund" above. Amounts in the Existing Projects Account and Bond Proceeds Account shall be applied as directed in writing by the City for purposes permitted by the Act and the Bonds and such other purposes as are permitted under the General Ordinance.

Amounts deposited in the Capital Account may be applied at the written direction of the City to (i) payments for the cost of renewals, replacements and improvements to the System; (ii) payments into the Sinking Fund or into the Subordinated Bond Fund to cure a deficiency in one of the foregoing; or (iii) the purchase of Bonds if a Consulting Engineer shall first have certified to the City that amounts remaining on deposit in the Capital Account following the proposed purchase of Bonds will be sufficient to pay the cost of renewals, replacement and improvements to the System projected to be payable during such Fiscal Year; provided, however, that no Bond shall be purchased at a price in excess of the principal amount and redemption price which would be applicable if the Bond were redeemed at the time such Bond was first subject to redemption.

As described the section titled "Segregation of Water and Wastewater Funds; Deposit of Project Revenues into Revenue Fund" , the General Ordinance requires that, if at any time sufficient moneys are not available for the payment of Operating Expenses, then amounts on deposit in the Capital Account may be used for the payment of Operating Expenses to the extent of the deficiency.

Residual Fund

Amounts on deposit in the Residual Fund may be used at the written direction of the City (i) to pay Operating Expenses; (ii) to fund transfers to any fund or account established under the General Ordinance or under a Supplemental Ordinance (other than the Revenue Fund and the Rate Stabilization Fund); (iii) to make payments required under any Exchange Agreement; (iv) for the payment of principal, redemption premium, if any, and interest on any revenue bonds or notes (the proceeds of which were applied in respect of the System) issued under the Act but not under the General Ordinance; (v) for the payment of principal, redemption premium, if any, and interest on any General Obligation Bonds; (vi) for the payment of principal, redemption premium, if any, and interest on other general obligation debt issued in respect of the System; (vii) for the payment of amounts due under capitalized leases or similar obligations relating to the System; and (viii) to fund a transfer to the City's "General Fund" in an amount not to exceed the lower of (A) all "Net Reserve Earnings" as defined below or (B) $4,994,000. "Net Reserve Earnings" shall mean the amount of interest earnings during the Fiscal Year on amounts in the Debt Reserve Account and the Subordinated Bond Fund less the amount of interest earnings during the Fiscal Year on amounts in any such reserve funds and accounts giving rise to a rebate obligation pursuant to Section 148(f) of the Code.

The General Ordinance provides that the City establish expenditure authority from the Residual Fund to enable it to pay Operating Expenses and the other items permitted by the General Ordinance. In the event that there is a substitution of appropriate surety bonds or insurance policies from some or all of the deposits held in the Debt Reserve Account, a transfer of resulting excess money in the Debt Reserve Account to the Revenue Fund and, following compliance with the provisions described under "Transfers From Revenue Fund" above, a transfer of remaining amounts of such excess to the Residual Fund, such remaining amount shall be deposited into the Special Water Infrastructure Account. Any amounts deposited in the Special Water Infrastructure Account may be used to finance water-related infrastructure projects.

Rate Stabilization Fund

Pursuant to the General Ordinance, as of the effective date of the General Ordinance and as of June 30 of each Fiscal Year, the City may transfer (i) from the Rate Stabilization Fund to the Revenue Fund or (ii) from the Revenue Fund to the Rate Stabilization Fund, the amount determined by the Water Commissioner to be transferred for such Fiscal Year.

Rebate Fund

The General Ordinance provides that the Rebate Fund shall be maintained for so long as any Series of Bonds is Outstanding, and for 60 days thereafter (or such other period as may be specified by the Code and applicable regulations), for the purpose of paying to the United States Treasury the amount required to be rebated pursuant to Section 148(f) of the Code. All amounts in the Rebate Fund, including income earned from investment of amounts in the Rebate Fund, shall be held by the City free and clear of the lien created by the General Ordinance.

Management of Funds and Accounts

The General Ordinance provides that the moneys on deposit in the funds and accounts established under the General Ordinance, to the extent not currently required, shall be invested and secured as required by Section 9 of the Act, all at the direction and under the management of the Director of Finance or such other chief fiscal officer of the City as may hereinafter be established.

Investment of Funds and Accounts

All moneys deposited in any fund or account established under the General Ordinance or under any Supplemental Ordinance may be invested by the City or by the Fiscal Agent, at the oral or written direction of the City, in any investments permitted by law (except as otherwise provided in the General Ordinance with respect to the Debt Reserve Account and Rebate Fund); provided that any investments with respect to amounts on deposit in the funds (other than the Debt Reserve Account) and accounts established under the General Ordinance shall mature or shall be subject to redemption by the holder thereof upon demand at par no later than the date when such amounts are needed for the purposes of such funds or accounts. Interest earnings on amounts on deposit (i) in the Revenue Fund are to be credited to the Revenue Fund; (ii) in the Sinking Fund (except as provided in (iii) below) are to be credited to the Sinking Fund to the extent needed to meet Debt Service Requirements in respect of Bonds (other than Subordinated Bonds) and additional interest earnings shall be credited to the Revenue Fund; (iii) in the Debt Reserve Account shall be credited to the Debt Reserve Account until such account is fully funded and shall then be credited to the Residual Fund up to the maximum amount to be transferred to the City's General Fund and any excess is to then be transferred to the Revenue Fund; (iv) in the Subordinated Bond Fund are to be credited to the Subordinated Bond Fund to the extent needed to meet Debt Service Requirements in respect of Subordinated Bonds and additional interest earnings shall be credited to the Revenue Fund or to such other fund or account established under the General Ordinance as the City may direct pursuant to a Supplemental Ordinance; (v) in the Residual Fund, shall be credited to the Residual Fund; (vi) in the Rate Stabilization Fund shall be credited to the Revenue Fund; (vii) in the Construction Fund shall be credited to the appropriate account of the Construction Fund or to the Revenue Fund, as the City shall direct; and (viii) in the Rebate Fund shall be credited to the Rebate Fund.

Valuation of Funds and Accounts

In computing the assets of any fund or account established under the General Ordinance, investments and accrued interest thereon are to be deemed a part thereof. Such investments shall be valued on June 30 of each Fiscal Year at the lower of the cost or current market value thereof if the applicable maturity is more than one year and at par if the applicable maturity is equal to or less than one year plus accrued interest, or at the redemption price thereof, if then redeemable at the option of the holder; provided that investments in any reserve fund or reserve account of the Sinking Fund established pursuant to a Supplemental Ordinance may be valued as provided in the Supplemental Ordinance establishing it. The annual valuation is to apply for all purposes of the General Ordinance except if Bonds are issued or a fund deficit occurs based on the annual valuation, in which cases a valuation is to be made on the date Bonds are issued or the deficit is eliminated, as the case may be.

Covenants of the City

Rate Covenant*. Pursuant to the General Ordinance, the City covenants with the Bondholders that it will, at a minimum, impose, charge and collect in each Fiscal Year such water and wastewater rents, rates, fees and charges as shall yield Net Revenues which shall be equal to at least: (i) 1.20 times the Debt Service Requirements for such Fiscal Year (excluding Debt Service Requirements in respect of Subordinated Bonds); and (ii) 0.90 times Debt Service Requirements for such Fiscal Year (excluding Debt Service Requirements in respect of Subordinated Bonds); provided that, for purposes of this clause (ii), Net Revenues shall be calculated to exclude therefrom any amounts transferred from the Rate Stabilization Fund to the Revenue Fund in, or as of the end of, such Fiscal Year; and (iii) 1.00 times (A) the Debt Service Requirements for such Fiscal Year (including Debt Service Requirements in respect of Subordinated Bonds); (B) amounts required to be deposited into the Debt Reserve Account during such Fiscal Year; (C) the principal or redemption price of and interest on General Obligation Bonds payable during such Fiscal Year; (D) debt service requirements on Interim Debt payable during such Fiscal Year; and (E) the Capital Account Deposit Amount for such Fiscal Year (less any amounts transferred from the Residual Fund to the Capital Account during such Fiscal Year).

In estimating Debt Service Requirements on any Interim Debt for the purposes of projecting compliance with this covenant, the City is entitled to assume that such Interim Debt will be amortized over a period of up to the maximum term permitted by the Act, provided, however, such period shall not be in excess of the useful life of the assets to be financed, on an approximately level debt service basis and bear interest at the average interest rate on bonds of a similar maturity and credit rating (without any credit enhancement) as the Bonds outstanding under the General Ordinance. Promptly upon any material change in the circumstances which were contemplated at the time such rents, rates, fees and charges were most recently reviewed, but not less frequently than once in each Fiscal Year, the City is required to review the rents, rates, fees and charges as necessary to enable the City to comply with the foregoing requirements; provided that such rents, rates, fees and charges shall in any event produce moneys sufficient to enable the City to comply with its covenants in the General Ordinance.

In estimating Debt Service Requirements on any Variable Rate Bonds for purposes of projecting compliance with this covenant or funding the Reserve Account, the City is entitled to assume that such Variable Rate Bonds will bear interest at a rate equal to (i) the average interest rate on the Variable Rate Bonds during the period of 24 consecutive calendar months preceding the date of calculation or (ii) if the

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* The provisions described under this heading will be amended upon the consent to the Springing Amendments of 67% of Holders of the outstanding Bonds. See APPENDIX III-B – "Twenty-First Supplemental Ordinance" attached to this Official Statement.

Variable Rate Bonds were not Outstanding during the entire 24-month period, the average interest rate on the Variable Rate Bonds since their date of issue or (iii) such other rate as may be specified in a Supplemental Ordinance or Determination.

Pursuant to the General Ordinance, the City represents that it has, by its Code of General Ordinances, as amended, authorized the imposition of rents, rates, fees and charges by the Water Department sufficient from time to time to comply with the Rate Covenant and covenants with the Holders of Bonds that it will not repeal or materially adversely dilute or impair such authorization.

Timely Payment of Principal, Redemption Premium and Interest. Pursuant to the General Ordinance, the City covenants with the Holders of all Bonds Outstanding under the General Ordinance that so long as such Bonds shall remain Outstanding it will pay or cause the Fiscal Agent or a paying agent to pay from the Project Revenues deposited in the Sinking Fund and the Subordinated Bond Fund the principal of, redemption premium, if any, and interest on all Bonds as the same shall become due and payable and as more particularly set forth in the Bonds and to pay the amounts due with respect to any and all Credit Facilities (including the reimbursement agreement or similar related agreement) and Qualified Swaps.

Operation of System. Pursuant to the General Ordinance, the City covenants with the Holders of all Bonds Outstanding under the General Ordinance that so long as such Bonds shall remain Outstanding it will continuously maintain the System or cause the System to be maintained in good condition and will continuously operate the System or cause the System to be operated.

Conditions of and Provisions Relating to Issuing Bonds. The City covenants with the Holders of all Bonds Outstanding under the General Ordinance that so long as any such Bonds shall remain Outstanding it will not issue any Series of Bonds under the General Ordinance without first complying with certain conditions stated in the General Ordinance including, without limitation, (a) the enactment of a Supplemental Ordinance, (b) the filing with the Fiscal Agent of a transcript of the proceedings relating to the issuance of such Series of Bonds, (c) the delivery to the City Council of a Consulting Engineer's Report, (d) the filing with the Fiscal Agent of certain opinions of counsel and (e) the execution of appropriate documents.

The Consulting Engineer's Report referred to in the preceding paragraph shall state that the Net Revenues are currently sufficient to comply with the Rate Covenant and are projected to be sufficient to comply with the Rate Covenant for each of the two Fiscal Years following the Fiscal Year in which the Bonds are to be issued; provided that if interest on such Bonds or a portion thereof has been capitalized, the projection shall extend to the two Fiscal Years following the Fiscal Year up to which interest has been capitalized on the Bonds or a portion thereof.

The General Ordinance provides that upon compliance with the conditions enumerated in the preceding paragraph and unless otherwise provided in the applicable Supplemental Ordinance or Determination, accrued interest on Bonds (other than Subordinated Bonds) shall be deposited in the Sinking Fund, accrued interest on Subordinated Bonds shall be deposited in the Subordinated Bond Fund, an amount sufficient to satisfy the requirements concerning the Debt Reserve Account shall be deposited in the Debt Reserve Account and the balance of the proceeds of the Bonds shall be deposited in the Bond Proceeds Account of the Construction Fund and shall be disbursed therefrom, in accordance with established procedures of the City; provided, however, that if such Bonds shall be issued for the purpose of funding or refunding Bonds previously issued by the City such proceeds shall, unless otherwise directed by the Supplemental Ordinance, be deposited in a special fund or account to be established with and held by the Fiscal Agent or another entity acting as an escrow agent and invested (if appropriate) and disbursed under the direction of the Director of Finance for the purpose of retiring the Bonds being funded or refunded.

Refunding Bonds

If the City shall, by Supplemental Ordinance, authorize the issuance of refunding Bonds pursuant to Section 10 of the Act, in the absence of specific direction or inconsistent authorization in the Supplemental Ordinance, the Director of Finance is authorized in the name and on behalf of the City to take all such action, including the irrevocable pledge of proceeds and the income and profit from the investment thereof for the payment and redemption of the funded or refunded Bonds, bonds or notes and, if there shall have been provided a Qualified Swap with respect to the Bonds to be refunded, provision for the payment, if any, of all amounts due and payable by the City under such Qualified Swap, and including the publication of all required redemption notices or the giving of irrevocable instructions therefor, as may be necessary or appropriate to accomplish the funding or refunding and to comply with the requirements of Section 10 of the Act.

Subordinated Bonds

The City may, at any time, or from time to time, issue Subordinated Bonds for any purpose permitted under the General Ordinance and under the Act. Subordinated Bonds shall be payable out of, and may be secured by a security interest in and a pledge and assignment of, Project Revenues and amounts on deposit in the Subordinated Bond Fund; provided, however, that any such security interest in and pledge and assignment of Project Revenues and amounts on deposit in the Subordinated Bond Fund shall be, and shall be expressed to be, subordinate in all respects to the security interest in, and pledge and assignment of, the Project Revenues and the amounts on deposit in the funds and accounts (other than the Rebate Fund but including the Subordinated Bond Fund) established under the General Ordinance for the security of the Bonds (other than Subordinated Bonds).

Annual Reports

The City covenants with the Holders of all Bonds Outstanding under the General Ordinance that so long as such Bonds shall remain Outstanding it will, within 120 days following the close of each Fiscal Year of the City or as soon thereafter as is practicable (not exceeding 150 days following the close of each Fiscal Year), file with the Fiscal Agent a report of the operation of the System, setting forth, among other things, in reasonable detail financial data concerning, and consolidated for, the water and wastewater components of the System for such Fiscal Year, including a balance sheet and a statement of income, expenses, and surplus (in each case not inconsistent with the statement of income, expenses, and other accounts of the City audited by the City Controller) prepared by the Water Department in accordance with generally accepted accounting principles consistently applied, showing compliance with the Rate Covenant, accompanied by a certificate of the Water Commissioner that the water and wastewater components of the System are in good operating condition and by a certificate of the Director of Finance that as of the date of such report the City has complied with all of the covenants in the General Ordinance and in all Supplemental Ordinances on its part to be performed. Such report shall be furnished to the Fiscal Agent in such reasonable number of copies as shall be required to meet the written requests of Bondholders therefor on a first come first served basis.

Disposition of Insurance Proceeds and Proceeds from the Sale of Assets

In the event that any assets of the System are destroyed or the City shall sell any assets of the System (except in the event of the sale or transfer of all or substantially all of the assets of the System to a municipal authority), the City shall, if the insurance proceeds or the proceeds from the sale of assets exceed 1.5% of the depreciated value of property, plant and equipment of the System, as shown on the financial statements of the City for the preceding Fiscal Year, apply such amounts, at the direction .of the Director of Finance or such other chief fiscal officer of the City as may hereinafter be established (i) to the retirement of the principal amount of debt incurred in respect to the System; (ii) to the reconstruction, repair or replacement of assets of the System; or (iii) to the making of capital additions or improvements to the System.

Bonds Not to Become Arbitrage Bonds

The General Ordinance provides that the City covenants for the benefit of the Bondholders that, notwithstanding any other provision of the General Ordinance or any other instrument, it will neither make nor instruct the Fiscal Agent to make any investment or other use of amounts on deposit in the funds and accounts established by the General Ordinance or other proceeds of the Bonds which would cause any Series of Bonds issued under the General Ordinance as tax-exempt to be arbitrage bonds under Section 148 of the Code and the regulations thereunder to the extent that the same are applicable at the time of such investment; it will file any reports required to be filed pursuant to the Code; and it will not take or fail to take any action so as to render any Series of Bonds issued under the General Ordinance as tax-exempt to be arbitrage bonds under Section 148 of the Code.

Prohibition Against Certain Uses of Funds; Enforcement

The City covenants that while any Bonds are Outstanding under the General Ordinance, it will not direct the Fiscal Agent to transfer, loan or advance proceeds of the Bonds or Project Revenues from the Water and Wastewater Funds to any City account for application other than for Water Department purposes.

If, on any date when a deposit is required to be made of the Project Revenues, the City fails to comply with any provision of the General Ordinance, the Fiscal Agent is authorized to and shall seek, by mandamus or other suit, action or proceeding at law or in equity, the specific enforcement or performance of the obligation of the City to cause the Project Revenues to be transferred to the Revenue Fund, and shall have any and all other rights and remedies of a fiscal agent under the General Ordinance, any Supplemental Ordinance, the Act or otherwise at law or in equity.

Credit Facilities and Qualified Swaps

All or any of the foregoing covenants of the City for the benefit of the Bondholders may also be for the benefit of the providers of any Credit Facility and any Qualified Swap to the extent provided in a Supplemental Ordinance or Determination.

Bonds May Be Subject to Redemption

Bonds of any Series may be subject to either optional or mandatory redemption at the times, in the order, in the amounts, at the redemption prices, and under such terms, conditions and restrictions, ail as may be set forth in the Supplemental Ordinance authorizing the issuance of such Series of Bonds or in the Determination relating to such Series of Bonds or, in the absence of such provisions, as may be set forth in the Bonds of such Series, at the direction of the Director of Finance. Notwithstanding or in limitation of the foregoing, a Supplemental Ordinance or Determination for a Series of Bonds may contain provisions for optional redemption of a Series of Bonds which may be retained by the City as a call option or may be held by the City or sold simultaneously with such Series of Bonds or at future dates as determined by such Supplemental Ordinance or Determination.

Effect of Redemption, Payment

Upon compliance with certain notice requirements stated in the General Ordinance, or upon irrevocable instructions to give such notice having been delivered to the Fiscal Agent, irrevocable instruction having been delivered to the Fiscal Agent to pay said Bonds or portions thereof and to pay the amount, if any, due and payable under any Qualified Swap related to said Bonds, and funds having been deposited in the Sinking Fund or the Subordinated Bond Fund (as the case may be) prior to the date fixed for redemption, the Bonds or portions thereof so called for redemption shall become due and payable on the redemption date so designated, and interest on such Bonds or portions thereof shall cease from such redemption date, whether such Bonds be presented for redemption or not. The principal amount of all Bonds or portions thereof so called for redemption, together with the premium, if any, and accrued interest thereon, shall be paid by the Fiscal Agent or any other paying agent designated in the Bonds, upon presentation and surrender thereof in negotiable form.

Partial Redemption

Upon presentation of any Bond which is to be redeemed in part only, the City and the Fiscal Agent shall execute and deliver to the Holder thereof, at the expense of the City, a new Bond or Bonds of authorized denominations in a principal amount equal to and of the same Series and maturity as the unredeemed portion of the Bond or Bonds so presented.

Fiscal Agent

The Fiscal Agent under the Prior Ordinance or its successor, shall be Fiscal Agent as of the Effective Date for the General Ordinance. The City may appoint a successor Fiscal Agent by Supplemental Ordinance to act as Fiscal Agent under the General Ordinance, and in connection with the Bonds issued under the General Ordinance. The Fiscal Agent shall also act as depository of the Sinking Fund and the Subordinated Bond Fund, and may act as paying agent and bonds registrar.

Nothing in the General Ordinance is to be construed to prevent the City, in accordance with law, from engaging other Fiscal Agents from time to time or to engage other paying agents of the Bonds or any Series thereof in addition to, or as a successor to the Fiscal Agent. Any entity appointed by the City as Fiscal Agent under the General Ordinance shall be a trust company or national or state bank having trust powers and combined capital and surplus of at least $50,000,000 and be qualified to serve pursuant to the Act. Any entity appointed by the City as Fiscal Agent under the General Ordinance as a successor to the Fiscal Agent shall assume all rights and obligations of the Fiscal Agent under the General Ordinance.

Subject to the foregoing, the General Ordinance provides that the proper officers of the City are authorized to enter into contracts or to confirm existing agreements governing the maintenance of funds and accounts and records, the disposal of cancelled Bonds, the rights, duties, privileges and immunities of the Fiscal Agent, and such other matters as are authorized by the Act and as are customary and appropriate and to confirm the agreement of the Fiscal Agent, in its several capacities, to comply with the provisions of the Act and of the General Ordinance.

The Fiscal Agent shall keep on file a copy of each report and its accompanying certificates delivered to it pursuant to the General Ordinance for a period of ten years and shall exhibit the same to, and permit the copying thereof by, any Bondholder or his authorized representative at all reasonable times.

Resignation of Fiscal Agent

The Fiscal Agent may resign and be discharged of the duties created by the General Ordinance by written resignation filed with the Director of Finance not less than 60 days before the date when such resignation is to take effect. Such resignation shall take effect on the day specified in such notice provided that a successor Fiscal Agent is appointed. If a successor Fiscal Agent is appointed prior to the date specified in the notice, the resignation shall take effect immediately on the appointment of such successor, and the City shall give the required notices described under "Appointment of Successor Fiscal Agent" below.

Appointment of Successor Fiscal Agent

If the Fiscal Agent or any successor Fiscal Agent resigns, is replaced, or is dissolved or if its property or business is taken under the control of any state or federal court or administrative body, a vacancy shall exist in the office of the Fiscal Agent, and the City shall appoint a successor within 30 days of such vacancy and shall mail notice of such appointment to the Bondholders and to the registered depositories at their registered addresses by first class mail, postage prepaid, within 30 days of such appointment.

Defaults and Statutory Remedies; Notice to Bondholders

If the City shall fail or neglect to pay or to cause to be paid the principal of, redemption premium, if any, or interest on any Bond or any Series of Bonds issued under the General Ordinance, whether at stated maturity or upon call for prior redemption, or if the City, after written notice to it, shall fail or neglect to make any payment owed by it as a result of a Credit Facility or Qualified Swap entered into with respect to Bonds and the provider of the Credit Facility or the Qualified Swap Provider provides written notification to the Fiscal Agent of such failure or neglect, or if the City shall fail to comply with any provision of any Bonds or with any covenant of the City contained in the General Ordinance, then, under and subject to the terms and conditions stated in the Act, the Holder or Holders of any Bond or Bonds shall be entitled to all of the rights and remedies, including the appointment of a trustee, provided in the Act; provided, however, that the remedy provided in Section 20(b)(4) of the Act may be exercised only upon the failure of the City to pay, when due, principal and redemption price (including principal due as a result of a scheduled mandatory redemption) and interest on a Series of Bonds.

Upon the occurrence of the event of default described above, or if an event occurs which could lead to a default with the passage of time and of which the Fiscal Agent has notice, the Fiscal Agent is required to, within 30 days, give written notice thereof by first-class mail to all Bondholders.

Remedies Not Exclusive; Effect of Delay in Exercise of Remedies

No remedy contained in the General Ordinance or in the Act conferred upon or reserved to the trustee, if any, or to the Holder of any Bond is intended to be exclusive (except as specifically provided in the Act) of any other remedy or remedies, and each and every such remedy shall be cumulative, and shall be in addition to every other remedy given under the General Ordinance or now or hereafter existing at law or in equity or by statute.

No delay or omission of a trustee, if one be appointed pursuant to Section 20 of the Act, or of any Holder of the Bonds 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 an acquiescence therein; and every power and remedy provided with respect to an event of default under the General Ordinance, by the Act or otherwise may be exercised from time to time, and as often as may be deemed expedient.

Remedies to be Enforced Only Against Project Revenues

Any decree or judgment for the payment of money against the City by reason of default under the General Ordinance shall be enforceable only against the Project Revenues and the investments thereof and amounts on deposit in the funds and accounts (other than the Rebate Fund) established under the General Ordinance, and no decree or judgment against the City upon an action brought under the General Ordinance shall order or be construed to permit the occupation, attachment, seizure, or sale upon execution of any other property of the City.

Conveyance of System and Assignment, Assumption and Release

The General Ordinance provides that nothing in the General Ordinance is to prevent the City from conveying and assigning to a municipal authority created pursuant to the Municipality Authorities Act of 1945, as amended, or an authority created pursuant to any other applicable statute or to another entity (the "Authority") all or substantially all (or less than substantially all, as provided below) of its right, title and interest in the System and thereupon becoming released from all of its obligations under the General Ordinance, under any Supplemental Ordinance and under the Bonds and related obligations, including, but not limited to, Credit Facilities, Qualified Swaps and Exchange Agreements, (i) if the Authority assumes in writing the City's obligations (1) to operate or cause the System to be operated and to maintain or cause the System to be maintained in good condition; and (2) to pay the principal, redemption premium, if any, and interest on all Bonds issued, and all payments due under Credit Facilities, Qualified Swaps and Exchange Agreements entered into, pursuant to the General Ordinance and then outstanding according to the terms thereof; and (ii) if the instrument of assumption provides the Bondholders or the trustee or entity serving in a similar capacity and acting on behalf of the Bondholders with the substantial equivalent of all of the rights and remedies provided in the General Ordinance and the Act; provided, however, that before the City may consummate such a conveyance and assignment and obtain a release of its obligations under the General Ordinance, under any Supplemental Ordinance and under the Bonds, certain conditions are required to have been satisfied, including, without limitation, (a) the receipt by the City and the Fiscal Agent of certain opinions of counsel, (b) the granting of a security interest by the Authority to the trustee or entity serving in a similar capacity on behalf of the Bondholders, (c) a report of a Consulting Engineer detailing, among other things, continued compliance with covenants relating to Debt Service Requirements and (d) the conveyance and assignment to the Authority of amounts in the funds and accounts established under the General Ordinance. Upon a conveyance of all or substantially all of the assets of the System to the Authority, the General Ordinance provides that the provisions of the General Ordinance are to cease being enforceable against the City.

Amendments and Modifications*

In addition to the enactment of Supplemental Ordinances supplementing or amending the General Ordinance in connection with the issuance of successive Series of Bonds, the General Ordinance provides that the General Ordinance and any Supplemental Ordinance may be further supplemented, modified or amended: (a) to cure any ambiguity, formal defect or omission therein or to make such provisions in regard to matters or questions arising thereunder which shall not be inconsistent with the provisions thereof and which shall not adversely affect the interests of Bondholders; (b) to grant to or confer upon Bondholders, or a trustee, if any, for the benefit of Bondholders any additional rights, remedies, powers, authority, or security that may be lawfully granted or conferred; (c) to incorporate modifications requested by any Rating Agency to obtain or maintain a credit rating on any Series of Bonds; (d) to comply with any mandatory provision of state or federal law or with any permissive provision of such law or regulation which does not substantially impair the security or right to payment of the Bonds but no amendment or modification shall be made with respect to any Outstanding Bonds to alter the amount, rate or time of payment, respectively, of the principal thereof or the interest thereon or to alter the redemption provisions thereof without the written consent of the Holders of all affected Outstanding Bonds; and (e) except as aforesaid, in such other

* The provisions described under this heading will be amended upon the consent to the Springing Amendments of 67% of Holders of the outstanding Bonds. See APPENDIX III-B – "Twenty-First Supplemental Ordinance" attached to this Official Statement.

respect as may be authorized in writing by the Holders of 67% in principal amount or Original Value in the case of Capital Appreciation Bonds of the Bonds Outstanding and affected. In the case of a Credit Facility or Qualified Swap, if and to the extent provided in the Supplemental Ordinance and Determination of Bonds related thereto, the provider thereof may be the representative of the Bondholders of such Series or portion of such Series for purposes of Bondholder consent, approval or authorization. The written authorization of Bondholders of any supplement to or modification or amendment of the General Ordinance or any Supplemental Ordinance need not approve the particular form of any proposed supplement, modification or amendment but only the substance thereof. Bonds, the payment for which has been provided for upon the redemption thereof, are to be deemed to be not Outstanding.

Deposit of Funds for Payment of Bonds

When interest on, and principal or redemption price (as the case may be) of, all Bonds issued under the General Ordinance, and all amounts owed under any Credit Facility, Qualified Swap and Exchange Agreement entered into under the General Ordinance, have been paid, or there shall have been deposited with the Fiscal Agent or an entity which would qualify as a Fiscal Agent under the General Ordinance an amount, evidenced by moneys or Qualified Escrow Securities the principal of and interest on which, when due, will provide sufficient moneys to fully pay the Bonds at the maturity date or date fixed for redemption thereof, and all amounts owed under any Credit Facility, Qualified Swap and Exchange Agreement entered into under the General Ordinance, the pledge and grant of a security interest in the Project Revenues made under the General Ordinance shall cease and terminate, and the Fiscal Agent and any other depository of funds and accounts established under the General Ordinance shall turn over to the City or to such person, body or authority as may be entitled to receive the same all balances remaining in any such funds and accounts established under the General Ordinance.

If the City deposits with the Fiscal Agent or such other qualified entity moneys or Qualified Escrow Securities sufficient to pay the principal or redemption price of any particular Bond or Bonds becoming due, either at maturity or by call for redemption or otherwise, together with all interest accruing thereon to the due date, interest on the Bond or Bonds shall cease to accrue on the due date and all liability of the City with respect to such Bond or Bonds shall likewise cease, except as provided in the following paragraph. Thereafter such Bond or Bonds shall be deemed not to be outstanding under the General Ordinance and shall have recourse solely and exclusively to the funds so deposited for any claims of whatsoever nature with respect to such Bond or Bonds, and the Fiscal Agent or such other qualified entity shall hold such funds in trust for such Holder or Holders.

Moneys deposited with the Fiscal Agent or such other qualified entity pursuant to the preceding paragraphs which remain unclaimed two years after the date payment thereof becomes due shall, upon written request of the City, if the City is not at the time to the knowledge of the Fiscal Agent or such other qualified entity (the Fiscal Agent having no responsibility to independently investigate), in default with respect to any covenant in the General Ordinance or the Bonds contained, be paid to the City; and the Holders of the Bonds for which the deposit was made shall thereafter be limited to a claim against the City; provided, however, that before making any such payment to the City, the Fiscal Agent or such other qualified entity shall, at the expense of the City, publish in a newspaper of general circulation published in Philadelphia, Pennsylvania, a notice that said moneys remain unclaimed and that, after a date named in said notice, which date shall be not less than 30 days after the date of publication of such notice, the balance of such moneys then unclaimed will be paid to the City.

The provisions regarding the deposit of funds for the payment of Bonds stated above are not be construed to limit the procedure set forth in Section 10 of the Act for calculating the principal or redemption price of and interest on any Bonds for the purpose of ascertaining the sufficiency of revenues for the purpose of Sections 7(a)(5) and 8(a)(iii) of the Act and for the purpose of determining the outstanding net debt of the City if General Obligation Bonds of the City are refunded pursuant to the Act.

Maintenance of Tax Exempt Status of Bonds

No deposit of funds for the payment of bonds shall be made if, in the opinion of Bond Counsel, such action shall cause the interest on any Series of Bonds initially issued as tax exempt Bonds, to become subject to Federal income tax.

Nothing contained in the General Ordinance shall require any Series of Bonds to be structured so that interest on such Bonds will be excluded from income of the Holders thereof for the purpose of calculating Federal income tax; provided that the provisions contained in the General Ordinance are satisfied.

Interested Parties

The General Ordinance provides that nothing in the General Ordinance expressed or implied is intended or is to be construed to confer upon, or to give to, any person or corporation, other than the City, the Owners of the Bonds, the Fiscal Agent, each provider of a Credit Facility, and Qualified Swap, Standby Agreement and Remarketing Agreement, any right, remedy or claim under or by reason of the General Ordinance or any covenants, condition or stipulation thereof; and all the covenants, stipulations, promises and agreements in the General Ordinance contained by and on behalf of the City shall be for the sole and exclusive benefit of the City, the Fiscal Agent, the Owners of the Bonds, each provider of a Credit Facility, Qualified Swap, Standby Agreement and Remarketing Agreement.

Ordinances are Contracts With Bondholders

The General Ordinance and Supplemental Ordinances adopted pursuant to the General Ordinance are contracts with the Holders of all Bonds from time to time Outstanding thereunder and are enforceable in accordance with the provisions of the General Ordinance and the laws of Pennsylvania.

Effectiveness

The General Ordinance provides that it is to become effective as to the holders of Bonds only upon consent in writing of the owners of not less than 67% in principal amount of all Bonds outstanding at the time of such consent.

THE SEVENTEENTH SUPPLEMENTAL ORDINANCE

A portion of the Series 2018A Bonds will be issued under and are subject to the Seventeenth Supplemental Ordinance, which supplements the provisions of the General Ordinance. Reference is made below to the Seventeenth Supplemental Ordinance and the General Ordinance, which provide more complete details of the terms of the Series 2018A Bonds. All capitalized and defined terms used in the following summary of the Seventeenth Supplemental Ordinance which are not otherwise defined in this Official Statement are defined as in the General Ordinance.

The Seventeenth Supplemental Ordinance was enacted pursuant to the Act and constitutes a Supplemental Ordinance enacted for the purpose of authorizing one or more Series of Bonds within the meaning of the General Ordinance.

The Seventeenth Supplemental Ordinance authorizes the Bond Committee, on behalf of the City, to borrow, by the issuance and sale of one or more series or subseries of Bonds, a sum or sums which in aggregate principal amount shall not exceed $550,000,000, exclusive of original issue discount, and in the event such Bonds are issued with original issue discount, the Bond Committee is authorized to increase the aggregate principal amount of the Bonds so issued, by the amount of such original issue discount. In accordance with the General Ordinance, the Bond Committee shall approve final terms of the Series 2018A Bonds in the Bond Committee Determination (the "Determination") prior to, and as a condition of, the issuance of the Series 2018A Bonds. Such Determination shall be deemed a supplement to the Seventeenth Supplemental Ordinance.

The Bond Committee is authorized, on behalf of the City, to enter into agreements specified in the Determination (the "Enhancement Agreements") with any bank, insurance company or other appropriate entity providing credit enhancement or payment or liquidity sources (collectively a "Provider") for the account of the City for the Series 2018A Bonds, including, without limitation, letters of credit, liquidity and credit facilities and bond insurance. Such Enhancement Agreements may provide for payment of the principal or purchase price of, or interest on, the Series 2018A Bonds if the City does not pay the Series 2018A Bonds when due and may provide for repayment with interest to the Provider from the date of such payment.

The Seventeenth Supplemental Ordinance authorizes the Bond Committee or the Director of Finance, as appropriate, to make all such covenants and to take any and all such other actions on behalf of the City as may be necessary or appropriate in connection with the consummation of the transactions contemplated in the Seventeenth Supplemental Ordinance.

The Seventeenth Supplemental Ordinance provides that the Series 2018A Bonds shall be sold either at public competitive sale to the highest bidder or bidders or at a private negotiated sale, as the Bond Committee shall determine to be in the best interest of the City. The Bonds may be issued and sold in one or more Series or, as authorized by the General Ordinance and as specified by the Determination, in one or more subseries, each of which shall be deemed a Series for purposes of the General Ordinance and shall be designated by letter as a Series of Bonds of the year in which such Series is issued, at the same or different times, as taxable or tax-exempt bonds, and may include serial bonds, terms bonds, and Capital Appreciation Bonds, all as specified in the Determination.

The Seventeenth Supplemental Ordinance provides that the Series 2018A Bonds shall not pledge the credit or taxing power of the City, or create any debt, charge or lien against the tax, general revenues or property of the City other than the revenues pledged by the General Ordinance.

The Seventeenth Supplemental Ordinance provides that proceeds of the Series 2018A Bonds shall be used for: (a) constructing, acquiring, reconstructing and renovating wastewater treatment plants and related facilities and equipment for the sewer system; (b) constructing, acquiring, reconstructing and renovating water treatment plants and related facilities and equipment for the water system; (c) constructing, acquiring, reconstructing and replacing water, wastewater and stormwater pipes, pumping stations and related facilities; (d) purchasing equipment and apparatus of a capital nature for the water and wastewater systems; (e) constructing, acquiring, reconstructing and renovating stormwater management and mitigation improvements and facilities and other improvements and facilities in furtherance of the City's Combined Sewer Overflow (CSO) Long Term Control Plan Update (referred to as the Green City, Clean Waters Program) dated September 1, 2009, as permitted under the Act and the General Ordinance; and (f) purchasing vehicles that serve the water and wastewater system, all as included in capital budgets of the City; (g) paying any other Project Costs as such term is defined in the Act; (h) making the deposits referred to in Section 6 of the Seventeenth Supplemental Ordinance; and (i) paying the issuance costs of the Series 2018A Bonds.

As provided in the General Ordinance, accrued interest, if any, on the Series 2018A Bonds shall be deposited in the Sinking Fund. Remaining Series 2018A Bond proceeds shall be deposited first in the Debt Reserve Account in an amount equal to the Debt Reserve Requirement to the extent that such requirement is not satisfied in whole or in part by available funds of the City or by a surety bond, insurance policy or letter of credit in accordance with the General Ordinance; and all other Series 2018A Bond proceeds and other moneys currently on deposit under the General Ordinance, including current reserves and construction funds, shall be deposited or transferred as provided in a certificate of the Director of Finance.

The City covenants in the Seventeenth Supplemental Ordinance that, so long as any Series 2018A Bonds shall remain outstanding, it will make payments or cause payments to be made out of the Sinking Fund established pursuant to the General Ordinance or any of the other Water and Wastewater Funds available therefor, at such times and in such amounts as shall be sufficient for the payment of the interest on the Series 2018A Bonds and the principal thereof when due. Prior to enactment of the Seventeenth Supplemental Ordinance by City Council, an opinion of the City Solicitor was filed with the City Council pursuant to the Act.

The Seventeenth Supplemental Ordinance authorizes the Director of Finance and any other applicable City officer to make such additional covenants and to take such other action with respect to the use and investment of the proceeds of the Series 2018A Bonds as may be necessary or advisable in order that no Series 2018A Bonds shall be "arbitrage bonds" as defined in Section 148 of the Internal Revenue Code of 1986, as amended (the "Code"), that the City will comply with the requirements of Section 148 throughout the term of the Series 2018A Bonds as described in the Determination and in order to otherwise effect or maintain the exclusion of interest on the Series 2018A Bonds from gross income of the holders thereof for federal income tax purposes, and further to establish such sub-accounts within the Sinking Fund and terms or restrictions to permit issuance of the Series 2018A Bonds.

The Seventeenth Supplemental Ordinance authorizes the Director of Finance to execute and deliver a Continuing Disclosure Agreement (the "Continuing Disclosure Agreement") meeting the requirements of Rule 15c2-12 promulgated under Securities Exchange Act of 1934. The City covenants and agrees that it will comply with and carry out all of the provisions of the Continuing Disclosure Agreement.

THE EIGHTEENTH SUPPLEMENTAL ORDINANCE

A portion of the Series 2018A Bonds will be issued under and are subject to the Eighteenth Supplemental Ordinance, which supplements the provisions of the General Ordinance. Reference is made below to the Eighteenth Supplemental Ordinance and the General Ordinance, which provide more complete details of the terms of the Series 2018A Bonds. All capitalized and defined terms used in the following summary of the Eighteenth Supplemental Ordinance which are not otherwise defined in this Official Statement are defined as in the General Ordinance.

The Eighteenth Supplemental Ordinance was enacted pursuant to the Act and constitutes a Supplemental Ordinance enacted for the purpose of authorizing one or more Series of Bonds within the meaning of the General Ordinance.

The Eighteenth Supplemental Ordinance authorizes the Bond Committee on behalf of the City, to borrow, by the issuance and sale of one or more series or subseries of Bonds (the "New Money Bonds"), to be expended as provided in Section 4(a) of the Eighteenth Supplemental Ordinance, a sum or sums which in the aggregate principal amount shall not exceed $600,000,000, exclusive of original issue discount; and in the event the New Money Bonds are issued with original issue discount, the Bond Committee is authorized to increase the aggregate principal amount of the New Money Bonds so issued, by the amount of such original issue discount.

The Eighteenth Supplemental Ordinance authorizes the Bond Committee on behalf of the City to borrow, by the issuance and sale of one or more series or subseries of Water and Wastewater Revenue Refunding Bonds of the City (the "Refunding Bonds" and, together with the New Money Bonds, the "Bonds"), to be expended as provided in Section 4(b) of the Eighteenth Supplemental Ordinance, a sum or sums which in the aggregate principal amount shall not exceed the principal amount of Refunding Bonds as provided in Section 4(b) of the Eighteenth Supplemental Ordinance.

In accordance with the General Ordinance, the Bond Committee shall approve the final terms of the Bonds in one or more Determinations of the Bond Committee (each a "Determination") prior to, and as a condition of, the issuance of any series of Bonds. Any such Determination shall be deemed a supplement to the Eighteenth Supplemental Ordinance.

The Bond Committee is authorized on behalf of the City to enter into agreements specified in a Determination (the "Enhancement Agreements") with any bank, insurance company or other appropriate entity providing credit enhancement or payment or liquidity sources (collectively a "Provider") for the account of the City for any Series of Bonds, including, without limitation, letters of credit and bond insurance. Such Enhancement Agreements may provide for payment of the principal or purchase price of or interest on the Series 2018A Bonds if the City does not pay the Series 2018A Bonds when due and may provide for repayment with interest to the Provider from the date of such payment.

The Eighteenth Supplemental Ordinance authorizes the Bond Committee or the Director of Finance, as appropriate, to make all such covenants and to take any and all such other actions on behalf of the City as may be necessary or appropriate in connection with the consummation of the transactions contemplated in the Eighteenth Supplemental Ordinance.

The Eighteenth Supplemental Ordinance provides that the Series 2018A Bonds shall be sold either at public competitive sale to the highest bidder or bidders or at a private negotiated sale, as the Bond Committee shall determine to be in the best interest of the City. The Bonds may be sold in one or more Series or, as authorized by the General Ordinance and as specified by the Determination, in one or more subseries, each of which shall be deemed a Series for purposes of the General Ordinance and shall be designated by letter as a Series of Bonds of the year in which such Series is issued, and may include serial bonds, terms bonds, Capital Appreciation Bonds or derivative financial instruments as specified in the Determination.

The Eighteenth Supplemental Ordinance provides that the Series 2018A Bonds shall not pledge the credit or taxing power of the City, or create any debt, charge or lien against the tax, general revenues or property of the City other than the revenues pledged by the General Ordinance.

The Eighteenth Supplemental Ordinance provides that proceeds of the New Money Bonds shall be used for: (a) constructing, acquiring, reconstructing and renovating wastewater treatment plants and related facilities and equipment for the sewer system; (b) constructing, acquiring, reconstructing and renovating water treatment plants and related facilities and equipment for the water system; (c) constructing, acquiring, reconstructing and replacing water, wastewater and stormwater pipes, pumping stations and related facilities; (d) purchasing equipment and apparatus of a capital nature for the water and wastewater systems; (e) constructing, acquiring, reconstructing and renovating stormwater management and mitigation improvements and facilities and other improvements and facilities in furtherance of the City's Combined Sewer Overflow (CSO) Long Term Control Plan Update (referred to as the Green City, Clean Waters Program) dated September 1, 2009, as permitted under the Act and the General Ordinance; and (f) purchasing vehicles that serve the water and wastewater system, all as included in capital budgets of the City; (g) paying any other Project Costs as such term is defined in the Act; (h) making the deposits referred to in Section 6 of the Eighteenth Supplemental Ordinance; and (i) paying the issuance costs of the Bonds.

The Eighteenth Supplemental Ordinance provides that proceeds of the Refunding Bonds shall be used to: (a) refund and redeem, at any time, all or any portion of the New Money Bonds issued pursuant to the Eighteenth Supplemental Ordinance (the "Refunded Bonds"); (b) if applicable, pay the costs of Enhancement Agreements; (c) pay any other Project Costs as such term is defined in the Act; (d) make the deposits referred to in Section 6 of the Eighteenth Supplemental Ordinance and (e) pay the issuance costs of the Bonds.

No Series of Refunding Bonds will be issued under the Eighteenth Supplemental Ordinance unless: (1) The final maturity of such Series of Refunding Bonds shall not exceed the final maturity of the Refunded Bonds in respect of which such Refunding Bonds are being issued; and (2) Debt Service Requirements in each Fiscal Year for such Series of Refunding Bonds shall not exceed the Debt Service Requirements that would have been payable in such Fiscal Year for the Refunded Bonds in respect of which such Series of Refunding Bonds are being issued.

The aggregate principal amount of the Refunding Bonds shall not exceed the principal amount necessary to accomplish the refunding of the New Money Bonds, if any, as contemplated by, and subject to the financial conditions and other limitations set forth in, the Eighteenth Supplemental Ordinance, and as shall be determined by the Bond Committee and specified in the Determination.

As provided in the General Ordinance, accrued interest, if any, on the Series 2018A Bonds shall be deposited in the Sinking Fund. Remaining Series 2018A Bond proceeds shall be deposited first in the Debt Reserve Account in an amount equal to the Debt Reserve Requirement to the extent that such requirement is not satisfied in whole or in part by available funds of the City or by a surety bond, insurance policy or letter of credit in accordance with the General Ordinance; all other Series 2018A Bond proceeds and other moneys currently on deposit under the General Ordinance, including current reserves and construction funds, shall be deposited or transferred as provided in a certificate of the Director of Finance.

The City covenants in the Eighteenth Supplemental Ordinance that, so long as any Series 2018A Bonds shall remain outstanding, it will make payments or cause payments to be made out of the Sinking Fund established pursuant to the General Ordinance or any of the other Water and Wastewater funds available therefor, at such times and in such amounts as shall be sufficient for the payment of the interest (including the Qualified Swap payments if any) on the Series 2018A Bonds and the principal thereof when due.

Prior to enactment of the Eighteenth Supplemental Ordinance by City Council, an opinion of the City Solicitor was filed with the City Council pursuant to the Act.

The Eighteenth Supplemental Ordinance authorizes the Director of Finance and any other applicable City officer to make such additional covenants and to take such other action with respect to the use and investment of the proceeds of the Series 2018A Bonds as may be necessary or advisable in order that the Series 2018A Bonds shall not be "arbitrage bonds" as defined in Section 148 of the Internal Revenue Code of 1986, as amended (the "Code"), that the City will comply with the requirements of Section 148 throughout the term of the Series 2018A Bonds as described in the Determination and in order to otherwise effect or maintain the exclusion of interest on the Series 2018A Bonds from gross income of the holders thereof for federal income tax purposes, and further to establish such sub-accounts within the Sinking Fund and terms or restrictions to permit issuance of the Series 2018A Bonds.

The Eighteenth Supplemental Ordinance authorizes the Director of Finance to execute and deliver a Continuing Disclosure Agreement (the "Continuing Disclosure Agreement") meeting the requirements of Rule 15c2-12 promulgated under Securities Exchange Act of 1934. The City covenants and agrees that it will comply with and carry out all of the provisions of the Continuing Disclosure Agreement.

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APPENDIX III-B

TWENTY-FIRST SUPPLEMENTAL ORDINANCE

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City of Philadelphia

(Bill No. 171110-A)

AN ORDINANCE

Constituting the Twenty-First Supplemental Ordinance to the Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended and supplemented (the "General Ordinance"), providing for certain amendments to the General Ordinance under certain terms and conditions.

THE COUNCIL OF THE CITY OF PHILADELPHIA HEREBY ORDAINS:

SECTION 1. *Amendment of Section 2.01 of the General Ordinance*. Section 2.01 of the Restated General Water and Wastewater Revenue Bond Ordinance of 1989, as amended and supplemented (the "General Ordinance"), entitled *Definitions* is hereby amended, as follows.

(a) The defined term "Balloon Bonds" is added after "Act" as set forth below.

> "Balloon Bonds" means any Series of Bonds, or any portion of a Series of Bonds, designated by a Determination as Balloon Bonds, (a) 25% or more of the principal payments (including mandatory sinking fund payments) of which are due in a single year, or (b) 25% or more of the principal of which may, at the option of the holder or holders thereof, be redeemed at one time; provided, however that a Variable Rate Bond that is able to be redeemed at the option of the Holder shall not constitute a Balloon Bond.

(b) The definition of "Credit Facility" is restated in its entirety as set forth below.

> "Credit Facility" means any letter of credit, standby bond purchase agreement, line of credit, surety bond, insurance policy or other insurance commitment or similar agreement (other than a Qualified Swap or an Exchange Agreement) that is provided by a commercial bank, insurance company or other institution.

(c) The defined term “Debt Reserve Facility” is added after “Debt Reserve Account” as set forth below.

> “Debt Reserve Facility” has the meaning set forth in Section 4.09(e) hereof.

(d) The definition of “Debt Reserve Requirement” is restated in its entirety as set forth below.

> “Debt Reserve Requirement” means (i) with respect to all Bonds outstanding (regardless whether interest thereon may be excluded from the gross income of the holder thereof for federal income tax purposes) (a) whose Debt Service Requirements are payable from the Sinking Fund (i.e., excluding Subordinated Bonds) and (b) that are of a Series for which the City has not created a Series Debt Reserve Subaccount, an amount equal to the greatest amount of Debt Service Requirements on such Bonds payable in any one Fiscal Year (except that such Debt Service Requirements will be computed as if any Qualified Swap did not exist and the Debt Service Requirements attributable to any Variable Rate Bonds may be based upon the fixed rate of interest as set forth in the Supplemental Ordinance or Determination for such Bonds) determined as of any particular date, and (ii) with respect to the amount to be deposited in the Debt Reserve Account, pursuant to the first paragraph of Section 4.09 hereof, in connection with the issuance of such a Series of Bonds, the lesser of (x) the amount necessary to comply clause (i) and (y) the maximum amount permitted to be financed with proceeds of Bonds permitted by Section 148(d)(1) the Code (or any successor provision).

(e) The definition of “Debt Service Requirements” is restated in its entirety as set forth below.

> “Debt Service Requirements,” with reference to a specified period, means:
>
> A. amounts required to be paid into any mandatory sinking fund established for the benefit of Bonds during the period;

B. amounts needed to pay the principal or redemption price of Bonds maturing during the period and not to be redeemed at or prior to maturity through any sinking fund established for the Bonds;

C. interest payable on Bonds during the period, with adjustments for capitalized interest or redemption through any sinking fund established for the benefit of Bonds; and

D. all net amounts, if any, due and payable by the City under a Qualified Swap during such period.

For purposes of estimating Debt Service Requirements for any future period, (i) any Option Bond outstanding during such period shall be assumed to mature on the stated maturity date thereof, except that the principal amount of any Option Bond tendered for payment and cancellation before its stated maturity date shall be deemed to accrue on the date required for payment pursuant such tender; and (ii) Debt Service Requirements on Bonds for which the City has entered into a Qualified Swap shall be calculated assuming that the interest rate on such Bonds shall equal the stated fixed or variable rate on the Qualified Swap or, if applicable and if greater such stated rate, the applicable rate for any Bonds issued in connection with the Qualified Swap adjusted, the case of a variable rate obligation, as provided in Section 5.01 hereof. Calculation of Debt Service Requirements with respect to Variable Rate Bonds and Balloon Bonds shall be subject to adjustment as permitted by Section 5.01(c) hereof.

(f) The defined term “Kroll” is added after “Interim Debt” as set forth below.

“Kroll” means Kroll Bond Rating Agency, Inc. and any successor thereto.

(g) The definition of “Rating Agency” is restated in its entirety as set forth below.

“Rating Agency” means any rating service that has issued a credit rating on the Bonds which is in effect at the time in question or, upon discontinuance of any of such rating services, such other nationally recognized rating service or services if any such rating service has issued a credit rating on the Bonds at the request of the City and such credit rating is in effect at the time in question."

(h) The defined term "Series Debt Reserve Requirement" is added after "Series" as set forth below.

"Series Debt Reserve Requirement" means, for any Series of Bonds, the amount, if any, required pursuant to a Supplemental Ordinance or Determination to be reserved and (if such amount is greater than zero dollars ($0)) deposited or maintained in the Series Debt Reserve Subaccount established for such Series of Bonds; provided that such amount may equal zero dollars ($0); and provided further that such amount may not exceed the lesser of (i) the greatest amount of Debt Service Requirements payable on such Series of Bonds in any one Fiscal Year and (ii) the maximum amount permitted to be financed with proceeds of such Series of Bonds permitted by Section 148(d)(1) the Code (or any successor provision).

(i) The defined term "Series Debt Reserve Subaccount" is added after "Series Debt Reserve Requirement" as set forth below.

"Series Debt Reserve Subaccount" means any subaccount of the Debt Reserve Account created, pursuant to a Supplemental Ordinance or Determination for a particular Series of Bonds, which Series of Bonds will not otherwise be secured by the Debt Reserve Account and for which a Series Debt Reserve Requirement applies.

(j) The definition of "Substitute Credit Facility" is restated in its entirety as set forth below.

"Substitute Credit Facility" means any letter of credit, standby bond purchase agreement, line of credit, surety bond, insurance policy or other insurance commitment or similar agreement (other than a Qualified Swap or an Exchange Agreement) that replaces a Credit Facility and is provided by a commercial bank, insurance company or other financial institution."

SECTION 2. *Amendment of Section 4.09 of General Ordinance*. Section 4.09 of the General Ordinance is restated in its entirety as set forth below.

Section 4.09. *Debt Reserve Account*.

(a) Unless otherwise provided in the applicable Supplemental Ordinance in compliance with this Section 4.09, the City shall, under direction of the Director of Finance, deposit in the Debt Reserve Account from the proceeds of sale of each Series of Bonds issued hereunder, an amount which, when added to the existing balance in the Debt Reserve Account, will be equal to the Debt Reserve Requirement immediately after the issuance of such Series of Bonds. The money and investments in the Debt Reserve Account shall be held and maintained in an amount equal at all times to the Debt Reserve Requirement; provided that if the Supplemental Ordinance authorizing a Series of Bonds shall authorize the accumulation from Project Revenues of a reserve of such amount in respect of such Bonds over a period of not more than three (3) Fiscal Years after the issuance and delivery of such Bonds, then the full payment of the annual deposits required under such Supplemental Ordinance will meet the Debt Reserve Requirements of this Ordinance in respect of such Bonds.

(b) Notwithstanding any provision of subsection (a) of this Section 4.09 to the contrary, a Supplemental Ordinance may provide for the establishment of a Series Debt Reserve Requirement for each Series of Bonds issued pursuant to such Supplemental Ordinance, and a separate Series Debt Reserve Subaccount (if such Series Debt Reserve Requirement is greater than zero dollars ($0)) within the Debt Reserve Account in respect of such Series of Bonds. The City shall not designate a Series Debt Reserve Requirement for a Series of Bonds unless (i) such Series of Bonds will be refunding Bonds issued pursuant to Section 5.04(g) hereof, or (ii) the City first obtains written confirmation from any one Rating Agency then rating the Bonds that such action, in and of itself, will not result in a downgrade, suspension or withdrawal of the credit rating on any Bonds Outstanding hereunder. The City shall deposit in the Series Debt Reserve Subaccount created pursuant to any Supplemental Ordinance, the Series Debt Reserve Requirement for such Series of Bonds. The money and investments in each Series Debt Reserve Subaccount shall be held and maintained in an amount equal at all times to the Series Debt Reserve Requirement for such Series secured thereby, as provided in the Supplemental Ordinance authorizing such Series of Bonds. All amounts in each Series Debt Reserve Subaccount shall be available solely to secure and pay the Debt Service Requirements of the Bonds for which such subaccount was created pursuant to such Supplemental Ordinance; and the Holders of such Bonds shall otherwise have no interests in or rights to amounts in the Debt Reserve Account.

(c) If at any time and for any reason, the moneys in the Debt Service Account of the Sinking Fund shall be insufficient to pay, as and when due, the principal of (and premium, if any) or interest on any Bond or Bonds or other obligations payable from the Debt Service Account then due (including under Swap Agreements and Credit Facilities), the Fiscal Agent is hereby authorized and directed to withdraw from the Debt Reserve Account or, as applicable, any Series Debt Reserve Subaccount, and pay over the amount of such deficiency for deposit in the Debt Service Account to pay such obligations. If by reason of such withdrawal or for any other reason there shall be a deficiency in the Debt Reserve Account or a Series Debt Reserve Subaccount, the City hereby covenants to restore such deficiency promptly from Net Revenues; provided that in the event that there simultaneously shall be deficiencies in the Debt Reserve Account and one or more Series Debt Reserve Subaccounts, the City hereby covenants to restore such deficiencies from Net Revenues on a pari passu basis, based on the Debt Reserve Requirement and the Series Debt Reserve Requirement(s) outstanding; and provided further, that notwithstanding the preceding proviso, the Supplemental Ordinance or Determination pursuant to which a Series Debt Reserve Requirement is established may provide for the restoration of such a deficiency in the related Series Debt Reserve Subaccount from Net Revenues on a less than pari passu basis for the related Series of Bonds.

(d) (i) Subject to the provisions of Section 4.09(d)(ii) and Section 4.09(e), any moneys in the Debt Reserve Account or any Series Debt Reserve Subaccount in excess of, respectively, the Debt Reserve Requirement or the Series Debt Reserve Requirement, shall be transferred and applied, at the written direction of the City, to any of the following purposes:

(A) to the Debt Service Account, to pay the Debt Service Requirements on Bonds secured by such account or subaccount, including without limitation redemption price in connection with the optional redemption of any such Bonds; or

(B) to an escrow fund or account established to facilitate the payment of Bonds pursuant to Section 11.01 hereof, to pay the Debt Service Requirements on Bonds secured by such account or subaccount, including without limitation redemption price in connection with the optional redemption of any such Bonds; or

(C) if such moneys do not constitute tax-exempt bond proceeds, to the Residual Fund for the purposes thereof.

(ii) In connection with the issuance of refunding Bonds pursuant to Section 5.04(g) hereof, the City may transfer amounts from the Debt Reserve Account or a Series Debt Reserve Subaccount held by the Fiscal Agent in respect of the Bonds being refunded to the Debt Reserve Account or a Series Debt Reserve Subaccount to satisfy any debt reserve requirements in respect of such refunding Bonds.

(e) Notwithstanding the foregoing provisions, in lieu of the required deposits into the Debt Reserve Account or any Series Debt Reserve Subaccount thereof, the City may cause to be deposited therein a surety bond or an insurance policy payable to the Fiscal Agent for the account of the Bondholders and any Qualified Swap or an irrevocable letter of credit to be benefitted thereby in an amount equal to the difference between the Debt Reserve Requirement or the Series Debt Reserve Requirement and the remaining sums, if any, then on deposit in the Debt Reserve Account or Series Debt Reserve Subaccount. The surety bond, insurance policy or letter of credit (hereinafter referred to, collectively, as the "Debt Reserve Facility") shall be payable (upon the giving of notice as required thereunder) on any interest payment date on which moneys will be required to be withdrawn from the Debt Reserve Account or Series Debt Reserve Subaccount and applied to the payment of Debt Service Requirements of the Bonds secured thereby if such withdrawal cannot be met by amounts on deposit in the Debt Reserve Account or Series Debt Reserve Subaccount, or provided from any other Fund under this Ordinance.

If a disbursement is made pursuant to a surety bond, an insurance policy or a letter of credit provided pursuant to this subsection, the City shall be obligated either (i) to reinstate the maximum limits of the surety bond insurance policy or letter of credit or (ii) to deposit into the Debt Reserve Account or applicable Series Debt Reserve Subaccount, funds in the amount of the disbursement made under such surety bond insurance policy or letter of credit, or combination of such alternatives, as shall provide that the amount in the Debt Reserve Account or applicable Series Debt Reserve Subaccount equals the Debt Reserve Requirement or the Series Debt Reserve Requirement within a time period not longer than would be required to restore the Debt Reserve Account or the Series Debt Reserve Requirement by operation of this Section 4.09 and from the same source of funds as provided herein.

The insurer providing a surety bond or insurance policy pursuant to this subsection (e) shall be an insurer whose municipal bond insurance policies insuring the payment, when due, of the principal of and interest on municipal bond issues results in such issues being rated in not lower than the "A" category (without regard to gradations) by any one Rating Agency. The letter of credit issuer providing a letter of credit pursuant to this subsection (e) shall be a bank or trust company that is rated not lower than the "A" category (without regard to gradations) by any one Rating Agency; and the letter of credit itself shall be rated in at least "A" category of such Rating Agency. Upon the occurrence of any reduction or suspension of any credit rating with respect to such bond insurance policy or letter of credit or the provider thereof) required by this Section 4.09, the City shall so notify the provider of the surety, bond insurance policy or letter of credit and prior to the effective date of any cancellation of such surety, bond insurance policy or letter of credit, shall either provide a substitute surety bond, insurance policy or letter of credit rating requirements of this Section 4.09 or shall deposit cash in the Debt Reserve Account or applicable Series Debt Reserve Subaccount so that the amount in such account or subaccount shall equal the Debt Reserve Requirement or Series Debt Reserve Requirement, respectively.

In the event that after the City has deposited cash as required in connection with a Debt Reserve Facility rating reduction or suspension, but prior to any cancellation thereof, such Debt Reserve Facility meets the rating criteria set forth in this subsection for deposit, no excess of the Debt Reserve Requirement shall result for purposes of Section 4.09(d) hereof.

SECTION 3. *Amendment of Section 5.01 of General Ordinance.* Section 5.01 of the General Ordinance is restated in its entirety as set forth below.

Section 5.01. *Rate Covenant.*

(a) The City covenants with the Bondholders that it will, at a minimum, impose, charge and collect in each Fiscal Year such water and wastewater rents, rates, fees and charges as shall yield Net Revenues which shall be equal to at least:

(i) 1.20 times the Debt Service Requirements for such Fiscal Year (excluding Debt Service Requirements in respect of Subordinated Bonds); and

(ii) 0.90 times Debt Service Requirements for such Fiscal Year (excluding Debt Service Requirements in respect of Subordinated Bonds); provided that, for purposes of this clause (ii), Net Revenues shall be calculated to exclude therefrom any amounts transferred from the Rate Stabilization Fund to the Revenue Fund in, or as of the end of, such Fiscal Year; and

(iii) 1.00 times (A) the Debt Service Requirements for such Fiscal Year (including Debt Service Requirements in respect of Subordinated Bonds); (B) amounts required to be deposited into the Debt Reserve Account during such Fiscal Year; (C) the principal or redemption price of and interest on General Obligation Bonds payable during such Fiscal Year; (D) debt service requirements on Interim Debt payable during such Fiscal Year; and (E) the Capital Account Deposit Amount for such Fiscal Year (less any amounts transferred from the Residual Fund to the Capital Account during such Fiscal Year).

(b) In estimating Debt Service Requirements on any Interim Debt for the purposes of projecting compliance with this Section, the City shall be entitled to assume that (i) such Interim Debt will be amortized over a period of up to the maximum term permitted by the Act, provided, however, such period shall not be in excess of the useful life of the assets to be financed, on an approximately level debt service basis and bear interest at the average interest rate on bonds of a similar maturity and credit rating (without any credit enhancement) as the Bonds outstanding under this Ordinance. Promptly upon ·any material change in the circumstances which were contemplated at the time such rents, rates, fees and charges were most recently reviewed, but not less frequently than once in each Fiscal Year, the City shall review the rents, rates, fees and charges as necessary to enable the City to comply with the foregoing requirements; provided that such rents, rates, fees and charges shall in any event produce moneys sufficient to enable the City to comply with its covenants in this Ordinance.

(c) In estimating Debt Service Requirements on any Variable Rate Bonds for purposes of projecting compliance with this Section or funding the Reserve Account, the City shall be entitled to assume that such Variable Rate Bonds will bear interest at a rate equal to (i) the average interest rate on the Variable Rate Bonds during the period of twenty-four (24) consecutive calendar months preceding the date of calculation or (ii) if the Variable Rate Bonds were not Outstanding during the entire twenty-four (24) month period, the average interest rate on the Variable Rate Bonds since their date of issue or (iii) such other rate as may be specified in a Supplemental Ordinance or Determination.

(d) The City represents that it has, by its Code of General Ordinances, as amended, authorized the imposition of rents, rates, fees and charges by the Water Department sufficient from time to time to comply with the Rate Covenant and covenants with the Holders of Bonds that it will not repeal or materially adversely dilute or impair such authorization.

SECTION 4. *Amendment of Section 5.01(c) of General Ordinance*. Section 5.01 of the General Ordinance is further amended by restating subsection (c) thereof in its entirety as set forth below.

(c)(i) In the event that any Bonds Outstanding are, or any proposed Series of Bonds are to be, Balloon Bonds, then Debt Service Requirements on such Balloon Bonds shall be calculated for purposes of projecting compliance with this Section and Section 5.04, or for purposes of determining the Debt Reserve Requirement or Series Debt Reserve Requirement (as applicable) for a particular Series of Balloon Bonds, whether for any period prior to or after the date of calculation, as follows.

(A) If such Balloon Bonds are not Capital Appreciation Bonds, then, for purposes of determining Debt Service Requirements, each maturity that constitutes Balloon Bonds shall, unless otherwise provided in a Supplemental Ordinance under which such Balloon Bonds are issued, be treated as if it were to be amortized over a period of no more than 30 years and with substantially level annual debt service funding payments commencing not later than the year following the year in which such Balloon Bonds were issued, and extending not later than the stated or deemed, as the case may be, final maturity of such Balloon Bonds, but in no event later than 30 years from the date such Balloon Bonds were originally issued; and the interest rate used for such computation shall be that rate quoted in The Bond Buyer 25 Revenue Bond Index, or its successor or replacement index, for the last week of the month preceding the date of calculation as published by *The Bond Buyer,* or if that index is no longer published, another similar index designated in a Determination, or if a Determination fails to select a replacement index, that rate determined by a banking institution or an investment banking institution as the interest rate or rates at which the City could reasonably expect to borrow by incurring indebtedness with the same term as assumed above, with no credit enhancement and taking into consideration whether such Bonds bear interest which is or is not excluded from gross income for federal income tax purposes; with respect to any Bonds only a portion of which constitutes Balloon Bonds, the remaining portion shall be treated as described in such other provision of the definition of Debt Service Requirements as shall be applicable and, with respect to any Bonds or that portion of a series thereof which constitutes Balloon Bonds, all Debt Service Requirements becoming due prior to the year of the stated maturity of the Balloon Bonds shall be treated as described in such other provision of Debt Service Requirements as shall be applicable; and

(B) If such Balloon Bonds are Capital Appreciation Bonds, by assuming that the Accreted Value of such Bonds for purposes of determining Debt Service Requirements, each maturity that constitutes Balloon Bonds shall, unless otherwise provided in a Supplemental Ordinance under which such Balloon Bonds are issued, be treated as if it were to be amortized over a period of no more than 30 years and with substantially level annual debt service funding payments commencing not later than the year following the year in which such Balloon Bonds were issued, and extending not later than the stated or deemed, as the case may be, final maturity of such Balloon Bonds, but in no event later than 30 years from the date such Balloon Bonds were originally issued; and the interest rate used for such computation shall be that rate quoted in The Bond Buyer 25 Revenue Bond Index, or its successor or replacement index, for the last week of the month preceding the date of calculation as published by *The Bond Buyer*, or if that index is no longer published, another similar index designated in a Determination, or if a Determination fails to select a replacement index, that rate determined by a banking institution or an investment banking institution as the interest rate or rates at which the City could reasonably expect to borrow by incurring indebtedness with the same term as assumed above, with no credit enhancement and taking into consideration whether such Bonds bear interest which is or is not excluded from gross income for federal income tax purposes; with respect to any Bonds only a portion of which constitutes Balloon Bonds, the remaining portion shall be treated as described in such other provision of the definition of Debt Service Requirements as shall be applicable and, with respect to any Bonds or that portion of a series thereof which constitutes Balloon Bonds, all Debt Service Requirements becoming due prior to the year of the stated maturity of the Balloon Bonds shall be treated as described in such other provision of Debt Service Requirements as shall be applicable.

(ii) In estimating Debt Service Requirements on any Variable Rate Bonds for purposes of projecting compliance with this Section or funding the Reserve Account, the City shall be entitled to assume that such Variable Rate Bonds will bear interest at a rate equal to (A) the average interest rate on the Variable Rate Bonds during the period of twenty-four (24) consecutive calendar months preceding the date of calculation or (B) if the Variable Rate Bonds were not Outstanding during the entire twenty-four (24) month period, the average interest rate on the Variable Rate Bonds since their date of issue or (C) such other rate as may be specified in a Supplemental Ordinance or Determination.

SECTION 5. *Amendment of Section 10.01 of General Ordinance*. Section 10.01 of the General Ordinance is restated in its entirety as set forth below.

Section 10.01. *Amendments and Modifications.* In addition to the enactment of Supplemental Ordinances supplementing or amending this Ordinance in connection with the issuance of successive Series of Bonds, this Ordinance and any Supplemental Ordinance may be further supplemented, modified or amended: (a) to cure any ambiguity, formal defect or omission herein or therein or to make such provisions in regard to matters or questions arising hereunder or thereunder which shall not be inconsistent with the provisions hereof or thereof and which shall not adversely affect the interests of Bondholders; (b) to grant to or confer upon Bondholders, or a trustee, if any, for the benefit of Bondholders any additional rights, remedies, powers, authority, or security that may be lawfully granted or conferred; (c) to incorporate modifications requested by any Rating Agency or Credit Facility provider to obtain or maintain a credit rating on any Series of Bonds; (d) to comply with any mandatory provision of state or federal law or with any permissive provision of such law or regulation which does not substantially impair the security or right to payment of the Bonds; provided however that no amendment or modification discussed in parts (a)-(d) of this Section 10.01 shall be made with respect to any Outstanding Bonds to alter the amount, rate or time of payment, respectively, of the principal thereof or the interest thereon or to alter the redemption provisions thereof without the written consent of the Holders of all affected Outstanding Bonds; and (e) except as aforesaid, in such other respect as may be authorized in writing by the Holders of a majority in principal amount or Original Value in the case of Capital Appreciation Bonds of the Bonds Outstanding and affected. In the case of a Credit Facility, Standby Agreement or Qualified Swap, if and to the extent provided in the Supplemental Ordinance and Determination of Bonds related thereto, the provider thereof may be the representative of the Bondholders of such Series or portion of such Series for purposes of Bondholder consent, approval or authorization. The written authorization of Bondholders of any supplement to or modification or amendment of this Ordinance or any Supplemental Ordinance need not approve the particular form of any proposed supplement, modification or amendment but only the substance thereof. Bonds, the payment for which has been provided for in accordance with Section 6.04 hereof, shall be deemed to be not Outstanding.

SECTION 6. *Other Elections Under the General Ordinance*. The Bond Committee is authorized on behalf of the City, without any further action by City Council, to make any and all additional elections under the General Ordinance as it shall determine to be in the best interest of the City as and when it shall deem such elections to be appropriate.

SECTION 7. *Effect of Ordinance*. This Ordinance is amendatory and supplementary to the General Ordinance and all sections of the General Ordinance and the Act not inconsistent herewith shall remain effective. All definitions of terms contained in the General Ordinance shall apply to such terms in this Ordinance, except to the extent they are amended by this Ordinance. No further action of City Council is necessary for this Ordinance to become effective. Sections 1(c), 1(d) and 1(f), Section 3 and Section 7 shall become effective immediately. Notwithstanding Section 8, the amendments set forth in Sections 1 through 5 (except Sections 1(c), 1(d) and 1(f) and Section 3) shall become effective upon the consent of the Holders of at least sixty- seven percent (67%) of the Outstanding Bonds (the "67% Effective Date"). The City, through the Director of Finance, shall publish notice of the 67% Effective Date to all Holders upon the occurrence of the consent of at least sixty-seven percent (67%) of the Outstanding Bonds. Publication through the Electronic Municipal Market Access System (EMMA) or such other nationally recognized municipal securities information repository shall constitute an acceptable mode of publication.

SECTION 8. *Effective Date*. Subject to the provisions of Section 7, this Ordinance shall take effect immediately.

City of Philadelphia

CERTIFICATION: This is a true and correct copy of the original Bill, Passed by the City Council on April 12, 2018. The Bill was Signed by the Mayor on April 24, 2018.

Michael A. Decker

Michael A. Decker
Chief Clerk of the City Council

APPENDIX IV

GOVERNMENT AND FINANCIAL INFORMATION OF THE CITY OF PHILADELPHIA

The Bonds are payable solely from Project Revenues and monies deposited in the water and wastewater funds. The Bonds are special obligations of the City and do not pledge the full faith, credit or taxing power of the City, or create any debt or charge against the tax or general revenues of the City, or create any lien or charge against any property of the City other than against the Project Revenues and amounts, if any, at any time on deposit in the water and wastewater funds. This APPENDIX IV is included for purposes of providing general financial information regarding the City.

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OVERVIEW

The City of Philadelphia (the "City" or "Philadelphia"), located along the southeastern border of the Commonwealth of Pennsylvania (the "Commonwealth" or "Pennsylvania"), is the largest city in the Commonwealth and the sixth largest city in the United States with approximately 1.58 million residents (based on 2017 estimates). The 2000 and 2010 U.S. Census reflect the City's first population gain in 60 years. Philadelphia's population has increased by 119,428 residents from 2006 – 2016, or by 8.25%. The City is also the center of the United States' eighth largest metropolitan statistical area, which is an 11-county area encompassing the City, Camden, NJ, and Wilmington, DE and represents approximately 6.1 million residents (based on 2017 estimates).

The City benefits from its strategic geographical location, relative affordability, cultural and recreational amenities, and its growing strength in key industries. The City's economy is composed of diverse industries, with virtually all classes of industrial and commercial businesses represented. The City is a major regional business and personal services center with strengths in insurance, law, finance, healthcare, higher education, utilities, and the arts. In addition, the City is a center for health, education, research and science facilities with the nation's largest concentration of healthcare resources within a 100-mile radius.

The cost of living in the City is relatively moderate and affordable compared to other major metropolitan areas in the northeast United States. The City, as one of the country's education centers, offers the business community a large and diverse labor pool that draws from major universities including, within the geographical boundaries of the City, the University of Pennsylvania, Temple University, Drexel University, St. Joseph's University, and LaSalle University, among others.

Fiscal Challenges

Despite population growth and the other favorable characteristics summarized above, the City continues to face certain significant ongoing structural fiscal challenges, which are described in detail in the Twenty-Seventh Five-Year Plan (as defined herein) and briefly summarized below.

Low General Fund Reserves: In its Fiscal Year 2019 Adopted Budget, the City projected that Fiscal Year 2018 would end with a General Fund balance of $228.5 million, which would result in a projected year-end General Fund balance of $139.5 million for Fiscal Year 2019, or 3.0% of projected expenditures. The City's target for the General Fund balance is 6-8% of expenditures. In the FY 2018 AFR (Unaudited) (as defined herein), the City reported that Fiscal Year 2018 ended with a General Fund balance of $368.8 million (unaudited).

Over the course of the Twenty-Seventh Five-Year Plan, projected increases in costs without matching projected increases in revenue are projected to deplete further the City's fund balances. Such low balances put the City in jeopardy of not having the financial flexibility to respond to any unexpected reductions in revenues or increases in costs without having to make significant cuts.

For more information on the City's historical financial operations and the City's projected General Fund balances for Fiscal Years 2019-2023, see "DISCUSSION OF FINANCIAL OPERATIONS" and Tables 1 and 2 (and the text following Table 2) herein. For a summary of certain key financial results from the FY 2019 First Quarter QCMR (as defined herein), including an updated projection in the General Fund balance for Fiscal Year 2019, see "DISCUSSION OF FINANCIAL OPERATIONS – Current Financial Information – FY 2019 First Quarter QCMR."

Federal and State Budget Reserve: To mitigate against potential state and federal cuts in funds provided to the City, the Fiscal Year 2019 Adopted Budget (as defined herein) sets aside $54.6 million in a reserve. The Twenty-Seventh Five-Year Plan continues funding such a reserve through Fiscal Year 2023. Although this reserve would help to offset any such cuts, it represents only a small fraction of what the City projects to receive in grants from the state and federal governments in Fiscal Year 2019. Accordingly, if potential cuts were to exceed the amount in the reserve, it could require the City to make difficult decisions about what to continue funding. If potential cuts in any Fiscal Year (as defined herein) were less than the reserve amount established for such year, the difference would increase the General Fund balance at the end of such year unless the City uses the funds in the reserves for other purposes.

Weak Tax Base: Approximately three-quarters of the City's revenues come from local taxes and the largest portion of these tax revenues, 46.1% (Fiscal Year 2019 projection), comes from the Wage and Earnings Tax (see Table 3 and "REVENUES OF THE CITY – Wage, Earnings, and Net Profits Taxes" herein). The City's 25.7% poverty rate, the highest of the 10 most populous U.S. cities, leads to a relatively weak tax base. The high poverty rate also creates stronger demand for public services.

High Tax Burden: The City's weak tax base results in higher tax rates to generate the same amount of revenue as cities that have stronger tax bases. Approximately three-quarters of the City's General Fund revenues come from taxes, and more than 85% (87.0% is Fiscal Year 2019 projection) of tax revenues come from just four taxes: Wage and Earnings Taxes, Real Estate Taxes, Business Income and Receipts Taxes ("BIRT"), and real property transfer taxes. The City remains unique among the nation's largest cities in that it imposes a tax on both corporate profits and revenue through the BIRT, which is projected to generate over 12% of the City's local tax revenue in Fiscal Year 2019. See "REVENUES OF THE CITY" and Table 3 herein.

High Fixed Legacy Costs: The City's high fixed legacy costs consume a significant portion of the City's budget. The largest of such costs is the City's payment to the Municipal Pension Fund. Pension costs are budgeted to consume more than 15% of the Fiscal Year 2019 Adopted Budget, with a City pension contribution of more than $700 million (across all funds). Even with such large payments, the Municipal Pension Fund is under 50% funded. See "PENSION SYSTEM" herein.

City Control of the School District: As of July 1, 2018, the School District of Philadelphia (the "School District") is governed by a Board of Education, with all members thereof appointed by the Mayor. In the Fiscal Year 2019 Adopted Budget, the City's direct contribution to the School District from the General Fund is $180.9 million in Fiscal Year 2019, an amount $76.5 million higher than the unaudited actual amount for Fiscal Year 2018 ($104.3 million). Such increase in the direct contribution to the School District from the General Fund is the largest single increase in spending in the Fiscal Year 2019 Adopted Budget. It will be funded by the General Fund with a portion of the increase being generated by tax rate changes in the Fiscal Year 2019 Adopted Budget (an increase to the real estate transfer tax and a slowing of planned reductions in the wage tax).

For more information on the School District, see "THE GOVERNMENT OF THE CITY OF PHILADELPHIA – Local Government Agencies – Mayoral-Appointed or Nominated Agencies – The School District" and "EXPENDITURES OF THE CITY – City Payments to School District" and Table 21 herein.

In addition to the ongoing structural challenges described above, the City faces several near-term fiscal uncertainties, such as (i) continued increases in pension costs, (ii) the possibility of an economic downturn, (iii) uncertainties related to how the recent amendments to the federal tax code may impact the

City's economy (such as the limits placed on the state and local tax deduction, among others), and (iv) possible decreases in federal and state spending.

This "OVERVIEW" is intended to highlight certain of the structural challenges and fiscal uncertainties facing the City. The reader is cautioned to review with care the more detailed information presented in this APPENDIX IV.

THE GOVERNMENT OF THE CITY OF PHILADELPHIA

Introduction

As noted above, the City is the largest city in the Commonwealth, the sixth largest city in the United States, and the center of the United States' eighth largest metropolitan statistical area. The City benefits from its strategic geographical location, relative affordability, cultural and recreational amenities, and its growing strength in key industries.

As one of the country's education centers, the City offers the business community a large and diverse labor pool. The University of Pennsylvania, Temple University, Drexel University, St. Joseph's University, La Salle University, and Community College of Philadelphia are certain of the well-known institutions of higher education located in the City. There are also a number of other well-known colleges and universities located near the City, notably including Villanova University, Bryn Mawr College, Haverford College, Swarthmore College, Lincoln University, and the Camden Campus of Rutgers University, among others.

The City is a center for health, education, research and science facilities. In the City, there are more than 30 hospitals, including the Children's Hospital of Philadelphia, Hospital of the University of Pennsylvania, Hahnemann University Hospital, Einstein Medical Center-Philadelphia, Temple University Hospital, and Thomas Jefferson University Hospital and Jefferson Health, among others, and schools of medicine, dentistry, pharmacy, optometry, podiatry, and veterinary medicine.

Tourism is important to the City and is driven by the City's extraordinary historic and cultural assets. The City's Historic District includes Independence Hall, the Liberty Bell, Carpenters' Hall, the Betsy Ross House, and Elfreth's Alley, the nation's oldest residential street. The Parkway District includes the Philadelphia Museum of Art, the Barnes Foundation, and the Rodin Museum. The Avenue of the Arts, located along a mile-long section of South Broad Street between City Hall and Washington Avenue, includes the Kimmel Center, the Academy of Music, and other performing arts venues. All of the foregoing are key tourist attractions in the City.

For more information on the City's demographic and economic resources and economic development initiatives, see APPENDIX V hereto.

History and Organization

The City was incorporated in 1789 by an Act of the General Assembly of the Commonwealth (the "General Assembly") (predecessors of the City under charters granted by William Penn in his capacity as proprietor of the colony of Pennsylvania may date to as early as 1682). In 1854, the General Assembly, by an act commonly referred to as the Consolidation Act: (i) made the City's boundaries coterminous with the boundaries of Philadelphia County (the same boundaries that exist today) (the "County"); (ii) abolished all governments within these boundaries other than the City and the County; and (iii) consolidated the legislative functions of the City and the County. Article 9, Section 13 of the

Pennsylvania Constitution abolished all county offices in the City, provides that the City performs all functions of county government, and states that laws applicable to counties apply to the City.

Since 1952, the City has been governed under a Home Rule Charter authorized by the General Assembly (First Class City Home Rule Act, Act of April 21, 1949, P.L. 665, Section 17) and adopted by the voters of the City (as amended and supplemented, the "City Charter"). The City Charter provides, among other things, for the election, organization, powers and duties of the legislative branch (the "City Council") and the executive and administrative branch, as well as the basic rules governing the City's fiscal and budgetary matters, contracts, procurement, property, and records. Under Article XII of the City Charter, the School District operates as a separate and independent home rule school district. Certain other constitutional provisions and Commonwealth statutes continue to govern various aspects of the City's affairs, notwithstanding the broad grant of powers of local self-government in relation to municipal functions set forth in the First Class City Home Rule Act.

Under the City Charter, there are two principal governmental entities in the City: (i) the City, which performs municipal and county functions; and (ii) the School District, which has boundaries coterminous with the City and responsibility for all public primary and secondary education.

The court system in the City, consisting of Common Pleas and Municipal Courts, is part of the Commonwealth judicial system. Although judges are paid by the Commonwealth, most other court costs are paid by the City, with partial reimbursement from the Commonwealth.

Elected and Appointed Officials

The Mayor is elected for a term of four years and is eligible to be elected for no more than two successive terms. Each of the seventeen members of City Council is also elected for a four-year term, which runs concurrently with that of the Mayor. There is no limitation on the number of terms that may be served by members of City Council. Of the members of City Council, ten are elected from districts and seven are elected at-large. No more than five of the seven at-large candidates for City Council may be nominated by any one party or political body. The District Attorney and the City Controller are elected at the mid-point of the terms of the Mayor and City Council.

The City Controller's responsibilities derive from the City Charter, various City ordinances and state and federal statutes, and contractual arrangements with auditees. The City Controller must follow Generally Accepted Government Auditing Standards, established by the federal Government Accountability Office (formerly known as the General Accounting Office), and Generally Accepted Auditing Standards, promulgated by the American Institute of Certified Public Accountants.

The City Controller post-audits and reports on the City's and the School District's Comprehensive Annual Financial Reports ("CAFRs"), federal assistance received by the City, and the performance of City departments. The City Controller also conducts a pre-audit program of City expenditure documents required to be submitted for approval, such as invoices, payment vouchers, purchase orders and contracts. Documents are selected for audit by category and statistical basis. The Pre-Audit Division verifies that expenditures are authorized and accurate in accordance with the City Charter and other pertinent legal and contractual requirements before any moneys are paid by the City Treasurer. The Pre-Audit Technical Unit, consisting of auditing and engineering staff, inspects and audits capital project design, construction and related expenditures. Other responsibilities of the City Controller include investigation of allegations of fraud, preparation of economic reports, certification of the City's debt capacity and the capital nature and useful life of the capital projects, and opining to the Pennsylvania

Intergovernmental Cooperation Authority ("PICA") on the reasonableness of the assumptions and estimates in the City's five-year financial plans.

Under the City Charter, the principal officers of the City's government are the Managing Director of the City (the "Managing Director"), the Director of Finance of the City (the "Director of Finance"), the City Solicitor (the "City Solicitor"), the Director of Commerce (the "Director of Commerce"), the City Representative (the "City Representative"), and the Director of Planning and Development (the "Director of Planning and Development"). Under the City Charter, the Mayor appoints the Managing Director, the Director of Finance, the Director of Commerce, the City Representative, and the Director of Planning and Development. The Mayor, with the advice and consent of a majority of City Council, also appoints the City Solicitor.

The Managing Director, in coordination with the senior officials of City departments and agencies, is responsible for supervising the operating departments and agencies of the City that render the City's various municipal services. The Director of Commerce is charged with the responsibility of promoting and developing commerce and industry. The City Representative is the Ceremonial Representative of the City and especially of the Mayor. The City Representative is charged with the responsibility of giving wide publicity to any items of interest reflecting the activities of the City and its inhabitants, and for the marketing and promotion of the image of the City. The Director of Planning and Development oversees the Department of Planning and Development, which includes three divisions: (i) the Division of Development Services; (ii) the Division of Planning and Zoning; and (iii) the Division of Housing and Community Development.

The City Solicitor is head of the Law Department and acts as legal advisor to the Mayor, City Council, and all of the agencies of the City government. The City Solicitor is also responsible for: (i) advising on legal matters pertaining to all of the City's contracts and bonds; (ii) assisting City Council, the Mayor, and City agencies in the preparation of ordinances for introduction in City Council; and (iii) conducting litigation involving the City.

The Director of Finance is the chief financial and budget officer of the City and is selected from three names submitted to the Mayor by a Finance Panel, which is established pursuant to the City Charter and is comprised of the President of the Philadelphia Clearing House Association, the Chairman of the Philadelphia Chapter of the Pennsylvania Institute of Certified Public Accountants, and the Dean of the Wharton School of Finance and Commerce of the University of Pennsylvania. Under Mayor Kenney's administration, the Director of Finance is responsible for the financial functions of the City, including: (i) development of the annual operating budget, the capital budget, and capital program; (ii) the City's program for temporary and long-term borrowing; (iii) supervision of the operating budget's execution; (iv) the collection of revenues through the Department of Revenue; (v) the oversight of pension administration as Chairperson of the Board of Pensions and Retirement; and (vi) the supervision of the Office of Property Assessment. The Director of Finance is also responsible for the appointment and supervision of the City Treasurer, whose office manages the City's debt program and serves as the disbursing agent for the distribution of checks and electronic payments from the City Treasury and the management of cash resources.

The following are brief biographies of Mayor Kenney, his Chief of Staff, the Director of Finance, and the City Treasurer.

James F. Kenney, Mayor. On November 3, 2015, James F. Kenney was elected as the City's 99th Mayor and was sworn into office on January 4, 2016. Mayor Kenney is a lifelong resident of the

City and a graduate of La Salle University. In 1991, Mayor Kenney was elected to serve as a Democratic City Councilman At-Large and was a member of City Council for 23 years.

James Engler, Chief of Staff. Mr. Engler was appointed Chief of Staff effective August 10, 2018. Prior to that, Mr. Engler served as Deputy Mayor for Policy and Legislation since January 2016. In that role, Mr. Engler served as a senior liaison between the Mayor's Office and City Council and was responsible for developing administration policy priorities and working with stakeholders inside and outside of government to advance those goals.

Rob Dubow, Director of Finance. Mr. Dubow has served as Director of Finance since being appointed on January 7, 2008. Prior to that appointment, Mr. Dubow was the Executive Director of PICA. He has also served as Executive Deputy Budget Secretary of the Commonwealth, from 2004 to 2005, and as Budget Director for the City, from 2000 to 2004.

Rasheia Johnson, City Treasurer. Ms. Johnson was appointed as City Treasurer on January 19, 2016. Ms. Johnson has over 15 years of experience in government and public finance. In public finance, she has worked in the capacities of investment banker, financial advisor, and issuer officer, including positions at Siebert Brandford Shank, Loop Capital Markets, and Public Financial Management, and as Assistant to the Director of Finance for Debt Management for the City.

Government Services

Municipal services provided by the City include: (i) police and fire protection; (ii) health care; (iii) certain welfare programs; (iv) construction and maintenance of local streets, highways, and bridges; (v) trash collection, disposal and recycling; (vi) provision for recreational programs and facilities; (vii) maintenance and operation of the water and wastewater systems (the "Water and Wastewater Systems"); (viii) acquisition and maintenance of City real and personal property, including vehicles; (ix) maintenance of building codes and regulation of licenses and permits; (x) maintenance of records; (xi) collection of taxes and revenues; (xii) purchase of supplies and equipment; (xiii) construction and maintenance of airport facilities (the "Airport System"); and (xiv) maintenance of a prison system. The City maintains enterprise funds – the Water Fund and the Aviation Fund – for each of the Water and Wastewater Systems and the Airport System. For information on the Water and Wastewater Systems, see APPENDIX V – "KEY CITY-RELATED SERVICES AND BUSINESSES – Water and Wastewater." For information on the Airport System, see APPENDIX V – "TRANSPORTATION – Airport System."

The City owns the assets that comprise the Philadelphia Gas Works ("PGW" or the "Gas Works"). PGW serves residential, commercial, and industrial customers in the City. PGW is operated by Philadelphia Facilities Management Corporation ("PFMC"), a non-profit corporation specifically organized to manage and operate PGW for the benefit of the City. For more information on PGW, see "PGW PENSION PLAN," "PGW OTHER POST-EMPLOYMENT BENEFITS," "EXPENDITURES OF THE CITY – PGW Annual Payments," and "LITIGATION – PGW," among others.

Local Government Agencies

There are a number of governmental authorities and quasi-governmental non-profit corporations that also provide services within the City. Certain of these entities are comprised of governing boards, the members of which are either appointed or nominated, in whole or part, by the Mayor, while others are independent of the Mayor's appointment or recommendation.

Mayoral-Appointed or Nominated Agencies

Philadelphia Industrial Development Corporation and Philadelphia Authority for Industrial Development. The Philadelphia Industrial Development Corporation ("PIDC") and the Philadelphia Authority for Industrial Development ("PAID"), along with the City's Commerce Department, coordinate the City's efforts to maintain an attractive business environment, attract new businesses to the City, and retain existing businesses. PIDC manages PAID's activities through a management agreement. Of the 30 members of the board of PIDC, eight are City officers or officials (the Mayor, the Managing Director, the Finance Director, the Commerce Director, the Director of Planning and Development, the City Solicitor, and two members of City Council), nine members are designated by the President of the Chamber of Commerce of Greater Philadelphia (the "Chamber of Commerce"), and the remaining 13 members are jointly designated by the Chamber of Commerce and the Commerce Director. The five-member board of PAID is appointed by the Mayor.

Philadelphia Municipal Authority. The Philadelphia Municipal Authority (formerly the Equipment Leasing Authority of Philadelphia) ("PMA") was originally established for the purpose of buying equipment and vehicles to be leased to the City. PMA's powers have been expanded to include any project authorized under applicable law that is specifically authorized by ordinance of City Council. PMA is governed by a five-member board appointed by City Council from nominations made by the Mayor.

Philadelphia Energy Authority. The Philadelphia Energy Authority ("PEA") was established by the City and incorporated in 2011 for the purpose of facilitating and developing energy generation projects, facilitating and developing energy efficiency projects, the purchase or facilitation of energy supply and consumer energy education. PEA is authorized to participate in projects on behalf of the City, other government agencies, institutions and businesses. PEA is governed by a five-member board appointed by City Council from four nominations made by the Mayor and one nomination from City Council.

Philadelphia Redevelopment Authority. The Philadelphia Redevelopment Authority (formerly known as the Redevelopment Authority of the City of Philadelphia) (the "PRA"), supported by federal funds through the City's Community Development Block Grant Fund and by Commonwealth and local funds, is responsible for the redevelopment of the City's blighted areas. PRA is governed by a five-member board appointed by the Mayor.

Philadelphia Land Bank. The Philadelphia Land Bank (the "PLB") was created in December 2013 with a mission to return vacant and tax delinquent property to productive reuse. The PLB is an independent agency formed under the authority of City ordinance and Pennsylvania law. The PLB has an 11-member board of directors, of which five are appointed by the Mayor and five are appointed by City Council. The final board member is appointed by a majority vote of the other board members. The City provides funds for its operations. For more information on the PLB, see APPENDIX V – "ECONOMIC DEVELOPMENT STRATEGIES AND IMPLEMENTATION – City and Quasi-City Economic Development Agencies – Philadelphia Land Bank."

Philadelphia Housing Authority. The Philadelphia Housing Authority (the "PHA") is a public body organized pursuant to the Housing Authorities Law of the Commonwealth and is neither a department nor an agency of the City. PHA is the fourth largest public housing authority in the United States and is responsible for developing and managing low and moderate income rental units and limited amounts of for-sale housing in the City. PHA is also responsible for administering rental subsidies to landlords who rent their units to housing tenants qualified by PHA for such housing assistance payments.

PHA is governed by a nine-member Board of Commissioners, all of whom are appointed by the Mayor with the approval of a majority of the members of City Council. The terms of the Commissioners are concurrent with the term of the appointing Mayor. Two of the members of the Board are required to be PHA residents. For more information on PHA, see APPENDIX V – "ECONOMIC DEVELOPMENT STRATEGIES AND IMPLEMENTATION – City and Quasi-City Economic Development Agencies – The Philadelphia Housing Authority."

Hospitals and Higher Education Facilities Authority of Philadelphia. The Hospitals and Higher Education Facilities Authority of Philadelphia (the "Hospitals Authority") assists non-profit hospitals by financing hospital construction projects. The City does not own or operate any hospitals. The powers of the Hospitals Authority also permit the financing of construction of buildings and facilities for certain colleges and universities and other health care facilities and nursing homes. The Hospitals Authority is governed by a five-member board appointed by City Council from nominations made by the Mayor.

Southeastern Pennsylvania Transportation Authority. The Southeastern Pennsylvania Transportation Authority ("SEPTA"), which is supported by transit revenues and federal, Commonwealth, and local funds, is responsible for developing and operating a comprehensive and coordinated public transportation system in the southeastern Pennsylvania region. Two of the 15 members of SEPTA's board are appointed by the Mayor and confirmed by City Council. For more information on SEPTA, see "EXPENDITURES OF THE CITY – City Payments to SEPTA" and APPENDIX V – "TRANSPORTATION – Southeastern Pennsylvania Transportation Authority (SEPTA)."

Pennsylvania Convention Center Authority. The Pennsylvania Convention Center Authority (the "Convention Center Authority") constructed and maintains, manages, and operates the Pennsylvania Convention Center, which opened on June 25, 1993. The Pennsylvania Convention Center is owned by the Commonwealth and leased to the Convention Center Authority. An expansion of the Pennsylvania Convention Center was completed in March 2011. This expansion enlarged the Pennsylvania Convention Center to approximately 2,300,000 square feet with the largest contiguous exhibit space in the Northeast, the largest convention center ballroom in the East and the ability to host large tradeshows or two major conventions simultaneously.

Of the 15 members of the board of the Convention Center Authority, two are appointed by the Mayor and one by each of the President and Minority Leader of City Council. The Director of Finance is an ex-officio member of the Board with no voting rights. The Commonwealth, the City and the Convention Center Authority have entered into an operating agreement with respect to the operation and financing of the Pennsylvania Convention Center. In January 2014, SMG began managing and operating the Pennsylvania Convention Center, instituting a number of measures intended to reduce and control show costs and improve customer service. For more information on the Convention Center Authority, see "EXPENDITURES OF THE CITY – City Payments to Convention Center Authority."

The School District. The School District was established, pursuant to the First Class City Home Rule Education Act, by the Educational Supplement to the City Charter as a separate and independent home rule school district to provide free public education to the City's residents. Under the City Charter, the School District is governed by the Board of Education of the School District of Philadelphia (the "Board of Education"). Effective December 22, 2001, the School District was declared distressed by the Secretary of Education of the Commonwealth (the "Secretary of Education") pursuant to the Public School Code of 1949, as amended (the "School Code"). During such a period of distress, all of the powers and duties of the Board of Education granted under the School Code, or any other law, are suspended. All of such powers and duties, including management, operations, and financial matters, are vested in the School Reform Commission (the "School Reform Commission") created pursuant to the School Code. During a period of distress, two of the five members of the School Reform Commission are appointed by the Mayor, with the other three appointed by the Governor of the Commonwealth (the "Governor"), subject to confirmation by the Pennsylvania Senate.

On November 16, 2017, the School Reform Commission adopted a resolution recommending its dissolution and the rescission of the declaration of distress. Such resolution included a recommendation that the Secretary of Education issue a declaration that the School Reform Commission be dissolved effective June 30, 2018.

On December 26, 2017, the Secretary of Education approved the dissolution of the School Reform Commission and rescinded the declaration of distressed school district status effective June 30, 2018. On April 4, 2018, the Mayor appointed nine members to serve on the Board of Education and such individuals assumed their duties on July 1, 2018. As of such date, the Board of Education governs the School District.

Under the City Charter, the School District's governing body is required to levy taxes annually, within the limits and upon the subjects authorized by the General Assembly or City Council, in amounts sufficient to provide for operating expenses, debt service charges, and for the costs of any other services incidental to the operation of public schools. The School District has no independent power to authorize school taxes. Certain financial information regarding the School District is included in the City's CAFR.

The School District is part of the Commonwealth system of public education. In a number of matters, including the incurrence of short-term and long-term debt, the School District is governed by the laws of the Commonwealth. The School District is a separate political subdivision of the Commonwealth, and the City has no property interest in or claim on any revenues or property of the School District.

In the FY 2018 AFR (Unaudited), the City reported that its direct contribution to the School District from the General Fund was $104.3 million in Fiscal Year 2018, not including funding from taxes levied by the School District and authorized by City Council. In the Fiscal Year 2019 Adopted Budget, the City's direct contribution to the School District from the General Fund is $180.9 million in Fiscal Year 2019 (an amount $76.5 million higher than the unaudited actual amount for Fiscal Year 2018), not including funding from taxes levied by the School District and authorized by City Council. Such increase in the direct contribution to the School District from the General Fund is the largest single increase in spending in the Fiscal Year 2019 Adopted Budget. It will be funded by the General Fund with a portion of the increase being generated by tax rate changes in the Fiscal Year 2019 Adopted Budget (an increase to the real estate transfer tax and a slowing of planned reductions in the wage tax). For more information on the City's historical contributions to the School District, see "EXPENDITURES OF THE CITY – City Payments to School District" and Table 21.

Non-Mayoral-Appointed or Nominated Agencies

PICA. PICA was created by the Pennsylvania Intergovernmental Cooperation Authority Act for Cities of the First Class (the "PICA Act") in 1991 to provide financial assistance to cities of the first class, and it continues in existence for a period not exceeding one year after all of its liabilities, including the PICA Bonds (as defined herein), have been fully paid and discharged. The City is the only city of the first class in the Commonwealth. The Governor, the President pro tempore of the Pennsylvania Senate, the Minority Leader of the Pennsylvania Senate, the Speaker of the Pennsylvania House of

Representatives, and the Minority Leader of the Pennsylvania House of Representatives each appoints one voting member of PICA's board. The Secretary of the Budget of the Commonwealth and the Director of Finance of the City serve as ex officio members of PICA's board with no voting rights.

In January 1992, the City and PICA entered into an Intergovernmental Cooperation Agreement (the "PICA Agreement"), pursuant to which PICA agreed to issue bonds from time to time, at the request of the City, for the purpose of funding, among other things, deficits in the General Fund and a debt service reserve. See "DEBT OF THE CITY – PICA Bonds."

Under the PICA Act and for so long as any PICA Bonds are outstanding, the City is required to submit to PICA: (i) a five-year financial plan on an annual basis; and (ii) quarterly financial reports, each as further described below under "DISCUSSION OF FINANCIAL OPERATIONS – Five-Year Plans of the City" and "– Quarterly Reporting to PICA." Under the PICA Act, at such time when no PICA Bonds are outstanding, the City will no longer be required to prepare such annual financial plans or quarterly reports. See "DEBT OF THE CITY – PICA Bonds" for the current final stated maturities of outstanding PICA Bonds. As of June 30, 2018, the principal amount of PICA Bonds outstanding was $168,505,000 and the final maturity date for such PICA Bonds is June 15, 2023. Such final maturity of the PICA Bonds would occur prior to the final maturity of the Bonds.

The PICA Act and the PICA Agreement provide PICA with certain financial and oversight functions. PICA has the power to exercise certain advisory and review procedures with respect to the City's financial affairs, including the power to review and approve the five-year financial plans prepared by the City, and to certify non-compliance by the City with the then-existing five-year plan. PICA is also required to certify non-compliance if, among other things, no approved five-year plan is in place or if the City has failed to file mandatory revisions to an approved five-year plan. Under the PICA Act, any such certification of non-compliance would, upon certification by PICA, require the Secretary of the Budget of the Commonwealth to withhold funds due to the City from the Commonwealth or any of its agencies (including, with certain exceptions, all grants, loans, entitlements, and payments payable to the City by the Commonwealth, including payment of the portion of the PICA Tax, as further described under "DEBT OF THE CITY – PICA Bonds" below, otherwise payable to the City).

Philadelphia Parking Authority. The Philadelphia Parking Authority (the "PPA") is responsible for: (i) the construction and operation of parking facilities in the City and at Philadelphia International Airport ("PHL"); and (ii) enforcement of on-street parking regulations. The members of the PPA's board are appointed by the Governor, with certain nominations from the General Assembly. For more information on the PPA, see "REVENUES OF THE CITY – Philadelphia Parking Authority Revenues."

DISCUSSION OF FINANCIAL OPERATIONS

Principal Operations

The major financial operations of the City are conducted through the General Fund. In addition to the General Fund, operations of the City are conducted through two other major governmental funds and 19 non-major governmental funds. The City operates on a July 1 to June 30 fiscal year ("Fiscal Year") and reports on all the funds of the City, as well as its component units, in the City's CAFR. PMA's and PICA's financial statements are blended with the City's statements. The financial statements for PGW, PRA, the PPA, the School District, the Community College of Philadelphia, the Community Behavioral Health, Inc., the Delaware River Waterfront Corporation, and PAID are presented discretely.

Fund Accounting

Funds are groupings of activities that enable the City to maintain control over resources that have been segregated for particular purposes or objectives. All of the funds of the City can be divided into three categories: governmental funds, proprietary funds and fiduciary funds.

Governmental Funds. The governmental funds are used to account for the financial activity of the City's basic services, such as: general government; economic and neighborhood development; public health, welfare and safety; cultural and recreational; and streets, highways and sanitation. The funds' financial activities focus on a short-term view of the inflows and outflows of spendable resources, as well as on the balances of spendable resources available at the end of the Fiscal Year. The financial information presented for the governmental funds is useful in evaluating the City's short-term financing requirements.

The City maintains 22 individual governmental funds. The City's CAFRs, including the City's CAFR for Fiscal Year 2017 (the "Fiscal Year 2017 CAFR"), present data separately for the General Fund, Grants Revenue Fund, and Health Choices Behavioral Health Fund, which are considered to be major funds. Data for the remaining 19 funds are combined into a single aggregated presentation.

Proprietary Funds. The proprietary funds are used to account for the financial activity of the City's operations for which customers are charged a user fee; they provide both a long- and short-term view of financial information. The City maintains three enterprise funds that are a type of proprietary fund – airport, water and wastewater operations, and industrial land bank.

Fiduciary Funds. The City is the trustee, or fiduciary, for its employees' pension plans. It is also responsible for PGW's employees' retirement reserve assets. Both of these fiduciary activities are reported in the City's CAFRs, including the Fiscal Year 2017 CAFR, as separate financial statements of fiduciary net assets and changes in fiduciary net assets.

See "CITY FINANCES AND FINANCIAL PROCEDURES" for a further description of these governmental, proprietary, and fiduciary funds.

Budget Procedure

At least 90 days before the end of the Fiscal Year, the operating budget for the next Fiscal Year is prepared by the Mayor and submitted to City Council for adoption. The budget, as adopted, must be balanced and provide for discharging any estimated deficit from the current Fiscal Year and make appropriations for all items to be funded with City revenues. The Mayor's budgetary estimates of revenues for the ensuing Fiscal Year and projection of surplus or deficit for the current Fiscal Year may not be altered by City Council. Not later than the passage of the operating budget ordinance, City Council must enact such revenue measures as will, in the opinion of the Mayor, yield sufficient revenues to balance the budget.

At least 30 days before the end of the Fiscal Year, City Council must adopt by ordinance an operating budget and a capital budget for the ensuing Fiscal Year and a capital program for the six ensuing Fiscal Years. If the Mayor disapproves the bills, he must return them to City Council with the reasons for his disapproval at the first meeting thereof held not less than ten days after he receives such bills. If the Mayor does not return the bills within the time required, they become law without his approval. If City Council passes the bills by a vote of two-thirds of all of its members within seven days after the bills have been returned with the Mayor's disapproval, they become law without his approval. While the City Charter requires that City Council adopt the ordinances for the operating and capital budgets at least 30 days before the end of the Fiscal Year, in practice, such ordinances are often adopted after such deadline, but before the end of such Fiscal Year. For example, the City's Fiscal Year 2019 operating budget ordinance was presented to City Council on March 1, 2018, approved by City Council on June 21, 2018, and signed by the Mayor on June 21, 2018. There is no practical consequence to adopting the budget ordinances after the deadline in the City Charter, but before the end of the Fiscal Year.

The capital program is prepared annually by the City Planning Commission to present the capital expenditures planned for each of the six ensuing Fiscal Years, including the estimated total cost of each project and the sources of funding (local, state, federal, and private) estimated to be required to finance each project. The capital program is reviewed by the Mayor and transmitted to City Council for adoption with his recommendation thereon. The Capital Program ordinance for Fiscal Years 2019-2024 (the "Fiscal Year 2019-2024 Adopted Capital Program") was approved by City Council on June 21, 2018, and signed by the Mayor on June 21, 2018.

The capital budget ordinance, authorizing in detail the capital expenditures to be made or incurred in the ensuing Fiscal Year from City Council appropriated funds, is adopted by City Council concurrently with the capital program. The capital budget must be in full conformity with that part of the capital program applicable to the Fiscal Year that it covers.

For information on the City's Fiscal Year 2019 Adopted Budget (as defined below), see "– Current Financial Information – Fiscal Year 2019 Adopted Budget and Twenty-Seventh Five-Year Plan" herein. For information on the City's capital program, see "CITY CAPITAL PROGRAM" herein.

Budget Stabilization Reserve

In April 2011, the City adopted an amendment to the City Charter that established the "Budget Stabilization Reserve." The City Charter provides that the annual operating budget ordinance is required to provide for appropriations to a Budget Stabilization Reserve, to be created and maintained by the Director of Finance as a separate fund, which may not be commingled with any other funds of the City. Appropriations to the Budget Stabilization Reserve are required to be made each Fiscal Year if the projected General Fund balance for the upcoming Fiscal Year equals or exceeds three percent of General Fund appropriations for such Fiscal Year. City Council can appropriate additional amounts to the Budget Stabilization Reserve by ordinance, no later than at the time of passage of the annual operating budget ordinance and only upon recommendation of the Mayor. Total appropriations to the Budget Stabilization Reserve are subject to a limit of five percent of General Fund appropriations. Amounts in the Budget Stabilization Reserve from the prior Fiscal Years, including any investment earnings certified by the Director of Finance, are to remain on deposit therein.

Since the establishment of the Budget Stabilization Reserve, no annual operating budget ordinance has included a provision to fund the Budget Stabilization Reserve because the conditions that would require the funding of such reserve have not been met.

Annual Financial Reports

The City is required by the City Charter to issue, within 120 days after the close of each Fiscal Year, a statement as of the end of the Fiscal Year showing the balances in all funds of the City, the amounts of the City's known liabilities, and such other information as is necessary to furnish a true picture of the City's financial condition (the "Annual Financial Reports"). The Annual Financial Reports, which are released on or about October 28 of each year, are intended to meet these requirements and are unaudited. As described above, the audited financial statements of the City are contained in its CAFR, which is published at a later date. The Annual Financial Reports contain financial statements for all City governmental funds and blended component units presented on the modified accrual basis. The proprietary and fiduciary funds are presented on the full accrual basis. They also contain budgetary comparison schedules for those funds that are subject to an annual budget. The financial statements of the City's discretely presented component units that are available as of the date of the Annual Financial Reports are also presented. Historically, the results for General Fund balance have not materially changed between the Annual Financial Reports and the CAFRs.

The Annual Financial Report for Fiscal Year 2017 was released on October 27, 2017. The Fiscal Year 2017 CAFR was filed with the Municipal Securities Rulemaking Board ("MSRB") on February 23, 2018. The Annual Financial Report for Fiscal Year 2018 was released on October 26, 2018 (the "FY 2018 AFR (Unaudited)"). See "CITY FINANCES AND FINANCIAL PROCEDURES – Current City Disclosure Practices."

Five-Year Plans of the City

The PICA Act requires the City to annually prepare a financial plan that includes projected revenues and expenditures of the principal operating funds of the City for five Fiscal Years consisting of the current Fiscal Year and the subsequent four Fiscal Years. Each five-year plan, which must be approved by PICA, is required to, among other things, eliminate any projected deficits, balance the Fiscal Year budgets and provide procedures to avoid fiscal emergencies. For information on the Twenty-Seventh Five-Year Plan, see "– Current Financial Information – Fiscal Year 2019 Adopted Budget and Twenty-Seventh Five-Year Plan."

Quarterly Reporting to PICA

The PICA Act requires the City to prepare and submit quarterly reports to PICA so that PICA may determine whether the City is in compliance with the then-current five-year plan. Each quarterly report is required to describe actual or current estimates of revenues, expenditures, and cash flows compared to budgeted revenues, expenditures, and cash flows by covered funds for each month in the previous quarter and for the year-to-date period from the beginning of the then-current Fiscal Year of the City to the last day of the fiscal quarter or month, as the case may be, just ended. Each such report is required to explain any variance existing as of such last day.

Under the PICA Agreement, a "variance" is deemed to have occurred as of the end of a reporting period if (i) a net adverse change in the fund balance of a covered fund (i.e., a principal operating fund) of more than 1% of the revenues budgeted for such fund for that Fiscal Year is reasonably projected to occur, such projection to be calculated from the beginning of the Fiscal Year for the entire Fiscal Year, or (ii) the actual net cash flows of the City for a covered fund are reasonably projected to be less than 95% of the net cash flows of the City for such covered fund for that Fiscal Year originally forecast at the time of adoption of the budget, such projection to be calculated from the beginning of the Fiscal Year for the entire Fiscal Year.

PICA may not take any action with respect to the City for variances if the City: (i) provides a written explanation of the variance that PICA deems reasonable; (ii) proposes remedial action that PICA believes will restore overall compliance with the then-current five-year plan; (iii) provides information in the immediately succeeding quarterly financial report demonstrating to the reasonable satisfaction of PICA that the City is taking remedial action and otherwise complying with the then-current five-year plan; and (iv) submits monthly supplemental reports until it regains compliance with the then-current five-year plan.

PICA last declared a variance in February 2009 and that variance was cured. A failure by the City to explain or remedy a variance would, upon certification by PICA, require the Secretary of the Budget of the Commonwealth to withhold funds due to the City from the Commonwealth or any of its agencies (including, with certain exceptions, all grants, loans, entitlements and payments payable to the City by the Commonwealth, including payment of the portion of the PICA Tax, as further described under "DEBT OF THE CITY – PICA Bonds" below, otherwise payable to the City). The City uses its Quarterly City Manager's Reports to satisfy the quarterly reporting requirement to PICA. Such reports are released within 45 days following the end of the applicable quarter and the most recent versions of such reports are available on the City's Investor Website (as defined herein). The Quarterly City Manager's Report for the period ending June 30, 2018 was released on August 15, 2018 (the "FY 2018 Fourth Quarter QCMR"). The most recent Quarterly City Manager's Report is the report for the period ending September 30, 2018, which was released on November 15, 2018 (the "FY 2019 First Quarter QCMR"). A summary of certain key financial results from the FY 2019 First Quarter QCMR is described in the text that follows Table 2 below. The next Quarterly City Manager's Report is the report for the period ending December 31, 2018, and it is expected to be released on or about February 15, 2019.

Summary of Operations

The following table presents the summary of operations for the General Fund for Fiscal Years 2014-2018 and budgeted amounts for Fiscal Year 2019. For a description of the legally enacted basis on which the City's budgetary process accounts for certain transactions, see "CITY FINANCES AND FINANCIAL PROCEDURES – Budgetary Accounting Practices." For Fiscal Year 2018, figures in the tables and text below are derived from the FY 2018 AFR (Unaudited), as noted in the sources. However, the FY 2018 AFR (Unaudited) does not include updated information for all Fiscal Year 2018 figures included herein. As such, certain figures for Fiscal Year 2018 included herein are derived from the FY 2018 Fourth Quarter QCMR. Where applicable, such figures are designated as "Current Estimate" for Fiscal Year 2018 and are sourced to the FY 2018 Fourth Quarter QCMR (except as otherwise indicated).

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Table 1
General Fund
Summary of Operations (Legal Basis)
Fiscal Years 2014-2017 (Actual), 2018 (Unaudited Actual), and 2019 (Adopted Budget)
(Amounts in Millions of USD)[(1), (2)]

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Unaudited Actual 2018 (October 26, 2018)	Adopted Budget 2019 (June 21, 2018)
Revenues						
Real Property Taxes[(3)]	526.4	536.4	571.6	587.1	650.4	669.1
Wage and Earnings Tax	1,261.6	1,325.8	1,373.0	1,448.9	1,542.3	1,588.6
Net Profits Tax	16.3	21.2	25.4	22.3	32.3	31.2
Business Income and Receipts Tax	461.7	438.2	474.2	417.5	446.1	425.2
Sales Tax[(4)]	263.1	149.5	169.4	188.4	198.4	216.5
Other Taxes[(5)]	266.9	305.9	353.0	367.7	454.9	437.1
Philadelphia Beverage Tax[(6)]	0.0	0.0	0.0	39.5	77.4	78.0
Total Taxes	2,795.9	2,777.0	2,966.6	3,071.4	3,401.8	3,445.7
Locally Generated Non-Tax Revenue	301.8	294.4	291.0	309.5	320.6	291.7
Revenue from Other Governments						
Net PICA Taxes Remitted to the City[(7)]	318.7	346.5	383.4	409.5	N/A[(1)]	469.0
Other Revenue from Other Governments[(8)]	347.3	302.8	305.6	307.7	N/A[(1)]	337.5
Total Revenue from Other Governments	666.0	649.3	689.1	717.2	778.2	806.4
Receipts from Other City Funds	42.0	39.0	42.3	60.1	55.4	73.1
Total Revenue	3,805.6	3,759.8	3,989.0	4,158.2	4,556.1	4,616.9
Obligations/Appropriations						
Personal Services	1,450.6	1,508.7	1,562.6	1,589.0	1,690.1	1,738.4
Purchase of Services[(9)]	787.6	810.6	822.2	851.4	891.1	951.7
Materials, Supplies and Equipment	88.8	90.6	92.1	94.4	102.2	114.4
Employee Benefits	1,194.1	1,099.5	1,181.3[(12)]	1,241.0[(12)]	1,314.0[(12)]	1,360.2[(12)]
Indemnities, Contributions, and Refunds[(10)]	208.6	150.7	192.7	186.6	195.2	282.2
City Debt Service[(11)]	122.5	132.0	132.1	140.9	148.8	169.5
Payments to Other City Funds	34.4	39.4	32.8	36.5	61.5	38.1
Advances & Miscellaneous Payments / Labor Reserve	0.0	0.0	0.0	0.0	0.0	16.4[(13)]
Advances & Miscellaneous Payments / Federal Funding Reserve	0.0	0.0	0.0	0.0	0.0	54.6[(13)]
Total Obligations/Appropriations	3,886.6	3,831.5	4,015.8	4,139.8	4,402.9	4,725.5
Operating Surplus (Deficit) for the Year	(80.9)	(71.7)	(26.8)	18.4	153.2	(108.6)
Net Adjustments – Prior Year	26.1	21.1	23.6	22.5	26.3	19.5
Cumulative Fund Balance Prior Year	256.9	202.1	151.5	148.3	189.2	228.5[(14)]
Cumulative Adjusted Year End Fund Balance (Deficit)	202.1	151.5	148.3	189.2	368.8[(14)]	139.5

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the FY 2018 AFR (Unaudited); figures marked as "N/A" are not available in the FY 2018 AFR (Unaudited). For Fiscal Year 2019 (Adopted Budget), the Fiscal Year 2019 Adopted Budget.
(2) Figures may not sum due to rounding.
(3) The amounts for Fiscal Year 2014 and thereafter reflect a reduction in the Real Estate Tax rate, but also an increase in the assessed value of all taxable real property resulting from a citywide property reassessment. See "REVENUES OF THE CITY – Real Property Taxes Assessment and Collection."
(4) The amount for Fiscal Year 2014 reflects a 1% increase in the City Sales Tax effective October 8, 2009, which expired June 30, 2014. The Fiscal Year 2015 figures include the remaining 1% City Sales Tax, an additional $15,000,000 for debt service, plus any amounts designated for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(5) Includes Amusement Tax, Real Property Transfer Tax, Parking Lot Tax, Smokeless Tobacco Tax and miscellaneous taxes.
(6) The Philadelphia Beverage Tax (as defined herein) taxes the distribution of certain beverages at 1.5 cents per ounce and became effective January 1, 2017.
(7) For a detailed breakdown of "Net PICA Taxes Remitted to the City," see Table 43. Such figures reflect revenues received by the City from the PICA Tax of 1.50%, the proceeds of which are remitted to PICA for payment of debt service on PICA bonds and PICA expenses. After paying debt service and expenses, net proceeds from the tax are remitted to the City as Revenue from Other Governments. See "DEBT OF THE CITY – PICA Bonds."
(8) For a detailed breakdown of "Other Revenue from Other Governments," see Table 12. "Other Revenue from Other Governments" includes state gaming revenues.
(9) Includes debt service on lease and service agreement financings.
(10) Includes contributions to the School District. See also Table 21 and the accompanying text herein.
(11) Includes debt service on General Obligation Debt (as defined herein) and tax and revenue anticipation notes; excludes debt service on PICA bonds and lease and service agreement financings.
(12) For Fiscal Year 2016, includes $9.7 million from City Sales Tax revenues for the Municipal Pension Fund. For Fiscal Year 2017, includes $19.2 million from such tax revenues for the Municipal Pension Fund. For Fiscal Year 2018, assumes $27.2 million from such tax revenues for the Municipal Pension Fund (figure derived from the FY 2018 Fourth Quarter QCMR; an unaudited figure is not included in the FY 2018 AFR (Unaudited)). For Fiscal Year 2019 (Adopted Budget), assumes $48.3 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(13) The Labor Reserve is set aside for labor-related costs, including costs related to labor agreements with certain of the City's municipal unions, among other things. See "EXPENDITURES OF THE CITY – Overview of City Employees." The Federal Funding Reserve is set aside to address certain federal funding that may become unavailable as a result of cuts in the federal budget or the implementation of other federal policies that may affect federal funding for the City.
(14) In its Fiscal Year 2019 Adopted Budget, the City projected that Fiscal Year 2018 would end with a General Fund balance of $228.5 million. In the FY 2018 AFR (Unaudited), the City reported that Fiscal Year 2018 ended with a General Fund balance of $368.8 million (unaudited). Such number has been included as the "Cumulative Fund Balance Prior Year" in the FY 2019 First Quarter QCMR.

Current Financial Information

Table 2 below shows General Fund balances for Fiscal Year 2017, unaudited actual results for Fiscal Year 2018, and budgeted amounts for Fiscal Year 2019.

Table 2
General Fund – Fund Balance Summary
(Amounts in Thousands of USD)[(1)]

	Fiscal Year 2017 Actual[(2)] (June 30, 2017)	Fiscal Year 2018 Unaudited Actual[(2)] (October 26, 2018)	Fiscal Year 2019 Adopted Budget[(2)] (June 21, 2018)
REVENUES			
Taxes	$3,071,422[(3)]	$3,401,829[(3)]	$3,445,678[(3)]
Locally Generated Non – Tax Revenues	309,481	320,643	291,684
Revenue from Other Governments	717,229	778,153	806,439
Revenues from Other Funds of City	60,072	55,437	73,108
Total Revenue	**$4,158,204**	**$4,556,062**	**$4,616,909**
OBLIGATIONS / APPROPRIATIONS			
Personal Services	1,589,003	1,690,081	1,738,441
Personal Services – Employee Benefits	1,240,989[(4)]	1,314,021[(4)]	1,360,238[(4)]
Purchase of Services[(5)]	851,447	891,074	951,665
Materials, Supplies, and Equipment	94,408	102,191	114,356
Contributions, Indemnities, and Taxes	186,559	195,197	282,185
Debt Service[(6)]	140,893	148,795	169,496
Payments to Other Funds	36,493	61,495	38,096
Advances & Miscellaneous Payments	0	0	71,020[(7)]
Total Obligations / Appropriations	**$4,139,792**	**$4,402,854**	**$4,725,497**
Operating Surplus (Deficit)	**18,412**	**153,208**	**(108,588)**
OPERATIONS IN RESPECT TO PRIOR FISCAL YEARS			
Net Adjustments – Prior Years	22,516	26,331	19,500
Operating Surplus/(Deficit) & Prior Year Adj.	40,928	179,539	(89,088)
Prior Year Fund Balance	148,315	189,243	228,545[(8)]
Year End Fund Balance	**$189,243**[(8)]	**$368,783**[(8)]	**$139,457**

(1) Figures may not sum due to rounding.
(2) Sources: For Fiscal Year 2017, the Fiscal Year 2017 CAFR. For Fiscal Year 2018 Unaudited Actual, the FY 2018 AFR (Unaudited). For Fiscal Year 2019 Adopted Budget, the Fiscal Year 2019 Adopted Budget.
(3) For Fiscal Year 2017, includes $39.5 million in revenue from the Philadelphia Beverage Tax. For Fiscal Year 2018 Unaudited Actual, includes $77.4 million in revenue from such tax. For Fiscal Year 2019 Adopted Budget, assumes $78.0 million in revenue from such tax. The Philadelphia Beverage Tax taxes the distribution of certain beverages at 1.5 cents per ounce and became effective January 1, 2017.
(4) For Fiscal Year 2017, includes $19.2 million from City Sales Tax revenues for the Municipal Pension Fund. For Fiscal Year 2018, assumes $27.2 million from such tax revenues for the Municipal Pension Fund (figure derived from the FY 2018 Fourth Quarter QCMR; an unaudited figure is not included in the FY 2018 AFR (Unaudited)). For Fiscal Year 2019 Adopted Budget, assumes $48.3 million from such tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(5) Includes debt service on lease and service agreement financings.
(6) Includes debt service on General Obligation Debt (as defined herein) and tax and revenue anticipation notes; excludes debt service on PICA bonds and lease and service agreement financings.
(7) Advances & Miscellaneous Payments includes funds set aside in the Labor Reserve and the Federal Funding Reserve, as applicable. The Labor Reserve is set aside for labor-related costs, including costs related to labor agreements with certain of the City's municipal unions, among other things. See "EXPENDITURES OF THE CITY – Overview of City Employees." The Federal Funding Reserve is set aside to address certain federal funding that may become unavailable as a result of cuts in the federal budget or the implementation of other federal policies that may affect federal funding for the City. The Fiscal Year 2019 Adopted Budget includes (i) $16.4 million for the Labor Reserve, and (ii) $54.6 million for the Federal Funding Reserve.
(8) In its Fiscal Year 2019 Adopted Budget, the City projected that Fiscal Year 2018 would end with a General Fund balance of $228.545 million. In the FY 2018 AFR (Unaudited), the City reported that Fiscal Year 2018 ended with a General Fund balance of $368.783 million (unaudited). Such number has been included as the "Prior Year Fund Balance" in the FY 2019 First Quarter QCMR.

The following discussion of the unaudited actual results for Fiscal Year 2018, the Fiscal Year 2019 Adopted Budget, the Twenty-Seventh Five-Year Plan, and the FY 2019 First Quarter QCMR, as applicable, is based, in part, on projections and forward-looking statements related to Fiscal Years 2018 and 2019. No assurance can be given that the applicable budget estimates and forward-looking statements will be realized. The accuracy of such budget estimates and forward-looking statements cannot be verified until after the close of the applicable Fiscal Year and the completion of the related audit.

Fiscal Year 2018 Unaudited Actual Results. The unaudited actual results for Fiscal Year 2018 are derived from information included in the FY 2018 AFR (Unaudited).

In the FY 2018 AFR (Unaudited), the City reported that Fiscal Year 2018 ended with a General Fund balance of $368.8 million, approximately $140.2 million higher than estimated in the Fiscal Year 2019 Adopted Budget.

Fiscal Year 2019 Adopted Budget and Twenty-Seventh Five-Year Plan. On March 1, 2018, the Mayor submitted his proposed Fiscal Year 2019 budget to City Council, along with the proposed five-year plan for Fiscal Years 2019-2023. On June 21, 2018, City Council approved the Fiscal Year 2019 operating budget ordinance, which was signed by the Mayor on June 21, 2018 (the "Fiscal Year 2019 Adopted Budget").

On June 26, 2018, the City submitted to PICA its FY 2019-2023 Five Year Financial Plan Per Council Approved Budget (the "Twenty-Seventh Five-Year Plan"). PICA approved the Twenty-Seventh Five-Year Plan on July 25, 2018. PICA staff, in recommending that PICA approve the Twenty-Seventh Five-Year Plan, noted that the revenue and expenditure projections presented in the Twenty-Seventh Five-Year Plan were [quoting from the PICA Act] "based on reasonable and appropriate assumptions and methods of estimation . . . consistently applied." The PICA staff report concluded that "[a]lthough PICA is confident that the [Twenty-Seventh Five-Year Plan] is based on reasonable and appropriate assumptions, projected year end fund balances, while positive, are lower than in recent plans." The PICA report did, however, identify certain factors that might present risks to the Twenty-Seventh Five-Year Plan, including: (i) the possibility of an economic recession over the period covered by the plan; (ii) bank reconciliation deficiencies in the City's Office of the Treasurer; (iii) funding of the now locally controlled School District; (iv) projected growth of the real estate transfer tax; and (v) costs of funding increasing pension liabilities. The PICA staff report also highlighted certain other financial concerns that could impact the City's financial condition, including, among others, future labor, overtime, and employee health benefit costs, BIRT volatility, lower than expected collections of the Philadelphia Beverage Tax, and low General Fund balances.

For Fiscal Years 2019-2023, the Twenty-Seventh Five-Year Plan projects that the City will end such Fiscal Years with General Fund balances (on the legally enacted basis) of approximately (i) $139.5 million (Fiscal Year 2019), (ii) $83.2 million (Fiscal Year 2020), (iii) $46.8 million (Fiscal Year 2021), (iv) $41.1 million (Fiscal Year 2022), and (v) $100.6 million (Fiscal Year 2023). The foregoing projections assumed a year-end General Fund balance of $228.5 million for Fiscal Year 2018 (which, as noted above, was reported to be $368.8 million in the FY 2018 AFR (Unaudited)). The City continues to face uncertainty regarding the pace of economic growth and the low estimated General Fund balances in Fiscal Years 2019-2023 could lead to financial risk.

FY 2019 First Quarter QCMR. The FY 2019 First Quarter QCMR projects modest increases in both revenues and expenditures for Fiscal Year 2019. Revenues are projected to be approximately $37.3 million above the estimate included in the Fiscal Year 2019 Adopted Budget, while expenditures are projected to be approximately $68.6 million above the estimate included in such budget. Such updated projections result in a projected operating deficit of approximately $139.9 million for Fiscal Year 2019, an increase of approximately $31.3 million from the estimate included in the Fiscal Year 2019 Adopted Budget. As noted in Table 2 above, the City reported an operating surplus of approximately $153.2 million (unaudited) for Fiscal Year 2018.

The FY 2019 First Quarter QCMR projects that the City will end such Fiscal Year with a General Fund balance (on the legally enacted basis) of approximately $248.4 million, which reflects an increase of approximately $108.9 million from the estimated General Fund balance included in the Fiscal Year 2019 Adopted Budget and Twenty-Seventh Five-Year Plan. Such higher projected fund balance is largely due to a higher than anticipated General Fund balance for Fiscal Year 2018 of approximately $368.8 million, as reported in the FY 2018 AFR (Unaudited), and certain other adjustments.

For more information on the City's annual budget process under the City Charter and the five-year financial plans and quarterly reporting required under the PICA Act, see "– Budget Procedure," "– Five-Year Plans of the City," and "– Quarterly Reporting to PICA," above.

CITY FINANCES AND FINANCIAL PROCEDURES

Except as otherwise noted, the financial statements, tables, statistics, and other information shown below have been prepared by the Office of the Director of Finance and can be reconciled to the financial statements in the Fiscal Year 2017 CAFR and notes therein. The Fiscal Year 2017 CAFR was prepared by the Office of the Director of Finance in conformance with guidelines adopted by the Governmental Accounting Standards Board and the American Institute of Certified Public Accountants' audit guide, Audits of State and Local Government Units.

General

Governmental funds account for their activities using the current financial resources measurement focus and the modified accrual basis of accounting. Revenues are recognized as soon as they are both measurable and available. Revenues are considered to be available when they are collectible within the current period or soon enough thereafter to pay liabilities of the current period. For this purpose, the City considers revenues to be available if they are collected within 60 days of the end of the current fiscal period. Expenditures are generally recorded when a liability is incurred, as in the case of full accrual accounting. Debt service expenditures, as well as expenditures related to compensated absences and claims and judgments, are recorded only when payment is due; however, those expenditures may be accrued if they are to be liquidated with available resources.

Imposed non-exchange revenues, such as real estate taxes, are recognized when the enforceable legal claim arises and the resources are available. Derived tax revenues, such as wage, BIRT, net profits and earnings taxes, are recognized when the underlying exchange transaction has occurred and the resources are available. Grant revenues are recognized when all the applicable eligibility requirements have been met and the resources are available. All other revenue items are considered to be measurable and available only when cash is received by the City.

Revenue that is considered to be program revenue includes: (i) charges to customers or applicants for goods received, services rendered or privileges provided; (ii) operating grants and contributions; and (iii) capital grants and contributions. Internally dedicated resources are reported as general revenues rather than as program specific revenues; therefore, all taxes are considered general revenues.

The City's financial statements reflect the following three funds as major Governmental Funds:

- The General Fund is the City's primary operating fund. It accounts for all financial resources of the general government, except those required to be accounted for in other funds.

- The Health Choices Behavioral Health Fund accounts for resources received from the Commonwealth. These resources are restricted to providing managed behavioral health care to residents of the City.

- The Grants Revenue Fund accounts for the resources received from various federal, Commonwealth, and private grantor agencies, including those received by the City's Department of Human Services ("DHS"). The resources are restricted to accomplishing the various objectives of the grantor agencies.

The City also reports on permanent funds, which are used to account for resources legally held in trust for use by the park and library systems of the City. There are legal restrictions on the resources of the permanent funds that require the principal to remain intact, while only the earnings may be used for the programs.

The City reports on the following fiduciary funds:

- The Municipal Pension Fund accumulates resources to provide pension benefit payments to qualified employees of the City and certain other quasi-governmental organizations.

- The Philadelphia Gas Works Retirement Reserve Fund accounts for contributions made by PGW to provide pension benefit payments to its qualified employees under its pension plan. For more information on the PGW Pension Plan (as defined herein), see "PGW PENSION PLAN."

- The Escrow Fund accounts for funds held in escrow for various purposes.

- The Employees Health & Welfare Fund accounts for funds deducted from employees' salaries for payment to various organizations.

- The Departmental Custodial Accounts account for funds held in custody by various departments of the City.

The City reports on the following major proprietary funds:

- The Water Fund accounts for the activities related to the operation of the Water and Wastewater Systems.

- The Aviation Fund accounts for the activities of the Airport System.

Proprietary funds distinguish operating revenues and expenses from non-operating items. Operating revenues and expenses generally result from providing services and producing and delivering goods in connection with a proprietary fund's ongoing operations. The principal operating revenues of the Water Fund are charges for water and sewer service. The principal operating revenues of the Aviation Fund are charges for the use of the City's airports. Operating expenses for enterprise funds include the cost of sales and services, administrative expenses, and depreciation on capital assets. All revenues and expenses not meeting this definition are reported as non-operating revenues and expenses.

Current City Disclosure Practices

It is the City's practice to file its CAFR, which contains the audited combined financial statements of the City, in addition to certain other information, such as the City's bond ratings and information about upcoming debt issuances, with the MSRB as soon as practicable after delivery of such report. For bonds issued in calendar year 2015 and after, the annual filing deadline is February 28; for bonds issued prior to calendar year 2015, the annual filing deadline is 240 days after the end of the respective Fiscal Year, being February 25. The Fiscal Year 2017 CAFR was filed with the MSRB on February 23, 2018, through the MSRB's Electronic Municipal Market Access ("EMMA") system.

A wide variety of information concerning the City is available from publications and websites of the City and others, including the City's investor information website at http://www.phila.gov/investor (the "City's Investor Website"). Any such information that is inconsistent with the information set forth in this Official Statement should be disregarded. No such information is a part of or incorporated into this Official Statement.

Independent Audit and Opinion of the City Controller

The City Controller has examined and expressed opinions on the basic financial statements of the City contained in the Fiscal Year 2017 CAFR. The City Controller has not participated in the preparation of this Official Statement nor in the preparation of the budget estimates and projections and cash flow statements and forecasts set forth in various tables contained in this Official Statement. Consequently, the City Controller expresses no opinion with respect to any of the data contained in this Official Statement other than what is contained in the basic financial statements of the City in the Fiscal Year 2017 CAFR.

Budgetary Accounting Practices

The City's budgetary process accounts for certain transactions on a basis other than generally accepted accounting principles ("GAAP"). In accordance with the City Charter, the City has formally established budgetary accounting control for its operating and capital improvement funds.

The operating funds of the City, consisting of the General Fund, nine Special Revenue Funds (County Liquid Fuels Tax, Special Gasoline Tax, Health Choices Behavioral Health, Hotel Room Rental Tax, Grants Revenue, Community Development, Car Rental Tax, Acute Care Hospital Assessment and Housing Trust Funds) and two Enterprise Funds (Water and Aviation Funds), are subject to annual operating budgets adopted by City Council. These budgets appropriate funds for all City departments, boards and commissions by major class of expenditure within each department. Major classes are defined as: (i) personal services; (ii) purchase of services; (iii) materials and supplies; (iv) equipment; (v) contributions, indemnities, and taxes; (vi) debt service; (vii) payments to other funds; and (viii) advances and other miscellaneous payments. The appropriation amounts for each fund are supported by revenue estimates and take into account the elimination of accumulated deficits and the re-appropriation of accumulated surpluses to the extent necessary. All transfers between major classes (except for materials and supplies and equipment, which are appropriated together) must have City Council approval. Appropriations that are not expended or encumbered at year-end are lapsed.

The City's capital budget is adopted annually by City Council. The capital budget is appropriated by project for each department. Requests to transfer appropriations between projects must be approved by City Council. Any appropriations that are not obligated at year-end are either lapsed or carried forward to the next Fiscal Year.

Schedules prepared on the legally enacted basis differ from the GAAP basis in that both expenditures and encumbrances are applied against the current budget, adjustments affecting activity budgeted in prior years are accounted for through fund balance or as reduction of expenditures and certain interfund transfers and reimbursements are budgeted as revenues and expenditures. The primary difference between the GAAP and legal (budgetary) fund balance is due to the timing of recognizing the BIRT. The legal basis recognizes BIRT revenues in the Fiscal Year they are collected. The GAAP basis requires the City to recognize the BIRT revenues (which are primarily paid in April) for the calendar year in which the BIRT taxes are due, requiring the City to defer a portion of the April payment into the next Fiscal Year. For more information on BIRT, see "REVENUES OF THE CITY – Business Income and Receipts Tax."

REVENUES OF THE CITY

General

Prior to 1939, the City relied heavily on the real estate tax as the mainstay of its revenue system. In 1932, the General Assembly adopted an act (commonly referred to as the Sterling Act) under which the City is permitted to levy any tax that was not specifically pre-empted by the Commonwealth. Acting under the Sterling Act and other Pennsylvania legislation, the City has taken various steps over the years to reduce its reliance on real property taxes as a source of income, including: (i) enacting the wage, earnings, and net profits tax in 1939; (ii) introducing a sewer service charge to make the sewage treatment system self-sustaining after 1945; (iii) requiring under the City Charter that the water, sewer, and other utility systems be fully self-sustaining; (iv) enacting the Mercantile License Tax (a gross receipts tax on business done within the City) in 1952, which was replaced as of the commencement of Fiscal Year 1985 by the Business Privilege Tax (renamed the Business Income and Receipts Tax in May 2012), and (v) enacting the City Sales Tax (as defined herein) for City general revenue purposes effective beginning in Fiscal Year 1992.

Major Revenue Sources

The City derives its revenues primarily from various taxes, non-tax revenues, and receipts from other governments. See Table 3 for General Fund tax revenues for Fiscal Years 2014-2018, as well as the budgeted amounts for Fiscal Year 2019. The following discussion of the City's revenues does not take into account revenues in the non-debt related funds. The tax rates for Fiscal Years 2014 through 2017 are contained in the Fiscal Year 2017 CAFR.

Table 3 provides a detailed breakdown of the "Total Taxes" line from Table 1 above. Table 3 does not include "Revenues from Other Governments," which consists of "Net PICA Taxes Remitted to the City" and "Other Revenue from Other Governments." "Net PICA Taxes Remitted to the City" is set forth in Table 1 and a detailed breakdown of such revenues is shown in Table 43. "Other Revenue from Other Governments" is set forth in Table 1 and a detailed breakdown of such revenues is shown in Table 12.

Table 3
General Fund Tax Revenues
Fiscal Years 2014-2017 (Actual), 2018 (Unaudited Actual), and 2019 (Adopted Budget)
(Amounts in Millions of USD) [(1), (2), (3)]

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Unaudited Actual 2018 (October 26, 2018)	Adopted Budget 2019 (June 21, 2018)
Real Property Taxes[(4)]						
Current	$483.9	$493.1	$521.2	$542.9	$611.3	$630.7
Prior	42.5	43.4	50.4	44.2	39.1	38.3
Total	$526.4	$536.4	$571.6	$587.1	$650.4	$669.1
Wage and Earnings Tax[(5)]						
Current	$1,255.9	$1,318.8	$1,364.6	$1,440.6	$1,536.9	$1,580.3
Prior	5.7	7.1	8.4	8.3	5.4	8.3
Total	$1,261.6	$1,325.8	$1,373.0	$1,448.9	$1,542.3	$1,588.6
Business Taxes						
Business Income and Receipts Tax						
Current & Prior	$461.7	$438.2	$474.2	$417.5	$446.1	$425.2
Net Profits Tax						
Current	$13.2	$14.7	$23.3	$25.3	$27.6	$28.7
Prior	3.1	6.5	2.1	(3.0)	4.7	2.5
Subtotal Net Profits Tax	$16.3	$21.2	$25.4	$22.3	$32.3	$31.2
Total Business and Net Profits Taxes	$478.0	$459.4	$499.6	$439.8	$478.4	$456.4
Other Taxes						
Sales and Use Tax[(6)]	$263.1	$149.5	$169.4	$188.4	$198.4	$216.5
Amusement Tax	20.0	19.0	19.4	20.6	23.0	22.2
Real Property Transfer Tax	168.1	203.4	237.3	247.3	331.5	310.5
Parking Taxes	75.1	79.7	92.7	96.1	96.5	100.7
Other Taxes	3.7	3.8	3.6	3.8	4.0	3.7
Subtotal Other Taxes	$530.0	$455.4	$522.4	$556.1	$653.3	$653.6
Philadelphia Beverage Tax[(7)]	0.0	0.0	0.0	39.5	77.4	78.0
TOTAL TAXES	**$2,795.9**	**$2,777.0**	**$2,966.6**	**$3,071.4**	**$3,401.8**	**$3,445.7**

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the FY 2018 AFR (Unaudited). For Fiscal Year 2019 (Adopted Budget), the Fiscal Year 2019 Adopted Budget.
(2) See Table 7 in the Fiscal Year 2017 CAFR for tax rates.
(3) Figures may not sum due to rounding.
(4) The amounts for Fiscal Year 2014 and thereafter reflect a reduction in the Real Estate Tax rate, but also an increase in the assessed value of all taxable real property resulting from a citywide property reassessment. See "– Real Property Taxes Assessment and Collection."
(5) Does not include the PICA Tax of 1.50%, the proceeds of which are remitted to PICA for payment of debt service on PICA Bonds and PICA expenses. After paying debt service and expenses, net proceeds from the tax are remitted to the City as Revenue from Other Governments. See "DEBT OF THE CITY – PICA Bonds" for a description of the PICA Tax.
(6) The amount for Fiscal Year 2014 reflects a 1% increase in the City Sales Tax effective October 8, 2009, which expired June 30, 2014. For Fiscal Years 2015-2018, figures include the remaining 1% City Sales Tax, an additional $15,000,000 for debt service, plus any amounts designated for the Municipal Pension Fund. See "– Sales and Use Tax."
(7) The Philadelphia Beverage Tax taxes the distribution of certain beverages at 1.5 cents per ounce and became effective January 1, 2017.

Wage, Earnings, and Net Profits Taxes

The largest tax revenue source (comprising more than 47% of all tax revenues in Fiscal Year 2017) is the wage, earnings and net profits tax. The wage and earnings tax is collected from all employees working within City limits, and all City residents regardless of work location. The net profits tax is collected on the net profits from the operation of a trade, business, profession, enterprise or other activity conducted by individuals, partnerships, associations or estates and trusts within the City limits. The following table sets forth the resident and non-resident wage, earnings and net profits tax rates for Fiscal Years 2014-2019, the annual wage, earnings and net profits tax receipts in Fiscal Years 2014-2017, the budgeted amount and current estimate of such receipts for Fiscal Year 2018, and the budgeted amount of such receipts for Fiscal Year 2019.

Table 4
Summary of Wage, Earnings and Net Profits Tax Rates and Receipts
Fiscal Years 2014-2017 (Actual), 2018 (Adopted Budget and Current Estimate), and 2019 (Adopted Budget)[(1)]

Fiscal Year	Resident Wage, Earnings and Net Profits Tax Rates[(2)]	Non-Resident Wage, Earnings and Net Profits Tax Rates	Annual Wage, Earnings and Net Profits Tax Receipts (including PICA Tax) (Amounts in Millions of USD)[(3)]
2014	3.9240%	3.4950%	$1,662.3 (Actual)
2015	3.9200%	3.4915%	$1,755.5 (Actual)
2016	3.9102%	3.4828%	$1,842.9 (Actual)
2017	3.9004%	3.4741%	$1,940.4 (Actual)
2018	3.8907%	3.4654%	$1,969.5 (Adopted Budget) $2,063.2 (Current Estimate)
2019	3.8809%	3.4567%	$2,135.8 (Adopted Budget)

(1) See Table 7 in the Fiscal Year 2017 CAFR for tax rates for Fiscal Years 2014-2017. See the Twenty-Seventh Five-Year Plan for tax rates for Fiscal Years 2018-2019.
(2) Includes PICA Tax. See "DEBT OF THE CITY – PICA Bonds" for a description of the PICA Tax.
(3) Sources: For Fiscal Years 2014-2017, the City's CAFRs for the City's annual wage, earnings, and net profits and the City's Quarterly City Manager's Reports for gross PICA Tax (see first column in Table 43). For Fiscal Year 2018, the Fiscal Year 2018 Adopted Budget and the FY 2018 Fourth Quarter QCMR. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.

Commonwealth funding from gaming revenues is mandated by statute to be used to reduce the resident and nonresident wage tax rate. Gaming revenues have averaged approximately $86.3 million in Fiscal Years 2014-2017. For Fiscal Year 2018, the budgeted amount and current estimate of gaming revenues is $86.3 million, which is also the budgeted amount for Fiscal Year 2019. The wage tax rates in such Fiscal Years reflect a rate reduction due to these revenues.

See "– Other Tax Rate Changes" herein, for information regarding wage and earnings tax rate reductions under the Twenty-Seventh Five-Year Plan.

In a 2015 decision by the Supreme Court of the United States (*Comptroller of the Treasury of Maryland v. Wynne*, 135 S. Ct. 1787 (2015)), a state's failure to provide certain credits against its personal income tax was held to have violated the dormant Commerce Clause of the United States Constitution. Such personal income tax was applied to income earned outside of the state of residency, and residents were not given a credit for income taxes paid to the state where such income was earned, resulting, in the circumstances presented, in taxing income earned interstate at a rate higher than income earned intrastate. The City does not provide a credit to resident taxpayers against their respective wage, earnings, and net profits tax liabilities for similar taxes paid to another jurisdiction. For 2016 and 2017, the City has paid to resident taxpayers approximately $414,000 in the aggregate in connection with this matter.

Business Income and Receipts Tax

In 1984, the Commonwealth passed legislation known as The First Class City Business Tax Reform Act of 1984, authorizing City Council to impose a business tax measured by gross receipts, net income or the combination of the two. The same year, City Council by ordinance repealed the Mercantile License Tax and the General Business Tax and imposed the Business Privilege Tax. As of May 1, 2012, the Business Privilege Tax was renamed the Business Income and Receipts Tax (or BIRT). Rental activities are usually considered to be business activities. Every estate or trust (whether the fiduciary is an individual or a corporation) must file a BIRT return if the estate or trust is engaged in any business or activity for profit within the City.

The BIRT allows for particular allocations and tax computations for regulated industries, public utilities, manufacturers, wholesalers and retailers. There are also credit programs where meeting the requirement of the program allows for a credit against the BIRT. All persons subject to both the BIRT and the net profits tax are entitled to apply a credit of 60% of the net income portion of their BIRT liability against what is due on the net profits tax to the maximum of the net profits tax liability for that tax year.

In November 2011, legislation was enacted to halt a previously enacted program of reducing the gross receipts portion of the BIRT and to commence reductions in the net income portion of the BIRT to take effect in tax year 2014 with changes phasing in through tax year 2023. The following table reflects such changes and provides a summary of BIRT rates for tax years 2012-2023. Future scheduled reductions in the net income portion of the BIRT remain subject to amendment by action of City Council and the Mayor.

Table 5
Summary of Business Income and Receipts Tax Rates

Tax Year	Gross Receipts	Net Income
2012	1.415 mills	6.45%
2013	1.415 mills	6.45%
2014	1.415 mills	6.43%
2015	1.415 mills	6.41%
2016	1.415 mills	6.39%
2017	1.415 mills	6.35%
2018	1.415 mills	6.30%
2019	1.415 mills	6.25%
2020	1.415 mills	6.20%
2021	1.415 mills	6.15%
2022	1.415 mills	6.10%
2023	1.415 mills	6.00%

In addition, the 2011 legislation incorporated several changes intended to help small and medium sized businesses and lower costs associated with starting a new business in order to stimulate new business formation and increase employment in the City, including the following: (i) the Commercial Activity License fee for all businesses was eliminated in 2014; (ii) business taxes for the first two years of operations for all new businesses with at least three employees in their first year and six employees in their second year were eliminated beginning in 2012; and (iii) across the board exclusions on the gross receipts portion of the BIRT were provided for all businesses phased in over a three-year period beginning in 2014 and eventually excluding the first $100,000 of gross receipts, along with proportional reductions in the net income portion of the BIRT. The legislation also provides for implementation of single sales factor apportionment in 2015, which enables businesses to pay BIRT based solely on sales in the City, rather than on property or payroll.

Since the late 1990s, reforms have been made to the BIRT to reduce the tax burden for businesses and to encourage job creation. By Fiscal Year 2023, the net income (profits) portion of the business tax is projected to reach 6.00%. Additionally, legislation has been enacted, effective beginning in tax year 2019, to (i) eliminate the requirement for new businesses to make an estimated business tax payment when filing a return for their first tax year of business operations and (ii) allow such estimated payments in the second year to be made in quarterly installments.

Real Property Taxes Assessment and Collection

A tax is levied on the assessed value of all taxable residential and commercial real property located within the City's boundaries (the "Real Estate Tax") as assessed by the Office of Property Assessment ("OPA") and collected by the Department of Revenue. Real Estate Taxes are allocated to the City and the School District with the millage split between the two taxes changing over the years. Real Estate Taxes are levied on a calendar year basis. Bills are sent in December for the following year and payments are due March 31. A discount of 1% is available for taxpayers who pay their Real Estate Taxes on or before the last day of February.

Beginning in 2010, the City significantly changed the system used for assessing Real Estate Tax in Philadelphia. On May 18, 2010, Philadelphia voters approved an amendment to the City Charter that split the assessment and appeals functions, moving assessment functions into City government into a new agency, OPA, and creating an independent board of appeals, replacing the Board of Revision of Taxes ("BRT"), which previously combined both functions. OPA formally took over responsibility for assessments in October 2010. However, the Pennsylvania Supreme Court ruled on September 20, 2010, that without an amendment to state law, the City did not have the authority to replace the BRT in its capacity as an existing appeals board. Therefore, the BRT remains in place as the property assessment appeals board; but the separation of the appeals function from the assessment function, which removed an inherent conflict and was a key goal of the legislation, remains in place. The BRT is an independent, seven-member board appointed by the Board of Judges of the Philadelphia Common Pleas Court.

For tax year 2014, under the Actual Value Initiative ("AVI"), all 579,000 properties in Philadelphia were reassessed at their actual market value by OPA, replacing outdated values and inequities within the system. As the new total assessed value of all properties more accurately reflected the market in Philadelphia, the total assessment grew substantially. As a result, the Mayor and City Council significantly reduced the tax rate to ensure that the reassessment resulted in the collection of approximately the same amount of current year revenue as the prior year (the rates are shown in Table 6 below). Moreover, in order to make the tax bills more understandable, AVI removed the complicated fractional system. Prior to AVI, tax bills were calculated by multiplying the certified market value by an established predetermined ratio ("EPR") multiplied by the tax rate. The last applicable EPR was 32%.

The changes in the system had implications for most property owners in the City. Under the old assessment system, some properties were valued closer to their actual value than other properties. Properties that had been valued closer to their actual value saw relatively smaller increases in assessments and when those assessment changes were coupled with the much lower Real Estate Tax rate, they produced tax decreases. On the other hand, properties that were relatively undervalued saw tax increases, a small number of which were substantial.

In order to mitigate the hardship that could be created by those large increases, the ordinance imposing the new Real Estate Tax rates included a homestead exemption of $30,000 for all primary residential owner-occupants. Alternative programs are also available to reduce Real Estate Tax bills for homeowners, including the Longtime Owner-Occupant Program (LOOP) to provide relief to longtime owners with large increases and the ten-year tax abatement. In addition to the homestead exemption, the City has also instituted several other property tax relief programs for taxpayers.

The Real Estate Tax rates for tax years 2012-2018 are set forth in Table 6 below:

Table 6
Real Estate Tax Rates and Allocations

Tax Year	City	School District	Total
2012	4.1230%	5.3090%	9.4320%
2013	4.4620%	5.3090%	9.7710%
2014[(1)]	0.6018%	0.7382%	1.3400%
2015[(1)]	0.6018%	0.7382%	1.3400%
2016[(1)]	0.6317%	0.7681%	1.3998%
2017[(1)]	0.6317%	0.7681%	1.3998%
2018[(1)]	0.6317%	0.7681%	1.3998%

(1) The reduction of the Real Estate Tax rates from tax year 2013 to tax year 2014 and succeeding tax years reflects the City's Actual Value Initiative.

For Fiscal Year 2017, the actual amount of Real Estate Tax revenue for the City was $542.9 million (excluding delinquent collections). For Fiscal Year 2018, the unaudited actual amount of Real Estate Tax revenue for the City is $611.3 million (excluding delinquent collections). For Fiscal Year 2019, the budgeted amount of Real Estate Tax revenue for the City is $630.7 million (excluding delinquent collections). See Table 3 above.

Currently, the Real Estate Tax is split between the City and the School District at the percentages of 45% for the City and 55% for the School District.

In the Fiscal Year 2019 Adopted Budget, the homestead exemption was increased from $30,000 to $40,000 of assessed value. To hold the School District harmless from the property tax revenues lost by increasing the homestead exemption, the local share of the real property transfer tax has been increased to 3.278% and the additional revenue generated by that increase is being provided to the School District.

Table 7 shows the assessed values of properties used for tax year 2018 and 2019 Real Estate Taxes (both of which reflect the effect of AVI). Under AVI, the OPA certifies the market values by March 31 of the prior year (that is, for tax year 2018, the OPA certified the market values on March 31, 2017). Taxpayers base their appeals on the certified market values, and therefore, the assessed values are adjusted as the appeals are finalized. For budgetary purposes, the OPA provides an updated table to the Office of the Director of Finance in February, from which tax rates are proposed. Certified values can vary substantially from the amounts included in such updated table and, as such, Real Estate Tax collections can also vary from the amounts included in the City's annual operating budget.

Table 7
Certified Property Values for Tax Years 2018 and 2019

Tax Year 2018*

Category	Tax Status	Assessed Value	Taxable Assessed Value	Exempt Assessed Value	Number of Parcels
Residential	Fully Taxable	$28,834,307,863	$28,834,307,863	$0	233,860
Residential	Abatement	5,583,248,300	1,573,935,559	4,009,312,741	13,061
Residential	Exemption	34,743,873,838	26,942,483,841	7,801,389,997	227,450
Total		**$69,161,430,001**	**$57,350,727,263**	**$11,810,702,738**	**474,371**
Hotels and Apartments	Fully Taxable	$15,522,233,388	$15,522,233,388	$0	21,960
Hotels and Apartments	Abatement	4,433,514,680	1,479,167,632	2,954,347,048	850
Hotels and Apartments	Exemption	3,817,077,100	1,169,583,571	2,647,493,529	4,584
Total		**$23,772,825,168**	**$18,170,984,591**	**$5,601,840,577**	**27,394**
Store with Dwelling	Fully Taxable	$3,104,975,030	$3,104,975,030	$0	12,830
Store with Dwelling	Abatement	155,607,400	69,866,381	85,741,019	224
Store with Dwelling	Exemption	416,206,725	293,689,072	122,517,653	1,686
Total		**$3,676,789,155**	**$3,468,530,483**	**$208,258,672**	**$14,740**
Commercial	Fully Taxable	$18,081,041,646	$18,081,041,646	$0	9,143
Commercial	Abatement	3,078,093,570	934,704,280	2,143,389,290	366
Commercial	Exemption	25,512,090,455	662,684,636	24,849,405,819	4,237
Total		**$46,671,225,671**	**$19,678,430,562**	**$26,992,795,109**	**$13,746**
Industrial	Fully Taxable	$3,378,308,625	$3,378,308,625	$0	4,240
Industrial	Abatement	693,382,830	397,776,002	295,606,828	89
Industrial	Exemption	583,057,900	34,885,062	548,172,838	202
Total		**$4,654,749,355**	**$3,810,969,689**	**$843,779,666**	**$4,531**
Vacant Land	Fully Taxable	$2,449,227,090	$2,449,227,090	$0	32,970
Vacant Land	Abatement	99,963,900	0	99,963,900	36
Vacant Land	Exemption	2,509,072,725	60,071,559	2,449,001,166	12,345
Total		**$5,058,263,715**	**$2,509,298,649**	**$2,548,965,066**	**45,351**
Grand Total		**$152,995,283,065**	**$104,988,941,237**	**$48,006,341,828**	**580,133**

* Certified Market Value as of 3/31/2017.

Tax Year 2019*

Category	Tax Status	Assessed Value	Taxable Assessed Value	Exempt Assessed Value	Number of Parcels
Residential	Fully Taxable	$33,864,504,350	$33,864,504,350	$0	233,539
Residential	Abatement	6,685,911,302	1,929,800,443	4,756,110,859	13,109
Residential	Exemption	38,955,018,700	30,619,175,628	8,335,843,072	228,538
Total		**$79,505,434,352**	**$66,413,480,421**	**$13,091,953,931**	**475,186**
Hotels and Apartments	Fully Taxable	$16,321,031,500	$16,321,031,500	$0	22,088
Hotels and Apartments	Abatement	5,588,435,540	1,757,731,082	3,830,704,458	941
Hotels and Apartments	Exemption	4,181,145,800	1,324,666,815	2,856,478,985	4,498
Total		**$26,090,612,840**	**$19,403,429,397**	**$6,687,183,443**	**27,527**
Store with Dwelling	Fully Taxable	$3,022,418,700	$3,022,418,700	$0	12,579
Store with Dwelling	Abatement	155,539,300	66,451,668	89,087,632	226
Store with Dwelling	Exemption	416,066,200	295,406,197	120,660,003	1,718
Total		**$3,594,024,200**	**$3,384,276,565**	**$209,747,635**	**14,523**
Commercial	Fully Taxable	$18,663,197,700	$18,663,197,700	$0	9,482
Commercial	Abatement	3,430,922,800	891,359,674	2,539,563,126	368
Commercial	Exemption	24,003,062,800	708,204,069	23,294,858,731	4,177
Total		**$46,097,183,300**	**$20,262,761,443**	**$25,834,421,857**	**14,027**
Industrial	Fully Taxable	$3,447,174,500	$3,447,174,500	$0	4,151
Industrial	Abatement	560,494,200	274,820,135	285,674,065	79
Industrial	Exemption	603,467,800	37,116,225	566,351,575	197
Total		**$4,611,136,500**	**$3,759,110,860**	**$852,025,640**	**4,427**
Vacant Land	Fully Taxable	$2,279,849,000	$2,279,849,000	$0	32,645
Vacant Land	Abatement	115,783,600	570,000	115,213,600	32
Vacant Land	Exemption	2,377,964,900	52,077,021	2,325,887,879	12,283
Total		**$4,773,597,500**	**$2,332,496,021**	**$2,441,101,479**	**44,960**
Grand Total		**$164,671,988,692**	**$115,555,554,707**	**$49,116,433,985**	**580,650**

* Certified Market Value as of 3/31/2018.

As part of the transition to the new assessment system, OPA set up a new process called a first level review ("FLR"), where a taxpayer could request an administrative review of its assessment notice prior to launching a formal appeal with the BRT. The BRT has the authority, following a formal appeal, to either increase, decrease, or leave unchanged the property valuations contained in the return of the assessors in order that such valuations conform with law. After all changes in property assessments, and after all assessment appeals, assessments are certified and the results provided to the Department of Revenue. Some appeals are not resolved before the Department of Revenue sends bills to taxpayers. As such, some property assessments are modified after taxpayers receive bills.

On October 24, 2012, the Governor approved Act 160 ("Act 160"), which permits downward adjustments to School District property tax and use and occupancy tax rates, solely to offset the higher assessed values anticipated under AVI, and only to the extent the yield from such lower rates is no lower than the highest tax yield in the previous three years. Act 160 permits such adjustment for the reassessment year and the two years thereafter.

For tax year 2018, OPA revised the assessed values of over 60,000 parcels (which included properties of all categories, including commercial and residential parcels) throughout the City as part of its reassessment. In September 2017, the owners of multiple commercial properties in the City filed a lawsuit against the City in the Court of Common Pleas. The plaintiffs in such matter have alleged, based on a July 2017 Pennsylvania Supreme Court decision, that OPA violated the uniformity clause of the Pennsylvania Constitution in reassessing commercial properties and not residential properties for tax year 2018. The plaintiffs are seeking declaratory relief, a permanent injunction, and an order directing OPA to recertify their properties at tax year 2017 values. Subsequently, ten additional cases were filed, asserting virtually the same claims. All of the cases, which in total currently encompass approximately 500 plaintiffs, have been or are in the process of being consolidated for management purposes. The City intends to defend these lawsuits and believes that the lawsuits both misstate the relevant facts about the OPA's assessment process and misapply the relevant law. If plaintiffs were to succeed in these matters, the City expects that any relief would only be granted prospectively, not resulting in the refund of any money. Such expectation is based on the City's position that the July 2017 decision was a significant change in law and that the City acted in good faith consistent with the prior case law. Additionally, even if the relief is retroactive, rather than prospective, the City expects that, at most, there would be a decrease in Real Estate Taxes equal to the difference in the plaintiffs' Real Estate Taxes from tax year 2017 to tax year 2018. As noted below, another City-wide reassessment was conducted for tax year 2019. As such, the City does not expect the Real Estate Taxes for tax year 2019 to be impacted by any judgment on this matter. The Real Estate Taxes associated with the increase of the taxable assessed values for the properties in question is more than $36 million, with approximately 55% allocated to the School District and 45% to the City. For more general information on judgments and settlements on claims against the City, see "LITIGATION."

For tax year 2019, OPA revised the assessed values of over 515,000 parcels throughout the City as part of its reassessment. As of October 31, 2018, OPA has received 20,616 FLRs, with approximately 7,000 remaining that have yet to be decided. As of October 31, 2018, BRT has received approximately 7,700 formal appeals. BRT will begin hearing these appeals in calendar year 2019.

Since 2010, the City has pursued a number of initiatives to improve the collection of Real Estate Taxes, including (i) prompt correspondence with taxpayers with overdue Real Estate Taxes, (ii) using outside collection firms to collect overdue Real Estate Taxes, (iii) sequestration of delinquent properties occupied by commercial tenants, and (iv) tax lien sales.

See Table 8 below for data with respect to Real Estate Taxes levied from 2013 to 2017 and collected by the City from January 1, 2013 to June 30, 2017. See Table 9 for the assessed property values of the City's principal taxable assessed parcels in 2017. See Table 10 for the 2017 market and assessed values of the ten highest valued taxable real properties in the City, as well as the amounts and duration of Real Estate Tax abatements with respect to such properties.

Table 8
City of Philadelphia
Real Property Taxes Levied and Collected
For the Calendar Years 2013-2017
(Amounts in Millions of USD)(1), (2)

Calendar Year	Taxes Levied Based on Original Assessment(3)	Taxes Levied Based on Adjusted Assessment(4)	Collections in the Calendar Year of Levy(6)	Percentage Collected in the Calendar Year of Levy	Collections in Subsequent Years(5), (6)	Total Collections to Date: All Years(6)	Percentage Collected to Date: All Years(6)
2013	$554.0	$537.5	$505.6	94.1%	$25.1	$530.7	98.7%
2014	$553.2	$514.6	$482.1	93.7%	$24.9	$507.0	98.5%
2015	$547.4	$517.5	$489.1	94.5%	$20.5	$509.6	98.5%
2016	$569.9	$549.9	$525.2	95.5%	$10.8	$536.0	97.5%
2017	$580.5	$567.0	$522.1	N/A	N/A	$522.1	N/A

(1) Source: Fiscal Year 2017 CAFR.
(2) Real Estate Taxes are levied by the City and the School District. While this table reflects City General Fund Real Estate Tax revenues exclusively, the School District Real Estate Tax collection rates are the same.
(3) Taxes are levied on a calendar year basis. They are due on March 31.
(4) Adjustments include assessment appeals, a 1% discount for payment in full by February 28, the senior citizen tax discount, and the tax increment financing return of tax paid.
(5) Includes payments from capitalization charges. This capitalization occurs one time, after the end of the first year of the levy, on any unpaid balances.
(6) For calendar year 2017, the data shown reflects collections through June 30, 2017. For earlier calendar years, the data shown reflects collections through December 31 of the respective year.

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Table 9
Principal Taxable Assessed Parcels – 2018
(Amounts in Millions of USD)[1]

Taxpayer	2018 Assessment[2]	2018 Percentage of Total Assessments
Liberty Property Phila	$337.6	0.30%
401 North Broad Fee Inter	333.7	0.30
Commonwealth of PA	329.8	0.30
EQC Nine Penn Center Prop	327.7	0.29
Phila Liberty Place LP	289.2	0.26
Park Towne Place Assoc	254.9	0.23
Commerce Square Partners	244.1	0.22
Philadelphia Market Street	243.1	0.22
Brandywine Operating	237.0	0.21
Maguire / Thomas Partners	231.4	0.21
Total	$2,828.5	2.54%
Total Taxable Assessments[3]	$111,257.1	

Source: City of Philadelphia, Office of Property Assessment.

(1) Figures may not sum due to rounding.
(2) Assessment Values rounded to the nearest $100,000 and only include the largest assessed property for each taxpayer, additional properties owned by the same taxpayer are not included.
(3) Total 2018 Taxable Assessment as of March 31, 2017.

Table 10
Ten Largest Certified Market and Assessment Values of Tax-Abated Properties
Certified Values for 2018
(Amounts in Millions of USD)[(1), (2)]

Location	2018 Certified Market Value	Total Assessment	Total Taxable Assessment	Total Exempt Assessment	Exempt Through Tax Year
401 N Broad St	$367.6	$367.6	$333.7	$33.9	2026
1001-99 Delaware Ave	$307.6	$307.6	$48.2	$259.4	2026
1500-30 Spring Garden St	$168.7	$168.7	$155.8	$12.9	2020
2116 Chestnut St	$133.7	$133.7	$13.4	$120.4	2023
1919-43 Market St	$121.3	$121.3	$12.1	$109.2	2026
1900-24 Arch St	$117.1	$117.1	$11.7	$105.4	2025
819-41 Chestnut St	$114.4	$114.4	$109.0	$5.4	2024
1901-39 Callowhill St	$113.9	$113.9	$11.4	$102.5	2023
3400L Lancaster Ave	$113.4	$113.4	$11.3	$102.1	2025
3601 Market St	$113.3	$113.3	$0.0	$113.3	2026

Source: City of Philadelphia, Office of Property Assessment.

(1) Figures may not sum due to rounding.
(2) Certified Values as of 3/31/2017.

Sales and Use Tax

Pursuant to the authorization granted by the Commonwealth under the PICA Act, the City adopted a 1% sales and use tax (the "City Sales Tax") for City general revenue purposes effective beginning in Fiscal Year 1992. It is imposed in addition to, and on the same basis as, the Commonwealth's sales and use tax. Vendors are required to pay City Sales Taxes to the Commonwealth Department of Revenue together with the Commonwealth sales and use tax. The State Treasurer deposits the collections of City Sales Taxes in a special fund and disburses the collections, including any investment income earned thereon, less administrative fees of the Commonwealth Department of Revenue, to the City on a monthly basis.

The City's budgets for Fiscal Years 2010-2014 provided for an increase in the City Sales Tax rate to 2%, as authorized by the Commonwealth effective October 8, 2009, through June 30, 2014. In July 2013, the Commonwealth authorized the implementation of a new, permanent 1% increase in the City Sales Tax rate effective July 1, 2014, which was adopted by the City on June 12, 2014 and became effective on July 1, 2014. Under the reauthorized City Sales Tax, the first $120 million collected from such additional 1% is distributed to the School District. For Fiscal Years 2015-2018, the General Assembly has also authorized the City to use the next $15 million of City Sales Tax revenues from such additional 1% collected in such Fiscal Years for the payment of debt service on obligations issued by the City for the benefit of the School District. Following any such debt service payments, that remaining portion of the City Sales Tax revenues from such additional 1% distributed to the City is required to be used exclusively in accordance with Act 205 (as defined herein) and deposited to the Municipal Pension Fund.

The following table sets forth the City Sales Taxes collected in Fiscal Years 2014-2018 and the budgeted amount for Fiscal Year 2019.

Table 11
Summary of City Sales Tax Collections
Fiscal Years 2014-2017 (Actual), 2018 (Unaudited Actual), and 2019 (Adopted Budget)
(Amounts in Millions of USD)(1)

Fiscal Year	City Sales Tax Collections
2014 (Actual)	$263.1
2015 (Actual)	$149.5(2)
2016 (Actual)	$169.4(2)
2017 (Actual)	$188.4(2)
2018 (Unaudited Actual)	$198.4(2)
2019 (Adopted Budget)	$216.5(3)

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the FY 2018 AFR (Unaudited). For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.

(2) Net collections estimated to be distributed to the City (i) from the first 1% City Sales Tax, (ii) following the distribution of $120 million of revenues from the second 1% City Sales Tax to the School District, and (iii) following the payment of debt service on obligations issued by the City for the benefit of the School District, as described above.

(3) Net collections estimated to be distributed to the City from the first 1% City Sales Tax and following the distribution of $120 million of revenues from the second 1% City Sales Tax to the School District, as described above.

Other Taxes

The City also collects real property transfer taxes, parking taxes, an amusement tax, a valet parking tax, an outdoor advertising tax, a smokeless tobacco tax, the Philadelphia Beverage Tax (see below), and other miscellaneous taxes.

In June 2016, City Council passed the Philadelphia Beverage Tax (Chapter 19-4100 of the Philadelphia Code) (the "Philadelphia Beverage Tax"). On October 31, 2016, the Department of Revenue adopted regulations for the Philadelphia Beverage Tax. The Philadelphia Beverage Tax taxes the distribution of certain beverages at 1.5 cents per ounce and became effective January 1, 2017.

The Philadelphia Beverage Tax is deposited into the General Fund, and with the additional revenue, the City has budgeted additional funds for pre-Kindergarten, community schools, and debt service for improvements to parks, playgrounds, recreation centers, and libraries. In the Fiscal Year 2017 CAFR, the City reported that it collected approximately $39.5 million in revenues from the Philadelphia Beverage Tax for Fiscal Year 2017.

Following one full year of collections of the Philadelphia Beverage Tax, the City has adjusted downward its projected collections of such tax in Fiscal Years 2018-2023. For example, in the FY 2018 AFR (Unaudited), the City reported that it collected approximately $77.4 million in Fiscal Year 2018, which is down from a projected $92.4 million (as included in the adopted budget for Fiscal Year 2018).

In the Twenty-Seventh Five-Year Plan, the City projects for Fiscal Years 2019-2023 that it will collect approximately (i) $78.0 million (Fiscal Year 2019), (ii) $77.3 million (Fiscal Year 2020), (iii) $76.5 million (Fiscal Year 2021), (iv) $75.7 million (Fiscal Year 2022), and (v) $75.0 million (Fiscal Year 2023) in revenues from the Philadelphia Beverage Tax in such Fiscal Years.

In September 2016, a lawsuit challenging the Philadelphia Beverage Tax was filed by the American Beverage Association and other co-plaintiffs in the Philadelphia Court of Common Pleas – Trial Division – Civil. In December 2016, the Court of Common Pleas dismissed the complaint in its entirety. The plaintiffs appealed this ruling. In June 2017, the Commonwealth Court of Pennsylvania, which is one of the Commonwealth's intermediate appellate courts, upheld the decision of the Court of Common Pleas. The plaintiffs petitioned the Pennsylvania Supreme Court to review this decision. In July 2018, the Pennsylvania Supreme Court upheld the decisions of the lower courts.

The City had reserved a portion of the revenues it collected from the Philadelphia Beverage Tax while the litigation described above was ongoing. The City expects to begin spending such reserved revenues now that such litigation has been resolved.

Improved Collection Initiative

The City is pursuing a multifaceted strategy designed to improve collections of various taxes while decreasing delinquencies. Key compliance strategies continue to include revocation of commercial licenses and sequestration, among others.

In addition to compliance efforts, the City has completed two projects – one to implement technology solutions for its cashiering and payments processing systems and another to develop an integrated data warehouse and case management system. These initiatives are designed to improve operational efficiencies and drive compliance efforts by providing tools currently unavailable to the City.

Other Locally Generated Non-Tax Revenues

These revenues include license fees and permit sales, traffic fines and parking meter receipts, court related fees, stadium revenues, interest earnings and other miscellaneous charges and revenues of the City.

Revenue from Other Governments

The following table presents revenues received from other governmental jurisdictions for Fiscal Years 2014-2017, the budgeted amounts and current estimate for Fiscal Year 2018, the budgeted amount for Fiscal Year 2019, and the percentage such revenues represent in the General Fund. The table does not reflect substantial amounts of revenues from other governments received by the Grants Revenue Fund, Community Development Fund, and other operating and capital funds of the City.

Table 12
Revenue from Other Governmental Jurisdictions
Fiscal Years 2014-2017 (Actual), 2018 (Adopted Budget and Current Estimate), and 2019 (Adopted Budget)
(Dollar Amounts in Millions of USD)[(1), (2), (3)]

Fiscal Year	Commonwealth[(4)]	Federal Government	Other Governments[(5)]	Total	Percentage of General Fund Revenues
2014 (Actual)	$255.3	$31.0	$61.0	$347.3	9.1%
2015 (Actual)	$212.7	$30.1	$60.0	$302.8	8.1%
2016 (Actual)	$223.7	$29.7	$52.3	$305.6	7.7%
2017 (Actual)	$214.7	$37.6	$55.4	$307.7	7.4%
2018 (Adopted Budget)	$221.4	$35.6	$59.3	$316.3	7.2%
2018 (Current Estimate)	$219.4	$31.8	$60.7	$311.9	7.0%
2019 (Adopted Budget)	$231.1	$43.1	$63.3	$337.5	7.3%

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the Fiscal Year 2018 Adopted Budget and the Twenty-Seventh Five-Year Plan. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.
(2) Figures may not sum due to rounding.
(3) Does not include the PICA Tax.
(4) Such revenues are for health, welfare, court, and various other specified purposes.
(5) Such revenues primarily consist of payments from PGW, parking fines and fees from PPA, and other authorized adjustments.

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Proposals to Reduce Federal Funding

The following discussion of the Executive Order (as defined below) addresses a federal policy that may affect certain funding for the City. The City is monitoring the Executive Order and the potential impact, if any, such initiative may have on City funding. Table 12 above presents certain revenues received from other governmental jurisdictions, including the federal government, and the percentage such revenues represent in the General Fund.

On January 25, 2017, President Trump issued "Executive Order – Enhancing Public Safety in the Interior of the United States," which aims to address certain immigration policies of the administration relating to "sanctuary jurisdictions," among other things (the "Executive Order"). The Executive Order states, in part, that the policy of the executive branch will be to "ensure that jurisdictions that fail to comply with applicable Federal law do not receive Federal funds, except as mandated by law."

The Executive Order raises many questions of law regarding the attachment of the above policies to federal funding and has been challenged in judicial proceedings. The United States Department of Justice (the "Department of Justice") has indicated in such proceedings that only certain law enforcement-related federal grants could potentially be impacted by the Executive Order. The Executive Order currently is enjoined nationwide by the United States District Court for Northern California.

The City receives an annual federal criminal justice-related federal grant in the amount of approximately $1.7 million. In April 2017, the Department of Justice sent a letter to nine cities, including the City, stating that they had until the end of June 2017 to certify their compliance with certain immigration-related federal laws or risk having criminal justice-related grants withheld. In June 2017, the City sent a letter to the Department of Justice explaining that its local policies do not violate any immigration-related federal laws.

In August 2017, the City filed a complaint challenging attachment of the immigration-related law to the grant, as well as other conditions of the grant, in the United States District Court for the Eastern District of Pennsylvania, and seeking to enjoin the Department of Justice from attaching the various conditions to the grant funding. On November 15, 2017, the court issued a preliminary injunction, which prohibited the Department of Justice and the Attorney General from withholding the grant funds in connection with the immigration-related law. By order entered on June 28, 2018, the court made the injunction permanent and directed the Department of Justice to process and approve the City's request for the criminal justice-related federal grant without regard to the conditions the Department of Justice had attempted to impose on the City. On July 24, 2018, the Department of Justice filed a notice of appeal to the United States Court of Appeals for the Third Circuit. The case has been fully briefed with argument scheduled for November 7, 2018. The City has received the criminal justice-related federal grant for Fiscal Year 2017 and has applied for such grant for Fiscal Year 2018 without acceptance of any immigration-related conditions.

Revenues from City-Owned Systems

In addition to taxes, the City realizes revenues through the operation of various City-owned systems, such as the Water and Wastewater Systems and PGW. The City has issued revenue bonds with respect to the Water and Wastewater Systems and PGW to be paid solely from and secured by a pledge of the respective revenues of these systems. The revenues of the Water and Wastewater Systems and PGW are not legally available for payment of other obligations of the City until, on an annual basis, all revenue bond debt service requirements and covenants relating to those bonds have been satisfied, and then only in a limited amount and upon satisfaction of certain other conditions.

Water Fund. The revenues of the Philadelphia Water Department (the "Water Department") are required to be segregated from other funds of the City. Under the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989 (the "Water Ordinance"), an annual transfer may be made from the Water Fund to the City's General Fund in an amount not to exceed the lesser of (i) all Net Reserve Earnings and (ii) $4,994,000. "Net Reserve Earnings" means the amount of interest earnings during the Fiscal Year on amounts in the Debt Reserve Account and Subordinated Bond Fund, each as defined in the Water Ordinance.

The following table shows the amounts transferred from the Water Fund to the General Fund for Fiscal Years 2014-2018 and the budgeted amount for Fiscal Year 2019.

Table 13
Transfers from Water Fund to General Fund (Excess Interest on Sinking Fund Reserve)
Fiscal Years 2014-2018 (Actual) and 2019 (Adopted Budget)[(1), (2)]

Fiscal Year	Amount Transferred
2014 (Actual)	$ 400,364
2015 (Actual)	$ 745,585
2016 (Actual)	$1,555,702
2017 (Actual)	$1,866,455
2018 (Actual)	$1,627,838
2019 (Adopted Budget)	$1,500,000

(1) Sources: For Fiscal Years 2014-2017, the City's Supplemental Report of Revenues & Obligations for such Fiscal Years. For Fiscal Year 2018, the Water Department. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.
(2) The Water Department's budgeted amount for such transfers is typically greater than the figure included in the City's operating budget.

The City also budgets for certain transfers from the Water Fund to the General Fund related to services performed and costs borne by the General Fund. For Fiscal Year 2018, the amount of such transfers was $7,319,325. For Fiscal Year 2019, the City has budgeted $9,624,000 for such transfers.

PGW. The revenues of PGW are required to be segregated from other funds of the City. Payments for debt service on PGW bonds are made directly by PGW. PGW is required to make an annual payment of $18 million to the General Fund. The Fiscal Year 2019 Adopted Budget includes such $18 million annual payment to the General Fund from PGW for such Fiscal Year. For more information on PGW, see "THE GOVERNMENT OF THE CITY OF PHILADELPHIA – Government Services."

Philadelphia Parking Authority Revenues

The PPA was established by City ordinance pursuant to the Pennsylvania Parking Authority Law (P.L. 458, No. 208 (June 5, 1947)). Various statutes, ordinances, and contracts authorize PPA to plan, design, acquire, hold, construct, improve, maintain and operate, own or lease land and facilities for parking in the City, including such facilities at PHL, and to administer the City's on-street parking program.

PPA owns and operates five parking garages and a number of surface parking lots at PHL. The land on which these garages and surface lots are located is leased from the City, acting through the Division of Aviation, pursuant to a lease expiring in 2030 (the "Lease Agreement"). The Lease Agreement provides for payment of rent to the City, which is equal to gross receipts less operating expense, debt service on PPA's bonds issued to finance improvements at PHL and reimbursement to PPA for capital expenditures and prior year operating deficits relating to its operations at PHL, if any.

One component of the operating expenses is PPA's administrative costs. In 1999, at the request of the FAA, PPA and the City entered into a letter agreement (the "FAA Letter Agreement"), which contained a formula for calculating PPA's administrative costs and capped such administrative costs at 28% of PPA's total administrative costs for all of its cost centers. PPA owns and/or operates parking facilities at a number of locations in the City in addition to those at PHL. These parking facilities are revenue centers for purposes of the FAA Letter Agreement. According to PPA's audited financial statements, as filed with the City, PPA has been in compliance with the FAA Letter Agreement since its execution.

On-street parking revenues are administered and collected on behalf of the City by the PPA. Pursuant to Pennsylvania law, PPA is to transmit these revenues to the City, net of any actual expenses incurred in the administration of the on-street parking system in accordance with the PPA's approved budget, provided that, should such net revenues exceed a designated threshold (as described below), any excess above that threshold is to be transmitted to the School District. Pursuant to Act 84 of 2012, the effect of which commenced in Fiscal Year 2015, the threshold, which was previously set at $25 million, was set at $35 million, including a mandatory escalator to take into account increases in revenues. The following table presents payments received by the City from PPA for on-street parking for Fiscal Years 2014-2017, the budgeted amount and current estimate for Fiscal Year 2018, and the budgeted amount for Fiscal Year 2019.

Table 14
PPA On-Street Parking Payments to the City
Fiscal Years 2014-2017 (Actual), 2018 (Adopted Budget and Current Estimate), and 2019 (Adopted Budget)[1]
(Amounts in Millions of USD)

Fiscal Year	Payments to the City
2014 (Actual)	$37.7
2015 (Actual)	$38.1
2016 (Actual)	$33.7
2017 (Actual)	$39.9
2018 (Adopted Budget)	$38.8
2018 (Current Estimate)	$40.1
2019 (Adopted Budget)	$42.8

(1) Sources: For Fiscal Years 2014-2017, the City's Supplemental Report of Revenues & Obligations for such Fiscal Years. For Fiscal Year 2018, the Fiscal Year 2018 Adopted Budget and the FY 2018 Fourth Quarter QCMR. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.

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Other Tax Rate Changes

The Twenty-Seventh Five-Year Plan includes reductions in both the resident and non-resident wage and earnings tax. The following table details rates under the Twenty-Seventh Five-Year Plan.

Table 15
Changes in Wage and Earnings Tax Rates[1]

	Twenty-Seventh Five-Year Plan	
Fiscal Year	Resident Wage and Earnings Tax Rates[2]	Non-Resident Wage and Earnings Tax Rates
2018	3.8907%	3.4654%
2019	3.8809%	3.4567%
2020	3.8712%	3.4481%
2021	3.8616%	3.4395%
2022	3.8519%	3.4309%
2023	3.8423%	3.4223%

(1) Source: The Twenty-Seventh Five-Year Plan.
(2) Includes PICA Tax. See "DEBT OF THE CITY – PICA Bonds" for a description of the PICA Tax.

Under the Twenty-Seventh Five-Year Plan, receipts from the Wage and Earnings Tax are estimated to grow at a rate of 6.39% in Fiscal Year 2018, 4.29% in Fiscal Year 2019, 4.50% in Fiscal Year 2020, 3.45% in Fiscal Year 2021, 3.41% in Fiscal Year 2022, and 3.37% in Fiscal Year 2023.

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EXPENDITURES OF THE CITY

Three of the principal City expenditures are for personal services (including pensions and other employee benefits), purchase of services (including payments to SEPTA), and debt service. The expenditures for personal services and purchase of services are addressed below under this caption; debt service is addressed below under "DEBT OF THE CITY."

Personal Services (Personnel)

As of June 30, 2018, the City employed 27,867 full-time employees, representing approximately 4.2% of employees in Philadelphia (approximately 663,917 employees, according to preliminary, non-seasonally adjusted data from the Bureau of Labor Statistics). Of these full-time public employees, the salaries of 22,226 were paid from the General Fund. Additional sources of funding for full-time City employees include the Grants Revenue Fund, the Water Fund, and the Aviation Fund, as well as grants and contributions from other governments. Activities funded through such grants and contributions are not undertaken if funding is not received. The following table sets forth the number of filled, full-time positions of the City as of the dates indicated.

Table 16
Filled, Full-Time Positions[(1), (2)]

	June 30, 2014	June 30, 2015	June 30, 2016	June 30, 2017	June 30, 2018
General Fund					
Police	7,095	7,061	6,942	6,986	7,172
Fire	2,053	2,150	2,316	2,281	2,511
Courts	1,866	1,842	1,839	1,856	1,867
Prisons	2,268	2,286	2,289	2,277	2,177
Streets	1,684	1,664	1,676	1,702	1,738
Public Health	659	653	653	687	711
Human Services	382	395	449	385	517
All Other	4,984	5,115	5,263	5,436	5,533
Total – General Fund	20,991	21,166	21,427	21,610	22,226
Other Funds	5,657	5,626	5,615	5,849	5,641
Total – All Funds	26,648	26,792	27,042	27,459	27,867

(1) Source: Table P-1 in the City's Quarterly City Manager's Reports.
(2) Table 16 does not include seasonal or temporary employees.

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Overview of City Employees

The wages and benefits of City employees vary not only by position, but also by whether the employees are represented by a union and, if so, which union. Employee wages and benefits may also be impacted by whether the employee is subject to the civil service system or exempt from those rules. Thus, City employees may be broken down into three major categories for purposes of understanding how their wages and benefits are determined: (i) employees who are not subject to the civil service system ("exempt employees"); (ii) employees who fall under the civil service system but are not represented by a union ("non-represented employees"); and (iii) employees who are subject to the civil service system and are represented by a union ("union employees").

As of September 30, 2018, the City had over 24,000 unionized employees, representing approximately 86% of the City's employees. Such employees were represented by the City's four municipal unions: (i) Fraternal Order of Police ("FOP") Lodge No. 5; (ii) International Association of Fire Fighters ("IAFF") Local 22; (iii) American Federation of State, County and Municipal Employees District Council 33 ("AFSCME DC33"); and (iv) American Federation of State, County and Municipal Employees District Council 47 ("AFSCME DC47").

In July 2016, a collective bargaining agreement was reached with AFSCME DC 33, which provides for pension reforms coupled with salary increases, lump sum payments for health care, and a one-time bonus. This collective bargaining agreement was ratified on August 19, 2016.

On June 30, 2017, the labor agreements for FOP Lodge No. 5, IAFF Local 22, and AFSCME DC 47 expired. On August 15, 2017, a labor arbitration panel awarded the FOP Lodge No. 5 Labor Contract, a new three-year contract, reflecting annual raises ranging from 3.25% to 3.75% and resulting in a projected aggregate cost to the City of approximately $247.22 million during Fiscal Years 2018-2022.

On March 13, 2018, an arbitration panel awarded a new three-year contract for the employees of the Philadelphia Sheriff's Office and Register of Wills, reflecting annual raises ranging from 2.5% to 3.0% for Register of Wills employees and 3.0% to 3.25% for Sheriff's Office employees and resulting in a projected aggregate cost to the City of approximately $13.46 million during Fiscal Years 2018-2023.

On March 19, 2018, an arbitration panel awarded a new three-year contract for the public safety employees represented by DC 33 Local 159 and DC 33 Local 1637, reflecting annual raises ranging from 3.0% to 3.25% and resulting in a projected aggregate cost to the City of approximately $50.28 million during Fiscal Years 2018-2023.

In May 2018, an arbitration panel awarded a new three-year contract for IAFF Local 22 (firefighters), reflecting annual raises ranging from 3.25% to 3.75% and resulting in a projected aggregate cost to the City of approximately $144.58 million during Fiscal Years 2018-2023.

In June 2018, a new three-year collective bargaining agreement was reached with AFSCME DC 47, reflecting annual raises ranging from 2.5% to 3.0% and resulting in a projected aggregate cost to the City of approximately $46.17 million during Fiscal Years 2018-2023.

The costs of the agreements discussed above have been included in the City's five-year plans, as applicable. See "DISCUSSION OF FINANCIAL OPERATIONS – Current Financial Information" herein).

For more information on the current status of the interest arbitration awards that have been issued for, and contract settlements reached with, the City's major labor organizations, as well as changes that have been made for non-represented employees, see Table 18.

Collective bargaining with respect to the wages, hours and other terms and conditions of employment of union employees, other than uniformed employees of the Police Department and the Fire Department, is governed by the Public Employee Relations Act (Pa. P.L. 563, No. 195 (1970)) ("PERA"). PERA requires the City and the unions to negotiate in good faith to attempt to reach agreement on new contract terms and, if an impasse exists after such negotiations, to mediate through the Commonwealth Bureau of Mediation. Once the mediation procedures have been satisfied, and if no collective bargaining agreement has been reached, most employees covered by PERA are permitted to strike. Certain employees, however, including employees of the Sheriff's Office and the Register of Wills represented by the FOP, corrections officers represented by AFSCME DC 33, and employees of the First Judicial District represented by AFSCME DC 47, are not permitted to strike under PERA. These employees must submit any impasse to binding interest arbitration once the mediation procedures have been satisfied. PERA permits parties at an impasse, which are not required to submit to binding interest arbitration, to do so voluntarily. Provisions of an interest arbitration award issued under PERA that require legislative action are considered advisory only and the legislative body is permitted to meet, consider, and reject those provisions.

Uniformed employees of the Police Department and the Fire Department bargain under the Policemen and Firemen Collective Bargaining Act (Pa. P.L. 237, No. 111 (1968)) ("Act 111"), which provides for final and binding interest arbitration to resolve collective bargaining impasses and prohibits these employees from striking. Interest arbitration under Act 111 operates similarly to interest arbitration under PERA, but City Council is not permitted to reject the portions of an interest arbitration award that require legislative action. To the contrary, City Council is required to pass any legislation necessary to implement the award unless doing so would violate state or federal law. Thus, the arbitration panel has significant, although not limitless, power to issue an award on mandatory subjects of bargaining. As with interest arbitration under PERA, the arbitration panel cannot issue an award on a matter that is one of inherent managerial policy. In addition to the grounds available to challenge a PERA interest arbitration award on appeal, the PICA Act requires an Act 111 interest arbitration panel to, among other things, give substantial weight to the City's five-year plan and ability to pay for the cost of the award without negatively impacting services, and gives the City the right to appeal the award to the Court of Common Pleas if it believes the panel has failed to meet these responsibilities. If the arbitration panel fails to do so or, among other things, if it awards wages or benefits that exceed what is assumed in the most-recent five-year plan without substantial evidence in the record demonstrating that the City can afford these increases without adversely impacting service levels, the Court of Common Pleas is required to vacate the arbitration award and remand it to the arbitration panel.

Overview of Employee Benefits

The City provides various pension, life insurance, and health benefits for its employees. The benefits offered depend on the employee's union status and bargaining unit, if applicable. General Fund employee benefit expenditures for Fiscal Years 2014 through 2019 are shown in the following table.

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Table 17
General Fund Employee Benefit Expenditures
Fiscal Years 2014-2017 (Actual) and 2018-2019 (Projected)
(Amounts in Millions of USD)[1]

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Adopted Budget 2018	Current Estimate 2018	Adopted Budget 2019
Pension Costs[2]	$646.4[4]	$558.3	$622.1[8]	$665.2[9]	$680.2[10]	$719.3[11]	$719.8[12]
Health[3]							
Payments under City-administered plan	75.6	75.5	72.5	83.8	96.3	96.3	98.3
Payments under union-administered plans[5]	333.8	319.1	339.0	345.3	370.1	357.6	383.5
Total Health	409.4	394.6	411.5	429.1	466.4	453.9	481.8
Federal Insurance Contributions Act (FICA) Taxes[6]	67.5	71.2	71.7	75.1	76.1	76.1	78.6
Other[7]	70.8	75.6	76.0	71.5	85.1	82.4	80.1
Total	$1,194.1	$1,099.5	$1,181.3	$1,241.0	$1,307.8	$1,331.7	$1,360.2

(1) Source: From the City's five-year financial plans, except for "Payments under City-administered plan" and "Payments under union-administered plans" which were provided by the City, Department of Human Resources. Figures may not sum due to rounding.
(2) Includes debt service on Pension Bonds (as defined herein) and the Commonwealth contributions to the Municipal Pension Fund. See Tables 29 and 30.
(3) This breakdown of "Health" between "Payments under City-administered plan" and "Payments under union-administered plans" is an estimate of actual expenses. The City records the actual health expenses in one line item, which corresponds to the figures in "Total Health."
(4) Includes repayment of deferred contributions. See Table 29.
(5) AFSCME DC 33 receives a per member per month amount of $1,194 from the City.
(6) Includes payments of social security and Medicare taxes.
(7) Includes payments for unemployment compensation, employee disability, group life, group legal, tool allowance, and flex cash payments.
(8) Includes $9.7 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(9) Includes $19.2 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(10) Assumes $24.0 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(11) Assumes $27.2 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."
(12) Assumes $48.3 million from City Sales Tax revenues for the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."

Each of the City's four municipal unions sponsors its own health plan that provides medical, prescription, dental and optical benefits to participating employees and eligible retirees through trusts on which the City has varying degrees of minority representation. Exempt and non-represented employees, along with represented employees of the Register of Wills and employees represented by AFSCME DC 33 who have chosen not to become members of the union's healthcare plan, receive health benefits through a plan sponsored and administered by the City. Each of the plans provides different benefits determined by the plan sponsor or through collective bargaining. To provide health care coverage, the City pays a negotiated monthly premium for employees covered by the union contract for AFSCME DC 33 and is self-insured for all other eligible employees. Aside from AFSCME DC 33, the City is responsible for the actual health care cost that is invoiced to the City's unions by their respective vendors. The actual cost can be a combination of self-insured claim expenses, premiums, ancillary services and administrative expenses. In addition, employees who satisfy the eligibility criteria receive five years of health benefits after their retirement. See "OTHER POST-EMPLOYMENT BENEFITS" below. These benefits are determined and administered by the plan in which the employee participated at the time of his or her retirement. Other employee benefits, including life insurance and paid leave, are similarly determined by the respective collective bargaining agreements and City policies and Civil Service Regulations. Employees also participate in the Municipal Pension Plan. See "PENSION SYSTEM" below.

Overview of Current Labor Situation

Table 18 summarizes the current status of the interest arbitration awards that have been issued for, and contract settlements reached with, the City's major labor organizations, as well as changes that have been made for non-represented employees. It also provides a brief summary of pension reforms that have occurred since 2016.

Table 18
Status of Arbitration Awards and Labor Contract Settlements

Organization	Authorized Number of Full-Time Citywide Employees Represented[1]	Status of Arbitration Award or Contract Settlement	Wage Increases	Pension Reforms[2]
FOP Lodge No. 5 (Police Department)	6,632	Three-year contract effective July 1, 2017 through June 30, 2020 awarded by arbitration panel on August 15, 2017	• 3.25% pay increase for Fiscal Year 2018 • 3.50% pay increase for Fiscal Year 2019 • 3.75% pay increase for Fiscal Year 2020	• Current employees in Plan 87 or Plan 10 will pay an additional .92% of salary effective 7/1/17, increasing by an additional .92% of salary effective 7/1/18 (total increase of 1.84%). These contributions are on top of the current 5% or 6% contribution rates in effect, varies by plan membership • Employees hired on or after 7/1/17 will be required to pay an additional 2.5% of salary
FOP Lodge No. 5 (Sheriff's Office and Register of Wills)	379	Three-year contract effective July 1, 2017 through June 30, 2020 awarded by arbitration panel on March 13, 2018 Register of Wills employees:	• 3.0% increase for Fiscal Year 2018 • 3.25% increase for Fiscal Year 2019 • 3.25% increase for Fiscal Year 2020 • 3.0% increase for Fiscal Year 2018 • 2.5% increase for Fiscal Year 2019 • 3.0% increase for Fiscal Year 2020	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contributions to the pension fund • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $50,000 of earnings and a defined contribution pension for earnings above $50,000 • Plan 10 closed to new enrollment for members of Lodge 5 but remains unchanged for other employee groups • Once fully implemented, such employees in Plan 10 are expected to receive a letter indicating that they have 90 days to make an irrevocable election to opt into the stacked-hybrid • DROP (as defined below) interest rate decreases from 4.5% to the rate on the one-year treasury effective January 1 of each year for participants not currently enrolled or eligible to enroll
IAFF Local 22	2,447	Three-year contract effective July 1, 2017 through June 30, 2020 awarded by arbitration panel on May 17, 2018;	• 3.25% pay increase for Fiscal Year 2018 • 3.5% pay increase for Fiscal Year 2019 • 3.75 % pay increase for Fiscal Year 2020	• Current employees in Plan 87 or Plan 10 will pay an additional .92% of salary effective 7/1/17, increasing by an additional .92% of salary effective 7/1/18 (total increase of 1.84%). These contributions are on top of the current 5% or 6% contribution rates in effect; varies by plan membership • Employees hired on or after 7/1/17 will be required to pay an additional 2.5% of salary
AFSCME DC 33	7,490	Four-year contract term effective July 1, 2016 through June 30, 2020 (ratified on August 19, 2016)	• 3.0% pay increase for Fiscal Year 2017 • 3.0% pay increase for Fiscal Year 2018 • 2.5% pay increase for Fiscal Year 2019 • 3.0% pay increase for Fiscal Year 2020.	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contributions to the pension fund • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $65,000 of earnings and a defined contribution pension for earnings above $65,000 • Plan 10 closed to new enrollment for members of DC33 but remains unchanged for other employee groups • Once fully implemented, such employees in Plan 10 are expected to receive a letter indicating that they have 90 days to make an irrevocable election to opt into the stacked-hybrid • DROP interest rate decreases from 4.5% to the rate on the one year treasury effective January 1 of each year for participants not currently enrolled or eligible to enroll

(1) From data provided by the Mayor's Office of Labor Relations as of September 30, 2018.
(2) "Plan 87", "Plan 10" and "Plan 16" referenced in this column are described in Table 19.

Organization	Authorized Number of Full-Time Citywide Employees Represented[1]	Status of Arbitration Award or Contract Settlement	Wage Increases	Pension Reforms[2]
AFSCME DC 33, Local 159 Correctional Officers	2,119	Three-year contract effective July 1, 2017 through June 30, 2020 awarded by arbitration panel on March 19, 2018	• 3.0% pay increase for Fiscal Year 2018 • 3.25% pay increase for Fiscal Year 2019 • 3.25% pay increase for Fiscal Year 2020	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contributions to the pension fund • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $65,000 of earnings and a defined contribution pension for earnings above $65,000 • Plan 10 closed to new enrollment for members of DC33 but remains unchanged for other employee groups • Once fully implemented, such employees in Plan 10 are expected to receive a letter indicating that they have 90 days to make an irrevocable election to opt into the stacked-hybrid • DROP interest rate decreases from 4.5% to the rate on the one year treasury effective January 1 of each year for participants not currently enrolled or eligible to enroll
AFSCME DC 47	3,718	Contract term from July 1, 2017 through June 30, 2020 (ratified on June 20, 2018)	• 3.0% pay increase for Fiscal Year 2018 • 2.5% pay increase for Fiscal Year 2019 • 3.0% pay increase for Fiscal Year 2020	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contributions to the pension fund (effective January 1, 2019) • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $65,000 of earnings and a defined contribution pension for earnings above $65,000 (effective January 1, 2019) • Plan 10 closed to new enrollment for members of DC47 (effective January 1, 2019) • Once fully implemented, such employees in Plan 10 are expected to receive a letter indicating that they have 90 days to make an irrevocable election to opt into the stacked-hybrid
AFSCME DC 47 Local 810 Court Employees	485	Agreement ratified July 27, 2018 on economic terms for July 1, 2017 through June 30, 2020	• 3.0% pay increase for Fiscal Year 2018 • 2.5% pay increase for Fiscal Year 2019 • 3.0% pay increase for Fiscal Year 2020	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contribution to the pension fund (effective January 1, 2019) • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $65,000 of earnings and a defined contribution pension for earnings above $65,000 (effective January 1, 2019) • Plan 10 closed to new enrollment for members of DC47 (effective January 1, 2019) • Once fully implemented, such employees in Plan 10 are expected to receive a letter indicating that they have 90 days to make an irrevocable election to opt into the stacked hybrid
Non-Represented Employees	1,154	Changes for non-represented employees	• 3.0% pay increase for Fiscal Year 2018 • 2.5% pay increase for Fiscal Year 2019	• Tiered contribution system for current employees under which employees who have higher salaries pay a higher percent of their salaries as contribution to the pension fund (effective January 1, 2019) • Mandatory stacked hybrid plan for new hires under which employees receive a defined benefit pension for their first $65,000 of earnings and a defined contribution pension for earnings above $65,000 (effective January 1, 2019) • Previous 2011 reforms to DROP program remain in place; interest rate was decreased from 4.5% to the rate on the one year treasury effective January 1 of each year for participants not currently enrolled or eligible to enroll and eligibility age remains increased by two years

(1) From data provided by the Mayor's Office of Labor Relations as of September 30, 2018.
(2) "Plan 87", "Plan 10" and "Plan 16" referenced in this column are described in Table 19.

Certain features of the 1987 Plan ("Plan 87"), the 2010 Plan ("Plan 10"), and the 2016 Plan ("Plan 16") are summarized below. Plan 87 is solely a defined benefit plan. Plan 10 and Plan 16 are a "hybrid" plans that include both defined benefit and defined contribution components. A more comprehensive summary of each plan is included as Appendix D of the July 1, 2017 Valuation (as defined herein). See "PENSION SYSTEM" below.

Table 19
Summary of Key Aspects of Plan 87, Plan 10, and Plan 16

Plan 87	Normal Retirement Eligibility	Average Final Compensation ("AFC")	Defined Benefit – Retirement Benefits Multiplier
Municipal (Plan Y)	Age 60 and 10 years of credited service[1]	Average of three highest calendar or anniversary years	• (2.2% x AFC x years of service up to 10 years) plus (2.0% x AFC x numbers of years in excess of 10 years), subject to a maximum of 100% of AFC
Police and Fire	Age 50 and 10 years of credited service[1]	Average of two highest calendar or anniversary years	• (2.2% x AFC x years of service up to 20 years) plus (2.0% x AFC x numbers of years in excess of 20 years), subject to a maximum of 100% of AFC
Elected Official (Plan L)	Age 55 and 10 years of credited service[2]	Average of three highest calendar or anniversary years	• 3.5% x AFC x years of service, subject to a maximum of 100% of AFC

Plan 10	Normal Retirement Eligibility	Average Final Compensation ("AFC")	Defined Benefit – Retirement Benefits Multiplier
Municipal[3]	Age 60 and 10 years of credited service	Average of five highest calendar or anniversary years	• 1.25% x AFC x years of service up to 20 years
Police and Fire	Age 50 and 10 years of credited service	Average of five highest calendar or anniversary years	• 1.75% x AFC x years of service up to 20 years - **Defined Contribution** • The City matches employee contributions at a 50% rate, with the total City match not to exceed 1.5% of compensation for each year. • After five years of credited service, the full amount in the account is distributed to the employee when he or she separates from City service. • The right to the portion of the account attributable to City contributions does not vest until the completion of five years of credited service.

Plan 16	Normal Retirement Eligibility	Average Final Compensation ("AFC")	Defined Benefit – Retirement Benefits Multiplier
Municipal	Age 60 and 10 years of credited service	Lesser of (i) AFC under Plan Y (of Plan 87) (which is the average of three highest calendar or anniversary years) or (ii) $50,000 (cap increases to $65,000 on 1/1/2019)	• (2.2% x AFC x years of service up to 10 years) plus (2.0% x AFC x numbers of years in excess of 10 years), subject to a maximum of 100% of AFC - **Defined Contribution** • Employees may voluntarily participate in the defined contribution portion; employee contributions vest immediately. • For employees with annual salaries above the cap, the City matches employee contributions at a 50% rate, with the total City match not to exceed 1.5% of compensation for each year (only if employee is contributing); the City's matching contributions vest after five years of credited service. • The maximum annual employee contribution is $18,000, excluding the City's matching contributions.

(1) Five years of credited service for those who make additional contributions. See "PENSION SYSTEM – Pension System; Pension Board – Membership."
(2) The lesser of two full terms or eight years of credited service for those elected officials who make additional contributions. See "PENSION SYSTEM – Pension System; Pension Board – Membership."
(3) Under Plan 10 (Municipal), pension contributions freeze after 20 years. At such time and for each subsequent year, the employee's pension payments remain fixed and the employee may no longer make pension contributions.

Purchase of Services

The following table shows the City's major purchase of services, which represents one of the major classes of expenditures from the General Fund. Table 20 shows contracted costs of the City for Fiscal Years 2014-2017, the budgeted amounts and current estimates for Fiscal Year 2018, and the budgeted amounts for Fiscal Year 2019.

Table 20
Purchase of Services in the General Fund
Fiscal Years 2014-2017 (Actual), 2018 (Adopted Budget and Current Estimate), and 2019 (Adopted Budget)
(Amounts in Millions of USD)[(1), (7)]

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Adopted Budget 2018	Current Estimate 2018	Adopted Budget 2019
Human Services[(2)]	$76.3	$77.3	$75.3	$75.7	$77.4	$76.3	$82.8
Public Health	60.5	59.4	64.9	70.7	73.9	73.9	92.9
Public Property[(3)]	140.7	148.8	155.0	158.5	156.4	159.8	162.2
Streets[(4)]	48.3	47.6	51.9	46.2	49.7	49.1	49.2
First Judicial District	15.8	17.1	17.7	12.1	9.5	9.5	8.5
Licenses & Inspections	10.1	10.0	10.4	12.0	11.8	11.6	13.6
Homeless Services[(5)]	36.9	36.6	37.1	38.0	39.1	39.2	43.6
Prisons	105.8	101.6	104.9	105.3	105.5	104.5	98.4
All Other[(6)]	293.2	312.2	305.0	332.9	411.8	398.7	400.7
Total	**$787.6**	**$810.6**	**$822.2**	**$851.4**	**$935.1**	**$922.6**	**$951.7**

(1) Sources: For Fiscal Years 2014-2017, the City's Supplemental Report of Revenues & Obligations for such Fiscal Years. For Fiscal Year 2018 (Adopted Budget), the adopted budget for such Fiscal Year. For Fiscal Year 2018 (Current Estimate) and Fiscal Year 2019 (Adopted Budget), the Fiscal Year 2019 Adopted Budget.
(2) Includes payments for care of dependent and delinquent children.
(3) Includes payments for SEPTA, space rentals, and utilities.
(4) Includes solid waste disposal costs.
(5) Includes homeless shelter and boarding home payments.
(6) Includes the Convention Center subsidy, payments for vehicle leasing, and debt service on lease and service agreement financings, among other things.
(7) Figures may not sum due to rounding.

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City Payments to School District

In each Fiscal Year since Fiscal Year 1996, the City has made an annual grant of at least $15 million to the School District. Pursuant to negotiations with the Commonwealth to address the School District's then current and future educational and fiscal situation, the Mayor and City Council agreed to provide the School District with an additional $20 million annual grant beginning in Fiscal Year 2002. The following table presents the City's payments to the School District from the General Fund for Fiscal Years 2014-2018 and the budgeted amount for Fiscal Year 2019.

Table 21
City Payments to School District
Fiscal Years 2014-2017 (Actual), 2018 (Unaudited Actual), and 2019 (Adopted Budget)
(Amounts in Millions of USD)[(1)]

	Actual 2014[(2)]	Actual 2015	Actual 2016	Actual 2017	Unaudited Actual 2018	Adopted Budget 2019
City Payments to School District	$114.1	$69.1	$104.2	$104.3	$104.3	$180.9

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the FY 2018 AFR (Unaudited). For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.
(2) In Fiscal Year 2014, the City's contribution included a budgeted contribution of $69.1 million and an additional $45.1 million one-time contribution that was passed through from the Commonwealth.

The City's adopted Fiscal Year 2016 budget included a property tax increase and parking tax increase to benefit the School District in amounts of $25 million and $10 million, respectively. The figures above for Fiscal Years 2016-2019 reflect such increases.

For Fiscal Year 2019, the City's direct contribution to the School District from the General Fund is approximately $76.5 million higher than the unaudited actual amount for Fiscal Year 2018. Such increase is expected to be funded by tax rate changes included in the Fiscal Year 2019 Adopted Budget (an increase to the real estate transfer tax and a slowing of planned reductions in the wage tax) and additional contributions from the General Fund. The budgeted amount above for Fiscal Year 2019 reflects such increases and modifications.

For more discussion of the School District, see "THE GOVERNMENT OF THE CITY OF PHILADELPHIA – Local Government Agencies – *Mayoral-Appointed or Nominated Agencies* – The School District," above. For a discussion of changes in the funding provided by the City to the School District, see "REVENUES OF THE CITY – Sales and Use Tax." For a discussion of the transition to AVI and how such transition affects funding for the School District, see "REVENUES OF THE CITY – Real Property Taxes Assessment and Collection."

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City Payments to SEPTA

SEPTA operates a public transportation system within the City and Bucks, Chester, Delaware, and Montgomery counties. SEPTA's operating budget is supported by federal, Commonwealth, and local subsidies, including payments from the City. The following table presents the City's payments to SEPTA from the General Fund for Fiscal Years 2014-2017, the budgeted amount and current estimate for Fiscal Year 2018, and the budgeted amount for Fiscal Year 2019.

Table 22
City Payments to SEPTA
Fiscal Years 2014-2017 (Actual), 2018 (Adopted Budget and Current Estimate), and 2019 (Adopted Budget)
(Amounts in Millions of USD)[1]

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Adopted Budget and Current Estimate 2018	Adopted Budget 2019
City Payment to SEPTA	$66.0	$70.4	$74.2	$79.7	$82.7	$84.6

(1) Sources: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the Fiscal Year 2018 Adopted Budget and the FY 2018 Fourth Quarter QCMR. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.

The City budgets operating subsidies each Fiscal Year to match the estimated operating subsidies of the Commonwealth under Act 89. The state operating subsidy is funded through the Pennsylvania Public Transportation Trust Fund as created by Act 44 of 2007, amended by Act 89 of 2013. The local match requirement for Fiscal Years 2018-2023 has been calculated to match state operating subsidies. In addition, local matching funds must be appropriated each Fiscal Year in which state funds are received in order for SEPTA to receive the full allocation of state funds. The Twenty-Seventh Five-Year Plan projects annual operating subsidy payments to SEPTA from the City will increase to $98.3 million by Fiscal Year 2023. For more information on SEPTA, see APPENDIX V – "TRANSPORTATION – Southeastern Pennsylvania Transportation Authority (SEPTA)."

City Payments to Convention Center Authority

In connection with the financing of the expansion to the Pennsylvania Convention Center and the refinancing of debt for the original Pennsylvania Convention Center construction, the Commonwealth, the City, and the Convention Center Authority entered into an operating agreement in 2010 (the "Convention Center Operating Agreement"). The Convention Center Operating Agreement provides for the operation of the Convention Center by the Convention Center Authority and includes an annual service fee of $15,000,000 from the City to the Convention Center Authority in each Fiscal Year through Fiscal Year 2040.

As authorized by ordinance, the City has agreed to pay to the Convention Center Authority on a monthly basis a certain percentage of hotel room taxes and hospitality promotion taxes collected during the term of the Convention Center Operating Agreement. The remaining percentages of such taxes are paid to the City's tourism and marketing agencies. The General Fund does not retain any portion of the proceeds of the hotel room rental tax or the hospitality promotion tax.

PENSION SYSTEM

The amounts and percentages set forth under this heading relating to the City's pension system, including, for example, actuarial liabilities and funded ratios, are based upon numerous demographic and economic assumptions, including the investment return rates, inflation rates, salary increase rates, post-retirement mortality, active member mortality, rates of retirement, etc. The reader is cautioned to review and carefully consider the assumptions set forth in the documents that are cited as the sources for the information in this section. In addition, the reader is cautioned that such sources and the underlying assumptions speak as of their respective dates, and are subject to changes, any of which could cause a significant change in the unfunded actuarial liability.

Overview

The City faces significant ongoing financial challenges in meeting its pension obligations, including an unfunded actuarial liability ("UAL") of approximately $6.2 billion as of July 1, 2017. In Fiscal Year 2017, the City's contribution to the Municipal Pension Fund was approximately $706.2 million, of which the General Fund's share (including the Commonwealth contribution) was $555.7 million. See Table 29. The City's aggregate pension costs (consisting of payments to the Municipal Pension Fund and debt service on the Pension Bonds (as defined herein)) have increased from approximately 9.47% of the City's General Fund budget to approximately 14.41% of the General Fund budget from Fiscal Years 2008 to 2017. See Table 31. As reflected in the Funded Ratio chart following Table 28, the funded ratio of the Municipal Pension Plan was 52.3% on July 1, 1998 (at which time the UAL was approximately $2.7 billion), and was 45.3% on July 1, 2017.

The decline in the Municipal Pension System's funded status and the net growth of the unfunded liability is the product of a number of factors, including the following:

- The declines in the equity markets in 2000-2001 and in 2008-2009. See Table 24 and the Funded Ratio chart below Table 28.

- A reduction in the assumed rate of return, from 9.00% in 2004 to 7.65% effective July 1, 2017. Although the gradual reductions in the assumed rates of return reflected in Table 24 are considered a prudent response to experience studies, by reducing the assumed return in the measurement of the actuarial liabilities, it serves to increase the UAL from what it otherwise would have been.

- Adopting more conservative mortality rates in response to experience studies performed by the Municipal Pension Plan actuary.

- The Municipal Pension Plan is a mature system, which means the number of members making contributions to the Municipal Pension Plan is less than the number of retirees and other beneficiaries receiving payments from the Municipal Pension Plan, by approximately 9,100. As a result, the aggregate of member contributions and the City's contributions are less than the amount of benefits and refunds payable in any particular year, with the result that investment income must be relied upon to meet such difference before such income can contribute to an increase in the Municipal Pension System's assets growth. See Table 26.

- The determination by the City, commencing in Fiscal Year 2005, to fund in accordance with the "minimum municipal obligation" ("MMO"), as permitted and as defined by Pennsylvania law, in lieu of the City Funding Policy (as defined herein), resulted in the City contributing less than otherwise would have been contributed. See below, "– Funding Requirements; Funding Standards."

- Revising, in Fiscal Year 2009, in accordance with Pennsylvania law, the period over which the UAL was being amortized, such that the UAL as of July 1, 2009 was "fresh started" to be amortized over a 30 year period ending June 30, 2039. In addition, changes were made to the periods over which actuarial gains and losses and assumption changes were amortized under Pennsylvania law. See "UAL and its Calculation – Actuarial Valuations."

The City has taken a number of steps to address the funding of the Municipal Pension Plan, including the following:

- Reducing the assumed rate of return on a gradual and consistent basis, which results in the City making larger annual contributions. See Table 24 below.

- Adopting more conservative mortality rates in response to experience studies performed by the Municipal Pension Plan actuary.

- In conjunction with the revisions to the amortization periods that occurred in Fiscal Year 2009, changing from a level percent of pay amortization schedule to a level dollar amount schedule. This results in producing payments that ensure that a portion of principal on the UAL is paid each year.

- Funding consistently an amount greater than the MMO (subject to the authorized deferrals for Fiscal Years 2010 and 2011 described below). See Table 29.

- Negotiating collective bargaining agreements by which additional contributions are being made (and will be made) by certain current (and future) members and by which benefits will be capped for certain future members of the Municipal Pension Plan. See Table 18.

- Securing additional funding, including funds required to be deposited by the City to the Municipal Pension Fund from its share of sales tax revenue.

- Adopting a Revenue Recognition Policy (defined and described below), by which sources of anticipated additional revenue that will be received by the System are specifically dedicated toward paying down the unfunded pension liability and not to reducing future costs of the City. The additional revenue is tracked and accumulated in a notional account, which is then deducted from the Actuarial Asset Value to determine the contribution under the Revenue Recognition Policy. As a result, such contribution is higher than the MMO.

- Changing the investment strategy to increase the use of passive investment vehicles, which has resulted in increased returns and decreased fees.

This "Overview" is intended to highlight certain of the principal factors that led to the pension system's current funded status, and significant steps the City and the Pension Board (as defined herein) have taken to address the underfunding. The reader is cautioned to review with care the more detailed information presented below under this caption, "PENSION SYSTEM."

Pension System; Pension Board

The City maintains two defined-benefit pension programs: (i) the Municipal Pension Plan, a single employer plan, which provides benefits to police officers, firefighters, non-uniformed employees, and non-represented appointed and elected officials, and (ii) the PGW Pension Plan, a single employer plan, which provides benefits to PGW employees. The Municipal Pension Plan is administered through 18 (20, effective July 1, 2018) separate benefit structures, the funding for which is accounted for on a consolidated basis by the Municipal Pension Fund. Such benefit structures establish for their respective members different contribution levels, retirement ages, etc., but all assets are available to pay benefits to all members of the Municipal Pension Plan. The Municipal Pension Plan is a mature plan, initially established in 1915, with investment assets that totaled approximately $4.9 billion as of June 30, 2017. The Municipal Pension Plan has approximately 28,600 members who make contributions to the plan, and provides benefits to approximately 37,700 retirees and other beneficiaries.

PGW is principally a gas distribution facility owned by the City. For accounting presentation purposes, PGW is a component unit of the City and follows accounting rules as they apply to proprietary fund-type activities. The PGW Pension Plan is funded with contributions by PGW to such plan, which are treated as an operating expense of PGW, and such plan is not otherwise addressed under the caption "PENSION SYSTEM." See "PGW PENSION PLAN" below.

Contributions are made by the City to the Municipal Pension Fund from: (i) the City's General Fund; (ii) funds that are received by the City from the Commonwealth for deposit into the Municipal Pension Fund; and (iii) various City inter-fund transfers, representing amounts contributed, or reimbursed, to the City's General Fund for pensions from the City's Water Fund, Aviation Fund, and certain other City funds or agencies. See Table 29. In addition to such City (employer) contribution, the other principal additions to the Municipal Pension Fund are: (i) member (employee) contributions; (ii) interest and dividend income; (iii) net appreciation in asset values; and (iv) net realized gains on the sale of investments. See Table 26 below. An additional source of funding is that portion of the 1% Sales Tax rate increase that is required under Pennsylvania law to be deposited to the Municipal Pension Fund. See "REVENUES OF THE CITY – Sales and Use Tax."

The City of Philadelphia Board of Pensions and Retirement (the "Pension Board") was established by the City Charter to administer "a comprehensive, fair and actuarially sound pension and retirement system covering all officers and employees of the City." The City Charter provides that the Pension Board "shall consist of the Director of Finance, who shall be its chairman, the Managing Director, the City Controller, the City Solicitor, the Personnel Director and four other persons who shall be elected to serve on the Board by the employees in the civil service in such manner as shall be determined by the Board." In addition, there is one non-voting member on the Pension Board, who is appointed by the President of City Council. An Executive Director, together with a budgeted staff of 73 personnel, administers the day-to-day activities of the retirement system, providing services to approximately 66,300 members.

The Municipal Pension Plan, the Municipal Pension Fund, and the Pension Board are for convenience sometimes collectively referred to under this caption as the "Municipal Retirement System."

Membership. The following table shows the membership totals for the Municipal Pension Plan, as of July 1, 2017 and as compared to July 1, 2016.

Table 23
Municipal Pension Plan – Membership Totals

	July 1, 2017	July 1, 2016	% Change
Actives	28,615	28,308	1.1%
Terminated Vesteds	1,157	1,248	-7.3%
Disabled	3,942	4,005	-1.6%
Retirees	22,288	22,412	-0.6%
Beneficiaries	8,552	8,567	-0.2%
Deferred Retirement Option Plan ("DROP")	1,767	1,614	9.5%
Total City Members	66,321	66,154	0.3%
Annual Salaries	$1,744,728,288	$1,676,548,962	4.1%
Average Salary per Active Member	$60,973	$59,225	3.0%
Annual Retirement Allowances	$750,204,529	$741,828,339	1.1%
Average Retirement Allowance	$21,569	$21,205	1.7%

Source: July 1, 2017 Valuation.

As shown in Table 23, total membership in the Municipal Pension Plan increased by 0.3%, or from 66,154 to 66,321 members, from July 1, 2016 to July 1, 2017, including an increase of 1.1% in active members from 28,308 to 28,615 (who were contributing to the Municipal Pension Fund). Of the 66,321 members, 37,706 were retirees, beneficiaries, disabled, and other members (who were withdrawing from, or not contributing to, the Municipal Pension Fund).

Subject to the exceptions otherwise described in this paragraph, employees and officials become vested in the Municipal Pension Plan upon the completion of ten years of service. Employees and appointed officials who hold positions that are exempt from civil service and who are not entitled to be represented by a union, and who were hired before January 13, 1999, may elect accelerated vesting after five years of service in return for payment of a higher employee contribution than if the vesting period were ten years. Such employees and officials hired after January 13, 1999, become vested after five years of service and pay a higher employee contribution than if the vesting period were ten years. Elected officials become vested in the Municipal Pension Plan once they complete service equal to the lesser of two full terms in their elected office or eight years and pay a higher contribution than if the vesting period were ten years. Elected officials pay an additional employee contribution for the full cost of the additional benefits they may receive over those of general municipal employees. Upon retirement, employees and officials may receive up to 100% of their average final compensation depending upon their years of credited service and the plan in which they participate.

All City employees participate in the U.S. Social Security retirement system except for uniformed Police and uniformed Fire employees.

Certain membership information relating to the City's municipal retirement system provided by the Pension Board is set forth in Appendix A to the July 1, 2017 Actuarial Valuation Report (the "July 1, 2017 Valuation") and includes as of July 1, 2017, among other information, active and non-active member data by plan, age/service distribution for active participants and average salary for all plans, and age and benefit distributions for non-active member data.

Funding Requirements; Funding Standards

City Charter. The City Charter establishes the "actuarially sound" standard quoted above. Case law has interpreted "actuarially sound" as used in the City Charter to require the funding of two components: (i) "normal cost" (as defined below) and (ii) interest on the UAL. (*Dombrowski v. City of Philadelphia*, 431 Pa. 199, 245 A.2d 238 (1968)).

Pennsylvania Law. The Municipal Pension Plan Funding Standard and Recovery Act (Pa. P.L. 1005, No. 205 (1984)) ("Act 205"), applies to all municipal pension plans in Pennsylvania, "[n]otwithstanding any provision of law, municipal ordinance, municipal resolution, municipal charter, pension plan agreement or pension plan contract to the contrary . . . ." Act 205 provides that the annual financial requirements of the Municipal Pension Plan are: (i) the normal cost; (ii) administrative expense requirements; and (iii) an amortization contribution requirement. In addition, Act 205 requires that the MMO be payable to the Municipal Pension Fund from City revenues, and that the City shall provide for the full amount of the MMO in its annual budget. The MMO is defined as "the financial requirements of the pension plan reduced by . . . the amount of any member contributions anticipated as receivable for the following year." Act 205 further provides that the City has a "duty to fund its municipal pension plan," and the failure to provide for the MMO in its budget, or to pay the full amount of the MMO, may be remedied by the institution of legal proceedings for mandamus.

In accordance with Pennsylvania law and Act 205, the City uses the entry age normal actuarial funding method, whereby "normal cost" (associated with active employees only) is the present value of the benefits that the City expects to become payable in the future distributed evenly as a percent of expected payroll from the age of first entry into the plan to the expected age at retirement. The City's share of such normal cost (to which the City adds the Plan's administrative expenses) is reduced by member contributions. The term "level" means that the contribution rate for the normal cost, expressed as a percentage of active member payroll, is expected to remain relatively level over time.

The City has budgeted and paid at least the full MMO amount since such requirement was established, and more specifically, prior to Fiscal Year 2005 the City had been contributing to the Municipal Pension Plan the greater amount as calculated pursuant to the City Funding Policy which was implemented before Act 205 was effective, as described below. Beginning in Fiscal Year 2018, the City is contributing under the Revenue Recognition Policy (defined below), which requires higher contribution amounts than under the MMO. Payment of the MMO is a condition for receipt of the Commonwealth contribution to the Municipal Pension Fund. See Table 29.

Act 205 was amended in 2009 by Pa. P.L. 396, No. 44 ("Act 44") to authorize the City to: (i) "fresh start" the amortization of the UAL as of July 1, 2009 by a level annual dollar amount over 30 years ending June 30, 2039; and (ii) revise the amortization periods for actuarial gains and losses and assumption changes in accordance with Act 44, as described below under "UAL and its Calculation – Actuarial Valuations." In addition, Act 44 authorized the City to defer, and the City did defer, $150 million of the MMO otherwise payable in Fiscal Year 2010, and $80 million of the MMO otherwise payable in Fiscal Year 2011, subject to repayment of the deferred amounts by June 30, 2014. The City repaid the aggregate deferred amount of $230 million, together with interest at the then-assumed interest rate of 8.25%, in Fiscal Year 2013. See Table 29. Because the final amortization date is fixed, if all actuarial assumptions are achieved, the unfunded liability would decline to zero as of the final amortization date. To the extent future experience differs from the assumptions used to establish the 30-year fixed amortization payment schedule, new amortization bases attributable to a particular year's difference would be established and amortized over their own 20-year schedule.

GASB; City Funding Policy. Governmental Accounting Standards Board ("GASB") Statement No. 27, "Accounting for Pensions by State and Local Governmental Employers" ("GASB 27"), applied to the City for Fiscal Years beginning prior to July 1, 2014. For the Fiscal Year beginning July 1, 2014, GASB Statement No. 68 ("GASB 68"), which amends GASB 27 in several significant respects, applies. GASB 27 defined an "annual required contribution" ("ARC") as that amount sufficient to pay (i) the normal cost and (ii) the amortization of UAL, and provides that the maximum acceptable amortization period is 30 years (for the initial 10 years of implementation, 1996-2006, a 40-year amortization period was permitted). GASB 27 did not establish funding requirements for the City but rather was an accounting and financial reporting standard. GASB 68 does not require the calculation of an ARC but does require the City to include as a liability on its balance sheet the City's "net pension liability," as defined by GASB 68. The City has been funding the Municipal Pension Fund since Fiscal Year 2003 based on the MMO (at a minimum), including the deferral permitted by Act 44. See Table 29 below.

The City, prior to Fiscal Year 2005, had been funding the Municipal Pension Fund in accordance with what the City referred to as the "City Funding Policy." That reference was used and continues to be used in the Actuarial Reports. Under the City Funding Policy, the UAL as of July 1, 1985 was to be amortized over 34 years ending June 30, 2019, with payments increasing at 3.3% per year, the assumed payroll growth. Other changes in the actuarial liability were amortized in level-dollar payments over various periods as prescribed in Act 205. In 1999, the City issued pension funding bonds, the proceeds of which were deposited directly into the Municipal Pension Fund to pay down its UAL. See "– Annual Contributions – *Annual Debt Service Payments on the Pension Bonds*" below.

Revenue Recognition Policy. The City follows a policy (the "Revenue Recognition Policy") to contribute each year to the Municipal Pension Fund an amount in excess of the MMO. The determination for such additional funding is based on not including (i) the portion of the amounts generated by the increase in the Sales Tax rate that became effective on July 1, 2014 and are required by Act 205 to be deposited to the Municipal Pension Fund (see "REVENUES OF THE CITY – Sales and Use Tax"), (ii) contributions to be made by City employees that are under Plan 16 (described above in the text that immediately follows Table 19), and (iii) additional member contributions for current and future members in Plan 87 Police, in the actuarial asset value when determining the annual contribution obligation.

The amounts projected by the City in the Twenty-Seventh Five-Year Plan to be deposited from Sales Tax revenue into the Municipal Pension Fund, for the six Fiscal Years 2018-2023, respectively, are as follows: $27.2 million; $48.3 million; $54.2 million; $59.7 million; $65.0 million; and $70.3 million.

UAL and its Calculation

According to the July 1, 2017 Valuation, the funded ratio (the valuation of assets available for benefits to total actuarial liability) of the Municipal Pension Fund as of July 1, 2017 was 45.3% and the Municipal Pension Fund had an unfunded actuarial liability ("UAL") of $6.167 billion. The UAL is the difference between total actuarial liability ($11.276 billion as of July 1, 2017) and the actuarial value of assets ($5.109 billion as of July 1, 2017).

Key Actuarial Assumptions. In accordance with Act 205, the actuarial assumptions must be, in the judgment of both Cheiron (the independent consulting actuary for the Municipal Pension Fund) and the City, "the best available estimate of future occurrences in the case of each assumption." The assumed investment return rate used in the July 1, 2017 Valuation was 7.65% a year (which includes an inflation assumption of 2.75%), net of administrative expenses, compounded annually. For the prior actuarial valuation, the assumed investment return rate was 7.70%. See Table 24 for the assumed rates of return for Fiscal Years 2008 to 2017. The 7.70% was used to establish the MMO payment for Fiscal Year 2018;

7.65% will be used to establish the MMO payment for Fiscal Year 2019; 7.6% will be used to establish the MMO payment for Fiscal Year 2020.

Other key actuarial assumptions in the July 1, 2017 Valuation include the following: (i) total annual payroll growth of 3.30%, (ii) annual administrative expenses assumed to increase 3.30% per year, (iii) to recognize the expense of the benefits payable under the Pension Adjustment Fund, actuarial liabilities were increased by 0.54%, based on the statistical average expected value of the benefits, (iv) a vested employee who terminates will elect a pension deferred to service retirement age so long as their age plus years of service at termination are greater than or equal to 55 (45 for police and fire employees in the 1967 Plan), (v) for municipal and elected members, 70% of all disabilities are ordinary and 30% are service-connected, and (vi) for police and fire members, 50% of all disabilities are ordinary and 50% are service-connected.

"Smoothing Methodology". The Municipal Retirement System uses an actuarial value of assets to calculate its annual pension contribution, using an asset smoothing method to dampen the volatility in asset values that could occur because of fluctuations in market conditions. The Municipal Retirement System used a five-year smoothing prior to Fiscal Year 2009, and beginning with Fiscal Year 2009 began employing a ten-year smoothing. Using the ten-year smoothing methodology, investment returns in excess or below the assumed rate are prospectively distributed in equal amounts over a ten-year period, subject to the requirement that the actuarial value of assets will be adjusted, if necessary, to ensure that the actuarial value of assets will never be less than 80% of the market value of the assets, nor greater than 120% of the market value of the assets. The actuarial value of assets as of July 1, 2017, was approximately 104.8% of the market value of the assets.

Actuarial Valuations. The Pension Board engages an independent consulting actuary (currently Cheiron) to prepare annually an actuarial valuation report. Act 205, as amended by Act 44, establishes certain parameters for the actuarial valuation report, including: (i) use of the entry age normal actuarial cost method; (ii) that the report shall contain: (a) actuarial exhibits, financial exhibits, and demographic exhibits; (b) an exhibit of normal costs expressed as a percentage of the future covered payroll of the active membership in the Municipal Pension Plan; and (c) an exhibit of the actuarial liability of the Municipal Pension Plan; and (iii) that changes in the actuarial liability be amortized in level-dollar payments as follows: (a) actuarial gains and losses be amortized over 20 years beginning July 1, 2009 (prior to July 1, 2009, gains and losses were amortized over 15 years); (b) assumption changes be amortized over 15 years beginning July 1, 2010 (prior to July 1, 2010, assumption changes were amortized over 20 years); (c) plan changes for active members be amortized over 10 years; (d) plan changes for inactive members be amortized over one year; and (e) plan changes mandated by the Commonwealth be amortized over 20 years.

Act 205 further requires that an experience study be conducted at least every four years, and cover the five-year period ending as of the end of the plan year preceding the plan year for which the actuarial valuation report is filed. The most recent Experience Study was prepared by Cheiron in March 2018 for the period July 1, 2012 – June 30, 2017. The changes to the actuarial and demographic assumptions that were adopted by the Pension Board in response to such Experience Study will be employed for the July 1, 2018 actuarial valuation (which determines the June 30, 2020 fiscal year end MMO, City Fund Policy, and Revenue Recognition Policy contributions). The principal revisions included increases in salary growth rates for municipal employees; decreases in retirement and termination rates; marginal changes in the expected disability rates; and changes in mortality assumptions to fully reflect the most recent experience. Details of these assumption changes and the experience of the Municipal Pension Plan can be found in the *City of Philadelphia Municipal Retirement System Experience Study Results for the period covering July 1, 2012 – June 30, 2017,* available at the Investor Information section of the City's Investor Website.

Pension Adjustment Fund

Pursuant to § 22-311 of the Philadelphia Code, the City directed the Pension Board to establish a Pension Adjustment Fund ("PAF") on July 1, 1999, and further directed the Pension Board to determine, effective June 30, 2000 and each Fiscal Year thereafter, whether there are "excess earnings" as defined available to be credited to the PAF. The Pension Board's determination is to be based upon the actuary's certification using the "adjusted market value of assets valuation method" as defined in § 22-311. Although the portion of the assets attributed to the PAF is not segregated from the assets of the Municipal Pension Fund, the Philadelphia Code provides that the "purpose of the Pension Adjustment Fund is for the distribution of benefits as determined by the Board for retirees, beneficiaries or survivors [and] [t]he Board shall make timely, regular and sufficient distributions from the Pension Adjustment Fund in order to maximize the benefits of retirees, beneficiaries or survivors." Distributions are to be made "without delay" no later than six months after the end of each Fiscal Year. The PAF was established, in part, because the Municipal Retirement System does not provide annual cost-of-living increases to retirees or beneficiaries. At the time the PAF was established, distributions from the PAF were subject to the restriction that the actuarial funded ratio using the "adjusted market value of assets" be not less than such ratio as of July 1, 1999 (76.7%). That restriction was deleted in 2007 by an ordinance adopted by City Council; the Mayor vetoed such ordinance, and City Council overrode such veto.

The amount to be credited to the PAF is 50% of the "excess earnings" that are between one percent (1%) and six percent (6%) above the actuarial assumed investment rate. Earnings in excess of six percent (6%) of the actuarial assumed investment rate remain in the Municipal Pension Fund. Although the Pension Board utilizes a ten-year smoothing methodology, as explained above, for the actuarial valuation of assets for funding and determination of the MMO, § 22-311 provides for a five-year smoothing to determine the amount to be credited to the PAF. The actuary determined that for the Fiscal Year ended June 30, 2017, there were no "excess earnings" as defined to be credited to the PAF. The Pension Board transfers to the PAF the full amount calculated by the actuary as being available in any year for transfer within six months of the Pension Board designating the amount to be transferred.

Transfers to the PAF and the resultant additional distributions to retirees result in removing assets from the Municipal Pension Plan. To account for the possibility of such transfers, and as an alternative to adjusting the assumed investment return rate to reflect such possibility, the actuary applies a load of 0.54% to the calculated actuarial liability as part of the funding requirement and MMO. Such calculation was utilized for the first time in the July 1, 2013 actuarial valuation.

The market value of assets as used under this caption, "PENSION SYSTEM," represents the value of the assets if they were liquidated on the valuation date and this value includes the PAF (except as otherwise indicated in certain tables), although the PAF is not available for funding purposes. The actuarial value of assets does not include the PAF.

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Rates of Return; Asset Values; Changes in Plan Net Position

Rates of Return. The following table sets forth for the Fiscal Years 2008-2017 the market value of assets internal rate of return and actuarial value of assets internal rate of return experienced by the Municipal Pension Fund, and the assumed rate of return. The 5-year and 10-year annual average returns as of June 30, 2017, were 7.10% and 3.91%, respectively, on a market value basis.

Table 24
Municipal Pension Fund
Annual Rates of Return

Year Ending June 30,	Market Value	Actuarial Value[1]	Assumed Rate of Return
2008	-4.5%	10.1%	8.75%
2009	-19.9%	-9.3%	8.75%
2010	13.8%	12.9%	8.25%
2011	19.4%	9.9%	8.15%
2012	0.2%	2.4%	8.10%
2013	10.9%	5.1%	7.95%
2014	15.7%	4.8%	7.85%
2015	0.3%	5.8%	7.80%
2016	-3.2%	4.5%	7.75%
2017	13.1%	4.4%	7.70%

Source: July 1, 2017 Valuation.

[1] Net of PAF. See "Pension Adjustment Fund" above. The actuarial value for 2008 reflects a five-year smoothing; for 2009-2017, a ten-year smoothing.

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Asset Values. The following table sets forth, as of the July 1 actuarial valuation date for the years 2008-2017, the actuarial and market values of assets in the Municipal Pension Fund and the actuarial value as a percentage of market value.

Table 25
Actuarial Value of Assets vs. Market Value of Net Assets
(Dollar Amounts in Millions of USD)

Actuarial Valuation Date (July 1)	Actuarial Value of Assets[1]	Market Value of Net Assets[1]	Actuarial Value as a Percentage of Market Value
2008	$4,623.6	$4,383.5	105.5%
2009	$4,042.1	$3,368.4	120.0%
2010[2]	$4,380.9	$3,650.7	120.0%
2011[2]	$4,719.1	$4,259.2	110.8%
2012[2]	$4,716.8	$4,151.8	113.6%
2013	$4,799.3	$4,444.1	108.0%
2014	$4,814.9	$4,854.3	99.2%
2015	$4,863.4	$4,636.1	104.9%
2016	$4,936.0	$4,350.8	113.5%
2017	$5,108.6	$4,873.0	104.8%

Source: July 1, 2017 Valuation for Actuarial Value of Assets; 2008-2017 Actuarial Reports for Market Value of Net Assets.

(1) For purposes of this table, the Market Value of Net Assets excludes the PAF, which as of June 30, 2017 equaled $1.097 million. The Actuarial Value of Assets excludes that portion of the Municipal Pension Fund that is allocated to the PAF. The actuarial value for 2008 reflects a five-year smoothing; for 2009-2017, a ten-year smoothing.

(2) The July 1, 2010 actuarial and market values of assets include the $150 million deferred contribution from Fiscal Year 2010, and the July 1, 2011 and July 1, 2012 actuarial and market values of assets include the total deferred contribution of $230 million. See Table 29 below.

Changes in Plan Net Position. The following table sets forth, for the Fiscal Years 2013-2017, the additions, including employee (member) contributions, City contributions (including contributions from the Commonwealth), investment income and miscellaneous income, and deductions, including benefit payments and administration expenses, for the Municipal Pension Fund. Debt service payments on pension funding bonds (as described below at "Annual Contributions – *Annual Debt Service Payments on the Pension Bonds*") are made from the City's General Fund, Water Operating Fund, and Aviation Operating Fund, but are not made from the Municipal Pension Fund, and therefore are not included in Table 26. In those years in which the investment income is less than anticipated, the Municipal Pension Fund may experience negative changes (total deductions greater than total additions), which, as the table reflects, did occur in Fiscal Years 2015 and 2016. Furthermore, if unrealized gains are excluded from Table 26, resulting in a comparison of cash actually received against actual cash outlays, it results in a negative cash flow in Fiscal Years 2014-2017, which is typical of a mature retirement system.

Contributions from the Commonwealth are provided pursuant to the provisions of Act 205. Any such contributions are required to be used to defray the cost of the City's pension system. The amounts contributed by the Commonwealth for each of the last ten Fiscal Years are set forth in Table 29 below. The contributions from the Commonwealth are capped pursuant to Act 205, which provides that "[n]o municipality shall be entitled to receive an allocation of general municipal pension system State aid in an amount greater that 25% of the total amount of the general municipal pension system State aid available."

Employee (member) contribution amounts reflect contribution rates as a percent of pay, which for the plan year beginning July 1, 2018, vary from 5.00% to 8.50% for police and fire employees, and from 2.21% to 7.00% for municipal employees excluding elected officials. These rates include the increases for police employees effective July 1, 2017 resulting from the FOP Lodge No. 5 Labor Contract. Such contract increased member contributions for current police officers in Plan 87 and Plan 10 by 0.92% effective July 1, 2017 and an additional 0.92% effective July 1, 2018. For new police officers hired or rehired on or after July 1, 2017, the member contribution rate is increased by 2.5% over the rate which would otherwise be in effect as of July 1, 2017. The rates also include the increases in contributions for certain municipal employees and elected officials currently in Plans 67, 87 and 87 Prime and elected officials as required by legislation. This legislation called for employees in these groups to pay an additional 0.5% of compensation from January 1, 2015 to December 31, 2015 and an additional 1.0% from January 1, 2016 onwards. New employees in these groups entering Plan 87 Municipal prime will pay an additional 1.0% of compensation which is included in the table below.

Table 26
Changes in Net Position of the Municipal Pension Fund
Fiscal Years 2013-2017
(Amounts in Thousands of USD)

	2013	2014	2015	2016	2017
Beginning Net Assets (Market Value)[1]	$3,922,817	$4,445,224	$4,916,705	$4,674,252	$4,357,975
Additions					
- Member Contributions	49,614	53,722	58,658	67,055	73,607
- City Contributions[2]	781,823	553,179	577,195	660,247	706,237
- Investment Income[3]	442,667	677,380	11,790	(147,424)	563,372
- Miscellaneous Income[4]	3,134	4,089	2,049	1,742	3,253
Total	$1,277,238	$1,288,370	$649,692	$581,620	$1,346,469
Deductions					
- Benefits and Refunds	(746,490)	(808,597)	(881,666)	(889,343)	(821,495)
- Administration	(8,341)	(8,292)	(10,479)	(8,554)	(8,874)
Total	$(754,831)	$(816,889)	$(892,145)	$(897,897)	$(830,369)
Ending Net Assets (Market Value)	$4,445,224	$4,916,705	$4,674,252	$4,357,975	$4,874,075

Source: Municipal Pension Fund's audited financial statements.

(1) Includes the PAF, which is not available for funding purposes.

(2) City Contributions include pension contributions from the Commonwealth. See Table 29.

(3) Investment income is shown net of fees and expenses, and includes interest and dividend income, net appreciation (depreciation) in fair value of investments, and net gains realized upon the sale of investments.

(4) Miscellaneous income includes securities lending and other miscellaneous revenues.

Funded Status of the Municipal Pension Fund

The following two tables set forth, as of the July 1 actuarial valuation date for the years 2008-2017, the asset value, the actuarial liability, the UAL, the funded ratio, covered payroll and UAL, as a percentage of covered payroll for the Municipal Pension Fund on actuarial and market value bases, respectively.

Table 27
Schedule of Funding Progress (Actuarial Value)
(Dollar Amounts in Millions of USD)

Actuarial Valuation Date (July 1)	Actuarial Value of Assets[1] (a)	Actuarial Liability (b)	UAL (Actuarial Value) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAL as a % of Covered Payroll [(b-a)/c]
2008	$4,623.6	$8,402.2	$3,778.7	55.0%	$1,456.5	259.4%
2009	$4,042.1	$8,975.0	$4,932.9	45.0%	$1,463.3	337.1%
2010	$4,380.9	$9,317.0	$4,936.1	47.0%	$1,421.2	347.3%
2011	$4,719.1[2]	$9,487.5	$4,768.4	49.7%	$1,371.3	347.7%
2012	$4,716.8[2]	$9,799.9	$5,083.1	48.1%	$1,372.2	370.4%
2013	$4,799.3	$10,126.2	$5,326.9	47.4%	$1,429.7	372.6%
2014	$4,814.9	$10,521.8	$5,706.9	45.8%	$1,495.4	381.6%
2015	$4,863.4	$10,800.4	$5,937.0	45.0%	$1,597.8	371.6%
2016	$4,936.0	$11,024.8	$6,088.8	44.8%	$1,676.5	363.2%
2017	$5,108.6	$11,275.7	$6,167.1	45.3%	$1,744.7	353.5%

Source: July 1, 2017 Valuation.

(1) The July 1, 2010 Actuarial Value of Assets includes the $150 million deferred contribution from Fiscal Year 2010 and each of the July 1, 2011 and July 1, 2012 Actuarial Value of Assets includes the total deferred contribution of $230 million.

(2) Reflects the assumed rate of return on deferred contributions at the time of the deferral.

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Table 28
Schedule of Funding Progress (Market Value)
(Dollar Amounts in Millions of USD)

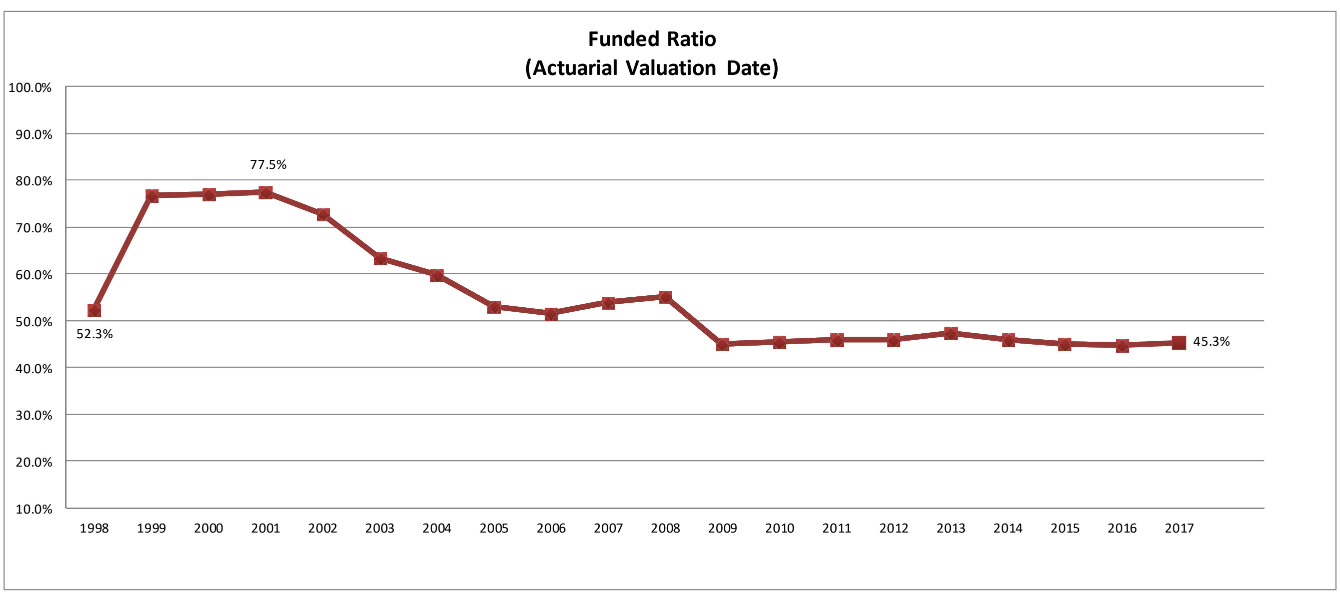
Actuarial Valuation Date (July 1)	Market Value of Net Assets[1] (a)	Actuarial Liability (b)	UAL (Market Value) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAL as a % of Covered Payroll [(b-a)/c]
2008	$4,383.5	$8,402.2	$4,018.7	52.2%	$1,456.5	275.9%
2009	$3,368.4	$8,975.0	$5,606.6	37.5%	$1,463.3	383.2%
2010	$3,650.7	$9,317.0	$5,666.3	39.2%	$1,421.2	398.7%
2011	$4,259.2	$9,487.5	$5,228.3	44.9%	$1,371.3	381.3%
2012	$4,151.8	$9,799.9	$5,648.1	42.4%	$1,372.2	411.6%
2013	$4,444.1	$10,126.2	$5,682.1	43.9%	$1,429.7	397.4%
2014	$4,854.3	$10,521.8	$5,667.6	46.1%	$1,495.4	379.0%
2015	$4,636.1[2]	$10,800.4	$6,164.3	42.9%	$1,597.8	385.8%
2016	$4,350.8[2]	$11,024.8	$6,674.0	39.5%	$1,676.5	398.1%
2017	$4,873.0[2]	$11,275.7	$6,402.7	43.2%	$1,744.7	367.0%

Source: 2008-2017 Actuarial Valuation Reports.

(1) The July 1, 2010 Market Value of Net Assets includes the $150 million deferred contribution from Fiscal Year 2010 and each of the July 1, 2011 and July 1, 2012 Market Value of Net Assets includes the total deferred contribution of $230 million.

(2) For purposes of this table, the Market Value of Net Assets excludes the PAF, which as of June 30, 2015 equaled $38,198,762; as of June 30, 2016 equaled $7,223,000; and as of June 30, 2017 equaled $1,097,499.

The following chart reflects the funded ratios, using the actuarial value of assets, for the 20-year period 1998 – 2017.



Annual Contributions

Annual Municipal Pension Contributions

Table 29 shows the components of the City's annual pension contributions to the Municipal Pension Fund for the Fiscal Years 2008-2017.

Table 29
Total Contribution to Municipal Pension Fund
(Dollar Amounts in Millions of USD)

Fiscal Year	General Fund Contribution (A)	Commonwealth Contribution (B)	Aggregate General Fund Contribution (A+B)	Water Fund Contribution	Aviation Fund Contribution	Grants Funding and Other Funds Contribution[1]	Contributions from Quasi-governmental Agencies	Pension Bond Proceeds	Total Contribution (C)	MMO (D)	MMO (Deferred) Makeup Payments	% of MMO Contributed (C/D)
2008	$292.7	$59.6	$352.3	$32.4	$15.5	$12.2	$14.5	$0.0	$426.9	$412.4		103.5%
2009	$315.0	$59.6	$374.6	$36.4	$17.5	$11.5	$15.4	$0.0	$455.4	$438.5		103.9%
2010	$190.8[2]	$59.2	$250.0	$25.1	$11.6	$10.8	$15.1	$0.0	$312.6[2]	$447.4	$(150.0)[3]	100.0%[4]
2011	$325.8[2]	$61.8	$387.6	$37.7	$17.1	$13.6	$14.2	$0.0	$470.2[2]	$511.0	$(80.0)[3]	100.0%[4]
2012	$352.7	$95.0	$447.7	$43.8	$20.6	$27.4	$16.2	$0.0	$555.7	$507.0		109.7%
2013	$356.5	$65.7	$422.2	$41.4	$20.3	$27.2	$18.1	$252.6[3]	$781.8	$492.0	$230.0[3]	100.0%[4]
2014	$365.8	$69.6	$435.4	$45.5	$22.5	$30.0	$19.8	$0.0	$553.2	$523.4		105.7%
2015	$388.5	$62.0	$450.5	$48.3	$23.9	$33.4	$21.1	$0.0	$577.2	$556.0		103.8%
2016	$449.6	$62.6	$512.2	$55.1	$27.1	$34.8	$31.0	$0.0	$660.2	$595.0		110.0%
2017	$487.0	$68.7	$555.7	$61.0	$28.8	$33.3	$27.4	$0.0	$706.2	$629.6		112.2%

(1) Other Funds Contributions represents contributions to the Municipal Pension Fund from the City's Special Gasoline Tax Fund, Community Development Block Grant Fund, Municipal Pension Fund, Youth Opportunity Fund, and General Capital Improvement Fund.

(2) Reflects the actual cash outlays for Fiscal Year 2010 and Fiscal Year 2011, which do not include the deferred contributions authorized pursuant to Act 44. See "– Funding Requirements; Funding Standards – Pennsylvania Law" above for a discussion of pension contribution deferrals authorized pursuant to Act 44.

(3) As authorized pursuant to Act 44, the City deferred payments to the Municipal Pension Fund of $150 million in fiscal year 2010 and $80 million in fiscal year 2011. Those amounts were repaid in fiscal year 2013, in which year the City made a contribution of $252.6 million to the Municipal Pension Fund, consisting of $230 million of proceeds of Pension Bonds that were issued in October 2012 and $22.6 million in refunding savings from a refunding Pension Bond financing in December 2012. See "– *Annual Debt Service Payments on the Pension Bonds*" below.

(4) Act 205 directs the Actuary, in performing the actuarial valuations, to disregard deferrals, and therefore for ease of presentation 100.0% is reflected in this column for both the years in which the deferrals occurred and the year in which the makeup payment was made.

Annual Debt Service Payments on the Pension Bonds

Pension funding bonds ("Pension Bonds") were issued in Fiscal Year 1999, at the request of the City, by PAID. Debt service on the Pension Bonds is payable pursuant to a Service Agreement between the City and PAID. The Service Agreement provides that the City is obligated to pay a service fee from its current revenues and the City covenanted in the agreement to include the annual amount in its operating budget and to make appropriations in such amounts as are required. If the City's revenues are insufficient to pay the full service fee in any Fiscal Year as the same becomes due and payable, the City has covenanted to include amounts not so paid in its operating budget for the ensuing Fiscal Year.

The 1999 Pension Bonds were issued in the principal amount of $1.3 billion, and the net proceeds were used, together with other funds of the City, to make a contribution in Fiscal Year 1999 to the Municipal Pension Fund in the amount of approximately $1.5 billion.

In October 2012, PAID, at the request of the City, issued Pension Bonds in the principal amount of $231.2 million, the proceeds of which were used principally to make the $230 million repayment of deferred contributions to the Municipal Pension Fund reflected in Table 29 above. These bonds had maturities of April 1, 2013 and 2014, and have been repaid.

In December 2012, PAID, at the request of the City, issued Pension Bonds in the approximate principal amount of $300 million, the proceeds of which were used to current refund a portion of the 1999 Pension Bonds. The refunding generated savings of approximately $22.6 million, which the City deposited into the Municipal Pension Fund.

Table 30 shows the components of the City's annual debt service payments on the Pension Bonds for the Fiscal Years 2008-2017.

Table 30
Total Debt Service Payments on Pension Bonds
(Amounts in Millions of USD)

Fiscal Year	General Fund Payment	Water Fund Payment	Aviation Fund Payment	Other Funds Payment[1]	Grants Funding	Total Payment
2008	$78.4	$7.8	$3.5	$0.6	$1.3	$91.6
2009	$84.4	$7.2	$3.3	$0.6	$1.3	$96.8
2010	$96.7	$7.6	$3.4	$0.6	$1.5	$109.8
2011	$97.7	$10.3	$4.6	$0.8	$1.5	$114.9
2012	$100.1	$10.7	$4.8	$0.7	$3.4	$119.7
2013[2]	$196.6	$21.5	$10.1	$1.3	$3.8	$233.3
2014[2]	$211.0	$23.6	$11.2	$1.4	$3.7	$250.9
2015	$107.7	$12.6	$5.9	$0.8	$4.0	$131.0
2016	$109.9	$13.7	$6.4	$0.9	$3.8	$134.7
2017	$109.5	$14.5	$6.6	$0.9	$3.3	$134.8

(1) Other Funds Payments represents the allocable portion of debt service payments on the City's Pension Bonds from the City's Community Development Block Grant Fund, Municipal Pension Fund, and General Capital Improvement Fund.

(2) The increase in debt service payments in fiscal years 2013 and 2014 over the fiscal year 2012 amounts reflect the debt service payments on the Pension Bonds that were issued in October 2012.

Annual Pension Costs of the General Fund

Table 31 shows the annual pension costs of the General Fund for the Fiscal Years 2008-2017, being the sum of the General Fund Contribution to the Municipal Pension Fund (column (A) in Table 29 above) and the General Fund debt service payments on Pension Bonds (Table 30 above).

Table 31
Annual Pension Costs of the General Fund
(Amounts in Millions of USD)

Fiscal Year	General Fund Pension Fund Contribution (A)[1]	General Fund Pension Bond Debt Service Payment (B)	Annual Pension Costs (A+B)	Total General Fund Expenditures (C)	General Fund portion of Annual Pension Costs as % of Total General Fund Expenditures (A+B) / C
2008	$292.7	$78.4	$371.1	$3,919.84	9.47%
2009	$315.0	$84.4	$399.4	$3,915.29	10.20%
2010	$190.8	$96.7	$287.5	$3,653.73	7.87%
2011	$325.8	$97.7	$423.5	$3,785.29	11.19%
2012	$352.7	$100.1	$452.8	$3,484.88	12.99%
2013	$356.5	$196.6	$553.1	$3,613.27	15.31%
2014	$365.8	$211.0	$576.8	$3,886.56	14.84%
2015	$388.5	$107.7	$496.2	$3,831.51	12.95%
2016	$449.6	$109.9	$559.5	$4,015.80	13.93%
2017	$487.0	$109.5	$596.5	$4,139.80	14.41%

(1) Does not include Commonwealth contribution. See Table 29.

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The following table shows the annual City contribution to the Municipal Pension Fund as a percentage of the covered employee payroll.

Table 32
Annual City Contribution as % of Covered Employee Payroll
(Dollar Amounts in Thousands of USD)

Fiscal Year	Annual City Contribution	Fiscal Year Covered Employee Payroll(1)	ACC as % of Payroll
2008	$426,934	$1,456,520	29.31%
2009	$455,389	$1,463,260	31.12%
2010	$312,556	$1,421,151	21.99%
2011	$470,155	$1,371,274	34.29%
2012	$555,690	$1,372,174	40.50%
2013	$781,823	$1,429,723	54.68%
2014	$553,179	$1,495,421	36.99%
2015	$577,195	$1,597,849	36.12%
2016	$660,247	$1,676,412	39.38%
2017	$706,237	$1,744,729	40.48%

Source: Municipal Pension Fund Financial Statements, June 30, 2017.

(1) The definition of "covered-employee payroll" in GASB 68 differs slightly from the "covered payroll" definition in GASB 27. See "PENSION SYSTEM – Funding Requirements; Funding Standards – *GASB; City Funding Policy*."

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Actuarial Projections of Funded Status

Cautionary Note. The information under this subheading, "Actuarial Projections of Funded Status," was prepared by Cheiron. The table below shows a five-year projection of MMO payments, Actuarial Value of Assets, Actuarial Liability, UAL, and Funded Ratio. The charts below show projections of funded ratios through 2037 and MMO contributions through 2038. All projections, whether for five years or for twenty years, are subject to actual experience deviating from the underlying assumptions and methods, and that is particularly the case for the charts below for the periods beyond the projections in the five-year table. **Projections and actuarial assessments are "forward looking" statements and are based upon assumptions which may not be fully realized in the future and are subject to change, including changes based upon the future experience of the City's Municipal Pension Fund and Municipal Pension Plan.**

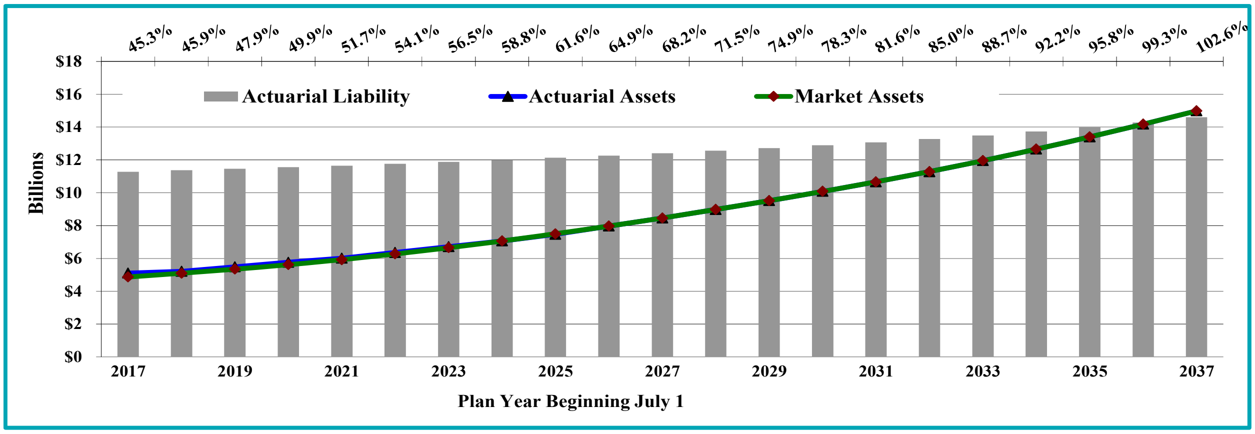
The projections are on the basis that all assumptions in the July 1, 2017 Valuation are exactly realized and the City makes all future MMO payments on schedule as required by Pennsylvania law, and must be understood in the context of the assumptions, methods and benefits in effect as described in the July 1, 2017 Valuation. Included among such assumptions are: (i) the rates of return for the Municipal Pension Fund over the projection period will equal 7.65% annually, (ii) MMO contributions will be made each year, and (iii) the provisions of Act 205 as amended by Act 44 will remain in force during the projection period. The July 1, 2017 Valuation includes charts reflecting the contributions based on MMO (charts 1A and 2A), and charts reflecting the additional contributions in accordance with the Revenue Recognition Policy (charts 3A and 4A). The charts below reflect the MMO contributions without taking into account any additional contributions in accordance with the Revenue Recognition Policy. See the July 1, 2017 Valuation for a further discussion of the assumptions and methodologies used by the Actuary in preparing the July 1, 2017 Valuation and the following projections, all of which should be carefully considered in reviewing the projections. The July 1, 2017 Valuation is available for review on the Municipal Retirement System website. The table and charts below separately set forth estimates of sales tax revenues that will be deposited by the City into the Municipal Pension Fund, which were provided by the City to Cheiron at the time of the valuation. Cheiron has not analyzed and makes no representation regarding the validity of the sales tax revenue assumptions and estimates provided by the City. See "REVENUES OF THE CITY – Sales and Use Tax." Each of the tables and graphs that follow are part of the July 1, 2017 Valuation and such Valuation report should be referenced regarding the underlying benefits, methods, and assumptions utilized in the production of these values.

Five-Year Projection. For the following chart, dollar amounts are in millions of USD.

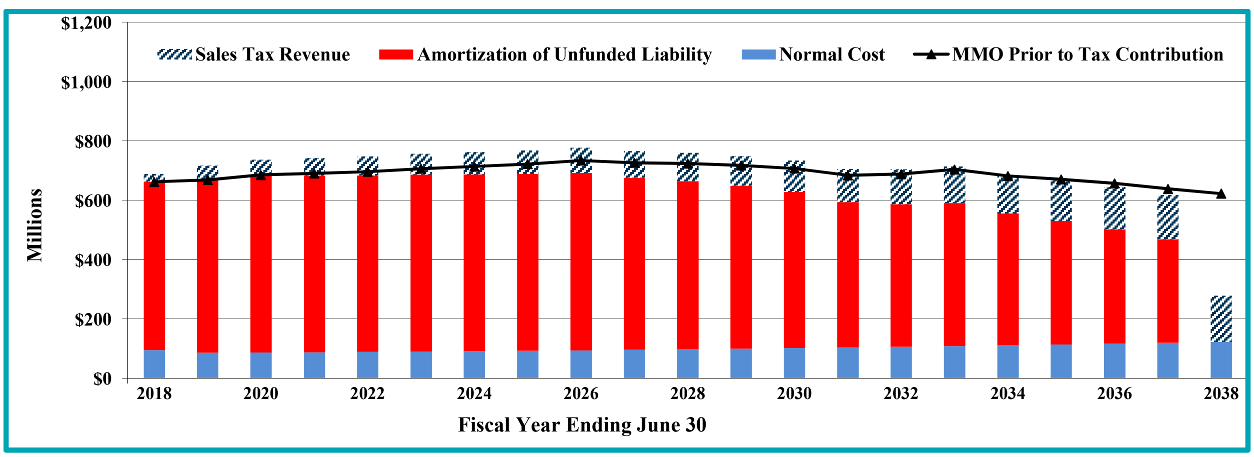
Fiscal Year End	MMO	Sales Tax Contribution	Actuarial Value of Assets	Actuarial Liability	UAL	Funded Ratio
2018	$ 661.3	$ 27.2	$ 5,108.6	$ 11,275.6	$ 6,167.0	45.3%
2019	668.3	48.3	5,220.6	11,375.9	6,155.4	45.9%
2020	682.1	54.2	5,490.8	11,469.5	5,978.7	47.9%
2021	682.3	59.7	5,767.2	11,557.7	5,790.4	49.9%
2022	682.6	65.0	6,019.0	11,643.0	5,624.0	51.7%
2023	686.3	70.3	6,358.3	11,762.2	5,403.9	54.1%

Twenty-Year Projections.

Funded Ratio Chart:



MMO Contribution Chart:



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OTHER POST-EMPLOYMENT BENEFITS

The City self-administers a single employer, defined benefit plan for post-employment benefits other than pension benefits ("OPEB"), and funds such plan on a pay-as-you-go basis. The City's OPEB plan provides for those persons who retire from the City and are participants in the Municipal Pension Plan: (i) post-employment healthcare benefits for a period of five years following the date of retirement and (ii) lifetime life insurance coverage ($7,500 for firefighters who retired before July 1, 1990; $6,000 for all other retirees). In general, retirees eligible for OPEB are those who terminate their employment after ten years of continuous service to immediately become pensioned under the Municipal Pension Plan.

To provide health care coverage, the City pays a negotiated monthly premium for retirees covered by the union contract for AFSCME DC 33 and is self-insured for all other eligible pre-Medicare retirees. Aside from AFSCME DC 33, the City is responsible for the actual health care cost that is invoiced to the City's unions by their respective vendors. The actual cost can be a combination of self-insured claim expenses, premiums, ancillary services, and administrative expenses. Eligible union represented employees receive five years of coverage through their union's health fund. The City's funding obligation for pre-Medicare retiree benefits is the same as for active employees. Union represented and non-union employees may defer their retiree health coverage until a later date. For some groups, the amount that the City pays for their deferred health care is based on the value of the health benefits at the time the retiree claims the benefits, but for police and fire retirees who retired after an established date, the City pays the cost of five years of coverage when the retiree claims the benefits.

The annual payments made by the City for OPEB for Fiscal Years 2013-2017 are shown in Table 33 below.

Table 33
Annual OPEB Payment
(Amounts in Thousands of USD)

Fiscal Year ended June 30,	Annual OPEB Payment
2013	$57,096
2014	$67,100
2015	$95,300
2016	$107,200
2017	$114,800

Source: See Note IV.3 to the City's audited Financial Statements for such Fiscal Years (as included in the City's CAFRs).

For financial reporting purposes, although the City funds OPEB on a pay-as-you-go basis, it is required to include in its financial statements (in accordance with GASB Statement No. 45) a calculation similar to that performed to calculate its pension liability. Pursuant to GASB 45, an annual required contribution is calculated which, if paid on an ongoing basis, is projected to cover normal costs each year and to amortize any unfunded actuarial liability over a period not to exceed 30 years. As of July 1, 2016, the date of the most recent actuarial valuation, the UAL for the City's OPEB was $1.94 billion, the covered annual payroll was $1.68 billion, and the ratio of UAL to the covered payroll was 115.5%. See Note IV.3 to the City's audited Financial Statements for the Fiscal Year ended June 30, 2017.

PGW PENSION PLAN

General

PGW consists of all the real and personal property owned by the City and used for the acquisition, manufacture, storage, processing, and distribution of gas within the City, and all property, books, and records employed and maintained in connection with the operation, maintenance, and administration of PGW. The City Charter provides for a Gas Commission (the "Gas Commission") to be constituted and appointed in accordance with the provisions of contracts between the City and the operator of PGW as may from time to time be in effect, or, in the absence of a contract, as may be provided by ordinance. The Gas Commission consists of the City Controller, two members appointed by City Council and two members appointed by the Mayor.

PGW is operated by PFMC, pursuant to an agreement between the City and PFMC dated December 29, 1972, as amended, authorized by ordinances of City Council (the "Management Agreement"). Under the Management Agreement, various aspects of PFMC's management of PGW are subject to review and approval by the Gas Commission. The PUC has the regulatory responsibility for PGW with regard to rates, safety, and customer service.

The City sponsors the Philadelphia Gas Works Pension Plan (the "PGW Pension Plan"), a single employer defined benefit plan, to provide pension benefits for certain current and former PGW employees and other eligible class employees of PFMC and the Gas Commission. As plan sponsor, the City, through its General Fund, could be responsible for plan liabilities if the PGW Pension Plan does not satisfy its payment obligations to PGW retirees. At June 30, 2018, the PGW Pension Plan membership total was 3,729, comprised of: (i) 2,516 retirees and beneficiaries currently receiving benefits and terminated employees entitled to benefits but not yet receiving them; and (ii) 1,213 participants, of which 961 were vested and 252 were nonvested.

PGW Pension Plan

The PGW Pension Plan provides retirement benefits as well as death and disability benefits. Retirement benefits vest after five years of credited service. Retirement payments for vested employees commence: (i) at age 65 and five years of credited service; (ii) age 55 and 15 years of credited service; or (iii) without regard to age, after 30 years of credited service. For covered employees hired prior to May 21, 2011 (union employees) or prior to December 21, 2011 (non-union employees), PGW pays the entire cost of the PGW Pension Plan. Union employees hired on or after May 21, 2011 and non-union employees hired on or after December 21, 2011 have the option to participate in the PGW Pension Plan and contribute 6% of applicable wages, or participate in a plan established in compliance with Section 401(a) of the Internal Revenue Code (deferred compensation plan) and have PGW contribute 5.5% of applicable wages.

PGW is required by statute to contribute the amounts necessary to fund the PGW Pension Plan. The PGW Pension Plan is being funded with contributions by PGW to the Sinking Fund Commission of the City, together with investment earnings and employee contributions required for new hires after December 2011 who elect to participate in the PGW Pension Plan. Benefit and contribution provisions are established by City ordinance and may be amended only as allowed by City ordinance. The pension payments are treated as an operating expense of PGW and are included as a component of PGW's base rate. The PUC approves all items that are to be included in PGW's base rates.

On February 27, 2017, PGW filed for an increase in its distribution base rates with the PUC. The filing sought a general rate increase calculated to produce $70.0 million, or 11.6%, in additional annual operating revenues based upon a ten-year normal weather assumption. The filing also requested to increase the fixed customer charge component, as well as the volumetric delivery charge component of base rates.

On July 21, 2017, PGW filed a Joint Petition for Partial Settlement (the "Settlement Agreement") of the matter for settlement of all but two issues in the case (neither of which directly concerned PGW's revenue request). The Settlement Agreement provided PGW with a general rate increase of $42.0 million in annual operating revenues calculated using a twenty-year normal weather assumption. PGW has determined the estimated pro forma revenue impact from the change from ten-year normal weather (less Heating Degree Days ("HDDs")) to twenty-year normal weather (more HDDs) is approximately an additional $17.0 million per year over the forecast period. Settlement agreements with reduced revenue requirements are typical in PUC base rate proceedings and are the product of compromise between the parties' diverse interests. The PUC has indicated that settlement results are often preferable to those achieved at the conclusion of a fully litigated proceeding.

On November 8, 2017, the PUC entered its Order and Opinion in the case, which approved the Settlement Agreement without modification and found in favor of PGW on the two non-settled issues. Thereafter, PGW made its Compliance Tariff filing on November 14, 2017. The new rates approved by the Settlement Agreement became effective on December 1, 2017.

Effective October 2015, payments to beneficiaries of the PGW Pension Plan are made by the PGW Retirement Reserve Fund. Prior to October 2015, payments to beneficiaries of the PGW Pension Plan were made by PGW through its payroll system. The financial statements for the PGW Pension Plan for the fiscal year ended June 30, 2018, show an amount due to PGW of approximately $0.1 million, which represents the cumulative excess of payments made to the retirees and administrative expenses incurred by PGW, over the sum of PGW's required annual contribution and reimbursements received from the PGW Pension Plan.

Pension Costs and Funding

PGW pays an annual amount that is projected to be sufficient to cover its normal cost and an amortization of the PGW Pension Plan's UAL. The following table shows the normal cost, the amortization payment, and the resulting annual required contribution as of the last five actuarial valuation dates for the PGW Pension Plan. PGW has been using a 20-year open amortization period (and the payments in Table 34 are on the basis of a 20-year open amortization). Commencing in PGW's fiscal year 2016, PGW calculates an annual required contribution on the basis of both a 20-year open amortization period and a 30-year closed amortization period, and will contribute the higher of the two amounts. See "– Projections of Funded Status" below. An open amortization period is one that begins again or is recalculated at each actuarial valuation date. With a closed amortization period, the unfunded liability is amortized over a specific number of years to produce a level annual payment. Because the final amortization date is fixed, if all actuarial assumptions are achieved, the unfunded liability would decline to zero as of the final amortization date. To the extent future experience differs from the assumptions used to establish the 30-year fixed amortization payment schedule, new amortization bases attributable to a particular year's difference would be established and amortized over their own 30-year schedule.

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Table 34
PGW Pension – Annual Required Contributions
(Dollar Amounts in Thousands of USD)

Calculation of ARC for the 12-month period ended:	Normal Cost[(1)] (A)	Amortization Payment[(1)] (B)	ARC[(1), (2)] (A + B)	Payments to Beneficiaries[(3)]
9/1/2014	$8,852	$12,130	$20,982	$42,913
7/1/2015	$7,859	$18,063	$25,922	$46,917
7/1/2016	$7,992	$20,238	$28,230	$50,447
7/1/2017	$7,717	$19,678	$27,395	$51,376
7/1/2018	$7,760	$20,022	$27,782	$52,627

(1) Source: The Actuarial Valuation Report (Funding) for the Plan Year July 1, 2018 – June 30, 2019 for the PGW Pension Plan.

(2) As described above, until October 2015, PGW did not make a net cash contribution to the PGW Pension Plan, but rather paid beneficiaries through its payroll system, and then was reimbursed by the Plan. Effective October 2015, payments to beneficiaries of the PGW Pension Plan are made by the PGW Retirement Reserve Fund. Each ARC is the sum reflected in this table, but the "Calculated Mid-Year Contribution" in Tables 36 and 37 more closely approximates the actual pension contributions made by PGW.

(3) Source: For 2014-2015, PGW's CAFR for the fiscal year ended August 31, 2015. For 2016, the audited financial statements for PGW for the fiscal years ended August 31, 2016 and 2015. For 2017, the audited financial statements for PGW for the fiscal years ended August 31, 2017 and 2016. For 2018, PGW records.

Although PGW has paid its annual required contribution each year, the market value of assets for the PGW Pension Plan is less than the actuarial accrued liability, as shown in the next table.

Table 35
Schedule of Pension Funding Progress
(Dollar Amounts in Thousands of USD)[(1)]

Actuarial Valuation Date	Market Value of Assets	Actuarial Liability	UAL (Market Value)	Funded Ratio
9/1/2014	$514,944	$643,988	$129,044	79.96%
7/1/2015	$510,719	$706,704	$195,985	72.27%
7/1/2016	$483,259	$736,078	$252,819	65.65%
7/1/2017	$521,526	$739,872	$218,346	70.49%
7/1/2018	$543,246	$758,069	$214,823	71.66%

(1) Source: The Actuarial Valuation Report (Funding) for the Plan Year July 1, 2018 – June 30, 2019 for the PGW Pension Plan.

The current significant actuarial assumptions for the PGW Pension Plan are: (i) investment return rate of 7.30% compounded annually; (ii) salary increases assumed to reach 4.5% per year; and (iii) retirements that are assumed to occur, for those with 30 or more years of service, at a rate of 15% at ages 55 to 60, 30% at age 61, 50% at ages 62-69, and 100% at age 70 and older.

Since the last actuarial valuation performed as of July 1, 2017, the demographics of the plan participants have changed as follows: (i) the number of plan participants has decreased 0.7%, (ii) the total number of actives in the plan decreased 2.4%, (iii) total payroll has increased 6.9%, (iv) average pay has increased 9.5% and (v) average age of active plan participants decreased 0.2%. Effective September 1, 2016, PGW began utilizing an investment rate of return of 7.30% for the PGW Pension Plan. The assumed investment rate return for the period July 1, 2015 – August 31, 2016 was 7.65%. Such reduction in the assumed investment rate of return increased the measurement of plan liabilities by approximately 3.6% and increased the annual contribution by $2,407,000 (2.6% of pay). The foregoing, among other factors, have resulted in an increase in the UAL from approximately $196.0 million at July 1, 2015 to approximately $252.8 million at July 1, 2016.

PGW uses a September 1 – August 31 fiscal year, while the PGW Pension Plan uses a July 1 – June 30 fiscal year (the same as the City's fiscal year). The last four actuarial valuation reports for the PGW Pension Plan utilized a plan year of July 1 to June 30. This is reflected in Table 35 above.

The PGW Pension Plan actuary prepared a separate actuarial valuation report ("GASB 67 Report") for the fiscal year ending June 30, 2018, for purposes of plan reporting information under Governmental Accounting Standards Board Statement No. 67, "Financial Reporting for Pension Plans." The GASB 67 Report shows for the fiscal year ending June 30, 2018, an unfunded liability of approximately $261.3 million (rather than the approximately $214.8 million reflected in Table 35), which results in a funded ratio of 67.53%. In addition, that report provides an interest rate sensitivity, which shows that were the investment rate to be 6.30% (1% lower than the assumed investment rate of 7.30%), the unfunded liability would be approximately $354.0 million.

Projections of Funded Status

The information under this subheading, "Projections of Funded Status," is extracted from tables prepared by Aon Hewitt, as actuary to the PGW Pension Plan, which were included in their "Actuarial Valuation Report (Funding) for the Plan Year July 1, 2018 – June 30, 2019," dated September 5, 2018. The charts show 10-year projections, using both the current amortization method (20-year, open) and the alternative amortization method (30-year, fixed). See "– Pension Costs and Funding" above. Projections are subject to actual experience deviating from the underlying assumptions and methods. **Projections and actuarial assessments are "forward looking" statements and are based upon assumptions that may not be fully realized in the future and are subject to change, including changes based upon the future experience of the PGW Pension Plan.**

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Table 36
Schedule of Prospective Funded Status (20-Year Open Amortization)
(Dollar Amounts in Thousands of USD)

Actuarial Valuation Date (July 1)	Actuarial Value of Assets	Actuarial Accrued Liability	UAL (Actuarial Value)	Calculated Mid-Year Contribution(1), (2)	Funded Ratio
2018	$535,678	$758,069	$222,391	$28,797	70.66%
2019	548,634	766,287	217,653	28,255	71.60%
2020	560,747	773,927	213,180	27,769	72.45%
2021	579,113	780,787	201,673	26,513	74.17%
2022	590,700	786,516	195,815	25,815	75.10%
2023	599,967	791,214	191,246	25,167	75.83%
2024	608,301	795,046	186,745	24,350	76.51%
2025	615,573	798,069	182,496	23,902	77.13%
2026	622,118	800,541	178,423	24,470	77.71%
2027	628,043	802,210	174,167	22,740	78.29%

(1) Source: The Actuarial Valuation Report (Funding) for the Plan Year July 1, 2018 – June 30, 2019 for the PGW Pension Plan.

(2) PGW makes monthly contributions to the PGW Retirement Reserve Fund. The actuary's report assumes contributions at the beginning, middle, and end of the plan year. PGW utilizes the mid-year contribution level to approximate the actual funding methodology.

Table 37
Schedule of Prospective Funded Status (30-Year Closed Amortization)
(Dollar Amounts in Thousands of USD)

Actuarial Valuation Date (July 1)	Actuarial Value of Assets	Actuarial Accrued Liability	UAL (Actuarial Value)	Calculated Mid-Year Contribution(1), (2)	Funded Ratio
2018	$535,678	$758,069	$222,391	$26,437	70.66%
2019	546,188	766,287	220,099	26,379	71.28%
2020	556,178	773,927	217,749	26,363	71.86%
2021	572,753	780,787	208,033	25,662	73.36%
2022	582,994	786,516	203,522	25,423	74.12%
2023	591,292	791,214	199,922	25,206	74.73%
2024	599,033	795,046	196,013	24,809	75.35%
2025	606,104	798,069	191,965	24,770	75.95%
2026	612,858	800,541	187,683	24,737	76.56%
2027	619,420	802,210	182,790	24,401	77.21%

(1) Source: The Actuarial Valuation Report (Funding) for the Plan Year July 1, 2018– June 30, 2019 for the PGW Pension Plan.

(2) PGW makes monthly contributions to the PGW Retirement Reserve Fund. The actuary's report assumes contributions at the beginning, middle, and end of the plan year. PGW utilizes the mid-year contribution level to approximate the actual funding methodology.

Additional Information

The City issues a publicly available financial report that includes financial statements and required supplementary information for the PGW Pension Plan. The report is not incorporated into this Official Statement by reference. The report may be obtained by writing to the Office of the Director of Finance of the City.

Further information on the PGW Pension Plan, including with respect to its membership, plan description, funding policy, actuarial assumptions and funded status is contained in the Fiscal Year 2017 CAFR.

PGW OTHER POST-EMPLOYMENT BENEFITS

PGW provides post-employment healthcare and life insurance benefits to its participating retirees and their beneficiaries and dependents. The City, through its General Fund, could be responsible for costs associated with post-employment healthcare and life insurance benefits if PGW fails to satisfy its post-employment benefit obligations.

PGW pays the full cost of medical, basic dental, and prescription coverage for employees who retired prior to December 1, 2001. Employees who retire after December 1, 2001 are provided a choice of three plans at PGW's expense and can elect to pay toward a more expensive plan. Union employees hired prior to May 21, 2011 and non-union employees hired prior to December 21, 2011 who retire from active service to immediately begin receiving pension benefits are entitled to receive lifetime post-retirement medical, prescription, and dental benefits for themselves and, depending on their retirement plan elections, their dependents. Employees hired on or after those dates are entitled to receive only five years of post-retirement benefits. Currently, PGW provides for the cost of healthcare and life insurance benefits for retirees and their beneficiaries on a pay-as-you-go-basis.

As part of a July 29, 2010 rate case settlement (the "Rate Settlement"), which provided for the establishment of an irrevocable trust for the deposit of funds derived through a rider from all customer classes to fund OPEB liabilities (the "OPEB Surcharge"), PGW established the trust in July 2010, and began funding the trust in accordance with the Rate Settlement in September 2010. The Rate Settlement provides that PGW shall deposit $15.0 million annually for an initial five-year period towards the ARC, and an additional $3.5 million annually, which represents a 30-year amortization of the OPEB liability at August 31, 2010. These deposits will be funded primarily through increased rates of $16.0 million granted in the Rate Settlement. The ARC represents a level of funding that, if paid on an ongoing basis, is projected to cover normal costs each year and amortize any unfunded actuarial liabilities (or funding excesses) over a period of 30 years. In PGW's 2015-2016 Gas Cost Rate ("GCR") proceeding, PGW proposed to continue its OPEB Surcharge. The parties to the GCR proceeding submitted a settlement agreement continuing the OPEB Surcharge at the same level of revenue ($16.0 million annually) and funding ($18.5 million annually). Such settlement agreement was approved by the PUC.

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Table 38 provides detail of actual PGW OPEB payments for the last five PGW Fiscal Years and projected PGW OPEB payments for PGW Fiscal Years 2018-2022.

Table 38
PGW OPEB Payments
(Amounts in Thousands of USD)

	Fiscal Year ended August 31,	Healthcare	Life Insurance	OPEB Trust	Total
Actual					
	2013	$22,180	$1,562	$18,500	$42,242
	2014	$24,247	$1,615	$18,500	$44,362
	2015	$28,598	$1,749	$18,500	$48,847
	2016	$29,251	$1,800	$18,500	$49,551
	2017	$27,788	$1,777	$18,500	$48,065
Projections					
	2018	$29,968	$1,700	$18,500	$50,168
	2019	$31,532	$1,700	$18,500	$51,732
	2020	$33,077	$1,700	$18,500	$53,277
	2021	$35,796	$1,700	$18,500	$55,996
	2022	$37,132	$1,700	$18,500	$57,332

Table 39 is the schedule of PGW OPEB funding progress, as of the actuarial valuation date of August 31 for 2013-2017.

Table 39
Schedule of OPEB Funding Progress
(Dollar Amounts in Thousands of USD)

Actuarial valuation date (August 31)	Actuarial value of assets	Actuarial liability	Unfunded actuarial liability	Funded ratio
2013	$61,796	$436,527	$374,731	14.2%
2014	$90,838	$450,289	$359,451	20.2%
2015	$104,318	$505,434	$401,116	20.6%
2016	$131,868	$489,725	$357,857	26.9%
2017	$165,883	$516,082	$350,199	32.1%

Further information on PGW's annual OPEB expense, net OPEB obligation and the funded status of the OPEB benefits related to PGW is contained in the Fiscal Year 2017 CAFR.

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CITY CASH MANAGEMENT AND INVESTMENT POLICIES

General Fund Cash Flow

Because the receipt of revenues into the General Fund generally lags behind expenditures from the General Fund during each Fiscal Year, the City issues notes in anticipation of General Fund revenues and makes payments from the Consolidated Cash Account (described below) to finance its on-going operations.

The timing imbalance referred to above results from a number of factors, principally the following: (i) Real Estate Taxes, BIRT, and net profits taxes are not due until the latter part of the Fiscal Year; and (ii) the City experiences lags in reimbursement from other governmental entities for expenditures initially made by the City in connection with programs funded by other governments.

The City has issued, or PICA has issued on behalf of the City, tax and revenue anticipation notes in each Fiscal Year since Fiscal Year 1972. Each issue was repaid when due, prior to the end of the Fiscal Year. The City issued $125 million of tax and revenue anticipation notes on December 6, 2017, which matured on June 29, 2018 and were paid in full.

The repayment of the tax and revenue anticipation notes is funded through cash available in the General Fund.

Consolidated Cash

The Act of the General Assembly of June 25, 1919 (Pa. P.L. 581, No. 274, Art. XVII, § 6) authorizes the City to make temporary inter-fund loans between certain operating and capital funds. The City maintains a Consolidated Cash Account for the purpose of pooling the cash and investments of all City funds, except those which, for legal or contractual reasons, cannot be commingled (e.g., the Municipal Pension Fund, sinking funds, sinking fund reserves, funds of PGW, the Aviation Fund, the Water Fund, and certain other restricted purpose funds). A separate accounting is maintained to record the equity of each member fund that participates in the Consolidated Cash Account. The City manages the Consolidated Cash Account pursuant to the procedures described below.

To the extent that any member fund temporarily experiences the equivalent of a cash deficiency, an advance is made from the Consolidated Cash Account, in an amount necessary to result in a zero balance in the cash equivalent account of the borrowing fund. All subsequent net receipts of a member fund that has negative equity are applied in repayment of the advance.

All advances are made within the budgetary constraints of the borrowing funds. Within the General Fund, this system of inter-fund advances has historically resulted in the temporary use of tax revenues or other operating revenues for capital purposes and the temporary use of capital funds for operating purposes. With the movement of the reimbursable component of DHS activities from the General Fund to the Grants Revenue Fund, a similar system of advances has resulted in the use of tax revenues or other operating revenues in the General Fund to make expenditures from the Grants Revenue Fund, which advances may be outstanding for multiple Fiscal Years, but which are expected to be reimbursed by the Commonwealth.

The City, in addition to maintaining an ongoing cash reconciliation process, is reviewing and reconciling certain unidentified variances in the Consolidated Cash Account. The reconciliation process, in short, reconciles the account balance and activity shown on the records of the bank at which the cash balance of the Consolidated Cash Account is maintained to that shown on the City's records. The City's records show currently that the reported balance in the Consolidated Cash Account on the City's records is higher than the account balance on the bank's records by approximately $23 million, which is attributable principally to unidentified historic variances. The City has engaged the services of an auditing firm to undertake a timely and complete reconciliation and resolve the unidentified variances. The audit has resulted in preliminary recommendations in September 2018 with a final report expected to be delivered in December 2018. At this time, the City does not know what impact, if any, the final results of such audit will show regarding the balance in the Consolidated Cash Account.

Procedures governing the City's cash management operations require the General Fund-related operating fund to borrow initially from the General Fund-related capital fund, and only to the extent there is a deficiency in such fund may the General Fund-related operating fund borrow money from any other funds in the Consolidated Cash Account.

Investment Practices

Cash balances in each of the City's funds are managed to maintain daily liquidity to pay expenses, and to make investments that preserve principal while striving to obtain the maximum rate of return. Pursuant to the City Charter, the City Treasurer is the City official responsible for managing cash collected into the City Treasury. The available cash balances in excess of daily expenses are placed in demand accounts, swept into money market mutual funds, or used to make investments directed by professional investment managers. These investments are held in segregated trust accounts at a separate financial institution. Cash balances related to revenue bonds for water and sewer and the airport are directly deposited and held separately in trust. A fiscal agent manages these cash balances in accordance with the applicable bond documents and the investment practice is guided by administrative direction of the City Treasurer per the Investment Committee and the Investment Policy (as described below). In addition, certain operating cash deposits (such as Community Behavioral Health, Special Gas/County Liquid and "911" surcharge) of the City are restricted by purpose and required to be segregated into accounts in compliance with federal or Commonwealth reporting.

Investment guidelines for the City are embodied in section 19-202 of the Philadelphia Code. In furtherance of these guidelines, as well as Commonwealth and federal legislative guidelines, the Director of Finance adopted a written Investment Policy (the "Policy") that went into effect in August 1994 and was most recently revised in September 2014. The Policy supplements other legal requirements and establishes guiding principles for the overall administration and effective management of all of the City's monetary funds (except the Municipal Pension Fund, the PGW Retirement Reserve Fund, the PGW OPEB Trust and the PGW Workers' Compensation Reserve Fund).

The Policy delineates the authorized investments as authorized by the Philadelphia Code and the funds to which the Policy applies. The authorized investments include U.S. government securities, U.S. treasuries, U.S. agencies, repurchase agreements, commercial paper, corporate bonds, money market mutual funds, obligations of the Commonwealth, collateralized banker's acceptances and certificates of deposit, and collateralized mortgage obligations and pass-through securities directly issued by a U.S. agency or instrumentality, all of investment grade rating or better and with maturity limitations.

U.S. government treasury and agency securities carry no limitation as to the percent of the total portfolio. Repurchase agreements, money market mutual funds, commercial paper, and corporate bonds are limited to investment of no more than 25% of the total portfolio. Obligations of the Commonwealth and collateralized banker's acceptances and certificates of deposit are limited to no more than 15% of the total portfolio. Collateralized mortgage obligations and pass-through securities directly issued by a U.S. agency or instrumentality are limited to no more than 5% of the total portfolio.

U.S. government securities carry no limitation as to the percent of the total portfolio per issuer. U.S. agency securities are limited to no more than 33% of the total portfolio per issuer. Repurchase agreements and money market mutual funds are limited to no more than 10% of the total portfolio per issuer. Commercial paper, corporate bonds, obligations of the Commonwealth, collateralized banker's acceptances and certificates of deposit, and collateralized mortgage obligations and pass-through securities directly issued by a U.S. agency or instrumentality are limited to no more than 3% of the total portfolio per issuer.

The Policy provides for an ad hoc Investment Committee consisting of the Director of Finance, the City Treasurer and one representative each from the Water Department, the Division of Aviation, and PGW. The Investment Committee meets quarterly with each of the investment managers to review each manager's performance to date and to plan for the next quarter. Investment managers are given any changes in investment instructions at these meetings. The Investment Committee approves all modifications to the Policy. The Investment Committee may from time to time review and revise the Policy and does from time to time approve temporary waivers of the restrictions on assets based on cash management needs and recommendations of investment managers.

The Policy expressly forbids the use of any derivative investment product as well as investments in any security whose yield or market value does not follow the normal swings in interest rates. Examples of these types of securities include, but are not limited to: structured notes, floating rate (excluding U.S. Treasury and U.S. agency floating rate securities) or inverse floating rate instruments, securities that could result in zero interest accrual if held to maturity, and mortgage derived interest and principal only strips. The City currently makes no investments in derivatives.

DEBT OF THE CITY

General

Section 12 of Article IX of the Constitution of the Commonwealth provides that the authorized debt of the City "may be increased in such amount that the total debt of [the] City shall not exceed 13.5% of the average of the annual assessed valuations of the taxable realty therein, during the ten years immediately preceding the year in which such increase is made, but [the] City shall not increase its indebtedness to an amount exceeding 3.0% upon such average assessed valuation of realty, without the consent of the electors thereof at a public election held in such manner as shall be provided by law." The Supreme Court of Pennsylvania has held that bond authorizations once approved by the voters need not be reduced as a result of a subsequent decline in the average assessed value of City property. The general obligation debt subject to the limitation described in this paragraph is referred to herein as "Tax-Supported Debt."

The Constitution of the Commonwealth further provides that there shall be excluded from the computation of debt for purposes of the Constitutional debt limit, debt (herein called "Self-Supporting Debt") incurred for revenue-producing capital improvements that may reasonably be expected to yield revenue in excess of operating expenses sufficient to pay interest and sinking fund charges thereon. In the case of general obligation debt, the amount of such Self-Supporting Debt to be so excluded must be determined by the Court of Common Pleas of Philadelphia County upon petition by the City. Self-Supporting Debt is general obligation debt of the City, with the only distinction from Tax-Supported Debt being that it is not used in the calculation of the Constitutional debt limit. Self-Supporting Debt has no lien on any particular revenues.

For purposes of this Official Statement, Tax-Supported Debt and Self-Supporting Debt are referred to collectively as "General Obligation Debt." The term "General Fund-Supported Debt" is comprised of: (i) General Obligation Debt; and (ii) PAID, PMA, PPA, and PRA bonds.

Using the methodology described above, as of June 30, 2018, the Constitutional debt limitation for Tax-Supported Debt was approximately $8,001,005,000. The total amount of authorized debt applicable to the debt limit was $2,404,512,000, including $794,787,000 of authorized but unissued debt, leaving a legal debt margin of $5,949,692,000. Based on the foregoing figures, the calculation of the legal debt margin is as follows:

Table 40
General Obligation Debt
June 30, 2018
(Amounts in Thousands of USD)

Authorized, issued and outstanding	$1,609,725
Authorized and unissued	794,787
Total	$2,404,512
Less: Self-Supporting Debt	($353,199)
Less: Serial bonds maturing within a year	0
Total amount of authorized debt applicable to debt limit	2,051,313
Legal debt limit	8,001,005
Legal debt margin	$5,949,692

As a result of the implementation of the City's AVI, the assessed value of taxable real estate within the City has increased substantially. See "REVENUES OF THE CITY – Real Property Taxes Assessment and Collection." The $8.001 billion Constitutional debt limit calculation includes five years of property values certified under the City's AVI program, and five years of property values under the City's former property valuation process. Assuming no increase or decrease in property values used to calculate the Constitutional debt limit in Table 40, the Constitutional debt limit is estimated to be $15.457 billion by 2027.

The City is also empowered by statute to issue revenue bonds and, as of June 30, 2018, had outstanding $1,824,507,000 aggregate principal amount of Water and Wastewater Revenue Bonds ("Water and Wastewater Bonds"), $1,041,780,000 aggregate principal amount of Gas Works Revenue Bonds, and $1,597,170,000 aggregate principal amount of Airport Revenue Bonds. As of June 30, 2018, the principal amount of PICA Bonds outstanding was $168,505,000. The City has also enacted an ordinance authorizing the issuance of approximately $350 million aggregate principal amount in commercial paper for the Division of Aviation, and ordinances authorizing the issuance of up to $270 million of Gas Works Revenue Notes to finance working capital and capital projects for PGW and the issuance of up to $300 million of Gas Works Revenue Bonds to finance capital projects for PGW.

Short-Term Debt

The City issued $125 million of tax and revenue anticipation notes on December 6, 2017, which matured on June 29, 2018 and were paid in full. As provided in the PICA Act, the City's tax and revenue anticipation notes are general obligations of the City, but do not constitute debt of the City subject to the limitations of the Constitutional debt limit. See "CITY CASH MANAGEMENT AND INVESTMENT POLICIES – General Fund Cash Flow."

Long-Term Debt

The following table presents a synopsis of the bonded debt of the City and its component units as of the date indicated. Of the total balance of the City's general obligation bonds issued and outstanding as of June 30, 2018, approximately 26% is scheduled to mature within five Fiscal Years and approximately 56% is scheduled to mature within ten Fiscal Years. When PICA's outstanding bonds are included with the City's general obligation bonds, approximately 60% is scheduled to mature within ten Fiscal Years.

Table 41

Bonded Debt – City of Philadelphia and Component Units
(as of June 30, 2018)
(Amounts in Thousands of USD)[1], [2]

General Obligation Debt and PICA Bonds				
General Obligation Bonds		$1,609,725		
PICA Bonds		168,505		
Subtotal: General Obligation Debt and PICA Bonds			**$1,778,230**	
Other General Fund-Supported Debt[3]				
Philadelphia Municipal Authority				
Criminal Justice Center	$9,180			
Juvenile Justice Center	84,625			
Public Safety Campus	63,830			
Energy Conservation	9,180			
		$166,815		
Philadelphia Authority for Industrial Development				
Pension capital appreciation bonds	$390,428			
Pension fixed rate bonds	761,655			
Stadiums	248,780			
Library	4,955			
Cultural and Commercial Corridor	85,015			
One Parkway	27,550			
Affordable Housing	52,910			
400 N. Broad[4]	250,544			
Art Museum	10,310			
		$1,832,147		
Parking Authority		10,930		
Redevelopment Authority		166,535		
Subtotal: Other General Fund-Supported Debt			**$2,176,427**	
Revenue Bonds				
Water Fund		$1,824,507		
Aviation Fund		1,597,170		
Gas Works		1,041,780		
Subtotal: Revenue Bonds			**$4,463,457**	
Grand Total				**$8,418,114**

(1) Unaudited; figures may not sum due to rounding.
(2) For tables setting forth a ten-year historical summary of Tax-Supported Debt of the City and the School District and the debt service requirements to maturity of the City's outstanding bonded indebtedness as of June 30, 2017, see the Fiscal Year 2017 CAFR.
(3) The principal amount outstanding relating to the PAID 1999 Pension Obligation Bonds, Series B (capital appreciation bonds) is reflected as the accreted value thereon as of June 30, 2018.
(4) Includes sublease payments of approximately $15.2 million annually, for the police headquarters renovation and projects that in year nine (2026), the City issues approximately $200 million in bonds to acquire the project at an assumed interest rate of 5% over the next 20 years.

Table 42
City of Philadelphia
Annual Debt Service on General Fund-Supported Debt
(as of June 30, 2018)
(Amounts in Millions of USD)[1]

	General Obligation Debt[2]			Other General Fund-Supported Debt[4], [5]			Aggregate General Fund-Supported Debt		
Fiscal Year	Principal	Interest[3]	Total	Principal	Interest[6]	Total	Principal	Interest	Total
2019	$82.00	$76.94	$158.94	$81.87	$151.58	$233.44	$163.87	$228.52	$392.38
2020	84.51	72.95	157.46	72.67	151.56	224.23	157.18	224.51	381.69
2021	78.24	68.98	147.22	88.20	136.11	224.31	166.44	205.09	371.53
2022	81.80	65.07	146.86	86.33	138.00	224.33	168.12	203.07	371.19
2023	86.92	60.82	147.74	124.10	100.22	224.32	211.02	161.05	372.07
2024	91.27	56.29	147.56	123.21	99.87	223.09	214.48	156.17	370.65
2025	95.74	51.58	147.32	128.09	95.02	223.11	223.83	146.59	370.42
2026	92.98	46.86	139.84	144.11	78.19	222.30	237.09	125.06	362.15
2027	97.45	42.10	139.55	166.69	55.47	222.16	264.14	97.57	361.71
2028	102.69	37.26	139.94	174.27	47.03	221.30	276.96	84.29	361.24
2029	78.06	32.97	111.03	279.97	29.66	309.62	358.03	62.63	420.65
2030	94.46	28.80	123.25	63.27	19.65	82.92	157.73	48.45	206.18
2031	99.93	24.08	124.01	66.26	16.68	82.94	166.19	40.76	206.94
2032	104.99	19.10	124.09	26.24	14.08	40.32	131.23	33.18	164.41
2033	70.47	14.80	85.27	18.91	12.99	31.90	89.38	27.79	117.16
2034	59.39	11.55	70.93	19.84	12.05	31.89	79.23	23.60	102.82
2035	45.89	8.94	54.83	20.83	11.07	31.90	66.71	20.01	86.72
2036	48.10	6.72	54.82	21.86	10.04	31.89	69.95	16.76	86.71
2037	35.24	4.71	39.95	22.94	8.95	31.89	58.18	13.67	71.85
2038	37.14	2.90	40.04	24.08	7.82	31.89	61.21	10.72	71.93
2039	18.67	1.55	20.21	20.05	6.73	26.77	38.71	8.27	46.98
2040	7.58	0.96	8.54	14.24	5.74	19.98	21.82	6.70	28.51
2041	7.93	0.61	8.54	14.94	5.03	19.97	22.87	5.65	28.51
2042	8.34	0.21	8.54	15.68	4.30	19.97	24.01	4.51	28.52
2043	0.00	0.00	0.00	16.45	3.53	19.98	16.45	3.53	19.98
2044	0.00	0.00	0.00	17.26	2.72	19.98	17.26	2.72	19.98
2045	0.00	0.00	0.00	14.04	1.86	15.90	14.04	1.86	15.90
2046	0.00	0.00	0.00	14.76	1.14	15.90	14.76	1.14	15.90
2047	0.00	0.00	0.00	15.52	0.39	15.90	15.52	0.39	15.90
Total	**$1,609.73**	**$736.77**	**$2,346.50**	**$1,896.62**	**$1,227.49**	**$3,124.11**	**$3,506.35**	**$1,964.26**	**$5,470.61**

(1) Does not include letter of credit fees. Figures may not sum due to rounding.
(2) Includes both Tax-Supported Debt and Self-Supporting Debt. See "– General." Does not include PICA Bonds.
(3) Assumes interest rate on hedged variable rate bonds to be the associated fixed swap rate.
(4) Includes PAID, PMA, PPA, and PRA bonds, with capital appreciation bonds including only actual amounts payable. The original issuance amount of such capital appreciation bonds is included under the "Principal" column in the Fiscal Year such bonds mature and the full accretion amount at maturity less the original issuance amount is included in the "Interest" column in the Fiscal Year such bonds mature.
(5) Includes sublease payments of approximately $15.2 million annually, for the police headquarters renovation and projects that in year nine (2026), the City issues approximately $200 million in bonds to acquire the project at an assumed interest rate of 5% over the next 20 years.
(6) Assumes interest rate on hedged variable rate bonds to be the associated fixed swap rate, plus any fixed spread. Net of capitalized interest on PAID 2012 Service Agreement Revenue Refunding Bonds.

Other Long-Term Debt Related Obligations

The City has entered into other contracts and leases to support the issuance of debt by public authorities related to the City pursuant to which the City is required to budget and appropriate tax or other general revenues to satisfy such obligations, as shown in Table 41. The City budgets all other long-term debt-related obligations as a single budget item with the exception of PPA.

The Hospitals Authority and the State Public School Building Authority have issued bonds on behalf of the Community College of Philadelphia ("CCP"). Under the Community College Act (Pa. P.L. 103, No. 31 (1985)), each community college must have a local sponsor, which for CCP is the City. As the local sponsor, the City is obligated to pay up to 50% of the annual capital expenses of CCP, which includes debt service. The remaining 50% is paid by the Commonwealth. Additionally, the City annually appropriates funds for a portion of CCP's operating costs (less tuition and less the Commonwealth's payment). The amount paid by the City in Fiscal Year 2017 was $29.9 million. The amount paid by the City in Fiscal Year 2018 was $30.4 million (unaudited). The budgeted amount for Fiscal Year 2019 is $32.4 million.

PICA Bonds

PICA has issued 11 series of bonds at the request of the City (the "PICA Bonds"). PICA no longer has authority under the PICA Act to issue bonds for new money purposes, but may refund bonds previously issued. As of June 30, 2018, the principal amount of PICA Bonds outstanding was $168,505,000. The final maturity date for such PICA Bonds is June 15, 2023. Such final maturity of the PICA Bonds would occur prior to the final maturity of the Bonds. The proceeds of the PICA Bonds were used to: (i) make grants to the City to fund its General Fund deficits, to fund the costs of certain City capital projects, to provide other financial assistance to the City to enhance operational productivity, and to defease certain of the City's general obligation bonds; (ii) refund other PICA Bonds; and (iii) pay costs of issuance.

The PICA Act authorizes the City to impose a tax for the sole and exclusive purposes of PICA. In connection with the adoption of the Fiscal Year 1992 budget and the execution of the PICA Agreement, as so authorized by the PICA Act, the City reduced the wage, earnings, and net profits taxes on City residents by 1.5% and enacted a new tax of 1.5% on wages, earnings, and net profits of City residents (the "PICA Tax"), which continues in effect. The PICA Tax secures the PICA Bonds. Pursuant to the PICA Act, at such time when no PICA Bonds are outstanding, the PICA Tax will expire. At any time, the City is authorized to increase for its own use its various taxes, including its wage, earnings, and net profits taxes on City residents and could do so upon the expiration of the PICA Tax. Certain taxes, such as sales, liquor, and hotel taxes, among others, cannot be increased by the City without Commonwealth approval.

The PICA Tax is collected by the City's Department of Revenue, as agent of the State Treasurer, and deposited in the Pennsylvania Intergovernmental Cooperation Authority Tax Fund (the "PICA Tax Fund") of which the State Treasurer is custodian. The PICA Tax Fund is not subject to appropriation by City Council or the General Assembly. See "THE GOVERNMENT OF THE CITY OF PHILADELPHIA – Local Government Agencies – *Non-Mayoral-Appointed or Nominated Agencies* – PICA."

The PICA Act authorizes PICA to pledge the PICA Tax to secure its bonds and prohibits the Commonwealth and the City from repealing the PICA Tax or reducing its rate while any PICA Bonds are outstanding. PICA Bonds are payable from PICA revenues, including the PICA Tax, pledged to secure PICA's bonds, the Bond Payment Account (as described below) and any debt service reserve fund established for such bonds and have no claim on any revenues of the Commonwealth or the City.

The PICA Act establishes a "Bond Payment Account" for PICA as a trust fund for the benefit of PICA bondholders and authorizes the creation of a debt service reserve fund for bonds issued by PICA. The State Treasurer is required to pay the proceeds of the PICA Tax held in the PICA Tax Fund directly to the Bond Payment Account. The proceeds of the PICA Tax in excess of amounts required for: (i) debt service; (ii) replenishment of any debt service reserve fund for bonds issued by PICA; and (iii) certain PICA operating expenses, are required to be deposited in a trust fund established exclusively to benefit the City and designated the "City Account." Amounts in the City Account are required to be remitted to the City not less often than monthly, unless PICA certifies the City's non-compliance with the then-current five-year financial plan.

The total amount of PICA Tax remitted by the State Treasurer to PICA (which is net of the costs of the State Treasurer in collecting the PICA Tax), PICA annual debt service and investment expenses, and net PICA tax revenue remitted to the City for Fiscal Years 2014-2017, the budgeted amounts and current estimates for Fiscal Year 2018, and the budgeted amounts for Fiscal Year 2019 are set forth below.

Table 43
Summary of PICA Tax Remitted by the State Treasurer to PICA and Net Taxes Remitted by PICA to the City (Amounts in Millions of USD)[(1)]

Fiscal Year	PICA Tax[(2)]	PICA Annual Debt Service and Investment Expenses[(2)]	Net taxes remitted to the City[(3)]
2014 (Actual)	$384.5	$65.8	$318.7
2015 (Actual)	$408.5	$62.0	$346.5
2016 (Actual)	$444.5	$61.1	$383.4
2017 (Actual)	$469.2	$59.7	$409.5
2018 (Adopted Budget)	$475.2	$56.0	$419.2
2018 (Current Estimate)	$497.3	$56.0	$441.3
2019 (Adopted Budget)	$516.0	$47.1	$469.0

(1) Figures may not sum due to rounding.
(2) Source: For Fiscal Years 2014-2018, the City's Quarterly City Manager's Reports. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.
(3) Source: For Fiscal Years 2014-2017, the City's CAFRs for such Fiscal Years. For Fiscal Year 2018, the FY 2018 Fourth Quarter QCMR. For Fiscal Year 2019, the Fiscal Year 2019 Adopted Budget.

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OTHER FINANCING RELATED MATTERS

Swap Information

The City has entered into various swaps related to its outstanding General Fund-Supported Debt as detailed in the following table:

Table 44
Summary of Swap Information for General Fund-Supported Debt as of June 30, 2018

City Entity	City GO	City Lease PAID	City Lease PAID	City Lease PAID	City Lease PAID	City Lease PAID
Related Bond Series	2009B[(1)]	2007A (Stadium)[(2)]	2007B-2,3 (Stadium)[(3),(5)]	2014A (Stadium)[(3)]	2007B-2,3 (Stadium)[(3),(6)]	2014A (Stadium)[(3)]
Initial Notional Amount	$313,505,000	$298,485,000	$217,275,000	$87,961,255	$72,400,000	$29,313,745
Current Notional Amount	$100,000,000	$193,520,000	$87,758,745	$87,961,255	$29,246,255	$29,313,745
Termination Date	8/1/2031	10/1/2030	10/1/2030	10/1/2030	10/1/2030	10/1/2030
Product	Fixed Payer Swap	Basis Swap	Fixed Payer Swap	Fixed Payer Swap	Fixed Payer Swap	Fixed Payer Swap
Rate Paid by Dealer	SIFMA	67% 1-month LIBOR + 0.20% plus fixed annuity	SIFMA	70% 1-month LIBOR	SIFMA	70% 1- month LIBOR
Rate Paid by City Entity	3.829%	SIFMA	3.9713%	3.62%	3.9713%	3.632%
Dealer	Royal Bank of Canada	Merrill Lynch Capital Services, Inc.	JPMorgan Chase Bank, N.A.	JPMorgan Chase Bank, N.A.	Merrill Lynch Capital Services, Inc.	Merrill Lynch Capital Services, Inc.
Fair Value[(4)]	($16,037,828)	($903,767)	($10,805,622)	($9,809,136)	($3,600,805)	($3,291,953)
Additional Termination Events	For Dealer: Rating change below BBB- or Baa3 For City: Rating change below BBB- or Baa3 upon insurer event (includes insurer being rated below A- or A3)	For Dealer: Rating change below BBB- or Baa3 For PAID: Rating change below BBB- or Baa3	For Dealer: Rating change below BBB- or Baa3 For PAID: Rating change below BBB- or Baa3 upon insurer event (includes insurer being rated below A- or A3)	For Dealer: Rating change below BBB- or Baa3 For PAID: Rating change below BBB- or Baa3 upon insurer event (includes insurer being rated below A- or A3)	For Dealer: Rating change below BBB- or Baa3 For PAID: Rating change below BBB- or Baa3 upon insurer event (includes insurer being rated below A- or A3)	For Dealer: Rating change below BBB- or Baa3 For PAID: Rating change below BBB- or Baa3 upon insurer event (includes insurer being rated below A- or A3)

(1) On July 28, 2009, the City terminated a portion of the swap in the amount of $213,505,000 in conjunction with the refunding of its Series 2007B bonds with the Series 2009A fixed rate bonds and the Series 2009B variable rate bonds. The City made a termination payment of $15,450,000.

(2) PAID received annual fixed payments of $1,216,500 from July 1, 2004 through July 1, 2013. As the result of an amendment on July 14, 2006, $104,965,000 of the total notional amount was restructured as a constant maturity swap (the rate received by PAID on that portion was converted from a percentage of 1-month LIBOR to a percentage of the 5-year LIBOR swap rate from October 1, 2006 to October 1, 2020). The constant maturity swap was terminated in December 2009. The City received a termination payment of $3,049,000.

(3) On May 13, 2014, PAID converted a portion of the 2007B SIFMA Swap to a LIBOR-based swap in conjunction with the refunding of its Series 2007B bonds with the Series 2014A bonds. Under the conversion, PAID pays a fixed rate of 3.62% and 3.632% to JPMorgan and Merrill Lynch, respectively, and receives a floating rate of 70% of 1-month LIBOR.

(4) Fair values are as of June 30, 2018, and are shown from the City's perspective and include accrued interest.

(5) On July 15, 2014, PAID terminated a portion of the swap in the amount of $41,555,000 in conjunction with the refunding of its Series 2007B bonds with the Series 2014B fixed rate bonds. PAID made a termination payment of $4,171,000 to JPMorgan.

(6) On July 15, 2014, PAID terminated a portion of the swap in the amount of $13,840,000 in conjunction with the refunding of its Series 2007B bonds with the Series 2014B fixed rate bonds. PAID made a termination payment of $1,391,800 to Merrill Lynch.

While the City is party to several interest rate swap agreements, for which there is General Fund exposure and on which the swaps currently have a negative mark against the City, the City has no obligation to post collateral on these swaps while the City's underlying ratings are investment grade.

For more information related to certain swaps entered into in connection with revenue bonds issued for PGW, the Water Department, and the Division of Aviation, see the Fiscal Year 2017 CAFR. In addition, PICA has entered into swaps, which are detailed in the Fiscal Year 2017 CAFR.

Swap Policy

The City has adopted a swap policy for the use of swaps, caps, floors, collars and other derivative financial products (collectively, "swaps") in conjunction with the City's debt management. The swap program managed by the City includes swaps related to the City's general obligation bonds, tax-supported service contract debt issued by related authorities, debt of the Water Department, Division of Aviation, and debt of PGW. Swaps related to debt of the PICA, the School District, and the PPA are managed by those governmental entities, respectively.

The Director of Finance has overall responsibility for entering into swaps. Day-to-day management of swaps is the responsibility of the City Treasurer, and the Executive Director of the Sinking Fund Commission is responsible for making swap payments. The Office of the City Treasurer and the City Solicitor's Office coordinate their activities to ensure that all swaps that are entered into are in compliance with applicable federal, state, and local laws.

The swap policy addresses the circumstances when swaps can be used, the risks that need to be evaluated prior to entering into swaps and on an ongoing basis after swaps have been executed, the guidelines to be employed when swaps are used, and how swap counterparties will be chosen. The swap policy is used in conjunction with the City's Debt Management Policy, reviewed annually, and updated as needed.

Under the swap policy, permitted uses of swaps include: (i) managing the City's exposure to floating interest rates through interest rate swaps, caps, floors and collars; (ii) locking in fixed rates in current markets for use at a later date through the use of forward starting swaps and rate locks; (iii) reducing the cost of fixed or floating rate debt through swaps and related products to create "synthetic" fixed or floating rate debt; and (iv) managing the City's credit exposure to financial institutions and other entities through the use of offsetting swaps.

Since swaps can create exposure to the creditworthiness of financial institutions that serve as the City's counterparties on swap transactions, the City has established standards for swap counterparties. As a general rule, the City enters into transactions with counterparties whose obligations are rated in the double-A rated category or better from two nationally recognized rating agencies. If counterparty's credit rating is downgraded below the double-A rating category, the swap policy requires that the City's exposure be collateralized. If a counterparty's credit is downgraded below the A category, even with collateralization, the swap policy requires a provision in the swap permitting the City to exercise a right to terminate the transaction prior to its scheduled termination date.

Letter of Credit Agreements

The City has entered into various letter of credit agreements related to its General Fund-Supported Debt as detailed in the table below. Under the terms of such letter of credit agreements, following a purchase of the applicable bonds, the City may be required to amortize such bonds more quickly than as originally scheduled at issuance.

Table 45
Summary of Letter of Credit Agreements for General Fund-Supported Debt as of June 30, 2018

Variable Rate Bond Series	Amount Outstanding	Bond Maturity Date	Provider	Expiration Date	Rating Thresholds [1]
General Obligation Multi-Modal Refunding Bonds, Series 2009B	$100,000,000	August 1, 2031	Barclays Bank PLC	May 24, 2019	The long-term rating assigned by any one of the rating agencies to any unenhanced long-term parity debt of the City is (i) withdrawn or suspended for credit-related reasons or (ii) reduced below investment grade.
PAID Multi-Modal Lease Revenue Refunding Bonds, Series 2007B-2	$72,400,000	October 1, 2030	TD Bank	May 29, 2019	The long-term ratings assigned by at least two of the rating agencies to any unenhanced general obligation bonds of the City is (i) withdrawn or suspended for credit-related reasons, or (ii) reduced below investment grade.
PAID Multi-Modal Lease Revenue Refunding Bonds, Series 2007B-3	$44,605,000	October 1, 2030	PNC Bank	May 22, 2020	The long-term ratings assigned by at least two of the rating agencies to any unenhanced general obligation bonds of the City is (i) withdrawn or suspended for credit-related reasons, or (ii) reduced below investment grade.

[1] The occurrence of a Rating Threshold event would result in an event of default under the reimbursement agreement with the related bank.

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Recent and Upcoming Financings

Recent Financings. The following is a list of financings that the City has entered into since June 30, 2017.

- In October 2018, PRA issued $40,000,000 in City Service Agreement Revenue Bonds for the benefit of the City. This financing is not reflected in Tables 40-42 under the caption "DEBT OF THE CITY" nor otherwise described therein.

- In April 2018, PAID issued $37,860,000 in City Service Agreement Revenue Bonds for the benefit of the City.

- In December 2017, the City, together with the Division of Aviation, issued $692,530,000 in Airport Revenue and Refunding Bonds.

- In December 2017, the City issued $125 million of tax and revenue anticipation notes, which matured on June 29, 2018 and were paid in full.

- In December 2017, the City entered into a sublease for property located at 400 N. Broad Street and 1501 Callowhill Street to be renovated and used as the City's police headquarters and related facilities. The sublease payments are approximately $15.2 million annually.

- In August 2017, PAID issued $52,910,000 in City Service Agreement Revenue Bonds for the benefit of the City.

- In August 2017, the City, together with PGW, issued $273,140,000 in Gas Works Revenue Bonds.

- In August 2017, the City issued $174,110,000 in Water and Wastewater Revenue Refunding Bonds.

- In August 2017, the City issued $331,615,000 in General Obligation Bonds.

Upcoming Financings. The City currently expects to enter into the following financings within the next six months:

- In November 2018, PAID expects to issue approximately $80 million in City Service Agreement Revenue Bonds for the benefit of the City.

- In 2018, the City expects to issue approximately $250 million in Water and Wastewater Revenue Refunding Bonds.

CITY CAPITAL PROGRAM

As part of the annual budget process, the Mayor submits for approval a six-year capital program to City Council, together with the proposed operating budget. For more information on the City's budget process, see "DISCUSSION OF FINANCIAL OPERATIONS – Budget Procedure."

Certain Historical Capital Expenditures

Table 46 shows the City's historical expenditures for Fiscal Years 2014-2018 for certain capital purposes, including expenditures for projects related to transit, streets and sanitation, municipal buildings, recreation, parks, museums, and stadia, and economic and community development. The source of funds used for such expenditures are primarily general obligation bond proceeds, but also include federal, state, private, and other government funds and operating revenue. Figures in the table below are generated after the Fiscal Year closes and may not sum due to rounding.

Table 46
Historical Expenditures for Certain Capital Purposes
Fiscal Years 2014-2018

Purpose Category	2014	2015	2016	2017	2018
Transit	$ 2,168,224	$ 1,283,307	$ 3,223,431	$ 378,229	$ 7,284,978
Streets & Sanitation	46,806,225	63,612,248	76,350,266	43,772,678	27,626,173
Municipal Buildings	35,579,152	53,419,449	50,653,561	45,002,188	75,096,668
Recreation, Parks, Museums & Stadia	17,787,234	29,875,633	35,963,360	37,323,288	61,839,958
Economic & Community Development	11,839,066	12,714,468	16,176,644	4,570,196	18,288,380
TOTAL	**$114,179,901**	**$160,905,105**	**$182,367,262**	**$131,046,579**	**$190,136,157**

Table 47 shows the City's historical expenditures for Fiscal Years 2014-2018 for certain capital purposes from general obligation bond proceeds only and the percentage of the total costs covered by such proceeds in such Fiscal Years. Figures in the table below are generated after the Fiscal Year closes and may not sum due to rounding.

Table 47
Historical Expenditures for Certain Capital Purposes
(General Obligation Bond Proceeds Only)
Fiscal Years 2014-2018

Purpose Category	2014	2015	2016	2017	2018
Transit	$ 2,168,224	$ 1,274,467	$ 3,223,431	$ 414,434	$ 7,227,880
Streets & Sanitation	18,642,621	24,887,488	23,963,058	21,952,654	19,601,019
Municipal Buildings	27,936,597	47,163,418	40,036,844	43,400,701	70,850,458
Recreation, Parks, Museums & Stadia	15,838,047	25,494,778	25,364,901	29,135,962	54,534,870
Economic & Community Development	11,816,222	12,714,468	12,474,164	4,570,196	18,288,380
TOTAL	**$76,401,711**	**$111,534,619**	**$105,062,398**	**$99,473,947**	**$170,502,607**
Percentage of Total Costs	**67%**	**69%**	**58%**	**76%**	**90%**

Fiscal Year 2019-2024 Adopted Capital Program

The Fiscal Year 2019-2024 Adopted Capital Program contemplates a total budget of $10.25 billion. In the Fiscal Year 2019-2024 Adopted Capital Program, approximately $3.21 billion is expected to be provided from federal, Commonwealth, and other sources and approximately $7.03 billion through City funding. The following table shows the amounts budgeted each year from various sources of funds for capital projects in the Fiscal Year 2019-2024 Adopted Capital Program.

Table 48
Fiscal Year 2019-2024 Adopted Capital Program
(Amounts in Thousands of USD)

Funding Source	2019	2020	2021	2022	2023	2024	2019-2024
City Funds--Tax Supported							
Carried-Forward Loans	$444,158	-	-	-	-	-	$444,158
Operating Revenue	45,436	$12,000	$12,000	$12,000	$12,000	$12,000	105,436
New Loans	173,980	213,875	179,257	178,830	163,796	128,372	1,038,110
Prefinanced Loans	11,911	-	-	-	-	-	11,911
PICA Prefinanced Loans	4,004	-	-	-	-	-	4,004
Tax Supported Subtotal	**$679,489**	**$225,875**	**$191,257**	**$190,830**	**$175,796**	**$140,372**	**$1,603,619**
City Funds--Self Sustaining							
Self-Sustaining Carried Forward Loans	$359,101	-	-	-	-	-	$359,101
Self-Sustaining Operating Revenue	136,187	$38,781	$52,888	$59,388	$58,854	$59,557	405,655
Self-Sustaining New Loans	736,214	748,841	775,482	771,978	778,809	784,701	4,596,025
Self-Sustaining Subtotal	**$1,231,502**	**$787,622**	**$828,370**	**$831,366**	**$837,663**	**$844,258**	**$5,360,781**
Other City Funds							
Revolving Funds	$13,000	$11,000	$11,000	$11,000	$11,000	$11,000	$68,000
Other Than City Funds							
Carried-Forward Other Government	$6,584	-	-	-	-	-	$6,584
Other Government Off Budget	1,060	$1,431	$1,421	$1,315	$1,422	$1,493	8,142
Other Governments/Agencies	24,000	500	200	200	200	200	25,300
Carried-Forward State	189,823	-	-	-	-	-	189,823
State Off Budget	179,719	209,756	195,147	193,677	200,226	203,637	1,182,162
State	32,500	42,825	31,429	25,948	31,454	31,483	195,639
Carried-Forward Private	105,526	-	-	-	-	-	105,526
Private	83,787	74,971	74,122	73,475	71,042	70,108	447,505
Carried-Forward Federal	320,882	-	-	-	-	-	320,882
Federal Off-Budget	36,161	105,802	10,228	4,092	-	16,000	172,283
Federal	89,011	96,393	95,891	75,948	101,599	101,694	560,536
Other Than City Funds Subtotal	**$1,069,053**	**$531,678**	**$408,438**	**$374,655**	**$405,943**	**$424,615**	**$3,214,382**
TOTAL	**$2,993,044**	**$1,556,175**	**$1,439,065**	**$1,407,851**	**$1,430,402**	**$1,420,245**	**$10,246,782**

LITIGATION

Generally, judgments and settlements on claims against the City are payable from the General Fund, except for claims against the Water Department, the Division of Aviation, and PGW, which are paid out of their respective funds or revenues and only secondarily out of the General Fund.

The Act of October 5, 1980, P.L. 693, No. 142, known as the "Political Subdivision Tort Claims Act," (the "Tort Claims Act") establishes a $500,000 aggregate limitation on damages for injury to a person or property arising from the same cause of action or transaction or occurrence or series of causes of action, transactions or occurrences with respect to governmental units in the Commonwealth such as the City. The constitutionality of that aggregate limitation on damages has been previously upheld by the Pennsylvania appellate courts, including in the recent decision of the Supreme Court of Pennsylvania in *Zauflik v. Pennsbury School District*, 104 A.3d 1096 (2014). Under Pennsylvania Rule of Civil Procedure 238, delay damages are not subject to the $500,000 limitation. The limit on damages is inapplicable to any suit against the City that does not arise under state tort law, such as claims made against the City under federal civil rights laws. In two instances over the last several years, legislation has been introduced in the General Assembly that would have increased such $500,000 limitation. In both such instances, the legislation was not reported out of committee or scheduled for a vote.

General Fund

The following table presents the City's aggregate losses from settlements and judgments paid out of the General Fund for Fiscal Years 2014-2018, and the budgeted amount for Fiscal Year 2019.

Table 49
Aggregate Losses – General and Special Litigation Claims (General Fund)
Fiscal Years 2014-2018 (Actual) and 2019 (Budget)
(Amounts in Millions of USD)

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Actual 2018	Budget 2019
Aggregate Losses	$41.0	$37.3	$41.2	$38.3	$44.6	$48.8

Sources: The City, Office of Budget and Program Evaluation – Budget Bureau, Indemnity Account, Status Reports.

The current estimate of settlements and judgments from the General Fund for Fiscal Year 2019 is $50.2 million. Such estimate is based on the Law Department's internal calculations using (i) the "Possible Costs" listed in its Quarterly Litigation Reports, (ii) the 3-year average cost for closed cases, and (iii) current year to date spending reports.

Based on the Twenty-Seventh Five-Year Plan, the City expects settlements and judgments from the General Fund for Fiscal Years 2020-2023 to range from $49.8 million in Fiscal Year 2020 to $50.2 million in Fiscal Year 2023.

In budgeting for settlements and judgments in the annual operating budget and projecting settlements and judgments for each five-year plan, the City bases its estimates on past experience and on an analysis of estimated potential liabilities and the timing of outcomes, to the extent a proceeding is sufficiently advanced to permit a projection of the timing of a result. General and special litigation claims are budgeted separately from back-pay awards and similar settlements relating to labor disputes. Usually, some of the costs arising from labor litigation are reported as part of current payroll expenses.

In addition to routine litigation incidental to performance of the City's governmental functions and litigation arising in the ordinary course relating to contract and tort claims and alleged violations of law, certain special litigation matters are currently being litigated and/or appealed and adverse final outcomes of such litigation could have a substantial or long-term adverse effect on the General Fund. These proceedings involve: (i) environmental-related actions and proceedings in which it has been or may be alleged that the City is liable for damages, including but not limited to property damage and bodily injury, or that the City should pay fines or penalties or the costs of response or remediation, because of the alleged generation, transport, or disposal of toxic or otherwise hazardous substances by the City, or the alleged disposal of such substances on or to City-owned property; (ii) contract disputes and other commercial litigation; (iii) union arbitrations and other employment-related litigation; (iv) potential and certified class action suits; and (v) civil rights litigation. The ultimate outcome and fiscal impact, if any, on the General Fund of the claims and proceedings described in this paragraph are not currently predictable. See Note 8 to the Fiscal Year 2017 CAFR, "Contingencies – Primary Government – Claims and Litigation."

In addition, see "REVENUES OF THE CITY – Real Property Taxes Assessment and Collection," for a discussion of litigation relating to the reassessment of commercial property in tax year 2018, and "REVENUES OF THE CITY – Proposals to Reduce Federal Funding," for a discussion of litigation relating to the potential withholding of certain federal funds.

Water Fund

Various claims have been asserted against the Water Department and in some cases lawsuits have been instituted. Many of these Water Department claims have been reduced to judgment or otherwise settled in a manner requiring payment by the Water Department. The following table presents the Water Department's aggregate losses from settlements and judgments paid out of the Water Fund for Fiscal Years 2014-2018, and the budgeted amount for Fiscal Year 2019. The current estimate for Fiscal Year 2019 is $4.3 million. The Water Fund is the first source of payment for any of the claims against the Water Department.

Table 50
Aggregate Losses – General and Special Litigation Claims (Water Fund)
Fiscal Years 2014-2018 (Actual) and 2019 (Budget)
(Amounts in Millions of USD)

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Actual 2018	Budget 2019
Aggregate Losses	$6.1	$3.8	$5.4	$7.0	$6.3	$8.5

Sources: The City, Office of Budget and Program Evaluation – Budget Bureau, Indemnity Account, Status Reports.

Aviation Fund

Various claims have been asserted against the Division of Aviation and in some cases lawsuits have been instituted. Many of these Division of Aviation claims have been reduced to judgment or otherwise settled in a manner requiring payment by the Division of Aviation. The following table presents the Division of Aviation's aggregate losses from settlements and judgments paid out of the Aviation Fund for Fiscal Years 2014-2018, and the budgeted amount for Fiscal Year 2019. The current estimate for Fiscal Year 2019 is $1.9 million. The Aviation Fund is the first source of payment for any of the claims against the Division of Aviation.

Table 51
Aggregate Losses – General and Special Litigation Claims (Aviation Fund)
Fiscal Years 2014-2018 (Actual) and 2019 (Budget)

	Actual 2014	Actual 2015	Actual 2016	Actual 2017	Actual 2018	Budget 2019
Aggregate Losses	$665,527	$750,793	$1.3 million	$1.6 million	$1.1 million	$2.5 million

Sources: The City, Office of Budget and Program Evaluation – Budget Bureau, Indemnity Account, Status Reports.

PGW

Various claims have been asserted against PGW and in some cases lawsuits have been instituted. Many of these PGW claims have been reduced to judgment or otherwise settled in a manner requiring payment by PGW. The following table presents PGW's settlements and judgments paid out of PGW revenues, with accompanying reserve information, in PGW Fiscal Years 2014 through 2018. PGW revenues are the first source of payment for any of the claims against PGW. PGW currently estimates approximately $6.0 million and $3.1 million in settlements and judgments for PGW Fiscal Years 2019 and 2020, respectively.

Table 52
Claims and Settlement Activity (PGW)
PGW Fiscal Years 2014-2018
(Amounts in Thousands of USD)

Fiscal Year (ending August 31)	Beginning of Year Reserve	Current Year Claims and Adjustments	Claims Settled	End of Year Reserve	Current Liability Amount
2014	$10,411	$2,498	($2,965)	$9,944	$4,728
2015	$9,944	$3,610	($2,042)	$11,512	$5,011
2016	$11,512	$2,022	($3,041)	$10,493	$5,307
2017	$10,493	$6,681	($2,797)	$14,377	$4,627
2018	$14,377	$2,910	($3,223)	$14,064	$6,100

Source: PGW's audited financial statements.

APPENDIX V

CITY OF PHILADELPHIA SOCIOECONOMIC INFORMATION

The Bonds are payable solely from Project Revenues and monies deposited in the water and wastewater funds. The Bonds are special obligations of the City and do not pledge the full faith, credit or taxing power of the City, or create any debt or charge against the tax or general revenues of the City, or create any lien or charge against any property of the City other than against the Project Revenues and amounts, if any, at any time on deposit in the water and wastewater funds. This APPENDIX V is included for purposes of providing general socioeconomic information regarding the City.

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INTRODUCTION

The City of Philadelphia (the "City" or "Philadelphia") is the sixth largest city in the nation by population, and is at the center of the United States' eighth largest metropolitan statistical area, according to 2017 estimates. The Philadelphia MSA (further described below) includes a substantial retail sales market, as well as a diverse network of business suppliers and complementary industries. Some of the City's top priorities include attracting and retaining knowledge workers, increasing educational attainment and employment skills among Philadelphians, attracting real estate development, and promoting Philadelphia as a desirable location for business.

According to the 2010 U.S. Census, the City increased its population by 0.7% to 1.53 million residents in the ten years from 2000 to 2010, ending six decades of population decline. Although the increase was modest, it was an indicator of more recent growth and development in Philadelphia. From 2010 to 2017, the City increased its population by 3.4% to 1.58 million residents, which exceeded the rate of population growth projected by the Philadelphia City Planning Commission in its 2011 comprehensive plan. As described below, the 20 to 34 year-old age group is the largest age group in Philadelphia and the fastest growing.

Philadelphia's recent population and job growth, the latter of which outpaced the national average for the past two years, is expected to provide additional resources to tackle the City's largest challenges. These challenges include underfunded pension liabilities, low estimated General Fund balances in Fiscal Years 2019-2023, high rates of poverty, and the School District of Philadelphia's (the "School District") ongoing fiscal challenges. Given the population shifts and economic development taking place nationwide, coupled with the City's strategic geographical location, relative affordability, diversified economy, cultural and recreational amenities, and its growing strength in key industries, Philadelphia is well positioned to attract new businesses and investment over the coming years.

Geography

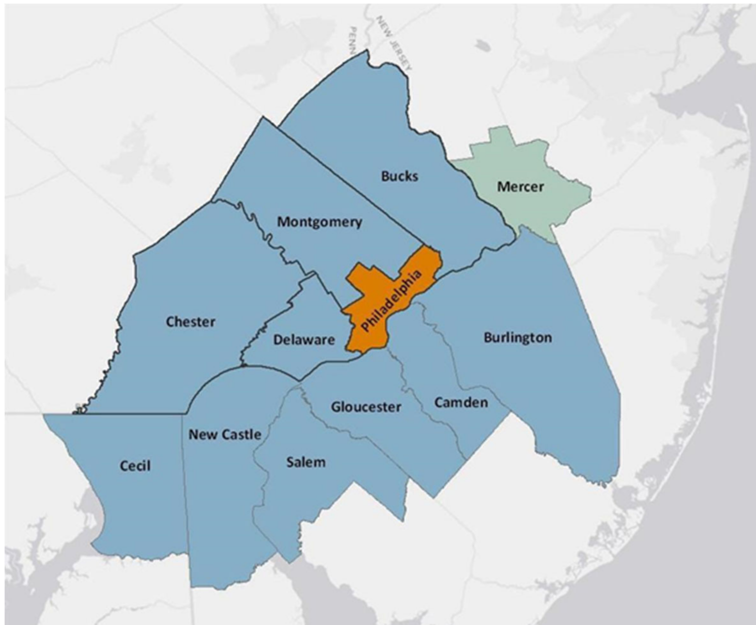
The City has an area of approximately 134 square miles, and is located along the southeastern border of the Commonwealth of Pennsylvania (the "Commonwealth"), at the confluence of the Delaware and Schuylkill Rivers. The City, highlighted in orange in Figure 1, lies at the geographical and economic center of the MSA and PMSA (described below). Philadelphia is both the largest city and the only city of the first class in the Commonwealth, and is coterminous with the County of Philadelphia.

Philadelphia Metropolitan Statistical Area (the "MSA"), highlighted in blue in Figure 1, is the eleven-county area named the Philadelphia-Camden-Wilmington metropolitan statistical area, representing an area of approximately 5,118 square miles with approximately 6,096,120 residents according to 2017 estimates by the U.S. Census Bureau.[1]

Philadelphia Primary Metropolitan Statistical Area (the "PMSA"), highlighted with bold black outlines, in Figure 1, is a five-county area within the MSA that lies in the Commonwealth and is sometimes called the Philadelphia Metropolitan Division. The counties of Bucks, Chester, Delaware, and Montgomery are referred to as the Suburban PMSA herein.

[1] Due to its close proximity and impact on the region's economy, Mercer County, New Jersey, highlighted in green in Figure 1, is included in the MSA by many regional agencies, although it is not included in the area defined by the U.S. Office of Management and Budget.

Figure 1
Map of Philadelphia Region including the MSA, PMSA, and Mercer County, NJ



Source: 2009 TIGER County Shapefiles

Strategic Location

Philadelphia is at the center of the fourth largest MSA on the East Coast, and is served by a robust transportation infrastructure, including: the Philadelphia International Airport, Amtrak's Northeast Corridor rail service, major interstate highway access, regional train service provided by Southeastern Pennsylvania Transportation Authority ("SEPTA") and New Jersey's PATCO (as defined herein), and the Port of Philadelphia. Due to the transportation infrastructure centered in the City, Philadelphia is accessible to regional and international markets, and is within a day's drive of 50% of the nation's population. Philadelphia's central location along the East Coast, an hour from New York City and less than two hours from Washington, D.C. by high-speed rail, also allows for convenient access to these significant economic centers.

Population and Demographics

Philadelphia is the nation's sixth most populous city, with 1.58 million residents, based on 2017 estimates. The 2000 and 2010 U.S. Census reflect the City's first population gain in 60 years. The City's population reached its nadir in 2006 with 1.45 million residents. Philadelphia's population has increased by approximately 130,000 residents from 2006 – 2016, or by 8.97%.

From 2006 to 2016, the share of the population represented by citizens age 20 to 34 ("millennials") grew from 20% to 26.5%, becoming the largest share of Philadelphia's population. Of the 30 largest cities in the country, Philadelphia had the largest percentage increase of millennials as a share of overall population from 2006 to 2016. This demographic tends to be better educated than the City's and the nation's adult population as a whole. In 2016, 44.2% of 25- to 34-year-olds in Philadelphia held a bachelor's degree or higher, while only 34.9% of 25 to 34-year-olds in the United States were college graduates. The City's many universities and diverse employment opportunities are likely draws for residents in the 20 to 34 age group. In addition to an increase in the millennial population, the City's immigrant population also grew significantly, with the City's Asian population increasing from 4.9% to

7.2% and the Hispanic or Latino population increasing from 8.5% to 13.7% between 2000 to 2016, according to the US Census Bureau.

Table 1
Population: City, MSA, Pennsylvania & Nation

	1990	2000	2010	2017	Percent Change 2000 - 2010	Percent Change 2010 - 2017
Philadelphia	1,585,577	1,517,550	1,528,427	1,580,863	0.7%	3.4%
Philadelphia-Camden-Wilmington MSA	5,435,468	5,687,147	5,972,049	6,096,120	5.0%	2.1%
Pennsylvania	11,881,643	12,281,054	12,712,343	12,805,537	3.5%	0.7%
United States	248,709,873	281,421,906	309,348,193	325,719,178	9.9%	5.3%

Source: U.S. Census Bureau, Population Estimates 2017, Census 2010, Census 2000, Census 1990.

Nearly 18% of Philadelphia's population is school-aged (aged 5-19), and in 2016, Philadelphia exceeded many selected peer cities in its share of students who are enrolled in an undergraduate, graduate or professional education program. Selected peer cities (as shown in Table 2) reflect characteristics consistent with Philadelphia, such as geography, socio-economic statistics, industrial legacies, or port facilities. Among these cities, while Boston had the highest percentage of its population enrolled in higher education, Philadelphia had 32,597 more students enrolled in higher education than Boston. Philadelphia had the sixth highest percentage of its population enrolled in higher education and the fifth largest university student population.

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Table 2
2016 Total Number of Students, as a Percent of Total Population of Selected Cities, Ranked by Total Number of Students Enrolled in Higher Education

	Total Number of Students Enrolled in School (all years)	Total Number of Students Enrolled in Higher Education	Percent of All Students Enrolled in Higher Education	Percent of Total Population Enrolled in Higher Education
Los Angeles, CA	1,028,019	362,891	35.30%	9.10%
Chicago, IL	670,286	217,173	32.40%	8.00%
Houston, TX	608,376	164,870	27.10%	7.20%
San Diego, CA	379,345	156,290	41.20%	11.10%
Philadelphia, PA	**400,792**	**137,872**	**34.40%**	**8.80%**
San Antonio, TX	401,867	108,504	27.00%	7.30%
Boston, MA	191,409	105,275	55.00%	15.60%
Phoenix, AZ	422,318	92,488	21.90%	5.70%
Washington, DC	168,430	74,109	44.00%	10.90%
Milwaukee, WI	175,981	53,498	30.40%	9.00%
Baltimore, MD	152,531	52,776	34.60%	8.60%
Memphis, TN	169,518	45,939	27.10%	7.00%
Detroit, MI	173,474	41,460	23.90%	6.20%
Cleveland, OH	94,000	25,098	26.70%	6.50%
United States	**81,572,277**	**22,595,520**	**27.70%**	**7%**

Source: 2016 American Community Survey, 1-Year Estimates.

ECONOMIC BASE AND EMPLOYMENT

The Philadelphia Economy

The City's economy is composed of diverse industries, with virtually all classes of industrial and commercial businesses represented. The City is a major regional business and personal services center with strengths in insurance, law, finance, health, education, utilities, and the arts. As of 2015, approximately 184,662 residents of the Philadelphia region's four suburban counties (Bucks, Chester, Delaware, and Montgomery), and an additional 110,538 residents of counties outside the five-county region, worked within the City. The City also provides a destination for entertainment, arts, dining and sports for residents of the suburban counties, as well as for those residents of the counties comprising the MSA plus Mercer County, New Jersey.

As shown in Table 11, the cost of living in the City is relatively moderate and affordable compared to other major metropolitan areas along the East Coast. Philadelphia's cost of living is 20% less than the Washington D.C. metropolitan area and 61% less than Manhattan. The City, as one of the country's education centers, offers the business community a large, diverse, and industrious labor pool.

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Key Industries

Table 3 provides location quotients for Philadelphia's most concentrated industry sectors. Location quotients quantify how concentrated a particular industry is in a region as compared to a base reference area, usually the nation. A location quotient greater than 1.00 indicates an industry with a greater share of the local area employment than is the case in the reference area.

As shown in Table 3, compared to the nation, Philadelphia County has higher concentrations in eight sectors: 1. educational services; 2. health care and social assistance; 3. management of companies and enterprises; 4. arts, entertainment, and recreation; 5. professional and technical services; 6. other services, except public administration; 7. finance and insurance; and 8. transportation and warehousing.[2] Of these eight sectors, the City has a higher concentration of employment than the Commonwealth in six sectors: educational services; health care and social assistance; arts, entertainment and recreation; professional and technical services; and other services, except public administration.

Table 3
Ratio of Philadelphia County and Pennsylvania Industry Concentrations
Compared to the United States

Industry	Philadelphia County to the US	Pennsylvania to the US
Educational Services	4.34	1.58
Health Care and Social Assistance	1.74	1.28
Management of Companies and Enterprises	1.18	1.48
Arts, Entertainment, and Recreation	1.2	1.05
Professional and Technical Services	1.2	0.97
Other Services, Except Public Administration	1.13	1.11
Finance and Insurance	1.08	1.08
Transportation and Warehousing	1.03	1.24

Source: Bureau of Labor Statistics: 2017 Annual Average Employment Location Quotient, Quarterly Census of Employment and Wages

The concentration of educational services not only provides stable support to the local economy, but also generates a steady and educated workforce, fueling the City's professional services and healthcare industries. The number of Philadelphia residents between the ages of 25 and 34 with college degrees has doubled between 2005 and 2016, from 66,178 to 130,790. A Campus Philly report of current students in 2016 found that 67% of students planned to stay in Philadelphia after they graduate.

The City is also capitalizing on the region's assets to become a leader in research generated by life sciences and educational institutions. Several sites now foster life science incubator facilities, including The Navy Yard, University City Science Center, University of Pennsylvania, Children's

[2] The Bureau of Labor Statistics ("BLS") defines the "Other Services" (except Public Administration) sector as establishments engaged in providing services not specifically provided for elsewhere in the BLS classification system, such as equipment and machinery repairing, promoting or administering religious activities, grant making, advocacy, providing dry cleaning and laundry services, personal care services, death care services, pet care services, photofinishing services, temporary parking services, and dating services.

Hospital of Philadelphia, Jefferson Hospital, Drexel University, and The Wistar Institute. Johnson & Johnson recently announced Pennovation Works as the site for JPOD, an interactive, high-tech conference space, and JLABS, a research and startup co-working space. The University of Pennsylvania's Penn Center for Innovation and Temple University's Office of Technology Development and Commercialization are two of several organizations driving tech transfer and commercialization of innovations developed at Philadelphia's major research institutions. A more recent development, uCity Square, was announced in late 2016. The Cambridge Innovation Center will occupy part of this development, bringing state-of-the-art wet lab and shared working space. When the project is complete, it will expand the one million square feet in facilities offered by the University City Science Center to 6 million square feet, with a projected investment of over $1 billion. It is expected to be completed in 2027.

Employment

Table 4 shows non-farm payroll employment in the City over the last decade by industry sectors. In the past 10 years, growth has occurred in Mining, Logging, and Construction; Trade, Transportation, and Utilities; Professional and Business Services; Education and Health Services; Leisure and Hospitality and Other Services. These sectors provide stability to the City's overall economy.

Table 4
Philadelphia Non-Farm Payroll Employment[(1)]
(Amounts in Thousands)

Sector	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	% Change 2008-2017
Education and health services	196.7	199.5	202.3	206.4	208.1	209.3	212.7	216.6	223.9	231.9	17.9%
Professional and business services	85.3	80.1	81.6	83.0	84.1	86.4	88.3	90.9	95.4	97.5	14.3%
Trade, transportation, and utilities	87.6	85.9	86.6	87.4	88.9	89.5	90.9	92.2	93.0	93.4	6.7%
Leisure and hospitality	57.9	56.9	58.4	60.6	63.2	64.8	66.9	68.5	70.8	75.2	29.8%
Financial activities	46.5	44.9	42.6	41.6	41.0	41.1	41.7	42.3	42.7	43.3	-6.8%
Other services	27.8	26.6	26.5	26.4	26.8	26.9	26.8	27.1	27.8	28.2	1.4%
Manufacturing	27.8	25.7	24.7	23.7	22.9	21.8	21.5	21.0	20.4	19.8	-28.9%
Mining, logging, and construction	12.1	10.1	10.0	10.0	10.2	10.4	11.0	11.5	12.0	12.4	2.5%
Information	12.5	12.6	12.2	12.0	12.0	11.5	11.5	11.8	11.7	11.7	-6.4%
Private Sector Total	*554.2*	*542.3*	*544.9*	*551.1*	*557.2*	*561.7*	*571.3*	*581.9*	*597.7*	*613.3*	10.7%
Government	109.2	110.4	112.1	109.0	105.3	103.5	102.2	101.6	101.9	102.5	-6.2%
Total	***663.3***	***652.6***	***657.1***	***660.0***	***662.3***	***665.2***	***673.4***	***683.4***	***699.6***	***715.8***	7.9%

Source: Bureau of Labor Statistics, 2017.
[1] Includes persons employed within the City, without regard to residency.

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Table 5
Philadelphia Change in Share of Employment Sectors(1)

Sector	Share of Total Employment 2008	Share of Total Employment 2017	Change 2008-2017
Education and health services	29.65%	32.39%	2.74%
Professional and business services	12.86%	13.62%	0.76%
Trade, transportation, and utilities	13.21%	13.05%	-0.15%
Leisure and hospitality	8.73%	10.50%	1.77%
Financial activities	7.01%	6.05%	-0.96%
Other services	4.19%	3.94%	-0.25%
Manufacturing	4.19%	2.76%	-1.43%
Mining, logging, and construction	1.82%	1.73%	-0.09%
Information	1.88%	1.63%	-0.25%
Private Sector Total	*83.55%*	*85.68%*	*2.13%*
Government	16.46%	14.32%	-2.15%

Source: Bureau of Labor Statistics, 2017.
[1] Includes persons employed within the City, without regard to residency.

Bureau of Labor Statistics data show that in 2017, the Education and Health Services, Professional and Business Services, Financial Activities, and Leisure and Hospitality sectors collectively represented 62.6% of total employment in the City for the year. From 2010 to 2017, Philadelphia gained 68,400 private sector jobs since losing nearly 12,000 private sector jobs at the peak of the recession in 2009. Job growth in Philadelphia has outpaced the rest of the nation, and the employment rate is the highest in decades.

Unemployment

Although Philadelphia has recently narrowed the gap between its unemployment levels and the national unemployment levels, the effects of the recession on unemployment endured longer in Philadelphia than in many other parts of the country.

As shown in Table 6, employment gains in the latter part of 2013 through 2017 have resulted in a decline in Philadelphia's unemployment rate from a high of 10.9% in 2012 to 6.2% in 2017.

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Table 6 below shows unemployment information for Philadelphia, the MSA, the Commonwealth and the United States.

Table 6
Unemployment Rate in Selected Geographical Areas
(Annual Average 2008-2017)

Geographical Area	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Change in rate from 2008-2017
United States	5.8	9.3	9.6	8.9	8.1	7.4	6.2	5.3	4.9	4.4	-1.4
Pennsylvania	5.3	8.1	8.4	7.9	7.8	7.3	5.9	5.3	5.4	4.9	-0.4
Philadelphia-Camden-Wilmington MSA	5.3	8.3	8.8	8.5	8.4	7.7	6.2	5.4	5.1	4.7	-0.6
Philadelphia	7.1	9.7	10.6	10.7	10.9	10.3	8.1	7.1	6.8	6.2	-0.9

Source: Local Area Unemployment Statistics, Bureau of Labor Statistics, 2017.

Principal Private Sector Employers in the City

Table 7 lists the 20 largest private employers that are based in Philadelphia. The University of Pennsylvania, and Thomas Jefferson University and Jefferson Health top this list. Other sectors represented include food services, bio-tech, and broadcasting/cable.

Fortune 500 companies headquartered or maintaining a major presence in Philadelphia include the Comcast Corporation and the Aramark Corporation. As of early 2018, Crown Holdings Inc. was located in Philadelphia, but has recently relocated its headquarters to Bucks County. Four Fortune 1000 companies are also headquartered within the City: (i) FMC Corporation, (ii) Urban Outfitters Inc., (iii) Radian, and (iv) Chemtura.

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Table 7
Largest Private Employers Based in Philadelphia
Ranked by Number of Local Employees

Employer	Local Employees
University of Pennsylvania	37,588
Thomas Jefferson University and Jefferson Health	19,000
Comcast Corporation	16,100
Drexel University	9,785
Temple University Health System	9,128
Einstein Healthcare Network	8,623
Temple University	8,405
Wells Fargo	7,297
Independence Health Group	7,266
Day & Zimmerman	4,000
Cardone Industries	2,400
PricewaterhouseCoopers	1,800
Deloitte	1,700
Sugarhouse Casino	1,608
Community College of Philadelphia	1,490
Saint Joseph's University	1,396
Ernst & Young LLP	1,210
KPMG	1,162
LaSalle University	1,096
Careers USA	1,029
Total	**142,083**

Source: Philadelphia Business Journal, 2017

Hospitals and Medical Centers

The City is a center for health, education, research and science facilities with the nation's largest concentration of healthcare resources within a 100-mile radius. There are presently more than 30 hospitals, five medical schools, two dental schools, two pharmacy schools, as well as schools of optometry, podiatry and veterinary medicine located in the City. The City is one of the largest health care and health care education centers in the world, and a number of the nation's largest pharmaceutical companies are located in the Philadelphia area.

Major research facilities are also located in the City, including those located at its universities and medical schools: Children's Hospital of Philadelphia, the Hospital of the University of Pennsylvania, The Wistar Institute, the Fox Chase Cancer Center, and the University City Science Center. Philadelphia is home to two of the nation's 41 National Cancer Institute ("NCI")-designated Comprehensive Cancer Centers (the Abramson Cancer Center at the University of Pennsylvania and Fox Chase Cancer Center, which is part of the Temple University Health System). Additionally, Philadelphia is also home to two NCI-designated Cancer Centers (Kimmel Cancer Center and The Wistar Institute Cancer Center).

Penn Medicine University of Pennsylvania Health System

Penn Medicine includes Pennsylvania Hospital, the nation's first hospital, founded in 1751 and the nation's first medical school, the University of Pennsylvania School of Medicine, opened in 1765. In addition, the Hospital of the University of Pennsylvania was established in 1874 as the nation's first teaching hospital. Penn Medicine's hospitals have been named among the top ten hospitals in the country with the combined University of Pennsylvania and Penn Presbyterian Medical Center ranked #1 in the region by *U.S. News and World Report*. Penn Medicine, which has invested more than $200 million in major capital investments between 2014 and 2015, began construction in 2016 on a new 1.5 million square foot Patient Pavilion, a clinical facility that is projected to be occupied by spring of 2021.

Children's Hospital of Philadelphia Expansion

Children's Hospital of Philadelphia ("CHOP") is the oldest children's hospital in the nation and one of the largest in the world. CHOP was ranked #2 in the nation in 2017-2018 according to the *U.S. News and World Report*. Since 2002, CHOP has invested over $5.3 billion in its expansion in Philadelphia. In 2017, CHOP opened two facilities as a part of this expansion: the $500 million, 700,000 square foot Buerger Center for Advanced Pediatric Care, and the $275 million, 466,000 square foot Roberts Center for Pediatric Research.

Temple University Hospital, Inc.

Temple University Hospital ("TUH") is one of the region's most respected academic medical centers. The 732-bed Philadelphia hospital is also the chief clinical training site for the Lewis Katz School of Medicine at Temple University. TUH was ranked among the "Best Regional Hospitals" in six different specialties in *U.S. News & World Report* 2015-2016 regional rankings.

Thomas Jefferson University and Jefferson Health

Thomas Jefferson University Hospital ("TJUH") has been at the top of the list of hospitals in Pennsylvania (3rd) and the Philadelphia metro area (2nd) in *U.S. News & World Report*'s annual listing of the best hospitals and specialties. TJUH also ranked 16th overall in the U.S. News and World Report listing. Jefferson Health has recently participated in several significant mergers, integrating Magee Hospital, Kennedy Health System, the Aria Health system and Abington Hospital into its system. In 2017, Thomas Jefferson University acquired Philadelphia University to become the fifth largest educational institution in Philadelphia.

Einstein Healthcare Network

Einstein Healthcare Network is a private, not-for-profit organization with several major facilities and many outpatient centers that has been in existence for nearly 150 years. The Einstein Health and Medical Center in Philadelphia has been listed as a top hospital in *U.S. News & World Report*.

In September 2018, Einstein Healthcare Network and Thomas Jefferson University announced a merger agreement and such entities are seeking necessary state and federal regulatory approvals to close the transaction.

Table 8 lists the top ten recipients of funding from the National Institutes of Health ("NIH") in Fiscal Year 2018, in order of total funding received. The University of Pennsylvania ("Penn") was the fifth largest recipient of NIH funding in Fiscal Year 2018 and consistently places near the top of this list.

Table 8
Largest Recipients of National Institutes of Health Funding, Fiscal Year 2018

	Organization	City	State	Awards	Funding
1	John Hopkins University	Baltimore	MD	1015	$505,543,173
2	University of California, San Francisco	San Francisco	CA	968	$458,084,689
3	University of Pittsburgh At Pittsburgh	Pittsburgh	PA	900	$440,481,429
4	University of Michigan	Ann Arbor	MI	921	$422,373,166
5	University of Pennsylvania	Philadelphia	PA	896	$405,631,135
6	Washington University	Saint Louis	WA	782	$372,935,247
7	Stanford University	Stanford	CA	783	$370,958,747
8	Massachusetts General Hospital	Boston	MA	710	$349,581,050
9	Columbia University Health Sciences	New York	NY	651	$347,971,876
10	University of California, San Diego	La Jolla	CA	734	$344,972,305

Source: National Institutes of Health, 2018

Educational Institutions

The MSA plus Mercer County, New Jersey, has the second largest concentration of undergraduate and graduate students on the East Coast, with approximately 100 degree granting institutions of higher education and a total enrollment of over 434,000 full and part-time students. Approximately 137,807 students lived within the geographic boundaries of the City in 2016. Included among these institutions are the University of Pennsylvania, Temple University, Drexel University, St. Joseph's University, and LaSalle University. Within a short drive from the City are such schools as Princeton University, Villanova University, Bryn Mawr College, Haverford College, Swarthmore College, Lincoln University, and the Camden Campus of Rutgers University.

University of Pennsylvania

Penn, the first university in the U.S., founded in 1740, and a prominent Ivy League institution, is located in West Philadelphia across the Schuylkill River from downtown Philadelphia. In Fall 2017, more than 25,000 full-time undergraduate, graduate and professional full-time students attended Penn, 5,144 of whom are international students. Approximately 3,700 part-time students were enrolled. As of Fall 2017, Penn had a total workforce of over 18,320 faculty and staff, and the University of Pennsylvania Health System had a workforce of 22,600 employees. In September 2016, Penn opened Pennovation Works, a 55,000 square foot business incubator and laboratory that houses researchers, innovators, and entrepreneurs for the commercialization of research discoveries.

Penn has undergone significant expansion in the last decade and has a growing endowment currently valued at $10.7 billion. In 2015, Penn, and related third-party developers, spent $932 million dollars on new buildings and renovations. A recent independent report conducted by Econsult Solutions, Inc. found that Penn and the University of Pennsylvania Health System had a combined economic impact on the City and State of more than $14 billion in Fiscal Year 2015, including $10.8 billion to the City. According to the same study, such Penn entities generate $1 out of every $20 of Philadelphia's general fund and one out of every nine jobs in the Philadelphia economy.

Drexel University

Founded in 1891 as the Drexel Institute of Science, Art and Industry, Drexel University ("Drexel") is one of Philadelphia's top 10 private employers, and a major engine for economic development in the region. Drexel is known for its innovation and civic engagement, ranked a "top 15 most innovative school" by *U.S. News and World Report*. Drexel's student body consists of approximately 26,000, making it one of the 15 largest private universities in the country. Drexel is unique in that it provides its students with a co-op work experience every six months throughout the four year college experience. Over the last decade, Drexel has undergone significant expansion and has major plans for future development. In 2011, Drexel opened the doors to the $69 million Constantine N. Papadakis Integrated Sciences Building, a $92 million facility for its LeBow School of Business, and a new mixed use residential and retail project, Chestnut Square.

Temple University

Temple University ("Temple"), founded in 1884, has undergone a significant transformation over the past three decades from a university with a mostly commuter-based enrollment to one in which on and near-campus housing is now in high demand. Temple features 17 schools and colleges, eight campuses, hundreds of degree programs and more than 38,000 students. Currently, an estimated 12,000 students live on or around the Temple campus. Temple's Board of Trustees approved a master plan, "Visualize Temple," in December 2014, and Temple has begun $1.2 billion of investment. Planned upgrades include improved green space, a student recreation facility, and academic buildings such as a library and a new science research lab.

Thomas Jefferson University

In 2017, Thomas Jefferson University and Philadelphia University merged to create the fifth largest university in the City of Philadelphia. The new Thomas Jefferson University creates a national comprehensive university designed to deliver high-impact education and value for students in medicine, science, architecture, design, fashion, textiles, health, business, engineering, and other disciplines.

In addition to nine colleges and three schools from both universities, the formation of the Philadelphia University Honors Institute and the Philadelphia University Design Institute are key components of the combined university's educational ecosystem. Thomas Jefferson University includes (i) campuses in Center City, East Falls, Montgomery County, Bucks County and Atlantic County; (ii) a growing online presence; (iii) numerous clinical sites; and (iv) an extensive global footprint with locations in Italy and Japan, study abroad sites and curricular and co-curricular partnerships and networks. Jefferson is home to more than 7,800 students, 4,000 faculty members and 63,000 alumni.

Community College of Philadelphia

The Community College of Philadelphia (the "College") serves 18,124 students in associate's degree and certificate programs. The College operates four campuses: its main Campus in Center City Philadelphia and three regional campuses in West Philadelphia, Northeast Philadelphia, and Northwest Philadelphia. The College offers more than 70 associate's degree, academic and proficiency certificate, and workforce programs. Recent graduates continue to strengthen Philadelphia's local economy and workforce—78 percent are employed in Philadelphia, and 93 percent work in the Greater Philadelphia region.

The College enables students to embark on a smart path to a bachelor's degree program, with transfer agreements and partnerships to assist in the transition. In the 2015-16 academic year, approximately 30,194 students took credit and noncredit courses. The College is embarking on an expansion of its West Philadelphia Campus, to expand its Automotive Center and to establish a Workforce Campus with a new $20 million facility in the heart of Philadelphia's Promise Zone.

The College is one of 30 community colleges in the nation to undertake a new Career Pathways model under which it has expanded its dual enrollment programs, including establishing the first Middle College in the Commonwealth, with the School District of Philadelphia. Upon completion of high school, enrolled students will receive both a high school degree and an associate's degree.

The College has vastly expanded its role in workforce development and economic innovation, establishing a division that is responsible for working directly with Philadelphia employers to meet their workforce hiring and professional development needs. The College has established new post-secondary programs matched with Philadelphia's high priority occupations enabling Philadelphians to earn family sustaining wages without a degree.

Family and Household Income

Table 9 shows median family income, which includes related people living together, and Table 10 shows median household income, which includes unrelated individuals living together, for Philadelphia, the MSA, the Commonwealth and the United States. Over the period 2007-2016, median family income for Philadelphia increased by 12% (see Table 9), while median household income increased by 17.0% over the period 2007-2016 as a result of an influx of higher income households (see Table 10).

Table 9
Median Family Income* for Selected Geographical Areas, 2007-2016
(Dollar Amounts in Thousands)

Year	Philadelphia	Philadelphia-Camden-Wilmington MSA	Pennsylvania	United States	Philadelphia as a percentage of the US
2007	$44.9	$74.0	$60.8	$61.2	73.37%
2008	$46.4	$77.6	$63.3	$63.4	73.19%
2009	$45.7	$76.9	$62.2	$61.1	74.96%
2010	$43.1	$74.5	$61.9	$60.6	71.12%
2011	$42.7	$75.7	$63.3	$61.5	69.43%
2012	$44.3	$77.0	$65.1	$62.5	70.88%
2013	$44.6	$78.2	$66.5	$64.0	69.69%
2014	$47.0	$80.6	$67.9	$65.9	71.32%
2015	$49.3	$83.0	$70.2	$68.3	72.18%
2016	$50.3	$84.8	$72.3	$71.1	70.76%
Change 2007-2016	$5.4	$10.8	$11.5	$9.9	

* Includes related people living together.
Source: 2016 American Community Survey 1-Year Estimates

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Table 10
Median Household Income* for Selected Geographical Areas, 2007-2016
(Dollar Amounts in Thousands)

Year	Philadelphia	Philadelphia-Camden-Wilmington MSA	Pennsylvania	United States	Philadelphia as a percentage of the US
2007	$35.4	$58.3	$48.6	$50.7	69.82%
2008	$37.0	$60.9	$50.7	$52.0	71.15%
2009	$37.0	$60.1	$49.5	$50.2	73.71%
2010	$34.4	$58.1	$49.3	$50.0	68.80%
2011	$34.2	$58.3	$50.2	$50.5	67.72%
2012	$35.4	$60.1	$51.2	$51.4	68.87%
2013	$36.8	$60.5	$52.0	$52.3	70.36%
2014	$39.0	$62.2	$53.2	$53.7	72.63%
2015	$41.2	$65.1	$55.7	$55.8	73.84%
2016	$41.4	$66.0	$56.9	$57.6	71.88%
Change 2007-2016	$6.0	$7.7	$8.3	$6.9	

* Includes unrelated people living together.
Source: 2016 American Community Survey 1-Year Estimates

One of the factors that contributes to a lower median household income is the fact that Philadelphia has the fifth largest undergraduate and graduate student population among major U.S. cities. These individuals, numbering 142,382 according to the 2016 American Community Survey, or approximately 9.0% of the City's overall population, generally have very low or no income, as they are either unemployed or working only part-time while they complete their education. The City's large student population has historically led to an overstatement of the City's percentage of residents living at or below the poverty level.

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Cost of Living Index

Philadelphia has the second lowest cost of living index among major cities in the Northeast, as shown in Table 11 below. Additionally, the City's Wage, Earnings, and Net Profits Tax Rates have decreased in each of Fiscal Years 2013-2018. See "REVENUES OF THE CITY – Wages, Earnings, and Net Profits Taxes" in APPENDIX IV for this Official Statement.

Table 11
2017 Cost of Living Index
Philadelphia Indexed to 100

City	Cost of Living Index
New York	192
San Francisco	150
D.C.	126
Boston	125
Seattle	122
Los Angeles	120
Philadelphia	100
Chicago	100
Baltimore	97
Denver	93
Dallas	85
Atlanta	83
Austin	82
Detroit	80
Pittsburgh	79

Source: Council for Community and Economic Research (C2ER), Cost of Living Index (COLI)

Housing

Growing rapidly from its founding in 1682, Philadelphia's historic housing stock reflects its past roles as the largest city in the British Empire and as "the workshop of the world" during the peak of the industrial revolution. However, its condition and age (among the oldest of any city in the country) is also a reflection of the decades of depopulation and abandonment that marked the second half of the 20th Century. Nevertheless, Philadelphia has undergone a significant revitalization in the most recent decades, particularly in the neighborhoods within and around its downtown core. The period between the 2000 and 2010 Censuses was the first wherein Philadelphia experienced a net population increase since 1940 to 1950, due both to rapid growth in the number of higher income households in these core neighborhoods and to a significant influx in the foreign-born population in more peripheral neighborhoods of the City.

As population has continued to increase, many neighborhoods have undergone significant new construction and investment, leading to increases in the value of the City's housing stock, even as much of the City continues to face significant challenges caused by the persistent problems of poverty, crime, underperforming schools and lack of employment opportunities. Nevertheless, most housing indicators for Philadelphia indicate an upward outlook, in terms of prices, construction, and sales, for the near future.

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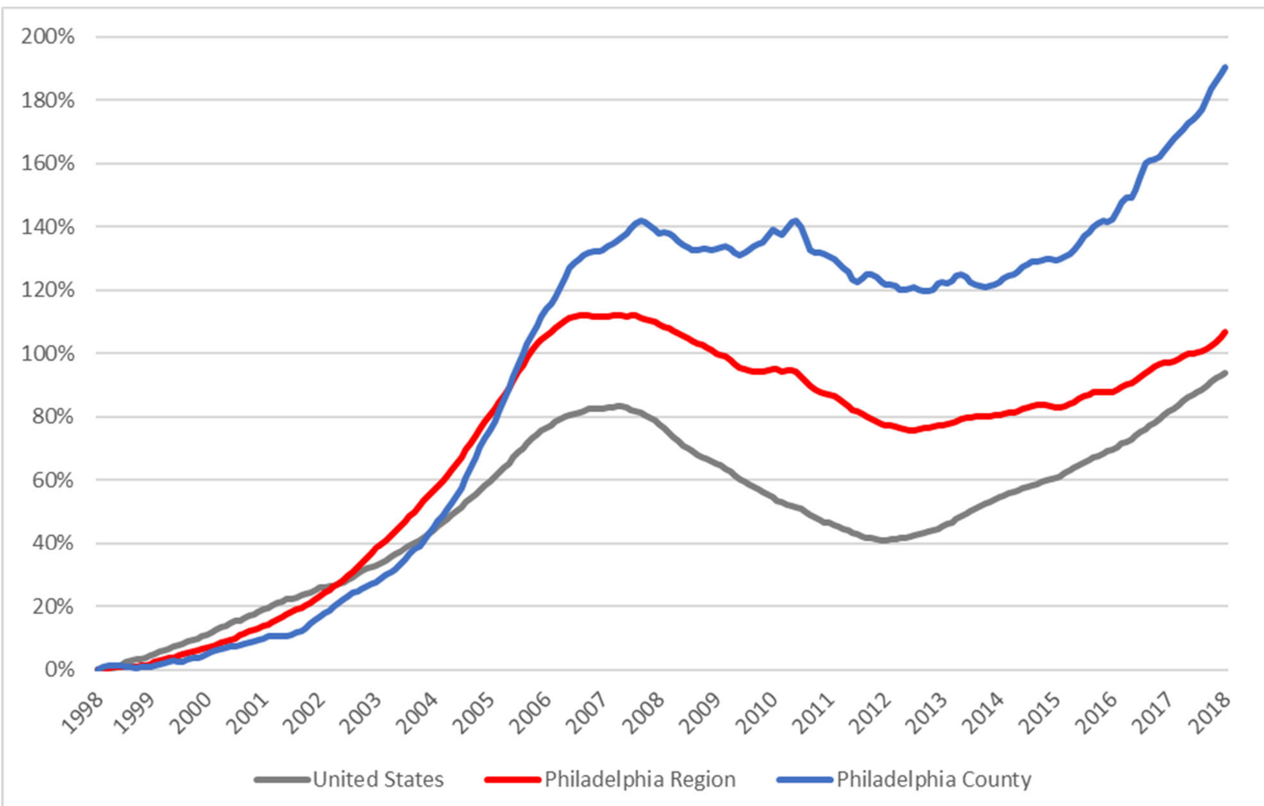
The total housing stock, measured by the number of units, increased by 0.7% from 2010-2016, for a total of 674,500 in 2016.[3] This increase of 4,500 units is the result of a net increase of 6,000 multifamily units and 500 "other" units (such as mobile homes and boats), off-set by a net loss of 2,000 single-family homes (due to multifamily conversions and demolitions).[3] The homeownership rate in the City in 2016 was 52.1%, which represents a decline from 54.1% in 2000.[3] Accordingly, properties in in the City have continued to command higher rents, with the median monthly rent in June 2018 equal to $1,214, representing a 10.9% increase over the prior five-year period.[4]

Home Prices

As shown in the chart below, after eight years of moderate house price deflation following the peak of the 2007, Philadelphia's housing market began posting rapid increases in prices, citywide, starting in 2013. In 2015, home values in Philadelphia recovered to their pre-recession peak and have continued to climb to 20% above that peak as of January 2018. The following chart uses the Home Value Index to chart changes in home values in Philadelphia, the Philadelphia region, and the U.S. as a whole over the 20-year period from February 1998 through January 2018.[5]

Percent Change in Median Nominal Home Value (Zillow Home Value Index), 1998-2018



Source: Zillow Research, ZHVI Time Series

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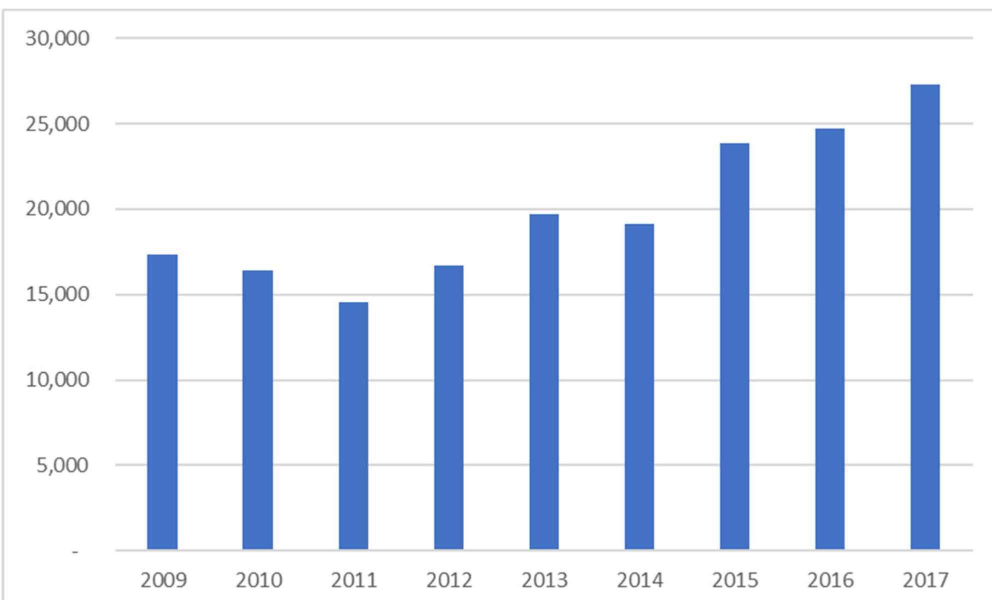
[3] US Census Bureau, American Communities Survey, 1-Year Survey
[4] Zillow Research, ZRI Time Series
[5] Zillow Research, ZHVI Time Series

In the first years shown in this chart, housing values in Philadelphia were not only lower than region and country as a whole, in nominal terms, but they also grew at a lower rate. From 2002 to 2007, however, the rate of growth in the City's home values significantly outpaced these comparison regions. Although home values in the City stagnated and declined for eight years, after hitting a peak in 2007, the housing market in Philadelphia retained a much greater share of its pre-recession gains during this period than did either the region or country as a whole. Since then, Philadelphia's housing market has surged, such that, in nominal terms, housing values within the City have nearly tripled since 1998, a rate of growth that is more than 50% greater than the rest of the country.

Home Sales

Another indicator of the housing market's recovery is the current level of home sales. The following chart shows the annual number of home sales in Philadelphia since 2009. Like prices, home sales dropped significantly following the bursting of the housing bubble, but have, seasonal variations notwithstanding, steadily increased since 2011. In 2017, there were 27,327 home sales, nearly double their post-recession nadir of 2011 of 14,542. This trend reflects a recovery of the City's housing market and is likely to continue as the significant increment of new housing construction (described below) is absorbed.

Home Sales in Philadelphia, 2009-2017



Source: Zillow Research, Home Sales Time Series

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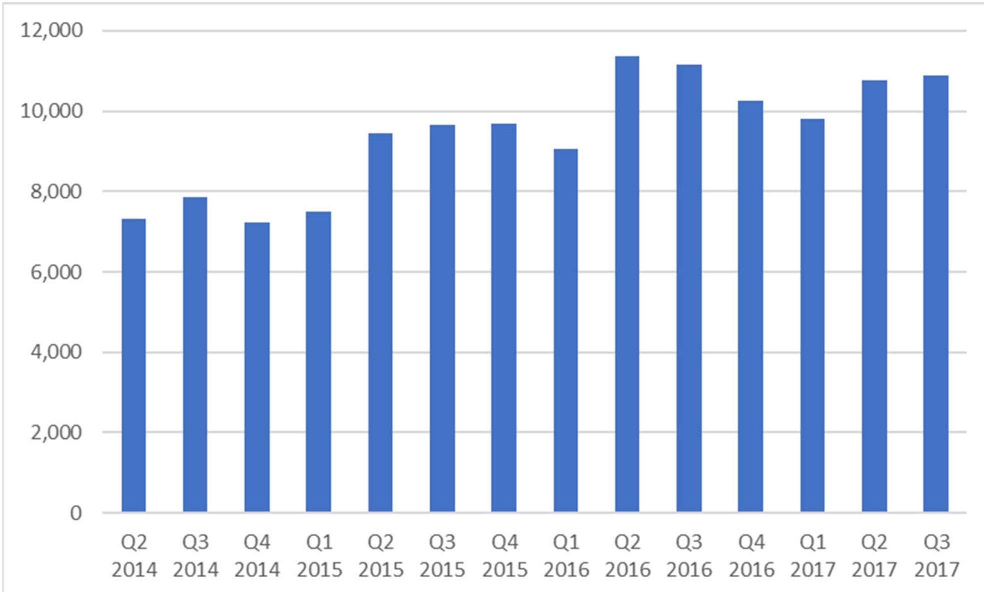
Home Sales in Philadelphia, April 2014 through September 2017



Source: Philadelphia Department of Revenue

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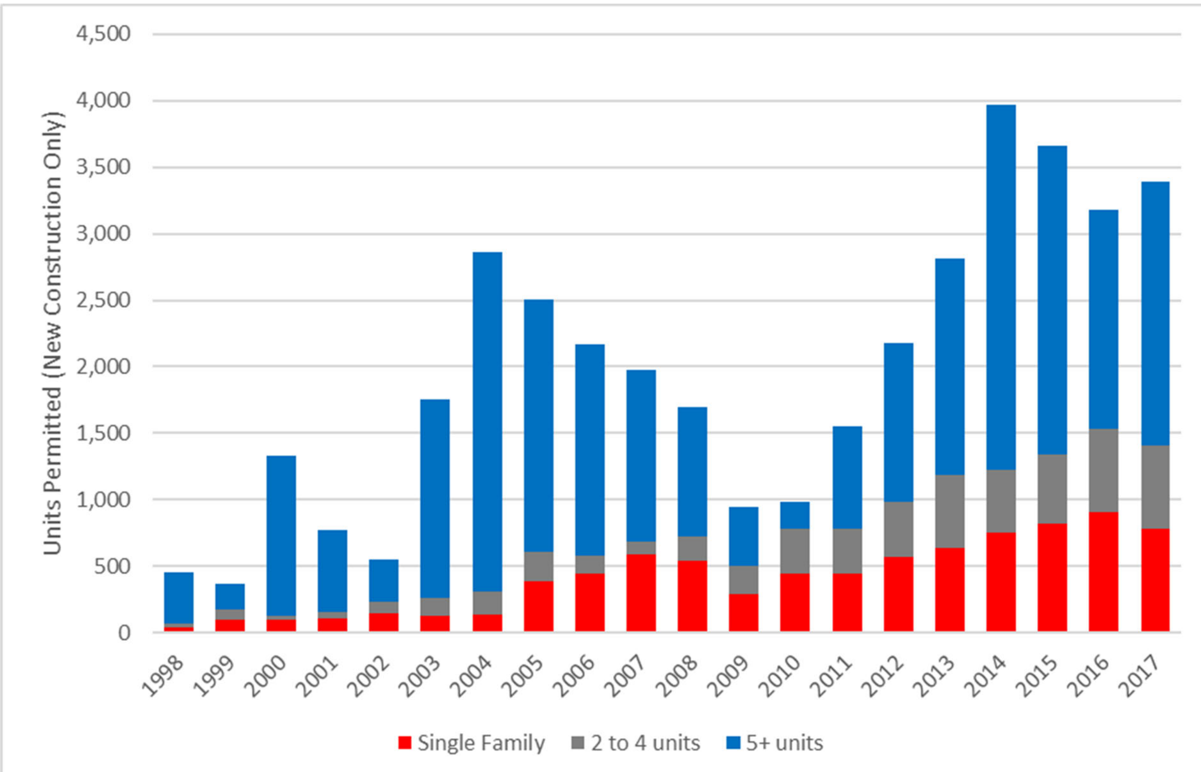
Home Construction

Home building activity in Philadelphia has also made significant progress since hitting its recessionary low in 2009. The following chart shows the number of newly constructed units being added to Philadelphia's housing stock, as represented by the number of building permits issued for such units, from 1998 through 2017.

Building Permits Issued in Philadelphia, New Construction Only (Number of Units by Building Type), 1998-2017



Source: US Census, Building Permits Survey

Prior to 2000, construction of new housing units in Philadelphia was low by both absolute and relative measures, averaging only 507 units per year in the decade from 1990 through 1999. However, since 2003, permits for new construction have not been for less than 947 units in any single year, including during the nadir of the great recession. In 2014, permits were issued to approve the construction of nearly 4,000 new housing units in Philadelphia—an all-time high. Notably, these data do not include additions or substantial alteration to existing buildings, which together account for nearly a third of all new housing units in Philadelphia from 2013 to 2017, based on permit issuance data from the Department of Licenses and Inspections. Although total permitting activity declined in 2015 and 2016, recovering somewhat in 2017, total residential development activity remains quite high, and it appears there is continued population growth in the City's metropolitan core. An easing in development activity could be interpreted as neutral or even positive, providing additional time for the absorption of the large number of recently completed projects, and lessening the potential of a temporary excess of supply (and consequent decline in rents and sales prices) to dissuade ongoing investment.

Office Market and New Development

The City currently has approximately 45.4 million square feet of office space in the Central Business District ("CBD"), with an additional 2.57 million square feet under construction according to Jones Lang LaSalle's ("JLL") statistics for the second quarter of 2018. The CBD includes four submarkets: University City, the Navy Yard, Market Street East and Market Street West. In the past year, Thomas Jefferson University signed a 237,000 square foot lease to consolidate some of its operations at 1101 Market Street. The highly anticipated Schuylkill Yards project kicked off with Sparks Therapeutics signing a 107,000 square foot lease at One Drexel Plaza. The First Judicial District of Pennsylvania will relocate from 1401 Market Street to 714 Market Street, making way for the renovation of 1401 by Alterra Property Group into micro-apartments. Comcast expanded by 70,000 square feet into Three Logan Square, quieting speculation that they will downsize their leased portfolio upon completion of the Comcast Technology Center.

The average direct asking rental rates in the City's CBD rose slightly to $31.57 per square foot in the second quarter of 2018. Markedly, the City's CBD enjoys rising rents with low overall total vacancy, while its suburban counterparts have higher overall total vacancy and lower rents during the same period, at 13.7% and $26.86 per square foot.

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Table 12 shows comparative overall second quarter 2018 office vacancy rates for selected office markets.

Table 12
Total Office Vacancy Rates of Selected Office Markets
Second Quarter 2018

Market	Vacancy Rate
San Francisco	7.7%
New York	8.1%
Austin	11.4%
Philadelphia	11.6%
Charlotte	12.0%
Chicago- Downtown	12.0%
San Diego	12.0%
Seattle	12.7%
Boston	13.7%
Baltimore	14.1%
Los Angeles	14.1%
United States CBD, All Markets	14.9%
San Antonio	15.3%
Washington, DC	16.2%
Atlanta	18.3%
Cleveland	19.6%
Phoenix	19.8%
Dallas	19.9%
Detroit	20.0%
Houston	24.5%

Source: Jones Lang LaSalle, National CBD Data, Second Quarter 2018

Comcast's $1.2 billion Comcast Technology Center became operational in the summer of 2018 with the first employees arriving in July. The new skyscraper will enable Comcast to consolidate employees currently scattered at several sites (in both Philadelphia and the surrounding suburbs) into a single location over the next several months. The facility will also create a media center in the heart of the City by becoming home to the operations of local broadcast television stations NBC 10/WCAU and Telemundo 62/WWSI. Comcast also recently clarified plans for a startup accelerator within the building, to be branded as LIFT Labs for Entrepreneurs. The tower will also serve as the new home to the Four Seasons Hotel, which will occupy the tower's top floors with 222 rooms and is expected to open in early 2019. The mixed-use tower is the tallest building in the United States outside of New York and Chicago and will be one of the largest private development projects in the history of Pennsylvania. Ultimately, the project is expected to create 1,500 permanent jobs in Philadelphia.

Retail Market, Food and Dining

According to a December 2017 Center City District report, Philadelphia's retail market has grown substantially and with nearly 188,000 residents, 292,000 workers, 3.2 million occupied hotel room nights and 117,000 college students in and around Center City, the market generates more than $1 billion in retail demand. The report also states that Center City's "affluent and highly educated residential demographic has attracted more than 45 national retailers since 2013. More than 2 million square feet of retail is under construction downtown, as older shopping streets are being redeveloped and Philadelphia's prime retail district continues to expand." According to Commercial Brokers Real Estate's 2016 report "Philadelphia Urban Retail," Center City's retail rental rates have risen faster than all North American cities other than Miami. The Center City District also reports that pedestrian volumes along West Chestnut now match and surpass pedestrian volumes along West Walnut, the City's traditional "high street." In January 2015, Philadelphia was named the second of 24 "Best Shopping Cities in the World," by Condé Nast Traveler Magazine, behind Barcelona.

Market East, an important commercial area nestled between City Hall and the City's historic district is experiencing a development boom. The revitalization of this section of the City, containing a major transport hub, is expected to be transformative. Most notably, the planned redevelopment of The Gallery at Market East into Fashion District Philadelphia is one of the biggest developments in the area. This 430,000 square foot urban retail mall complex features 130 stores. In April 2013, Pennsylvania Real Estate Investment Trust ("PREIT") acquired single entity ownership of The Gallery at Market East. In July 2014, the Macerich Company, which owns 55 shopping centers across the nation, acquired a 50% interest in The Gallery. In December 2015, Macerich and PREIT closed on their agreement for the $325 million redevelopment of the shopping center. Interior demolition of The Gallery at Market East began in 2016 and Fashion District Philadelphia is expected to open in the fall of 2019.

Recent improvements along East Market Street also include the 2014 opening of New York-based department store Century 21, the chain's first store outside of New York City, in a 95,000 square foot space that was previously vacant. To the east of Century 21, Brickstone Realty completely renovated the 720,000 square foot Lits Building into mixed use office and retail, which is now home to Five Below's corporate offices and their flagship retail store. Also, in March 2014, National Real Estate Developers ("NRED") announced a mixed-use redevelopment project, called East Market, also located on Market Street between 11th and 12th Streets. To date, NRED has completely renovated 175,000 square feet of office in an existing building, completed the construction of their first tower which opened in April 2018 with 322 residential units and is nearing completion on a second tower that will be completed at the end of 2018 adding another 180 residential units and 60 hotel rooms. The base of these three buildings contains 125,000 square feet of retail. These three buildings constitute a little over 50% of NRED's real estate in this City block, which they are now planning for the next phase of development. On the block just south of NRED's real estate, Brickstone Co. has completed construction of a mixed-use redevelopment project including 90,000 square feet of retail including a Target and 115 residential units.

Complementing the rise of retail in Philadelphia, the City has experienced a revival of restaurant establishments, especially in Center City and in the Greater Center City area, indicating an improved quality of life and vibrancy of those neighborhoods. The Center City District's investment in beautification of the area as well as the City's support in making the area more welcoming to visitors and diners sparked a significant increase in the number of indoor/outdoor dining establishments throughout Center City. According to the most recent "State of Center City" report, there were 992 retailers, 453 full-service restaurants and 447 quick serve restaurants in Center City in 2017.

ECONOMIC DEVELOPMENT STRATEGIES AND IMPLEMENTATION

City of Philadelphia Economic Development Mission and Goals

The City's economic development strategy is to (1) spur job-creation by fostering an improved business environment; (2) increase the City's population and visitation; and (3) enhance quality of life within the City – all in order to grow the City's tax base and market competitiveness. The City partners with numerous quasi-city and private agencies to accomplish these objectives.

The City utilizes several place-based economic development strategies to spur development in Philadelphia. These strategies include: (i) a 10-year real estate tax abatement on all new construction, as well as on improvements to existing properties; (ii) Commonwealth-designated Keystone Opportunity Zones in which eligible businesses may be exempt from all Commonwealth and local business taxes until a specified date; (iii) Commonwealth-designated Keystone Innovation Zones in which energy, defense, technology, and life-sciences companies may be eligible for saleable tax credits worth $100,000 annually for the first eight years of operations; (iv) tax increment financing; and (v) commercial corridor revitalization through support of Business Improvement Districts and reimbursement for certain storefront and interior retail improvements.

In recent years, Philadelphia has received recognition from large companies and employers who are seeking to expand. In the fall of 2017, Philadelphia was one of the many cities that responded to the Amazon HQ2 request for proposals. In early 2018, Amazon announced a short-list of 20 locations, which included Philadelphia. When the United States Army sought a location for a new, state-of-the-art command center in early 2018, Philadelphia was once again short-listed to the top 5. A new website was launched in 2018, philadelphiadelivers.com, which showcases all that Philadelphia has to offer businesses including location, talent, affordability, and amenities. Also in 2018, Philadelphia was one of four cities selected by the Brookings Institute to join the Global Identity Cohort. As such, more than 80 local stakeholders have been engaged to begin crafting a shared brand and narrative around Philadelphia in order to attract residents, businesses and events.

The City has also actively worked to raise its profile in the international business community. In October 2015, Philadelphia received the designation of the first World Heritage City in the United States by the Organization of World Heritage Cities. In summer 2015, the City entered into a "sister city" agreement with Frankfurt, Germany, considered the largest financial center in continental Europe. This agreement is Philadelphia's first sister city since 1992. In fall 2014 and 2015, Philadelphia hosted delegations of Israeli high-tech companies following a 2013 Israeli trade mission. In September 2016, a delegation of City officials and business leaders participated in a trade mission to Germany, France and Portugal further enhancing Philadelphia's relationship with these three countries. Between 2016 and 2017, delegates from Philadelphia also participated in trade missions to China, South Korea and Canada. Additionally, by participating in the Global Cities Initiative with multiple private stakeholders, the City of Philadelphia is supporting the development of a metro export growth plan, which launched in spring 2016.

City and Quasi-City Economic Development Agencies

City of Philadelphia Department of Commerce

The mission of the Department of Commerce, a 75-person City agency, is to ensure that Philadelphia is a globally-competitive city where employers hire, entrepreneurs thrive, and innovation abounds; to recruit and retain a diverse set of businesses; to foster economic opportunities for all Philadelphians in all neighborhoods; and to partner with workforce development programs and local businesses on talent development with the goal of ensuring that all Philadelphians can find and retain living-wage jobs. The Department of Commerce has three major divisions: Neighborhood & Business Services; Office of Business Development and Office of Economic Opportunity.

City of Philadelphia Department of Planning and Development

The Department of Planning and Development oversees all planning, real estate development support, and commissions such as Historical Commission, Planning Commission, Art Commission and Civic Design Review. Planning and Development also oversees all housing initiatives and plays a key role in community development.

Philadelphia Industrial Development Corporation ("PIDC")

PIDC is a non-profit organization founded by the City of Philadelphia and the Greater Philadelphia Chamber of Commerce in 1958. PIDC offers flexible financing tools, a targeted portfolio of industrial and commercial real estate, and expertise to help clients invest, develop, and grow in Philadelphia. PIDC also structures and invests in public-private partnerships for key City policy areas and development priorities. Since its inception, PIDC and its affiliates have settled approximately 6,700 transactions, including $14 billion in financing that has leveraged over $25 billion in total investment and assisted in creating and retaining hundreds of thousands of jobs. Its direct loan and managed third-party portfolio at the start of 2018 was approximately $615 million, representing 500 loans.

Philadelphia Redevelopment Authority ("PRA")

In 1945, the Commonwealth enacted the Urban Renewal Law and created the PRA as the City's urban renewal agency. Today, the PRA continues its role as a key financer, project manager, leader, and expert of developing and maintaining land in the City of Philadelphia. The PRA is one of five municipal land holding agencies. Its Real Estate Division facilitates the redevelopment of PRA assets and it provides project management and analysis for real estate sales, acquisitions, redeveloper agreements, developer submissions and required approvals. Its Housing Department leads the underwriting and loan closing process for all affordable housing projects within the City of Philadelphia and works primarily with non-profit and for-profit developers as a lender.

Philadelphia Land Bank ("PLB")

Established in 2013, the PLB is a new institutional partner in land use. The aim of the PLB is to consolidate many of the land acquisition and disposition processes of the City under one umbrella, making it easier for private individuals and organizations to acquire properties that otherwise contribute to neighborhood disinvestment and turn them into assets for the community in which they are located. The PLB can: (i) consolidate properties owned by multiple public agencies into single ownership to speed property transfers to new, private owners; (ii) acquire tax-delinquent properties through purchase or by bidding the City's lien interests at a tax foreclosure; (iii) with consent of the City, clear the title to those properties so new owners are not burdened by old liens; and (iv) assist in the assemblage and disposition of land for community, non-profit, and for-profit uses.

The Division of Housing and Community Development ("DHCD")

DHCD, formerly known as the Office of Housing and Community Development ("OHCD"), and now part of the City's Department of Planning and Development, manages planning, policy and investment in low-income housing through several assistance programs. Most significantly, the DHCD creates and manages implementation of the Consolidated Plan, a federally-mandated plan and budget that must be updated yearly in order to receive federal Community Development Block Grant funding.

The Philadelphia Housing Authority ("PHA")

PHA is funded primarily by the federal government and is the largest landlord in Pennsylvania. PHA develops, acquires, leases and operates affordable housing for City residents with limited incomes. PHA works in partnership with the City and state governments, as well as private investors. Over 93% of PHA's annual budget is funded directly or indirectly by the U.S. Department of Housing and Urban Development, and most of the balance of PHA's budget is derived from resident rent payments. Neither PHA's funds nor its assets are available to pay City expenses, debts or other obligations, and the City has no power to tax PHA or its property. Neither the City's funds nor its assets are subject to claims for the expenses, debts, or other obligations of PHA.

Rebuilding Community Infrastructure Program ("REBUILD")

Rebuild is a new $500 million initiative to revitalize neighborhood parks, recreation centers, playgrounds, and libraries across the City over a seven-year period. This program is intended to catalyze economic development in some of Philadelphia's most impoverished communities and neighborhoods. Rebuild is not only committed to making transformative capital improvements in neighborhood public and shared spaces, but will also strive to build capacity and opportunities for minority and women-owned businesses and job opportunities for local residents.

Key Commercial Districts and Development

Over the last two decades the efforts of Philadelphia's economic development agencies and others have spurred significant economic revitalization throughout the City. In particular, a number of geographic areas have experienced concentrated developments: Philadelphia's Historic District, Avenue of the Arts, North Broad Street, and the Benjamin Franklin Parkway. Many of these developments, such as a significant increase to Philadelphia's hotel room inventory in Center City Philadelphia and expansion of the Pennsylvania Convention Center, are key to the growth of Philadelphia's leisure and hospitality sector. Several key areas within the City have been instrumental in the economic and commercial development of Philadelphia over the past twenty-five years and the population growth since 2000.

Center City

A district that has seen a resurgence over the last two and a half decades, Center City is Philadelphia's central business and office region within the City. Center City is the strongest employment center in the City. In addition, the area contains a sizeable residential population and provides ample access to retail, dining, arts and culture, entertainment, and mass transportation services, to both residents and daily commuters. Center City is flanked by neighborhoods that are considered "Greater Center City." According to the Center City District, 309,000 riders take public transit into Greater Center City every weekday. Over the last two decades, as there has been an influx of new businesses and residents in these neighborhoods, the boundaries of Greater Center City have moved significantly further North and South, with the Delaware and Schuylkill rivers remaining boundaries on the East and West.

Seventeen major development projects, totaling $808 million, were completed in 2016 between Fairmount and Washington Avenues, Schuylkill River to the Delaware River. Another 42 projects of all types, totaling $5.4 billion in new investment were under construction at the end of December 2016, while 22 more, totaling $3.3 billion, have been proposed and are in the conceptual phases of pre-construction.

Of the 59 projects that were completed or under construction in 2016, more than half involved residential components: 24 are residential/mixed-use; another eight were exclusively residential. Remaining projects include nine commercial/mixed-use developments, six hospitality projects, five public space improvements, as well as retail, healthcare, education, and cultural developments. Together, they account for 18.7 million square feet.

Recent and current key developments in Center City are listed in Table 13.

Old City

Old City is home to some of the country's oldest historical assets and is considered America's "most historic square mile." Independence National Historical Park is an international destination, attracting 3.6 million visitors annually. Important culturally and economically, Old City is also home to world-class museums, theaters and art galleries. The neighborhood offers excellent hotels, a wide range of dining and nightlife establishments, independent retailers and a diverse mix of technology, media, professional and service organizations. Some 8,000 residents live in historic townhouses, industrial loft apartments and new condominium properties. Old City is located within a Keystone Innovation Zone, meaning that technology, energy and life sciences businesses may be eligible for up to $100,000 in tax credits. Old City District ("OCD") is a business improvement district that promotes the area and fosters economic development locally. OCD helps companies find suitable real estate and actively promotes the sector to attract businesses. Over the last few years, technology and creative businesses have established an increasingly important presence in the area.

University City

Located west of Center City, University City is a hub for the health care, life sciences, and higher education sectors and accounted for approximately 11% of the City's employment in 2017. It includes the campuses of the University of Pennsylvania, Drexel University, University of the Sciences, the University of Pennsylvania Health System, the Children's Hospital of Philadelphia and The Wistar Institute, as well as the University City Science Center, a biomedical incubator. The Cambridge Innovation Center, a co-working wet lab space, and the Johnson and Johnson JPOD and JLABS networking, research and co-working space, are set to open in late 2018. University City has experienced significant real estate development, driven mostly through the investment of its universities and research institutional anchors. The University of Pennsylvania built the $88 million Singh Center for Nanotechnology in 2013 and is investing $127 million in a new residence hall called New College House at Hill Field. Drexel University invested nearly $300 million in University City in 2013, and is planning for an additional $3.5 billion over 20 years in the development of Schuylkill Yards in partnership with Brandywine Realty Trust. This project will develop 14 acres of underutilized land near Philadelphia's 30th Street Station into an innovation neighborhood. It will feature a mix of entrepreneurial spaces, educational facilities and research laboratories, corporate offices, residential and retail spaces, hospitality and cultural venues and public open spaces.

The Navy Yard

The Navy Yard is a 1,200 acre mixed-use office, research and industrial park with over 13,000 people working on site across 150 companies. The Navy Yard has diverse tenants such as Philly Shipyard, one of the world's most advanced commercial shipbuilding facilities; the global headquarters for retailer Urban Outfitters, Inc.; a 208,000 square foot, double LEED Platinum corporate office for pharmaceutical company GlaxoSmithKline; and a LEED Silver bakery facility for the Tasty Baking Company. More than 7.5 million square feet of space is currently occupied or in development with significant additional capacity available for office, industrial, retail and residential development.

PIDC and its partners released an updated Navy Yard master plan in 2013, detailing a comprehensive vision for the Navy Yard. The plan calls for a total of over 13.5 million square feet of new construction and historic renovation supporting office, R&D, industrial and residential development, complemented with commercial retail amenities, open spaces and expanded mass transit. At full build, the Navy Yard will support more than 30,000 employees and over $3 billion in private investment. Currently, PIDC is negotiating changes to deed restrictions with the U.S. Navy to allow the construction of housing at Philadelphia's Navy Yard.

The Navy Yard continues to grow, adding over 500 employees and attracting four new companies in 2016, bringing the Navy Yard closer to its strategic targets. Recently completed construction projects include: 4701 League Island Blvd, the third facility on campus for WuXi AppTec, a leading pharmaceutical and biotechnology company; 1200 Intrepid Ave, the new LEED Gold office building designed by world-renowned architecture firm Bjarke Ingels Group; and most recently, in 2017, a UK-based life sciences company, Adaptimmune, opened its U.S. headquarters and Clinical and Manufacturing Operations at the Navy Yard. This was in addition to the opening of a 175,000 square foot Global Innovation Center for Axalta Coating Systems, an advanced coatings manufacturer. Since 2000, the Navy Yard has leveraged more than $150 million in publicly funded infrastructure improvements to spur more than $750 million in new private investment.

Waterfront Developments

Taking advantage of the City's geographic assets, the Schuylkill River and the Delaware River, the City is redeveloping its waterfront to accommodate a variety of developments, including mixed-use projects and housing, parks and recreational trails, and hotels. These projects improve quality of life for residents and improve the visitor experience, but also are an impetus for environmental remediation and private development of former industrial property within the City.

Delaware River Waterfront Corporation

The Delaware River has historically been a center of activity, industry, and commerce, bounded at its north and south ends by active port facilities. The City adopted a Master Plan for the central Delaware River in 2011. The Delaware River Waterfront Corporation (the "DRWC"), in partnership with the City, is a nonprofit corporation that works to transform the central Delaware River waterfront into a vibrant destination for recreational, cultural, and commercial activities. Successful park projects include Race Street Pier in 2011, Washington Avenue Green in 2014, and Pier 68 in September 2015. In October 2018, DRWC opened the newly-renovated Cherry Street Pier after a $5 million restoration effort. All four parks are adaptive reuse projects built on former pier structures.

In April 2014, the DRWC published a feasibility study for redevelopment of Penn's Landing, a major public space along the Delaware River waterfront. Recently the City announced a $90 million commitment to cap I-95 and build an 11-acre expanse of greenery between Walnut and Chestnut streets, as part of an estimated $225 million project to better connect Center City with the waterfront. The Commonwealth of Pennsylvania joined the City in supporting the project, and committed $115 million towards its completion. DRWC has committed to raising the remaining funds from philanthropic sources. The resulting civic space will leverage investment from private sources for the redevelopment of the adjoining parcels.

Schuylkill River Development Corporation

Redevelopment along the Schuylkill River is managed by a partnership among the Schuylkill River Development Corporation (the "SRDC"), the Department of Parks & Recreation, and the

Department of Commerce. SRDC works with federal, Commonwealth, City and private agencies to coordinate, plan and implement economic, recreational, environmental and cultural improvements, and tourism initiatives on the Schuylkill River.

From 1992 to 2017, $70 million was invested by SRDC, the City, and their partners along the tidal Schuylkill to create 3.65 miles of riverfront trails within 30 acres of premiere park space in the heart of the City, and has added amenities to the Schuylkill River Park such as floating docks, fishing piers, a composting toilet, and architectural bridge lighting. SRDC continues to work towards meeting its goal of creating and maintaining 8 miles of trail and 50 acres of green space along the tidal Schuylkill River in Philadelphia. The latest Schuylkill Trail extension running from Locust Street to South Street, called the Schuylkill Banks Boardwalk, opened in October 2014 and more recently the Bartram's Mile and South to Christian Street trail segments have been opened. Philadelphia was awarded $10.265 million in federal TIGER grants, split among three projects across the City. The City will use $3.265 million of the grant to convert an abandoned swing rail bridge over the Schuylkill River near Grays Ferry into a bridge trail. Crews began removing the existing truss bridge in the summer of 2018 to make way for the new swing rail bridge.

Since 2005, Philadelphia has benefitted from more than $1 billion in development along the Schuylkill River, with more planned by private developers, universities, and healthcare institutions.

SugarHouse Casino

Legislation enacted by the Pennsylvania General Assembly authorized two stand-alone casino licenses for the City. Philadelphia's first casino, SugarHouse, opened in September 2010. SugarHouse Casino sits on the Delaware River waterfront offering an array of slot machines, table games and dining options. In May 2013, SugarHouse received approval from the Pennsylvania Gaming Control Board to expand its operations and increase its amenities, including a multi-purpose event space with waterfront views, new restaurants, a parking garage, a 30-table poker room and more. Completed in 2015, the $164 million expansion added more than 400 full-time team members, and as of August 2018, SugarHouse employs approximately 1,500. As reported to the Pennsylvania Gaming Control Board, SugarHouse's gaming revenue was $299,119,873 after the 2018 fiscal year.

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Table 13
Selected Major Development Investments Recently Completed or Under Construction (as of October 2018)

Project Name, by Neighborhood	Project Type	Cost in Millions	Est. Completion Date
CENTER CITY			
The Sterling – Redevelopment	Residential	$75	Completed 2017
One Riverside	Residential	$90	Completed 2017
View 32 - 3201 Race Street	Residential	$55	Completed 2017
1213 Walnut	Residential	$125	Completed 2017
East Market (formerly Girard Square)	Mixed Use	$400	Q4 2018
Comcast Innovation and Technology Center	Commercial/Hotel	$1,200	Q2 2019
Park Towne Place – Redevelopment	Residential	$200	Completed 2018
2400 Market	Commercial	$230	Q1 2019
National Building	Residential	$23	Completed 2018
W Hotel/Element	Hotel	$359	Q2 2019
The Hamilton	Residential	$130	Completed 2018
Fashion District Philadelphia	Commercial	$100	Q3 2019
1911 Walnut	Mixed Use	$300	2020
Hanover North Broad	Mixed Use	$50	Completed 2018
SLS Residences	Residential and Hotel	$240	2021
Police Headquarters in Inquirer Building	Public	$250	Q4 2020
NAVY YARD			
Adaptimmune	Commercial	$24	Completed 2017
Axalta R & D Facility	Commercial	$68	Completed 2017
Pavilion	Commercial	$11	Q4 2018
OLD CITY			
American Revolution Center	Arts & Culture	$101	Completed 2017
205 Race Street	Residential	$65	Completed 2017
500 Walnut	Residential	$174	Completed 2017
218 Arch	Mixed Use	$25	Completed 2017
OTHER NEIGHBORHOODS			
Divine Lorraine	Residential	$43	Completed 2017
Lincoln Square	Mixed Use	$130	Completed 2018
Philadelphia Metropolitan Opera House	Arts & Culture	$56	Completed 2018
UNIVERSITY CITY			
FMC Tower at Cira Centre South	Mixed Use	$385	Completed 2017
CHOP Schuylkill Ave Expansion (Phase 1)	Health Care	$250	Completed 2017
4601 Market	Mixed Use	$250	Q1 2020
Penn Health Tower	Health Care	$1,500	2021
TOTAL		**$7,217**	

Source: Philadelphia Department of Commerce

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TOURISM AND HOSPITALITY

Philadelphia has experienced a significant increase in tourism over the last decade, fueled by several high profile, global events that the City hosted, notably the 2015 World Meeting of Families, culminating in a papal visit from Pope Francis, and the Democratic National Convention in 2016. In April 2017, Philadelphia hosted the NFL Draft, which is estimated to have brought approximately 250,000 people to Center City. Both business and convention tourism as well as leisure tourism were at a record high in 2016. In 2016, Lonely Planet named Philadelphia on its top-10 best list of "unexpectedly exciting places to see," and in 2017, Travel and Leisure named Philadelphia as one of the best places to visit in the world.

The Philadelphia Convention and Visitors Bureau ("PHLCVB") books meetings, conventions and sporting events and supports international marketing of Philadelphia overseas. PHLCVB also books domestic group tours. Tourism Economics, an Oxford Economics Company, reported that international visitors from overseas to Philadelphia in 2017 numbered more than 648,000, spending $651 million generating $1.1 billion in total economic impact to the Philadelphia region. According to the same source, Philadelphia ranks as the 16th most visited city in the U.S. by overseas travelers. Philadelphia's international visitation has seen significant growth over the past decade, a 18% growth in overseas travelers since 2007 (up from 549,000 in 2007).

The PHLCVB currently has 892 meetings, conventions, and sporting events booked for future years. These groups will bring a total of 3.1 million attendees to Philadelphia consuming 3.7 million room nights.

Visit Philadelphia markets Philadelphia domestically, as well as in Canada and Mexico, to promote leisure travel. Philadelphia has attracted more overnight leisure travelers than ever before and Center City hotels reached a landmark 1 million leisure room nights in 2016. Further, several big and new-to-the-city brands are entering the market, along with smaller boutique hotels. Leisure hotel room stays have increased 334% since 1997 and in 2017 the estimated economic impact of leisure travel to the region was $11.5 billion according to the Visit Philly 2018 Annual Report.

Table 14
Greater Philadelphia Visitor Growth, 1997-2017
(In Millions)

	1997	2017	Net Change	% Change
Total Visitation	26.7	43.3	16.6	62%
Leisure- Overnight	7.3	15.1	7.8	107%
Leisure- Day	15.5	23.1	7.6	49%
Business- Overnight	1.4	2.3	0.9	64%
Business- Day	2.5	2.8	0.3	12%

Source: Visit Philadelphia Annual Report, 2018

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Philadelphia has seen an influx in new hotel development, with numerous new developments underway or confirmed. Table 15 lists notable hotel developments since 2015, representing over $1 billion in investment. The number of hotel rooms available in the City in 1993 was 5,613, with annual demand of 1,331,684 hotel rooms, representing 65% occupancy. In 2017, the City's hotel room inventory was 16,334 rooms, with occupancy at 76.6%%. Several hotel projects are currently under development, which will increase hotel room inventory by close to 2,000 rooms.

Recent years have brought a slew of hotel openings in and around Center City. After more than a year of renovations, the historic Liberty Title building returned to north of City Hall as the Aloft Hotel, opening in the summer of 2017. In February 2014, the City announced plans for the adaptive reuse of the City's former Family Division of the Court of Common Pleas building to become a 199-room luxury hotel, currently projected to be completed in 2019. The 219-room Four Seasons Hotel will reopen in early 2019 on the top 12 floors of the Comcast Innovation and Technology Center.

Table 15
Notable Hotel Development (as of August 2018)

Hotels	Total Rooms	Proposed Opening Date
Cambria Hotel and Suites Broad and Locust Streets	222	Opened March 2018
Fairfield Inn & Suites 13th and Spruce Streets	119	Opened June 2018
Four Seasons 18th and Arch Streets	219	April 2019
Mainstay/Ascend Hotel 917 Arch Street	118	June 2019
W Hotel 15th and Chestnut Streets	295	June 2019
Element Hotel 15th and Chestnut Streets	460	June 2019
Pod Philly 31 S 19th Street	252	June 2019
Centric Hotel by Hyatt 17th and Chancellor Streets	310	June 2020
AKA University City 30th and Walnut Streets	103	Opened January 2017
Study at University City 33rd and Chestnut Streets	212	Opened January 2017
Best Western On Vine Street between 12th and 13th Street	93	Opened February 2017
Aloft Hotel Broad and Arch Streets	179	Opened August 2017

Source: STR, Inc. via the Philadelphia Convention and Visitors Bureau, August 2018

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Museum and Cultural Centers

Crucial to tourism is the City's robust arts and culture sector. The Center City District reports that one in three tourists who come to Center City Philadelphia cite museums and cultural events as the primary reason for their visit. Top attractions in Philadelphia include Independence National Park, the Philadelphia Museum of Art, the Philadelphia Zoo and Reading Terminal Market.

Organizations like the Philadelphia Museum of Art, the Kimmel Center, FringeArts, and the more than 400 smaller cultural organizations throughout the City help improve the quality of life for residents and visitors. The Greater Philadelphia Cultural Alliance reported in 2017 that arts and culture produced \$3.4 billion in economic impact and contributed \$930 million in household income in the city of Philadelphia.

Avenue of the Arts (South Broad Street) Investments

The Avenue of the Arts is located along a mile-long section of South Broad Street between City Hall and Washington Avenue, in the heart of Philadelphia's Center City. Reinventing South Broad Street as the Avenue of the Arts, a world class cultural destination, has been a civic goal in Philadelphia for more than two decades. Cultural institutions, the William Penn Foundation, local property owners and civic leaders advanced the idea of a performing arts district on South Broad Street anchored by the Academy of Music and modeled after successful performing arts districts around the country. The Avenue of the Arts became a key element of the City's strategy to strengthen Center City as the region's premier cultural destination and an important element in the City's bid to expand its convention and tourism industries.

The Benjamin Franklin Parkway

Complementing the Avenue of the Arts theater district developments, the Benjamin Franklin Parkway is considered the spine of Philadelphia's museum district. Designed by French architect Jacques Gréber, to emulate the Champs Elysées of Paris, the Parkway opened in 1929. It runs from the area of City Hall to the Philadelphia Museum of Art and is a central public space and tourist attraction. Key Parkway features include Love Park – which has undergone major renovations and was reopened in the spring of 2018 - the Philadelphia Museum of Art, the Rodin Museum, the Franklin Institute, The Barnes Foundation, the Free Library of Philadelphia, the Academy of Natural Sciences, the Swann Memorial Fountain, Sister Cities Park, Cathedral Basilica of Saints Peter and Paul on Logan Square, and numerous pieces of public art.

Opened in May 2012, The Barnes Foundation is a welcome addition to the City's impressive roster of arts facilities, and has had a significant impact on the City's leisure and hospitality industry. In October 2015, the Barnes welcomed its one millionth visitor since opening on the Parkway. With membership over 85,000, it is ranked among the top institutions of its kind in the country.

Historic District

Key to the City's leisure and hospitality growth is the maintenance and investment in the City's extraordinary historic assets. As the birthplace of the country, Philadelphia remains a major tourist destination year-round, particularly the City's Historic District, which includes such national treasures as the Liberty Bell, Independence Hall, Carpenters' Hall, Betsy Ross' house and Elfreth's Alley, the nation's oldest residential street. The City continues to invest in the maintenance and expansion of the Historic District's tourist experience. Since 2001, \$613 million of improvements have been made in Philadelphia's historic district, with an additional \$120 million either under construction or planned over the next three years. Coupled with proposed developments, public and private, this district is expected to remain competitive in the national and international tourism markets for years to come.

North Broad Street and the Philadelphia Convention Center

In 1993, with support from the Commonwealth, the Pennsylvania Convention Center was completed, providing a total of 624,000 square feet of saleable space across its four exhibit halls, ballroom and banquet spaces. In 2011, a $786 million expansion, across 20 acres of central Philadelphia real estate, increased the facility to 2.3 million square feet. It is the largest single public works project in Pennsylvania history. In January 2014, SMG began managing and operating the Convention Center, instituting a number of measures intended to reduce and control show costs and improve customer service. In May 2014, SMG implemented new work rules through a customer service agreement signed by the Convention Center and four of six unions. The Convention Center continues to operate with no plans to replace the two unions that did not sign the agreement. In February 2016, the Convention Center announced that 2015 was its highest booking year ever with 856,663 bookings, a 1.2% increase from 2014, representing an estimated $1.1 billion in future economic impact. The 2011 expansion of the Pennsylvania Convention Center reignited development efforts along this key corridor of North Broad Street. Improvements include Lenfest Plaza, which is adjacent to the Pennsylvania Academy of Fine Arts and across from the Pennsylvania Convention Center expansion entrance. In 2017, Starwoods opened an Aloft Hotel at the corner of N. Broad and Arch Streets. Realen Properties converted the historic Liberty Title Building into a 179-room hotel with retail space and a direct connection into the Convention Center. This location was critically important for the City since the Convention Center wraps around this formerly vacant building. Now completed, the Aloft creates a vibrant corner that completes the footprint of the Convention Center.

Development is moving north along Broad Street, with significant investment taking place to restore the Berry Building, the Philadelphia Metropolitan Opera House, and the Divine Lorraine Hotel.

South Philadelphia Sports Complex

Another key element of Philadelphia's hospitality industry is professional sports. Philadelphia is the only city to have a professional hockey, basketball, baseball, and football team playing in a single district within the City, the Sports Complex Special Services District, created by the City in 2000.

The South Philadelphia Sports Complex houses three professional sports facilities: The Wells Fargo Center opened in 1996 and is home to the Philadelphia Flyers (National Hockey League) and Philadelphia 76ers (National Basketball Association); Lincoln Financial Field opened in 2003 and is home to the Philadelphia Eagles (National Football League); and Citizens Bank Park opened in 2004 and is home to the Philadelphia Phillies (Major League Baseball). The Phillies and the Eagles are contractually obligated to play in Philadelphia until 2033 and 2034, respectively.

Average paid home season attendance for the Eagles in Lincoln Financial Field has exceeded 100% of actual seating, since its opening in 2003. In the 2009 through 2012 seasons, the Phillies had a paid home season attendance in excess of 100% of actual seating at Citizen's Bank Park. In 2010, the Phillies had the second highest attendance of any team in Major League Baseball ("MLB") and in both 2011 and 2012 the Phillies registered the highest home attendance of any team in the MLB. The Phillies attendance rate declined in 2013, but remained in the top ten of MLB teams. However, team performance contributed to a significant decline in overall attendance from 2014 to 2017. In August of 2018, attendance rank was 16 out of 30 teams in the MLB.

In 2012, Xfinity Live! Philadelphia, a 50,000-square foot sports entertainment and dining complex, opened within the sports complex. The privately funded, $60 million venue includes a miniature sports field hosting free concerts and other activities, an outdoor theater accommodating sports games and family films, and a dozen dining and bar establishments. The complex, a Comcast-Spectacor and Cordish-owned company, also hosts the first ever NBC Sports Arena, featuring a 32-foot LED HD television, displaying the NBC Sports Ticker and in-game promotions. Cordish is currently in early conceptual planning stages of a phased expansion of the complex that could include retail, hotel and theater space. The entire complex is open year-round and sustains 276 full-time equivalent jobs.

In November 2014, the Pennsylvania Gaming Control Board awarded the City's remaining casino license to Live! Hotel & Casino, a joint venture between Cordish Cos. and Greenwood Gaming and Entertainment Inc. The $425 million, 200,000-square-foot casino will include a 240-room hotel, 2,000 slots and 125 table games. It will also have a spa and conference center built in and around an existing Holiday Inn at the South Philadelphia Sports Complex. The license award has been challenged by several court appeals; in March 2016, the Pennsylvania Supreme Court ruled that the Pennsylvania Gaming Control Board must take a closer look at the company's ownership structure. Cordish was granted zoning approval in December 2015 and has begun demolition on the existing structure. The project is expected to be completed in 2021.

TRANSPORTATION

The residents of the City and surrounding counties are served by a commuter transportation system operated by SEPTA. This system includes two subway lines, a network of buses and trolleys, and a commuter rail network joining Center City and other areas of the City to PHL and to the surrounding counties. For more information on SEPTA, see "– Southeastern Pennsylvania Transportation Authority (SEPTA)" and APPENDIX IV – "EXPENDITURES OF THE CITY – City Payments to SEPTA."

A high-speed train line runs from southern New Jersey to Center City and is operated by the Port Authority Transit Corporation ("PATCO"), a subsidiary of the Delaware River Port Authority. On the average weekday, PATCO brings approximately 15,000 individuals to Philadelphia.

New Jersey Transit operates 19 different bus routes and the Atlantic City Train Line, all of which serve to connect Philadelphia and New Jersey. On the average weekday, the New Jersey Transit bus routes bring approximately 2,000 individuals to Philadelphia and the Atlantic City Line brings approximately 700 individuals to Philadelphia.

Amtrak, SEPTA, Norfolk Southern, CSX Transportation, Conrail and the Canadian Pacific provide inter-city commuter and freight rail services connecting the City to other major cities and markets in the United States. According to Amtrak, Philadelphia's 30th Street Station is the third busiest station in the United States. Structural improvements of $30 million were recently completed to the station, and an additional $60 million restoration project is awaiting federal approval.

The City now has one of the most accessible downtown areas in the nation with respect to highway transportation by virtue of Interstate 95 ("I-95"); Interstate 676 (the "Vine Street Expressway"), running east-to-west through the Central Business District between Interstate 76 (the "Schuylkill Expressway") and I-95; and Interstate 476 (the "Blue Route") in suburban Delaware and Montgomery Counties, which connects the Pennsylvania Turnpike and I-95 and connects to the Schuylkill Expressway, which runs to Center City Philadelphia. In addition, more than 100 truck lines serve the Philadelphia area.

The City is served within city limits by numerous private buses and shuttles. These buses and shuttles are operated by apartment complexes, universities, and private companies. These buses and shuttles connect Philadelphians to transit hubs, employment, and residences. A rail line reaches PHL in less than 20 minutes from the City's central business district and connects directly with the commuter rail network and the Pennsylvania Convention Center.

Philadelphia launched the Indego bike share program, sponsored by Independence Blue Cross, in April 2015. The system launched with 600 bicycles and 70 stations throughout the City from Temple University in North Philadelphia to Tasker Street in South Philadelphia and from the Delaware River on the east to 44th Street in West Philadelphia. Indego is the first bike share system in the United States to launch with a cash payment option for members. In 2017, the City expanded Indego to 1,100 bicycles and 121 bike share stations, with stations as far north as Dauphin Street in Kensington, as far south as McKean Street in South Philadelphia, and as far west as 52nd Street. In 2017, 780,000 trips were taken.

Southeastern Pennsylvania Transportation Authority (SEPTA)

SEPTA operates facilities across the five-county Greater Philadelphia area encompassing approximately 2,200 square miles and serving approximately 4.1 million inhabitants. SEPTA operates service 24 hours a day, seven days a week, 365 days a year. SEPTA's Fiscal Year 2017 operating budget totals $1.4 billion. This is supported by $870 million in federal, state, and local subsidies, as well as $536 million of operating revenue. A significant segment of the region relies on SEPTA for public transportation and annual SEPTA ridership totaled more than $308.3 million in Fiscal Year 2017.

SEPTA's operations are accounted for in three separate divisions, the percentages following each division representing its approximate share of SEPTA's expense budget: City Transit (66%); Regional Rail Division (25%); and Suburban (9%). The City Transit Division serves the City with a network of 88 subway-elevated, light rail, trackless trolley and bus routes, providing approximately 852,000 unlinked passengers trips per weekday. The Regional Rail Division serves the City and the local counties with a network of 13 commuter rail lines providing approximately 120,000 passenger trips per weekday.

Since Fiscal Year 2015, SEPTA's annual capital budget and 12-year capital program have increased significantly. The Fiscal Year 2017 Capital Budget totals $548.6 million. Of this amount, 60% of the budget, or $326.8 million, is programmed to come from State sources; 38%, or $210.9 million, from Federal sources; and 2%, or $10.9 million, from local government sources. Local governments include the four counties of Bucks, Chester, Delaware and Montgomery and the City of Philadelphia. These funding levels take into account the Federal transportation funding authorization, the Fixing America's Surface Transportation Act (known as the "FAST Act"), as well as State funding. Each dollar of local funding leverages $49 in projected State and Federal funding.

SEPTA's increased capital budget will enable it to address a variety of needs. The Fiscal Year 2017 Capital Budget and twelve year capital program continues the direction set forth after passage of Act 89 to address SEPTA's multi-billion dollar backlog and to rebuild the system. SEPTA continues to rehabilitate and replace critical infrastructure and systems, such as substations, bridges and stations. The capital program includes safety and security enhancements, along with modernization of communication and signal equipment. The SEPTA Key project will replace antiquated fare collection systems with cutting-edge payment technology. SEPTA will replace rail vehicles that have exceeded their useful life, while enhancing accessibility and also expanding capacity to address ridership growth. SEPTA will expand its fleet of hybrid buses and perform vehicle overhauls to optimize vehicle performance. Other expenses supported by the capital program include capital asset leases and debt service.

Recent Ridership Trends

Demand for public transportation has steadily increased over the past decade in the City, and in Fiscal Year 2012, SEPTA experienced its highest ridership in 25 years and in Fiscal Year 2016, SEPTA experienced its highest ridership ever for regional rail. Eight months into Fiscal Year 2018, SEPTA ridership is 2.3% below last year. Ridership in City Transit is down 3.3%, but is partially offset by ridership increases of 0.3% for Regional Rail and 4.9% for Suburban Transit.

Airport System

The Airport System serves residents and visitors from a broad geographic area that includes eleven counties within four states: Pennsylvania, New Jersey, Delaware and Maryland. The Airport System consists of the following:

Philadelphia International Airport ("PHL" or the "Airport")

PHL is classified by the Federal Aviation Administration as a large air traffic hub (enplaning 1.0% or more of the total passengers enplaned in the U.S.). According to data reported by Airports Council International – North America, PHL was ranked the twentieth busiest airport in the United States, serving 29.6 million passengers in calendar year 2017.

Land: Approximately 2,584 acres located partly in the southwestern section of the City and partly in the northeastern section of Delaware County, about 7.2 miles from center city Philadelphia. Additionally, The Airport finalized the purchase of an adjacent 136-acre parcel to the west of the Airport in early 2018 for future expansion.

Runways: The PHL runway system consists of parallel Runways 9L-27R and 9R-27L (which was recently extended to a total length of 12,000 feet), crosswind Runway 17-35, commuter Runway 8-26, and interconnecting taxiways.

Terminal Buildings: Approximately 3.2 million square feet, consisting of seven terminal units (A-West, A-East, B, C, D, E, and F). Terminal facilities principally include: ticketing areas, passenger and baggage screening areas, passenger hold rooms and other amenities, baggage claim areas, back of house support areas, and approximately 180 food, retail and service establishments.

Other Buildings and Areas: Consisting of six active cargo facilities, a variety of support buildings, Fire Department CFR and training areas, Air Traffic Control Tower (ATCT), Fixed-Base Operator (FBO) Atlantic Aviation, Corporate Hangars, Fueling Supply Facility, two American Airlines aircraft maintenance hangars, and a first-class office complex located at the western end of the Airport.

Outside Terminal Area: Consisting of a 15-story, 419-room hotel, seven rental car facilities, a 150-vehicle cell-phone lot and two employee parking lots with a total of 4,200 spaces. This area also includes five parking garages and surface lots consisting of a total of 18,940 vehicle spaces, operated by the Philadelphia Parking Authority.

Northeast Philadelphia Airport ("PNE")

PNE is located on approximately 1,126 acres situated within the City limits, ten miles northeast of Center City Philadelphia. PNE serves as a reliever airport for PHL and provides for general aviation, air taxi, corporate, and occasional military use. PNE currently has no scheduled commercial service. There are presently 85 T-hangars, ten corporate hangars (one corporate hangar is in construction and expected to be completed in spring 2019), and six open hangars for general aviation activities. There are approximately 175 general aviation aircraft based at PNE.

Capital Development

The Airport has implemented a Capital Development Plan ("CDP") for Fiscal Years 2019 to 2023 that incorporates terminal, landside, and cargo projects identified in the Master Plan in addition to near-term capital facility needs, including on-going rehabilitation and repair projects.

The CDP includes the following major improvements:

<u>Major terminal and landside improvements (approximately $812.6 million)</u>: Updates to Terminals B/C ticketing, security checkpoints and checked baggage system renovations; planning and design for international gate expansion; loading bridge replacement and terminal systems rehabilitation and improvements; terminal interior and exterior renovations and improvements; roof replacement program; restroom renovation program; HVAC system improvements, lighting LED replacement, Electrical Substation and Panel replacements, baggage handling system improvements; terminal concession development and redevelopment; wetlands mitigation; and other terminal improvements, including a terminal refresh.

<u>Major airfield improvements (approximately $700.0 million)</u>: 9R-27L Runway extension and taxiway work; construction of an air traffic control tower, which is contingent on partial federal funding; an airfield pavement management program; deicing improvements; airfield security and access control; lighting and electrical improvements; and additional airfield and apron improvement and equipment.

<u>Major security and information technology improvements (approximately $67.2 million)</u>: perimeter surveillance upgrades; badging system upgrades; design of automated unstaffed exit lanes; Terminal B/C boarding bridge access control extension; additional security and perimeter gate improvements; and construction of redundant IT support facilities to maintain business continuity.

<u>Land Acquisition and Ground Transportation improvements (approximately $400.5 million)</u>: various property acquisitions adjacent to or nearby the Airport; and design and development of a consolidated rental car facility.

<u>Northeast Airport improvement projects (approximately $26.0 million)</u>: runway and taxiway rehabilitation program; airfield lighting program; Runway Safety Area upgrades; airfield signage improvements; and administration building upgrades.

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Capital Development Program as of November 1, 2017
City of Philadelphia, Division of Aviation
($000)

	Total Project Costs
AIRFIELD PROJECTS	
Stage 1 Airfield Runway 9R-27L extension and taxiway work	$202,800
Air Traffic Control Tower	197,500
Airfield Pavement Program	65,750
Deicing Improvements	49,710
Wetlands Mitigation	30,000
Airfield Security and Access Control	28,000
Lighting & Electrical Improvements	19,000
Other Airfield Improvements and Equipment	75,300
Apron projects	31,000
	$699,060
TERMINAL AND LANDSIDE PROJECTS	
Terminal Redevelopment and Expansion	$420,090
Loading Bridge Replacement Program	43,000
Terminal Systems Rehabilitation and Improvements	61,250
Terminal Interior and Exterior Renovations and Improvements	46,800
Roof Replacement Program	17,500
Restroom Renovation Program	28,250
Baggage Handling System Improvements	23,000
Terminal Concession Development	13,000
Other Terminal Improvements	19,500
PHL Support Facilities	96,500
Other landside improvements	43,720
	$812,610
SECURITY AND INFORMATION TECHNOLOGY	**$67,160**
LAND ACQUISITION AND GROUND TRANSPORTATION PROJECTS	
Land Acquisition	$88,400
Ground Transportation	312,090
	$400,490
PNE PROJECTS	**$26,000**
Total Approved Capital Development Program	**$2,005,320**

Under the Airline Agreement, the airlines have approved approximately $2.4 billion in capital development projects, of which approximately $370.1 million have been completed. The CDP includes approximately $2.0 billion of airline-approved projects remaining to be completed, which incorporate long-term development projects and ongoing rehabilitation and repair projects. The Airport continues to work with the airlines to evaluate operational needs at the Airport and assess the timing and scope of projects. The CDP will continue to evolve as priorities change.

Use and Lease Agreement

In June 2015, the City Council of Philadelphia approved a five-year Airport-Airline Use and Lease Agreement (the "Airline Agreement") between PHL and the airlines. The Airline Agreement began July 1, 2015, and includes options for two one-year extensions.

PHL will continue to study, plan, and modularly execute the mission to ensure its full potential benefit to PHL and its stakeholders.

PHL Passenger and Other Traffic Activity

In Fiscal Year 2018, PHL enplaned passenger traffic increased by 3.0%; domestic enplanements increased 3.6% while international enplanements decreased 1.2%. American Airlines' mainline traffic experienced an uptick in domestic passenger counts with several new routes being placed in service. Additionally, all four of PHL's low cost carriers (Alaska Airlines, Frontier Airlines, JetBlue Airways, and Spirit Airlines) saw increases in domestic service with Alaska, Frontier and Spirit adding new routes over the course of Fiscal Year 2018. PHL experienced a slight loss in international enplaned passenger counts in Fiscal Year 2018 despite new service to Dublin, Ireland on Aer Lingus and increased load factors on flights to Reykyavik, Iceland (Icelandair) and Doha, Qatar (Qatar Airways).

Between Fiscal Year 2009 and Fiscal Year 2018, the total number of enplaned passengers at PHL decreased at a compound annual growth rate of (0.1)% while cargo tonnage increased at a compound growth rate of 0.2%.

	Fiscal Year 2018	**Fiscal Year 2017**
Domestic Enplanements	13,238,844	12,775,958
International Enplanements	2,006,609	2,030,924
Total Enplanements	15,245,453	14,806,882
Freight (US tons)	487,086	424,009
Mail (US tons)	23,344	24,659
Total (US tons)	510,430	448,668

Port of Philadelphia

The Port of Philadelphia (the "Port") is located on the Delaware River within the City limits. Philadelphia's Port facilities are serviced by two Class I railroads (CSX and Norfolk Southern) and provide service to major eastern Canadian points, as well as Midwestern, southern and southeastern U.S. destinations. Terminal facilities, encompassing four million square feet of warehousing, are located in close proximity to Interstate 95 and Interstate 76. Over 1,600 local general freight trucking companies operate in the MSA, according to Hoover's Inc.

The Philadelphia Regional Port Authority (the "PRPA") reported approximately 6,262,648 metric tons of cargo moved through the Port in 2016, the second year of more than 6 million tons of cargo in a single calendar year, representing a 2.7% increase over 2015. The Port is the top-ranked port for meat importing in the United States, and is among the nation's leaders for fruit, cocoa, forest products and steel imports. In December 2015, the PRPA secured a new shipping service that will link directly with burgeoning port operations on the Gulf of Mexico at Veracruz and Altamira. This service will target commodities including goods such as avocados, lemons, tomatoes and commercial cargo.

As part of an ongoing project, the PRPA is working to increase the Port's competitiveness by increasing capacity by deepening the main channel of the Delaware River from 40 to 45 feet. In November 2016, the Governor announced $300 million in Commonwealth funding to significantly expand the Port's facilities and double its capacity by 2020. Improvements will double container and auto capacity at the Port and increase the Port's ability to handle wood pulp, a food grade commodity.

KEY CITY-RELATED SERVICES AND BUSINESSES

Water and Wastewater

The water and wastewater systems of the City are owned by the City and operated by the City's Water Department (the "Water Department"). The water and wastewater systems are referred to herein individually as the "Water System" and "Wastewater System", respectively.

The Water System's service area includes the City of Philadelphia and has one wholesale water service contract. Based on the 2017 U.S. Census Bureau estimate, the Water System served 1,580,863 individuals.

As of June 30, 2018, the Water System served approximately 480,000 active customer accounts using approximately 3,100 miles of mains and approximately 25,000 fire hydrants.

The City obtains approximately 59% of its water from the Delaware River and the balance from the Schuylkill River. The City is authorized by the Pennsylvania Department of Environmental Protection (the "PaDEP") to withdraw up to 423 million gallons per day ("MGD") from the Delaware River and up to 258 MGD from the Schuylkill River. On September 27, 2016, the PaDEP issued the Water Department a new water allocation permit, which expires on September 27, 2041. Under the new permit, the amount the City is authorized to withdraw from each river has not changed.

Water treatment is provided by the Samuel S. Baxter Water Treatment Plant on the Delaware River and by the Belmont and Queen Lane Water Treatment Plants on the Schuylkill River. The combined rated treatment capacity of these plants under the Water Department's Partnership for Safe Water procedures is 546 MGD. The combined maximum source water withdrawal capacity from the two rivers that supply these plants is 680 MGD. The excess source water capacity enables higher than normal withdrawal from either river should conditions limit withdrawals from one.

The Wastewater System's service area includes the City of Philadelphia and ten wholesale wastewater service contracts. Based on the 2017 U.S. Census Bureau estimate, the Wastewater System served 1,580,863 individuals that live in the City and ten wholesale contracts.

As of June 30, 2018, the Wastewater System served approximately 545,000 accounts, including approximately 50,000 stormwater-only accounts and ten wholesale contracts with neighboring municipalities and authorities.

The Wastewater System consists of three water pollution control plants, the Northeast, Southwest and Southeast water pollution control plants (the "WPCPs"), 19 pumping stations, approximately 3,700 miles of sewers, and a privately managed centralized biosolids handling facility. It includes approximately 1,850 miles of combined sewers, 760 miles of sanitary sewers, 740 miles of stormwater sewers, 13 miles of force mains (sanitary and storm) and 349 miles of appurtenant piping. The three WPCPs processed a combined average of 413 MGD of wastewater in Fiscal Year 2018, have a 522 MGD combined average daily design capacity and a peak capacity of 1,059 MGD.

Solid Waste Disposal

The City is responsible for collecting solid waste, including recycling, from residential households and some commercial establishments. On average, approximately 2,300 tons of solid waste per day are collected by the City. Municipal solid waste is disposed of through a combination of recycling processing facilities, private and City transfer stations within the City limits, and at various landfills operated outside the City limits.

Parks

The City was originally designed by William Penn and Thomas Holme around five urban parks, each of which remains in Center City to this day. The City's parklands total over 10,300 acres, and include Fairmount Park, the world's largest landscaped urban park at 9,200 acres, Pennypack Park, and the Philadelphia Zoo, the country's first zoo. The City also offers its residents and visitors America's most historic square mile, which includes Independence Hall and the Liberty Bell. Under the Rebuild initiative, an estimated $500 million will be invested in Philadelphia parks, recreation centers, playgrounds and libraries in the next several years.

Libraries

The Free Library of Philadelphia, the City's public library system, comprises 54 branches and an extensive online resource system.

Streets and Sanitation

The Philadelphia Streets Department (the "Streets Department") and the divisions within it are responsible for the City's large network of streets and roadways. The City's pavement condition is considered to be a "Fair" pavement condition. In order for the City to maintain its pavement in a state of good repair, local streets should be repaved once every 20 years and arterials should be repaved once every 10 years. This requires approximately 131 miles of paving every year. The pavement program has accumulated a backlog of approximately 1,100 miles since 1996. As a result of the new funding under Act 89, the Streets Department has funds to address long standing state of good repair needs without an additional allocation from the General Fund. During Fiscal Years 2014-2017, the Streets Department invested in critical equipment replacements and begin to implement a strategy to address recurring state of good repair needs. This includes critical equipment replacement, street paving and pothole repair, and replacement of traffic control equipment.

The Streets Department is also responsible for the ongoing collection and disposal of residential trash and recyclables, as well as the construction, cleanliness and maintenance of the street system. The streets system in Philadelphia totals 2,575 miles - 2,180 miles of City streets, 35 miles of Fairmount Park roads and 360 miles of state highways. The Highway Unit and Sanitation Division annually collects and disposes of approximately 600,000 tons of rubbish and 125,000 tons of recycling, completes over 48,000 miles of mechanical street cleaning, clears 1,800 major illegal dump sites, and removes over 155,000 abandoned tires.

Sustainability and Green Initiatives

Mayor Kenney continues the City's commitment to make Philadelphia the greenest and most sustainable city in America. To aid in achieving this goal, the Philadelphia Energy Authority has been tasked with improving energy sustainability and affordability in the City and with educating consumers on their energy choices. The City is investing in and evaluating additional options and investing in green infrastructure to better manage storm water reclamation and reduce pollution of the City's public waters. There has been extensive investment in creating more and better public green spaces, such as Love Park in Center City, as well as green spaces along both the Delaware and Schuylkill Rivers. Finally, the City has been taking steps to further reduce automobile traffic, congestion and pollution by making Philadelphia's streets increasingly friendly to bicyclists. The City introduced its new bicycle sharing system, Indego, in 2015, as further described in "TRANSPORTATION." Bicycle share programs have been successfully implemented in other cities worldwide.

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APPENDIX VI

FORM OF APPROVING OPINION OF CO-BOND COUNSEL

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FORM OF APPROVING OPINION OF CO-BOND COUNSEL

Re: $276,935,000 City of Philadelphia, Pennsylvania
Water and Wastewater Revenue Bonds, Series 2018A

Ladies and Gentlemen:

We have acted as Co-Bond Counsel to the City of Philadelphia (the "City") in connection with the issuance by the City of $276,935,000 aggregate principal amount of its Water and Wastewater Revenue Bonds, Series 2018A (the "Bonds"). The Bonds are issued under and pursuant to (a) The First Class City Revenue Bond Act, P.L. 955, Act No. 234 of the General Assembly of the Commonwealth of Pennsylvania, approved October 18, 1972 (the "Act"); (b) the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989 approved June 24, 1993, as amended by an Ordinance approved on January 23, 2007 (as so amended, the "General Ordinance"), and as supplemented, including by the Seventeenth Supplemental Ordinance approved by the Mayor on April 4, 2014 (the "Seventeenth Supplemental Ordinance") and by the Eighteenth Supplemental Ordinance approved by the Mayor on December 8, 2015 (the "Eighteenth Supplemental Ordinance" and, together with the Seventeenth Supplemental Ordinance, the "Supplemental Ordinances") authorizing the issuance of the Bonds; and (c) the Bond Committee Determination dated November 15, 2018 (the "Bond Committee Determination"). Capitalized terms used but not defined herein have the meanings assigned to such terms in the General Ordinance.

The Bonds are being issued for the purpose of providing funds that will be used to finance (a) capital improvements to the City's Water System and Wastewater System (the "System") and (b) the costs of issuance of the Bonds.

The City previously has issued, pursuant to the General Ordinance, and there are outstanding Water and Wastewater Revenue Bonds, consisting of the Variable Rate Series 1997B, the Series 1999A, the Series 2009A, the Series 2009B, the Series 2009C, the Series 2009D, the Series 2010A, the Series 2010B, the Series 2010C, the Series 2011A, the Series 2011B, the Series 2012, the Series 2013A, the Series 2014A, the Series 2015A, the Series 2015B, the Series 2016, the Series 2017A and the Series 2017B (collectively, the "Outstanding Bonds"). The Outstanding Bonds, the Bonds and all other Water and Wastewater Revenue Bonds hereafter issued by the City under the General Ordinance are and will be equally and ratably secured to the extent provided in the General Ordinance and the Act by the pledge of, and the security interest created in, all Project Revenues derived from the System and all amounts on deposit in or standing to the credit of the funds and accounts (other than the Rebate Fund) established pursuant to the General Ordinance.

The City has covenanted in the Supplemental Ordinances and the Bond Committee Determination that it will make or permit no investment or other use of the proceeds of the Bonds that would cause the Bonds to be "arbitrage bonds" under Section 148 of the Internal Revenue Code of 1986, as amended (the "Code"), and the rules promulgated thereunder, and that it will comply with the requirements of said Section throughout the term of the Bonds. The City has further covenanted that it will comply with the requirements of the Code that must be met after the issuance of the Bonds in order that interest on the Bonds be excluded from gross income for federal income tax purposes. An officer of the City has executed a certificate stating the reasonable expectations of the City on the date of issue of the Bonds as to future events that are material for purposes of Section 148 of the Code pertaining to arbitrage bonds. We have reviewed this certificate, and in our opinion the Bonds are not arbitrage bonds. The City is filing with the Internal Revenue Service a report of the issuance of the Bonds as required by Section 149(e) of the Code as a condition of the exclusion from gross income of the interest on the Bonds for federal income tax purposes. We have not undertaken to monitor compliance with respect to the aforesaid covenants or to advise any party as to changes in the law that may affect the exclusion of interest on the Bonds from gross income for federal income tax purposes.

We have examined such proceedings, documents, statutes and decisions, as we consider necessary as the basis for this opinion, including, inter alia, the Act, the General Ordinance, the Supplemental Ordinances, the Bond Committee Determination, and the executed and authenticated Bonds. We assume that all other Bonds have been similarly executed and authenticated. We also assume that all documents, records, certifications and other instruments examined by us are genuine (including the signatures thereon), accurate and complete and we have not undertaken, by independent investigation, to verify the factual matters set forth in any such documents, records, certifications or other instruments.

Based on the foregoing, it is our opinion that:

1. The City has the power under the Constitution and the laws of the Commonwealth of Pennsylvania (the "Commonwealth") to perform its obligations under the General Ordinance, the Supplemental Ordinances, the Bond Committee Determination and the Bonds.

2. Under the Constitution and the laws of the Commonwealth, including the Act, the City is authorized to issue the Bonds, and the terms of the Bonds comply with the requirements of the Act, the General Ordinance, the Supplemental Ordinances and the Bond Committee Determination.

3. The purposes for which the Bonds have been issued are lawful purposes under the Act and the General Ordinance.

4. The General Ordinance and the Supplemental Ordinances have been duly enacted, and the Bond Committee Determination has been duly authorized, executed and delivered by the City, and each is a legal, valid and binding obligation of the City enforceable in accordance with its terms, except as the rights created thereunder and the enforcement thereof may be limited by bankruptcy, insolvency, moratorium or other laws or legal or equitable principles affecting the enforcement of creditors' rights.

5. The Bonds have been duly authorized, executed, authenticated, issued and delivered and are legal, valid and binding obligations of the City, enforceable in accordance with their terms, except as enforcement may be limited as described in paragraph 4 above.

6. Under the Act and the General Ordinance, the Bonds constitute special obligations of the City payable solely from Project Revenues and all amounts on deposit in or standing to the credit of the funds and accounts (other than the Rebate Fund) established pursuant to the General Ordinance, together with interest earnings, if any, on amounts in such funds and accounts (other than the Rebate Fund). The Bonds do not pledge the credit or taxing power or create any debt or charge against the tax or general revenues of the City or create any lien against property of the City other than all amounts on deposit in or standing to the credit of the funds and accounts (other than the Rebate Fund) established pursuant to the General Ordinance, together with interest earnings on amounts in such funds and accounts (other than the Rebate Fund).

7. In the opinion of Co-Bond Counsel, interest on the Bonds is excludable from gross income for purposes of federal income tax under existing laws as enacted and construed on the date of initial delivery of the Bonds, assuming the accuracy of the certifications of the City and continuing compliance by the City with the requirements of the Code. Interest on the Bonds is not an item of tax

preference for purposes of the individual federal alternative minimum tax. The corporate alternative minimum tax was repealed by legislation enacted on December 22, 2017 (known as the "Tax Cuts and Jobs Act"), effective for tax years beginning after December 31, 2017. For tax years beginning on or before December 31, 2017 interest on the Bonds is not an item of tax preference for purposes of the corporate alternate minimum tax in effect prior to enactment of the Tax Cuts and Jobs Act; however, interest on Bonds held by a corporation (other than an S Corporation, regulated investment company, or real estate investment trust) indirectly may be subject to federal alternative minimum tax because of its inclusion in the adjusted current earnings of a corporate holder. Co-Bond Counsel expresses no opinion regarding other federal tax consequences relating to ownership or disposition of, or the accrual or receipt of interest on, the Bonds.

Original issue premium on a Bond issued at an issue price that exceeds its principal amount is amortizable periodically over the term of a Bond through reductions in the holder's tax basis for the Bond for determining taxable gain or loss from sale or from redemption prior to maturity. Amortization of premium does not create a deductible expense or loss.

In rendering this opinion, we have assumed compliance by the City with the covenants contained in the General Ordinance, the Supplemental Ordinances and the Bond Committee Determination that are intended to comply with the requirements in the Code relating to actions to be taken by the City in respect of the Bonds after the issuance thereof to the extent necessary to effect or maintain the federal exclusion from gross income of the interest on the Bonds. Failure to comply with such covenants could cause the interest on the Bonds to be includable in gross income retroactively to the date of issuance of the Bonds.

8. Under the laws of the Commonwealth, as enacted and construed on the date of the issuance of the Bonds, the Bonds are exempt from personal property taxes in Pennsylvania and interest on the Bonds is exempt from Pennsylvania personal income tax and Pennsylvania corporate net income tax.

We render this opinion as of the date hereof on the basis of federal law and the laws of the Commonwealth as enacted and construed on the date hereof. We express no opinion as to any matter not set forth in the numbered paragraphs herein, including, without limitation, the accuracy or completeness of the preliminary or final official statement or other documents prepared or statements made in connection with the offering and sale of the Bonds, and make no representation that we have independently verified the contents thereof.

Very truly yours,

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APPENDIX VII

FORM OF CONTINUING DISCLOSURE AGREEMENT

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CONTINUING DISCLOSURE AGREEMENT

This Continuing Disclosure Agreement (the "Agreement") dated November 28, 2018, is entered into and by and between The City of Philadelphia, Pennsylvania ("City") and Digital Assurance Certification, L.L.C., as dissemination agent ("Dissemination Agent") in connection with the issuance and sale by the City of Philadelphia, Pennsylvania (the "City") of $276,935,000 aggregate principal amount of its Water and Wastewater Revenue Bonds, Series 2018A (the "Bonds"). The Bonds are being issued pursuant to the Act and the General Ordinance. Capitalized terms used in this Agreement but not defined herein shall have the meanings ascribed to such terms in the Official Statement, including Appendix III-A and Appendix III-B thereto.

In consideration of the mutual covenants, promises and agreements contained herein and intending to be legally bound hereby, the parties hereto agree as follows:

ARTICLE I

The Undertaking

Section 1.1. Purpose. This Agreement is authorized to be executed and delivered by the City pursuant to the General Ordinance and Section 7 of the Bond Committee Determination in order to assist the Underwriters in complying with subsection (b)(5) of the Rule.

Section 1.2. Annual Financial Information. (a) Commencing with the fiscal year ending June 30, 2018, the Disclosure Representative shall deliver to the Dissemination Agent no later than February 28, 2019, and no later than each succeeding February 28 thereafter, Annual Financial Information with respect to each fiscal year of the City. The Dissemination Agent shall promptly upon receipt thereof file the Annual Financial Information with EMMA (as defined herein).

(b) The Dissemination Agent shall provide, in a timely manner, notice of any failure of the City to provide the Annual Financial Information by the date specified in subsection (a) hereof.

Section 1.3. Audited Financial Statements. If not provided as part of Annual Financial Information by the date required by Section 1.2(a) hereof, the Disclosure Representative shall provide Audited Financial Statements, when and if available, to the Dissemination Agent. The Dissemination Agent shall promptly upon receipt thereof file such Audited Financial Statements with EMMA.

Section 1.4. Notice Events. (a) If a Notice Event occurs, the Disclosure Representative shall provide through the Dissemination Agent, in a timely manner not in excess of ten (10) business days after the occurrence of such Notice Event, notice of such Notice Event to EMMA.

(b) Any notice of a defeasance of the Bonds shall state whether the Bonds have been escrowed to maturity or to an earlier redemption date and the timing of such maturity or redemption.

(c) Each Notice Event notice relating to the Bonds shall include the CUSIP numbers of the Bonds to which such Notice Event notice relates or, if the Notice Event notice relates to all bond issues of the City including the Bonds, such Notice Event notice need only include the CUSIP number of the City.

(d) The Dissemination Agent shall promptly advise the City whenever, in the course of performing its duties as Dissemination Agent under this Agreement, the Dissemination Agent has actual notice of an occurrence which, if material, would require the City to provide notice of a Notice Event hereunder; provided, however, that the failure of the Dissemination Agent so to advise the City shall not constitute a breach by the Dissemination Agent of any of its duties and responsibilities under this Agreement.

Section 1.5. Additional Information. Nothing in this Agreement shall be deemed to prevent the City from disseminating any other information, using the means of dissemination set forth in this Agreement or any other means of communication, or including any other information in any Annual Financial Information or notice of Notice Event hereunder, in addition to that which is required by this Agreement. If the City chooses to do so, the City shall have no obligation under this Agreement to update such additional information or include it in any future Annual Financial Information or notice of a Notice Event hereunder.

Section 1.6. Additional Disclosure Obligations. The City acknowledges and understands that other state and federal laws, including but not limited to the Securities Act of 1933 and Rule 10b-5 promulgated under the Securities Exchange Act of 1934, may apply to the City and that, under some circumstances, compliance with this Agreement without additional disclosures or other action may not fully discharge all duties and obligations of the City under such laws.

ARTICLE II

Operating Rules

Section 2.1. Reference to Other Filed Documents. It shall be sufficient for purposes of Section 1.2 hereof if the City provides Annual Financial Information by specific reference to documents (i) available to the public on the MSRB Internet Web site (currently, www.emma.msrb.org) or (ii) filed with the SEC. The provisions of this Section shall not apply to notices of Notice Events pursuant to Section 1.4 hereof.

Section 2.2. Submission of Information. Annual Financial Information may be set forth or provided in one document or a set of documents, and at one time or in part from time to time.

Section 2.3. Dissemination Agent. The City has designated the Dissemination Agent as its agent to act on its behalf in providing or filing notices, documents and information as required of the City under this Agreement. The City may revoke or modify such designation. Upon any revocation of such designation, the City shall comply with its obligation to provide or file notices, documents and information as required under this Agreement or may designate another agent to act on its behalf.

Section 2.4. Transmission of Notices, Documents and Information. (a) Unless otherwise required by the MSRB, all notices, documents and information provided to the MSRB shall be provided to the MSRB's Electronic Municipal Markets Access ("EMMA") system, the current Internet Web address of which is www.emma.msrb.org.

(b) All notices, documents and information provided on EMMA shall be provided in an electronic format as prescribed by the MSRB and shall be accompanied by identifying information as prescribed by the MSRB.

Section 2.5. Fiscal Year. (a) The City's current fiscal year begins July 1, and the City shall promptly file a notification on EMMA, through the Dissemination Agent, of any change in its fiscal year.

(b) Annual Financial Information shall be provided at least annually notwithstanding any fiscal year longer than 12 calendar months.

ARTICLE III

Effective Date, Termination, Amendment and Enforcement

Section 3.1. Effective Date; Termination. (a) This Agreement shall be effective upon the issuance of the Bonds.

(b) The City's and the Dissemination Agent's obligations under this Agreement shall terminate upon a legal defeasance, prior redemption or payment in full of all of the Bonds.

Section 3.2. Amendment. (a) This Agreement may be amended, by written agreement of the parties, without the consent of the holders of the Bonds (except to the extent required under clause (4)(ii) below), if all of the following conditions are satisfied: (1) such amendment is made in connection with a change in circumstances that arises from a change in legal (including regulatory) requirements, a change in law (including rules or regulations) or in interpretations thereof, or a change in the identity, nature or status of the City or the type of business conducted thereby, (2) this Agreement as so amended would have complied with the requirements of the Rule as of the date of this Agreement, after taking into account any amendments or interpretations of the Rule, as well as any change in circumstances, (3) the City shall have delivered to the Dissemination Agent an opinion of Counsel, addressed to the City and the Dissemination Agent, to the same effect as set forth in clause (2) above, (4) either (i) the City shall have delivered to the Dissemination Agent an opinion of Counsel or a determination by an entity, in each case unaffiliated with the City (such as bond counsel or the Dissemination Agent), addressed to the City and the Dissemination Agent, to the effect that the amendment does not materially impair the interests of the holders of the Bonds or (ii) the holders of the Bonds consent to the amendment to this Agreement pursuant to the same procedures as are required for amendments to the General Ordinance with consent of holders of Bonds pursuant to the General Ordinance as in effect at the time of the amendment, and (5) the Disclosure Representative shall have delivered copies of such opinion(s) and amendment to the Dissemination Agent. The items provided in clause (5) shall be promptly filed by the Dissemination Agent on EMMA and sent to each Registered Owner.

(b) This Agreement may be amended, by written agreement of the parties, without the consent of the holders of the Bonds, if all of the following conditions are satisfied: (1) an amendment to the Rule is adopted, or a new or modified official interpretation of the Rule is issued, after the effective date of this Agreement which is applicable to this Agreement, (2) the City shall have delivered to the Dissemination Agent an opinion of Counsel, addressed to the City and the Dissemination Agent, to the effect that performance by the City and the Dissemination Agent under this Agreement as so amended will not result in a violation of the Rule and (3) the Disclosure Representative shall have delivered copies of such opinion and amendment to the Dissemination Agent. The items provided in clause (3) shall be promptly filed by the Dissemination Agent on EMMA and sent to each Registered Owner.

(c) This Agreement may be amended by written agreement of the parties, without the consent of the holders of the Bonds, if all of the following conditions are satisfied: (1) the City shall have delivered to the Dissemination Agent an opinion of Counsel, addressed to the City and the Dissemination Agent, to the effect that the amendment is permitted by rule, order or other official pronouncement, or is consistent with any interpretive advice or no-action positions of Staff, of the SEC, and (2) the Disclosure Representative shall have delivered copies of such opinion and amendment to the Dissemination Agent. The items provided in clause (2) shall be promptly filed by the Dissemination Agent on EMMA and sent to each Registered Owner.

(d) To the extent any amendment to this Agreement results in a change in the type of financial information or operating data provided pursuant to this Agreement, the first Annual Financial Information provided thereafter shall include a narrative explanation of the reasons for the amendment and its effect on the type of operating data or financial information being provided.

(e) If an amendment is made pursuant to Section 3.2(a) hereof to the accounting principles to be followed by the City in preparing its financial statements, the Annual Financial Information for the fiscal year in which the change is made shall present a comparison between the financial statements or information prepared on the basis of the new accounting principles and those prepared on the basis of the former accounting principles. Such comparison shall include a qualitative and, to the extent reasonably feasible, quantitative discussion of the differences in the accounting principles and the impact of the change in the accounting principles on the presentation of the financial information.

Section 3.3. Benefit; Third-Party Beneficiaries; Enforcement. (a) The provisions of this Agreement shall constitute a contract with and inure solely to the benefit of the holders from time to time of the Bonds, except that beneficial owners of Bonds shall be third-party beneficiaries of this Agreement. The provisions of this Agreement shall create no rights in any person or entity except as provided in this subsection (a) and in subsection (b) of this Section.

(b) The obligations of the City to comply with the provisions of this Agreement shall be enforceable by any holder of Outstanding Bonds. The holders' rights to enforce the provisions of this Agreement shall be limited solely to a right, by action in mandamus or for specific performance, to compel performance of the City's obligations under this Agreement. In consideration of the third-party beneficiary status of beneficial owners of Bonds pursuant to subsection (a) of this Section, beneficial owners shall be deemed to be holders of Bonds for purposes of this subsection (b).

(c) Any failure by the City or the Dissemination Agent to perform in accordance with this Agreement shall not constitute a default or an Event of Default under the General Ordinance, and the rights and remedies provided by the General Ordinance upon the occurrence of a default or an Event of Default shall not apply to any such failure.

(d) This Agreement shall be construed and interpreted in accordance with the laws of the Commonwealth, and any suits and actions arising out of this Agreement shall be instituted in a court of competent jurisdiction in the Commonwealth; provided, however, that to the extent this Agreement addresses matters of federal securities laws, including the Rule, this Agreement shall be construed in accordance with such federal securities laws and official interpretations thereof.

ARTICLE IV

Definitions

Section 4.1. Definitions. The following terms used in this Agreement shall have the following respective meanings:

(1) "Act" means The First Class City Revenue Bond Act, P.L. 955, Act No. 234 of the General Assembly of the Commonwealth of Pennsylvania, approved October 18, 1972.

(2) "Annual Financial Information" means, collectively, (i) the Annual Financial Report-Philadelphia Water Department for the most recently ended fiscal year and, if not included or able to be derived from information presented therein, updates to the information presented in the Official Statement under the headings and in the Tables enumerated in the schedule annexed hereto as Exhibit A and made a part hereof, (ii) financial information or operating data with respect to the City, substantially similar to the type set forth in Appendices IV and V of the Official Statement, delivered at least annually pursuant to

Section 1.2(a) hereof and in accordance with the Rule and (iii) the information regarding amendments to this Agreement required pursuant to Sections 3.2(d) and (e) of this Agreement. Annual Financial Information shall include Audited Financial Statements, if available, or Unaudited Financial Statements.

In connection with Section 4.1.(2)(ii), it is the City's intention to satisfy all or a portion of the obligations set forth therein by submitting to EMMA (A) its "Annual Report of Bonded Indebtedness and Other Long Term Obligations" in substantially the same format as such report for the fiscal year ended June 30, 2018, and (B) with respect to financial information or operating data regarding the Pension System, either (i) the annual audited financial statements of the Municipal Pension Fund, (ii) an Official Statement of the City that updates the financial information and operating data under the heading "Pension System," as included in the Official Statement, or (iii) updated financial information and operating data under the heading "Pension System," as included in the Official Statement.

The descriptions contained in Section 4.1(2)(i) hereof of financial information and operating data constituting Annual Financial Information are of general categories of financial information and operating data. When such descriptions include information that no longer can be generated because the operations to which it related have been materially changed or discontinued, a statement to that effect shall be provided in lieu of such information. Any Annual Financial Information containing modified financial information or operating data shall explain, in narrative form, the reasons for the modification and the impact of the modification on the type of financial information or operating data being provided.

(3) "Audited Financial Statements" means the annual financial statements, if any, of the City, which includes the financial statements of the Water Fund, audited by such auditor as shall then be required or permitted by Commonwealth law. Audited Financial Statements shall be prepared in accordance with GAAP; provided, however, that pursuant to Sections 3.2(a) and (e) hereof, the City may from time to time, if required by federal or Commonwealth legal requirements, modify the accounting principles to be followed in preparing its financial statements. The notice of any such modification required by Section 3.2(a) hereof shall include a reference to the specific federal or Commonwealth law a regulation describing such accounting principles, or other description thereof.

(4) "Bond Committee Determination means the Bond Committee Determination for the Bonds adopted by the Bond Committee (consisting of the Mayor, the City Solicitor and the City Controller and acting by a majority thereof) on November 15, 2018.

(5) "Commonwealth" means the Commonwealth of Pennsylvania.

(6) "Counsel" means any nationally recognized bond counsel or counsel expert in federal securities laws.

(7) "Disclosure Representative" means the Director of Finance of the City, the City Treasurer or such other official or employee of the City as the Director of Finance or the City Treasurer shall designate in writing to the Dissemination Agent.

(8) "Fiscal Agent" means U.S. Bank National Association, as fiscal agent and registrar for the Bonds.

(9) "GAAP" means generally accepted accounting principles as prescribed from time to time for governmental units by the Governmental Accounting Standards Board, the Financial Accounting Standards Board, or any successor to the duties and responsibilities of either of them.

(10) "General Ordinance" means the City's Restated General Water and Wastewater Revenue Bond Ordinance of 1989, approved June 24, 1993, as supplemented and amended by twenty-one (21) supplemental ordinances, as further supplemented or amended from time to time.

(11) "MSRB" means the Municipal Securities Rulemaking Board established pursuant to Section 15B(b)(1) of the Securities Exchange Act of 1934, or any successor thereto or to the functions of the MSRB contemplated by this Agreement.

(12) "Notice Event" means any of the following events with respect to the Bonds, whether relating to the City or otherwise:

(i) principal and interest payment delinquencies;

(ii) non-payment related defaults, if material;

(iii) unscheduled draws on debt service reserves reflecting financial difficulties;

(iv) unscheduled draws on credit enhancements reflecting financial difficulties;

(v) substitution of credit or liquidity providers, or their failure to perform;

(vi) adverse tax opinions, the issuance by the Internal Revenue Service of proposed or final determinations of taxability, Notices of Proposed Issue (IRS Form 5701-TEB) or other material notices of determinations with respect to the tax status of the Bonds, or other material events affecting the tax status of the Bonds;

(vii) modifications to rights of Bondholders, if material;

(viii) Bond calls, if material, and tender offers;

(ix) defeasances;

(x) release, substitution, or sale of property securing repayment of the Bonds, if material;

(xi) rating changes;

(xii) bankruptcy, insolvency, receivership or similar event of the City;

(xiii) the consummation of a merger, consolidation, or acquisition involving the City or the sale of all or substantially all of the assets of the City, other than in the ordinary course of business, the entry into a definitive agreement to undertake such an action or the termination of a definitive agreement relating to any such actions, other than pursuant to its terms, if material; and

(xiv) appointment of a successor or additional paying agent, or the change of name of a paying agent, if material.

(13) "Official Statement" means the Official Statement dated November 15, 2018 of the City relating to the Bonds.

(14) "Registered Owner" or "Registered Owners" means the person or persons in whose name a Bond is registered on the books of the City maintained by the Fiscal Agent in accordance with the General

Ordinance. For so long as the Bonds shall be registered in the name of the Securities Depository or its nominee, the term “Registered Owner” or “Registered Owners” also means and includes, for the purposes of this Agreement, the owners of book-entry credits in the Bonds evidencing an interest in the Bonds; provided, however, that the Dissemination Agent shall have no obligation to provide notice hereunder to owners of book-entry credits in the Bonds except those who have filed their names and addresses with the Dissemination Agent for the purposes of receiving notices or giving direction under this Agreement.

(15) “Rule” means Rule 15c2-12 promulgated by the SEC under the Securities Exchange Act of 1934 (17 CFR Part 240, §240.15c2-12), as amended, as in effect on the date of this Agreement, including any official interpretations thereof issued either before or after the effective date of this Agreement which are applicable to this Agreement.

(16) “SEC” means the United States Securities and Exchange Commission.

(17) “Securities Depository” shall mean The Depository Trust Company, New York, New York, or its nominee, Cede & Co., or successor thereto appointed pursuant to the General Ordinance.

(18) “Unaudited Financial Statements” means the same as Audited Financial Statements, except that they shall not have been audited.

(19) “Underwriters” means the financial institutions named on the cover of the Official Statement.

ARTICLE V

Miscellaneous

Section 5.1. Duties, Immunities and Liabilities of the Dissemination Agent. The Dissemination Agent shall have only such duties under the Agreement as are specifically set forth in this Agreement, and the City agrees to indemnify and save the Dissemination Agent, its officers, directors, employees and agents, harmless against any loss, expense and liabilities which it may incur arising out of or in the exercise or performance of its powers and duties hereunder, including the costs and expenses (including attorneys' fees) of defending against any claim of liability, but excluding liabilities due to the Dissemination Agent's negligence or willful misconduct in the performance of its duties hereunder. The obligations of the City under this Section shall survive resignation or removal of the Dissemination Agent and payment of the Bonds.

Section 5.2. Counterparts. This Agreement may be executed in several counterparts, each of which shall be an original and all of which shall constitute but one and the same instrument.

IN WITNESS WHEREOF, THE CITY OF PHILADELPHIA, PENNSYLVANIA, has caused this Disclosure Agreement to be executed by the Director of Finance and DIGITAL ASSURANCE CERTIFICATION, L.L.C., as Dissemination Agent, has caused this Disclosure Agreement to be executed by one of its authorized officers, all as of the day and year first above written.

CITY OF PHILADELPHIA, PENNSYLVANIA

By:______________________________
Name: Rob Dubow
Title: Director of Finance

DIGITAL ASSURANCE CERTIFICATION, L.L.C.,
as Dissemination Agent

By:______________________________
Name:
Title:

EXHIBIT A

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APPENDIX VIII

BOOK-ENTRY ONLY SYSTEM

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BOOK-ENTRY ONLY SYSTEM

DTC will act as securities depository for the Bonds. The Bonds will be initially issued as fully-registered securities registered in the name of Cede & Co. (DTC's partnership nominee) or such other name as may be requested by an authorized representative of DTC. One fully-registered Bond certificate will be issued for each maturity of the Bonds, each in the aggregate principal amount thereof, and will be deposited with DTC.

DTC, the world's largest securities depository, is a limited-purpose trust company organized under the New York Banking Law, a "banking organization" within the meaning of the New York Banking Law, a member of the Federal Reserve System, a "clearing corporation" within the meaning of the New York Uniform Commercial Code, and a "clearing agency" registered pursuant to the provisions of Section 17A of the Securities Exchange Act of 1934. DTC holds and provides asset servicing for over 3.6 million issues of U.S. and non-U.S. equity issues, corporate and municipal debt issues, and money market instruments (from over 100 countries) that DTC's participants ("Direct Participants") deposit with DTC. DTC also facilitates the post-trade settlement among Direct Participants of sales and other securities transactions in deposited securities, through electronic computerized book-entry transfers and pledges between Direct Participants' accounts. This eliminates the need for physical movement of securities certificates. Direct Participants include both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, clearing corporations, and certain other organizations. DTC is a wholly-owned subsidiary of The Depository Trust & Clearing Corporation ("DTCC"). DTCC is the holding company for DTC, National Securities Clearing Corporation and Fixed Income Clearing Corporation, all of which are registered clearing agencies. DTCC is owned by the users of its regulated subsidiaries. Access to the DTC system is also available to others such as both U.S. and non-U.S. securities brokers and dealers, banks, trust companies, and clearing corporations that clear through or maintain a custodial relationship with a Direct Participant, either directly or indirectly ("Indirect Participants"). DTC has an S&P rating of "AA+." The DTC Rules applicable to its Participants are on file with the Securities and Exchange Commission. More information about DTC can be found at www.dtcc.com and www.dtc.org.

Purchases of the Bonds under the DTC system must be made by or through Direct Participants, which will receive a credit for the Bonds on DTC's records. The ownership interest of each actual purchaser of each Bond ("Beneficial Owner") is in turn to be recorded on the Direct and Indirect Participants' records. Beneficial Owners will not receive written confirmation from DTC of their purchase. Beneficial Owners are, however, expected to receive written confirmations providing details of the transaction, as well as periodic statements of their holdings, from the Direct or Indirect Participant through which the Beneficial Owner entered into the transaction. Transfers of ownership interests in the Bonds are to be accomplished by entries made on the books of Direct and Indirect Participants acting on behalf of Beneficial Owners. Beneficial Owners will not receive certificates representing their ownership interests in the Bonds, except in the event that use of the book-entry system for the Bonds is discontinued.

To facilitate subsequent transfers, all Bonds deposited by Direct Participants with DTC are registered in the name of DTC's partnership nominee, Cede & Co., or such other name as may be requested by an authorized representative of DTC. The deposit of Bonds with DTC and their registration in the name of Cede & Co. or such other DTC nominee do not effect any change in beneficial ownership. DTC has no knowledge of the actual Beneficial Owners of the Bonds; DTC's records reflect only the identity of the Direct Participants to whose accounts such Bonds are credited, which may or may not be the Beneficial Owners. The Direct and Indirect Participants will remain responsible for keeping account of their holdings on behalf of their customers.

Conveyance of notices and other communications by DTC to Direct Participants, by Direct Participants to Indirect Participants, and by Direct Participants and Indirect Participants to Beneficial Owners will be governed by arrangements among them, subject to any statutory or regulatory requirements as may be in effect from time to time.

Redemption notices shall be sent to DTC. If less than all the Bonds of a series within a maturity are being redeemed, DTC's practice is to determine by lot the amount of the interest of each Direct Participant in such maturity to be redeemed.

Neither DTC nor Cede & Co. (nor any other DTC nominee) will consent or vote with respect to the Bonds unless authorized by a Direct Participant in accordance with DTC's MMI Procedures. Under its usual procedures, DTC mails an Omnibus Proxy to the issuer as soon as possible after the record date. The Omnibus Proxy assigns Cede & Co.'s consenting or voting rights to those Direct Participants to whose accounts the Bonds are credited on the record date (identified in a listing attached to the Omnibus Proxy).

Principal and interest payments on the Bonds will be made to Cede & Co., or such other nominee as may be requested by an authorized representative of DTC. DTC's practice is to credit Direct Participants' accounts upon DTC's receipt of funds and corresponding detail information from the City or the Fiscal Agent, on payable dates in accordance with their respective holdings shown on DTC's records. Payments by Participants to Beneficial Owners will be governed by standing instructions and customary practices, as is the case with securities held for the accounts of customers in bearer form or registered in "street name," and will be the responsibility of such Participant and not of DTC, the Fiscal Agent, or the City, subject to any statutory or regulatory requirements as may be in effect from time to time. Payment of principal and interest to Cede & Co. (or such other nominee as may be requested by an authorized representative of DTC) is the responsibility of the City or the Fiscal Agent, disbursement of such payments to Direct Participants will be the responsibility of DTC, and disbursement of such payments to the Beneficial Owners will be the responsibility of Direct and Indirect Participants.

DTC may discontinue providing its services as depository with respect to the Bonds at any time by giving reasonable notice to the City or the Fiscal Agent. Under such circumstances, in the event that a successor depository is not obtained, bond certificates are required to be printed and delivered.

The City may decide to discontinue use of the system of book-entry-only transfers through DTC (or a successor securities depository). In that event, bond certificates will be printed and delivered.

THE CITY AND THE FISCAL AGENT WILL NOT HAVE ANY RESPONSIBILITY OR OBLIGATION TO DTC PARTICIPANTS OR THE PERSONS FOR WHOM THEY ACT AS NOMINEES WITH RESPECT TO THE ACCURACY OF THE RECORDS OF DTC, ITS NOMINEE OR ANY DTC PARTICIPANT WITH RESPECT TO ANY OWNERSHIP INTEREST IN THE BONDS, OR PAYMENTS TO, OR THE PROVIDING OF NOTICE FOR, DTC PARTICIPANTS OR THE INDIRECT PARTICIPANTS OR BENEFICIAL OWNERS.

The information in this section concerning DTC and DTC's book-entry system has been obtained from sources that the City believes to be reliable, but the City takes no responsibility for the completeness or accuracy thereof, or the absence of materially adverse changes in such information subsequent to the date hereof. For further information, Beneficial Owners should contact DTC in New York, New York.

SEAL OF THE CITY OF PHILADELPHIA