

THE PITTSBURGH WATER & SEWER AUTHORITY

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2023 Consulting Engineer's Annual Report

December 2023

PITTSBURGH WATER AND SEWER AUTHORITY
(Allegheny County, Pennsylvania)

2023 CONSULTING ENGINEER'S ANNUAL

REPORT CERTIFICATE OF ENGINEER

I am a Professional Engineer registered in the Commonwealth of Pennsylvania and am employed by ms consultants, inc. I am qualified to offer the following information being familiar with the operations of The Pittsburgh Water and Sewer Authority (Authority) and having worked in similar capacities for other such entities.

I hereby report and certify that the statements of opinions, projections of efforts and schedules, and presentation of other information contained in the following report, relevant to the water and sewer systems of the Authority, are consistent with my understanding of the conditions of the systems and future plans of the Authority as provided by the Authority as of November 16, 2023.

IN WITNESS WHEREOF, I have executed this document on behalf of ms consultants, inc. on December 8, 2023.

By:
Charles J. Jordan, PE



ISSUE AND REVISION RECORD

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EXECUTIVE SUMMARY

The Pittsburgh Water and Sewer Authority (PWSA) retained ms consultants, inc. to prepare the 2023 Annual Report of the Consulting Engineer on February 28, 2022. The Annual Report is required under Article VII, Section 7.11 of the 2017 Amended and Restated Trust Indenture and Article VII, Section 7.10 of the 2019 Amended and Restated Subordinate Trust Indenture. There are several sections in the 2017 Trust Indenture and 2019 Subordinate Indenture referring to the duties of the Consulting Engineer, (see Appendix A of this report). In accordance with the 2017 Trust Indenture and 2019 Subordinate Indenture, "Consulting Engineer" shall be a qualified independent consultant having the skill and experience necessary to provide the particular certificate, report, or approval required by the provision of the Indenture or any Supplemental Indenture. The Consulting Engineer completing this report is a Professional Engineer Registered in the Commonwealth of Pennsylvania and is qualified to offer the findings and recommendations being familiar with the operations of the PWSA.

The duties of the Consulting Engineer mentioned in Article VII, Section 7.11 of the 2017 Senior Indenture and Article VII, Section 7.10 of the 2019 Subordinate Indenture, including the following Consulting Engineers' services:

- a. Provide advice and recommendations as to the proper maintenance, repair, and operation of the water and sewer systems during the next Fiscal Year and estimate the amounts of money that should be expended for such purposes.
- b. Provide advice and recommendations as to the Capital Additions that should be made during the next Fiscal Year and estimate (review) the amount of money that is recommended for such purposes.
- c. Indicate whether the properties of the System have been maintained in good repair and sound operating condition and the Consulting Engineer's estimate of the amount, if any, required to place such properties in such condition and the details of such expenditures and the approximate time required thereof.

The following sections of the 2017 Senior Indenture and 2019 Subordinate Indenture discuss duties of the Consulting Engineer not included in this Annual Report: Article I, Section 1.01 (2017 Senior Indenture and 2019 Subordinate Indenture); Article V, Sections 5.01 and 5.03 (2017 Senior Indenture and 2019 Subordinate Indenture); and Article VII, Sections 7.07 and 7.10 (2017 Senior Indenture) Section 7.06 and 7.09 (2019 Subordinate Indenture).

In this 2023 Consulting Engineer's Annual Report, the Consulting Engineer acknowledges that the water, sewer, and stormwater systems are functional but are currently subject to Administrative and Consent Orders and Agreements from State and Federal regulatory agencies to address numerous regulatory standards and other compliance requirements.

The water, sewer, and stormwater systems require upgrades to address end of useful life conditions and updates to current operational, regulatory, and safety standards. The PWSA's water systems also include critical facilities which expose customers to the risk of loss of water if taken offline for repairs due to a lack of redundant facilities.

The Water Reliability Plan (WRP) is Pittsburgh's blueprint for high quality water infrastructure. The projects that make up the WRP will happen sequentially and work together to fortify the water system, so it is ready to supply continuous water service during the final, and biggest project – the complete restoration of the Clearwell.

PWSA continues to make great strides on most of the necessary upgrades and updates for these critical facilities. Highlights of PWSA's work in 2023 include continued progress on improvements to key components of the water treatment and distribution system, the continuation of design work on critical water transmission system projects, and an achievement of reduction and compliance goals with required lead levels.

Additionally, to sustain cost-effective operations while optimizing asset performance and life expectancy, significant structural, operational, and maintenance improvements are required and must be undertaken in the near-term to address long-standing deficiencies in both the water and sewer systems. PWSA has increased staffing levels and implemented some industry best practices in the past couple years to help improve operations and system reliability in the water system. Already this has made an impact on recovering non-revenue water, specifically where PWSA has seen the average daily pumpage decrease over those past couple years due to finding and addressing non-surfacing leaks. Though there is a long road ahead, these efforts reflect PWSA's commitment to continue to improve and better manage their assets.

In the Cooperative Agreement executed on October 3, 2019, PWSA and the City of Pittsburgh (City) agreed upon their respective responsibilities associated with the division of services related to the system, payments, collections, cooperation by the City and PWSA in their respective capital projects that may impact each other, and the separate stormwater system within the City, and to confirm that the system will remain under public ownership. The Cooperative Agreement states that PWSA will have responsibility for operations, maintenance, repair, and replacement of water mains and service lines, sanitary sewer and combined sewer mains and sewer laterals, and subsurface stormwater conveyance line and facilities in the 11 City parks that are more than 50 acres. The City is treated like other commercial customers of the PWSA with respect to water service lines and sewer laterals, with two exceptions: in the 11 City parks that are 50 acres or larger; and, the City's share of the cost is being phased in over five years, to become 100 percent in 2025 and thereafter.

Facility Assessment

An updated Facility Assessment Report was prepared in 2023 for the PWSA to provide a current summary of maintenance, repair, and operating conditions relative to select Authority's Water and Wastewater facilities. Facilities whose status was reflected as in design, out for bid, or completed construction within the last two years (2022 and 20223) were excluded from inspection, resulting in 10 facilities visited. The information presented in the report was based on field observations and discussions with operations personnel during field visits also completed in 2023. All facilities inspected under the 2023 Condition Assessment other than the Sodium Hypochlorite building and Evergreen Lift Station already have capital improvement projects on the current CIP. These improvements will address the observed deficiencies, improve operations and maintenance, meet regulatory requirements, and extend their useful life.

Water System

PWSA's water treatment plant (drinking water) has the permitted capacity to provide 100 million gallons per day (MGD). The water system has the capacity to deliver adequate water supply to meet the demands of the customers into the foreseeable future, assuming PWSA continues the rehabilitation and replacement program provided for in its ongoing Capital Improvement Program (CIP). PWSA monitors water quality for contaminants that may be present in source water prior to treatment, during treatment, and in finished water from the water treatment plant. This monitoring is necessary to verify that water quality meets or exceeds regulatory standards.

In 2020, PWSA succeeded in replacing public lead service lines as stipulated in the Consent Order and Agreement (COA) issued by the Pennsylvania Department of Environmental Protection (PADEP) on November 17, 2017. Since then, PWSA has continued to prioritize reducing the number of public and private lead service lines in the

water distribution system, which would reduce the risk of these lines leaching lead into the water supply. The program to reduce the presence of lead in the water supply is one of PWSA's success stories for 2023, as it was in 2018 through 2022. Considerable progress has been made to replace lead service lines. Since July 1, 2016, and as of December 1, 2023, the PWSA has replaced 10,642 public lead lines and 7,482 private lead service lines. PWSA will continue lead service line replacements, working towards the goal to replace all lead service lines by 2026. Starting in 2020, the lead service line replacement program was merged with the Small Diameter Water Main Replacement (SDWMR) Program in order to more cost effectively replace lead lines as the small diameter mains are replaced. The SDWMR program has continued through 2023.

PWSA received one of the first ever Equity Awards given by the Association of Metropolitan Water Agencies (AMWA). The award recognized PWSA for the approach it is taking with the lead service line replacement program in terms of how it is planned and prioritized and the community engagement that PWSA takes upon each lead service line replacement project.

Two Lead and Copper Rule compliance sampling rounds were completed in December 2019 and June 2020, respectively, and the testing showed that lead concentrations in the water distribution system were less than State and Federal action levels. The lead levels indicated compliance with the United States Environmental Protection Agency (USEPA) and the PADEP regulatory standards. The permit, received in June 2022, requires PWSA to conduct another two rounds of six-month sampling before they submit a Request for Designation of Optimum Water Quality Parameters. These two rounds were conducted in 2022b and 2023a, both of which had 90th percentile lead levels lower than the 15 ppb action level, at 5.0 ppb and 3.4 ppb respectively. A Request for Designation of Optimum Water Quality Parameters was submitted to PADEP on July 30, 2023. Until approval of that request, PWSA continues compliance sampling events every 6-months; the 2023b sampling program is currently underway.

As part of the tap sample monitoring, during the 2022b and 2023a sampling periods PWSA asked customers to collect both first and fifth liter samples. The present rule requires the first liter samples, however the Lead and Copper Rule Revisions (LCRR) will require fifth liter (and the Lead and Copper Rule Improvements (LCRI), as drafted, will require both first and fifth liter samples). PWSA is proactively trying to determine their progress when the new requirement kicks in. Another provision of LCRR/LCRI's to only collect samples from lead service lines, and PWSA has been doing that for years.

Related to past WTP violations, a Pre-Disposition Remediation Resolution (PDRR) dated July 15, 2020, was developed between the Commonwealth of Pennsylvania, the Pennsylvania Attorney General's (AG) Office and the PWSA. The PDRR required the PWSA to issue a statement, make donations and enter into a two-year Corporate Monitorship. The Corporate Monitor oversaw WTP, lead, copper and water distribution system compliance and provided quarterly reports to the AG and the Southwest PADEP office. On March 30, 2023, the Commonwealth of PA withdrew charges against PWSA and the PDRR was withdrawn.

PWSA has actively engaged with their Water Reliability Plan, which is a comprehensive series of projects that will provide a resilient and redundant water system and water service. In 2023, PWSA awarded construction and construction management contracts for the Highland Reservoir Pump Station. Work continued on the engineering contract for the Aspinwall Pump Station Improvements, and the engineering contract for the Clearwell Bypass System – Permitting, Implementation and SOP's awarded in 2022.

Wastewater and Stormwater System

Approximately 26 percent of the sewer collection system consists of sanitary sewers and sanitary pump stations. These systems are in satisfactory operating condition and have adequate capacity for dry weather flows. There

are some localized areas in the sanitary sewer system that become overtaxed during wet weather. PWSA has made progress on their plan to rehabilitate sanitary sewers and pump stations and on meeting the regulatory requirements for operation of the sewers.

An estimated 74 percent of the wastewater collection system consists of combined sewers where sewage and storm water are conveyed in the same pipe. The collection system is designed so that during wet weather, a portion of the collected storm water and diluted wastewater is discharged to natural water courses through diversion chambers located throughout the sewer system including at connections to the Allegheny County Sanitary Authority (ALCOSAN) interceptors. The combined sewer system is in satisfactory operating condition and has adequate capacity for the dry weather sewer flows. However, even during minor wet weather events, the sewer system is often taxed beyond its capacity, resulting in overflows, bypassing, and flooding. PWSA's sewer system overflows were the subject of a 2004 Consent Order issued by the PADEP. The 2004 Consent Order has expired however PWSA entered into negotiations in 2021 for a Consent Decree with the PADEP, the USEPA and the U.S. Department of Justice (DOJ) to require PWSA to continue to address these issues. Negotiations are underway and will continue in 2024.

Several combined sewer overflow (CSO) abatement projects, basement flooding reduction projects, sewer rehabilitation, and stormwater infrastructure improvements are in various stages of design, construction, or regulatory review. These projects are expected to require significant operational and capital investments once the Consent Decree is finalized. The collection system requires ongoing attention and funds from the Capital Improvement Program (CIP) to correct existing deficiencies and repair, rehabilitate, and upgrade the system to meet regulatory requirements and reduce the potential for localized backups. If the CIP continues to fund the identified sewer system improvements and projects are implemented, it is anticipated that foreseeable future demands on the system can be met and progress can be made in working toward CSO compliance.

In 2023, PWSA continued to make progress on being a more compliant, sustainable, and reliable utility. Areas that specifically shows their commitment to this effort are:

- Moved forward and completed key aspects of their Water Reliability Plan.
- Continued to strategically increase the number of staff by the addition of a few key hires under engineering, operations, and support services.
- Implemented some industry best practices to track and improve the maintenance and operation of their system.
- Selected and initiated implementation of a new and robust CMMS to be integrated with GIS.
- Improved compliance with regulations and Orders regarding abatement of lead, system resiliency, and overall water treatment and quality.
- Continuing to improve the aging sewer system with repairs and maintenance with more focus on a risk-based approach.
- Continuing compliance activities related to the water system, wastewater system, and stormwater system, emphasizing a culture of compliance, and enhancing the Environmental Compliance Manual.
- Under stormwater strategic planning efforts, hosted 6 public meetings with attendance ranging from 14 to over 70 people with notable excellent participation by PWSA staff and their stormwater partners. Continue strategic and effective outreach and communication to address public comments received on the SSP.

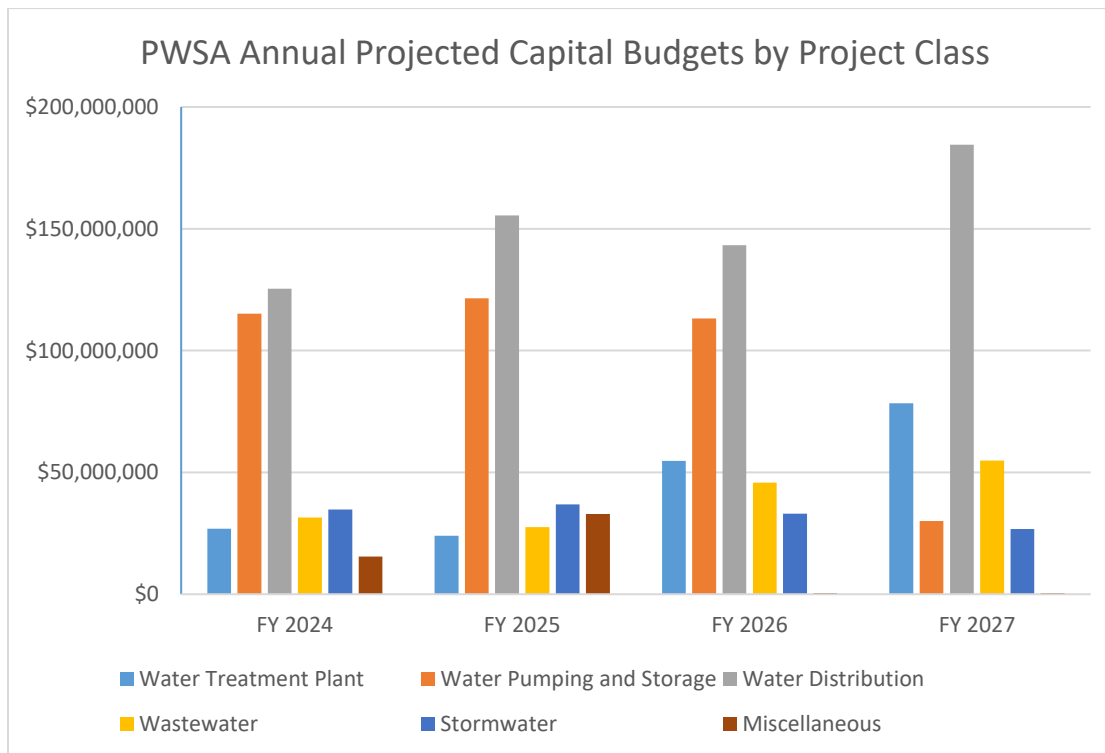
- Successfully implementing the aggressive PWSA 2023 – 2027 Capital Improvement Plan.
- Continuing to make improvements to the Clean Fill Policy requirements as this is anticipated to have a growing impact on PWSA projects into 2024.

Capital Improvement Plan

ms consultants was authorized to begin preparation of the Annual Report of the Consulting Engineer on February 28, 2022. As of the date of this report, the 2024-2028 Capital Improvement Plan has not yet been approved by the Board or reviewed by the Consulting Engineer. **The 2023–2027 Capital Improvement Plan was utilized for this report.**

Figure ES.1 presents an illustration of the CIP for the fiscal years 2023 through 2027 that was approved by the PWSA Board of Directors on October 28, 2022. The CIP is divided into six project classes: water treatment plant, water pumping and storage, water distribution system, wastewater system, stormwater system, and miscellaneous.

Figure ES.1: PWSA Annual Projected Capital Budgets by Project Class



Review of the FY 2023-2027 capital program budget reflects significant increases from the previous year. Roughly 75 percent of the FY 2023-2027 CIP is dedicated to water infrastructure. Some of this increase can be attributed to the increased cost for supplies and materials due to supply chain issues and inflation. This is evident by the significant increase in recent construction costs. Additionally, it should be noted that while almost 58% of the current 5-year CIP in wastewater is devoted to the small diameter sewer rehabilitation program, it is anticipated that once the consent decree is negotiated, the wastewater CIP will significantly increase. With all this said, while PWSA has made a concerted effort to obtain and secure capital funding to invest in their infrastructure, they need to ensure that they have sufficient staff and resources to execute their capital program otherwise those efforts are futile.

The 2024 operating budget only increased slightly from 2023. Of that increase, the salaries themselves increased by 5%, which reflects both the cost of living and planned additional hires. General and Administrative expenses decreased by 3% and the Direct Operating expenses decreased by 2%.

Based upon our review, PWSA's financial commitment, both in the past couple of years and for the future shown in the Board approved CIP for 2023 - 2027 along with continued organizational and operational improvements, it is apparent PWSA is committed to investing in upgrading their infrastructure and becoming a well-run utility. Through interviews with key staff, it is evident PWSA is implementing some industry best practices such as focused regulatory compliance, enhanced safety and security program, tracking and addressing non-revenue water and water valve exercising and replacement program. Though some of these initiatives are in their infancy they already have made an impact. Therefore, in summary, it is the Consulting Engineer's opinion that PWSA is managing their organization, water, sewer, and stormwater systems and committing the financial resources to continue to move the utility forward towards maintaining a regulatory compliant organization that provides reliable service to their customers.

1.0 HISTORY AND BACKGROUND

1.1 GENERAL

In February 1984, the leadership of the City of Pittsburgh (City) formed The Pittsburgh Water and Sewer Authority (PWSA) under the provisions of the Pennsylvania Municipality Authorities Act, 53 Pa. C.S.A. §5601 et. seq. The PWSA's Articles of Incorporation were originally approved on February 17, 1984, by the Commonwealth of Pennsylvania. In 2008, the Commonwealth approved an Amendment to the Articles of Incorporation as adopted by the City and the PWSA to extend its term of existence to 2045 to ensure that its term covers the duration of certain bond obligations. In 2019, the Commonwealth of Pennsylvania approved an Amendment to the Articles of Incorporation as adopted by the City and the PWSA to extend its term of existence to March 13, 2070 and to include stormwater systems. Under its Articles of Incorporation, the Authority is specifically authorized to acquire, hold, construct, finance, improve, maintain, operate, own and lease, either as lessor or lessee, projects of the following kinds and character: sewers, sewer systems or parts thereof, waterworks, water supply works, and water distribution systems, low head dams, facilities for generating surplus power, and stormwater systems.

1.2 INITIAL OPERATION

In 1984, pursuant to a Lease and Management Agreement between the City and the Authority (the "Lease and Management Agreement"), the Authority leased the Water and Sewer System from the City and assumed responsibility for establishing and collecting user fees and charges and for maintaining and improving the System. This agreement further provided that the System was to be operated and maintained for the Authority by the City, subject to the general supervision of the Authority. In 1995, the Authority and the City terminated the Lease and Management Agreement. On June 15, 1995, the Authority and City entered into a Capital Lease Agreement (the "Capital Lease Agreement") whereby the City is leasing to the Authority the "Leased Property" which includes the "System", the "Real Property" and the "Equipment", as each term is defined in the Capital Lease Agreement. The Capital Lease Agreement, which has a term of thirty (30) years, provides for lease payments totaling \$101,416,974.60, which payments were made to the City during the initial three (3) years of the agreement and further provides that on September 1, 2025, upon payment of \$1.00, the Authority has the option to acquire title to the Leased Property. The Authority intends to exercise its option to purchase the Leased Property as of September 1, 2025.

Concurrently with entering into the Capital Lease Agreement, the City and the Authority entered into a Cooperation Agreement, dated as of June 15, 1995, and effective January 1, 1995, as amended by a First Amendment to Cooperation Agreement dated March 21, 2011 (collectively the "Cooperation Agreement"). The Cooperation Agreement may be terminated by the Authority upon 90 days' written notice. Pursuant to the Cooperation Agreement, the City is to provide certain services to the Authority including telephone and data services, vehicle fuel and repair, legal aid, computer services, payroll services and administration of benefit programs. In exchange, the Authority is required, among other things, to (i) provide the City with up to 600 million gallons of water each year (at no cost to the City) to certain properties formerly owned by the City, such as the Pittsburgh Zoo and the Phipps Conservatory, (ii) reimburse the City's direct expense and overhead expense for services provided by the City to the Authority, and (iii) subsidize the water rates paid by certain residents of the City who are not Authority customers (the "PAW Subsidy").

On February 4, 2019, the Board of the Authority voted to terminate the Cooperation Agreement. On February 5, 2019, the Chairman of the Authority provided written notice to the Mayor of the City that, pursuant to the terms of the Cooperation Agreement, the Authority was exercising its right to terminate the Cooperation Agreement by providing the required 90-day notice of such termination. On April 26, 2019, the Board of the Authority voted to extend the notice period of the termination until July 5, 2019. On October 3, 2019, the City and Authority entered into a new Cooperation Agreement that, among other things, (i) reflects changes in their respective rights and obligations, (ii) accurately reflects the division of services related to the System, (iii) provides for payments between the City and the Authority to be based upon actual, verifiable, direct expenses, and in accordance with customary utility practices under the Pennsylvania Public Utility Code, (iv) confirms that payments by the Authority to the City will continue to be subordinate to all debt obligations of the Authority, (v) provides for cooperation by the City and the Authority in their respective capital projects which may impact each other, (vi) provides for clarification of the responsibilities of the Authority with respect to City Regional Parks and other City properties, (vii) confirms that the System will remain under public ownership, and (viii) sets forth certain other provisions relating to the roles and responsibilities of the City and the Authority with respect to the System.

On July 23, 2020, Pennsylvania Act 70 (“Act 70”) was signed into law. Act 70 provides that the Cooperation Agreement shall have the force and effect of law until January 1, 2025, or an earlier termination date to which the City and the Authority mutually agree. Act 70 also provides that the Cooperation Agreement shall govern, among other things, payments by the Authority to the City under the Cooperation Agreement shall be subordinate to each debt obligation of the Authority. Under Act 70, notwithstanding Act 65 and the Public Utility Code, each defined below, the Cooperation Agreement supersedes, during the term of the Cooperation Agreement, any provision of the Public Utility Code, a PUC, defined below, regulation, policy statement, order and regulatory proceeding as they pertain to issues covered by the Cooperation Agreement, including the Authority’s rates, terms and conditions of service rendered to the City and the respective rights and duties between the Authority and the City. Finally, Act 70 provides that the Cooperation Agreement is subject to the home rule charter of the City.

On December 21, 2017, the Pennsylvania legislature enacted Act 65 of 2017 (“Act 65”), placing the Authority under the jurisdiction of the PUC pursuant to the Pennsylvania Public Utility Code (the “Public Utility Code”). Act 65 applies most of the provisions of the Public Utility Code to the Authority in the same manner as a “public utility,” resulting in regulation of the Authority’s rate making, its operating effectiveness, debt issuances and other aspects of conducting its business similar to the way the PUC regulates investor-owned utilities. Act 65 includes provisions that allow the Authority to impose, charge or collect rates or charges as necessary to permit the Authority to comply with its covenants with the holders of any bonds or other financial obligations of the Authority, and prohibits the PUC from requiring the Authority to take any action that would cause the interest on the Authority’s financial obligations to be includible in gross income of the holders of such obligations for federal income tax purposes. The PUC rate-setting process can last a maximum of 270 days (or about 9 months) unless all parties agree on a joint settlement sooner.

On January 18, 2018, the PUC issued a Tentative Implementation Order (“TIO”) which included methods by which the PUC and affected entities may carry out the tariff approval, ratemaking, compliance plan and assessment provision of Act 65. The PUC issued a Final Implementation Order (“FIO”) on March 15, 2018 which, inter alia, directed (1) the filing of water and wastewater tariff filings no later than July 2, 2018; and, (2) a compliance plan to the PUC no later than September 28, 2018 to address how it will achieve full

regulatory compliance including provisions to bring the Authority's existing information technology, accounting, billing, collections, and other operating systems and procedures into compliance with the requirements applicable to jurisdictional water and wastewater utilities. The Authority complied with both of these requirements and received approval of its Initial PUC Tariffs effective March 1, 2019. The Authority's Compliance Plan was filed on September 28, 2018, and supplemented on February 1, 2019. The PUC elected to stage its review of the Authority's Compliance Plan and Stage 1 was directed to urgent infrastructure remediation and improvement and the revenue and forecasting requirements of maintaining service that support public health and safety. The PUC issued Orders regarding Stage 1 on March 26, 2020, June 18, 2020, and February 14, 2021. The Orders resolved a significant number of issues in the proceeding by approving a partial settlement.

Compliance Plan Stage 2 was initiated on January 24, 2020, to address stormwater and customer service issues. Regarding stormwater, the PUC approved the Authority's Stormwater Tariff on November 18, 2021, and a full settlement of the Stage 2 Compliance Plan - Stormwater on August 25, 2022. Regarding customer service issues, the PUC approved a full settlement of the Stage 2 Compliance Plan – Customer Service on July 14, 2022. The Authority filed an updated Compliance Plan and proposed Compliance Tariffs on September 12, 2022, regarding customer service issues. Similar filings regarding Stormwater are to be filed on November 4, 2022.

Under Act 65, the Authority is also required to submit a long-term infrastructure improvement plan ("LTIP"). The Authority met this requirement by filing the LTIP with the PUC on September 28, 2018. The LTIP includes information on how the Authority intends to replace and/or upgrade targeted eligible property to improve system reliability and safety, and it includes metrics that the Authority uses to track and evaluate the effectiveness of infrastructure improvements. The LTIP provides the rationale used to select and target eligible programs and property for planning consideration, and projection of annual capital expenses to ensure that the LTIP is cost-effective. The Authority's LTIP for water and LTIP for wastewater were approved by the PUC on August 27, 2020. The Authority received approval from the PUC on December 3, 2020, to implement a Distribution System Improvement Charge ("DSIC") to recover some of the costs of the LTIP through a separate surcharge assessed to ratepayers. The Authority files quarterly reports to the PUC regarding its DSIC and an annual report regarding its LTIP. The Authority filed a revised LTIP with the PUC in October 2022 for the purpose of providing updated budget information for projects included within the plan. The revised LTIP was approved by the PUC in January 2023.

1.3 CAPITAL IMPROVEMENT PROGRAM (CIP) FUNDING SOURCES

The PWSA has employed various funding mechanisms since 1984 to fund their annual Capital Improvement Plans. Appendix B provides the history of the bond issuances and refunding from 1984 through 2020. Current funding mechanisms are outlined as follows:

1.3.1 REVOLVING LINE OF CREDIT IN 2016, 2018, 2020 AND 2022

In July 2016 and pursuant to Resolution No. 36 of 2016, the PWSA entered a drawdown, revolving line of credit financing with JPMorgan Chase Bank NA. The maximum amount that can be drawn and outstanding at any one time is \$80,000,000 and had an initial term of four years. The PWSA used funds borrowed under this

vehicle to finance capital projects. The intention of the PWSA was to draw down the balance to near capacity and then to issue bonds to replenish this vehicle before using it again.

In June 2018 and pursuant to Resolution No. 63 of 2018, the PWSA amended the revolving line of credit financing agreement with JP Morgan Chase Bank NA to increase the maximum line of credit limit from \$80,000,000 to \$150,000,000. The JP Morgan line of credit expired in June 2020.

In June 2020, the PWSA entered into a new revolving line of credit bank loan with PNC Bank National Association in an amount of \$150,000,000 with a maturity date of June 23, 2023.

In April 2022 and pursuant to Resolution 54 of 2022, the PWSA approved an amendment for replacement of the PNC Bank National Association Line of Credit in an amount not-to-exceed \$150,000,000 with a maturity date of June 23, 2025.

1.3.2 2023 BOND ISSUE

In June 2023 and pursuant to Resolution Nos. 14 and 15 of 2023, the PWSA issued \$106,075,000 Water and Sewer System First Lien Revenue Bonds, Series A of 2023 and \$144,530,000 Water and Sewer System First Lien Revenue Bonds, Series B of 2023. The proceeds from 2023A Bonds will be used to pay down a portion of the outstanding principal amount under a capital line of Credit revenue note Series of 2022 in favor of PNC Bank National Association, pay the cost to insure certain 2023A Bonds, fund the debt service reserve requirement, and pay the costs of issuance. The proceeds from the 2023B Bonds will be used to pay the costs of refunding a portion of the Authority's outstanding Water and Sewer System Revenue Refunding Bonds, Series A of 2013 and Water and Sewer System Revenue Bonds, Series B of 2013, pay the costs of refunding a portion of the Authority's outstanding Water and Sewer System First Lien Revenue Bonds, Series C of 2017, pay the costs of terminating a certain fixed payer swap related to the 2017C Refunded Bonds, pay the costs of terminating the overlay basis swap related to the 2017C Refunded Bonds, pay the cost to insure certain 2023B Bonds and pay the costs of issuance.

1.3.3 S & P GLOBAL RATINGS

On October 12, 2022, S&P Global Ratings raised its rating on PWSA's first-lien revenue bonds to 'A+' while simultaneously increasing its rating on subordinate-lien revenue bonds to 'A.' This upgrade moves PWSA's rating to the highest level attainable in the upper medium investment grade category with the first-lien revenue bonds rated 'A+.' This is the first credit upgrade PWSA has received in over ten years.

1.3.4 PENNVEST FUNDING

Act 16 of 1988 established the Pennsylvania Infrastructure Investment Authority (PENNVEST) to assist local governments in financing water and sewer projects. The PENNVEST Program provides loans and grants for acquisition, construction, improvement, expansion, extension, repair and/or rehabilitation of all or part of any water or sewer system. Funding under the PENNVEST Program is primarily in the form of low-interest, 20-year or 30-year loans.

In the last few years, two PENNVEST loans have significantly helped fund the PWSA's work in continuing the lead service line replacements (LSLR) in 2019 through 2022. The LSLR Program transitioned in 2020 to become

part of the Small Diameter Water Main Replacement (SDWMR) Program. The LSLR and the SDWMR programs are detailed in Section 2.5.

In 2023, there were five PENNVEST low-interest loan awards and three PENNVEST grant award to the PWSA. The details of the awards are as follows:

1. On January 12, 2023, PWSA received a \$2,918,874 loan and a \$9,647,471 grant to replace approximately 988 prioritized lead service lines, affecting residences that have been identified as either low-income populations or homes of children under six years of age and/or women of child-bearing age.
2. On April 21, 2023, PWSA received a \$59,136,000 loan to rehabilitate large and small diameter collection lines ranging in size from 36 inches up to 120 inches. The work will be completed in four phases for a total of 56 miles of collection line rehabilitation. The project will address pipes that have reached the end of their useful life and eliminate sources of infiltration.
3. On July 19, 2023, PWSA received a \$4,599,382 loan and a \$10,005,618 grant to replace lead service lines at approximately 1,200 homes. The project will contribute to the protection of adults and children from lead.
4. On October 19, 2023, PWSA received a \$34,159,707 loan to replace approximately 63,000 feet of 8- and 12-inch waterlines in their distribution system. The project will alleviate water outages and reduce water loss which will result in lower operational costs.
5. On October 19, 2023, PWSA received a \$2,474,472 grant and a \$686,353 loan to replace lead service lines that will affect 300 residential customers in areas where water mains are being replaced in a partner project. These line replacements will prevent potential lead contamination in users' drinking water and reduce water loss and the high operational costs associated with the loss of water resources.

Table 1.1 summarizes the active and complete PENNVEST loans secured by the PWSA.

Project Name	Project Type	Loan Approval Date	Status	Loan Amount ¹
Railside Street Sanitary Sewer Ext.	Wastewater	11/15/2000	Complete	\$158,399.23
Ollie Street & Overbrook Blvd. Storm Sewer	Storm	11/15/2000	Complete	\$800,963.48
Water System Improvements No. 1	Water	3/21/2001	Complete	\$3,940,113.91
Streets Run Interceptor	Wastewater	7/18/2001	Complete	\$1,928,470.44
Water System Improvements No. 2	Water	3/20/2002	Complete	\$5,112,263.50
Water System Improvements No. 3	Water	7/17/2002	Complete	\$4,821,500.00
Sewer System Improvements – Phase I	Wastewater	10/27/2008	Complete	\$4,672,410.00
Sewer System Improvements – Phase II	Wastewater	4/20/2009	Complete	\$10,264,250.00
Sewer System Improvements – Phase III	Wastewater	7/21/2009	Complete	\$4,865,613.00
	Water	4/20/2009	Complete	\$8,613,546.00

Water System Improvements – Phase V				
Water System Improvements – Phase VI	Water	7/21/2009	Complete	\$8,393,478.00
Sewer System Improvements – Phase IV	Wastewater	1/22/2013	Complete	\$3,275,316.00
Water System Improvements – Phase VII	Water	1/22/2013	Complete	\$2,713,065.00
Water System Improvements – Phase VIII	Water	4/24/2013	Complete	\$3,813,561.00
Lower Hill Sewer Infrastructure Project Phase 1A	Wastewater	10/23/2013	Complete	\$1,712,506.00
COA Storm Sewer Separation Project 2013	Storm	10/23/2013	Complete	\$2,361,405.00
Lead Service Line Replacements	Water	10/17/2018	Complete	\$35,441,231.00
Small Diameter Water Main Replacement Program	Water	1/29/2020	Complete	\$65,220,000.00
Sewer Rehabilitation in Brighton Heights, South Side Slopes, & Hazelwood	Wastewater	1/20/2021	Active	\$7,750,000.00
Water Distribution and Lead Service Line Replacements	Water	4/21/2021	Active	\$35,573,550.00
Sewer Repair & Rehabilitation in Homewood, Squirrel Hill, Marshall-Shadeland, Spring Garden, Highland Park, & Carrick	Wastewater	7/26/2021	Active	\$23,970,000.00
Lead Service Line Replacements	Water	10/20/2021	Complete	\$1,830,833.00
Large Diameter and Small Diameter Sewer Rehabilitation	Wastewater	10/20/2021	Active	\$36,277,000.00
Water Reliability Plan	Water	7/20/2022	Active	\$209,005,329.00
Water Distribution and Lead Service Line Replacements	Water	10/20/2022	Active	\$1,349,427.00
2022 Water Main Replacement Program	Water	10/20/2022	Active	\$75,529,516.00
Security Upgrades	Water	10/20/2022	Active	\$9,978,156.00
Catch Basin Replacements	Wastewater	10/20/2022	Active	\$46,054,410.00
2022 Neighborhood Lead Service Line Program	Water	1/12/2023	Active	\$2,918,874.00
2023-2025 Small and Large Diameter Sewer Rehabilitation	Wastewater	4/21/2023	Active	\$59,136,000.00
2023 Neighborhood Lead Service Line Program (Contract B)	Water	7/19/2023	Active	\$4,599,382.00
2022 Small Diameter Water Main Replacement Project	Water	10/19/2023	Closing	\$34,159,707.00
2022 Small Diameter Water Main Replacement Project	Water	10/19/2023	Closing	\$686,353.00

TOTAL PENNVEST LOANS**\$716,926,628.56**

¹ PENNVEST loan amount shown is final loan amount for completed project or original approved loan amount for active projects. Table 1.1 does not include PENNVEST grant funds.

1.3.5 WATER INFRASTRUCTURE FINANCE AND INNOVATION ACT (WIFIA) LOAN

The PWSA received an invitation from the United States Environmental Protection Agency (USEPA) to apply for a Water Infrastructure Finance and Innovation Act (WIFIA) loan. The application was submitted in spring 2021. In March of 2022, the PWSA Board authorized the Issuance of debt for \$225,000,000. This funding will be used for a portion of the projects associated with the Water Reliability Plan (WRP). The amount of the authorization was amended in April 2022 to a not-to-exceed amount of \$280,000,000.

It is anticipated that the WIFIA funding will be made up of three loans in order to accommodate project schedules associated with the WRP. The PWSA closed on the first loan on May 31, 2023, in the amount of \$52,475,722. The tentative closing timeframe for the second and third loans are mid/late 2024 and mid/late 2025 respectively.

1.3.6 GREEN REVITALIZATION OF OUR WATERWAYS (GROW) GRANTS

The PWSA has applied to the Allegheny County Sanitary Authority's (ALCOSAN) GROW Grant Program since the initial Cycle 1 in 2016 and currently has pending awards for the projects Four Mile Run, Bus Rapid Transit, 2023 SDSR Contract 3, and Queenston Sewer Improvements. PWSA submitted their Southside Park and Southside Flats projects in Cycle 7 however they weren't selected for award. This was a result of a significant change in the selection and award of GROW dollars as ALCOSAN updated their criteria to weigh less heavily on sheds that are tributary to their proposed tunnel system and more favorably on sheds where the tunnel system will not reach. As of 2023, the Southside Parks and Flats projects have not been selected. Both require further modeling and additional project performance review prior to re-submission. A summary of GROW Awards as of August 22, 2023, is found in **Table 1.2** below.

Table 1.2 GROW Grant Awards Status as of August 22, 2023

Award Cycle	Project Name	Project Status	Eligible Project Cost	ALCOSAN GROW GRANT TOTAL VALUE	Award Agreement Date
1	Larimer Park	Post - Construction	\$974,000	\$302,000	3/22/2017
1	Hayson Avenue	Closeout Completed	\$851,962	\$434,600	3/22/2017
1	Centre and Herron	Closeout Completed	\$483,842	\$242,000	3/22/2017
1	Hillcrest	Closeout Completed	\$895,709	\$250,800	3/22/2017
1	Melwood	Closeout Completed	\$723,936	\$318,600	3/22/2017
1	McKinley Park	Post - Construction	\$1,141,500	\$285,400	3/22/2017
2	South 21st Street	Design	\$4,655,646	\$1,489,900	1/8/2018

2	MLK Field (aka Soho)	Design	\$1,006,200	\$855,270	1/8/2018
2	Thomas and McPherson	Construction	\$2,572,400	\$1,517,800	1/8/2018
2	Lawn and Ophelia	Construction	\$730,000	\$313,900	1/8/2018
4	Maryland Ave. Phase 1	Construction	\$2,257,461	\$733,000	8/11/2020
4	Woods Run Stream Inflow	Design	\$3,892,617	\$1,224,300	8/11/2020
4	S-18 Maytide Rehab	Post - Construction	\$2,938,195	\$638,800	9/27/2019
4	M-34 Poplargo Rehab	Post - Construction	\$1,090,061	\$303,000	9/27/2019
5	Woodland Rd	Construction	\$1,901,708	\$1,616,452	12/29/2020
5	Wightman Park	Post - Construction (Phase 1); Construction (Phase 2)	\$3,520,502	\$2,992,427	12/29/2020
6	Four Mile Run	Design	\$19,289,630	\$10,000,000	Pending
6	Maytide Phase 2 Rehab	Construction	\$2,522,590	\$391,700	2/15/2022
7	Maytide Phase 3 Rehab	Design	\$1,415,121	\$304,400	12/2/2022
8	<i>Bus Rapid Transit</i>	<i>Design</i>	<i>\$1,560,654</i>		
8	<i>2023 SDSR Contract 3</i>	<i>Design</i>	<i>TBD</i>		
8	<i>Queenston Sewer improvements</i>	<i>Design</i>	<i>\$2,453,753</i>		
-	<i>Southside Park</i>	<i>Design</i>			
-	<i>Southside Flats</i>	<i>Design</i>			

1.3.7 BROKERAGE ACCOUNT

In February 2021, the PWSA Board of Directors approved management to open and maintain a brokerage account with PNC Capital Markets LLC for the purpose of investing operating and revenue funds. Funds invested will follow the objectives included within the Investment Policy that was approved and adopted by the PWSA Board of Directors on October 25, 2019.

1.3.8 RATE REQUEST TO PENNSYLVANIA PUBLIC UTILITY COMMISSION

The Pittsburgh Water and Sewer Authority filed a proposed settlement with the Pennsylvania Public Utility Commission (“PUC”) regarding its 2022 and 2023 water, wastewater and stormwater rate proposal, which

was approved by the PUC in November 2021 and went into effect on January 12, 2022. The settlement established a new stormwater fee and included a 10.98% total increase in water, wastewater and stormwater charges that will be phased in over 2022 and 2023. The rate increases and additional changes approved in the settlement resulted in annual revenue increase of \$16,996,300 in 2022 and \$4,001,634 in 2023 for a total amount of \$20,997,934.

1.4 WATER SYSTEM BACKGROUND

The Allegheny River provides the sole source of water for the PWSA's Water System. The PA Department of Environmental Resources, Bureau of Water Resources Management issued a Water Allocation Permit WA-131A to the PWSA on April 4, 1989, which allows for water withdrawal of up to 100 million gallons per day (MGD) from the river. The PADEP has advised the PWSA that the permitted allocation would be re-evaluated in the future if the PWSA's demand increases due to growth within the City or through the sale of water to surrounding municipalities.

The PWSA, through its water supply and distribution system, provides water service to more than 400,000 people and over 80,500 service line connections to residential, commercial, industrial, and public customers with potable water and water for fire protection within the geographic boundaries of the City, Borough of Millvale, and surrounding areas. The system consists of:

- Rapid sand-type water treatment plant with a maximum capacity of 110 million gallons per day
- 28.2 MGD microfiltration water treatment plant
- Approximately 964 miles of water mains
- Over 32,000 valves and hydrants
- Raw water pump station located along the Allegheny River
- Ten finished water pump stations
- Three finished water reservoirs
- One Source water reservoir
- 13 storage tanks located at 9 sites

The total storage capacity of the reservoirs and the tanks is approximately 455 million gallons. The useable storage capacity within the reservoir and tank system provides adequate volume and pressure under normal water usage for the equivalent of about two days.

The Pennsylvania-American Water Company (PAAW) supplies water to approximately 26,000 customers in the southern and western sections of the City. The PWSA provides sewer conveyance to these customers.

Two additional small areas, one in the eastern part of the City and the other in the western end of the City, are served by the Wilkesburg-Penn Joint Water Authority and the West View Water Authority, respectively. In each of these areas, the respective independent water purveyor owns and maintains the distribution system elements such as the waterlines, valves, hydrants, and other equipment. In addition, the PWSA, through interconnections with other systems, provides bulk water supply to Borough of Aspinwall, Fox Chapel Water Authority, and Reserve Township, and emergency use water to several adjacent municipalities.

1.4.1 WATER SYSTEM ORDERS AND AGREEMENTS

Over the past two decades PWSA has been presented with regulatory measures and actions through Orders and Agreements that have directly impacted their capital planning and future operations and maintenance programs. These key regulatory Orders and Agreements that the PWSA is complying with, specifically related to PWSA's Water treatment and distributions systems, are summarized in **Table 1.3** and Annual Report in the Sections directly following.

Table 1.3: Orders and Agreements Related to the PWSA's Water Treatment and Distribution System

Order or Agreement	Start Date	Order or Agreement End Date
PADEP Administrative Order	April 2016	Completed
PADEP Consent Order and Agreement	November 17, 2017	Varies
PADEP Consent Order and Agreement, the May 13, 2020 COVID-19 Extension, the May 7, 2021 COA First Amendment, and the August 4, 2022 Second Amendment	September 6, 2019	Varies
PADEP Consent Order and Agreement	May 7, 2021	Varies
Pre-disposition Remediation Resolution	July 15, 2020	March 30, 2023
Plea Agreement/Judgement and Conviction	January 13, 2021	September 14, 2024
PADEP Administrative Agreement	September 14, 2021	September 14, 2025
PADEP Consent Order and Agreement	August 3, 2022	Varies

1.4.1.1 ADMINISTRATIVE ORDER, APRIL 2016

On July 26, 1995, the PADEP approved PWSA's corrosion control feasibility study, which identified the use of lime and soda ash as the optimal corrosion control treatment for PWSA's System. In April of 2014, PWSA made substantial modification to its corrosion control treatment facilities and to its public water system by substituting caustic soda for soda ash as the primary chemical for corrosion control without first obtaining an amended construction permit from the Department. On April 25, 2016, after learning of PWSA's unauthorized substantial modification to the corrosion control treatment facilities at its System, the PADEP issued an Administrative Order to PWSA directing the Authority to undertake a number of actions to, among other things: investigate lead levels within the System and evaluate impacts from PWSA's change in corrosion control chemicals; provide public notice to its consumers regarding the change of corrosion control chemicals and measures to evaluate impacts; conduct a feasibility study and develop recommendations for optimization of corrosion control treatment for the System; and submit a final report of the study to the Department with all data and PWSA's recommendations for optimal corrosion control protection within the System. PWSA has completed the requirements of this Order.

1.4.1.2 COA ON NOVEMBER 17, 2017

The November 17, 2017, Consent Order and Agreement (COA) is related to PWSA Water distribution system corrosion control and lead service lines. Primary violations included: Failure to Treat as Permitted, Lead Action Level Exceedances 2016, Failure to Conduct System Materials Evaluation, Failure to Replace Lead Service Lines, and Failure to Meet Notice Sampling Requirements. Corrective actions and associated schedule terms were outlined in the Order with a stipulation that PWSA meet the lead action level during two consecutive 6-month periods.

The recommendations approved by the PADEP, subsequently in 2018, included the introduction of orthophosphate into the system at strategic locations to reduce corrosion and help control lead levels. In 2019, four orthophosphate systems (at seven application points) were placed into service. These corrosion control systems have decreased the lead concentration and the corrosion in the water distribution system over the past five years.

As part of PWSA's Corrosion Control Optimization Plan, PWSA made the following adjustments by first dropping the pH to 7.8 and studied the results for 10 weeks. Next, they did a drop in orthophosphate from 1.9 milligrams per liter (mg/l) to 1.7 mg/l. PWSA was not satisfied with the results of that change therefore they continued the 40 weeks of monitoring and ultimately decided against making more adjustments. Once the study was concluded, the recommendation was to keep the pH at 7.8 and revert back to 1.9 mg/l orthophosphate dose. PWSA received approval to make the adjustment to the orthophosphate dosage. The permit, received in June 2022, requires PWSA to conduct another two rounds of six-month sampling before they submit a Request for Designation of Optimum Water Quality Parameters. These two rounds were conducted in 2022b and 2023a, both of which had 90th percentile lead levels lower than the 15 ppb action level, at 5.0 ppb and 3.4 ppb respectively. A Request for Designation of Optimum Water Quality Parameters was submitted to PADEP on July 30, 2023. Until approval of that request, PWSA continues compliance sampling events every 6-months; the 2023b sampling program is currently underway.

As part of the tap sample monitoring, during the 2022b and 2023a sampling periods PWSA asked customers to collect both first and fifth liter samples. The present rule requires the first liter samples, however the Lead and Copper Rule Revisions (LCRR) will require fifth liter (and the Lead and Copper Rule Improvements (LCRI), as drafted, will require both first and fifth liter samples). PWSA is proactively trying to determine their progress when the new requirement kicks in. Another provision of LCRR/LCRI's to only collect samples from lead service lines, and PWSA has been doing that for years.

The COA also requires that PWSA provide an update of their inventory by the end of 2022. The PWSA submitted a detailed inventory of residential service lines in December of 2020 and the COA calls for an update of that inventory to include all of their service line connections by the end of 2022. PWSA submitted the inventory on December 23, 2022.

More on this topic is discussed as part of the Lead Service Line Replacement (LSLR) program in Section 2.5.

1.4.1.3 COA ON SEPTEMBER 6, 2019, COVID-19 EXTENSION MAY 13, 2020, FIRST AMENDMENT MAY 7, 2021, AND SECOND AMENDMENT AUGUST 4, 2022

On September 6, 2019, the PWSA entered into a COA with the PADEP in the matter of "violations of the Pennsylvania Safe Drinking Water Act and the Rules and Regulations Promulgated Pursuant Thereto." The COA mandates that the PWSA take action to implement a previously recommended Clearwell Improvement Plan and eliminate "washout" cross-connections; (washouts are used to drain the water system via direct connections to the sewer/storm pipe, manhole or isolated manhole).

The issues surrounding the Clearwell have been studied by technical experts from six different consultants since 1994. Three consultants discussed the condition of the Clearwell. It was found that the Clearwell was structurally stable but identified areas of concern including but not limited to build-up of sediment in the bottom of the tank prohibiting inspection; infiltrating tree roots; erosion evidence, deterioration and cracks in the concrete walls; Clearwell equalization chamber leaks and rusted gates on the Clearwell and gatehouse. The other three consultants provided reports in 2008, 2012, and 2017 that focused on available alternatives

to address, as one of the reports stated, "PWSA's desires to have a Clearwell system with the operational flexibility of being able to remove approximately one half of the Clearwell from service for cleaning and maintenance while the other half remains in service; and to have the ability to bypass the Clearwell and send filtered water directly to the Bruecken Pump Station in emergency situations."

The September 2019 COA establishes the requirements to bring the PWSA Clearwell and cross-connection systems into compliance along with a timeline for the improvements. On May 13, 2020, an extension was granted because of the COVID-19 pandemic. On May 7, 2021, a First Amendment to the September 6, 2019 Consent Order and Agreement was entered as an order of the PADEP and agreed to by the PWSA. Because of delays associated with the COVID-19 pandemic and changes in design and construction approaches, the PWSA requested the amendment to the 2019 COA for the purpose of: 1) extending the deadline for the PWSA to submit applications for permits to construct two new pump stations; 2) shortening the deadline for the PWSA to submit an application for a permit to construct a new Clearwell bypass system; and, 3) establishing a new stipulated civil penalty in the event the PWSA fails to meet the new deadlines under the First Amendment. Four paragraphs of the COA were amended, and the changes are documented in the First Amendment. The PWSA met the deadlines of #1 and #2 above and submitted permit applications by September 30, 2021, and thus did not incur any penalties in #3.

In accordance with terms and conditions of Public Water Supply Permit No. 0220523MA, a final draft of the second amendment to the September 6, 2019 COA was completed July 6, 2022 and later executed as final on August 4, 2022. This Amendment extended the construction deadlines for the Highland No. 2 Reservoir (Liner and cover Replacement) and the Rising Main No. 3 project to the end of 2022 for completion. These construction projects have since been completed. Currently the PWSA is in discussion with PADEP on an amendment to the 2019 COA related to water reliability projects.

Table 1.4 provides a status update on the corrective actions from the September 6, 2019 COA, subsequent extension and two amendments as of August 22, 2023.

In order to meet the requirements of the COA, the PWSA will need to complete two additional support projects including, the Highland Reservoir Pump Station and Rising Main, and the booster chlorination system portion of the Lanpher Reservoir Improvements.

Table 1.4: September 6, 2019 COA - Clearwell and Related Projects and Cross-Connections; May 7, 2021 COA – First Amendment to September 6, 2019 COA; August 4, 2022 COA – Second Amendment to September 6, 2019 COA Status

Clearwell and Related Projects	Status	Notes
Aspinwall WTP Clearwell Bypass (Emergency Response)	PWS Resubmitted October 1, 2023 SHPO Programmatic Agreement (PA) executed October 26, 2023**	
Rising Main 3 - Rehabilitation/Replacements	Complete	Operating Permit Received
Rising Main 4 - Rehabilitation/Replacement	Construction In-Progress	Operating Permit Application Submitted to DEP
Aspinwall Pump Station to Lanpher Reservoir Rising Main	Pending Amendment*	SHPO Approval In-Progress**

Highland No. 2 Reservoir Improvements (Liner and Cover Replacement)	Complete	Operating Permit Received
Aspinwall Pump Station Improvements	Pending Amendment*	SHPO Approval In-Progress**
Bruecken Pump Station Improvements	PWS Permit Returned*	SHPO Approval In-Progress**
Aspinwall WTP Clearwell Improvements (Replacement)	Design 2023	Permit Application due January 1, 2024 per COA
Cross-Connection Projects	Status	Notes
Investigation of location of valves, blow-offs, meters are within chambers, pits or manholes with connection to storm or sanitary sewer (i.e. washout)	Complete	
Submit report with plan and proposed schedule to eliminate all identified cross-connections.	Complete	
Complete removal to eliminate identified cross-connections	In-Progress	Removal via Operations, Dedicated Contracts, Part of Other Contracts

*Refer to separate permit notes.

**Refer to separate SHPO notes.

***Aspinwall WTP Clearwell Bypass, Aspinwall Pump Station Improvements and Bruecken Pump Station Improvements:** The PWS permit was originally submitted on September 30, 2021 to DEP. A technical deficiency letter was issued February 28, 2022 and PWSA provided a response March 14, 2022. DEP returned the PWS permit on May 26, 2023 as the permit application was not considered complete due to the outstanding issue with Pennsylvania State Historical Preservation Office (SHPO) approval. A revised public water supply permit package was submitted to DEP on October 1, 2023 and is under review.

***Aspinwall Pump Station to Lanpher Reservoir Rising Main:** The PWS permit was originally submitted on March 29, 2021 to the DEP. A technical deficiency letter was issued October 26, 2021 and PWSA provided a response November 29, 2021. DEP returned the PWS permit on May 26, 2023 as the permit application was not considered complete due to the outstanding issue with SHPO approval and outstanding NPDES/stream crossing related permits and the resolution of comments from Hampton-Shaler Water Authority.

Pennsylvania State Historic Preservation Office (SHPO) approval is in-progress for projects related to the 2019 COA for Clearwell and related project work.

****Aspinwall WTP Clearwell Bypass and APS Improvements:** PWSA distributed the final draft Programmatic Agreement for the Aspinwall Pump Station Improvements and Clearwell Emergency Bypass Response and Clearwell Improvements Projects to the Consulting Parties on July 7, 2023 and a 30-day comment period was initiated and closed August 9, 2023. The final Programmatic Agreement was subsequently approved and executed in October, 2023.

****Aspinwall Pump Station to Lanpher Reservoir Rising Main:** SHPO conducted the Consulting Party Meeting #2 on May 11, 2023, with PA SHPO, EPA, Preservation Pittsburgh, PWSA, Borough of Aspinwall, Heinz History

Center, Glenn Engineering, Michael Baker Engineering, and PWSA in attendance. Discussed Minimization Efforts and Mitigation of Adverse Effect Measures, and the proposed Mitigation Plan was discussed.

1.4.1.4 COA ON MAY 7, 2021

On May 7, 2021, the PWSA entered into a COA with the PADEP in the matter of “violations of the Pennsylvania Safe Drinking Water Act and the Rules and Regulations Promulgated Pursuant Thereto” and describes five violations related to the water system. After negotiation of these matters, the COA mandates, as ordered by the PADEP and agreed to by the PWSA, resulted in corrective actions. The following **Table 1.5** provides a status update to the corrective actions.

Table 1.5: Status Update of the COA May 7, 2021

Construction Prior to Authorization	Status	Notes
Permit Corrective Action Plan to ensure Public Water Supply (PWS) Permit prior to construction and annual training	Complete/In-Progress	Annual SOP Review/Update and Staff Training Complete
Interconnect Valve Pits	Status	Notes
Submit Plan that describes what PWSA will do to prevent water from accumulating within 7 meter/vault pits	Complete	
Weekly Monitoring until remote telemetry installed. Inspect all other interconnect meter and pump station valve pits twice per year.	Ended	Monitoring now using remote sensors
Implement Plan - Short Term Plan - Remote Telemetry Water Sensors	Complete	
Implement Plan - Short Term Plan - Pump Out Pits.	In-Progress	Currently PWSA Operations performs pump out
Implement Plan - Long Term Plan - Design and Construct Permanent solution for pumping or draining to a sewer	Design In-Progress	Updated Corrective Action Plan approved by DEP
Install Barriers or Implement other methods to prevent future fuel spills from entering meter pump pits	Complete	
Ferric Chloride		
Chemical Delivery Procedure SOP Annual Training	Complete/In-Progress	Annual SOP Review/Update and Staff Training Complete

Annual review of the Permit Compliance Check SOP_EC_GEN-01-03 and annual review of the chemical delivery procedure were completed in quarter one of 2023.

1.4.1.5 PRE-DISPOSITION REMEDIATION RESOLUTION (PDRR), PLEA AGREEMENT, AND ADMINISTRATIVE AGREEMENT

Related to past WTP violations, a Pre-Disposition Remediation Resolution (PDRR) dated July 15, 2020 was developed between the Commonwealth of Pennsylvania, the Pennsylvania Attorney General's (AG) Office and

the PWSA. The PDRR required the PWSA to issue a statement, make donations totaling \$500,000, and enter into a two-year Corporate Monitorship. The Corporate Monitor has been overseeing WTP and lead and copper water distribution system compliance and providing quarterly reports to the AG and the Southwest PADEP office. On March 30, 2023 the Commonwealth of PA withdrew charges against PWSA and the PDRR was withdrawn.

Also related to past WTP violations, a Plea Agreement dated January 13, 2021 among DOJ, USEPA, and the PWSA was signed. The Plea Agreement established a three-year probation period, a \$500,000 self-paid compliance fund, development of an Environmental Compliance Program, creation of Environmental Compliance Manual for water production, creation of the Environmental Compliance Manager position, and retaining an Independent Environmental Consultant to perform annual compliance audits of the WTP. The PWSA was sentenced on September 14, 2021. The sentencing formalized the terms of the Plea Agreement and requires PWSA to provide monthly reports to a court appointed probation officer.

Leading up to the Plea, the PWSA was working with the EPA Suspension and Debarment Office (SDO) to establish what is known as the Administrative Agreement. On the date of PWSA's Plea, the Authority was also entered into an Administrative Agreement dated September 14, 2021 between USEPA Suspension and Debarment Office and the PWSA. The Plea type placed the Authority under probation for three years; however, the Administrative Agreement is for a four-year period. The Administrative Agreement enforced the requirements of the Plea Agreement and PDRR and included the establishment of a Chief Environmental Compliance and Ethics Officer (CECEO), implementation of improved ethics and compliance programs, expansion of the environmental compliance program to all PWSA facilities, continued implementation of Corrosion Control Optimization Plan and replacement of lead service lines and an Independent Monitor to oversee compliance and report to regulatory authorities. The CECEO serves as the Environmental Compliance Manager under the terms of the Plea Agreement. The Administrative Agreement also extends PWSA's compliance program to focus not only on the water treatment plant but all PWSA facilities by September 15, 2023.

In response to the Plea Agreement and the Administrative Agreement, the PWSA implemented new initiatives in 2021 and more in 2022 with the intent of improving water treatment plant operations and attention to environmental compliance and ethics. These initiatives are further described in Section 2.2.

1.4.1.6 COA ON AUGUST 3, 2022

As part of implementing PWSA's Environmental Compliance Manual, the Authority self-identified to DEP several Above ground Storage Tanks (ASTs) which required registration under PA DEP regulations. Three of

these storage tanks, associated with chlorine booster systems, did not have sufficient secondary or emergency containment. The following **Table 1.6** provides a status update to the corrective actions.

Table 1.6: COA August 3, 2022 Status Update

Chlorine Booster ASTs	Status	Notes
Provide and maintain remote monitoring of tank levels and alarms.	Complete	Level sensors installed and SCADA updated
Perform daily inspections and submit quarterly to DEP	On-Going	Fourth quarterly submittal to DEP completed
Herron Hill – Replace existing ASTs	Construction In-Progress	Construction schedule update provided to DEP
Highland 2 – Modify room housing ASTs to provide containment.	Complete	DEP storage tank registration complete
Highland 2 – Submit schedule for replacement of ASTs	Complete	ASTs will be replaced with Highland Pump Station Construction Project
Lanpher – Install flood panel across door to provide containment.	Complete	
Lanpher – Submit schedule for replacement of ASTs	In-Progress	Schedule submitted to DEP May 17, 2023

All of these sites have capital projects that are in progress and then the existing tank systems will be replaced with new booster stations.

1.4.2 WATER RELIABILITY PLAN (WRP)

The Authority's Water Reliability Plan (WRP) consists of a series of grand-scale unique to a generation of infrastructure improvement projects intended to modernize the region's water distribution system while also increasing the reliability of water services for PWSA customers. Comprised of eight projects completed in sequence, the WRP culminates in the complete restoration of a 44-million-gallon basin while previously rehabilitated reservoirs act as temporary Clearwells. The WRP represents an approximate \$480 million investment by the Authority. The eight projects include: 1) Highland No. 2 Reservoir Liner Cover Replacement, 2) Highland Reservoir Pump Station and Rising Main, 3) Aspinwall Pump Station to Lanpher Reservoir Rising Main Project, 4) Aspinwall Pump Station Improvements, 5) Bruecken Pump Station Improvements, 6) Rising Mains 3 & 4 Rehabilitation and Replacement, 7) Clearwell Emergency Bypass Project, and 8) Clearwell Replacement

The criticality of the WRP implementation is not taken lightly. PWSA has implemented numerous workshops that outline every project to identify opportunities for coordination and to identify all the potential outages that need to occur in order to ensure PWSA can deliver an uninterrupted quality water supply.

1.5 WASTEWATER SYSTEM AND STORMWATER SYSTEM BACKGROUND

The PWSA sewer system conveys wastewater collected from 24 neighboring suburban municipalities and wastewater generated by 306,000 residents and businesses within the City boundaries to the ALCOSAN interceptors. The ALCOSAN interceptors are located along the rivers and tributaries for conveyance to

ALCOSAN's Wastewater Treatment Facility (WWTF) for treatment prior to discharge into the Ohio River. As a point of reference, the ALCOSAN WWTF is operating in compliance with the National Pollutant Discharge Elimination System (NPDES) under Permit No. 0025984. In total, the ALCOSAN WWTF receives wastewater flows from 83 municipalities and authorities in the region. ALCOSAN also conducts enforcement of industrial pretreatment in the PWSA service area.

The PWSA's sewer collection system serves over 111,000 customers (accounts) and includes:

- An extensive network of approximately 1,227 miles of sanitary, storm, and combined sewers
- 29,502 manholes (some manholes include flow dividers and diversion chambers)
- 24,463 inlets (includes catch basins and storm inlets; excludes private inlets)
- 98 combined sewer overflow (CSO) diversion chambers maintained by the PWSA
- Three sanitary sewer overflow (SSO) structures maintained by the PWSA (previously designed/constructed as part of the original system)
- 35 CSO outfall structures maintained by the PWSA and 169 CSO outfall structures included in ALCOSAN's Consent Decree
- 195 storm sewer outfalls
- Four wastewater pump stations and ancillary facilities

1.5.1 COMBINED AND SANITARY SEWER SYSTEM

Approximately 26 percent of the PWSA sewer system (based on linear feet of pipe) consists of sanitary sewers and sanitary pump stations. However, as redevelopment occurs in the City and portions of the combined sewer system are replaced by separate sewer systems, the percentage of separate sanitary and storm sewers is gradually increasing.

Approximately 74 percent of the sewer system has combined sewers designed so that during wet weather events, when capacity in the combined sewer pipes is exceeded, a portion of the collected storm water and diluted wastewater is discharged into natural watercourses through 35 CSO outfall structures maintained by the PWSA. The PADEP issued CSO NPDES Permit PA0217611 to the PWSA and the City (as co-permittees), with an effective date of May 1, 2004. The PADEP has administratively extended this permit since April 30, 2009. The PWSA continues to prioritize work associated with the compliance requirements in the CSO NPDES Permit.

The 24 neighboring municipalities combined and sanitary-only sewer system connections to the PWSA collection system were established pursuant to agreements with the City to convey their wastewater to the ALCOSAN WWTF. While some agreements with neighboring municipalities specify sharing of the costs associated with construction and maintenance of the trunk sewers carrying this sewage flow, most do not.

The sewer system has adequate capacity to convey dry weather wastewater flows; however, during wet weather events, the system often exceeds its capacity, which results in overflows, bypassing, and flooding.

The USEPA has adopted regulations regarding overflows from combined sewer outfalls during events that result in the discharge of untreated sanitary sewage into receiving waters. These CSOs contain pollutants that are present in domestic and industrial wastewater, as well as those in urban storm water. The USEPA regulations require owners of any sewer system having CSOs to acquire NPDES discharge permits for each overflow site. The PWSA's CSO permit requires the implementation of the USEPA's "Nine Minimum Control

Measures” (NMCs). The NMCs define the basic steps for maintaining the combined sewer system in proper operational order and identifying potential areas requiring updates and repairs.

During dry weather conditions, the ALCOSAN interceptor system is designed to intercept wastewater flows from the City and surrounding municipalities and convey the flows to the ALCOSAN WWTF. This system includes shallow-cut pipes, deep tunnels, and diversion structures. During wet weather conditions, the flow diversion structures (which are maintained by ALCOSAN, the PWSA, and other municipalities) limit or “regulate” the amount of combined sewage that enters trunk sewers and ALCOSAN’s interceptor system. In addition, there are regulator points in the sanitary sewer system that relieve or overflow untreated sewage (sanitary sewer overflows or SSOs) to the nearest water body when the systems are overtaxed.

ALCOSAN’s WWTF has a NPDES permitted dry weather capacity of 190 MGD and wet weather capacity of 250 MGD. Currently, the ALCOSAN WWTF is operating at capacity. The flow regulation at the plant limits peak wet weather flow to the permitted capacity. The combined sewage that exceeds the capacity of the flow regulators at the trunk sewers, interceptors, and treatment plant is discharged as CSOs to the receiving waters of the Commonwealth. There are 252 combined sewer outfalls in the ALCOSAN conveyance system (source: ALCOSAN 2020 Modified Consent Decree), and some of the diversion structures are maintained by ALCOSAN, and some of the diversion structures are maintained by the PWSA and other municipalities and authorities. In 2020, ALCOSAN signed a Modified Consent Decree with the USEPA, the DOJ, the PADEP, and the Allegheny County Health Department, which the PWSA is not a party to, and ALCOSAN will be increasing the WWTF capacity and conveyance capacities in coming years.

1.5.2 STORM SEWER SYSTEM

As stated above in the History and Background, in 2019, the Commonwealth of Pennsylvania approved an Amendment to the Articles of Incorporation as adopted by the City and the PWSA to extend its term of existence to March 13, 2070 and to include stormwater systems.

PWSA is drafting a stormwater focused agreement with the City of Pittsburgh to outline responsibilities for the management of stormwater to ensure health and safety of City residents and waterways. Specific goals include:

- Stormwater Management Site Plan Review
- Public Stormwater Management Project Review Process
- Stormwater Management Projects within the Right-of-Way
- Stormwater Management Projects within City Parks, Greenways, and Publicly-Owned Parcels
- City Stormwater Assets within the Right-of-Way
- City Stormwater Assets in the City Parks and Greenways
- Operations and Maintenance of Stormwater Assets within the Right-of-Way
- Operations and Maintenance of Stormwater Assets in the City Parks and Greenways

The PADEP issued the latest Municipal Separate Storm Sewer System (MS4) NPDES Permit #PAI136133 to the PWSA and the City (as co-permittees), with a permit term of July 1, 2020 through June 30, 2025. As part the NPDES permit requirements, an annual report is due to the DEP on or before September 30th annually during the permit period. PWSA is to take the lead in compiling the annual report, with input provided from the City.

1.5.3 WASTEWATER AND STORMWATER ORDERS AND AGREEMENTS

1.5.3.1 COA ON JANUARY 29, 2004, AMENDED JULY 2007 AND OTHER SOURCE REDUCTION MEASURES

Administrative Consent Orders (ACOs) and Consent Orders and Agreements (COAs) were issued in early 2004 to the City and the other 82 communities tributary to ALCOSAN. The Orders directed compliance with the Pennsylvania Clean Streams Law of 1937 and the Federal Clean Water Act, to eliminate SSOs, and fulfill the Pennsylvania and USEPA CSO Policy obligations. The ACOs were issued to separate sewer communities by the Allegheny County Health Department (ACHD) and the COAs were issued to combined sewer communities by the PADEP. The initial COA among the PWSA, the City, the PADEP, and the ACHD was entered into on January 29, 2004, and later amended in July 2007. The original Orders required communities to complete the following: assess, map, clean, and televise the sewer collection system, make critical repairs, conduct flow monitoring, and develop a long-term wet weather control plan in conjunction with ALCOSAN.

The PWSA completed the Consent Order's compliance requirements, including the preparation and submission of a Wet Weather Feasibility Study on July 31, 2013. The submitted Feasibility Study proposed the use of green infrastructure and integrated watershed management (IWM) to assist in the control of combined sewer overflows. The integrated approach, which utilizes a combination of 'green' and 'gray' solutions to address combined sewer overflows, considers all types of pollutant sources in the watershed to holistically address water quality challenges.

On March 27, 2015, the PADEP sent a letter to ALCOSAN customer municipalities and authorities setting forth a procedure to provide additional time to explore flow reduction. The obligations of the COAs and ACOs, as amended, terminated on March 30, 2015. In mid-2015, the City and the PWSA requested to work with USEPA rather than the PADEP on future orders and agreements relating to wet weather overflows. In late 2015, 82 municipalities in the ALCOSAN service area (all municipalities except Pittsburgh) received new COAs outlining Corrective Actions with a due date of December 1, 2017. The Corrective Actions included development of a Source Reduction Study, which the PWSA completed on December 1, 2017, that identified the types of projects that will most effectively reduce flows in the sewer system and at least one flow reduction demonstration project.

1.5.3.2 DEVELOPING CONSENT DECREE (CD) FOR CSO COMPLIANCE

USEPA, DOJ, and PADEP representatives began negotiations in 2021 to develop a consent decree with the PWSA and the City related to CSO compliance and sanitary sewer overflows (SSOs). It is anticipated that negotiations will continue into 2024. In October 2021, the PWSA awarded a contract to a consulting firm to assist the PWSA with Wet Weather Program Management during and following consent decree negotiations.

1.5.3.3 ADMINISTRATIVE ORDER ON CONSENT FOR MS4 COMPLIANCE, JANUARY 26, 2021

As part of the PWSA's MS4 stormwater permit with the City, the PADEP requires implementation of stormwater management practices for operation of the storm sewer system, and to reduce the amount of sediment that enters the streams from the storm sewer system. On January 26, 2021, PWSA and the City of Pittsburgh entered into a two-year Administrative Order on Consent with the USEPA to resolve violations related to the MS4. The Order required PWSA and the City to develop and implement a program for conducting inspections and enforcement of constructed erosion and sediment controls, and post-construction Best Management Practices (BMPs), including submission of an amended unified Stormwater Code to the City of Pittsburgh by July 1, 2021; in addition, the inspection and enforcement program must be fully implemented by March 31, 2022. On January 7, 2022 an agreement between PWSA and the City of Pittsburgh was executed

establishing roles and responsibilities as they relate to MS4 compliance within the City. The agreement specifies that the primary roles and responsibilities of PWSA's Stormwater Division include the planning, design, implementation, and maintenance of stormwater related Capital Projects that may reduce localized flooding and Combined Sewer System overflows at the rivers while improving the water quality health of streams and waterways. Remaining responsibilities relating to stormwater will follow in a separate agreement or agreements following the MS4-focused January 7, 2022 agreement. February 11, 2022 the PUC indicated that the agreement dated January 7, 2022 was certified as filed. Associated Administrative Order reports are due to the EPA the last day of each quarter until the terms of this Order are fulfilled. Other measures under the responsibility of the PWSA are:

- Track and list all surface waters that receive stormwater discharges from an MS4 area.
- Identify a lead entity for each Minimum Control Measure (MCM) and provide key contact information.
- Maintain a Standard Operation Procedure (SOP) for all MCM's. The City and PWSA shall review the SOPs by July 31st of each year.
- Specifics are outlined for MCM's #1, 2, 3, 4, 5 and 6 within the Agreement document.
- Report on Pollutant Control Measure (PCM's) if applicable
- Report on Pollutant Reduction Plans (PRPs) and Total Maximum Daily Load (TMDL) Plans.

The timeframe on this administrative order is two years, ending January 20, 2023 if all actions were completed. A quarterly report was submitted on June 23, 2023 to the Environmental Protection Agency (EPA) providing updates on remaining item associated with the hiring of three stormwater inspectors by the City of Pittsburgh. PWSA has been in communication with EPA and the City to provide additional information on the three stormwater inspectors and if they are needed based on current workload. EPA has received the information from City and is reviewing it. PWSA and the City remain under this Order until the City addresses this task.

1.5.3.4 BROOK STREET SEWAGE DISCHARGE ORDER, MARCH 15, 2023

On March 14, 2023 PWSA received an Order from the Allegheny County Health Department (ACHD) regarding a sewage overflow on Brook Street. The unnamed tributary to Saw Mill Run where a PWSA permitted combined sewer overflow discharges into has become encroached upon and blocked due to a landslide on City of Pittsburgh property and an associated clogging of a culvert pipe under a City of Pittsburgh roadway. This blockage is resulting in a surcharge in the combined sewer. Allegheny County Conservation District issued an inspection report and violations to the City of Pittsburgh on March 22, 2023 noting the need for the City to address the collapsed road and restoration of the channel to remove debris that is blocking the stream due to the landslide. PWSA filed an appeal of the ACHD Order and the order was dismissed on October 25, 2023.

2.0 MAINTENANCE, REPAIR, AND OPERATION OF THE WATER, WASTEWATER, AND STORMWATER SYSTEMS

The PWSA's work to maintain and renew the water, wastewater, and stormwater infrastructure is divided into operating expenses and capital expenses. Operating expenses include routine maintenance and repair work that allows the systems to continue to operate as designed. The operating budget funds expenses such as smaller scale water and sewer main repairs, catch basin cleaning, water treatment chemicals, vehicles, and employee salaries and benefits. Given the advanced age of much of the infrastructure, investing in maintenance is not enough. For this reason, the PWSA Capital Improvement Plan consists of prioritized projects intended to replace and upgrade key infrastructure. The 2023-2027 Capital Improvement Plan is discussed primarily in Section 3 of this report. However, the allocation of funds for future projects is relevant to the information in Section 2.

During 2023, unforeseen effects from supply chain issues and inflation continued to have an effect on PWSA capital, maintenance and repair projects. This is expected to continue in 2024. The effects continue to include delays on material and equipment availability, along with a significant cost increase in chemicals needed for operations.

Other impacts are a result of the City agency requirement updates and how in the long term they will impact the PWSA. Generally, coordination with City entities such as the Department of Public Works (DPW) and Department of Mobility and Infrastructure (DOMI) has increased, especially in regard to agreements. More clarity has been established regarding easements, cooperation agreements, joint funding opportunities and cost shares are approved and signed off on in advance. A major impact over the last year involved the PADEP Regulations regarding Clean Fill and the imposition of fees with regards to the required Environmental Due Diligence (EDD) forms, potential for soils testing, addressing need for on or off-site storage and disposal etc. Other impacts included substantial delays in bidding for at least 6 months or more. Debris/waste removed from inlets and drains through the process of cleaning could classify as non-Clean Fill and is required to be disposed of as such. Engineering staff have been debriefed on the impacts to their projects and PWSA integrated into their specifications for construction projects an Environmental Protection Plan and Waste Management Plan. PWSA is proactively addressing and making improvements to their Clean Fill Policy though this is anticipated to have a growing impact on PWSA projects into 2024.

The PWSA Operations and Maintenance staff report that the organization is focused on goals towards maintenance and repair rates, customer service, and the reporting measures that are required in the Compliance Plan established by the PUC. Overall, there are approximately 60 performance metrics that the PWSA is required to report to the PUC. Examples include valve turning and hydrant flushing. The PWSA maintains an organizational performance improvement dashboard called Headwaters and it is publicly available on a PWSA website at <https://headwaters.pgh2o.com>. The dashboard provides a snapshot of the PWSA's progress for eight metrics that are being measured and tracked: number of lead service line replacements (PWSA side); four metrics for customer communications; number of water meters repaired or replaced; number of training hours per employee per year; and length of service disruptions. The PWSA has met or exceeded the expectations for several of the metrics shown in the Headwaters webpage.

The PWSA inspects their facilities individually as part of the design process when a particular facility is being renewed, renovated, or replaced. The Senior Manager of Safety and Security performs safety inspections of facilities on an as-needed basis.

Two primary sources of information were used to construct the findings and recommendations of Section 2 for the maintenance, repair, and operation of the water and sewer systems:

- Discussions with the PWSA Directors and other staff were conducted in August 2023 to have a dialogue and obtain current data.
- ms consultants inc. inspection of selected PWSA facilities and associated Facility Assessment Report dated November 2023.

2.1 FACILITIES ASSESSMENT

An updated Facility Assessment Report was prepared in 2023 for the PWSA to provide a current summary of maintenance, repair, and operating conditions relative to select Authority's facilities. Facilities whose status was reflected as in design, out for bid, or completed construction within the last two years (2022 and 20223) were excluded from inspection. The information presented in the report was based on field observations and discussions with operations personnel during field visits. The PWSA's 2015 Facility Physical Condition Assessment reflects a prior conditions benchmark and was used as the basis for beginning the 2021. The 2021 evaluation was used as the basis for the 2023 inspection. To evaluate the condition of each of the facilities, an investigation was performed that included site visits, review of the previous inspection report, and limited personnel interviews. The site visits provided an opportunity to visually inspect and photo document the facilities, interview staff on the condition of the assets, and ascertain the conditions relative to the general physical condition, operations, maintenance, and health and safety of each facility.

In June and July of 2023, ms consultants performed a Facility Physical Condition Assessment on 10 of PWSA's vertical facilities to evaluate the condition of each facility. Of the 10 facilities, one was a water treatment plant with sixteen major process areas, seven were water pump stations, one was a sewer lift station and one was a warehouse. The facilities evaluated and their 2023 project status are listed in Table 2.1 below.

Table 2.1 2023 Facility Condition Assessment Project Status

Facility	Current Facility Improvement Project Status
1. Aspinwall Water Treatment Plant	
Sites and Grounds	No specific improvement in 2023 - 2027 CIP
Operations Building, Operations Control Center, and Laboratory	HVAC Improvements (Project No. 2024-100-102)
East Raw Water Intake Facility	2023 - 2027 CIP (East Intake - Project No. 2023-100-102)
West Raw Water Intake Facility	2023 - 2027 CIP (West Intake - Project No. 2018-322-100)
Gas Meter Building	No specific improvements in 2023 - 2027 CIP
Chemical Facilities at Ross Water Pump Station and Screen Room, Flash Mix Tanks, Carbon Facilities and 48-in Influent Valve Vault	2023 - 2027 CIP (Chemical Feed Modernization/Rapid Mix and Clarifier Improvements - Project No. 2023-100-103) 2023 - 2027 CIP (Lime Slurry System Improvements - Project No. 2017-322-101-7)

Sodium Hypochlorite Building	Major updates just completed construction, two new tanks to be installed under another project in the in 2023 - 2027 CIP
Clarifiers and Sludge Distribution Chamber	2023 - 2027 CIP (Sludge Chamber Pump - Project No. 2021-322-102) to replace pumps and update the facility. 100% Design was submitted to PWSA for review on July 7, 2023. Administrative Agreement required completion of work by Dec. 31, 2022. EPA Suspension and Debarment Officer has been informed of the updated project schedule. The current project schedule indicates completion in Dec. 2024.
Sedimentation Basin and Old Administration Building	2023-2027 CIP (Phase 1 Sedimentation Basin Rehabilitation and WTP Gate Valve and 84-inch Coupling Project - Project No. 2023-100-106) 2023-2027 CIP (Phase 2 Sedimentation Basin Rehabilitation (Project – 2026-100-100)
Rapid Sand Filtration Building	Rapid sand filter system and piping gallery improvements was completed in 2023 2023-2027 CIP (Water Treatment Plant Filter Building Roof - Project No. 2024-100-101) to replace the roof and parapet flashing. 2023-2027 CIP (WTP Filter Backwash System Improvements - Project No. 2023-100-107) to upgrade the backwash systems 2023-2027 CIP (Hydraulic Valve Replacement (Project No. 2023-100-102) to upgrade hydraulic valve actuators to electric actuators
Fluoride Building	In 2023 - 2027 CIP
Backwash Retention Basin (old)	Being addressed in operating budget. some capital improvements being done under 2023 - 2027 CIP (West Intake - Project No. 2018-322-100)
Clearwell Inlet Gate House	2023-2027 CIP (Clearwell Improvements - Project No. 2023-100-104)
Filtered Water Reservoir (Clearwell)	2023-2027 CIP (Clearwell Improvements- Project No. 2023-100-104)
Clearwell Outlet Gate House	2023-2027 CIP (Clearwell Improvements – Project No. 2023-100-104)
2. Herron Hill Water Pump Station	2023-2027 CIP (Herron Hill Pump Station Improvements - Project No. 2023-300-100)
3. Herron Hill Tank Water Pump Station	2023-2027 CIP (Herron Hill Tank Pump Station Improvements - Project No. 2024-300-102)
4. Howard Water Pump Station	2023-2027 CIP (Howard Pump Station Improvements - Project No. 2025-300-100)
5. Inline Water Pump Station (Coral and Pacific)	2023-2027 CIP (Inline Pump Station (Coral and Pacific) Improvements - Project No. 2024-300-103)

6. Lincoln Water Pump Station	the 2023-2027 CIP (Lincoln Pump Station Improvements - Project No. 2023-300-101)
7. Mission Water Pump Station	2023-2027 CIP (Mission Pump Station Improvements - Project No. 2025-300-101)
8. Saline Water Pump Station	2023-2027 CIP (Saline Pump Station Improvements - Project No. 2026-300-102)
9. Evergreen Lift Station	Not in 2023 - 2027 CIP
10. Central Warehouse	Not in 2023 - 2027 CIP, however, building expected to be abandoned and will be part of new PWSA Headquarters and Operations Facility (Project No. 23-600-101)

2.1.1 WATER FACILITY FINDINGS

The 2023 Facilities Assessments Report was reviewed for the PWSA's aforementioned vertical facilities. The report documented significant site observations and summarized the considerations for ongoing:

- Maintenance, repair, and operation of the water and sewer systems
- Capital addition and planning projects
- Recommendations for funding for renewal and replacement projects

Many recommended repairs and/or replacements are currently identified and prioritized in the 2023-2027 CIP. Water facility projects that were included in the 2023 Facility Assessment related to the 10 facilities are only a portion of the capital investment identified in 2023- 2027 CIP which plan consist of:

- 27 projects at the Water Treatment Plant, with estimated capital costs of \$200,197,272
- 25 water pumping and storage projects, with estimated capital costs of \$435,179,033

Water Treatment Plant improvements will be required to meet current and upcoming water quality regulations and operational reliability. The PWSA uses their WTP Master Plan as the framework for the current CIP related to the WTP. There are several facilities that are in use beyond their useful lives and have not had a detailed condition assessment to check for major or moderate structural defects. Detailed analyses by qualified experts are required to determine actual conditions and appropriate maintenance and/or rehabilitation.

The following summary outlines some of the more critical findings that were observed at the Aspinwall WTP. Many improvements have been made to the sites and grounds including updating the security system. In October 2022, PWSA received \$10 million in funding for the purpose of funding a variety of needed security improvement throughout its system. This project will have its own line item in the capital budget and will be drawn down over two to three years.

The two raw water intake facilities, East and West, both had significant vegetation growth on the manual screens which also show signs of corrosion and should be replaced or repaired. Provisions for safely maintaining the screens should also be considered. The chemical facilities at Ross Water Raw Pump Station had a number of issues that were observed during the assessment. A number of these issues were new findings since the last assessment in 2021. Currently, many chemicals are housed together without sufficient ventilation observed as increased corrosion on feed equipment and spalling and deterioration of equipment pads. Much of the chemical feed equipment is past its service life and should be replaced. Many electrical

issues were observed during the assessment. Many electrical enclosures and conduits are severely corroded and are not labelled. The overall condition of the low service pumps appears to be fair to good condition.

The Sodium Hypochlorite Building and the Screen Room, Flash Mix Tanks, Carbon Facilities, and 48-inch Influent Valve Vault all were in good condition without any major deficiencies observed. The clarifiers exhibited severe corrosion on all the metal parts including the effluent launder and the ladders. Ladders were significantly corroded and are not currently used. Maintenance ladders and launders should be replaced by materials that can sustain the corrosion from the ferric coagulant. The influent gates and the drain sluice gates are over 50 years and are at the end of their service life.

Many of the issues identified from previous assessments still remain at the sedimentation basins. Implementation of a stormwater management plan is needed to prevent erosion and run-off from being conveyed into the north side of sedimentation basins possibly contaminating the clarified water. There is a major issue with vegetation including shrubs and trees on the sedimentation basin walls. This can quickly cause structural issues and should be removed as soon as possible. The rapid sand filters and piping gallery have recently been replaced and are in good condition with no major deficiencies observed. Although the fluoride building is scheduled to be replaced as part of the 2023 – 2027 CIP, there were many deficiencies that need immediate attention. A robust ventilation system is typically required for this chemical; however, the existing system was corroded and inoperable. PWSA personnel should avoid exposure to the inside of the Fluoride Building due to the presence of hydrofluosilicic acid vapors which are extremely corrosive. To ensure the safety of personnel and chemical delivery drivers, an eye wash station that includes a shower should be installed immediately.

The Backwash Retention Basin is no longer in service; however, the tank is currently utilized as an overflow structure to serve as an emergency backup operation for the new storage tank and recycling facility according to PWSA personnel. The Clearwell and its associated facilities were in fair condition. PWSA personnel noted that the sluice gates are not operable in either the inlet or outlet gate houses. The sluice gates should be inspected and either reconditioned or replaced. Both facilities exhibited moderate corrosion due to chlorine off-gas and lack of sufficient ventilation. The condition of the interior of the Clearwell is not known. PWSA personnel indicated that they do not remember the last time the Clearwell was inspected by divers. The Clearwell vents were all very corroded and there were groundhog holes observed around the property. There are trees along both sides of the Clearwell that should be removed to prevent root systems from penetrating the Clearwell walls should there be cracks. The lighting is not operational and should be replaced with LED lighting.

Many of the seven water pump stations facilities that were evaluated exhibited similar deficiencies. The pumps were in fair to good condition, however, some of the pump appurtenances such as valves and piping are leaking. Additionally, many of the pump bases were in poor condition and should be repaired before pump performance is affected. HVAC improvements should be implemented at the water pump stations as corrosion was observed in many of the water pump station basements and piping gallery. Also, many motor control centers, control panels and breakers exhibited corrosion from the lack of sufficient ventilation. Many instrumentation and electrical issues from previous assessments remain. There are electrical boxes, outlets, and devices that are corroded and need replacement. There were several overhead lights that were not operable.

The only water pump station without an associated facility was Inline Water Pump Station, which is underground in a road near the intersection of Pacific and Coral and had many unique deficiencies. The access

hatch to the pump station is in the middle of the road, which presents safety concerns. Both pumps are operational according to PWSA personnel, however, there is significant water on the bottom of the pump station causing significant corrosion to the pumps, piping, valves, and associated appurtenances. The standing water can also cause hazardous conditions for PWSA personnel that need to perform maintenance in the structure. There is no remote monitoring instrumentation in the pump station to let PWSA personnel know if the pump station is working or not, therefore PWSA personnel must check the pump station daily. Multiple electrical switches, receptacles, and equipment are uncovered and at risk of immersion during storm or flooding events.

2.1.2 WASTEWATER FACILITY FINDINGS

The Evergreen Lift Station was the only wastewater facility assessed during the 2023 Condition Assessment project. Most of the issues noted in previous condition assessments have been corrected. Most of the issues noted in previous assessments have been corrected. The only observed issue was the control panel's interior, which is corroded and in poor condition, so should be replaced. Due to the facility's condition, there does not appear to be a need for a significant capital project in the 5-year CIP. However, there are a few maintenance related items that could take place to address some smaller deficiencies found.

2.1.3 WAREHOUSE FACILITIES

The Central Warehouse was evaluated and many of the previous deficiencies were still present. Currently there is not a specific project in the 2023-2027 CIP to address the deficiencies at this facility. The Central Warehouse is one of the PWSA facilities that is being considered to be abandoned as part of the New Headquarter and Operations Facility project (Project No. 2023-600-101) where there is \$50M slated in the 2023-2027 CIP. Under this project, PWSA would build a new headquarters at a new location that would also include space for their Operation's Division. Based upon that, there is no need to put an overall facility specific project in the CIP for the Central Warehouse. However, since this is an occupied building, at minimum it is recommended that the safety related conditions identified be addressed as soon as possible, since a new headquarter facility realistically would not be built and occupied in the near term. This could either be done as a small capital project or through operating funds.

2.2 PLEA AGREEMENT AND ADMINISTRATIVE AGREEMENT COMPLIANCE STATUS

In response to the Plea Agreement, associated Judgment and Conviction in Federal Court, and the Administrative Agreement, PWSA has:

1. Retained an Independent Monitor (Sewerd & Kissel) who shall oversee the Authority's compliance with the Agreement.
2. Retained an Independent Environmental Consultant (Arcadis) to conduct annual environmental audits of the water treatment plant during the period of probation. The annual audit and corrective actions are posted on PWSA's public website.
3. Implemented an Environmental Compliance and Ethics Program (ECEP).

PWSA's Independent Monitor who oversees their compliance with the Administrative Agreement certified to the government that PWSA is in compliance with their Administrative Agreement and they have a work plan approved by the government of things that they will audit. The 2021 Environmental Compliance Audit Report for Aspinwall WTP has been completed and posted on PWSA's public website. PWSA has either addressed or

is in the progress of addressing all of the findings from that audit. Given it was the first in a series of audits, numerous items were identified such as waste management policies, inspection reports, etc. The 2022 audit was completed in November and December 2022 and the final report posted by January 13, 2023. In 2023 the audit was completed in October-November and the final report will be submitted on schedule.

2.2.1 ENVIRONMENTAL COMPLIANCE AND ETHICS PROGRAM (ECEP)

Another piece of the Administrative Agreement is that it extends PWSA's compliance program to not just focus on the water treatment plant. By September 15, 2023, PWSA was required to expand their environmental compliance program to all PWSA facilities. This includes the wastewater side, field operation side, the warehouse, 1200 Penn, engineering, etc.

The Environmental Compliance and Ethics Program (ECEP) is also intended to satisfy those requirements imposed upon the PWSA by virtue of the Plea Agreement between the PWSA and the US Department of Justice, Judgement and Conviction from the U.S. Western District Court, and Administrative Agreement between the PWSA and the U.S. Environmental Protection Agency. To that end, the ECEP establishes systems to prevent and detect criminal and violative conduct and establishes a reporting structure to ensure the development of a culture of compliance in which employees are encouraged to understand and implement environmental compliance and ethics standards. Employees are empowered to report acts of non-compliance without fear of retribution. The ECEP also emphasizes the importance of training and educational updates on compliance and regulatory issues that impact the operations of the PWSA.

The primary goals of the ECEP are to:

- Prevent fraud, waste, abuse, and other improper activity by creating a culture of environmental compliance and ethics within PWSA
- Detect any non-compliance activities at an early stage before they may impact water quality or compliance with regulations
- Respond swiftly to environmental compliance and ethics issues through appropriate action and documentation

The ECEP applies to all PWSA board members, executives, employees, representatives, and agents. PWSA will also require contractors to comply with applicable parts of the ECEP.

There are five key components to PWSA's ECEP, establishing an organization-wide framework for environmental compliance and ethics and complying with requirements in the Plea and Administrative Agreements.

1. **Mission Statement:** PWSA's Mission Statement and Core Value on Ethics & Integrity re-enforce the Authority's commitment to protecting public health and the environment and doing so in an ethical and professional manner.
2. **Organizational Structure:** The compliance group was expanded in 2022 beyond the Chief Environmental Compliance and Ethics Officer (CECEO) to a team of six individuals, five environmental compliance specialists and an environmental compliance program manager, all who report to the CECEO. In 2023, the group grew by two more individuals that transferred from the water quality group into compliance. The CECEO also is stationed in the field at the Water Treatment Plant, reports directly

to the CEO, and participates on the Board Executive and Environmental Compliance and Ethics Committee.

3. **Codes and Policies:** The Code of Ethics (Revised January 7, 2022) and Code of Conduct (Revised January 7, 2022) are maintained to include obligations to report suspected or known compliance, ethics, or safety violations. PWSA implemented an independent third-party whistleblower system for anonymous reporting which includes a third party operated Anonymous Reporting Hotline in addition to a whistleblower policy (Revised January 7, 2022). Other updates included their non-discrimination retaliation policy (Revised January 7, 2022). PWSA maintains copies of all of these policies on the intranet site for staff access and as hard copy in the breakroom of all staffed facilities.
4. **Training:** PWSA is committed to the development and training of each staff member, equipping them with necessary knowledge of environmental compliance and ethics obligations and the understanding of how to report suspected acts of non-compliance. The PWSA Human Resource Department maintains the Comprehensive Training Policy and Employee Training Requirements. Organization-wide training is facilitated and tracked using a cloud-based Learning Management System (LMS). Each PWSA employee is made aware of the Administrative Agreement, codes and policies, and the Environmental Compliance Manual during the on-boarding process (within 30 days of hire date). Annual refresher training is provided to all PWSA staff by September of each year. Refresher training includes ethics, environmental compliance, and whistleblower information. Environmental compliance and ethics training is also conducted as part of weekly tailgate meetings at Aspinwall WTP, Mission, Howard, and Brilliant. These tailgate meetings include review of environmental compliance, ethics, and safety topics for PWSA's Operations staff. PWSA also provides training for contractors and consultants on environmental compliance and ethics requirements.
5. **Environmental Compliance Manual:** The purpose of the Environmental Compliance Manual ("Manual") is to establish the foundation of PWSA's compliance with water quality and environmental requirements in accordance with federal, state, and local laws and regulations; orders and agreements; and PWSA's policies and procedures.

The Manual is used to manage environmental compliance for all of PWSA's facilities including the Aspinwall Water Treatment Plant (WTP), Highland Park Membrane Filtration Plant (MFP), pump stations, reservoirs, and storage tanks, sewage pump stations, Brilliant, Mission, and Howard Field Operations Yards, Central Warehouse, and Administration Building. The Manual addresses drinking water, wastewater, and stormwater compliance, disposal of generated wastes, storage and management of chemicals, industrial stormwater and wastewater discharges, air emissions, and monitoring and reporting to regulatory agencies. The Manual is intended to be utilized by PWSA Environmental Compliance Department for day-to-day operations at these facilities and as a reference for all PWSA staff.

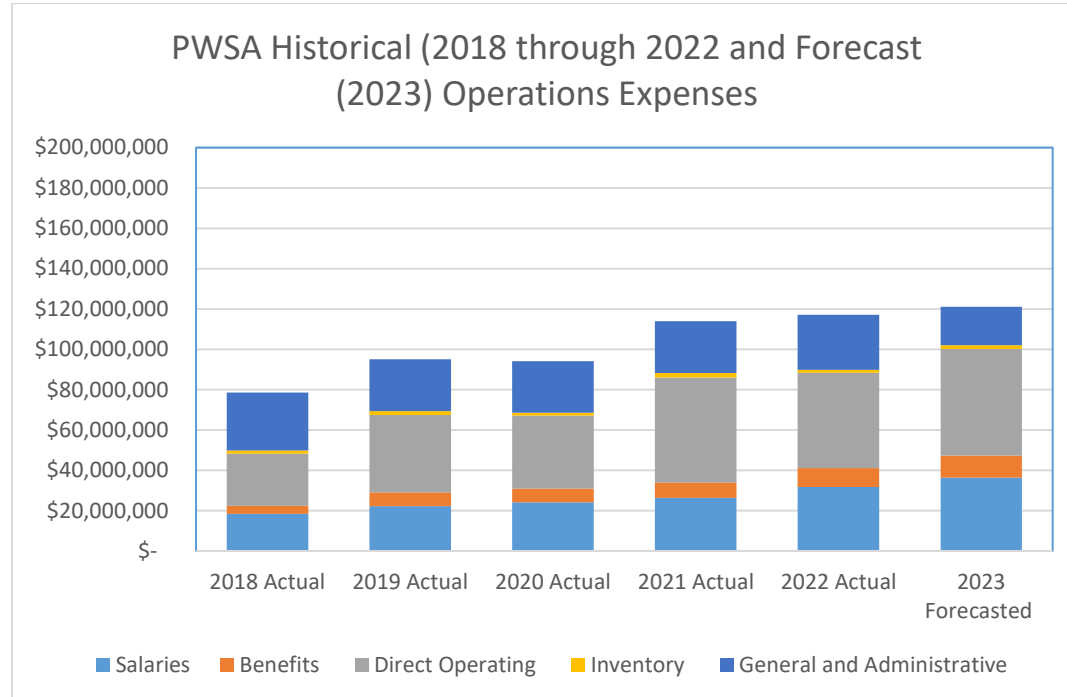
2.3 ADDITIONAL FINDINGS AND RECOMMENDATIONS FOR MAINTENANCE, REPAIR AND OPERATION OF THE WATER, WASTEWATER, AND STORMWATER SYSTEMS DURING THE 2024 FISCAL YEAR

As Consulting Engineer for the PWSA, ms consultants, inc. recommends the PWSA advance the 5- year CIP, approved on October 28, 2022. Most of the maintenance and operational issues previously identified are

being addressed as separate tasks. In addition, this section contains suggestions and recommendations to be undertaken (or continued) during 2023 to improve the PWSA's ability to provide a reliable source of potable water to its customers, provide reliable sewer system operations, and achieve compliance with current Consent Order requirements. Most of these recommendations are included in the CIP for 2023-2027.

Capital costs associated with these actions were estimated and used to assess the budget for the PWSA's CIP for 2022. Operational costs are shown in **Figure 2.1** for the years from 2017 through 2021 (actual operations expenses) and for 2022 (forecast operations expenses), that the PWSA provided November 9, 2022.

Figure 2.1: PWSA Historical (2017 through 2021) and Forecast (2022) Operations Expenses¹



On November 17, 2023, the PWSA Board approved the Operating Budget for 2024. The 2024 operations expenses and the operations categories are summarized in **Table 2.2**. The budget indicates that the operation expenses are slightly higher than last year.

When looking beyond 2023, a greater amount of operations expenses is anticipated to be needed in anticipation of the need to implement a more robust program that will be required as part of the consent decree currently under negotiation.

Table 2.2: PWSA's Estimated Operating Expenses for 2024

	2023	2024
Salaries	\$36,346,062	\$38,001,626,
Benefits	10,917,252	11,159,594
Direct Operating	52,795,159	51,515,682
Inventory	2,005,208	2,064,150
General and Administrative	18,956,638	18,453,261
TOTAL	\$121,020,419	\$121,176,313

Operating expense increases over the past five years are mostly attributable to increased hiring (salaries and benefits), direct operating costs, and general and administrative expenses. Overall, the proposed 2024 Operation Budget is slightly higher than the approved 2023 budget. Of that increase, the salaries themselves increased by 5%, which reflects both the cost of living and planned additional hires. Also noted are the General and Administrative expenses, which decreased by 3% and the Direct Operating expenses, which decreased by 2%.

A significant increase in the number of employees is needed to effectively address the additional operations, monitoring, maintenance, environmental compliance, and project management actions required to implement the CIP and the maintenance and operational improvements identified herein. For example, additional operations staff will be needed to assist engineering staff with providing valuable input in the design stage and reviewing design plans, and staff experienced in supporting projects during the construction and commissioning phases of a project appear beneficial.

Active coordination and collaboration among departments, such as engineering and operations, engineering and compliance, operations and compliance, and engineering and finance, will be more important than ever to accomplish the work in the CIP and operations budgets, which in 2023 are both the highest in the PWSA's history, respectively. Especially for large projects, it is recommended that there is increased cohesiveness and coordination and clearer definitions of responsibilities throughout the critical path for each project.

The projected increase in the 2024 operating budget is in line with what is needed in order for PWSA to execute all their internal initiatives such as safety and regulatory compliance and training programs. This also reflects the PWSA commitment to improving their operations with the goal of maintaining a much more reliable system to meet or exceed customers' expected level of service.

2.4 WATER SYSTEM FINDINGS AND RECOMMENDATIONS

The existing water distribution system has significant portions of the system operating beyond their useful lives. In reviewing the American Water Works Association (AWWA) standards and guidance for the percent of water system renewal that should occur based on system size, PWSA has been behind, however; over the past few years they have made a concerted effort to help close the gap and are continuing to do so as evidenced in their 2023 – 2027 CIP. Specifically for the water distribution system, the PWSA used the February 25, 2020, Water Distribution Master Plan as a guide. This Plan includes an assessment of each system within the storage and distribution system, and a plan to address noted deficiencies or required improvements. Although the master plan recommended over \$446 million in improvements for the water distribution system, which consists of pumping, storage, and water main replacement, the 2023-2027 CIP budget has almost \$945 million allocated for improvements in these categories. This excludes the \$242 million that was slated for the water reliability projects Aspinwall Pump Station to Lanpher Reservoir Rising Main and the Bruecken Pump Station Improvements. Of the \$945 million, roughly \$512 million is for PWSA's program for rehabilitation and/or replacement of large- and intermediate-sized diameter water mains and their Small Diameter Water Main Replacement program. This capital investment reflects PWSA's continued commitment to increasing reliability, reducing outages, and improving their water distribution system overall.

Known changes in future water quality standards require a plan for implementing changed operating treatment materials and procedures. The PWSA has restored its pilot plant within the laboratory at the Water Treatment Plant, as well as joined Partnership for Safe Water in order to prepare for future changes and advancements.

Operations have made significant strides in the past couple of years, specifically focused on their meter renewal, leak detection, hydrant flushing, and valve exercising programs. Average daily pumpage in the system has also reduced from over 70 MGD to around 62-65 MGD in 2022. This can be a reflection of both the PWSA leak detection program and capital investment in their infrastructure.

Relative to their meter program, Operations has worked on installing meters for customers that were historically placed on a flat billing rate. As of November 2023, only 261 customer accounts (down from around 450 accounts) remain on a flat billing rate. On top of that, they have installed meters on each of the City facilities that were not metered previously.

As described in Section 1.4.1.1, since 2016, the PWSA has made significant progress with reducing lead levels in the water distribution system, by implementing corrosion control with the addition of orthophosphate in the water lines and by replacing lead lines. Highlights of PWSA's additional larger water system implemented in 2023 include the following awarded projects:

- Construction and Construction Management of 2022 Small Diameter Water Main Replacement
- Design of 2023 Small Diameter Water Main Replacement
- Construction and Construction Management of 2022 Valve Replacement Project
- Construction and Construction Management for 2023 Neighborhood Lead Service Line Replacement
- Construction and Construction Management for 2023 Urgent Lead Service Line Replacement
- Construction and Construction Management for 2023 Neighborhood Lead Service Line Replacement – Contract 2
- Construction and Construction Management for Highland Reservoir Pump Station and Rising Main
- Construction of Security Cameras for the Water and Wastewater Safety and Security Project

The other program that we're implementing is part of the regulator upgrade program, PWSA is replacing all of the Pressure Relief Valves (PRV's) that are between the pressure districts. These PRV's will have cloud-based flow meters and pressure monitors on them in order to better track when those are activating and water's going from one pressure zone to a lower pressure zone. Those will also help with that leak detection.

2.4.1 NEW RECOMMENDATIONS

Monitor upcoming federal and state regulations, including the Federal Lead and Copper Rule revision (LLCR/LCRI) and Federal regulation on per- and polyfluoroalkyl substances (PFAS). PWSA began pro-actively monitoring for PFAS at raw and entry point water locations and continues to do so. In 2024 initial monitoring will be completed as required under PADEP new rule as found in Chapter 109 (4 consecutive quarterly samples at entry point). In 2024 PWSA will perform UCMR5 sampling for PFAS and Lithium.

The LLCR and proposed LCRI focuses on lead service line replacement, of which PWSA is ahead of the curve compared to most other utilities in the U.S; however, there are other aspects of the rule that will require additional sampling and communications that may impact PWSA.

2.4.2 ON-GOING RECOMMENDATIONS

Sluice gates are currently inspected on an as-needed basis. It is suggested that a maintenance plan be developed to address the inspection and maintenance of PWSA's sluice gates on a more routine basis.

Consider adding additional staff in the engineering group to assist with the execution of ever-increasing capital projects in the capital improvement program. It was reported in 2023 that PWSA was able to hire a senior facilities construction manager who will take over the construction oversight of the larger facilities once they go out to bid. A senior facilities project manager was also hired to take over some of the larger-scale projects.

Significant portions of the PWSA facilities and infrastructure are located outside of the public right-of-way, and existing easements may not have been obtained at the time of installation. To allow for unencumbered access and necessary maintenance, the PWSA should establish easements where the PWSA facilities or infrastructure are located.

Designate a primary point of contact to lead a team from the operations staff to coordinate with compliance staff and to focus on system flushing, testing, monitoring, and tracking trends to optimize this work.

Designate a primary point of contact to lead a team from the operations staff to coordinate with engineering staff and to focus on system improvements such as valve isolations for future work, putting new systems into service, and coordinating with design and construction services.

Continue the Water Quality Initiative Program and adjust the program as necessary, depending on regulatory requirements and testing results. These types of requirements include a lead and copper testing program for residential customers, continued optimization at the WTP, continuing lead service line replacement assistance, replacing the PWSA-owned lead service lines, and continuing the internal and public education programs.

Continue to track and control non-revenue water, through increased leak detection efforts, large meter calibration and/or replacement, and installation of meters on unmetered uses.

PWSA Operations (OPS) staff is aggressively changing out meters aiming to change out 50,000 small (one inch or less) meters in a five-year period. The small meter replacement was slightly impacted by the effects of the COVID pandemic and only 6,000 new meters were installed in 2020 and 5,000 new meter were installed in 2021. In 2022, total small meter replacements were 6,028 in total. As of November 2023, a total of 4,546 meters have been replaced. Additionally, OPS is just as aggressive on targeting large meters to replace. Consideration should be made on first replacing the larger, older meters that serve PWSA's largest customers as those would yield the highest return on investment.

PWSA has a team of employees charged with surveying leaks with acoustical sounding equipment. PWSA has expressed a desire to supplement the current program by creating a District Metering Program. Adding flow monitors in zones/districts of the system would allow PSWA to determine baseline demands in that district so when you see a significant increase would alert for possible losses that do not typically surface. Currently finished water leaving the plant is accurately metered, however once it leaves the plant and they do not have a handle on the demands throughout different portions of the system. Creating a more programmatic approach of system leak detection will help improve non-revenue water.

Exercise distribution system valves and hydrants on a routine basis and implement a plan to exercise valves and sluice gates at the water treatment plant on a routine basis. Repair or replace non-operable valves and sluice gates at the water treatment plant and non-operable valves and hydrants in the system. PWSA has a

program that exercises approximately 5,000 valves a year; the number may change based on conversations with the PUC and the need to exercise the critical valves (approximately 1,000 valves) every year. PWSA is striving to create a program in which they touch every valve in a four-year cycle. PWSA also created a program to flush and inspect 2,500 hydrants per year which put them on a three-year cycle.

The need for inspections on the water storage tanks is shown in **Table 2.2**. This activity would benefit from the development of a more programmatic inspection program by Operations.

Continue the routine maintenance program to remove and prevent vine and vegetation growth from the vertical facilities and perform detailed inspections of roofs and rain conductor systems. This is both accomplished by in-house employees who routinely cut grass and maintain some of the vegetation and by maintenance contracts at some of the Authority's facilities.

Continue planning and design of facilities to replace the Clearwell. Monitor and record the condition of the existing Clearwell related to cleaning, structural, and mechanical performance, and implement the Emergency Contingency Plan as necessary.

PWSA has tried to address both waterline and sewer system upgrades simultaneously and they have proven that the logistics are not ideal. It is recommended that PWSA continue strategic coordination of waterline replacements in conjunction with deteriorating buried sewer infrastructure where it makes sense specific to schedule and for construction sequencing. This can be done by continuing to make repairs to deeper infrastructure prior to waterline replacements and jointly, where applicable.

2.5 LEAD SERVICE LINE REPLACEMENT (LSLR) PROGRAM

Pursuant to Paragraph 3.e.i of the November 17, 2017 COA issued by the PADEP, the PWSA was required to replace at least 1,341 public lead service lines within the system on or before June 30, 2018. To address the requirements of the COA and in support of full-service line replacements, the PWSA Board of Directors approved allocation of approximately \$44 million of the 2018 CIP budget to fund both the public and private side replacement for lead service lines in the PWSA's water service area. The public and private line replacements were performed by several contractors selected by an open public bid process. The PWSA met the requirements of Paragraph 3.e.i of the PADEP's November 17, 2017 COA. By June 26, 2018, the PWSA had replaced 1,347 public lead service lines to meet the COA requirements. Of the 1,347 lead service line replacements, 634 replacements were conducted under the 2017 and 2018 Lead Service Line Replacement Program. All other replacements were conducted either by the PWSA's Field Operations crews or as part of water main relay projects. Pursuant to Paragraph 3.e.i of the November 17, 2017 COA and as subsequently amended by the PADEP, the PWSA was required to replace an additional 855 public lead service lines by December 31, 2018. The PWSA exceeded that goal and replaced 1,366 lead service lines between June 27, 2018 and December 19, 2018.

In addition to dedicated Lead Service Line Replacement (LSLR) projects, a major component of the Small Diameter Water Main Replacement (SDWMMR) program includes the replacement of lead service lines. There are two active lead service line replacement contracts:

1. Neighborhood LSLR program – The 2022 program was funded by a \$17 million grant from the city's American Recovery Plan (ARP) Act. PWSA initiated the work in April of 2022 and the work completion is expected by the end of 2023. The 2023 Program received two funding approvals totaling \$27.2M funding from PENNVEST and will focus on low-income populations or homes with children under six years of age.

2. Urgent LSLR – PWSA OPS, by current practice, is out replacing either a section of a water main that's had a break or even a section of a public service line that's had a break. In doing so, if lead was encountered on the private side, PWSA will immediately try to connect the customer to a temporary private side service line. Then PWSA will bring in one of their construction contractors to do the private side replacement.

Updates on behalf of the 2023 reporting period include:

- 2021B and C SDWMR – complete.
- 2022 Neighborhood LSLR – work conducted at almost 2,500 locations so far to have service line materials verified and around 700 public and 680 private service lines replaced (completion late 2023 with final restoration in spring 2024)
- 2022 Urgent LSLR – allow private side LSLR when PWSA Operations Department replaces a public side service line (annual contract ended August 2023).
- 2022 SDWMR projects, which will include about 12 miles of water main replacement and 1,400 public service line replacements (and any private lead connected to these) is closed with PENNVEST in July and construction started August 2023.
- 2023A Neighborhood LSLR Program with work planned at 1,200 locations with construction starting July 24, 2023.
- 2023B Neighborhood LSLR Program Funding With work planned at 1,500 locations, construction starting in March 2024.
- 2023 Urgent LSLR started in August 2023.

Significant progress has been made to replace lead service lines. Since July 1, 2016 and as of December 1, 2023, the PWSA has replaced 10,642 public lead lines and 7,482 private lead service lines. PWSA will continue lead service line replacements, working towards the goal to replace all lead service lines by 2026.

Table 2.3: 90th Percentile Lead Results:

90th Percentile Lead Results Since Implementation of Orthophosphate		
Sampling Event	1st Liter	5th Liter
2019b	10.0 ppb	Not collected
2020a	5.1 ppb	Not collected
2021b	7.04 ppb	Not collected
2022a	4.42 ppb	Not collected
2022b	5.00 ppb	5.18 ppb
2023a	3.41 ppb	2.71 ppb
2023b	Pending Final Certification	Not Collected

The 2023a sampling concluded at the end of June, with 240 bottles delivered to the sampling plan locations and 118 samples returned for analysis. During this period both 1st and 5th liter samples were again collected. The 90th percentile lead results are the lowest results collected to date (3.41 ppb), continuing to demonstrate

the efficacy of the program. After completion of the 2023a sampling, PWSA prepared and submitted a Request for Designation of Optimal Water Quality Parameters (WQPS) on July 30, 2023.

The 2023b sampling program is currently underway with 240 bottles delivered to the sampling plan locations and over 100 samples returned for analysis. This sampling program reverted to first draw sampling only. The 90th percentile lead results will be available after the sampling periods ends on December 31, 2023 – likely in mid-January 2024.

Additional updates on behalf of the 2023 reporting period as related to the November 17, 2017 COA include:

- Quarterly Status reports have been prepared and submitted to DEP as required under the COA.
- Remaining obligations: Within 30 days of the end of the second period of follow-up tap monitoring, PWSA shall submit a request for designation of optimal corrosion control treatment water quality parameters.
- The designation of optimal water quality parameters request form was submitted to DEP on July 30, 2023. Once approved by DEP, PWSA is obliged to conduct WQP sampling on a monthly basis (vs two times every six months) for a one-year period under the terms of the COA.

The PWSA has been nationally recognized for their work on their lead program and over the years it's become streamlined with minimal changes needed. PWSA is meeting their compliance obligations and acted proactively to address future compliance requirements. As a result, no additional recommended improvements to the LSLR or orthophosphate optimization programs are suggested.

PWSA received one of the first ever Equity Awards given by the Association of Metropolitan Water Agencies (AMWA). The award recognized PWSA for the approach it is taking with the lead service line replacement program in terms of how it is planned and prioritized and the community engagement that PWSA takes upon each lead service line replacement project.

2.6 WASTEWATER SYSTEM AND STORMWATER FINDINGS AND RECOMMENDATIONS

The existing wastewater and storm sewer systems have significant portions of the systems operating beyond their useful lives. Preventative maintenance, rehabilitation, and/or replacement is strongly recommended in the near-term to ensure reliable wastewater and storm service.

In 2021, PWSA reported having proactively completed approximately 79,296 linear feet (15 miles) of sewer televising. Comparatively, in 2022 they completed 112,504 linear feet (21 miles), and in 2023 they completed 132,848 linear feet (25 miles) mainly through their Small Diameter Water Main Replacement (concurrent CCTV) and Small Diameter Sewer Rehabilitation contracts. These statistics do not include the televising performed by PWSA internal Operations staff, since it is primarily performed in reaction to an operation or maintenance issue. Inspection and condition assessment of below-ground infrastructure, pipelines, and storage facilities should continue to be conducted with a proactive approach. The PWSA established and "piloted" a risk-based approach towards prioritizing sewer rehabilitation in 2023 and plan to utilize the methodology on future contracts. Results of this trial indicated that approximately 50% of infrastructure that was condition assessed required a rehab measure. PWSA was able to adopt and utilize the rehabilitation criteria to make a call whether the asset requires rehab or not. This includes infrastructure inspected by PWSA's OPS CCTV crews. To enhance the outcome from the televising work that OPS performs, PWSA

established a new protocol such that OPS will complete a full inspection for every pipe they televise as opposed to a partial inspection.

The sewer system contains a significant number of “junctions” serving as sewer connections in place of manholes. These sewer connections are inaccessible for maintenance and repair purposes. Construction of new junctions should be avoided wherever possible. It is recommended that manholes are constructed instead of junctions or in place of existing junctions where feasible and standard guidance applies. The maximum distance between manholes should be 400 feet, as per “Recommended Standards for Wastewater Facilities,” also known as “10 State Standards.” PWSA reported that they are replacing Junctions everywhere as located through the SDSR contracts even if pipe rehabilitation is not needed or recommended.

Starting in Spring of 2020, PWSA and their consultant, in close collaboration with the Department of City Planning, had been working on a substantial update to the City’s Code and Ordinances specific to stormwater management. This effort was done primarily to create a more unified Code and make improvements to the stormwater review and approval process. As part of this effort, the City released a Stormwater Design Manual providing guidance for compliance with the stormwater management requirements included in the City’s modified Code. The stormwater Code updates went into effect on March 31, 2022.

In conjunction with the Code and Ordinance updates, PWSA and their consultant drafted a Stormwater Strategic Plan which is a high-level planning document that serves as a roadmap for stormwater management and education. The Stormwater Strategic Plan was built off past planning efforts by using climate change data, community input, and prioritizing public health and wellness to provide a cost-effective, inclusive, and sustainable way to address one of the region's most challenging problems. A draft of the Strategic Stormwater Plan was released and shared with the public in December 2022. The creation of the plan was funded by three foundations (\$100k per foundation) which helped defer the cost of its development. The PWSA should continue to collaborate with the City and, where applicable, the Pennsylvania Department of Transportation (PennDOT), to mitigate flooding.

A draft of the Strategic Stormwater Plan (SSP) was shared with the public in December 2022. The CIP for 2023 through 2027 doesn’t include projects specifically sourced from the Stormwater Strategic Plan, though it’s focus is the following:

- Outlines priorities for investment for stormwater management focusing on 4 lenses:
- Water Quality – CSO and MS4
- Flooding – localized, basement backup, riverine
- Equity – Investment in distressed communities
- Opportunity – Targeting existing green space and vacant property
- Looked for ways to leverage PWSA’s investment through partnerships, external funding partners, etc. stormwater to other infrastructure investment such as energy, transportation, etc.

A public comment period for the SSP was open from December 16, 2022 through June 30, 2023. A total of six public meetings were held with attendance ranging from 14 to over 70 people. PWSA also created and deployed communication that included social media, regular city-wide meetings, and ways to directly engage the community with mailers and door to door efforts. Total of 37 comments were received and overall participation in the public comment period was excellent with participation from PWSA staff along with stormwater partners. A consideration for the development and implementation of future stormwater projects

is their synergy with the on-going wet weather planning efforts and the recommended projects that will result from the long-term control plan development. These efforts will require on-going coordination.

Negotiations began in 2021 with the USEPA, the DOJ, the PWSA, and the City to develop a consent decree for implementing CSO and SSO reductions. To date, a CSO Long Term Control Plan (LTCP) has not been accepted by the PADEP, USEPA and the DOJ for the City and the PWSA. It is anticipated that the PWSA will develop a new LTCP in the next few years, after the consent decree is agreed upon. In October 2021, the PWSA awarded a contract for a Wet Weather Program Management (WWPM) consultant to assist the PWSA with negotiating the consent decree and developing the new LTCP. This LTCP, once finalized and accepted, will create a significant draw on the PWSA resources.

Wet Weather Current Activities Include:

- Development of Operations and Maintenance Standard Operating Procedures/Manual
- Model expansion and calibration
- Flow monitoring in sanitary sewer system
- Regionalization
- Green Infrastructure effectiveness monitoring

As part of late 2021 through 2022 wet weather planning efforts, approximately 100 flow meters were installed in a systematic manner throughout PWSA's system to help inform H&H model expansion and long-term control planning efforts. The meters were installed until the end of November 2022 resulting in a 9-month total monitoring period. Subsequently in 2023, the WWPM Team sited and installed flow meters in separate sanitary sewer areas for another 9 months of metering. PWSA also has 74 permanent flow meters and associated rain gages installed as part of their CSO reporting requirements.

As part of wet weather planning team efforts, a task is being performed by a consultant to evaluate the impacts of ALCOSAN's Regionalization program to the PWSA. As part of this evaluation, a Benefit Cost Estimate (BCE) was prepared and shared with PWSA as a justification for PWSA and PUC use as to whether Regionalizing assets is beneficial to the PWSA or not. PWSA hopes to have direction on this effort moving into 2024.

In 2023, several collaborative meetings were held with key regional and regulatory stakeholders and partners including ALCOSAN and 3RWW. In May 2023, a meeting regarding hydrologic and hydraulic (H&H) modeling was held with regulators along with a meeting in June 2023 for water quality and operations and maintenance.

PWSA is also working on their compliance with their MS4 and has a Memorandum of Understanding (MOU) with the City outlining roles and responsibilities specific to MS4 designated overlay areas. PWSA has an ongoing project, initiated in 2022, in City parks that are greater than 50 acres in area. PWSA didn't have a good understanding of the existing stormwater collection and conveyance infrastructure asset connectivity or condition in those City parks. As a result, they are performing CCTV work to identify all of the infrastructure including the GPS locating and mapping of MS4 outfalls. That work remains in progress as work to date has located more buried infrastructure than anticipated. The City has separate MS4 requirements. As a result, PWSA meets with them regularly to coordinate efforts.

Current regulatory requirements defined in the PWSA's and the City's MS4 NPDES Permit No. PA136133 include 10% sediment reduction to be completed by June 30, 2025 in the Saw Mill Run watershed, the Streets Run-Monongahela River watershed, and the Chartiers Creek watershed specific to Pollution

Reduction Plan (PRP) requirements defined under the MS4 program. PWSA has partnered with PennDOT to implement projects for credit in areas such as Saw Mill Run with projects targeted in lower Chartiers Creek and Beck's Run. Both stream restoration projects for Chartiers Creek and Beck's Run have anticipated implementation by 2024. Sedimentation is the pollutant of concern within both watersheds. The PADEP requirements stipulate that a 10% reduction in pollutant loads (sediment) be achieved for each watershed. This equates to approximately 5,608 lb./yr. for the Chartiers and 12,209 lb./yr. for the Becks Run/Streets Run-Monongahela.

Through the implementation of PWSA's new Learning Management System, MS4 training requirements have been met 100% by April 24, 2023.

The PWSA is continuing to prioritize sewer rehabilitation projects, green infrastructure projects, repairs for wastewater pump stations, and closed-circuit televising of sewers. Highlights of the PWSA's larger sanitary, combined and stormwater project awards include:

- Construction and Construction Management of 2023 Catch Basin and Inlet Replacement Project
- Construction of Queenstown Sewer Improvement Project
- Construction of 2023 Sewer Reconstruction Project
- Construction of 2021 Large Diameter Sewer Rehabilitation
- Construction of 2023 Small Diameter Sewer Rehabilitation – Contract 1, 2, and 3
- Construction of Haverhill Street Stormwater Improvements

PWSA reported that DEP Technical Reviews for PENNVEST funded projects have resulted in project implementation delays. For the 2023's, PWSA allowed for 90 days based on what they thought the effort would take and they far exceeded that 90-day period. As a result, the cash flow for some of their wastewater projects have been impacted.

2.6.1 NEW RECOMMENDATIONS

Coordinate with PWSA WWPM team tasked with assessing the impacts of Regionalization to the PWSA which is specific to assets that convey flow from one or more community located upstream of the PWSA service area.

2.6.2 ON-GOING RECOMMENDATIONS

Paragraph 7 of the 2004 Consent Order and Agreement required all municipal catch basins within 100 feet of a sanitary sewer to be tested to verify they are not connected to the sanitary sewer. The PWSA completed testing of the catch basins in 2011. It is recommended that the PWSA systematically continues to disconnect illicitly connected catch basins to the sanitary sewer system, as discovered.

Continue participation in 3RWW Combined Sewer System (CSS) and Separate Sanitary Sewer System (SSS) committee meetings to facilitate knowledge transfer and collaboration with PWSA upstream municipalities to support 2021 "Revised Orders."

In relation to similar recommendations made on behalf of the Water System, the Wastewater Group should continue to strategically identify sewers for concurrent CCTV with future water main rehabilitation. For example, when 2024 small diameter water main repair areas have been identified, a query of interacting sewers is performed such that any identified as overlapping can be categorized as replaced, lined, existing

quality CCTV, and those remaining would be identified for CCTV. Sewers identified as deficient can then be prioritized for lining ahead of waterline replacement.

While PWSA's financial status may limit or post-pone the development of a system-wide Stormwater Management Plan, a watershed-specific demonstration project is recommended as a pilot Stormwater Management Planning tool where a specified watershed is analyzed from a feasibility study phase, to concept all the way through to implementation where lessons learned could be scaled for future system-wide application.

In 2022, PWSA established more proactive program for preventative and post-intense rain maintenance. Hot spots have been identified and coordinated with PWSA sewer operations such that a visit will be made prior to and/or directly after an intense rain event to clean troubled or blocked areas to prevent and minimize flooding impacts. This initiative continued to grow and expand beyond 2023.

The WWPM team is tasked with assessing PWSA's Capacity, Management, Operations and Maintenance (CMOM) framework and has provided preliminary recommendations. A planning initiative for risk assessment is to build out a logic tree to initiate a risk-based approach for identifying priority areas and inspection frequency for rehabilitation as it relates to the sewer mains.

Increase the cleaning and inspection frequency cycle for the wastewater and stormwater systems to improve on O&M knowledge to allow the PWSA to be proactive in responding to potential failures before they occur.

Continued coordination with the Wet Weather Program Management team is recommended as PWSA's system continues to be evaluated which will help identify and inform problem areas and eventually lead to a Level of Service evaluation.

Continue to replace junctions throughout the wastewater and stormwater systems with traditional manholes wherever possible. There are a few contracting vehicles for this work currently, 1) Operations Manhole Point Repair contract 2) Small Diameter Sewer Rehab projects 3) Urgent Sewer Repairs, as applicable.

Continue to update the electronic asset registry in asset management software for CIP projects that have been completed as-built drawings and resulted in asset changes, such as addition of new manholes and sewer pipe, abandonment of existing infrastructure, updating of key attributes such as pipe, shape, material, invert depths etc., if applicable. PWSA has moved to centralize inspection information in e-Builder versus web maps. PWSA reported improvements with faster updates and accessibility.

Continue to prioritize the regulatory requirements in the CSO NPDES permit, including compliance with the Nine Minimum Controls requirements. Through the course of 2022 PWSA updated their Nine Minimum Controls document and shared the updated version with state and federal regulators in early 2023. The PWSA received comments from the agencies and PWSA had follow up questions. Once responses to the questions are received the document will be finalized and is anticipated to be completed April 2024.

Since 2021, PWSA has streamlined their approach to the documentation and logging of complaints related to sewer basement backups. In-field confirmations have increased in frequency in addition to the enhancement of the mapping of backups within PWSA's GIS environment. The Wastewater Group initiated a process in 2020 for a root cause analysis for basement backups. It is recommended that PWSA continue to enhance this tracking and analysis and coordinate with their Stormwater Group in regard to similar initiatives they have planned to further assess customers impacted by basement backups due to flooding. PWSA is exemplified as progressing these needs through projects such as Fuchsia Way, which was born out of a significant amount of reported basement backups.

PWSA has a monthly standing meeting with ALCOSAN, but currently both organizations meet several times a month due to all the coordination and overlap of wet weather planning initiatives. The PWSA should continue to coordinate with ALCOSAN regarding the wet weather improvements that each organization is embarking on in their respective wet weather programs. More specifically of high priority is ALCOSAN's Ohio River Tunnel (ORT) design progress and impacts to the PWSA system.

Continue to maintain the stormwater system for optimal operation and in compliance with the MS4 requirements, including the six Minimum Control Measures. The PWSA should prioritize the regulatory obligations for the PWSA and the City in the five-year MS4 permit term, including the required reduction of sediment in three watersheds by June 30, 2025. In 2022, the PWSA and the City should plan and design the stormwater best management practices to address the pollutant reduction regulatory requirements currently mandated before June 30, 2025 and plan for future pollutant reduction.

Continue to focus on opportunities for trenchless rehabilitation due to its significant cost savings (four times cheaper) as compared to rehab that requires digging up a street.

2.7 SUPPORT SERVICES FINDINGS AND RECOMMENDATIONS

2.7.1 INFORMATION MANAGEMENT SYSTEM (IMS) FINDINGS

The PWSA is in the process of initiating implementation of a Computerized Maintenance Management System (CMMS) in 2023. As part of PWSA's CMMS selection, and prior to the RFP stage they talked with 13 or 14 different Water utilities around the country to understand the various systems they are using and how they structure their asset management program. A non-negotiable for PWSA was that the system had to be a Geographic Information System (GIS) mapping centric asset management system. The new CMMS system will be rolled out in two phases. Phase 1 will be focusing on vertical assets first, and then phase two will be replacing the current work order system Spry Mobile with the new system. Spry Mobile was implemented for field use in 2019 and began to be utilized at the Aspinwall Water Treatment plant in 2022. The Authority is also in the process of enhancing their current GIS in order to build out the GIS platform to allow it to integrate with the new CMMS software. A steering committee that included representatives from multiple departments that would be impacted including engineering, operations, GIS, and MIS, was formed to help make decisions about the level of detail to track in the asset management system. The team spent a lot of time establishing asset hierarchy rules. PWSA does not have a robust inventory of records for all asset types, particularly on the production side. Thus, they have been working on completing an inventory.

The PWSA implemented an Enterprise Resource Planning (ERP) System in 2022, which had been several years in the making. The PWSA went live with the ERP software Systems, Applications and Products more frequently referred to as SAP in August of 2022, which was a replacement for their financial system, previously Cogsdale. This included the replacement of their customer information, also previously Cogsdale. This resulted in the introduction of a new customer portal. Before the introduction of that new customer portal, customers needed to log into two different vendor websites. One, to get usage information about their property and the other one to see billing information and make payments. Now they can do all of that within one platform, a benefit for customers. They can also set up usage alerts, if they have high use. Consequently, there was some additional functionality that resulted from that implementation. The ERP integration project has been a large initiative as replacing the financial system and customer information system are two of the most important enterprise systems that the authority has. Selection and implementation were a lot of work along, then there's the need for integration with different other pieces of software within the authority. Other integrations

included the bill print vendor KUBRA integration to their meter platform census. While it was a very challenging project, the PWSA adopted it, are using it, and are continuing to enhance it over time. PWSA believes SAP is going to be the foundation for the Authority for years to come. Some other enhancements in 2023 included the automated collections process called Dunning went live in 2023. For their non-access process, if they're not able to get into a customer home to replace a meter, there's a formalized process to go through to post notices which has now been automated within SAP. SAP will remain PWSA's source for their inventory record. SCADA is intended to also be integrated into the CMMS to facilitate the start of preventative maintenance tasks.

The PWSA built and calibrated a hydraulic water model using WaterGems by Bentley. This model work was completed in November 2019, and the PWSA uses the hydraulic water model frequently for water system analyses. In conjunction with water model updates and related to asset management, the PWSA has been reviewing historical records and updating asset data more specifically the asset installation date to assist with rehab and replacement prioritization and risk evaluation.

The PWSA's hydrologic and hydraulic (H&H) sewer system model is a valuable tool for assessing and evaluating the sewer system and should be upgraded as necessary and maintained on a regular basis. In 2022, PWSA shared their H&H system-wide model with their Wet Weather Program Management (WWPM) Team. The WWPM Team has developed a methodology and approach to its expansion and calibration. Calibration for the primarily combined sewers areas commenced in 2023 and will continue into 2024.

In 2022, PWSA received Board approval to implement a cloud-based Environmental Management Information System (EMIS) program. EMIS is a software/database system to provide a single platform for tracking and documenting environmental compliance activities such as permitting, investigations, safety, and audits. This system was implemented in 2023 by PWSA's Environmental Compliance Program Manager and will help PWSA move away from paper forms and documentation to an electronic system for tracking documents, deadlines and everything compliance related. In 2023, PWSA completed the following tasks and activities including planning and scoping of items related to the implementation of their EMIS.

Table 2.4: 2023 EMIS Tasks/Activities

Completed Tasks/Activities	Timeframe
Scoping Discussion: Mobile ICE Tracking Form	January 2023
In Person Meeting With NJBSoft	January 2023
Module - Chemical Inventory, Storage Tanks & Spill Prevention - Live	February 2023
Scoping Discussion: NOV Tracking in Incident Management	February 2023
Scoping Discussion: Safety	March 2023
Module - Stormwater MS4 - Live	March 2023
Module - Incident Management (IM) / Corrective Action (CA) – Live	April 2023
Scoping Discussion – Sanitary Sewer Overflows	June 2023
Scoping Discussion – Combined Sewer Overflows	June 2023
Scoping Discussion – NPDES for WTP	June 2023
Module – Safety – Inspections & IM / CA – Live	July 2023
Module - Stormwater WTP NPDES	August 2023
Module - Sanitary Sewer Pump Station Inspections	August 2023
Module - Combined Sewer Overflow Diversion Inspections	August 2023

In addition, the PWSA has implemented a cloud-based Document Management System (known as DocuWare), which provides PWSA employees with the ability to electronically view and analyze engineering and administrative documents that were previously only available in paper copy form.

In regard to staffing in 2023, the PWSA was able to fully staff their IT help desk. All open requisitions have been filled.

Cybersecurity is an important focus for the PWSA. PWSA works closely with Cybersecurity and Infrastructure Security Agency (CISA), the Federal Cybersecurity Agency, and utilizes tools and services provided by the Agency to protect the critical infrastructure.

2.7.2 INFORMATION MANAGEMENT SYSTEM (IMS) RECOMMENDATIONS

The PWSA should prioritize the continuing effort of upgrading the current GIS. Recent upgrades include working with an integration vendor to set up asset management system using ARC GIS. Continue to have conversations with the integration vendor and PWSA's GIS software vendor Esri specific to the setup of the asset management software. More recent discussions revolved around using ARC GIS online (AGOL) or their enterprise version. There's pros and cons associated with each. As part of their asset management program expansion, the PWSA built out new asset classes for all of the different vertical assets that they intend to track. They are using the Esri GIS-based Field Maps software application to field collect GPS points of the asset and the high level details because the software they're implementing will tie into those asset layers in GIS.

Continue with development and implementation of the selected CMMS, including training staff to assist with capital investment prioritization. CMMS is a software system that can be used to house, manage, and track all the various field inspection, relays, repairs, materials, equipment and labor costs, and other associated work for the PWSA's asset management program. The CMMS can be used by field and engineering staff to record, house, track, and identify short-term and long-term asset investment needs. A properly developed CMMS can identify efficiency improvements, increase levels of asset renewal, and reduce operation, maintenance, and capital costs. The CMMS should communicate with the GIS system and be able to coordinate with e-Builder software as well as the PWSA's finance system. Successful implementation of a system-wide CMMS will require significant organizational, operational, management, and capital changes to the PWSA's existing systems. The current plan is to launch the CMMS in two phases with phase one focusing on vertical assets and phase two will be replacing their current work order system of Spry Mobile with the newly selected system. Training will also be a component of the CMMS rollout.

Operations and maintenance staff as well as construction inspectors and construction managers should add existing conditions and/or as-built information such as pipe material and installation date with hyperlinks to records and photographs to the existing GIS information. Continuous GIS improvements will reduce the costs of data management, increase the flow of technical information, decrease the costs of engineering activities, and allow more comprehensive coordination with agencies, utilities, and the PWSA operations. In addition, it will allow the PWSA to securely share and/or publish certain data to the public.

The water distribution modelling software, WaterGEMS, has been developed for the PWSA's system. WaterGEMS is the only hydraulic water model that has a separate input for hydrant data. Hydrant results from field investigations can easily be compared to modelled data to pinpoint possible problems in the system. It also can perform a criticality analysis, which can be integrated into the CMMS to develop a comprehensive main replacement program and help turn engineering decisions from a reactive process to a proactive process.

The model that has been developed can be made more accurate as increased input data is obtained. It is our understanding that these activities were undertaken as part of the water system master planning effort during 2019. We recommend this effort continue and that this model is used to help plan each project.

The PWSA should coordinate with ALCOSAN regarding the wet weather modeling that each organization will be updating and expanding for their respective wet weather programs.

With the implementation and roll-out of a CMMS, it is recommended that PWSA consider and implement improvements with accessibility and the end-user audience in mind. The PWSA currently tracks track some of their work in an existing work order management system SpryMobile. However, that tool is not fully integrated into GIS. For example, if they wanted to see a map of the active operations water main repair work orders, to show those to the public, there's no easy way to do that. However, with the new CMMS, PWSA staff can easily show that information to the public or other stakeholders within the organization who don't necessarily need a license to the asset management system. The PWSA will be able to provide better access to information for their field crews that currently have iPads. Now they have to log into an internal web app that shows all of the GIS layers and separately they log into SpryMobile. Going forward staff will be able to see all of that in one application in the field.

Due to the criticality of PWSA's infrastructure CISA, the Federal Cybersecurity Agency, worked with PWSA closely and take advantage of different tools and services that they offer, including last year they did a tabletop exercise where they walked through a cybersecurity case study and received recommendations. In 2023, the PWSA took advantage of their penetration testing services and a risk and resilience assessment. PWSA used CISA so much that they were invited to speak at one of their conferences about what the use they get out of their services. It is recommended that PWSA continue to maximize access to support, training, and other services offered to them through CISA.

2.7.3 HEALTH AND SAFETY FINDINGS

Significant strides were made in regard to safety support services regarding staffing, training, and emergency preparedness in 2022 and 2023. PWSA hired two full-time employees in 2022, a Workplace Safety Manager and an Emergency Planning and Water Production Safety Manager. The Workplace Safety Manager is focused on workplace and field safety and the Emergency Planning and Water Production Safety Manager's focus is on water treatment facilities. The two positions enabled PWSA to bring the positions in-house and relieve themselves of an outside safety consulting contract and associated expense. In 2023, the PWSA hired two specialists, a health and safety specialist and a senior health and safety specialist. Safety has been both a focus and a concern at the PWSA, especially due to the impacts and added workload related to overseeing the Authority's' COVID 19 safety measures.

2.7.3.1 TRAINING AND INCENTIVES

The safety group implemented a training calendar in conjunction with Human Resources (HR) and the Environmental Compliance group to track required staff trainings. Safety trainings were also incorporated into PWSA's Learning Management System (LMS). This improved the ease of training deployment and access, including tracking training completion status for the employees. PWSA was also able to complete additional training that isn't required but important to the organization to reinforce. Some key trainings this past year included another round of defensive driving, NFPA 70E, training for repairmen and electricians, competent persons' excavations training, DOT Hazmat and PA One Call. Other substantial training improvements included a full revision to new employee orientation that was also deployed via the LMS. Customized training versions

specific to the following four categories 1) Plant-oriented, 2) Field, 3) Engineering, or 4) Other staff assigned to 1200 Penn Avenue were created and have been launched. A training matrix has also been established which serves as a roadmap depicting by job type which trainings are required and when. Specialized trainings, based on job type are offered as soon as day 3 and may include lockout/ tag out /authorized, forklift training, certified flagger training, etc. PWSA also re-trained over 80 employees in First Aid and CPR in 2022.

Another key and successful initiative included a customized web-based safety incentive program to improve safety culture. 2023 was the first year the incentive program was fully implemented within the approved budget. The incentive program has seen significant participation in non-mandatory programs, such as daily stretching prior to the work day. Part of this effort included a near-miss reporting program in addition to incentives for staff and managers. PWSA also implemented the Geotab system that monitors vehicles and encourages safe driving practices. A volunteer ergonomics and stretching program to reduce workplace injuries was also included in the incentive program.

Additionally, electrical safety (600 volts or higher), previously identified as a training gap was also implemented in 2022. In addition to this, Safety has requested funds in the operating budget to perform assessment and training specific to Arc Flashes.

2.7.3.2 EMERGENCY PREPAREDNESS

In regard to emergency preparedness and response, in 2021, the PWSA implemented an Incident Command System (ICS) that designated roles and responsibilities for incident commanders, Public Information Officers, safety officers, operations, planning and logistic section chiefs. Staff were designated specific roles and trained on what the role entails. Various emergency scenarios such as plant outages, natural hazards, and water quality events, which are included in an emergency response plan, were reviewed. PWSA's Senior Health and Safety Manager holds regular meetings every six weeks with the individuals involved in an emergency scenario via a tabletop setting to walk through the actions that should be taken step-by-step under an emergency response scenario. Annual training on the Emergency Response Plan (ERP) reinforces these and other emergency safety measures for employees. Annual trainings and review meetings were completed in 2023 and ERP has been kept up to date.

2.7.3.3 EQUIPMENT UPGRADES

In 2022, the PWSA spent nearly \$40,000 upgrading their excavation equipment; 80% of the utility trucks were outfitted with a fin board. PWSA also switched from hydraulic shoring to pneumatic shoring since there were previous related issues. In 2023, the PWSA purchased the needed equipment for pneumatic shoring along with purchased trench boxes. In 2022, Modular Aluminum Panel Systems (MAPS) were purchased to aide with the larger scale excavation work PWSA crews perform. Approximately \$80,000 was spent in 2023 for an arc flash assessment for all pump stations to be evaluated. The evaluation helps determine the potential for arc flashes and get all the labelling up to code. This helps evaluate needed equipment upgrades and emergency preparedness.

PWSA had an ergonomic assessment completed in 2022. As a result, training was rolled out to reach staff operating equipment i.e. high-risk lifts. Ergonomic practices addressing items such as exertions and static positions were rolled out to the field and the Plant personnel. While PWSA is not regulated by OSHA, OSHA 10 training will be required of all PWSA's engineers in construction and all of their field and plant managers are expected to attend a second class so that they all get an OSHA 10 certification for construction. In 2023, PWSA completed the OSHA 10 training certification.

2.7.3.4 SECURITY MEASURES

Regarding physical security, items completed in 2022 include a \$250,000 project to implement access upgrades at the Water Treatment Plant and Brilliant Yard facility. The other two projects include approximately 2,000 linear feet of replacement of fencing at PWSA's sedimentation ponds, as well as approximately 250 feet at the Lincoln Tank location. The other project is to provide fencing across the front side of the WTP.

In October 2022, PWSA received \$10 million in funding for the purpose of funding a variety of needed security improvement throughout its system. This project will have six separate contracts, will have its own line item in the capital budget, and has a completion timeline continuing through 2024.

2.7.4 HEALTH AND SAFETY RECOMMENDATIONS

PWSA Safety Group desires to work with Engineering to utilize e-Builder to build out a platform that would facilitate contractors to provide site specific project information as it relates to health and safety for PWSA to review as opposed to an entire health and safety manual that doesn't provide a real look at what exactly the project is or what aspects of their program are going to be utilized. Recently progress has been made with updated specifications for bid documents and completed training for all the specifications. This enabled PWSA to reestablish job expectations and specify what is needed onsite. A second phase is expected to occur in the following year for EHS inspection and RFPs to help ensure contractors are completing in the field what is stated on paper.

2.7.5 HUMAN RESOURCES AND STAFFING FINDINGS

The PWSA employs over 400 people and projects a total workforce of over 500 employees in the coming years. It is anticipated that a greater number of staff positions will be needed for the engineering, procurement, and environmental compliance departments to address the responsibilities of the CIP program and numerous regulatory requirements. This need was reinforced during interviews with the various leadership throughout PWSA with some specific needs identified such as an additional safety coordinator and Senior Water Engineer that can focus on the projects related to vertical infrastructure.

PWSA made great strides in regard to staffing and authorized strength by filling a total of 53 positions in 2023, in addition to 48 internal promotions. Staffing enhancements in 2023 included expanding our Safety and Security team by bringing Security Guards in house and eliminating an outsourced contract. Additionally, we continued to grow the Legal team and fill key positions, such as Engineering Senior Project Managers. As of October 31, 2023, PWSA had approximately 28 open positions posted such as Chief Engineering Officer, Senior Manager of Maintenance, Plant Operator and Deputy Director of Water Production. The PWSA will continue to assess staffing to enhance their authorized strength.

In 2021, the PWSA Board of Directors approved a revised domicile policy to allow non-union and union employees, if specified in the union contracts, to live in the City of Pittsburgh or the surrounding 36 municipalities. PWSA has reported in 2022 that this policy change has made a considerable positive impact to the number of applicants and hires for the PWSA's job postings.

2.7.6 HUMAN RESOURCES AND STAFFING RECOMMENDATIONS

The PWSA will continue to assess staffing and within the next few years, the PWSA is looking to grow from 400 to 500 staff. As the large programs continue to progress and knowledge is gained as a result of consent

decrease negotiations, the PWSA should continue to assess staff makeup, composition, and levels needed to operate the Authority long-term.

The Authority is looking to expand their in-house human resources department in order to gain technical ability with the focus on key hires and positions where voids are the greatest currently and in the near future.

A high-level position in the Water Program is needed. This role is specific to a senior person with expertise in vertical facilities and a focus on pumping and storage. Having somebody, whether it's in operations or engineering, that's going to ensure the money used by PWSA is channeled in a manner that what's constructed is properly maintained is critical. Identifying the position/individual, how they fit within the organizational structure and how they're going to facilitate their role is critical to the water system. This role is the Apex of a team needed to support this individual and specific expertise across the full lifecycle of a project from design to construction oversight and inspection.

Given the inevitable expansion of the Wastewater's Groups workload as a result of Wet Weather Planning and on-going Consent Decree negotiations, PWSA will likely need an additional position to support the Senior Wastewater Group Manager.

Whether in Engineering or Operations, a position is needed to review and QA/QC incoming CCTV data to qualify and identify true urgent repairs and then funnel them through the appropriate work order/contract mechanism for immediate or future repair.

With Wastewater, Stormwater and Water Systems needing improvements as outlined in this report and through the Planned CIP, expenditures resources needs will continue to expand over the next few years or even decades. A potential consideration would be to supplement PWSA senior management through the reintroduction of a Program Management Team.

As a backup plan to fill resources voids in the meantime and/or the future is to continue to find and leverage embedded employees and also look to on-calls to fulfill certain project manager roles, which has been done in the past.

2.7.7 SUPPLY CHAIN AND INFLATION IMPACTS

PWSA has been impacted by supply chain issues and higher than anticipated inflation rates driving up the cost of goods and labor. In 2022, it was reported that PWSA's ability to acquire various materials, especially metal or plastics for items such as valves and piping, has proved challenging due to low supplies and resulting schedule impacts due to long delays. In 2023, improvements in the supply chain of these materials have been observed. The more recent challenge is with electrical equipment (i.e. transformers, control panels and motors) with lead times on some larger-scale projects of up to three years. Other difficult to obtain materials include curb-stops and services such as plumbing. Unlike in the past, contractors are presenting challenges as suppliers are not guaranteeing their prices. Also, historically PWSA has not encountered the escalation clause in their contract documents being invoked or challenged; however, the script has flipped where almost all contractors are threatening to cease work until escalation is addressed. To further complicate things, PWSA is also working to minimize risk in their contract language to protect themselves against the potential scenario where prices start to drop. The PWSA should continue the following additional actions to help mitigate the issues:

- At the pre-bid meeting, communicate to potential bidders that early and increased communication during project execution is imperative. Clearly defining the intent and constraints of their escalation clause.
- If prices fluctuate and drop, provisions are in place to address a decrease in pricing such as via rebates.
- If PWSA is to let a large project out at the peak of the prices and suddenly all the costs start going down, have an escalation clause that goes both directions to avoid overpayment on a project that may span years.
- PWSA looked to other partner organizations such as PennDot for guidance. They also consulted Nationally recognized indices such as those published in Engineer News Record (ENR) magazine. PWSA had previously used the ENR index for multi-year surface restoration contracts.
- In 2023, PWSA was able to get their net payment terms in their agreements down to 30 days in addition to making bid meetings non-mandatory.
- PWSA, when prepping bids for procurement has provided procurement with a targeted list of potential contractors for notification. Longer bid durations are also being explored especially where significant coordination is required between contractors and sub-contractors.
- PWSA hosted a contractor outreach effort and expand allowable technologies.

It is recommended that PWSA review and potentially revise their specifications to transfer the burden on the contractor to prove escalation clause requirements. Less burden would be put on PWSA staff, and staff would be in a review role as opposed to developing the protocols, researching the indices, etc.

3.0 CAPITAL IMPROVEMENT PROGRAM PROJECTS

Sections 3.1, 3.2, and 3.3 are based on information in the PWSA fiscal years 2023-2027 Capital Improvement Plan, approved by the PWSA Board of Directors on October 28, 2022. As of December 7, 2023 the 2024-2028 Capital Improvement Plan has not been approved by the PWSA Board of Directors.

3.1 GENERAL

The PWSA considered the following criteria in evaluating and prioritizing capital projects:

- Safety
- Regulatory Compliance
- Operational Flexibility
- Quality of Service
- Organizational Goals
- Social Impact

The PWSA, as with other utilities throughout the country, have seen impacts to their capital program due to supply chain issues and the labor shortage. Construction costs have significantly increased over the past couple of years, causing utilities to re-evaluate their capital program. This includes adjusting project costs, pushing out non-priority projects due to costs of priority projects, and extending project schedules to accommodate supply chain issues. The PWSA also explained that a winter moratorium on right-of-way construction work in the City and lengthy permit application review periods by regulatory agencies have also caused the Authority to adjust the timing of projects and have influenced its planning of the CIP.

3.2 FUNDING SOURCES

3.2.1 PRIMARY SOURCES

The PWSA Capital Improvement Program is funded through several primary sources to which specific programs and projects are allocated. The CIP Funding Sources are Debt (Revenue Bonds), PENNVEST, WIFIA/PENNVEST, DSIC – Water, DSIC – Wastewater, ARPA, WIFIA, and Cash (Rates). **Figure 3.21** presents the annual allocation of the proposed CIP funding sources for FY 2024 through FY2027.

3.2.2 STORMWATER FEE

In April 2021, the PWSA submitted a request to the PUC to change how the PWSA bills for stormwater services. The stormwater fee was approved by the PUC in November 2021 and went into effect January 12, 2022 and will be phased-in over 2022 and 2023.

The stormwater fee will provide an additional funding source and will assist the PWSA with implementing capital and operations projects, including stormwater management projects.

The implementation of the stormwater fee in 2022 raised many questions from PWSA's customer base, though it also served as an opportunity for PWSA to perform extensive outreach and education on stormwater

issues within the PWSA service area and City boundary. This education will better inform and prepare PWSA customers for future conversations related to PWSA's system and associated Level of Service (LOS).

As the stormwater fee program evolves over the next year or two, it will lead the PWSA into master and strategic planning with a stormwater lens. Ultimately, future stormwater planning coupled with PWSA's wet weather planning and MS4 requirements will identify capital improvement projects and their estimated fee for implementation. How the projects get funded from the stormwater fee will be evaluated over time.

3.3 CURRENT CAPITAL IMPROVEMENT PLAN

Table 3.1 presents the fiscal years 2024 through 2027 CIP that was approved by the PWSA Board of Directors on October 28, 2022.

Table 3.1: PWSA 2024-2027 Capital Improvement Plan

	2024 - 2027 CIP				Total
	FY 2024	FY 2025	FY 2026	FY 2027	
Water Treatment Plant	26,885,665	24,038,988	54,790,690	78,451,718	184,167,061
Water Pumping and Storage	115,127,475	121,491,637	113,245,473	30,009,851	379,874,436
Water Distribution	125,439,446	155,468,790	143,283,004	184,525,120	608,716,360
Wastewater	31,442,487	27,579,779	45,751,309	54,918,077	159,691,652
Stormwater	34,827,423	36,884,821	33,038,424	26,808,750	131,559,418
Miscellaneous	15,500,000	33,000,000	500,000	500,000	49,500,000
	349,222,496	398,464,015	390,608,900	375,213,516	\$1,513,508,927
Debt (Revenue Bonds)	150,214,517	203,743,270	236,469,077	316,179,204	906,606,068
PENNVEST	97,299,382	86,216,706	47,511,528	10,020,526	241,048,142
WIFIA/PENNVEST	89,843,438	98,036,402	98,113,624	40,456,543	326,450,007
DSIC - Water	6,058,669	6,088,962	6,119,407	6,150,004	24,417,042
DSIC - Wastewater	2,371,490	2,383,347	2,395,264	2,407,240	9,557,341
ARPA	-	-	-	-	0
WIFIA	3,310,501	1,995,327	-	-	5,305,828
Cash (Rates)	124,500	-	-	-	124,500
Total	349,222,497	398,464,014	390,608,900	375,213,516	\$1,513,508,928

Figure 3.1: PWSA FY 2024 to FY 2027 Proposed Funding Sources

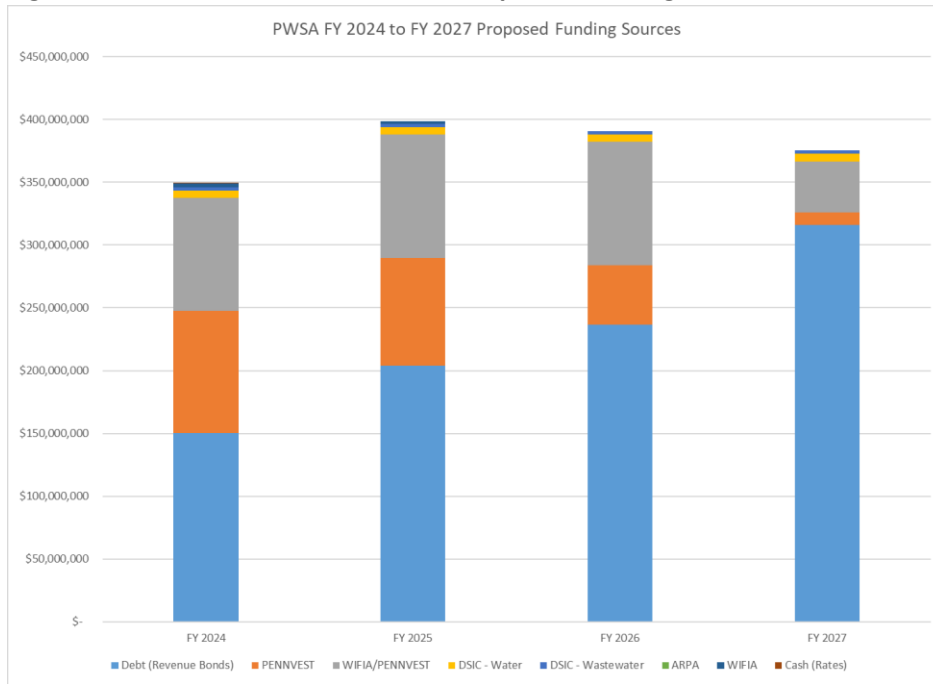


Figure 3.2 shows the annual projected capital budget by project class. The CIP is divided into six project classes: water treatment plant, water pumping and storage, water distribution, wastewater, stormwater, and miscellaneous. Figure 3.3 illustrates fiscal year 2023 capital budget by project class.

Figure 3.2: PWSA Annual Projected Capital Budgets by Project Class

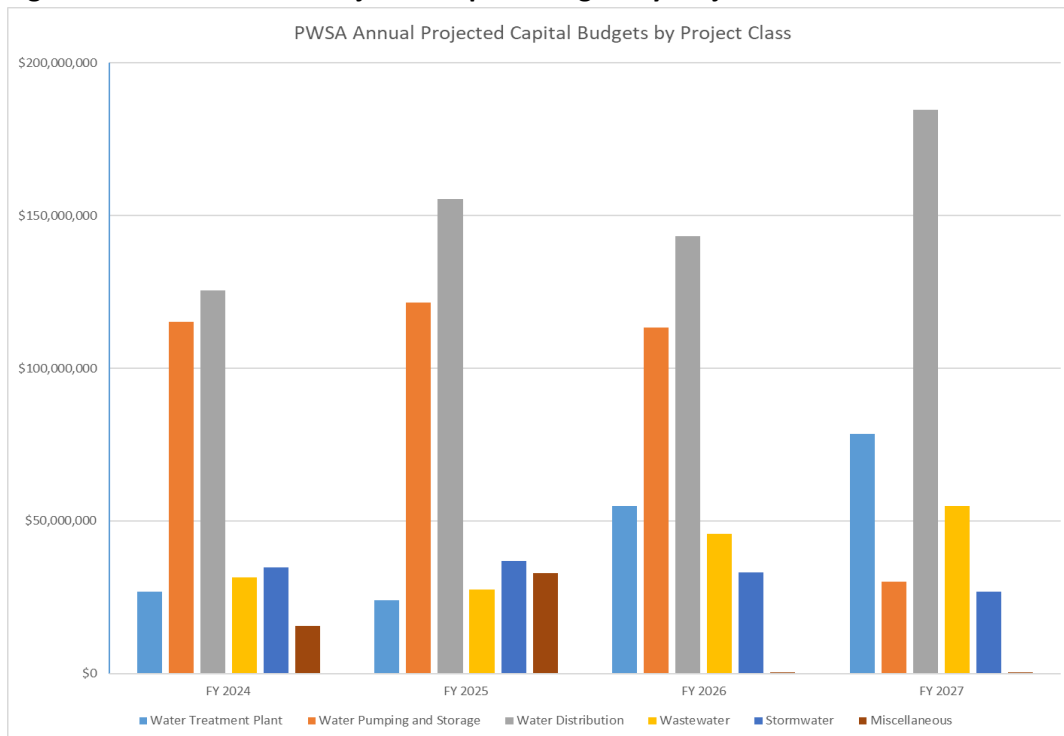


Figure 3.3: PWSA Fiscal Year 2024 Projected Capital Budgets by Project Class

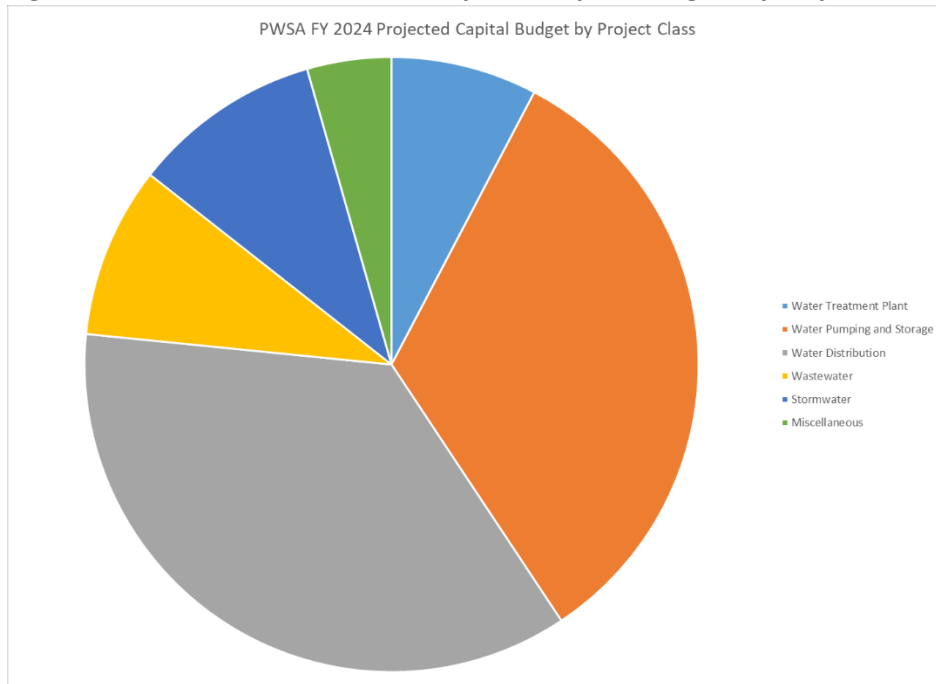


Figure 3.4 illustrates the annual water system capital budgets based upon project class. Table 3.2, Table 3.3, and Table 3.4 summarize the water system capital budgets and the planned improvement projects for fiscal years 2024 through 2027, for water treatment plant, water pumping and storage, and water distribution system respectively. The CIP shows that 2024 through 2026 will be the peak years for water reliability plan projects.

Figure 3.4: PWSA Annual Projected Water System Capital Budgets

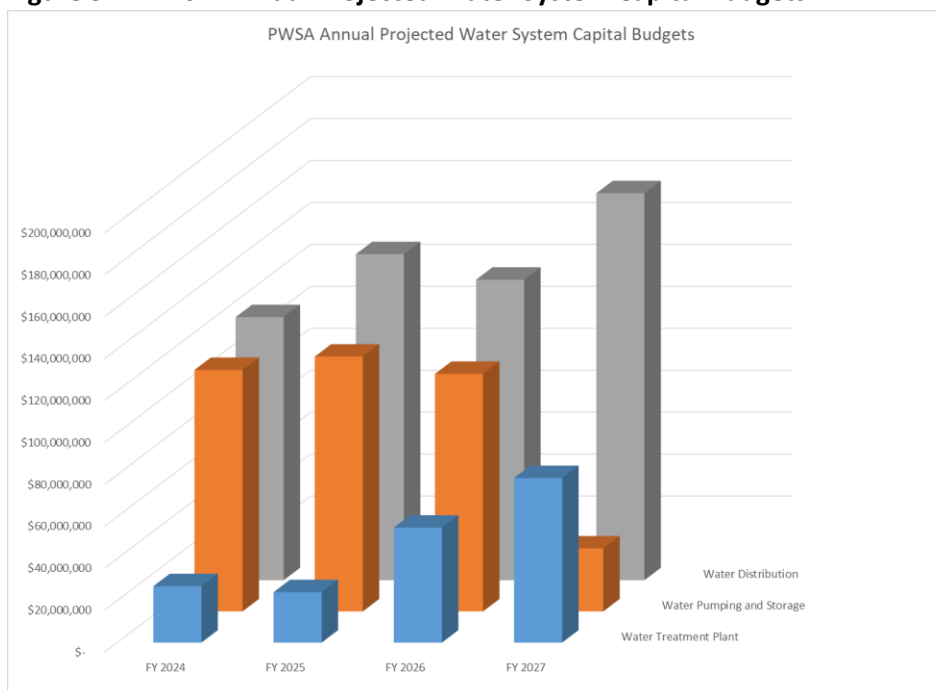


Table 3.2: Water Treatment Plant Improvements

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
Algae Control for Open Basins	\$0.00	-	\$0.00
Aspinwall Water Treatment Plant Electrical and Backup Power Improvements	\$24,623,823.00	\$866,981.00	\$23,756,842.00
Aspinwall Water Treatment Plant Filter Improvements	\$2,626,293.12	\$164,942.53	\$2,461,350.59
Aspinwall Water Treatment Plant Filter Building Sodium Hypochlorite Improvements	\$0.00	\$0.00	\$0.00
Aspinwall Water Treatment Plant Raw Water Intakes - East Intake	\$2,373,000.00	\$465,000.00	\$1,908,000.00
Aspinwall Water Treatment Plant Raw Water Intakes - West Intake	\$16,239,473.69	\$1,127,368.42	\$15,112,105.27
Chemical Feed Modernization Project/Rapid Mix and Clarifier Improvements	\$41,147,901.70	\$2,789,028.23	\$38,358,873.47
Clearwell Emergency Response Project	\$23,460,437.00	\$7,408,660.00	\$16,051,777.00
Clearwell Improvements	\$19,371,626.07	\$2,448,008.62	\$16,923,617.45
Corrosion Control Chemical Storage & Feed Systems	\$0.00	\$0.00	\$0.00
Highland Park Membrane Filtration Plant Assessment and Critical Process Improvements	\$0.00	\$0.00	\$0.00
Highland Park Microfiltration Plant Improvements Project	\$0.00	\$0.00	\$0.00
Hydraulic Valve Replacement Program	\$3,160,057.49	\$302,298.85	\$2,857,758.64
Lime Slurry System Improvements	\$4,731,147.00	\$3,548,360.00	\$1,182,787.00
Overhead Crane Modernization	\$815,000.00	\$375,000.00	\$440,000.00
Phase 1 Sedimentation Basin Rehabilitation and Water Treatment Plant Gate Valve and 84-inch Coupling Project	\$4,775,078.40	\$299,895.51	\$4,475,182.89
Phase 2 Sedimentation Basin Rehabilitation Project	\$1,312,042.85	\$0.00	\$1,312,042.85
Post-Filter Chemical System Improvements	\$1,417,006.28	\$0.00	\$1,417,006.28
Powdered Activated Carbon System Improvements	\$0.00	\$0.00	\$0.00
Ross Pump Station	\$18,280,386.21	\$1,249,655.17	\$17,030,731.04
Sludge Chamber Pump Project	\$869,343.78	\$869,343.78	\$0.00
Water Treatment Plant Filter Backwash System Improvements	\$12,759,946.00	\$883,290.00	\$11,876,656.00
Water Treatment Plant Filter Building Roof	\$3,500,000.00	\$3,500,000.00	\$0.00
Water Treatment Plant HVAC Improvements	\$1,379,999.00	\$163,333.00	\$1,216,666.00
Water Treatment Plant NPDES Permit Autosamplers and Flow Meters	\$124,500.00	\$124,500.00	\$0.00
Water Treatment Plant Rail Siding Improvements	\$1,200,000.00	\$300,000.00	\$900,000.00
WTP Sodium Hypochlorite Tank Emergency Replacement	\$0.00	\$0.00	\$0.00
Water Treatment Plant Contingency	\$0.00	\$0.00	\$0.00
TOTAL WATER TREATMENT PLANT	\$184,167,061.59	\$26,885,665.11	\$157,281,396.48

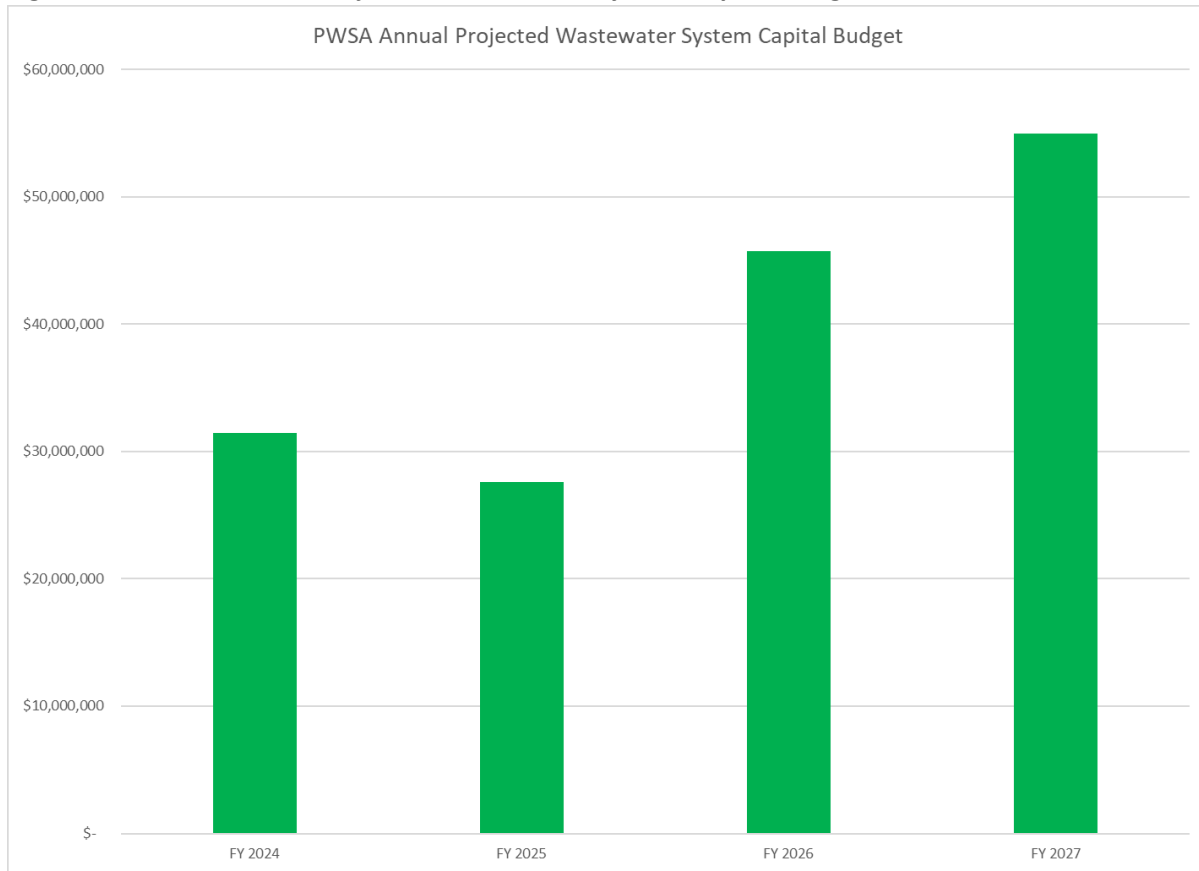
Table 3.3: Water Pumping and Storage Improvements

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
Aspinwall Pump Station Improvements	\$48,170,579.59	\$15,197,171.56	\$32,973,408.03
Aspinwall Pump Station to Lanpher Reservoir Rising Main	\$133,062,726.44	\$29,622,031.14	\$103,440,695.30
Aspinwall WTP Chemical Unloading Area Improvements, Underground Storage Tank Removal & Replacement	\$0.00	\$0.00	\$0.00
Bruecken Pump Station Concealed Gutters	\$175,000.00	\$175,000.00	\$0.00
Bruecken Pump Station Improvements	\$98,208,196.00	\$30,991,126.00	\$67,217,070.00
Chlorine Booster Station Improvements	\$14,027,659.37	\$6,436,147.83	\$7,591,511.54
Disinfection By-Products Mitigation	\$1,426,705.77	\$1,426,705.77	\$0.00
Garfield Tank Improvements	\$2,926,940.00	\$122,198.00	\$2,804,742.00
Herron Hill Pump Station Improvements	\$13,590,804.68	\$818,390.81	\$12,772,413.87
Herron Hill Reservoir Improvements	\$0.00	\$0.00	\$0.00
Herron Hill Reservoir Improvements - Sodium Hypochlorite Building	\$0.00	\$0.00	\$0.00
Herron Hill Tank Pump Station Improvements	\$3,000,000.02	\$164,077.30	\$2,835,922.72
Highland 1 Reservoir Liner	\$704,981.00	\$0.00	\$704,981.00
Highland No. 2 Reservoir Liner and Cover Replacements	\$10,587,451.07	\$6,515,354.50	\$4,072,096.57
Highland Reservoir Pump Station and Rising Main	\$23,520,554.94	\$14,537,145.09	\$8,983,409.85
Howard Pump Station Improvements	\$2,426,564.51	\$0.00	\$2,426,564.51
Inline Pump Station (Coral and Pacific) Improvements	\$600,000.00	\$32,979.66	\$567,020.34
Lanpher Reservoir Improvements	\$10,086,350.10	\$6,370,326.38	\$3,716,023.72
Lincoln Pump Station Improvements	\$4,711,366.57	\$288,633.46	\$4,422,733.11
Lincoln Pump Station: Bypass Pump Station Project	\$2,164,264.00	\$2,164,264.00	\$0.00
Lincoln Tank Improvements	\$3,884,259.28	\$203,588.76	\$3,680,670.52
Mission Pump Station Improvements	\$2,426,565.00	\$0.00	\$2,426,565.00
Pump Station Architectural	\$2,500,000.00	\$0.00	\$2,500,000.00
Saline Pump Station Improvements	\$481,055.00	\$0.00	\$481,055.00
Spring Hill Tank Improvements	\$1,192,412.00	\$62,335.00	\$1,130,077.00
Water Pumping and Storage Contingency	\$0.00	\$0.00	\$0.00
TOTAL WATER PUMPING AND STORAGE	\$379,874,435.36	\$115,127,475.27	\$264,746,960.10

Table 3.4: Water Distribution System Improvements

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
2019 Large Diameter Water Main Improvements - Rising Main 3/4	\$240,769.91	\$240,769.90	\$0.00
2019 Large Diameter Water Main Improvements - Rising Main 4	\$4,176,441.00	\$4,176,441.00	\$0.00
Bus Rapid Transit Water Distribution	\$0.00	\$0.00	\$0.00
District Metering Program	\$9,360,000.06	\$0.00	\$9,360,000.06
Hazelwood Backup Feed (formerly Duck Hollow Main Replacement)	\$2,825,113.92	\$175,156.10	\$2,649,957.82
Herron Hill - Squirrel Hill Boundary Adjustments	\$1,044,000.00	\$0.00	\$1,044,000.00
Interconnection Vault Stormwater Removal	\$1,837,241.38	\$1,225,931.03	\$611,310.35
Intermediate Diameter Water Main Replacement Program	\$49,867,250.52	\$0.00	\$49,867,250.52
Intermediate Meter Replacement Program	\$344,846.16	\$84,307.69	\$260,538.47
Large Diameter Water Main Replacement Program	\$99,481,254.09	\$4,820,095.96	\$94,661,158.13
Large Meter Replacement Program	\$2,582,764.39	\$1,341,456.69	\$1,241,307.70
Low Pressure Area Remediation	\$1,696,441.49	\$0.00	\$1,696,441.49
Neighborhood Lead Service Line Replacement Program	\$111,170,000.00	\$27,792,500.00	\$83,377,500.00
North Side Boundary Adjustments	\$1,566,000.00	\$0.00	\$1,566,000.00
Priority LSLR	\$0.00	\$0.00	\$0.00
Private Lead Service Line Reimbursement	\$0.00	\$0.00	\$0.00
Regulator Valve and Vault Replacement Program	\$12,898,359.93	\$1,839,360.70	\$11,058,999.23
Small Diameter Water Main Replacement Program	\$276,037,176.07	\$75,057,893.92	\$200,979,282.15
Small Meter Replacement Program	\$2,373,525.61	\$1,351,089.38	\$1,022,436.23
South Side Slopes Boundary Adjustments	\$1,566,000.00	\$0.00	\$1,566,000.00
Unmetered and Flat Rate Properties	\$635,250.00	\$635,250.00	\$0.00
Urgent Lead Service Line Replacement	\$6,256,708.10	\$1,749,194.10	\$4,507,514.00
Valve Replacement Program	\$11,200,000.00	\$2,800,000.00	\$8,400,000.00
Water and Wastewater Safety and Security Improvements	\$0.00	\$0.00	\$0.00
Water and Wastewater Safety and Security Improvements (PENNVEST)	\$0.00	\$0.00	\$0.00
Water Relay Program	\$11,557,217.50	\$2,150,000.00	\$9,407,217.50
Water Distribution Contingency	\$0.00	\$0.00	\$0.00
TOTAL WATER DISTRIBUTION SYSTEM	\$608,716,360.13	\$125,439,446.48	\$483,276,913.65

Figure 3.5 illustrates the annual wastewater system capital budgets. **Table 4.5** outlines the wastewater system capital budgets and the planned projects for fiscal years 2024 through 2027.

Figure 3.5: PWSA Annual Projected Wastewater System Capital Budgets**Table 3.5: Wastewater System Improvements**

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
31st Ward Pump Station and Appurtenances - Phase 2	\$16,234,333.33	\$726,666.67	\$15,507,666.66
6122 and 6150 Mifflin Road Demolition	\$0.00	\$0.00	\$0.00
Browns Hill Road Sewer Pump Station Replacement	\$3,488,000.00	\$1,608,000.00	\$1,880,000.00
Large Diameter Sewer Rehabilitation Program	\$17,117,238.09	\$2,997,238.10	\$14,119,999.99
M-29 Outfall Improvements	\$0.00	\$0.00	\$0.00
Maytide Storm and Sanitary Sewer System Improvements	\$5,984,282.00	\$4,026,497.00	\$1,957,785.00
Queenston Sewer Improvements	\$243,203.00	\$243,203.00	\$0.00
Sewer Reconstruction Program	\$8,207,788.00	\$1,810,000.00	\$6,397,788.00
Sewers Under Structures Program	\$11,713,283.68	\$2,373,663.24	\$9,339,620.44
Small Diameter Sewer Rehabilitation Program	\$96,703,523.79	\$17,657,219.00	\$79,046,304.79
Wastewater Contingency	\$0.00	\$0.00	\$0.00
TOTAL WASTEWATER SYSTEM	\$159,691,651.90	\$31,442,487.00	\$128,249,164.90

Figure 3.6 illustrates the annual stormwater system capital budgets. Table 3.6 outlines the stormwater system capital budgets and the planned projects for fiscal years 2024 through 2027.

Figure 3.6: PWSA Annual Projected Stormwater System Capital Budgets

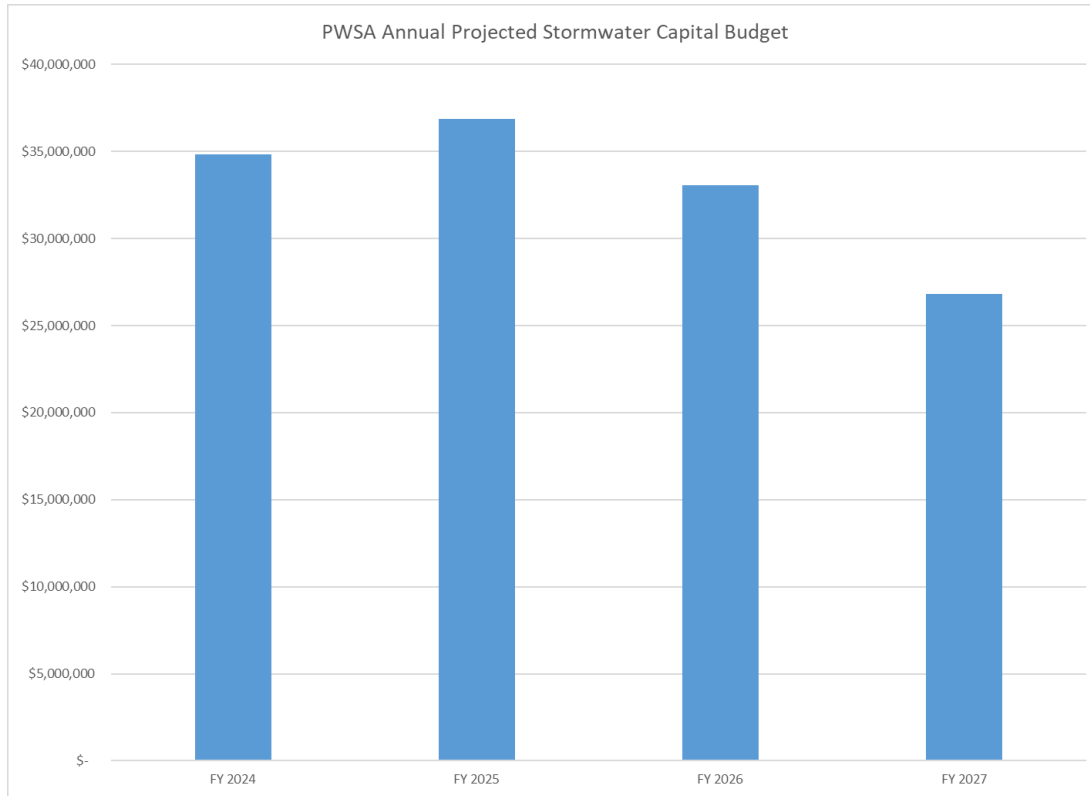


Table 3.6: Stormwater System Improvements

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
Braywood Stormwater Improvements	\$439,375.00	\$439,375.00	\$0.00
Bus Rapid Transit Phase 2	\$1,500,000.00	\$500,000.00	\$1,000,000.00
Bus Rapid Transit Stormwater Infrastructure Improvements	\$1,489,272.15	\$785,634.29	\$703,637.86
Catch Basin and Inlet Replacement Program	\$60,619,383.03	\$16,007,303.03	\$44,612,080.00
Dragoon Way Stormwater Improvements	\$95,625.00	\$95,625.00	\$0.00
Fleury Way Stormwater Infrastructure Improvements	\$0.00	\$0.00	\$0.00
Four Mile Run Stormwater Infrastructure Improvements	\$19,395,235.00	\$4,500,108.00	\$14,895,127.00
Haverhill Street Improvements Project	\$104,500.00	\$104,500.00	\$0.00
Lawn and Ophelia	\$0.00	\$0.00	\$0.00

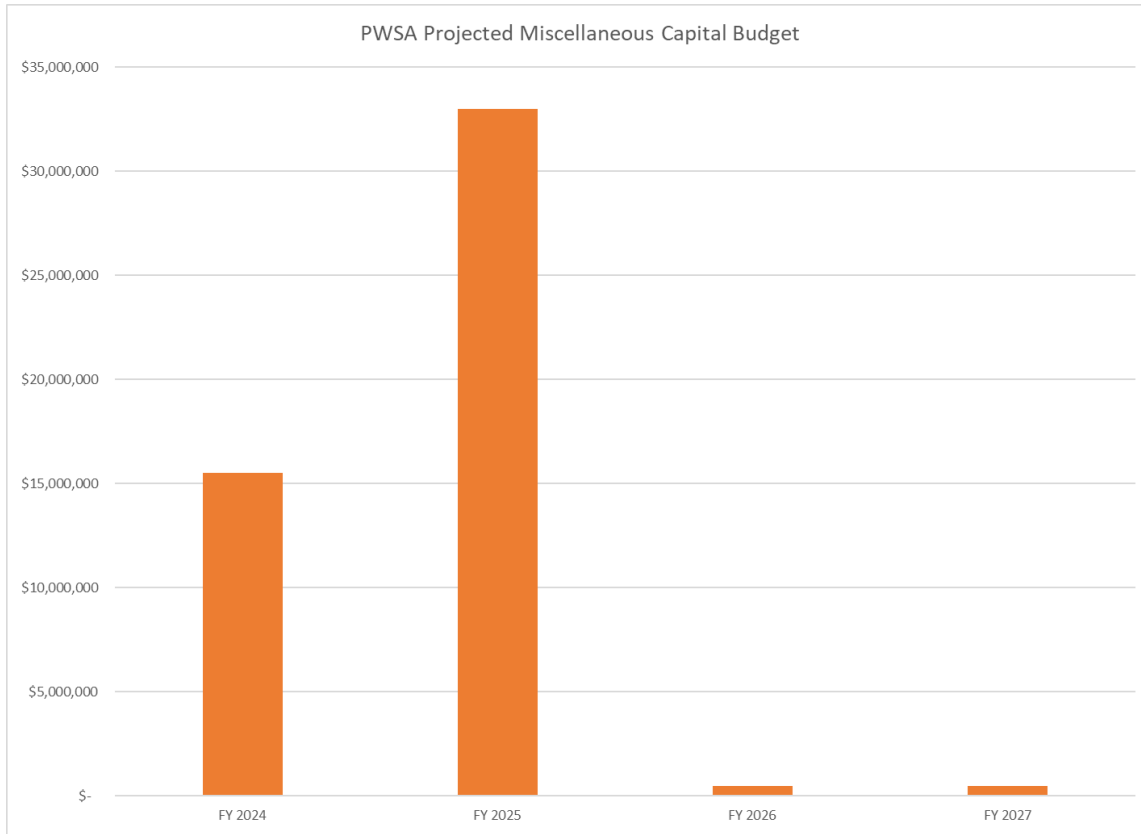
Martin Luther King Field Stormwater Infrastructure Improvements	\$1,324,108.00	\$1,324,108.00	\$0.00
Maryland Avenue Stormwater Infrastructure Improvements	\$0.00	\$0.00	\$0.00
MS4 Permit PRP Plan Sediment Reduction Project	\$912,500.00	\$605,000.00	\$307,500.00
Saw Mill Run Municipal Separate Storm Sewer System Compliance	\$3,500,000.00	\$0.00	\$3,500,000.00
Saw Mill Run Watershed Improvements	\$150,000.00	\$150,000.00	\$0.00
Southside Flats Sewer Separation	\$2,232,587.00	\$2,232,587.00	\$0.00
Southside Stormwater Infrastructure Improvements	\$2,703,667.00	\$2,703,667.00	\$0.00
Stewart Avenue Stormwater Infrastructure Project	\$2,409,833.00	\$1,515,389.00	\$894,444.00
Thomas and McPherson Stormwater Infrastructure Improvements	\$0.00	\$0.00	\$0.00
Volunteer's Field Stormwater Infrastructure Improvements	\$0.00	\$0.00	\$0.00
Wet Weather Program Projects	\$32,500,000.00	\$2,500,000.00	\$30,000,000.00
Wightman Park Phase 2 Project	\$0.00	\$0.00	\$0.00
Woodland Road Stormwater Infrastructure Improvements	\$0.00	\$0.00	\$0.00
Woods Run Stream Removal Stormwater Infrastructure Improvements	\$2,183,333.00	\$1,364,127.00	\$819,206.00
Stormwater Contingency	\$0.00	\$0.00	\$0.00
TOTAL STORMWATER SYSTEM	\$131,559,418.18	\$34,827,423.32	\$96,731,994.86

Increased miscellaneous cost in 2024-2027 budget is also attributed to PWSA's plans to build a new headquarters location that would also house and include space for the operations division with an estimated total cost of \$50 million.

Table 3.7 Miscellaneous CIP table

PWSA 2024-2027 Capital Improvement Program	Total 4-Year Commitment (Budget)	FY 2024	FY 2025- FY 2027
New Headquarters and Operations Facility	\$47,500,000.00	\$15,000,000.00	\$32,500,000.00
Utility Cost Shares	\$2,000,000.00	\$500,000.00	\$1,500,000.00
Miscellaneous Contingency	\$0.00	\$0.00	\$0.00
TOTAL MISCELLANEOUS	\$49,500,000.00	\$15,500,000.00	\$34,000,000.00

Figure 3.7 PWSA Projected Miscellaneous Capital Budget



4.0 PUBLIC UTILITIES COMMISSION ACT 65 AND ACT 70

4.1 PUBLIC UTILITY COMMISSION REGULATORY BACKGROUND

4.1.1 OVERVIEW

On December 21, 2017, Pennsylvania Governor Wolf signed Act 65 of 2017 (Act) into law amending the Pennsylvania Public Utility Code which, among other things, added Chapter 32 (Sections 3201 – 3209) addressing the Pennsylvania Public Utility Commission's (Commission or PUC) jurisdiction over the provision of utility water, wastewater, and stormwater service by entities created by Pennsylvania cities of the second class under the Municipality Authorities Act. As the City is the only city of the second class in the Commonwealth, the Commission now has jurisdiction over the PWSA. Effective April 1, 2018, pursuant to 66 Pa.C.S. §§ 3201-3209, Act 65 of 2017, the PUC was granted jurisdiction over the PWSA. The PWSA is the first municipal water authority to be regulated by the Commission.

The Commission approved the initial water and wastewater tariffs of the PWSA effective March 1, 2019 as part of the PWSA's first base rate filing at Docket Numbers R-2018-3002645 and R- 2018-3002647. On September 30, 2020, the Authority filed a proposed settlement with the PUC regarding its 2021 water and wastewater rate proposal, and the PUC approved a settlement for approximately half of the proposed service rate increase, which went into effect on January 14, 2021.

The PWSA's 2021 Tariff Filing Package was submitted to the Pennsylvania Public Utility Commission (PUC) in April 2021. The request included a rate increase and a new stormwater fee. The PUC approved the request in November 2021 and went into effect on January 12, 2022. The rate increase and stormwater fee will be phased-in over 2022 and 2023.

The PWSA's submitted a rate proposal to the PUC on May 9, 2023. The settlement will go before the PUC for final approval and would go into effect no sooner than February 15, 2024. The terms of the settlement are limited to setting rates for 2024 only. The settlement will enhance customer bill assistance while continuing to advance essential infrastructure upgrades. The settlement also includes stormwater incentives and a credit program. In 2025, PWSA will implement a new charge to pay low-interest PENNVEST loans, if the settlement is approved. The charge will only include loans closed on or after 2025.

4.1.2 LONG-TERM INFRASTRUCTURE IMPROVEMENT PLAN

Under Act 65, the PWSA was requested to file a Long-Term Infrastructure Improvement Plan (LTIIP) (66 Pa C.S. §3202 (6)) by September 28, 2018. The Commission normally requires that a LTIIP be submitted to support a Distribution System Improvement Charge (DSIC). A DSIC is a separate charge from the tariff and supports the accelerated replacement of aging infrastructure.

The requirements for the development and submission of an LTIIP are outlined in PA code Chapter 121 §121.3 as follows:

- Identification of the types and age of eligible property owned and operated by the utility
- An initial schedule for planned repair and replacement of eligible property
- A general description of the location of eligible property

- A reasonable estimate of the quantity of eligible property to be improved or repaired
- Projected annual expenditures and means to finance the expenditures
- A description of the way infrastructure replacements will be accelerated and how repair, improvement or replacement will ensure and maintain adequate, efficient, safe, reliable and reasonable service to customers
- A workforce management and training program designed to ensure that the utility will have access to a qualified workforce to perform work in a cost-effective, safe and reliable manner
- A description of the utility's outreach and coordination activities with other utilities, Department of Transportation and local governments regarding the planned maintenance/construction projects and roadways that may be impacted by the LTIP

The PWSA submitted their LTIP to the Commission on September 28, 2018. An update to the LTIP was finalized in August and September 2019 after consideration of input from interested parties and stakeholders. The Authority's LTIP for water and wastewater was approved by the PUC on August 27, 2020. The PWSA filed a revised LTIP with the PUC in October 2022 for the purpose of providing updated budget information for projects included within the plan. The revised LTIP is pending final approval while under review by the PUC.

4.1.3 COMPLIANCE PLAN

On December 21, 2017, the Pennsylvania legislature enacted Act 65 of 2017 (Act 65), placing the Authority under the jurisdiction of the PUC pursuant to the Pennsylvania Public Utility Code. Act 65 applies most of the provisions of the Public Utility Code to the Authority in the same manner as a "public utility," resulting in regulation of the Authority's rate making, its operating effectiveness, debt issuances and other aspects of conducting its business similar to the way the PUC regulates investor-owned utilities. Act 65 includes provisions that allow the Authority to impose, charge or collect rates or charges as necessary to permit the Authority to comply with its covenants with the holders of any bonds or other financial obligations of the Authority, and prohibits the PUC from requiring the Authority to take any action that would cause the interest on the Authority's financial obligations to be includible in gross income of the holders of such obligations for federal income tax purposes.

On January 18, 2018, the PUC issued a Tentative Implementation Order ("TIO") which included methods by which the PUC and affected entities may carry out the tariff approval, ratemaking, compliance plan and assessment provision of Act 65. The PUC issued a Final Implementation Order ("FIO") on March 15, 2018 which, *inter alia*, directed (1) the filing of water and wastewater tariff filings no later than July 2, 2018; and, (2) a compliance plan to the PUC no later than September 28, 2018 to address how it will achieve full regulatory compliance including provisions to bring the Authority's existing information technology, accounting, billing, collections, and other operating systems and procedures into compliance with the requirements applicable to jurisdictional water and wastewater utilities. The Authority complied with both of these requirements and received approval of its Initial PUC Tariffs effective March 1, 2019. The Authority's Compliance Plan was filed on September 28, 2018 and supplemented on February 1, 2019. The PUC elected to stage its review of the Authority's Compliance Plan and Stage 1 was directed to urgent infrastructure remediation and improvement and the revenue and forecasting requirements of maintaining service that support public health and safety. The PUC issued Orders regarding Stage 1 on March 26, 2020, June 18, 2020 and February 14, 2021. The Orders resolved a significant number of issues in the proceeding by approving a partial settlement.

Compliance Plan Stage 2 was initiated on January 24, 2020 to address stormwater and customer service issues. Regarding stormwater, the PUC approved the Authority's Stormwater Tariff on November 18, 2021 and a full settlement of the Stage 2 Compliance Plan - Stormwater on August 25, 2022. Regarding customer service issues, the PUC approved a full settlement of the Stage 2 Compliance Plan – Customer Service on July 14, 2022. The Authority filed an updated Compliance Plan and proposed Compliance Tariffs on September 12, 2022 regarding customer service issues. Similar filings regarding Stormwater are to be filed on November 4, 2022.

4.2 ACT 70 AND THE COOPERATIVE AGREEMENT

On July 23, 2020, the General Assembly of Pennsylvania enacted Act 70, which is now state law. It indicates that the Cooperative Agreement executed in October 2019 supersedes portions of the PWSA's requirements that have been controlled by the Public Utility Commission regulations since April 1, 2018 when the Public Utility Commission began jurisdiction over the PWSA. The change in requirements is with respect to issues involved with the PWSA and the City. Act 70's Article XXVIII-G, Water and Sewer Authorities in Cities of the Second Class (Pittsburgh is the only second-class city in the Commonwealth), refers to the Cooperation Agreement entered into between the City and the Authority on October 3, 2019. It states the Cooperation Agreement shall have the force and effect of law until January 1, 2025, or an earlier termination date to which the City and Authority mutually agree, and the Cooperation Agreement shall govern:

- Changes in the City and Authority's rights and obligations resulting from the enactment of the Act of December 21, 2017 (P.L. 1208, No.65), entitled "An Act amending Title 66 (Public Utilities) of the Pennsylvania Consolidated Statutes, in rates and distribution systems, further providing for rates to be just and reasonable; and providing for water and sewer authorities in cities of the second class," including rates paid by the City to the Authority for public utility service.
- The division of services related to the system.
- Payments by the City and Authority to the other based on actual, verifiable, direct expenses and in accordance with customary utility practices under 66 PA.C.S Pt. 1 (relating to public utility code).
- Payments by the Authority to the City that shall be subordinate to each debt obligation of the Authority.
- Cooperation by the City and Authority in their respective capital projects which may impact each other.
- Responsibilities of the Authority with respect to City parks and other City properties. (City parks are defined as 50 acres or larger.)
- Ownership of the system.
- Roles and responsibilities of the City and Authority with respect to the system.

Therefore, since July 23, 2020, the PWSA is abiding by both the Act 70 requirements and the Public Utility Commission regulations, metrics, and reporting.

5.0 CONCLUSIONS

In 2023, PWSA continued to make progress on being a more compliant, sustainable and reliable utility. Areas that specifically show their commitment to this effort are:

- Moved forward and completed key aspects of their Water Reliability Plan.
- Continued to strategically increase the number of staff by the addition of a few key hires under engineering, operations, and support services.
- Implemented some industry best practices to track and improve the maintenance and operation of their system.
- Selected and initiated implementation of a new and robust CMMS to be integrated with GIS.
- Improved compliance with regulations and Orders regarding abatement of lead, system resiliency, and overall water treatment and quality.
- Continuing to improve the aging sewer system with repairs and maintenance with more focus on a risk-based approach.
- Continuing compliance activities related to the water system, wastewater system, and stormwater system, emphasizing a culture of compliance, and enhancing the Environmental Compliance Manual.
- Under stormwater strategic planning efforts, hosted 6 public meetings with attendance ranging from 14 to over 70 people with notable excellent participation by PWSA staff and their stormwater partners. Continue strategic and effective outreach and communication to address public comments received on the SSP.
- Successfully implementing the aggressive PWSA 2023 – 2027 Capital Improvement Plan.
- Continuing to make improvements to the Clean Fill Policy requirements as this is anticipated to have a growing impact on PWSA projects into 2024.

Review of the FY 2023-2027 capital program budget reflects significant increases from the previous year. Roughly 75 percent of the FY 2023-2027 CIP is dedicated to water infrastructure. Some of this increase can be attributed to the increased cost for supplies and materials due to supply chain issues and inflation. This is evident by the significant increase in recent construction costs. Additionally, it should be noted that while almost 58% of the current 5-year CIP in wastewater is devoted to the small diameter sewer rehabilitation program, it is anticipated that once the consent decree is negotiated, the wastewater CIP will significantly increase. With all this said, while PWSA has made a concerted effort to obtain and secure capital funding to invest in their infrastructure, they need to ensure that they have sufficient staff and resources to execute their capital program otherwise those efforts are futile.

The 2024 operating budget only increased slightly from 2023. Of that increase, the salaries themselves increased by 5%, which reflects both the cost of living and planned additional hires. General and Administrative expenses decreased by 3% and the Direct Operating expenses decreased by 2%.

Based upon our review, PWSA's financial commitment, both in the past couple of years and for the future shown in the Board approved CIP for 2023 - 2027 along with continued organizational and operational improvements, it is apparent PWSA is committed to investing in upgrading their infrastructure and becoming a well-run utility. Through interviews with key staff, it is evident PWSA is implementing some industry best

practices such as focused regulatory compliance, enhanced safety and security program, tracking and addressing non-revenue water and water valve exercising and replacement program. Though some of these initiatives are in their infancy they already have made an impact. Therefore, in summary, it is the Consulting Engineer's opinion that PWSA is managing their organization, water, sewer, and stormwater systems and committing the financial resources to continue to move the utility forward towards maintaining a regulatory compliant organization that provides reliable service to their customers.

6.0 ACKNOWLEDGEMENTS

ms consultants would like to take this opportunity to express sincere thanks to the staff of the Pittsburgh Water and Sewer Authority for their valuable contributions to this report. Specifically, we want to acknowledge Will Pickering, Barry King, Ed Barca, Kevin Pawlos, Kate Mechler, Sarah Bolenbaugh, Toby Stutzman, Tony Igwe, Dan Duffy, Frank Sidari, B.J. McFaddin, Jason Felsner, Lee Haller, and Kasey Stewart, for participating in our staff interviews and providing sharing valuable insights to aid us during the preparation of this 2023 Consulting Engineer's Annual Report.

APPENDIX A – DUTIES OF THE CONSULTING ENGINEER

The duties of the Consulting Engineer are many and vary depending on the needs of the Authority and the provisions of the Trust Indenture. Those duties beyond the provisions of the Trust Indenture are addressed elsewhere. Per the Amended and Restated Trust Indenture between the Pittsburgh Water and Sewer Authority and the Bank of New York Mellon Trust Company, NA originally dated October 15, 1993 and restated in the 2019 Senior Indenture and Subordinate Indenture, the Pittsburgh Water and Sewer Authority must engage a Consulting Engineer to perform such duties as are imposed by the provisions of the Trust Indenture. Those provisions from the Trust Indenture pertinent to the activities of the Consulting Engineer are provided below for reference.

Per ARTICLE I – DEFINITIONS AND GENERAL INDENTURE MATTERS

Section 1.01 – Definitions: Qualified Independent Consultant

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

Per ARTICLE V – CONSTRUCTION FUND

Section 5.01 Construction Fund

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

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

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

Section 5.02 Amendment of Construction Project

“The Authority may from time to time amend or revise a construction project with the approval of the Consulting Engineer, but only if the Authority shall have first delivered to the Trustee:

- (i) a written statement describing the proposed amendments and revisions.

- (ii) a Resolution of the Board approving the proposed amendments and revisions.
- (iii) a certificate signed by the Consulting Engineer setting forth the general effect of such proposed amendments and revisions and certifying in his opinion that such proposed amendments and revisions are in the best interests of the Authority.
- (iv) an opinion of Bond Counsel that such amendment or revision in and of itself will not adversely affect the exclusion from gross incoming of interest on the Series of Bonds issued to fund such construction project.”

Section 5.03 Contract Security

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

Per ARTICLE VII – RATE COVENANT AND PARTICULAR COVENANTS

Section 7.07 Liens; Sale of Assets

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

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

Section 7.10 Damage, Destruction or Condemnation of System: Application of Proceeds

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

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

Section 7.11 Employment of Consulting Engineer; Reports

“The Authority will employ a Consulting Engineer to perform such duties as are imposed on the Consulting Engineer by the provisions of the Indentures.

It shall be the duty of the Consulting Engineer, in addition to the other duties prescribed elsewhere in this in this Indenture, to prepare and file with the PWSA and with the Trustee on or before 30 days prior to the beginning of each fiscal year thereafter, a report setting forth the following:

- (a) Advice and recommendations as to the proper maintenance, repair, and operation of the system during the next fiscal year and an estimate of the amounts of money that should be expended for such purposes.

- (b) Advice and recommendations as to the Capital Additions that should be made during the next fiscal year, and an estimate of the amount of money that is recommended for such purposes.
- (c) Whether the properties of the System have been maintained in good repair and sound operating condition of the Consulting Engineer's estimate of the amount, if any, required to place such properties in such condition and the details of such expenditures and the approximate time required therefor."

APPENDIX B – HISTORY OF BOND ISSUE AND REFUNDING (1984-2020)

The PWSA has employed various funding mechanisms since 1984 to fund their annual Capital Improvement Plans. Appendix B provides the history of the bond issuances and refunding from 1984 through 2020. Present funding mechanisms are outlined in Section 1.3 of this report.

B.1 FIRST BOND ISSUE

On April 19, 1984, the PWSA Board adopted a major CIP by Resolution No. 19 of 1984. The Program was designed to maintain a satisfactory level of service to the water and sewer systems current users, to improve operating efficiency, and to address future user requirements. In July 1984, the PWSA issued \$93,600,000 Daily Adjustable Demand Water and Sewer Systems Revenue Bonds, Series of 1984, to implement the initial phase of the Program. From proceeds of this Bond Issue, \$78,777,000 was deposited into the Construction Fund for the initial phase of the CIP. In June 1986, the PWSA issued an additional \$134,700,000 Adjustable Rate Tender Revenue Bonds, Series of 1986. From the 1986 Bond Issue, \$115,000,000 was available to continue the Program.

Additionally, the initial Bond Issue of the PWSA created the “Renewal and Replacement Fund” to be held in trust by the Trustee to be used by the PWSA for extraordinary maintenance and repair of the water and sewer systems or to pay the cost of capital additions. The Trust Indenture provides, so long as the aggregate amount of funds on deposit in the Construction Fund(s) is not less than \$7,000,000, the PWSA is not required to make any deposits into the Renewal and Replacement Fund. It is further required that if this aggregate amount is less than

\$7,000,000, the PWSA shall transfer, on or before the first day of each month, a sum of \$100,000 from the Revenue Fund to the Renewal and Replacement Fund until the aggregate amount equals \$7,000,000. In addition, if the aggregate amount on deposit in these two funds is less than \$5,000,000, the PWSA shall, on each September 1st, transfer to the Renewal and Replacement Fund all surplus moneys remaining in the Revenue Fund after all payments required to be made on such September 1st have been made until such time as the aggregate amount on deposit in these funds are equal to not less than \$5,000,000.

B.2 1993 BOND ISSUE AND REFUNDING

In November 1993, the PWSA issued two series of Water and Sewer System Bonds to advance refund all the outstanding previously issued bonds, provide additional funds for capital improvements to the water and sewer systems, and pay all fees and expenses incurred in connection with issuance of the 1993 Bonds. Series A of the 1993 Bonds, in the aggregate principal amount of \$278,970,000, was for the advanced refunding of outstanding bonds. Series B of the 1993 Bonds, in the aggregate principal amount of \$10,785,000, was to finance additional capital improvements.

The Trust Indenture dated October 15, 1993 and applicable to the Series A and B of the 1993 Bond Issues, eliminated the requirements for a fund balance, as described in the previous Section, to be maintained in the “Renewal and Replacement Fund” unless determined necessary annually by the Consulting Engineer. Therefore, the \$2,009,523 which was being maintained in the Fund under the previous Trust Indenture was

transferred to the “Prior Bonds Construction Fund” for use for capital improvements. From the Series B of the 1993 Bond Issue, \$9,990,477 was deposited into the 1993 Bond Construction Fund for additional capital improvements.

B.3 1995 BOND ISSUE

In 1995, the PWSA recognized that the funding for the CIP implemented in 1984 was almost depleted. To ensure a continued supply of safe drinking water and proper sewer service to the PWSA’s current and future users and to address future demands on the water and sewer systems, a new CIP was developed and adopted in 1995.

The PWSA also negotiated a Capital Lease Agreement with the City, which terminated the Lease and Management Agreement and provided for the PWSA to acquire the water and sewer systems from the City in 2025.

The PWSA issued additional bonds in 1995 to fund the 1995 CIP and to pay certain obligations of the PWSA to the City under the Capital Lease Agreement. On July 15, 1995, the PWSA issued Water and Sewer System First Lien Revenue Bonds, Series A of 1995, to pay for the capital improvements identified in the new CIP and Water and Sewer System Subordinate Revenue Bonds, Series B of 1995, to pay the obligation of the PWSA to the City under the Capital Lease Agreement in the aggregate principal amounts of \$89,850,000 and \$103,020,000, respectively. From the Series A of 1995 Bonds, \$80,000,000 was deposited into the Series A of 1995 Capital Project Fund to fund the 1995 CIP of the PWSA.

B.4 1998 BOND ISSUE AND REFUNDING

Early in 1998, additions to the CIP were proposed that addressed future needs of the PWSA, which included covering Highland Reservoir No. 1, City and Urban Redevelopment Authority Projects, and improvements to the water distribution and sewerage systems.

On March 2, 1998, the PWSA issued Water and Sewer System First Lien Revenue Bonds, Series A of 1998, to provide for the refunding of the PWSA’s outstanding Series A of 1995 Bonds; Water and Sewer System First Lien Revenue Bonds, Series B of 1998, to fund additions to the CIP; and Water and Sewer System Subordinate Revenue Bonds, Series C of 1998, and to refund the PWSA’s outstanding Series B of 1995 Bonds. The Series B of 1998 Bonds enabled \$36,001,908 to be deposited into the 1998 Capital Projects Fund, funding the CIP into the year 2000.

B.5 2002 BOND ISSUE

At the end of 2000, the Capital Project Funds of the PWSA were largely spent with approximately \$345,000 in reserve for construction and capital projects. The PWSA had anticipated this drawdown of funds and had begun work to issue additional bonds in early 2002. The Capital Projects Fund, through this issue, provided \$90,494,400 for the construction of capital projects and to meet the needs of emergencies that may require the use of capital funds.

B.6 2003 BOND REFUNDING

On September 23, 2003, the PWSA issued \$167,390,000 of Water and Sewer System Revenue Refunding Bonds, 2003 Bonds, to partially refund the 1993 Bond Series. The 2003 Bonds, with an average yield of 3.8

percent, generated a reduction in annual debt service payments of approximately \$4,000,000 for 2004. The 2003 Bonds were refunded by a portion of the 2013 Series A Bonds discussed below.

B.7 2005 BOND ISSUE

In June of 2005, the PWSA issued First Lien Revenue Bonds, 2005 Bonds, in the amount of \$50,385,000 to provide for continuation of the CIP and to meet the needs of emergencies that may require the use of capital funds. The 2005 Bonds, with an average yield of 4.23 percent, created an increase in annual debt service payments of approximately \$32 million for the first 12 years. The Capital Projects Fund, through this issue, provided \$49,799,037 for capital projects.

B.8 2007 BOND ADVANCE REFUNDING

In March of 2007 and pursuant to Resolution No. 23 of 2007, adopted on February 9, 2007, the PWSA issued \$158,895,000 of First Lien Water and Sewer System Revenue Refunding Bonds: \$43,720,000 Series A of 2007 (fixed rate), \$57,585,000 Series B-1 of 2007 (variable rate demand), and \$57,590,000 Series B-2 of 2007 (variable rate demand). The 2007 Bond Issue refunded the 2002 and 2005 Bonds. The 2007 Bond Advance Refunding also resulted in the deposit of \$6,319,014 into the 2007 Depository Agreement Fund. These funds were available for capital projects and were exhausted in 2009. The final amount deposited was \$7,503,881. Series B of 2007 Bonds are being refunded by the Series A of 2013 Bonds discussed below.

Pursuant to Resolution No. 23 of 2007, adopted on February 9, 2007, an additional \$7,000,000 was made available for capital improvements. These additional funds were provided through a transfer from the Debt Service Reserve Fund in accordance with Section 6.04 of the Trust Indenture, which provided for the required funds for Debt Service Reserve Fund to be in the form of cash, a letter of credit or other credit instrument, a surety bond, or a combination thereof. The PWSA Board elected to replace the monies in the fund with a surety bond. As a result, \$7,000,000 was transferred to the Construction Fund for capital improvements, and the balance of the monies were transferred to the Debt Service Fund.

B.9 2008 BOND ADVANCE REFUNDED

In June 2008 and pursuant to Resolution No. 54 of 2008, adopted on April 11, 2008, the PWSA issued the following bonds:

- \$145,495,000 (variable rate demand) Water and Sewer System First Lien Revenue Bonds, Series B of 2008
- \$71,225,000 (variable rate demand) Water and Sewer System First Lien Revenue Bonds, Series D-2 of 2008
- \$51,910,000 (variable rate demand) Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-1 of 2008
- \$51,885,000 (variable rate demand) Water and Sewer System Subordinate Revenue Refunding Bonds, Series C-2 of 2008
- \$68,970,000 (fixed rate) Water and Sewer System First Lien Revenue Refunding Bonds, Series A of 2008 Taxable

- \$24,665,000 (fixed rate) Water and Sewer System First Lien Revenue Refunding Bonds, Series D-1 of 2008 Taxable

Proceeds of the 2008 Bonds refunded the PWSA's Series A of 1998 Bonds, Series C of 1998 Bonds, certain maturities of the Series B-1 and B-2 of 2007 Bonds, advance refunded certain maturities of the Series B of 1998 Bonds, and provided \$98,442,194 for the continuation of the CIP and to meet the needs of emergencies that may require the use of capital funds.

The issuance of the 2008 Bonds resulted in no rate increase and initially levelled the PWSA's debt service requirements at approximately \$42,000,000 until 2040. Due to the crisis that hit the

financial sector in the last quarter of 2008, the debt service for 2009 increased to \$51,716,888. The debt service was \$49,803,245 in 2010 and \$46,507,900 in 2011.

In 2011, Resolution No. 59 of 2011 extended liquidity facilities for \$71,225,000 (variable rate demand) Water and Sewer System First Lien Revenue Bonds, Series D-2 of 2008. Also, Resolution No. 77 of 2011 and Resolution No. 78 of 2011 extended credit facilities for

\$72,750,000 (variable rate demand) Water and Sewer System First Lien Revenue Bonds, Series B-2 of 2008 and \$72,745,000 (variable rate demand) Water and Sewer System First Lien Revenue Bonds, Series B-2 of 2008, respectively.

In 2012, Resolution No. 64 of 2012 and Resolution No. 65 of 2012 extended liquidity facilities for the 2008 Series C-1-A, B, and C Bonds and the 2008 Series C-1D Bonds, respectively.

B.10 2013 BOND ISSUE

In December of 2013 and pursuant to Resolution No. 101 of 2013, the PWSA issued \$86,695,000 (fixed rate) of Water and Sewer System First Lien Revenue Bonds, Series B of 2013, to provide for continuation of the CIP and to meet the needs of emergencies that may require the use of capital funds. Additionally, \$8,941,131 of the Series B of 2013 Bonds was utilized to reimburse the PWSA's Operations Fund for funds that were used by the PWSA to construct CIP projects in 2013. The Capital Projects Fund, through this issue, provided \$75,000,000 for capital projects. These Bonds are expected to carry interest at approximately 5.16 percent maturing in 2043. The PWSA also issued \$130,215 (fixed rate) of Water and Sewer System First Lien Revenue Refunding Bonds, Series A of 2013, to refund the Series 2003 and Series 2007 B-1 and B-2 Bonds.

B.11 2017 BOND REFUNDING

In December 2017 and pursuant to Resolution No. 190 of 2017, the PWSA issued \$165,390,000 Water and Sewer First Lien Revenue Refunding Bonds composed of Series A (\$159,795,000) and Series B (taxable) (\$5,595,000). The proceeds of the Bonds were used to fund the costs of the refunding of all or a portion of the PWSA's outstanding Series 1998B, 2008A, 2008D-1, and 2013B Water and Sewer System Revenue Bonds. The refunding was completed to reduce the PWSA's debt service payments over the next 15 years by approximately \$6,275,000 and to obtain an economic gain (difference between present values of old debt and new debt service payments) of \$5,311,111.

In addition, the PWSA issued \$218,805,000 Series C First Lien Revenue Refunding Bonds, the proceeds of which were used to fund the costs of refunding the PWSA's outstanding Series 2008 B-1, B-2, and D-2 Water and Sewer System Revenue Bonds. The refunding was completed to reduce the PWSA's debt service payments over the next 23 years by approximately \$9,782,000 and to obtain an economic gain (difference between present values of old and new debt service payments) of \$7,852,000.

B.12 2019 BOND ISSUANCE AND REFUNDING

In July 2019 and pursuant to Resolution No. 62 of 2019, the PWSA issued \$109,900,000 (fixed-rate) Series A First Lien Water and Sewer Revenue Bonds and \$104,290,000 (fixed-rate) Series B Subordinate Water and Sewer Refunding Bonds. The proceeds from the Series A of 2019 Bonds were used to pay down the balance of the revolving line of credit. This increased the capacity on the revolving line of credit to allow the PWSA to continue funding capital projects.

The proceeds from the Series B of 2019 were used to refund the PWSA's outstanding Series C-1 and C-2 of 2008 Water and Sewer System Revenue Bonds and terminating the associated swaps. The cost to terminate the swaps was \$27,605,000, of which \$5,700,000 was funded with a cash contribution. The refunding was completed to reduce the PWSA's exposure from the risks associated with swaps.

B.13 2020 BOND ISSUANCE AND REMARKETING

In December 2020, and pursuant to Resolution No. 108 of 2020, the PWSA issued \$890,000 (fixed-rate) taxable Series A First Lien Water and Sewer Revenue Bonds, \$91,520,000 (fixed-rate) Series B First Lien Water and Sewer Bonds and remarketed \$218,805,000 of the Series C of 2017 First Lien Revenue Refunding Bonds.

The proceeds from the Series B of 2020 Bonds were used to pay down the balance of the revolving line of credit. The proceeds from the Series A of 2020 Bonds were used to pay for the cost of issuance for the remarketing of the Series C of 2017 Refunding Bonds.

The Series C of 2017 Refunding Bonds were originally sold as soft tender index bonds with a three-year LIBOR Index Rate Period prior to a mandatory tender on December 1, 2020 at 70 percent of 1-month LIBOR plus 64 basis points. The remarketing of the Series C of 2017 Refunding Bonds were sold with a SIFMA Index Rate Period prior to a mandatory tender on December 1, 2023 at SIFMA plus 65 basis points. The Series C of 2017 Refunding Bonds can be called at par June 1, 2023. In addition, the PWSA entered into a basis swap with Merrill Lynch Capital Services, Inc. where the PWSA receives SIFMA and pays 70 percent of 1-month LIBOR to manage variable rate interest payments associated with the remarketing.