PHILADELPHIA WATER DEPARTMENT
STATEMENT NO. 4

BEFORE THE
PHILADELPHIA WATER, SEWER AND STORM WATER RATE BOARD

In the Matter of the Philadelphia Water Department's Proposed Change in Water, Wastewater and Stormwater Rates and Related Charges	Fiscal Years 2022 - 2023

Direct Testimony

of
Donna Schwartz, Benjamin Jewell,
Brendan Reilly and Mary Ellen Senss

on behalf of

The Philadelphia Water Department

Dated: January 2021

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I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q1. PLEASE STATE YOUR NAME AND POSITION WITH THE PHILADELHIA WATER DEPARTMENT.

A1. My name is Donna Schwartz. I am the Deputy Commissioner and General Manager of the Operations Division of the Philadelphia Water Department ("PWD" or "Department").

Testifying with me are Benjamin Jewell, who is the Manager of the Department's Collector System Unit; Brendan Reilly, who is Water Conveyance Chief for the Department; and Mary Ellen Senss, who is the Wastewater Manager for the Department.

Q2. WOULD EACH OF YOU PLEASE DESCRIBE YOUR RESPECTIVE EDUCATIONAL BACKGROUND AND RELEVANT WORK EXPERIENCE?

A2. Our respective backgrounds and experience are summarized below:

Ms. Schwartz

I hold a Bachelor of Science degree in chemical engineering from Drexel University. I am a registered professional engineer licensed in Pennsylvania and a certified plant operator. As noted in the attached resume of experience, I have held several positions with increasing responsibility since joining the Department in 1982. My resume of experience is attached and marked as Schedule DS-1.

I am principally responsible for managing the Department's Operations Division.

Mr. Jewell

I hold a Bachelor of Science degree in environmental engineering from Northwestern University. As noted in the attached resume of experience, I have held several positions with increasing responsibility since joining the Department in 2007. My resume of experience is attached and marked as Schedule BCJ-1.

I am the manager for the Department's Collector Systems Unit. This group is responsible for operation and maintenance of all components of the wastewater and stormwater collection system included gravity sewers, pumping stations, combined sewer overflow control structure, green stormwater infrastructure and street drainage structures (inlets), as well as engineering support for operational decision making. My responsibilities include oversite of major program functions including, but not limited to, providing guidance and decision-making support related to budgeting, expenditures, major projects and emergency response.

Mr. Reilly

I am the Department's Water Conveyance Chief. I have been in this position for 5 years. I have held several positions with increasing responsibility since joining the Department in June 2002, all within the Water Conveyance Division. I hold a degree in civil engineering from Widener University and also hold a Class A/E Operators certification with the Pennsylvania's Department of Environmental Protection. My resume of experience is attached and marked as Schedule BR-1.

My responsibilities include management of the operation and maintenance of the water transmission and distribution systems through the oversight of the Load Control,

Pumping, and Distribution Units. Each Unit plays a key role to provide continuous and reliable water service to all thirteen pressure districts across the City. I am also responsible for the development of related budgets, contract management and workplace policies.

Ms. Senss

I am the Wastewater Manager for the Department. I have worked for the Department for 33 years. I have held a Waste Water Operator Class A License in Pennsylvania since 2004. My resume of experience is attached and marked as Schedule MES-1.

My responsibilities include managing the Department's wastewater treatment plants and the Department's biosolids recycling center. I am also responsible for the budgets and capital programs for these facilities as well as providing oversight in policy and managerial decisions.

Q3. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A3. The purpose of our testimony is to (i) provide an overview of the water and wastewater systems; (ii) discuss current and future challenges; (iii) identify capital projects and major maintenance activities; and, (iv) explain why rate relief is critical to support operations and system improvements during FY 2022 and FY 2023 (the "Rate Period").

A4.

Q4. PLEASE IDENTIFY THE SCHEDULES THAT ACCOMPANY THIS TESTIMONY.

A5. The following schedules accompany this testimony:

Schedule DS-1: Resume of Donna Schwartz

Schedule DS-2: Summary of Drinking Water Regulations

Schedule DS-3: Green Stormwater Infrastructure Tools

Schedule BCJ-1: Resume of Benjamin Jewell

Schedule BR-1: Resume of Brendan Reilly

Schedule MES-1: Resume of Mary Ellen Senss

II. OVERVIEW OF THE WATER AND WASTEWATER SYSTEMS

Water System

Q5. PLEASE DESCRIBE THE WATER SYSTEM.

A6. The water system serves approximately 490,000 active customer accounts within the City of Philadelphia ("City") using approximately 3,100 miles of mains and approximately 25,000 fire hydrants.

In addition, the system provides water service to Aqua Pennsylvania pursuant to a wholesale contract.

The City obtains approximately 58% of its water from the Delaware River and the balance from the Schuylkill River. Under the City's water allocation permit issued by the Pennsylvania Department of Environmental Resources ("PaDEP"), which expires in September 2041, the City is authorized to withdraw up to 423 million gallons per day ("MGD") from the Delaware River and up to 258 MGD from the Schuylkill River.

Water treatment is provided by the Samuel S. Baxter Water Treatment Plant on the Delaware River and by the Belmont and Queen Lane Water Treatment Plants on the

Schuylkill River. The combined rated treatment capacity of these plants under the Department's Partnership for Safe Water procedures is 546 MGD. The combined maximum source water withdrawal capacity from the two rivers that supply these plants is 680 MGD.

PWD also operates a sophisticated testing laboratory and a range of technical and administrative support services which support both the water and wastewater systems. We consistently test our treated water for about 100 regulated contaminants, ranging from organisms like bacteria to chemicals like nitrate, and use online water quality monitors to provide continuous testing during all stages of the water treatment process and in the distribution system.

Q6. PLEASE DESCRIBE THE REGULATORY REQUIREMENTS APPLICABLE TO THE DELIVERY OF SAFE DRINKING WATER.

A7. Under the federal and state Safe Drinking Water Acts, the U.S. Environmental Protection Agency ("EPA") and the Commonwealth of Pennsylvania ("Commonwealth" or "Pennsylvania") have promulgated regulations which limit the amounts of contaminants in drinking water provided by public water systems and establish treatment, monitoring, reporting, planning, and operating requirements to ensure that tap water is safe to drink.

The PaDEP manages and enforces both the state and federally delegated safe drinking water programs and associated regulations. A summary of the applicable safe drinking water regulations, the key requirements of each regulation, and PWD's associated activities to comply with each of the regulations is attached to this testimony as Schedule DS-2.

PWD complies with all federal and state drinking water standards, as well as more rigorous PWD internal water quality performance standards and operational goals.

Q7. PLEASE DESCRIBE KEY CHANGES IN FEDERAL AND STATE DRINKING WATER REGULATIONS THAT IMPACT OPERATIONS.

A8. Amendments to the safe drinking water regulations have resulted in increases in both the workload for PWD staff and the cost of remaining in compliance with the applicable regulations.

Specifically, amendments to Pennsylvania's Disinfection Requirements Rule, published in the Pennsylvania Bulletin on April 28, 2018, imposed more stringent water system treatment requirements related to microbial protection and disinfection. The amended rule requires PWD to maintain higher levels of chlorine or chloramine in the distribution system and to perform additional monitoring and reporting to PaDEP.

Amended regulations published in the Pennsylvania Bulletin on August 18, 2018, increased existing PaDEP permit fees and added new annual fees that PWD is required to pay to the Commonwealth. The amended regulations also imposed new continuous monitoring requirements for turbidity in source water beginning August 20, 2019; and require PWD to have standby generators at its critical pumping facilities by August 17, 2021. Compliance with the standby generator rule requires $24 million of additional capital expenditures to install standby generators at two pumping facilities.

PWD will be required to take additional steps during the Rate Period to remain in

compliance with the federal and state Long-Term 2 Enhanced Surface Water Treatment Rule ("Rule"). This Rule, initially promulgated by EPA in 2006, is designed to protect the public from waterborne illnesses by reducing Cryptosporidium and other microbial pathogens in the sources of drinking water. Under this Rule, public water systems are classified in one of four treatment categories or "bins" based on the results of a two-year long source water monitoring program. The higher the Cryptosporidium concentration in the source water, the higher the bin classification and the more treatment or other management options are required to comply with the rule.

Initial monitoring showed low Cryptosporidium counts in the river water at the Baxter and Belmont Water Treatment Plant intakes, resulting in a Bin 1 classification for those plants, but a slightly higher count in river water at the Queen Lane Treatment Plant intake, resulting in a Bin 2 classification for that plant. PWD has complied with the Rule by treating water using conventional filtration treatment systems at all three water treatment plants and completing a Watershed Control Program Plan for the Queen Lane Water Treatment Plant. The aforesaid plan identified potential and actual sources of Cryptosporidium in portions of the Schuylkill River watershed and established a set of control measures to reduce Cryptosporidium loading from targeted sources. Recent monitoring has shown an increase in Cryptosporidium in the Delaware River. To remain in compliance with the Rule, PWD submitted an updated Watershed Control Program Plan to the PaDEP in 2020 to include portions of the Delaware River watershed area contributing to the intake for the Baxter Water Treatment Plant.

In December 2020, the EPA finalized revisions to the National Primary Drinking Water Regulations for lead and copper under the Safe Drinking Water Act (commonly known as

the Lead and Copper Rule). This is the first major revision of the Rule in nearly thirty years; and will require PWD to expand current driking water programs and cause the incurrence of additional expenses not accounted for in the cost of service study to achieve compliance.

PWD has complied with the current (non-revised) federal and Pennsylvania Lead and Copper Rules by implementing a corrosion control treatment program and conducting monitoring to make sure that this treatment program is working. The Department's corrosion control program has been optimized over the past two decades, which has minimized the release of lead from service lines, pipes, fixtures and solder by created a coating that keeps lead from leaching into water. The Department also has taken proactive steps to accelerate the removal and replacement of privately-owned lead service lines that remain in service. For example, when the Department replaces water mains it also offers to replace customer-owned lead water service lines at no cost to the customer. The Department also offers interest free loans to customers who are interested in replacing their lead water service lines before the next water main replacement project.

Wastewater System

Q8. PLEASE DESCRIBE THE WASTEWATER SYSTEM.

A9. The wastewater system serves approximately 545,000 accounts, including approximately 60,000 stormwater-only accounts within the City.

In addition, wastewater service is provided to ten municipalities or municipal authorities pursuant to wholesale service contracts.

The wastewater system consists of three water pollution control plants, the Northeast,

Southwest, and Southeast water pollution control plants (the "WPCPs"), approximately 29 pumping stations, approximately 3,700 miles of sewers, and a privately managed centralized biosolids handling facility. It includes approximately 1,850 miles of combined sewers, 770 miles of sanitary sewers, 750 miles of stormwater sewers, 16 miles of force mains (sanitary and storm), and approximately 330 miles of appurtenant piping. The three WPCPs processed a combined average of 484 MGD of wastewater in Fiscal Year 2019, have a 522 MGD combined average design capacity, and a peak capacity of 1,059 MGD.

The Department's stormwater-related assets also include numerous green stormwater infrastructure systems located throughout the City. Examples of the various types of green stormwater infrastructure include stormwater tree trenches, stormwater bump-outs, stormwater planters, pervious pavement, green roofs, and rain gardens, as depicted in Schedule DS-3.

Q9. PLEASE DESCRIBE REGULATORY AND PERMIT REQUIREMENTS CURRENTLY APPLICABLE TO THE DEPARTMENT'S SANITARY AND COMBINED SEWER SYSTEMS UNDER THE CLEAN WATER ACT.

A10. PWD has National Pollutant Discharge Elimination System ("NPDES") permits for each of its three wastewater treatment plants and their associated combined sewer overflow outfalls to rivers and creeks in the City. The NPDES permit program is a national program for regulating discharges into the waters of the United States under the Clean Water Act. EPA has delegated the NPDES permitting program for facilities in Pennsylvania to the PaDEP, which issues NPDES permits for these facilities under the Pennsylvania Clean Streams Law.

PaDEP issued the current NPDES permits for the Northeast, Southeast, and Southwest Wastewater Treatment Plants in 2007. These permits expired in 2012. The facilities are operating under automatic extensions of the expired permits, as dictated by the policies of the PaDEP. The expired NPDES permits will remain in place until new permits are issued.

The Department's NPDES permits contain discharge limits, monitoring schedules, sampling, analysis and reporting requirements, and numerous other operating and management requirements. Many of the requirements in the NPDES permits address Combined Sewer Overflows, commonly referred to as CSOs. A CSO is an intermittent discharge from a municipal CSO outfall to waters of the United States or the Commonwealth which occurs because of stormwater entering the combined sewer system and exceeding the hydraulic capacity of the sewers or treatment plants. The City owns and operates numerous CSO outfalls which are authorized by the NPDES permits for its three wastewater treatment plants.

The Department's CSO program is associated, in part, with complying with the CSO requirements of its NPDES permits and EPA's National CSO Control Policy. The NPDES permits issued in 2007 required the Department to update its long-term control plan for controlling CSO discharges and to implement capital improvement projects to provide for additional projects that reduce CSO frequency and volume. In accordance with EPA's National CSO Control Policy, the permits also require the Department to take numerous actions or measures designed to satisfy the Nine Minimum Controls, which are described in that policy as technology-based actions designed to reduce CSO pollutant discharges and address their effects on receiving waters.

Q10. PLEASE DESCRIBE REGULATORY AND PERMIT REQUIREMENTS CURRENTLY APPLICABLE TO THE DEPARTMENT'S MUNICIPAL SEPARATE STORM SEWER SYSTEM.

A11. The Clean Water Act requires municipalities with municipal separate storm sewer systems serving populations of 100,000 or more to obtain NPDES permits for their stormwater discharges. EPA defines a municipal separate storm sewer system (commonly referred to as an "MS4") as a conveyance or system of conveyances that is: (i) owned by state, city, town, village or other public entity that discharges to waters of the United States; (ii) designed or used to collect or convey stormwater; (iii) not a combined sewer; and (iv) not part of a sewage treatment plant or publicly owned treatment work. In Pennsylvania, this requirement of the Clean Water Act is administered by PaDEP under its MS4 Program. PaDEP issues NPDES MS4 permits under the Pennsylvania Clean Streams Law and its delegated authority from the EPA.

PaDEP issued the current NPDES MS4 permit for the City's separate storm sewer system in 2005 and amended the permit in 2006. The permit expired in 2010. As required under PaDEP regulations, the Department applied for renewal of this permit to PaDEP on March 29, 2010. PaDEP has made a tentative determination to issue the new permit and provided PWD with a pre-draft permit for review and comment in November 2019.

The Department is in negotiations with the PaDEP to finalize the NPDES MS4 permit requirements. The Department continues operating under an extension of the expired NPDES MS4 permit, as dictated by the policies of the PaDEP, which will remain in place until a new permit is issued.

The Department's current NPDES MS4 permit establishes numerous permit conditions and requires stormwater management practices to ensure water quality standards and designated uses are attained in our rivers and creeks.

Q11. ARE THERE ADDITIONAL REGULATORY REQUIREMENTS THE DEPARTMENT MUST MEET RELATED TO STORMWATER MANAGEMENT?

A12. Yes. The PaDEP and the Department signed the Consent Order and Agreement ("COA") on June 1, 2011. A copy of the COA is included with the filing as PWD Exhibit 7. The COA requires the Department to implement its updated long-term control plan to control CSO discharges, which the Department submitted to PaDEP in 2009. PWD sometimes refers to its updated long-term control plan as the "Green City, Clean Waters" program. The COA is discussed in PWD Statement 3.

III. CURRENT AND FUTURE CHALLENGES

Q12. PLEASE DESCRIBE THE CATEGORIES OF OPERATIONAL CHALLENGES FACING THE DEPARTMENT.

A13. Broadly speaking the challenges facing the Department fall into three related categories: reliability, resilience, and regulatory compliance.

<u>Reliability</u>

Reliability, as a widely used term, points to the attribute of consistently meeting water and wastewater system operational goals. For the water system, we use the term

reliability to describe the ability of the water system to provide water that consistently meets drinking water standards. For the wastewater system, the term is used to describe the ability to collect and treat wastewater in compliance with the standards in our discharge permits.

To achieve operational reliability the Department must continuously renew and replace its aging infrastructure. The City's water and wastewater infrastructure was built and financed by previous generations. Many parts of that infrastructure are approaching or have exceeded their service lives and need renewal and replacement.

The Department must also maintain operational redundancies to achieve operational reliability. Redundancy is about the use of measures beyond minimum requirements to ensure that treatment goals are more reliably met or that performance can be more reliably demonstrated. A common kind of redundancy is having standby equipment (such as a pump or filter) to provide operational reliability and flexibility to ensure that the system can properly function, if a problem develops.

Resilience

When we speak of resilience, or robustness, we are referring to the ability of the system to avoid disruptions due to emergencies such as severe weather events or accidents.

With the passage of America's Water Infrastructure Act of 2018 ("AWIA"), water systems are increasingly focused on utility risk and resilience. This law addresses utility risk, resilience, and emergency response plans.

Regulatory Compliance

Standards for water and wastewater systems have undergone major and dramatic changes during the past decades, and trends indicate that they will continue to become more stringent and complicated. Major regulatory requirements applicable to the water and wastewater systems are summarized in Section II of this testimony and in PWD Statement 3.

The Department is able to provide reliable levels of service and meet regulatory requirements by taking a proactive approach to operations and maintenance and by regularly reviewing its capital improvement needs to remain in compliance and keep its water facilities in good condition.

Q13. PLEASE DESCRIBE THE MAJOR OPERATIONAL CHALLENGES FACING THE DEPARTMENT IN PROVIDING SAFE, CLEAN, AND RELIABLE WATER SERVICE.

A14. The major water system operational challenges facing PWD during the Rate Period relate to (i) upgrading its aging plant; (ii) improving its water conveyance and distribution system; (iii) meeting operational requirements with reduced staffing and COVID-19 constraints; and (iv) managing unavoidable and non-discretionary operating costs.

Plant Upgrades

One major challenge facing the Department is to complete major plant upgrades currently underway or that will be initiated during the Rate Period. The Department's water treatment plants are over 100 years old and need to be constantly upgraded to address structural issues and incorporate the most recent advancements in technology.

Water Conveyance and Distribution System Improvements

A second major challenge relates to the repair and replacement of a portion of the Department's water conveyance and distribution system. This system is aging with water mains having an average age of 80 years. Given the historic rate of water main breaks, the Department is engaged in an accelerated program of main replacement. By FY 2024, the targeted level of main replacement will be 42 miles annually — with the goal of significantly reducing the frequency of water main breaks. Even at the above rate, however, it will take roughly 75 years to replace the entire system.

Transmission lines, SCADA (supervisory control and data acquisition) equipment, pump stations and storage facilities are also important components of the water system. They work to deliver water to and within the distribution system at the appropriate pressure. They will need rehabilitation, upgrades, or even expansion. By way of illustration, mechanical equipment (such as primary pumping units) should be considered for replacement before the end of their anticipated service life or when they are repeatedly performing below expected performance levels. In assessing the equipment, it could be determined that an upgrade or expansion is more appropriate than continued repair or replacement-in-kind.

Improvements to the water transmission system will add system redundancy, reduce water age and ensure compliance with PaDEP minimum chloramine disinfectant residual regulatory requirements.

Meeting Operational Requirements with Reduced Staffing and COVID-19 Constraints

A third major challenge facing the Department relates to COVID-19. The pandemic has literally impacted every aspect of the Department's operations. A key example of this relates to difficulties and delays in obtaining support related to human resources and procurement.

In addition, the Operations Division has to meet the challenge of managing operational requirements with limited staffing while observing COVID-19 protocols. In most instances this requires reconfiguring staffing on given projects and transporting staff to field locations and positioning staff in proximity to each other in accordance with social distancing objectives. Use of Personal Protective Equipment ("PPE") is also necessary to ensure a safe work environment. The foregoing challenge is made more complicated by a higher employee turnover rate due to transfers, retirements and resignations. Filling the current number of vacancies is another logistical problem (given City hiring practices and collective bargaining agreement work requirements). All of the above have caused an increased workload on our employees and a loss of efficiency/productivity which must be carefully managed.

Managing Unavoidable and Non-Discretionary Operating Costs

A fourth major challenge facing the Department is in connection with managing unavoidable and non-discretionary operating costs. Such costs include those related to personal services (labor) and chemical purchases necessary for water treatment. These costs are, in many instances, increasing even as customer demands are declining. These costs, in the aggregate, comprise approximately 80% of the Department's budgeted operating costs for its water treatment facilities.

Q14. WHAT ARE THE OPERATIONAL CHALLENGES FACING PWD IN PROVIDING RELIABLE WASTEWATER SERVICES AND MEETING ASSOCIATED REGULATORY REQUIREMENTS?

A15. The major wastewater system operational challenges facing PWD, during the Rate Period, mirror those for the water system and include:

Plant Upgrades

One major challenge is in connection with wastewater treatment plant upgrades. Planned improvements or expansions to these plants must be undertaken and completed while they remain in service. This will require a significant balancing act to ensure reliable service while meeting applicable regulatory requirements.

Plant expansions may be required to respond to additional flows and effluent (discharge) requirements. Additional flows can be created by wet weather. Effluent requirements may change for ammonia and nutrients, since the Delaware River Basin Commission ("DRBC") approved a resolution in September 2017 to conduct analysis of requirements and water quality standards in the Delaware River Estuary. The Department is in discussions with the DRBC regarding the potential to increase nutrient management.

Repair and Replacement of Collector Systems

A second challenge relates to the repair and replacement of the wastewater and stormwater collector systems. The average age of the sewers serving this system is about 100 years. Notably, the Department is increasing the miles of sewer inspection to provide actionable information to increase the miles of sewers reconstructed/ rehabilitated.

However, as the system grows older, the frequency of repairs and service interruptions is expected to increase. This phenomenon will create more demands on limited PWD staff.

As with the water system, the wastewater collection system contains a number of pumping stations that are critical to continued service. Currently, the Department is engaged in rehabilitation of the largest of those stations (Central Schuylkill), but other rehabilitation projects are planned. These would be expected to ease maintenance burdens but are obviously the result of stations of advanced age nearing the end of their service life. There are pumping stations being planned for addition to the system, once they come online they will increase our asset inventory and O&M responsibilities. Other capital projects that increase operational burden within the collection system are related to real time control of flows (new mechanical, electrical and instrumentation systems) for the purpose of better management of wet weather flows. There are a few being considered by planning and design, but none are imminent.

In addition, maintenance costs associated with Green Stormwater Infrastructure ("GSI") projects are projected to increase to keep pace with COA requirements. The COA includes requirements to steadily increase the number of Greened Acres associated with GSI projects each year. PWD continues to design and construct a large portion of the GSI projects required to comply with the COA. This obligation will increase each year as the number of Greened Acres required by the COA increases. With GSI almost every dollar is spent to build a new asset. Under the COA, there is a requirement to maintain constructed stormwater management practices in accordance with the City's GSI Maintenance Plan. This regulatory requirement along with the construction of new assets means that operating costs will necessarily increase as capital investment in GSI

continue. This is another area to be carefully managed in view of limited resources. Without proper maintenance of greened acres, the Department runs the risk of non-compliance under the COA.

Meeting Operational Requirements with Reduced Staffing and COVID-19 Constraints

The wastewater side of the Operations Division faces the same COVID-19 challenges that are being faced by the water side of the Operations Division. For reasons parallel to those explained above, wastewater system repairs/replacements must be carried out, as efficiently as possible, with reduced support services, reduced staffing and while observing all COVID-19 safety requirements. Due to this combination of factors, productivity/efficiency is reduced and presents another area to be managed carefully in light of our limited resources.

Q15. PLEASE EXPLAIN HOW REDUCTION IN DEMAND, INDICATED BY PRODUCTION DATA, PRESENTS AN ADDITIONAL CHALLENGE FOR THE DEPARTMENT.

A16. PWD projects a decline in customer demand, as confirmed by production data. The customer account and consumption assumptions for the Rate Period, FY 2022 and FY 2023, are discussed in greater detail in PWD Statement 2 and 7A.

Dealing with the twin pressures of increasing water costs and decreasing water demand is a challenge. Simply put, not all of the costs necessary to provide service decline when there is a reduction in demand. As explained in PWD Statement 2 and 7A, the Department's rates are set to provide the revenues needed to allow it to cover both fixed costs (that do not change with consumption) and variable costs (that vary with

consumption) to provide service. The vast majority of the Department's costs fall into the fixed category (which are subject to increase with salary/benefit adjustments, inflation and regulatory changes), so these costs can increase even as consumption declines. When this happens the Department's rates must be adjusted upward to track cost incurrence.

The Department cannot reduce fixed costs without sacrificing the mission of providing safe and reliable services. In the instant context, the Department's fixed costs - at the treatment plants and across the water and wastewater systems - are increasing over time given needed plant upgrades, major maintenance and inflationary impacts.

Beyond the fixed costs, the Department also has variable costs. The variable costs rise if more water is produced and if more wastewater is treated. They decline as the volume of output decreases. Examples of variable costs include chemicals to treat raw water and electricity used at the production/treatment facilities and at pump stations to move water through the distribution system. The anticipated declines in variable costs do not negate the anticipated increases in fixed costs, as explained in PWD Statement 2 and 7A.

IV. MAJOR CAPITAL PROJECTS AND MAINTENANCE ACTIVITIES

Q16. PLEASE BRIEFLY DESCRIBE HOW THE DEPARTMENT PLANS FOR THE REPAIR, REPLACEMENT, IMPROVEMENT AND MAINTENANCE OF ITS FACILITIES.

A17. The Department evaluates facility needs and develops the capital improvement plan for funding the design and construction of improvements. The plans are flexible, realizing

that priorities change, and the Department reprioritizes to meet the needs of facilities and to maintain compliance.

In addition to capital replacement or improvement projects, regular preventative maintenance is scheduled to prioritize preventative and corrective actions. Maintenance of facilities is ongoing and perpetually included in the Department's budgets. For example, the Department needs to clean four of its twenty digesters each year. This places the cleaning for each digester on a five-year cycle. Without proper maintenance, the Department runs the risk of deteriorating service and, ultimately, non-compliance and public health risks.

Most capital investment is made for replacement or rehabilitation of an existing asset. Replacement and rehabilitation does not increase O&M costs and burdens. When an asset is repaired or rehabilitated, it should require either the same or less maintenance. However, with GSI investment almost every dollar is spent to build a new asset. This means that, as already noted, each new greened acre creates new maintenance costs, since the greened acre must be maintained in the future. Without proper maintenance of greened acres, the Department runs the risk of non-compliance under the COA.

Q17. PLEASE PROVIDE AN OVERVIEW OF CRITICAL CAPITAL PROJECTS AND MAINTENANCE ACTIVITIES PLANNED FOR THE CURRENT FISCAL YEAR, FY 2021.

A18. The Department has identified several critical projects that must proceed in FY 2021. These projects will, in the aggregate, exceed $101.1 million in cost. The aforesaid projects fall into the following categories with associated costs stated below:

Table 1

Critical Infrastructure In FY 2021

Water Facilities		$30,975,000
Wastewater Facilities		$41,446,000
Street Work		$16,596,000
Green Stormwater Infrastructure		$12,089,000
	TOTAL	$101,106,000

The total amount in Table 1 is significantly less than the approved Capital Budget of $611 million for FY 2021, since the pandemic forced the Department to prioritize remaining projects planned for the fiscal period and only bid those projects deemed critical in order to utilize the limited amount of capital funds in the most prudent manner. The Capital Budget for FY 2021 is discussed in PWD Statement 3.

Q18. ARE CRITICAL RENEWAL AND REPLACEMENT PROJECTS PLANNED FOR THE RATE PERIOD, FY 2022 AND FY 2023?

A19. Yes. These projects are included in the capital improvement program. The Department anticipates encumbered costs of approximately $1.2 billion during FY 2022 and FY 2023, as discussed in PWD Statements 2, 3 and 7A. Expenditures in the aggregate amount of $611 million are planned in FY 2022 (including carry-over items from FY 2021).

Additional capital projects are planned for FY 2023 in the amount of $603 million. These projects are summarized by category in Tables 2 and 3 in PWD Statement 3.

Q19. PLEASE DESCRIBE THE CRITERIA USED TO DETERMINE CRITICAL CAPITAL IMPROVEMENTS AND MAINTENANCE ACTIVITIES.

A20. The challenges referenced above point to key areas where capital improvements are needed. A recurring criterion in determining critical capital improvements is directly related to the need to upgrade/replace/repair aging plant, facilities and equipment in service on the water and wastewater systems. Capital improvements prioritized for the Rate Period are in connection with (i) upgrading water treatment plants and water pollution control plants; (ii) replacing water mains to prevent catastrophic failures, to prevent damage claims and to minimize interruptions of service emergencies; (iii) replacing/rehabilitating the wastewater collector system (including sanitary sewers, stormwater sewers and combined sewers used for both sewage and stormwater); and (iv) constructing new stormwater sewers to mitigate flooding or to improve use of in-system storage to reduce combined sewer overflows, among other repairs/improvements.

In addition to the foregoing, the Department has a suite of major maintenance activities which must be undertaken continuously to keep an expansive system in reasonable working condition. It bears emphasis that all of the projects identified for the Rate Period meet the over-arching objectives of (i) maintaining system reliability, (ii) reducing chronic maintenance issues associated with aging plants/facilities, (iii) maintaining regulatory compliance, and (iv) mitigating risk associated with the operation of the water and wastewater systems.

Q20. WILL THE DEPARTMENT BE IMPLEMENTING ADVANCED METERING INFRASTRUCTURE DURING THE RATE PERIOD?

A21. Yes. The advanced metering infrastructure ("AMI") system relates to a need to upgrade/replace/repair aging plant, facilities and equipment in service on the water system. The installation of the AMI system and communications network was completed on February 12, 2020. The Department is currently in deployment phase, during which Automatic Meter Reading ("AMR") equipment will be replaced with AMI units and service lines inside the properties will be examined for lead. This phase is expected to continue during the Rate Period. The costs for installation and deployment are included in the Water Capital Improvement Program.

The AMI system will provide enhanced customer benefits such as the ability to view detailed water usage and receive possible leak alerts. The system will improve operations by allowing the Department to monitor the meters in near real time with advanced diagnostics. These improvements should reduce billing disputes, improve customer service, increase revenue collection and increase operational efficiency.

V. RATE RELIEF NEEDED TO SUPPORT OPERATIONS AND SYSTEM IMPROVEMENTS

Q21. PLEASE EXPLAIN THE IMPORTANCE OF OPERATIONAL CHANGES PLANNED FOR THE RATE PERIOD, FY 2022 AND FY 2023, TO ENHANCE OPERATIONAL EFFICIENCY AND CONTROL O&M EXPENSES.

A22. Operational changes are necessary because PWD cannot continuously engage in chronic maintenance of aging infrastructure. We need to replace plant and equipment during its service life. Delays in renewal and replacement have created certain scenarios where our

equipment is so old that replacement parts are unavailable. These circumstances have to change to achieve optimal performance levels. The critical projects identified for FY 2021 and the CIP projects for the Rate Period must be supported through new rates to break the cycle of redundant maintenance for plant/equipment which is beyond its service life.

Q22. ARE THE TYPES OF RENEWAL AND REPLACEMENT PROJECTS DESCRIBED IN YOUR TESTIMONY NECESSARY TO MEET REGULATORY REQUIREMENTS AND MAINTAIN CURRENT LEVELS OF SERVICE?

A23. Yes. As alluded to previously, PWD's infrastructure is massive, and it is aging, much of it exceeding its estimated service life. The drinking water treatment plants are roughly about 100 years old, but they are constantly being upgraded. The wastewater treatment plants are newer, between 60-87 years old. These plants are frequently being rebuilt and renovated to meet stricter federal water pollution control laws. The average age of our water lines is roughly 80 years old. The average age of the wastewater lines is about 100 years.

Infrastructure programs are critical and must move forward if the Department is to provide a safe and reliable services in the future. The age and deteriorating condition of the Department's infrastructure underscore the current critical need for replacement and rehabilitation. Replacing and rehabilitating aging mains, pipes, pumps, storage and treatment facilities requires large capital investments, as shown in the Capital Improvement Plan and as discussed in PWD Statement 3.

The cost of failing to invest in infrastructure replacement and rehabilitation could be

significant. Without continued investment, the Department's systems will become less reliable, breaks and failures will become more common, vulnerabilities to disruptions will compound, and the potential for non-compliance will increase. As water systems continue to age, water loss will accelerate. Leaks and pipe breaks will be more frequent, wasting more treated water. As wastewater infrastructure deteriorates and ruptures, street flooding, shutdowns, and damage from storms would increase. Such events will cause service disruptions that will place large, unexpected personal costs on individuals, families and businesses.

The benefits of investing in infrastructure include reliability, resilience, and regulatory compliance, as discussed herein. Other positive benefits of investing in infrastructure are described in PWD Statement 8.

Q23. WILL THE DEPARTMENT EXPERIENCE HIGHER OPERATING COSTS BECAUSE OF REGULATORY REQUIREMENTS RELATED TO ITS WASTEWATER SYSTEM DURING THE RATE PERIOD?

A24. Yes. The requirements of the NPDES permits for the three wastewater treatment plants and the separate storm sewer system will continue a trend of higher annual operating costs for the Department. These expenditures, along with the ongoing operating and maintenance costs for the Green City, Clean Waters program, are among those projected for the Rate Period and together with other operating and financial costs contribute to the need for the requested rate relief.

Q24. PLEASE EXPLAIN HOW EXPENDITURES INDENTIFIED IN THE TABLE 2 ABOVE (RELATED TO WATER AND WASTEWATER SYSTEMS) ARE FUNDED.

A25. Proposed rates will support planned capital expenditures in the Rate Period, FY 2022 and FY 2023. As noted in PWD Statements 2 and 3, a significant portion of costs for the above fiscal years will be funded with proceeds of debt. Debt service requirements and contributions from current revenues are integral components of the revenue requirements for the Rate Period.

VI. CONCLUSION

Q25. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A26. Yes.

Schedule DS-1

Donna Lee Schwartz
ARAMARK TOWER
1101 Market Street, 5th Floor
Philadelphia, PA 19107

EDUCATION:

Drexel University
B.S. in Chemical Engineering, June 1982

The Pennsylvania State University
Pre-med major, September 1977 to June 1979

EXPERIENCE:

03/16 to present: City of Philadelphia Water Department
Title: Deputy Commissioner/Director of Operations
Duties: Direct the activities of all operating units of the Philadelphia Water Department. Responsibilities include oversight of the operation and maintenance of the water and wastewater utilities including three water plants, three wastewater plants and a biosolids recycling facility. Responsibilities also include the operation and maintenance of 3,100 miles of water mains, 3,500 miles of sewers, 79,000 storm water inlets, 25,000 fire hydrants and water and wastewater pumping stations, throughout the City. Oversee the supply of water and wastewater services to suburban contract customers.
Liaison with other divisions within the Department to coordinate efforts and ensure effective operations.
Advance Philadelphia Water Department interests in activities involving other city departments, local, state and federal agencies as well as other outside entities.

01/09 to 03/16 : City of Philadelphia Water Department – Belmont WTP
Title: Engineer IV – Plant Manager
Duties: Oversee the effective and efficient operation and maintenance of the plant and employees ensuring compliance with all standards
Develop staff by mentoring subordinate managers, supporting group leaders, coaching individuals and building a team
Direct capital and operational planning
Develop and adhere to the operational budget that is based on best management practices and cost effectiveness
Set goals and protocols for the facility and personnel, oversee their implementation and assess performance
Promote sustainability, energy management and green initiatives
Liaison with other units, departments, utilities and agencies
Provide off hours technical support as Incident Commander and Certified Operator in Charge

11/89 to 01/09: City of Philadelphia Water Department – Belmont WTP
Title: Engineer III – Assistant Plant Manager
Duties: Maintain water quality and plant operation
Ensure compliance with all local, state and federal regulations for water and wastewater including all reporting requirements and involvement in the PfSDW
Set process goals and performance criteria and assess performance of plant
Suggest, research, design and evaluate the effectiveness of plant upgrades and process enhancements
Provide off hours technical support and spill response

6/82 to 11/89: City of Philadelphia Water Department – Industrial Waste Unit
Title: Engineer
Duties: Manage the wastewater pretreatment program.
Interpret and enforce all discharge requirements
Assess compliance, suggest improvements, levy fines/charges
Develop/ manage the PCB transformer delisting program
Provide off hours spill response

PROFESSIONAL MEMBERSHIPS AND LICENSES: Commonwealth of Pennsylvania Professional Engineer
Commonwealth of Pennsylvania Water System Operator Certification

References: Supplied on request

SCHEDULE DS-2

Summary of Drinking Water Regulations

Regulation	Key Requirements	PWD Activities
Lead and Copper Rule (LCR) 25 Pa Code 109.1101-1108	90% of samples collected in a monitoring round must be below the action levels of 0.015 mg/L for lead and 1.3 mg/L for copper Systems serving more than 50,000 people were required to install corrosion control treatment (CCT) and must perform routine monitoring for a defined list of water quality parameters	PWD performed the most recent round of LCR compliance sampling in 2019. PWD performs active CCT at all three plants by adding zinc orthophosphate and maintaining finished water pH in the range of 6.8 to 7.8 and performs the required water quality monitoring at each entry point to the distribution system and within the distribution system.
Revised Total Coliform Rule (RTCR) 46 Pa Bulletin 6005-6019 (September 24, 2016)	Routine sampling for total coliform from representative sites throughout the distribution system	PWD collects and analyzes samples for total coliforms and *E. coli* from over 70 representative locations throughout the distribution system.
Stage 1 and Stage 2 Disinfection Byproducts (DBP) Rule 25 Pa Code 109.301(12) and 109.701(g)	Established maximum contaminant levels (MCLs) and operational evaluation levels (CELs) for total trihalomethanes (TTHMs) and the sum of five haloacetic acids (HAA5) and maximum residual disinfectant levels (MRDLs) for chlorine, chloramines, chlorine dioxide, chlorite, and bromate	PWD collects and analyzes samples in accordance with the Stage 1 and Stage 2 DDBP Rule.
PaDEP Disinfectant Requirements Rule (DRR) 48 Pa Bulletin 2509-2544 (April 28, 2018)	Requires reporting of individual disinfectant residuals from Revised Total Coliform Rule monitoring locations and establishes a minimum disinfectant residual of 0.20 mg/L in 95% of water distribution samples collected each month starting 4/29/2019 Requires a Sampling Siting Plan and Nitrification Control Plan to be developed and submitted to PaDEP	PWD monitors and reports chlorine residual data in accordance with a Sampling Siting Plan prepared by PWD and on file with PaDEP. PWD developed a Nitrification Control Plan which it submitted to PADEP in 2019.

General Update and Fees Rule 48 Pa Bulletin 4974-5027 (August 18, 2019)	Requires continuous monitoring for turbidity starting 8/20/2019 Increases permit fees and adds annual fees	PWD monitors turbidity and pays the increased and additional fees in accordance with the rule
Long Term 2 Enhanced Surface Water Treatment Rule (LT2) 25 Pa Code 109.1201-1206	Requires additional treatment based on the concentration of Cryptosporidium or *E. Coli* in source water	Queen Lane and Baxter Plants are designated as Bin 2 under the rule, requiring a 1.0-log removal/inactivation of Cryptosporidium. PWD meets this requirement through very low turbidity levels in the combined filter effluent (CFE) and individual filter effluent (IFE) at both plants. The Queen Lane Plant also achieves a back-up 0.5-log treatment credit by implementing a Watershed Control Program Plan for the Queen Lane Plant. In October 2018, PWD provided PaDEP with a letter indicating PWD's intent to expand the Watershed Control Program Plan into the Delaware River Watershed to achieve a 0.5 log back-up credit to Baxter's IFE and CFE requirement. The updated Watershed Control Program Plan will be submitted to PaDEP in 2020.
Consumer Confidence Report (CCR) Rule 25 Pa Code 109.416	Requires a CCR to be provided to Water Department consumers annually	PWD electronically delivers the CCR in the spring of each year.
Unregulated Contaminant Monitoring Rule (UCMR) 25 Pa Code 109.412 40 CFR 141.40	Requires sample analysis for a specific list of unregulated compounds between 1/1/2018 and 12/31/2020	PWD is monitors for the required list of compounds.

SCHEDULE DS-3

Overview

Green City, Clean Waters promotes the use of green stormwater infrastructure throughout the city. These green tools use plants, trees and stone to filter store and manage stormwater in a smart and cost-effective way.

How do These Green Tools Work?

When it rains, stormwater runs off streets and sidewalks into a green stormwater infrastructure (GSI) tool. Water soaks into a stone bed below ground where it is absorbed by plant roots and released through transpiration. Some of the water evaporates from the surface and excess water is slowly released back into the sewer system. Storing water in these GSI systems significantly reduce pollutants entering our creeks and rivers.

What are the Benefits?

- Improves water quality by reducing combined sewer overflows*
- Improves the health of our stream banks and aquatic life
- Enhances the beauty of our streets and neighborhoods
- Promotes a safer and healthier community
- Reduce the urban heat island effect (city's temperature)
- Improves air quality

*Combined sewer overflows occur during heavy rainstorms when treatment plants can't clean all the water running through the system so polluted stormwater and sanitary waste overflow into local rivers.

Stormwater Tree Trenches

A stormwater tree trench is a system of trees connected by an underground infiltration structure. On the surface, a stormwater tree trench looks similar to a series of street tree pits. However, under the sidewalk a perforated pipe distributes water throughout the trench.

Ben Franklin Parkway, Center City

Stormwater Trees

Stormwater trees look like typical street trees, but they have a deep stone pit to help manage stormwater. While a tree trench has multiple trees in one trench, stormwater trees are planted individually.

Sepviva Street, North Philadelphia

Stormwater Bump-outs

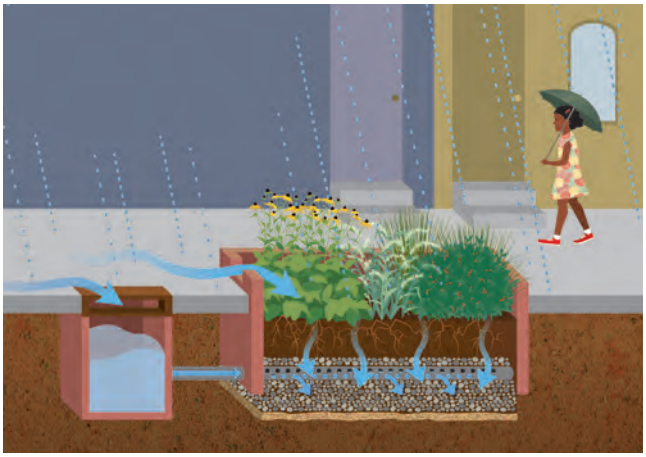
A stormwater bump-out is a landscaped extension of the curb that protrudes into the street at an intersection. A bump-out has a layer of stone that is topped with soil and plants to capture stormwater runoff. In addition to managing stormwater, bump-outs can calm traffic and make intersections safer for pedestrians.

Queen Lane, East Falls

3rd Street, Northern Liberties

Stormwater Planters

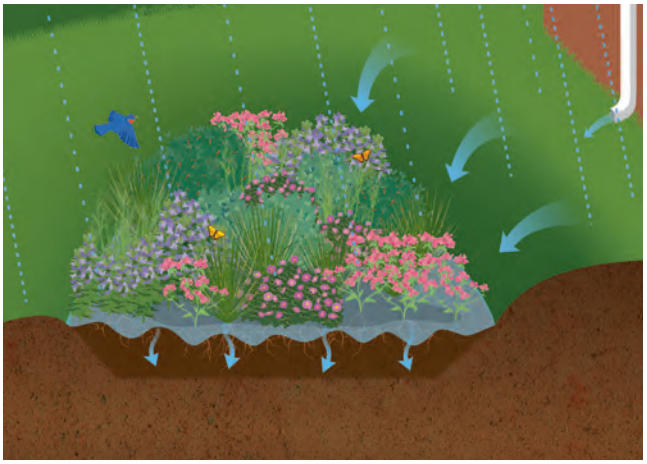
Stormwater planters mange stormwater runoff from the street and sidewalk. They sit below the sidewalk and are filled with vegetation, soil and stone. A stormwater inlet collects water from the street and directs it into the planter where plant roots soak can it up. The planter also has small openings to catch stormwater following from the sidewalk.



Philadelphia Navy Yard

Rain Gardens

A rain garden is a planted shallow depression designed to catch and filter stormwater runoff from a downspout or nearby paved surface. The plant species are selected for their ability to thrive in extremely wet and dry weather. Rain gardens filter pollutants, replenish groundwater and provide habitat for animals. They are one of the simplest and effective ways to manage stormwater.



Eadom Street, Northeast Philadelphia

Permeable Materials

Special materials, such as porous asphalt or concrete, and permeable pavers or rubber playgrounds, allow water to pass through their surfaces into the stone and ground below. These materials slow, redirect and filter water through the soil instead of overwhelming sewers. They can be used in streets, around homes or in schoolyards.

Percy Street, Bella Vista

SCHEDULE BCJ-1

BENJAMIN C. JEWELL

PROFESSIONAL EXPERIENCE

PHILADELPHIA WATER DEPARTMENT, PHILADELPHIA, PA, 2007 - PRESENT

Chief Water Transport Operations Engineer, Collector Systems (2016-Present)

- Responsible for the operation and maintenance of the City's wastewater and stormwater collection systems.
- Supervise 400 employees and oversee an annual operating budget over $32M.
- Manage and support multiple superintendents with operating and maintenance decisions, development of budgets, contract management, disciplinary decisions, and workplace policy.
- Review and support labor relations between management and union represented personnel, including evaluation of union grievances and assistance resolving disciplinary issues.
- Manage a team of engineers responsible for providing technical support and analysis of various information systems to support field personnel actions and decisions.
- Provide feedback to modify capital design proposals to meet maintenance needs required by field personnel.
- Identify and recommend necessary actions to execute repairs to structural issues within the collection system in coordination with subordinate staff.

Engineering Supervisor and Unit Manager, Collector Systems, (2013-2016)

- Managed multidisciplinary team of engineers responsible for supporting Collector Systems field operations, including management of subordinate supervisors.
- Worked across Collector Systems units with direct coordination on work requests from assistant superintendent and supervisor level employees.
- Assisted group supervisors with work management, including development of tools and skills for effective and efficient completion of work assignments.
- Led expansion of group duties through creation of various initiatives to increase communication and information transfer between Collector Systems units.
- Assisted Chief Engineer with development of group budget, organization and hiring.
- Supported efforts to enhance work order management systems and data collection systems to maximize accuracy and value of information.
- Participated on multiple department-wide teams to enhance initiatives involving different units.

Environmental Engineer, Industrial Waste Unit (2007-2013)

- Inspected industrial facilities and drafted documents (permits) regulating wastewater discharged to City sewers.
- Assisted with management of co-engineers, industrial facility inspection and wastewater sampling technicians.
- Prepared annual reports to regulating agencies requiring verification of compliance and sampling information collected during the previous year.
- Developed written policies for unit operations, and instructional public documents circulated to regulated facilities.
- Oversaw surcharge program, including facility inspections, allocation of inspector resources, customer contact and dispute resolution, and billing accuracy verification.
- Developed public webpage content and directed website's organization and launch.

EDUCATION

Northwestern University, Evanston, IL (1999-2004)

B.S., Environmental Engineering with a Certificate in Cooperative Education

Schedule BR-1

Brendan F. Reilly

Philadelphia Water Dept.
1101 Market Street, 6th Fl
Philadelphia, PA 19107

Experience

December 2015 – Present

Water Conveyance Chief • Operations • Philadelphia Water Department

- Responsible for the operation and maintenance of the City's water system
- Supervise approx. 350 employees with an annual operating budget of $28M
- Management and support of several Unit managers with operational and maintenance decisions, development of budgets, contract management, disciplinary decision, and workplace policy
- Provide insight and input to the Planning Unit on the future of the water system
- Provide feedback to the Design Unit on water main replacements
- Annual reporting to the DEP confirming PWD's adherence to approved water withdrawal permit
- Provide guidance and feedback on the Department's Annual Water Audit

November 2010 – December 2015

Load Control Chief • Load Control Unit • Philadelphia Water Department

- Responsible for the operation of the City's water system
- Managed multidisciplinary team of engineers and technicians responsible for the effective operation of the water system, including management of subordinate supervisors.
- This position required the development and proposal of annual operating budget for electrical use at pump stations
- Development of goals and objectives for subordinate supervisors
- Chair of the Reservoir Operations Management Group tasked with the maintenance, security and cleaning of the Department's potable water storage reservoirs
- Review of design, construction and operation of large-scale capital contract work suck as the new East Park Tanks
- Responsible for the procurement of professional services contracts and materials needed by the Unit

July 2008 – November 2010

Hydraulic Investigations Supervisor • Load Control Unit • Philadelphia Water Department

- First level supervisory position overseeing the work of full performance engineers and technicians
- Review of and approval of fire hydrant flow tests completed by subordinate engineers and technicians which required thorough understanding of system hydraulics
- Planning and execution of transmission pipeline disinfections requiring a multidisciplinary group with participates from several other units within the Department
- Provide guidance and direction on water quality and low-pressure investigations
- Oversight and management of a professional service contract used to annually test all the Departments master meters, including wholesale export meters
- Investigate the feasibility and cost of implementing updated engineering methods, techniques, and processes regarding pump operation

December 2005 – July 2008

Operations Engineering Specialist • Load Control Unit • Philadelphia Water Department

- Full performance engineering position in the Operations Squad of the Load Control Unit.
- Review of electrical data from PECO bills to compare to system input to identify any operating or billing anomalies based on spreadsheets developed to mimic PECO's billing structure
- Review and edit of daily hydraulic data to correctly report the total system input
- Review of Supervisory Control and Data Acquisition (SCADA) system data for errors or malfunctioning data points
- Communication and coordination with the Electronic and Instrumentation Squad on suspected instrument failures

June 2002 – December 2005

Graduate Civil Engineer / CE1 / CE2 • Load Control Unit • Philadelphia Water Department

- Engineering work which was mostly focused on field investigations
- Completion of hydrant flow tests, low pressure and water quality investigations

Education

Widener University, Chester, PA

- Graduated in June 2002 with a Bachelor of Science in Civil Engineering
- Class A and E Operators Certification from the PADEP
- EIT Certification

Schedule MES-1

MARY ELLEN SENSS

PROFESSIONAL SUMMARY

Highly effective waste water manager dedicated to bringing organizations to the next phase of growth and development. Diligent and motivated to improve processes, streamline operations, and increase efficiency.

SKILLS

Operations & Maintenance Management
Facility Expansion & Long Term Planning
Process Control & Performance
Project Coordination & Development
Facility Design & Start-up
Budget Administration
Staff Development
Strategic Planning

WORK HISTORY

Waste Water Treatment Manager, May 2015 – Current
City of Philadelphia – Water Department – 1101 Market Street Philadelphia, PA 19107
Directs and coordinates the activities of the City's three waste water plants and the biosolids management program. Responsible for the maintenance and operation of these facilities with a total design capacity of over 500 MGD, insuring that the treatment processes comply with all legal and environmental standards. Provides safe and cost-effective services to the public, coordinates plant activities with other departmental programs and establishes effective working relationships with external government and regulatory agencies. Prepares program and capital budget proposals and reviews operating and capital budget requests prepared by facility managers. Reviews designs and specifications for new or additional facilities and makes recommendations for plant expansions and long range development of the facilities.

Plant Manager, May 2010 – May 2015
City of Philadelphia – Water Department – 8200 Enterprise Avenue Philadelphia, PA 19153
Manager of the 200 MGD Southwest Water Pollution Control Plant, responsible for treating all of the waste water and storm water flow that entered the facility in a cost-effective manner that met all legal and regulatory obligations. Directed and coordinated the operations and maintenance activities of the facility including supervising varying levels of staff totaling 125 employees. Directed all capital and operational planning and budgetary responsibilities including design and specification review. Initiated new studies and technological research.

Graduate Engineer up to Assistant Plant Manager, July 1987 – May 2010
City of Philadelphia – Water Department – 7800 Penrose Ferry Road Philadelphia, PA 19153
Developed SOP's and coordinated the start-up and training activities of the new Biosolids Recycling Center. Worked up through management to become the Assistant Plant Manager of the BRC, supervising the Operations and Engineering staff and managing the construction and operational activities of this facility which dewatered and composted all of the biosolids generated from the City's 3 waste water plants.

EDUCATION & CERTIFICATION

Bachelor of Science: Chemical Engineering, 1987
University of Delaware – Newark, DE
Certified Class A Waste Water System Operator in Pennsylvania since 2004.