REPORT

OCTOBER 2026

Triennial Report of the Consulting Engineer Conditions & Operations

Prepared for:

MASSACHUSETTS WATER RESOURCES AUTHORITY

CDM Smith

October 29, 2026

Mr. Stephen Estes-Smargiassi
Interim Executive Director
Massachusetts Water Resources Authority
Deer Island
33 Tafts Avenue
Boston, Massachusetts 02128

Subject: Triennial Report of the Consulting Engineer to the Massachusetts Water Resources Authority

Dear Mr. Estes-Smargiassi:

Enclosed herewith is the Triennial Report of the Consulting Engineer to the Massachusetts Water Resources Authority (the "Authority" or the "MWRA"). The Triennial Report was prepared in accordance with Section 714(c) of the Authority's General Revenue Bond Resolution.

In the preparation of the report, we inspected the Authority's major water and wastewater facilities, reviewed and analyzed various reports and studies, operating and capital budgets and other statistical and financial information prepared by others. We also interviewed key members of the Authority staff regarding the matters presented in this report.

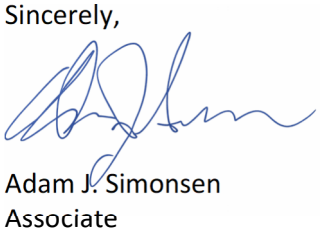
In addressing the specific requirements of the Triennial Report, as set forth in Section 714(c) of the General Revenue Bond Resolution, CDM Smith finds that:

- The properties of the Authority's water and wastewater systems (collectively, the "System") have been maintained in good operating condition during the past three fiscal years or adequate steps are being taken to make them so;
- The adopted FY 2027 Capital Improvement Program (CIP) and the adopted FY 2027 Current Expense Budget (CEB), along with planned current expense projections through FY 2032, provide appropriate expenditure levels to maintain the System in good operating condition through the three-year period ending in FY 2029;
- The Authority's planned funding of the Renewal and Replacement Reserve Fund Requirement and the adopted FY 2027 CIP and FY 2027 CEB are adequate to meet the Authority's current projected needs; and
- The Authority's rates, fees, rentals, and other charges appropriately provide for the necessary cash revenue requirements of the System and comply with the requirements of the General Revenue Bond Resolution.

75 State Street, Suite 701, Boston, Massachusetts 02109 | tel: 617 452-6000

It has been a pleasure being of service to the Authority in fulfilling the role of the Consulting Engineer.

Sincerely,



Adam J. Simonsen
Associate
CDM Smith Inc.

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1.0 Introduction

1.1 Purpose and Scope

Under Section 714(c) of the Resolution, the Authority is required to file, with the Trustee, every three years, a copy of a certificate of a Consulting Engineer that sets forth in reasonable detail:

(1) its findings as to whether the properties of the System have been maintained during such three year period, and are then being maintained, in good repair and sound operating condition, (2) its estimate of the amount, if any, required to be expended to place such properties in such condition and the approximate time therefore, (3) its recommendation, if any, as to improved management and proper maintenance, repair, and operation of and capital improvements to the System during the ensuing three year period, (4) its recommendations as to the adequacy of the Renewal and Replacement Reserve Fund Requirement and the then current Operating Budget and Capital Budget and its recommendations as to the adequacy of the Authority's rates, fees, rentals and other charges. If such certificate sets forth that the properties of the System are not then being maintained in good repair and sound operating condition, the Authority shall restore the properties to good repair and sound operating conditions as promptly as is practicable.

The purpose of this report is to respond to these requirements of the Resolution and to present financial projections for the Authority's FY 2027 to FY 2032. In the process of compiling this document we have visited and evaluated key facilities, have interviewed key Authority personnel responsible for the operation and management of the System, have evaluated the FY 2027 Current Expense Budget (the "CEB") and the FY 2027 Capital Improvement Program (the "CIP") and have assessed the adequacy of the Authority's required Reserves.

The report is organized in the following fashion:

Section 1: Describes the purpose and scope of the report, together with relevant background information concerning the Authority and its management.

Section 2: Describes the Authority's System, assesses its condition and makes recommendations with respect to improvements where appropriate.

Section 3: Presents the costs and estimated time for completion of the recommended improvements.

Section 4: Discusses the adequacy of the Authority's Renewal and Replacement Reserve Fund Requirement, the Operating Reserve Fund, the CEB and the CIP.

Section 5: Discusses the adequacy of the Authority's rates, fees, rentals and other charges.

1.2 Background

The Authority was established by a special act of the Commonwealth of Massachusetts (the "Commonwealth"), Chapter 372 of the Acts of 1984, as amended (the "Enabling Act"). The Enabling Act sets forth the obligations and powers of the Authority and establishes the general form of governance. Under the terms of the Enabling Act, the Authority is governed by an eleven-person Board of Directors (the "Board") chaired by the Commonwealth's Secretary of Energy and Environmental Affairs. The Secretary and two other members are appointed by the Governor. Three members are appointed by the Mayor of the City of Boston and three members are appointed by the MWRA Advisory Board. One member is appointed by the Mayor of the City Quincy and one member appointed by the Town of Winthrop Town Council.

The Enabling Act also created the Massachusetts Water Resources Authority's Advisory Board (the "Advisory Board") to review the Authority's budget and operation and to serve as a liaison with the Local Bodies. The Advisory Board is composed of representatives from 60 of the 61 communities (Lancaster is not represented on the Advisory Board) that receive water and/or sewer service from the Authority, plus a representative from the Metropolitan Area Planning Council (a regional planning organization established by the Massachusetts legislature). In addition, six people are appointed by the Governor to include a person with skills and expertise in matters relating to environmental protection, one representative each from the Connecticut River basin, the Quabbin/Ware watershed areas, and the Wachusett watershed area, plus two persons qualified by membership or affiliation in organizations concerned with the recreational or commercial uses of the Boston Harbor.

In 1985, the Authority assumed possession and control from the Metropolitan District Commission (the "MDC"), which became part of the Department of Conservation and Recreation (the "DCR") in July 2003, a department of the Commonwealth, of a water distribution system (the "Waterworks System") and a sewer system (the "Sewer System") (collectively, the "System"), which provide wholesale services in a service area encompassing, in whole or in part, 64 communities located primarily in eastern Massachusetts, including most of the metropolitan Boston area. Fifty-six cities, towns, and special purpose entities (known as "Local Bodies") currently are authorized to receive water from the Waterworks System; other communities continue to evaluate joining the System. Forty-three Local Bodies connect their local sewer systems to the regional sewage collection and treatment facilities constituting the Sewer System. Approximately 3.0 million people, who comprise approximately 44 percent of the Commonwealth's total population, live in the communities served or potentially served by the System. The Authority has had and continues to have discussions with additional communities and Local Bodies regarding potential water sales to meet various needs. In September 2022, the Board of Directors approved a 5-year waiver to the entrance fee to facilitate both new connections to the system and increased consumption by Local Bodies, especially for those communities potentially affected by PFAS and/or facing water quantity challenges. Three communities have increased their usage (Burlington, Dedham-Westwood Water District, Wilmington) and one community (Lynnfield Center Water District) has connected to the Water System, utilizing the fee waiver. As of September 2026, no decision has been made as to whether to extend the waiver beyond December 31, 2027.

Since its creation, the Authority has demonstrated its capacity to successfully manage its complex affairs. The Deer Island Treatment Plant ("DITP"), one of the nation's largest and most complex wastewater treatment improvement projects, was completed on time and below its original cost estimate. As a result of this project the water quality of Boston Harbor has improved dramatically with sewage solids from Deer Island reduced by 85%, toxic pollutants reduced by 90%, and the water three times as clear. Shortly after the creation of the Authority, the Safe Drinking Water Act (the "SDWA") amendments were enacted, increasing the regulatory requirements for many water utilities, including the Authority. The Authority has developed and implemented a program to comply with the requirements of the SDWA. This includes the construction of the John J. Carroll Water Treatment Plant (the "Carroll WTP") and redesigning the transmission system so that all treated water is stored in covered storage facilities. The Authority also constructed the Norumbega Covered Storage Facility and the MetroWest Water Supply Tunnel (the "MWWST"), providing redundancy to the existing Hultman Aqueduct. The Authority continues to scrutinize its capital program to determine whether certain elements are necessary, or if alternatives exist to attain the same objective at a lower cost.

As these major programs have been developed and construction implemented, the Authority has worked to ensure that the long-term integrity of the System through a proactive maintenance program and systematic replacement of aging facilities. Based on our review of the CIP, a physical inspection of the systems, and interviews with staff, we believe the Authority is acting appropriately to ensure the long-term viability of the System. In December 2006, the Authority developed and presented its initial Master Plan, a long-term strategy which identified and prioritized potential System needs through FY 2048. The Authority updated the Master Plan in 2013, 2018, and in the process of completing an update (expected to be complete in 2027) to ensure that it reflects the anticipated needs of the System. Much of the Master Plan targets upgrading existing infrastructure that is at or would be nearing the end of its useful life. In recent years, the Authority has focused much of its capital spending towards the completion of the long-term combined sewer overflow ("CSO") control plan to comply with federal mandates in the so-called Clean Water Act Case. The Authority substantially completed the CSO control program in 2015. The Authority anticipates that future capital spending will focus on asset protection, an updated CSO control plan, and water redundancy initiatives with the Metropolitan Tunnel Redundancy project being the most significant.

The Authority has been sensitive to the economic and public implications of financing its capital program and properly operating and maintaining its existing and newly constructed infrastructure. The Authority, with the Advisory Board and many other stakeholders, has continuously sought state and federal financial assistance for its construction program and has also aggressively sought alternative, less expensive means of achieving compliance with the various legal and regulatory requirements imposed upon it. The Authority continues to strive to improve its operating efficiency and minimize or reduce operating expenses. To maintain public support, the Authority has sought to educate the public at large to the tangible real benefits that have resulted or will result from its programs.

In addition, the Authority has established a five-year CIP spending cap intended to ensure that it effectively balances its facility needs with financial realities. This cap provides a mechanism for determining what the Authority can afford and requires the Authority to establish and enforce spending priorities. The CIP set the baseline cap excluding Local Assistance programs for the period FY 2024 – FY

2028 at $1,364 million. Each year the Authority assesses annual CIP cash flow requirements and its ability to meet that cap. As a result the cap has been adjusted downward at the start of FY 2027 to $1,055 million exclusive of Local Assistance programs and Chicopee Vally Aqueduct projects. The cap does not reflect certain items where costs could change as a result of additional regulatory requirements in the SDWA compliance area. While no formal spending cap has been established beyond FY 2028, the Authority is actively evaluating future capital investments and project sequencing to maintain an affordable and more distributed capital spending profile over the long term.

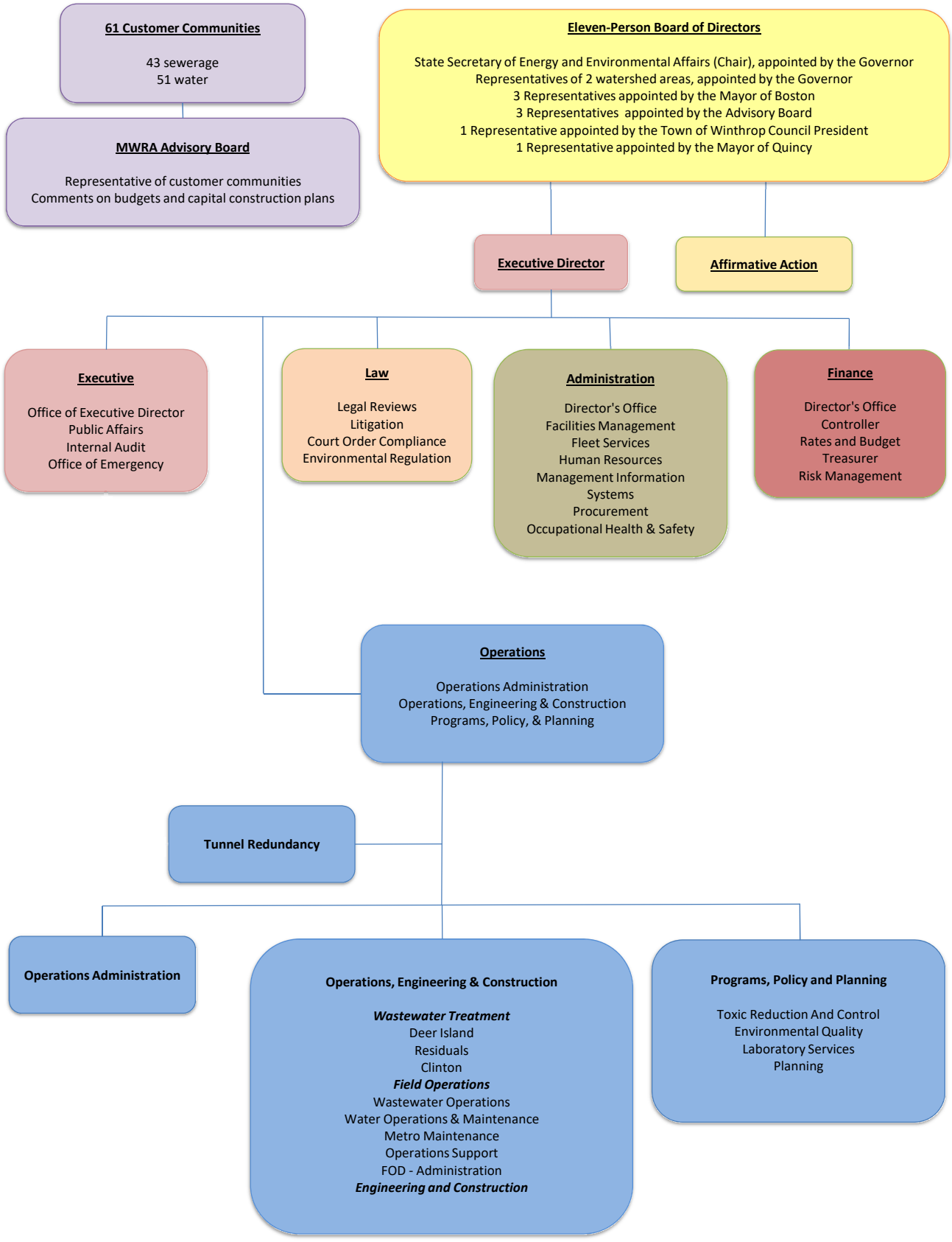
The Authority is advancing its project to construct long-term redundancy improvements for the Metropolitan Tunnels, anticipating the construction of two deep rock tunnels to provide redundant potable water conveyance to the Authority's Boston metropolitan service area. The Authority has engaged a program support services team for this project. The CIP includes $2.2 billion (excluding inflation and contingencies) for the long-term redundancy project, which the Authority anticipates expending over approximately 17 years.

In assessing the organization's ability to address the many real challenges that face the Authority, we believe its record of achievement over the past 40 years is an important consideration.

1.3 Organizational Structure

The Authority is organized in a divisional structure designed to establish clear lines of authority and responsibility and to promote organizational efficiency. Figure 1-1 provides the Authority's current organizational structure. The Authority periodically evaluates and modifies its organizational structure as appropriate. The Authority budgeted FY 2027 staffing at 1,167 full time equivalent (FTE) positions.

Figure 1-1 MWRA Organizational Chart



The responsibilities of each Division:

- **Executive Division** - The Executive Division supports the Office of the Executive Director, the chief executive officer of the Authority, responsible for the implementation and coordination of Authority programs, policies, and procedures at the direction of the Board. The Office of the Executive Director also supports the Board of Directors, the Advisory Board, and other advisory committees.
- For FY 2026 the Office of the Executive Director includes three authorized positions. The Executive Division also includes the Office of Emergency Preparedness, the Affirmative Action Compliance Unit, Internal Audit, and Public Affairs.
  - *Office of Emergency Preparedness* - The Office of Emergency Preparedness consists of providing Authority-wide planning and implementation of security and emergency responses. For FY 2026, this department includes six authorized positions.
  - *Affirmative Action and Compliance Unit* - The Affirmative Action and Compliance Unit is responsible for developing, administering, and monitoring compliance of affirmative action programs and policies, and reports to the Board of Directors through the Executive Director. For FY 2026, this department includes seven authorized positions.
  - *Internal Audit Department* - The Internal Audit Department is responsible for auditing financial and program operations, reviewing compliance with accounting and management control systems, and coordination of policy revision. The department reports directly to the Executive Director and Board of Directors. For FY 2026, this department includes eight authorized positions.
  - *Public Affairs Department* - The Public Affairs Department is responsible for community relations, communications, education and intergovernmental affairs. For FY 2026, this department includes 13 authorized positions.
- **Operations Division** - The Operations Division is responsible for the planning, policy decision support, design, construction, operation and maintenance of the System. The Operations Division is discussed further below. For FY 2026, this division includes 916 authorized positions.
- **Law Division** - The Law Division provides legal analysis and counsel to the Authority's operating and administrative divisions and represents the Authority in court-related matters. For FY 2026, this division includes 12 authorized positions.
- **Administration Division** - The Administration Division is responsible for administrative support functions such as human resources, management information systems, procurement, real property and occupational safety and health, and fleet services. For FY 2026, this division includes 152 authorized positions.
- **Finance Division** - The Finance Division manages the financial services of the Authority. The division is responsible for rates and revenue management, budgeting, treasury, capital financing, investment management, accounting, grant and loan management, risk management, and coordination of Authority financial planning. For FY 2026, this division includes 49 authorized positions.

The Operations Division, headed by the Chief Operating Officer, is responsible for 74 percent of the Authority's operating costs and 79 percent of total staffing. The Operations Division includes separate Waterworks and Wastewater departments that are responsible for the operations of the respective systems, including plants and field activities. The Division also includes departments for planning and decision support and centralized engineering, construction, laboratory, and administrative support units.

The Authority traditionally operates below its budgeted FTEs with workforce retirement and recruitment trends continuing to influence staffing levels in certain technical and operational positions. In response, the Authority has implemented a broad workforce planning strategy encompassing succession planning, employee development, licensing support, mentoring, position redesign, and compensation reviews. The Authority's increasing focus on developing and advancing internal talent supports continuity of operations and preservation of institutional knowledge. While recruitment conditions for select specialized positions remain competitive, management has demonstrated ongoing attention to workforce sustainability through a combination of retention and workforce development initiatives.

The Authority is currently undergoing a planned executive leadership transition following the retirement of long-serving Executive Director Frederick Laskey in May 2026 after approximately 25 years in the position. To ensure continuity of operations and strategic initiatives, the Authority Board appointed Stephen Estes-Smargiassi, a senior Authority executive with extensive experience in planning, sustainability, and regulatory affairs, to serve as Interim Executive Director while a permanent successor is selected. The transition has been structured to maintain organizational stability and continuity across the Authority's core water, wastewater, environmental, and capital programs. At the time of this report, the Authority continues to be supported by an experienced senior management team and remains focused on advancing its capital improvement program, regulatory compliance obligations, and long-term strategic objectives. The Authority conducted a national search for a permanent Executive Director and appointed on October 21, 2026, Jonathan Gulliver. Mr. Gulliver currently serves as the Massachusetts Undersecretary of Transportation and State Highway Administrator. In these roles, he oversees the engineering, construction, maintenance, and operations of the Commonwealth's highway, bridge, and tunnel systems, leading nearly 3,000 employees and delivery of a $2.3 billion annual capital program. He is expected to officially start as Executive Director of the Authority in early January 2027.

We believe that the Authority is effectively organized to perform its mission. The Authority has shown its willingness and ability to modify its organizational structure to address emerging issues and demonstrate management's commitment to adjust the organization considering shifting priorities and conditions.

1.4 Management Processes

Since its inception the Authority has continuously modified its management processes to ensure that its programs and policies are conducted in accordance with Authority directives, in a cost-conscious manner, and in a way that is effectively communicated to the interested public. On an annual basis the Authority produces a comprehensive CIP and a CEB, both of which are subject to public review and comment. The Authority also undertakes management initiatives that are intended to enhance the efficiency of its operations.

The Authority has a capital budgeting process that addresses the significant needs of the Authority while minimizing future rate increases to the extent possible. The CIP is prepared every year and includes future planned expenditures on capital improvement projects. The CIP is funded primarily through the issuance of revenue bonds, which are repaid over a number of years through inclusion of debt service amounts in each fiscal year's CEB.

The progress of capital projects is continually monitored for purposes of managerial control, decision-making, financial planning, and management. Each Division is responsible for monitoring and reporting on the projects for which it is responsible, including explanations for both schedule and expenditure variance.

The FY 2027 CIP includes $5.9 billion in planned capital spending by FY 2033. Given the magnitude of capital spending within that timeframe, the Authority currently is undertaking a comprehensive capital project prioritization process to potentially restructure the planned capital spending. The intent of the prioritization process is to develop a CIP that is actionable, focused on highest priority items, and structured with a realistic plan for any projects shifted to later years. This process follows the Authority's practice of projecting expenses to allow for consistent and sustainable rate increases.

The Authority has historically expended approximately 75 percent of its annual CIP in a given year. Although management is actively pursuing initiatives intended to improve capital project execution, the gap between planned and actual capital spending is a longstanding and predictable aspect of the Authority's operations that is incorporated into financial planning and provides an additional measure of flexibility as part of capital project capital execution.

The Authority annually prepares a CEB with detailed expenditure information for several prior fiscal years and the upcoming fiscal year. The CEB reflects the operating and maintenance costs of existing water and sewer facilities, administrative and support activities, and current expenses supporting the additional expenses associated with the operation of the Authority's extensive capital improvement projects. The operating budget is balanced by revenue and income derived mostly from user charges to the Local Bodies that receive water and/or sewer services from the Authority.

The Authority uses a management indicator reporting system to measure actual performance against objectives, including a budget variance analysis of both the CIP and the CEB, and reports on progress in achieving program performance objectives. Monthly and quarterly budget reports are prepared for internal review. These reports provide Authority managers and the Board of Directors with a mechanism for evaluating both favorable and unfavorable changes in circumstances. We believe that the management indicators variance analysis reporting system is a good management tool that allows assessment of planning and implementation performance and identifies opportunities to improve future performance. It also enables the Authority to control costs and ensures that expenses do not exceed its resources.

The Authority has identified and focused on rates as a central management issue. The Authority has worked closely with the Advisory Board to contain expenses. At the same time, the Authority has devised and implemented strategies to minimize rate increases and continues to take steps to minimize future rate requirements. The Authority's rate relief strategy includes several major components:

- Ensuring that all capital and operating costs are kept to a minimum, and that each dollar invested adds to the value of water and sewer services.
- Continuing to seek federal support for the Authority's capital program, including funding from both the Clean Water Act and the Safe Drinking Water State Revolving Funds.
- Continuing to seek the receipt of Commonwealth debt service assistance ("DSA") for the capital improvement program. The Authority received $1,234,567 in debt service assistance (DSA) from the Commonwealth in FY 2026 and is using that to offset capital financing costs in FY 2027. The availability or extent of future assistance is unknown at this time. The Authority's projections assume that additional DSA will not be received beyond FY 2027.
- Continuous use of the lowest cost of capital available including: revenue bonds, tax exempt commercial paper ("TECP"), current revenue for capital, , variable rate debt, low interest Massachusetts Clean Water Trust loans ("SRF loans" - formerly, the Massachusetts Water Pollution Abatement Trust) to finance the rate of growth in the Authority's revenue requirement.
- Use of operating surpluses and favorable market conditions to defease higher cost legacy debt. Between FY 2006 through the Spring 2026 defeasance the Authority has defeased over $992 million in debt service, which has created substantial headroom within rates to allow the Authority to execute its capital program.

We are of the opinion that the Authority is properly organized to respond to the management challenges it faces and is taking reasonable and prudent steps to optimize the efficiency of its operations.

1.5 Summary

In summary, we have reached the following conclusions regarding the Authority's management of the System.

The Authority is well organized to effectively carry out its various duties. Of equal importance, the Authority continually evaluates and adjusts its organizational structure to properly address emerging issues and shifting priorities.

The Authority continues to attract and retain managerial and technical staff to supervise its planning, design, and construction programs. Key members of the staff have the qualifications and experience commensurate with their responsibilities and have demonstrated their ability to make organizational and staffing changes as required, maintaining a cost-effective and efficient operational structure.

The Authority's primary focus in the CIP is to ensure the integrity of the existing system and strengthen the reliability of its systems, especially the water system. The Authority is also devoting substantial attention to how best to maintain and enhance drinking water quality, as well as implementing programs to improve water redundancy as it operates existing and develops new drinking water facilities.

Through a business planning process, the Authority is strengthening its management focus to improve operational efficiency and control the growth of expenses in the future.

2.0 Condition of Existing Facilities and Recommended Improvements

2.1 Sewer System Overview

Over its first two decades, the Authority was committed to an ambitious program for the planning, design, construction, and operation of a secondary treatment plant located at Deer Island in Boston. This program was executed concurrently with the planning, management, operation, and upgrading of the Authority's other wastewater facilities located upstream of Deer Island, including pumping stations, CSO control and headworks facilities for the removal of grit and screenings. The Authority also implemented an aggressive program for processing and distributing biosolids through beneficial reuse of wastewater residuals ("sludge").

The Authority's initial wastewater investments were guided by several detailed planning level engineering documents. The documents provided the definition and the timetables for the Authority's wastewater CIP and included the Secondary Treatment Facilities Plan, the Residuals Management Plan, and the CSO Conceptual Plan and System Master Plan. The improvements recommended in all the above documents have been completed, with the CSO Control Plan being the last to conclude in 2015. The Authority performed a three-year performance assessment of the CSO improvements starting in November 2017, that required semiannual reporting and a final report was submitted to the United States Environmental Protection Agency ("EPA") and Massachusetts Department of Environmental Protection ("MassDEP") in December 2021. A supplement to the 2021 Final Combined Sewer Overflow Report was submitted in December 2024. The reports showed that there has been an 88% reduction in CSOs in a typical year, from 3.3 billion gallons to 0.4 billion gallons, with 94.5% of the remaining overflow volume receiving treatment at the Authority's four CSO facilities.

The CSO Control Plan was developed to provide a framework for investments in the collection and treatment systems and to ensure compliance with the National CSO Policy. The CSO Control Plan recognized the leadership role that the Authority must play with regards to integration of system-wide programs that involve the Local Bodies. The Authority's plan identified those elements of each Local Bodies combined sewer systems that, if upgraded and improved, will not only improve local systems, but also improve the operations of the System. All 35 original CSO Control Plan projects have been completed.

The Authority, in collaboration with the Cities of Cambridge and Somerville, recently submitted a Draft Updated CSO Control Plan to the EPA and MassDEP in April 2026 for regulatory review and public comment. The draft Updated CSO Control Plan includes recommended alternatives which are projected to result in zero CSO discharges in a "2050 typical year" (a metric based on climate change model predictions of average annual rainfall forecast for the 2050 planning year and defined in the draft Updated CSO Control Plan). Following the public comment period, a final Updated CSO Control Plan is required by May 31, 2027, for review under the EPA and MassDEP.

The Authority anticipates that future CSO projects will include on-going CSO improvements in Boston, Chelsea and Somerville, rehabilitation of MWRA's Somerville Marginal, Prison Point and Cottage Farm CSO treatment facilities, and a new placeholder at the end of the cap period for design of any projects that come out of the Variance Waters Updated CSO Control Plan process. The next phase of the CSO program includes 7 new projects that were added to the FY 2027 Final CIP. These projects total $772.4 million, with projected spending of $267.1 million in the FY 2029-2033 period and $477.3 million beyond FY 2033. This spending addresses the remaining CSO outfalls located in the Alewife Brook/Upper Mystic River Basin and the Lower Charles River/Charles Basin.

In 2013 the Authority updated the original Master Plan for its Sewer System. The purpose of the wastewater Master Plan was to assess the long-range capital needs of the Authority, with an emphasis on the need for rehabilitation and renovation of all the System's assets, including the cyclical replacement of those elements of the new facilities constructed in recent years that are anticipated to reach the end of their useful lives within approximately 10-15 years due to the aggressive corrosive environment found in wastewater facilities. Beginning with the FY 2014 CIP, the Master Plan has provided the framework for all capital planning and budgeting. In 2018, the Authority prepared a comprehensive update to the 2013 Master Plan. The final 2018 Master Plan is the most recent document, and focuses on projects proposed during the next two 5-year CIP cap cycles, FY 2019 – 2023 and FY 2024 – 2028. A Master Plan update is nearing completion and expected in 2027. Storm surge, together with anticipated sea level rise resulting from climate change will affect several MWRA coastal collection systems and wastewater facilities; this will be a critical theme of future Master Plans.

2.2 Sewer Service Area and System Facilities

The Authority provides wastewater treatment services to two geographic regions of the state. By far the larger of the two, the greater Boston metropolitan area, consists of 43 communities proximate to Boston. The second area includes the Town of Clinton and the Lancaster Sewer District in Central Massachusetts and is referred to as the Clinton Service Area.

2.2.1 Boston Metropolitan Sewer Service Areas

The Authority's Boston metropolitan sewerage system currently serves a 502 square mile region with a total sewered population of approximately 2.3 million. The system is divided into two major drainage basins with both the north and south sewer systems conveying flows to the DITP. Figure 2-1 shows the service areas and location of major wastewater treatment facilities. With an area of approximately 212 square miles, the north system serves approximately 65 percent of the population in the sewered area, with approximately 97 percent of those connected to the Sewer System.

The south system encompasses approximately 290 square miles and services approximately 35 percent of the total population, of which approximately 90 percent are connected to and contribute wastewater to the Sewer System. The remainder of the population use septic systems.

2.2.2 Clinton Service Area

The Clinton Wastewater Treatment Plant (the "Clinton Plant") was constructed to provide sewer service to the Town of Clinton and the Lancaster Sewer District located in Central Massachusetts, in conjunction with the development of the Wachusett Reservoir. The Clinton Plant, originally constructed in 1955, was upgraded to provide advanced wastewater treatment in 1992. More recently, a new phosphorous removal building was completed in FY 2019. Only active in the summer months, the three treatment trains each contain 25 disc filters to remove phosphorous below the 0.15 mg/l summertime NPDES permit limit. The plant has been able to achieve the limit since being online. It presently has a connected population of approximately 14,000 and the capacity to serve a design population of 23,500.

2.2.3 Boston Metropolitan Sewer System Facilities

The Boston metropolitan sewer system facilities include sewers, pump stations, headworks and treatment facilities located throughout eastern Massachusetts. The following summarizes the major components of the system. More detailed evaluations are presented in later sections.

2.2.3.1 Wastewater Transport System

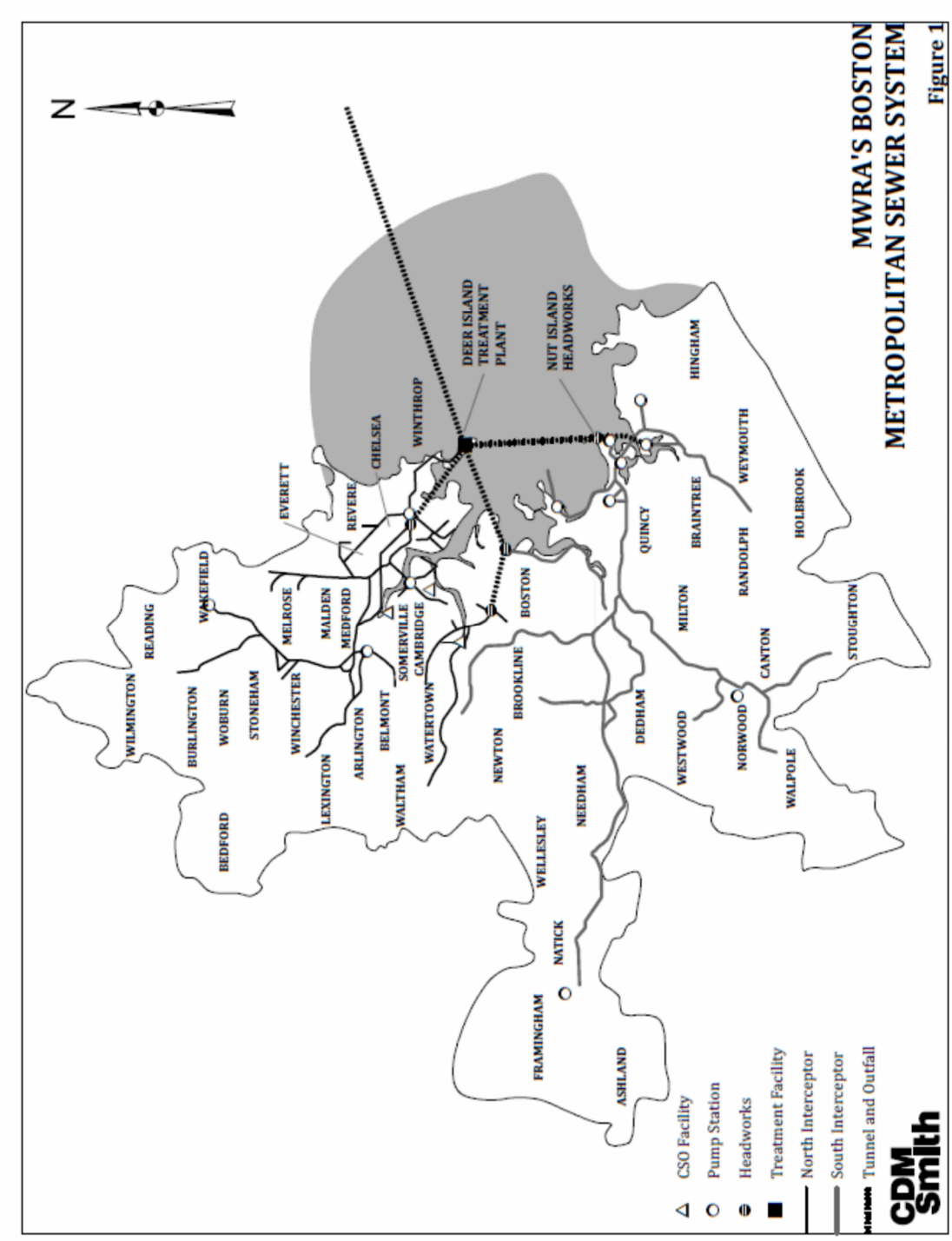
The Boston metropolitan wastewater transport system consists of 274 miles of sewers and cross-harbor tunnels, ranging in size from 4 inches to 11 feet in diameter. The Authority does not provide collection services to retail customers; rather the Local Bodies connect to the Authority's Sewer System at over 1,800 locations. The Local Bodies are then responsible for service to retail customers through the local collection systems.

The Authority operates 11 sewage pumping stations in the Boston metropolitan sewerage system. Over the past 25 years the Authority has either replaced or significantly renovated all the pumping stations in the system. In concert with the pump station projects, the Authority has replaced approximately 40 miles of associated interceptors and forcemains.

2.2.3.2 Headworks

The Authority currently has six headworks—the Winthrop Terminal Facility at Deer Island and five remote headworks including the headworks facility at the Braintree-Weymouth Intermediate Pumping Station—that provide screening and coarse grit removal to protect major conveyance tunnels and other facilities. The North Metropolitan Relief Tunnel conveys wastewater from the Chelsea Creek Headworks, which was recently upgraded. Wastewater from East Boston, Chelsea, Revere, and Winthrop is conveyed in the North Metropolitan Trunk Sewer to the Winthrop Terminal Headworks and Pumping Facility. The Boston Main Drainage Tunnel conveys wastewater from both the Ward Street and Columbus Park headworks. The Ward Street and Columbus Park Headworks Upgrade are currently under design, with construction anticipated to begin in 2027. Screening and grit removal for south system flows prior to transport through the Inter-Island Tunnel to the DITP is provided at the Nut Island Headworks and at the Intermediate Pumping Station in Quincy.

Figure 2-1. MWRA's Boston Metropolitan Sewer System



2.2.3.3 Treatment Plant

Primary and secondary treatment is provided at the DITP. The DITP includes influent pump stations, primary clarifiers, cryogenic oxygen plant, aeration reactors, secondary clarifiers, disinfection, odor control systems, residual thickening and sludge digesters, administration buildings, maintenance and laboratory buildings, as well as required on-island pumping facilities, biogas power plant, stand-by generators, and site utilities. Sea level rise was accounted for during the design and construction of DITP. The DITP has capacity to provide secondary treatment for flows up to 700 million gallons per day ("mgd") and primary, chlorination and dechlorination treatment for flows up to 1,270 mgd. The Authority is currently executing a rehabilitation of the plant's 48 primary and 54 secondary clarifiers, many of which have been in service since the late 1990s and are experiencing age- and corrosion-related deterioration. The project replaces critical mechanical equipment, gates, drive systems, piping, and other components while maintaining continuous plant operations, extending the useful life and reliability of one of most important treatment processes. Phase I, completed in 2013, replaced sludge collection equipment and repaired concrete structures, while the ongoing Phase II program represents an approximately $289 million investment in comprehensive rehabilitation of clarifier infrastructure as part of the Authority's long-term asset protection strategy. Additionally, the design of a comprehensive rehabilitation of the residuals (solids handling) systems at the DITP is currently underway and is expected to be bid in 2028, but may shift to a later year as the Authority continues to evaluate the priority of its larger capital projects.

2.2.3.4 Combined Sewer Overflow Facilities

Four of the 43 Local Bodies in the MWRA wastewater service area (Boston Water and Sewer Commission, Cambridge, Chelsea and Somerville) are served by combined sewers (sewers that carry sanitary flow and stormwater) and have permits from the EPA to discharge CSOs to area surface waters. Flows exceeding the capacity of the locally owned collection system or the Authority's transport system can discharge directly to Boston Harbor, the Alewife Brook, the Mystic River, and the Charles River Basin at CSO outfalls. Parts of the Town of Brookline were historically served by combined sewers, but Brookline does not have its own CSO outfall. The original Brookline area served by combined sewers was greatly reduced with a project in the Authority's CSO program, with nominal combined pipes remaining. There were 84 CSO outfalls in existence at the beginning of the CSO program permitted to the MWRA and the four Local Bodies with permitted CSOs. Upon completion of the CSO Control Plan in 2015, 35 of those were closed and five are maintained to 25-year storm control, virtually eliminating overflow events. The remainder of the outfalls are monitored and assessed consistent with the CSO Control Plan and five of the remaining outfalls receive treatment at one of four Authority CSO facilities (there are two outfalls associated with the Somerville Marginal CSO Facility). As a result of these efforts, the total annual volume of CSO discharge, as of the end of 2024, in a typical year has been reduced by approximately 88%, from 3.3 billion gallons in 1988 to 0.4 billion gallons, with 94.5% of the remaining overflow volume receiving treatment at the Authority's four CSO facilities. The Authority's Long-Term Control plan had set an annual target of 410 million gallons. The MWRA has played a lead role in regards to the resolution of CSO discharges by assuming responsibility for the development of an abatement plan for all CSOs.

The Authority, Cambridge, and Somerville submitted to MassDEP and EPA a draft Updated CSO Control Plan on April 30, 2026 for regulatory review and public comment. The draft Updated CSO Control Plan

includes recommended alternatives which are projected to result in zero CSO discharges in a "2050 typical year" (a metric based on climate change model predictions of average annual rainfall forecast for the 2050 planning year and defined in the draft Updated CSO Control Plan). The preliminary estimated capital costs of the draft Updated CSO Control Plan are approximately $1.3 billion, to be allocated among the parties as negotiated and approved by the respective governing bodies. Such preliminary estimated costs are planning level capital cost estimates, in 2026 dollars, that are not escalated to the mid-point of construction. Such costs also exclude land acquisition, extensive permitting, or operation and maintenance costs. Design and construction expenses are currently expected to commence in 2028 and be completed in 2042. Following the public comment period, a final Updated CSO Control Plan is required by May 31, 2027, for review under the EPA and MassDEP.

Future projects related to CSO planning and support include on-going CSO improvements in Boston, Chelsea and Somerville, rehabilitation of MWRA's Somerville Marginal, Prison Point and Cottage Farm CSO treatment facilities, and a new placeholder at the end of the cap period for design of any projects that come out of the Variance Water updated CSO Long-Term Control Plan process. The next phase of the CSO program includes $772.4 million total spending, with projected spending of $267.1 million in the FY 2029-2033 period and $477.3 million beyond FY 2033. This spending addresses the remaining CSO outfalls located in the Alewife Brook/Upper Mystic River Basin and the Lower Charles River/Charles Basin.

2.2.3.5 Sludge Pelletizing Facilities

Sludge produced by the DITP is processed at a sludge pelletizing plant located at the former Quincy Shipyard site in Quincy, Massachusetts. The pellets produced at the facility are distributed locally and nationally for beneficial reuse and disposal. The facility was placed into service in December 1991. It is owned by the Authority, with operations and product disposal/distribution the responsibility of New England Fertilizer Company (NEFCO). The Authority entered into a new contract in January 2024 with NEFCO for both the operation and management of the plant and the disposition, through sale or otherwise, of the sludge. The current NEFCO. contract expires at the end of December 2034. The procurement terms and conditions are structured to provide the Authority flexibility to react to the evolving PFAS regulatory situation.

2.3 Sewer System Facilities Evaluation

2.3.1 Boston Harbor Project Facilities

The primary portion of the DITP has been designed and constructed to receive and treat up to 1,270 mgd; the secondary portion of the DITP is constructed with a treatment capacity of 700 mgd, which is sufficient to meet effluent limits for all flows received. The overall treatment process consists of influent degritting of north system flows, primary clarification, aeration with pure oxygen, secondary clarification, and hypochlorite disinfection followed by dechlorination.

Influent from the north system is pumped into the DITP plant from either the North Main Pump Station or the Winthrop Terminal facility. Influent from the south system is pumped into the DITP plant by the South System (Lydia Goodhue) Pump Station. The northern flows are degritted on island, and southern flows are screened and degritted at the Nut Island Headworks Facility. Primary sedimentation is

provided by four batteries of stacked primary clarifiers. The clarifiers and all grit facilities are covered, and the exhaust air is treated to remove odor. Primary sludge that settles to the bottom of the clarifiers is collected and pumped out of each clarifier to the gravity thickeners. Primary scum that floats to the top of the clarifiers is collected and pumped to primary scum screens. The reject material is collected and sent to landfills while the liquid scum continues on to scum concentrators. Concentrated scum is also sent to landfill for final disposal.

The DITP's activated sludge secondary treatment aeration process uses pure oxygen mixed with wastewater to reduce the biological oxygen demand. The oxygen is generated on-site by a cryogenic oxygen plant. There are three batteries of oxygen aeration tanks (reactors) and three batteries of stacked secondary clarifiers. The treatment process is an activated sludge system with a portion of the sludge that is settled out in the secondary clarifiers recycled back to the oxygen aeration basins. The recycled sludge is then pumped to the centrifuge thickening facility. The effluent is chlorinated at disinfection basins, dechlorinated after appropriate detention and discharged to Massachusetts Bay through the Effluent Outfall Tunnel.

The thickened primary and secondary sludges are pumped into sludge anaerobic digestion tanks. The anaerobic digesters biologically reduce the volatile content and stabilize the sludge. Anaerobic digestion converts a portion of the sludge to methane gas to be used as a fuel source at the plant's thermal power plant facility. The anaerobic digester complex includes three modules of four 128-ft tall egg-shaped digesters each, for a total of 12 digesters. The complex also includes two sludge and gas storage tanks used to store digested sludge and biogas. The digested sludge is pumped through an underwater pipeline to the pelletizing plant, located at the former Quincy Shipyard site.

The Authority has instituted a detailed automated maintenance management program at the DITP. The staff keeps track of equipment availability and the completion of scheduled and required maintenance. A thorough maintenance management and asset management program to optimize performance, maximize useful lives and control maintenance costs has been instituted (the "Asset Management Program"). The Asset Management Program identifies the mechanical portions of the primary and sludge processing facilities, that are approaching the ends of their useful lives, influenced by the aggressive, corrosive environment found in wastewater facilities, and plans for their rehabilitation or replacement. Accordingly, the Master Plan identifies projects for the cyclical replacement of critical assets such as the primary clarifier's collectors, gates, and sludge pumping equipment. Through the CIP, Phase I of the Asset Management Program, replacement of clarifier components, was completed in 2013. Phase II of the program, the replacement of clarifier drives and other components, was designed and, bid, and construction activities began in 2023. The schedule for Phase II was subsequently extended based on an expanded scope of work and active construction was ongoing as of August 2026. The Authority's Asset Management Program is well conceived, and its implementation is assuring the Authority that the plant's capacity is reliably available. In 2023, both of the sludge and gas storage tanks were cleaned, including removal of grit and other inert material to better utilize the full tank volumes. As of August 2026, the water chillers were replaced at the North Main Pump Station and designs for the rehabilitation of the residuals complex and new covers for the sludge and gas storage tanks are in progress.

Energy efficiency and management has been a focus both in the initial design, including hydro-electric generation and methane reuse, as well as ongoing improvements to DITP operation. The Authority estimates that the total power generated at DITP accounts for 22 percent of the total power use on-site, based on data from the 4th quarter of 2026. Two wind turbines have been installed at the site, which are providing 600 kW of power each (although one of the turbines is currently offline). Photovoltaic systems installed on rooftops and in a parking lot provide 736 kW of power. The Authority has replaced existing lighting at the DITP and at over 40 facilities with high efficiency fluorescent or LED type lighting in both offices and process areas to cut the energy use at the facility and improve working conditions. The DITP minimizes electrical demand costs by maximizing the utilization of the two on-site 26 megawatt power generation turbines and participates in a demand response program to drop off the grid during times of peak power demand in the region.

In April 2023, on one of the two wind turbines, the main bearing on the shaft between the blades and the generator failed. In May 2023, at least two sections of blades broke free from the turbine, ultimately resulting in irreparable damage to the turbine. The Authority executed an emergency removal of the wind turbine and as of the end of FY 2026 replacement is in progress. The FY 2027 CIP notes that spending on the project is less than planned due to less than anticipated contractor progress. In April 2024, the Authority filed suit against the maintenance contractor for the wind turbine and the outcome of the lawsuit is still pending. The Authority cannot predict at this time how this matter will be resolved.

Wind turbine generation is back above target as of the 4th quarter of FY 2026; however, both hydro turbines were out of service in FY 2026 pending rehabilitation. Total on-site generation during the 4th quarter of 2026 was 19.6% below target due mainly to much lower-than-expected generation by the combustion turbine generators (CTGs) and the lack of hydro turbine generation. Nevertheless, overall on-site generation remained within 3.3% of the FY 2026 target.

The cross-harbor cable that provides power to Deer Island was replaced in 2019. This was a $116M project but received $17.5 million in a credit to reflect the old cable's remaining life. The DITP combustion turbine generators were used for 23 days during switch over.

The majority of the plant is over 25 years old and many of the mechanical systems are approaching the typical useful life. As a result, the Authority is currently proactively planning, designing and constructing many capital improvement projects to maintain, upgrade, or replace these systems. The renewal of DITP is a major focus of the Authority's long-term CIP. Overall, the DITP is well maintained and in excellent condition overall.

2.3.2 Discharge Permit Compliance and Facility Performance

The DITP has been designed to achieve an effluent with an average monthly CBOD concentration of 25 mg/l and an average monthly TSS concentration of 30 mg/l, consistent with the discharge permit (the "NPDES Permit") issued by the EPA and the MassDEP. The NPDES Permit, which became effective most recently on August 10, 2000, incorporates federal secondary treatment requirements and other limits necessary to meet water quality standards established by the Commonwealth. Although the NPDES Permit technically remained effective through August 9, 2005, it has been administratively extended since that time and continues in full force and effect until the EPA and MassDEP each issues a new permit.

On May 31, 2023, EPA and MassDEP issued draft permits for the Deer Island Wastewater Treatment Plant and Combined Sewer Overflow outfalls. In 2020, EPA terminated its joint NPDES permitting agreement with MassDEP. The permits are now issued separately by EPA and MassDEP. On May 31, 2023, EPA issued a draft DITP Permit and the public comment period ended November 28, 2023. The Authority submitted comments on the draft EPA and MassDEP permits, and the Authority continues to await final action on the permit renewal. The Authority cannot predict whether EPA or MassDEP will make revisions to the draft permits in response to the comments received. The permit renewal remains an important but unresolved regulatory matter. Most proposed treatment-related requirements appear manageable within existing Deer Island facilities; however, provisions related to blending, co-permittee liability, and wet-weather operations remain under discussion and could have more significant operational and institutional implications.

Through the most recent monthly report, there was one reported violation at DITP during FY 2026, for acute toxicity in December 2025. MWRA sent a notification letter to the EPA on July 25, 2025. This was within five days after the exceedance result became available. DITP has been compliant with all effluent limits since 2006 and DITP has not previously failed any acute toxicity tests. All other permit effluent limits were met during the same month, including three other toxicity tests. In 2025, Deer Island received the National Association of Clean Water Agency's ("NACWA") Silver Award for Peak Performance. For the eighteen years prior, Deer Island received the NACWA Platinum Award for Peak Performance.

2.3.3 Clinton Wastewater Treatment Facilities

In addition to the Deer Island Treatment Plant, the Authority also operates a treatment plant in the Town of Clinton. In 1987, special legislation transferred ownership of the Clinton Plant from the MDC to the Authority and obligates Clinton to pay up to $500,000 to the Authority per year for wastewater treatment service. The Clinton Plant is an advanced wastewater treatment facility with a design flow of 3.0 mgd and hydraulic capacity for peak flows of 12.0 mgd. Consisting of a combination of new facilities and upgraded elements from an existing plant, the upgraded Clinton Plant has been fully operational since 1992, and performance and operation have been good.

The sludge, grit, and screenings from the plant are disposed at an eight-acre lined landfill site that was constructed in Clinton as part of the plant's upgrade. The site is owned by the Authority and consists of three separate cells, each designed to provide a 20-year capacity for sludge from the plant. The first of the three cells was used for 26 years and is now full. Since the fall 2019, all material has been deposited into Cell 2. The landfill is now expected to be operable for over 40 more years at current sludge production rates. An additional investment in residuals management is being considered to add a fourth cell to the residuals landfill. Leachate from the landfill is collected and pumped back into the Sewer System and returned to the plant for treatment.

The Authority submitted its renewal application for the NPDES Permit associated with the Clinton Plant in August 2021. Since the Authority submitted its renewal application in a timely fashion, the Clinton NPDES Permit was administratively continued beyond its nominal five-year term, which expired in February 2022. In February 2022, EPA issued a draft NPDES General Permit for the discharge of wastewater from medium-sized wastewater treatment facilities in the Commonwealth, which was subsequently issued as a final NPDES General Permit in September 2022. Facilities eligible for coverage

under the General Permit include those in Massachusetts with a design flow between one and five million gallons per day, which includes the Clinton Plant. MassDEP issued a similar General Permit under state law in October 2022. On December 1, 2022, the Authority submitted to EPA and MassDEP a Notice of Intent to discharge under the General Permit and authorization to discharge was received from EPA and MassDEP in late February 2023, with an effective date of the new permit of April 1, 2023.

Through the end of FY 2026, the average daily flow to the Clinton Plant was approximately 2.0 mgd, and the monthly rolling average flow did not exceed the limit of 3.01 mgd during any month so far during FY 2026. A new permit was issued in December 2016 which went into effect in 2019. The new permit contains a more stringent phosphorus limit of 0.15 mg/L seasonally, and 1.0 mg/L during the summer. According to the Board of Directors Report on Key Indicators of MWRA Performance Fourth Quarter FY 2026, the Clinton Plant did not receive any phosphorous violations in FY 2026. There have been five total permit violations at the Clinton Plant for average monthly total recoverable copper in FY 2026.

The construction of a new tertiary treatment facility and building which includes flocculation tanks and disc filters was completed in FY 2019. The new facility includes three trains of 25 disc filters to remove phosphorous; polymer and ferric chloride are also added to aid in performance of the filters. The project also included other improvements around the plant such as the conversion of the heating system from oil to natural gas, replacement of the fuel tanks for the backup generator, and paving much of the site.

Since 2014, the Authority has rehabilitated needed portions of the Clinton Plant and replaced equipment including at the influent pump station, the intermediate pump station, the aeration basins and the digesters. The Authority's wastewater Master Plan anticipates that the Local Bodies served by the Clinton Plant will undertake programs to control excessive inflow and infiltration (I/I).

2.3.4 Pumping Stations Facility Evaluation

In addition to the pumping stations on Deer Island, the Authority has 11 wastewater pump stations; four in the north system and seven in the south system. All of the pumping stations are well maintained and functioning properly; however five of the facilities have been in operation for over 25 years since they have been put into service, or since their most recent major upgrade, and are nearing the end of their design life. These five pump stations are known as DeLauri, Hingham, Hough's Neck, Neponset and Framingham. Neponset and Framingham only operate as needed during wet weather storm events, not continuously. The Authority is aware of the age of these facilities and is planning to address it as appropriate. Generally, the pump stations have been found to be efficient and in proper working condition and the pumping systems appear to be well operated and maintained. Equipment is replaced proactively or as required by operational or maintenance issues. A large rehabilitation project for the Braintree-Weymouth Intermediate Pump Station (IPS) was completed early 2025. The FY 2027 CIP includes comprehensive rehabilitation and upgrades for the following pumping stations: Allison C. Hayes PS, Caruso PS, Delauri PS, Hingham PS, Hough's Neck PS, Quincy PS, Squantum PS, Framingham PS, and New Neponset PS. In addition, the CIP calls for a long-term asset protection project to budget an annual baseline for asset protection projects for all pump stations.

Key data on the pump stations is summarized in Table 2-1. In viewing the table, it is important to note that the term "upgrade" refers to a major rehabilitation/renovation project and does not include minor maintenance or installation items such as pump replacement.

Table 2-1 Pump Station Summary

Pump Station	Pump Description	Built	Most Recent Upgrade
Alewife Brook	3 – 26 mgd electric 1 – 14 mgd electric	1951	2019
Allison C. Hayes	3 – 5.5 mgd electric	1987	Upgrades Currently Under Construction
Braintree-Weymouth	3 – 14 mgd electric	2008	2025
Caruso	4 – 21 mgd electric (dry-weather) 3 – 50 mgd electric (wet-weather)	1991	2017
DeLauri	3 – 65 mgd electric (46.5 mgd max allowed per pump)	1993	Future Upgrades Planned
Hingham	3 – 4.89 mgd electric	1957	Future Upgrades Planned
Hough's Neck	2 – 1.4 mgd electric	1998	Future Upgrades Planned
Quincy	3- 14.4 mgd electric	2002	Future Upgrades Planned
Squantum	4 - 2.9 mgd electric	2003	Future Upgrades Planned
New Neponset (Intermittent Operation)	3 – 34.6 mgd electric	1995	Future Upgrades Planned
Framingham (Intermittent Operation)	3 – 14 mgd electric	1998	Future Upgrades Planned

2.3.5 Headworks Facilities

In the north service area, there are three remote headworks that protect the tunnel system by providing screening and coarse degritting of the wastewater at the drop shafts to the tunnels that feed the North Main Pump Station at Deer Island. In the south service area, there are remote headworks facilities at Nut Island in Quincy and at the Intermediate Pump Station in Quincy. Screening and degritting are provided at these locations to protect the interisland tunnel that feeds the South System Pump Station at Deer Island. There is a headworks at Deer Island, referred to as the Winthrop Terminal facility, that was upgraded as part of the Boston Harbor Project.

The remote headworks on the north system function as flow regulators. Operators regulate flow to correspond to available capacity at the DITP. Flows in excess of capacity are either stored within the interceptor system or discharged as CSOs.

The three remote headworks in the north service area are the Chelsea Creek Headworks, the Ward Street Headworks, and the Columbus Park Headworks. All three headworks are functionally identical to each other except for elevation and minor dimensional differences. Major upgrades to all three of the North System Headworks facilities have been completed or are in progress.

- The Authority began construction on a complete rehabilitation project of the Chelsea Creek Headworks facility in November 2016. Construction for the upgrades was completed in early 2022, which is beyond the original scheduled completion estimation of November 2020. The contract price for the Chelsea Creek Upgrade was approximately $83.3 million.
- The design of upgrades to Ward Street and Columbus Park began in early 2021, with construction of the projects scheduled to begin in 2028.

Summary information on the size, capacity, and year of construction for the headworks is presented in Table 2-2.

Table 2-2 Headwork Facilities Summary

Facility	Discharges To	Capacity (mgd)	Year Built
Winthrop Terminal Facility	Deer Island Treatment Plant	125	1968
Columbus Park Headworks	Boston Main Tunnel	182	1968
Ward Street Headworks	Boston Main Tunnel	256	1967
Chelsea Creek Headworks	North Metro Tunnel	350	1967
Nut Island Headworks	Inter-Island Tunnel	360	1996
Braintree-Weymouth Intermediate Pumping Station (IPS)	Inter-Island Tunnel	45	2004

The remote headworks are adequate to handle the projected flows. They are well maintained, with equipment replaced at or before the end of its useful life. Operations staff at each facility do an excellent job of keeping the facilities clean and well maintained. The staff are knowledgeable in the maintenance and operation of the facilities. The operation of these facilities is labor intensive due to their remote locations and equipment configurations although ongoing rehabilitation efforts are working to reduce the labor required to operate the facilities.

2.3.6 CSO Facilities

CSOs are discharges during wet weather events from combined sewers that were designed to carry sanitary flows and a limited quantity of street runoff and drainage. Untreated CSO discharges must be eliminated or mitigated under current regulatory standards since they generally cause water quality standards to be exceeded and may compromise beneficial uses of the receiving waters. Within the Authority service area, there were 84 permitted CSOs when the Authority commenced CSO control planning in 1992 to comply with the evolved regulatory requirements. The Authority's obligations for CSO control under the Federal Court Order in the Boston Harbor Case were set forth in a March 15, 2006, Second Stipulation of the United States and the Massachusetts Water Resources Authority on Responsibility and Legal Liability for Combined Sewer Overflow Control, as amended on April 30, 2008. The Court maintains active oversight of the Authority's activities to correct CSOs.

As of December 2015, CSO discharges were eliminated (or, for the North Dorchester Bay outfalls, "effectively eliminated," i.e. eliminated up to the 25-year design storm) at all 34 of the outfalls recommended to be closed in the CSO Control Plan. Six additional outfalls have been closed to CSOs by the Boston Water and Sewer Commission (three), the City of Cambridge (two) and the City of Chelsea (one). At the Authority's five permitted CSO outfalls, the Authority operates four CSO treatment facilities that were constructed or upgraded under the CSO Control Plan. Each of the CSO facilities provides preliminary treatment (screening), disinfection with sodium hypochlorite and dechlorination with sodium bisulfite.

The four facilities have the following capacities:

1. Somerville Marginal (145 mgd);
2. Cottage Farm (210 mgd);
3. Prison Point (385 mgd); and
4. Union Park (330 mgd).

Cottage Farm, Prison Point and Union Park also have detention basins that provide the benefit of reducing discharges and providing a level of solids removal for remaining discharges (Union Park is a joint facility with BWSC that also provides stormwater control functions for BWSC infrastructure and is operated by BWSC via a joint operating agreement with the Authority). Three other treatment facilities that were operated by the Authority, Fox Point, Commercial Point and Constitution Beach, were decommissioned under the CSO Control Plan.

CDM Smith believes that the Authority's approach to CSO control has been reasonable and prudent. Unlike other water pollution control programs, CSO pollution abatement is a complicated and costly process. It involves widely dispersed facilities primarily in dense urban, waterfront areas, relatively expensive solutions, and imprecise benefits with respect to water quality standards and uses due to other sources of pollution that will continue to impair water quality, such as urban stormwater. The Authority's approach maximizes benefits while minimizing costs, eliminating, or effectively eliminating, CSO discharges to sensitive use waters (swimming and shellfishing), and bringing CSO discharges into compliance with "fishable/swimmable" water quality standards at least 98 percent of the time in less sensitive receiving waters.

The FY 2027 CIP notes the Authority completed all 35 projects in the CSO Control Plan in 2015. Subsequently, the Authority performed a three-year performance assessment of the CSO improvements starting in November 2017, that required semiannual reporting and a final report was submitted to EPA and MassDEP in December 2021. A supplement to the 2021 Final Combined Sewer Overflow Report was submitted in December 2024.

The interim reports include data on rainfall and CSO events, as well as a description of hydraulic model recalibration efforts, regular model updates, and comparisons between modeled versus measured CSOs. The semi-annual reports and the final report are to verify attainment of the required long-term levels of control, including frequency of CSO activation and volume of discharge, as specified in the approved CSO Control Plan.

The Authority, Cambridge, and Somerville submitted to MassDEP and EPA a draft Updated CSO Control Plan on April 30, 2026 for regulatory review and public comment. The draft Updated CSO Control Plan includes recommended alternatives which are projected to result in zero CSO discharges in a "2050 typical year" (a metric based on climate change model predictions of average annual rainfall forecast for the 2050 planning year and defined in the draft Updated CSO Control Plan). Design and construction expenses are currently expected to commence in 2028 and be completed in 2042. Following the public

comment period, a final Updated CSO Control Plan is required by May 31, 2027, for review under the EPA and MassDEP.

Future projects related to CSO planning and support include on-going CSO improvements in Boston, Chelsea and Somerville, rehabilitation of MWRA's Somerville Marginal, Prison Point and Cottage Farm CSO treatment facilities, and a new placeholder at the end of the cap period for design of any projects that come out of the Variance Water updated CSO Long-Term Control Plan process. The FY 2027 CIP includes 7 new projects totaling $772.4 million, with the majority of this spending beyond FY 2028.

MWRA continues to evaluate the scope and timing of the program and will refine cost and schedule projections as more regulatory certainty becomes available.

2.3.7 Interceptor Evaluation

The Sewer System includes large interceptor sewers that were constructed over the past century. The average age of MWRA's 226-mile sewer system is approximately 70 years old, with approximately 39 percent of the sewers more than 100 years old. Overall, the collection system is in reasonably good condition given its age. The focus of the Authority's sewerage program is to renovate those aging portions of the system and to accommodate growth in the service area by providing additional conveyance capacity where needed.

The focus of sewerage improvements in the south service area has been to increase capacity to relieve hydraulic under-capacities that have developed as a result of growth within certain segments of the service area. Improvements in the north service area were principally focused on the renovation of existing facilities to restore hydraulic capacity and to ensure the structural integrity of the Sewer System.

In addition to correcting deficiencies within the Sewer System, the Authority has provided leadership and financial assistance to the Local Bodies through a grant/loan program to support the identification and elimination of inflow and infiltration ("I/I") within the sewers of Local Bodies. As of FY 2026, sixteen grant/loan funding Phases had been approved for distribution through FY 2035 for a total budget of $1,086 million. The original grant/loan percentage split has been revised from a 45/55 split (through Phase 8), where the loan portion was to be repaid over five years, to a 75 percent grant, combined with a zero-interest rate loan on the remaining 25 percent to be repaid over 10 years (Phases 9 through 12). The Authority has also approved an additional $100 million 10-year loan for Phases 13 through 15, and $125 million 10-year loan for Phase 16. From FY 1993 through the end of FY 2026, the Authority has committed $633 million for this program which has funded 723 I/I identification and sewer rehabilitation projects. The program has achieved measurable reduction in I/I as evidenced by the gradual drop in average daily flow to the DITP. The objective of this program is to assist Local Bodies with identifying and accelerating the elimination of I/I, thereby reducing the potential need for expansion of Sewer System facilities and optimizing the efficiency of the existing Sewer System.

CDM Smith believes that the Authority's program both for financially assisting the Local Bodies with the elimination of I/I and for constructing, renovating, rehabilitating and maintaining its interceptor sewers is properly focused. Given the overall age of the sewer system, the Authority will need to make continued investments in rehabilitation and renovation.

2.3.8 Maintenance Facilities and Initiatives

2.3.8.1 Centralized Maintenance Facilities

Wastewater and water distribution maintenance activities for the metropolitan systems are located at a leased facility located in Chelsea. The facility also houses the operations control centers. Included are the machine shops, storage areas, and garage facilities. In addition to the centralized facility for maintenance, individual facilities have maintenance areas, tools, and limited storage for routine maintenance items. The DITP has its own maintenance facility.

2.3.8.2 Maintenance Management Activities

The Authority has adopted an Asset Management Program that has been implemented system-wide. The Authority has recognized the need to conduct cost-effective preventative maintenance and to be able to identify the appropriate timing for equipment replacement. As part of the Asset Management Program, a maintenance management information system is used, preventative maintenance programs using real time condition monitoring are being installed throughout the Authority's facilities, and reliability centered maintenance strategies are being instituted. This initiative is targeted to manage maintenance costs and to ensure that the Authority's equipment and assets can be cost effectively operated and maintained over at least their anticipated design lives.

2.3.9 Sludge Pelletizing Facilities

Sludge produced by the Authority's DITP is processed for beneficial use or disposal at the Authority's sludge pelletizing plant located on an eight-acre site at the former Quincy Shipyard. Sludge is pumped from the DITP to the pelletizing plant via redundant pipelines within the Inter-Island Tunnel under Boston Harbor. NEFCO is under contract to operate the plant through December 2034, after a new 10-year contract began in 2024. The Authority is working with NEFCO to provide the most flexibility possible to react to the evolving PFAS regulatory situation. MassDEP currently requires quarterly sampling of sludge for PFAS for all POTWs with an Approval of Suitability (AOS), which includes the Authority's Bay State Fertilizer Class A (Type I) pellets. As of August 2026, there are several Bills in the MA legislature that have the potential to impact the use and sale of MWRA Biosolids for beneficial use. S-3034, S-3064, H-4853, H-5510, or H-136 if promulgated, have the potential to limit or prevent the use of biosolids on land within MA.

Until the spring of 2005, sludge was barged from Deer Island to the pelletizing plant. With the completion of the new interceptor facilities on the south service area, the Authority began pumping sludge to the facility via redundant pipelines within the Inter-Island Tunnel. The dock facilities at Deer Island and the pelletizing plant remain, however they are in need of an upgrade. Although the barges have been sold, the docks could be utilized in the future, following necessary rehabilitation, to bring material via water directly to Deer Island to support future capital projects.

Dewatered sludge is normally fed to a thermal dryer that produces fertilizer pellets. The dryers have an operational capacity of 4,000 lbs/hr. Fertilizer pellets are stored in silos prior to shipment off-site. When the thermal dryers and/or downstream facilities are out of service, dewatered sludge may be loaded into either a rail car or a truck for off-site disposal. Air streams from process areas are treated

prior to discharge to the atmosphere. Wastewater, recycle flows, and filtrate from the facility are pumped back to the DITP for treatment.

In 2024, approximately 40 percent of the pellets produced were distributed and beneficially reused within New England and New York. The remaining goes to various states throughout the US, mostly along the east coast and Midwest, and Canada.

On October 2, 2020, MassDEP published final regulations establishing a drinking water standard, or a Maximum Contaminant Level (MCL), for the sum of six per- and polyfluoroalkyl substances (PFAS). Since August 2020, MassDEP has required quarterly monitoring of per- and polyfluoroalkyl substances (PFAS) in residuals that have an Approval of Suitability (AOS) and are permitted to be reused through land application. On March 14, 2023, the EPA announced the proposed National Primary Drinking Water Regulation for PFOA, PFOS, and four additional PFAS compounds (GenX, PFBA, PFNA, and PFHxS) as a mixture using a Hazard Index. At the time of this report, it is unknown the impacts this will have on the Authority's land application outlets, but it is anticipated that these regulations will stress the land application market in Massachusetts.

The pelletizing plant is sized to produce up to 180 tons per day of pellets. For FY 2027, the operating budget is based on 102.3 dry tons per day, consistent with recent historical values for sludge received at the pelletizing plant, with dried sludge being converted to pellets suitable for beneficial reuse. The operational reliability of the pelletizing plant, as well as the beneficial use of finished product from its initial startup in 1991 to the present time, provides a clear indication of the Authority's ability to meet its long-term objectives for sludge processing and reuse through effective management, long range planning, and a willingness to address and resolve operational problems as they occur.

CDM Smith believes that the pelletizing plant is well operated and maintained and that adequate management attention is given to continued reliable operation of the plant.

2.3.10 Summary of Wastewater System Condition and Operation

CDM Smith has visited all the major facilities in the Sewer System, and have interviewed key staff associated with the planning, design, construction and operation of the individual facilities, as well as the maintenance of those facilities. It is our opinion that the Authority facilities are all in operable condition and are well maintained. The Authority's senior management has in place a system for assessing the adequacy of staff, equipment and both capital and maintenance needs. Overall, the Authority's staff understands that maintenance of the investment made in major capital projects, along with a continuous reassessment of how to efficiently operate the facilities, will optimize the useful life and minimize the costs to operate and maintain the Authority's Sewer System.

2.4 Waterworks System Overview

The Waterworks System serves, or potentially serves, approximately 3.0 million people (44 percent of Massachusetts population) in 56 cities, towns, and special purpose entities. Most of the communities are in located in eastern Massachusetts, with a limited number (three) in central parts of the state. The Enabling Act charges the Authority with the responsibility to modernize, maintain, and operate the metropolitan Boston area water conveyance and treatment systems, as well as to provide service to several communities in central and western Massachusetts. The Authority is responsible for the delivery of water to the distribution systems of its Local Bodies. The Local Bodies are responsible for distribution of water to individual customers. The Commonwealth retains ownership of the supply sources but the Authority has exclusive rights for use.

The Waterworks System consists of three primary water sources: the Quabbin, the Wachusett and the Ware River watersheds. It consists of two major reservoirs, the Quabbin and the Wachusett, and two water treatment plants, the Carroll WTP and the William A. Brutsch Water Treatment Facility (the "Brutsch WTF"). Treated water is delivered to Local Bodies through a large transmission and distribution system. The transmission and distribution system consists of approximately 350 miles of aqueducts, tunnels and mains that transport water from the treatment plants to the user communities. The system also includes 14 active distribution storage reservoirs and standpipes, nine back-up distribution storage locations, two back-up supply sources, 11 active pumping stations, and four active hydro-electric power stations. Key elements of the Authority's water supply system are shown in Figure 2-2.

2.5 Waterworks System Facilities Evaluation

2.5.1 Water Supply

The Waterworks System consists of three primary water sources located in central Massachusetts: the Quabbin Reservoir watershed, the Wachusett Reservoir watershed, and the Ware River watershed. The system has a combined safe yield (the maximum rate at which the system can be expected to continuously deliver water under extended dry conditions) of approximately 300 mgd. MWRA customers used an average of 200 mgd in the 4th quarter of FY 2026. This is an increase of 7.6 mgd or 4.0% compared to the 4th quarter of FY 2025. The 2018 Master Plan indicates that modeling efforts show climate change is not expected to have significant impacts on reservoir yields, and the safe yield of the water system is sufficient to meet future demands through 2060 for water both within the service area and additional demand outside the service area. Existing supply facilities are summarized in Table 2-3.

Figure 2-2. MWRA's Water System

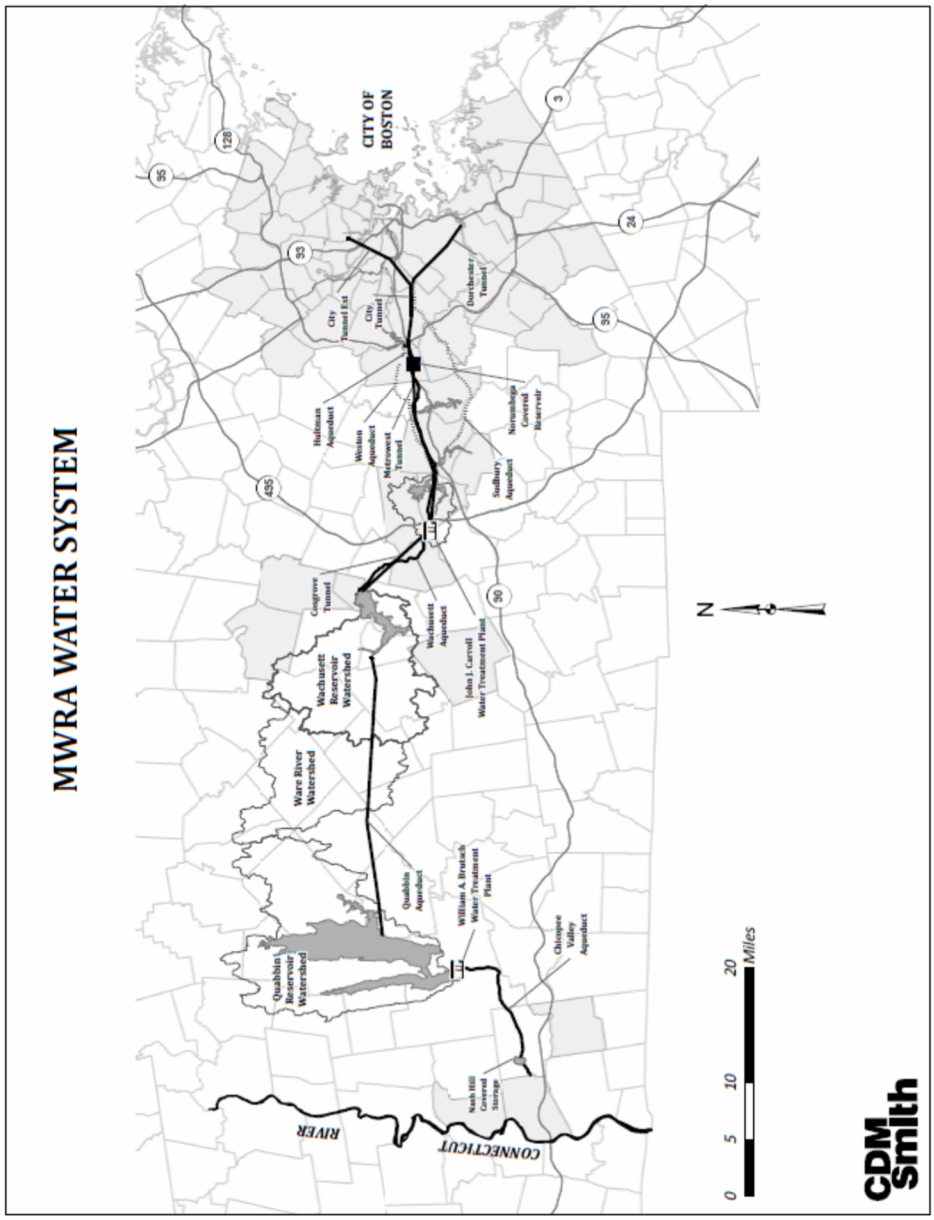


Table 2-3 Existing Water Supply Sources

Watershed	Reservoirs	Year Complete	Capacity (mg)	Supplies
Ware River	None	1931	NA	Quabbin or Wachusett Reservoirs
Swift River	Quabbin	Completed by 1939; filled by 1946	412,300	Chicopee Valley Aqueduct ("CVA") communities; and the Metropolitan Boston Service Area through the Wachusett Reservoir
Nashua	Wachusett	Completed by 1906; filled by 1908	65,000	Metropolitan Boston Service Area
Sudbury	Sudbury Framingham No. 3	1878-1898	8,400	Currently in standby status

The Quabbin Reservoir, completed in 1939 and filled by 1946, is the largest water supply reservoir in the Waterworks System, and is located 65 miles west of Boston. The reservoir storage capacity is approximately 412 billion gallons, with a surface area of 39 square miles. The watershed (drainage area) of the reservoir is approximately 186 square miles and extends into the Towns of Belchertown, Hardwick, New Salem, Pelham, Petersham, Shutesbury, and Ware. The reservoir receives inflow from its watershed, and from the Ware River watershed via the Quabbin Aqueduct. Outflow from this reservoir is to the Swift River, a tributary to the Connecticut River; to the Chicopee Valley Aqueduct; and to the Quabbin Aqueduct.

The Wachusett Reservoir is located 35 miles west of Boston in the Clinton area. The reservoir storage capacity is approximately 65 billion gallons, with a surface area of 6.5 square miles. The reservoir's watershed is approximately 110 square miles. The reservoir receives inflow from its watershed, which includes the Stillwater and Quinapoxet Rivers; and from the Quabbin Reservoir via the Quabbin Aqueduct. Inflow can also be received directly from the Ware River watershed, although this diversion is seldom implemented. Outflow from this reservoir is to the Nashua River, the Wachusett Aqueduct, and the Cosgrove Aqueduct. The Town of Clinton withdraws water directly from the Wachusett Reservoir. The City of Leominster can withdraw water from the Wachusett Reservoir. In addition, the City of Worcester can withdraw water from the Wachusett Reservoir or Quabbin Tunnel and owns several reservoirs within the Wachusett watershed.

The Ware River watershed is located between the Quabbin and Wachusett watersheds, with a 98-square mile drainage area to the intake. The intake is located at the midpoint of the Quabbin Aqueduct in the Town of Barre. From this point, water can be diverted in either direction—to Quabbin or Wachusett; however, diversions are generally routed through the Quabbin Reservoir to maintain adequate water quality. Diversions from the Ware River watershed are limited to periods when flow exceeds 85 mgd in the river and are allowed between October 15 and June 15; diversions are only allowed outside that time frame under special circumstances. The Ware River is tributary to the Chicopee River, which is tributary to the Connecticut River.

The Authority maintains an emergency supply source of approximately 8.4 billion gallons within the Sudbury Reservoir system.

2.5.2 Water Treatment

The Authority currently provides treatment at two locations to control pathogens and other organisms that could present public health problems. Table 2-4 presents a summary of the existing treatment facilities. Both treatment plants are currently operating without issue. They are both in excellent condition with proactive maintenance projects occurring on top of routine maintenance. The facilities are adequately operated to maintain water quality commensurate with local, state and federal regulations.

Both treatment facilities have completed upgrades to the treatment scheme to provide ultraviolet disinfection as a second means of disinfection, in addition to the disinfection already provided. The second means of disinfection ensures the facilities complied with the EPA's Long-Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR, or LT2) prior to the regulatory compliance date of April 2014 for the Carroll WTP and October 2014 for the Brutsch WTF.

On March 14, 2023, the EPA released draft National Primary Drinking Water Regulations for six PFAS compounds, which were finalized in April 2024. The Authority has tested for all six of the compounds, as required by current state regulations. The results are either not-detectable, or at trace levels so low that can't be quantified. While the new regulation's testing requirements did not take effect until 2021, the Authority tested for the six regulated PFAS as well as a dozen other PFAS compounds beginning in 2019, with regular quarterly testing beginning in January 2021. Current data indicates that the Authority and all fully-supplied Local Bodies meet the new EPA PFAS standards without the need for any treatment changes. Each partially-supplied Local Body will need to individually review its data, and may need to make source or treatment changes to meet the standards. The Authority will continue to monitor MassDEP's standards on PFAS for future revisions.

Table 2-4 Water Treatment Facilities Summary

Reservoir	Facility	Year in Use	Treats
Quabbin	Brutsch WTF	2000	Water to CVA Aqueduct Communities
Wachusett	Carroll WTP	2005	Water to Metropolitan Boston Service Area and Marlborough, Southborough and Northborough

MWRA's current treatment systems include the following:

- *William A. Brutsch Water Treatment Facility*. Located in Ware, disinfection is provided at this facility for water delivered to the three communities in the western part of the state supplied by the Chicopee Valley Aqueduct. The facility has a design capacity of 16 mgd, and uses ultraviolet disinfection followed by chlorine, to disinfect the high-quality water drawn from the Quabbin Reservoir. The Local Bodies served by the Brutsch WTF provide further treatment prior to delivery to their customers.
- *Carroll Water Treatment Plant*. Located in Marlborough, the Carroll WTP is one of the three major components completed as part of MWRA's Integrated Water Supply Improvement Program. The plant was placed into service in July 2005.

The Brutsch WTF has a design capacity of 16 mgd and provides water to the three Chicopee Valley Aqueduct Water System Communities of Wilbraham, Chicopee, and South Hadley Fire District No. 1. The average daily demand from these three communities was 7.7 mgd.

The Brutsch WTF has two disinfection processes. First the water is disinfected with UV light followed by sodium hypochlorite. Each community provides further corrosion control treatment to protect their local system. In 2018, the Authority completed the Hatchery Pipeline and Hydroelectric Project at the Brutsch WTF. This project provides 6 mgd of untreated Quabbin Reservoir water to the McLaughlin Fish Hatchery in Belchertown, MA to supplement water from the Swift River and powers a new hydropower generator located on the WTF site.

The Carroll WTP has a maximum day design treatment capacity of 405 mgd and an average day design capacity of 270 mgd. The design average flow for the plant is 270 mgd. To date, typical operating targets for the plant have ranged from 180 to 340 mgd depending upon demand. However, the Carroll WTP has been run down as low as 130 mgd and its highest flow was 360 mgd on May 2, 2010 during a large water main break.

The Carroll WTP has two disinfectant processes. First the water is disinfected with ozone, and since April 2014, is then disinfected with ultraviolet light (UV). Downstream of the disinfection processes the water has both soda ash and carbon dioxide added for alkalinity and pH adjustment for corrosion control. Hydrofluosilicic acid, aqua ammonia and hypochlorite are also added to the finished water to provide for further public health protection with chloramines. The plant has two below-grade storage tanks that fluctuate diurnally allowing the plant's ozonation, UV and chemical addition processes to be operated in an optimum steady state condition. The largest FY 2027 Carroll Water Treatment Plant CIP project is the Carroll WTP Asset Protection program. This project was developed to ensure that the Authority maintains ongoing service while optimizing operations in its water facilities. This project in its current form addresses immediate critical facility and equipment issues. While the current schedule indicates a completion date of 2036 for construction, the Carroll WTP Facility Asset Protection project will be ongoing throughout the useful life of the facilities. The plant distributes water to the MetroWest Water Supply Tunnel (MWWST) and the Hultman Aqueduct for conveyance to the Boston service area. The Carroll WTP also has a 30-inch distribution main that conveys finished water by gravity to the Towns of Marlborough and Southborough. Those two communities own and operate their own pump stations.

The plant also provides finished water to the Town of Northborough via a connection off of the plant's water system.

The Authority began construction on the Wachusett Aqueduct Pumping Station in March of 2016 that has been designed to convey 240 mgd from the Wachusett Aqueduct to the Carroll WTP for treatment to provide redundancy in the event the Cosgrove Tunnel is removed from service or during an emergency. The pump station was completed in 2020 and is currently operational if needed. However, the pump station will only be activated when the Cosgrove Tunnel is off-line, and the Wachusett Aqueduct is needed to provide water to the Carroll WTP. This situation has not yet occurred; therefore, the pump station has not been activated to its full capacity. Flow tests on individual pumps at this pump station are performed annually.

The Authority has instituted a number of energy generation and energy saving initiatives at the Carroll WTP. The Carroll WTP minimizes electrical demand charges by monitoring both plant energy usage as well as energy usage on the supply grid and switches to on site power generators during peak demand periods. The Authority has also installed on the open areas of the plant site a 500 kw array of power generating solar panels and installed an additional solar array at the Wachusett Aqueduct Pumping Station site. In 2022, the Authority completed a lighting upgrade at the Carroll WTP to replace all lights with LED lighting. The Wachusett Aqueduct Pumping Station also includes a geothermal heat exchanger system to provide a more sustainable climate control system to the building. The supervisory control and data acquisition (SCADA) system at the Carroll WTP replacement project was completed in 2026. The upgrade project also included replacement of associated treatment processes programable logic controllers (PLCs), which improved efficiency and reliability of the WTP. The soda ash chemical feed system upgrade project was also completed in 2026. Building roof repair work was completed since the 2023 review.

The Authority is in process of replacing the motors on the Plant Water Pumps, with two of four motors replaced in 2023. The existing CPVC chemical feed piping was replaced with PVDF for the sodium hypochlorite and fluosilicic acid, as it is more chemical resistant. The sodium hypochlorite bulk storage tanks are being relined (grind the interior and re-epoxy). The forthcoming Lead and Copper Rule Improvements (LCRI), effective November 2027, will introduce more stringent sampling requirements, including lowering the federal lead action level (AL) from 15 to 10 µg/L. In anticipation, the Authority recently conducted a multiyear Corrosion Control Optimization Study – including a three-year flow-through pipe-rig program using harvested LSLs – to evaluate the potential benefits and risks of orthophosphate treatment in the case that additional treatment will be required to meet the updated AL. A study focusing on evaluating the ozone system at Carroll WTP is currently in progress as the original generators are approaching end of life and spare parts are more challenging to find. Piping improvements to the Oxygen Yard will be completed at the same time. The Authority is planning to replace the carbon dioxide vaporizers, moving them outside of the building and simplifying the piping inside, with work anticipated to be complete fall of 2027.

The Wachusett Aqueduct Pumping Station located at the Carroll WTP has only recently become fully available for service. The Authority is working on an upgrade to address leaking air release valves (ARVs) on the pump outlet piping, which should be complete fall 2026. The pumps' mechanical seals are a maintenance focus, as the pumps are low hours as an emergency supply and exercising without seal

water requires replacement of the expensive ceramic seals. The Authority is scheduled to clean the wetwell in September 2026.

2.5.3 Water Transmission

Seven major aqueducts are used regularly to transport water from the reservoirs to the Local Bodies' distribution systems. Existing water transmission facilities are summarized in Table 2-5.

The Quabbin Aqueduct transports water between the Quabbin and Wachusett Reservoirs. Completed in 1932, this pressure tunnel extends 24.6 miles between the Quabbin and Wachusett Reservoirs. There are 13 shafts to the tunnel; one is the inlet from the Ware River located about midway between the Quabbin and Wachusett Reservoirs. Water can flow from the Ware River into the tunnel at Shaft 8 to the Wachusett or Quabbin. The overflow structure at Shaft 2 was replaced in 2021-2022 and features a new concrete structure, refinished valves and grating, and replaced rip rap. Whenever water is conveyed from the Quabbin to Wachusett Reservoir, hydroelectric power is generated at the Oakdale Station. The Oakdale Station has an overhaul of the bushing shaft scheduled in the CIP and was offline at the time of inspection due to a leak in the upper bearing.

The Chicopee Valley Aqueduct ("CVA") transports water to three Local Bodies in central Massachusetts from the Quabbin Reservoir: Chicopee, Wilbraham, and South Hadley Fire District No. 1. The CVA, a pressure aqueduct, was constructed between 1947 and 1949 and was first operated in 1950. The aqueduct extends from the Quabbin Reservoir to the Nash Hill covered storage tanks. The Nash Hill covered storage tanks have a combined capacity of 25 million gallons. From these two partially buried concrete tanks, the aqueduct runs to the Chicopee City line. Flow in the aqueduct is by gravity and is controlled with valves at the Brutsch WTF between the Quabbin and Nash Hill tanks. The two partially buried tanks replaced the former open Nash Hill Reservoir in 1999. Construction of a partially redundant barrel was completed in 2008. New backpressure valves have been added to the metered connection with Wilbraham from the CVA. The CVA has a design flow capacity of around 16 mgd. The Authority will be repairing or replacing the valve actuators at Nash Hill, as well as routine maintenance on the air cans and valves along the CVA.

Table 2-5 Existing MWRA Transmission Facilities

Facility	Completed	Purpose
Quabbin Aqueduct	1932	Transports water from Quabbin to Wachusett; transports water from Ware River to either Quabbin or Wachusett Reservoirs
Chicopee Valley Aqueduct	1949	Transports water to CVA communities via the Nash Hill Reservoirs
Cosgrove Tunnel	1967	Transports water from Wachusett Reservoir to the Carroll WTP
Wachusett Aqueduct	1897	Transports water from Wachusett Reservoir to the Carroll WTP
Weston Aqueduct	1903	Standby status
Hultman Aqueduct	1940	Transports water from Carroll WTP to Norumbega Covered Storage Reservoir and on to the City Tunnel
City Tunnel	1950	From the Hultman Aqueduct to the service area
City Tunnel Extension	1963	Serving communities in the northern service area
Dorchester Tunnel	1976	Serving communities in the southern service area
Sudbury Aqueduct	1878	Standby status
MetroWest Water Supply Tunnel	2004	Delivers water to the Norumbega Covered Storage Reservoir and on to the City Tunnel

The Cosgrove Tunnel, completed in 1967, is a deep rock tunnel approximately eight miles long. Water leaving the Wachusett Reservoir passes through two hydroelectric turbines at Cosgrove Station prior to entering the tunnel. The Cosgrove Tunnel connects to the Carroll WTP. Recent projects at the Cosgrove Tunnel intake have improved security and water quality, including the installation of new building roof flood lights and a perimeter deck drain. The FY 2027 CIP notes the Cosgrove Tunnel Redundancy Project completed at $58.6M. A new inspection and subsequent design of necessary rehabilitation measures is included in the FY 2026 CIP, expected to commence in 2028.

The Wachusett Aqueduct, completed in 1897, is a gravity aqueduct that extends approximately 9 miles from the Wachusett Reservoir to the Hultman Aqueduct. With the completion of the Wachusett Aqueduct Pump Station in 2020, the Wachusett Aqueduct is again hydraulically connected to the Carroll WTP. The Wachusett Aqueduct is now a redundant system to the Cosgrove Tunnel up to 240 mgd.

The MetroWest Water Supply Tunnel (MWWST) carries treated water from the Carroll WTP to the existing City Tunnel and supplies the Norumbega Covered Storage Facility. The MWWST is 14 feet in diameter, 17.6 miles long, and 200 to 500 feet below ground surface along the alignment. Constructed to provide redundant capacity for the Hultman Aqueduct, the MWWST was completed in 2004. In May 2013 the construction was substantially complete for the interconnection of the MWWST and Hultman Aqueduct, which together convey water to the metropolitan Boston service area. Intermediate connections between the MetroWest Tunnel and the Hultman Aqueduct permit operation of segments

of either the aqueduct or the tunnel interchangeably, allowing flexibility in the maintenance of the two conduits.

The Hultman Aqueduct is a pressure aqueduct constructed in 1940. Originally constructed to convey water from the Cosgrove Tunnel and Wachusett Aqueduct to the metropolitan Boston service area, it now serves as a redundant means to convey treated water from the Carroll WTP to the metropolitan Boston service area. The Aqueduct is operated in tandem with the MWWST to provide redundancy and flexibility in supply to the metropolitan Boston service area. Portions of the Hultman Aqueduct were taken off-line in 2003 when the MWWST was completed and then completely taken out of service in 2009 when the Authority rehabilitated the entire 13.4 miles. The Aqueduct was placed back into service in 2014.

The City Tunnel, installed in 1950, is a deep-rock facility, 12 feet in diameter and the major connection to the metropolitan service area. It connects the MWWST/Hultman Aqueduct with Chestnut Hill. At Chestnut Hill, there are links to large distribution mains conveying water to several communities. A 10-foot diameter branch is the City Tunnel Extension and extends 7.1 miles from Chestnut Hill to Malden, serving most communities north of Boston. The Dorchester Tunnel, also extending from Chestnut Hill, is a 10-foot diameter, deep-rock tunnel running 6.6 miles to the Boston-Milton line at Dorchester Lower Mills. It is designed to serve the southern sections of the service area.

The Sudbury Aqueduct, also a gravity aqueduct, is currently not in use. Constructed in 1878, it extends from the Sudbury system to Chestnut Hill Reservoir.

The Weston Aqueduct, constructed in 1903, is a gravity aqueduct that supplies the Weston Reservoir and the Low Service Area. Both the Sudbury and Weston Aqueducts are retained for emergency use.

East of Shaft 5 of City Tunnel, no redundancy exists for the Metropolitan Tunnel System. The Authority is addressing this with the construction of two new water supply tunnels (Metropolitan Water Tunnel Program) within the CIP including approximately $2.2 billion in spending, making it the largest project in the 10-year planning period. The Program is currently in the design phase with the upcoming years including detailed design, continued field investigations, construction management, preparation of construction contract documents, land acquisition, tunnel boring machine power supply, and stakeholder outreach. The initial contract for Program Support Services was awarded in March 2019 with a budget of $17.5M and spanning over a nine-year period. The second contract, Preliminary Design and MEPA Review, for $15.7M was awarded in May 2020, and was completed in 2024. Work for the Final Design and Engineering Services During Construction contract began in November 2024, followed by the 2026 awards of the Construction Management Services and the Owner Representatives Services contract to support the Tunnel Program through 2040 when construction is expected to be complete.

The proposed tunnel system for the Metropolitan Water Tunnel Program consists of a northern and a southern tunnel. Both tunnels are proposed to begin in the Town of Weston, Massachusetts; the northern tunnel is proposed to extend approximately 4.5 miles to the north, and the southern tunnel is proposed to extend approximately 10 miles to the south. The construction of the South Tunnel and North Tunnel are set to begin in early 2028 and 2029, respectively. The Program is driven by a need to improve system redundancy for the aging City Tunnel, City Tunnel Extension, and Dorchester Tunnels.

The actual project cost has increased to an estimated $2.2 billion primarily due to updated costs due to inflation adjustments for Tunnel Construction North CP-1, Tunnel Construction South CP-2, Preliminary Design and MEPA Review, Construction Management, Shaft 7 Buildings Design CA/RI and Construction and the updated final cost for the Preliminary Design and MEPA Review contract. Geotechnical investigations were completed during Preliminary Design, however geotechnical uncertainties remain with rock tunneling of this magnitude. Unexpected rock conditions, fault zones, groundwater inflows, poor rock quality, or difficult shaft excavations could significantly increase tunneling costs. There are also portions of some Article 97 sites that are impacted or may be impacted depending on the final design. Permitting and public outreach associated with the project are also additional cost items. Given the magnitude of the planned investment, the Authority should continue to place a strong emphasis on cost containment and value optimization throughout implementation of the Metropolitan Water Tunnel Program.

Additionally, several interim improvements have been identified that will reduce water system transmission risk prior to the new tunnels being constructed. These include Top of Shafts Interim Improvements, Chestnut Hill Emergency Pump Station improvements, WASM/Spot Pond Supply Mains, Shaft 5 Building Improvements, PRV Improvements, and Rehabilitation of WASM 3. As of September 2026, work is under way on all these projects. Between projects included in the CIP and recommended work, the updated 2018 Master Plan identifies approximately $1.65 billion in future transmission system spending.

2.5.4 Water Pumping and Distribution

Seven water distribution service areas are used to serve Local Bodies in the metropolitan Boston area: Low, Intermediate High, Northern Intermediate High, Southern High, Northern High, Southern Extra High, and Northern Extra High Service Areas. All service areas are supplied from the aqueducts and augmented by 11 active pump stations and 12 active distribution storage facilities. To service these facilities the Authority maintains a distribution system of approximately 350 miles of pipelines, 96 percent of them ranging from 16 to 60 inches in diameter. Local Bodies are responsible for delivery of water to their customers, through approximately 6,600 miles of pipeline.

Similar to the grant/loan program to support the identification and elimination of inflow and infiltration (“I/I”) within the sewers of Local Bodies, the Authority has the Local Water System Assistance Program (LWSAP). The LWSAP provides a total of $1.025 billion (an average of about $24 million per year from FY 2001 to FY 2035) in interest-free loans to member water communities to perform water system improvement projects. Community loans are repaid to MWRA over a 10-year period beginning one year after distribution of the funds. The program's goal is to improve local water system pipeline conditions to help maintain high water quality from MWRA's treatment plant through local pipelines to customers' taps. There have been four phases of MWRA community water loans. The Phase 1 water loan program concluded in FY 2013 with $222 million in loan distributions. The Phase 2 - LWSAP concluded in FY 2025 with $209 million in loan distributions. The Phase 3 LWSAP is authorized for distributions from FY 2018 through FY 2030. The Phase 4 LWSAP is authorized for distributions from FY 2025 through FY 2035.

During the 4th quarter of FY 2026, $8.6 million in interest free loans was distributed to fund local water projects. From FY 2001 through 4th quarter of FY 2026, $640 million has been distributed to fund 606

local water system rehabilitation project in 45 MWRA member communities. Distribution of the remaining funds has been approved through FY 2035. The FY 2027 CIP includes $15.0 million in net expenditures for the local water pipeline program. In 2016, the MWRA Board of Directors approved an enhancement to the LWSAP to provide up to $100 million in 10-year zero-interest loans to communities to fully replace lead service lines. This program is referred to as the Lead Service Line Replacement Loan Program or 'Lead Replacement Program' (LRP). In FY 2025 the LRP was increased from $100 million to $200 million and now includes a 25% grant portion for projects that include replacement of the privately owned portion of the lead service line at no cost to the homeowner. From FY 2017 through the 4th quarter of FY 2026, $76 million has been distributed to fund 67 lead replacement projects in 22 MWRA member communities under the LRP.

Existing, proposed and standby storage facilities are summarized in Table 2-6. Total distribution storage is approximately 3,781.4 MG including those in emergency standby status. As part of the Integrated Water Supply Plan, the Authority constructed new covered distribution storage facilities that replaced several open reservoirs. The major facility constructed was the 115 million-gallon Norumbega Covered Storage Tank. This tank covers approximately 17 acres, and stores water that has been fully treated at the Carroll WTP. The open reservoirs that have been replaced are being kept in emergency standby status, meaning that they could be brought back into service should the need arise.

Table 2-6 Water Storage Facilities Summary

Reservoir/Tank	Capacity (mg)	Pressure Zone	Status
Arlington Covered Reservoir	2	Intermediate High	Active
Arlington Heights Standpipe	2	Northern Extra High	Active
Bear Hill Reservoir	6	Northern Intermediate High	Active
Bellevue Standpipe 1	2.5	Southern Extra High	Emergency Standby
Bellevue Standpipe 2	3.7	Southern Extra High	Active
Blue Hills Covered Storage (2 tanks)	20	Southern High	Active
Carroll WTP Clearwell	53	High Service	Active
Chestnut Hill Reservoir	522	Low Service	Emergency Standby
Deer Island Storage Tank	2	Northern High	Active
Fells Reservoir Covered Storage (3 tanks)	20	Northern High	Active
Fells Open Reservoirs No. 1 & 2	67	High Service	Emergency Standby
Framingham Reservoir No. 3	500	High Service	Emergency Standby
Loring Road Covered Storage (2 tanks)	20	Boston Low	Active
Nash Hill Covered Storage (2 tanks)	25	Chicopee Valley Aqueduct	Active
Norumbega Covered Storage (3 tanks)	115	High	Active
Norumbega Open Reservoir	204	High	Emergency Standby
Schenck's Pond	50	-	Emergency Standby
Frederick Laskey Covered Storage (2 tanks)	20	Northern Low	Active
Spot Pond Open Reservoir	1,800	Low Service	Emergency Standby
Sudbury Open Reservoir	7,200	Low Service	Emergency Standby
Turkey Hill Standpipe	2	Northern Extra High	Active
Walnut Hill Elevated Storage Tank	2	Northern Extra High	Active
Weston Open Reservoir	200	Low Service	Emergency Standby

The Authority has 11 active pumping stations to provide water to distribution areas that cannot be served by gravity alone, and one emergency pump station. An additional pump station at the Spot Pond covered storage facility was completed in 2015 to provide redundancy for the Gillis pump station and service to the Northern Intermediate and Northern High service areas. These stations are presented in Table 2-7. Between 1997 and 2010 the Authority undertook renovations of the pump stations in order to bring them up to current standards and to install instrumentation systems. Upgrades to the Commonwealth Avenue pump station were completed in 2021. The FY 2027 CIP notes that rehabilitation of the Gillis Pump Station has been completed; future rehabilitation of the Newton Street and Lexington Street pump stations, is noted in the final FY 2027 CIP.

Table 2-7 Existing MWRA Finished Water Pumping Stations

Pumping Station	Year Built/Renovated
Arlington No. 1 Brattle Court	1907/2010
Arlington No. 2 Spring Street	1958/2009
Belmont	1937/2009
Commonwealth Avenue	1999/2021
Dudley Road	1954/2008
Hyde Park	1912/2010
Lexington Street	1955/1997
Newton Street	1954/1997
Reservoir Road	1936/2010
James Gillis (at Spot Pond)	1901/2012/2013/2021
Chestnut Hill Emergency (Inactive)	2001
Frederick Laskey	2015

2.5.5 System Demand

When the Authority was established in 1985, the existing water system had been exceeding its safe yield of 300 mgd for almost 20 years. In response to the increasing water demand during the 1960s, 1970s, and 1980s, several water supply studies were undertaken by the MDC. These studies projected a demand of 410 mgd by 2020. In 1986, the Board of Directors opted to pursue demand management strategies rather than pursue options for increasing the water supply. With the help of the Local Bodies, the MWRA reduced average demand from 326 mgd in 1987 to 285 mgd in 1990, below the system's safe yield for the first time in more than 20 years. For calendar year 2025 average demand was 192 mgd.

The Authority has instituted a series of ongoing programs designed to reduce water demand. These programs include long range planning; leak detection and repair of MWRA and Local Body distribution systems; rehabilitation and replacement of MWRA and Local Body distribution system components; water metering and monitoring; distribution of residential water conservation fixtures and conservation outreach; public education and information distribution; school education; and industrial, commercial, and institutional audits.

The Authority has made projections of long-term demand trends, taking into consideration changes in the regional economy, the price of water, investments in transmission and distribution systems to

reduce leakage, and potential additional demands and local sources of supply. These forecasts indicate that demand will remain below the Waterworks System's safe yield through 2060.

2.5.6 Summary of Water System Condition and Operation

CDM Smith has visited the major facilities in the Waterworks System, and has interviewed key staff associated with the planning, design, construction and operation of the individual facilities, as well as the maintenance of those facilities. It is our opinion that the Authority's facilities are all in operable condition and are well maintained. The Authority's senior management has in place a system for assessing the adequacy of staff, equipment and both capital and maintenance needs. This includes a systematic asset management program to track maintenance activities and identify and plan for capital replacements as equipment begins to reach the end of its useful life.

3.0 Cost and Time Estimate for Recommended Improvements

The Authority has ongoing plans for significant investments in repairs, renovations and improvements to the System.

The FY 2027 CIP provides for projected expenditures of approximately $322.1 million in FY 2027 and $493.0 million in FY 2028, which is the end of the current cap period. For the subsequent planning period, FY 2029-2033, the CIP includes projected expenditures of approximately $5.0 billion. While spending levels for this period have not been formally approved or established as a spending cap, the projected investment significantly exceeds expenditures contemplated under prior CIP planning periods. The Authority currently is undertaking a capital project prioritization process to identify peak spending years, refine project sequencing, and develop a more realistic and sustainable long-term capital execution profile. In addition, the Authority's FY 2027 CEB provides funds for routine, planned maintenance as well as emergency maintenance of the System. In total, the FY 2027 CEB contains approximately $52.0 million for maintenance projects, exclusive of Authority personnel costs.

As discussed in Section 2, many of the projects contained in the CIP make provision for renovation or replacement of existing facilities where those facilities will remain in service. We believe that the major areas for improvements to the System are presented in the CIP, or are provided for in the CEB, and thus have no additional specific recommendations with respect to the System at this time. We believe that the CIP reasonably reflects capital expenditure needs and provides adequate funds to properly maintain the System.

The Wastewater CIP is projected to total $149.6 million in FY 2027 and $309.4 million in FY 2028. For the subsequent 5-year period of FY 2029-2033, the Wastewater CIP is projected to total $3.0 billion. In the past, the Authority's resources have been targeted towards legally mandated projects such as the Authority's CSO Control Plan. The Authority anticipates focusing future capital spending on asset protection, as well as spending for the Long-Term CSO Control Plan.

The Waterworks CIP is projected to total $140.8 million in FY 2027 and $159.9 million in FY 2028. For the subsequent 5-year period of FY 2029-2033, the Waterworks CIP is projected to total $2.0 billion. As the major treatment and storage projects have been completed, the Authority's Waterworks CIP appropriately emphasizes long-term redundancy, transmission, distribution and pumping. Consistent with the Authority's focus on long-term redundancy, the FY 2027 CIP includes approximately $2.2 billion, exclusive of inflation and contingencies, in spending to address redundancy improvements for the Metropolitan Tunnel System.

Contingency amounts are included as part of an Authority-wide contingency fund. The capital budget contingency is set at seven percent of the annual expenditures for all Waterworks and Wastewater capital projects, except for all tunnel-related projects for which the contingency is set at fifteen percent. The higher contingency for tunnel related projects reflects the relatively riskier construction associated with tunnel construction. We believe this represents a reasonable approach to contingency budgeting.

Based on our review of the Authority's facilities, our understanding of the regulatory requirements, the Authority's Consent Orders, and our professional judgment, we believe that the Authority is targeting appropriate projects in the CIP, and that the process for updating the CIP is adequate.

As the Authority develops specific plans for expenditure of monies for repair and maintenance from the CEB, we believe that highest priority should be given to those projects that will protect the health and safety of workers, and to those which serve to preserve the Authority's ability to deliver an adequate supply of potable water and to provide waste treatment consistent with prudent public health practices. Table 3-1 shows the breakdown of capital expenditures by Wastewater and Waterworks CIP category as contained in the FY 2027 CIP, with a breakdown of the full contract values and the expenditures completed as of the end of FY 2025.

Table 3-1 FY 2027 CIP Summary

Project	Contract Amount In Thousand Dollars	Remaining Balance as of 6/30/25
Total MWRA	**$14,543,471**	**$9,103,087**
Wastewater System Improvements	**$8,490,436**	**$5,835,883**
Interception & Pumping		
102 Quincy Pump Facilities	$25,907	$0
104 Braintree-Weymouth Relief Facilities	$250,553	$4,860
105 New Neponset Valley Relief Sewer	$30,300	$0
106 Wellesley Ext Replacement Sewer	$64,359	$0
107 Framingham Extension Relief Sewer	$47,856	$0
127 Cummingsville Replacement Sewer	$8,999	$0
130 Siphon Structure Rehabilitation	$29,765	$26,233
131 Upper Neponset Valley Sewer System	$54,174	$0
132 Corrosion & Odor Control	$140,112	$65,726
136 West Roxbury Tunnel	$53,456	$43,014
137 Wastewater Central Monitoring	$30,982	$11,056
139 South System Relief Project	$4,939	$1,500
141 Wastewater Process Optimization	$8,310	$6,111
142 Wastewater Meter System - Equip Replace	$21,057	$9,126
143 Regional I/I Management Planning	$169	$0
145 Facility Asset Protection	$1,366,097	$1,172,578
146 DI Cross Harbor Tunnel	$5,000	$5,000
147 Randolph Trunk Sewer Relief	$698	$698
Total Interception and Pumping	**$2,142,734**	**$1,345,901**
Treatment and Residuals		
182 DI Primary and Secondary Treatment	($958)	$0
200 DI Plant Optimization	$33,279	$0
206 DI Treatment Plant Asset Protection	$3,557,334	$3,137,768
210 Clinton WWTP	$93,051	$72,770
211 Laboratory Services	$2,212	$0
261 Residuals	$63,811	$0
271 Residuals Asset Protection	$323,515	$306,388
Total Treatment and Residuals	**$4,072,243**	**$3,516,927**

Project	Contract Amount In Thousand Dollars	Remaining Balance as of 6/30/25
Combined Sewer Overflow Program		
MWRA Managed		
339 North Dorchester Bay & Reserve Channel	$221,510	$0
347 East Boston Branch Sewer Relief	$85,637	$0
348 BOS019 Conduit	$14,288	$0
349 Chelsea Trunk Sewer	$31,664	$0
350 Union Park Detention Treatment Facility	$49,583	$0
353 Upgrade Existing CSO Facilities	$22,385	$0
354 Hydraulic Relief Projects	$7,542	$5,112
355 MWR003 Gate & Siphon	$4,424	$0
357 Charles River CSO Controls	$214,673	$211,040
Total MWRA Managed CSO	**$651,705**	**$216,152**
Community Managed		
340 S. Dorchester Bay Sewer Separation (Fox Point)	$55,029	$0
341 S. Dorchester Bay Sewer Separation (Commercial Point)	$61,440	$0
342 Neponset River Sewer Separation	$2,492	$0
343 Constitution Beach Sewer Separation	$3,731	$0
344 Stony Brook Sewer Separation	$364,496	$320,177
346 Cambridge Sewer Separation	$293,483	$188,931
351 BWSC Floatables Controls	$946	$0
352 Cambridge Floatables Controls	$1,127	$0
355 MWR003 Gate & Siphon	$52,257	$52,257
356 Fort Point Channel Sewer Separation	$23,389	$0
358 Morrissey Boulevard Drain	$32,181	$0
359 Reserved Channel Sewer Separator	$70,524	$0
360 Brookline Sewer Separation	$24,715	$0
361 Bulfinch Triangle Sewer Separation	$9,032	$0
362 East Boston CSO Control	$2,182	$0
324 CSO Support	$65,115	$7,522
Community Managed CSO and CSO Support	**$1,062,138**	**$568,887**
Other Wastewater		
128 I/I Local Financial Assistance	$561,335	$188,016
138 Sewerage System Mapping Upgrade	$281	$0
Total Other Wastewater	**$561,616**	**$188,016**
Waterworks System Improvements	**$5,802,145**	**$3,174,706**
Drinking Water Quality Improvements		
542 Carroll Water Treatment Plant	$455,445	$24,354
543 Quabbin Water Treatment Plant	$19,973	$0
544 Norumbega Covered Storage	$106,674	$0
545 Blue Hills Covered Storage	$40,083	$0
550 Spot Pond Covered Storage Facility	$60,126	$0
555 Carroll Water Treatment Plant Asset Protection	$77,268	$70,049
Total Drinking Water Quality Improvements	**$759,569**	**$94,404**
Transmission		
597 Winsor Station Pipeline	$74,330	$66,756
601 Sluice Gate Rehabilitation	$9,158	$0

Project	Contract Amount In Thousand Dollars	Remaining Balance as of 6/30/25
604 MetroWest Tunnel	$710,670	$13,488
615 Chicopee Valley Aqueduct Redundancy	$8,666	$0
616 Quabbin Transmission System	$47,482	$12,733
617 Sudbury/Weston Aqueduct Repairs	$18,293	$13,423
620 Wachusett Reservoir Spillway Improvements	$9,287	$0
621 Watershed Land	$34,000	$4,500
622 Cosgrove Tunnel Redundancy	$58,619	$0
623 Dam Projects	$12,303	$3,514
625 Metropolitan Water Tunnel Redundancy	$2,183,936	$2,125,627
628 Metropolitan Redundancy Interim Improvements	$257,477	$160,885
630 Watershed Division Capital Improvements	$31,678	$28,285
Total Transmission	**$3,455,899**	**$2,429,211**
Distribution and Pumping		
618 Peabody Pipeline Project	$1,448	$0
677 Valve Replacement	$12,016	$0
678 Boston Low Service - Pipe & Valve Rehabilitation	$23,691	$0
683 Heath Hill Road Pipe Replacement	$19,358	$0
689 James L. Gillis Pump Station Rehab	$33,419	$0
692 Northern High Service (NHS) - Section 27 Improvements	$2,136	$2,013
693 NHS - Revere & Malden Pipeline Improvements	$174,144	$135,186
702 New Connecting Mains - Shaft 7 to WASM 3	$107,512	$43,406
704 Rehabilitation of Other Pumping Stations	$51,572	$21,482
706 NHS - Connecting Mains from Section 91	$2,360	$0
708 Northern Extra High Service (NEH) - New Pipelines	$85,941	$63,906
712 Cathodic Protection of Distribution Mains	$8,515	$7,355
713 Spot Pond Supply Mains Rehabilitation	$81,033	$15,131
714 Southern Extra High Sections 41 & 42	$3,657	$0
719 Chestnut Hill Connecting Mains	$60,452	$42,165
720 Warren Cottage Line Rehabilitation	$1,205	$0
721 Southern Spine Distribution Mains	$128,978	$90,263
722 Northern Intermediate High (NIH) Redundancy & Storage	$160,919	$52,273
723 Northern Low Service Rehabilitation - Section 8	$68,982	$63,425
725 Hydraulic Model Update	$598	$0
727 Southern Extra High (SEH) Redundancy and Storage	$179,117	$114,023
730 Weston Aqueduct Supply Mains (WASM)	$80,403	$0
731 Lynnfield Pipeline	$5,626	$0
732 Walnut St. & Fisher Hill Pipeline Rehabilitation	$2,717	$0
735 Section 80 Rehabilitation	$30,848	$28,924
Total Distribution and Pumping	**$1,326,647**	**$679,550**
Other Waterworks		
753 Central Monitoring System	$46,719	$5,606
763 Distribution Systems Facilities Mapping	$3,008	$1,252
764 Local Water Infrastructure Rehabilitation	$7,488	$0
765 Local Water Pipeline Assistance Program	$39,166	($182,243)
766 Waterworks Facility Asset Protection	$163,649	$146,926
Total Other Waterworks	**$260,030**	**($28,458)**

Project	Contract Amount In Thousand Dollars	Remaining Balance as of 6/30/25
Business and Operations Support	**$250,890**	**$92,498**
881 Equipment Purchase	$43,121	$13,370
925 Technical Assistance	$0	$0
930 MWRA Facility - Chelsea	$9,812	$0
931 Business Systems Plan	$24,562	$0
932 Environmental Remediation	$1,479	$0
933 Capital Maintenance Planning & Development	$48,498	$22,315
934 MWRA Facilities Management & Planning	$23,101	$2,692
935 Alternative Energy Initiatives	$47,592	$29,408
940 Application Improvement Program	$25,465	$11,736
942 Information Security Program (ISP)	$5,393	$2,292
944 IT Management Program	$2	$0
946 IT Infrastructure Program	$21,866	$10,684

Note: Totals may not add due to rounding.

4.0 Adequacy of the Renewal and Replacement Reserve Fund, Operating Reserve Fund and Operating and Capital Budget

The purpose of this section is to evaluate the Adequacy of the Renewal and Replacement Reserve Fund, Operating Reserve Fund, Operating Budget and Capital Budget of the Authority. The Authority also has an Insurance Reserve Fund; however, the Authority has a specialized insurance consultant review the adequacy of that Fund.

4.1 Renewal and Replacement Reserve Fund Requirement

Under section 714(c) of the Resolution, the Consulting Engineer must make its recommendation as to the adequacy of the Renewal and Replacement Reserve Fund Requirement.

The current Renewal and Replacement Reserve Fund (the "R&R Reserve Fund") Requirement is $35 million. The Authority maintains a cash balance of $10 million, with the remaining $25 million balance met through any short-term loan capacity, such as commercial paper or a committed line of credit. As of the end of FY 2026, the fund balance meets the Fund Requirement. The purpose of the Renewal and Replacement Reserve Fund is to pay the costs of construction of projects that have not been provided for in the Construction Fund or the Operating Fund, and which are reasonably necessary for the continued operation of the System and maintenance of revenues. Projects of this nature will generally be classified as emergency repairs of a major nature, as the CEB already contains provisions for regular recurring maintenance activities, and minor emergency repairs.

The establishment of a recommended value for the R&R Reserve Fund is not amenable to precise analysis. Several reviews of the practices of various water and wastewater utilities across the country have shown a variety of techniques are used to size such funds. These range from establishing the reserve at some percentage of the current year's renewal and replacement expenditures, to establishing the reserve at some fraction of the net asset value of the applicable system.

The R&R Reserve Fund is intended to provide the Authority with sufficient financial resources so that it can undertake emergency projects expeditiously, without being forced into a financing plan at times, or in ways, that may be disadvantageous to the Authority. For example, the R&R Reserve Fund should be of sufficient size to avoid the need to immediately change planned capital expenditures in a way that displaces otherwise necessary projects. Also, it should be of sufficient size so that the Authority is not forced into the financial markets at times that are disadvantageous to the Authority. The size of the R&R Reserve Fund should thus be large enough so that repair of major facilities can be commenced and continue for a period of several months without significant changes to the Authority's planned capital program.

The size of such a fund necessary to sustain several months of construction without hampering the Authority's ongoing capital plan can be evaluated by an analysis of the annual cash requirements of the Authority's current and historical capital projects. This supposes that draws on the R&R Reserve Fund will be similar in nature to those originally experienced in constructing the facilities. Using information from the FY 2027 CIP, the largest annual cash requirement for any project in the current CIP related to renewal and replacement for FY 2027 is $30 million, for Phase 2 of the Clarifier Rehabilitation project. The majority of annual cashflows are, however relatively small, with just 2 contracts related to rehabilitation having projected FY 2027 expenditures over $10 million. Under all but the most drastic of circumstances it is unlikely that the Authority would experience a need to draw on over $35 million of R&R Reserve Fund balances in any one year.

The R&R Reserve Fund is also intended to enable the Authority to undertake emergency repairs, in the event no other funding is available. Over the past, three years, the largest emergency repairs had costs of less than $750,000. Historically, following emergency repairs, the Authority has been able to incorporate permanent repairs into its capital program, if required.

The appropriate size of the R&R Reserve Fund is also influenced by the Authority’s robust asset management program that has been established and identifies the funding required to replace or rehabilitate equipment at or near the end of its useful life reducing the probability of catastrophic failures and the frequency of emergency repairs.

In addition, if the Authority were an infrequent borrower in the capital markets, it would be important to have a relatively larger R&R Reserve Fund, to provide flexibility regarding the timing of issuing debt to fund repairs. However, the Authority has been, and will continue to be, a frequent issuer of debt giving it an ability to obtain capital to meet replacement needs should available fund balances be insufficient. Moreover, the Authority has available to it a tax-exempt commercial paper program that can provide rapid access to short term funds. In practice, the Authority maintains a minimum available capacity of approximately $50 million against the upper limit of its tax-exempt commercial paper authorization. The Authority also seeks to maintain a minimum balance of $30 million in its construction fund, providing additional flexibility.

Given the above factors, it is our opinion that the $35 million R&R Reserve Fund Requirement is adequate for the purposes intended.

4.2 Operating Reserve Fund

The Resolution establishes an Operating Reserve Fund, with a requirement that the reserve be equal to one sixth of the operating budget of the Authority. At the beginning of FY 2027, the Operating Reserve Fund balance was $61.7 million, meeting the fund balance requirement. The purpose of the Operating Reserve Fund is to provide contingency funds in the event of unanticipated expenditures for operation and maintenance. In addition to the Operating Reserve Fund, the Resolution requires that the Operating Fund established under the Resolution carry, at the beginning of each month, an amount equal to the projected expenditures for the next three months. These monies can serve as a working capital allowance, as well as sources of short-term funds in extraordinary circumstances.

By comparison, the amounts of operating contingency funds typically carried by other major utilities range from 30 days of expected system expenditures to two months of operating expenses.

The level of such reserves is sometimes tied directly to the predictability of the revenues of the system, with reserves being higher in regions where supply deficits may seriously curtail sales, and hence revenues. In such instances the operating reserves serve as a contingency against both unanticipated increases in expenses and shortfalls in revenues.

The sufficiency of the Operating Reserve Fund requirement is a function of the uses to which it might be put, other contingency funds available to the Authority for operating purposes, and the predictability of revenues flowing from the application of the Authority's rates and charges. Based upon our review of the operating expenses of the Authority, the monies in the Operating Reserve Fund are sufficient to cover any reasonable unanticipated operating event. Moreover, because the Authority's rates and charges are applied retroactively (the assessments against any particular Local Body are a function of this fiscal year's budget and last fiscal year's use of the System) and are thus known with precision, there is little probability that shortfalls in sales, owing, for example to supply deficits, will directly impact the revenues of the Authority. Because the Authority has the ability to intercept state aid for most Local Bodies, there is little probability of a continued shortfall of revenues. The Authority does, however, need reserves to provide for increased expenses or revenue shortfalls. It is our opinion that the Operating Reserve Fund Revenue Requirement is adequate for these purposes.

4.3 Current Expense Budget

The Authority is required, under Section 8 of the Enabling Act, to adopt an annual budget for its current expenses. The budget must be provided to the Advisory Board for comment and recommendation not less than 60 days prior to its adoption. Amendments to the budget may be made during the year, provided the Advisory Board is provided a copy of revisions not less than 30 days prior to the adoption of the modifications.

The process for the development of the budget generally begins in September of each year, when initial budget targets, guidelines and procedures are distributed. From September through January the budget undergoes internal development by divisional managers, budget analysts and senior management. Budgets for individual programs within the divisions are developed based on a combination of information from prior years, current budgetary targets and the CIP. The CIP budget process requires that each project include an estimate of the impact of the project on the operating budget.

The Authority then transmits the proposed current expense budget to the Advisory Board in February. In April the Authority holds public hearings on the budget and in May receives comments and recommendations from the Advisory Board. In June of each year, or earlier the Board of Directors adopts the final current expense budget for the next fiscal year.

For FY 2027, the CEB provides for approximately $943.1 million in gross current expenses, net of debt service assistance received in FY 2026. Historically, the Authority has successfully operated below its budgeted amounts.

Based on our review of the FY 2027 CEB, we are of the opinion that the budget is adequate for the continuance of the System in sound operating condition. Following the adoption of the CEB, the Authority produces monthly reports comparing actual spending to budget and produces a comprehensive report which presents CEB spending and variances from budgeted expenditures.

4.4 Capital Improvement Budget

The Resolution requires that the Authority prepare an annual CIP, covering a five-year period and a capital improvement budget for the projects to be undertaken in the first year of the five-year period. The CIP must identify the projects to be carried out, and the costs and period of construction of these projects. The capital improvement budget must also show the sources of money projected to be available to meet the budgeted expenditures.

Because of the size and complexity of the Authority's construction program, the development and maintenance of the CIP is a continuous process within the Authority. Initial steps in the development of the capital budget are undertaken early in the prior fiscal year, with the distribution of various planning and budgeting forms and instruction. During the period of July through December, divisional staff, capital budget staff and senior management review proposed projects, evaluate sources of funding and develop a preliminary CIP for transmittal to the Board and thence to the Advisory Board. During January through March, the Advisory Board reviews the proposed CIP and makes comments and recommendations to the Authority, following which the Board holds public hearings on the proposed CIP. Typically, the Board generally adopts a final CIP in June for the subsequent five fiscal year period, having taken various comments on the draft documents into consideration. Following the adoption of the CIP, the Authority produces monthly reports comparing capital spending to budget and produces a comprehensive report every six months which presents capital improvement progress and variances from budgeted expenditures.

As described in Section 3, the FY 2027 CIP provides for estimated capital expenditures of $322.1 million in FY 2027 and $493.0 million in FY 2028. The Authority’s 5-year cap currently is for the FY 2024-2028 period, with the FY 2027 CIP indicating the Authority spending for the current cap period is projected below the baseline cap set in FY 2024. The Authority’s next 5-year period will encompass FY 2029-FY 2033. Based on the CIP, the Authority estimates capital expenditures of $5.0 billion over that timeframe. Given the planned growth of spending during this period, the Authority is actively evaluating the timing and prioritization of future capital projects to develop a more balanced and sustainable long-term capital execution profile.

Based on our review of the FY 2027 CIP, the needs of the System with respect to renovation and redundancy, and the regulatory requirements imposed on the System, we are of the opinion that the current CIP adequately provides for the proper and efficient operation of the System, although the timing and prioritization of many projects planned within the next five years will be spread over the next decade.

5.0 Adequacy of Rates, Fees, Rentals and Other Charges

5.1 Introduction

Our financial evaluation and projections are based on a review of the Authority's financial statements and various budget documents, current, proposed, and historical, as well as the Authority's financial projections. Our analysis is based on the following documents and data sources: the Authority's financial statements, the Authority's actual operating results through FY 2026, the FY 2027 CEB, the FY 2027 CIP, the most recent Master Plan, and the Authority's projections of grant receipts, escrows, and participation in the Massachusetts Clean Water Trust SRF loan program (the "SRF"). Consistent with the Authority's rate management strategy, these projections assume the Authority continues its practice of smoothing its rate increases, including by making additional debt service prepayments. See Section 5.4.1, below. We believe that this is a conservative and reasonable approach to developing the projections contained herein.

We have reviewed the Authority's projected revenue requirements for the current fiscal year (FY 2027) and the following five-year forecast period (FY 2028 to FY 2032), assessing present expenditures, anticipated schedules for capital improvements, the Authority's FY 2027 CIP and FY 2027 CEB and the covenants of the Resolution.

The purposes of this section are to:

- Project Authority expenses for FY 2028 through FY 2032.
- Project non rate revenues for the same period.
- Project rate increases for FY 2028 through FY 2032.
- Assess the impacts of such rate increases on customers.
- Evaluate the Authority's compliance with various Resolution covenants.

The projections contained in this Report reflect assumptions regarding the schedule, timing and cost of certain key capital projects as set forth in the FY 2027 CIP. Modifications to the timing and costs of those projects will impact the projections and potentially the conclusions contained herein.

5.2 Key Assumptions

This section describes the key assumptions that have been used by the Authority in developing its own projections which are the basis of the projections contained herein. CDM Smith has reviewed the Authority's assumptions and believes that they are reasonable for developing these financial projections. These projections consider the data and information described above, assumptions regarding economic conditions, Authority policies and spending practices, and the Authority's most recent financings. These projections consider Authority-developed projections on the use of debt defeasances and tax-exempt commercial paper ("TECP"). The projections are developed such that the Authority's projected revenues and expenses meet the various requirements of the Resolution.

As described in the following subsections, the Resolution requires the Authority to comply with two rate covenants regarding the adequacy of rate revenue. The covenants require that the Authority generate sufficient revenue to meet all annual revenue requirements, including operation and maintenance expenses, pro rata debt service fund deposits, and reserve fund requirements. In addition, the Authority is mandated to provide revenue available for debt service payments in each fiscal year equal to the sum of the Primary and Secured Bond Coverage Ratios. The key assumptions and inputs used for these projections include:

- Future senior debt for FY 2027 is assumed to be 25-year debt, with an interest rate of 5.0 percent. After FY 2027, future senior debt is assumed to be 30-year debt, with an interest rate of 6.0 percent for subsequent fiscal years. Variable-rate debt is assumed to carry an interest rate of 4.0 percent in FY 2027 and all subsequent fiscal years.
- SRF loans will carry an effective interest rate of 2.15 percent with a 20-year term for FY 2027 and all subsequent fiscal years.
- Capital costs are projected to inflate at an average annual rate of 2.5 percent for projects not yet under contract. It should be noted that changes to this assumption will not have a significant impact on the Authority's projected increases in total expenses over the forecast period but will have a greater impact over the long term.
- Labor costs are projected to inflate at an average annual rate of 2.7 percent for all future years. Insurance costs are projected to inflate at an average annual rate of 4.0 percent for all future years. Other operating and maintenance costs for existing facilities generally are projected to inflate at an average annual rate of 3.0 percent for all future years. Incremental operations and maintenance cost savings resulting from completed capital improvements during FY 2027 to FY 2032 are projected to have a modest impact on the Authority's total operating expenses.
- Capital spending is based on the FY 2027 CIP, and it is assumed that the Authority's expenditure rate will average 85 percent of the budgeted cash expenditure rate. However, two-thirds of the deferred expenditures are expected to be spent three years later. Thus, the amount deferred in FY 2027 is added to FY 2030 anticipated CIP expenditures.
- The Authority's projections include receipt of $1,234,567 in Commonwealth debt service assistance, applied to FY 2027. The projections assume no debt service assistance will be received for future years.
- These projections assume that the Authority utilizes Rate Stabilization funds of $782,000 in FY 2028, $740,000 in FY 2029, $140,000 in FY 2030, $12,000 in FY 2031. No use of Rate Stabilizations funds are assumed in FY 2032.

5.3 Rate Revenue Requirements

In describing the projected rate revenue requirements as shown in Tables 5-1 through 5-3, we have followed the Authority's CEB format with expenditures classified as direct, indirect and capital financing. Non rate revenue is then applied against total expenses to determine the Authority's rate revenue requirement for a fiscal year.

5.3.1 Direct Expenses

Projected direct expenses are summarized in Table 5-1 and discussed in the following sections. Direct expenditures are projected to increase from approximately $352.3 million in FY 2027 to approximately $405.3 million in FY 2032, an average annual increase of 2.8 percent. These projections reflect the costs of operating and maintaining the Systems, as well as the net incremental savings associated with new facilities and projects that the Authority anticipates becoming operational during this time.

The increase in direct expenses largely reflects the anticipated inflationary increases in labor and other operating costs. Labor costs reflect a $10.5 million reduction as a vacancy adjustment for unfilled positions. The chemical expenses include $507,000 for the chemicals that will be required to comply for the anticipated Deer Island NPDES Permit which is projected to have more stringent requirements for enterococcus treatment compliance. CDM Smith does not believe that the issuance of a new permit and associated costs that would be incurred over the forecast period is likely to have a material impact on these projections.

Sewer Fund direct expenses, as presented in Table 5-1, includes allocated administrative expenses but excludes the Clinton Wastewater Treatment Plant expenses. (The Clinton Wastewater Treatment Plant is treated as a Waterworks Fund expense because the facility was constructed to mitigate the impact of certain Waterworks System facilities). Sewer Fund direct expenses are projected to increase at an average annual rate of approximately 2.8 percent from FY 2027 to FY 2032. Projected net incremental savings on Sewer Fund direct expenses from capital improvements are included through FY 2032.

Administrative and support expenses are allocated between the Waterworks Fund and the Sewer Fund, based on the total direct annual costs in each Fund. Approximately 62 percent of allocable direct administrative expenses were assigned to the Sewer Fund for FY 2027, and that assumption is carried forward through the forecast period.

The Waterworks Fund direct expenses are projected to increase at an average annual rate of approximately 2.8 percent between FY 2027 and FY 2032. The Waterworks Fund expenses include Clinton Wastewater Treatment Plant costs and allocated administrative expenses (approximately 38 percent of the total administrative expenses). Projected net incremental costs on Water Fund direct expenses from capital improvements are included through FY 2032.

Table 5-1 Budgeted and Projected Direct Expenses, By Fund, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Sewer Fund Direct Expenses[1]	$235,611	$242,839	$249,252	$256,319	$263,592	$271,072
Waterworks Fund Direct Expenses[2]	$116,665	$120,072	$123,450	$126,933	$130,402	$134,198
Total Direct Expenses	**$352,277**	**$362,911**	**$372,702**	**$383,252**	**$393,995**	**$405,271**

[1]Includes Sewer Division, sewer portions of the Field Operating Division and allocated Engineering and Construction, Laboratory Service and Administrative. Excludes Clinton Wastewater Treatment Plant.

[2]Includes Waterworks Division, water portions of Field Operating Division, the Clinton Wastewater Treatment Plant and allocated Engineering and Construction, Laboratory Services and Administrative.

Note: Totals may not add exactly due to rounding.

Table 5-2 presents a breakdown of the Authority's projected combined direct expenses, by expense category. These expenses are presented by CEB line item for the period FY 2027 through FY 2032. Excluding capital financing expenses, labor costs are the Authority's largest line-item expense representing 52.0 percent of total direct expenses over the projection period and are projected to increase from $183.9 million in FY 2027 to $210.1 million in FY 2032. Labor costs are expected to increase at an average annual increase of 2.7 percent over the period between FY 2027 and FY 2032.

Table 5-2 Budgeted and Projected Direct Expenses, By Category, FY 2027-2032 ($ in 000's)

Category	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Labor	$183,883	$188,847	$193,946	$199,183	$204,561	$210,084
Chemicals	$19,804	$20,398	$21,010	$21,640	$22,289	$22,958
Utilities	$35,983	$37,062	$38,174	$39,325	$40,460	$41,627
Maintenance & Materials	$60,121	$62,439	$63,782	$65,696	$67,666	$69,696
Services	$52,487	$54,165	$55,790	$57,409	$59,019	$60,905
Total Direct Expenses	**$352,277**	**$362,911**	**$372,702**	**$383,252**	**$393,995**	**$405,271**

Note: Totals may not add exactly due to rounding.

Chemical costs account for approximately 5.6 percent of direct expenses and are estimated to increase at an average annual rate of 3.0 percent between FY 2027 and FY 2032, reflecting assumed inflation for future costs. The Authority is including approximately $507,000 for chemicals that will be required to comply with the new NPDES permit for the DITP.

Utilities, which represent approximately 10.2 percent of direct expenses, are expected to increase at an average annual rate of 3.0 percent between FY 2027 and FY 2032, reflecting the Authority's fixed price energy agreements, as well as most recent pricing outlook and trends in fuel and electricity market prices and planned usage. Maintenance and materials, which represent 17.1 percent of direct expenses over the projection period, are projected to increase at an average annual rate of 3.0 percent from FY 2027 to FY 2032. Services represent 15.0 percent of the direct expenses, which include approximately $4.7 million in FY 2027 for potential landfill disposal costs if required by future PFAS regulations. Services are projected to increase at an average annual rate of 3.0 percent over the projection period.

5.3.2 Indirect Expenses

Indirect expenses for FY 2027 through FY 2032 are summarized in Table 5-3. Indirect expenses include several cost items that reflect financial commitments by the Authority that are not directly controlled by their operating divisions. As an example, the Authority has agreed to compensate certain Local Bodies (Quincy and Winthrop) for the adverse impacts caused by the construction and operation of facilities located in those communities. These mitigation payments are financial obligations of the Authority and are allocated specifically to the Sewer System.

Table 5-3 Budgeted and Projected Indirect Expenses, FY 2027-2032 ($ in 000's)

Category	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Insurance[2]	$4,943	$0	$0	$0	$0	$0
Watershed/PILOT	$36,576	$37,673	$38,804	$39,968	$41,167	$42,402
HEEC Harbor Cable	$6,660	$6,028	$5,817	$5,607	$5,398	$5,190
Mitigation	$1,916	$1,964	$2,013	$2,063	$2,115	$2,168
OPEB	$5,404	$5,816	$5,792	$5,735	$5,641	$5,500
Reserves Additions	$4,009	$2,159	$2,885	$2,713	($3,721)[1]	$1,930
Pension Fund Deposits	$28,410	$34,665	$42,346	$48,231	$15,321	$15,781
Total Indirect Expenses	**$352,277**	**$362,911**	**$372,702**	**$383,252**	**$393,995**	**$405,271**

[1]No contributions projected for FY 2031.

[2]Insurance payments reported at zero due to budgeting error. See narrative below regarding insurance for further information.

Note: Totals may not add exactly due to rounding.

The major indirect expenses are:

- **Insurance**: The Authority purchases property and casualty insurance from external insurance carriers and self-insures for significant levels of property and general liabilities. During the FY 2027 budgeting process, insurance payments for future years were inadvertently omitted. The Authority intends to correct this error in the FY 2028 budgeting process. Given the modest amount of this cost relative to the overall expense budget and in light of the Authority's conservative budgeting practices, including the use of operating surpluses, discretionary payments and conservative financing assumptions, the Authority does not believe the inclusion of this expense in future years will have a material impact on projected future rate revenue requirements.
- **Watershed/PILOT**: The Enabling Act requires the Authority to pay the Commonwealth for two obligations. The first obligation is to reimburse the Commonwealth for the operating costs and debt service associated with land acquisitions of the DCR's Division of Water Supply Protection. The Authority prepaid the remaining debt service costs associated with the land acquisition in FY 2016, from the operating surplus. The second obligation is to make payments in lieu of taxes ("PILOT") to each city or town with land located in the Authority's watersheds. PILOT payments are revalued every two years, the most recent occurring in FY 2026. The Authority's projections assume that PILOT payments will increase 3.0 percent annually from FY 2027 through FY 2032. CDM Smith believes the Authority's approach is appropriately conservative for these purposes.
- **Cable and Substation Lease**: NSTAR Electric Company (successor to Boston Edison Co. and now doing business as Eversource) together with Harbor Electric Energy Company ("HEEC"), an NSTAR subsidiary, completed installation of a cross-harbor power cable and built a power substation in 1990-1991 to supply electric power for the construction and operation of the DITP.

The Authority paid HEEC's capital investment for the cross-harbor electrical cable over a 25-year schedule governed by a written agreement, with contractual obligations ending in FY 2015. At the end of the term of that agreement, HEEC petitioned the Massachusetts Department of Public Utilities to establish a tariff formalizing the terms for continued supply of power to the DITP. The Authority fully participated in that 2015 tariff proceeding and engaged with HEEC in a rate setting process to update that tariff and to incorporate the terms of a May 2017 agreement whereby HEEC was required to install and MWRA was required to pay for a replacement power cable. The cable replacement was required to allow for dredging of Boston Harbor to accommodate deep draft ship berths. The replacement cable was placed in service in August 2019. Additional costs related to the replacement cable were incurred starting in FY 2020. The FY 2027 CEB includes the latest cost estimates available. The Authority allocated $6.5 million in FY 2018 for a HEEC cable capacity reserve fund, which was deposited to the Rate Stabilization Fund.

- **Mitigation**: The Authority is party to an agreement that requires the Authority to make payments to the Town of Winthrop to ameliorate the adverse physical, social, and economic impacts of the DITP. The Authority also has a mitigation agreement with the City of Quincy that requires the Authority to make payments for police, fire, and other municipal services for several Authority water and sewer facilities located in Quincy. Those payments are projected to total approximately $1.9 million in FY 2027. The mitigation agreements with the two municipalities were renewed in FY 2025 with a 10-year term.
- **Additions to Reserves**: The Authority is required by the terms of the Resolution to maintain reserve funds for operations, insurance, and renewal and replacement. These reserves are incrementally funded each year, as necessary, to bring them to stipulated levels. These are discussed in more detail in the following section.
- **Pension Fund Contribution**: The Authority's methodology for assessing retirement liability is to comply with Chapter 32 of the Massachusetts General Laws, although the Authority's current policy is to reach full funding by the end of FY 2030. For FY 2027, the Authority intends to contribute $28.4 million to the Pension Fund. This is comprised of a $21.9 million required contribution based on the January 2026 actuarial evaluation and an additional $6.5 million to assist with reaching full funding. In addition to the projected required contributions for FY 2028, FY 2029, and FY 2030, the Authority's projected contribution schedule includes additional deposits of $8.5 million, $11.1 million, and $11.1 million, respectively. The Authority has funded 87.2 percent of its pension liability and is projected to be fully funded by June 30, 2030.
- **Other Post-Employment Benefits**: The Authority adopted GASB 45, which requires accounting and reporting of post-employment benefits other than pensions ("OPEB"). In 2015, the Authority created the Massachusetts Water Resources Authority Irrevocable Other Post-Employment Benefits Trust (the "OPEB Trust") to meet its OPEB liability. Under the Authority's current plan, the Authority anticipates depositing between $5.4 and $5.8 million in each year of the forecast period, but this may change based on the anticipated review of pension fund contributions. As of the end of June 2026, the OPEB Trust had a balance of $107.1 million, approximately 54 percent funded. Since FY 2018, GASB 75 is the prevailing guidance for OPEB contributions, and the Authority follows that guidance.

5.3.3 Reserve Funds

The Authority is required by the Resolution to meet funding requirements for certain funds. The Authority is required to maintain an Operating Reserve Fund to be used in the event of unexpected or extraordinary fluctuations in monthly operation and maintenance expenses. The Authority is required to have on deposit in the Operating Reserve Fund at the end of each fiscal year an amount equal to one-sixth of that fiscal year's operating expenses. (Operating expenses are the total of direct and indirect expenses found in Tables 5-2 and 5-3, less the amounts expended for Watershed/PILOT, Reserve additions, and OPEB Trust contributions).

At the end of FY 2026, the Operating Reserve had a balance of $61.7 million. Accordingly, the FY 2027 CEB includes contributions of $4.0 million, $2.2 million, $2.9 million, and $2.7 million anticipated to maintain the required balance for FY 2027 through FY 2030, respectively. No contribution is projected for FY 2031. A contribution of $1.9 million is anticipated for FY 2032.

The Resolution requires the Authority to fund an Insurance Reserve Fund to a level confirmed by a qualified insurance consultant. The Insurance Reserve Fund was last reviewed by the Insurance Consultant in March 2026 and the Consultant confirmed that a balance between $9 million and $13 million would be appropriate. The Insurance Reserve Fund has a balance of approximately $14 million; the Authority expects the fund balance to remain level at the high end of the recommended range throughout the forecast period. The Insurance Reserve Fund Requirement has not been independently reviewed or evaluated by CDM Smith.

The Resolution also requires the Authority to fund a Renewal and Replacement Reserve Fund, based on the recommendations of the Consulting Engineer. The Renewal and Replacement Reserve Fund is established to pay the costs of emergency repairs or capital improvements to the Systems when funds are not available in either the Construction Fund or the Operating Fund. Projects financed from the Renewal and Replacement Reserve Fund must be necessary to ensure the continual operation of the Systems, and not previously identified to be financed from the Operating Fund. The Renewal and Replacement Reserve Fund requirement is presently established at a total of $35 million. It is recommended that the funding requirement remain at $35 million level, as discussed in Section 4 of this report. The Resolution, as amended, requires the Authority to maintain a minimum cash balance of $10 million in the Renewal and Replacement Reserve Fund. The remaining balance will be met through unused capacity in the Short-term borrowing program (TECP and Revolving Loan). Based on the current funding requirement, no additional deposits are projected to be required over the forecast period.

The Authority has in the past and may in the future pre-fund required reserve fund deposits.

5.3.4 Capital Spending

The projected capital spending for FY 2027 through FY 2032 is presented in Table 5-4, based on the FY 2027 CIP. The capital expenditures presented in this table are presented on a cash basis and represent the anticipated actual expenditures for various projects. The projected capital expenditures are based on contracts that are currently underway, as well as projected future projects reflected in the FY 2027 CIP. Inflated estimates are based on a 2.5 percent average annual inflation rate for all projects that are not under contract. In our opinion, the assumed inflation rate is reasonable given long term inflation

trends. This inflation rate should provide an adequate allowance for currently unforeseen factors that could increase inflation pressures on construction costs.

Contingency amounts shown in Table 5-4 are based on projected cash expenditures. The contingency in a particular year is estimated to be 7.0 percent of projected spending, except for tunnel related projects which carry a 15 percent contingency. We believe that the Authority's contingency assumptions are reasonable and appropriate and provide sufficient allowances to cover unanticipated events.

The FY 2027 CIP identifies asset protection, water system redundancy, pipeline replacement and rehabilitation, business system support, and support for community assistance programs as the primary focus of the Authority's capital spending going forward. The FY 2027 CIP includes potential design of projects that may arise from the Variance Waters updated CSO Long-Term Control Plan. MWRA continues to evaluate the scope and timing of the program and will refine cost and schedule projections as more regulatory certainty becomes available.

The Authority is advancing its project to construct long-term redundancy improvements for the Metropolitan Tunnels that supply water to the metropolitan Boston area. The Authority, based on a Board vote in February 2017, is moving forward with permitting and design for the redundancy project, which anticipates the construction of two deep rock tunnels to provide redundant potable water conveyance to the Authority's Boston metropolitan service area. The Authority has engaged a program support services team for this project. The FY 2027 CIP includes $2.2 billion for the long-term redundancy project which the Authority anticipates expending over a period of approximately 17 years. The Authority established a dedicated group responsible for the implementation and oversight of the redundancy initiative and projects, similar to the approach taken in constructing the DITP. The Tunnel Unit is currently staffed with eight and is intending to increase to 16 as the project ramps up.

Table 5-4 Projected Capital Spending, Inflated and Uninflated, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Sewer System[1]						
Contracted[2]	$75,185	$72,108	$53,758	$46,928	$0	$0
Uncontracted[2]	$64,661	$215,990	$510,468	$620,793	$647,064[3]	$484,665[3]
Contingency[2]	$11,317	$21,762	$41,159	$48,472	$47,094	$35,794
Subtotal[2]	**$151,163**	**$309,860**	**$605,386**	**$716,192**	**$694,157**	**$520,459**
Waterworks System[1]						
Contracted[2]	$120,353	$83,882	$84,313	$57,312	$54,512	$53,525
Uncontracted[2]	$57,490	$129,799	$311,999	$525,634	$699,829	$758,450
Contingency[2]	$10,216	$13,907	$26,844	$41,731	$54,639	$59,424
Subtotal[2]	**$188,058**	**$227,589**	**$423,156**	**$624,676**	**$808,979**	**$871,399**
Total CIP - Uninflated[2]	$339,221	$537,449	$1,028,542	$1,340,868	$1,503,137	$1,391,858
Total CIP - Inflated	$342,491	$556,228	$1,096,322	$1,468,504	$1,693,308	$1,611,007
Reduction for Maximum CIP[4]	$0	$0	($396,322)	($768,504)	($943,308)	($861,007)
Total CIP Spending	**$342,491**	**$556,228**	**$700,000**	**$700,000**	**$750,000**	**$750,000**

[1] Includes allocated Administrative Division expenses.

[2] Stated in 2026 dollars throughout forecast period.

[3] Capital from Current Revenue applied to Uncontracted total in FY 2031 and FY 2032.

[4] The Authority's projections assume maximum annual CIP spending of $700 million in FY 2029, $700 million in FY 2030, $750 million in FY 2031, and $750 million in FY 2032.

Table 5-5 presents the projected flow of funds within the Construction Fund from FY 2027 through FY 2032. Most construction funding is projected to be financed with long-term debt or SRF loans; however, the Authority intends to fund a total of $150.0 million in capital expenditures through pay-as-you-go current year funding for the projection period. The assumption for future years is that SRF loan availability remains stable beyond FY 2027, but that no grant funding will be available.

Table 5-5 Construction Fund Projected Cash Flow, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Construction Needs[1]	$320,797	$504,629	$634,723	$629,249	$693,123	$707,500
Financed by:						
Balance: Begin. of Year	$278,314	$70,003	$80,322	$80,675	$87,962	$90,300
Long Term Debt	$47,985	$449,448	$568,575	$569,036	$626,961	$638,900
SRF	$42,000	$42,000	$42,000	$42,000	$42,000	$42,000
Pay As You Go	$22,500	$23,500	$24,500	$25,500	$26,500	$27,500
Balance: End of Year[2]	**$70,003**	**$80,322**	**$80,675**	**$87,962**	**$90,300**	**$91,200**

[1] Construction needs is approximately 85 percent of "Total CIP Spending" line shown on bottom of Table 5-4, plus two-thirds of the 15 percent deferred three years earlier.

[2]The Balance: End of Year is equal to the sum of the available sources, less projected construction needs.

Note: Totals may not add exactly due to rounding.

The Authority has developed its projections of borrowing amounts in a fiscal year, such that it begins the following fiscal year with a Construction Fund starting balance that, when combined with SRF loans, grants, and pay-as-you-go capital, is at least 10 percent of the next fiscal year's construction requirement. This, coupled with the availability of TECP, provides a sufficient cushion to prevent disruption of the Authority's capital program from unanticipated or unfavorable capital market conditions. The Authority may elect on an annual basis to borrow amounts that differ from the projections, which are based on timing of capital spending. Borrowings in the aggregate presented in Table 5-5 are not expected to be materially different over the projection period. In the FY 2027 CEB, the Authority has proposed $400 million borrowing in FY 2027.

The capital spending program described in the preceding paragraphs affects the Authority's revenue requirement in two ways:

- Debt service must be paid on the bonds issued to fund the program.
- Sufficient revenues must be generated to comply with the Primary and Secured Coverage requirements.

Table 5-6 presents existing and projected debt service resulting from the projected capital spending program. Annual debt service in a fiscal year is based on the monthly debt service deposits that are required in accordance with the Resolution. As noted earlier, Commonwealth debt service assistance in the amount of $1,234,567 is included in FY 2027, however no additional debt service assistance is assumed for the remainder of the projection period. Debt service projections reflect the proposed $400 million borrowing in FY 2027, structured to align with policies to maintain a consistent and predictable debt service pattern.

Table 5-6 Current and Projected Debt Service, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Senior Debt						
Principal to be Issued in FY[1]	$56,871	$499,433	$630,724	$631,232	$695,071	$708,229
Existing Senior Debt Service	$281,928	$277,287	$351,958	$376,578	$435,158	$401,420
Future Senior Debt Service	$30,235	$59,777	$22,911	$22,929	$25,248	$76,222
Total Senior Debt Service	**$312,163**	**$337,064**	**$374,868**	**$399,507**	**$460,406**	**$477,642**
Debt Service Assistance	($1,235)	$0	$0	$0	$0	$0
Bond Redemption Account	$0	$0	$0	$0	$0	$0
Net Senior Debt Service	**$310,928**	**$337,064**	**$374,868**	**$399,507**	**$460,406**	**$477,642**
Subordinated/SRF Debt						
Principal to be Issued in FY[1]	$42,000	$42,000	$42,000	$42,000	$42,000	$42,000
Existing Debt Service	$139,972	$127,261	$101,571	$89,101	$85,540	$81,597
Future Sub/SRF Debt Service	$6,927	$5,770	$4,343	$4,343	$4,343	$4,343
Total Sub/SRF Debt Service	**$146,898**	**$133,031**	**$105,914**	**$93,444**	**$89,883**	**$85,941**
Debt Service Assistance	$0	$0	$0	$0	$0	$0
Net Sub/SRF Debt Service	**$146,898**	**$133,031**	**$105,914**	**$93,444**	**$89,883**	**$85,941**
Total Debt Service	**$457,827**	**$470,095**	**$480,782**	**$492,951**	**$550,289**	**$563,583**

[1]Total principal amount represents the amount of bonds required to provide the Construction Fund Deposit shown on line 1 of Table 5-5, plus repayment of TECP issued in prior fiscal year(s). This amount is increased to reflect Debt Service Reserve Fund Requirements and cost of issuance.

Note: Totals may not add exactly due to rounding.

Total Senior Debt Service is projected to increase from approximately $312.2 million in FY 2027 to approximately $477.6 million in FY 2032 before accounting for proceeds from the Bond Redemption Account, and debt service assistance. In Table 5-6, Net Senior Debt Service reflects the senior debt service with the reduction of current and anticipated debt service assistance and the Bond Redemption Account. The Bond Redemption Account is a rate-smoothing tool available to the Authority, and the Authority estimates that it will have nearly $26.1 million in the Bond Redemption Account at the beginning of the forecast period. The Authority does not expect to draw from the Bond Redemption Account during the projection period; however, the timing and amount of actual usage may vary.

Subordinated debt service, including both SRF and other outstanding subordinated Authority debt, is projected to decrease from $146.9 million in FY 2027 to $85.9 million in FY 2032. No future variable-rate debt is assumed to be issued over the timeframe of these projections; an assumption that may change based on market conditions. Projected SRF debt service assumes an interest rate of 2.15 percent for FY 2027 and the remainder of the projection period.

5.3.5 Non-Rate Revenues

The Authority receives revenues from a variety of sources that offset the amount that must be collected from the Local Bodies. Total non-rate revenues are budgeted at $42.4 million in FY 2027 and are projected to increase to a total of $49.9 million in FY 2032. Table 5-7 summarizes these sources from FY 2027 through FY 2032.

Table 5-7 Projected Non-Rate Revenue, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Rate Stabilization Fund Withdrawal	$0	$782	$740	$140	$12	$0
Miscellaneous	$18,533	$18,616	$18,990	$19,143	$19,441	$19,785
Investment Income	$23,910	$21,935	$23,818	$25,820	$27,768	$30,124
Total Non-Rate Revenue	**$42,443**	**$41,332**	**$43,548**	**$45,102**	**$47,221**	**$49,910**

Note: Totals may not add exactly due to rounding.

Major non-rate revenue sources are briefly described in the following:

- **Rate Stabilization Fund Withdrawal**: When annual revenues exceed expenses, the Authority may deposit the money in the Rate Stabilization Fund. In future years, money may be withdrawn from the Rate Stabilization Fund to reduce rate revenue requirements. The projections cap Rate Stabilization Fund withdrawals at an amount no greater than 10 percent of the Required Debt Service Fund Deposits, net of debt service assistance credited to Senior Debt for such year, consistent with the Resolution, and use such amounts as available to moderate projected rate increases consistent with Authority practice. The Rate Stabilization Fund balance at the end of FY 2026 was $39.0 million. The Authority anticipates withdrawals of $782,000 in FY 2028, $740,000 in FY 2029, $140,000 in FY 2030, and $12,000 in FY 2031. The projections do not include a withdrawal from the Rate Stabilization Fund in FY 2032.
- **Investment Income**: The Authority earns interest by investing fund balances in a variety of interest-bearing securities. Interest earnings from these funds, except for the Debt Service Reserve Fund, are transferred to the Revenue Fund and are available to meet the ongoing obligations of the Authority. Interest earned in the Debt Service Reserve Fund is transferred to the Debt Service Fund to meet funding requirements. Total investment income is projected to generate $23.9 million in FY 2027 and then varying between $22 million and $30 million in the forecast period. The fluctuations in investment income between FY 2027 and FY 2032 partially reflect changes in the Construction Fund, Rate Stabilization Fund, and Debt Service Reserve Fund balances.

- **Miscellaneous**: The Authority also receives certain amounts from Local Bodies, primarily the Chicopee Valley Aqueduct ("CVA") communities that are provided water under various contracts, as well as payments from the Town of Clinton for partial operation of the Clinton Wastewater Treatment Plant. The Authority is projected to receive approximately $46.2 million from Clinton and the CVA communities under the contractual service agreements over the forecast period. The Authority estimates that over the same period it will collect $16.3 million in water revenue from sewer customers to offset water usage at the DITP. The Authority also receives a variety of fees, penalties and charges in its normal course of business.

5.4 Rate Revenue Requirement and Retail Customer Impacts

5.4.1 Rate Revenue Requirement

Table 5-8 summarizes the projected rates for FY 2027 through FY 2032, based on the FY 2027 CEB and other factors described herein. For FY 2027, the Authority's rate revenue requirement increased by 2.5 percent over FY 2026 levels to a total of approximately $900.7 million. The rate revenue requirement equals the total amount of expenses in a fiscal year (including required reserve deposits and any amounts required to meet coverage requirements) less non-rate revenues. Of this amount, approximately $564.6 million will be required to meet the expenses of the Sewer System, including allocated administrative and indirect expenses, and approximately $336.0 million for the Waterworks System.

Rate revenues are projected to increase to approximately $1,045.2 million in FY 2032, an average annual increase of 2.9 percent from FY 2027 levels. For the Sewer System, the rate revenue requirement is projected to increase from $564.6 million in FY 2027 to approximately $638.0 million in FY 2032, an average annual increase of approximately 2.3 percent. The Waterworks System revenue requirement is projected to increase from $336.0 million in FY 2027 to approximately $407.2 million in FY 2032, an average annual increase of 3.9 percent.

The Authority historically has attempted to smooth total rate increases to mitigate significant short-term rate increases. Recognizing that smoothing total rate increases is beneficial to Local Bodies receiving both water and sewer service only, in FY 2017, the Authority began to smooth rates at the Sewer and Waterworks Systems level. Rate smoothing at the Systems level has created more sustainable and predictable rates for each System, which has helped mitigate short-term rate spikes and provide consistent rates for the Local Bodies that only receive one service from the Authority.

Table 5-8 Projected Rate Revenue Requirement Increases, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Sewer Rate Revenue	$564,642	$578,260	$592,423	$607,104	$621,613	$637,983
Waterworks Rate Revenue	$336,034	$349,217	$362,918	$377,061	$391,870	$407,178
Total Rate Revenue	**$900,676**	**$927,477**	**$955,342**	**$984,166**	**$1,013,482**	**$1,045,161**
Annual Rate Increase	2.5%	3.6%	2.9%	3.0%	3.0%	3.1%

Note: Totals may not add exactly due to rounding.

The projected rate revenue increases are the product of many assumptions, including the rate of growth in Authority operating expenses and economic and financial assumptions. They also assume that the Authority uses the Rate Stabilization Fund as described in this Report.

5.4.2 Rate Allocation Methodology

The Authority's charges for the services of the Waterworks System and Sewer System, identified as Total Rate Revenue in the preceding table, are billed to Local Bodies on a wholesale basis. This means that the Authority bills Local Bodies, including special districts, rather than the individual residences or businesses served by the Systems. Separate charges applicable to the Waterworks System and Sewer System are established each year as required by the Enabling Act. These charges, together with other available revenue, are established at levels that are at least sufficient to pay the full annual revenue requirement, as described in subsequent sections.

5.4.2.1 Water Rate Methodology

Using an average cost methodology, the Authority's net annual Waterworks System costs for the current fiscal year, including operation and maintenance, debt service, and reserve fund requirements, are recovered from Local Bodies in proportion to their prior calendar year annual water consumption. In FY 2027, the unit cost of water is $5,092 per million gallons; and based on the Authority's projections the unit cost of water will be approximately $5,402 per million gallons in FY 2028, with a unit cost of $6,299 in FY 2032.

5.4.2.2 Contractual Agreements for Water Service

Twenty-seven of the 56 authorized water-served Local Bodies are "contract communities" in which water is supplied pursuant to water supply agreements. The list of water-served communities evolved through various legislative acts that allowed the communities/water districts to join the Waterworks System. The water supply agreements contain terms and conditions agreed to by the respective Local Body and the Authority. Twenty-one of the 27 contract communities pay for water at the full water rates. The three CVA communities have a separate assessment. Southborough receives its first 110 million gallons per year at no charge. Clinton is also considered a water-served community; however, Clinton withdraws its first 800 million gallons of water per year from the Authority's water supply reservoirs via its own infrastructure free of charge under special legislation. There are additional entities served by the Authority, including DCR facilities. The Authority has had and continues to have discussions with additional communities and Local Bodies regarding potential water sales to meet various needs. The Authority currently provides water services to eight Local Bodies added to the Waterworks System since its inception.

5.4.2.3 Wastewater Rate Methodology

The Authority's wastewater rate methodology encompasses the following elements:

- **Operation and Maintenance Expense**: Each Local Body's annual allocation in FY 2027 is based upon the average total annual metered flow for the prior three years from each community taking into account three separate prices for each portion of wastewater: total annual flow, pounds of suspended solids, and pounds of biochemical oxygen demand.

- **Capital Costs**: A flow-based method, adjusted for strength, is used to recover one-quarter of the capital costs, and a population-based method is used to recover the remaining three-quarters. For each Local Body in FY 2027, flow calculations are based on the average of the month in the prior three calendar years in which the highest average daily flows occurred for that Local Body. The remaining share of capital costs is allocated based on population: 50 percent of the balance (37.5 percent of the total) assigned on the basis of the Local Body's total or census population and 50 percent of the balance (37.5 percent of the total) on the basis of the presently served population.

The Authority completed a meter replacement program in FY 2023 for the flow meters that were used to allocate flow among Local Bodies to determine each Local Bodies share of costs.

5.4.2.4 Enforceability of Charges

The Authority's charges to Local Bodies are a general obligation of the Local Bodies. Local Bodies fund payment of the Authority's wholesale rates and charges from several revenue sources, including local retail water and wastewater charges, real and personal property taxes, Commonwealth local aid distributions, or a combination of the preceding. In the event any charge to a Local Body is not paid when due, the Enabling Act authorizes the Authority to recover the amount due, together with interest and other actual damages, by action in the state Superior Court. Without suit, the Authority may also certify to the State Treasurer the amount of any unpaid charge from a Local Body (except the Boston Water and Sewer Commission, the Lynn Water and Sewer Commission, the Dedham-Westwood Water District, Lynnfield Center Water District and the Lynnfield Water District, which collectively will account for approximately 30.5 percent of total rate revenues in FY 2027), whereupon the State Treasurer is required by the Act to deduct the amount due from any distribution of local aid then payable to such Local Body by the Commonwealth, if any, and instead to pay such amount to the Authority. The Authority has collected 100 percent of its rates and charges in each year of its existence. This local aid intercept has been used only eight times in total, and not since FY 1993. To date, 100 percent of the Authority's rates and charges were collected within 30 days of due dates, except for one instance in which the Authority made special arrangements with a Local Body to extend the due date.

The availability of Commonwealth local aid distributions in the future to satisfy unpaid charges imposed by the Authority with respect to those Local Bodies eligible to receive such distributions will be dependent upon, among other things, the aggregate amount actually appropriated to each Local Body by the state legislature in a fiscal year for local aid distribution, and to the extent to which a Local Body's local aid distribution may have already been accessed under other valid intercept mechanisms.

5.4.3 Retail Customer Impacts

The Local Bodies and their retail customers will continue to be impacted by the projected increases in the Authority's charges for water and wastewater service over the next several years. Local Bodies will be required to increase their contributions through retail user fee increases. Due to the variety of revenue sources used by the Local Bodies and the differences in service levels, it is difficult to accurately assess the impact of the projected increases in the Authority's charges on the average household in the Authority's service area. The Advisory Board annually surveys the Local Bodies and based on the 2025 Annual Water and Sewer Retail Rate Survey, the Advisory Board has estimated that during FY 2025 the average annual household charges for water and wastewater service across the Local Bodies served by

the Authority will total $2,097 using an industry standard benchmark that the average household consumes 90,000 gallons per year. For FY 2027, we project that the average household bill assuming 90,000 gallons for average annual consumption will increase to approximately $2,279. When making these projections, we have assumed (1) that the Local Body that provides retail services receives both water and sewer services from the Authority, (2) that the Local Body passes on to each household 100 percent of any Authority increases in the form of retail user fees, (3) that the Local Body's charges increase by 5.0 percent annually through FY 2032, and (4) that the Authority's charges constitute approximately 40.5 percent of the Local Bodies' charges in FY 2027.

Table 5-9 summarizes the projected annual household bills through FY 2032 assuming average household consumption of 90,000 gallons per year. Typical annual household bills are projected to increase to approximately $2,812 in FY 2032. Of this amount, $1,081 is the Authority wholesale charge and $1,732 is the projected local charge.

These estimates of household charges are based on the assumptions regarding inflationary increases, long-term debt interest rates, state and federal assistance, estimates of additional operating expenses related to new facilities, and construction costs of new facilities. These estimated charges are, therefore, subject to change.

We believe that assuming average annual consumption of 90,000 gallons per year overstates residential consumption in many of the Local Bodies, and that most residential customers consume significantly less. Another benchmark that the Authority is using is based on 61,000 gallons per year per household, or 68 percent of the industry benchmark which the Authority believes tracks closer to actual consumption in its service area. Consequently, the average annual household bills described above and presented below are not reflective of the actual cost of water and sewer service being incurred by the Local Bodies' residential customers. At the consumption level of 61,000 gallons, the average retail bill during FY 2027 would be approximately $1,544, and in FY 2032 the average bill is estimated to be $1,906.

Table 5-9 Projected Typical Household Bills, FY 2027-2032 ($ in 000's)

	FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
Combined						
Local	$1,357	$1,425	$1,496	$1,571	$1,649	$1,732
MWRA	$922	$951	$982	$1,014	$1,046	$1,081
Total	**$2,279**	**$2,376**	**$2,478**	**$2,584**	**$2,695**	**$2,812**
Water						
Local	$445	$467	$490	$515	$540	$567
MWRA	$480	$498	$518	$538	$559	$581
Total	**$924**	**$965**	**$1,008**	**$1,053**	**$1,100**	**$1,149**
Sewer						
Local	$912	$958	$1,006	$1,056	$1,109	$1,164
MWRA	$442	$453	$464	$476	$487	$500
Total	**$1,354**	**$1,411**	**$1,470**	**$1,531**	**$1,596**	**$1,664**

The retail rates within the Authority's service area are among the highest in the country according to the Advisory Board's 2025 Annual Water and Sewer Retail Rate Survey. The survey found an average annual combined water and sewer household bill of approximately $2,097 in FY 2025 assuming 90,000 gallons of water use for all 61 communities served by the Authority. However, comparing the costs to households of water and sewer services across jurisdictions is difficult given differing methodologies in establishing user fees, capital assessments, general tax support, and the availability of state and federal financial assistance. In addition, it is important to consider regional variations in water consumption and household income when assessing the impact of such bills on residential customers. The Authority believes that with these factors considered, its service costs are comparable to many utilities across the country.

For certain segments of the Authority's service area population, especially those with low and/or fixed incomes, we believe that the retail rates may be burdensome. If these increases are not mitigated in some fashion, certain demographic groups within the retail customer base may find the projected increases unaffordable. However, Local Bodies have a variety of means for mitigating these impacts, including lifeline rates, subsidization from other revenue sources, and discounts for senior and low-income households.

Based upon our review and recognizing the availability and use of retail rate alternatives by the Local Bodies, we are reasonably confident that the Authority's projected rates and charges will be within the ability of the individual Local Bodies and their collective retail customer base to afford.

5.5 Compliance with the General Bond Resolution

Table 5-10 summarizes our evaluation of the Authority's compliance with certain terms of the Resolution from FY 2027 through FY 2032. The data included in this table regarding non-rate revenues, operating expenses, debt service assistance and reserve fund deposits are described in prior sections. Rate revenue is described in the preceding section. In general, the Authority must generate sufficient rate revenue to meet all operating and capital expenses after accounting for non-rate revenue, such as debt service assistance and investment income. In addition, the Authority's total revenues must be sufficient to comply with the debt service coverage requirements of the Resolution.

Projected annual revenue requirements of the Authority, including operation and maintenance expenses, debt service, and deposits into the various reserve funds are discussed previously. The Authority may deposit certain year-end surpluses from operations into the Rate Stabilization Fund (line 18) and use the accumulated balance in this fund to mitigate the impact of future increases in revenue requirements, subject to the terms of the Resolution and management discretion. Year-end surpluses have resulted from favorable variances of capital financing and other operating expenses, and non-rate revenues.

In addition to meeting its yearly cash requirements, the annual revenues of the Authority must be adequate to comply with certain covenants of the Resolution, including the covenants prescribed in Section 705 as to annual level of rates and charges and the required annual debt service coverage ratio (the "Rate Covenant"), as well as the covenants outlined in Section 206 concerning conditions precedent to the issuance of additional revenue bonds (the "Additional Bonds Test").

In order to comply with the Rate Covenant, annual revenues of the Authority must be adequate to: (1) meet all annual revenue requirements including operation and maintenance expenses, pro rata debt service fund deposits, and reserve fund requirements; and (2) provide revenue available for revenue bond debt service payments in each fiscal year equal to the sum of the Primary and Secured Bond Coverage Ratios. Revenue available from current year operations must provide the Primary Bond Coverage Ratio of 120 percent (1.2 x).

The Authority is also required to maintain Revenues Available for Bond Debt Service at a level equal to 110 percent (1.1 x) of debt service on all senior and secured bonds, including bonds issued to the SRF (Secured Bond Rate Covenant).

As shown on lines 23 through 25 of Table 5-10, the Authority is projected to generate sufficient revenues to comply with the applicable coverage requirements. The projected Primary Bond Coverage Ratio (line 24) exceeds the 120 percent requirement for all forecasted years. The Secured Bond Coverage Ratio (line 25) is projected to equal or surpass the 110 percent level in all forecasted years.

Table 5-10 Projected Compliance with Resolution, FY 2027-2032 ($ in 000's)

		FY 2027	FY 2028	FY 2029	FY 2030	FY 2031	FY 2032
	Revenues						
1	Non-Rate Revenues:						
2	Investment Income	$23,910	$21,935	$23,818	$25,820	$27,768	$30,124
3	Rate Stabilization Fund	$0	$782	$740	$140	$12	$0
4	Miscellaneous	$18,533	$18,616	$18,990	$19,143	$19,441	$19,785
5	Rate Revenue Requirement						
6	**Total Revenue**	**$943,120**	**$968,809**	**$998,889**	**$1,029,268**	**$1,060,703**	**$1,095,071**
7	Operating Expenses	$394,206	$405,568	$422,878	$439,154	$416,829	$428,408
8	Chelsea Facility Lease	$3,217	$3,217	$3,217	$3,217	$3,217	$3,217
9	Other Post-Employment Benefits	$5,404	$5,816	$5,792	$5,735	$5,641	$5,500
10	**Net Operating Revenues**	**$540,292**	**$554,208**	**$567,002**	**$581,163**	**$635,016**	**$657,945**
11	**Debt Service**						
12	Senior Debt Service	$312,163	$337,064	$374,868	$399,507	$460,406	$477,642
13	Debt Service Assistance & Bond Redemption Account	($1,235)	$0	$0	$0	$0	$0
14	Secured Debt Service	$146,898	$133,031	$105,914	$93,444	$89,883	$85,941
15	**Total Debt Service**	**$457,827**	**$470,095**	**$480,782**	**$492,951**	**$550,289**	**$563,583**
16	Watershed and PILOT	$36,576	$37,673	$38,804	$39,968	$41,167	$42,402
17	Reserve Fund Deposits	$4,009	$2,159	$2,885	$2,713	($3,721)	$1,930
18	Rate Stabilization Fund Deposits	$0	$0	$0	$0	$0	$0
19	Current Revenue for Capital	$22,500	$23,500	$24,500	$25,500	$26,500	$27,500
20	CP Interest for Water Pipeline Program	$9,531	$9,531	$9,531	$9,531	$9,531	$9,531
21	Debt Service Defeasance	$9,850	$11,250	$10,500	$10,500	$11,250	$13,000
22	Balance Available Year End	$0	$0	$0	$0	$0	$0
23	Rate Covenant Test						
24	**Primary Coverage[1]**	**1.74**	**1.64**	**1.51**	**1.45**	**1.38**	**1.38**
25	**Secured Coverage[2]**	**1.18**	**1.18**	**1.18**	**1.18**	**1.15**	**1.17**

[1]Primary Coverage equals Net Revenues divided by Senior Debt.

[2]Secured Coverage equals Net Revenues divided by Total Debt.

Note: Totals may not add exactly due to rounding.