

March 1, 2013

Mr. Thomas Paolicelli
Executive Director
New York City Municipal Water Finance Authority
255 Greenwich Street
New York, NY 10007

Re: New York City Municipal Water
Finance Authority
Fiscal Year 2013 Consulting Engineer's Report

Dear Mr. Paolicelli:

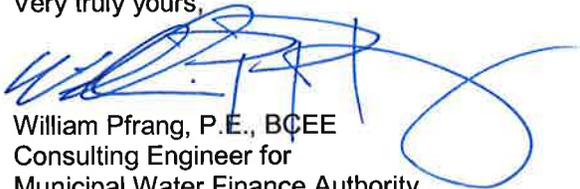
We herewith submit the Fiscal Year 2013 Consulting Engineer's Report on the operation of the Water and Sewer System of the City of New York. This Report addresses the condition and operation of the System as it presently stands, as well as the adequacy of capital and operating programs for Fiscal Years 2013 and 2014.

It is our opinion that the System condition is adequate and that it continues to be managed by the New York City Department of Environmental Protection (NYCDEP) in a professional and prudent manner. The current budget allocations for Fiscal Year 2013 and Fiscal Year 2014 are adequate for the immediate needs of the System and address all legally mandated projects.

It is important to note that much of the data utilized for the analyses conducted by AECOM has been generated by the on-going budgetary process. The budgetary planning will continue past the date of this report and revisions may be made. However, it is our opinion that meaningful observations and conclusions can be made at this time, although the final budget allocations are subject to change based on the outcome of the budgetary process. It is these observations and conclusions that are presented hereinafter.

We have no responsibility to update this report for events and circumstances occurring after the date of this Report.

Very truly yours,



William Pfrang, P.E., BCEE
Consulting Engineer for
Municipal Water Finance Authority

cc: Marjorie E. Henning, Secretary



**THE NEW YORK CITY MUNICIPAL WATER
FINANCE AUTHORITY**

**FISCAL YEAR 2013 CONSULTING ENGINEER'S
REPORT**

PREPARED BY

AECOM

March 1, 2013

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1.0 PURPOSE AND SCOPE OF THE REPORT

The purpose of this report is to provide engineering information pertinent to the condition of the Water and Sewer System (System) serving New York City (NYC) and the use of the proposed capital improvement program (CIP) funds. Since 1983, AECOM (formerly Metcalf & Eddy) has provided engineering services related to the NYC Water and Wastewater Operations Evaluation Study (Study) and has provided services to the NYC Municipal Water Finance Authority (Authority) since 1985. Certain studies and analyses were performed in anticipation of the creation of the Authority and were used in developing the information included in the Municipal Water Finance Authority Official Statements under the captions: "CAPITAL IMPROVEMENT AND FINANCING PROGRAM — Ten Year Capital Strategy, Current Capital Plan and the Capital Improvement Program", "THE SYSTEM — The Water System", and "THE SYSTEM — The Sewer System". AECOM has performed ongoing evaluations of the condition of the System, independently reviewed the capital and operating programs pertaining to water and wastewater, reviewed pertinent studies associated with the long-term development of the System, and interviewed key individuals responsible for managing the activities of the New York City Department of Environmental Protection (NYCDEP).

The report addresses the issues listed below:

- present physical condition of the System,
- Fiscal Year 2013 capital budget and Fiscal Year 2014 projected capital budget for the System,
- Fiscal Year 2013 expense budget and Fiscal Year 2014 projected expense budget relative to operation and maintenance of the System,
- overview of the Preliminary Ten Year Capital Strategy for Fiscal Years 2014 to 2023, and
- management of the System.

2.0 METHODOLOGY FOR ANALYSIS

The analyses conducted by AECOM were accomplished utilizing the following methods:

- discussions with representatives of the Authority and NYCDEP,
- selected confirmation inspections of operating facilities and major on-going construction programs,
- review of documentation relative to the ongoing budgetary process, and
- evaluation of other comparable water and wastewater systems and industries.

The budgetary process is ongoing and has not been concluded by the date of this report's publication. Observations and conclusions presented herein are therefore based on budget data as it presently stands. It is the opinion of AECOM that these observations and conclusions are meaningful with respect to the System. It should be noted, however, that these observations and conclusions are subject to change based on the outcome of the budgetary process. We understand that no significant changes are expected in the Ten Year Capital Strategy with the release of the Executive Budget.

3.0 THE CONSULTING ENGINEER

AECOM has served the water and wastewater industry for over 100 years and NYC as a consulting engineer for many decades dealing with water supply, water distribution, sewage collection, and wastewater treatment. AECOM is one of the largest consulting engineering firms in the United States and is recognized internationally as a leader in providing services to the water and wastewater industry. AECOM is a global leader in all the markets for which it provides professional technical and management support services including water/wastewater, facilities, environment, energy, government, and transportation. AECOM has over 45,000 employees worldwide and serves clients in approximately 130 countries. In 2012, Engineering News Record (ENR) magazine ranked AECOM #1 in the top 500 overall design firm category.

4.0 THE CONSULTING ENGINEER'S CONCLUSIONS

- In our opinion, the System continues to be managed in a professional and prudent manner with an appropriate regard for the level of service afforded to the users within the available funding.
- NYCDEP capital and expense budget projections for Fiscal Year (FY) 2013 satisfy the immediate needs for the System including all legally mandated projects, which comprise approximately 23% of the capital budget for FY 2013.
- NYCDEP capital and expense budget projections for FY 2014 satisfy the immediate needs for the System including all legally mandated projects, which comprise approximately 24% of the capital budget for FY 2014.
- The physical condition of the System receives an adequate rating.
- Staffing levels are at approximately 92% of current allocations. NYCDEP continues to maximize the efficient use of its staff through re-allocation of current positions and new hires. Fleet maintenance staffing has been reduced due to consolidation of efforts with other City agencies while water treatment operations staff has increased. The key staffing goals are to provide adequate staffing for the operation of the CAT/DEL Ultraviolet (UV) Disinfection Facility by the Bureau of Water Supply (BWS), to provide adequate staffing for the future operation of the Croton Water Filtration Plant (WFP) by the Bureau of Water and Sewer Operations (BWSO), and to continue succession planning for key operational staff at the wastewater treatment facilities by the Bureau of Wastewater Treatment (BWT). Strong recruitment practices and training continue to strengthen NYCDEP staff with the newly formed Organizational Development position within NYCDEP.

5.0 OVERVIEW OF THE SYSTEM

Description of the System

NYCDEP is charged with the operation and maintenance of a vast system of water and wastewater infrastructure.

The NYC water supply system consists of three upstate watersheds, Delaware, Catskill and Croton that extend as far as 125 miles north of NYC, consisting of 19 storage reservoirs and three controlled lakes, as shown in Figure 1. The Delaware, Catskill and Croton watersheds have the ability to supply approximately 50%, 40% and 10% of the NYC's daily water supply, respectively. NYCDEP also



Figure 1: New York City Water Supply System

maintains wells in Queens which can provide up to 1% of the NYC's daily water supply. However the groundwater system has not been in operation since 2007. The average daily in-city water consumption for FY2012 was 1.008 billion gallons per day (BGD). The water supply is conveyed by gravity from the upstate reservoirs through an extensive system of tunnels and aqueducts. Water supplies from the upstate watersheds are presently unfiltered. In 2013, the Croton WFP, which is presently under construction, will come on line. A UV Disinfection Facility to treat water from Kensico Reservoir, which is fed by the Delaware and Catskill watersheds commenced operations in late 2012, feeding water to the city via Hillview Reservoir. Both Kensico Reservoir and Hillview Reservoir serve as balancing reservoirs for the water system, handling the daily fluctuation and hourly fluctuations of water demand, respectively. Water from Hillview Reservoir is conveyed to the City through three tunnels, City Tunnel No. 1, City Tunnel No. 2, and City Tunnel No. 3, which is partially in operation and partially under construction. The water distribution system from the three city tunnels consists of a grid network of over 6,700 miles of pipe, as well as valves, 109,000 fire hydrants, distribution facilities, gatehouses, pump stations, water quality monitoring stations, laboratories and maintenance and repair yards.

The NYCDEP wastewater system is comprised of fourteen in-city Wastewater Treatment Plants (WWTPs) that discharge into receiving bodies surrounding NYC and seven upstate WWTPs that protect the watersheds, as indicated in Figure 2. The NYC WWTPs has a capacity of 1.805 BGD and is currently treating approximately 1.315 BGD of municipal wastewater and stormwater. The NYC sewer system is divided into 14 drainage areas, which correspond to each of the WWTPs. The NYCDEP in-city WWTPs provide physical, chemical and biological treatment of the wastewater flows to achieve secondary treatment standards. Some of the WWTPs have been upgraded to Biological Nitrogen Removal (BNR). The sewer system is comprised of approximately 7,400 miles of sewer pipes of varying size and material, which are classified as sanitary, storm or combined sewers. Much like many other older cities, the NYC collection system consists primarily of combined sewers (70%), which means during a wet weather event wastewater, rainwater and surface water runoff is collected into the sewer system with most flow being sent to the WWTPs while excess flow discharges to the receiving water as combined sewer overflow (CSO). There are approximately 423 combined sewer overflow (CSO) regulators and outfalls and four combined sewer overflow retention facilities (Paerdegat Facility, Alley Creek Facility, Spring Creek Facility, Flushing Bay Facility) that store the peak flow and then pass the stored flow to the WWTP when possible. Additional NYCDEP infrastructure that supports the wastewater system includes 96 wastewater pump stations, 144,000 catch basins, laboratories, eight sludge dewatering facilities (six dewatering facilities currently active) and inner-harbor vessels which transport sludge between facilities.

Impact of Superstorm Sandy on NYCDEP's System and NYCDEP Response to Superstorm Sandy

Superstorm Sandy made landfall in the Northeast on October 29, 2012. The storm caused severe and widespread damage in NYC and the surrounding area. High winds toppled trees and power lines and significant record-level tidal storm surge caused extensive flooding. Figure 3 shows the unprecedented storm surge elevation of Hurricane Sandy at the Battery in New York City compared with historical data.

Leading up to the storm, NYCDEP made necessary preparations and implemented emergency planning procedures across the agency. Such activities included the hardening and relocating of critical infrastructure, securing extra deliveries of chemicals, fuel and supplies, sandbagging facilities, running shutdown drills, testing emergency generators, placing crews on standby/relocating management and operating staff, lowering reservoirs, expediting operations of key infrastructure in the watershed and activating the NYCDEP Incident Command Center.

THE NEW YORK CITY MUNICIPAL WATER FINANCE AUTHORITY
Fiscal Year 2013 Consulting Engineer's Report

Despite lengthy preparations, NYCDEP infrastructure was impacted by this significant storm. As a result of the extreme storm surge, a number of the NYCDEP WWTPs experienced flooding. Many WWTPs and pump stations also lost power, such as Manhattan Pump Station, North River WWTP, Coney Island WWTP, and Rockaway WWTP. Several of the WWTPs and pump stations experienced damage (10 of the 14 WWTPs and 42 of 96 pump stations). Secondary treatment was restored for all treatment plants except the Rockaway WWTP by November 2, 2012 (within 4 days). Rockaway WWTP, the City's smallest WWTP, experienced the worst damage. However treatment was restored by November 4, 2012 (within 6 days).

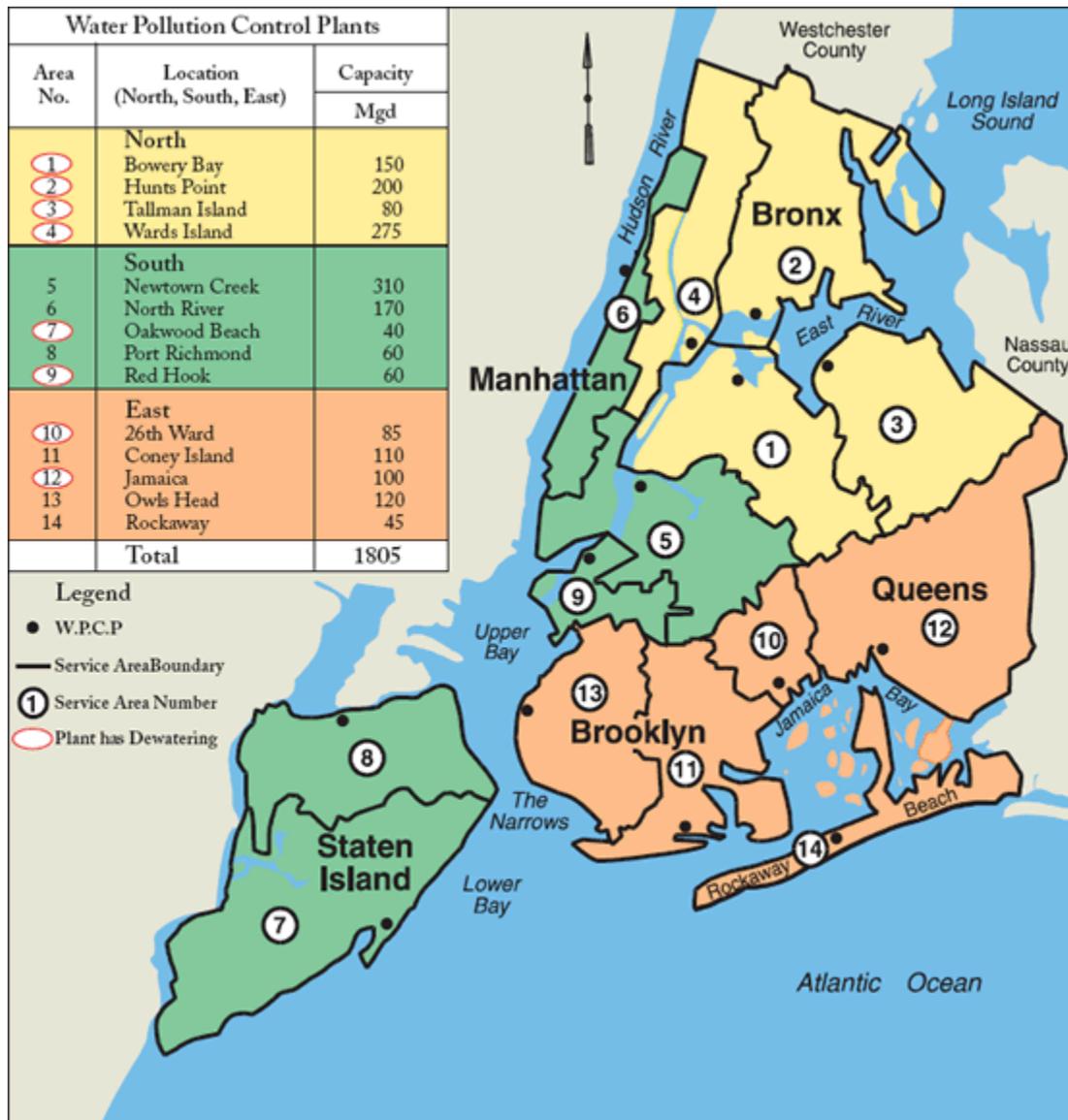


Figure 2: New York City Wastewater Treatment Plants

Due to the high winds that occurred during Hurricane Sandy, the water at Kensico Reservoir exceeded acceptable turbidity levels for a short time. In response to the high turbidity, NYCDEP revised water distribution operations at Kensico Reservoir and increased chlorine treatment. The water was also being disinfected with UV radiation. NYCDEP complied with and will continue to comply with the required notification regarding the turbidity to customers through February 2013.

NYCDEP is working very closely with Federal Emergency Management Agency (FEMA) assessing facilities, damage and costs. To date, NYCDEP's assessment of the damage caused by the storm is estimated to be \$95 million, consisting of debris removal, emergency protection measures and long-term capital repairs.

Given the severity of the storm, the preparatory efforts taken, operations during the storm, and the recovery time, overall NYCDEP performed exceptionally well given the severity of the challenge.

NYCDEP Next Steps/Climate Change Adaptation

While NYCDEP performed well in the Hurricane Sandy emergency, it is clear that the climate change is impacting NYCDEP facilities, and long-term adaptation measures are a necessary part of the near-term capital improvement program. NYCDEP has been evaluating climate change adaptation requirements for the past several years. Adaptation refers to those actions that must be taken to allow NYCDEP facilities to meet their intended functions when considering increased sea levels and more intense storm events. Following release of the Climate Change Program Assessment and Action Plan in 2008, NYCDEP began studying the effects of climate change on the City's stormwater/wastewater collection system in more detail to determine what level of infrastructure and policy modifications are necessary to alleviate potential damage from larger, more frequent storm events and rising sea levels. In May 2010, the NYC Panel on Climate Change released a report entitled Climate Change Adaptation in New York City: Building a Risk Management Response, which among other important information it includes climate trends and projections for NYC, which NYCDEP is using for analysis and planning. In addition, BEPA has recently completed a two-year pilot study to develop an adaptation and optimization strategy to minimize global climate change risks for NYCDEP infrastructure using one WWTP (Hunts Point) and one drainage area (Flushing Bay). The results of this study will be used in the development of a citywide risk based management strategy and adaptation evaluation to address long term climate change. It is expected that the pilot study will lead to the development of Storm Surge Guidance for all NYCDEP WWTPs, pumps stations and other threatened infrastructure. The Mayor's Office intends to issue a report on the Special Initiative on Rebuilding and Resiliency (SIRR) for NYC in the spring of 2013 which will include NYCDEP's efforts to date on priority areas. FEMA has issued revised flood maps for portions of the NYC area and plans to issue the remainder of the NYC area in the near future. NYCDEP will incorporate this new data into the ongoing evaluations. NYCDEP will also be developing cost benefit analysis to assist in the climate change adaptation decision making process.

Climate change adaptation evaluations are also taking place for other parts of the system. BWS is focused on climate change impacts on the water supply side through the use of Operation Support Tool (OST) models. NYCDEP's 2010 Green Infrastructure Plan outlined a comprehensive approach to stormwater management. The plan is based on implementing city-wide green infrastructure improvements to reduce the volume of stormwater that reaches the engineered stormwater collection system. NYCDEP maintains strong involvement with the climate change science community on the City, national and international level.

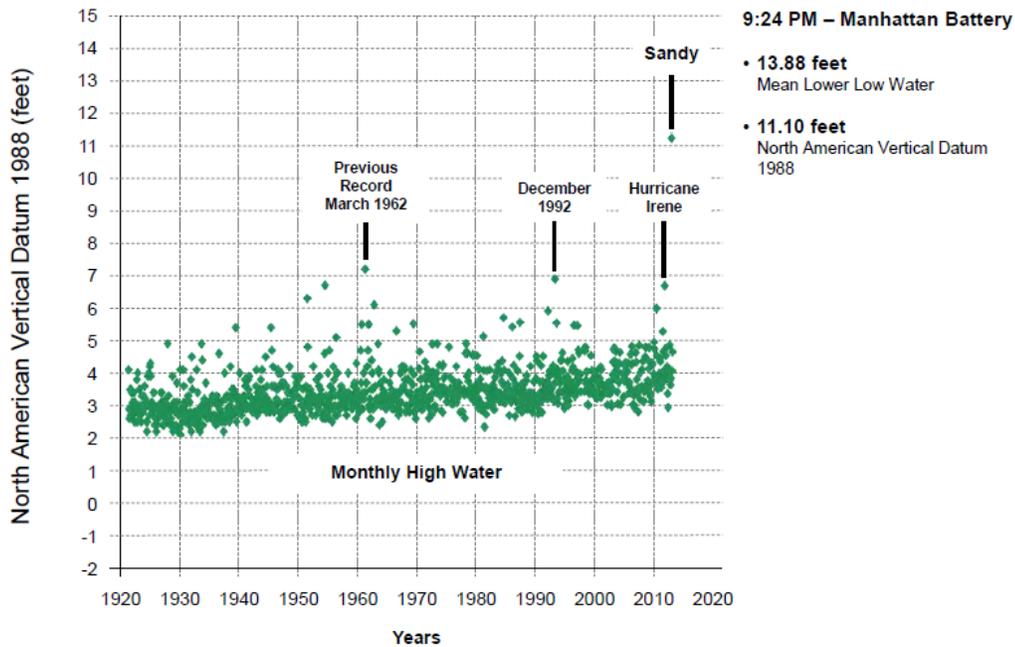


Figure 3: Historical Monthly Maximum Water Levels at the Battery, New York City

Climate change adaptation is a challenge facing all water and wastewater utilities, and should be considered in short-term and long-term utility planning. There is uncertainty inherent in climate science due to the magnitude variability, timing and frequency of localized events and their impacts on the system. However, despite the uncertainty of climate change prediction, rational capital investments must be considered to protect NYCDEP facilities in the next ten year planning cycle, when the results of the current studies and cost benefit analyses are completed. It is anticipated that NYCDEP will transition from study/planning to implementation phase for climate change adaptation in a systematic prioritized approach in the next Ten Year Plan.

6.0 MANAGEMENT OF THE SYSTEM

Organizational Structure

Commissioner Carter Strickland, Jr. was appointed Commissioner of the NYCDEP in August 2011 to replace Commissioner Cas Holloway who accepted an appointment as the Deputy Mayor of Operations. Prior to this current position, Commissioner Strickland was the former NYCDEP Deputy Commissioner of Sustainability. He continues to manage the agency based upon the four core functions of NYCDEP, as set out in the Strategic Plan: (1) Utility Service (water and wastewater operations), (2) Capital Program Delivery, (3) Regulatory Compliance (Air, Water, and Environment), and (4) Financial Management:

- The Utility Group consists of the three operating Bureaus: Bureau of Wastewater Treatment (BWT), Bureau of Water Supply (BWS) and Bureau of Water and Sewer Operations (BWSO), along with the Office of Strategic Planning (OSP) and the newly formed Office of Energy. All operating bureaus coordinate activities through the Chief Operating Officer (COO). The key responsibilities of each operating bureaus in the Utility Group are:

- BWT is responsible for the operation and maintenance of the fourteen in-city WWTPs, the City's wastewater pump stations, interceptor regulators, sludge dewatering facilities, fleet of marine vessels, laboratories, and the control of discharges from combined sewer overflows. BWT has recently undergone organizational restructuring to implement greater efficiencies at WWTP operations. Six Area Facility Managers have been appointed to provide senior leadership in the operation of the fourteen wastewater treatment plants. Working with the Chief Operators of the individual plants, the Area Facility Managers provide overall operational consistency. Each Area Facility Manager is assisted by a Maintenance Manger that has brought greater efficiency to plant maintenance.
- BWS is responsible for managing, operating, maintaining and protecting the City's upstate water supply system to deliver a sufficient quantity of high quality drinking water. BWS is also responsible for the management, operation and maintenance of the CAT/DEL UV Disinfection Facility.
- BWSO is responsible for the operation and maintenance of the City's drinking water distribution and wastewater collection systems. BWSO will also be responsible for the management, operation and maintenance of the Croton WFP when the new facilities are commissioned. In 2011, a new unit was formalized within BWSO to address Capacity, Management, Operations, and Maintenance (CMOM) program related issues with specific Standard Operating Procedures (SOPs) in place. This group utilizes proactive strategies to focus on target areas that have recurring problems to reduce such problems in the collections system.
- OSP is responsible for development and update of the Strategic Plan, the implementation of transparent performance metrics for each of NYCDEP's four core functions, the development and implementation of an asset management system to guide capital investment prioritization and more recently the coordination of the Operation Efficiencies, OpX program.
- Office of Energy is responsible for the consolidation of energy issues and initiatives from all NYCDEP bureaus. The Office of Energy will perform planning and strategy, along with energy policy decisions and program implementation of NYCDEP energy projects.
- BEDC is the bureau responsible for managing the design and construction of major capital projects, including major water transmission facilities, water treatment facilities, wastewater treatment and disposal facilities, wastewater pumping stations stormwater/CSO facilities. BEDC continues to implement improvements to overall business practices, increase efficiencies and implement standardization across BEDC in cost estimating, project scheduling, project delivery, contract structure and change order procedures. Phase I of the Project Management Information Systems (PMIS) has been rolled out this past year which will continue to make project management functions more efficient by tracking cost and project schedule performance. BEDC in-house design department also continues to strengthen. BEDC recently reorganized to create a new group for the project delivery of the Water for Future program. The Water for Future program organization is designed to promote inter-bureau coordination due to the magnitude and complexity of the program.
- The Sustainability Group is responsible for the development and implementation of environmental policy and strategy, including water and air quality, the noise code, and other quality of life issues. The Group includes the Office of Green Infrastructure (OGI), Bureau of Environmental Planning and Analysis (BEPA) and Bureau of Environmental

Compliance (BEC). An Office of Green Infrastructure has been established to support and implement the Green Infrastructure Plan. This group will continue to work closely with the NYC Department of Design and Construction (DDC). BEPA is responsible for conducting environmental reviews for NYCDEP, providing technical assistance for the preservation of natural resources, conducting long range planning (population/employment, consumption and demand/flow), conducting strategic planning to help ensure appropriate forecasting, trend analysis, regulatory review, scientific modeling, and research. BEPA is also continuing the work of the climate change task force, and helping NYCDEP plan for the new growth stimulated by rezoning throughout the City. BEC is made up of the Division of Air & Noise Policy, Permitting and Enforcement and the Asbestos Control Program. BEC is responsible for responding to air and noise code complaints, maintaining the database of facilities containing hazardous and toxic material, overseeing remediation of hazardous waste municipal landfills, managing investigation of contaminated sites and responding to hazardous material emergency incidents. The Sustainability Group is also responsible for implementing PlaNYC initiatives throughout the agency, and will also develop long-term strategies to meet the NYCDEP's water quality goals.

- The Chief Financial Officer (CFO) is responsible for financial management of NYCDEP. In this capacity, the CFO oversees the Budget Office and the Bureau of Customer Service. The CFO is also responsible for overseeing the administrative functions consisting of procurement, information technology, engineering audit and facilities.

Other key components of the NYCDEP organizational structure consist of:

- Environmental Health & Safety (EH&S) is responsible for a comprehensive EH&S compliance program, all EH&S training, audits, EH&S employee surveys and the NYCDEP internal compliance office.
- Organizational Development is a newly formed group that is responsible for human resources, training, succession planning, labor relations and discipline.
- Legal Affairs is responsible for handling NYCDEP's legal matters.
- The Bureau of Police and Security is responsible for protecting the City water supply and the associated critical infrastructure from terrorism, pollution and crime.
- Executive includes the Commissioner and Chief of Staff, as well as the Bureau of Communication and Intergovernmental Affairs.

7.0 STRATEGIC PLAN

NYCDEP released its Strategic Plan (2011 – 2014) in February 2011 which established a plan to achieve the agency's core objectives over the long-term in a safe, cost-effective, efficient and transparent way. The Strategic Plan established 29 goals for NYCDEP's core functions and launched 100 initiatives to reach most of these goals within the next four years. The following areas are addressed in the Strategic Plan:

- Strategic Planning and Performance
- Customer Service
- Worker safety, public health and environmental protection

- Operations
 - Water Supply
 - Water Distribution
 - Wastewater Treatment
- Capital
- Sustainability
 - Regulatory Relationships and Policy
 - Harbor Water Quality
 - Energy
 - Hazardous Materials
 - Air and Noise Pollution

The Strategic Plan presents significant programs that are already underway (such as Croton, UV, City Tunnel #3, WWTP upgrades) and other programs that are in the early implementation phase (such as the Water for the Future program and the Green Infrastructure Plan). The Strategic Plan discusses implementation of several cost-effective strategies into their overall plan such as: green infrastructure implementation to improve water quality and provide other sustainability benefits; energy goals of reduced electrical demand and investment in cost effective clean energy projects; and improvements in the implementation of the CIP with an improved asset management tool, better business practices and further project controls. This Strategic Plan incorporated the significant progress that has been made for the water and wastewater system along with the plans for the future of the agency to continue in a forward-thinking positive direction, into a comprehensive plan. Several projects discussed in the strategic plan are also addressed later in this report.

The 2011 Strategic Plan Update was issued in March 2012, which showed 99% of NYCDEP's initiatives were achieved or underway in the first year. The 2012 Update is expected to officially be released soon which will reflect continued implementation in the NYCDEP Strategic Plan.

8.0 CAPITAL IMPROVEMENT PROGRAM (CIP)

8.1 Overview

Budgeting is a lengthy and comprehensive process, especially for an agency operating such a large and complex system as is the responsibility of the NYCDEP. NYCDEP budgeting is an ongoing iterative process that takes into account legal mandates, mayoral initiatives such as PlaNYC, state of good repair (SOG) projects to maintain permit compliance, capacity issues, dependability, environmental, health, and safety (EH&S) compliance requirements, community drivers, climate change adaptation and other facility improvements. Project schedules, cost estimate updates, technical issues, regulatory updates, emergency events and legal issues may impact project prioritization and the overall budgeting process.

The NYCDEP CIP consists of the Ten-Year Capital Strategy, along with the Four Year Current Capital Plan, which is updated quarterly. The Ten Year Strategy is updated every two years. The Preliminary Ten Year Capital Strategy for FY 2013 through FY 2023 was released on January 29, 2013 and is the document considered herein. This review includes the budget for FY 2013, which ends on June 30, 2013, and the budget for FY 2014, which begins on July 1, 2013. AECOM has reviewed the Preliminary Ten Year Capital Strategy and met with key individuals responsible for budgetary planning to provide an independent assessment of its adequacy. It is anticipated that the Mayor will issue the Executive Budget in April 2013. Our findings are summarized in the following paragraphs.

Regarding FY 2013

The Preliminary Plan FY 2013 budget is set at approximately \$2.27 billion. Approximately 23% of FY 2013 funding supports mandated projects, such as the combined sewer overflow (CSO) work (both green infrastructure and grey infrastructure projects) and filtration avoidance determination (FAD) requirements, total residual chlorine (TRC) program and the nitrogen control program. Additional funding (Change orders) is provided in FY 2013 for the following mandated projects: Croton WFP, CAT/DEL UV Facility and Newtown Creek WWTP. NYCDEP has indicated that all legally mandated projects are fully funded in FY 2013. Significant funding is also included in FY 2013 for Water for the Future program (Rondout-West Branch tunnel by-pass, repairs and water supply augmentation), City Tunnel #3 connections, wastewater treatment plant SOGR projects, water supply infrastructure SOGR projects, water distribution system and wastewater collection sewer work.

Regarding FY 2014

The Preliminary Plan FY 2014 budget is set at approximately \$2.03 billion. Approximately 24% of FY 2014 funding supports legally mandated projects, such as CSO projects (grey and green infrastructure), FAD requirements, total residual chlorine (TRC) program, the nitrogen program, along with Croton and UV Facility change orders. NYCDEP believes that all legally mandated projects will be fully funded in FY 2014. Significant funding is also included in FY 2014 for Water for the Future projects, City Tunnel #3 connections, Bluebelt initiatives, Gilboa Dam reconstruction, wastewater treatment plant SOGR projects, water supply infrastructure SOGR projects, water distribution system and wastewater collection sewer work.

Regarding the Ten Year Capital Strategy for FY 2013 to FY 2023

The Preliminary Ten Year Capital Strategy for FY 2013-2023 consists of about \$14.43 billion in funding. Approximately 17% of the total funding for FY 2013-2023 is dedicated to mandated projects, which is consistent with the recent trend of decreasing NYCDEP mandated projects, as shown in Figure 4. As shown in Figure 4, FY 2008 through FY 2012, the overall budget consisted of a high percentage of mandated project costs (Croton WFP, UV Facility, Newtown Creek WWTP); however, the portion of mandated projects has been decreasing in this current budget plan. As a consequence, the majority of the capital improvement program must be planned and budgeted based solely on its importance to the overall System and NYCDEP prioritization as determined by NYCDEP.

As in most US cities, the NYCDEP infrastructure is aging. Therefore, it is necessary to refurbish or replace infrastructure in a planned manner to cost effectively minimize risk of failure. The NYCDEP has refined and implemented their Asset Management program significantly in order to set priorities for the continued refurbishment of its physical assets. The Asset Management program provides a uniform methodology for a comprehensive evaluation of capital assets throughout the System and allows a systematic approach to maintain and upgrade physical assets so that capital improvements can progress in an orderly manner.

Currently, the non-mandated improvements include a significant amount of funding for the Water for the Future program, SOGR projects, and water distribution system and sewer projects. Approximately 10% of the FY 2013-2023 budget is set aside for Water for the Future program. Approximately 36% of the total funding for FY 2013-2023 is dedicated to the SOGR projects which is an increase compared to previous years. NYCDEP is making significant strides in dedicating funds to the SOGR projects across all bureaus.

NYCDEP will continue to be a strong advocate for prioritizing water quality projects and the affordability issue. NYCDEP is a member of the National Association of Clean Water Agencies (NACWA) Money Matters Task Force and continues aggressive discussions with regulators.

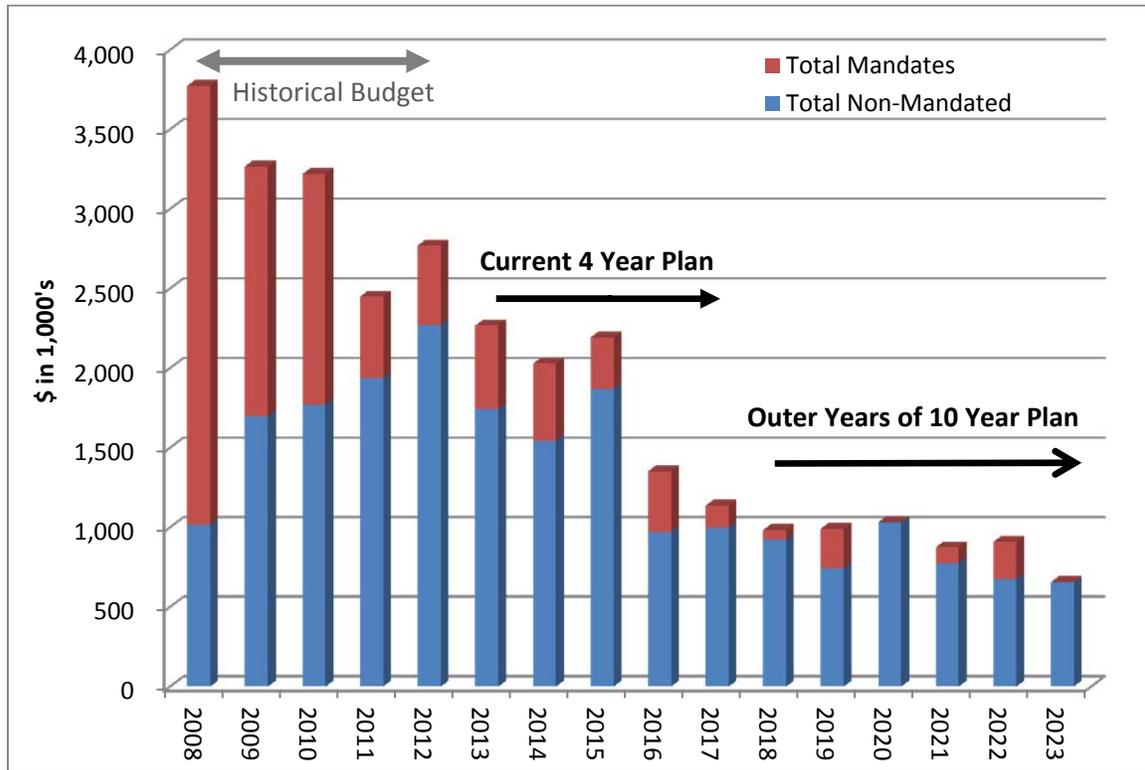


Figure 4: NYCDEP Historical and Projected Budgets

8.2 System-wide Programs

Asset Management

Building on past experience, NYCDEP has made further efforts to refine their asset management program and expanded it to include the majority of the water and wastewater infrastructure. The results of the asset management program has been used in the development of the funding needs for the state of good repair for the current Preliminary Ten-Year Capital Strategy. This ongoing effort is based upon a collaborative approach between the operating bureaus (BWT, BWS, and BWSO) and BEDC so that all stakeholders have input throughout the process. Business case project prioritization is based upon a scoring of the following criteria: physical condition, performance/process condition, regulatory/environmental, service level/reliability, efficiency/energy, O&M and hazard, growth/public/community, public image and financial. NYCDEP will perform continuous real time updating of the status of the many NYCDEP physical assets to reflect completion of improvement projects and condition survey updates for operating assets. The principles of asset management have been effectively applied to many water and wastewater utilities worldwide and the NYCDEP's progress in asset management is a positive development. It is anticipated that NYCDEP will continue to build their asset management program to include operations and maintenance data to achieve a full comprehensive formalized Asset Management program for all assets. All potential projects receive a numerical rating. The capital program for the state of good repair projects is determined based upon the highest numerically rated projects within the available funding.

Sustainability and Greenhouse Gas Emissions

In April 2011, Mayor Bloomberg released an updated full PlaNYC Update Report: A Greener, Greater New York, an update on the comprehensive sustainability plan for New York City's future. In 2012, an

annual PlaNYC Progress Report was issued. This plan focuses on five key target areas of the City's environment – air, land, water, energy and transportation. From NYCDEP's perspective, three major initiatives have moved to the forefront and are currently being incorporated into NYCDEP's planning and design projects. These initiatives include climate change adaptation (as discussed in Section 5), greenhouse gas reduction and energy planning.

Greenhouse Gas Reduction Requirements. As part of PlaNYC, the City has committed to reducing its municipal greenhouse gas emissions by 30% below FY 2006 levels by FY 2017. NYCDEP is continuing a project to develop a strategic plan to meet the 30% reduction. NYCDEP continues to fully inventory its annual greenhouse gas emissions, which identifies the largest emissions sources and greatest opportunities for reductions, and continues to quantify the impact of ongoing and planned projects on the inventory. Although substantial energy consumption increases are expected over the next several years system-wide, largely driven by mandated activities, NYCDEP is diligently pursuing projects that reduce greenhouse gas emissions and improve energy efficiency. Current planned and on-going energy and greenhouse gas-related projects bring NYCDEP very near their overall reduction goals. NYCDEP has completed detailed energy audits of all fourteen WWTP facilities to identify additional opportunities for energy reduction and develop the strategic plan to meet the PlaNYC goal. Building on that effort, results of these energy audits help NYCDEP fully understand how energy is being used at its facilities, identify low and no-cost operational modifications that will meaningfully reduce on-site energy consumption and GHG emissions, and identify capital projects with favorable payback periods to further reduce energy consumption and GHG emissions.

Energy Planning. With new systems and facilities coming on-line, it is in the best interest of the Agency to assist in the planning of reliable sources of power, both from conventional and renewable sources. NYCDEP's Office of Energy will coordinate all NYCDEP initiatives. One particular project that appears to be promising is the Newtown Creek/National Grid Partnership, however it is currently being evaluated to determine the most appropriate business model. As NYCDEP's largest WWTP, Newtown Creek produces an excess of anaerobic digester gas (ADG) that is typically flared in its flare towers. In this new partnership, NYCDEP will send ADG to a processing facility, where the ADG will be converted to pipe-line quality gas, which will then be added to National Grid's natural gas supply. This project will improve local air quality, reduce City-wide greenhouse gas emissions, utilize a renewable energy resource, and increase City-wide natural gas supply. Other energy projects that NYCDEP is pursuing are cogeneration facilities, hydropower and solar panels at NYCDEP facilities.

NYCDEP holds a preliminary permit from the Federal Energy Regulatory Commissioner (FERC) to investigate the installation of hydro-electric turbines at NYCDEP upstate dams to harness hydro power. NYCDEP continues to evaluate the economic feasibility of constructing these hydroelectric facilities at the dams on three Delaware reservoirs and one Catskill reservoir. NYCDEP's main concerns are dam safety, maintaining operational control over the dams and the ability to meet flow management agreements.

8.3 Capital Program Accomplishments

There are a number of capital program accomplishments during the past year that are noteworthy. These items play an essential role in the development and advancement of the CIP, and providing for prudent and professional management of the System.

- Completion of \$1.6 billion UV Facility at the NYCDEP Eastview site to provide secondary disinfection of the Delaware and Catskill water supplies.
- Water for Future program has moved into the construction phase, with the commencement of the site preparation work for construction of shafts.

- Tunneling operations for the Staten Island siphon project began which replaces (2) existing siphons between Brooklyn and Staten Island to convey water supply to Staten Island. NYCDEP is in partnership with Port Authority of New York and New Jersey and NYC Economic Development Corporation (NYCEDC).

8.4 Capital Improvement Program Highlights for the Water System (Supply, Treatment, and Conveyance Programs)

Water for the Future Program

The Water for Future program consists of two main components – fixing the Delaware Aqueduct in two areas where significant leaking has been noted (installing a by-pass tunnel and making repairs) and supplementing NYC water supply during the period when these water transmission elements are out-of-service for repair. The Water for the Future program is a comprehensive program that requires thorough coordination throughout the entire NYCDEP. A strong organizational structure is in place within BEDC and across all operating bureaus (with designated liaisons) and executive management, to continue with the planning and implementation of the Water for Future program. The final environmental impact statement (EIS) for the by-pass tunnel and repair component of the Water for the Future program was released in June 2012. There is over \$1.4 billion in funding in the Preliminary Ten Year Capital Strategy for the Water for the Future program, which consists of \$760 million for the by-pass tunnel and repairs and \$400 million in water supply augmentation projects (when the Delaware Aqueduct is not in service for by-pass connection). Engineering studies conducted during the progression of the project development have identified program improvements that will result in shorter shutdown periods and less required water supply augmentation reducing the overall program cost by \$400 million than originally estimated.

Since the early 1990s, NYCDEP has closely monitored the Rondout-West Branch (RWB) Tunnel portion of the Delaware Aqueduct that has shown evidence of deterioration (water leaks). NYCDEP has a series of tunnel leak investigations including geological investigations, tunnel flow monitoring, well monitoring, surface expression monitoring, automated underwater vehicle (AUV) investigations, and a series of dives and investigations at Shaft #6. NYCDEP plans to perform another AUV run in the Spring of 2013 to continue to monitor the conditions in the tunnel. After evaluating several repair alternatives, NYCDEP decided on a comprehensive plan to build a three-mile bypass tunnel around the leaking (deteriorated) section in the area of Roseton, NY and to perform repairs of the concrete liner in other areas near Wawarsing, NY. NYCDEP's schedule for the repair consists of beginning tunnel construction in 2015. NYCDEP is also evaluating the effectiveness of lime addition to seal the cracks from within the tunnel. The chemical addition project, which includes building a small-scale water system that replicates full-scale water supply conditions, will help the city better determine if full-scale application of lime will be successful. NYCDEP has conducted emergency planning for the RWB tunnel involving NYC, NYS Office of Emergency Management (OEM) and surrounding County agencies.

The NYCDEP has been evaluating strategies for water supply augmentation to meet the demands of the system when water supply system components are out-of-service either planned or unplanned. Several projects are funded in the Preliminary Ten Year Capital Strategy to provide operational flexibility for NYCDEP to provide safe, reliable additional water supply when the Delaware Aqueduct is shutdown for a period of approximately six months to connect the bypass tunnel to the existing tunnel and to make the other repairs. NYCDEP is currently planning to implement the following projects which would be in place before the tunnel is taken out of service: conservation measures, optimization of the Catskill Aqueduct to increase its capacity, reactivation of the Queens groundwater system and possible interconnections with Nassau County, New York.

Increasing groundwater supply in Jamaica Bay has been identified as a project to supplement NYC water supplies: Drilling wells and treating groundwater is funded at \$110.6 million. The construction

contracts to allow for the interconnection of the Delaware Aqueduct with the Catskill Aqueduct at Shaft #4 was awarded for \$21 million in November 2012. The implementation of conservation measures is also funded at \$53.8 million. NYCDEP anticipates a 5% reduction of water demand due to planned demand management strategies, such as the Municipal Water Efficiency Program (MWEF) and the Residential Water Efficiency Program. A project to increase the capacity of the upper Catskill Aqueduct is funded at \$164 million. Funding for connections between NYC and Nassau County groundwater is in the Current Capital Plan at a level of \$29.3 million. The Croton Falls Pump Station is funded at \$42.9 million in FY 2013. The Cross River Pump Station upgrade was just recently completed. These two pumping stations provide conveyance flexibility to NYCDEP and would permit Croton water to be supplied to the Delaware Aqueduct if required in emergencies.

Catskill/Delaware Water Supply System Filtration Avoidance

NYCDEP continues to operate under the 2007 Filtration Avoidance Determination (FAD) for the Catskill/Delaware systems. The 2007 FAD consists of a watershed protection program for 2007-2017, consisting of two five-year periods. The United States Environmental Protection Agency (USEPA) transferred primacy to the New York State Department of Health (NYSDOH) after the 2007 FAD was issued.

NYCDEP issued the 2011 Long-Term Watershed Protection Plan to the NYSDOH and the USEPA in December 2011 which provides a summary of accomplishments under the FAD and water quality results and it will form the basis for the continuation for the second five years of the current FAD. This report identifies the plan and schedule for the second five years of the FAD, 2012-2017. The report addresses several FAD programs (such as septic and sewer rehabilitation/replacement program, upstate wastewater treatment upgrade program, stormwater management program, waterfowl management program, land management, watershed agricultural program, and wetlands protection program) which were evaluated to determine the continuation of certain programs for the second five year period. Although the regulators are still finalizing the next five-year FAD, the existing FAD remains in effect and NYCDEP has continued with existing programs. It is anticipated that the continuation of the FAD for the second five years will be issued in mid-2013 calendar year. The continuation of the FAD programs is funded in the Preliminary Ten Year Capital Strategy at a level of approximately \$286.1 million. Additional funding will also be required beyond FY 2017, for the continuation of future FAD programs.

Under the current FAD, NYCDEP is required to continue a land acquisition program (LAP) for the ten years covered by the FAD. NYCDEP received a new 15-year New York State Department of Environmental Conservation (NYSDEC) land acquisition permit in December 2010, which will allow the City to continue to acquire environmentally sensitive land to protect the watershed, while making sure that the upstate community interests and economic development is protected.

USEPA, NYSDEC and NYSDOH have endorsed the operational modifications that NYCDEP proposed for the Schoharie Reservoir and the Ashokan Reservoir with the implementation of an OST model. NYCDEP's OST links water quality and water quantity models, uses near real-time data for reservoir levels, stream flows entering reservoirs, snowpack and water quality in streams and reservoirs, and it includes National Weather service forecasts. NYCDEP has held workshops for technical review of the OST modeling and monitoring system by leading water supply experts, water scientists, academics and engineers. NYCDEP's OST is being rolled out in phases with full implementation planned for the end of 2013.

CAT/DEL UV Disinfection Facility

The FAD also includes the construction of a UV Disinfection Facility to treat water from the Catskill and Delaware (CAT/DEL) watersheds. Operation commenced at the UV Facility at the Eastview site by October 2012 in advance of the UV Administrative Consent Order. The order also provides a

schedule for validation testing, which is required to be completed by October 29, 2013, to ensure compliance with Long-Term 2 Enhanced Surface Water Treatment Rule (LT2). The change orders for this project are fully funded in the CIP at a level of approximately \$25.6 million. NYCDEP will operate the UV Facility once the contractor has completed commissioning and testing of the facility.

The Catskill Aqueduct pressurization project is funded at a level of \$535 million in the Ten Year Capital Strategy. This project will allow additional flows to be conveyed from Kensico Reservoir and treated at the CAT/DEL UV Facility.

Dam Safety

The full long-term rehabilitation upgrades for the Gilboa Dam are anticipated to bring the dam into a state of good repair and in compliance with the NYSDEC dam safety guidelines. The total rehabilitation is funded at approximately \$151.1 million in the Ten Year Capital Strategy, which includes a new low level outlet and rehabilitation of the Shandaken Tunnel intake chamber. The crest gates contract was completed in July 2011. The Olive Bridge Dam at Ashokan Reservoir is funded in the 10 Year Capital Plan with \$102.4 million for state of good repair funding.

In addition to capital programs, BWS maintains an inspection and maintenance program to support dam safety. NYCDEP continues their dam inspection program using engineering contracts and in-house NYCDEP inspectors. NYCDEP operates and maintains a safe dam system based on capital upgrades, inspection and maintenance program, and emergency action plans.

Croton Water Filtration Plant

NYCDEP, USEPA and NYSDOH continue to negotiate revised milestones for the Croton WFP construction schedule due to delays in earlier Croton Filter Consent Decree milestones attributable to a delay in the notice-to-proceed (NTP) for the General (G), Heating, Ventilating and Air Conditioning (HVAC) and Electrical (E) construction contracts and slow progress by the E Contractor. BEDC is monitoring construction and is working diligently to maintain construction progress. NYCDEP's current estimate for the start-up and testing of operations is Summer 2013. The Croton WFP is divided into Plant A and Plant B. Commencement of Plant A operations is currently scheduled November 2013 and commencement of Plant B operations is currently scheduled for February 2014. Discussions will continue with NYCDEP and the regulators regarding operation of the Croton WFP and the schedule. Approximately \$214.3 million is included in the CIP for the remaining facilities associated with the Croton WFP, which includes the off-site facilities, the permanent Mosholu Golf Club House and construction change orders. Funding of approximately \$55 million is included in the CIP for payments to the Parks Department in connection with the Croton WFP. NYCDEP evaluated alternatives to provide standby power for the Croton WFP to increase dependability if there was a major power outage. The additional work is currently not funded in the Croton budget. Standby power is not part of the critical path for completing construction and starting-up the Croton WFP.

The new electrical subcontractor has increased productivity, but the electrical work remains behind schedule. The General Contractor for the Croton Water Filtration Plant is finishing installation of equipment, instrumentation and controls, and the other contract work is progressing to keep pace.

Con Edison energized two of the new electrical feeders to the plant late 2012; the remaining two feeders will be energized in early 2013. The tunnel contract has been completed. Construction of the Offsite Facilities at Jerome Reservoir and Gate House No. 1 is proceeding. Completing work at Gate House No. 1 is being delayed while waiting for Con Edison to install a new electrical service to the gate house. The force main contract is being terminated and the WFP residuals will be discharged to the sewer in Jerome Avenue.

Rehabilitation of the NCA is virtually complete. The NCA Contractor expects to complete the work by Spring 2013, so that the NCA is operational in time for the start-up of the Croton Water Filtration Plant. The above grade work and other change order work for the filtration plant will be completed by 2015. The NCA is funded with \$16.2 million in the Preliminary Ten Year Capital Strategy.

City Tunnel No. 3, Stage 2

NYCDEP has accelerated funding for the activation of City Tunnel No. 3, Stage 2, Manhattan leg to support an aggressive schedule for activation by the end of 2013. It is currently funded at \$66 million in the CIP for connections and activation of the Manhattan segment. Significant coordination among NYCDEP, Department of Design and Construction (DDC) and Department of Transportation (DOT) is ongoing regarding the challenging issues associated with the connection of shafts and the distribution mains.

Funding of \$402.1 million is included in the Ten Year Capital Strategy for City Tunnel No. 3, including completion, activation and shaft work. On completion of City Tunnel No. 3, NYCDEP will have significantly increased conveyance capacity downstream of Hillview Reservoir which will enable NYCDEP to take City Tunnel No.1 out-of-service for inspection and repair for the first time since it was put into service in 1917. This project provides critical redundancy for water conveyance to NYC.

Hillview Reservoir

The Hillview cover has been required due to federal regulations administered by USEPA and an Administrative Consent Order with NYSDOH, which includes a schedule for installation. NYCDEP and USEPA executed a revised Administrative Order in May 2010, which provided an extension of time for construction of the Hillview cover. According to the current order, the site preparation construction contract is required to start by January 31, 2017, construction start for the East Basin cover is required by December 31, 2018, and construction completion of the cover by May 31, 2028. This revised Order also allowed NYCDEP to submit an additional time deferral request. In October 2010, NYCDEP requested an additional six years, due to planned water system projects that would not permit Hillview cover construction simultaneously. In February 2011, NYCDEP received a letter from the United States Department of Justice (USDOJ) indicating that this issue had been referred to them.

In August 2011, USEPA announced that it is reviewing the LT2 requirements for controlling microbial risks, including covering reservoirs, such as Hillview Reservoir. USDOJ and the City have agreed to defer negotiations over revised dates until USEPA completes its review. NYCDEP is currently in compliance with the Administrative Order. NYCDEP submitted a proposal to the USEPA in the Spring of 2012, and it is under review.

There is approximately \$23.4 million for design modifications to the Hillview cover in the Ten Year Capital Strategy; there is no funding for construction of the Hillview cover. Depending upon the outcome of the USEPA review and the discussions regarding the additional time extension, funding may be required in a future budget planning period.

Funding is included in the Preliminary Ten Year Capital Strategy for state of good repair upgrades planned at Hillview Reservoir. Approximately \$392 million is included for the modification of chambers at Hillview. Approximately \$1.3 million is included in the budget for the Hillview Chlorination Building to improve chemical deliveries and security of the building.

8.5 Capital Improvement Program Highlights for the Wastewater and Stormwater System

Combined Sewer Overflow (CSO) Program/Green Infrastructure Plan

NYCDEP released its Green Infrastructure Plan in September 2010, which outlines a comprehensive long-term hybrid approach of grey and green infrastructure implementation to address water quality issues and other public sustainable benefits. Green infrastructure is an approach to wet weather management that is cost-effective, sustainable and environmentally friendly. The overall goal of NYC's Green Infrastructure Plan over the next 20 years is to capture the first inch of rainfall on 10% of the impervious areas in combined sewer watersheds through detention or infiltration. The Green Infrastructure Plan presents a savings of approximately \$2.4 billion over twenty years with implementation of green infrastructure compared to the all-grey infrastructure strategy (tanks, tunnels and WWTP expansions).

Implementation of this plan requires significant coordination among several city agencies and this effort is ongoing with the Green Infrastructure Task Force. In collaboration with other city agencies NYCDEP has built several demonstration projects for a variety of land uses, such as blue roofs/green roofs, porous pavement, tree pits, street side swales, green streets, constructed wetlands, and rain barrels. Several cities across the country have implemented green infrastructure for wet weather management and water quality control issues. Up to \$6 million in grants will be available through the 2013 Green Infrastructure Grant Program for green infrastructure projects such as right of way bioswales, blue roofs, green roofs and porous pavement on private property and in sidewalks in combined sewer areas.

NYCDEP and NYSDEC held a series of successful negotiations with regard to modifying the 2005 CSO Order to eliminate/change some grey infrastructure requirements to more cost-effective grey alternatives, to modify the Long-Term Control Plan (LTCP) submittal dates and to incorporate green infrastructure into the CSO Order. The 2012 CSO Consent Order Modification became effective March 2012. NYCDEP and NYSDEC have negotiated a hybrid approach of green and grey infrastructure control strategies. The modified Consent Order is based upon an adaptive management approach to solving the CSO water quality issues. The modified Order calls for \$187 million in green infrastructure in the next four years to meet the first milestone by December 31, 2015, which is capturing the equivalent of stormwater generated by one-inch of precipitation on 1.5% of impervious areas citywide. The NYCDEP is currently on track to meet this first aggressive milestone with the installation of several thousand effective right of way (ROW) bioswales throughout the City. Standard designs have been approved for the ROW bioswales. By June 30, 2016, NYCDEP is required to develop and submit to NYSDEC CSO performance metric. The Alley Creek LTCP is due to NYSDEC June 2013. NYCDEP has missed some milestones and has requested a time extension.

NYCDEP has implemented a CSO monitoring pilot program, with the installation of remote sensors that monitor combined sewer overflows in real time at five CSO outfall locations. The pilot objectives are to better understand the effects of combined sewer overflows and improve the public notification system for CSOs.

The Ten Year Capital Strategy includes approximately \$730 million is funded for green infrastructure and approximately \$445 million is included for grey infrastructure for a combined funding of \$1.175 billion in capital projects for implementation of the CSO Program.

Cogeneration Facility at North River WWTP

A project for a Cogeneration Facility at North River WWTP was developed as a sustainability project to meet the needs of PlaNYC GHG emissions and achieving a SOGR to replace the main sewage pumps and engine blowers that are near the end of their useful life. The North River WWTP Cogeneration Facility is funded in the Ten Year CIP at a level of \$212 million. An additional \$20 million in funding is available from PlaNYC funding. This project consists of replacing the main sewage pump drives, the aeration blowers, and the aeration blower drives. The new cogeneration facilities will provide new gas driven engines and generators which will electrically drive the main sewage pumps and the new aeration blowers. The project is under design. Upon completion of the

30% design, all major facility improvements will be fully defined so that the capital improvement budget requirements can be fully confirmed. When completed, the cogeneration will provide all the electrical and heat energy necessary to operate the North River WTP.

Citywide Nitrogen Removal Program

Regarding the Upper East River and 26th Ward WWTPs

The Upper East River WWTPs (Hunts Point, Bowery Bay, Tallman Island, and Wards Island WWTPs) and the 26th Ward WWTP have been undergoing BNR upgrades as required by the Nitrogen Consent Judgment for the Phase I Facility Plan. Bowery Bay WWTP completed construction for the Phase I nitrogen removal upgrades and started operation of biological nitrogen removal in June 2012. Hunts Point WWTP completed construction in the Summer of 2010. The full-scale 25-mgd BNR demonstration project at Wards Island WWTP came on-line in December 2008; this demonstration project will serve as a testing facility for various operational control and optimization strategies that the City can implement at its other BNR installations. The SHARON® (Single reactor system for high activity Ammonium Removal Over Nitrite) demonstration facility came on-line in November 2009. The Wards Island WWTP and Tallman Island WWTP are still in construction for BNR upgrades. The Tallman Island WWTP nitrogen upgrade has had a series of delays. NYCDEP continues to work with the regulators for revisions to the Nitrogen Consent Judgment due to these delays.

In accordance with the Nitrogen Consent Judgment, NYCDEP submitted a Basis of Design Report (BODR) for the Phase II BNR upgrades to NYSDEC in June 2011. NYSDEC issued comments to the report and upon addressing the comments, NYCDEP submitted the final BODR to NYSDEC in December 2011. Glycerol has been selected as the supplemental carbon source for additional nitrogen removals. The carbon addition for Hunts Point WWTP is required by August 2014 and funding of approximately \$0.8 million for construction is included in FY 2013. Additional funding of \$56.2 million is included in the CIP for construction of supplemental carbon facilities for the remaining UER WWTPs (Bowery Bay, Tallman Island and Wards Island WWTPs) for Phase II BNR. Construction completion for these carbon facilities is required by July 2016.

Regarding Jamaica Bay

26th Ward WWTP completed construction for the Phase I nitrogen removal upgrades and started operation of biological nitrogen removal in December 2010. NYCDEP and NYSDEC entered into an agreement to upgrade the Jamaica WWTP to reduce nitrogen discharges. A Stipulation and Order Modifying the Nitrogen Consent Judgment became effective October 2009, which added nitrogen removal upgrades at the Jamaica WWTP. NYCDEP, NYSDEC and Natural Resources Defense Council (NRDC) have entered into a Jamaica Bay Agreement which addresses nitrogen removal upgrades at Rockaway WWTP and Coney Island WWTP, construction milestones for the Jamaica Bay WWTPs interim nitrogen effluent limits for Jamaica Bay and the funding of an environmental benefits project for the saltwater marsh restoration in Jamaica Bay. Funding is currently included in the CIP for the nitrogen removal upgrades at Coney Island at a level of \$27 million and Rockaway WWTP at a level of \$27 million for each plant in the CIP. NYCDEP is evaluating alternatives for future use and operations at the Rockaway WWTP facility. Carbon addition for Jamaica WWTP and 26th Ward WWTP is funded in the CIP for \$23 million and \$14.8 million, respectively.

As of January 1, 2012, NYCDEP is in compliance with the step down combined nitrogen limit for the Jamaica Bay WWTPs of 36,500 pounds/day of total nitrogen, as required under the Consent Judgment. This is a direct result of the capital upgrades and the operation of the Jamaica Bay WWTPs.

NYCDEP and NYSDEC have negotiated an amendment to the Jamaica Order to take into account NYCDEP's decision to cancel the Ammonia Removal Process (ARP®) System, a separate

sidestream centrate treatment at the 26th Ward WPCP. As part of this amendment, carbon addition (glycerol) will also be added to Jamaica WWTP.

Newtown Creek WWTP Upgrade Program

All Newtown Creek Consent Order milestones are in compliance. In May 2011, NYCDEP certified that the Newtown Creek WWTP meets the effluent discharge requirements of the Clean Water Act, well in advance of the Consent Judgment milestone of May 2013. The Newtown Creek WWTP mandated upgrade projects that are part of the Consent Judgment are funded in FY 2013 at a level of approximately \$7.5 million for construction change orders.

NYCDEP and NYSDEC entered into a Newtown Creek Third Modified Consent Judgment effective August 2009, which addresses a revised construction schedule for the attainment of secondary treatment and completion of all construction at Newtown Creek WWTP, and resolution of penalties for missed milestones. The key elements of the resolution are: (1) Placement of \$29 million in escrow, which can be recovered if NYCDEP meets certain future milestone dates; (2) Establishment of a \$10 million fund for environmental benefits projects (EBP); (3) Performing environmental audits of NYCDEP's in-City wastewater treatment plants and four combined sewer overflow (CSO) facilities, under an agreement that requires NYCDEP to remedy any legal deficiencies uncovered during the audits but protects NYCDEP from penalties for any such deficiencies; (4) The continued implementation of improvements to NYCDEP's business practices related to certain elements of its capital construction program. NYCDEP is required to complete construction of all Newtown Creek mandated work by July 4, 2014. NYCDEP was unable to meet a construction milestone in September 2012 due to problems with faulty Main Sewage Pumps (MSP) received as part of the contract. NYCDEP will provide a revised schedule for the repair of existing pumps or installation of new MSPs to the NYSDEC by March 2013.

Total Residual Chlorine (TRC)

The State Permit Discharge Elimination System (SPDES) permits for each of the fourteen WWTPs calls for an interim effluent limit for total residual chlorine in the effluent of 2.0 mg/l. This interim limit will stay in effect until construction completion of facilities required to achieve compliance with the final water quality based effluent limits. The SPDES permits also include a schedule of compliance for each plant to make improvements to further reduce residual chlorine. The final effluent limit has not yet been determined by NYSDEC. Due to a number of issues, NYCDEP submitted a proposal for permit modification to the TRC compliance schedule requesting additional time to complete these projects. NYCDEP received a NOV from NYSDEC in January 2012 due to missed dates of compliance with TRC requirements in the SPDES.

There is \$142.5 million in the CIP for the TRC program. BNR WWTPs have received an extension until 2026 for construction completion of TRC upgrades at the BNR WWTPs which will allow time for pilot studies. Additional funding may be required for additional TRC upgrades pending the results of additional testing.

Bluebelts

NYCDEP has been developing Bluebelt sites in Staten Island since the 1990s. Bluebelts are an innovative stormwater drainage system made up of manmade and natural wetlands, streams and ponds. NYCDEP has recently expanded the program to park property sites in Queens and the Bronx, and plans to build additional Bluebelts in the Mid-Island region of Staten Island. NYCDEP currently has 55 Bluebelts in planning, 26 in design, and seven in construction. Approximately \$359.5 million is included in the Ten Year Capital plan to expand the Bluebelts for stormwater management.

8.6 Potential Water and Wastewater Projects Beyond Ten Year Capital Strategy

Kensico-City Tunnel (KCT)

Due to other priority needs of the water conveyance system, KCT is currently not in the NYCDEP current financial planning period and therefore, there is no funding included in the CIP. A planning level document recommending general routing of the KCT was completed. The proposed tunnel would extend from the Kensico Reservoir to the interconnecting valve chamber of Tunnel 3, Stage I, south of Hillview Reservoir. Preliminary KCT construction costs are estimated between \$4 and \$6 billion, depending upon specific routing, shaft locations and connections.

Nitrogen Removal in the Harbor Estuary

The New York/New Jersey Harbor Estuary Program (HEP) is a National Estuary Program that has been sanctioned by the USEPA to restore the waters of the Lower Harbor Estuary and the tidally influenced portions of all rivers and streams that empty into the Estuary. The HEP was convened as a partnership of federal, state, and local governments; scientists; civic and environmental advocates; the fishing community; business and labor leaders; and educators (called the Management Conference). NYCDEP submitted a report to USEPA last year that evaluated the capital investment cost of upgrading four WWTPs (Owls Head WWTP, Red Hook WWTP, North River WWTP, and Port Richmond WWTP) to provide nitrogen and carbon removal at four different levels of treatment. The water quality impacts on the Harbor Estuary are now being evaluated by USEPA for the various levels of treatment. Through this methodology, it is expected that USEPA and the Management Conference will determine which treatment upgrades, if any, will be required for NYC. Funding is currently not in the Capital Plan for HEP-related upgrades. Upon completion of the HEP studies and based upon negotiations with USEPA, funding may be required in a later planning period.

9.0 PERFORMANCE OVERVIEW

Water Conservation

Figure 5 presents the annual water demand for the last 20 years. Water conservation measures taken by NYCDEP in the 1990s have resulted in a steady reduction in the overall water demand. More recent declines in water consumption have been noted most likely due to conservation measures, metering, economic downturn and weather patterns.

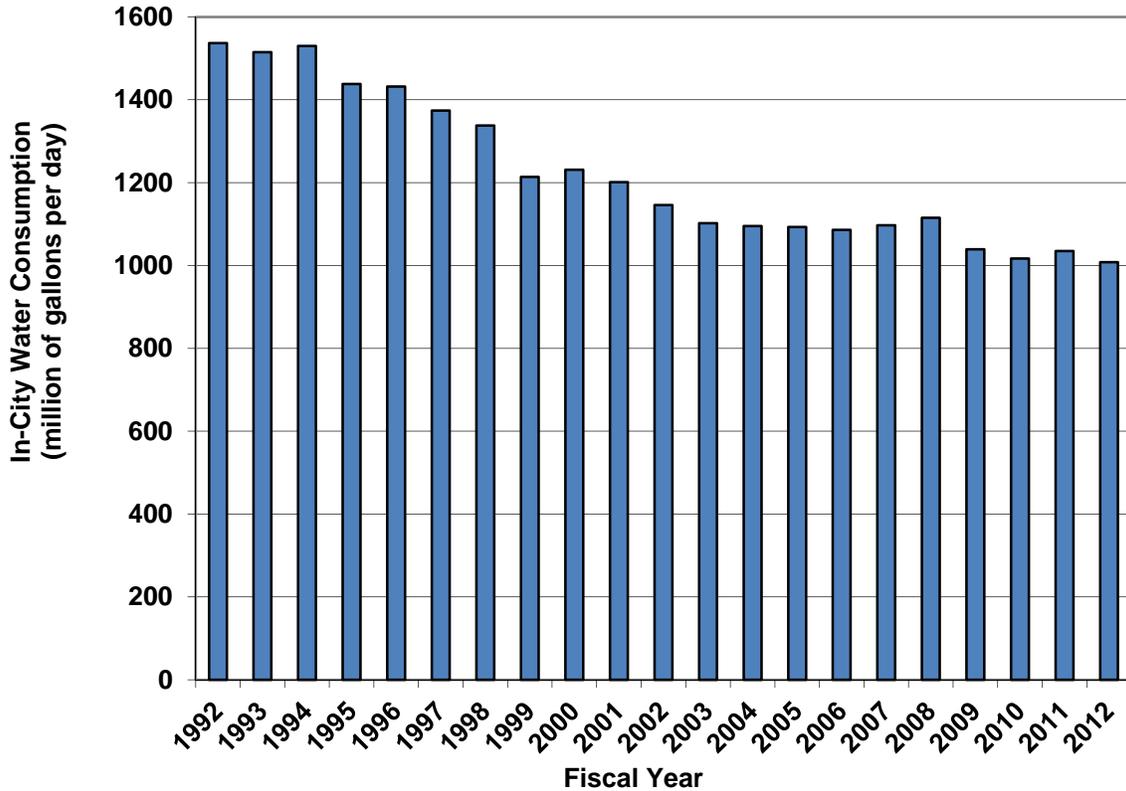


Figure 5: New York City Average Daily Water Demand in Million Gallons per Day (mgd)

System Staffing Levels

Approved positions for the System presently stand at 6,004 for FY 2013 and vacancies currently stand at 480. This reflects a slight net increase in budgeted headcount and an increase in vacancies compared to FY 2012, as shown in Figure 6. Approximately 54 NYCDEP staff have been transferred to other NYC agencies due to the citywide fleet consolidation program. A new class of 72 sewage treatment workers recently completed training for assignment at wastewater treatment facilities or collection facilities. Additional staff have come on board or have been reassigned to operate and maintain new facilities.

Further improvements are underway for the recruitment and personnel procurement process with the recent creation of Organizational Development position within NYCDEP's management. NYCDEP has seen improvements in attracting highly skilled and qualified staff.

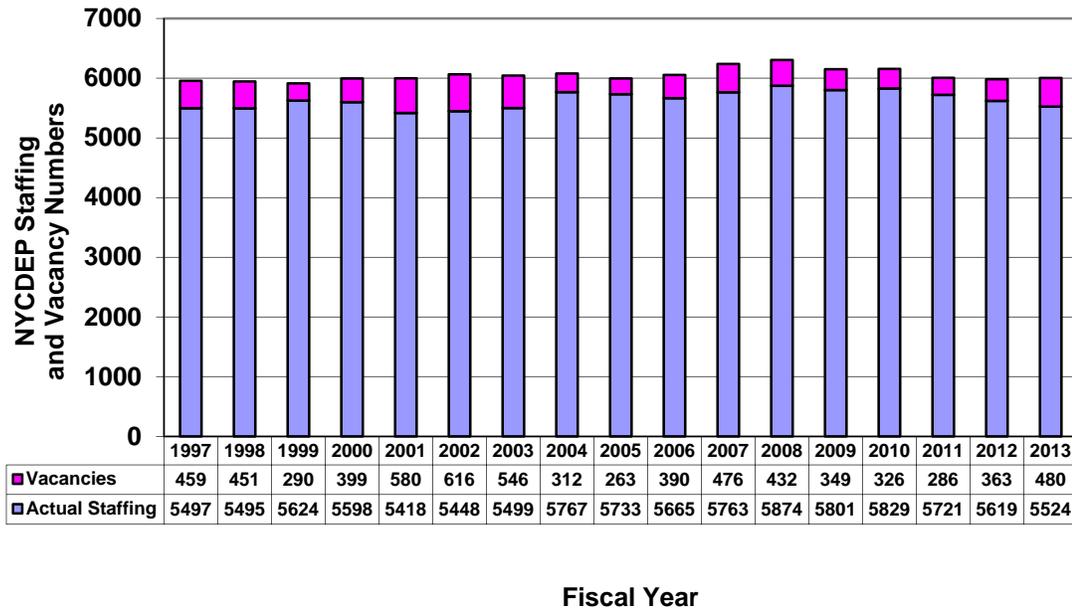


Figure 6: NYCDEP – Staffing and Vacancy Levels 1997-2013

Operational Performance Indicators

There are many operational parameters that can be reviewed to assess the effectiveness of operating programs. NYCDEP continues to use H₂OStat metrics to improve operational efficiencies, drive performance management and increase accountability across the agency. Since the inception of the H₂OStat program, NYCDEP continues to experience good results with improved performance. Several performance indicators for water and sewer operations are summarized below.

There were 370 water main breaks reported in FY 2012, which reflects a decrease in reported water main breaks compared to the previous several years (See Figure 7). This decrease can partially be attributed to milder winter weather. However it is also a function of NYCDEP operations on regulators maintenance and pressure management in the distribution system, as well as additional training at the new BWSO training facility. NYCDEP has expanded its preventative maintenance program to target pressure reducing valves by exercising valves and inspecting regulators to help prevent the occurrence of water main break, costly repairs, leaks and disruption of service. On average, NYCDEP restored water to residents within 4.8 hours after confirming the break, which is less than the previous four years. The range of water main breaks that NYC has recently experienced is below that of other municipalities in the United States.

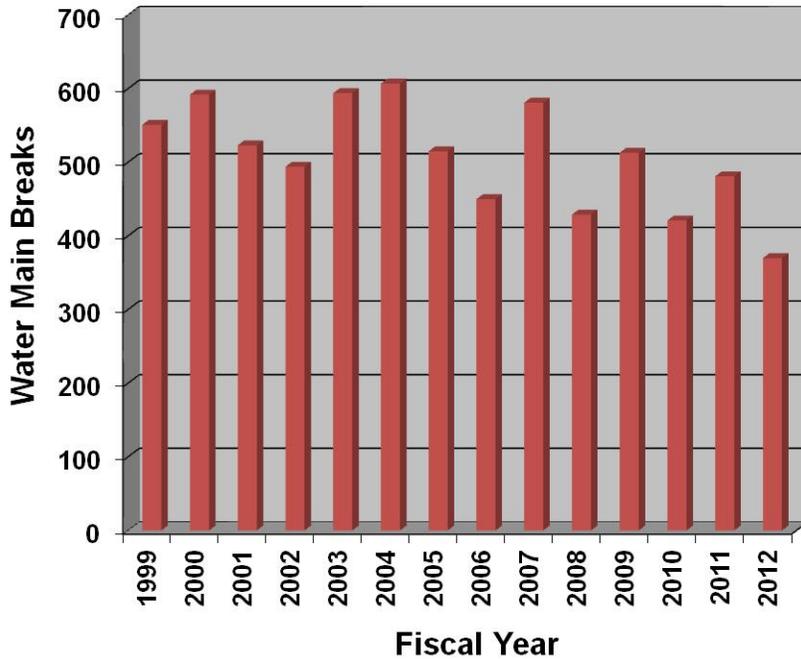


Figure 7: Total NYCDEP Water Main Breaks per Fiscal Year

Response time for leak repairs decreased to 11.1 days (See Figure 8). The number of leak complaints totaled 3,751 which reflect a decrease in the number of leaks complaints received compared to last year. The NYCDEP performed leak detection surveys on approximately 43.2% of the City's water mains in FY 2012 which is slightly less than the target than NYCDEP had anticipated surveying. The average backlog of broken and inoperative fire hydrants was 390 hydrants (0.36%) in FY 2012, less than previous years. The average time to repair or replace high priority broken or inoperative hydrants (as determined by the Fire Department) by NYCDEP was 4.4 days in FY 2012, which is less than the previous few years.

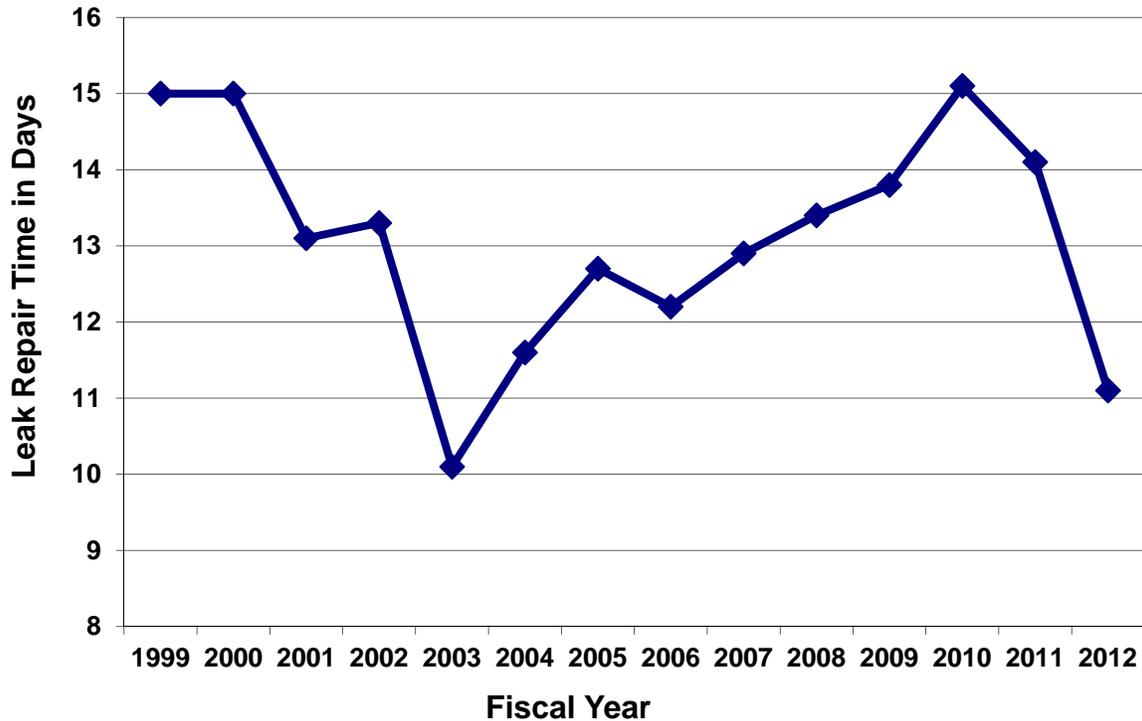


Figure 8: Water Main Leak Repair Time in Days

Sewer back-up (SBU) complaints received by NYCDEP dropped to 13,933 in FY 2012, which reflects a significant decrease in the last several years. Response time for SBUs was 5.6 hours on average, within the range of the past several years and below the target of 7 hours. Approximately 33.1% of catch basins were surveyed and inspected in FY 2012, which reflects the target that NYCDEP had established. In addition, DEP launched a pilot to evaluate sewer manhole sensors. The sensors measure the elevation of wastewater in the sewer and transmit that information to NYCDEP's computer systems wirelessly. This technology will assist NYCDEP in preventing SBUs by quickly dispatching crews and fixing the problem.

The first annual State of Sewers report was recently issued by NYCDEP BWSO in November 2012, which provides a comprehensive summary and description of key performance indicators for sewer maintenance. NYCDEP uses a data-driven risk management approach to operate and maintain the sewer system, targeting specific locations with reoccurring problems. The Sewer Operations and Analysis Program (SOAP) at NYCDEP allows for a more proactive rather than reactive approach. This group analyzes areas with reoccurring problems to determine the cause of the problem and then determines a remediation plan (degreasing, cleaning, repair, replacement). BWSO's top priority remains their core work which consists of televising of sewers, sewer cleaning, catch basin reconstruction and cleaning, hydrant repair, installation of new water mains. In May 2012, NYCDEP BWSO opened a new hands-on water and sewer training facility with full-scale model street including sewer, catch basins and hydrants. This facility will be used for new staff to train water repair, sewer repair, water maintenance and sewer maintenance, as well as continuing education and further training for existing staff.

Operational and Maintenance Program Significant Accomplishments

Operational Excellence. Operational Excellence, also known as OpX continues to find efficiencies in overall NYCDEP operations and maintenance that provides recurring cost savings to the NYCDEP. This program addresses all aspects of O&M, such as procurement, chemical usage, fleet management, energy usage, staffing/organizational changes and plant operations. It was initiated by NYCDEP in November 2011 and it will be implemented in two phases over the next four years. Phase 1 report, issued in June 2012, summarized the six-month diagnostic phase involving all aspects of NYCDEP operations. Phase 2 consists of the implementation phase over the next four years.

Drinking Water Quality. NYCDEP conducts significant monitoring of the source water and in-city water quality. In calendar year 2011, NYCDEP collected more than 33,000 samples from the city's distribution system and performed more than 357,000 analyses, meeting all state and federal sampling requirements.

Ashokan Release Operations. Due to high turbidity levels in the Ashokan Reservoir caused by heavy rains, NYCDEP has been making water releases through the Ashokan Release Channel. NYCDEP has been operating under the NYSDEC Interim Protocol, issued in October 2011 for operation of the Ashokan Release Channel which will help reduce flooding and protect drinking water quality.

Harbor Water Quality. NYC has been collecting and record keeping water quality data for over 100 years. The New York Harbor Water Quality Survey currently consists of 70 sampling station harborwide. The number of water quality parameters measured has also increased from five in 1909 to over 20 at present. NYCDEP will increase the number of monitoring sites throughout the harbor and at the mouth of key tributaries to 85 sites in order to assess the effectiveness of the Green Infrastructure Plan.

The water quality in the harbor has continued to improve as a result of the maintenance and operation of the wastewater treatment plants and the combined sewer overflow floatables program. Figures 9 and 10 below demonstrate the improvements in water quality over the past 35 years as indicated by the increased dissolved oxygen concentrations and reduced Fecal Coliform counts. The current information indicates that the harbor waters have achieved the standard set for fishable and swimmable quality.

The percentage of wastewater treatment plant effluent that met federal standards in FY 2012 was 99.9 %.

Permits. NYSDEC issued final SPDES permits to the 14 WWTPs in October 2010, which expire in 2015. NYSDEC has begun working with NYCDEP on evaluating new SPDES permits, possibly issuing new permits later in 2013. A portion of New York City has separate sanitary sewer systems. Until now the provisions for separate sanitary sewers were included in the SPDES permits; however, NYSDEC indicated its intention to issue a new citywide municipal separate storm sewer system (MS4) permit to NYC. Negotiations are ongoing to determine the additional requirements due to the proposed citywide MS4 permit and when the new permit will go into effect.

Biosolids. NYCDEP WWTPs are configured to produce Class B sludge. NYCDEP currently has several biosolids contracts that consist of beneficial reuse and landfilling biosolids. The current contract with WeCare Organics for the beneficial reuse of biosolids cost \$75/ton for the transporting, processing and marketing the biosolids, which is significantly less costly than the previous beneficial reuse contract. The remaining NYCDEP biosolids contracts will expire in 2013 and 2014.

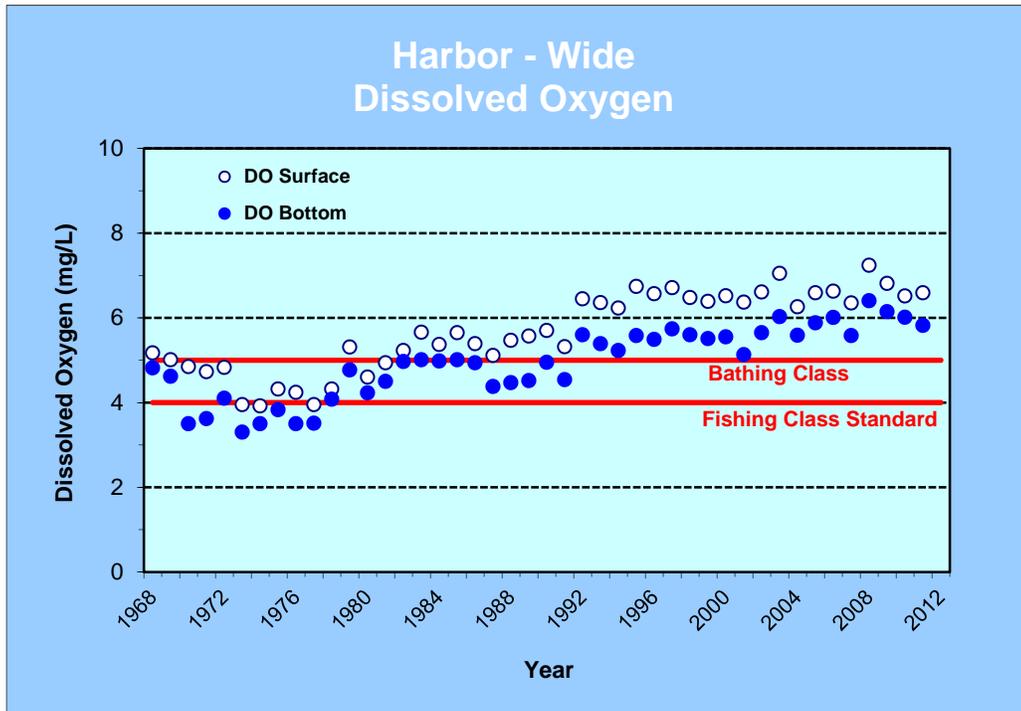


Figure 9: Dissolved Oxygen for Harbor Survey Key Stations (1968-2011)

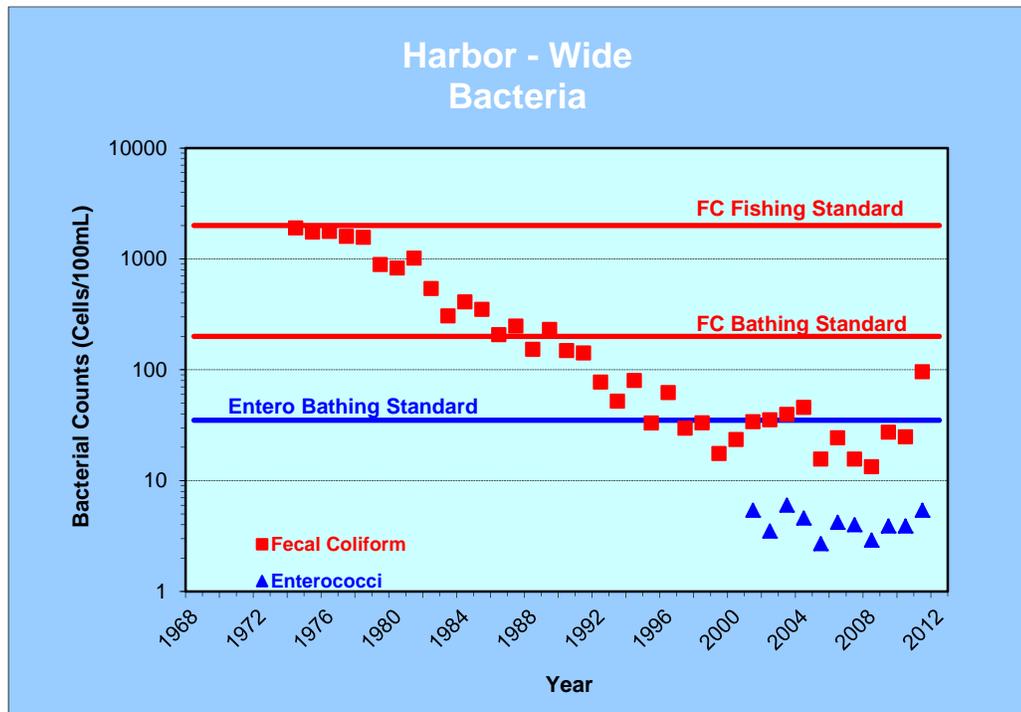


Figure 10: Fecal Coliform Counts for Harbor Survey Key Stations (1974-2011)

Citywide Fleet Consolidation. NYCDEP transferred the maintenance and repair function of the NYCDEP fleet to other city agencies as part of the Citywide Fleet Consolidation Program. Heavy duty trucks were transferred to the Department of Sanitation and light duty vehicles were transferred to the Police Department. The NYCDEP fleet transfer was completed by December 2012.

Environmental Health & Safety (EH&S). NYCDEP continues to maintain a robust and comprehensive EH&S program across all bureaus throughout the NYCDEP. NYCDEP provide consistent EH&S training so that staff can carry out their work responsibilities safely and in compliance with the many local, state and federal regulations.

Operations and Maintenance Program Summary

Staffing levels for the System, when combined with capital and operating programs are sufficient to provide for adequate operation of the current System. NYCDEP has continued to increase staff and/or redirect staff for the future operations for the Croton and CAT/DEL treatment facilities. Once commissioning of the plants are complete, BWS will manage/operate the Cat/Del UV facility and BWSO will manage/operate the Croton treatment facility when it comes on-line.

The operating bureaus continue to evaluate and find effective means to operate more efficiently with reduced expense budgets projections for FY 2013 without impacting the overall operation and maintenance (O&M) of the System. NYCDEP has implemented alternative chemical procurement opportunities and reduction of nonessential expense items without impacting the system-wide water supply, water distribution and wastewater treatment processes. NYCDEP and the OpX contract will continue to evaluate reductions in the O&M expense budget for without impacting the integrity of their operations.

10.0 OTHER NOTEWORTHY ISSUES AND COMMENTS

Fire at the North River Wastewater Treatment Plant

As a result of the fire in the engine room at the North River WWTP in July 2011, NYSDEC has indicated they will issue a Notice of Violation (NOV) to the NYCDEP due to the bypass during the plant shutdown. NYCDEP requested a withdrawal of the NOV and NYSDEC denied the withdrawal. Negotiations between NYCDEP and NYSDEC will continue regarding the NOV at North River WWTP.

Natural Gas Exploration

In 2011, NYSDEC proposed a ban on high-volume hydrofracking (HVHF) within the watersheds of unfiltered water supplies in New York State, which includes the NYC Catskill/Delaware watershed and a 4,000 foot buffer around the watershed. NYSDEC issued a Revised Draft Supplemental Generic Environmental Impact Statement (RDSGEIS) on the Oil, Gas and Solution Mining Regulatory Program in September 2011. NYCDEP hired a geophysical expert consultant to study the impacts to microseismic events caused by natural gas drilling. NYCDEP issued significant comments to the RDSGEIS on January 11, 2012. The main concern pertains to risks and the potential consequences of impacts from high volume hydrofracking near NYCDEP infrastructure that are located outside the watershed. The comments include a hybrid approach to infrastructure protection through buffer zones. In addition, NYCDEP requested that the Final Supplemental Generic Environmental Impact Statement (SGEIS) commit to further environmental review for low volume hydrofracking (LVHF).

In September 2012, the NYS Department of Health was asked to assess the SGEIS health impact analysis. NYSDEC released revised high volume hydraulic fracturing (HVHF) regulations on November 29, 2012. NYCDEP submitted comments to NYSDEC on January 7, 2013 addressing the

continued concern for the protection of NYCDEP's infrastructure located outside the watershed boundaries, concern regarding LVHF not being addressed in the SGEIS and the inclusion of rigorous seismic monitoring into the regulations.

The NYSDOH has not completed the review on health impacts due to hydrofracking by the required February 2013 date; therefore, the SGEIS cannot be issued. Due to these delays, the SGEIS will be required to undergo an additional public comment period when completed. New York City continues to diligently monitor this issue and its impact on the upstate water system.

Newtown Creek and Gowanus Creek Superfund Designations

In March 2010, the Gowanus Canal was declared a Superfund site and in September 2010, Newtown Creek was declared a Superfund site. USEPA has notified NYC that they are considered a potential responsible party (PRP) for hazardous waste under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) for both Superfund sites.

In December 2011, USEPA released its draft feasibility study for the Gowanus Canal, evaluating various alternatives to address the contamination. NYCDEP is currently undertaking a \$160 million capital project which will modernize a flushing tunnel to directly improve water quality and circulation within the canal. These projects should not be impacted by the listing of the Gowanus Canal as a federal Superfund site, based upon communication between NYCDEP and USEPA. On December 27, 2012, USEPA released its proposed plan for the Gowanus Canal Superfund remediation which is currently out for public comment. The proposed plan includes dredging the contaminated sediment in the Canal and covering it with a cap, along with additional CSO controls for two outfalls. NYC questions the technical basis of Superfund-related CSO controls and will be submitting comments on the overall proposed plan by April 2013.

NYCDEP has entered into an Administrative Settlement Agreement and Order on Consent with EPA, along with five other potential responsible parties that own or operate facilities adjacent to Newtown Creek in the investigation of conditions in Newtown Creek and the evaluation of feasible remedies. The Remedial Investigation/Feasibility Study (RI/FS) is ongoing. The cost for the investigation is approximately \$25 million. The City's share of the cost is one quarter of the total. The settlement does not cover any remedy that may ultimately be chosen by USEPA to address the contamination identified as a result of the investigation and evaluation.

There are future potential financial impacts to NYC for both Superfund sites; however, the extent to which NYC will be responsible has not yet been determined.

Awards

NYCDEP was awarded the 2012 Association of Metropolitan Water Agencies (AMWA) Platinum Award for excellence in effective utility management, which is based on nationally recognized industry standards that focus on product quality, customer satisfaction, employee and leadership development, operational optimization, financial viability, infrastructure stability, operational resiliency, community sustainability, water resource adequacy, and stakeholder understanding and support.

Occupational Safety and Health Administration (OSHA) granted the Croton Water Filtration Plant project Voluntary Protection Program status with merit recognition for numerous innovative and effective safety measures such as extensive procedures for identifying on-site and environmental hazards, and the creation of a number of programs designed specifically for employees to encourage workplace safety. The Voluntary Protection Program recognizes employers and employees who demonstrate exemplary achievement in the prevention and control of occupational safety and health

hazards while developing, implementing, and continuously improving safety and health management systems.

The Environmental Law Institute awarded NYC the 2012 Award for Achievement in Environmental Law, Policy, and Management for NYC's PlaNYC and Green Infrastructure Plan.

11.0 SUMMARY AND CONCLUSIONS

Regarding System Management

In our opinion, the System continues to be managed in a professional and prudent manner with an appropriate regard for the level of service afforded to the users.

Regarding the Capital Improvement Program (CIP)

Additional increases in funding will be necessary in the future, depending upon the outcome of ongoing studies/evaluations. The most notable project is:

- *Climate Change Adaptation Projects:* The climate change initiative will identify additional upgrading requirements for NYCDEP assets. Until the facility assessments have been made, the budgetary funding requirements cannot be ascertained. Additional funding may be required in the next budgeting cycle.

Additional increases in funding may be necessary in the future, depending upon the outcome of ongoing evaluations and/or negotiations with regulators. The most notable projects are:

- *MS4:* NYSDEC has not indicated to NYCDEP what requirement will be necessary. Pending negotiations with the regulators additional funding may be required however this is not expected to be significant.
- *Hillview Reservoir Cover:* The cost of completely covering the Hillview Reservoir using a fixed concrete cover is currently estimated at approximately \$1.6 billion; there is no funding for construction in the Ten Year Capital Strategy. Pending the outcome of the federal review of LT2 which may take a few years and will impact the need to cover the Hillview Reservoir, additional funding may be required.

Regarding the Physical Condition of the System

In our opinion, the NYCDEP facilities and infrastructure are in adequate condition and are similar to water and wastewater assets in other urban areas nationwide. As indicated, an Asset Management program is being utilized by NYCDEP that better identifies the needs and costs for infrastructure upgrades. These needs will have to continue to be addressed and implemented as they are identified. NYCDEP is taking a proactive approach prioritizing their needs and spending money (capital and expense) where it will have the greatest impact to the water and wastewater system and water quality. NYCDEP will continue move from the planning stage to implementation phase of climate change adaptations based upon sound cost-effective analysis. Because of the extensive nature of the NYCDEP facilities, continued diligence and future capital improvements will be necessary to maintain an adequate rating.