NYC Environmental Protection
Michael R. Bloomberg, Mayor
Carter Strickland, Commissioner

WEEKLY PIPELINE

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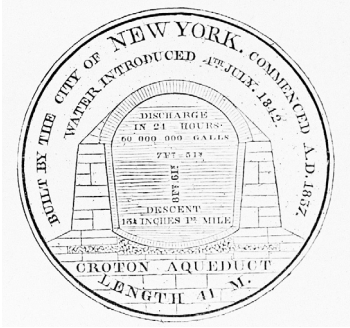
Croton Aqueduct Ensured NYC Pipes 'Were So Gallantly Streaming'

This year, Independence Day marks the 170th anniversary of the Old Croton Aqueduct. When the Croton Aqueduct went into service, it provided New York City with its first abundant and reliable water supply, freeing the city from its reliance on the dwindling and increasingly polluted sources on Manhattan Island. For New Yorkers, Croton water delivered the promise of improved health and better living conditions. It also helped to support industry, grow the city's economy, and fight fires.



Before the Croton, New York depended on public and private wells, ponds, streams and rain cisterns for its water. As early as the 1700s, ground and surface waters were polluted by unchecked waste from sewage cesspools, slaughterhouses, tanneries, horses and free roaming livestock. By the 19th century New York was the nation's fastest growing city. Its rapid population and industrial growth only worsened sanitary conditions and put even greater demands on finite water supplies. Poor sanitation created conditions that helped disease thrive. Yellow fever and cholera epidemics took many lives and while the causes were not understood, these diseases were attributed to the lack of clean

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Spotlight on Safety

It's your Back—Watch it!

According to the United States Occupational Safety and Health Administration, "back disorders are one of the leading causes of disability for working-age people and afflict over 600,000 employees each year with an annual cost of about $50 billion…."

There are many factors contributing to the increase in back injuries and disorders, including:

- Reaching while lifting
- Poor posture
- Stressful living and working activities—staying in one position for too long
- Bad body mechanics—how one lifts, pushes, pulls, or carries objects
- Repetitive lifting of awkward items
- Vibration from working with certain tools and equipment

Training on proper lifting techniques is only part of the answer to preventing and controlling back disorders. A combination of engineered and other controls is also important. Material handling devices including hand trucks, conveyors, pneumatic lifts, and platforms should be used whenever possible. Repositioning bins and moving employees closer to parts and conveyors will go a long way towards removing the repetitive or sustained twisting, stretching, or leaning associated with many job tasks. Job rotation, where the employee utilizes a completely different muscle group from the ones that have been overexerted, is also a good practice. Employees should also exercise to strengthen their body.

At DEP, everyone is responsible for safety. If you or anyone on your team is concerned about your working conditions, it's okay to ask your supervisor or your bureau's EHS liaison how they can help. If you've still got questions, you can call the EHS Employee Concerns Hotline. It's DEP's responsibility to acknowledge and fix unsafe situations, procedures, and practices. With your help, we'll not only get the job done, we'll make it safer for ourselves, our coworkers, our families, and our city.

CALL (800) 897-9677 OR SEND A MESSAGE THROUGH PIPELINE. HELP IS ON THE WAY.

Commissioner's Corner

Summer has officially arrived in New York City, and as we prepare to celebrate the 4th of July, DEP will do its part to ensure New Yorkers can have a safe, healthy, and enjoyable summer.

Keeping New York City waterways clean is one of DEP's top priorities, and already New York Harbor is at its cleanest in more than 100 years of testing. However, we can—and must—continue to do more. Last Tuesday, I attended a citywide kickoff meeting at the Newtown Creek Visitors Center to publicly share our Long-Term Control Plan (LTCP) to combat combined sewer overflows (CSO), a complex planning process that will carry us through 2017. Before **Mayor Bloomberg** launched the groundbreaking NYC Green Infrastructure Plan in 2010, DEP had been planning, designing and constructing CSO improvement strategies for some time; since 1992, facility plans have been under development to control CSOs within specific waterbodies. DEP has invested over $1.8 billion on various CSO projects, and as a result, 12 of 15 waterbodies affected by CSOs currently or will soon meet water quality standards for either primary contact such as swimming, or secondary contact like boating or kayaking. The LTCP will continue to study water quality where goals are not yet met and evaluate potential upgrades. Now is the perfect time to initiate the next phase of the City's CSO Program, and we are looking forward to a collaborative approach with DEC, EPA, and local communities and stakeholders, and I thank all DEP staff who participated in a successful kickoff.

DEP must always plan for the long term while also standing at the ready for emergencies. On Thursday, a sinkhole developed in Brooklyn on 92nd Street. Responding crews observed a surface opening on the south sidewalk, and discovered a large void underneath the roadway pavement. BWSO staff immediately developed a multi-agency course of action to protect pedestrians and residents. With assistance from NYPD, the street was closed and all danger zones were cordoned off, while Third Avenue was kept open. I thank Deputy Commissioner **James Roberts** along with **Ed Coleman, Paul Villella, Tom Marrama, Tom Votta** and their excellent staff for their work to keep residents safe in difficult circumstances.

When we experience high summer temperatures, we see greater numbers of unauthorized openings of New York City fire hydrants. As we prepare to celebrate our nation's independence this week, I would like to take this opportunity to remind New Yorkers that opening fire hydrants without spray caps is illegal, wasteful and dangerous. Illegally opened hydrants can lower water pressure and put lives at risk if there is a fire. Children can also be at serious risk, because the powerful force of an open hydrant without a spray cap can knock a child down and cause serious injury. The reduction of water pressure resulting from illegally opened hydrants can also cause problems at hospitals and other medical facilities. New Yorkers should call 311 to report open fire hydrants. However, hydrants can be opened legally if equipped with a City-approved spray cap. Spray caps can be obtained by adults age 18 or over, free of charge, at local firehouses. I hope that the entire DEP family enjoys a safe and happy 4th of July.

Focus on the Field

When New Yorkers open a faucet for a drink, they may not be aware of the water's journey from upstate to the Big Apple—and what goes on behind the scenes to make it happen. New York's water supply system is in the hands of DEP staffers like **Ralph Marchitelli,** P.E., Regional Manager for the Kensico Region. As a civil engineer with 20 years of experience at DEP, Marchitelli knows firsthand the inner workings of how the agency keeps water flowing. As he puts it, "We are stewards of an incredible water supply system that was designed and built by our predecessors. Our job is to maintain it for future generations."

The Kensico Reservoir holds more than 30 billion gallons at full capacity. It receives all the water from both the Catskill and Delaware systems, specifically from their six reservoirs. Kensico, a terminal reservoir, collects and then sends its water to the smaller Hillview Reservoir in Yonkers for distribution to New York City. This system allows for water to be continuously available despite fluctuating supply or demand.

Making sure that water flows without interruption requires constant attention and coordination. Marchitelli manages operational and maintenance staff that includes watershed maintainers, engineers, electricians, plumbers, and technicians, among others, to ensure the mechanical and structural integrity of more than 50 facilities. Operational activities include checking water supply status, elevations, chemical residuals, and flow balance. "What is especially challenging about my job," says Marchitelli, "is being ready to respond to the needs of our round-the-clock operation. Storm events such as Hurricane Irene, Tropical Storm Lee, or even a simple thunderstorm can affect water quality or knock out a piece of equipment, which may require a change to our normal operation."

Marchitelli is an avid New York Giants football fan and likes to spend his free time with his family.

Did You Know?

The Delaware River is the longest un-dammed river east of the Mississippi, flowing for 330 miles from Hancock, N.Y., to the Delaware Bay, where it empties into the Atlantic Ocean. More than 15 million people in four states depend on the river's water for drinking, agricultural and industrial use. The Delaware river includes natural wonders, like the National Wild and Scenic Rivers program, and important commercial assets.

Word of the Week

Greywater: Used water from clothes washing machines, showers, bathtubs, hand washing, and sinks.

We welcome your feedback! To submit an announcement or suggestion, please email us at: newsletter@dep.nyc.gov.

(Croton Aqueduct Ensured NYC Pipes… continued)

water. To make matters worse, the densely built city was under constant threat of fire.

Over and over again, disease and fire invigorated the city's quest to secure a new water supply. The earliest full blown effort was the New York Water Works proposed by Christopher Colles in 1774. The publicly funded Works included a well in lower Manhattan, a reservoir, a steam engine for pumping the water into the reservoir and a log pipe distribution system. Partially constructed, the Works were destroyed by fire when the British occupied the city in 1776.

The next big push came in 1798 on the heels of a yellow fever epidemic that claimed more than 2,000 lives. Concluding that the lack of plentiful fresh water was to blame, the city applied to the State Legislature to secure a public water supply from a remote source, the Bronx River. Instead, in an unfortunate twist of fate, Aaron Burr persuaded the Legislature to give the Manhattan Company, a private organization with banking interests, exclusive rights to supply the city with "pure and wholesome water." By the fall of 1799 the company had opened its bank and started digging wells in the heavily populated and industrialized area of town. The bank prospered, but the same was not true for the water supply that was neither pure nor wholesome and was inadequate to fight fires. Its banking rights predicated on supplying water, the Manhattan Company thwarted the city's efforts to secure a different and better supply for the next 30 plus years. In desperation, the city constructed a reservoir at 13th Street and Bowery, exclusively to fight fires in districts that the Manhattan Company did not service.

In 1832, cholera took the lives of 3,513 New Yorkers. The poor, living in densely populated areas, reliant on polluted wells and unable to flee, were hit the hardest. Again the city went to the Legislature to plead its case for a public water supply, and this time it was rewarded. On February 26, 1833 a Water Commission was created to investigate and report on a potential water source. Eight months later the Croton River was recommended, over both the Bronx and Byram Rivers, as the only certain source of abundant pure water that could be delivered to the city by gravity. Colonel David Bates Douglass, a Yale graduate and a former professor of mathematics and engineering at West Point, was named Chief Engineer. Douglass was responsible for the overall scheme and for determining the route of the aqueduct and the placement of the dam across the Croton River. Six months after Douglass was hired, on December 16, 1835, a devastating fire destroyed 674 buildings in New York City's commercial district erasing any doubt about the project's urgency.

Slow to get building, Douglass was dismissed and replaced by John Jervis in November 1836. Jervis got his start as an axman on the Erie Canal, clearing the way for survey teams. From there he worked his way up the ranks on important canal and railroad projects. An experienced supervisor of large scale public works, Jervis had the aqueduct under construction by May 1837. Jervis designed the major structures including the nation's first high masonry dam. Under his leadership the system was built in a little more than five years, with the exception of the High Bridge, which was completed in 1848.

At daybreak on July 4, 1842 a single gunshot announced the arrival of the aqueduct water to the Distributing Reservoir on 42nd Street. Some 25,000 visitors came to witness the event and to share in a cup of Croton water. Fearing fire from the evening's revelries, Mayor Robert Morris's first order was to release the water into the distributing pipes. At last there was water to fight fires and to tackle sanitation. Street hydrants supplied free water to the public for drinking and other domestic purposes. Private dwellings and businesses could connect for an annual fee. Fire and disease were not eradicated and it would take years before water was introduced into every home, but it was a start.

Selecting the Croton River over the Bronx River turned out to be more than the right decision. Before the end of the 19th century the city was at work on additional reservoirs, a second aqueduct (the New Croton Aqueduct) and a higher dam, all in the Croton watershed. Responding to the water demands of the city, the system would be expanded and adapted again and again, adding the Catskill Aqueduct in 1917 and the Delaware Aqueduct in 1945. Today the system delivers more than one billion gallons of water a day and is considered one of the greatest urban water supply systems in the world. New Yorkers should all drink to that!