NEW YORK CITY

DEPARTMENT OF ENVIRONMENTAL PROTECTION

BUREAU OF WATER SUPPLY

Kensico Water Quality Control Program
Annual Report

January 2011

Prepared in accordance with Section 4.10 of the New York City Filtration Avoidance Determination, July 2007

This report discusses the status of the components of the Kensico Water Quality Control Program for 2010.

Prepared by the New York City Department of Environmental Protection

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1. Introduction to Kensico Watershed Programs

Kensico Reservoir, located in Westchester County, is the terminal reservoir for the City's Catskill/Delaware (Cat/Del) water supply system. Because it provides the last impoundment of Cat/Del water prior to entering the City's distribution system, DEP has prioritized watershed protection in the Kensico basin to ensure the continued success of past efforts while providing for new source water protection initiatives that are specifically targeted toward stormwater and wastewater pollution sources.

1.1 Stormwater Management and Erosion Abatement Facilities

1.1.1 BMP Construction, Operation, and Maintenance

DEP constructed 45 stormwater management and erosion abatement facilities throughout the watershed in order to reduce pollutant loads conveyed to the reservoir by stormwater. The facilities, shown in Figure 1, were routinely inspected and maintained as needed throughout the year under a 3-year maintenance contract. DEP is currently into the third year of the contract.

Routine inspections found that typical maintenance such as, grass mowing, vegetation removal, fence repairs, tree removal, sediment and debris removal were necessary and completed. None of the maintenance items appeared to compromise the effectiveness of the storm water facilities.

1.1.2 Spill Containment Facilities

DEP installed, and maintains, spill containment facilities around Kensico Reservoir. The facilities improve spill response, clean up, and recovery, thereby minimizing water quality impacts in the event of a spill. In 2010, DEP continued to maintain the 39 spill containment facilities installed at the outlets of 26 storm drains along Interstate 684 and Route 120.

Although no spills have been reported on the roads surrounding Kensico since the booms were installed, the booms have functioned as designed. Temporary booms were located at the end of the boat ramp that can encircle the ramp in the event of a spill. No spills or discharges occurred, nor was boom deployment required.

1.1.3 Turbidity Curtains

DEP continues to monitor the 1,100-foot primary and 1,000-foot secondary turbidity curtains in the reservoir between the Catskill Upper Effluent Chamber (CUEC) and Malcolm and Young Brooks. The turbidity curtains appear to effectively deflect discharges from the two watercourses away from the effluent chamber as intended.

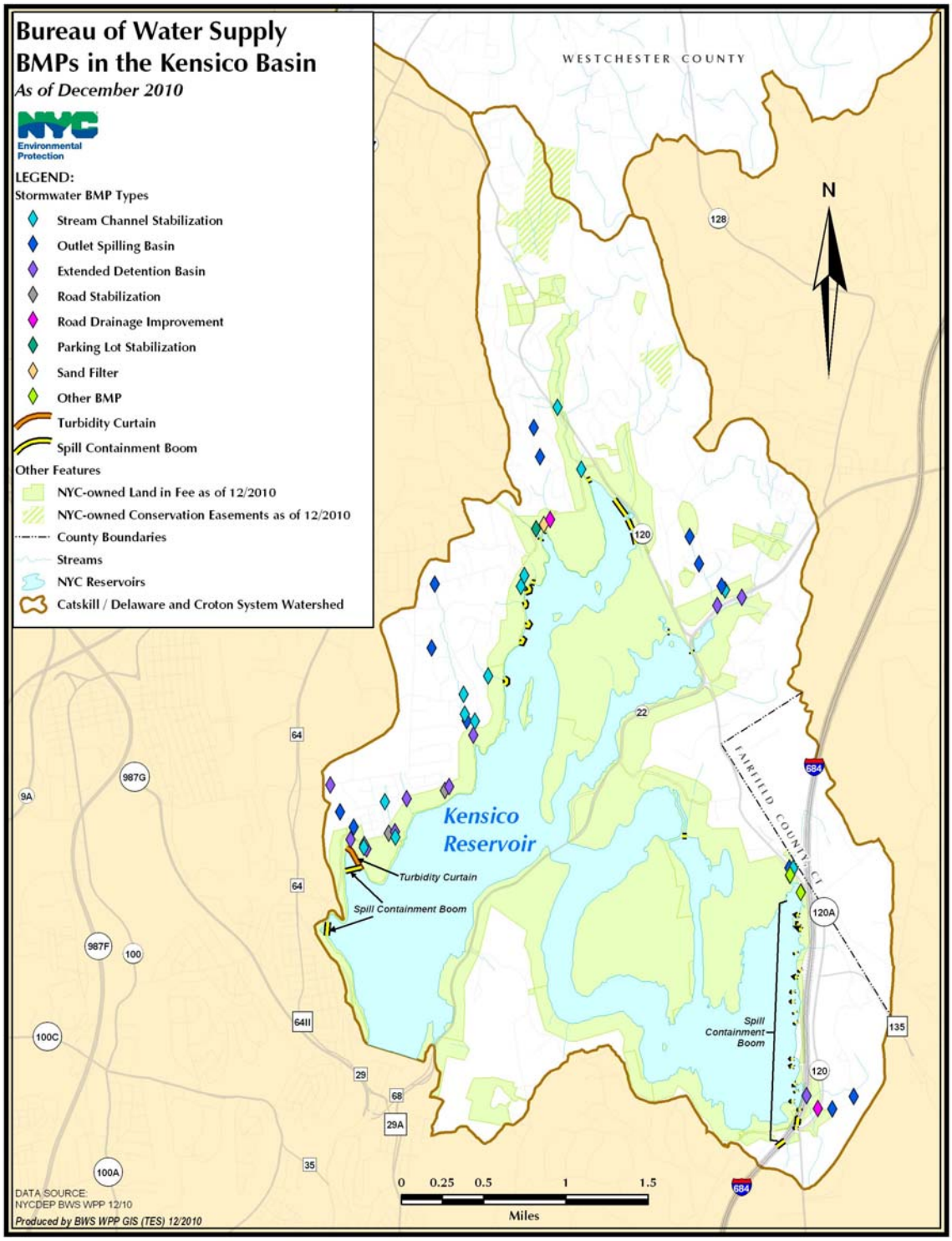

Figure 1. Location of nonpoint source management facilities in Kensico watershed

In 2010, DEP monitored the turbidity curtains, and performed the following maintenance tasks:

- May 2010 – An underwater diving inspection of the primary turbidity curtain was performed which generated a list of curtain sections requiring removal and replacement. Two 50-foot sections of the primary turbidity curtain were replaced. Sections of the primary curtain where plastic ties were used were replaced with stainless steel ties. An underwater diving inspection of the secondary curtain was performed, and stainless steel ties were applied to fasten every other grommet.

- October 2010 - An underwater diving inspection was performed on the primary and secondary turbidity curtains. Divers installed stainless steel ties on the primary turbidity curtain from station 5+50 to 11+50. Minor tears were repaired on the secondary turbidity curtain.

1.2 Kensico Action Plan

Following completion of the Kensico Action Plan in August 2007, DEP determined to move forward with the implementation of the four proposed pollution remediation practices: 1) a pipeline system and engineering stormwater practice at N7, 2) an extended detention basin at N12, 3) stream stabilization at Whippoorwill, and 4) drainage improvements along Westlake Drive in order to enhance the performance of BMPs 12 and 13. DEP has completed design and has prepared the necessary bid specifications. The project has gone through several rounds of bidding in order to get a successful bid. DEP bid the contract again in August 2010.A Pre-Award meeting was held in December 2010 and a contractor was selected. Permits for this project have been secured.

1.3 West Lake Sewer

The Westlake Sewer Trunk Line, owned and maintained by the Westchester County Department of Environmental Facilities (WCDEF), conveys untreated wastewater to treatment facilities located elsewhere in the county. Given the proximity of the collection system to Kensico Reservoir, potential defects or abnormal conditions within the sewer line and its components could lead to exfiltration or overflows of wastewater. The intent of this program is to work with the County to mitigate risks posed by the line while maintaining the collection system's location and gravity flow.

1.3.1 Sanitary Sewer Remote Monitoring System

DEP has proposed a sanitary sewer remote monitoring system for the Westlake Sewer Trunk Line, the purpose of which would be to provide real-time detection of problem events such as leaks, system breaks, overflows, and blockages, which in turn would facilitate a quick response to such problems. DEP and the WCDEF continued work on the intermunicipal agreement (IMA). WCDEF has agreed to provide the contracting services for installation, monitoring, and maintenance of the system. DEP submitted a draft IMA to Westchester County in March 2010. DEP met with Westchester County in June 2010 regarding a new technology for the remote monitoring system.

WCDEF and DEP have accepted a product for real-time monitoring of this sanitary system. The system is a self-contained, continuously monitoring, ultrasonic level sensor with satellite communication and web based access and data management. Both agencies have agreed on the priority manhole locations along the trunk line where the sensors will be installed. Based on the new technology, WCDEF is currently reviewing the revised IMA.

1.3.2 Sewer Line Visual Inspection

DEP conducts an annual visual inspection of the trunk line in order to assess the condition of exposed infrastructure, including manholes, for irregularities. The annual full inspection was performed in December 2010. Routine partial inspections were also conducted throughout the year in association with ongoing maintenance of Kensico stormwater best management practices in the vicinity of the line. No defects or abnormalities have been noted.

1.4 Video Inspection of Sanitary Sewers

DEP has established an inspection program for targeted portions of the sanitary sewer system located within the Kensico basin. These selected areas, identified as possible areas of concern during the prior video inspection of sanitary infrastructure in the Kensico basin, have been inspected under the same contract as was entered into for the inspection and cleaning of the sanitary infrastructure contained within the EOH Cat/Del reservoir basins. The results of these inspections will be submitted as part of a Comprehensive Summary Report, which compiles the information obtained as part of the sewer pipe cleaning/video inspection/digital mapping of the sanitary lines and will be used to determine rehabilitation methods. Receipt of the report is anticipated in the next reporting period.

1 .5 Septic Rehabilitation Reimbursement Program

In March 2010, the New York State Environmental Facilities Corporation (EFC) mailed notification letters and response cards to 347 residents located in the Program's Phase III priority area. This mailing included all remaining residential properties in the Kensico basin that are served by onsite wastewater treatment systems and had not yet been previously notified. During the reporting period, EFC issued reimbursement to two participants for sewer connections in the Town of Mount Pleasant.

1.6 Turbidity Reduction/Shoreline Stabilization

The CUEC is situated along the shore of a cove in the southwest section of Kensico Reservoir. The shoreline of this cove trends north to south, so that CUEC faces east into the cove. DEP determined that a shoreline stabilization project south of CUEC would be implemented to mitigate the erosion and possible resuspension of near-shore materials that may contribute to turbidity at CUEC during wind events.

The shoreline stabilization project has resulted in a requirement for DEP to undertake a wetland mitigation project in the Kensico watershed. DEP cannot move ahead with the project until the design of the wetland mitigation is addressed. In December 2010, DEC decided to review the wetland mitigation and the shoreline stabilization as two separate

projects. To complete the shoreline stabilization project, DEP will be securing permits from the US Army Corps of Engineers and DEC. During the reporting period, DEP secured the local permitting approvals that were dependent upon the SEQR Negative Declaration.

1.7 Dredging

The 2007 FAD calls for this report to address a summary of the work evaluating the need for effluent channel dredging of the CUEC and Shaft 18 intake channels. CUEC and Shaft 18 were last dredged in 1999 when 1,326 and 451 cubic yards of material was removed respectively.

Current Conditions

CUEC

In June of 2009, divers conducted a survey of over 1,000 square feet to determine the amount and depth of the accumulated sediment in the CUEC intake channel. To estimate the volume of accumulated sediment, the sediment depth was measured at predetermined locations using a measuring rod, marked at six-inch intervals. The divers probed the depth of the sediment at twenty-six (26) predetermined locations. The survey indicated an average of 4 feet of mud covered by a 2 foot silt layer with logs leaves and branches in the channel. It is estimated that approximately 235 cubic yards of sediment has accumulated in the CUEC intake channel.

Shaft 18

In November of 2010, divers conducted a survey of 7,500 square feet to determine the amount and depth of the accumulated sediment in the Shaft 18 intake channel. To estimate the volume of accumulated sediment, the sediment depth was measured at eight (8) predetermined locations using a measuring rod, marked at six-inch intervals. The survey indicated an average 0.50 foot sediment layer (0 inches at 0 feet to 0.75 inches at 100 feet) in the channel. It is estimated that approximately 81 cubic yards of sediment has accumulated in the Shaft 18 intake channel.

Current Operational Measures

CUEC

Since dredging last occurred, DEP has taken steps to reduce potential turbidity at CUEC. DEP has implemented Standard Operating Procedures (SOPs) that limit the "opening" speed of the sluice gates at the initial start-up of the aqueduct, and also establishes timeframes between the interval operations of the sluice gates to eliminate/minimize turbidity in the Catskill Aqueduct. The SOPs have been effective in controlling turbidity spikes. In addition to the SOPs, DEP has found that weather conditions at Kensico Reservoir occasionally result in wind originating from an easterly direction, thereby impacting the shoreline adjacent to CUEC. When wind velocities are sufficient to create wave action on the shoreline in the cove near CUEC, sediment in this area may become re-suspended and entrained into the Kensico Reservoir effluent that enters the CUEC, resulting in a short-term rise in turbidity values. Bottom sediments appear to be too deep to be impacted by this wind induced wave action alone. As noted in Section 1.6 of this

report, DEP is working on a project to stabilize the nearby shoreline and thereby limiting the potential for wave action to result in turbidity at CUEC.

Shaft 18
There have been no required changes in normal operating procedures to address turbidity in the Delaware Aqueduct when returning the aqueduct to service post shutdown or when making large flow increases.

Future Operations
Catskill Aqueduct
The Cat/Del UV Facility is expected to be operational in August 2012. Once complete, the Catskill Aqueduct will be shut down to allow for the Catskill Pressurization Contract. After the pressurization of the Catskill Aqueduct, the sluice gates at the CUEC and CLEC will be fully opened (full flow-aqueduct filled with water), and flow control will be managed at the Cat/Del UV Facility. In addition, the maximum flow in the Catskill Aqueduct will be increase from 825 MGD to an estimated 1200 MGD. Flow changes made at the Cat/Del UV Facility and an increase in flow above 825 MGD will cause velocity increases at the CUEC and could increase the potential for turbidity in the Catskill Aqueduct if sediment levels in channel rise too high.

Delaware Aqueduct Future Operations

Once the Cat/Del UV Facility is in-service, the sluice gates at Shaft 18 will be fully opened and flow control will be managed at the Cat/Del UV Facility. The maximum flow in the Delaware Aqueduct will increase from 1800 MGD to an estimated 2050 MGD.

Effluent Channel Maintenance
CUEC
The Catskill Pressurization Contract will include the removal of the accumulated sediment in the intake channel, including sediment along the south side of the chamber, on the channel head walls, and on the riprap slopes at the CUEC. If the need arises to operate the Catskill Aqueduct on a scheduled (emergency) basis, DEP would initiate a small dredging contract to remove the sediments and silt within the intake channel only. The extended Catskill Aqueduct shutdown from Kensico to the Cat/Del UV Facility will present an opportune time to undertake a sediment removal project while minimizing impacts to water quality and operations. After the removal the accumulated sediment, DEP anticipates conducting an underwater survey of the CUEC intake channel after 5 years of operations.

Shaft 18
Based on the 2010 diver survey, there appears to be very little sediment in the Shaft 18 intake channel. The 451 cubic yards of sediment removed in 1999 had accumulated since the original construction of the inlet channel in 1938. Considering the limited accumulation of sediment since DEP's last sediment removal effort, DEP concludes that there is a very slow rate of sediment accumulation at Shaft 18. DEP anticipates

conducting underwater surveys every 10 years in order to assess whether the sediment in the intake channel has accumulated to a point where it might impact water quality.

1.8 Route 120

The New York State Department of Transportation may initiate the project in 2011. The proposal includes resurfacing I-684 and constructing stormwater treatment basins in the I-684 median from just south of the new Lake Street overpass in New York northward to the bridge over Tamarack Swamp in Connecticut, including resurfacing of all the ramps for exit two of I-684.

1.9 Westchester County Airport

The Westchester County Airport is located east of Kensico Reservoir in close proximity to Rye Lake. As such, DEP continues to review any activities that are being proposed at the airport. According to the Westchester County Department of Public Works, the Airport Perimeter Road project is complete. DEP has not identified serious problems with the two pending proposals.