New York City
Filtration Avoidance
Determination

Prepared By
NYSDOH in consultation with USEPA
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Mid-Term Revisions to the 2007 Surface Water Treatment Rule Determination for
New York City's Catskill/Delaware Water Supply System

FINAL DRAFT

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Acronyms

AOC	Administrative Order on Consent
BMPs	Best Management Practices
CAP	*Cryptosporidium* Action Plan
CATUEC	Catskill Aqueduct Upper Effluent Chamber
CDUV	Catskill/Delaware Ultraviolet Facility
CCE	Cornell Cooperative Extension
CE	Conservation Easement
CFR	Code of Federal Regulations
CREP	Conservation Reserve Enhancement Program
CSBI	Catskill Stream Buffer Initiative
CT	Concentration-Time (chlorine contact time)
CWC	Catskill Watershed Corporation
DDBPR	Disinfection and Disinfectant Byproducts Rule
EOH	East-of-Hudson
EOHWC	East-of-Hudson Watershed Corporation
EPA	United States Environmental Protection Agency
EWP	Emergency Watershed Protection
FAD	Filtration Avoidance Determination
FBO	Flood Buy-Out
FEMA	Federal Emergency Management Agency
FIRMs	Flood Insurance Rate Maps
GIS	Geographic Information System
HAA5	Haloacetic Acids (sum of five)
IESWTR	Interim Enhanced Surface Water Treatment Rule
KAP	Kensico Action Plan
LAP	Land Acquisition Program
LFHMP	Local Flood Hazard Management Program
LT2	Long Term 2 Enhanced Surface Water Treatment Rule
MAP	Forestry Management Assistance Program
MCL	Maximum Contaminant Level
MGD	Million Gallons per Day
MOA	New York City Watershed Memorandum of Agreement
MOU	Memorandum of Understanding
NIP	New Sewage Treatment Infrastructure Program
NPS	Nonpoint Source
NYC	New York City
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York [State] Codes, Rules, and Regulations
NYS	New York State
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
O&M	Operations and Maintenance
OST	Operations Support Tool
PFM	Precision Feed Management
PHL	New York State Public Health Law
RWBT	Rondout West Branch Tunnel
SDWA	Safe Drinking Water Act
SEQRA	State Environmental Quality Review Act
SOEM	New York State Office of Emergency Management
SMP	Stream Management Program

SMIP	Stream Management Implementation Grant Program
SPDES	State Pollutant Discharge Elimination System
SWPPP	Stormwater Pollution Prevention Plan
SRP	Septic Repair Program
SWTR	Surface Water Treatment Rule
TAP	Turbidity Action Plan
TCR	Total Coliform Rule
TTHM	Total Trihalomethanes
USEPA	United States Environmental Protection Agency
USGS	Unites States Geological Survey
UV	Ultraviolet
WAC	Watershed Agricultural Council
WAP	Watershed Agricultural Program
WDRAP	Waterborne Disease Risk Assessment Program
WECC	Watershed Enforcement Coordination Committee
WOH	West-of-Hudson
WPS	Wetlands Protection Strategy
WR&Rs	Watershed Rules and Regulations
WSP	Water Supply Permit
WWTP	Wastewater Treatment Plant
WQIP	Water Quality Investment Program

Mid-Term Revisions to the 2007 Filtration Avoidance Determination

Executive Summary

In July 2007, the United States Environmental Protection Agency (EPA), in consultation with the New York State Department of Health (NYSDOH), made a determination that New York City ("the City") has a long-term watershed protection program for its Catskill/Delaware water supply that adequately meets the requirements of the Surface Water Treatment Rule (SWTR) and the Interim Enhanced Surface Water Treatment Rule (IESWTR) for unfiltered water supply systems. The resulting 2007 Filtration Avoidance Determination (FAD) covered a watershed protection program to be undertaken by the City over the next ten years, broken into two five year periods: (i) 2007-2012 ("First Five Year Period"), and (ii) 2012-2017 ("Second Five Year Period"). The 2007 FAD required the City to undertake a ten-year land acquisition program, which built upon and expanded the land acquisition provisions contained in the City's 2006 Long-Term Watershed Protection Program ("2006 Long-Term Plan"). In addition, during the First Five Year Period, the City committed to engaging in activities in a number of additional programs other than land acquisition ("Other Programs").

As described by the 2007 FAD, at the end of the First Five Year Period, with the primacy agency taking the lead, EPA and NYSDOH would conduct a review of the City's implementation of its 2006 Long-Term Plan and compliance with the requirements of the FAD. In addition, the City was required to evaluate, in consultation with EPA and NYSDOH, which of the Other Programs should be continued into the Second Five Year Period, whether and how the Other Programs to be continued should be revised, and/or whether additional programs are necessary to ensure that the City continues to have an adequate long-term watershed protection program that meets the requirements of the SWTR and the IESWTR for unfiltered water supply systems. These evaluations, combined with input from watershed stakeholders, formed the basis for developing this mid-term revision to the 2007 FAD ("Revised 2007 FAD"). With the issuance of this Revised 2007 FAD, the City will be required to meet the commitments defined in this document for the Other Programs, as well as the Land Acquisition Program, for the remaining period of the 2007 FAD.

The Revised 2007 FAD supersedes the 2007 FAD and will be applicable until a further determination is made, currently scheduled for May 2017. However, at any time, the primacy agency may make a determination that the City's watershed program no longer provides adequate protection of the City's water supply, pursuant to the SWTR/IESWTR and/or other avoidance criteria in the SWTR/IESWTR, and require the City to filter its Catskill/Delaware water supply.

1. Background and Basis for Determination and Revisions

As required under the Safe Drinking Water Act (SDWA) Amendments of 1986, EPA promulgated the SWTR on June 29, 1989, specifying the criteria pursuant to which filtration is required as a treatment technique for public water systems supplied by a surface water source. The SWTR is codified in Subpart H of 40 CFR, Part 141 - National Primary Drinking Water Regulations. The SWTR was promulgated to reduce the risk of waterborne disease occurrence from microbial contaminants at public water systems with surface water sources, either through filtration or by meeting the stringent water quality, disinfection, and site-specific avoidance criteria which make filtration unnecessary.

In response to requirements set forth in the 1996 Amendments to the SDWA, EPA amended the SWTR on December 16, 1998, with the Interim Enhanced Surface Water Treatment Rule (IESWTR), which is codified in Subpart P of 40 CFR, Part 141, and again on January 5, 2006 with the Long Term 2 Enhanced Surface Water Treatment Rule (LT2), which is codified in Subpart W of 40 CFR, Part 141. The IESWTR requires unfiltered systems to meet additional provisions to remain unfiltered, including compliance with more stringent disinfection byproduct maximum contaminant levels and the requirement to address *Cryptosporidium* in their watershed control programs. The LT2 provisions for unfiltered systems are not specifically identified as requirements for filtration avoidance, but do require that unfiltered systems provide treatment for *Cryptosporidium*.

The following criteria, which are established by the SWTR (40 CFR §141.71 and §141.72) and the IESWTR (40 CFR §141.171), must be met in order to maintain filtration avoidance. Applicable sections of Title 10 of the NYS Codes, Rules and Regulations (NYCRR), Subpart 5-1 are cited following the corresponding federal code citations.

Source water quality conditions:

§141.71 (a)(1), §5-1.30(c)(*1*): Fecal or total coliform concentration requirements
§141.71 (a)(2), §5-1.30(c)(*2*): Turbidity level requirements

Site-specific conditions:

§141.71 (b)(1)(i)/§141.72(a)(1), §5-1.30(c)(3): Disinfection and CT requirements.
§141.71 (b)(1)(ii)/§141.72(a)(2), §5-1.30(c)(4): Redundant disinfection components and auxiliary power supply requirements.
§141.71 (b)(1)(iii)/141.72(a)(3), §5-1.30(c)(5): Entry point residual disinfectant concentration requirements.
§141.71 (b)(1)(iv)/§141.72(a)(4), §5-1.30(c)(6): Distribution system residual disinfectant concentration requirements.
§141.71(b)(2), §5-1.30(c)(7)(i)-(vii): Maintain a watershed control program which minimizes contamination by *Giardia lamblia* cysts and viruses, and through which the public water system operator demonstrates adequate control over activities that may have an adverse impact on the microbiological quality of the source water. The program must:

(i) Characterize watershed hydrology and land ownership;
(ii) Identify watershed characteristics and activities which may have an adverse effect on source water quality; and
(iii) Monitor the occurrence of activities which may have an adverse effect on source water quality.

§141.71 (b)(3) and §141.171(b): Be subject to an annual on-site inspection, which includes determination of adequacy of watershed protection program to limit potential contamination from *Cryptosporidium.*

§141.71 (b)(4), §5-1.30(c)(8): Must not be identified as a source of a waterborne disease outbreak.

§141.71 (b)(5), §5-1.30(c)(10): Must comply with the maximum contaminant level (MCL) for total coliforms in at least 11 of the 12 previous months (starting April 1, 2016, comply with MCL for *Escherichia coli).*

§141.71 (b)(6), §5-1.30(c)(9): Must comply with disinfection byproduct requirements (this provision of Subpart H was amended as part of the IESWTR).

§141.171(a), §5-1.30(c)(7): Minimize the potential for contamination by *Cryptosporidium* oocysts in the source water.

If, at any time, a system fails to meet the avoidance criteria, it will be required to provide filtration within 18 months of such failure.

Additional National Primary Drinking Water Regulations that apply to unfiltered systems, but are not specifically identified as filtration avoidance criteria, are included in the Stage 2 Disinfectants and Disinfection Byproducts Rule (Stage 2 DDBPR) and the LT2. The Stage 2 DDBPR strengthens public health protection by tightening compliance monitoring requirements for trihalomethanes (TTHM) and haloacetic acids (HAA5). Systems must identify specific locations in the distribution system with the highest disinfection byproduct concentrations, and then must comply with MCLs for TTHM and HAA5 based on a locational running annual average (rather than the previous allowance for averaging of all monitoring locations across the system). April 1, 2012 was the compliance date for these tighter monitoring and compliance requirements. While implementation of Stage 2 has changed the sites that are being monitored for DDBPR compliance, unfiltered systems are still required to calculate a system-wide running annual average based on the results from the Stage 2 sample sites. These system-wide running annual averages must comply with the TTHM and HAA5 MCLs in order for the water system to maintain filtration avoidance.

The LT2 establishes some important new requirements for both filtered and unfiltered systems. All systems are required to conduct source water sampling and provide effective treatment for *Cryptosporidium*. For unfiltered systems, the rule requires use of two disinfectants. April 1, 2012 was the compliance date for this rule, although up to two additional years may be provided for systems making capital improvements. A schedule for the City's compliance with LT2 requirements was established by an Administrative Order on Consent (AOC) that was issued by the EPA to the City in February 2007. Milestones for this AOC were also included in the 2007 FAD. The AOC was revised in September 2012 to accommodate the need for additional

ultraviolet light treatment unit validation testing. These FAD revisions include the milestones from the revised AOC.

Revisions to the 1989 Total Coliform Rule (TCR) were published February 13, 2013. These revisions will impact the City's requirements for maintaining filtration avoidance within the remaining period of the 2007 FAD. Starting April 1, 2016, the City will no longer be required to comply with the MCL for total coliforms in water delivered to the public. Compliance with the Revised TCR will instead be based on an MCL for *Escherichia coli* (§141.63(c)).

Previous Filtration Avoidance Determinations

EPA's First Determination (January 1993): Following the New York City Department of Environmental Protection's (NYCDEP) July 1992 submission of an application not to filter its Catskill/Delaware water system, EPA began an in-depth review of New York City's water supply in order to determine whether the Catskill/Delaware system could fully meet the avoidance criteria. EPA concluded that the system met each of the objective criteria for filtration avoidance. EPA also concluded that the City's existing watershed protection programs were adequate and met the SWTR goal for a watershed control program, but that the program's ability to meet the criteria in the future was uncertain. Accordingly, on January 19, 1993, EPA issued its conditional determination granting filtration avoidance until a further determination was made, on or before December 31, 1993, or earlier if the City failed to meet the conditions for avoidance.

EPA's Second Determination (December 1993): In September 1993, NYCDEP submitted "New York City's 1993 Long-Term Watershed Protection and Filtration Avoidance Program" to demonstrate that the Catskill/Delaware system could and would continue to meet the filtration avoidance criteria in the future. EPA reviewed historic and 1993 water quality data, "New York City's 1993 Long-Term Watershed Protection and Filtration Avoidance Program," the City's achievements meeting the conditions contained in EPA's January 19, 1993 conditional determination, the EPA March 23, 1993 Expert Panel Report, public comments received, and additional documentation submitted by the NYCDEP and interested parties relating to the watershed. EPA concluded that the Catskill/Delaware system met each of the SWTR objective criteria for filtration avoidance. EPA also concluded that NYCDEP's existing watershed protection programs continued to be adequate and met the SWTR's criteria for a watershed control program, but that the program's ability to meet the criteria in the future was still uncertain. EPA determined that progress had been made toward enhanced watershed protection programs. However, EPA sought a more refined characterization of the watershed and more specific data concerning the identification and location of the activities within the watershed. EPA also wanted the watershed protection programs to operate for a longer time period in order to evaluate the effectiveness of the programs' long-term abilities to monitor and control activities which have the potential to pollute the water supply.

On December 30, 1993, EPA issued a second conditional determination which allowed New York City's Catskill/Delaware public water system to remain unfiltered. This second determination was intended to be effective until a further determination was made, scheduled for December 15, 1996, and contained conditions primarily related to enhanced watershed protection

and monitoring programs, pathogen studies, reservoir modeling, and other efforts to characterize the watershed and human activities. The conditions also included continued design of filtration facilities should EPA deem filtration necessary in the future, as well as a requirement that the City remove bottom sediment from and cover Hillview Reservoir. Hillview Reservoir was believed to be the cause of violations of the Total Coliform Rule in 1993 and again in 1994. (Hillview remediation requirements are now part of a NYCDEP/NYSDOH Administrative Order on Consent and, therefore, are no longer FAD requirements.)

EPA's Third and Fourth Determinations (January and May 1997): By 1995, implementation of a number of conditions of the 1993 determination had not yet occurred. At that time, EPA and other interested stakeholders urged the Governor of New York State to intercede. Then Governor Pataki brought the parties together in a consensus-building approach to negotiate reasonable, effective and scientifically-defensible watershed protection programs. The January 1997 New York City Watershed Memorandum of Agreement (MOA), signed by New York State, New York City, watershed towns and counties, environmental parties and EPA, enabled NYCDEP to implement watershed protection programs necessary to continue to avoid filtration. On January 21, 1997, NYCDEP received a water supply permit from the New York State Department of Environmental Conservation (NYSDEC), which authorized NYCDEP to acquire land and conservation easements in the watershed of the New York City water supply system. The City promulgated new Watershed Rules and Regulations (effective on May 1, 1997) and established economic partnerships with watershed communities to assist the City and stakeholders in their efforts to protect the watershed. In addition, the MOA mandated wastewater treatment plant upgrades, nonpoint source pollution controls, and the review of the existing monitoring program.

EPA issued a four-month interim FAD on January 21, 1997, followed by a FAD in May 1997, granting New York City conditional relief from filtering its Catskill/Delaware water system until the agency made a further determination, scheduled for April 15, 2002.

EPA's Fifth Determination (November 2002): Based on NYCDEP's December 2001 Long-Term Watershed Protection Program, EPA issued a FAD in November 2002, which included significant enhancements to the overall watershed protection program. In addition, the 2002 FAD highlighted two major themes in the City's program: a long-term commitment to watershed protection programs, and a reliance on watershed partners (such as the Catskill Watershed Corporation and the Watershed Agricultural Council) to enhance program acceptance and implementation.

Program enhancements in the 2002 FAD included expansion of the agricultural program to include small farms and east-of-Hudson farms; commitment to seven new wastewater projects for communities on the MOA prioritized list; an expanded stream management program; study of Catskill turbidity and evaluation of control alternatives; and commitment to construction of an ultraviolet light disinfection plant for the Catskill/Delaware water supply.

EPA's 2007 Filtration Avoidance Determination

In accordance with the provisions of the 2002 FAD, the 2007 FAD development process was initiated by the City's submittal of a report entitled "2006 Watershed Protection Program

Summary and Assessment" in March 2006. This report briefly summarized the City's protection programs and included results of a status and trends analysis of water quality throughout the watershed. This report served as a reference for the FAD development activities which followed. In the spring of 2006, EPA began substantive discussions with NYCDEP and New York State about the 2007 FAD. In addition, EPA and NYSDOH reached out to watershed stakeholders and the public in an effort to gain input about various issues and programs. Discussions were held with watershed stakeholders, and four public meetings were conducted.

Developments after Submission of City's Long-Term Program

The City's 2006 Long-Term Watershed Protection Program was a comprehensive effort, arrived at after extensive consultation with EPA, NYSDOH and NYSDEC. In developing its 2006 Long-Term Watershed Protection Program, the City, among other things, committed to take additional steps to address several significant issues and challenges that are important to the continuation of filtration avoidance: 1) excessive turbidity in the Catskill system that is produced by large storm events; 2) compliance with new, more stringent national standards for disinfection byproducts; and 3) the potential for changes in development patterns, and how to refine the City's land acquisition program. The 2006 Long-Term Program was premised on the 2007 FAD being issued for a period of five years and thus geared its various programs and activities to such a five-year period.

Subsequent to submission of the City's 2006 Long-Term Watershed Protection Program, and based on further discussions among the City, EPA, and the State, as well as input received from interested stakeholders, the City, EPA, and NYSDOH agreed that the 2007 FAD should cover a term of ten years, consisting of two five-year periods: (i) 2007-2012 ("First Five Year Period"), and (ii) 2012-2017 ("Second Five Year Period"). As part of this agreement, the City committed to a land acquisition program covering ten years, rather than five as originally proposed. Pursuant to this program, the City would: (1) continue to solicit land in accordance with the FAD and the MOA; (2) periodically reevaluate its solicitation/resolicitation plans and establish plans that include a minimum of 50,000 acres to be solicited annually; (3) commit, upon request by the primacy agency, the remaining $23 million of supplementary funds, and commit an additional $241 million to the program in three phases: $72.5 million by December 31, 2008, $90 million by December 31, 2011, and $78.5 million by December 31, 2014 ; (4) consult with EPA/NYSDOH regarding the need for additional funding and secure funds as needed; (5) continue its best efforts to acquire land in the critical Kensico and West Branch basins; (6) develop and implement a plan to significantly increase participation by land trusts and other non-governmental organizations in identifying and helping the City acquire eligible lands; and (7) complete a strategic review to help establish the future shape of the program. In addition, by January 21, 2010, the City would request/apply for a water supply permit from NYSDEC covering a ten-year period.

In addition, the City, EPA, and NYSDOH agreed that while the programs and activities described in the City's 2006 Long-Term submission were adequate for purposes of a five-year FAD, given that the 2007 FAD was now planned as having a ten-year term overall, an agreement would need to be reached for the second five years of the FAD, on which of such programs, other than land acquisition, should be continued during such period; whether and how any of the

programs to be so continued should be modified; and/or whether additional programs are needed to justify the continuation of the FAD for the second five years of its term. Hence, the 2007 FAD required that such an agreement be reached for the Second Five Year Period, as a condition to the FAD continuing through such period. In consultation with NYSDOH and EPA, NYCDEP was required to develop proposed program commitments which would be subject to NYSDOH/EPA review and approval. Once the program commitments were established, the City would be required to meet its commitments on the agreed-upon programs in order for the FAD to continue for the duration of the Second Five Year Period. NYSDOH/EPA would seek input from watershed stakeholders regarding the commitments to be established for the Second Five Year Period and issue a mid-term revision to the FAD in 2012 memorializing the new commitments.

Developments after Release of Draft 2007 FAD

On April 12, 2007, EPA released a draft FAD which incorporated a land acquisition program covering ten years, as described above. EPA invited written public comment on the draft FAD, and accepted comments until May 31, 2007. A substantial number of comments were received. This prompted EPA and NYSDOH to initiate further discussions with the City, aimed at exploring improvements to the draft FAD, to address certain comments that were received from interested parties. These discussions resulted in the City making several additional commitments to enhance its watershed protection program. Program enhancements in the 2007 FAD included expanding the Septic Remediation and Replacement Program to include cluster systems and small businesses; funding wastewater management systems in the final five communities listed in Paragraph 122 of the Watershed MOA; providing additional funds for wastewater treatment plant upgrades west-of-Hudson; funding an additional engineering position at the Catskill Watershed Corporation to assist applicants in complying with storm water provisions of the WR&Rs; funding the Watershed Agricultural Council to implement a forest easement program, to support easement stewardship activities, to make the Nutrient Management Credit more widely available, and to report on a study on Precision Feed Management; and funding local consultation activities to support review of proposed City land acquisitions.

2007 Determination

In July 2007, EPA, in consultation with NYSDOH, determined that the City's 2006 Long-Term Watershed Protection Program, along with the milestones and clarifications/additions set forth in the 2007 determination, if complied with, would achieve the objectives of the Safe Drinking Water Act and the Surface Water Treatment Rule for unfiltered systems. The determination stated that prior to developing their Revised Long-Term Watershed Protection Program, NYCDEP would undertake a comprehensive evaluation of its watershed protection program, and would provide an evaluation and assessment report by March 31, 2011. This evaluation should serve as a useful reference during the development of revised program commitments for the Second Five Year Period of the FAD. With the primacy agency taking the lead, EPA and NYSDOH would conduct a compliance review and issue a report by July 31, 2011 regarding the City's implementation of its December 2006 Long-Term Watershed Protection Program. This review would evaluate: (1) the City's compliance with this filtration avoidance determination during the First Five Year Period; (2) the progress the City is making in implementing its Long-

Term Watershed Protection Program and meeting the program's objectives during the First Five Year Period; and (3) what revisions might be necessary for all FAD programs (except land acquisition) for the Second Five Year Period. The report would also assist the City in its development of a Revised Long-Term Watershed Protection Program which would be submitted by December 15, 2011, and used as the basis for NYSDOH/EPA determining the programs and activities, other than land acquisition, required to be undertaken by the City so as to support the continuation of this FAD into the Second Five Year Period.

Developments Since the 2007 FAD was Issued

In September 2007, EPA granted NYSDOH primary regulatory responsibility for the Surface Water Treatment Rule as it applies to the Catskill/Delaware water supply, making NYSDOH the primacy agency for oversight of the City's FAD.

On April 4, 2010, the City adopted amendments to its *Rules and Regulations for the Protection from Contamination, Degradation and Pollution of the New York City Water Supply and Its Sources* (WR&Rs). These amendments served to make the City's WR&Rs consistent with NYS's requirements for storm water pollution prevention plans and to revise the definition of "phosphorus-restricted basin" to include basins for source water reservoirs whose phosphorus levels exceed 15 micrograms/liter.

After significant discussion among the City, the State, EPA, and watershed stakeholders on the conditions that would apply to the City's Land Acquisition Program, the City applied to NYSDEC for a Water Supply Permit (WSP) in 2010, and the City was issued a fifteen-year WSP on December 24, 2010.

Revision of the 2007 FAD

At the end of the First Five Year Period, as described by the 2007 FAD, NYSDOH, now as the primacy agency, took the lead on conducting a review of the City's implementation of its 2006 Long-Term Plan and compliance with the requirements of the FAD. NYSDOH, in consultation with EPA, issued a report on their assessment in September 2011. This assessment, multiple meetings with the City, and a number of other elements, formed the basis for this Revised 2007 FAD. Other key components of the overall FAD revision process included:

- *2011 Watershed Protection Program Summary and Assessment* (March 2011) report by the City;
- Outreach to Watershed Stakeholders: NYSDOH, EPA, and the New York State Department of Environmental Conservation (NYSDEC) met with various watershed stakeholders in 2011 to gather input for development of FAD program requirements;
- Public Information Sessions in June and July of 2011, held in Delhi, Belleayre, Somers, and New York City;
- *2011 Revised Long-Term Watershed Protection Plan* ("2011 Long-Term Plan" - submitted by the City on December 15, 2011), which proposed the City's commitments for FAD programs for the Second Five Year Period; and

- Public Comment Period in 2013 to solicit comment on draft mid-term revisions of the 2007 FAD.

With the issuance of this Revised 2007 FAD, the City will be required to meet the commitments defined in the program sections that follow. Unless otherwise specified, program projects/activities completed after the end of the First Five Year Period will be credited towards meeting program numeric goals defined in this Revised 2007 FAD. In general, the activities set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. However, in a number of instances, program requirements have been revised to enhance program effectiveness or to improve efficiency of implementation. For example, the following changes and enhancements are reflected in program requirements for the remaining period of the 2007 FAD:

Community Wastewater Management Program - In addition to completing the three community wastewater management systems that were started during the First Five Year Period (Trout Creek, Lexington, and South Kortright), the program commitments include designing and constructing systems for the five remaining communities identified in Paragraph 122 of the MOA that have not yet been addressed by the program (Shandaken, West Conesville, Claryville, Halcottsville, and New Kingston) in accordance with the schedule contained herein. As a new program requirement, the City will study the potential need for a community wastewater management system for the Hamlet of Shokan.

Stormwater Programs – Commitment to this program has been enhanced by including a requirement for the City to provide funding needed to construct 9 stormwater retrofit projects per year for the remaining term of the 2007 FAD. In addition, the revised FAD emphasizes that program funding be used to support retrofit projects installed in coordination with Community Wastewater Management Program projects.

Wastewater Treatment Plant Upgrade Program – Upgrades of the five City-owned and thirty-four non-City-owned wastewater treatment plants (WWTPs) in the west-of-Hudson (WOH) watershed have been completed. As such, this program will no longer be included in the Revised 2007 FAD. However, in accordance with Public Health Law §1104 and the MOA, the City is obligated to pay for capital replacement of Watershed Equipment and Methods that are installed at all public WWTPs and all (public or non-public) WWTPs under construction as of November 2, 1995 and that are required solely by the City's WR&Rs and not otherwise required by federal or State law. Replacement work conducted under these provisions will be reported in the semi-annual reports for the Watershed Rules and Regulations and Other Enforcement/Project Review Program.

Land Acquisition Program – Requirements in the 2007 FAD for the Land Acquisition Program were designed to cover a ten-year period. However, the 2007 FAD only required solicitation plans through 2012 and allowed for the potential that the program may need additional funds prior to the end of the ten-year period. The 2007 FAD states that the City may consult with EPA/NYSDOH/NYSDEC regarding the potential need for any additional monies beyond that already committed to land acquisition; if such funding is needed, sequester the funds. During the First Five Year Period of the Land Acquisition Program, the City exceeded the minimum

solicitation goals of the 2007 FAD (i.e., 50,000 acres/year). Economic and market circumstances resulted in high rates of landowner acceptance and the City made purchases totaling more than $200 million. In order to assess whether or not the funds committed by the 2007 FAD would be sufficient to support a viable Land Acquisition Program through the remaining period of the 2007 FAD, NYSDOH/EPA requested that the City submit a report evaluating remaining funds in the Land Acquisition Program and estimating funds that would be required to sustain the program through the remaining period of the 2007 FAD. This assessment indicated that additional funds would need to be committed in order to maintain a program at the historically required solicitation rate of 50,000 acres/year. Based on this assessment, the Revised 2007 FAD requires that the City solicit a total of 250,000 acres over the remaining period of the 2007 FAD (including 2012) and commit an additional $50 million to the program. As described below, these funds may also be used to supplement the City-funded flood buy-out program.

In the aftermath of Tropical Storms Irene and Lee in 2011, the City is participating in a flood buy-out program that is managed by the Federal Emergency Management Agency (FEMA) and the State Office of Emergency Management (SOEM). Through this program, qualified properties, which have sustained flood damage and are located in 100-year floodplains, can be purchased from willing sellers and vacated to promote safety and to prevent possible contaminants from these properties from entering waterways during future flooding events. In accordance with the terms of their 2010 Water Supply Permit, the City is allowed to purchase these properties, because they are part of a federal or State-sponsored flood buy-out program. By paying for the land portion of the purchase price and all acquisition-related soft costs, the City will be providing all or most of the 25% local match required by this program, with the federal government providing 75% of project costs[1]. This flood buy-out program will provide many floodplain landowners the opportunity to realize the pre-flood value of their property and move out of the floodplain. In recognition that there may be additional opportunities for the City to purchase from willing sellers floodplain properties that were not otherwise eligible for or did not participate in the FEMA flood buy-out program, or are not eligible for purchase under the terms of the Water Supply Permit unless they are participating in a flood buy-out program, the mid-term revisions require the City to commit to funding a City-funded flood buy-out program. The intent of this program is to acquire high-priority parcels that are important from a flood mitigation and water quality perspective, but which did not participate or otherwise qualify for a federal buy-out program. Based on the estimated value of properties that initially applied for the FEMA flood buy-out program after Tropical Storms Irene and Lee, but did not in the end participate, the City will commit $15 million to ensure adequate funding for this program. These funds will only be available for flood buy-out purchases made in accordance with the conditions of the City's 2010 WSP as amended. In addition, if more than $15 million is required to purchase flood buy-out properties, the City may draw funds from the $50 million allocated for general land acquisition to make these purchases.

To complement efforts under the City-funded flood buy-out program and ensure long term economic viability and sustainability of the upstate watershed communities, the Revised 2007 FAD requires the City to provide the Catskill Watershed Corporation $17 million to support a

[1] A recently announced State program may cover a portion of these costs. The City is committed to providing necessary funding regardless of the State contribution.

Local Flood Hazard Mitigation Program, which, in part, is expected to include the relocation of homes, anchor businesses and critical community facilities.

The 2007 FAD required the City to contract with the WAC to provide funding for the long-term stewardship of Watershed Agricultural Easements. In order to ensure that this requirement is met, the Revised 2007 FAD requires the City to commit to pay for the stewardship and enforcement costs associated with the WAC's current and future portfolio of conservation easements acquired with funds from the City through 2034. This commitment will help ensure that these easements will continue to be protected and provide water quality benefits in perpetuity.

Land Management Program – In addition to ongoing management of City-owned lands and forests to ensure water quality protection, the City will develop a comprehensive Invasive Species Management Strategy. Some invasive species can impact water system infrastructure, while others compete with or destroy native species, impairing the function of watershed ecosystems in protecting water quality. Implementation of this plan will help eliminate or reduce the spread of invasive species in the watershed.

Watershed Agricultural Program – As required by the 2007 FAD, the City, in consultation with the Watershed Agricultural Council (WAC), reviewed the existing evaluation criteria by which the success of the Watershed Agricultural Program (WAP) has been measured. The review resulted in the development of a new prioritization methodology by which Best Management Practices (BMPs) for preventing pollution of the water supply from agricultural activities will be selected for implementation. This new methodology will be adopted for use in the remaining period of the 2007 FAD. A review of the methodology and metrics used to evaluate the WAP is scheduled in 2015.

The revised WAP program requirements include a new commitment for the City to provide funding to support implementation of Precision Feed Management (PFM) on 60 eligible farms in the watershed. The City may provide justification for not implementing PFM on all 60 farms if it is demonstrated that PFM will provide minimal water quality benefit. For some dairy farms, PFM has been demonstrated to be an effective tool, as part of a comprehensive nutrient management plan, for reducing the amount of phosphorus and nitrogen that comes onto dairy farms and that is subsequently excreted in manure, reducing the potential for these nutrients to enter the City's source waters.

While the federal Farm Bill has yet to be reauthorized, the future of the Conservation Reserve Enhancement Program (CREP) is uncertain. This program allows the WAP to leverage federal funds to support taking environmentally sensitive lands out of farm production, thereby protecting water resources from farm inputs. The Revised 2007 FAD requires the City to assess potential program alternatives to CREP in the event that CREP is not reauthorized as part of the Farm Bill.

Watershed Forestry Program – The Revised 2007 FAD adds a new requirement to support a riparian buffer restoration program (such as Trees for Tributaries) in the east-of-Hudson (EOH) watershed. Trees for Tributaries engages volunteers in planting riparian areas with trees and

shrubs, thereby creating forested buffers, which help protect water quality. At the same time, watershed residents learn about the valuable role of riparian forests and develop a vested interest in watershed protection. This program complements activities conducted under the Riparian Buffer Protection Program.

Stream Management Program – The historic damage to the NYC watershed inflicted by Tropical Storms Irene and Lee in August and September of 2011 caused the City to rethink the priorities of the Stream Management Program (SMP) for the remaining period of the 2007 FAD. During the First Five Year Period, stream management plans were developed and adopted for most of the stream basins in the west-of-Hudson (WOH) watershed. These plans are now being implemented through partnerships with County Soil and Water Conservation Districts/Cornell Cooperative Extension and in consultation with Project Advisory Committees comprised of local leaders and NYCDEP staff. Stream and floodplain restoration, bank stabilization, flood response and recovery and future flood mitigation have been critical components of these stream management plans, as these activities work to directly protect water quality.

After Tropical Storms Irene and Lee, the City and watershed counties subsequently joined in a collaborative effort to develop a new focus for the SMP, called the Local Flood Hazard Mitigation Program (LFHMP). This new program initiative is aimed at mitigating the risk of flooding to streamside communities, which can be a significant source of pollutants to flood waters. The program will have components that are administered by the SMP partners (County Soil and Water Conservation Districts and Ulster County Cornell Cooperative Extension) and components that are administered by the Catskill Watershed Corporation (CWC). A commitment to initiate and fund this new program during the remaining period of the 2007 FAD has been incorporated into the Revised 2007 FAD, and requires the City to provide an additional $10.1 million to SMP partners and commit $17 million to the CWC to support this effort. At the same time, the City's SMP partners will continue to carry on the work that has defined the success of this program. To ensure that the baseline work of the SMP is supported, the Revised 2007 FAD requires the City to increase the baseline funding that was committed during the First Five Year Period by an additional $10.5 million. Special emphasis has been given in the baseline program to managing stormwater in roadside ditches.

Also in the aftermath of Tropical Storms Irene and Lee, the City provided 25% matching funds to support work that was being performed under the Natural Resources Conservation Services Emergency Watershed Protection (EWP) program. EWP funding could be used to address watershed damage from the storms that imposed imminent threats to lives and property or that had caused significant soil loss. In order to ensure that adequate matching funds are available to make best use of federal monies available through the EWP program, the Revised 2007 FAD requires the City to commit an additional $500,000 to support EWP projects that will provide significant water quality benefits.

Due in large part to the underlying geology of the Catskill watershed, the streams within that watershed are prone to elevated levels of turbidity during high flow events. The design of the Catskill water supply system, alum treatment facilities, and the overall flexibility of the City's water supply system have enabled the City to mitigate these elevated turbidity events so that filtration avoidance criteria have been met. While the stream restoration work that is conducted

by the SMP is not expected to prevent the occurrence of these high turbidity events during extreme storms, stream projects can help reduce sediment entrainment into streams, benefiting overall water quality. To further understanding of the benefits of stream projects, the Revised 2007 FAD requires that the City submit a proposal for a study that assesses the efficacy of stream restoration projects in reducing turbidity. In addition, the City will report on the status of an ongoing study that is helping to identify various sources of turbidity in the Ashokan watershed. Also, in order to focus efforts on reducing sediment inputs to the Catskill water supply and to further complement efforts under the Catskill Turbidity Control Program, the Revised 2007 FAD requires the City to complete 7 stream restoration projects within the Ashokan watershed during the remaining period of the 2007 FAD. These stream projects are in addition to projects that were already completed in 2012 in this reservoir basin.

Wetlands Protection Program - With a goal of enhancing wetlands mapping capabilities, during the remaining period of the 2007 FAD the City will explore the use of Light Detection and Ranging (LIDAR)-derived data to detect wetlands and assess wetlands connectivity. Wetland permit application review and reference wetland monitoring will also form the basis for program implementation during the remaining period of the 2007 FAD.

East-of-Hudson Nonpoint Source Pollution Control Program - The 1997 New York City Watershed Memorandum of Agreement (MOA) established the EOH Water Quality Investment Program (WQIP), which committed NYC funds to be used by Westchester and Putnam Counties to help protect the water quality of NYC's EOH water supply basins. In Putnam County, some WQIP funds were used to establish a Septic Repair Program (SRP). As of the end of 2010, the SRP had repaired 162 septic systems. However, the program is currently not being funded by the County and is no longer reimbursing homeowners for septic repairs. Given the proximity of the EOH reservoirs to the intakes serving NYC, protection of these unfiltered supplies from contamination by human pathogens resulting from failing septic systems is critical. To address the lack of a septic repair funding program in the EOH water supply basins, NYC must implement, or cause to be implemented, a phased septic repair program that provides funding to share the costs with homeowners for the repair or replacement of failing and potentially failing septic systems. The focus for the remainder of this FAD will be to provide cost share funding for 100 septic systems within the West Branch and Boyd Corners watersheds. A proposal to expand this program to the Cross River and Croton Falls Reservoir basins is also required.

Catskill Turbidity Control – The City is planning an extended shutdown of the Rondout to West Branch Tunnel (RWBT) in order to address a significant leak in this section of the Delaware Aqueduct. While this shutdown is not planned to occur within the term of the 2007 FAD, planning for augmentation of the City's water supply during this shutdown is in progress. Given that the City will not have use of the Delaware system's WOH reservoirs during the shutdown, greater reliance will be placed on the Catskill system to supply the City's needs. However, a current strategy for reducing the impacts of Catskill turbidity on the quality of the City's water supply is to reduce flow from the Catskill system. To address how these competing goals will be resolved during the limited period of the Delaware Aqueduct shutdown, the Revised 2007 FAD requires the City to submit a Catskill Turbidity Control General Management Plan, which will consider how water quality will be maintained for the duration of the RWBT shutdown.

The City relies extensively on modeling to assess the efficacy of watershed control programs and the impacts of weather events on water quality, as well as to make decisions regarding how to best operate their water supply system to provide adequate water quality and quantity. Models used to help implement the Catskill Turbidity Control Program have been developed by the City with input from independent experts and peer review. These models form the basis of the Operations Support Tool (OST), which the City uses to help make operational decisions. As the City continues to develop and use the OST, the Revised 2007 FAD seeks to ensure that expert review and oversight is ongoing by requiring that the City request that an organization of independent national experts (e.g., the National Research Council or the National Academy of Sciences) convene a panel of modeling experts, who will be tasked to review the use and effectiveness of the City's OST, and to help develop performance measures to assess the efficacy of the Catskill Turbidity Control Program.

General Program Requirement Changes – As some FAD programs have developed and matured, the need for frequent reporting on the progress of these programs has become less critical. In recognition of this, and to allow more efficient use of resources and time to implement FAD programs, the reporting requirements for some FAD programs has been reduced for the remaining period of the 2007 FAD. Reporting has been reduced from semi-annual to annual for the following programs: Septic Remediation and Replacement, Septic Maintenance, Alternate Design Septic, Sewer Extension, New Infrastructure, Community Waste Management, Stormwater Retrofit, EOH Nonpoint Source Pollution Control, Kensico Water Quality Control, Watershed Monitoring, Waterborne Disease Risk Assessment, and Cross Connection Control. In addition, inspection and water quality monitoring reports for the Wastewater Treatment Plant Compliance and Inspection Program will be submitted semi-annually instead of quarterly. While the reporting frequency for some programs has been reduced, NYSDOH/EPA may request that the City submit more immediate reports on these programs, as well as other programs and water quality-related events, when deemed necessary.

While some program requirements have been revised, the 2007 FAD remains as one component of the City's comprehensive watershed protection program, which has been established within the context of the 1997 MOA and previous FADs. Many of the program activities will be implemented through continued partnerships with watershed stakeholders the City has developed and maintained since the signing of the Watershed MOA. This FAD includes all the commitments made by the City in their 2011 Long-Term Plan (note that the City is required to meet the requirements and due dates as set forth in this determination, rather than those in the 2011 Long-Term Plan, in instances where they differ from those in the 2011 Long-Term Plan). In addition, continued implementation of the Watershed Rules and Regulations (WR&Rs) (effective May 1, 1997 and amended April 4, 2010) and compliance with the Water Supply Permit issued by NYSDEC for land acquisition (reissued December 24, 2010) is required by this FAD. This Revised 2007 FAD also requires that the City continue to meet the filtration avoidance criteria, detailed in 40 CFR §§141.71, 141.72, 141.171, and 141.712 of the federal code of regulations; and 10 NYCRR Part 5, Subpart 5-1, Section 1.30(c) of the NYS Sanitary Code (SSC).

The Revised 2007 FAD supersedes the 2007 FAD and will be applicable until a further determination is made, currently scheduled for May 2017. Looking ahead to the transition from

the 2007 FAD into the 2017 FAD, EPA and NYSDOH expect that NYCDEP will undertake a second comprehensive evaluation of its watershed protection program to be completed by March 31, 2016 covering the Second Five Year Period. With the primacy agency taking the lead, NYSDOH and EPA will conduct a second compliance review report by July 31, 2016. This report will assist the City in its development of a new Long-Term Watershed Protection Program due on December 15, 2016, which will serve as the reference in developing and reaching agreement on the next renewal of this determination, scheduled for May 2017. The dates above are tentative and will be re-evaluated by NYSDOH/EPA at a later date.

Regulatory Authority

NYSDOH possesses authority under both State and federal law to enforce the 2007 FAD and the City's Long Term Watershed Protection Plan, as revised in December 2011. These documents, along with the City's Watershed Rules and Regulations and related requirements of the State Sanitary Code, *see* 10 NYCRR § 5-1.30, and federal regulations, *see* 40 CFR § 141.71(b), 141.171, embody the "watershed control program" for filtration avoidance under State law and under the federal Safe Drinking Water Act, 42 USC § 300f *et seq.*

The City would be in violation of State and federal filtration avoidance requirements if it fails to comply with its obligations to fully perform the watershed control program in timely fashion, including any failure by the City to make adequate, timely, and approvable submissions to NYSDOH required by that program. *See* §§ 141.71(b)(3) (watershed control program and disinfection treatment process must be "adequately designed and maintained" to "the State's satisfaction"); 141.71(c)(1); 10 NYCRR § 5-1.30(d). The City also would be in violation of State and federal filtration avoidance requirements if it fails to meet applicable numerical standards for source water conditions and disinfection. *Id.*

NYSDOH may take enforcement action against the City to address any such violations through the Commissioner's assessment of civil penalties of up to $25,000 per day for each violation, *see* Public Health Law, § 206[4](d), and in a State or federal court action brought by the Attorney General on NYSDOH's behalf to compel the City to comply with the watershed control program or, in the alternative, to compel the City to filter its Catskill/Delaware water supply.

2. SWTR Filtration Avoidance Criteria Requirements

The Surface Water Treatment Rule at 40 CFR §141.71, the Interim Enhanced Surface Water Treatment Rule at 40 CFR §141.171, and 10 NYCRR, Subpart 5-1, §5-1.30 require that all surface water supplies provide filtration unless certain source water quality, disinfection, and site-specific avoidance criteria are met. In addition, the supplier must comply with: (1) the Total Coliform Rule, and (2) the Stage 1 Disinfectants and Disinfection Byproducts Rule. Further, the Stage 2 Disinfectants and Disinfection Byproducts Rule and the Long Term 2 Enhanced Surface Water Treatment Rule establish additional important requirements for unfiltered systems, although these provisions are not identified in EPA regulations as filtration avoidance criteria.

The First Five Year Period of the 2007 FAD required ongoing monitoring and periodic reporting related to compliance with the SDWA, which must continue for the remaining period of the 2007 FAD. Two reporting requirements that were included in the 2007 FAD are not continued in this revision since they are not specifically required by the SWTR as conditions of filtration avoidance. The requirements are: (1) report on the operational status of the UV plant as required by LT2, and (2) notify NYSDOH/EPA within 24 hours of learning that a sample from a distribution system TCR compliance site has tested positive for *E. coli*.

During the remaining period of the 2007 FAD, the City must continue to meet the requirements below.

Requirement	Due Date
Continue to meet SWTR filtration avoidance criteria (40 CFR §141.71 and §141.171, and 10 NYCRR §5-1.30) and submit reports and certification of compliance on: • §141.71(a)(1) and §5-1.30(c)(1) - raw water fecal coliform concentrations • §141.71(a)(2) and §5-1.30(c)(2) - raw water turbidity sampling • §141.71(b)(1)(i)/§141.72(a)(1) and §5-1.30(c)(3) - raw water disinfection CT values • §141.71(b)(1)(ii)/§141.72(a)(2) and §5-1.30(c)(4) - operational status of Kensico and Hillview disinfection facilities, including generators and alarm systems • §141.71(b)(1)(iii)/§141.72(a)(3) and §5-1.30(c)(5) - entry point chlorine residual levels • §141.71(b)(1)(iv)/§141.72(a)(4) and §5-1.30(c)(6) - distribution system disinfection levels (the City will include a discussion of any remedial measures taken if chlorine residual levels are not	Monthly

Requirement	Due Date
maintained throughout system) • §141.71(b)(5) and §5-1.30(c)(10) - distribution system coliform monitoring, including a summary of the number of samples taken, how many tested positive for total coliform, whether the required number of repeat samples were taken at the required locations, and which, if any, total coliform positive samples were also *E. coli* positive. For each *E. coli* positive sample, include the investigation of potential causes, problems identified and what has or will be done to remediate problems. Include copies of any public notices issued as well as dates and frequency of issuance.	
All requirements described in § 141.71(b)(4) and §5-1.30(c)(8) must continue to be met. Notify NYSDOH/EPA within twenty-four hours of any suspected waterborne disease outbreak.	Event Based
All requirements described in §141.71(b)(6) and §5-1.30(c)(9) must continue to be met. Submit report on disinfection byproduct monitoring results.	Quarterly
Notify NYSDOH/EPA within twenty-four hours, if at any time the chlorine residual falls below 0.2 mg/l in the water entering the distribution system.	Event Based
Notify NYSDOH/EPA by the close of the next business day, whether or not the chlorine residual was restored within 4 hours.	Event Based
Report on the operational status of Kensico Reservoir, West Branch Reservoir (on-line or by-pass), Hillview Reservoir, and whether any of these reservoirs experienced unusual water quality problems.	Monthly

Requirement	Due Date
Regarding the emergency/dependability use of Croton Falls and Cross River source water: (A) The City shall not introduce Croton Falls or Cross River source water into the Catskill/Delaware water supply system without the prior written approval of NYSDOH/EPA. (B) As a condition of approval, the City must demonstrate continuing, substantial compliance with the watershed protection program elements being implemented in the Croton Falls and Cross River watersheds that are contained in this Determination. (C) As a condition of approval, until filtration of the Croton system has been achieved, the City must have submitted all relevant water quality data as specified in the Judicial Order on Consent, including any supplements, in United States v. City of New York, 97-CV-2154 (NG). Once filtration of the Croton system has been achieved, the City will submit water quality data and monitor water quality at Croton Falls and/or Cross River, pursuant to the approved sampling plan submitted to NYSDOH/EPA in May 2010, or as revised thereafter. (D) NYSDOH/EPA approval under this Section may include additional conditions, including but not limited to, project schedules or specific operating goals or parameters for the City's water supply facilities (such as maximizing use of the Croton Filtration Plant, or operation of the Catskill/Delaware UV Plant at 3-log inactivation). (E) As used in this Section, the term "NYSDOH/EPA" is defined as the primacy agency. In evaluating requests for approval from the City, the primacy agency shall consult with the cooperating regulatory agency.	Continuous

3. Environmental Infrastructure Programs

3.1 Septic and Sewer Programs

The City implements a comprehensive set of programs that serve to reduce the number of failing or potentially failing septic systems in the watershed. For the remaining period of the 2007 FAD these programs will continue, and build upon the accomplishments made under the First Five Year Period of the 2007 FAD and the Watershed Memorandum of Agreement (MOA) septic program. Since the 1997 FAD, the City has worked closely with the Catskill Watershed Corporation (CWC) to implement these programs in the west-of-Hudson watershed. Also integral to the program are the implementation and enforcement of the New York City Watershed Rules and Regulations (WR&Rs) that have been in effect since May 1, 1997 and were amended on April 4, 2010.

The Septic and Sewer Programs are composed of the following elements:

- Septic Remediation and Replacement Program;
- Septic Maintenance Program;
- Sewer Extension Program;
- Alternate Design and Other Septic Systems.

Septic Remediation and Replacement Program
A number of requirements were fulfilled in the First Five Year Period of the 2007 FAD that will facilitate the work of this program going forward. Contract changes were executed with the CWC to administer the septic inspection/pump out/remediation program, which is a continuation of the MOA septic program. In addition, contract changes and program rules were developed to provide $2 million in funding to be used for repairing or replacing existing (or creating new) cluster systems. Eligible cluster systems may serve residences or small businesses at specified locations where deemed appropriate for water quality protection. Working with CWC, program changes were also executed to expand eligibility to commercial septic systems operated by small businesses, and to provide an additional $4 million to fund these systems. Finally, assessments were performed that determined that funding allocated in the First Five Year Period is adequate to address cluster and small business septic systems needs during the remaining period of the 2007 FAD.

Septic Maintenance Program
This program funds 50% of the cost for septic pump-outs for homeowners in the west-of-Hudson watershed who installed or replaced septic systems after January 1, 1997. The overall goal of this voluntary reimbursement program is to enhance the functioning and reduce the incidence of failures of septic systems in the watershed.

Sewer Extension Program
This program provides funding for the design and construction of wastewater sewer extensions connected to City-owned wastewater treatment plants (WWTPs) discharging in the west-of-Hudson watershed. The goal of this program is to reduce the number of failing or potentially

failing septic systems in the west-of-Hudson watershed by extending the WWTP service to priority areas.

The projects for the towns of Roxbury (Grand Gorge) and Neversink (Grahamsville) were completed during the First Five Year Period of the 2007 FAD, but those in the towns of Shandaken (Pine Hill), Middletown (Margaretville), and Hunter (Showers Road area) are still in progress. Successful program implementation is dependent upon completion of certain municipal actions. While this does not allow the City to entirely control project completion times, the City will work to complete projects at Pine Hill-Shandaken (Pine Hill WWTP), Showers Road-Hunter (Tannersville WWTP), and Margaretville-Middletown (Margaretville WWTP) by December 31, 2015. Community participation and accomplishment of key tasks is required for project progress and timely completion.

Alternate Design and Other Septic Systems Program
The Alternate Design Septic Program funds the eligible incremental costs to comply with the septic system provisions of the WR&Rs to the extent that they are not otherwise required by State and federal regulations. The City funded the Alternate Design Septic Program under the MOA.

The City's compliance with the requirements of the Septic and Sewer Programs in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Septic and Sewer programs in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
In accordance with Septic Remediation and Replacement Program Rules (dated 01/08/13 or as may be amended), provide adequate funding in support of the Septic Remediation and Replacement Program at a funding level sufficient to address 300 septic systems per year.	Ongoing
In accordance with Cluster Septic System Program Rules (dated 04/05/11 or as may be amended), support the continued use of the funding allocated in the First Five Year Period of the 2007 FAD for the Cluster System Program and work with CWC to explore implementation, and examine the program terms to facilitate the advancement of the Cluster System Program component of the Septic Remediation and Replacement Program.	Ongoing

In accordance with Small Business Septic System Rehabilitation and Replacement Program Rules (dated 03/01/11 or as may be amended), support the continued availability of the funding allocated in the First Five Year Period of the 2007 FAD for the Small Business Program component of the Septic Remediation and Replacement Program.	Ongoing
The City will meet with NYSDOH/EPA to review implementation status of the Cluster System and Small Business Programs.	11/30/14

Septic Maintenance Program

Activity	Due Date
Provide additional funding, if necessary, to permit maintenance each year of 20% of the total number of septic systems eligible under the Septic Maintenance Program Rules (dated 12/01/09, or as may be amended).	Ongoing

Sewer Extension Program

Activity	Due Date
Continue to work with the Town of Shandaken on the construction of the sewer extension to the Pine Hill WWTP.	Ongoing
Continue to work with the Town of Hunter on the construction of the sewer extension project at Showers Road.	Ongoing
Continue to work with the Town of Middletown and Village of Margaretville on the construction of the sewer extension projects to the Margaretville WWTP.	Ongoing

Alternate Design Septic Program

Activity	Due Date
Support the use of already provided funding to cover the eligible incremental costs to comply with the septic system provisions of the WR&Rs to the extent that they are not otherwise required by State and federal regulations.	Ongoing

Report Description	Due Date
Submit a report which will provide information on the status of implementation of the following programs: • Septic Remediation and Replacement Program, including the Cluster and Small Business Programs; • Septic Maintenance Program; • Sewer Extension Program; • Alternate Design Septic Program.	Annually, 3/31

3.2 New Sewage Treatment Infrastructure Program

The New Sewage Treatment Infrastructure Program (NIP) funded assessment of wastewater infrastructure needs and provided technical assistance and funding for the construction of the recommended wastewater solutions in the communities listed in the MOA. The City has completed six New Sewage Treatment Infrastructure projects in the following municipalities: Andes (2005); Hunter (2005); Roxbury (2005); Windham (2005); Fleischmanns (2007); and Prattsville (2007). The Phoenicia project was not advanced by the Town of Shandaken, and was subsequently dropped from the NIP in 2012.

The City's compliance with the requirements of the New Sewage Treatment Infrastructure Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

As of this FAD revision, this program is considered to be concluded.

3.3 Community Wastewater Management Program

The Community Wastewater Management Program provides funding for the design and construction of community septic systems, including related sewerage collection systems, and/or the creation of septic maintenance districts, including septic system replacement, rehabilitation and upgrades as well as operation and maintenance of the district. As stipulated in the First Five Year Period of the 2007 FAD, wastewater management systems were completed for five of the communities where needs were identified in Paragraph 122 of the MOA (the 8-22 communities), and designs were started for three additional community systems.

The City's compliance with the requirements of the Community Wastewater Management Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

During the remaining period of the 2007 FAD the City shall complete construction at the three communities identified in the 2007 FAD (Trout Creek, Lexington, and South Kortright) and complete the study, design, and construction for five additional communities (Shandaken, West Conesville, Claryville, Halcottsville, and New Kingston) in accordance with the schedule outlined below. In addition, the City will study the potential need for a community wastewater management system for the Hamlet of Shokan.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Community Wastewater Management Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Execute contract changes with CWC in support of the Community Wastewater Management Program that include providing sufficient funding to complete the projects for Shandaken, West Conesville, Claryville, Halcottsville, and New Kingston.[1]	Date of commencement of Second Five Year Period + 12 months
Complete construction for Trout Creek.[2]	12/31/13
Complete construction for Lexington.[2]	12/31/14
Complete construction for South Kortright.[2]	12/31/14
Complete study for Shandaken, West Conesville.[2]	6/30/14

Complete design for Shandaken, West Conesville.[2]	6/30/15
Complete construction for Shandaken, West Conesville.[2]	6/30/17
Complete study for Claryville, Halcottsville, New Kingston.[2]	6/30/16
Complete design for Claryville, Halcottsville, New Kingston.[2]	6/30/17
Complete construction for Claryville, Halcottsville, New Kingston.[2]	6/30/19

[1] Provision of additional funding not required if relief is provided by the primacy agency. Relief will be provided if: 1) through the 2016 compliance review process, the primacy agency or NYCDEP concludes that there are substantial impediments to continued filtration avoidance following the Second Five Year Period; and 2) the City provides written notice to the primacy agency that the City no longer seeks filtration avoidance.

[2] Milestone dates are contingent on the communities executing the necessary study, design, construction, municipal authorizations, and agreements with CWC in order for the projects to proceed.

Activity	Due Date
Submit a proposal to NYSDOH/EPA and NYSDEC for review and approval for a study that will evaluate the potential need for a community wastewater management system for the Hamlet of Shokan.	10/31/13
Complete a study, as approved by NYSDOH/EPA and NYSDEC, to determine the potential need for a community wastewater management system for the Hamlet of Shokan.	12/31/15

Report Description	Due Date
Report annually on program implementation.	Annually, 3/31

3.4 Wastewater Treatment Plant Upgrade Program

In accordance with the NYC Watershed Rules and Regulations (WR&Rs), all surface water discharging wastewater treatment plants (WWTPs) in the watershed must include advanced tertiary treatment (microfiltration or approved equivalent), sand filtration (or approved alternative), disinfection, and phosphorus removal treatment. In addition, subsurface discharging WWTPs must install sand filtration (or approved alternative), phosphorus removal, and disinfection, where applicable. The City is required under both Section 1104 of the New York State Public Health Law (PHL) and the 1997 Watershed Memorandum of Agreement to pay for certain costs associated with WWTPs in the watershed. The City must pay for design, installation, operation, and maintenance of "Watershed Equipment and Methods" for WWTPs that either (or both): (1) are "public" within the meaning of PHL § 1104, or (2) were operating, or were permitted and under construction, as of November 2, 1995. Watershed Equipment and Methods, or "upgrades", are wastewater treatment plant components and methods of operation that are required solely as a result of the WR&Rs and not otherwise required by federal or State law. The City's commitment to pay for Watershed Equipment and Methods at WWTPs in the two categories described above includes capital replacement of such Watershed Equipment and Methods. Any replacement activities completed in accordance with this provision will be described in reports for the Watershed Rules and Regulations and Other Enforcement/Project Review Program. The City further agreed to pay the annual costs of operation and maintenance of the upgrades.

The 2007 FAD required that upgrades be completed at all remaining WWTPs in the watershed that do not meet the requirements of the WR&Rs, or that such WWTPs be decommissioned and connected to approved WWTPs.

As reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011), functional completion has been achieved for all WWTPs in the west-of-Hudson and east-of-Hudson Catskill/Delaware watersheds that required upgrades. Achievement of this FAD goal is a significant and critical component of the City's watershed protection plan. The City's ongoing support for proper operation and maintenance of these WWTPs will ensure the success of this protection measure.

As of this FAD revision, this program is considered to be concluded. Consideration of the need for a new FAD program task to address facility and/or equipment replacement is reserved for future FAD negotiations.

3.5 Stormwater Programs

As a result of the 1997 MOA, the City established the following Stormwater Cost-Sharing Programs: (1) Future Stormwater Controls paid for by the City for Single Family Houses, Small Businesses, and Low Income Housing Program, and (2) the west-of-Hudson Future Stormwater Controls Program administered by the Catskill Watershed Corporation (CWC). These programs provide financial support for the cost of designing, constructing and, in some cases, maintaining stormwater controls that are required by the Watershed Rules and Regulations (WR&Rs), but not otherwise required by federal or State law, for certain new development projects. The City fully funded the incremental design and construction cost under the 1997 MOA and no additional funds are needed for the continuation of the west-of-Hudson Future Stormwater Controls Program. The City shall ensure adequate funding exists for an engineering position at CWC to assist the regulated community in complying with the stormwater provisions of the City's WR&Rs.

The Stormwater Retrofit Program, also administered by CWC, was established in the 1997 MOA to address existing stormwater runoff problems through the construction of stormwater best management practices (BMPs) in concentrated areas of impervious surfaces in the west-of-Hudson watershed based on water quality priorities. During the remaining period of the 2007 FAD the City shall continue: (1) the installation of stormwater BMPs and community-wide stormwater infrastructure assessment and planning consistent with the Stormwater Retrofit Program Rules (October 2009); and (2) to support the use of program funding for retrofit projects installed in coordination with Community Wastewater Management Program (CWMP) projects.

The City's compliance with the requirements of the Stormwater Programs in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement all elements of the Stormwater Programs in accordance with the milestones below.

Activity and Reporting Requirements

Stormwater Cost-Sharing Programs

Activity	Due Date
Fund, in accordance with the MOA and consistent with the program rules (dated 03/06/12, or as may be amended), the eligible incremental costs to comply with the stormwater provisions of the WR&Rs to the extent that they are not otherwise required by federal or State law.	Ongoing

Ensure adequate funding exists for an appropriate engineering position at CWC to assist applicants undertaking regulated activities to comply with the stormwater provisions of the WR&Rs.	Ongoing

Report Description	Due Date
Submit a report on program implementation.	Annually, 3/31

Stormwater Retrofit Program

Activity	Due Date
Provide funding necessary to construct 9 stormwater retrofit projects per year, starting 2013. Selection and implementation of eligible projects will be based on potential to benefit water quality protection. Program implementation will be consistent with the Stormwater Retrofit Rules (October 2009). Support the use of program funding for retrofit projects installed in coordination with CWMP projects.	Ongoing
Continue to provide the funding needed for the Operation and Maintenance of retrofit projects funded through the Stormwater Retrofit Program consistent with the Stormwater Retrofit Rules (October 2009).	Ongoing

Report Description	Due Date
Submit a report on program implementation.	Annually, 3/31

4. Protection and Remediation Programs

4.1 Waterfowl Management Program

The Waterfowl Management Program was initiated in 1993 by the City for the Kensico Reservoir in response to elevated coliform bacteria levels in the Reservoir. The program was later expanded to include six additional reservoirs (West Branch, Rondout, Ashokan, Cross River, Croton Falls, and Hillview) with the objective to minimize the fecal coliform loading to the reservoirs that result from roosting birds during migratory season. Since its inception, the program has been highly effective in controlling fecal coliform contributions from birds, which assists the City in meeting federal and State drinking water quality standards. The program makes use of bird harassment and deterrence techniques to discourage birds from roosting on or residing in proximity of City reservoirs.

The term "bird harassment" refers to use of pyrotechnics, motorboats, airboats, remote control motorboats, propane cannons, and other methods employed to physically chase or deter waterbirds from inhabiting the reservoirs. The term "bird deterrence" refers to preventive methods employed to prevent waterbirds from inhabiting the reservoirs. Such bird deterrent measures include nest and egg depredation, overhead bird deterrent wires, bird netting on shaft buildings, meadow maintenance, and other methods.

The City's compliance with the requirements of the Waterfowl Management Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The Waterfowl Management program remains an important element of source water protection from contamination with fecal coliform and shall continue through the City's commitment to the program. The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Waterfowl Management program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Active bird harassment – Kensico Reservoir.	Annually, 8/1 to 3/31
Active bird harassment – Hillview Reservoir.	Year-around
"As needed"[1] bird harassment – West Branch, Rondout, Ashokan, Croton Falls, and Cross River Reservoirs.	Annually, 8/1 to 4/15
"As needed" [1] bird deterrent measures – Kensico, West Branch, Rondout, Ashokan, Croton Falls, Cross River, and Hillview Reservoirs.	Year-around

Report Description	Due Date
Summary of Waterfowl Management Program activities for all reservoirs, including contract status.	Annually, 9/30

[1] The term "as needed" refers to active bird harassment measures that may be implemented based on a review and assessment of the following criteria:

- fecal coliform bacteria concentrations approaching or exceeding 20 colony-forming units per 100 milliliters at reservoir effluent structures coincident with elevated bird populations;
- current bird populations, including roosting or staging locations relative to water intakes;
- recent weather events;
- operational flow conditions within the reservoir (i.e., elevations and flow patterns and amounts);
- reservoir ice coverage and watershed snow cover; and
- an assessment that active bird management measures would be effective in reducing bird populations and fecal coliform bacteria levels.

4.2 Land Acquisition Program

Land acquisition is one of the most effective, and therefore, important mechanisms to protect the City's Catskill/Delaware watershed. The Land Acquisition Program (LAP) and Land Management Program seek to prevent future degradation of water quality by acquiring sensitive lands and by managing the impact of uses on these lands. The overarching goal of the LAP is to ensure that environmentally-sensitive watershed lands are placed into permanently protected status so that the watershed continues to be a source of high-quality drinking water for the City and upstate counties. In pursuit of this goal, since 1997 the City has secured over 127,000 acres of land and conservation easements (CEs). Prior to 1997, the City owned 35,542 acres of reservoir buffer land. Three hundred seventy-nine thousand acres (37%) of the Catskill/Delaware 1,023,000-acre watershed are currently protected by the City, State, and/or other entities such as towns and land trusts.

The 2007 FAD established a ten-year LAP to which the City committed $241 million in addition to funds previously committed to the program. Solicitation goals for the First Five Year Period were set at 50,000 acres per year. To address program goals beyond the First Five Year Period, the 2007 FAD required the City to submit a 2012-2022 Long-Term Land Acquisition Plan. That plan generally refocused acquisition activities toward less-protected basins and sub-basins west-of-Hudson in order to increase the level of protection in these areas and to maximize the cost-effectiveness of acquisition efforts.

The City's compliance with the requirements of the Land Acquisition Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011). In particular, the City has accomplished a number of goals set forth in the First Five Year Period of the 2007 FAD that will shape the activities in the remaining period of the 2007 FAD:

- the City allocated $162.5 million of the required $241 million for LAP hard and soft costs;
- the City allocated an additional $500,000 to the Catskill Watershed Corporation for Local Consultation;
- the City developed a Programmatic Strategy for augmenting land acquisition efforts through increased participation of land trusts and other non-governmental organizations;
- while the City failed to meet the 04/30/09 deadline stipulated in the First Five Year Period of the 2007 FAD to allocate $23 million to the Watershed Agricultural Council (WAC) Farm CE Program, funding for this has been reserved in a new program contract effective on September 15, 2013; and
- while the City failed to meet the 04/30/08 deadline stipulated in the First Five Year Period of the 2007 FAD to allocate $6 million to the Watershed Forest Conservation Easement Program, funding for this has been reserved in a new program contract effective on September 15, 2013.

Although the LAP requirements for a ten-year period were established by the 2007 FAD, the solicitation goals for the Second Five Year Period were not defined in the 2007 FAD. The City continues to refine its solicitation based on watershed conditions and the success of the Land Acquisition Program to date. The City's goal is to ensure that solicitation continues to identify the parcels that are most beneficial for water quality protection. In order to maintain the level of activity that the program has been required to maintain in previous FADs, the Revised 2007 FAD requires that the City solicit at least 250,000 acres of eligible parcels in the remaining period of the 2007 FAD to acquire from willing sellers in fee simple or conservation easement. Acreage solicited during 2012 and 2013 will be credited towards this solicitation goal. Up to 10,000 acres per year of acres solicited for Riparian Buffer Easements, Flood Buy-Out properties, and Watershed Agricultural Council (WAC) Farm and Forest Easements may also be counted towards this solicitation goal. Riparian buffer and Flood Buy-Out acres will be given credit for two acres for every acre solicited. On the basis of this solicitation goal, NYSDOH requested that the City assess the funding remaining in the program and evaluate whether or not additional funds would be required to maintain a solicitation goal of an average of 50,000 acres per year. The City's assessment indicated that it would need to allocate more funding to the LAP in order to sustain that rate of solicitation. The Revised 2007 FAD recognizes this need and commits the City to allocating an additional $50 million to fund the LAP through the remaining period of the 2007 FAD.

In addition to the LAP requirements set forth in the FAD, the LAP operates under the conditions set by the City's Water Supply Permit (WSP), initially issued by NYSDEC in 1997. The 2007 FAD required the City to apply to NYSDEC for a successor WSP, which was issued to the City on December 24, 2010. The successor permit contains new parameters for the LAP including:

- Natural Features Criteria thresholds have been established: properties or CEs acquired in the west-of-Hudson Priority Areas 2, 3, and 4 (defined in the WSP) must have at least 50% of their area covered by slopes that are steeper than 15% and/or at least 7% of their area designated as a surface water feature. Exceptions to these limits are allowed in aggregate up to 300 acres per county and 1,500 acres in the west-of-Hudson watershed;
- towns have been authorized to expand their existing hamlets and many of them have done so, effectively expanding the areas where LAP is prohibited;
- the City has been permitted to acquire up to 106,712 acres of additional land through fee title or CEs between January 1, 2010 and January 1, 2025.

The 2010 WSP also commits the City to funding a Riparian Buffer Program, which focuses on acquiring riparian buffer areas through fee simple or easement. Recognizing that protecting riparian acres can significantly benefit water quality protection, but that acquiring these lands can require much staff time relative to the number of acres acquired, the Revised 2007 FAD allows the City to take credit for two acres toward their solicitation goal for every riparian acre solicited.

Supporting a requirement of the 2007 FAD which was not completed in the First Five Year Period, the WSP requires the City to develop and fund a pilot forest conservation easement program, which is to be implemented by WAC, another qualified land trust organization, or the City. Replacing the City's Programmatic Strategy for increasing participation of land trusts in the LAP, the WSP requires that the City develop an Enhanced Land Trust Program (ELTP),

which would make use of collaborations with land trusts in towns that opt into the ELTP to purchase large properties with habitable buildings, conveying the vacant portion to the City. These requirements are also included in the Revised 2007 FAD.

Since the issuance of the ten-year LAP, the historical flooding due to Tropical Storms Irene and Lee in August and September 2011 raised the question of how best to address the potential impacts that flooded developed properties can have on water quality. In response to these storms, the Federal Emergency Management Agency (FEMA) made funds available through the State Office of Emergency Management (SOEM) to help purchase and remove flooded structures while protecting the underlying properties, or to remove or elevate structures out of the floodplain. Acting to use FEMA funds effectively and efficiently, the City, regulatory agencies and a number of watershed stakeholders have worked together to purchase such damaged properties in floodplains from interested property owners, as well as to mitigate flood hazards, enhance floodplain restoration and develop other measures to reduce the impacts of future floods on homes and businesses. The resulting flood buy-out program leverages State and federal flood hazard mitigation funding with LAP funding to enable landowners to more fully realize the value of their property while at the same time protecting water quality. The federally supported flood buy-out program is recognized in this revised FAD.

Also in response to the flooding in 2011, the City has worked with watershed stakeholders to develop a Local Flood Hazard Mitigation Program (LFHMP) to be implemented within the context of the Stream Management Program. As part of the LFHMP, analyses will be performed to identify features that contribute to increasing the flood elevation through streamside communities. These analyses may recommend that a property in the floodplain be solicited for acquisition and the improvements removed in order to facilitate passage of higher stream flows and reduce future flood elevations. In accordance with the 2010 WSP, a property does not need to be vacant, nor is it required to meet the size and natural features criteria, nor is it subject to the hamlet exclusion condition, if the property is participating in a State or federal flood buy-out program. The Revised 2007 FAD requires the City to develop and implement a City-funded flood buy-out program, which will allow the City, consistent with the 2010 WSP as modified, to acquire improved properties that were not eligible for or did not participate in the FEMA/SOEM program, but if vacated and returned to a natural floodplain, would help mitigate flooding in other areas or otherwise protect water quality. The City will commit $15 million to ensure adequate funding for this program[2]. While the funds for this program will be pooled with general LAP funds, they may only be used for the flood buy-out program. However, if more than $15 million is required to purchase flooded properties under this program, additional funds may be drawn for these purchases from the general LAP funding. The CWC's Local Flood Hazard Mitigation Program, in turn, is expected to be used to assist in the relocation of homes, businesses and critical community facilities to help ensure that communities remain viable and sustainable over the long term.

[2] This funding level is based on the estimated value of properties that initially applied for the FEMA/SOEM flood buy-out program after Irene and Lee, but did not in the end participate. The funds may be spent on those properties and/or others.

Since there are potentially a large number of properties, representing a small amount of acreage, involved in the FEMA/SOEM buy-out program, much LAP staff time may be committed early in the remaining period of the 2007 FAD to acquiring a relatively small number of acres. This effort is accounted for in the Revised 2007 FAD by setting the City's solicitation goal as a total number of acres (250,000 acres) rather than a set number of acres per year. In addition, acreage acquired under the City-funded flood buy-out program will be granted two acres credit towards the solicitation goal for every acre solicited. This will allow the City some flexibility in budgeting its staff time to achieve the multiple goals of the LAP.

And finally, the City is committed to paying for the stewardship and enforcement costs associated with the WAC's current and future portfolio of conservation easements acquired with funds from the City through 2034. This commitment will help ensure that these easements will continue to be protected and provide water quality benefits in perpetuity.

The Revised 2007 FAD requires that the City continue to implement the Land Acquisition Program in accordance with the activity and reporting descriptions and milestones below.

Activity and Reporting Requirements

Activity	Due Date
Dedicate previously-allocated $241 million through 2017, to be deposited in LAP-segregated account in three allocations, one of which remains: $78.5 million.	Completed
Allocate and make available $50 million to the Land Acquisition Program.	06/30/14
Submit solicitation plans for each two-year period. Plans will include a commitment to solicit at least 250,000 acres through 2017. Acreage solicited in 2012 and 2013 will be credited towards solicitation goals. Riparian Buffer and Flood Buy-Out (FBO) acres may be credited 2 acres for every 1 solicited. Subject to approval, up to a total of 10,000 acres/year of WAC, Riparian Buffer and FBO acres may be credited towards solicitation goals.	Biannually, beginning October 2013
Meet with NYSDOH/EPA and NYSDEC to review status of the Farm CE Program.	Biannually, beginning December 2013
Consult with NYSDOH/EPA and NYSDEC regarding the potential need for any additional monies beyond that already committed to land acquisition; if such funding is needed, sequester the funds.	As needed
Develop and implement a $5 million Pilot Riparian Buffer Acquisition Program, working in partnership with one or more land trusts, if possible.	Ongoing, in accordance with the 2010 WSP
Develop an Enhanced Land Trust program through which large properties with dwellings will be acquired by land trusts, and vacant portions conveyed to the City.	Ongoing, in accordance with the 2010 WSP
Execute a contract with the WAC to provide the $23 million in supplementary funds that were committed under the 2007 FAD and were directed in a letter from NYSDOH dated April 30, 2008 to be made available to WAC to support an agricultural easement program.	Effective 09/15/13
Execute a contract with the WAC to provide the $6 million in funding that was committed under the 2007 FAD for a watershed forest conservation easement program. Based on the requirements of the Water Supply Permit, NYCDEP shall submit written evaluation of the program to NYSDOH/EPA and NYSDEC making recommendations as to whether the program should be continued or terminated, as well as any proposed improvements to the program. If a determination is made by NYSDOH/EPA, NYSDEC, and the City not to continue the program, all unused funds, with any earnings thereon, are to be returned to the City to be available for land acquisition.	Effective 09/15/13 4 years and 3 months after commencement of program
Execute a contract with the WAC, the intent of which is for the City to	By

continue to pay the stewardship and enforcement costs associated with the WAC's current and future portfolio of conservation easements acquired with funds from the City through 2034, and to contribute additional funds to WAC's stewardship endowment fund to be used exclusively for the stewardship of Watershed Conservation Easements, in perpetuity, regardless of whether WAC is dissolved or another entity succeeds WAC as grantee.	07/31/14
Participate in FEMA/SOEM's 2012 Flood Buy-out (FBO) Program, providing up to 25% of the eligible costs as the local match for each NYC watershed property participating in the program. [3]	As required by FEMA/SOEM FBO program rules
Develop and implement a City-funded FBO program, which is consistent with the City's 2010 WSP. Properties may be eligible for the program based on expected flood mitigation and water quality benefits derived. Program will be implemented as needed when eligible properties are identified. Develop program rules. Allocate and make available $15 million to the LAP to be used solely for properties acquired under the City-funded FBO program. Additional funds may be drawn for this program, if needed, from the general LAP funds.	 04/30/14 06/30/14

Report Description	Due Date
Submit semi-annual reports on program activities and status. Reports shall include an assessment of City-funded land acquisition efforts undertaken by land trusts and/or non-governmental organizations, including acreage solicited and acreage acquired by such entities, funds expended by and funds made available to such entities, and a discussion of advantages/disadvantages of the programs and of participation of such entities in them.	Semi-annually, 3/31 in FAD Annual Report and 7/31

[3] A recently announced State program may cover a portion of these costs. The City is committed to providing necessary funding regardless of the State contribution.

4.3 Land Management Program

The overall objective of the Land Management Program is to protect source water quality through effective management of lands in the watershed. This objective is achieved through the three major elements of this program: management of City watershed lands and conservation easements (CEs) (including recreational and agricultural uses), forest management, and invasive species control.

The City has been very successful in its land acquisition efforts and in securing CEs. While the City supports and allows recreational and agricultural uses of its land, it must continue effective and routine monitoring of lands and easements, which is vital to discovering encroachments, timber trespass, overuse of fee lands, and potential violations of easement conditions. Comprehensive land management also includes a stewardship component, which fosters healthy forests and other natural resources and eradicates and/or controls invasive species.

The City's compliance with the requirements of the Land Management Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Land Management Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Monitor and actively manage watershed lands.	Ongoing
Monitor and enforce watershed conservation easements.	Ongoing
Continue to assess and implement strategies of increasing the public's recreational use of watershed lands.	Ongoing
Maintain a Watershed Land Information System (WaLIS).	Ongoing
Provide proposed modifications to plans for land management to NYSDOH/EPA for review and comment.	As such modifications are proposed
Support and implement best management practices consistent with Conservation Practices as described in the City's Forest Management Plan for forest improvement projects on City-owned lands.	Ongoing
Continue to assess deer populations and their impacts on forest regeneration on City-owned lands.	Ongoing
Continue to conduct forest inventories on City-owned lands, including long-term continuous forest inventory (CFI) plots.	Ongoing

Develop an Invasive Species Management Strategy and submit description of the strategy to NYSDOH/EPA and NYSDEC.	By 12/31/16
Engage watershed partners and residents to coordinate efforts in invasive species prevention and control.	Ongoing

Report Description	Due Date
Report on Land Management activities in FAD Annual Report.	Annually, 3/31

4.4 Watershed Agricultural Program

The overall objective of the Watershed Agricultural Program (WAP) is to protect and improve source water quality by reducing pollution associated with agricultural land use. Well-managed farming is considered a preferred watershed land use and is guided by a scientifically-based approach which provides support to agricultural operations without compromising water quality and public health. The WAP is a voluntary program which is administered by the Watershed Agricultural Council (WAC) in cooperation with local, State, and federal partner organizations. The program is designed to identify, prioritize, and mitigate environmental issues on each participating farm through development of Whole Farm Plans (WFPs) and the implementation of best management practices (BMPs).

The requirements of the First Five Year Period of the 2007 FAD contained a number of programmatic goals, including continual recruitment of nonparticipating large farms west-of-Hudson, expansion of the Small Farms and the east-of-Hudson programs, and development of a strategy for replacing aging/failing BMPs. They also included preparation and submittal of a comprehensive annual report on the status of all programmatic activities; completion of annual status reviews on all farms with substantially implemented WFPs; inventorying all small farms to determine the number, extent and potential impact of small farms on water quality in the west-of-Hudson watershed; and continuation of the Farmer Education and Farm to Market Outreach initiatives to address effective pathogen, sediment and nutrient management. Other requirements included continuation and expansion of the Nutrient Management Credit program to additional farms in the Cannonsville Reservoir Basin and funding and perpetual enforcement of the long-term stewardship of Agricultural Easements.

In addition to general requirements, the 2007 FAD contained specific requirements to be attained during the First Five Year Period of the FAD. It was required that 90% of all active large farms west-of-Hudson achieve and maintain "substantially implemented" status of their WFPs, beginning September 30, 2010. The City was also obligated to conduct a review of the WAP evaluation criteria with input from the WAC Advisory Committee. The First Five Year Period of the 2007 FAD was also enhanced by the City's commitment to evaluate and report on a study of the potential benefits of a Precision Feed Management Program conducted by Delaware County.

The City's compliance with the requirements of the Watershed Agricultural Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of the New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

Successful protection of, and long-term benefit to, source water quality and public health shall continue through the City's commitment to the WAP. To complement existing programs, an additional requirement has been added to the WAP for the remaining period of the 2007 FAD. The City must provide funding to support the implementation of Precision Feed Management (PFM) on 60 eligible farms in the NYC watershed. Subject to the review and approval of NYSDOH/EPA, the City may provide justification for not implementing PFM on all 60 farms if

it is demonstrated that, in some cases, PFM will provide minimal water quality benefit. For some dairy farms, PFM is an effective tool not only for reducing nutrient export from dairy farms, but also, in some cases, for improving animal health and productivity. As such, the Revised 2007 FAD recognizes PFM as an important BMP to be considered for suitable farms when developing the Whole Farm Plans for those farms.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Watershed Agricultural Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Maintain at least 90% active large farm participation.	Ongoing
Develop 50 new Whole Farm Plans on large, small, or east-of-Hudson farms unless written evaluation and justification for developing fewer than 50 WFPs is submitted to NYSDOH/EPA for review and approval. • Submit to NYSDOH/EPA for review and approval justification for developing fewer than 50 WFPs.	Ongoing 8 months after issuance of Revised 2007 FAD
Conduct annual status reviews on at least 90% of all active Whole Farm Plans (with a goal of 100%) and revise Whole Farm Plans as needed based on their priority status.	Ongoing
Maintain current nutrient management plans on 90% of all active participating large farms.	Ongoing
Continue to make available the Nutrient Management Credit Program to at least 100 watershed farmers.	Ongoing
In consultation with local partners (WAC and CCE), develop and submit a proposal, for NYSDOH/EPA review and approval, for funding and implementing Precision Feed Management (PFM) on 60 eligible farms. Justification may be included for not implementing PFM on all 60 farms if it is demonstrated that, in some cases, PFM will provide minimal water quality benefit. Execute a contract change order with WAC to provide funding adequate to support the PFM proposal as approved by NYSDOH/EPA.	4 months after issuance of the Revised 2007 FAD Within 12 months after approval
Implement new BMPs and repair/replace existing BMPs on active participating large, small and east-of-Hudson farms according to a BMP Prioritization Methodology.	Ongoing
Evaluate the BMP Prioritization Methodology, summarize the implementation status of the WAP, and review the adequacy of current metrics.	01/31/15

Meet with NYSDOH/EPA and NYSDEC to discuss program status and review the adequacy of current metrics.	04/31/15
Develop and submit a CREP assessment report that describes potential program alternatives in the event that CREP is not re-authorized by Congress as part of the next Federal Farm Bill.	9 months after Farm Bill re-authorization
Develop new and re-enroll expiring CREP contracts.	Ongoing
Implement the Farmer Education and Farm-to-Market Programs.	Ongoing

Report Description	Due Date
Watershed Agricultural Program Annual Report, to include: • number of new and revised Whole Farm Plans on large, small, and east-of-Hudson farms; • number and types of new BMPs implemented on large, small, and east-of-Hudson farms; • status of BMP Prioritization Methodology (including the number of renewed/extended Operation and Maintenance agreements and number/types of BMPs repaired or replaced); • BMP implementation workload for the following year; • annual BMP expenditures for current year and following year; • number and summary of annual status reviews completed on large, small, and east-of-Hudson farms; • number of new and updated nutrient management plans completed on large, small, and east-of-Hudson farms; • status and accomplishments of the Nutrient Management Credit Program; • number of eligible farms on which PFM has been implemented; • status and accomplishments of CREP; • status and accomplishments of the Farmer Education and Farm-to-Market Programs; • summary of WAP-related research activities; • status of farmer enrollment in the WAC Easement and WAC Forestry Programs.	Annually, 3/31
BMP Prioritization Methodology Evaluation and WAP Metrics Assessment Report	1/31/15
CREP Alternatives Assessment Report (if needed)	9 months after Farm Bill re-authorization

4.5 Watershed Forestry Program

The Watershed Forestry Program is a voluntary partnership between the City and the forestry community that supports and maintains well-managed forests as a beneficial land use in the watershed. The Program promotes and supports healthy, well-managed working forests for multiple benefits: improved water quality for downstate consumers; a viable rural economy for upstate watershed communities; and the preservation of natural resources for future generations.

The Watershed Forestry Program began as a grass-roots effort and has been administered by the Watershed Agricultural Council (WAC) since 1997. The primary objective of the program is to promote the use of management practices to prevent nonpoint source pollution during timber harvests. The program encourages good forestry practices and stewardship behaviors by watershed landowners, foresters, loggers, and members of the forest products industry. In addition, the program provides resources for logger training, forest management planning, implementation of management practices, research, demonstration projects, and educational opportunities.

The City's compliance with the requirements of the Watershed Forestry Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

Through its commitment to the successful implementation and enhancement of the Forestry Program, the City shall continue its protection of source water quality and the environment, while supporting viability of rural economy. As the program matures, greater emphasis shall be placed on improving coordination with other WAC programs, prioritization strategies, programmatic flexibility, and targeted allocation of resources to maximize the water quality benefit. In addition to these program goals, the Revised 2007 FAD requires the City to fund a riparian restoration program, supporting the completion of five restoration projects per year in the east-of-Hudson watershed during the remaining period of the 2007 FAD.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Watershed Forestry Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue to enroll landowners in WAC forest management plans.	Ongoing
Evaluate the implementation status review of five-year-old WAC forest management plans.	Annually, 3/31
Support implementation of WAC forest management plans and forestry BMP projects.	Ongoing

Provide funding to support the implementation of 45 Management Assistance Program (MAP) projects every year.	Ongoing
Provide funding to support a riparian buffer restoration program (such as Trees for Tributaries) in east-of-Hudson basins (priority given to FAD basins) with a goal of completing at least 5 projects/year.	09/15/13
Conduct training workshops for loggers and foresters.	Ongoing
Conduct forest landowner education programs.	Ongoing
Implement the Urban/Rural School-based Education Initiative.	Ongoing
Coordinate and maintain four existing model forest sites.	Ongoing

Report Description	Due Date
Watershed Forestry Program Annual Report, to include: • number of forest management plans completed (including acreage and riparian plans); • evaluation update regarding implementation status of five-year old WAC forest management plans; • status and accomplishments of the MAP; • accomplishments of the east-of-Hudson riparian buffer restoration program; • number and types of forestry BMP projects implemented; • status and accomplishments of logger and forester training program, forest landowner education, and Urban/Rural School-based Education Initiative; • status of the watershed model forest program.	Annually, 3/31

4.6 Stream Management Program

The overall goal of the Stream Management Program (SMP) is to improve water quality through the protection and restoration of stream system stability and ecological integrity for west-of-Hudson watershed streams and floodplains. The program objectives include, but are not limited to, the development and implementation of stream management plans, demonstration projects, and the enhancement of long-term stream stewardship through increased community participation resulting from partnerships, education, and training.

The City's compliance with the requirements of the SMP in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

During the remaining period of the 2007 FAD, the SMP shall continue its four initiatives as defined by the 2007 FAD: stream projects, the Catskill Stream Buffer Initiative (CSBI), the Stream Management Implementation Grant Program (SMIP), and education/outreach/training. Implementation of the SMP through these four program elements will improve management of streams, riparian buffers, and floodplains; continue to demonstrate multi-objective best management practices in stream work; and maintain and expand training provided to key stakeholders to assist them in their application and design of stream management projects. Implementation of projects, programs, and policies shall continue to be done in partnership with key local leaders where stream management expertise has been developed over several years. Through these partnerships, stakeholder interests are supported, and water quality within the west-of-Hudson watershed is protected.

While flood hazard mitigation has always been a component of the SMP, flooding resulting from Tropical Storms Irene and Lee in late summer 2011 heightened awareness of the impact flooding can have on water quality. This prompted SMP partners to give flood mitigation a higher priority in stream management planning. After the storms, the City worked with county Soil and Water Conservation Districts and Ulster County Cornell Cooperative Extension (CCE) to provide matching funds for stream work conducted under the Natural Resources Conservation Service's Emergency Watershed Protection (EWP) Program. These FAD revisions require that $500,000 in additional matching funds be committed during the remaining period of the 2007 FAD to ensure that projects that are eligible for the EWP, and which will provide a water quality benefit, will be completed.

In a collaborative effort, the City and watershed stakeholders subsequently joined in developing a new focus for the SMP, the Local Flood Hazard Mitigation Program (LFHMP). This new program initiative is aimed at mitigating the hazards caused by flooding to streamside communities, which can be a significant source of pollutants to flood waters. A commitment to initiate and to provide $10.1 million to support this new program during the remaining period of the 2007 FAD has been incorporated into the Revised 2007 FAD. At the same time, the City's partners in the SMP will continue to carry on the work that has defined the success of this program. To ensure the baseline work of the SMP is supported during the remaining period of

the FAD, the Revised 2007 FAD requires the City to commit to increasing the funding for the base program by an additional $10.5 million beyond the 2007 FAD SMP baseline funding level. The City is extending existing contracts with SMP partners to ensure program activities can continue while these new funding commitments are put in place.

A goal of the LFHMP is to reduce repetitive flood losses that also pose a threat to water quality during storm events. In pursuit of this goal, the City shall commit to funding analyses to explore options that will most effectively achieve flood hazard mitigation and water quality benefit. Floodplain reclamation and returning streams to their natural channel dimensions are projects that may be evaluated, among others, in these analyses. The results of these analyses will help direct the development of flood mitigation plans. Community planning and buy-in is critical to program success since implementation of these plans may involve removing or relocating homes, anchor businesses, critical community facilities, and/or infrastructure to restore natural flow paths and floodplains. To address these types of FHMP activities (e.g. relocation of an anchor business, residence, or critical community facility), which are outside the normal scope of the SMP, the City has committed to provide $17 million to support, as a priority, a voluntary relocation program and will seek assistance from the Catskill Watershed Corporation (CWC) to implement this program. Other eligible activities under this program may include, but not be limited to, flood proofing and elevation of structures, road alterations designed to reduce flood risk, debris removal, and other activities that may help to attenuate peak flows, including floodplain enhancement and restoration. The City will also work with the CWC to apply CWC resources to assist in SMP implementation, if such assistance would enhance achievement of SMP goals.

Another new requirement for the remaining period of the 2007 FAD is for the City to conduct or continue to conduct two water quality monitoring studies in the Ashokan watershed. The first study will evaluate the efficacy of stream restoration work in improving water quality, in particular in reducing turbidity. Results of this study will help inform ongoing assessments of the relative benefits of the City's water quality protection measures. The second study is an ongoing study by USGS that is identifying various sources of turbidity within the Ashokan watershed. Results of this study, in combination with the first study, could help the City prioritize the siting and selection of stream management projects to maximize the efficacy of the SMP in reducing turbidity into the Catskill system. Study results may also help inform Catskill Turbidity Control modeling efforts. As the City strives to enhance its understanding of the Catskill system and what stream management practices are most effective, it will continue to focus efforts on implementing projects in the Ashokan basin, a number of which have been completed prior to this revision of the 2007 FAD. During the remaining period of the 2007 FAD, the City has committed to completing an additional seven stream projects in the Ashokan basin that will provide water quality benefits.

Also, in order to recognize the impact of good roadside ditch maintenance practices on improving the quality of storm water runoff, the revised FAD emphasizes inclusion of best maintenance practices in SMP training and provision of funding for these practices as a component of the Stream Management Implementation Grants Program.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Stream Management Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Stream Projects Design and complete construction of five additional stream and/or floodplain projects that have a principal benefit of water quality protection. Proposed projects and anticipated timelines for their completion will be included in Annual Action Plans. Projects completed in 2012 and 2013 will be credited towards meeting this goal.	11/30/17
CSBI Continue to provide technical assistance and conservation guidance to riparian landowners. (This program is also included in Section 4.7, the Riparian Buffer Protection Program.)	
• Convene annual meeting of Riparian Buffer Working Group.	Annually, 11/30
• Facilitate the supply of native plant materials to the CSBI.	Ongoing
• Implement Education, Outreach, and Marketing Strategy with partners.	Ongoing
• Complete at least 80 plans and/or projects throughout the west-of-Hudson Watershed.	11/30/17
SMIP Continue the local funding programs for the enhanced implementation of stream management plan recommendations in the Schoharie, Cannonsville, Pepacton, and Ashokan basins.	Ongoing
Initiate adoption of the Rondout and the Neversink stream management plans.	Completed
• With the Neversink-Rondout Watershed Advisory Group, finalize program rules, application form and guidance, and scoring criteria; develop process for reviewing, awarding, contracting, and evaluating projects;	Completed
• Upon adoption of stream management plans, initiate implementation of Rondout and Neversink stream management plan recommendations.	Completed
Complete commitment of funds to a minimum of 65 SMIP projects throughout the west-of-Hudson Watershed.	11/30/17

Education/Outreach/Training Propose a plan and schedule for providing routine, systematic training in stream, floodplain, and watershed management techniques targeted to local officials. Training shall include information on best maintenance practices for roadside ditches.	11/30/13
Annual Action Plans Meet annually with county contracting partners to review progress made in the previous year within each program area (Stream Projects, CSBI, SMIP, Education/Outreach/Training, and LFHMP) and re-evaluate priorities as the basis for preparing new Action Plans for the coming year, especially after major flood events. Action plans should place priority on projects that will enhance eligibility for CREP funding, where applicable, and address roadside ditch maintenance. Each year, submit a rolling two-year Action Plan for each of the basins that outlines the upcoming projects in the program areas (Stream Projects, CSBI, SMIP, Education/Outreach/Training, and LFHMP).	Annually, 1/31 Annually, 5/31
Flood Maps Develop and distribute updated preliminary Flood Insurance Rate Maps (FIRMs) for the west-of-Hudson Watershed in collaboration with the Federal Emergency Management Agency (FEMA) and NYSDEC. Continue to support watershed community utilization of FIRMs and their participation in a variety of floodplain management, flood hazard mitigation, and flood preparedness programs.	12/31/15 Ongoing
Addendum A Meet with NYSDEC as needed regarding the implementation of Addendum A to the 1993 Memorandum of Understanding between NYSDEC and the City as it pertains to the review of Article 15 Stream Disturbance Permits, to enhance coordination between the agencies with the goal of ensuring consistency with the recommendations in stream management plans and implementation of stream management projects.	As needed
SMP Baseline Funding Execute contracts or contract changes with SMP partners to provide all necessary funding at the level provided during the First Five Year Period of the 2007 FAD plus an additional $10.5 million total for all contracts for the remaining period of the 2007 FAD.	06/30/14

EWP Funding	
Execute contract or contract changes with SMP partners to provide an additional $500,000 to be available for use as matching funds for Emergency Watershed Protection projects identified in the aftermath of Tropical Storms Irene and Lee, where these projects remain a water quality priority for the SMP.	03/31/14
Local Flood Hazard Mitigation Program (LFHMP)	
Make $10.1 million available to the SMP to fund a LFHMP in the west-of-Hudson Watershed. The goals of this program are to identify flood hazards and to develop plans and implement projects to mitigate such hazards to benefit water quality and community protection.	Included in Contracts with SMP Partners
Execute a contract with CWC for $17 million ("CWC LFHMP funds"), $5 million of which is to be made available upon execution of the contract, to assist in implementation of Flood Hazard Mitigation Plan recommended projects and to supplement the SMP's capacity to implement FHM Plans. CWC will serve as program manager for the allocation of these funds.	07/31/14
Working with the CWC, develop program rules that will ensure that program goals are met and commence program.	02/28/14
Upon request and demonstrated need from CWC, allocate additional funds, as needed, from CWC LFHMP funds.	As needed
Water Quality Monitoring Studies	
Submit a proposal, including implementation schedule, for monitoring at Stream Management project sites with a goal of evaluating the efficacy of these projects in reducing turbidity.	Within 6 months of issuance of the Revised 2007 FAD
Report on the status of an ongoing USGS study aimed at identifying the sources of turbidity in the Ashokan watershed, including a proposal for additional data collection, if warranted.	11/30/14
Ashokan Basin Stream Projects	
Complete construction of 7 stream management projects within the Ashokan basin with a goal of protecting water quality, in particular by reducing turbidity.	11/30/17
Submit to NYSDOH/EPA and NYSDEC brief descriptions of proposed projects and anticipated timelines for their completion as projects are identified by Annual Action Plans. Stream projects completed in 2012 may not be credited towards the program goal of 7 stream projects.	Annually, as projects are identified, 3/31

Progress Meeting Convene progress meetings with NYSDOH/EPA and NYSDEC. An office-based meeting shall be held by 8/30, and a field-based meeting shall be held following construction season by 10/31.	Twice a year, by 8/30 and 10/31

Report Description	Due Date
Submit a report to NYSDOH/EPA and NYSDEC that evaluates the status of CWC LFHMP funding, specifically evaluating funding needs through 2017.	12/31/15
Submit an annual report evaluating the overall progress made in implementing the SMP. The report will provide a discussion of progress made in implementing specific stream management plans, site selection, and construction status of all applicable stream projects. The report will include the following metrics: number of projects completed within each project category (Stream Projects, SMIPs, CSBI projects) and their respective length and acreage treated; for the SMIP, the number of projects approved within the SMIP project categories (including LFHMP) and funding committed, including number of miles of roadside ditches maintained and funding committed to roadside ditch maintenance; number of Outreach/Education/Training programs offered to stakeholders, and total number of stakeholders that participated.	Annually, 3/31

4.7 Riparian Buffer Protection Program

The Riparian Buffer Protection Program, initiated under the 2007 FAD, commits the City to continue its riparian buffer protection efforts through existing programs (e.g. Land Acquisition, Watershed Agricultural, Stream Management, and Forestry Programs) as well as initiating selected program enhancements. The primary programmatic enhancement has been the Catskill Streams Buffer Initiative (a component of the Stream Management Program), which targets improved riparian buffer protections along privately-owned, primarily non-agricultural streamside areas. In addition, non-agricultural riparian landowners will have access to technical assistance targeted to their needs. Specifically, enhanced education and training will focus on proper streamside management including development and design assistance with plans for riparian plantings.

Communication between the landowners and riparian buffer protection experts, along with coordination of the ongoing riparian buffer protection efforts offered by the various watershed protection programs, is essential to the success of the Riparian Buffer Protection Program.

The following requirements have been completed in the First Five Year Period of the 2007 FAD:

- development of an enhanced education, outreach, and marketing strategy for riparian landowners;
- evaluation of the Conservation Reserve Enhancement Program (CREP).

The City's compliance with the requirements of the Riparian Buffer Protection Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

The 2010 WSP commits the City to funding a Riparian Buffer Program, focused on acquiring riparian buffer parcels in the west-of-Hudson watershed through fee or easement, using LAP funds. These FAD revisions include this requirement.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Riparian Buffer Protection Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue existing programs that are protective of riparian buffers including, but not limited to, watershed regulations, farm and forest programs, land acquisition, stream management, and land management.	Ongoing
Continue implementation of CREP.	Ongoing

Continue implementation of the Catskill Streams Buffer Initiative (CSBI) by providing technical assistance and conservation guidance to riparian landowners. The following tasks of the CSBI are also included in the Stream Management Program and will be reported within Section 4.6 of the Revised 2007 FAD:	Ongoing
• Convene annual meeting of Riparian Buffer Working Group.	Annually, 11/30
• Facilitate the supply of native plant materials to the CSBI.	Ongoing
• Implement Education, Outreach, and Marketing Strategy with partners.	Ongoing
• Complete at least 80 plans and/or projects throughout the west-of-Hudson watershed.	11/30/17
Continue to seek enhanced management agreements (voluntary 10-year or purchased perpetual) for all current and future stream restoration projects.	Ongoing
Pilot a Riparian Buffer Program (RBP), the following milestones of which are based on the requirements of the Water Supply Permit and will also be reported through the Land Acquisition Program within Section 4.2 of the Revised 2007 FAD:	
• The City shall cause to be completed the riparian buffer Program Development Initiative Report ("PDI Report") and a copy provided to NYSDOH/EPA and NYSDEC;	Completed
• The City will commence implementation of the RBP through a local land trust, or if a suitable land trust is not found, will commence implementation itself. The RBP will be a minimum 3 years in length;	11/01/14
• The City will submit an evaluation report to NYSDOH/EPA and NYSDEC.	Six months before the end of the initial 3-year program period

Report Description	Due Date
The annual report will reference the other FAD programs where the completed Riparian Buffer Protection Program details will be described.	Annually, 3/31

4.8 Wetlands Protection Program

The City's Wetlands Protection Strategy (WPS) was first implemented in 1996 and was updated in 2001. This strategy recognizes the major role that wetlands play in watershed protection. From a drinking water perspective, critical functions include their ability to maintain good surface water quality in watercourses and reservoirs and to improve degraded water. Wetlands also moderate peak runoff, recharge groundwater, and maintain baseflow in watershed streams. The function of the WPS is to inform wetland protection and management with data collected through mapping and monitoring programs.

The City's compliance with the requirements of the Wetlands Protection Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

For the duration of the remaining period of the 2007 FAD the City shall continue its commitment to effective wetlands protection and management. In addition, the City shall update the WPS to reflect accomplishments and programmatic changes and conduct a small-scale wetland mapping project to ascertain the utility of 2009 Light Detection and Ranging (LIDAR)-derived data to improve National Wetlands Inventory mapping in the New York City Watershed.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Wetlands Protection Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Monitor reference wetlands.	Ongoing
Review federal, State, and municipal permit applications.	Ongoing
Update Wetlands Protection Strategy.	Completed
Analyze reference wetlands data and develop reference standards.	07/31/14
Complete small-scale LIDAR wetland mapping project and submit report.	07/31/15

Report Description	Due Date
Report as part of FAD Annual Report, including updates on permit review, wetlands monitoring, and wetlands-related components of land acquisition, stream management, agricultural, and associated partnership and education programs.	Annually, 3/31

4.9 East-of-Hudson Nonpoint Source Pollution Control Program

The East-of-Hudson Nonpoint Source (NPS) Pollution Control Program has been developed to reduce inputs of pollutants from stormwater, septic systems, and sanitary sewers to the West Branch, Boyd Corners, Croton Falls, and Cross River Reservoir basins. The program addresses this concern through the continued implementation of the WR&Rs, involvement in project reviews, and inspection and maintenance of existing stormwater management facilities. The program has also initiated a grant program, which recognizes the elevated levels of impervious surfaces in these basins and is aimed at reducing stormwater pollution through funding the construction of stormwater retrofits. Specifically, the program goals are to reduce pathogen and nutrients inputs from nonpoint sources by ensuring effective long-term operation and maintenance of existing stormwater management facilities, inspecting sanitary sewers, providing technical assistance to county septic programs, and supporting a grant program to fund the design and construction of stormwater retrofits in the east-of-Hudson FAD basins.

The City's compliance with the requirements of the East-of-Hudson NPS Pollution Control Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

The City shall continue to address the goals of this program in the remaining period of the 2007 FAD by maintaining stormwater management facilities, providing technical assistance to county septic programs, completing stormwater remediation projects that had been started in the First Five Year Period, and funding the stormwater retrofits grant program, which includes $4.5 million committed in the First Five Year Period and $15.5 million committed through the City's 2010 Water Supply Permit. In addition, the City will be required to establish, or cause to be established, an east-of-Hudson Septic Repair Program during the remaining period of the 2007 FAD. Water in the east-of-Hudson FAD reservoirs may experience a short travel time to the intakes that deliver water to consumers. This new requirement has been added in recognition that protecting these unfiltered supplies from contamination by human pathogens resulting from failing septic systems is critical to providing safe drinking water.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the East-of-Hudson NPS Pollution Control Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Maintain east-of-Hudson Stormwater Facilities.	Ongoing
Complete construction of five stormwater retrofits: • Maple Avenue (Cross River Reservoir basin); • Drewville Road (Croton Falls Reservoir basin); • Michael Brook (Croton Falls Reservoir basin); • Sycamore Park (West Branch Reservoir basin); • Nemarest Club (Boyd Corner Reservoir basin).	 12/30/15 12/30/15 10/31/13 10/31/13 10/31/13
Support the east-of-Hudson watershed communities' efforts to design and construct stormwater retrofits by supporting the use of $18.2 million in east-of-Hudson Water Quality Investment Program funds that were committed to Putnam and Westchester Counties under the 1997 MOA, and up to $15.5 million[4] in funds that will be provided to the east-of-Hudson communities. Make available $15.5 million for this program.	Ongoing Within 90 days of receiving all necessary documentation for the East-of-Hudson Watershed Corporation (EOHWC)
Make City lands available for stormwater retrofit projects constructed by east-of-Hudson watershed communities so long as the City determines that the projects will not pose a threat to water quality or to operations related to the water supply.	Ongoing
Make available $4.5 million in grant funding to implement stormwater retrofits that will reduce stormwater pollutant loading in the Croton Falls, Cross River, and upstream/hydrologically connected basins. This effort requires a local funding match of at least 50%.	Within 90 days of receiving all necessary documentation for the EOHWC

[4] The City will make $10 million available to the east-of-Hudson watershed communities and will make the remaining $5.5 million available within six months of receiving written notification that the first $10 million have been committed via binding agreements.

Complete inspection of targeted areas of Sanitary Infrastructure, identify potential defects, and coordinate with entities responsible for the remediation of identified deficiencies.	Report findings in the Annual Report for 2013
Continue to provide technical assistance in support of the east-of-Hudson county septic management programs.	Ongoing
East-of-Hudson Septic Repair Program Strategy (SRP) Submit a proposal to NYSDOH/EPA and NYSDEC for review and approval, to implement or cause to be implemented a SRP that will be funded at a level sufficient to reimburse homeowners for a portion of the repair or replacement of 100 septic systems in the West Branch and Boyd Corners Reservoir basins in the remaining term of the 2007 FAD. The program shall include a cost share of 50 percent by the homeowner, with a provision for 25 percent cost share in cases of demonstrated financial hardship. This program shall be implemented on a prioritized basis (i.e., priority areas defined by degree of risk that a failing septic system in that area would pose to terminal reservoir water quality). Submit to NYSDOH/EPA and NYSDEC program rules that will ensure that program goals are met. Commence implementation of the SRP. Submit to NYSDOH/EPA and NYSDEC a proposal to expand the SRP to the Croton Falls and Cross River Reservoir basins.	12/31/13 06/30/14 06/30/15 06/30/15

Report Description	**Due Date**
Report on program implementation.	Annually, 3/31

4.10 Kensico Water Quality Control

Kensico Reservoir, located in Westchester County, is the terminal reservoir for the City's Catskill/Delaware water supply. Because the Kensico Reservoir is the last impoundment of Catskill/Delaware water prior to entering the City's distribution system, the protection of this reservoir is critically important to preventing water quality degradation and maintaining filtration avoidance. The 1997 and 2002 FADs built a foundation of expanded watershed protection and pollution prevention initiatives for the Kensico basin. During the First Five Year Period of the 2007 FAD, the City instituted new watershed protection and remediation programs designed to ensure the continued success of past efforts, while providing new protection initiatives that specifically targeted inputs of pollutants from stormwater and wastewater.

The City's compliance with the requirements of the Kensico Water Quality Control Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of the New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five Year Period* (September 30, 2011).

Successful protection of, and long-term benefit to, source water quality and public health shall continue through the City's commitment to this program. In the remaining period of the 2007 FAD the program shall continue focusing on:

- Long-Term Operation and Maintenance – the City shall continue to regularly inspect the existing stormwater management facilities and determine maintenance needs of each identified facility in order to maximize its removal efficiency;
- Reducing Potential Pathogen Risk– the City has implemented a Septic Repair Reimbursement Program and installed an early warning sanitary sewer overflow protection system to prevent possible discharges of wastewater to Kensico Reservoir;
- Reducing the Potential Risk of Turbidity at Effluent Chambers - the City shall review the timeline for assessing and/or dredging effluent chambers to prevent possible resuspension of sediment and assess sediment accumulation at Shaft 18 every 10 years following the last assessment in 2010.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Kensico Water Quality Control Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Inspect and maintain nonpoint source management facilities within the Kensico Reservoir Basin: • Stormwater management facilities;	Ongoing

• Turbidity curtain; • Spill containment measures.	
Work with Westchester County to complete construction of the remote monitoring system at Westlake Sewer Extension.	Completed July 2012
Complete installation of nonpoint source reduction projects identified in the Kensico Action Plan (KAP): • Drainage improvements in the N1catchment; • Pipeline system for N7 sub-basin; • Extended detention basin for the N12 sub-basin; • Whippoorwill Creek stream stabilization.	 Completed 10/31/13 06/30/14 Completed
Assess the feasibility and need for the CATUEC shoreline stabilization project and the proposed future use and location of CATUEC.	Ongoing
Reduce turbidity risk at CATUEC: • Submit progress report on the development of draft schedule for dredging at CATUEC; • Assess sediment accumulation at CATUEC after completion of CATUEC dredging.	 06/30/17 Based on schedule
Continue to implement Septic Repair Reimbursement Program.	Ongoing
Implement the Video Sanitary Sewer Inspection Program: • Complete inspection of targeted areas; • Identify existing and potential defects; • Coordinate with entities responsible for remediation of identified deficiencies.	Report findings in the 2013 Annual Report

Report Description	Due Date
Submit Kensico Programs Annual Report – an integrated report on the progress implementing the Kensico Water Quality Control Program, including: • Operations and Management of nonpoint source management facilities; • KAP implementation; • Westlake monitoring program; • CATUEC shoreline stabilization and future use of CATUEC; • Septic Repair Reimbursement Program; • Westchester County Airport and Route 120 Corridor Projects, as needed.	Annually, 3/31

4.11 Catskill Turbidity Control

The Catskill Turbidity Control program was developed to address elevated turbidity in the Catskill watershed. Due to the region's underlying geology, the streams within the Catskill watershed are prone to elevated levels of turbidity during high flow events. The design of the Catskill System takes into account the local geology, and provides for settling within Schoharie Reservoir, Ashokan West Basin, Ashokan East Basin, and the upper reaches of Kensico Reservoir. Under most circumstances, the extended detention time in these reservoirs, combined with strong source water protection programs, is sufficient to allow water quality goals to be met. However, following extreme storm events, and if the NYSDOH declares an imminent public health hazard, the City may have to use chemical treatment (i.e., alum, with or without sodium hydroxide) to control high turbidity levels. In order to reduce the frequency of alum treatment events, the City has executed a comprehensive program over the past several years to identify and implement operational strategies and infrastructure improvements that improve the system's resilience during naturally-occurring turbidity events.

In accordance with the requirements of the 2002 FAD, turbidity control investigations (the Catskill Turbidity Control Studies) were conducted in phases, with each phase building upon what was learned previously. The Phase I study, completed in December 2004, provided a preliminary screening-level assessment of turbidity control alternatives at Schoharie and Ashokan Reservoirs, and identified potentially feasible, effective, and cost-effective measures for subsequent detailed evaluation. The Phase II study, completed in September 2006, consisted of a detailed conceptual design, cost estimation, and performance evaluation of three alternatives for improving turbidity and temperature control in diversions from Schoharie Reservoir: a Multi-Level Intake, In-Reservoir Baffle, and Modification of Reservoir Operations. The Phase III study, completed in December 2007, focused on alternatives at Ashokan Reservoir that could reduce turbidity levels entering Kensico Reservoir, including a West Basin Outlet Structure, Dividing Weir Crest Gates, East Basin Diversion Wall, Upper Gate Chamber Modifications, a new East Basin Intake, and Catskill Aqueduct Improvements/Modified Operations. Overall, the City selected Modification of Reservoir Operations as the most feasible alternative for reducing turbidity levels entering Kensico Reservoir. In support of implementation of this alternative, the City proposed to develop a system-wide Operations Support Tool (OST).

NYSDOH/EPA and NYSDEC approved the Phase III Implementation Plan in November 2010, with a condition that the City develops performance measures to evaluate the efficacy of the Catskill turbidity control program once fully implemented, and to convene an annual meeting with the regulators to discuss the status of the program. Further scrutiny of the OST was provided during an expert panel workshop, which the City convened in February 2011 to provide technical expertise to ensure that the science behind the OST is sound and to offer guidance for future use.

The City's compliance with the requirements of the Catskill Turbidity Control Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of the New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five Year Period* (September 30, 2011).

In the remaining period of the 2007 FAD, the overall goal of this program will continue to be to control turbidity of the water delivered to Kensico Reservoir by reducing flow in the Catskill Aqueduct during high-turbidity events. At the same time, there are communities that draw water from the Catskill Aqueduct, and maintaining flow for them is a consideration. This program protects the quality of water that is delivered to the City, while minimizing the need for chemical treatment. The Catskill Turbidity Control Program consists of three components:

1. *Modified reservoir operations guided by OST:*
   OST will combine current system data with inflow forecast data and system operating rules to project the likely range of reservoir levels and water quality over the coming weeks and months. This look-ahead capability will provide system analysts, operators, and managers with information to support decisions concerning reservoir diversions and releases, and will allow operators to test the risk/reliability of actual operations decisions 'on paper' before implementing them.

2. *Catskill and Delaware Aqueduct Connection at Shaft 4:*
   The Shaft 4 Connection will be a new engineered connection between the Catskill and Delaware Aqueducts at the Delaware Aqueduct's Shaft 4 location, where the two aqueducts cross. This connection will allow the City to divert Delaware System water into the Catskill Aqueduct, including when Catskill System turbidity is elevated, thereby allowing the flow of water from Ashokan Reservoir to be reduced while still maintaining sufficient flow to provide service to outside communities and meet overall demand. Preliminary design of the Shaft 4 Connection and a value engineering workshop were completed in 2010. Design was completed in early 2012, and notice to proceed with construction was issued in April 2013.

3. *Improvements to Catskill Aqueduct Stop Shutters:*
   The goal of this component is to facilitate the deployment of stop shutters to impound water in the Catskill Aqueduct, allowing Catskill flow to be reduced while enabling community intakes along the aqueduct to continue to operate. Improvements to the stop shutter installation process consist of fabricating new aluminum stop shutters, which will seal more effectively, and building hoist systems, which will allow operations staff to install and remove stop shutters more quickly.

Subsequent to completion of the Catskill Turbidity Control Studies, several major storm events occurred in the watershed that led to substantial reliance upon one of the operational tools evaluated in the Catskill Turbidity Control Study Phase III Implementation Plan. This tool, use of the Ashokan Release Channel to create a void in the West Basin of the Ashokan Reservoir and to reduce spilling of turbid water to the East Basin, reduced the need for alum treatment after these storm events. However, sustained use of the Ashokan Release Channel after heavy rainfall in Fall 2010 led to reports that the turbid water was causing environmental and economic impacts to the lower Esopus Creek basin. NYSDEC initiated enforcement action in 2011, and has worked with the City to develop an operating protocol for the Release Channel, which is expected to be added as a condition of the City's CATALUM SPDES Permit. The DEC Order on Consent, executed by the City in 2012, requires the City to submit a Draft Environmental Impact Statement (DEIS), which analyzes the environmental and socioeconomic impacts of

operating the Ashokan Release Channel in accordance with revised operating protocols, and assesses alternative methods of operating the Catskill System. The Revised 2007 FAD requires the City to meet with NYSDOH/EPA, NYSDEC and the Watershed Inspector General (WIG) to discuss the findings of the DEIS and potential alternatives for operating the Catskill System to control turbidity.

The revised FAD also has the following new program requirements for the remaining period of the 2007 FAD:

- following up on a condition of approval of the Phase III Implementation Plan, the City must submit for review and approval their final proposal for performance measures/criteria for evaluating the efficacy of the Catskill Turbidity Control Program;
- acknowledging that the City will be relying heavily upon the Catskill System during the period that the Delaware System is shut down to address leaks in the Rondout-West Branch Tunnel (RWBT), the City shall submit a plan describing how it will manage its water system to maintain acceptable water quality during this period; and
- in light of the City's continuing development and use of water quality and water supply system models to support water supply operational decisions, the City shall request that an organization of national experts (e.g., the National Research Council or the National Academy of Sciences) to convene a panel of experts in reservoir water quality and quantity modeling to review the ongoing development and use of the OST, and the effectiveness of OST use in mitigating the effects of elevated turbidity in the reservoir system. The panel will assist in developing performance measures to evaluate OST use, and will also help evaluate strategies of water supply operation developed with the OST. The panel will provide written feedback following their review and will also participate in a progress meeting with regulators, as described in the Activity Table below.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Catskill Turbidity Control Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue to develop and deploy Operations Support Tool.	Ongoing
Catskill Aqueduct Stop Shutter Improvements – Construction Functionally Complete.	12/31/15
Shaft 4 Interconnection – Construction Functionally Complete.	12/31/16
Using results from the USGS turbidity monitoring study, evaluate spatial variations in sub-basin turbidity loading in the Esopus Creek Watershed, and as appropriate use this information to improve estimates of turbidity loading to the Ashokan Reservoir.	When indicated

Request that an organization of independent national experts (e.g., the National Research Council or the National Academy of Sciences) convene a panel of experts ('Expert Panel') in water quality and quantity modeling, which will be funded by the City. • Submit to NYSDOH/EPA and NYSDEC a scope of work for the Expert Panel, detailing the goals and questions to be answered by the panel. Goals should include evaluating the City's use of and effectiveness of the OST and assisting the City in developing performance measures/criteria for assessing the efficacy of the Catskill Turbidity Control Program. • NYCDEP will provide to the Expert Panel the information necessary to assess the City's turbidity and water system modeling programs and to respond to the questions the Panel has been asked to address, including the City's proposed performance measures/criteria for evaluating the efficacy of the Catskill Turbidity Control Program. • Submit to NYSDOH/EPA and NYSDEC a timeline for development and submittal of final revised performance measures/criteria for evaluating the efficacy of the Catskill Turbidity Control Program.	Within 30 days of approval of the scope of work 03/31/14 Upon request of the Expert Panel 03/31/14
Convene, on an annual basis, a progress meeting with NYSDOH/EPA, NYSDEC and the WIG providing a forum for discussion of the status of the Catskill Turbidity Control program, management of turbidity events reported in the March Annual Report, responses to any significant events that have occurred subsequent to those reported in the March Annual Report, use of performance measures to assess program efficacy, status/results of the DEIS that has been required by the DEC Consent Order, and other matters related to turbidity control. In addition, include discussion of the following items during the following designated meetings: • Efficacy of Catskill Turbidity Control Program (report due 08/31/15); • Findings of the Expert Panel (report due 08/31/16).	Annually, Starting 09/30/13 09/30/15 09/30/16
Submit Catskill Turbidity Control General Management Plan, including consideration of maintaining water quality during the Delaware RWBT repair and shutdown.	One year prior to the planned RWBT shutdown

Report Description	Due Date
Report on progress of Catskill Turbidity Control Program components in Annual Report.	Annually, 3/31
Report on the efficacy of the Catskill Turbidity Control Program, including performance of the OST and other structural improvements	08/31/15

to control Catskill turbidity. Assess the adequacy of control measures, and if necessary, discuss alternative measures to control Catskill turbidity, including the alternatives considered in the DEIS required by the Consent Order.	
Report on the findings of the Expert Panel, including evaluation of the use and effectiveness of the OST in mitigating the impacts of elevated reservoir turbidity, recommendations from the Expert Panel for further development and improvement to the OST, and an evaluation of the operation of the Ashokan Release Channel.	08/31/16

4.12 Sand and Salt Storage

Under the Sand and Salt Storage Program (a version of which began under the MOA), NYCDEP provided funding to support efforts, administered by the CWC, to improve the storage of sand, salt, and other road de-icing materials in the west-of-Hudson watershed. This program helped protect water quality and assisted local governments in complying with the City's Watershed Rules and Regulations (WR&Rs).

The 2007 FAD required NYCDEP to contract with CWC to provide $500,000 in funding for this program by February 28, 2008. This contract was executed. Therefore, as of this revision, the program is considered to be concluded.

5. Watershed Monitoring, Modeling, and GIS Programs

5.1 Watershed Monitoring Program

The City conducts extensive water quality monitoring throughout the watershed. Programmatic goals are defined in the 2009 Watershed Water Quality Monitoring Plan (WWQMP), which describes the data gathering protocols for regulatory purposes, FAD Program evaluation, modeling, and surveillance (including pathogen surveillance). Significant alterations in the monitoring plan require the City to submit the proposed changes to NYSDOH for review and approval prior to implementation. Changes to the plan are documented through the use of addenda.

Water quality results collected from routine monitoring of reservoirs, streams, and aqueducts throughout the watershed are stored in a database. The database serves both short- and long-term objectives. The daily results are used for regulatory compliance and operational decisions. Over the longer term, the data generated through the City's monitoring program, in conjunction with other defensible scientific findings, are used to assess water quality status, water quality trends, and the overall effectiveness of the watershed protection program. The 2007 FAD requires that, upon the completion of one year of data gathering, the City compile the results in the Watershed Water Quality Annual Report and submit it for review to NYSDOH/EPA. During the remaining period of the 2007 FAD, the City shall continue its commitment to undertake a comprehensive evaluation of the program on a periodic basis. The last submission on this evaluation occurred on March 31, 2011, and the next assessment report shall be submitted by March 31, 2016.

The City's compliance with the requirements of the Watershed Monitoring Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of the New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five Year Period* (September 30, 2011).

Based on current New York State policies, gas drilling using high volume hydraulic fracturing will not be allowed in the New York City watershed. However, as a contingency in the event that New York State policies change and gas drilling is authorized in the NYC watershed, the City shall work with regulatory partners to develop parameters to revise/enhance its monitoring plan to include sampling for indicator pollutants.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Watershed Monitoring Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Annual participation in educational seminars on watershed monitoring.	Annually, 9/30
Coordinate annual technical Pathogen Working Group meeting.	Annually, 5/31
Submit after-action reports following chemical treatment activities and other significant or unusual water quality-related events.	Upon completion, as specified for each action

Report Description	Due Date
Submit Watershed Water Quality Annual Report (including comprehensive chapters on pathogens and ongoing research projects).	Annually, 7/31
Submit Watershed Protection Program Summary and Assessment Report.	03/31/16

5.2 Multi-Tiered Water Quality Modeling Program

The City has developed a Multi-Tiered Water Quality Modeling Program consisting of integrated reservoir and terrestrial models. The models were developed and used in order to assist the City in evaluating the effects of changes in land use practices, watershed management, reservoir operations, ecosystem health, and climate on water supply quantity and quality. The models encapsulate the key processes and interactions that control generation and transport of water, sediment, and nutrients from the land surface, through the watersheds, and within the reservoirs.

Research and development remain as an integral component of this program's mission, and an ongoing activity that leads to improvements to existing models, adaptation of new models, and development of model applications. The combined scientific expertise of the City's scientific staff and contractual support shall continue to ensure that needed levels of research and development, as well as practical model applications, can be produced in a timely and effective manner. The program shall also offer technical support and scientific expertise to assist in local watershed protection efforts.

The City's compliance with the requirements of the Multi-Tiered Water Quality Modeling Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

During the remaining period of the 2007 FAD the program shall maintain its primary goal of development and application of the models to:

- predict turbidity transport within the Catskill System and Kensico Reservoir;
- provide guidance for reservoir operations to minimize the impact of high turbidity events, including continued application and testing of models that are used as part of the Operations Support Tool (OST) and providing for improved efficacy of model results;
- assist in evaluating the effectiveness of the FAD/MOA-related programs that are implemented to control and protect the City's water supply; and
- provide modeling support for predicting the potential effects of climate change on the water supply and ensuring the long-term availability of high quality and adequate quantity of drinking water throughout the system.

The general milestones set forth for the First Five Year Period of the 2007 remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Multi-Tiered Water Quality Modeling Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue model testing and development based on ongoing model simulations, data analyses, and research results.	Ongoing
Update land use, watershed programs, and time-series data (meteorological, stream flow and chemistry, reservoir chemistry) to support modeling.	Ongoing
Continue development of data analysis tools for modeling, and software for model connectivity.	Ongoing
Provide modeling and technical support to the Catskill Turbidity Control Program including the development and use of the Operations Support Tool (OST).	Ongoing
Use reservoir turbidity models to support operational decisions in response to unfavorable turbidity conditions.	Ongoing
Develop and improve model applications to support watershed management and long-term planning.	Ongoing
Develop model applications that simulate the impacts of future climate change on reservoir water quality and quantity.	Ongoing
Update future climate scenarios that can be used as inputs to the City's reservoir and watershed models.	Ongoing

Report Description	Due Date
Submit program Status Report, which includes updates on the modeling activities described above.	Annually, 3/31
Report on Modeling Analysis of FAD Programs in the Watershed Protection Program Summary and Assessment Report.	03/31/16

5.3 Geographic Information System Program

The City maintains an extensive Geographic Information System (GIS) which is designed for watershed management applications and remote sensing. The GIS's capability to manipulate spatial databases is used to support existing program objectives and terrestrial and reservoir modeling. This system is used not only to manage the City's interests in the lands and facilities of the upstate water supply system, but also to display and evaluate the potential efficacy of watershed protection programs through maps, queries, and spatial analyses. The GIS is also used to support watershed and reservoir modeling of water quantity and quality, as well as modeling of water supply system operation.

The City's compliance with the requirements of the GIS Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

In the remaining period of the 2007 FAD, the GIS Program shall continue to provide visualization and analysis tools that assist in the design, implementation, and evaluation of water quality monitoring and watershed protection programs in a unique spatial and temporal context. These tools will enhance the City's ability to:

- inventory and track water supply lands and facilities;
- perform analysis of land use and terrain to map development, agriculture, forest, and hydrography;
- provide estimation of the effects of watershed management programs on long-term water quality; and
- support watershed and reservoir modeling of water quantity and quality, and modeling of system operations.

The general milestones set forth for the First Five Year Period of the 2007 remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the GIS Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue to provide GIS technical support for protection and monitoring programs, and modeling applications.	Ongoing
Continue to develop and update GIS data and metadata, including acquisition of high-resolution aerial data and their derived products as needed.	Ongoing

Continue to improve and maintain GIS infrastructure to evolve with changing technology and growing database needs.	Ongoing
Continue to fulfill requests for program-related GIS data from regulatory agencies and watershed stakeholders.	Ongoing

Report Description	Due Date
Report on programmatic activities , which shall include updates on: • GIS technical support for protection programs, monitoring programs, and modeling applications; • completion or acquisition of new GIS data layers and aerial products in the GIS spatial data libraries; • GIS infrastructure improvement; • GIS data dissemination summaries.	Annually, 3/31

6. Regulatory Programs

6.1 Watershed Rules and Regulations and Other Enforcement/Project Review

The 2007 FAD required the City to administer and enforce all applicable environmental regulations, which include the *Rules and Regulations for the Protection from Contamination, Degradation, and Pollution of the New York City Water Supply and Its Sources* (WR&Rs), including the regulations and standards incorporated by reference in the WR&Rs, the federal Clean Water Act, National Pollution Discharge Elimination System Program (CWA NPDES), and the State Environmental Review Act (SEQRA).

The City's compliance with the requirements of the Watershed Rules and Regulations and Other Enforcement/Project Review Programs in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. A new reporting requirement has been added to this program for the remaining period. With completion of all required upgrades of WWTPs as part of the 2007 FAD WWTP Upgrade Program, the City, in accordance with Public Health Law §1104 and the MOA, is obligated to pay for capital replacement of Watershed Equipment and Methods that are installed at all public WWTPs and all (public or non-public) WWTPs under construction as of November 2, 1995 and that are required solely by the City's WR&Rs and not otherwise required by federal or State law. Replacement work conducted under these provisions will be reported in the semi-annual reports for the Watershed Rules and Regulations and Other Enforcement/Project Review Program.

The Revised 2007 FAD requires that the City continue to implement the Watershed Rules and Regulations and Other Enforcement/Project Review programs in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Enforce the WR&Rs and other applicable regulations. Continue to promote compliance guidance to applicants seeking WR&Rs approvals, through: • pre-application conferences; • providing Guidance Documents.	Ongoing
Review best management practice (BMP) monitoring data and BMP performance and effectiveness in the field and, where appropriate, make revisions to stormwater pollution prevention plan (SWPPP) guidance. These revisions may include, but are not limited to:	Ongoing

• refinements of BMP assumptions; • creation of performance-based benchmarks; • emphasizing the importance of non-structural BMPs and buffers; • promotion of innovative site design to meet SWPPP requirements.	
Work with NYSDEC, in accordance with Addendum S of the DEP/NYSDEC Memorandum of Understanding, to improve coordination of stormwater enforcement and compliance activities between agencies and with the New York State Office of the Attorney General. Such enforcement and compliance coordination shall apply, but not be limited to, all effective NYSDEC general permits for construction activity. Stormwater Enforcement Coordination Committee meetings with involved agencies will be held at least twice per year or more as needed.	Ongoing

Report Description	Due Date
Submit reports consisting of: • summary table, with corresponding maps, of new project activities that may affect water quality, including variance activities and review of new/remediated septic systems in the Catskill/Delaware watershed basins as well as in the Croton Falls and Cross River basins east of the Hudson River; • summary table (inventory) of all development projects proposed and their SEQRA status, with corresponding maps; • summary table of projects under construction, by basin, with corresponding maps; • descriptions of replacement work conducted under the provisions of Public Health Law §1104 and the MOA (annually in 4/30 report).	Semi-annually, 4/30 and 10/31
Submit reports on the status of the City's regulatory enforcement actions in the Catskill/Delaware watershed basins, including the Croton Falls and Cross River basins.	Semi-annually, 4/30 and 10/31
Report on the analyses used to determine the phosphorus-restricted and coliform-restricted status of each reservoir, as part of the Watershed Water Quality Annual Report.	Annually, 7/31

6.2 Wastewater Treatment Plant Compliance and Inspection Program

The goal of the Wastewater Treatment Plant (WWTP) Compliance and Inspection Program is to prevent degradation of source waters from the threat of contamination from WWTPs discharging in the watershed. To ensure compliance with the Watershed Rules and Regulations (WR&Rs) and State Pollutant Discharge Elimination System (SPDES) permits, the City through the WWTP Compliance and Inspection Group performs onsite inspections, conducts sample monitoring, provides compliance assistance, and takes enforcement actions when needed. The program is coordinated through an EPA-approved Memorandum of Understanding (MOU) between NYSDEC and the City. The MOU established the Watershed Enforcement Coordination Committee (WECC), which meets quarterly to address non-compliance through formal enforcement and/or compliance assistance under specific inter-agency protocols. The WECC process is designed to address instances of significant non-compliance in a timely and appropriate manner. In addition, the City's Water Quality sampling program regularly monitors the effluent of all treatment plants in the watershed and uses the results of sampling to assist WWTP operators to meet compliance requirements or to initiate enforcement actions as necessary.

The City's compliance with the requirements of the Wastewater Treatment Plant Compliance and Inspection Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of the New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Wastewater Treatment Plant Compliance and Inspection Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Perform monitoring at all New York City-owned WWTPs in accordance with their SPDES permits, and grab sample monitoring monthly at all non-New York City-owned WWTPs discharging in the Catskill/Delaware watershed. At least once annually, for the non-City-owned WWTPs, samples shall be collected and analyzed in accordance with the monitoring requirements of each facility's SPDES permit. Continue to provide assistance to owner/operators of non-City-owned WWTPs as needed.	Ongoing

Continue to take timely and appropriate enforcement actions against non-City-owned WWTPs for noncompliance with the WR&Rs and SPDES discharge permit requirements, in accordance with the WECC enforcement coordination protocol of the NYSDEC/NYCDEP MOU.	Ongoing
Conduct at least four on-site inspections for year-round SPDES permitted facilities and at least two on-site inspections for seasonal SPDES permitted facilities per year at all WWTPs in the watershed.	Ongoing

Report Description	**Due Date**
Report on the Wastewater Treatment Plant Compliance and Inspection Program, including: • WWTP Inspection Summary Reports; • Enforcement Actions.	Semi-annually, 2/28 and 8/31
Report by email to the NYSDOH all sewage spills exceeding 500 gallons within 24 hours of the City becoming aware of the spill.	Ongoing
Submit WWTP Water Quality Sampling Monitoring Report.	Semi-annually, 2/28 and 8/31

7. Catskill/Delaware Filtration and UV Disinfection Facilities

As a condition of relief from completing final design deliverables for the Catskill/Delaware filtration planning process, the 2002 FAD required that the City move forward with design and construction of an Ultraviolet (UV) Light Disinfection Facility for the Catskill/Delaware water supply. In addition, the City would update the preliminary design for the Catskill/Delaware filtration plant every two years to ensure that the existing design documents do not become obsolete, thereby minimizing the overall time to commence filtration in the event that the City or the primacy agency later determines that filtration is necessary.

The program set milestones for placing the Catskill/Delaware UV (CDUV) Facility into service in order to provide treatment of the Catskill/Delaware water supply for *Cryptosporidium* inactivation. Application of UV treatment to the Catskill/Delaware water supply provides an additional disinfection barrier enhancing the City's water supply protection efforts. The CDUV Facility has been designed to satisfy the *Cryptosporidium* inactivation treatment requirements under the Long Term 2 Enhanced Surface Water Treatment Rule, 40 CFR Part 141, Subpart W. The facility is located at the Eastview site in Valhalla, NY, and is designed to treat up to 2 billion gallons per day to provide 99.9% inactivation of *Cryptosporidium*. Construction began in 2006 and the facility went on-line on December 1, 2012 providing UV treatment to all Catskill/Delaware water delivered to the City.

In response to questions raised by NYSDOH/EPA regarding the validation work performed on the Catskill/Delaware UV units, additional validation work was performed in two phases (Phase I and Phase II) in the Fall of 2012. A report on this validation work was submitted to NYSDOH/EPA in January 2013. Pending review of the results of this additional validation work, NYSDOH/EPA required that the CDUV facility be operated to provide a UV reduction equivalent dose of 40 mJ/cm^2 (based on MS2 as the test surrogate). New milestones, which included dates for completion of additional validation work and for operating in compliance with 40 CFR Part 141, Subpart W, were established in a revised Administrative Order on Consent (SDWA-02-2012-8101) (UVAOC), which was issued by EPA on September 7, 2012. Applicable milestones from the UVAOC have been included in these FAD revisions.

The City's compliance with the requirements of the Catskill/Delaware Filtration and UV Disinfection Facilities program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City implement the Catskill/Delaware Filtration and UV Disinfection Facilities program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Commence full operation of the Catskill/Delaware UV (CDUV) Facility.	Completed
Operate the CDUV Facility at a dose of 40 mJ/cm^2 (based on MS2 coliphage as the test surrogate), or an alternative dose as may be approved by NYSDOH, in compliance with 40 CFR §141.720(d).	Within 8 weeks of notification by NYSDOH/EPA that Phase II validation report has been accepted, and no later than 10/29/13
Update the preliminary design for the Catskill/Delaware Filtration Facilities.	Biennially, Beginning 09/30/13
At the request of NYSDOH/EPA, host a presentation highlighting the changes to the preliminary filtration design.	As requested

Report Description	Due Date
Monthly progress reports to regulators.	Monthly to project completion
Provide letter to confirm to NYSDOH/EPA that the UV Facility is adequately staffed by certified operators as defined by NYSDOH's Operator Certification Regulation (10 NYCRR Subpart 5-4).	Completed
Report on updates to the preliminary design for the Catskill/Delaware filtration facilities. Report shall discuss the analysis and redesign work performed, and contain the necessary change pages to the final preliminary design, including revisions to drawings.	Biennially, Beginning 09/30/13

8. In-City Programs

8.1 Waterborne Disease Risk Assessment Program

In order to meet the criteria for maintaining filtration avoidance, the City must be able to demonstrate that the NYC water supply is not the source of a waterborne disease outbreak. The overall goal of the Waterborne Disease Risk Assessment Program (WDRAP) is to track the incidence of, and gather relevant epidemiological data on, waterborne diseases, in particular giardiasis and cryptosporidiosis, to ensure that water consumers served by the NYC water supply are adequately protected against waterborne disease.

The City's compliance with the requirements of the WDRAP in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

Through its commitment to the WDRAP, the City shall continue to sufficiently monitor and assess whether or not there are waterborne outbreaks of giardiasis or cryptosporidiosis. The City continued to respond to source water pathogen monitoring results as outlined in the *Cryptosporidium* Action Plan (CAP) until the Catskill/Delaware UV Disinfection Plant became fully operational on December 1, 2012. With the plant now online, any *Cryptosporidium* oocysts should be inactivated by UV treatment, so the CAP is no longer being implemented. However, the City's Turbidity Action Plan (TAP) has been revised to ensure that source water pathogen monitoring and UV operations are reviewed in response to elevated turbidity.

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the WDRAP in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue to operate the WDRAP.	Ongoing
Continue to implement the Turbidity Action Plan (TAP).	Event based
In relation to any water quality "event" involving the NYC water supply (e.g. increased turbidity levels, pathogen detection, disruption of operations), the City will provide syndromic surveillance system information (e.g. signals and trend data), as requested by NYSDOH/EPA. Information requests will be coordinated through the City.	Event based

Notify NYSDOH/EPA whenever the City is notified by the New York City Department of Health and Mental Hygiene of any significant signs of community gastrointestinal illness in which the public drinking water supply appears to be the source of the illness.	Event based

Report Description	Due Date
Submit Annual Report on program and program findings, implementation, and analysis.	Annually, 3/31

8.2 Cross Connection Control Program

This program complements other FAD programs, which focus on source water protection, by helping ensure water quality continues to be protected from cross connections once the water reaches the distribution system. A cross connection is a physical connection in a drinking water distribution system through which the water supply can become contaminated. Cross connections can be caused by improper or direct connections, excessive back pressure on the system, back siphonage, and other reasons. By investigating and eliminating possible cross connections or backflow conditions, responding to complaints, confirming the proper and legal installation of approved backflow devices, and providing a mechanism for swift and effective enforcement, the Cross Connection Control Program works to eradicate the possibility of cross connection contamination.

The City's compliance with the requirements of the Cross Connection Control Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Cross Connection Control Program in accordance with the milestones below. Some activities performed by the Cross Connection Control Program are on an as-needed basis; consequently, milestones for these activities are given as "as needed" or "estimated", which are estimates based on current programmatic participation of the NYC community.

Activity and Reporting Requirements

Activity	Due Date
Respond to cross connection control complaints	As needed
Initiate enforcement for non-compliant hazardous premises	Estimated 225/year
Backflow preventer plans approved	Estimated 400/year
Backflow preventer plans accepted with self-certification	TBD
Notices of Violation issued for failure to test annually	Estimated 200/year
Review requests for exemption from cross connection control requirements	Estimated 400/year
Perform full inspection of potentially hazardous premises	300 to 450 per year

Report Description	Due Date
Report on implementation of the Cross Connection Control Program	Annually, 3/31

9. Administration

The FAD requires the City to maintain the level of staffing, funding and expertise necessary to support all elements of the City's Long-Term Watershed Protection Plan and all requirements under the 2007 FAD determination. Beginning in the early 1990's, the City hired hundreds of professionals in a variety of fields to support its comprehensive watershed protection program. The efforts of this dedicated staff allow the City to successfully implement the elements of the overall protection effort.

The City's compliance with the requirements of the Administration program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination - Status Review of the First Five-Year Period* (September 30, 2011).

During the remaining period of the 2007 FAD the City shall continue to maintain the level of staffing, funding, and expertise necessary to support all elements of the overall water supply protection. The general milestones set forth for the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Administration Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
The City, in consultation with the New York City Office of Management and Budget, shall make a presentation to NYSDOH/EPA and NYSDEC on the amount of money appropriated and spent for watershed protection programs and its adequacy to meet program objectives and FAD requirements.	Within 60 days of annual report

Report Description	Due Date
Report annually on actual filled staff position levels versus available positions for each division and section involved in supporting the watershed protection program, and confirm that resource levels are adequate to ensure that all program goals/FAD requirements are met. Contractor support staff will be noted.	Annually, 9/30
Report on the City budget for the upcoming fiscal year, specifically the amount (capital and expense) spent during the previous year, the amount appropriated for watershed protection programs for the current year, and the amount planned for the year thereafter. The amount spent, appropriated, and planned will be broken down by program, to the extent practicable. The report will also include costs for technical consultant contracts identified in the 2007 FAD.	Annually, 9/30

10. Education and Outreach

The Education and Outreach Program is truly a collaborative effort that involves numerous partners working to educate, inform, teach, promote, and raise awareness about the importance of the water supply, source water protection, water conservation, environmental stewardship, and sustainability. Watershed education and outreach is based on the principle that creating an informed base of upstate watershed residents and downstate water consumers will facilitate and strengthen the City's Long-Term Watershed Protection Strategy. On a year-round basis, the City supports and participates in numerous community events throughout the watershed and within the City. These activities include, but are not limited to, county fairs, festivals, conferences, workshops, and other public outreach venues where staff disseminate informational publications and directly explain the City's role as a watershed partner. The City also supports school-based watershed education programs while conducting regular professional training opportunities for teachers, environmental educators, watershed landowners, local government officials, and watershed professionals. Common topics covered by these programs include land use planning, stream corridor protection, farm and forest management, septic system maintenance, riparian buffers, invasive species, and stormwater management.

The City's compliance with the requirements of the Education and Outreach Program in the First Five Year Period has been assessed by NYSDOH/EPA and is reported in *Implementation of New York City's Watershed Protection Program and Compliance with the 2007 Filtration Avoidance Determination – Status Review of the First Five-Year Period* (September 30, 2011).

The core program activities set forth in the First Five Year Period of the 2007 FAD remain relevant and form the basis for program implementation during the remaining period of the 2007 FAD. The Revised 2007 FAD requires that the City continue to implement the Education and Outreach Program in accordance with the milestones below.

Activity and Reporting Requirements

Activity	Due Date
Continue to support and implement targeted education and outreach programs for specific audiences through the Watershed Agricultural Program, Watershed Forestry Program, Stream Management Program and Land Management Program (including Watershed Recreation and Invasive Species Control).	Ongoing
Continue to fund the CWC Public Education Grants Program and support other community outreach activities in relation to CWC watershed protection programs.	Ongoing
Continue to support upstate/downstate school-based education and training programs.	Ongoing
Continue to participate in a range of community/public outreach events both in the watershed and within the City.	Ongoing

Utilize publications, the DEP website, and social media tools to disseminate information about watershed protection and conservation to upstate/downstate constituents.	Ongoing

Report Description	Due Date
Report on program activities in Annual Report.	Annually, 3/31

11. Reporting

The Revised 2007 FAD continues to require that the City inform NYSDOH and EPA of its watershed protection efforts through submittal of reports designed to assist the regulatory community and watershed stakeholders in their assessment of the overall progress of the City's Watershed Protection Program. The expected content for these reports is described in more detail in each section of this 2007 FAD and in the City's 2011 Long-Term Watershed Protection Program; this reporting section is not an exhaustive list of all reporting obligations. All FAD reports generated by NYCDEP are posted on the NYCDEP web site. The following tables highlight reports submitted on a periodic as well as a one-time only basis.

For informational purposes, the City will also inform NYSDOH and EPA annually about actions planned and actions taken by the City on water conservation, implementation or revisions to the City's Drought Management Plan, and the elimination of leaks in the Delaware Aqueduct.

The FAD requires that the City implement the reporting requirements in accordance with the submittal list and schedule below:

Periodic Submittals by FAD Section

Section Task	Report Topic	Frequency*
2a	Objective Criteria Compliance	Monthly (quarterly on the 10th of the month in March, June, September, and December for disinfection byproduct results)
2b	Report on the operational status of Kensico Reservoir, West Branch Reservoir (on-line or by-pass), and Hillview Reservoir	Monthly
3.1	Septic Programs • Septic Remediation and Replacement Program, including the Cluster and Small Business Programs; • Septic Maintenance Program; • Sewer Extension Program; • Alternate Design Septic Program	Annually
3.3	Community Wastewater Management Program	Annually
3.5a	Stormwater Cost-Sharing Programs	Annually
3.5b	Stormwater Retrofit Program	Annually
4.1	Waterfowl Management Program	Annually (September 30)
4.2	Land Acquisition Program – report on program activities and status. Reports shall include an assessment of City-funded land acquisition efforts undertaken by land trusts and/or non-governmental organizations	Semi-annually (March 31 in FAD Annual Report and July 31)

Section Task	Report Topic	Frequency*
4.3	Land Management Program	Annually
4.4	Watershed Agricultural Program (WAP)	Annually
4.5a	Watershed Forestry Program	Annually
4.5b	Watershed Forestry Program Evaluation Report (for five-year old management plans)	Annually
4.6a	Stream Management Program	Annually
4.6b	Submit rolling two-year Action Plans for implementing stream management plan recommendations and establishing priorities, by reservoir basin.	Annually (May 31)
4.6c	Submit descriptions of proposed Ashokan Basin Stream projects and anticipated timelines for completion	Annually, as projects are identified by Annual Action Plans (May 31)
4.7	Riparian Buffer Protection Program	Annually
4.8	Wetlands Protection Program	Annually
4.9	East-of-Hudson Nonpoint Source (NPS) Pollution Control Program	Annually
4.10	Kensico Water Quality Control Program	Annually
4.11	Catskill Turbidity Control Program	Annually
5.1	Watershed Water Quality Annual Report	Annually (July 31)
5.2	Water Quality Modeling Program	Annually
5.3	GIS Program	Annually
6.1a	WR&Rs Project Review Report	Semi-annually (April 30 and October 31)
6.1b	WR&Rs Enforcement Report	Semi-annually (April 30 and October 31)
6.1c	Analyses used to determine the phosphorus-restricted and coliform-restricted status of each reservoir	Annually in Watershed Water Quality Report (July 31)
6.2a	WWTP Compliance and Inspection Program	Semi-annually (February 28 and August 31)
6.2b	WWTP Water Quality Sampling Monitoring Report	Semi-annually (February 28 and August 31)
7a	Catskill/Delaware UV Disinfection Facility Progress Reports	Monthly (to project completion)
7b	Catskill/Delaware Filtration Design Update	Biennially (beginning September 30, 2013)
8.1	Waterborne Disease Surveillance Program	Annually
8.2	Cross Connection Control Program	Annually
9a	Administration Report on staffing	Annually (September 30)

Section Task	Report Topic	Frequency*
9b	Administration Report on budget	Annually (September 30)
10	Education and Outreach	Annually
11a	Comprehensive FAD Annual Report	Annually
11b	NYCDEP Response to DOH On-site Inspection Report	Annually (within 60 days of DOH's report)

*Annually: means submittal of reports for the previous calendar year due no later than March 31, unless otherwise stated in the FAD.

Semi-annually: means submittal of reports for the six month period ending the last day of the month prior to the due date, due no later than January 31 and July 31, unless otherwise stated in the FAD.

Monthly: means submittal of reports for the preceding month, due no later than ten days after the end of that month.

Significant One-Time Submittals Required under the FAD in Chronological Order

Section	Description	Due Date
4.4	Proposal for funding and implementing PFM on 60 eligible farms	4 months after issuance of Revised 2007 FAD
4.6	Proposal, including schedule, for monitoring at Stream Management project sites to evaluate efficacy	Within 6 months of issuance of Revised 2007 FAD
4.4	Justification for developing fewer than 50 Whole Farm Plans	8 months after issuance of Revised 2007 FAD
4.7	Riparian Buffer Program Evaluation Report	Six months before the end of the initial 3-year program period
3.3	Proposal for a study that will evaluate the potential need for a community waste management system for the Hamlet of Shokan	10/31/13
4.6	Plan and schedule for providing training in stream, floodplain, and watershed management techniques	11/30/13
4.9	Proposal for East-of-Hudson Septic Repair Program	12/31/13
4.9	Findings of inspection of targeted areas of Sanitary Infrastructure, including coordination with entities responsible for the remediation of identified deficiencies	FAD Annual Report for 2013
4.11	Scope of work for Expert Panel as required by Catskill Turbidity Control Program	03/31/14
4.9	East-of-Hudson Septic Repair Program rules	06/30/14
4.8	Report on status of analysis of reference wetlands data and development of reference standards	07/31/14
4.6	Report on status of USGS turbidity study, including proposal for additional data collection, if warranted	11/30/14
4.6	Stream Management Program funding evaluation	12/31/14
4.4	BMP Prioritization Methodology Evaluation and WAP Metrics Assessment Report	01/31/15
4.9	Proposal for expansion of East-of-Hudson Septic Repair Program to Croton Falls and Cross River Reservoir basins	06/30/15
4.8	Report on LIDAR wetland mapping project	07/31/15
4.11	Report on efficacy of the Catskill Turbidity Control Program	08/31/15
4.6	Distribute updated preliminary Flood Insurance Rate Maps for the west-of-Hudson Watershed	12/31/15
4.6	Report on status of CWC LFHMP funding.	12/31/15
5.1	Watershed Protection Program Summary and Assessment Report.	03/31/16
5.2	Report on Modeling Analysis of FAD Programs in the Watershed Protection Program Summary and Assessment	03/31/16

Section	Description	Due Date
	Report.	
4.11	Report on findings of the Expert Panel	08/31/16
4.3	Report on Invasive Species Management Strategy	12/31/16
4.10	Progress report on development of draft schedule for dredging at CATUEC	06/30/17
4.6	Report on the findings of the water quality monitoring study	Six months after completion of the study
4.4	CREP Alternatives Assessment Report (if needed)	9 months after Farm Bill reauthorization
4.11	Catskill Turbidity Control General Management Plan	One year prior to the planned RWBT shutdown

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