Office of the Watershed Inspector General
Comments on the Draft Mid-Term Revisions to the 2007 Filtration Avoidance Determination
November 15, 2013

The Office of the Watershed Inspector General ("WIG" or "WIG Office") respectfully submits these comments to the New York State Department of Health ("DOH") concerning DOH's Draft Mid-Term Revisions to the 2007 Filtration Avoidance Determination for New York City's West of Hudson drinking water supply ("Draft Revisions").[1] The Draft Revisions include noteworthy improvements to the 2007 filtration avoidance determination ("2007 FAD"). WIG commends DOH for enhancing the FAD's land acquisition program by including flood buyout, relocation, and riparian buffer acquisition components. These program elements will enable the City of New York ("the City") to acquire for the first time smaller but important parcels of land alongside streams to prevent pollution and other impairments of surface waters. The Draft Revisions include other significant improvements as well.

WIG believes that the Draft Revisions can be improved still further. As discussed below, WIG recommends the following enhancements to revisions of the 2007 FAD: (i) development of measures to incorporate more recent precipitation data into FAD programs and to address the impact of climate change on the City's Watershed; and (ii) with the assistance of outside experts, consideration of alternatives to use of the release channel at the Ashokan Reservoir to determine whether the City's water supply can be protected from turbidity without impairing water quality in the Lower Esopus Creek.

I. Background: New York City's Unfiltered Drinking Water Supply

The West of Hudson ("WOH") portion of the New York City Watershed is presently the source of all drinking water consumed by nine million New Yorkers each day. And the WOH watershed is the largest source of unfiltered drinking water in the Nation. The water is collected by streams and reservoirs from precipitation, runoff from rain and melting of snow, groundwater infiltration, and other sources. It is distributed by a system of aqueducts, tunnels and pipes to consumers in New York City, its northern suburbs, and upstate communities.

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[1] The position of WIG was established by the New York City Watershed Memorandum of Agreement and implemented through successive Executive Orders of four governors, most recently pursuant to 9 NYCRR § 8.2, "to enhance current efforts to protect the New York City drinking water supply from activities that have the potential to adversely affect the New York City Watershed reservoirs and tributaries." *See* 9 NYCRR §§ 5.86, 6.5, 8.2. WIG submits these comments under his authority to "recommend legislative, regulatory and management practice changes . . . relating to the use, operation and protection of the Watershed." 9 NYCRR §§ 5.86, 6.5, 8.2.

Other than disinfection and settling, WOH water receives no treatment, such as filtration, before entering the taps of consumers.[2]

Filtering the water would require construction and operation of a massive filtration plant at a potential cost of $10 to $20 billion. The City has avoided that expenditure pursuant to a series of FADs issued and/or administered by EPA and DOH under the federal Safe Drinking Water Act, 42 U.S.C. § 300f *et seq.* ("SDWA") and New York's Public Health Law. Instead of filtration, $1.5 billion dollars of public funds have been spent on pollution prevention efforts to protect the WOH Watershed and ensure safe drinking water. This "Pollution Prevention" approach, adopted instead of filtration, represents the longstanding consensus of State and federal agencies, New York City, Watershed communities, and environmental groups, as agreed in their landmark 1997 Memorandum of Agreement.[3] The Pollution Prevention approach has been effective in ensuring the safety of WOH water and has been endorsed by the National Research Council, which functions under the auspices of the National Academy of Sciences.[4]

A variety of FAD programs help prevent pollutants from contaminating the City's WOH water supply: Infrastructure improvements include septic repair and maintenance, wastewater treatment upgrades, and stormwater retrofit projects. The land acquisition program entails purchases and preservation of unimproved parcels of land. Preserved land prevents pollution in two ways: First, it acts as a sponge for infiltration and natural treatment within the ground of surface water flows containing pollutants. If the land were otherwise developed the pollutants could more readily discharge from pavements and roofs directly into Watershed streams and reservoirs. Second, by preserving undeveloped land, the generation of potential contaminants associated with development and human activity (such as sewage or automobile fluids) is prevented. Other FAD programs entail management of City lands, forest management and forestry, and the watershed agriculture program, all intended to reduce pollution from those land uses. The stream management program seeks to protect stream integrity by reducing erosion, mitigating flooding hazards, and riparian buffer management. The City administers its own regulatory program to enforce its Watershed rules and regulations to facilitate proper construction/operation of wastewater treatment and

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[2] In addition to relying on WOH water, the City has historically obtained about ten percent of its water from the Croton Watershed located east of the Hudson River. Because of intensive development and population growth there, the quality of Croton water has degraded and a filtration plant to treat its water is being readied for operation.

[3] *See New York City Watershed Memorandum of Agreement* (January 21, 1997) (hereinafter MOA) at www.nysefc.org?home/indec asp?page294.

[4] National Research Council, *Watershed Management for Potable Water Supply: Assessing the New York City Strategy* (2000).

stormwater management facilities. The Catskill Turbidity Control program seeks to reduce the potential for elevated turbidity within the Catskill portion of the Watershed through operational changes and water supply infrastructure improvements.

II. Beneficial Elements in the Draft Revisions

The Draft Revisions include several important improvements to the 2007 FAD. Chief among these are flood buyout and flood mitigation programs proposed in response to Tropical Storms Irene and Lee, massive storms that caused widespread water quality problems and property damage within the West of Hudson Watershed. In addition, the Draft Revisions include a riparian buffer land acquisition program, originally proposed by WIG during stakeholder discussions, and incorporated within the City's 2010 water supply permit.

Under the flood buyout and flood mitigation programs, the City will be providing all or most of the 25% local match of the Federal Emergency Management Agency ("FEMA") flood buyout program to owners of properties within a 100-year floodplain who suffered damage from these storms. The federal government will provide the remaining 75% match. The City will supplement this program with its own flood buyout program for property owners not participating in the FEMA program, devoting $15 million in funds to the supplemental program. If additional monies for that program are needed, the City could draw up to $50 million in funds already committed by it in the Draft Revisions under the land acquisition program. Finally, the City will also provide $17 million in funding to the Catskill Watershed Corporation to allow relocation of businesses and critical community facilities from flood-prone areas to upland locations. In addition, under the Riparian Buffer Program, the City will allocate $5 million to acquire parcels in fee and by conservation easement in 100-year floodplains within the Schoharie Basin for the purpose of augmenting protection of the Basin's watercourses.

The floodplain and riparian buffer programs are major enhancements of the City's existing land acquisition program because they focus resources on acquisition of lands that present the greatest threat to water quality: lands within floodplains located in proximity to streams. Flood buyouts will result in removal of impervious surfaces and sources of pollutants that could otherwise readily migrate into streams, especially during large storm events. Riparian buffer acquisitions will prevent future development and discharges in sensitive stream corridors. Both programs have the potential to strengthen stream banks, prevent erosion, and capture and treat runoff. In addition, by assisting property owners who have been victims of flooding, the City strengthens its relationship with Watershed communities and residents. The success of much of the City's watershed control program rests on its partnership with those communities.

Other positive elements in the Draft Revisions include the City's commitment under a Revised FAD to improve the Watershed Agricultural Program by paying the stewardship and enforcement costs of the Watershed Agricultural Council ("WAC") for easements on agricultural lands through 2034, and the City's funding to implement a precision feed management program on 60 farms in the Watershed. These funding commitments taken together are needed to ensure that the pollution prevention benefits of agricultural easements are realized and that nutrient discharges from farm animals are minimized. The Draft Revisions also include significant improvements in the Stream Management Program. The City will increase its funding for existing components of this program by $10.5 million, and will contribute $10.1 million for a new program component, the Local Flood Hazard Mitigation Program. This program will help mitigate flooding hazards in Watershed communities located along streams. Such hazards are significant sources of pollutants found in flood waters. These programs, in addition to the flood land buyout and relocation programs discussed earlier, will help reduce pollution risks and loadings to Watershed streams from large storm events.

III. Threats to WOH Water Quality and Filtration Avoidance

Pathogens in drinking water can include viruses, bacteria, and protozoa, such as *Giardia lamblia*, *Cryptosporidium*, and *Escherichia coli* 01 57:H7, which can cause serious illness or death, especially among the elderly, infants and children, and people whose immune systems are compromised.[5] "Turbidity" is murkiness in the water due to the presence of suspended solids. Turbidity is associated with the transportation of pathogens and other pollutants that pose risks to public health because the suspended solid particles that contribute to turbidity act as carriers of pathogens. Turbidity also can shelter pathogens from exposure to attack by chlorine, a disinfectant routinely used to treat water to protect public health.

Because of the health risks of pathogens and turbidity, the SDWA's Surface Water Treatment Rule generally requires filtration of public drinking water unless a FAD waiving that requirement is issued by EPA or a state agency granted authority by EPA (called "primacy") to do so. To receive a FAD and maintain that waiver, the operator of a public drinking water supply system must maintain a watershed control program: "ensuring that the system is not a source of a waterborne disease outbreak;" limiting potential contamination by *Giardia lamblia* cysts and viruses, *Cryptospordium*, and fecal and total coliforms (indicators for the

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[5] In 1993, the water supply for the City of Milwaukee became contaminated with cryptosporidium causing over 400,000 people to suffer stomach cramps, fever, diarrhea and dehydration, and killing over 100 people. In August 1999, the largest outbreak of waterborne *E. coli* 0157:H7 illness in United States history occurred at the Washington County Fair in New York, when a drinking water supply well became contaminated with that pathogen, infecting 781 people, and resulting in the hospitalization of 71 people and two deaths.

presence of pathogens); and limiting raw water turbidity measurements at the unfiltered drinking water's intake to the distribution system. 40 C.F.R. §§ 141.71(a), 141.71(b).

WOH water is obtained from two subwatersheds, the Delaware and the Catskill. While Delaware water is generally of excellent quality, at times water quality in Catskill reservoirs is harmed by discharges of stormwater and other surface water flows polluted by turbidity. Turbid water conditions occur in the Catskill subwatershed when heavy rains or snow melt cause erosion of land, stream banks, and streambeds in waterbodies that feed the Schoharie and Ashokan Reservoirs. The erosion dislodges Catskill soils composed of clay and silt. Because these soils have very small particle sizes, they tend to stay suspended in water for long periods of time, giving the water a turbid, murky appearance. In light of excessive turbidity in the Catskill's Schoharie and Ashokan Reservoirs, these waterbodies are listed as impaired under Section 303(d) of the federal Clean Water Act, 33 U.S.C. § 1251 *et seq.* And DOH and EPA have concluded that problems of elevated turbidity within the Catskill system "likely represent the greatest risk to the City maintaining its filtration avoidance."[6]

Under the SDWA, turbidity cannot exceed 5 NTUs at the intake to a water supply's distribution system. 40 C.F.R. § 141.71(a)(2). The intake for Catskill water is found at Kensico Reservoir, in Westchester County. Kensico Reservoir is the most sensitive reservoir in the City's water supply system because it receives all WOH water and is a "terminal reservoir," affording minimal opportunity for pollutants to settle out before the water reaches consumers. Catskill water collects in the Ashokan Reservoir located west of the Hudson River. Water enters this reservoir primarily by flow from the Upper Esopus Creek which empties into the Ashokan's West Basin. That basin frequently allows for settling of suspended solids before the water is transferred over a weir into the East Basin which generally holds clearer, less turbid water. The East Basin water (and, when it is relatively clear, West Basin water) is then transported to the Kensico Reservoir through the Catskill Aqueduct. When exceedence of the 5 NTU limit on turbidity at Kensico is threatened, the City takes action to reduce turbidity there by introducing aluminum sulfate (alum) into the Catskill aqueduct before the water enters the Kensico. Alum is a compound that attracts and aggregates suspended particles present in the water, producing a precipitate. The precipitate then falls to the bottom of the Reservoir, thereby removing the suspended particles from the water and reducing the water's turbidity. The City is authorized to introduce alum into the Kensico Reservoir pursuant to a State Pollutant Discharge Elimination System permit issued by the State Department of Environmental Conservation ("DEC") under the

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[6] DOH and EPA, "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), p. 25.

Clean Water Act and ECL Article 17. The permit is referred to as the "Cat/Alum" permit.

Pursuant to ECL Article 17 and the Clean Water Act, DEC promulgated water quality standards for the Kensico Reservoir, classifying it as a Class AA waterbody whose best usages are: a source of safe drinking water, primary and secondary contact recreation, and fishing, and whose waters must be suitable for fish and wildlife propagation and survival. 6 NYCRR §§ 701.5; 935.6 (Table I). Turbidity in the Reservoir's water cannot exceed natural conditions, and suspended and other solids (which cause turbidity) cannot cause deposition or impair the water for its best usages. *Id.*, 6 NYCRR § 703.2.

The 2007 FAD requires implementation of a Catskill Turbidity Control program to reduce turbidity in the Catskill subwatershed. The City submitted a proposal to DOH for its Catskill Turbidity Control Program in 2008 and DOH approved the proposal in November 2010. The program includes the following elements that are intended to reduce the flow of turbid water from the Ashokan Reservoir to the Kensico Reservoir: (1) modified reservoir operations guided by mathematical models embodied in a computerized "Operations Support Tool." Modified operations include drawdown of the West Basin of Ashokan Reservoir in advance of anticipated storm events to create a void in that waterbody. The void provides the West Basin capacity to store subsequent storm flows of turbid water, avoiding the need to transfer the murky water into the East Basin and into the Catskill Aqueduct. Modified operations also include use of the Ashokan waste channel (also known as the Ashokan "release channel") in advance of and during such events also to reduce flows of turbid water to the Reservoir's East Basin and the Catskill Aqueduct; (2) construction of the Shaft 4 connection between the Delaware and Catskill Aqueducts to facilitate during storm events increased reliance by the City on less turbid drinking water from the Delaware subwatershed and less reliance on water from the Catskill subwatershed; and (3) improvements to stop shutters in the Catskill Aqueduct to enable reductions in the flow of Catksill water in the Aqueduct during high turbidity conditions without compromising the City's ability to provide water to local communities which draw water from that pipe.[7]

Removing turbid water from the City's water supply system protects the quality and healthfulness of drinking water originating in the Catskill subwatershed, and in doing so facilitates compliance with the 2007 FAD, thus helping to avert the need to build an extremely expensive filtration plant. Reducing flows of turbid water to the Kensico Reservoir also reduces the need for alum application and resulting deposition of materials in that waterbody. The deposition

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[7] *See* Gannett Fleming/Hazen and Sawyer, "Phase III Implementation Plan Catskill Turbidity Control Study," July 31, 2008; Hazen and Sawyer, "Final Report: Turbidity Control Alternatives Analysis," February 28, 2011.

can bury and kill plant and animal life at the Reservoir's bottom and impair fishing by disrupting the food chain. When deposition is reduced, the Clean Water Act's objectives of preventing deposition and impairment of the Kensico Reservoir's best usages are furthered. *See* 6 NYCRR § 703.2 (suspended and other solids may not cause deposition in the Reservoir or impair the water for its best usages).

In addition, the drawdown of the West Basin can help to avoid downstream flooding during large storm events. In anticipation of a large storm, the City can create that void by transferring water via the Catskill Aqueduct to the Kensico Reservoir. When a storm subsequently occurs, there would be more room in the Ashokan Reservoir to receive large flows of water into it from the Upper Esopus Creek. Thus, the void can reduce or prevent overfilling of the Reservoir during a large storm that could otherwise cause flooding of downstream areas.

These benefits of the Catskill Turbidity Control program come with a significant price, however. When the City releases turbid water from the Ashokan Reservoir through the waste channel and into the Little Beaver Kill, a tributary of the Lower Esopus Creek, it can cause prolonged periods when water quality standards in the Creek are violated. Water quality standards provide that the Creek's best usages are primary and secondary contact recreation and fishing, that turbidity in its water cannot exceed natural conditions, and suspended and other solids (which cause turbidity) cannot cause deposition or impair the water for its best usages. 6 NYCRR §§ 701.7, 701.8, 703.2, 861.4 (Table 1).

During and after large storm events in October and December of 2010, and Hurricane Irene and Tropical Storm Lee in August and September 2011, the City continuously released turbid water into the release channel from the West Basin. Those releases were intended to protect water quality in the Kensico Reservoir and to attenuate risks of flooding, but also resulted in sustained turbid water conditions in the Lower Esopus Creek for months at a time. Turbid conditions impaired the use of the Lower Esopus Creek, causing great concern to Lower Esopus residents, communities, businesses, and elected officials, and led EPA on January 18, 2013 to place the Lower Esopus Creek on its Clean Water Act Section 303(d) list of impaired waters. In doing so, EPA found that current regulatory requirements would not result in attainment of water quality standards for turbidity in the Lower Esopus Creek within a reasonable period of time.

It is likely that, under the Catskill Turbidity Control program, these problems will recur in the future. The City has expressed its intent to implement this program "to minimize flow from Ashokan Reservoir [to Kensico Reservoir] during turbidity events" and that it will "meet [water] demand for long periods of time without the Catskill System."[8] The large volumes of turbid Catskill water no

[8] Letter from Paul V. Rush, P.E. to Mark Klotz, P.E., dated April 1, 2011, at 5.

longer flowing to Kensico will have to go somewhere given the limited capacity for the West Basin to hold the water and the City's need to remove the turbid water from Ashokan so that it can be replaced by cleaner water following a storm event. It is the precise function of the release channel to accomplish that removal under the control program. In addition, for reasons discussed below, in the future climate change will likely result in larger and more frequent releases from the waste channel to the Lower Esopus Creek watershed.

IV. Proposed Enhancements to the Draft Revisions

A. Climate Change

There is broad scientific consensus that climate change is occurring and that recent precipitation patterns are quite different from those of fifty years ago. As the City has recently noted, in the future its water supply system "may increasingly be affected by climate change."[9] Peer reviewed research suggests that precipitation and resulting stream flows within the WOH Watershed will increase in the future for almost all months of the year[10], and in recent years the Watershed has experienced unusually severe storm events. Traditional engineering design of systems affected by hydrologic processes often assumes historical observations are an appropriate proxy for future conditions. The new climate reality renders this approach invalid; the most recent hydrologic data and projections of future climate conditions must now be incorporated in design of important infrastructure. In the Watershed and elsewhere within the State, stormwater design, floodplain delineation (which affects where new development and construction can occur), and other climate sensitive regulatory requirements and programs often use outdated precipitation data that does not represent current or likely future conditions. WIG recommends that climate change should be incorporated into the 2007 FAD, and into subsequent FADs, on an interim and long-term basis.

The 2007 FAD and Draft Revisions do not incorporate more recent climate data and do not take into account expected future changes in climate. This is true for the stormwater retrofits program (Draft Revisions at 26); State and City stormwater regulations, permits, and guidance documents governing stormwater design within the Watershed; the stream management program (*id.* at 42-47); the watershed agricultural program (*id.* at 37-39), and programs for land acquisition

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[9] plaNYC, *A Stronger, More Relient New York*, (June 2013) at 218, available at http://www.nyc.gov/html/sirr/downloads/pdf/final_report/Ch_12_WaterWaste_FINAL_singles.pdf

[10] A. Matonse, et al., "Investigating the Impact of Climate Change on New York City's Primary Water Supply," 116 *Climate Change* 437, 452 (2013); *see also NOAA Technical Report NESDIS 142-1: Regional Climate Trends and Scenarios for the U.S. National Climate Assessment, Part 1. Climate of the Northeast U.S.* (January 2013) at 20 (noting statistically significant upward trend in annual precipitation in the northeastern United States).

(*id.* at 29-31). By not taking into account more recent precipitation data and future climate change, the effectiveness of these programs is undermined, thus allowing development and other human activities to occur without taking adequate mitigation measures to protect the integrity of Watershed streams and prevent pollution.

In the field of stormwater design, until very recently, the National Weather Service "Rainfall Frequency Atlas of the United States for Durations from 30 Minutes to 24 Hours and Return Periods from 1 to 100 Years" (called "Technical Paper No. 40" or "TP-40") was used as the primary national reference to establish runoff volumes and peak flows for various storm frequencies in New York. TP-40, developed by David Hershfield, utilized rainfall data from 1940 to 1962. The Soil Conservation Service began using this data in 1962 to develop planning and design criteria for the federal Watershed Protection and Flood Prevention Program (P.L. 566, 83rd Congress and as amended). The rainfall quantities from TP-40 have long been used for designing stormwater retention and detention basins, infiltration devices, culverts, and other hydraulic structures.

But TP-40 is no longer an accurate and reliable tool for current precipitation conditions. It is now fifty years since TP-40 was issued. More up-to-date precipitation data for New York was developed by the Northeast Regional Climate Center ("NRCC") in January 2011, and is available on the NRCC's website at www.precip.net. These values can be imported into Natural Resources Conservation Service Technical Release 20, HydroCAD, and other computer models for use in Watershed evaluations and stormwater management. DEC recognizes the recent NRCC data set as an acceptable alternative to use of the TP-40 data, *see* attached letter from Carol Lamb-LaFay, P.E., dated September 30, 2013, but has not yet revised its design manual to require use of this more recent and accurate data within the State. WIG's understanding is that in administering its stormwater regulations, a component of the 2007 FAD, the City also does not compel use of the recent data.

Stormwater hydrology in the Watershed needs to be calculated using the 2011 NRCC hydrologic data and rainfall distributions. Using outdated stormwater hydrology data can result in undersized stormwater controls. Undersized stormwater treatment facilities can be overwhelmed, causing erosion and water quality violations.[11]

Research on future precipitation patterns in light of climate change is ongoing. NRCC is developing estimates of future extreme storm events across the

[11] In some instances, use of the older data could result in oversized stormwater structures. This too could have adverse consequences because construction of those structures would entail more soil disturbance than is necessary at a site, risking additional water quality impacts.

State pursuant to a grant funded by the New York State Energy Research and Development Authority. WIG understands that preliminary results for the WOH Watershed show that over the next 40 years rainfall amounts associated with 50 and 100 year storms are expected to increase by 10 to 20 percent, with larger increases possible by the end of the century.[12]

The Draft Revisions should provide for incorporation of the 2011 NRCC hydrologic data and rainfall distributions in applicable FAD programs, with an additional "margin of safety" to account for projected future climate change as appropriate under the circumstances. For example, depending upon the lifespan of a structure proposed to be constructed in the Watershed and its potential impact on water quality, siting considerations should include whether the proposed location, although outside the current floodplain, would over time likely lie within the floodplain as a result of expected increases in precipitation and extreme storm events. Site design and stormwater controls should also take into account expected future changes in precipitation patterns to ensure sufficient control of stormwater discharges. In some instances, incorporating dynamic and adaptive risk management approaches to system design, such as incorporating the ability to modify structures or systems in the future, should be employed.

B. Catskill Turbidity Control and the Lower Esopus Creek

The Catskill Turbidity Control program is a technically feasible method to achieve the vital goal of reducing Catskill turbidity. However, it can also cause, and has caused, significant adverse impacts to water quality in the Lower Esopus Creek through the sustained releases of highly turbid water from the City's water supply into the drainage basin for that creek. Such releases have resulted in prolonged violations of state water quality standards promulgated by DEC under Article 17 of the Environmental Conservation Law and approved by EPA under the Clean Water Act for the Lower Esopus, and the violations are likely to recur during large storm events in the future. Significant recurring future violations could possibly threaten sustainability of the City's watershed protection efforts.

In approving the City's proposed turbidity control program, DOH made no determination or findings concerning its adverse impacts on the Lower Esopus Creek or whether there are feasible alternatives for Catskill turbidity control that would avoid such impacts. Neither do the Draft Revisions. While the Draft

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[12] Personal communication with Art DeGaetano, Professor in the Department of Earth and Atmospheric Sciences and Director of the Northeast Regional Climate Center, Cornell University, dated November 7, 2013; *see also* DeGaetano, A.T., "Time-Dependent Changes in Extreme-Precipitation Return-Period Amounts in the Continental United States," 48 *J. Appl. Meteor. Climatol.* 2086 (2009) (showing a trend to more frequent extreme precipitation events).

Revisions call for an expert panel to review the effectiveness of the program's Operations Support Tool "in mitigating the effects of elevated turbidity *in the reservoir system,*" that review does not address mitigation of turbidity in the Lower Esopus Creek which lies outside the reservoir system, and the proposed review does not provide for a determination by DOH whether there are feasible alternatives to the Catskill turbidity control program that would avoid or lessen adverse impacts to the Creek.

WIG recommends that the Draft Revisions provide for such a determination, to be preceded by a City-funded study by independent outside experts that considers alternatives for Catskill turbidity control and their impacts on the Lower Esopus Creek. The expert panel should be convened by DOH in consultation with EPA.[13] While DOH's charge is to administer filtration avoidance under the SDWA to achieve safe public drinking water, it also has discretion to tailor its FAD determinations to prevent harm to water quality that would undermine the objectives of other federal and state laws, such as the Clean Water Act and Article 17 of the Environmental Conservation Law, a state law that implements the Clean Water Act and falls within its savings clause. As explained by the court in *Hudson River Fishermen's Ass'n v. City of New York*, 751 F.Supp. 1088, 1099 (S.D.N.Y 1990):

> The objective of the Clean Water Act is to preserve the environmental integrity of navigable waters, while the objective of the Safe Drinking Water Act is to prescribe minimum national standards concerning the purity of drinking water for the protection of the public health. Neither of these objectives are mutually exclusive.

As noted by the court in *Bath Petroleum Storage, Inc. v. Savas*, 309 F. Supp.2d 357, 371 (N.D.N.Y. 2004), "[t]he CWA and SDWA are in fact complementary and must be implemented together." With that principle in mind, consideration by DOH of the turbidity control program's impacts on the Lower Esopus Creek utilizing outside experts would complement DEC's efforts to address those impacts in the consent order it recently entered into with the City to resolve violations of the Cat-Alum permit. *See Matter of New York City Department of Environmental Protection*, DEC Case No.: D007-0001-11 (consent order dated October 4, 2013). The consent order provides for an environmental review process

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[13] City funding for review to be performed by other government agencies is already provided for in the 2007 FAD. *See* 2007 FAD, at 44 ($500,000 for WOH localities to review and comment on proposed City land acquisitions). WIG expects that City funding for expert review concerning Catskill turbidity control could exceed that $500,000 amount. To avoid even the appearance of any conflict of interest, the City should not request a third-party to procure those experts or otherwise participate in their selection. *Compare* Draft Revisions at 58.

under SEQRA to address Lower Esopus impacts, and to consider alternatives to the release channel to reduce turbidity in that waterbody along with mitigation measures.

Independent outside experts secured by DOH could play an important role in providing the specialized technical knowledge needed for that environmental review. The City should be commended for devoting substantial resources in developing the Turbidity Control program, which relies on specialized outside expertise in the fields of water supply engineering, turbidity control and mathematical modeling. However, DOH does not have equivalent specialized expertise on staff in these subject areas.[14] In particular, reliable and accurate modeling "is the key to selection of the design and operational approach" for Catskill turbidity control, as an outside review procured by the City's Office of Management and Budget concluded.[15] Complex models "are often impervious creatures, insulated by their sheer complexity, seeming definitiveness, and extensive reliance on modeler judgment."[16] City funding for outside experts is needed for regulatory review because achieving a detailed understanding of the complex modeling and other aspects of the issues requires specialized expertise that is usually costly.[17] And the need for independent expert review is buttressed by concerns previously raised regarding the City's modeling.[18] Independent review can help DOH evaluate whether the City has sufficiently addressed those concerns. In sum, outside expertise would enhance and strengthen the information available to

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[14] The technical complexity of the models relied on by the City are reflected in its *CAT 211 Phase III Final Report Catskill Turbidity Control Study* (2007) ("Phase III Study"), which employed four interrelated models to make recommendations for the control program. The Environmental Fluid Dynamics Code is a 3-dimensional, hydrothermal/transport water quality model. The CE-QUAL-W2 is a 2-dimensional hydrothermal/transport water quality model that was run on the Schoharie Reservoir, the Ashokan Reservoir West Basin, the Ashokan Reservoir East Basin, and the Kensico Reservoir. OASIS is a resource operations/water supply model. And the Ashokan East Basin 3-D Water Quality Model was run to assess water quality performance for proposed diversion wall improvements.

[15] Olympic Associates, *et al.*, *Value Engineering Study: Catskill Turbidity Phase III, City of New York Office of Management and Budget* (January 2008) ("Value Engineering Study") at 4. This study did not address impacts to the Lower Esopus Creek.

[16] Matthew W. Swinehart, "Remedying Daubert's Inadequacy in Evaluating the Admissibility of Scientific Models Used in Environmental-Tort Litigation," 86 *Tex. L. Rev.* 1281, 1293-94 (May 2008).

[17] *See, e.g.*, James D. Fine and Dave Owen, "Technocracy and Democracy: Conflicts Between Models and Participation in Environmental Law and Planning," 56 *Hastings L.J.* 901, 976 (2005).

[18] The Value Engineering Study noted the City modeling's "difficulty predicting turbidity during high events," expressed concern about the absence of a formal sensitivity and uncertainty analysis in the Phase III Study, and recommended use of better meteorological data and consideration of incorporating a "time series" approach into the modeling. Value Engineering Study at 4, 77-79, 85.

DOH and DEC for decision making in the complementary but complex tasks of securing safe drinking water from the Watershed while avoiding harm to downstream waters.[19]

V. Conclusion

The WIG Office appreciates this opportunity to comment on the Draft Revisions and looks forward to working with DOH, EPA, and other Watershed regulators and stakeholders in finalizing the revisions.

Respectfully submitted,

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[19] The City would need to make its models and related data available to the outside experts to the extent they need the information for their review. *See Novartis Corp. v. Ben Venue Laboratories, Inc.*, 271 F.3d 1043, 1053-54 (Fed. Cir. 2001) (computer model must be fully disclosed); *In re Delta Smelt Consolidated Cases*, 2010 WL 2520946, *20 - *21 (E.D. Cal. 2010) (requiring supplementation of administrative record to include mathematical model concerning temperature impacts of state water projects on fish mortality); *Lands Council v. Powell*, 379 F.3d 738, 749-50 (9th Cir. 2004) (NEPA requires full disclosure of modeling information in environmental impact statement). The need for model transparency was emphasized by Columbia University Professor Peter Kolesar in a peer review workshop concerning the City's Operations Support Tool held in February 2011. *See* NYCDEP Operations Support Tool Expert Panel Workshop Comments from Expert Panel Members, March 24, 2011, p. 12.

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September 30, 2013

Mr. Charles Silver
NYS Office of the Attorney General
Environmental Protection Bureau
The Capitol
Albany, NY 12224-0341

Dear Mr. Silver:

I am writing to you in response to your inquiry as to the Department's position with regard to the use of updated precipitation data in the design of stormwater management practices. The New York State Stormwater Management Design Manual, August 2010 (Design Manual), includes a provision that allows designers to use the most recent rainfall frequency values developed by acceptable sources. Hydrologic data and rainfall distributions published by the Northeast Regional Climate Center (NRCC) in January 2011 on their website www.precip.net is considered to be an acceptable alternative to using the isohyets maps for required design storms presented in the Design Manual.

If you have any questions or need further clarification, please contact me at 518-402-8123 or calambla@gw.dec.state.ny.us.

Sincerely,

Carol Lamb-LaFay, P.E.
Chief, Stormwater Permits Section
Bureau of Water Permits

ecc: P. Bein, OAG