

CITY OF NEW YORK
DEPARTMENT OF ENVIRONMENTAL PROTECTION

**DROUGHT MANAGEMENT AND
CONTINGENCY PLAN**

(Supersedes Drought Management Plan and Rules dated December 29, 1998)

October 1, 2012

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DROUGHT MANAGEMENT CONTINGENCY PLAN

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INTRODUCTION

The City of New York (the City), through its Department of Environmental Protection (DEP), owns and operates the New York City Water Supply System (Water Supply System), which supplies high quality drinking water to the City and many communities in Westchester, Putnam, Orange, and Ulster counties. The City's Water Supply System is comprised of a surface water system and a groundwater system. The surface water system is comprised of three source-water reservoir systems—Croton, Catskill, and Delaware—which include 19 reservoirs and three controlled lakes that have a collective storage capacity of approximately 580 billion gallons. Typically, the Catskill and Delaware systems provide approximately 40 and 60 percent of the total daily supply, respectively. In recent years, the Croton System has taken on a reserve role. The major components of the systems are shown in Figure 1, and their capacities are listed in Table 1. The groundwater system, which is located in southeast Queens County, consists of 68 wells and has a New York State Department of Environmental Conservation (NYSDEC) permitted capacity of approximately 68 million gallons per day (MGD) on an annual basis. Many of these wells require treatment systems that are currently not in place. The City also has several interconnections between private water utilities in Nassau County, which may be available in an emergency.

In addition to the tunnels, aqueducts and the three reservoir systems, there are features within the Water Supply System that allow for contingency and emergency operations. Several interconnections exist between the reservoir systems. Through these interconnections, water can be transferred from one reservoir system to another in response to localized water quality or quantity concerns. In 1996, the City acquired the former Jamaica Water Supply Company wells located in Queens County. These wells have not been used for several years and require rehabilitation. In a drought or during other water supply needs, DEP would look to maximize the use of the wells to supplement the surface water supply. A pumping station in Chelsea, New York, which is capable of drawing water from the Hudson River, may be available to augment the water supply by 100 MGD under emergency conditions.

The City observes a “water-year,” which runs from June 1 to May 31. Using historical data, a profile of typical system-wide storage levels has been established. Using this profile, criteria have been developed to assess the probability of achieving reservoir refill by the start of the succeeding water year using historical data, hydrologic forecasting, and a sophisticated computer modeling tool (Operations Support Tool). These criteria are used to identify potential or impending drought conditions that fall within one of three phases: Watch, Warning, or Emergency. DEP monitors and records daily reservoir storage levels, inflow, and releases. These

conditions are reviewed and regularly compared with the criteria to forecast the probability of achieving adequate reservoir levels to serve the consumers throughout the coming water year.

In the event that this comparison reveals emerging and worsening drought conditions, the operators of the Water Supply System can implement the contingency and emergency operations to supplement the water supply. Conservation measures will also be taken to reduce the demand for water. These measures can slow the depletion rate of the stored water and potentially postpone or eliminate the threat of serious shortage.

OBJECTIVE OF PLAN

The objective of this plan is to establish actions and procedures for managing water supply and demand during drought conditions. The plan enables DEP to maintain essential public health and safety, and minimize adverse impacts on economic activity, environmental resources and the region's lifestyle. The City's water supply options and controls are described in the following pages.

Figure 1
New York City Water Supply System



MANAGEMENT STRATEGY

DEP utilizes the following for water supply management:

- Monitoring current conditions
- Forecasting
- Communication and Coordination with Other Agencies
- Operational Adjustments
- Curtailment Actions
- Alternative Water Supplies

Monitoring Current Conditions

To deal with hydrologic uncertainty in real-time and in longer term planning horizons, DEP uses a number of available informational and data gathering sources.

Forecasting

The National Weather Service, in cooperation with the City, is working to develop and improve the probabilistic streamflow (reservoir inflow) forecasts that are used in the City's Operations Support Tool (OST) model to perform water system performance analysis. Probabilistic streamflow forecasts are critical in helping to quantify water supply reliability. In addition, streamflow forecasts aid water managers in developing robust long-term operating strategies for the water system. There are essentially two types of forecasts that are used in system modeling: (1) forecasts based solely on historical streamflow observations and (2) forecasts based on a combination of historical information, estimates of current meteorologic, hydrologic and climatic conditions, and meteorological forecast information. In OST, forecasts are used to inform real-time day-to-day operating decisions and to evaluate the near-term (up to a year) expected benefits of alternative operating strategies.

Communication and Coordination with Other Agencies

Close coordination between City and New York State (the State) officials is required as drought conditions become evident and as they worsen. When conditions indicate difficulty in achieving appropriate storage levels in the reservoirs, the City notifies the New York State Drought Management Task Force (Drought Task Force), the New York State Disaster Preparedness Commission (NYSDPC) and any other State authorities responsible for coordinating preparations for an imminent drought period.

The State has a Statewide Drought Response Plan. To best address the needs of the different regions of the State, the State has been subdivided into different drought management regions. Since the City's watersheds are a significant portion of the State, the Water Supply System has

its own subdivision designation, which is Drought Region IIA. Accordingly, the Statewide Drought Response Plan includes the New York City Department of Environmental Protection Drought Management and Contingency Plan (NYC Plan). Pursuant to the requirements of the New York State Sanitary Code, the NYC Plan has been submitted to the New York State Department of Health (NYSDOH) as part of DEP's Water Supply Emergency Plan.

The reservoirs of the City's Delaware system impound the headwaters of the Delaware River and as a result, the City and the State, along with the states of Delaware, New Jersey, and Pennsylvania, are parties to a Supreme Court Decree (Decree) which dictates the relationship of these parties pertaining to the use of the Delaware River. The Decree is administered in part by the Delaware River Master. The states of Delaware, New Jersey, New York, Pennsylvania and the United States of America comprise the Delaware River Basin Commission (DRBC). The City serves as an advisor to the State for DRBC issues. DRBC and the parties to the Decree have established a drought response plan, which is part of the Delaware Basin Water Code and is based upon a different set of criteria than that of the NYC Plan, but which constrains the City in certain regards (which are reflected in the NYC Plan). The DRBC criteria are tied to certain storage levels in the City's Delaware basin reservoirs. The City and DRBC maintain close coordination in the implementation of either of these management plans.

In addition to the communications noted above, throughout this plan are references to communication to customers, stakeholders and the media. Information contained in this plan regarding communications is only guidance. It may be appropriate to do more or less communication depending on the particular circumstances of the drought.

Curtailment Actions

Customers may be asked to take actions to curtail their use of water during a drought. Those actions will depend on the phase implemented at the time.

Alternative Water Supplies

Depending on the nature and timing of a drought, alternative or emergency water supplies may be useful to supplement existing supplies.

DROUGHT PHASES

The NYC Plan has three levels of severity: Watch, Warning, and Emergency, which are invoked sequentially as conditions dictate. Emergency is further subdivided into three stages with increasingly severe mandated use restrictions, with the possibility of a Stage III Emergency being declared immediately upon the occurrence of certain conditions, as more fully explained below. Guidelines have been established to identify when a Watch, Warning or Emergency should be declared and the appropriate responses should be implemented. These guidelines are based on factors such as prevailing hydrological and meteorological conditions, as well as certain operational considerations, such as current storage capacity and projected demands. In some cases, other circumstances, such as low storage or operational constraints, may influence the timing of drought declarations.

Watch

A Watch stage is declared when there is less than a 50% probability that either of the two largest reservoir systems, the Delaware (Cannonsville, Neversink, Pepacton, and Rondout reservoirs) or the Catskill (Ashokan, and Schoharie reservoirs), will fill by the start of the water-year.

Warning

A Warning stage is declared when there is less than a 33% probability that either of the two largest reservoir systems, the Delaware (Cannonsville, Neversink, Pepacton, and Rondout reservoirs) or the Catskill (Ashokan, and Schoharie reservoirs), will fill by the start of the water-year.

Emergency

An Emergency stage is declared when there is a reasonable probability that, without the implementation of stringent measures to reduce consumption, a protracted dry period would cause the City's reservoirs to be drained resulting in a shortage of water. This probability is estimated during dry periods in consultation with the Drought Task Force and the NYSDPC. The estimation is based on analyses of the historical record, the pattern of the dry period months, water quality, sub-system storage balances, delivery system status, system construction, maintenance operations, snow cover, precipitation patterns, use forecasts, and other factors. Because no two droughts have identical characteristics, no single probability profile can be identified in advance that would generally apply to the declaration of an Emergency.

Exit Strategy for Phase

As soon as actual and forecasted supply conditions substantially improve, DEP will either inform the public of the return to normal use of water, or inform them that the utility is moving from one stage to a lesser stage of this plan. This latter process would occur until there was a return to normal operations. Stages could be skipped in this process as conditions and forecasts warrant.

ACTIONS AND RULES

When it becomes apparent that the probability of reservoir refill is approaching the Watch criteria, DEP will initiate the following actions:

- Review the NYC Plan
- More closely monitor City reservoir and watershed conditions
- Coordinate with upstate communities
- Coordinate with NYSDOH, NYSDEC, DOHMH, and DRBC

As conditions dictate the declaration of the successive phases of the NYC Plan, certain actions are to be implemented. For a Watch stage, DEP responses are primarily operational, while activities that involve the consumer community are primarily informative and voluntary. For a Warning stage, voluntary use restrictions are heightened and other City agencies are required to modify their operations. When an Emergency stage is declared, rules and sanctions for failure to comply with the rules are imposed. The details of the specific responses to each of the phases follow.

WATCH

When a Watch is declared, the following actions are taken by DEP, if applicable:

1. Apprise NYSDOH, NYSDEC, DOHMH, upstate communities, and DRBC on system status.
2. Institute a drought awareness media campaign within the City and regionally.
3. Maximize Croton water usage, where feasible:
 - In-City distribution (the Croton Water Treatment Plant will be commissioned in 2013)
 - utilize Croton Falls and Cross River pump stations, if necessary (requires NYSDOH approval)
 - implement pumping into the Catskill Connection at the New Croton Reservoir, if necessary (requires NYSDOH approval)
4. Initiate planning to commence output of groundwater wells in Queens County. Initiate actions in preparation for treatment and activation of other available wells, including, as appropriate, identifying the potential for emergency contract procurement.
5. Expand leak detection, leak repair and hydrant surveillance programs.
6. Budget for future resources to be used if drought conditions escalate.

7. Advise upstate communities of the situation and request their cooperation in water conservation efforts.
8. Initiate dialogue with the New York City Mayor's Office and other City agencies concerning actions to be taken if a "Warning" is declared.
9. Contact each of the following agencies to confirm that Standard Operating Procedures (SOPs) for water demand management under water supply shortage warnings and emergencies are in place and reviewed: New York City Department of Sanitation (DSNY); New York City Police Department (NYPD); New York City Fire Department (FDNY); New York City Department of Parks & Recreation (DPR); New York City Department of Citywide Administrative Services (DCAS); New York City Housing Authority (NYCHA); New York City Department of Housing Preservation & Development (HPD); New York City Department of Education (DOE); New York City Department of Health and Mental Hygiene (DOHMH); and Metropolitan Transportation Authority (MTA).

WARNING

When a Warning is declared, all of the actions that are implemented during a Watch become enhanced, and these additional actions are implemented, if applicable:

1. Request voluntary water use restrictions.
2. Develop plans and commence activities to prepare the Chelsea Pumping Station for operation.
3. Commence operation of standby wells in Queens County to increase the daily system output. Prepare additional standby wells in Queens County for operation.
4. Continue maximizing Croton water use.
5. Coordinate with upstate communities to initiate appropriate water use restrictions.
6. Reduce fleet washing activities and reduce water usage at DEP facilities.
7. Coordinate the following actions with other City agencies: **
 - *DSNY* - suspend all street flushing activities and reduce fleet washing;
 - *NYPD and FDNY* - assist closing illegally opened hydrants and reduce fleet washing;
 - *DPR* - limit water use for fountains and golf courses, and stop providing make-up water for artificial ponds and lakes, unless they are fish or wildlife habitats;

** NOTE: the above listing of agency activities is not to be construed as a comprehensive itemization of all activities, but rather a summary of the major agency responsibilities.

- *NYCHA and HPD* - request plumbing leak surveys and appropriate repair work; seek installation of low flow devices; restrict lawn watering;
- *MTA* - reduce fleet washing activities;
- *DOE* - initiate drought awareness programs for students;
- *DCAS* - conduct leak survey and leak repair activities where necessary at City facilities and cease building washing activities; and
- *DOHMH* - approval for providing additional supply from groundwater wells and assistance in notifications to food service establishments for any restrictions of water use.

EMERGENCY

When an Emergency is declared, drought rules are implemented, which direct and restrict the use of water. Additional actions are also undertaken by DEP and other City agencies. There are three successive stages of emergency in the Emergency phase. Each stage represents an increase in regulatory activity commensurate with the severity of the drought conditions. As each successive Emergency stage is declared, specific water use regulations and corresponding sanctions are imposed. The rules for Stages I-III are outlined below. Since Stage IV conditions have not been experienced, rules have yet to be developed for such an occurrence. In the event that Stage IV conditions are imminent, appropriate rules will be developed and enacted.

Listed below are the general actions to be undertaken by DEP and other City agencies during an Emergency and the specific regulations that would be imposed during each stage of an Emergency.

DEP actions during an Emergency, if applicable:

1. Implement and enforce Stages I-III Emergency Rules, as appropriate.
2. Implement public communication and education program for residents, businesses, and industry commensurate with the Emergency stage.
3. Continue maximizing Croton water use, up to 250 MGD.
4. Continue leak detection efforts and reevaluate leak backlog; determine what resources need to be allocated to rectify all identified leaks.
5. Work with DPC and invoke provisions of upstate Water Supply Agreements to compel upstate communities to implement regulations/measures, which are consistent with those in effect in the City.

6. Obtain any necessary permits, complete necessary rehabilitation and commence operational activities at remaining standby groundwater wells in Queens County, and increase the daily system output to approximately 68 MGD, or maximum feasible amount.
7. Evaluate and implement system distribution changes where feasible to maximize conservation to the greatest extent practical.
8. Conduct leak and waste inspections in private buildings using *water use inspectors*.
9. Include conservation notices with water and sewer billings.
10. Obtain NYSDOH and NYSDEC permits and activate the Chelsea Pumping Station (Stage III only).
11. Increase customer assistance and restriction enforcement capacity.
12. Comply with the declared stage water use restrictions.
13. Implement established Emergency Rate Structure for Stage I, II, and III, as appropriate.

All City agencies are to comply with the declared Stage water use restrictions. Actions to be performed by other City agencies during an Emergency, in addition to what is required during Watch and Warning stages:^{***}

1. *DCAS* – assign building inspectors to conduct leak surveys in private buildings.
2. *FDNY* – conduct leak and waste reports during routine fire inspections of buildings.
3. *NYCHA and HPD* – encourage voluntary installation of low flow fixtures.

Emergency Rules

Summaries of the specific rules for each Drought Emergency stage are provided below. It should be noted that the full text of these rules appear at Title 15 of the Rules of the City of New York, Chapter 21, “Drought Emergency Rules.”

Definitions

- *Acceptable Irrigation Controller*. “Acceptable Irrigation Controller” means a microprocessor-based controller for the valve(s) of an irrigation system that can be programmed for the various time and date intervals set forth in § 21-09(e), 21-10(e) and 21-11(e) of these Rules, and that incorporates a rain sensor, soil moisture sensor or evapo-transpiration control.
- *Active Source*. “Active source” means any sprinkling device or system and any device that delivers water under pressure.

^{***} See NOTE on previous page

- *City*. “City” means the City of New York.
- *City water*. “City water” means water supplied by or taken from the City water system.
- *City water system*. “City water system” means the City water supply system.
- *Commissioner*. “Commissioner” means the commissioner of the department or his or her designee or successor in function.
- *Department*. “Department” means the New York City Department of Environmental Protection or its successor in function.
- *Drought emergency*. “Drought emergency” as declared by the commissioner, exists when, in the opinion of the commissioner, there is a reasonable probability that without the implementation of stringent measures to reduce consumption, a protracted dry period would cause the City's reservoirs to drop to levels that would threaten public health and safety.
- *ECB*. “ECB” means the New York City Environmental Control Board.
- *Health care facilities*. “Health care facilities” means hospitals, hospices, medical clinics, physician's offices, nursing homes or any other facility caring for persons who are ill, aged or infirm, where, in the opinion of the commissioner, relief from the prohibition contained in § 21-10(j) is necessary to protect the health and well-being of such persons.
- *Non-turf plants*. “Non-turf plants” means all plants excluding turf.
- *Turf*. “Turf” means grasses used as ground cover or lawn.
- *Water-conserving Irrigation System*. “Water-conserving Irrigation System” means an irrigation system that delivers water at low pressure and low flow rate directly to the roots of non-turf plants, including trees, such as “drip irrigation systems,” “soaker hoses,” or “Tregators.”
- *Well water*. “Well water” means water drawn from a subsurface well under permit from the New York City Department of Health and/or the New York State Department of Environmental Conservation.

Sanctions

- (a) Violations of the rules or any variances granted pursuant to § 21-04 of the rules, shall be punishable by fines and penalties established by Administrative Code, Sections 24-337 and 24-346, and may be returnable before the Environmental Control Board of the City of New York.
- (b) In addition to any penalties that may be imposed by the Environmental Control Board, where a leak and waste notice has been served in accordance with Section 24-337 of the Administrative Code and the condition to which such notice relates has not been corrected, a fine of up to fifty dollars per day may be imposed by the Commissioner.
- (c) A flow restrictor may be installed or water service may be terminated for violation of any provision of the rules for any waste of water.

Variances

- (a) The Commissioner may appoint a “Drought Emergency Variance Board” (the “Variance Board”) for the purpose of entertaining requests for variances from compliance with any of the requirements of the rules contained in this chapter. Variance Board members shall only be appointed from the personnel of the Department or the New York City Water Board.

- (b) Any person or entity applying for a variance must submit a notarized application for a variance to the Variance Board. The applicant must demonstrate, at a minimum, to the satisfaction of the Variance Board:
- (1) that compliance with such rules would result in an undue hardship;
 - (2) that there are no reasonable alternatives;
 - (3) that the applicant has taken and will take all possible measures to conserve water, with a complete description of such measures and the water savings to be effected; and
 - (4) that such variance is not inconsistent with the purpose of such rules.
- (c) The Variance Board may grant a variance relieving a person or entity from compliance with the requirements of the rules in this subchapter. In connection with any variance that may be granted, the Variance Board shall impose such terms and conditions as deemed appropriate. Requests for variances shall be processed in a timely fashion, and determinations shall not be unreasonably withheld or delayed. The filing or pendency of a variance application shall not relieve any person or entity from complying with these rules, and shall not immunize any person or entity from any civil or criminal prosecution or sanction under the rules.
- (d) Variance application forms may be obtained at 59-17 Junction Boulevard, Flushing, NY 11373, or by calling 311.
- (e) Appeals.
- (1) An applicant may appeal the denial of a variance issued by the Variance Board under the rules of this subchapter by filing a notarized petition in writing with the Commissioner within thirty (30) days of the date the denial notification was mailed. The appeal shall state the name and address of the petitioner and shall include a short and plain statement of the matters to be adjudicated, identifying the variance sought by the petitioner with citation to the applicable provisions of such rules, the proposed location of the activity, and the date of the Variance Board's denial. A copy of the denial notification being appealed shall be attached to the petition.
 - (2) The applicant may appeal only the issue of whether the Variance Board abused its discretion in denying a request for a variance or in imposing a substantial condition in a grant of a variance.
 - (3) Upon review of any appeal filed pursuant to § 21-04(e), the Commissioner may, in his/her discretion, grant a variance relieving a person or entity from compliance with any of the requirements of the rules. In connection with any variance that may be granted, the Commissioner may impose such terms and conditions as deemed appropriate. Appeals shall be processed in a timely fashion, and determinations shall not be unreasonably withheld or delayed.

(4) The filing of an appeal shall not relieve the petitioner from complying with any requirements of the rules of this subchapter, and shall not immunize any person or entity from any civil or criminal prosecution or sanction authorized under such rules.

(f) The Commissioner may delegate to personnel of the Department or of the New York City Water Board any or all of his or her powers relating to the Drought Emergency Rule variances and/or appeals thereof.

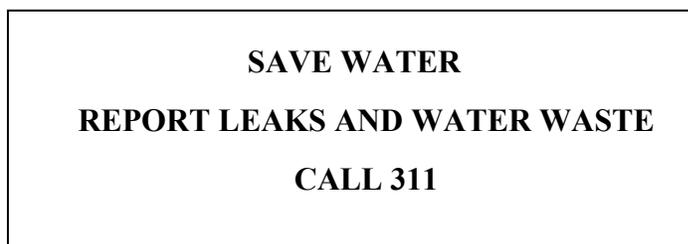
Drought Emergency Rate Plan

At any time after the actual declaration of a Phase I Drought Emergency, the Commissioner may recommend and request that the New York City Water Board consider the adoption of a drought emergency contingency rate plan that conforms with § 24-360 of the Administrative Code of the City of New York. Such rate plan shall have as its goal the creation of enhanced incentives for water conservation by increasing the cost of city water by such amounts, and for such duration, as the Commissioner may recommend and which the Water Board in its sole discretion shall consider appropriate.

“Save Water” Signage

“SAVE WATER” signs shall be prominently displayed in every building or premises connected to the city water system or in which city water is used and it is the responsibility of every such person or entity owning, using, leasing, managing, operating or controlling any such building or premises to assure the signs are properly posted. This does not apply to one-, two-, three-, or four-family dwellings.

The sign should be not less than 6 inches by 9 inches in size and the heading “SAVE WATER” should be in letters not less than 3/4 of an inch in height. It must include the following language and may include other water conservation artwork or language:



Such signs shall be prominently posted in the following locations:

- Multiple dwellings. In multiple dwellings (five units or more): At each entrance, near mailboxes, in each elevator and on each floor.
- Hotels. In hotels: At each entrance, near each check-in desk and cashier, near each entrance to each restaurant or other public eating place, in each elevator, in the public hallway on every floor and in each bathroom (except signs in private bathrooms in individual hotel rooms may be reduced to three inches by five inches in size).
- Hospitals. In hospitals: At each entrance, in each elevator, on every floor by an elevator, in each bathroom and shower room, in each laboratory, and in each restaurant or cafeteria.

- Office buildings. In office buildings: At each entrance, in each elevator, on every floor by an elevator, in each bathroom and in each dining room or cafeteria or other places where food is sold.
- Restaurants. In restaurants: In each bathroom and at each table (except signs at tables may be reduced to three inches by five inches in size).
- All other nonresidential buildings. In all other nonresidential buildings, including all commercial and industrial buildings: At each entrance, in each elevator, on every floor by an elevator, in each bathroom and shower room, above each sink or group of sinks, in each eating area and in the work area of every process or operation using any water.

“Water-Conserving Irrigation System” Signage

“WATER-CONSERVING IRRIGATION SYSTEM” signs shall be prominently posted at every building or premises in which city water is used in Water-conserving Irrigation Systems for the irrigation of non-turf plants. It shall be the responsibility of every person or entity owning, using, leasing, managing, operating or controlling any such building or premises to assure the signs are properly posted.

The sign should be not less than 6 inches by 9 inches in size and must be prominently posted at the watering location indicating that a Water-conserving irrigation system is in use. It must include the following language and may include other water conservation artwork or language:

**SAVE WATER
WATER-CONSERVING IRRIGATION
SYSTEM IN USE
REPORT LEAKS AND WATER WASTE
CALL 311**

Well Water Use Prohibition Exceptions

No person shall cause, permit or allow the use of well water for any purpose for which the use of city water is prohibited unless:

- Such installation is covered by a valid permit from DOHMH; and
- There are no cross-connections and all swing-joint connections have been replaced by permanent rigid piping or the connection to the City system has been sealed; and
- Signs are prominently displayed, not less than 8.5 inches by 11 inches in size with lettering not less than 1 inch in height, bearing the following wording including the permit number:

**PRIVATE WELL WATER IN USE
HEALTH DEPARTMENT PERMIT No. ____**

Drought Emergency Rules: Stage I

Upon declaration of the Commissioner of a Stage I Drought Emergency, no person shall cause, permit or allow the use of public water:

- (a) The continuing of any leak or waste from any water pipe, valve, faucet, conduit, equipment, facility or device connected to the city water system, or that utilizes city water, on or in any premises owned, used, leased, managed, operated or controlled by such person or entity;
- (b) The use of city water to wash any vehicle (including any aircraft, watercraft or land vehicle whether on- or off-road), provided that this provision shall not be construed to prohibit the reasonable use of city water for washing of such vehicles where mandated by law or for health or safety purposes;
- (c) The use of city water to spray, wash or wet any hard or paved surfaces, including, but not limited to, streets, sidewalks, driveways, outdoor areaways (including any recreational areas, whether at ground level or on a structure), parking areas or outdoor steps. This provision, however, shall not be construed to prohibit the washing of such surfaces, particularly the exterior surface of a building, where such washing is required as part of repairs mandated by the Administrative Code or to protect the health and safety of the public, assuming such use is consistent with the provisions set forth in § 24-332 of the Administrative Code of the City of New York and § 20-08(a)(5) of Title 15 of the Rules of the City of New York;
- (d) The use of city water for any ornamental or aesthetic purpose, including, but not limited to, use in fountains, artificial waterfalls, reflecting pools, lakes and ponds, unless the pond or lake is a habitat for animals living in such body of water prior to the declaration of a drought emergency. In the case where city water is not used, a sign not less than 6 inches by 9 inches must be prominently posted at the location indicating that the water being used in such fountain, waterfall, pool, lake or pond is not city water;
- (e) In accordance with the provisions set forth in § 20-08(a)(5) of Title 15 of the Rules of the City of New York, the use of city water by means of a hose or other active source to water any turf or any non-turf plants, except that:
 - (1) city water may be used to water any turf, except for golf course fairways, from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m., on the following schedule:
 - (i) At even numbered addresses, city water may be so used during the above-specified hours on even-numbered days of the month;
 - (ii) At odd-numbered addresses, city water may be used during the above-specified hours on odd-numbered days of the month.
 - (2) newly seeded or newly sodded turf (excluding golf course fairways) or newly planted non-turf plants, may be irrigated with city water, in addition to the scheduled times in (e)(1)(i) and (ii), on the day of planting and for the two days following planting;

(3) if hand-held hoses equipped with nozzle tips or in-line flow regulators, or water conserving irrigation systems that effectively limit water output to a maximum flow rate of five gallons per minute are utilized, city water may be used to water non-turf plants from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m. on the following schedule:

(i) At even numbered addresses, city water may be used during the above specified hours on even-numbered days of the month;

(ii) At odd-numbered addresses, city water may be used during the above specified hours on odd-numbered days of the month;

(4) If hand-held containers or a water conserving irrigation systems with an acceptable irrigation automatic controller is utilized, city water may be used for any two two-hour periods on the appropriate day of the month as set forth above, provided that, for water-conserving irrigation systems, these time periods are indicated on the signage mandated by § 21-07 of these Rules;

(f) The opening or use of any fire hydrant, or of the city water therefrom, for any purpose other than fire protection, except in accordance with the terms and conditions set forth in a permit obtained from the Department, in accordance with the provisions set forth in § 20-08(b) of Title 15 of the Rules of the City of New York;

(g) The serving of water from the city water system to any patron of a restaurant, club, hotel, cafe, cafeteria or other public place where food is served or offered for sale, unless specifically requested by such patron;

(h) The use of city water to fill or maintain the water level in any swimming pool, except that pools operated with recirculating equipment may be filled with city water once during each calendar year and may thereafter use the minimum amount of city water necessary to maintain the water level at a level no greater than that necessary to ensure continued operation of such recirculating equipment;

(i) The use, or the maintaining so as to be capable of use, of any shower head in any residential building or premises, or in any nonresidential building or premises, including any commercial or industrial building or premises, unless it flows at a maximum rate of 2.5 gallons of water per minute at a constant water pressure of eighty pounds per square inch.

Drought Emergency Rules: Stage II

Upon declaration of the Commissioner of a Stage II Drought Emergency, no person shall cause, permit or allow:

(a) The continuing of any leak or waste from any water pipe, valve, faucet, conduit, equipment, facility or device connected to the city water system, or that utilizes city water, on or in any premises owned, used, leased, managed, operated or controlled by such person or entity;

- (b) The use of city water to wash any vehicle (including any aircraft, watercraft or land vehicle whether on- or off-road), provided that this provision shall not be construed to prohibit the reasonable use of city water for washing of such vehicles where mandated by law or for health or safety purposes;
- (c) The use of city water to spray, wash or wet any hard or paved surfaces, including, but not limited to, streets, sidewalks, driveways, outdoor areaways (including any recreational areas, whether at ground level or on a structure), parking areas or outdoor steps. This provision, however, shall not be construed to prohibit the washing of such surfaces, particularly the exterior surface of a building, where such washing is required as part of repairs mandated by the Administrative Code or to protect the health and safety of the public, as determined by the Commissioner, assuming such use is consistent with the provisions set forth in § 24-332 of the Administrative Code of the City of New York and § 20-08(a)(5) of Title 15 of the Rules of the City of New York;
- (d) The use of water from any source for any ornamental or aesthetic purpose, including, but not limited to, use in fountains, artificial waterfalls, reflecting pools, lakes and ponds, unless the pond or lake is a habitat for animals living in such body of water prior to the drought emergency;
- (e) In accordance with the provisions set forth in § 20-08(a)(5) of Title 15 of the Rules of the City of New York, the use of city water by means of a hose or other active source to water any turf or any other non-turf plants, except that:
 - (1) newly seeded or newly sodded turf (excluding golf course fairways) or newly planted non-turf plants may be irrigated with city water on the day of planting and for the first day following planting;
 - (2) if hand-held hoses equipped with automatic shut-off nozzles or in-line hose flow regulators that effectively limit water output to a maximum flow rate of five gallons per minute at eighty pounds per square inch; or water-conserving low-flow/low pressure irrigation systems are utilized, city water may be used to water non-turf plants from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m. on the following schedule:
 - (i) At even numbered addresses, city water may be used during the above specified hours on even-numbered days of the month;
 - (ii) At odd-numbered addresses, city water may be used during the above specified hours on odd-numbered days of the month;
 - (3) if hand-held containers or a water conserving irrigation system with an acceptable irrigation controller is utilized, city water may be used to water non-turf plants for any two two-hour periods from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m. on the following schedule:
 - (i) At even numbered addresses, city water may be used during the above specified hours on even-numbered days of the month;

(ii) At odd-numbered addresses, city water may be used during the above specified hours on odd-numbered days of the month;

provided that, for water-conserving irrigation systems, these time periods are indicated on the signage mandated by § 21-07 of these Rules;

- (f) The opening or use of any fire hydrant, or of the city water therefrom, for any purpose other than fire protection, except in accordance with the terms and conditions set forth in a permit obtained from the Department, in accordance with the provisions set forth in § 20-08(b) of Title 15 of the Rules of the City of New York;
- (g) The serving of water from the city water system to any patron of a restaurant, club, hotel, café, cafeteria or other public place where food is served or offered for sale, unless specifically requested by such patron;
- (h) The use of city water to fill or maintain the water level in any swimming pool, except that city water may be used to fill municipally-operated swimming pools and other swimming pools open to the general public, that are operated with recirculating equipment and are filled once during each calendar year, and thereafter may be used as necessary to maintain the water level in such pools open to the general public at a level no greater than that necessary to ensure continued operation of such recirculating equipment;
- (i) The use, or the maintaining so as to be capable of use, of any shower head in any residential building or premises, or in any nonresidential building or premises, including any commercial or industrial building or premises, unless it flows at a maximum rate of 2.5 gallons of water per minute at a constant pressure of eighty pounds per square inch.

Drought Emergency Rules: Stage III

Upon declaration of the Commissioner of a Stage III Drought Emergency, no person shall cause, permit or allow:

- (a) The continuing of any leak or waste from any water pipe, valve, faucet, conduit, equipment, facility or device connected to the city water system, or that utilizes city water, on or in any premises owned, used, leased, managed, operated or controlled by such person or entity;
- (b) The use of city water to wash any vehicle (including any aircraft, watercraft or land vehicle whether on- or off-road), provided that this provision shall not be construed to prohibit the reasonable use of city water for washing of such vehicles where mandated by law or for health or safety purposes;
- (c) The use of city water to spray, wash or wet any hard or paved surfaces, including, but not limited to, streets, sidewalks, driveways, outdoor areaways (including any recreational areas, whether at ground level or on a structure), parking areas or outdoor steps. This provision, however, shall not be construed to prohibit the washing of such surfaces, particularly the exterior surface of a building, where such washing is required as part of repairs mandated by the Administrative Code or to protect the health and safety of the public, as determined by the Commissioner, assuming such use is consistent with the provisions set forth in § 24-332

of the Administrative Code of the City of New York and § 20-08(a)(5) of Title 15 of the Rules of the City of New York;

(d) The use of water from any source for any ornamental or aesthetic purpose, including, but not limited to, use in fountains, artificial waterfalls, reflecting pools, lakes and ponds;

(e) In accordance with the provisions set forth in § 20-08(a)(5) of Title 15 of the Rules of the City of New York, the use of city water by means of a hose or other active source to water any turf or any other non-turf plants, except that:

(1) newly seeded or newly sodded turf (excluding golf course fairways) or newly planted non-turf plants may be irrigated with city water on the day of planting;

(2) if hand-held hoses equipped with nozzle tips or in-line hose flow regulators that effectively limit water output to a maximum flow rate of five gallons per minute at eighty pounds per square inch or water conserving irrigation systems are utilized, city water may be used to water non-turf plants from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m. on the following schedule:

(i) At even numbered addresses, city water may be used during the above specified hours on even-numbered days of the month;

(ii) At odd-numbered addresses, city water may be used during the above specified hours on odd-numbered days of the month;

(3) if hand-held containers or a water-conserving irrigation systems with an acceptable irrigation controller is utilized, city water may be used to water non-turf plants for any two two-hour periods from 7:00 a.m. to 9:00 a.m. and from 7:00 p.m. to 9:00 p.m. on the following schedule:

(i) At even numbered addresses, city water may be used during the above specified hours on even-numbered days of the month;

(ii) At odd-numbered addresses, city water may be used during the above specified hours on odd-numbered days of the month;

provided that, for water-conserving irrigation systems, these time periods are indicated on the signage mandated by § 21-07 of these Rules;

(f) The opening or use of any fire hydrant, or of the city water therefrom, for any purpose other than fire protection, except in accordance with the terms and conditions set forth in a permit obtained from the Department, in accordance with the provisions set forth in § 20-08(b) of Title 15 of the Rules of the City of New York;

(g) The serving of water from the city water system to any patron of a restaurant, club, hotel, café, cafeteria or other public place where food is served or offered for sale, unless specifically requested by such patron;

- (h) The use of city water to fill or maintain the water level in any swimming pool, except that city water may be used to fill municipally-operated swimming pools and other swimming pools open to the general public, that are operated with recirculating equipment and are filled once during each calendar year, and thereafter may be used as necessary to maintain the water level in such pools open to the general public at a level no greater than that necessary to ensure continued operation of such recirculating equipment;
- (i) The use, or the maintaining so as to be capable of use, of any shower head in any residential building or premises, or in any nonresidential building or premises, including any commercial or industrial building or premises, unless it flows at a maximum rate of 2.5 gallons of water per minute at a constant pressure of eighty pounds per square inch.
- (j) The use of any non air-cooled air conditioning system utilizing water from the city water system unless the room dry-bulb temperature is not permitted to fall below 79 degrees Fahrenheit, except that:
 - (1) this subdivision (j) shall not apply in health care facilities or to buildings that use non-city water for cooling tower makeup water;
 - (2) when essential for the continuous operation of electronic data processing equipment, the temperature in a room or flood occupied predominately by such equipment may be maintained lower than 79 degrees Fahrenheit but at the highest temperature compatible with such continuous operation. The burden of proof shall be upon the respondent in any administrative proceeding to show that the temperature maintained was the highest temperature compatible with continuous operation of such equipment, and respondent's proof must include documentation of the manufacturer's temperature control specification for such equipment.

MANAGEMENT OF THE CROTON SYSTEM IN DROUGHT

The Croton watershed has an estimated safe yield of 250 MGD. The Croton Water Treatment Plant (CWTP) is currently under construction in the Bronx, and is schedule to be completed and commissioned in 2013. The CWTP has a capacity of 290 MGD; however, the Distribution System has limited consumption capacity during off peak water demand hours. All efforts will be made to maximize the output with an anticipated daily average output of 240 MGD. The distribution will be a combination of the following:

Table 2
Croton System Consumption within New York City (BWSO)

	Drought Operation (MGD)
Croton into High Service City Tunnel #1	0-150
City Tunnel #3	0-150
Croton Gravity Bronx <i>(Including Crotona Pump Station)</i>	20 <i>(Average Daily)</i>
Manhattan <i>(Including Hydraulic 40th Street Pump Station)</i>	90 <i>(Average daily)</i>
Total Daily Average	240MGD

When hydrological analysis indicates that the Croton System has a better chance of filling than either the Catskill or Delaware systems, additional pumping will be commenced at the City's standby pumping stations. During a drought, these plants can pump up to a rate of 40 MGD, raising the potential Croton usage to 280 MGD.

Table 3
Croton Watershed Pumping Stations (BWS)

	Capacity (MGD)	Normal (MGD)
Cross River	60	12
Croton Falls	180	10

MANAGEMENT OF THE CATSKILL SYSTEM IN DROUGHT

The combined flows of the Catskill and Delaware systems provide the Water Supply System's consumers with the greatest portion of the supply. Normally, these flows are limited by the capacities of the transmission conduits that deliver water from these systems into the City. During drought operations, use of water from the Delaware System is restricted in accordance with interstate agreements. Under these circumstances, it is critical for the Catskill System to be

operated in a manner that maintains water quality and facilitates the greatest chance for refill of the West of Hudson reservoirs.

MANAGEMENT OF THE DELAWARE RESERVOIRS IN DROUGHT

The City's three reservoirs in the Delaware River Basin – Cannonsville, Neversink, and Pepacton – are operated in drought according to the rule curves presented in the 'Good Faith Agreement' of 1982 and incorporated in the current Flexible Flow Management Program (available at the office of the Delaware River Master [www.water.usgs.gov/osw/odrm]). This agreement provides the guidelines for actions by the DRBC, and includes different criteria for initiating drought related activities.

EMERGENCY SUPPLY AT THE CHELSEA PUMPING STATION

The segment of the Delaware Aqueduct carrying water from Rondout Reservoir to West Branch Reservoir passes under the Hudson River at Chelsea, New York. Shaft 6 of the Delaware Aqueduct, located on the east bank of the river, was designed as a tunnel blow-off and dewatering shaft. The City owns and maintains a 100 MGD pumping station at Chelsea, New York, which connects to the Delaware Aqueduct through Shaft 6.

The pumping station may be activated during an Emergency only when approval to do so is granted by the State. Operation of the pumping station requires concurrent activities at the following sites:

1. The Chelsea Pumping Station. All water pumped from the Hudson River at Chelsea passes through an intake crib and an intake conduit into the plant. The principal activities at the pumping station are running the pumps and operating the chemical addition facilities. Water pumped from the Hudson River is treated at the Chelsea site and is then pumped approximately 1/4 mile to Shaft 6, where it enters the Delaware Aqueduct.
2. Rondout Reservoir. A chlorination facility at Rondout Reservoir, which is normally on stand-by status, is used to supplement disinfection activities at the Chelsea Pumping Station and to treat any water quality problems that may arise at Rondout Reservoir.
3. Delaware Aqueduct - Shaft 9. Water from Rondout Reservoir and the Chelsea Pumping Station flows through Shaft 9 to the West Branch Reservoir or the West Branch Reservoir By-Pass. Chlorine residuals are monitored. Dechlorination facilities are being proposed at Shaft 9.
4. Delaware Aqueduct - Shaft 10. At Shaft 10, water enters the Delaware Aqueduct from the West Branch Reservoir or the West Branch Reservoir By-Pass. A

chlorination facility is in place to maintain required chlorine residuals at Shaft 17, where water enters Kensico Reservoir.

5. Delaware Aqueduct - Shaft 17. Dechlorination facilities are also being proposed for this site.

Prior to operation of the pumping station, DEP conducts extensive test operations at all five of these sites. The activities required at Chelsea, Rondout, and Shaft 10 are staffed during appropriate stages of an Emergency on a 24 hour basis, 7 days per week. DEP hires new workers to provide staff for these activities, including *stationary engineers* and *oilers*. These new personnel assist in staffing the sites associated with the pumping operation and replace experienced operators drawn from other DEP locations to supervise the Emergency operations.

A variety of water quality control operations are implemented during use of this emergency supply. These include: operating water quality monitoring at the Chelsea Pumping Station; sampling at West Branch, Kensico, and Hiliview reservoirs, as well as City Tunnels Nos. 1, 2 and 3; chloride monitoring in the Hudson River; and enhanced limnological monitoring in West Branch and Kensico reservoirs and at the discharge of West Branch and Croton Falls reservoirs. These activities are designed to meet applicable Federal, State and City requirements.